Delaware Department of Natural Resources and Environmental Control
Delaware Coastal Management Program

Initial Review: ________
Updated On: ________
Complete: ________
Official Use Only

# Coastal Zone Management Act
# Federal Consistency Form

This document provides the Delaware Coastal Management Program (DCMP) with a Federal Consistency Determination or Certification for activities regulated under the Coastal Zone Management Act of 1972, as amended, and NOAA's Federal Consistency Regulations, 15 C.F.R. Part 930. Federal agencies and other applicants for federal consistency are not required to use this form; it is provided to applicants to facilitate the submission of a Consistency Determination or Consistency Certification. In addition, federal agencies and applicants are only required to provide the information required by NOAA's Federal Consistency Regulations.

| **Project/Activity Name:** | Port of Wilmington Maintenance Dredging |
|---|---|

## I. Federal Agency or Non-Federal Applicant Contact Information:

Contact Name/Title: Eugene Bailey (Diamond State Port Corporation)

Federal Agency Contractor Name (if applicable): ________

Federal Agency: U.S. Army Corps of Engineers
(either the federal agency proposing an action or the federal agency issuing a federal license/permit or financial assistance to a non-federal applicant)

Mailing Address: 1 Hausel Road

City: Wilmington State: DE Zip Code: 19801

E-mail: GBailey@port.state.de.us Telephone #: 302-571-4600

## II. Federal Consistency Category:

- ○ Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)
- ○ Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)
- ○ Federal Financial Assistance (15 C.F.R. Part 930, Subpart F)
- ◉ Federal License or Permit Activity (15 C.F.R. Part 930, Subpart D)
- ○ Federal License or Permit Activity which occurs wholly in another state (interstate consistency activities identified in DCMP's Policy document)

## III. Detailed Project Description (attach additional sheets if necessary):

Diamond State Port Corporation proposes to conduct maintenance dredging at the Port of Wilmington Berths 1 through 7. Dredging will occur hydraulically to a depth of -35 feet Mean Low Water plus an allowable 2 feet of overdredge for Berths 5-7, and -38 feet Mean Low Water plus an allowable -2 feet of overdredge for Berths 1-4. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event for ten (10) years. Dredged material will be pumped in a slurry via pipeline to the Pedricktown South Confined Disposal Facility in Oldmans Township, Salem County, NJ or the Wilmington Harbor South Confined Disposal Facility in Wilmington, DE, both of which are operated by the U.S. Army Corps of Engineers.

The Christina River navigational channel is dredged regularly by the U.S. Army Corps of Engineers and dredging for this project will occur concurrently with main channel dredging.

## IV. General Analysis of Coastal Effects (attach additional sheets if necessary):

Dredging occurs frequently within the project area and adjacent channel, so new coastal effects are not anticipated. Dredging may result in an increase in turbidity during and immediately after the activity takes place. Turbidity increases are unknown, however, since this is a tidal area that is close to the mouth of the Delaware River, mixing and dispersion will occur rapidly. Turbidity may result in a decrease in photosynthetic activity along with disturbance to fish. Motile organisms will likely avoid the dredging area, while filter-feeders in the surrounding area may be negatively affected. Any immobile benthic organisms in the project area will be entrained.

## V. Detailed Analysis of Consistency with DCMP Enforceable Policies (attach additional sheets if necessary):

**Policy 5.1: Wetlands Management**

Not applicable, no wetlands present on site.

**Policy 5.2: Beach Management**

Not applicable, no beaches present on site.

**Policy 5.3: Coastal Waters Management** (includes wells, water supply, and stormwater management. Attach additional sheets if necessary)

Please see addendum attached.

**Policy 5.4: Subaqueous Land and Coastal Strip Management**

Please see addendum attached.

**Policy 5.5: Public Lands Management**

Not applicable, no public lands management takes place within the project area.

**Policy 5.6: Natural Lands Management**

Not applicable as there are no designated natural areas within the site.

**Policy 5.7: Flood Hazard Areas Management**

Not applicable. The entire project area is submerged therefore it is not within a flood hazard area.

**Policy 5.8: Port of Wilmington**

Please see addendum attached.

**Policy 5.9: Woodlands and Agricultural Lands Management**

Not applicable. No woodlands or agricultural lands on site.

**Policy 5.10: Historic and Cultural Areas Management**

Not applicable. No historic or cultural areas on site.

**Policy 5.11: Living Resources**

Please see addendum attached.

**Policy 5.12 Mineral Resources Management**

Not applicable. No mineral resources managed on site.

**Policy 5.13: State Owned Coastal Recreation and Conservation**

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| Please see addendum attached. |

**Policy 5.14: Public Trust Doctrine**

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| Not applicable. This rule mainly applies to regulators. |

**Policy 5.15: Energy Facilities**

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| Not applicable. This rule does not apply as the project area does not represent an energy facility. |

**Policy 5.16: Public Investment**

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| This rule does not apply as the project does not involve public investment. |

**Policy 5.17: Recreation and Tourism**

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| Not applicable. This policy does apply as the project does not involve the promotion or development of recreation and/or tourism. |

**Policy 5.18: National Defense and Aerospace Facilities**

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| Not applicable. No national defense or aerospace facilities on site. |

**Policy 5.19: Transportation Facilities**

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| Please see addendum attached. |

**Policy 5.20: Air Quality Management**

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| Not applicable as this project does not affect air quality to the extent of being regulated. |

**Policy 5.21: Water Supply Management**

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| Not applicable as this project does not concern public water supply. |

**Policy 5.22: Waste Disposal Management**

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| Not applicable as this project does not concern waste disposal management. |

**Policy 5.23: Development**

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| Not applicable. This rule does not apply as the project does not involve any new development. |

**Policy 5.24: Pollution Prevention**

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| Please see addendum attached. |

**Policy 5.25: Coastal Management Coordination**

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| No applicable. This rule applies to state agencies only. |

**VI. JPP and RAS Review** (Check all that apply)**:**

Has the project been reviewed in a monthly Joint Permit Processing and/or Regulatory Advisory Service meeting?

☐ JPP ☐ RAS ☒ None

*If yes, provide the date of the meeting(s): ______________________________

**VII. Statement of Certification/Determination and Signature** (Check one and sign below):

☐ **FEDERAL AGENCY CONSISTENCY DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program.

OR

☐ **FEDERAL AGENCY NEGATIVE DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity will not have any reasonably foreseeable effects on Delaware's coastal uses or resources (Negative Determination) and is therefore consistent with the enforceable policies of the Delaware Coastal Management Program.

OR

☒ **NON-FEDERAL APPLICANT'S CONSISTENCY CERTIFICATION.** Based upon the information, data, and analysis included herein, the non-federal applicant for a federal license or permit, or state or local government agency applying for federal funding, listed in (I) above, finds that this proposed activity complies with the enforceable policies of the Delaware Coastal Management Program and will be conducted in a manner consistent with such program.

| | | | |
|---|---|---|---|
| Signature: | Eugene Bailey | | |
| Printed Name: | Eugene Bailey | Date: | 09/09/2020 |

Pursuant to 15 C.F.R. Part 930, the Delaware Coastal Management Program must provide its concurrence with or objection to this consistency determination or consistency certification in accordance with the deadlines listed below. Concurrence will be presumed if the state's response is not received within the allowable timeframe.

