Brunswick Harbor Modifications Study, Glynn County, GA
Draft Integrated Feasibility Report and Environmental Assessment

Section 401 Water Quality Certification

and Section 404 (b)(1) Evaluation

Appendix L

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
100 WEST OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401

August 2020

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

EPD Director's Office
2 Martin Luther King, Jr. Drive
Suite 1456, East Tower
Atlanta, Georgia 30334
404-656-4713

Oct 26, 2020

Ms. Kimberly Garvey
Chief, Planning Branch
U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 41401-3604

Re: Water Quality Certification
Andrews Island Effluent Related to
Brunswick Harbor Dredging
Brunswick River Coastal Watershed
Glynn County

Dear Ms. Garvey:

In accordance with Section 401 of the Federal Clean Water Act, 33 U.S.C. § 1341, the State of Georgia has evaluated the Brunswick Harbor Modification Study Dredging project as an addition to the regular Operations and Maintenance dredging submitted by the U.S. Army Corps of Engineers, Savannah District (Corps), Planning Branch related to proposed activity in, on, or adjacent to the waters of the State of Georgia.

The State has examined the information regarding the project provided to it by the Corps Planning Branch. In accordance with that information, the State of Georgia issues this Section 401 certification to the U.S. Army Corps of Engineers, Savannah District for resulting effluent from Andrews Island. This Section 401 water quality certification is subject to the following terms and conditions:

1. The applicant shall conduct all activities in a manner that will assure water quality adequate or necessary to protect and maintain designated uses. 33 U.S.C. § 1313(a)-(d); O.C.G.A. § 12-5-23(c)(2),(6),(9),(15); Ga. Comp. R. and Regs. 391-3-6-.03(2)(b)(i), (ii).

    a. The applicant shall install in-water Best Management Practices (BMPs) to the extent practical and feasible, to minimize total suspended solids (TSS) and sedimentation for any work conducted within a state water or within the delineated boundaries of wetlands. 33 U.S.C. § 1313(a)-(d); O.C.G.A. § 12-5-23(c)(2), (6), (9), (15); O.C.G.A. § 12-5-29(a); O.C.G.A. §§ 12-7-6 to 7; Ga. Comp. R. and Regs. 391-3-6-.03(5).
    b. The applicant must ensure that any fill placed in state water must be clean fill that is free of solid waste, toxic, or hazardous contaminants. 33 U.S.C. §§

1311; 1313(a)-(d); O.C.G.A. § 12-5-23(c)(2), (6), (9), (15); O.C.G.A. § 12-5-29(a); Ga. Comp. R. and Regs. 391-3-6-.03(5), (6), (11), (14)-(16).

2. Modifications to this Project may require an amendment to these conditions. Accordingly, the applicant must notify the Georgia Environmental Protection Division of any modifications to the proposed activity including, but not limited to, modifications to the construction or operation of any facility, or any new, updated, or modified applications for federal permits or licenses for the Project. 33 U.S.C. §§ 1311-1313; O.C.G.A. § 12-5-23(c)(2),(6),(9),(15); Ga. Comp. R. and Regs. 391-3-6-.03.

3. Before commencement of the new work dredging, the applicant will conduct sampling and analysis of channel bottom sediments at the footprints of the project's Turning Basin and Bend Widener dredging zones. This sampling and analysis is intended to determine the presence of any regulated constituents for which there are in-stream water quality standards, maximum contaminant levels, or EPA advisory levels and, therefore, the release of which may cause or contribute to a violation of state water quality standards. 33 U.S.C. §§ 1311; 1313(a)-(d); O.C.G.A. § 12-5-23(c)(2), (6), (9), (15); O.C.G.A. § 12-5-29(a); Ga. Comp. R. and Regs. 391-3-6-.03. This sediment sampling and assessment will be performed according to details contained in the July 11, 2020 E-mail project comments from EPD's Stephen Wiedl to the Corps' Mary Richards and Kimberly Garvey and in sediment characterization E-mails exchanged July 28, 2020 between EPD's Amy Potter and the Corps' Jeff Schwindaman. *See* Attached correspondence, incorporated herein by reference. In particular, such sampling shall include:

    a. Fifteen (15) sediment borings will be taken at the Turning Basin and five (5) sediment borings will be taken at the Bend Widener. These sediment borings will be sampled as the upper two (2) feet of channel bottom substrate.
    b. Five (5) sediment elutriate samples from the Turning Basin and two (2) sediment elutriate samples from the Bend Widener will be processed. Each elutriate sample will be processed as a composite of no more than three adjacent sediment boring sample points.
    c. One surface water sample from the Turning Basin and one surface water sample from the Bend Widener will be taken.

   Sediment samples and sediment elutriate samples will be analyzed for RCRA metals suite, organochlorine pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Reporting on chemical analyses of these sediment and elutriate samples will be submitted to EPD Wetlands Unit Brunswick agent Bradley Smith at Bradley.Smith@dnr.ga.gov and to EPD Risk Assessment Unit Manager Amy Potter at Amy.Potter@dnr.ga.gov before the beginning of the Brunswick Harbor Modification dredging and no later than 365 days from the date of this certification.

4. Once the project's harbor dredging begins, with its associated placement of dredge slurry material into and sediment dewatering discharge from the Andrews Island Dredged Material Containment Area (DMCA), the applicant will perform monthly water quality sampling of discharge waters at the project's DMCA outlet weir. The approach of this construction-phase monitoring will be based on results of the elutriate sampling conducted according to Condition 3 above, such that, in addition to the water quality monitoring for temperature, dissolved oxygen, specific conductance, salinity, pH and turbidity already practiced at the Andrews Island site, DMCA weir water quality testing will be performed only for any particular contaminant which may have been discovered to exceed State water quality standards in the elutriate test waters which were analyzed as part of initial sediment boring elutriate sampling. 33 U.S.C. §§ 1311-1313; O.C.G.A. § 12-5-23(c)(2),(6),(9),(15); Ga. Comp. R. and Regs. 391-3-6-.03.

5. In the event that DMCA weir discharge monitoring as cited in Condition 4 above shows exceedance of State water quality standards, this certification will be subject to re-assessment and modification as appropriate to assure that discharges from the project's existing Andrews Island DMCA will comply with State water quality standards. 33 U.S.C. §§ 1311-1313; O.C.G.A. § 12-5-23(c)(2),(6),(9),(15); Ga. Comp. R. and Regs. 391-3-6-.03. As necessary and appropriate following review of DMCA weir operational-phase water quality monitoring results, such potential modifications may address factors such as: alternate approaches for handling and disposal of dredge sediments; ambient monitoring in waters receiving effluent discharge from the Andrews Island DMCA; approaches for placement of sediment or manipulation of effluent flows at the Andrews Island DMCA; assessments, including modeling, of aqueous phase constituents discharged from Andrews Island DMCA with focus on dilution effects and assimilative capacity within adjacent receiving waters.

The Georgia Environmental Protection Division may invalidate or revoke this certification for failure to comply with any of these terms or conditions. This certification does not waive any other permit or other legal requirement applicable to this project or relieve the applicant of any obligation or responsibility for complying with the provisions of any other federal, state, or local laws, ordinances, or regulations.

It is your responsibility to submit this certification to the appropriate federal agency. If you have any questions regarding this certification, please contact Stephen Wiedl at Stephen.Wiedl@dnr.ga.gov/404-651-8459.

Sincerely,

Richard E. Dunn, Director
Environmental Protection Division

Attachments: S. Wiedl/EPD 7-11-20 E-mail to M. Richards & K. Garvey/Corps
J. Schwindaman/Corps and A. Potter/EPD 7-28-20 E-mails

cc: Mr. Eric Somerville, EPA
Mr. Bill Wikoff, FWS
Ms. Kelie Moore, CRD

Attachment 1

From: Wiedl, Stephen

Sent: Saturday, July 11, 2020 12:34 AM

To: Richards, Mary E. SAS; Kimberly L SAS Garvey; CESAS-PD.SAS@usace.army.mil

Cc: Armetta, Robin E CIV USARMY CESAS (US); Smith, Bradley; Zeng, Wei; Potter, Amy; Booth, Elizabeth

Subject:401 WQC Requirement and GaEPD Comments per Brunswick Harbor Modification and Study

Attachments: o2020 06 09_No SAS Number_BS_USACE Planning Notice - Brunswick Harbor Modifications, Glynn Co. KLG.pdf

To:

Mary Richards and Kimberly Garvey

Savannah District Corps of Engineers

Planning Branch

This message comprises Georgia EPD Wetlands/401 Unit's response to inquiries made last month by Savannah USACE Planning Branch's Mary Richards regarding the possible need for a new 401 Water Quality Certification (WQC) for the upcoming Brunswick Harbor Modifications (BHM) project. This project was posted by a USACE Planning Notice as of June 9, 2020 and this message by association comprises comments for that USACE Planning Notice.

The original Brunswick Harbor deepening project had a 401 WQC issued more than 22 years ago as of March 24, 1998. We have held in-house discussions with EPD's Risk Assessment Unit and Watershed Monitoring and Planning Program and also discussions with Environmental Protection Agency Region IV staff on this current harbor modification topic. Based on these discussions and before a determination whether a new 401 WQC would be required for this project or whether the 1998 vintage 401 WQC would be sufficient to embrace the newly conceived Brunswick Harbor Modifications, we request that information be provided to EPD regarding dissolved oxygen profile data in the project vicinity as to support the assertion of minimal, temporary water quality effects cited on pages 89-90 of the USACE June 2020 Draft Integrated Feasibility Report & Environmental Assessment and Draft FONSI. We also request information on the characteristics of the sediments to be dredged at the specific new project footprints (the Turning Basin and the Bend Widener).

The following sampling scheme as provided by EPD's Risk Assessment Unit should be executed to determine the quality of the sediments which will be removed by dredging during the BHM project:

12 core samples from the Turning Basin and 15 core samples from the Bend Widener area should be obtained. The core samples should be driven to 6 inches below the project dredging depth.

To determine the impact of sediment disposition at Andrews Island, both sediment samples and elutriate from those samples should be obtained from above the project depth. Sediment samples taken from 6" below the project depth will determine the quality of the sediments after dredging operations. If sediment is to be beneficially reused (i.e., placed on Bird Island or other marshy area), a toxicity bioassay for benthic organisms should be conducted using sediment samples of the dredged material above the project depth.

Sediment samples may be composited to reduce the number of samples to analyzed. Samples in a composite should represent sediments taken from approximately the same depth and from the same geographic area within the dredging area.

* Composites should be comprised of no more than three samples.
* Core material above the project depth will be composited.
* Core material below the project depth (additional six inches) will be composited separately.
* Cores from areas known or suspected to consist of impacted sediments (e.g. outfall or spill areas) are not to be composited with cores from other areas.

All composited sediment samples, and sediment elutriate from the project depth samples should be analyzed for metals (including Mercury), organochlorine pesticides, PCBs, and PAHs.

We thank you for your coordination on this project and for providing the requested water quality and sediment sampling information as would allow EPD to determine whether the 401 WQC from the previous 1998 harbor deepening will be sufficient for this new Brunswick Harbor Modification project or whether a new 401 WQC would be in order.

Stephen C. Wiedl, PWS

Manager – Wetlands Unit

Georgia Environmental Protection Division

7 Martin Luther King, Jr. Drive, Suite 450

Atlanta, GA 30334

404-452-5060

Stephen.Wiedl@dnr.ga.gov

Attachment 2

From: Schwindaman, Jeffrey P CIV USARMY CESAS (USA) <Jeffrey.P.Schwindaman@usace.army.mil>

Sent: Tuesday, July 28, 2020 4:03 PM

To: Potter, Amy

Cc: Smith, Bradley; Wiedl, Stephen

Subject:RE: Brunswick Harbor Modifications Study - Sediment Characterization

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless

you recognize the sender and know the content is safe.

[please view in HTML]

Amy, thanks for reviewing.

- Apologies for the maps being a little confusing. There are 15 borings proposed at the turning basin and 5 at the bend widener (see below). The proposed borings are purple/black and are located within the dredging footprint. Borings from previous investigations are in white/black and can be disregarded for this discussion.

- Agree, references to soil samples are incorrect. These are sediment samples.

- We were proposing 1 environmental sediment sample from the upper 2 ft of each boring location (total of 20). If elutriate samples were added to the SOW, I'd propose we composited up to three borings for each elutriate sample (as was suggested previously), which would be a grand total of:

-20 sediment samples (1 at each boring location)

-7 elutriate samples (5 from the turning basin, 2 from the bend widener)

-2 surface water samples (Needed to compare with elutriate results, 1 from the turning basin, 1 from the bend widener)

Would this be an acceptable approach?

Thanks,

Jeff

Jeff Schwindaman, P.G.

Project Manager, Civil Works

US Army Corps of Engineers, Savannah District

(912) 652-5099 (o)

(912) 547-0896 (m)

jeffrey.p.schwindaman@usace.army.mil

From: Potter, Amy <Amy.Potter@dnr.ga.gov>

Sent: Tuesday, July 28, 2020 3:35 PM

To: Schwindaman, Jeffrey P CIV USARMY CESAS (USA) <Jeffrey.P.Schwindaman@usace.army.mil>

Cc: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>; Smith, Bradley <Bradley.Smith@dnr.ga.gov>

Subject: [Non-DoD Source] RE: Brunswick Harbor Modifications Study - Sediment Characterization

Hi Jeff:

I’ve looked at the SOW and had a couple of questions.

From what I can tell, there are 10 samples in the turning basin and 10 samples in the bend widener. Is that correct?

The samples are called soil samples. Wouldn't it be more accurate to call them "sediment" samples?

The "soil" samples appear to be outside of the dredging footprint. It that correct? Is there a reason why?

It does not appear that elutriate samples are planned. Can the SOW be modified to include elutriate samples?

Amy M. Potter

Manager

Risk Assessment Program

Land Protection Branch

404-657-8658

From: Schwindaman, Jeffrey P CIV USARMY CESAS (USA) <Jeffrey.P.Schwindaman@usace.army.mil>

Sent: Tuesday, July 28, 2020 11:14 AM

To: Potter, Amy <Amy.Potter@dnr.ga.gov>

Subject: RE: Brunswick Harbor Modifications Study - Sediment Characterization

Hi Amy,

Have you had a chance to review the SOW for BHMS? The sediment testing portion is just a few paragraphs. I'd be happy to discuss with you and answer any questions. I'm available any time today and can be reached at 912-547-0896.

Thank you!

Jeff

Jeff Schwindaman, P.G.

Project Manager, Civil Works

US Army Corps of Engineers, Savannah District

(912) 652-5099 (o)

(912) 547-0896 (m)

jeffrey.p.schwindaman@usace.army.mil

From: Schwindaman, Jeffrey P CIV USARMY CESAS (USA)

Sent: Monday, July 20, 2020 5:07 PM

To: Smith, Bradley <Bradley.Smith@dnr.ga.gov>; Potter, Amy <Amy.Potter@dnr.ga.gov>; Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>; Martin, Molly <Martin.Molly@epa.gov>

Cc: Garvey, Kimberly L CIV USARMY CESAS (US) <Kimberly.L.Garvey@usace.army.mil>; McIntosh, Margarett G (Mackie) CIV USARMY CESAS (USA) <Margarett.G.Mcintosh@usace.army.mil>; Henshaw, Susan H CIV USARMY CELRE (USA) <Susan.Henshaw@usace.army.mil>; Lopes, J M CIV USARMY CESAS (USA) <Jared.M.Lopes@usace.army.mil>; Fox, Stephen M CIV USARMY CESAD (USA) <Stephen.M.Fox@usace.army.mil>

Subject: Brunswick Harbor Modifications Study - Sediment Characterization

All,

Thanks again for attending the call today. As discussed, attached is the scope of work for our subsurface investigation contract.

Please keep in mind, these are performance-based instructions for the contractor and not a specific workplan. Task 1 of the scope of work involves the contractor providing the Corps with a specific workplan which we will review.

Also discussed, it's not explicitly stated in the scope of work, but our development of the proposed sampling strategy included the following rationale:

- The bend widener and turning basin expansion are relatively small additions to the overall Federal navigation project and are located directly adjacent to the existing channel which was sufficiently characterized during previous investigations and found to have no evidence of contamination.

- The number of borings and spacing are similar to previous geotechnical investigations. Although the boring locations were initially selected for the geotechnical characterization, they were considered to be sufficient for the chemical characterization considering there are no known sources of contamination in the area.

- Surface sediment samples were proposed because this was thought to be the most likely sediment potentially impacted by any anthropogenic activities since the last sediment characterization. It was thought that the subsurface new-work sediment is unlikely to be affected by anthropogenic inputs of potential contaminants.

- The list of analytes were developed based on discussion with EPA.

- It was understood that any potential beneficial use project may require additional project-specific testing, but that the proposed testing would be helpful to assess whether or not beneficial use options warranted further consideration.

Please let me know if you have any questions. We appreciate your timely turnaround on this review given our own time constraints with executing the contract action.

Thanks,

Jeff

Jeff Schwindaman, P.G.
Project Manager, Civil Works
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Section 404(b)(1) Evaluation

SECTION 404 (b)(1) EVALUATION
BRUNSWICK HARBOR MODIFICATION STUDY

I. INTRODUCTION

The purpose of this document is to comply with Section 404(b)(1) of the Clean Water Act of 1972, as amended, pertaining to guidelines for placement of dredged or fill material into the waters of the United States. This evaluation also provides information and data to the Georgia Department of Natural Resources Environmental Protection Division to obtain a Section 401 State Certification of Water Quality for the proposed new work and effluent discharge from Andrews Island Dredged Material Containment Area (DMCA). This analysis is limited to features of the federal Recommended Plan as identified in the BHMS draft Integrated Feasibility Report and Environmental Assessment and Draft FONSI (IFR/EA).

II. PROJECT DESCRIPTION:

A. **Location:** Brunswick Harbor is located in the southeastern section of Glynn County, Georgia, adjacent to the City of Brunswick and includes the inner channels through St. Simons Sound, the Brunswick River, the Turtle River, and the East River to the Colonel's Island Terminal. The major drainage in the project vicinity includes Turtle River and South Brunswick River. Both rivers flow from the west, merge just east of Colonel's Island Terminal, and flow through Brunswick Harbor to the St. Simons Sound. East River is oriented in a roughly north/south direction, passing along the east side of Andrews Island before discharging into Brunswick River just upstream of the Sidney Lanier Bridge (US Highway 17). In addition to these main streams, a complex network of small streams, creeks, and tidal sloughs dissects the entire estuarine complex *(Brunswick EIS, 1998)*.
See Figure(s) 1, 2 and 3 in the BHMS IFR/EA.

B. **General Description:** The recommended plan would expand the Cedar Hammock Range bend widener, expand the existing turning basin at Colonel's Island Terminal, and would create a Roll-on/Roll-off (RO/RO) meeting area at St. Simons Sound near the entrance channel to Brunswick Harbor. The proposed action includes dredging 205,000 cubic yards (CY) of material at the bend widener, 346,000 CY at the turning basin expansion, and 0 CY at the meeting area at St. Simons Sound for a total of approximately 551,000 CY of dredged material. Dredging will occur to a depth equal to the existing Federal channel (-36 feet mean lower low water (MLLW) +2 feet allowable over-depth).

The disposal of the dredged material from construction and subsequent maintenance would result in the discharge of effluent from the Andrews Island DMCA into the Turtle River and East River. The proposed action would exclusively use the hydraulic pipeline cutterhead dredge method for new work dredging, thus minimizing turbidity by piping away the sediments without having to bring them up through the water column in a bucket and transport them to an upland disposal area. Future maintenance dredging activities will utilize the capability of cutterhead, clamshell, and hopper dredges for the removal of maintenance material.

C. **Authority and Purpose:** The study authority is Section 1201 of WRDA 2016, which reads: "The Secretary is authorized to conduct a feasibility study for the following projects for water resources development and conservation and other purposes, as identified in the reports titled ''Report to Congress on Future Water Resources Development'' submitted to Congress on January 29, 2015, and January 29, 2016, respectively, pursuant to section 7001 of the Water Resources Reform and Development Act of 2014 (33 U.S.C. 2282d) or otherwise reviewed by Congress:

(12) BRUNSWICK HARBOR, GEORGIA.—Project for navigation, Brunswick

The purpose of the proposed action is to reduce transportation cost inefficiencies experienced by the largest ship type utilizing Brunswick Harbor. Colonel's Island Terminal is the second busiest port in the U.S. for total RO/RO cargo and busiest for RO/RO imports. The Brunswick Harbor Pilots have guidelines and restrictions for vessel operations depending on RO/RO vessel dimensions and draft, and these result in cost inefficiencies for the largest RO/RO ship-type calling on Brunswick Harbor. These larger vessels experience navigation and maneuverability issues primarily due to the channel width at specific locations between St. Simons Sound and the Colonel's Island Terminal including a channel bend near the Cedar Hammock Range and a turning basin near Colonel's Island Terminal.

D. **General Description of Dredged or Fill Material:**

(1) **General Characteristics of Material:** The material to be dredged and placed in the Andrews Island DMCA will be new work dredged material from the Bend Widener and Turning Basin. Subsequent maintenance material will also be dredged from the area as part of routine operations. Based on the historical boring logs within the general area, it is expected that the material proposed to be removed during construction of the bend widener consists of poorly graded sands, silty sands, and highly weathered limestone. For the turning basin, expected material to be removed during construction consists of poorly graded sands, clayey sands, sandy clays, highly weathered limestone and highly plastic clays. Additional description of regional geology and materials characteristics can be found in Appendix B.

A subsurface investigation to collect geologic and geotechnical data to inform the Brunswick Harbor Modification design will occur prior to construction. This investigation will also provide site specific geotechnical data for the proposed new features including the Bend Widener and the Turning Basin.

(2) **Quantity and Source of Material:** Approximately 551,000 cubic

yards of material is anticipated for this dredging event from the bend widener (205,000 cubic yards) and turning basin expansion (346,000 cubic yards). Since St. Simons Sound is naturally deep water (>38 feet MLLW), no dredging would be required for the proposed meeting area. Future annual maintenance material is estimated to be 406,900 cubic yards, an increase of 16,900 cubic yards per year (4.24%) from the existing O&M quantities based on the proposed action.

E. **Description of the Proposed Discharge Site(s):**

(1) **Location:** The Andrews Island DMCA is located across the South Brunswick River from the proposed dredging area in the southeastern section of Glynn County, Georgia. Areas proposed for beneficial use have yet to be fully determined. Areas that are under consideration include the existing Bird Island in St. Simons Sound

(2) **Size:** The Andrews Island DMCA is approximately 770 acres in size.

(3) **Type of Site:** The Andrews Island DMCA is an existing confined disposal area. Andrews Island is surrounded by four miles of containment dikes and is actively used for maintenance of the federal navigation channel.

(4) **Type of Habitat:** The Andrews Island DMCA is characterized predominantly by unconsolidated sands.

(5) **Timing and Duration of Discharge:** The dredging activities and effluent discharge for this project can occur any time of the year.

F. **Description of the Disposal Method:** Placement will be accomplished by using hydraulic pipeline dredges. This is a conventional dredging method that is routinely used for deep draft navigation projects. The dredge works using a rotating cutter apparatus surrounding the intake of a suction pipe to cut and remove material which is suctioned and transported through a pipeline and deposited in the disposal area. A detailed description of this type of dredge and its operation can be found in EM 1110-2-5025 (USACE, 2015).

III. Factual Determinations (Section 230.11):

A. **Physical Substrate Determinations:**

(1) **Sediment Type:** It is expected that bend widener substrate material consists of poorly graded sands, silty sands, and highly weathered limestone. For the turning basin, the expected substrate material consists of poorly graded sands, clayey sands, sandy clays, highly weathered limestone and highly plastic clays.

(2) **Dredged/Fill Material Movement**. Dredged material would be transported through a pipeline into the Andrews Island DMCA, an existing confined

disposal area. Effluent material would be discharged from the Andrews Island DMCA into the Turtle River and East River. Most of the action area is open water that receives semi-diurnal tidal flushing from St. Simon's Sound.

(3) **Physical Effects on Benthos**. Physical impacts to benthos from dredging are anticipated as a result of the expansion of the Cedar Hammock Range bend widener and the expansion of the existing turning basin at Colonel's Island Terminal.

The Cedar Hammock Range bend widener would be expanded by a maximum of 321 feet on the north side and at a length of approximately 2,700 feet between stations 20+300 to 23+300. The bend widener would be dredged to a depth of -38 feet MLLW (-36 feet MLLW plus 2 feet of allowable over-depth). Approximately 205,000 cubic yards of material would need to be dredged to expand the bend widener.

The existing turning basin at Colonel's Island Terminal would be expanded along approximately 4,100 feet, increasing the width by a maximum of 395 feet along South Brunswick River from stations 0+900 to 5+300. The turning basin expansion would be dredged to a depth of -38 feet MLLW (-36 feet MLLW plus 2 feet of allowable over-depth). The turning basin expansion would require approximately 346,000 cubic yards of dredged material to be removed.

Those areas would be available for recolonization and use by benthic organisms once the dredging event ceases, so no irreversible loss of resources would occur. Early successional benthic organisms will likely rapidly colonize the dredged footprint (Van Dolah et al., 1984). However, the dredged footprint may be comprised of different benthic communities due to the alteration in depth, from shallow to deeper waters (NMFS 2020).

(4) **Other effects**. No other effects are anticipated.

(5) **Actions Taken to Minimize Impacts (Subpart H)**. No actions that would further reduce impacts due to the discharge of effluent material are deemed necessary.

B. **<u>Water Column Determinations:</u>**

(1) **Salinity**. There would be no significant change in salinity gradients or patterns. Most of the action area is open water that receives semi-diurnal tidal flushing from St. Simon's Sound. The salinity levels tend to be approximately 25 parts per thousand (ppt), depending on tide stage. The St. Simons Sound tide range is approximately 6.5 feet, and the water in the harbor is well-mixed with a relatively uniform salinity. The project would not result in an obstruction that would restrict water flow (either salt or fresh water) or move the salt-wedge upstream or downstream.

(2) **Water Chemistry (pH, etc.)**. No impacts to water chemistry are

anticipated.

(3) **Clarity**. Minor increases in turbidity may occur. However, these increases will be temporary and would return to pre-project conditions shortly after construction completion.

(4) **Color**. No effect.

(5) **Odor**. No effect.

(6) **Taste**. No effect.

(7) **Dissolved Gas Levels.** Any limited impacts to dissolved gas levels would be temporary and minimal, and no significant effect to the water column are anticipated.

(8) **Nutrients**. Slight increases in nutrient concentrations may occur; however, these would rapidly return to normal. These described increases would have no significant effect to the water column.

(9) **Eutrophication**. No effect.

C. **Water Circulation, Fluctuation, and Salinity Gradient Determinations:**

(1) **Current Patterns and Circulation.**

(a) **Current Patterns and Flow**. This area of the South Brunswick River is subject to semi-diurnal tides. Maximum ebb velocities usually range from 1.5 to 3.0 feet per second during mean tide conditions. As a result, the water in the harbor is well-mixed with a relatively uniform salinity, DO, and other important water quality parameters. Placement of dredged material into the Andrews Island DMCA and the subsequent effluent discharge into the Turtle River and East River would have no effect on current patterns and flow in the vicinity of the project area.

(b) **Velocity**. No effect.

(2) **Stratification**. No effect.

(3) **Hydrologic Regime**. No effect.

(4) **Normal Water Level Fluctuations**. No effect.

(5) **Salinity Gradient**. No effect on the salinity gradient is anticipated.

D. **Suspended Particulate/Turbidity Determination:**

(1) **Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site:** Suspended particulate and turbidity levels are expected to undergo minor increases during dredging activities and effluent discharge; however, suspended sediment of this type will quickly fall out of the water column and return to normal conditions. Cutterhead dredges utilize the rotational motion and vacuum pump of the cutterhead to move the material towards the dredge suction inlet. While this dredging method may create a small turbidity plume, the plume is expected to be localized around the dredging head. No significant effects would occur as a result of these increases. Effluent from Andrews Island DMCA would be discharged into the East River and Turtle River and is not expected to violate any State water quality certification conditions.

(2) **Effects on Chemical and Physical Properties of the Water Column:**

(a) **Light Penetration**. Increased turbidity levels in the project area as a result of dredging activities and the discharge of effluent would reduce the penetration of light into the water column only slightly and would be a minor short-term impact. No visible plume is anticipated.

(b) **Dissolved Oxygen**. The project proposes to use hydraulic pipeline cutterhead dredging for all new work dredging activities. Cutterhead dredging pumps near surface water to the cutterhead blade to improve excavation efficiencies and material recoveries. This action draws in a portion of the more oxygen rich surface water and moves it to the sea floor where DO levels are typically lower. A recent study (USACE 2019b) measuring changes in DO around a cutterhead dredge in the Savannah River noted that the greatest change in DO occurred in the bottom third of the water column where the cutterhead was operating. Changes in DO in the bottom of the water column were most notable within 50 meters downstream of the dredge and returned to background levels within 100 meters of the dredge with all changes occurring directly downstream and did not extend the width of the river. Due to the very small footprint where the cutterhead dredge is removing sediment once embedded, the area of higher turbidity and lower DO are localized and normalize quickly in riverine environments once dredging activities are concluded. Most of the study area is open water that receives semi-diurnal tidal flushing from St. Simons Sound. As a result, the water in the harbor is well-mixed with a relatively uniform salinity, DO, and other important water quality parameters. Any limited impacts to dissolved oxygen would be temporary and minimal, and no significant effects are anticipated.

(c) **Toxic Metals and Organics**. No effect.

(d) **Pathogens**. No effect.

(e) **Aesthetics**. No effect.

(3) **Effects on Biota:**

(a) **Primary Production Photosynthesis**. No significant effects greater than those experienced under current project conditions are anticipated.

(b) **Suspension/Filter Feeders**. Some local increases in suspended particulates may be encountered during dredging activities and effluent discharges, but these increases would not cause significant impacts to these organisms unless they are directly covered with sediment. Overall, the impact to these organisms is expected to be minor and insignificant.

(c) **Sight Feeders**. Sight feeders would avoid impacted areas and return when conditions are suitable. However, it is difficult to relate the presence or absence of sight feeders in an area to the placement of dredged material. Sight feeders, particularly fishes, may vary in abundance as a result of temperature changes, salinity changes, seasonal changes, dissolved oxygen level changes, as well as other variables. Diadromous fish species such as striped bass, blueback herring, and shortnose and Atlantic sturgeon actively use the entire water column within the project area for both traveling upstream and downstream and feeding. However, no impacts are anticipated since the aforementioned species have the ability to freely avoid any dredge activity. In addition, feeding during any dredge activity will likely temporarily decrease in the project area due to a temporary loss of macro benthic invertebrates, as well as a reduced ability for fish feeding via sight due to the temporary increase of turbidity in the water column. No significant impacts are expected to occur on sight feeders.

(4) **Actions Taken to Minimize Impacts (Subpart H)**. The Corps water quality monitoring protocol will be followed and is detailed in the 1996 Savannah Harbor Long Term Management Strategy (LTMS), adopted for Brunswick Harbor. The effluent could contain some sediments that may be released into the East River and Turtle River and subsequently habitat located downstream. However, once the dredged material is placed within the DMCA, the sediments can settle out before the effluent is discharged into the river. As a result, most of the sediment remains within the DMCA and would not be discharged with the effluent or enter the water column. The amount of effluent that would be discharged into the Turtle River and East River would be proportionally negligible compared to the total volume of water currently within the rivers. Any suspended solids within the effluent would be diluted in the water column (GPA 2015).

E. **Contaminant Determinations**. Additional chemical testing will be conducted on the sediments proposed for dredging prior to construction. Based on coordination with both EPA and GADNR-EPD, the Corps will conduct environmental sediment sampling at 20 sub-surface boring locations, 7 elutriate samples (5 from the turning basin, 2 from bend widener), and 2 surface water samples (1 from the turning basin, 1 from the bend widener) to ensure adherence to State of Georgia water quality parameters.

Brunswick Harbor Entrance Channel sediments were tested for suitability for ocean disposal in 2016. The testing results reviewed for this evaluation are contained in the August 2016 MPRSA Section 103 Sediment Evaluation for Brunswick Harbor Navigation Project, Brunswick, GA., ANAMAR Environmental Consulting, Inc. This work was performed in accordance with the EPA / U.S. Army Corps of Engineers (USACE) joint publication, Evaluation of Dredged Material Proposed for Ocean Disposal - (Testing Manual), dated February 1991, referred to as the 1991 "Green Book" and the Southeast Regional Implementation Manual (SERIM), dated August 2008. The sediments were found suitable for transport and disposal into the Brunswick Ocean Dredged Material Disposal Site (ODMDS); EPA concurrence received in letter dated September 12, 2016.

The last sediment testing for new work material was conducted in 1998 for the Brunswick Harbor Deepening FEIS. Although sediment testing indicated varied results both above and below federal limits per the Clean Water Act, the results appeared to be localized and although present within Brunswick Harbor, those sites were not in close proximity to BHMS proposed dredge locations. Furthermore, the sediments analyzed in 1998 were found suitable for disposal into the ODMDS, Andrews Island DMCA, other nearshore areas and for construction of a bird island in St. Simons Sound. A summary of the 1998 and 2016 sediment testing can be found in Appendix F.

F. **Aquatic Ecosystem and Organism Determinations:**

(1) **Effects on Plankton**. Since benthic populations in the navigation channel are also in a constant state of flux due to the continual sedimentation and shoaling that creates the need for maintenance dredging (SHEP-EIS 2012), no significant effects greater than those experienced under current maintenance conditions are anticipated for the phytoplankton and zooplankton species living in the water column.

(2) **Effects on Benthos.** Benthic organisms would be destroyed by the proposed dredging activities, but no long-term effects are expected on the benthic community as a result of the proposed action. Research conducted by the U.S. Army Corps of Engineers, Engineering, Research and Development Center (ERDC) under the Dredged Material Research Program suggests that the benthic community is adapted to a wide range of naturally occurring environmental changes and that no significant or long-term changes in community structure or function are expected.

For macrobenthic invertebrates species that could be in the action area, including shrimp, crabs, oysters, and clams, to other species such as polychaetes, mollusks, and other less well known, but valuable, species which make up the remainder of the food chain, removal of the bottom substrate within the dredging areas would eliminate most benthic resources in those locations. Those sites would be available for recolonization and use by benthic organisms once the dredging event ceases, so no irreversible loss of resources would occur. Early successional benthic organisms will likely rapidly colonize the dredged footprint (Van Dolah et al., 1984). However, the dredged footprint may be comprised of different benthic communities due to the alteration in depth, from shallow to deeper waters (NMFS 2020). Surviving populations of fish and macroinvertebrates specifically adapted to the shallower habitat will relocate to abundant similar habitat just outside the project scope that will remain preserved. The proposed dredging will not limit the density and diversity of the benthic community that becomes reestablished any more so than existing maintenance activities.

(3) **Effects on Nekton**. No significant effects greater than those experienced under current maintenance conditions are anticipated.

(4) **Effects on Aquatic Food Web**. No significant effects greater than those experienced under current maintenance conditions are anticipated.

(5) **Effects on Special Aquatic Sites**. No effect.

(a) **Sanctuaries and Refuges**. No effect.

(b) **Wetlands**. No effect.

(c) **Mud Flats**. Not applicable.

(d) **Vegetated Shallows**. Not applicable.

(e) **Coral Reefs**. Not applicable.

(f) **Riffle and Pool Complexes**. Not applicable.

(6) **Effects on Threatened and Endangered Species**. Pursuant to Section 7 of the Endangered Species Act, the Corps has determined that the proposed actions may affect but are not likely to adversely affect some and have no effect to other Federally listed species under National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) jurisdiction. These impacts would be covered by the analysis and Project Design Criteria in the 2020 SARBO as well as the ESA. A full description is available in Section 2.7 of the BHMS IFR/EA.

(7) **Effects on Other Wildlife.** No significant effects.

(8) **Actions to Minimize Impacts**. The dredging method was selected to avoid impacts to protected species. Implementation of BMPs will also minimize impacts. As required by the MMPA, in the event of an encounter from a protected marine mammals species, contractors will observe the BMP's and will remain informed of the civil and criminal penalties for harming, harassing or killing of marine mammals protected under the MMPA and in some cases, both the MMPA as well as the ESA. The contractor(s) may be held responsible for any marine mammals harmed, harassed, or killed as a result of construction activities.

G. **Proposed Disposal Site Determinations:**

(1) **Mixing Zone Determination**. Discharges from Andrews Island DMCA are expected to meet water quality standards or meet them with minimal mixing zone. The Andrews Island DMCA outfalls are monitored regularly and sample data is collected if there is discharge from the DMCA into the Turtle River or East River. Currently, the following parameters are being monitored in accordance with Section 401 and Section 303 of the Clean Water Act water quality certification and monitoring rules (EPD 1998):

- Location (identify DMCA, discharge pipe, receiving water for weirs, channel station number and location in channel -- middle, left side facing upstream, right side). When monitoring near a dredge, record sampling depth. For weir sampling, indicate if sampling is from ponded water, weir overflow, seepage at the boards, outfall pipe, outfall ditch, or receiving water.
- Date
- Time
- Tide (estimate of high slack, near high falling, mid-tide falling, near low falling, low slack, near low rising, mid-tide rising, near high rising)
- Estimate of depth of water flowing over the weir boards (also width of flow if it is less than the full width of the weir boards)
- Total discharge at weir outfall pipe on a monthly basis (to include seepage and weir overflow)
- Dissolved Oxygen (DO, in milligrams per liter, mg/l). Winkler analyses will be conducted as needed.
- pH
- Turbidity (in nephalometric turbidity units, NTU)

(2) **Determination of Compliance with Applicable Water Quality Standards**. The proposed activity is expected to be in compliance with all

applicable water quality standards. A Section 401 State Certification of Water Quality is requested and will be obtained from the GADNR-EPD prior to construction to reflect the proposed new work and all effluent discharges from Andrews Island DMCA, including this new work and ongoing maintenance.

(3) **Potential Effects on Human Use Characteristics**.

(a) **Municipal and Private Water Supply**. No effect.

(b) **Recreational and Commercial Fisheries**. Recreational and commercial fishing may be temporarily impacted primarily as a result of the physical presence of heavy equipment during dredging activities.

The Essential Fish Habitat analysis is location in Section 4 of the IFR/EA. Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), NMFS responded by letter dated July 8, 2020 and provided no conservation recommendations, therefore the substantive requirements of the MSA have been met. The MSA correspondence letter can be found in Appendix F.

(c) **Water Related Recreation**. No effect.

(d) **Aesthetics**. No effect.

(e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves**. No effect.

(f) **Other Effects**. No effect.

H. **Determination of Cumulative Effects on the Aquatic Ecosystem.** The proposed action is not expected to have significant cumulative adverse impacts.

G. **Determination of Secondary Effects of the Aquatic Ecosystem.** The proposed action is not expected to have any significant secondary adverse effects on the aquatic ecosystem.

IV. Finding of Compliance with the Restrictions on Discharge:

A. The proposed effluent discharge would comply with Section 404(b)(1) guidelines of the Clean Water Act of 1972, as amended. No significant adaptations of the guidelines were made for this evaluation. As discussed in the BHMS IFR/EA, the dredging activities and discharge of effluent for the proposed action is required to achieve the project purpose, which is to reduce transportation cost inefficiencies experienced by the largest ship type utilizing Brunswick Harbor. The Recommended Plan is the least environmentally damaging practicable alternative. With adherence to state water quality standards and construction best management practices, the proposed action is not anticipated to significantly impact the aquatic ecosystem.

B. The proposed dredging activities and discharge of effluent from the Andrews Island DMCA would comply with state water quality standards, Section 307 of the Clean Water Act of 1972, as amended, and the Endangered Species Act of 1973, as amended. The proposed dredging activity and effluent discharge would not have significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. No adverse effects on aquatic ecosystem diversity, productivity, and stability and on recreational, aesthetic, and economic values would occur.

C. Based on the determinations herein, the finding is made that, with the conditions enumerated in this document, the proposed effluent discharge complies with the Section 404(b)(1) guidelines of the Clean Water Act of 1972, as amended

ENVIRONMENTAL SITE INVESTIGATION REPORT FOR THE DESIGN SERVICES IN SUPPORT OF THE BRUNSWICK HARBOR MODIFICATION STUDY GLYNN COUNTY, GEORGIA

W912HN-17-D-0005

Prepared for:

U.S. Army Corps of Engineers
Savannah District
Georgia

March 2021

Prepared by:

Ardaman & Associates, Inc.
8008 South Orange Avenue
Orlando, FL 32809
A Tetra Tech Company

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
%Ds	Percent Differences
%Rs	Percent Recoveries
bgs	below ground surface
ASV	Acute Screening Value
CCV	Continuing Calibration Verification
CSV	Chronic Screening Value
DoD	Department of Defense
DPT	Direct Push Technology
EDL	Estimated Detection Limit (Dioxins and Furans)
ESV	Ecological Screening Value
GEPD	Georgia Environmental Protection Division
HSRA	Hazardous Site Response Act
ICV	Initial Calibration Verification
IDW	Investigative Derived Waste
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOQ	Limit of Quantitation
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NC	Notification Concentration
NSBLD	New Savannah Bluff Lock and Dam
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
QC	Quality Control
QSM	Quality Services Manual

(continue next page)

ACRONYMS/ABBREVIATIONS (continued)

Acronyms/Abbreviations	Definition
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SESD	Science and Ecosystem Support Division
SOP	Standard Operating Procedure
SVOC	Semi-Volatile Organic Compounds
Tetra Tech - AAI	Tetra Tech, Inc. Ardaman & Associates, Inc.
TEC	Toxic Equivalent Concentration to 2,3,7,8-TCDD
TEF	Toxic Equivalency Factor
TEL	Threshold Effect Level
TEQ	Toxic Equivalency Quotient
TestAmerica	Eurofins Test America Laboratories, Inc.
USACE	United States Army Corps of Engineers
USEPA	Environmental Protection Agency

Ardaman & Associates, Inc.
Geotechnical, Environmental, and
Materials Consultants
A Tetra Tech Company

March 4, 2021
File Number 20-13-0122

U.S. Army Engineer District, Savannah
100 West Oglethorpe Avenue
Savannah, GA 31402

Attention: Mr. Michael R. Loveland, P.G.

Subject: Environmental Site Investigation Report
Brunswick Harbor Modification Study
Glynn County, Georgia
Contract No. W912HN-17-D-0005

Dear Mr. Loveland:

As authorized, we have completed sampling and analysis of sediments, surface water and generated elutriate samples for the Brunswick Harbor Modification Study in Glynn County, Georgia. The purpose of performing this exploration was to characterize sediments and surface water that are located within the boundaries of the proposed Brunswick Harbor Modification project, and to evaluate potential concerns related to disturbance of the sediments during conventional dredging for the project.

We appreciate the opportunity of assisting the U.S. Army Corps of Engineers on this interesting project and look forward to working with you on future projects. If you have any questions or comments, please contact the undersigned.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
A Tetra Tech Company

Carl R. Stephens, P.E.
Senior Project Engineer

Mohamad Al-hawaree, P.E., P.Eng.
President, Senior Consultant
Georgia License No. 39495

GEORGIA REGISTERED No. PE039495 PROFESSIONAL ENGINEER MOHAMAD AL-HAWAREE 03/04/2021

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EXECUTIVE SUMMARY

Navigation channel improvements are proposed at the channel Turning Basin and Bend Widener areas as part of the Brunswick harbor modification study. These areas are proposed to be conventionally dredged to Elevation -36 feet (MLLW) with a 2-foot over-depth. Tetra Tech was tasked by the U.S. Army Corps of Engineers (USACE), Savannah District to perform subsurface exploration for the Brunswick Harbor modification study under Corps of Engineers Contract Number W912HN-17- D-0005 and Delivery Order W912HN20F2042.