**Federal Consistency Review Deadlines:**

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| Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C) | 60 days with option to extend an additional 15 days or stay review (15 C.F.R. § 930.41) |
| Federal License or Permit (15 C.F.R. Part 930, Subpart D) | Six months, with a status letter at three months. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.63) |
| Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E) | Six months, with a status letter at three months. If three month status letter not issued, then concurrence presumed. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.78) |
| Federal Financial Assistance to State or Local Governments (15 C.F.R. Part 930, Subpart F) | State Clearinghouse schedule |

**OFFICIAL USE ONLY:**

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| Reviewed By: | Fed Con ID: | Date Received: |
| Public notice dates: to | Comments Received: ☐ NO ☐ YES *[attach comments]* | |
| Decision type: *(objections or conditions attach details)* | Decision Date: | |



H-7912

# SECTION 3

# COASTAL ZONE MANAGEMENT ACT FEDERAL CONSISTENCY FORM ADDENDUM

**5.3 COASTAL WATERS MANAGEMENT**

5.3.1.1 The development and utilization of the land and water resources of the State shall be regulated to ensure that water resources are employed for beneficial uses and not wasted, to protect beneficial uses of water resources, and to assure adequate water resources for the future. [7 Del.C. §6001 (a)(2)(3)]

***Response:*** ***Since the continued operation of the Port of Wilmington, an economic focal point of the Delaware economy, is dependent upon this project's completion, this project constitutes a beneficial use.***

5.3.1.2 The water resources of the State shall be protected from pollution which may threaten the safety and health of the general public. [7 Del.C. §§6001 (a)(5)(c)(2)]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.3 The coastal water resources of the State shall be protected and conserved to assure continued availability for public recreational purposes and for the conservation of aquatic life and wildlife. [7 Del.C. §6001(a)(4)]

***Response:*** ***Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.4 It is the policy of the DNREC to maintain within its jurisdiction surface waters of the State of satisfactory quality consistent with public health and public recreation purposes, the propagation and protection of fish and aquatic life, and other beneficial uses of the water. [7 DE Admin. Code 7401 subsection 1.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.5 The designated uses applicable to the various stream basins represent the categories of beneficial use of waters of the State which must be maintained and protected through application of appropriate criteria. Such uses shall include public water supply; industrial water supply; primary contact recreation involving any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water such as swimming and water skiing; secondary contact recreation involving a water-based form of recreation, the practice of which has a low probability for total body immersion or ingestion of water such as wading, boating and fishing; maintenance, protection and propagation of fish, shellfish, aquatic life and wildlife preservation; agricultural water supply; and waters of exceptional recreational or ecological significance (ERES waters). [7 DE Admin. Code 7401 Sections 2.0 and 3.0]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.6 Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Degradation of water quality in such a manner that results in reduced number, quality, or river or stream mileage of existing uses shall be prohibited. Degradation shall be defined for the purposes of this section as a statistically significant reduction, accounting for natural variations, in biological, chemical, or habitat quality as measured or predicted using appropriate assessment protocols. [7 DE Admin. Code 7401 subsection 5.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.7 Where the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that water quality shall be maintained and protected. In the case of E.R.E.S. waters, existing quality shall be maintained or enhanced. Limited degradation may be allowed if the DNREC finds, after review, that allowing lower water quality would result in a substantial net environmental or public health benefit and does not impede existing uses in the area in which the waters are located In while allowing for full protection of existing uses. [7 DE Admin. Code 7401 subsections 5.2 and 5.6]

***Response:*** ***The Christina River is not an E.R.E.S. waterbody, therefore this does not apply.***

5.3.1.8 Where high quality waters constitute an outstanding national resource, such as waters of national parks and wildlife refuges, existing quality shall be maintained and protected. [7 DE Admin. Code 7401 subsection 5.3]

***Response:*** ***The project area does not lie within a national park or wildlife refuge, therefore this rule does not apply.***

5.3.1.9 In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Water Quality Act of 1987. [7 DE Admin. Code 7401 subsection 5.4]

***Response:*** ***No thermal discharges are associated with this project.***

5.3.1.10 All surface waters of the State shall be free from substances that are attributable to wastes of industrial, municipal, agricultural or other human-induced origin. Examples include but are not limited to the following:

5.3.1.10.1 Floating debris, oil, grease, scum, foam, or other materials on the water surface that may create a nuisance condition, or that may in any water interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.2 Settleable solids, sediments, sludge deposits, or suspended particles that may coat or cover submerged surfaces and create a nuisance condition, or that may in any way interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.3 Any pollutants, including those of a thermal, toxic, corrosive, bacteriological, radiological, or other nature that may interfere with attainment and maintenance of designated uses of the water, may impart undesirable odors, tastes, or colors to the water or to aquatic life found therein, may endanger public health, or may result in dominance of nuisance species. [7 DE Admin. Code 7401 subsection 4.1]

***Response:*** ***It is the priority of the applicant to minimize the release of settleable solids and suspended sediment that is typically a result of dredging. While it is not possible to completely eliminate it, hydraulic dredging typically minimizes the resuspension of sediment within the water column. Hydraulic dredging will be conducted in a controlled manner and the process will be observed by attendants at the surface to ensure that activities do not result in an unforeseen release of sediment into the water column. If this should occur, dredging will halt until turbidity dissipates and the dredger and line will be inspected for defects.***

5.3.1.11 Regulatory mixing zones shall not impinge upon areas of special importance, including but not limited to drinking water supply intakes, nursery areas for aquatic life or waterfowl, approved or conditional shellfish areas or heavily utilized primary contact recreation areas. Zones shall not be located in such a manner as to interfere with passage of fishes or other organisms. Shore-hugging plumes should be avoided to the maximum extent practicable. In areas where multiple discharges are located in proximity, overlapping discharge plumes may occur. In such instances, the thermal mixing zone, which is not to exceed 25% of the cross-sectional area of the receiving water as measured from the point of discharge to the opposite shore, may be reduced to preclude acute toxicity in the overlap areas, or to ensure an adequate zone of passage for fish. [7 DE Admin. Code 7401 subsections 6.2 and 6.4]

***Response:*** ***This rule does not apply as there is no discharge associated with a mandated mixing zone.***

5.3.1.12 Streams with a designated use of public water supply shall provide waters of acceptable quality for use for drinking, culinary or food processing purposes after application of approved treatment equivalent to coagulation, filtration, and disinfection (with additional treatment as necessary to remove naturally occurring impurities). Water shall be free from substances (except natural impurities) that, alone or in combination with other substrates, result in:

5.3.1.12.1 Unacceptable levels of taste or odor in the treated water;
5.3.1.12.2 Significant disruption of the treatment processes at the treatment facility; or
5.3.1.12.3 Concentrations of toxic substances in the treated water that may be harmful to human health. [7 DE Admin. Code 7401 subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.13 Designated exceptional recreational or ecological significance (ERES) waters shall be accorded a level of protection and monitoring in excess of that provided most other waters of the State. These waters are recognized as special natural assets of the State, and must be protected and enhanced for the benefit of present and future generations of Delawareans. [7 DE Admin. Code 7401 subsection 5.6.1.1]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.14 ERES waters shall be restored, to the maximum extent practicable, to their natural condition. To this end, the DNREC shall, through adoption of a pollution control strategy for each ERES stream basin, take appropriate action to cause the systematic control, reduction, or removal of existing pollution sources, and the diversion of new pollution sources, away from ERES waters. [7 DE Admin. Code 7401 subsection 5.6.1.2]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.15 The discharge of oil from a vessel, truck, pipeline, storage, tank or tank car which causes or poses a threat of making a film on, emulsion in or sludge beneath the waters of the State or its shoreline shall be prohibited. [7 Del.C. §§6203, 6202(7)(5)(9)]