Tetra Tech – AAI conducted an Environmental Site Investigation consisting of sediment and surface water characterization and generation and analysis of elutriate samples. The investigation was conducted in support of the Brunswick Harbor Modification study that proposes conventional dredging to widen a channel bend and expand a turning basin. Field sampling was conducted between November 3 and 8, 2020. A total of 22 sediment samples, including two duplicates, were obtained for characterization at the 20 geotechnical boring locations. Two surface water samples were obtained for characterization, one from the Turning Basin area and one from the Bend Widener area. An equipment blank was also obtained for analysis. Eight composite sediment samples, including a duplicate, and sufficient surface water from each project section were also obtained for generation of elutriate using the Modified Elutriate Test Method. The supernatant was split into total and dissolved (centrifuged) fractions. The sediment, surface water and elutriate fractions were analyzed for dioxins and furans, RCRA metals, Chlorinated Pesticides, PCBs and PAHs.

Sediment sample analytical results were compared to TEL screening values listed in the NOAA SQuiRTs tables as well as the ESVs listed in USEPA Region IV Ecological Risk Assessment Supplemental Guidance, updated March 2018. Six of the 22 sediment samples had estimated 2,3,7,8-TCDD TEQs in excess of the NOAA SQuiRTs TEQ TEL. The TELs and ESVs for arsenic, cadmium and mercury were exceeded by sample BR-SD-TB-B10-0-2. Chlorinated pesticides, Total PCBs, PAHs and Total PAHs were below the TELs and ESVs for all for the 22 collected sediment samples.

The analytical results from the collected surface water samples were compared to the Marine Surface Water Acute Screening Values referenced in the NOAA SQuiRTs Quick Reference Tables and the USEPA Region 4 Saltwater Acute Screening Values to determine background concentrations of regulated substances in surface water used for the modified elutriate tests. The concentrations of RCRA metals, Chlorinated pesticides, Total PCBs and PAHs were below the ASVs for the 2 collected surface water samples and the equipment blank.

The Marine Surface Water Acute Screening Values referenced in the NOAA SQuiRTs Quick Reference Tables, and the USEPA Region IV Saltwater ASVs were used to evaluate if regulated substances detected in the 16 modified elutriate fraction samples indicate disturbance of the sediments by dredging are a potential ecological risk. No 2,3,7,8-TCDD TEQ ASVs are listed for comparison of dioxin and furan results. The analytical results for the RCRA metals, Chlorinated pesticides, Total PCBs and PAHs were below the ASVs for the 16 elutriate fraction samples.

We understand the dredged material will be placed in a designated, upland, confined disposal area. Laboratory analysis indicates that dioxins and furans are relatively widely distributed in the Brunswick River which is an industrial harbor.

1.0 INTRODUCTION AND SCOPE OF WORK

Environmental data relative to contaminant concentrations in sediment and surface water was obtained in support of the Brunswick Harbor Modification study which proposes conventional dredging to widen a channel bend and expand a turning basin. The environmental data will be used to determine the presence of contaminants of concern in the channel widener and turning basin expansion areas. Sediment and surface water samples were obtained and analyzed to characterize and explore the presence of contaminants within the project limits. Elutriate samples were generated and analyzed to evaluate potential concerns related to disturbance of the sediments during dredging for the project. Our services were conducted for the Department of the Army, Savannah District, Corps of Engineers Contract Number (No.) W912HN-17-D-0005 and Delivery Order W912HN20F2042.

The environmental sampling program was conducted between November 3 and 8, 2020. Sediment and surface water samples were collected at the same locations as the 20 boring/coring locations designated by the USACE.

Tetra Tech - Ardaman & Associates, Inc. (Tetra Tech – AAI) was retained to perform the following tasks on this phase of the project:

- Locate boring/sampling locations using a Trimble Geo7X or a Trimble R2 antenna;
- Obtain one sediment sample from the upper 2 feet of sediment at each boring location (20 total);
- Obtain 2 field duplicate sediment samples from randomly chosen boring locations for QA/QC purposes;
- Obtain 1 water sample from the Turning Basin area and 1 water sample from the Bend Widener area;
- Generate 1 equipment blank sample for water analysis QA/QC purposes;
- Collect site water and sediment samples (each composited from 3 adjacent borings) to generate 5 elutriate samples from the Turning Basin and 2 elutriate samples from the Bend Widener area;
- Collect site water and sediment duplicate sample from 1 randomly selected elutriate sampling location (composited from 3 adjacent borings) for elutriate analysis QA/QC purposes;
- Generate 5 elutriate samples from the Turning Basin composite water and sediment samples, 2 elutriate samples from the Bend Widener composite water and sediment samples, and 1 duplicate elutriate sample using the Modified Elutriate Test Method. Siphon off the supernatant creating the total fraction (8 samples) and centrifuge a portion of the supernatant creating the dissolved fraction (8 samples);

- Conduct laboratory analytical testing on the 20 sediment samples, 2 field duplicate sediment samples and 2 QA/QC samples consisting of Dioxins (EPA Method 1613B or equivalent), RCRA Metals (EPA Method 6020B or equivalent) + Mercury (EPA Method 7474 or equivalent), PAHs (EPA Method 8270E or equivalent), Organochlorine Pesticides (EPA Method 8081B or equivalent) and PCBs (EPA Method 8082A or equivalent);

- Conduct laboratory analytical testing on the 7 elutriate total fraction samples, 1 field duplicate elutriate total fraction sample and 3 QA/QC elutriate total fraction samples consisting of Dioxins (EPA Method 1613B or equivalent), RCRA Metals (EPA Method 6020B or equivalent) + Mercury (EPA Method 7474 or equivalent), PAHs (EPA Method 8270E or equivalent), Organochlorine Pesticides (EPA Method 8081B or equivalent) and PCBs (EPA Method 8082A or equivalent);

- Conduct laboratory analytical testing on the 7 elutriate dissolved fraction samples, 1 field duplicate elutriate dissolved fraction sample and 3 QA/QC elutriate dissolved fraction samples consisting of Dioxins (EPA Method 1613B or equivalent), RCRA Metals (EPA Method 6020B or equivalent) + Mercury (EPA Method 7474 or equivalent), PAHs (EPA Method 8270E or equivalent), Organochlorine Pesticides (EPA Method 8081B or equivalent) and PCBs (EPA Method 8082A or equivalent);

- Conduct laboratory analytical testing on the 2 water samples, and 1 equipment blank water sample consisting of Dioxins (EPA Method 1613B or equivalent), RCRA Metals (EPA Method 6020B or equivalent) + Mercury (EPA Method 7474 or equivalent), PAHs (EPA Method 8270E or equivalent), Organochlorine Pesticides (EPA Method 8081B or equivalent) and PCBs (EPA Method 8082A or equivalent); and

- Provide an environmental sampling report that will include the sampling locations and procedures and laboratory testing results.

The purpose of this report is to present the results of the field investigation activities that occurred onsite from November 3 through November 8, 2020. This Site Investigation Report presents the characterization activities performed by Tetra Tech-AAI and the analytical results for the samples collected during the field effort as detailed in the approved Work Plan for the Design Services in support of the Brunswick Harbor Modifications.

2.0 ENVIRONMENTAL SAMPLING AND ANALYSIS PROGRAM

The environmental sampling program consisted of obtaining 20 sediment samples, 2 duplicate sediment samples, 2 surface water samples and sufficient sediment and surface water to generate 7 elutriate samples composited from sediments from 3 designated, adjacent boring locations, and 1 duplicate elutriate composited sample. The boring location plan for the Brunswick Harbor Modification study is presented as in Figure 1. Section A (Turning Basin area) boring locations are presented at a larger scale on Figure 2. Similarly, the Section B (Bend Widener area) borings are shown on Figure 3.

2.1 Sediment Characterization Sampling

Tetra Tech - AAI was on-site between November 3 and November 8, 2020 to collect sediment samples from the twenty designated boring locations. The sediment sampling locations designated, BR-SD-TB-B-01-0-2 through BR-SD-TB-B-15-0-2, and BR-SD-BW-B-01-0-2 through BR-SD-BW-B-05.

Collection of the sediment samples required the use of a boat. All personnel on board the boat wore United States Coast Guard approved life preservers and following all protocols outlined in the approved Accident Prevention Plan and Site Safety and Health Plan.

Once in position at each sampling location, as confirmed with a Trimble Geo7X hand-held GPS which has a typical accuracy of 1 foot, sediment samples were collected from the upper two feet of sediment using a stainless-steel PONAR grab sampler. A PONAR grab sampler is a bottom sampling device used on vessels to collect bottom sediments of a lake or river. The grab sampler provides a means to obtain a somewhat quantitative and undisturbed sample of the bottom material by capturing a known surface area and penetration depth, provided that the bottom material is neither too hard or nor too soft. The PONAR grab sampler consists of two opposing semi-circular jaws that are normally held open by a trigger mechanism. The sampler is lowered to the bottom where contact with the bottom sets off the trigger and a strong spring snaps the jaws shut trapping a sample of the bottom inside. Fine stainless-steel screen covers the top of the jaws so that the trapped material will not wash out as the sampler is retrieved.

Upon retrieval of the PONAR device from the Brunswick River bottom, the collected sediment samples were immediately transferred to a decontaminated stainless-steel pan to be photographed and placed in the proper laboratory supplied sample containers. After the collection of each sediment sample, the PONAR sampler, stainless-steel pan and all scoops, spoons, etc. were decontaminated by scrubbing with a brush using deionized water and Liqui-Nox (or equivalent non-phosphate detergent). The sampler was then rinsed with deionized water prior to moving to the next sampling location. Sample collection for sediment followed the protocol outlined in USEPA Region 4 LSASD SOP, Sediment Sampling LSASDPROC-200-R4, February 23, 2020 as well as the Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations (USACE 1995).

All collected sediment samples were preserved as specified in USEPA Document SW-846, transported to the TestAmerica service center in Savannah, Georgia, and then shipped to TestAmerica in Pittsburgh, Pennsylvania for analysis. The sediment samples were analyzed for the following constituents:

- Dioxins and Furans by USEPA EPA Method 1613B
- RCRA 8-Metals by USEPA Methods 6020B and 7471B (Mercury)
- Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A
- Organochlorine Pesticides by USEPA Method 8081B LL
- Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 8270E LL

The sediment sample analytical results are presented in Table 1 and discussed in further detail in Section 3.1. Laboratory analytical reports for the sediment samples are provided in Appendix A. Daily Field Reports for the sampling program are provided in Appendix B.

2.2 Surface Water Characterization Sampling

Two surface water samples were obtained for laboratory analysis on November 4, 2020 by Tetra Tech - AAI. One sample was obtained from the Turning Basin area, and one surface water sample was obtained from the Bend Widener area.

The surface water samples were collected using a peristaltic pump with flexible thermoplastic tubing (Tygon) and new, unused polyethylene tubing. Rollers in the pump head create suction in the flexible tubing by compressing the flexible tubing through peristaltic action. The polyethylene tubing is inserted into the suction end of the flexible tubing to provide a means to convey water from the sampling location and depth to the surface. The polyethylene tubing was attached with plastic zip-ties to a telescopic 18-foot aluminum pole. The tubing was secured with a 1.5-foot section extended past the bottom of the pole so that the sampling point can be controlled. The end of the tubing was lowered to approximately 2/3rds the water depth at the sampling location. The Peristaltic pump was then used to flush a minimum of 10 tubing volumes (minimum 2 gallons flushed) prior to collection of the surface water samples using the laboratory-provided containers. Samples were collected up current of the boat to ensure cross contamination from any material attached to the vessel is not encountered. Upon completion of surface water sampling in each section, the Tygon and polyethylene tubing was discarded and replaced with new, unused tubing. Sample collection for surface water samples followed the protocol outlined in USEPA Region 4 SESD SOP, Surface Water Sampling SESDPROC-201-R4, December 14, 2016 as well as the Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations (USACE 1995).

An aqueous equipment blank (BR-EQUIP BLANK) was also generated by pumping analyte-free water provided by the analytical laboratory through 5 feet of new, unused polyethylene tubing and 1 foot of Tygon tubing using the peristatic pump. The tubing was flushed with approximately 0.5 gallons of the analyte-free water before pumping the equipment blank sample directly into the laboratory sample container.

All collected surface water samples were preserved as specified in USEPA Document SW-846, transported to the TestAmerica service center in Savannah, Georgia, and then shipped to TestAmerica in Pittsburgh, Pennsylvania for analysis. The surface water and equipment blank samples were analyzed for the following constituents:

- Dioxins and Furans by USEPA Method 1613B
- RCRA 8-Metals by USEPA Methods 6020B and 7470A (Mercury)
- Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A
- Organochlorine Pesticides by USEPA Method 8081B LL
- Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 8270E LL

The surface water sample analytical results are presented in Table 2 and discussed in further detail in Section 3.2. Laboratory analytical reports for the surface water samples are provided in Appendix A. Daily Field Reports for the sampling program are provided in Appendix B.

2.3 Elutriate Generation and Analysis

Additional sediment and surface water sample was obtained from the Turning Basin area and Bend Widener area to generate elutriate samples. The additional sediment samples were obtained in the same manner described in Section 2.2, and the surface water for the elutriate generation was obtained in the same manner as described in Section 2.3.

Composite samples were created from aliquots obtained from requested adjacent boring locations at Turning Basin area (Section A) and the Bend Widener area (Section B) Borings as summarized in Table A.

Table A: Elutriate Sediment Compositing Scheme

Section (Location)	Boring Designation/Sediment Sampling Location	Georgia East State Plane Coordinates (feet, NAD83)		Composite Sediment Sample ID for Elutriate Sample Generation
		X	Y	
Section A (Turning Basin)	TB-B-01	853,758.940	412,901.714	BR-EL-SD-TB-CS01-0-2
	TB-B-02	854,190.465	412,727.036	
	TB-B-03	854,512.562	412,484.082	
	TB-B-04	854,900.483	412,439.745	BR-EL-SD-TB-CS02-0-2
	TB-B-05	855,208.904	412,236.729	
	TB-B-06	855,651.284	412,135.970	
	TB-B-07	855,945.650	411,984.168	BR-EL-SD-TB-CS03-0-2
	TB-B-08	856,149.757	411,858.036	
	TB-B-09	856,326.372	411,995.821	
	TB-B-10	856,538.597	411,873.012	BR-EL-SD-TB-CS04-0-2
	TB-B-11	856,811.465	411,922.603	
	TB-B-12	856,910.122	411,743.851	
	TB-B-13	857,184.242	411,847.650	BR-EL-SD-TB-CS05-0-2
	TB-B-14	857,437.021	411,962.239	
	TB-B-15	857,423.721	411,666.079	
Section B (Bend Widener)	BW-B-01	879,421.271	402,882.491	BR-EL-SD-BW-CS06-0-2
	BW-B-02	879,676.753	402,625.515	
	BW-B-03	880,159.299	402,830.866	
	BW-B-01	879,421.271	402,882.491	BR-EL-SD-BW-CS06-0-2 DUP
	BW-B-02	879,676.753	402,625.515	
	BW-B-03	880,159.299	402,830.866	
	BW-B-03	880,159.299	402,830.866	BR-EL-SD-BW-CS07-0-2
	BW-B-04	880,498.999	402,570.802	
	BW-B-05	880,809.295	402,792.509	

The water sample fractions for the elutriate testing were collected from the Turning Basin area for the Turning Basin elutriate samples, and from the Bend Widener area for the Bend Widener area elutriate samples.

The composite sediment samples were created for elutriate generation by thoroughly mixing aliquots from the designated sampling locations. The sediment subsample from each of the three boring/sediment sampling locations, as summarized in Table A, was placed in a separate decontaminated stainless-steel pan. The pans were covered with aluminum foil and placed in a cooler with ice. After all three sediment subsamples were obtained from the three adjacent borings, equal volume aliquots were obtained with a stainless steel spoon from each of the three pans and placed in a fourth decontaminated stainless steel pan. The aliquots were then photographed, thoroughly mixed with a stainless-steel spoon in the stainless-steel pan. The composited sample was then transferred to the proper laboratory supplied sample container which was labeled, logged on the chain of custody form and placed in cooler on ice to preserve the sample to maintain a temperature of 4°C. The composite samples and the surface water samples for elutriate generation were transported to the TestAmerica service center in Savannah, Georgia, and then shipped to TestAmerica in Pittsburgh, Pennsylvania for elutriate generation using the Modified Elutriate Test Method. Surface water from the Turning Basin area were used with the composite samples from the Turning Basin area, and surface water from the Bend Widener was used with the composite sample from the Bend Widener area to generate the elutriate samples. The elutriate supernatant was siphoned off from each of the 8 samples creating the total fraction. A portion of the total fraction from each elutriate sample was centrifuged creating the 8 dissolved fraction samples.

The Total and Dissolved elutriate sample fractions were analyzed for the following laboratory analyses:

- Dioxins and Furans by USEPA Method 1613B
- RCRA 8-Metals by USEPA Methods 6020B and 7470A (Mercury)
- Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A
- Organochlorine Pesticides by USEPA Method 8081B LL
- Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 8270E LL

The Total and Dissolved elutriate sample fraction analytical results are presented in Table 3 and discussed in further detail in Section 3.3. Laboratory analytical reports for the elutriate sample fractions are provided in Appendix A. Daily Field Reports for the sampling program are provided in Appendix B.

3.0 LABORATORY ANALYTICAL RESULTS

This section provides a detailed comparison of the analytical results from the samples collected to an applicable environmental screening standard for each type of environmental media sampled during site characterization activities.

3.1 Sediment Characterization Analytical Results

Between November 3 and November 8, 2020, Tetra Tech -AAI collected 22 sediment samples including two duplicates from the 20 boring/sediment sampling locations, BR-SD-TB-B-01-0-2 through BR-SD-TB-B-15-0-2 and BR-SD-BW-B-01-0-2 through BR-SD-BW-B-05-0-2, plus duplicate samples BR-SD-TB-B-15-0-2 DUP and BR-SD-BW-B-04-0-2 DUP.

The analytical results from the collected sediment samples were compared to the Threshold Effect Level (TEL) referenced in the NOAA SQuiRTs Quick Reference Tables (NOAA, 2008), and the USEPA Region IV Ecological Screening Values (ESVs) referenced in United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update (USEPA, 2018) to determine if detections of regulated substances in sediments are a potential ecological risk. TELs are benchmark levels calculated as geometric means of toxic sample concentrations from a database of studies. The TELs do not use non-toxic sample results. According to the USEPA Region IV, “Ecological screening values are based on chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. Since these numbers are based on conservative endpoints and sensitive ecological effects data, they represent a preliminary screening of site chemical concentrations to determine the need to conduct further investigations at the site. ESVs are not recommended for use as remediation levels” (USEPA Region IV, 2018). In general, TELs and ESVs values are approximately equal for contaminants that have both TELs and ESVs.

3.1.1 Dioxins and Furans

The dioxin and furan concentrations were multiplied by the NOAA SQuiRTs Toxic Equivalency Factors (TEF) for fish to calculate the Toxic Equivalency Concentration (TEC) for each dioxin and furan relative to 2,3,7,8-TCDD. The TECs for each dioxin and furan was summed to calculate the Toxic Equivalency Quotient (TEQ). TECs for dioxin and furan concentrations below the Estimated Detection Level (EDL) were assigned a value of 0.0 to exclude them from the TEQ calculation (Sum of TECs). TEC values for dioxins and furans that were also present in the laboratory blank (designated with data qualifier B) were also assigned a value of 0.0 so that they are also excluded from the TEQ calculation. The TEQ for each sample was compared to the NOAA SQuiRTs TEQ (0.00085 μg/Kg) for 2,3,7,8-TCDD. There is no corresponding EPA Region IV ESV for 2,3,7,8-TCDD.

The NOAA SQuiRTs marine sediment TEL for 2,3,7,8-TCDD was exceeded by the estimated TEQ values of 6 of the 22 sediment samples. As shown in Table 1, the TEL was exceeded by the estimated TEQs of samples BR-SD-TB-B-01-0-2, BR-SD-TB-B-06-0-2, BR-SD-TB-B-10-0-2, BR-SD-TB-B-11-0-2, BR-SD-TB-B-12-0-2 and BR-SD-TB-B-14-0-2.

Please note that the dioxin and furan concentrations are extremely low, in the parts per trillion range, and often close to the lower detection limits. Consequently, the TEQ values should be considered as estimated values.

The remaining TEQs calculated from the analytical results for the dioxins and furans analyzed via USEPA Method 1613B were below the NOAA SQuiRTs TEQ for the collected sediments samples.

3.1.2 RCRA-8 Metals

An exceedance of the TEL for arsenic (7.24 mg/Kg) and the ESV for arsenic (7.24 mg/Kg) was exceeded by sample BR-SD-TB-B10-0-2 (9.2 mg/Kg), as shown in Table 1.

An exceedance of the TEL for cadmium (0.68 mg/Kg) and the ESV for cadmium (7.24 mg/Kg) was exceeded by sample BR-SD-TB-B10-0-2 (13 mg/Kg), as shown in Table 1.

An exceedance of the TEL for mercury (0.13 mg/Kg) and the ESV for mercury (0.13 mg/Kg) was exceeded by sample BR-SD-TB-B10-0-2 (0.23 mg/Kg), as shown in Table 1.

The remaining analytical results for the RCRA-8 metals analyzed via USEPA Method 6020B and USEPA Method 7471B were below the TELs and ESVs for the collected sediments samples.

3.1.3 Pesticides

Analytical results for Pesticides analyzed via USEPA Method 8081B LL were below the NOAA SQuiRTs TELs and USEPA Region IV ESVs for all the 22 collected sediment samples, including two duplicate samples.

3.1.4 Poly-Chlorinated Biphenyls (PCBs)

The 22 collected sediment samples, including two duplicates, were analyzed for PCBs by USEPA Method 8082A. The sum of the PCB concentrations for each sample was compared to the Total PCBs TEL and ESV (21.6 μg/Kg). Only results that exceeded the Method Detection Level (MDL) were used to calculate the Total PCBs concentration for each sample. The NOAA SQuiRTs tables also list a 63.3 mg/Kg TEL for PCB 1254. Analytical results for PCBs were below the TELs and ESVs for the 22 collected sediment samples.

3.1.5 Polynuclear Aromatic Hydrocarbons (PAHs)

The 22 collected sediment samples, including two duplicates, were analyzed for Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 8270E LL. The PAH concentrations for each of the 22 samples were compared to the TELs and ESVs for each PAH. The sum of the PAH concentrations for each sample was also compared to the Total PAHs TEL and ESV. Only results that exceeded the Method Detection Level (MDL) were used to calculate the Total PCBs concentration for each sample. Analytical results for PAHs were below the TELs and ESVs for all PAHs and Total PAHs for the 22 collected sediment samples, including the two duplicate samples.

The sediment sample analytical results are presented in Table 1. Laboratory analytical reports for the sediment samples are provided in Appendix A. Daily Field Reports for the sampling program are provided in Appendix B.

3.2 Surface Water Characterization Analytical Results

Between November 3 and November 8, 2020, Tetra Tech -AAI collected 2 surface water samples, one from the Turning Basin area (BR-SW-TB) and one from the Bend Widener area (BR-SW-BW), for laboratory analysis. An aqueous equipment blank (BR-EQUIP BLANK) was also generated by pumping analyte-free water provided by the analytical laboratory though new, unused tubing directly into the laboratory sample container using the peristatic pump.

The analytical results from the collected surface water samples were compared to the Marine Surface Water Acute Screening Value (ASV) referenced in the NOAA SQuiRTs Quick Reference Tables (NOAA, 2008), and the Saltwater Acute Screening Value (ASV) referenced in United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update (USEPA, 2018) to determine potential interferences from background surface water concentrations in the modified elutriate sample fraction analyses, discussed below.

3.2.1 Dioxins and Furans

The dioxin and furan concentrations were multiplied by the NOAA SQuiRTs Toxic Equivalency Factors (TEF) for fish to calculate the Toxic Equivalency Concentration (TEC) for each dioxin and furan relative to 2,3,7,8-TCDD. The TECs for each dioxin and furan was summed to calculate the Toxic Equivalency Quotient (TEQ). TECs for dioxin and furan concentrations below the Estimated Detection Level (EDL) were assigned a value of 0.0 to exclude them from the TEQ calculation (Sum of TECs). TEC values for dioxins and furans that were also present in the laboratory blank (designated with data qualifier B) were also assigned a value of 0.0 so that they are also excluded from the TEQ calculation.

No 2,3,7,8-TCDD TEQ ASV is listed for Marine Surface Water in the NOAA SQuiRTs tables. Similarly, no acute screening value is listed for Saltwater in the USEPA Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update (USEPA, 2018).

The TEQs calculated from the analytical results for the dioxins and furans analyzed via USEPA Method 1613B are presented in Table 2. No acute screening values are listed for comparison of results in the NOAA SQuiRTs or the USEPA Region IV ASV Tables for Saltwater.

3.2.2 RCRA-8 Metals

The analytical results for the RCRA-8 metals analyzed via USEPA Method 6020B and USEPA Method 7470A were below the ASVs as shown in Table 2.

3.2.3 Pesticides

Analytical results for Pesticides analyzed via USEPA Method 8081B LL were below the NOAA SQuiRTs and USEPA Region IV ASVs for the 2 collected surface water samples and the equipment blank.

3.2.4 Poly-Chlorinated Biphenyls (PCBs)

The two collected surface water samples and the equipment blank were analyzed for PCBs by USEPA Method 8082A. The sum of the PCB concentrations for each sample was compared to the Total PCBs ASVs (0.033 μg/L) listed in the NOAA SQuiRTs tables and in the USEPA Region IV screening value tables for surface waters. Only results that exceeded the Method Detection Level (MDL) were used to calculate the Total PCBs concentration for each sample. Analytical results for Total PCBs analyzed via USEPA Method 8082B LL were below the NOAA SQuiRTs and USEPA Region IV ASVs for the 2 collected surface water samples and the equipment blank.

3.2.5 Polynuclear Aromatic Hydrocarbons (PAHs)

The two collected surface water samples were analyzed for PAHs by USEPA Method 8270E. The PCB concentrations for each sample that exceeded the Method Detection Level (MDL) was compared to the ASVs listed in the NOAA SQuiRTs tables and in the USEPA Region IV screening value tables for Marine/Saltwater surface waters. Analytical results for Total PAHs analyzed via USEPA Method 8082B LL were below the NOAA SQuiRTs and USEPA Region IV ASVs for the 2 collected surface water samples and the equipment blank.

The two collected surface water samples and the equipment blank were analyzed for Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 8270E LL. The PAH concentrations for each of the samples were compared to the ASVs for each PAH. The sum of the PAH concentrations for each sample was also compared to the Total PAHs ASVs. Only results that exceeded the Method Detection Level (MDL) were used to calculate the Total PCBs concentration for each sample. Analytical results for PAHs were below the ASVs for all PAHs and Total PAHs for the 2 collected surface water samples and the equipment blank.

The surface water and equipment blank sample analytical results are presented in Table 2. Laboratory analytical reports for the surface water samples are provided in Appendix A. Daily Field Reports for the sampling program are provided in Appendix B.

3.3 Elutriate Sample Analytical Results

The elutriate samples were generated using the Modified Elutriate Test Method by TestAmerica in Pittsburgh, Pennsylvania on November 13, 2020 using the sediment composite samples and surface water samples obtained by Tetra Tech -AAI between November 4 and November 8, 2020. Surface water from the Turning Basin area were used with the 5 composite samples from the Turning Basin area, and surface water from the Bend Widener was used with the 3 composite sample from the Bend Widener area, including a duplicate composite sample, to generate the elutriate samples. The elutriate supernatant was siphoned off from each of the 8 samples creating the total fraction. A portion of the total fraction from each elutriate sample was centrifuged creating the 8 dissolved fraction samples.

The elutriate results represent a very temporary condition as a result of dredging operations. The analytical results from the 16 elutriate sample fractions were therefore compared to the Marine Surface Water Acute Screening Value (ASV) referenced in the NOAA SQuiRTs Quick Reference Tables (NOAA, 2008), and the Saltwater Acute Screening Value referenced in USEPA, 2018 to determine if detections of regulated substances in elutriate samples indicate disturbance of the sediments by dredging are a potential ecological risk.

3.3.1 Dioxins and Furans

The dioxin and furan concentrations were multiplied by the NOAA SQuiRTs Toxic Equivalency Factors (TEF) for fish to calculate the Toxic Equivalency Concentration (TEC) for each dioxin and furan relative to 2,3,7,8-TCDD. The TECs for each dioxin and furan was summed to calculate the Toxic Equivalency Quotient (TEQ). TECs for dioxin and furan concentrations below the Estimated Detection Level (EDL) were assigned a value of 0.0 to exclude them from the TEQ calculation (Sum of TECs). TEC values for dioxins and furans that were also present in the laboratory blank (designated with data qualifier B) were also assigned a value of 0.0 so that they are also excluded from the TEQ calculation.

No 2,3,7,8-TCDD TEQ ASV is listed for Marine Surface Water in the NOAA SQuiRTs tables. Similarly, no TEQ ASV is listed for Saltwater in the USEPA Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update (USEPA, 2018).

The TEQs calculated from the analytical results for the dioxins and furans analyzed via USEPA Method 1613B are presented in Table 3. No acute screening values are listed for comparison of results in the NOAA SQuiRTs or the USEPA Region IV ASV Tables for Saltwater.

3.3.2 RCRA-8 Metals

The 8 Total and 8 Dissolved elutriate samples were analyzed for RCRA-8 metals by USEPA Methods 6020B and 7470A. No RCRA-8 metals concentrations exceeding the NOAA SQuiRTs or USEPA Region IV ASVs were detected in the 16 sample fractions, as shown in Table 3.

3.3.3 Pesticides

The 8 Total and 8 Dissolved elutriate samples were analyzed for Organochlorine Pesticides by USEPA Method 8081B LL. Analytical results for Chlorinated Pesticides were below the NOAA SQuiRTs ASVs.

3.3.4 Poly-Chlorinated Biphenyls (PCBs)

The 8 Total and 8 Dissolved elutriate samples were analyzed for PCBs by USEPA Method 8082A. The sum of the PCB concentrations for each sample was compared to the Total PCBs ASV (0.033 μg/L) listed in the NOAA SQuiRTs tables and in the USEPA Region IV acute screening value tables for surface waters. Only results that exceeded the Method Detection Level (MDL) were used to calculate the Total PCBs concentration for each sample. Analytical results for Total PCBs analyzed via USEPA Method 8082B LL were below the NOAA SQuiRTs ASVs and USEPA Region IV ASVs for the 16 elutriate sample fractions.

3.3.5 Polynuclear Aromatic Hydrocarbons (PAHs)

The 8 Total and 8 Dissolved elutriate samples were analyzed for PAHs by USEPA Method 8270E. The PAH concentrations for each of the samples were compared to the ASVs for each PAH. Only results that exceeded the Method Detection Level (MDL) were compared to ASVs. Analytical results for PAHs were below the ASVs for all PAHs for the 16 elutriate sample fractions.

The elutriate fraction sample analytical results are presented in Table 3. Laboratory analytical reports for the sediment samples are provided in Appendix Daily Field Reports for the sampling program are provided in Appendix B.

4.0 CONCLUSIONS AND DISCUSSION

4.1 Conclusions

Navigation channel improvements are proposed at the channel Turning Basin and Bend Widener areas as part of the Brunswick harbor modification study. These areas are proposed to be conventionally dredged to Elevation -36 feet (MLLW) with a 2-foot over-depth. Tetra Tech was tasked by the U.S. Army Corps of Engineers (USACE), Savannah District to perform subsurface exploration for the Brunswick Harbor modification study.

Tetra Tech – AAI conducted an Environmental Site Investigation consisting of sediment and surface water characterization and generation and analysis of elutriate samples to support the Brunswick Harbor Modification study. Field sampling was conducted between November 3 and 8, 2020. A total of 22 sediment samples, including two duplicates, were obtained for characterization at the 20 geotechnical boring locations. Two surface water samples were obtained for characterization, one from the Turning Basin area and one from the Bend Widener area. An equipment blank was also obtained for analysis. Eight composite sediment samples, including a duplicate, and sufficient surface water from each project section were also obtained for generation of elutriate using the Modified Elutriate Test Method. The supernatant was split into total and dissolved (centrifuged) fractions. The sediment, surface water and elutriate fractions were analyzed for dioxins and furans, RCRA metals, Chlorinated Pesticides, PCBs and PAHs.

Analytical results of the sediment samples were compared to NOAA SQuiRTs TELs and USEPA Region IV ESVs. Six of the 22 sediment samples had estimated 2,3,7,8-TCDD TEQs in excess of the NOAA SQuiRTs TEL. The NOAA SQuiRTs TELs and Region IV ESVs for arsenic, cadmium and mercury were exceeded by sample BR-SD-TB-B10-0-2. Chlorinated pesticides, Total PCBs, PAHs and Total PAHs were below the TELs and ESVs for all for the 22 collected sediment samples.

The analytical results from the collected surface water samples were compared to the NOAA SQuiRTs Marine Surface Water ASVs and the USEPA Region 4 Saltwater ASVs to determine background concentrations of regulated substances in surface water used for modified elutriate tests. No marine surface water screening values were available for dioxins and furans. The RCRA metals, Chlorinated pesticides, Total PCBs and PAHs were below the ASVs for the 2 collected surface water samples and the equipment blank.

The NOAA SQuiRTs Marine Surface Water ASVs and the USEPA Region IV Saltwater ASVs were used to evaluate if detections of regulated substances in the 16 elutriate fraction samples indicate disturbance of the sediments by dredging are a potential ecological risk. No 2,3,7,8-TCDD TEQ AVSs are listed for comparison of dioxin and furan results. The analytical results for the RCRA metals, Chlorinated pesticides, Total PCBs and PAHs were below the ASVs for the 16 elutriate fraction samples.

4.2 Discussion

We understand the dredged material will be placed in a designated, upland, confined disposal area. Laboratory analysis indicates that dioxins and furans are relatively widely distributed in the Brunswick River which is an industrial harbor.

5.0 REFERENCES

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NOAA, 2008. Screening Quick Reference Tables (SQuiRTs).

USEPA R4, 2018. United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update.

BORING LOCATION PLAN
SECTIONS A AND B

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BRUNSWICK HARBOR MODIFICATION STUDY
GLYNN COUNTY
BRUNSWICK, GEORGIA

DRAWN BY: CCS	CHECKED BY: AC	DATE: 01/11/2021
FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 1

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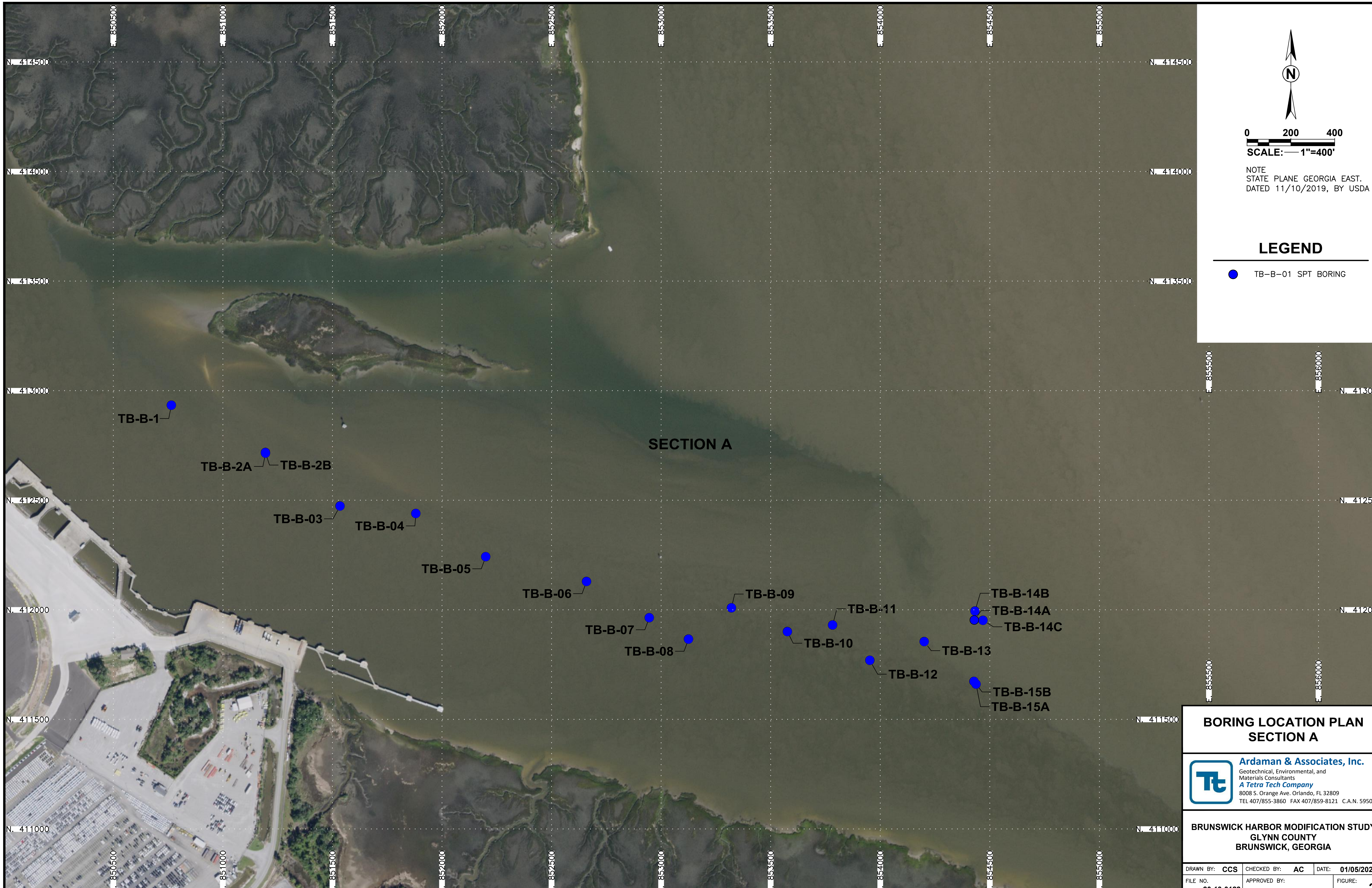

NOTE
STATE PLANE GEORGIA EAST.
DATED 11/10/2019, BY USDA

LEGEND

● TB–B–01 SPT BORING

BORING LOCATION PLAN SECTION A

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BRUNSWICK HARBOR MODIFICATION STUDY
GLYNN COUNTY
BRUNSWICK, GEORGIA

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FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 2

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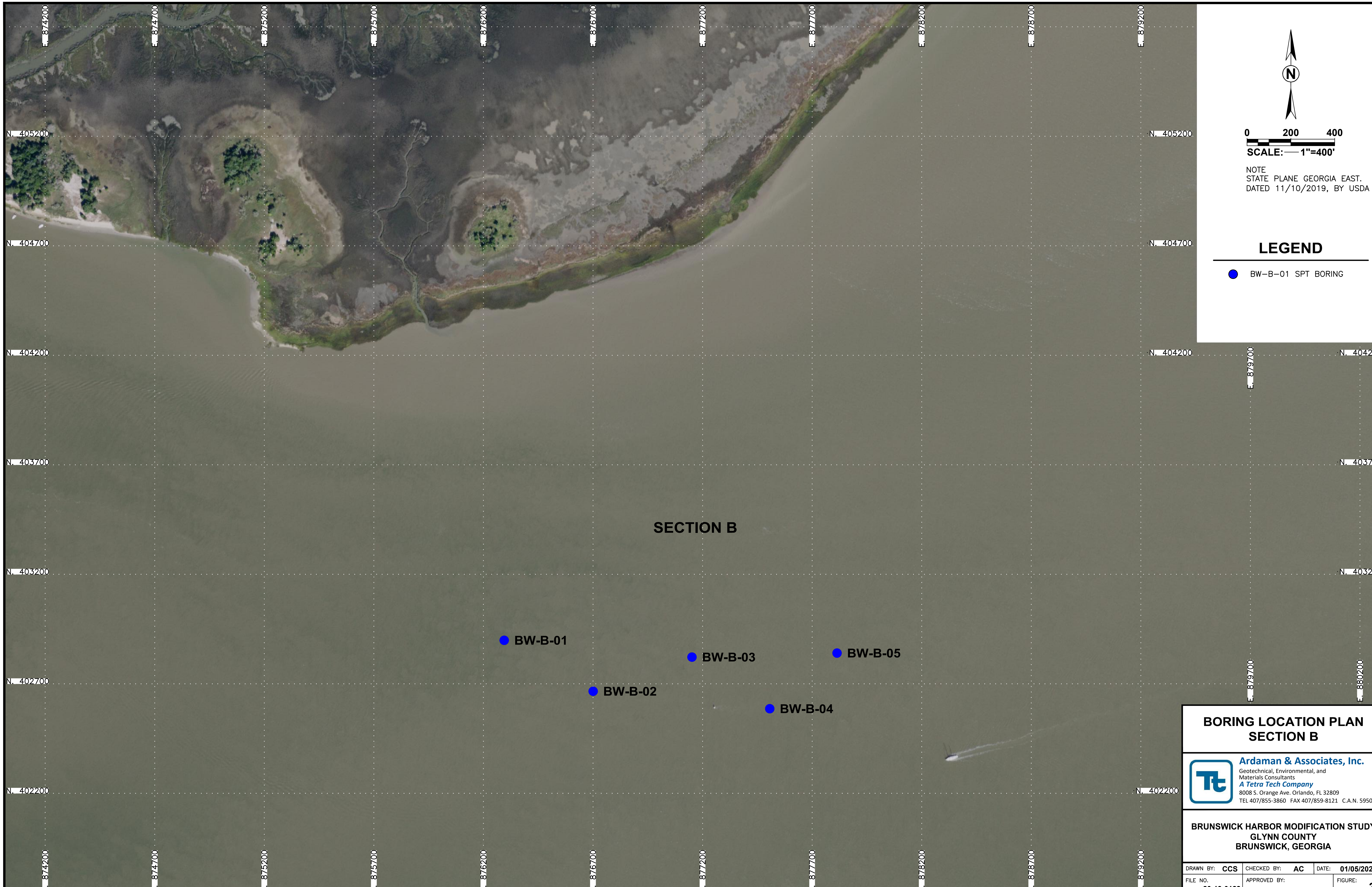

BORING LOCATION PLAN
SECTION B

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BRUNSWICK HARBOR MODIFICATION STUDY
GLYNN COUNTY
BRUNSWICK, GEORGIA

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FILE NO. 20-13-0122	APPROVED BY:	FIGURE: 3