***Response:*** ***This rule does not apply.***

5.3.1.16 At a minimum, any discharge of liquid waste - sewage, industrial waste or other waste to State waters shall be subject to effluent limitations, discharge requirements and any alternate effluent control strategy that reflect a practicable level of pollutant removal technology. For the purposes of this section, a practicable level of pollutant removal technology is defined as the application of "best" treatment technology, control measures and practices, including pollution prevention, available to prevent, manage, reduce or remove pollutants taking into account the cost of applying such technology, control measures or practices in relation to the effluent reduction benefits to be achieved, the age of equipment and facilities involved, the process(es) employed, the engineering aspects of applying the various types of control, process changes, pollution prevention measures, non-water quality impacts (e.g. energy requirements) and other factors deemed appropriate. For the parameters, BOD5 (5-day biochemical oxygen demand) and suspended solids, the degree of removal reflecting an application of a practicable level of pollutant removal technology shall be at least 85% of the BOD5 and suspended solids contained in the influent to the treatment works or prior to application of the removal technology, control measures or practices. For discharges of sewage to State waters, a practicable level of pollutant removal technology shall be secondary treatment and disinfection.

5.3.1.16.1 No person shall cause or permit any discharge of liquid waste to the Delaware River, the Delaware Bay, or Atlantic Ocean except liquid waste which has received at least secondary treatment and disinfection.

5.3.1.16.2 No person shall cause or permit discharge of liquid waste to a lake or a pond or any tributary thereof, except liquid waste which has received at least secondary treatment, filtration, nutrient removal and disinfection.

5.3.1.16.3 No person shall cause or permit any discharge of liquid waste to the Little Assawoman Bay, Indian River Bay, or to Rehoboth Bay, including any tributaries to those waterbodies, except liquid waste which has received at least secondary treatment, filtration, and disinfection.

5.3.1.16.4 No person shall cause or permit any discharge of liquid waste to a stream, tidal or non-tidal, except liquid waste which has received at least secondary treatment, filtration, and disinfection. This subsection shall not govern discharge into the Delaware River, the Delaware Bay or the Atlantic Ocean, which shall be governed by subsection 5.3.1.16.1. For existing facilities, filtration may not be required if the existing facility has demonstrated the

ability to continuously meet secondary treatment levels. [7 DE Admin. Code 7201 subsections 7.1 and 7.2]

***Response:*** ***If a discharge of decant water from the designated Wilmington Harbor South and/or Pedricktown Confined Disposal Facility is necessary, it will be monitored for contaminants. The dredge material has been tested using the modified elutriate method, which simulates the constituents that are to be expected in decant water. The slurry released into the confined disposal area will be given sufficient time for solids to settle before decant water is released using an adjustable weir system to calibrate the discharge structure to the level necessary to release only water. The slurry will be monitored visually for settlement and the appropriate time for release will then be determined.***

5.3.1.17 In the event that Delaware Surface Water Quality Standards are not achieved through application of the technology based requirements, additional effluent limitations and treatment requirements shall be imposed to assure compliance with the Surface Water Quality Standards. Such additional effluent limitations and treatment requirements must control all pollutants or pollutant parameters which the DNREC determines are or may be discharged at a level which will cause, have the reasonable potential to cause or significantly contribute to an excursion of any numerical or narrative water quality criterion contained within Delaware's Surface Water Quality Standards. The need for additional effluent limitations and treatment requirements shall be based upon the results of chemical and/or biological tests in conjunction with studies or analyses designed to assess the potential of the discharge to cause or contribute to in-stream excursions of Delaware's Surface Water Quality Standards. [7 DE Admin. Code 7201 subsection 8.1]

***Response:*** ***Treatment of decant water is not anticipated to be necessary and therefore is not proposed. This rule does not apply currently.***

5.3.1.18 Where conflicts develop between stated surface water uses, stream criteria, or discharge criteria, designated uses for each segment shall be paramount in determining the required stream criteria, which, in turn, shall be the basis of specific discharge limits or other necessary controls. [7 DE Admin. Code 7401 subsection 1.2]

***Response:*** ***This rule does not apply.***

5.3.1.19 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources, undertake any activity:

5.3.1.19.1 In a way which may cause or contribute to the discharge of an air contaminant;

5.3.1.19.2 In a way which may cause or contribute to the discharge of a pollutant into any surface or ground water;

5.3.1.19.3 In a way which may cause or contribute to withdrawal of ground water or surface water or both;

5.3.1.19.4 In a way which may cause or contribute to the collection, transportation, storage, processing or disposal of solid wastes, regardless of the geographic origin or source of such solid wastes;

5.3.1.19.5 To construct, maintain or operate a pipeline system including any appurtenances such as a storage tank or pump station;

5.3.1.19.6 To construct any water facility; or

5.3.1.19.7 To plan or construct any highway corridor which may cause or contribute to the discharge of an air contaminant or discharge of pollutants into any surface or ground water. [7 Del.C. § 6003(a)]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from the State of Delaware. No other permit is necessary.***

5.3.1.20 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources and Environmental Control, construct, install, replace, modify or use any equipment or device or other article:

5.3.1.20.1 Which may cause or contribute to the discharge of an air contaminant;

5.3.1.20.2 Which may cause or contribute to the discharge of a pollutant into any surface or groundwater;

5.3.1.20.3 Which is intended to prevent or control the emission of air contaminants into the atmosphere or pollutants into surface or groundwaters;

5.3.1.20.4 Which is intended to withdraw ground water or surface water for treatment and supply; or

5.3.1.20.5 For disposal of solid waste. [7 Del.C. §6003(b)]

***Response: This rule does not apply.***

5.3.1.21 Regulatory variances for the activities identified in the preceding policy statement may be granted pursuant to 7 Del.C. §6011 if all of the following conditions exist in the opinion of the Secretary of the Delaware Department of Natural Resources and Environmental Control:



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PROFESSIONAL ENGINEERS & CONSULTANTS

5.3.1.21.1 Good faith efforts have been made to comply with these policies;

5.3.1.21.2 The cost of compliance is disproportionately high with respect to the benefits which would be bestowed by compliance, or the necessary technology is unavailable;

5.3.1.21.3 Available alternative operating procedures or interim control measures are being or will be used to reduce adverse impacts; and

5.3.1.21.4 The activities are necessary to the national security or to the lives, health, or welfare of the occupants of Delaware. [7 Del.C. §6011(b)]

***Response:*** ***A variance is not requested, therefor this rule does not apply.***

5.3.1.22 No permit for the activities identified above shall be granted unless the activities are consistent with county and municipal zoning regulations. [7 Del.C. §6003(c)(1)]