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Table 1
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-SD-TB-B-01-0-2			BR-SD-TB-B-02-0-2			BR-SD-TB-B-03-0-2			BR-SD-TB-B-04-0-2		
				Units	11/4/2020	Qualifiers	TEC	11/4/2020	Qualifiers	TEC	11/4/2020	Qualifiers	TEC	11/4/2020	Qualifiers	TEC
Dioxins and Furans																
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/Kg	0.061	B	0.000000	0.0096	B	0.000000	0.033	B	0.000000	0.0066	B	0.000000
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/Kg	0.0035	J B	0.000000	0.0006	J B	0.000000	0.002	J B	0.000000	0.00041	J B	0.000000
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/Kg	0.00026	J B	0.000000	0.000045	U	0.000000	0.00011	J q B	0.000000	0.00003	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/Kg	0.0012	J B	0.000000	0.00026	J q B	0.000000	0.00068	J B	0.000000	0.00023	J B	0.000000
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/Kg	0.0014	J	0.000140	0.00017	J q	0.000017	0.00076	J	0.000076	0.00015	J q	0.000015
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/Kg	0.0024	J B	0.000000	0.00033	J B	0.000000	0.0009	J q B	0.000000	0.00022	J q B	0.000000
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.00038	J q	0.000038	0.000044	U	0.000000	0.00026	J	0.000026	0.000037	J q	0.000004
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/Kg	0.0053		0.000053	0.00072	J q	0.000007	0.0025	J	0.000025	0.00049	J	0.000005
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/Kg	0.000038	U	0.000000	0.000054	U	0.000000	0.000054	U	0.000000	0.000043	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/Kg	0.00073	J q B	0.000000	0.00013	J q B	0.000000	0.00036	J B	0.000000	0.000026	U	0.000000
1,2,3,7,8-PeCDF	--	--	0.05	µg/Kg	0.00047	J q	0.000024	0.000055	U	0.000000	0.00034	J	0.000017	0.000053	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.00081	J	0.000081	0.000047	U	0.000000	0.00035	J	0.000035	0.000093	J q	0.000009
2,3,4,7,8-PeCDF	--	--	0.5	µg/Kg	0.00047	J	0.000235	0.000048	U	0.000000	0.00022	J q	0.000110	0.000049	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/Kg	0.00038	J	0.000380	0.000062	U	0.000000	0.00018	J	0.000180	0.00006	J q	0.000060
2,3,7,8-TCDF	--	--	0.05	µg/Kg	0.0014	q	0.000070	0.00017	J q	0.000009	0.00058	J	0.000029	0.00013	J q	0.000007
OCDD	--	--	0.0001	µg/Kg	0.72	B	0.000000	0.12	B	0.000000	0.37	B	0.000000	0.074	B	0.000000
OCDF	--	--	0.0001	µg/Kg	0.0036	J B	0.000000	0.00049	J B	0.000000	0.0026	J B	0.000000	0.00041	J B	0.000000
Dioxins and Furans TEQ	0.00085	--	--				0.001021			0.000033			0.000498			0.000099
Total HpCDD	--	--	--	µg/Kg	0.21	B		0.032	B		0.12	B		0.022	B	
Total HpCDF	--	--	--	µg/Kg	0.0077	B		0.00092	J q B		0.0047	J q B		0.00078	J q B	
Total HxCDD	--	--	--	µg/Kg	0.12	B		0.017	q B		0.06	q B		0.012	q B	
Total HxCDF	--	--	--	µg/Kg	0.012	I q		0.0014	J I q		0.0058	I q		0.0014	J I q	
Total PeCDD	--	--	--	µg/Kg	0.021	q B		0.0028	J q B		0.0095	q B		0.0015	J q B	
Total PeCDF	--	--	--	µg/Kg	0.0089	I q		0.00065	J q		0.0037	J I q		0.0005	J q	
Total TCDD	--	--	--	µg/Kg	0.01	q		0.0011	q		0.006	q		0.0007	J q	
Total TCDF	--	--	--	µg/Kg	0.0097	I q		0.00096	J q		0.0062	q		0.00081	J q	

Analyte	BR-SD-TB-B-05-0-2			BR-SD-TB-B-06-0-2			BR-SD-TB-B-07-0-2			BR-SD-TB-B-08-0-2		
	11/4/2020	Qualifiers	TEC	11/4/2020	Qualifiers	TEC	11/5/2020	Qualifiers	TEC	11/5/2020	Qualifiers	TEC
Dioxins and Furans												
1,2,3,4,6,7,8-HpCDD	0.031	B	0.000000	0.11	B	0.000000	0.0023	J	0.000002	0.015	B	0.000000
1,2,3,4,6,7,8-HpCDF	0.0018	J B	0.000000	0.0059	B	0.000000	0.00016	J q	0.000002	0.00072	J q B	0.000000
1,2,3,4,7,8,9-HpCDF	0.0001	J q B	0.000000	0.00033	J B	0.000000	0.000024	U	0.000000	0.000071	J q B	0.000000
1,2,3,4,7,8-HxCDD	0.0008	J B	0.000000	0.0025	J B	0.000000	0.000074	U	0.000000	0.00038	J B	0.000000
1,2,3,4,7,8-HxCDF	0.00071	J	0.000071	0.0021	J	0.000210	0.000037	U	0.000000	0.00022	J q	0.000022
1,2,3,6,7,8-HxCDD	0.00095	J B	0.000000	0.0034	J B	0.000000	0.00007	U	0.000000	0.00049	J q B	0.000000
1,2,3,6,7,8-HxCDF	0.00021	J	0.000021	0.00074	J	0.000074	0.00004	U	0.000000	0.000094	J q	0.000009
1,2,3,7,8,9-HxCDD	0.0024	J	0.000024	0.0086		0.000086	0.000068	U	0.000000	0.0013	J	0.000013
1,2,3,7,8,9-HxCDF	0.000053	U	0.000000	0.000088	U	0.000000	0.00005	U	0.000000	0.000041	U	0.000000
1,2,3,7,8-PeCDD	0.00029	J B	0.000000	0.0013	J B	0.000000	0.00006	U	0.000000	0.00016	J q B	0.000000
1,2,3,7,8-PeCDF	0.00029	J	0.000015	0.00087	J	0.000044	0.000071	U	0.000000	0.00017	J q	0.000009
2,3,4,6,7,8-HxCDF	0.0004	J	0.000040	0.0011	J	0.000110	0.000041	U	0.000000	0.00015	J q	0.000015
2,3,4,7,8-PeCDF	0.00013	J q	0.000065	0.00069	J	0.000345	0.000063	U	0.000000	0.00011	J q	0.000055
2,3,7,8-TCDD	0.00014	J q	0.000140	0.00043	J q	0.000430	0.00005	U	0.000000	0.000082	U	0.000000
2,3,7,8-TCDF	0.0007	J	0.000035	0.0023		0.000115	0.000058	U	0.000000	0.00035	J	0.000018
OCDD	0.37	B	0.000037	1.3	B	0.000000	0.029		0.000003	0.19	B	0.000000
OCDF	0.0022	J B	0.000000	0.0063	J B	0.000000	0.00012	J q	0.000000	0.00077	J B	0.000000
Dioxins and Furans TEQ			0.000448			0.001414			0.000007			0.000140
Total HpCDD	0.11	B		0.37	B		0.0081			0.051	B	
Total HpCDF	0.0042	J q B		0.013	B		0.0003	J q		0.0018	J q B	
Total HxCDD	0.056	q B		0.2	q B		0.0042	J q		0.027	q B	
Total HxCDF	0.0057	I q		0.019	I q		0.00011	J q		0.0024	J q	
Total PeCDD	0.009	q B		0.031	q B		0.00049	J q		0.0035	J q B	
Total PeCDF	0.0032	J I q		0.015	I q		0.0018	U		0.0018	J I q	
Total TCDD	0.0053	q		0.015	q		0.00028	J q		0.0019	q	
Total TCDF	0.0048	q		0.016	I q		0.0018	U		0.0018	I q	

Table 1 (continued)
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-TB-B-01-0-2		BR-SD-TB-B-02-0-2		BR-SD-TB-B-03-0-2		BR-SD-TB-B-04-0-2		BR-SD-TB-B-05-0-2		BR-SD-TB-B-06-0-2		BR-SD-TB-B-07-0-2		BR-SD-TB-B-08-0-2	
			Units	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020		11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/5/2020	Qualifiers	11/5/2020	Qualifiers
Metals																			
Arsenic	7.24	7.24	mg/Kg	2.9		1.0		1.3		0.70		2.7		3.6		1.1		0.94	
Barium	130.1	--	mg/Kg	7.5		4.2		3.5		2.4		7.1		8.5		2.6		2.6	
Cadmium	0.68	0.68	mg/Kg	0.049	J	0.041	J	0.025	J	0.031	J	0.045	J	0.052	J	0.031	J	0.033	J
Chromium	52.3	52.3	mg/Kg	8.6		3.1		3.6		2.5		8.6		12		2.2		2.1	
Lead	30.2	30.2	mg/Kg	4.0		1.6		1.8		0.99		3.9		5.2		0.87		0.78	
Mercury	0.13	0.13	mg/Kg	0.046		0.013	U	0.018	J	0.013	U	0.036		0.051		0.012	U	0.014	U
Selenium	--	--	mg/Kg	0.16	J	0.078	U	0.085	U	0.076	U	0.12	J	0.17	J	0.072	U	0.078	U
Silver	0.73	0.73	mg/Kg	0.022	U	0.018	U	0.020	U	0.017	U	0.024	U	0.03	U	0.017	U	0.018	U
Pesticides																			
4,4'-DDD	1.22	1.2	µg/Kg	0.15	U	0.023	U	0.025	U	0.022	U	0.15	U	0.19	U	0.021	U	0.023	U
4,4'-DDE	2.07	2.1	µg/Kg	0.070	U	0.011	U	0.012	U	0.011	U	0.074	U	0.092	U	0.010	U	0.011	U
4,4'-DDT	1.19	--	µg/Kg	0.25	U	0.038	U	0.043	U	0.037	U	0.26	U	0.32	U	0.036	U	0.038	U
Aldrin	--	0.1	µg/Kg	0.11	U	0.017	U	0.018	U	0.016	U	0.11	U	0.14	U	0.016	U	0.016	U
alpha-BHC	--	1.3	µg/Kg	0.084	U	0.013	U	0.015	U	0.013	U	0.089	U	0.11	U	0.012	U	0.013	U
beta-BHC	--	--	µg/Kg	0.094	U	0.015	U	0.016	U	0.014	U	0.099	U	0.12	U	0.014	U	0.015	U
cis-Chlordane	--	2.7	µg/Kg	0.086	U	0.013	U	0.015	U	0.013	U	0.090	U	0.11	U	0.013	U	0.013	U
delta-BHC	--	--	µg/Kg	0.11	U	0.017	U	0.019	U	0.016	U	0.11	U	0.14	U	0.016	U	0.017	U
Dieldrin	0.72	0.1	µg/Kg	0.086	U	0.013	U	0.015	U	0.013	U	0.090	U	0.11	U	0.013	U	0.013	U
Endosulfan I	--	0.1	µg/Kg	0.093	U	0.014	U	0.016	U	0.014	U	0.098	U	0.12	U	0.014	U	0.014	U
Endosulfan II	--	0.14	µg/Kg	0.076	U	0.012	U	0.013	U	0.011	U	0.080	U	0.099	U	0.011	U	0.012	U
Endosulfan sulfate	--	0.11	µg/Kg	0.089	U	0.014	U	0.015	U	0.014	U	0.094	U	0.12	U	0.013	U	0.014	U
Endrin	--	0.12	µg/Kg	0.064	U	0.010	U	0.011	U	0.0097	U	0.068	U	0.14	J	0.050		0.0099	U
Endrin aldehyde	--	--	µg/Kg	0.12	U F1	0.019	U	0.021	U	0.019	U	0.13	U	0.16	U	0.018	U	0.019	U
Endrin ketone	--	0.12	µg/Kg	0.047	U	0.0074	U	0.0082	U	0.0072	U	0.050	U	0.062	U	0.0069	U	0.0073	U
gamma-BHC (Lindane)	0.32	0.6	µg/Kg	0.088	U	0.014	U	0.015	U	0.013	U	0.093	U	0.12	U	0.013	U	0.014	U
Heptachlor	--	1.5	µg/Kg	0.11	U	0.017	U	0.019	U	0.016	U	0.11	U	0.14	U	0.016	U	0.017	U
Heptachlor epoxide	--	0.14	µg/Kg	0.088	U	0.014	U	0.015	U	0.013	U	0.092	U	0.11	U	0.013	U	0.014	U
Methoxychlor	--	2.1	µg/Kg	0.19	J p	0.021	U	0.023	U	0.020	U	0.14	U	0.18	U	0.019	U	0.021	U
Toxaphene	0.1	0.15	µg/Kg	9.3	U	1.4	U	1.6	U	1.4	U	9.8	U	12	U	1.4	U	1.4	U
trans-Chlordane	--	2.7	µg/Kg	0.080	U	0.012	U	0.014	U	0.012	U	0.084	U	0.10	U	0.012	U	0.012	U

Table 1 (continued)
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-TB-B-01-0-2		BR-SD-TB-B-02-0-2		BR-SD-TB-B-03-0-2		BR-SD-TB-B-04-0-2		BR-SD-TB-B-05-0-2		BR-SD-TB-B-06-0-2		BR-SD-TB-B-07-0-2		BR-SD-TB-B-08-0-2	
			Units	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/4/2020	Qualifiers	11/5/2020	Qualifiers	11/5/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)																			
PCB-1016	--	--	µg/Kg	0.22	U	0.17	U	0.19	U	0.17	U	0.23	U	0.29	U	0.16	U	0.17	U
PCB-1221	--	--	µg/Kg	0.24	U	0.19	U	0.21	U	0.18	U	0.25	U	0.32	U	0.18	U	0.19	U
PCB-1232	--	--	µg/Kg	0.16	U	0.13	U	0.14	U	0.13	U	0.17	U	0.22	U	0.12	U	0.13	U
PCB-1242	--	--	µg/Kg	0.097	U	0.077	U	0.085	U	0.076	U	0.10	U	0.13	U	0.074	U	0.078	U
PCB-1248	--	--	µg/Kg	0.16	U	0.13	U	0.14	U	0.13	U	0.17	U	0.22	U	0.12	U	0.13	U
PCB-1254	63.3	--	µg/Kg	0.20	U	0.16	U	0.18	U	0.15	U	0.21	U	0.27	U	0.15	U	0.16	U
PCB-1260	--	--	µg/Kg	0.19	U	0.15	U	0.17	U	0.15	U	0.20	U	0.26	U	0.14	U	0.15	U
PCB-1262	--	--	µg/Kg	0.23	U	0.19	U	0.21	U	0.18	U	0.25	U	0.32	U	0.18	U	0.19	U
PCB-1268	--	--	µg/Kg	9.7		1.0		1.5		1.1		9.0		8.6		0.26	J	1.6	
Total PCBs	21.6	21.6	µg/Kg	9.7		1.0		1.5		1.1		9.0		8.6		0.26		1.6	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	6.71	6.7	µg/Kg	3.1	U	4.9	U	5.5	U	4.7	U	3.3	U	4.2	U	4.6	U	4.9	U
Acenaphthylene	5.87	5.9	µg/Kg	2.4	U	3.7	U	4.2	U	3.6	U	2.5	U	3.2	U	3.5	U	3.7	U
Anthracene	46.9	47	µg/Kg	2.8	U	4.4	U	4.9	U	4.3	U	3.0	U	3.7	U	4.2	U	4.4	U
Benzo[a]anthracene	74.8	75	µg/Kg	4.9	U	7.7	U	8.6	U	7.5	J	5.2	U	6.5	U	7.2	U	7.6	U
Benzo[a]pyrene	88.8	89	µg/Kg	4.7	U	7.4	U	8.2	U	7.3	J	5.0	U	6.3	U	6.9	U	7.3	U
Benzo[b]fluoranthene	--	--	µg/Kg	3.4	J	4.2	U	4.7	U	8.9	J	4.9	J	6.4	J	3.9	U	4.2	U
Benzo[g,h,i]perylene	--	310	µg/Kg	2.4	U	3.7	U	4.1	U	5.3	J	3.4	J	3.8	J	3.5	U	3.7	U
Benzo[k]fluoranthene	--	--	µg/Kg	3.3	U	5.1	U	5.7	U	4.9	U	3.5	U	4.3	U	4.8	U	5.1	U
Chrysene	108	108	µg/Kg	6.1	U	9.5	U	11	U	9.1	U	6.4	U	8.0	U	8.9	U	9.4	U
Dibenz(a,h)anthracene	6.22	6.2	µg/Kg	7.0	U	11	U	12	U	11	U	7.4	U	9.2	U	10	U	11	U
Fluoranthene	113	113	µg/Kg	4.2	J	4.5	U	5.0	U	15	J	4.8	J	7.4	J	4.2	U	4.5	U
Fluorene	21.2	21	µg/Kg	2.1	U	3.4	U	3.7	U	3.2	U	2.3	U	2.8	U	3.1	U	3.3	U
Indeno[1,2,3-cd]pyrene	--	340	µg/Kg	5.4	U	8.5	U	9.4	U	8.2	U	5.8	U	7.2	U	8.0	U	8.4	U
Naphthalene	34.6	35	µg/Kg	2.1	U	3.3	U	3.7	U	3.2	U	2.3	U	2.8	U	3.1	U	3.3	U
Phenanthrene	86.7	87	µg/Kg	2.9	U	4.6	U	5.1	U	8.4	J	3.1	U	3.9	U	4.3	U	4.5	U
Pyrene	153	153	µg/Kg	4.0	J	4.1	U	4.5	U	14	J	4.3	J	6.7	J	3.8	U	4.0	U
Total PAHs	1684	1684	µg/Kg	11.6		0.0		0.0		66.4		17.4		24.3		0.0		0.0	

Table 1 (continued)
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-SD-TB-B-09-0-2			BR-SD-TB-B-10-0-2			BR-SD-TB-B-11-0-2			BR-SD-TB-B-12-0-2			BR-SD-TB-B-13-0-2			BR-SD-TB-B-14-0-2			BR-SD-TB-B-15-0-2			BR-SD-TB-B-15DUP-0-2		
				Units	11/5/2020	Qualifiers	TEC	11/5/2020	Qualifiers	TEC	11/5/2020	Qualifiers	TEC	11/6/2020	Qualifiers	TEC	11/6/2020	Qualifiers	TEC	11/6/2020	Qualifiers	TEC	11/6/2020	Qualifiers	TEC	11/6/2020	Qualifiers	TEC
Dioxins and Furans																												
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/Kg	0.0023	J q B	0.000000	0.1	B	0.000000	0.094	B	0.000000	0.09		0.000090	0.02	q	0.000020	0.046		0.000046	0.0087		0.000009	0.007		0.000007
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/Kg	0.00016	J q B	0.000000	0.006	B	0.000000	0.0057	B	0.000000	0.0066	B	0.000000	0.0012	J B	0.000000	0.0025	J B	0.000000	0.0005	J q B	0.000000	0.00041	J B	0.000000
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/Kg	0.000043	U	0.000000	0.00028	J q B	0.000000	0.00033	J B	0.000000	0.00038	J	0.000004	0.000095	J	0.000001	0.00017	J q	0.000002	0.000027	U	0.000000	0.000055	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/Kg	0.000056	U	0.000000	0.0023	J B	0.000000	0.0019	J q B	0.000000	0.0022	J	0.001100	0.00055	J q	0.000275	0.00095	J q	0.000475	0.00031	J	0.000155	0.00017	J q	0.000085
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/Kg	0.000038	U	0.000000	0.0022	J	0.000220	0.002	J	0.000200	0.0023	J	0.000230	0.00043	J	0.000043	0.00092	J	0.000092	0.00017	J q	0.000017	0.000059	U	0.000000
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/Kg	0.000055	U	0.000000	0.0034	J B	0.000000	0.003	J B	0.000000	0.0034	J	0.000034	0.00078	J	0.000008	0.0015	J	0.000015	0.00027	J q	0.000003	0.00018	J q	0.000002
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.000041	U	0.000000	0.00072	J	0.000072	0.00066	J	0.000066	0.00088	J	0.000088	0.00016	J	0.000016	0.00029	J I	0.000029	0.000045	U	0.000000	0.000059	U	0.000000
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/Kg	0.00019	J q	0.000002	0.0085		0.000085	0.0075		0.000075	0.0077		0.000077	0.0017	J	0.000017	0.0035	J	0.000035	0.0008	J	0.000008	0.00069	J	0.000007
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/Kg	0.000051	U	0.000000	0.000085	J q	0.000009	0.000094	J q	0.000009	0.000065	U	0.000000	0.00004	U	0.000000	0.00005	U	0.000000	0.00006	U	0.000000	0.000073	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/Kg	0.000029	U	0.000000	0.0012	J B	0.000000	0.0011	J q B	0.000000	0.0011	J q	0.001100	0.00025	J	0.000250	0.00056	J q	0.000560	0.000064	U	0.000000	0.000069	U	0.000000
1,2,3,7,8-PeCDF	--	--	0.05	µg/Kg	0.000046	U	0.000000	0.00092	J q	0.000046	0.00078	J	0.000039	0.00094	J	0.000047	0.00017	J	0.000009	0.0003	J q	0.000015	0.000043	U	0.000000	0.000048	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.000043	U	0.000000	0.0013	J	0.000130	0.0011	J	0.000110	0.0012	J	0.000120	0.00019	J q	0.000019	0.00041	J q	0.000041	0.000051	U	0.000000	0.000057	U	0.000000
2,3,4,7,8-PeCDF	--	--	0.5	µg/Kg	0.000044	U	0.000000	0.00054	J q	0.000270	0.00067	J	0.000335	0.00076	J q	0.000380	0.00012	J q	0.000060	0.00027	J q	0.000135	0.000036	U	0.000000	0.000043	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/Kg	0.000065	U	0.000000	0.00043	J	0.000430	0.00032	J q	0.000320	0.0005	J q	0.000500	0.000038	J q	0.000038	0.00021	J	0.000210	0.000055	U	0.000000	0.000062	U	0.000000
2,3,7,8-TCDF	--	--	0.05	µg/Kg	0.000078	U	0.000000	0.002	q	0.000100	0.0019		0.000095	0.0017		0.000085	0.00042	J	0.000021	0.00069	J q	0.000035	0.00018	J	0.000009	0.000061	U	0.000000
OCDD	--	--	0.0001	µg/Kg	0.028	B	0.000000	1.1	B	0.000000	1.1	B	0.000000	0.97	B	0.000000	0.24	B	0.000000	0.53	B	0.000000	0.11	B	0.000000	0.085	B	0.000000
OCDF	--	--	0.0001	µg/Kg	0.00013	J q B	0.000000	0.006	J B	0.000000	0.0056	J B	0.000000	0.0059	J B	0.000000	0.0012	J B	0.000000	0.0026	J q B	0.000000	0.00048	J q B	0.000000	0.00045	J q B	0.000000
Dioxins and Furans TEQ	0.00085	--	--				0.000002			0.001362			0.001249			0.003855			0.000776			0.001689			0.000200			0.000101
Total HpCDD	--	--	--	µg/Kg	0.0083	q B		0.37	B		0.33	B		0.36			0.081	q		0.15			0.03			0.027		
Total HpCDF	--	--	--	µg/Kg	0.0003	J q B		0.014	q B		0.012	B		0.014	B		0.0025	J B		0.0054	q B		0.001	J q B		0.00084	J B	
Total HxCDD	--	--	--	µg/Kg	0.0039	J q B		0.19	B		0.18	q B		0.19	q		0.045	q		0.087	q		0.018	q		0.013	q	
Total HxCDF	--	--	--	µg/Kg	0.000051	U		0.019	I q		0.018	I q		0.022	I q		0.0045	I q		0.0086	I q		0.0012	J I q		0.00093	J q	
Total PeCDD	--	--	--	µg/Kg	0.00046	J q B		0.029	q B		0.029	q B		0.029	B q		0.0063	B q		0.013	q B		0.0017	J q B		0.0019	J q B	
Total PeCDF	--	--	--	µg/Kg	0.000046	U		0.013	I q		0.013	I q		0.016	I q		0.0025	J I q		0.0054	q		0.00057	J q		0.0004	J q	
Total TCDD	--	--	--	µg/Kg	0.00016	J q		0.013	q		0.014	q		0.013	q		0.0031	q		0.0061	q		0.00088	q		0.00088	q	
Total TCDF	--	--	--	µg/Kg	0.000078	U		0.014	I q		0.013	I q		0.017	I q		0.0032	q		0.0057	q		0.001	q		0.00053	J q	