***Response:*** ***County and municipal zoning approval is not necessary for maintenance dredging at the Port of Wilmington.***

5.3.1.23 No person or entity shall commence construction, replacement, or operation of any of the following without first having obtained a permit from DNREC:

5.3.1.23.1 Sewer;

5.3.1.23.2 Any liquid waste collection or conveyance facilities such as wastewater pump stations and force mains;

5.3.1.23.3 Liquid waste treatment facilities;

5.3.1.23.4 Any surface impoundment for liquid waste or

5.3.1.23.5 Any bulk storage, bulk transfer or pipeline facility. [7 DE Admin. Code 7201 Section 2.0 and subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.24 No person shall construct, install, modify, rehabilitate, or replace an on-site wastewater treatment and disposal system or construct or place any dwelling, building, mobile home, manufactured home or other structure capable of discharging wastewater on-site unless such person has a valid license and permit issued by the DNREC. [7 DE Admin. Code 7101 subsection 3.31.1]

***Response:*** ***This rule does not apply.***

5.3.1.25 No person shall cause or permit to be discharged, thrown, or dumped into any waters or any drainage ditch in the State any garbage, refuse, dead animal, poultry, trash, carton, bottle, container, box, lumber, timber, paper, or light material or other solid waste. [7 DE Admin. Code 7201 subsection 3.2.6]

***Response:*** ***This rule does not apply.***

5.3.1.26 No person or entity shall:

5.3.1.26.1 Engage in the drilling, boring, coring, driving, digging, construction, installation, removal, or repair of a water well or water test well, except as or under the supervision of a licensed water well contractor;

5.3.1.26.2 Construct, repair, install or replace any part of a septic tank system except by or under the supervision of a licensed septic tank installer; or

5.3.1.26.3 Operate any liquid waste treatment system without a licensed liquid waste treatment plant operator.

5.3.1.26.4 No permits or licenses shall be issued for these activities unless the DNREC finds that the applicant is prepared and willing to conduct such activities in a manner which is consistent with the CMP policies. [7 Del.C. §6023; Delaware Executive Order 43, August 15, 1996]

***Response:*** ***This rule does not apply.***

5.3.1.27 The person who has caused the contamination of a person's drinking water supply by contaminant other than bacteria, viruses, nitrate or pesticides may be required to provide, at no cost to each person who has had his drinking water supply contaminated, an interim water supply that is of a quality and quantity to meet said person's needs as shall be determined by the Secretary of DNREC, in addition to the dates on which the interim water supply shall commence and be terminated. [7 Del.C. §6037]

***Response:*** ***This rule does not apply.***

5.3.1.28 No permits shall be issued for the discharge of any radiological, chemical or biological warfare agents or high-level radioactive wastes into State waters. [7 DE Admin. Code 7201 subsection 3.2.8.1]

***Response:*** ***This rule does not apply.***

5.3.1.29 No person shall cast, put, place, discharge in or permit or suffer to be cast, put, placed, discharged in or to escape into any running stream of water within the limits of this State, from which stream the inhabitants of any borough, town or city within this State are supplied wholly or in part with water for and as drink or beverage,

any dye-stuffs, drugs, chemicals or other substance or matter of any kind whatsoever whereby the water so supplied as and for a drink or beverage is made and becomes noxious to the health or disagreeable to the senses of smell or taste. [16 Del.C. §1301]

***Response:*** ***This rule does not apply.***

5.3.1.30 Water delivered to every consumer by any public water supplier shall be so protected by natural means, by proper constructions or by treatment so as maintain or increase water quality above the level determined to be safe and not to negatively impact users of water from such systems, either directly or indirectly. [16 DE Admin. Code 4462 subsection 3.3]

***Response:*** ***This rule does not apply.***

5.3.1.31 After July 1, 1991, unless a particular activity is exempted by these regulations, a person may not disturb land without an approved sediment and stormwater management plan from the appropriate plan approval agency. [Delaware Sediment and Stormwater Regulations, Section 8(1), amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.32 The following activities are exempt from both sediment control and stormwater management requirements:

5.3.1.32.1 Agricultural land management practices, unless the local Conservation District or the DNREC determines that the land requires a new or updated soil and water conservation plan, and the owner or operator of the land has refused either to apply to a Conservation District for the development of such a plan, or to implement a plan developed by a Conservation District;

5.3.1.32.2 Developments or construction that disturbs less than 5,000 square feet.

5.3.1.32.3 Land development activities which are regulated under specific State or federal laws which provide for managing sediment control and stormwater runoff, such as specific permits required under the National Pollutant Discharge Elimination System (NPDES) when discharges are a combination of stormwater and industrial or domestic wastewater.

5.3.1.32.4 Projects which are emergency in nature that are necessary to protect life or property such as bridges, culvert, or pipe repairs and above ground or underground electric and gas utilities or public utility restoration; and

5.3.1.32.5 Qualifying commercial forest harvesting operations. [Delaware Sediment and Stormwater Regulations, subsection 3.1 amended April 11, 2005]

***Response: This rule does not apply.***

5.3.1.33 A project may be eligible for a waiver of stormwater management for both quantitative and qualitative control if the applicant can demonstrate that:

5.3.1.33.1 The proposed project will return the disturbed area to a pre-development runoff condition and the pre-development land use is unchanged at the conclusion of the project; or

5.3.1.33.2 The proposed project consists of a linear disturbance of less than ten (10) feet in width; or

5.3.1.33.3 The project is for an individual residential detached unit or agricultural structure, and the total disturbed area of the site is less than one acre; or

5.3.1.33.4 The proposed project is for agricultural structures in locations included in current soil and water conservation plans that have been approved by the appropriate Conservation District. [Delaware Sediment and Stormwater Regulations, subsection 3.2.1, amended April 11, 2005]

***Response: This rule does not apply.***

5.3.1.34 All sediment and stormwater management plans shall be designed to implement water quality control measures to minimize, to the maximum extent possible, degradation of downstream water quality and habitat. Unless a particular activity is exempt, no person may disturb land without an approved sediment and stormwater management plan. [Delaware Sediment and Stormwater Regulations, subsection 10.2.2, amended April 11, 2005]

***Response: This rule does not apply.***

5.3.1.35 Water quantity control is an integral component of overall stormwater management. Control of peak discharges will, to some extent, prevent increases in flooding. The following design criteria for peak flow control are established for water quantity control purposes, unless a waiver is granted based on a case-by-case basis:

5.3.1.35.1 Projects in New Castle County that are located north of the Chesapeake and Delaware Canal shall not exceed the post-development peak discharge for the 2, 10, and 100 year frequency storm events at the pre-development peak discharge rates for the 2, 10, and 100 year frequency storm events.

5.3.1.35.2 Projects in New Castle County that are located south of the Chesapeake and Delaware Canal, Kent County, and Sussex County shall not exceed the post-development peak discharge for the 2 and 10 year frequency storm events at the pre-development peak discharge rates for the 2 and 10 year frequency storm events.

5.3.1.35.3 Watersheds, other than Designated Watersheds or subwatersheds that have well documented water quantity problems may have more stringent or modified design criteria that are responsive to the specific needs of that watershed. Modified criteria for that watershed must receive Departmental approval, and all projects reviewed and approved by the appropriate plan approval agency shall meet or exceed the modified criteria. Proposed modification of criteria for a watershed shall be subject to public review and comment prior to implementation. [Delaware Sediment and Stormwater Regulations, subsection 10.3.4, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.36 Water quality control is also an integral component of stormwater management. Control of water quality on-site will prevent further degradation of downstream water quality. The following design criteria are established for water quality protection unless a waiver or variance is granted on a case-by-case basis.

5.3.1.36.1 In general, the preferred option for water quality protection shall be those practices collectively referred to as "Green Technology BMP's". Other practices shall be considered only after preferred practices have been eliminated for engineering or hardship reasons as approved by the appropriate plan approval agency.

5.3.1.36.2 Water quality be designed to manage the rate and volume of flow from the 2.0" NRCS Type II rainfall event, up to a maximum of 1.0" and

5.3.1.36.3 Alternative stormwater quality practices may be acceptable to the Department and/or the plan approval agency if the removal efficiency for suspended solids meets or exceeds 80% as demonstrated by scientifically independent evaluation and monitoring performance data,

5.3.1.36.4 The Department and/or plan approval agency may require other acceptable stormwater practices if a receiving waterbody has been identified as impaired or designated with a specific pollutant reduction target.

5.3.1.36.5 Water quality practices may also be acceptable to the Department and/or the plan approval agency if they are designed to reduce pollutant loading from a specific post-development source.

***Response:*** ***This rule does not apply.***

## 5.4 SUBAQUEOUS LANDS AND COASTAL STRIP MANAGEMENT

5.4.1 The “coastal zone", referred to in these policies as the “coastal strip”, is defined as all that area of the State, whether land, water or subaqueous land between the territorial limits of Delaware in the Delaware River, Delaware Bay and Atlantic Ocean, and a line formed by certain Delaware highways and roads. [7 Del.C. §7002]

***Response:*** ***We are operating under the assumption that the project is within the Delaware coastal zone.***

5.4.2 The natural environment of the coastal strip shall be protected from the impacts of heavy industry and oil pollution for the purpose of recreation, tourism, fishing, crabbing, and gathering other marine life useful in food production. [7 Del.C. §§7001, 6201]

***Response:*** ***As this project does not involve heavy industry and oil pollution, the project is in compliance with this rule.***

5.4.3 The need for protection of the natural environment in the coastal strip shall be balanced with the need for new industry in the State’s coastal areas [7 Del.C. §7001]

***Response:*** ***This rule does not apply; no new industry is proposed.***

5.4.4 The location, extent and type of industrial development in the coastal strip that will result in the degradation of the Delaware's bays and coastal areas shall be controlled [7 Del.C. §7001; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***This project involves solely existing land use; therefore, the project is in compliance*** *with this rule.*

5.4.5 The development and use of offshore oil, gas, and other mineral resources of the State shall be managed to make the maximum contribution to the public benefit and so as to balance their utilization, conservation, and protection [Delaware Oil, Gas and Mineral Exploration Regulations, 2.1. September, 1971]

***Response:*** ***This rule does not apply.***

5.4.6 New heavy industrial uses shall be prohibited in the coastal strip. Such uses are ones characteristically involving more than 20 acres, and characteristically employing smokestacks, tanks, distillation or reaction columns, chemical processing equipment or waste-treatment lagoons. Heavy industrial uses shall not only be defined by their physical characteristics, however, but also by their potential to pollute in the event of human error or equipment failure. Examples of

heavy industry are oil refineries, basic steel manufacturing plants, basic cellulosic pulp-paper mills, and chemical plants such as petrochemical complexes. For purposes of this policy, public sewage treatment or recycling plants shall not be deemed heavy industrial uses. [7 Del.C. §§7002(e), 7003; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***No new heavy industrial uses are proposed for this project.***

5.4.7 New manufacturing uses or the expansion of existing manufacturing uses shall be allowed in the coastal strip by permit only, although in no case shall new manufacturing uses be allowed in wetlands or where inconsistent with local zoning regulations. Manufacturing uses are ones which mechanically or chemically transform substances into new products, and characteristically employ power-driven machines and materials handling equipment. Manufacturing uses typically include establishments engaged in assembling components of manufactured products, provided the new products are not fixed improvements. [7 Del.C. §§7002(d)(e), 7004(a)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.8 The following factors shall be considered in passing on requests for permission to construct or operate a manufacturing use in the coastal strip:

5.4.8.1 Environmental impact, including but not limited to, probable air and water pollution likely to be generated by the proposed use under normal operating conditions, as well as during mechanical malfunction and human error; likely destruction of wetlands and flora and fauna; impact of site preparation on drainage of the area in question, especially as it relates to flood control; impact of site preparation and facility operations on land erosion; effect of site preparation and facility operations on the quality and quantity of surface, and subsurface water resources, such as the use of water for processing, cooling, effluent removal, and other purposes; in addition, but not limited to, the likelihood of generation of glare, heat, noise, vibration, radiation, electromagnetic interference and obnoxious odors.

5.4.8.2 Economic effect, including the number of jobs created and the income which will be generated by the wages and salaries of these jobs in relation to the amount of land required, and the amount of tax revenues potentially accruing to State and local government.

5.4.8.3 Aesthetic effect, such as impact on scenic beauty of the surrounding area.

5.4.8.4 Number and type of supporting facilities required and the impact of such facilities on all factors listed in this subsection.

5.4.8.5 Effect on neighboring land uses including, but not limited to, effect on public access to tidal waters, effect on recreational areas, and effect on adjacent residential and agricultural areas.

5.4.8.6 County and municipal comprehensive plans for the development and/or conservation of their areas of jurisdiction. [7 Del.C. §7004(b)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.9 New offshore gas, liquid, or solid bulk product transfer facilities shall be prohibited in the coastal strip. Such facilities are docks or port facilities, whether artificial islands or attached to shore by any means, for the transfer of bulk quantities of any substance from vessel to onshore facility or vice versa. However, a docking facility or pier for a single industrial or manufacturing facility and docking facilities located in the City of Wilmington for the Port of Wilmington shall not be prohibited. [7 Del.C. §§7002(f), 7003; Inf. Attorney General Opinion No. 65, October 22, 1974]

***Response:*** ***New offshore gas, liquid, or solid bulk product transfer facilities are not proposed as part of this project.***

5.4.10 Offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip shall be prohibited. Such pipelines generally shall be allowed if they transit the coastal strip and environmental safeguards are observed. However, if such pipelines represent a significant danger of pollution to the coastal strip or generate pressure for construction of industrial plants in the coastal strip, they shall be prohibited. [7 Del.C. §§7001, 7002, 7003; Inf. Attorney General Opinion No. 77-33, July 6, 1977]

***Response:*** ***New offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip are not proposed as part of this project.***

5.4.11 A permit may be issued for geological, geophysical and seismic surveys, including the taking of cores and other samples, or the tide and submerged lands of this State. Such permits shall be nonexclusive and shall not give any preferential rights to any oil, gas and sulfur or other mineral lease. After consultation with those agencies of the State having an interest in the possible effects of the leasing, such rules and regulations deemed necessary to protect the fish, game, wildlife and natural resources of the State shall be included in the permit. Survey activities on any area determined to be an area where a lease should not be granted may be prohibited. The permit shall include conditions and payment proper to safeguard the interests of the State. [7 Del.C. §§6103, 6104]