Table 1 (continued)
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-TB-B-09-0-2		BR-SD-TB-B-10-0-2		BR-SD-TB-B-11-0-2		BR-SD-TB-B-12-0-2		BR-SD-TB-B-13-0-2		BR-SD-TB-B-14-0-2		BR-SD-TB-B-15-0-2		BR-SD-TB-B-15DUP-0-2	
			Units	11/5/2020	Qualifiers	11/5/2020	Qualifiers	11/5/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers
Metals																			
Arsenic	7.24	7.24	mg/Kg	1.1		9.2		2.7		1.7		1.7		1.9		1.3		1.3	
Barium	130.1	--	mg/Kg	3.2		0.069	J	6.1		8.9		12		5.2		6.4		7.1	
Cadmium	0.68	0.68	mg/Kg	0.040	J	13		0.064	J	0.072		0.042	J	0.036	J	0.093		0.077	
Chromium	52.3	52.3	mg/Kg	2.5		5.6		6.6		5.0		3.7		6.0		3.7		3.4	
Lead	30.2	30.2	mg/Kg	1.1		0.046		2.7		1.6		1.4		2.5		0.92		0.85	
Mercury	0.13	0.13	mg/Kg	0.013	U	0.23	J	0.021	J	0.014	U	0.014	U	0.016	U	0.012	U	0.013	U
Selenium	--	--	mg/Kg	0.080	U	0.024	U	0.13	J	0.11	J	0.094	J	0.095	J	0.11	J	0.097	J
Silver	0.73	0.73	mg/Kg	0.018	U			0.023	U	0.020	U	0.018	U	0.021	U	0.017	U	0.018	U
Pesticides																			
4,4'-DDD	1.22	1.2	µg/Kg	0.023	U	0.031	U	0.030	U	0.026	U	0.024	U	0.026	U	0.11	U	0.023	U
4,4'-DDE	2.07	2.1	µg/Kg	0.011	U	0.015	U	0.014	U	0.012	U	0.011	U	0.018	J	0.052	U	0.011	U
4,4'-DDT	1.19	--	µg/Kg	0.039	U	0.052	U	0.050	U	0.044	U	0.039	U	0.044	U	0.18	U	0.039	U
Aldrin	--	0.1	µg/Kg	0.017	U	0.023	U	0.021	U	0.019	U	0.017	U	0.019	U	0.079	U	0.017	U
alpha-BHC	--	1.3	µg/Kg	0.013	U	0.018	U	0.017	U	0.015	U	0.014	U	0.015	U	0.062	U	0.013	U
beta-BHC	--	--	µg/Kg	0.015	U	0.020	U	0.019	U	0.017	U	0.015	U	0.017	U	0.070	U	0.015	U
cis-Chlordane	--	2.7	µg/Kg	0.014	U	0.018	U	0.017	U	0.015	U	0.014	U	0.015	U	0.064	U	0.014	U
delta-BHC	--	--	µg/Kg	0.017	U	0.023	U	0.022	U	0.019	U	0.017	U	0.019	U	0.080	U	0.017	U
Dieldrin	0.72	0.1	µg/Kg	0.014	U	0.018	U	0.017	U	0.015	U	0.014	U	0.015	U	0.064	U	0.014	U
Endosulfan I	--	0.1	µg/Kg	0.015	U	0.020	U	0.019	U	0.016	U	0.015	U	0.017	U	0.069	U	0.015	U
Endosulfan II	--	0.14	µg/Kg	0.012	U	0.016	U	0.015	U	0.013	U	0.012	U	0.014	U	0.056	U	0.012	U
Endosulfan sulfate	--	0.11	µg/Kg	0.014	U	0.019	U	0.018	U	0.016	U	0.014	U	0.016	U	0.066	U	0.014	U
Endrin	--	0.12	µg/Kg	0.010	U	0.014	U	0.013	U	0.011	U	0.010	U	0.011	U	0.047	U	0.010	U
Endrin aldehyde	--	--	µg/Kg	0.020	U	0.026	U	0.025	U	0.022	U	0.020	U	0.022	U	0.091	U	0.019	U
Endrin ketone	--	0.12	µg/Kg	0.0075	U	0.010	U	0.0095	U	0.0084	U	0.0076	U	0.0085	U	0.035	U	0.0075	U
gamma-BHC (Lindane)	0.32	0.6	µg/Kg	0.014	U	0.019	U	0.018	U	0.016	U	0.014	U	0.016	U	0.065	U	0.014	U
Heptachlor	--	1.5	µg/Kg	0.017	U	0.023	U	0.022	U	0.019	U	0.017	U	0.019	U	0.079	U	0.017	U
Heptachlor epoxide	--	0.14	µg/Kg	0.014	U	0.019	U	0.018	U	0.016	U	0.014	U	0.016	U	0.065	U	0.014	U
Methoxychlor	--	2.1	µg/Kg	0.021	U	0.028	U	0.027	U	0.024	U	0.021	U	0.024	U	0.099	U	0.021	U
Toxaphene	0.1	0.15	µg/Kg	1.5	U	2.0	U	1.9	U	1.6	U	1.5	U	1.7	U	6.9	U	1.5	U
trans-Chlordane	--	2.7	µg/Kg	0.013	U	0.017	U	0.016	U	0.014	U	0.013	U	0.014	U	0.059	U	0.013	U

Table 1 (continued)
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-TB-B-09-0-2		BR-SD-TB-B-10-0-2		BR-SD-TB-B-11-0-2		BR-SD-TB-B-12-0-2		BR-SD-TB-B-13-0-2		BR-SD-TB-B-14-0-2		BR-SD-TB-B-15-0-2		BR-SD-TB-B-15DUP-0-2	
			Units	11/5/2020	Qualifiers	11/5/2020	Qualifiers	11/5/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/6/2020	Qualifiers	11/5/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)																			
PCB-1016	--	--	µg/Kg	0.18	U	0.24	U	0.22	U	0.20	U	0.18	U	0.20	U	0.17	U	0.18	U
PCB-1221	--	--	µg/Kg	0.19	U	0.26	U	0.25	U	0.22	U	0.20	U	0.22	U	0.18	U	0.19	U
PCB-1232	--	--	µg/Kg	0.13	U	0.18	U	0.17	U	0.15	U	0.14	U	0.15	U	0.13	U	0.13	U
PCB-1242	--	--	µg/Kg	0.080	U	0.11	U	0.10	U	0.090	U	0.081	U	0.089	U	0.075	U	0.080	U
PCB-1248	--	--	µg/Kg	0.13	U	0.18	U	0.17	U	0.15	U	0.13	U	0.15	U	0.12	U	0.13	U
PCB-1254	63.3	--	µg/Kg	0.16	U	0.22	U	0.21	U	0.18	U	0.17	U	0.18	U	0.15	U	0.16	U
PCB-1260	--	--	µg/Kg	0.16	U	0.21	U	0.20	U	0.18	U	0.16	U	0.17	U	0.15	U	0.16	U
PCB-1262	--	--	µg/Kg	0.19	U	0.26	U	0.24	U	0.22	U	0.19	U	0.22	U	0.18	U	0.19	U
PCB-1268	--	--	µg/Kg	0.58		11		7.4		3.4		1.5		3.0		1.2		0.074	U
Total PCBs	21.6	21.6	µg/Kg	0.58		11		7.4		3.4		1.5		3.0		1.2		0.00	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	6.71	6.7	µg/Kg	5.0	U	8.4	U	7.8	U	7.0	U	5.1	U	5.6	U	4.7	U	5.0	U
Acenaphthylene	5.87	5.9	µg/Kg	3.8	U	6.4	U	6.0	U	5.3	U	3.9	U	4.3	U	3.6	U	3.8	U
Anthracene	46.9	47	µg/Kg	4.5	U	7.6	U	7.1	U	6.3	U	4.6	U	5.1	U	4.3	U	4.5	U
Benzo[a]anthracene	74.8	75	µg/Kg	7.8	U	13	U	12	U	11	U	8.0	U	8.8	U	7.4	U	7.8	U
Benzo[a]pyrene	88.8	89	µg/Kg	7.5	U	13	U	12	U	11	U	7.7	U	8.5	U	7.1	U	7.5	U
Benzo[b]fluoranthene	--	--	µg/Kg	4.3	U	10	J	6.7	U	6.0	U	4.3	U	4.8	U	4.0	U	4.3	U
Benzo[g,h,i]perylene	--	310	µg/Kg	3.7	U	6.3	U	5.9	U	5.3	U	3.8	U	4.2	U	3.5	U	3.7	U
Benzo[k]fluoranthene	--	--	µg/Kg	5.2	U	8.7	U	8.2	U	7.3	U	5.3	U	5.9	U	4.9	U	5.2	U
Chrysene	108	108	µg/Kg	9.6	U	16	U	15	U	14	U	9.8	U	11	U	9.1	U	9.6	U
Dibenz(a,h)anthracene	6.22	6.2	µg/Kg	11	U	19	U	17	U	16	U	11	U	12	U	10	U	11	U
Fluoranthene	113	113	µg/Kg	4.6	U	9.6	J	7.2	U	6.4	U	4.7	U	5.2	U	4.3	U	4.6	U
Fluorene	21.2	21	µg/Kg	3.4	U	5.7	U	5.4	U	4.8	U	3.5	U	3.8	U	3.2	U	3.4	U
Indeno[1,2,3-cd]pyrene	--	340	µg/Kg	8.6	U	15	U	14	U	12	U	8.8	U	9.7	U	8.2	U	8.6	U
Naphthalene	34.6	35	µg/Kg	3.4	U	5.7	U	5.3	U	4.8	U	3.4	U	3.8	U	3.2	U	3.4	U
Phenanthrene	86.7	87	µg/Kg	4.7	U	7.8	U	7.3	U	6.6	U	4.7	U	5.2	U	4.4	U	4.7	U
Pyrene	153	153	µg/Kg	4.1	U	7.6	J	6.5	U	5.8	U	4.2	U	4.6	U	3.9	U	4.1	U
Total PAHs	1684	1684	µg/Kg	0.0		27.2		0.0		0.0		0.0		0.0		0.0		0.0	

Table 1
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-SD-BW-B-01-0-2			BR-SD-BW-B-02-0-2			BR-SD-BW-B-03-0-2			BR-SD-BW-B-03DUP-0-2			BR-SD-BW-B-04-0-2			BR-SD-BW-B-05-0-2		
				Units	11/7/2020	Qualifiers	TEC	11/7/2020	Qualifiers	TEC	11/7/2020	Qualifiers	TEC	11/7/2020	Qualifiers	TEC	11/8/2020	Qualifiers	TEC	11/8/2020	Qualifiers	TEC
Dioxins and Furans																						
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/Kg	0.0067		0.000007	0.0038		0.000004	0.003	q	0.000003	0.0042		0.000004	0.026		0.000026	0.021		0.000021
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/Kg	0.00021	J B q	0.000000	0.00016	J B q	0.000000	0.00013	J B q	0.000000	0.00015	J B q	0.000000	0.001	J B	0.000000	0.00069	J B	0.000000
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/Kg	0.000027	J q	0.000000	0.000031	U	0.000000	0.00002	U	0.000000	0.000034	U	0.000000	0.000061	U	0.000000	0.000035	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/Kg	0.00016	J q	0.000080	0.00013	J q	0.000065	0.00013	J	0.000065	0.00011	J q	0.000055	0.00078	J	0.000390	0.00054	J	0.000270
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/Kg	0.000031	U	0.000000	0.000029	U	0.000000	0.000025	U	0.000000	0.000049	U	0.000000	0.00034	J q	0.000034	0.0002	J	0.000020
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/Kg	0.00029	J	0.000003	0.00015	J q	0.000002	0.00014	J q	0.000001	0.00015	J	0.000002	0.00082	J q	0.000008	0.00069	J q	0.000007
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.000034	U	0.000000	0.000031	U	0.000000	0.000027	U	0.000000	0.000051	U	0.000000	0.000085	U	0.000000	0.000041	U	0.000000
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/Kg	0.00057	J	0.000006	0.00034	J q	0.000003	0.00028	J q	0.000003	0.00042	J q	0.000004	0.0022	J	0.000022	0.0017	J	0.000017
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/Kg	0.000046	U	0.000000	0.000042	U	0.000000	0.000036	U	0.000000	0.000067	U	0.000000	0.00012	U	0.000000	0.000056	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/Kg	0.00011	J	0.000110	0.000035	U	0.000000	0.000052	U	0.000000	0.000073	U	0.000000	0.00024	J q	0.000240	0.00025	J	0.000250
1,2,3,7,8-PeCDF	--	--	0.05	µg/Kg	0.000042	U	0.000000	0.000039	U	0.000000	0.000038	U	0.000000	0.000047	U	0.000000	0.00017	J q	0.000009	0.000071	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/Kg	0.000036	U	0.000000	0.000033	U	0.000000	0.000084	J q	0.000008	0.000076	J q	0.000008	0.000091	U	0.000000	0.00012	J q	0.000012
2,3,4,7,8-PeCDF	--	--	0.5	µg/Kg	0.000038	U	0.000000	0.000035	U	0.000000	0.000035	U	0.000000	0.000044	U	0.000000	0.000095	J q	0.000048	0.00006	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/Kg	0.000044	U	0.000000	0.000041	U	0.000000	0.000049	U	0.000000	0.0001	U	0.000000	0.00011	U	0.000000	0.00007	U	0.000000
2,3,7,8-TCDF	--	--	0.05	µg/Kg	0.00012	J q	0.000006	0.00005	U	0.000000	0.000049	U	0.000000	0.00014	J	0.000007	0.00036	J q	0.000018	0.00021	J q	0.000011
OCDD	--	--	0.0001	µg/Kg	0.077	B	0.000000	0.043	B	0.000000	0.04	B	0.000000	0.047	B	0.000000	0.32	B	0.000000	0.25	B	0.000000
OCDF	--	--	0.0001	µg/Kg	0.0003	J B	0.000000	0.00017	J B	0.000000	0.00016	J B q	0.000000	0.00024	J B	0.000000	0.0013	J B q	0.000000	0.00055	J B q	0.000000
Dioxins and Furans TEQ	0.00085	--	--				0.000212			0.000074			0.000081			0.000080			0.000794			0.000607
Total HpCDD	--	--	--	µg/Kg	0.024			0.015			0.012	q		0.016			0.099			0.076	q	
Total HpCDF	--	--	--	µg/Kg	0.00048	J B q		0.0003	J B q		0.00027	J B q		0.00026	J B q		0.0022	J B		0.0013	J B q	
Total HxCDD	--	--	--	µg/Kg	0.014	q		0.0078	q		0.0072	q		0.0098	q		0.057	q		0.044	q	
Total HxCDF	--	--	--	µg/Kg	0.00026	J q		0.00028	J q		0.00035	J q		0.00057	J q		0.0024	J q		0.0015	J q	
Total PeCDD	--	--	--	µg/Kg	0.002	J B q		0.00086	J B q		0.00099	J B q		0.0016	J B q		0.0089	B q		0.0062	B q	
Total PeCDF	--	--	--	µg/Kg	0.0002	J		0.000039	U		0.00012	J q		0.00018	J q		0.0021	J I q		0.001	J q	
Total TCDD	--	--	--	µg/Kg	0.0052			0.00029	J q		0.00054	J q		0.0012	q		0.0044	q		0.003	q	
Total TCDF	--	--	--	µg/Kg	0.00058	J q		0.000081	J		0.00015	J q		0.00046	J q		0.0035	q		0.0014	q	

Table 1
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-BW-B-01-0-2		BR-SD-BW-B-01-0-2		BR-SD-BW-B-03-0-2		BR-SD-BW-B-03DUP-0-2		BR-SD-BW-B-04-0-2		BR-SD-BW-B-05-0-2	
			Units	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/8/2020	Qualifiers	11/8/2020	Qualifiers
Metals															
Arsenic	7.24	7.24	mg/Kg	3.5		6.8		2.3		2.2		4.2		4.5	
Barium	130.1	--	mg/Kg	6.0		4.0		2.7		3.7		7.0		4.3	
Cadmium	0.68	0.68	mg/Kg	0.075		0.045	J	0.072		0.085		0.050	J	0.034	J
Chromium	52.3	52.3	mg/Kg	8.0		5.1		2.5		3.3		8.7		5.5	
Lead	30.2	30.2	mg/Kg	2.9	B	2.0	B	0.83	B	0.99	B	3.3	B	2.0	B
Mercury	0.13	0.13	mg/Kg	0.014	U	0.015	U	0.013	U	0.012	U	0.017	U	0.016	U
Selenium	--	--	mg/Kg	0.17	J	0.092	U	0.18	J	0.077	J	0.17	J	0.11	J
Silver	0.73	0.73	mg/Kg	0.018	U	0.021	U	0.017	U	0.016	U	0.023	U	0.022	U
Pesticides															
4,4'-DDD	1.22	1.2	µg/Kg	0.023	U	0.027	U	0.021	U	0.021	U	0.030	U	0.028	U
4,4'-DDE	2.07	2.1	µg/Kg	0.011	U	0.013	U	0.010	U	0.010	U	0.014	U	0.014	U
4,4'-DDT	1.19	--	µg/Kg	0.039	U	0.045	U	0.036	U	0.036	U	0.050	U	0.047	U
Aldrin	--	0.1	µg/Kg	0.017	U	0.020	U	0.015	U	0.016	U	0.022	U	0.021	U
alpha-BHC	--	1.3	µg/Kg	0.013	U	0.015	U	0.012	U	0.012	U	0.017	U	0.016	U
beta-BHC	--	--	µg/Kg	0.015	U	0.017	U	0.16		0.014	U	0.019	U	0.018	U
cis-Chlordane	--	2.7	µg/Kg	0.014	U	0.016	U	0.013	U	0.013	U	0.017	U	0.017	U
delta-BHC	--	--	µg/Kg	0.017	U	0.020	U	0.016	U	0.016	U	0.022	U	0.021	U
Dieldrin	0.72	0.1	µg/Kg	0.014	U	0.016	U	0.013	U	0.013	U	0.017	U	0.017	U
Endosulfan I	--	0.1	µg/Kg	0.015	U	0.017	U	0.014	U	0.014	U	0.019	U	0.018	U
Endosulfan II	--	0.14	µg/Kg	0.012	U	0.014	U	0.011	U	0.011	U	0.015	U	0.015	U
Endosulfan sulfate	--	0.11	µg/Kg	0.014	U	0.016	U	0.013	U	0.013	U	0.018	U	0.017	U
Endrin	--	0.12	µg/Kg	0.010	U	0.012	U	0.0093	U	0.0094	U	0.013	U	0.012	U
Endrin aldehyde	--	--	µg/Kg	0.019	U	0.022	U	0.018	U	0.018	U	0.025	U	0.024	U
Endrin ketone	--	0.12	µg/Kg	0.0075	U	0.0087	U	0.0069	U	0.0069	U	0.0096	U	0.0091	U
gamma-BHC (Lindane)	0.32	0.6	µg/Kg	0.014	U	0.016	U	0.013	U	0.013	U	0.018	U	0.017	U
Heptachlor	--	1.5	µg/Kg	0.025	J p	0.020	U	0.016	U	0.016	U	0.022	U	0.021	U
Heptachlor epoxide	--	0.14	µg/Kg	0.014	U	0.016	U	0.013	U	0.013	U	0.018	U	0.017	U
Methoxychlor	--	2.1	µg/Kg	0.021	U	0.025	U	0.019	U	0.020	U	0.027	U	0.026	U
Toxaphene	0.1	0.15	µg/Kg	1.5	U	1.7	U	1.4	U	1.4	U	1.9	U	1.8	U
trans-Chlordane	--	2.7	µg/Kg	0.013	U	0.015	U	0.012	U	0.012	U	0.016	U	0.015	U