***Response:*** ***This rule does not apply.***

5.4.12 No operations or activities shall be commenced on the drilling, deepening or plugging back of any offshore oil or gas wells located on underwater lands of Delaware without the permission of the State, and unless the activities are conducted in a manner which do not result in the degradation of the State's natural resources. [Delaware Oil, Gas and Mineral Exploration Regulations Numbers I-V, September 1971]

***Response:*** ***This rule does not apply.***

5.4.13 Easements for mineral exploration and exploitation underlying that part of the surface of the Atlantic shore owned by the state shall be permitted at such times and places as necessary to permit the extraction and transportation of oil, gas, sulfur or other minerals from State, federal or private lands, but permanent interference with the surface of the Atlantic shore shall be prohibited. [7 Del.C. §§6102(d), 6118, 6119(a)]

***Response:*** ***This rule does not apply.***

5.4.14 Before offering tide and submerged lands for leasing for possible mineral development, or whenever any person files a written application with the Secretary of DNREC requesting that lands be offered for leasing, accompanying the same with the required fee, a public hearing shall be held. After the public hearing, it will be determined whether an invitation for bidding to lease the area under consideration would be in the public interest. Consideration shall be made as to whether a lease or leases of the area under consideration would:

5.4.14.1 Be detrimental to the health, safety, or welfare of persons residing in, owning real property or working in the neighborhood of such areas;

5.4.14.2 Interfere with the residential or recreation areas to an extent that would render such areas unfit for recreational or residential uses or unfit for park purposes;

5.4.14.3 Destroy, impair or interfere with the aesthetic and scenic values of the Delaware coast, or other affected area;

5.4.14.4 Create any air, water and other pollution;

5.4.14.5 Substantially endanger marine life or wildlife;

5.4.14.6 Substantially interfere with commerce or navigation; and

5.4.14.7 Protect State lands from drainage of oil, gas or other minerals or objectionable substances [7 Del.C. §§6107, 6108]

***Response:*** ***This rule does not apply.***

5.4.15 Avoidable pollution or avoidable contamination of the ocean and of the waters covering submerged lands, avoidable pollution or avoidable contamination of the beaches or land underlying the ocean or waters covering submerged lands, or any substantial impairment of and interference with the enjoyment and use thereof, including but not limited to bathing, boating, fishing, fish and wildlife production, and navigation, shall be prohibited and the lessee shall exercise a high degree of care to provide that no oil, tar, residuary product of oil or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into the waters of the ocean, any bay or inlet thereof, or any other waters covering submerged lands; provided, however, that this policy does not apply to the deposit on, or passing into, such water or waters not containing any hydrocarbons or vegetable or animal matter. [7 Del.C. §6119(a)]

***Response:*** ***The applicant will take all precautions necessary to ensure that avoidable pollution or contamination of waters does not take place.***

5.4.16 For the purposes of this section, "avoidable pollution" or "avoidable contamination" means pollution or contamination arising from:

5.4.16.1 The acts of omissions of the lessee or its officers, employees or agents; or,

5.4.16.2 Events that could have been prevented by the lessee or its officers, employees or agents through the exercise of a high degree of care. [7 Del.C. §6119(b)]

***No response required.***

5.4.17 State subaqueous lands within the boundaries of Delaware constitute an important resource of the State and shall be protected against uses or changes which may impair the public interest in the use of tidal or nontidal waters. [7 Del.C. Ch. 72]

***Response:*** ***All uses are existing, and no new uses are proposed. The project will not impair the public interest in the use of tidal waters.***

5.4.18 No person shall deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands without first having obtained a permit, lease or letter of approval from the DNREC. Such permit, lease or letter of approval, if granted, may include reasonable conditions required in the judgment of the DNREC to protect the interest of the public. If it is determined that granting the permit, lease or approval will result in loss to the public of a substantial resource, the permittee may be required to take measures which will offset or mitigate the loss. [7 Del.C. §7205]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed activity.***

5.4.19 The extent of jurisdictional authority over public or private subaqueous lands includes any activity in a navigable stream or waterbody, which have a hydrologic connection to natural waterbodies. "Activity" includes, but is not limited to, any human induced action, such as dredging, draining, filling, grading, bulkheading, mining, drilling, extraction of materials or excavation, or construction of any kind, including, but not limited to, construction of a boat ramp or slip, breakwater, residences, bridge, bulkhead, culvert, dam, derrick, deck, groin, jetty, lagoon, gabion, rip-rap, launching facility, marina, mooring facility, pier, seawall, walkway, or wharf. [7 DE Admin Code 7504 Section 1.0 and subsection 2.2.1.1]

***No response required.***

5.4.20 The following types of activities in, on, over, or under private subaqueous lands require a permit or letter of authorization from the DNREC:

5.4.20.1 Construction of a convenience structure or boat docking facility.

5.4.20.2 Construction of a shoreline erosion control structure or measure.

5.4.20.3 Dredging, filling, excavating or extracting of materials.

5.4.20.4 Excavation, creation, or alteration of any channel, lagoon, turning basin, pond, embayment, or other navigable waterway on private subaqueous lands which will make connection with public subaqueous lands.

5.4.20.5 Dredging of existing channels, ditches, dockages, lagoons and other navigable waterways to maintain or restore the approved depth and width.

5.4.20.6 Excavation of land which makes connection to public subaqueous lands.

5.4.20.7 The laying of any pipeline, electric transmission line, telephone line, or any other utility structure in, on, over, or under the beds of private subaqueous lands.

5.4.20.8 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.20.9 Establishment of an anchorage for the use of a mooring for more than two (2) boats or for appurtenant onshore services.

5.4.20.10 Anchoring or mooring a floating platform over private subaqueous lands and for a period of twenty-four (24) consecutive hours or more.

5.4.20.11 Anchoring or mooring any vessel or platform over private subaqueous lands for revenue generating purposes.

5.4.20.12 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure. [7 DE Admin. Code 7504 subsection 2.3.3.1]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.21 The following types of activities on public subaqueous lands require a lease, permit, or letter of authorization from the DNREC:

5.4.21.1 Construction or use of any structure on, in, under, or over public subaqueous lands, including but not limited to, any convenience structures, shoreline erosion control structure or measure, or boat docking facility.

5.4.21.2 Dredging, filling, excavating or extracting of materials.

5.4.21.3 Continuous anchoring or mooring of a commercial vessel used in a commercial activity on or over public subaqueous lands for thirty (30) or more calendar days during any consecutive three (3) months.

5.4.21.4 The laying of any pipeline, electric transmission line, or telephone line in, on, over, or under the beds of public subaqueous lands.

5.4.21.5 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.21.6 Establishment of an anchorage for mooring more than two (2) boats or which serves as a permanent place for resident vessels.

5.4.21.7 Anchoring or mooring a floating platform over public subaqueous lands and for a period of twenty- four (24) consecutive hours or more.

5.4.21.8 Maintenance dredging of existing or new channels, ditches, dockages, lagoon and other waterways to maintain or restore the approach depth and width.

5.4.21.9 Anchoring or mooring any vessel or platform over public subaqueous lands for revenue generating purposes.

5.4.21.10 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure.

5.4.21.11 New dredging activities of channels, ditches, dockage, or other waterways [7 DE Admin. Code 7504 subsection 2.4.2]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.22 The DNREC shall consider the public interest in any proposed activity which might affect the use of subaqueous lands. These considerations include, but are not limited to, the following:

5.4.22.1 The value to the State or the public in retaining any interest in subaqueous lands which the applicant seeks to acquire, including the potential economic value of the interest.

5.4.22.2 The value to the State or the public in conveying any interest in subaqueous lands which the applicant seeks to acquire.

5.4.22.3 The potential effect on the public with respect to commerce, navigation, recreation, aesthetic enjoyment, natural resources and other uses of the subaqueous lands.

5.4.22.4 The extent to which any disruption of the public use of such lands is temporary or permanent.

5.4.22.5 The extent to which the applicant’s primary objectives and purposes can be realized without the use of such lands (avoidance).

5.4.22.6 The extent to which the applicant's primary purpose and objectives can be realized by alternatives, i.e. minimize the scope or extent of an activity or project and its adverse impact.

5.4.22.7 Given the inability for avoidance or alternatives, the extent to which the applicant can employ mitigation measures to offset any losses incurred by the public.

5.4.22.8 The extent to which the public at large would benefit from the activity or project and the extent to which it would suffer detriment.

5.4.22.9 The extent to which the primary purpose of a project is water-dependent. [7 DE Admin. Code 7504 subsection 4.6]

***Response:*** ***The proposed project aligns with the public interest in that it allows for the continued operation of the Port of Wilmington, a vital economic engine for the State of Delaware.***

5.4.23 The DNREC shall consider the impact on the environment, including but not limited to, the following:

5.4.23.1 Any impairment of water quality, either temporary or permanent, which may reasonably be expected to cause violation of the State Surface Water Quality Standards. This impairment may include violation of criteria or degradation of existing uses;

5.4.23.2 Any effect on shell fishing, finfishing, or other recreational activities and existing or designated water uses;

5.4.23.3 Any harm to aquatic or tidal vegetation, benthic organisms or other flora and fauna, and their habitats;

5.4.23.4 Any loss of natural aquatic habitat;

5.4.23.5 Any impairment of air quality either temporarily or permanently, including noise, odors, and hazardous chemicals;

5.4.23.6 The extent to which the proposed project may adversely impact natural surface and groundwater hydrology and sediment transport functions. [7 DE Admin. Code 7504 subsection 4.7.1]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.24 The DNREC shall also consider the following to determine whether to approve the application:

5.4.24.1 The degree to which the project represents an encroachment on or otherwise interferes with public lands, waterways or surrounding private interests.

5.4.24.2 The degree to which the project incorporates sound engineering principles and appropriate materials of construction.

5.4.24.3 The degree to which the proposed project fits in with the surrounding structures, facilities, and uses of the subaqueous lands and uplands.

5.4.24.4 Whether the proposed activity complies with the State of Delaware's Surface Water Quality Standards both during construction and during subsequent operation or maintenance.

5.4.24.5 The degree to which the proposed project may adversely affect shellfish beds or finfish activity in the area. [7 DE Admin. Code 7504 subsection 4.7.5]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.25 The following concerns for protecting water quality shall be specifically considered by the DNREC in evaluating applications for dredging projects:

5.4.25.1 All dredging is to be conducted in a manner consistent with sound conservation and water pollution control practices. Spoil and fill areas are to be properly diked to contain the dredged material and prevent its entrance into any surface water. Specific requirements for spoils retention may be specified by the DNREC in the approval, permit or license.

5.4.25.2 All material excavated shall be transported, deposited, confined, and graded to drain within the disposal areas approved by the DNREC. Any material that is deposited elsewhere than in approved areas shall be removed by the applicant and deposited where directed at the applicant's expense and any required mitigation shall also be at the applicant's expense.

5.4.25.3 Materials excavated by hydraulic dredge shall be transported by pipeline directly to the approved disposal area. All pipelines shall be kept in good condition at all times and any leaks or breaks shall be immediately repaired.

5.4.25.4 Materials excavated and not deposited directly into an approved disposal area shall be placed in scows or other vessels and transported to either an approved enclosed basin, dumped, and then rehandled by hydraulic dredge to an approved disposal area, or to a mooring where scows or other vessels shall be unloaded by pumping directly to an approved disposal area.

5.4.25.5 When scows or other vessels are unloading without dumping, they shall have their contents pumped directly into an approved disposal area by a means sufficient to preclude any loss of material into the body of water.

5.4.25.6 In approved disposal areas, the applicant may construct any temporary structures or use any means necessary to control the dredge effluent, except borrowing from the outer slopes of existing embankments and/or hydraulic placing of perimeter embankments. For bermed disposal sites, a minimum freeboard of two (2) feet, measured vertically from the retained materials and water to the top of the adjacent confining embankment, shall be maintained at all times.

5.4.25.7 The applicant shall not obstruct drainage or tidal flushing on existent wetlands or upland areas adjacent thereto. The applicant shall leave free, clear, and unobstructed outfalls of sewers, drainage ditches, and other similar structures affected by the disposal operations. The dredged materials shall be distributed within the disposal area in a reasonably uniform manner to permit full drainage without ponding during and after fill operations.

5.4.25.8 The dredging operation must be suspended if water quality conditions deteriorate in the vicinity of dredging or spoil disposal site. Minimum water quality standards may be included as an element of the permit and shall be monitored by the applicant. Violation of these conditions shall be cause for immediate suspension of activity and notification of the DNREC. Dredging shall not be resumed until water quality conditions have improved and the DNREC has authorized the resumption. [7 DE Admin. Code 7504 subsection 4.11.3]

***Response:*** ***Dredging will be conducted according to best industry practices including observation from the ship deck and controlled use of the dredging equipment. Dredging will cease if excessive levels of turbidity are observed and the cause will be rectified before any dredging resumes. Pipelines will be inspected prior to dredging. All dikes are required to be in sound structural condition and are maintained by the disposal site operator. Dredge material will be placed in a managed disposal area and handled concurrently with the material dredged from the main Christina River channel through the course of its regular upkeep by the Army Corps of Engineers. The dredging and management of the dredge material will be overseen by a contractor selected by the U.S. Army Corps of Engineers.***

5.4.26 The following types of dredging projects are prohibited:

5.4.26.1 Dredging of biologically productive areas, such as nursery areas, shellfish beds, and submerged aquatic vegetation, if such dredging will have a significant or lasting impact on the biological productivity of the area.

5.4.26.2 Dredging of new dead-end lagoons, new basins and new channels, which have a length to width ratio greater than 3:1. This subsection shall not apply to marina projects governed by the Marina Regulations.

5.4.26.3 Dredging channels, lagoons or canals deeper than the existing controlling depth of the connecting or controlling waterway.