Table 1
Sediment Analytical Results

Analyte	NOAA SQuiRTs Marine Sediments TEL (2008) [1]	EPA Region IV Marine/Estuarine ESV (2018) [2]		BR-SD-BW-B-01-0-2		BR-SD-BW-B-01-0-2		BR-SD-BW-B-03-0-2		BR-SD-BW-B-03DUP-0-2		BR-SD-BW-B-04-0-2		BR-SD-BW-B-05-0-2	
			Units	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/7/2020	Qualifiers	11/8/2020	Qualifiers	11/8/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)															
PCB-1016	--	--	µg/Kg	0.18	U	0.20	U	0.16	U	0.16	U	0.22	U	0.21	U
PCB-1221	--	--	µg/Kg	0.19	U	0.22	U	0.18	U	0.17	U	0.25	U	0.23	U
PCB-1232	--	--	µg/Kg	0.13	U	0.15	U	0.12	U	0.12	U	0.17	U	0.16	U
PCB-1242	--	--	µg/Kg	0.080	U	0.091	U	0.073	U	0.072	U	0.10	U	0.096	U
PCB-1248	--	--	µg/Kg	0.13	U	0.15	U	0.12	U	0.12	U	0.17	U	0.16	U
PCB-1254	63.3	--	µg/Kg	0.16	U	0.19	U	0.15	U	0.15	U	0.21	U	0.20	U
PCB-1260	--	--	µg/Kg	0.16	U	0.18	U	0.14	U	0.14	U	0.20	U *3	0.47	J
PCB-1262	--	--	µg/Kg	0.19	U	0.22	U	0.18	U	0.17	U	0.24	U *3	0.23	U
PCB-1268	--	--	µg/Kg	1.1		18		0.76		0.78		2.3	*3	0.088	U
Total PCBs	21.6	21.6	µg/Kg	1.1		18		0.76		0.78		2.3		0.47	
Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	6.71	6.7	µg/Kg	5.0	U	5.8	U	4.5	U	4.5	U	6.5	U	6.1	U
Acenaphthylene	5.87	5.9	µg/Kg	3.8	U	4.4	U	3.4	U	3.4	U	4.9	U	4.6	U
Anthracene	46.9	47	µg/Kg	4.5	U	5.3	U	4.1	U	4.1	U	5.8	U	5.5	U
Benzo[a]anthracene	74.8	75	µg/Kg	7.9	U	9.1	U	7.1	U	7.1	U	10	U	9.5	U
Benzo[a]pyrene	88.8	89	µg/Kg	7.6	U	8.8	U	6.8	U	6.8	U	9.7	U	9.2	U
Benzo[b]fluoranthene	--	--	µg/Kg	4.3	U	5.0	U	3.9	U	3.9	U	5.5	U	5.2	U
Benzo[g,h,i]perylene	--	310	µg/Kg	3.8	U	4.4	U	3.4	U	3.4	U	4.8	U	4.6	U
Benzo[k]fluoranthene	--	--	µg/Kg	5.2	U	6.1	U	4.7	U	4.7	U	6.7	U	6.3	U
Chrysene	108	108	µg/Kg	9.7	U	11	U	8.7	U	8.7	U	12	U	12	U
Dibenz(a,h)anthracene	6.22	6.2	µg/Kg	11	U	13	U	10	U	10	U	14	U	14	U
Fluoranthene	113	113	µg/Kg	4.6	U	5.4	U	4.2	U	4.2	U	5.9	U	5.6	U
Fluorene	21.2	21	µg/Kg	3.4	U	4.0	U	3.1	U	3.1	U	4.4	U	4.1	U
Indeno[1,2,3-cd]pyrene	--	340	µg/Kg	8.7	U	10	U	7.8	U	7.8	U	11	U	11	U
Naphthalene	34.6	35	µg/Kg	3.4	U	4.0	U	3.1	U	3.1	U	4.4	U	4.1	U
Phenanthrene	86.7	87	µg/Kg	4.7	U	5.4	U	4.2	U	4.2	U	6.0	U	5.7	U
Pyrene	153	153	µg/Kg	4.1	U	4.8	U	3.7	U	3.7	U	5.3	U	5.0	U
Total PAHs	1684	1684	µg/Kg	0.0		0.0		0.0		0.0		0.0		0.0	

Notes:
1. Threshold Effect Level referenced in NOAA SQuiRTs Quick Refererence Tables (2008)
2. Ecological Screening Values referenced in United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update
3. 2005 TEF as referenced in NOAA SQuiRTs Quick Refererence Tables (2008)
Values highlighted in yellow exceed a screening value for that analyte.
-- No Value referenced
U - The analyte was analyzed for, but was not detected above the concentration shown (MDL or EDL).
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
q - The reported result is the estimated maximum possible concentration of this analyte.
B - Compound was found in the blank and sample.
*3 - ISTD response or retention time outside acceptable limits.
MDL - Method Detection Limit
RL - Reporting Limit or Requested Limit (Radiochemistry).
EDL - Estimated Detection Limit (Dioxin)
TEF - Toxicity Equivalent Factor (Dioxin)
TEC - Toxicity Equivalent Quotient (Dioxin)
TEL - Threshold Effect Level
ESV - Ecological Screening Value

Table 2
Surface Water and Equipment Blank Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-SW-TB			BR-SW-BW			BR-EQUIP BLANK		
				Units	11/6/2020	Qualifiers	TEC	11/9/2020	Qualifiers	TEC	11/9/2020	Qualifiers	TEC
Dioxins and Furans													
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/L	0.0000011	U	0.000000	0.00000072	J q	0.000000	0.000001	U	0.000000
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/L	0.00055	U	0.000000	0.00035	U	0.000000	0.00038	U	0.000000
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/L	0.00063	U	0.000000	0.00046	U	0.000000	0.00048	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/L	0.00041	U	0.000000	0.00059	U	0.000000	0.0015	J B	0.000000
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/L	0.00038	U	0.000000	0.00028	U	0.000000	0.00058	U	0.000000
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/L	0.0004	U	0.000000	0.00064	U	0.000000	0.00043	U	0.000000
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/L	0.00044	U	0.000000	0.0003	U	0.000000	0.00065	U	0.000000
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/L	0.00039	U	0.000000	0.00059	U	0.000000	0.00042	U	0.000000
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/L	0.00053	U	0.000000	0.00043	U	0.000000	0.00079	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/L	0.00016	U	0.000000	0.00025	U	0.000000	0.00033	U	0.000000
1,2,3,7,8-PeCDF	--	--	0.05	µg/L	0.00039	U	0.000000	0.00031	U	0.000000	0.00047	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/L	0.00045	U	0.000000	0.0003	U	0.000000	0.00065	U	0.000000
2,3,4,7,8-PeCDF	--	--	0.5	µg/L	0.00034	U	0.000000	0.00029	U	0.000000	0.00042	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/L	0.00053	U	0.000000	0.00053	U	0.000000	0.00088	U	0.000000
2,3,7,8-TCDF	--	--	0.05	µg/L	0.00066	U	0.000000	0.00046	U	0.000000	0.00072	U	0.000000
OCDD	--	--	0.0001	µg/L	0.017	J B	0.000000	0.014	J B	0.000000	0.0018	J B q	0.000000
OCDF	--	--	0.0001	µg/L	0.00034	U	0.000000	0.00059	J B	0.000000	0.00039	U	0.000000
Dioxins and Furans TEQ	--	--	--	µg/L			0.000000			0.000000			0.000000
Total HpCDD	--	--	--	µg/L	0.0033	J q		0.0038	J q		0.001	U	
Total HpCDF	--	--	--	µg/L	0.00063	U		0.00046	U		0.00048	U	
Total HxCDD	--	--	--	µg/L	0.0022	J B		0.00064	U		0.0015	J B	
Total HxCDF	--	--	--	µg/L	0.00053	U		0.00043	U		0.00079	U	
Total PeCDD	--	--	--	µg/L	0.00016	U		0.00025	U		0.00033	U	
Total PeCDF	--	--	--	µg/L	0.00039	U		0.00031	U		0.00047	U	
Total TCDD	--	--	--	µg/L	0.00053	U		0.00053	U		0.00088	U	
Total TCDF	--	--	--	µg/L	0.00066	U		0.00046	U		0.00072	U	

Table 2 (continued)
Surface Water and Equipment Blank Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-SW-TB		BR-SW-BW		BR-EQUIP BLANK	
			Units	11/6/2020	Qualifiers	11/9/2020	Qualifiers	11/9/2020	Qualifiers
Metals (unfiltered)									
Arsenic	69	69	µg/L	3.2	J	3.1	U	0.31	U
Barium	1000	110	µg/L	21	U	18	J	1.6	U
Cadmium	40	33	µg/L	3	U	2.2	U	0.22	U
Chromium (total)	-	1100	µg/L	15	U	15	U	1.5	U
Lead	210	210	µg/L	1.3	U	1.3	U	0.13	U
Mercury	1.8	1.8	µg/L	0.13	U	0.13	U	0.13	U
Selenium	290	290	µg/L	15	U	15	U	1.5	U
Silver	0.95	1.9	µg/L	1.8	U	1.8	U	0.18	U
Pesticides									
4,4'-DDD	3.6	0.35	µg/L	0.00051	U	0.00051	U	0.00051	U
4,4'-DDE	14	0.7	µg/L	0.00028	U	0.00028	U	0.00028	U
4,4'-DDT	0.065	0.13	µg/L	0.00028	U	0.00028	U	0.00028	U
Aldrin	0.65	1.3	µg/L	0.00034	U	0.00034	U	0.00034	U
alpha-BHC	--	--	µg/L	0.00023	U	0.00023	U	0.00023	U
beta-BHC	--	--	µg/L	0.00035	U	0.00035	U	0.00035	U
cis-Chlordane	--	--	µg/L	0.00043	J p	0.00035	U	0.00035	U
delta-BHC	--	--	µg/L	0.00061	U	0.00061	U	0.00061	U
Dieldrin	0.335	0.71	µg/L	0.00026	U	0.00026	U	0.00026	U
Endosulfan I	0.017	0.03	µg/L	0.00065	U	0.00065	U	0.00065	U
Endosulfan II	0.017	0.03	µg/L	0.00030	U	0.00030	U	0.00030	U
Endosulfan sulfate	--	0.03	µg/L	0.00061	U	0.00061	U	0.00061	U
Endrin	0.0185	0.04	µg/L	0.00022	U	0.00022	U	0.00022	U
Endrin aldehyde	--	--	µg/L	0.00049	U	0.00049	U	0.00049	U
Endrin ketone	--	--	µg/L	0.00038	U	0.00038	U	0.00038	U
gamma-BHC (Lindane)	0.08	0.16	µg/L	0.00028	U	0.00065	J p	0.00028	U
Heptachlor	0.0265	0.05	µg/L	0.0012		0.00050	J p	0.00043	U
Heptachlor epoxide	0.0265	0.05	µg/L	0.00032	U	0.00032	U	0.00032	U
Methoxychlor	--	--	µg/L	0.00074	U	0.00074	U	0.00074	U
Toxaphene	0.21	0.21	µg/L	0.047	U	0.047	U	0.047	U
trans-Chlordane	--	--	µg/L	0.00039	U	0.00039	U	0.00039	U

Table 2 (continued)
Surface Water and Equipment Blank Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-SW-TB		BR-SW-BW		BR-EQUIP BLANK	
			Units	11/6/2020	Qualifiers	11/9/2020	Qualifiers	11/9/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)									
PCB-1016	--	--	µg/L	0.0045	U	0.0045	U	0.0045	U
PCB-1221	--	--	µg/L	0.0054	U	0.0054	U	0.0054	U
PCB-1232	--	--	µg/L	0.0050	U	0.0050	U	0.0050	U
PCB-1242	--	--	µg/L	0.0034	U	0.0034	U	0.0034	U
PCB-1248	--	--	µg/L	0.0028	U	0.0028	U	0.0028	U
PCB-1254	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U
PCB-1260	--	--	µg/L	0.0037	U	0.0037	U	0.0037	U
PCB-1262	--	--	µg/L	0.0068	U	0.0068	U	0.0068	U
PCB-1268	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U
Total PCBs	0.033	0.03	µg/L	0.000		0.000		0.000	
Polycyclic Aromatic Hydrocarbons (PAHs)									
Acenaphthene	970	320	µg/L	0.063	U	0.060	U	0.060	U
Acenaphthylene	300	291	µg/L	0.063	U	0.060	U	0.060	U
Anthracene	300	1.8	µg/L	0.047	U	0.045	U	0.045	U
Benzo[a]anthracene	300	4.6	µg/L	0.072	U	0.069	U	0.069	U
Benzo[a]pyrene	300	0.64	µg/L	0.051	U	0.049	U	0.049	U
Benzo[b]fluoranthene	300	1.4	µg/L	0.093	U	0.090	U	0.090	U
Benzo[g,h,i]perylene	300	0.19	µg/L	0.066	U	0.064	U	0.064	U
Benzo[k]fluoranthene	300	1.3	µg/L	0.085	U	0.081	U	0.081	U
Chrysene	300	4.2	µg/L	0.078	U	0.075	U	0.075	U
Dibenz(a,h)anthracene	300	0.28	µg/L	0.069	U	0.067	U	0.067	U
Fluoranthene	40	3.4	µg/L	0.058	U	0.057	J	0.056	U
Fluorene	300	82	µg/L	0.066	U	0.064	U	0.064	U
Indeno[1,2,3-cd]pyrene	300	0.27	µg/L	0.082	U	0.079	U	0.079	U
Naphthalene	2350	780	µg/L	0.057	U	0.055	U	0.055	U
Phenanthrene	7.7	7.7	µg/L	0.053	U	0.081	J	0.051	U
Pyrene	300	0.45	µg/L	0.052	U	0.05	U	0.050	U
Total PAHs	300	--	µg/L	0.000		0.138		0.000	

Notes:
1. Threshold Effect Level referenced in NOAA SQuiRTs Quick Refererence Tables (2008)
2. Ecological Screening Values referenced in United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update
3. 2005 TEF as referenced in NOAA SQuiRTs Quick Refererence Tables (2008)

Values highlighted in yellow exceed a screening value for that analyte.
-- No Value referenced
U - The analyte was analyzed for, but was not detected above the concentration shown (MDL or EDL).
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
q - The reported result is the estimated maximum possible concentration of this analyte.
B - Compound was found in the blank and sample.
MDL - Method Detection Limit
RL - Reporting Limit or Requested Limit (Radiochemistry).
EDL - Estimated Detection Limit (Dioxin)
TEF - Toxicity Equivalent Factor (Dioxin)
TEC - Toxicity Equivalent Quotient (Dioxin)
TEL - Threshold Effect Level
ESV - Ecological Screening Value

Table 3
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-EL-SD-TB-CS01-0-2 Total			BR-EL-SD-TB-CS01-0-2 Dissolved			BR-EL-SD-TB-CS02-0-2 Total			BR-EL-SD-TB-CS02-0-2 Dissolved			BR-EL-SD-TB-CS03-0-2 Total			BR-EL-SD-TB-CS03-0-2 Dissolved			BR-EL-SD-TB-CS04-0-2 Total			BR-EL-SD-TB-CS04-0-2 Dissolved		
				Units	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC
Dioxins and Furans																												
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/L	0.000022	J	0.000000	0.000005	J	0.000000	0.000063	J	0.000000	0.0000056	J q	0.000000	0.000018	J	0.000000	0.0000023	J q	0.000000	0.000026	J	0.000000	0.0000084	J	0.000000
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/L	0.0011	J q	0.000011	0.00021	U	0.000000	0.0037	J q	0.000037	0.00044	J q	0.000004	0.0012	J	0.000012	0.00036	U	0.000000	0.0018	J	0.000018	0.00056	J q	0.000006
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/L	0.00065	U	0.000000	0.00026	U	0.000000	0.0012	U	0.000000	0.00033	U	0.000000	0.0003	U	0.000000	0.00049	U	0.000000	0.00052	U	0.000000	0.00037	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/L	0.0014	J B	0.000000	0.00082	J B	0.000000	0.003	J q B	0.000000	0.00093	U	0.000000	0.0011	J q B	0.000000	0.00063	J q B	0.000000	0.00051	U	0.000000	0.00055	J q B	0.000000
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/L	0.00052	J q	0.000052	0.00017	U	0.000000	0.0009	U	0.000000	0.0013	U	0.000000	0.0003	J q	0.000030	0.00014	U	0.000000	0.00027	U	0.000000	0.00022	J q	0.000022
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/L	0.00077	J q	0.000008	0.00029	U	0.000000	0.0023	J q	0.000023	0.00086	U	0.000000	0.00062	J	0.000006	0.00038	U	0.000000	0.00054	U	0.000000	0.00044	U	0.000000
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/L	0.00026	J q	0.000026	0.00018	U	0.000000	0.00098	U	0.000000	0.0015	U	0.000000	0.00027	J q	0.000027	0.00016	U	0.000000	0.00031	U	0.000000	0.00015	U	0.000000
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/L	0.0011	J	0.000011	0.00027	U	0.000000	0.0038	J S	0.000038	0.00085	U	0.000000	0.0015	J q	0.000015	0.00036	U	0.000000	0.0015	J	0.000015	0.00082	J	0.000008
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/L	0.00028	U	0.000000	0.00022	U	0.000000	0.0012	U	0.000000	0.0016	U	0.000000	0.00033	J q	0.000033	0.0002	U	0.000000	0.00038	U	0.000000	0.00018	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/L	0.00019	U	0.000000	0.00033	J q	0.000330	0.00075	U	0.000000	0.00021	U	0.000000	0.00048	J	0.000480	0.00017	U	0.000000	0.00024	U	0.000000	0.0002	U	0.000000
1,2,3,7,8-PeCDF	--	--	0.05	µg/L	0.00023	U	0.000000	0.00022	U	0.000000	0.00074	U	0.000000	0.00067	U	0.000000	0.00021	U	0.000000	0.00021	U	0.000000	0.00023	U	0.000000	0.00026	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/L	0.00025	U	0.000000	0.00019	U	0.000000	0.00087	U	0.000000	0.0014	U	0.000000	0.0002	U	0.000000	0.00025	U	0.000000	0.00034	U	0.000000	0.00016	U	0.000000
2,3,4,7,8-PeCDF	--	--	0.5	µg/L	0.00022	U	0.000000	0.0002	U	0.000000	0.00071	U	0.000000	0.00059	U	0.000000	0.00018	U	0.000000	0.00024	U	0.000000	0.00022	U	0.000000	0.00023	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/L	0.00019	U	0.000000	0.0004	U	0.000000	0.001	U	0.000000	0.0014	U	0.000000	0.00029	U	0.000000	0.00031	U	0.000000	0.0004	U	0.000000	0.00029	U	0.000000
2,3,7,8-TCDF	--	--	0.05	µg/L	0.00026	U	0.000000	0.00026	U	0.000000	0.001	U	0.000000	0.001	U	0.000000	0.00022	U	0.000000	0.0003	U	0.000000	0.00036	U	0.000000	0.00021	U	0.000000
OCDD	--	--	0.0001	µg/L	0.5	B	0.000000	0.065	J B	0.000000	0.98	B	0.000000	0.054	J B	0.000000	0.36	B	0.000000	0.036	J B	0.000000	0.75	B	0.000000	0.12	B	0.000000
OCDF	--	--	0.0001	µg/L	0.003	J B	0.000000	0.00069	J q B	0.000000	0.004	J q B	0.000000	0.00038	U	0.000000	0.0018	J q B	0.000000	0.0007	J q B	0.000000	0.0027	J B	0.000000	0.00075	J B	0.000000
Dioxins and Furans TEQ	--	--	--	µg/L			0.000108			0.000330			0.000098			0.000004			0.000603			0.000000			0.000033			0.000036
Total HpCDD	--	--	--	µg/L	0.075			0.016	J q		0.26			0.014	J q		0.065			0.0078	J q		0.094			0.028	J	
Total HpCDF	--	--	--	µg/L	0.0026	J q		0.00026	U		0.0082	J q		0.00044	J q		0.0028	J		0.00049	U		0.003	J q		0.00056	J q	
Total HxCDD	--	--	--	µg/L	0.027	J q B		0.0085	J q B		0.095	q S B		0.0062	J q B		0.033	J q B		0.0036	J q B		0.031	J q B		0.011	J q B	
Total HxCDF	--	--	--	µg/L	0.0033	J q		0.00022	U		0.0055	J		0.0016	U		0.0045	J I q		0.00025	U		0.0016	J q		0.001	J q	
Total PeCDD	--	--	--	µg/L	0.0015	J q B		0.0013	J q B		0.0042	J q B		0.00021	U		0.0039	J q B		0.00017	U		0.0026	J q B		0.0002	U	
Total PeCDF	--	--	--	µg/L	0.00023	U		0.00022	U		0.00074	U		0.00067	U		0.00051	J q B		0.00024	U		0.00023	U		0.00026	U	
Total TCDD	--	--	--	µg/L	0.00089	J		0.0004	U		0.0038	J		0.0014	U		0.0006	J q		0.00031	U		0.0004	U		0.00029	U	
Total TCDF	--	--	--	µg/L	0.00042	J q		0.00026	U		0.0023	J		0.001	U		0.0004	J q		0.0003	U		0.00036	U		0.00021	U	

Table 3 (continued)
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-EL-SD-TB-CS01-0-2 Total		BR-EL-SD-TB-CS01-0-2 Dissolved		BR-EL-SD-TB-CS02-0-2 Total		BR-EL-SD-TB-CS02-0-2 Dissolved		BR-EL-SD-TB-CS03-0-2 Total		BR-EL-SD-TB-CS03-0-2 Dissolved		BR-EL-SD-TB-CS04-0-2 Total		BR-EL-SD-TB-CS04-0-2 Dissolved	
			Units	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	11/4/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers
Metals (unfiltered)																			
Arsenic	69	69	µg/L	1.4		1.3		3.1		1.1		2.1		1.8		3.0		3.5	
Barium	1000	110	µg/L	22		22		28		23		24		22		21		21	
Cadmium	40	33	µg/L	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
Chromium (total)	-	1100	µg/L	1.5	U	1.5	U	6.2		1.5	U	2.1		1.5	U	1.5	U	1.5	U
Lead	210	210	µg/L	0.46	J	0.13	U	2.8		0.13	U	0.74	J	0.13	U	0.46	J	0.13	U
Mercury	1.8	1.8	µg/L	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
Selenium	290	290	µg/L	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Silver	0.95	1.9	µg/L	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
Pesticides																			
4,4'-DDD	3.6	0.35	µg/L	0.00050	U	0.00050	U	0.00051	U	0.00051	U	0.00050	U	0.00028	U	0.00050	U	0.00050	U
4,4'-DDE	14	0.7	µg/L	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U
4,4'-DDT	0.065	0.13	µg/L	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00034	U	0.00028	U	0.00028	U
Aldrin	0.65	1.3	µg/L	0.00034	U	0.00034	U	0.00034	U	0.00034	U	0.00034	U	0.00022	U	0.00034	U	0.00034	U
alpha-BHC	--	--	µg/L	0.00022	U	0.00022	U	0.00023	U	0.00023	U	0.00022	U	0.00035	U	0.00022	U	0.00022	U
beta-BHC	--	--	µg/L	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U
cis-Chlordane	--	--	µg/L	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00061	U	0.00035	U	0.00035	U
delta-BHC	--	--	µg/L	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00026	U	0.00061	U	0.00061	U
Dieldrin	0.335	0.71	µg/L	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00065	U	0.00026	U	0.00026	U
Endosulfan I	0.017	0.03	µg/L	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00030	U	0.00065	U	0.00065	U
Endosulfan II	0.017	0.03	µg/L	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00060	U	0.00030	U	0.00030	U
Endosulfan sulfate	--	0.03	µg/L	0.00060	U	0.00060	U	0.00061	U	0.00061	U	0.00060	U	0.00060	U	0.00060	U	0.00060	U
Endrin	0.0185	0.04	µg/L	0.00022	U	0.00049	U	0.00022	U	0.00072	J p	0.00022	U	0.00074	J p	0.00022	U	0.00049	U
Endrin aldehyde	--	--	µg/L	0.00049	U	0.00037	U	0.00049	U	0.00038	U	0.00049	U	0.00037	U	0.00063	J p	0.00037	U
Endrin ketone	--	--	µg/L	0.00037	U	0.00022	U	0.00038	U	0.00022	U	0.00037	U	0.00022	U	0.00037	U	0.00022	U
gamma-BHC (Lindane)	0.08	0.16	µg/L	0.00028	U	0.00028	U	0.00042	J p	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U
Heptachlor	0.0265	0.05	µg/L	0.00043	U	0.00032	U	0.00043	U	0.00032	U	0.00043	U	0.00032	U	0.00087	J	0.00032	U
Heptachlor epoxide	0.0265	0.05	µg/L	0.00032	U	0.00043	U	0.00032	U	0.00090	J	0.00032	U	0.00052	J p	0.00032	U	0.00043	U
Methoxychlor	--	--	µg/L	0.00073	U	0.00073	U	0.00074	U	0.0013		0.00073	U	0.00073	U	0.00073	U	0.00073	U
Toxaphene	0.21	0.21	µg/L	0.046	U	0.046	U	0.047	U	0.047	U	0.046	U	0.046	U	0.046	U	0.046	U
trans-Chlordane	--	--	µg/L	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U

Table 3 (continued)
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-EL-SD-TB-CS01-0-2 Total		BR-EL-SD-TB-CS01-0-2 Dissolved		BR-EL-SD-TB-CS02-0-2 Total		BR-EL-SD-TB-CS02-0-2 Dissolved		BR-EL-SD-TB-CS03-0-2 Total		BR-EL-SD-TB-CS03-0-2 Dissolved		BR-EL-SD-TB-CS04-0-2 Total		BR-EL-SD-TB-CS04-0-2 Dissolved	
			Units	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	11/4/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers	1/13/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)																			
PCB-1016	--	--	µg/L	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U
PCB-1221	--	--	µg/L	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U
PCB-1232	--	--	µg/L	0.0049	U	0.0049	U	0.0050	U	0.0050	U	0.0049	U	0.0049	U	0.0049	U	0.0049	U
PCB-1242	--	--	µg/L	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U
PCB-1248	--	--	µg/L	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U
PCB-1254	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U
PCB-1260	--	--	µg/L	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U
PCB-1262	--	--	µg/L	0.0067	U	0.0067	U	0.0068	U	0.0068	U	0.0067	U	0.0067	U	0.0067	U	0.0067	U
PCB-1268	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U
Total PCBs	0.033	0.03	µg/L	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	970	320	µg/L	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Acenaphthylene	300	291	µg/L	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Anthracene	300	1.8	µg/L	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
Benzo[a]anthracene	300	4.6	µg/L	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U
Benzo[a]pyrene	300	0.64	µg/L	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
Benzo[b]fluoranthene	300	1.4	µg/L	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U
Benzo[g,h,i]perylene	300	0.19	µg/L	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U
Benzo[k]fluoranthene	300	1.3	µg/L	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U
Chrysene	300	4.2	µg/L	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U
Dibenz(a,h)anthracene	300	0.28	µg/L	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
Fluoranthene	40	3.4	µg/L	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
Fluorene	300	82	µg/L	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U
Indeno[1,2,3-cd]pyrene	300	0.27	µg/L	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
Naphthalene	2350	780	µg/L	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U
Phenanthrene	7.7	7.7	µg/L	0.059	J	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U	0.051	U
Pyrene	300	0.45	µg/L	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Total PAHs	300	--	µg/L	0.059		0.000		0.000		0.000		0.000		0.000		0.000		0.000	

Table 3 (continued)
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]	NOAA SQuiRTs 1998 Fish TEF (2005) [1]		BR-EL-SD-TB-CS05-0-2 Total			BR-EL-SD-TB-CS05-0-2 Dissolved			BR-EL-SD-BW-CS06-0-2 Total			BR-EL-SD-BW-CS06-0-2 Dissolved			BR-EL-SD-BW-CS06-0-2 DUP Total			BR-EL-SD-BW-CS06-0-2 DUP Dissolved			BR-EL-SD-BW-CS07-0-2 Total			BR-EL-SD-BW-CS07-0-2 Dissolved		
				Units	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC	11/13/2020	Qualifiers	TEC
Dioxins and Furans																												
1,2,3,4,6,7,8-HpCDD	--	--	0.001	µg/L	0.000016	J	0.000000	0.0000044	J q	0.000000	0.0000069	J q	0.000000	0.0000014	U	0.000000	0.0000082	J	0.000000	0.00000086	U	0.000000	0.000015	J	0.000000	0.0000014	U	0.000000
1,2,3,4,6,7,8-HpCDF	--	--	0.01	µg/L	0.00084	U	0.000000	0.00044	U	0.000000	0.00083	U	0.000000	0.0005	U	0.000000	0.00096	U	0.000000	0.00054	U	0.000000	0.0013	J q	0.000013	0.0013	U	0.000000
1,2,3,4,7,8,9-HpCDF	--	--	0.01	µg/L	0.0011	U	0.000000	0.00061	U	0.000000	0.0011	U	0.000000	0.00061	U	0.000000	0.0012	U	0.000000	0.00071	U	0.000000	0.001	U	0.000000	0.0016	U	0.000000
1,2,3,4,7,8-HxCDD	--	--	0.5	µg/L	0.0022	U	0.000000	0.00095	U	0.000000	0.0011	U	0.000000	0.00085	J q	0.000425	0.0008	U	0.000000	0.0012	J	0.000600	0.0014	J	0.000700	0.00066	U	0.000000
1,2,3,4,7,8-HxCDF	--	--	0.1	µg/L	0.00058	U	0.000000	0.00039	U	0.000000	0.00044	U	0.000000	0.00041	U	0.000000	0.00056	U	0.000000	0.00032	U	0.000000	0.00096	U	0.000000	0.00065	U	0.000000
1,2,3,6,7,8-HxCDD	--	--	0.01	µg/L	0.0022	U	0.000000	0.00088	U	0.000000	0.0012	U	0.000000	0.00056	U	0.000000	0.00083	U	0.000000	0.00036	U	0.000000	0.00052	U	0.000000	0.00065	U	0.000000
1,2,3,6,7,8-HxCDF	--	--	0.1	µg/L	0.00069	U	0.000000	0.00043	U	0.000000	0.00048	U	0.000000	0.00048	U	0.000000	0.00059	U	0.000000	0.00037	U	0.000000	0.0011	U	0.000000	0.00069	U	0.000000
1,2,3,7,8,9-HxCDD	--	--	0.01	µg/L	0.0021	U	0.000000	0.00087	U	0.000000	0.0011	U	0.000000	0.00051	U	0.000000	0.00078	U	0.000000	0.00032	U	0.000000	0.0012	J q	0.000012	0.00062	U	0.000000
1,2,3,7,8,9-HxCDF	--	--	0.1	µg/L	0.00084	U	0.000000	0.00053	U	0.000000	0.00056	U	0.000000	0.00061	U	0.000000	0.00075	U	0.000000	0.00046	U	0.000000	0.0013	U	0.000000	0.00081	U	0.000000
1,2,3,7,8-PeCDD	--	--	1.0	µg/L	0.00089	U	0.000000	0.00059	U	0.000000	0.00038	U	0.000000	0.00043	U	0.000000	0.00078	U	0.000000	0.00031	U	0.000000	0.00062	U	0.000000	0.00026	U	0.000000
1,2,3,7,8-PeCDF	--	--	0.05	µg/L	0.00071	U	0.000000	0.00049	U	0.000000	0.00064	U	0.000000	0.00056	U	0.000000	0.00079	U	0.000000	0.00048	U	0.000000	0.00067	U	0.000000	0.00058	U	0.000000
2,3,4,6,7,8-HxCDF	--	--	0.1	µg/L	0.00063	U	0.000000	0.00045	U	0.000000	0.00045	U	0.000000	0.00047	U	0.000000	0.00057	U	0.000000	0.00036	U	0.000000	0.001	U	0.000000	0.00067	U	0.000000
2,3,4,7,8-PeCDF	--	--	0.5	µg/L	0.00067	U	0.000000	0.00046	U	0.000000	0.0006	U	0.000000	0.00052	U	0.000000	0.00073	U	0.000000	0.00042	U	0.000000	0.00064	U	0.000000	0.00054	U	0.000000
2,3,7,8-TCDD	--	--	1.0	µg/L	0.0011	U	0.000000	0.0012	U	0.000000	0.00067	U	0.000000	0.00086	U	0.000000	0.0013	U	0.000000	0.00058	U	0.000000	0.0012	U	0.000000	0.0012	U	0.000000
2,3,7,8-TCDF	--	--	0.05	µg/L	0.0011	U	0.000000	0.00088	U	0.000000	0.00099	U	0.000000	0.00082	U	0.000000	0.001	U	0.000000	0.00058	U	0.000000	0.0011	U	0.000000	0.0013	U	0.000000
OCDD	--	--	0.0001	µg/L	0.44	B	0.000000	0.06	J B	0.000000	0.19	B	0.000000	0.025	J B	0.000000	0.19	B	0.000000	0.019	J q B	0.000000	0.52	B	0.000000	0.067	J B	0.000000
OCDF	--	--	0.0001	µg/L	0.0031	J B	0.000000	0.0005	U	0.000000	0.00035	J q B	0.000000	0.00078	J q B	0.000000	0.0012	J q B	0.000000	0.000086	U	0.000000	0.00097	U	0.000000	0.0011	J q B	0.000000
Dioxins and Furans TEQ	--	--	--	µg/L			0.000000			0.000000			0.000000			0.000425			0.000000			0.000600			0.000725			0.000000
Total HpCDD	--	--	--	µg/L	0.052			0.013	J q		0.024	J q		0.003	J q		0.022	J q		0.0042	J		0.047			0.01	J q	
Total HpCDF	--	--	--	µg/L	0.0011	U		0.00053	U		0.0011	U		0.00061	U		0.0012	U		0.00071	U		0.0013	J q		0.0016	U	
Total HxCDD	--	--	--	µg/L	0.01	J q		0.0009	J		0.0069	J		0.0019	J q		0.0061	J q		0.0023	J q		0.023	J q		0.0066	J	
Total HxCDF	--	--	--	µg/L	0.00084	U		0.00053	U		0.00056	U		0.00061	U		0.00075	U		0.00046	U		0.0013	U		0.00081	U	
Total PeCDD	--	--	--	µg/L	0.0013	U		0.00059	U		0.00078	J q B		0.001	J q B		0.00078	U		0.00031	U		0.0017	J q B		0.00083	J B	
Total PeCDF	--	--	--	µg/L	0.00071	U		0.00049	U		0.00064	U		0.00056	U		0.00079	U		0.00048	U		0.00067	U		0.00058	U	
Total TCDD	--	--	--	µg/L	0.0011	U		0.0012	U		0.00067	U		0.00086	U		0.0013	U		0.00058	U		0.0012	U		0.0012	U	
Total TCDF	--	--	--	µg/L	0.0011	U		0.00088	U		0.00099	U		0.00082	U		0.001	U		0.00058	U		0.0011	U		0.0013	U	

Table 3 (continued)
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-EL-SD-TB-CS05-0-2 Total		BR-EL-SD-TB-CS05-0-2 Dissolved		BR-EL-SE-BW-CS06-0-2 Total		BR-EL-SE-BW-CS06-0-2 Dissolved		BR-EL-SD-BW-CS06-0-2 DUP Total		BR-EL-SD-BW-CS06-0-2 DUP Dissolved		BR-EL-SD-BW-CS07-0-2 Total		BR-EL-SD-BW-CS07-0-2 Dissolved	
			Units	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers
Metals (unfiltered)																			
Arsenic	69	69	µg/L	3.1	U	3.1	U	3.1	U	3.1	U	3.1	U	3.1	U	3.1	U	3.1	U
Barium	1000	110	µg/L	21	J	17	J	19	J	16	J	17	J	18	J	17	J	18	J
Cadmium	40	33	µg/L	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U
Chromium	-	1100	µg/L	15	U	15	U	15	U	15	U	15	U	15	U	15	U	15	U
Lead	210	210	µg/L	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Mercury	1.8	1.8	µg/L	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
Selenium	290	290	µg/L	15	U	15	U	15	U	15	U	15	U	15	U	15	U	15	U
Silver	0.95	1.9	µg/L	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
Pesticides																			
4,4'-DDD	3.6	0.35	µg/L	0.00050	U	0.00050	U	0.00051	U	0.00051	U	0.00051	U	0.00050	U	0.00051	U	0.00050	U
4,4'-DDE	14	0.7	µg/L	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00087	J p	0.00028	U	0.00028	U
4,4'-DDT	0.065	0.13	µg/L	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00028	U	0.00096	J	0.00028	U	0.00028	U
Aldrin	0.65	1.3	µg/L	0.00034	U	0.00034	U	0.00034	U	0.00050	J	0.00034	U	0.00034	U	0.00034	U	0.00034	U
alpha-BHC	--	--	µg/L	0.00022	U	0.00022	U	0.00023	U	0.00023	U	0.00023	U	0.00022	U	0.00023	U	0.00022	U
beta-BHC	--	--	µg/L	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U
cis-Chlordane	--	--	µg/L	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U	0.00035	U
delta-BHC	--	--	µg/L	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00061	U	0.00061	U
Dieldrin	0.335	0.71	µg/L	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00026	U	0.00026	U
Endosulfan I	0.017	0.03	µg/L	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U
Endosulfan II	0.017	0.03	µg/L	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00030	U	0.00030	U
Endosulfan sulfate	--	0.03	µg/L	0.00060	U	0.00060	U	0.00061	U	0.00061	U	0.00061	U	0.00060	U	0.00061	U	0.00060	U
Endrin	0.0185	0.04	µg/L	0.00022	U	0.00022	U	0.00022	U	0.00049	U	0.00022	U	0.00049	U	0.00022	U	0.00094	J
Endrin aldehyde	--	--	µg/L	0.00064	J p	0.00049	U	0.00049	U	0.00038	U	0.0011	J	0.00037	U	0.00049	U	0.00037	U
Endrin ketone	--	--	µg/L	0.00037	U	0.00037	U	0.00038	U	0.00022	U	0.00038	U	0.00022	U	0.00038	U	0.00022	U
gamma-BHC (Lindane)	0.08	0.16	µg/L	0.00028	U	0.00071	J p	0.0011	J	0.0013		0.00028	U	0.0012		0.0015		0.0021	
Heptachlor	0.0265	0.05	µg/L	0.00095	J	0.00043	U	0.00043	U	0.00032	U	0.00062	J	0.00032	U	0.00043	U	0.00032	U
Heptachlor epoxide	0.0265	0.05	µg/L	0.00032	U	0.00032	U	0.00032	U	0.00063	J	0.00032	U	0.00043	U	0.00032	U	0.00043	U
Methoxychlor	--	--	µg/L	0.00073	U	0.00073	U	0.00074	U	0.00074	U	0.00074	U	0.00073	U	0.00074	U	0.00073	U
Toxaphene	0.21	0.21	µg/L	0.046	U	0.046	U	0.047	U	0.047	U	0.047	U	0.046	U	0.047	U	0.046	U
trans-Chlordane	--	--	µg/L	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U	0.00039	U

Table 3 (continued)
Elutriate Sample Analytical Results

Analyte	NOAA SQuiRTs Marine Acute Screening Value (2008) [1]	EPA Region IV Saltwater Acute Screening Value (2018) [2]		BR-EL-SD-TB-CS05-0-2 Total		BR-EL-SD-TB-CS05-0-2 Dissolved		BR-EL-SE-BW-CS06-0-2 Total		BR-EL-SE-BW-CS06-0-2 Dissolved		BR-EL-SD-BW-CS06-0-2 DUP Total		BR-EL-SD-BW-CS06-0-2 DUP Dissolved		BR-EL-SD-BW-CS07-0-2 Total		BR-EL-SD-BW-CS07-0-2 Dissolved	
			Units	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers	11/13/2020	Qualifiers
Poly-Chlorinated Biphynels (PCBs)																			
PCB-1016	--	--	µg/L	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U	0.0045	U
PCB-1221	--	--	µg/L	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U	0.0054	U
PCB-1232	--	--	µg/L	0.0049	U	0.0049	U	0.0050	U	0.0050	U	0.0050	U	0.0049	U	0.0050	U	0.0049	U
PCB-1242	--	--	µg/L	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U	0.0034	U
PCB-1248	--	--	µg/L	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U
PCB-1254	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U
PCB-1260	--	--	µg/L	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U	0.0037	U
PCB-1262	--	--	µg/L	0.0067	U	0.0067	U	0.0068	U	0.0068	U	0.0068	U	0.0067	U	0.0068	U	0.0067	U
PCB-1268	--	--	µg/L	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U	0.0043	U
Total PCBs	0.033	0.03	µg/L	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	970	320	µg/L	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Acenaphthylene	300	291	µg/L	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Anthracene	300	1.8	µg/L	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U	0.045	U
Benzo[a]anthracene	300	4.6	µg/L	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U	0.069	U
Benzo[a]pyrene	300	0.64	µg/L	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U	0.049	U
Benzo[b]fluoranthene	300	1.4	µg/L	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U
Benzo[g,h,i]perylene	300	0.19	µg/L	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U
Benzo[k]fluoranthene	300	1.3	µg/L	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U	0.081	U
Chrysene	300	4.2	µg/L	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U	0.075	U
Dibenz(a,h)anthracene	300	0.28	µg/L	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
Fluoranthene	40	3.4	µg/L	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
Fluorene	300	82	µg/L	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U	0.064	U
Indeno[1,2,3-cd]pyrene	300	0.27	µg/L	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U	0.079	U
Naphthalene	2350	780	µg/L	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U	0.055	U
Phenanthrene	7.7	7.7	µg/L	0.058	J	0.051	U	0.051	U	0.051	U	0.051	U	0.062	J	0.057	J	0.051	U
Pyrene	300	0.45	µg/L	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Total PAHs	300	--	µg/L	0.058		0.000		0.000		0.000		0.000		0.062		0.057		0.000	

Notes:
1. Threshold Effect Level referenced in NOAA SQuiRTs Quick Refererence Tables (2008)
2. Ecological Screening Values referenced in United States Environmental Protection Agency Region IV Ecological Risk Assessment Supplemental Guidance, March 2018 Update
3. 2005 TEF as referenced in NOAA SQuiRTs Quick Refererence Tables (2008)
Values highlighted in yellow exceed a screening value for that analyte.
-- No Value referenced
U - The analyte was analyzed for, but was not detected above the concentration shown (MDL or EDL).
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
q - The reported result is the estimated maximum possible concentration of this analyte.
B - Compound was found in the blank and sample.
MDL - Method Detection Limit
RL - Reporting Limit or Requested Limit (Radiochemistry).
EDL - Estimated Detection Limit (Dioxin)
TEF - Toxicity Equivalent Factor (Dioxin)
TEC - Toxicity Equivalent Quotient (Dioxin)
TEL - Threshold Effect Level
ESV - Ecological Screening Value

APPENDIX A

Laboratory Analytical Reports

(Available upon request)

APPENDIX B

Daily Field Reports

(Available upon request)