5.4.26.4 Dredging channels, cleaning marinas or other subaqueous areas by using propeller wash from boats. [7 DE Admin. Code 7504 subsection 4.11.6]

***Response:*** ***No nurseries, shellfish beds, or submerged aquatic vegetation is known to exist within the project area. The project does not consist of new dredging or the dredging of new areas including dead-end lagoons. Dredging will be conducted to existing, maintained channel depths. Dredging will not be performed using propeller wash from boats.***

## 5.8 PORT OF WILMINGTON

5.8.1 Advisory Policies

5.8.1.1 The long-term economic viability and competitiveness of the Port of Wilmington should be encouraged and supported.

5.8.1.2 The people who benefit from the Port of Wilmington should contribute to its support and help maintain the financial health of the port.

5.8.1.3 Expansion of the Port of Wilmington along the Delaware River is encouraged to meet future national and regional transshipment needs and to reduce the dredging and spoils disposal activities associated with port operations along the Christina River. Port expansion, however, should not proceed if such expansion means air and water quality standards cannot be kept.

5.8.1.4 The port should be promoted for general cargo transfer and, to the extent feasible, as a location for the support of outer continental shelf development.

***Response:*** ***The proposed project is in accordance with all the aforementioned rules.***

## 5.11 LIVING RESOURCES

5.11.1 General

5.11.1.1 No activity shall have an adverse environmental effect on living resources and shall include consideration of the effect of site preparation and the proposed activity on the following wetland values:

5.11.1.1.1 Value of tidal ebb and flow

5.11.1.1.1.1 Production Value: carving organic matter to adjacent estuaries and coastal waters which serve as breeding areas for certain animal species (especially fish and shellfish).

5.11.1.1.1.2 Value as a natural protective system of absorption of storm wave energy, flood waters, and heavy rainfall, thereby decreasing flood and erosion damage.

5.11.1.1.1.3 The prevention of silting in certain harbors and inlets thereby reducing dredging.

5.11.1.1.1.4 Removal and recycling of inorganic nutrients.

5.11.1.1.1.5 Effect on the estuarine waters.

5.11.1.1.2 Habitat Value

5.11.1.1.2.1 Habitat for resident species of wildlife including furbearers, invertebrates, finfish.

5.11.1.1.2.2 Habitat for migratory wildlife species including waterfowl, wading birds, shorebirds, passerines, finfish, shrimp.

5.11.1.1.2.3 Rearing area, nesting area, breeding grounds for various species.

5.11.1.1.2.4 Habitat for rare or endangered plants.

5.11.1.1.2.5 Presence of plants or animals known to be rare generally, or unique to the particular location.

5.11.1.1.2.6 Presence of plants or animals near the limits of their territorial range.

5.11.1.1.2.7 Presence of unique geologic or wetland features [7 DE Admin. Code 7502 subsection 12.2]

5.11.2 Fish and Wildlife

5.11.2.1 All forms of protected wildlife shall be managed and protected from negative impacts. [7 Del.C.§102(a)]

5.11.2.2 State shellfish resources shall be protected from further impairment and improved when possible [7 Del.C. §1902 (a)(1)(2)(5)]

5.11.2.3 Mosquito and other pest controls shall use techniques such as open marsh water management, which reduce the application of chemicals and which substitute biological controls. [Delaware Mosquito Control Spray Policy, revised February 26, 2018, Delaware Executive Order 43, August 15, 1996]

5.11.3 Nongame and Endangered Species

5.11.3.1 “Nongame” is that fauna, including rare and endangered species, which are not commonly trapped, killed, captured or consumed, either for sport or profit. [7 Del.C. §202(a)]

5.11.3.2 Rare and endangered species are in need of active, protective management to preserve and enhance such species. The diversity and abundance of the native flora and fauna of Delaware, particularly those deemed rare or

endangered, shall be preserved and enhanced through the protection of the habitat, natural areas, and areas of unusual scientific significance or having unusual importance to their survival. [7 Del.C. §201(1) and (2)]

5.11.4 Advisory Policy

5.11.4.1 Actions which may interfere with or otherwise adversely affect fish and wildlife in Delaware shall be implemented only after careful consultation with DNREC and exploration of alternatives less damaging to such fish and wildlife.

***Response:*** ***Seasonal dredging restrictions may be observed in order to protect migratory fish. We do not know of any other endangered or threatened species in the project area. We expect any issues to be addressed during the course of the DNREC permitting process. The dredging procedures outlined in this application are intended to minimize the effect of maintenance dredging on the surrounding environmental while allowing the activity to still take place, which is necessary in order to continue operations at the Port of Wilmington.***

## 5.13 STATE OWNED COASTAL RECREATION AND CONSERVATION

5.13.1 State owned lands whose natural condition or present state of use would maintain important recreational areas and wildlife habitat, or would maintain or enhance the conservation of natural, cultural or historic resources shall be managed, preserved, and protected, for conservation and recreational use. [7 Del.C. §§7301, 7504(6), 5305; 7 Del.C. Ch 45]

***Response:*** ***The state-owned submerged lands within the project area will be maintained free from obstruction for navigational and recreational purposes as safety permits. Open-water habitat will be preserved.***

5.13.2 Open spaces shall be preserved through the acquisition of interests or rights in real property, or donation of lands, for public recreation and conservation of natural resources promotes biological diversity, public health, prosperity and general welfare [7 Del.C. §7502]

***No response required.***

## 5.19 TRANSPORTATION FACILITIES

5.19.1 General

5.19.1.1 The DCMP supports the expansion and development of the Port of Wilmington. [7 Del.C. Ch 70]

5.19.1.2 Due to the threats posed to the natural environment, recreational activities and commercial fishing activities by the transfer of oil, petroleum products and their byproducts between vessels and vessels and onshore facilities and vessels, parties responsible for oil spills, discharges and the escape of oil in the waters of the State shall be required to immediately remove such oil pollution to DNRECs satisfaction or the responsible parties shall be required to pay for the expenses incurred in the removal of such oil pollution. [7 Del.C. §6201]

5.19.2 Advisory Policies

5.19.2.1 When essential to the national interest, the construction, maintenance and improvement of transportation systems shall predominate over less essential interests.

5.19.2.2 Transportation planning programs shall provide for alternatives to continued reliance on private motor vehicles with their associated highway requirements.

5.19.2.3 The State shall undertake an accelerated program of highway maintenance, upgrading, and safety improvements.

5.19.2.4 The DCMP supports the maintenance of an adequate and efficient railroad network to serve industry and agriculture on the Delmarva Peninsula.

5.19.2.5 The DCMP supports the establishment and maintenance of efficient public transit systems in order to reduce impacts to air quality and natural resources of the State.

5.19.2.6 New or expanded ports which involve extensive and continual dredging and spoil disposal in order to keep them useable are discouraged unless it can clearly be demonstrated that such facilities can be developed in an environmentally sound manner and without imposing continuing maintenance costs on any level of government or the general public.

***Response:*** ***The proposed activity is necessary to sustain vessel traffic to and commerce at the Port of Wilmington. No further port development or expansion is proposed.***

## 5.24 POLLUTION PREVENTION

5.24.1 General

5.24.1.1 Whenever possible, the generation of waste should be reduced or eliminated as expeditiously as possible, and that waste that is generated should be recovered, reused, recycled, treated or disposed of in a manner that

minimizes any present or future threats to human health or the environment. [7 Del.C. §7802(a)(1)]

***Response:*** ***Not applicable. The project does not involve the generation of waste.***

5.24.2 Advisory Policies

5.24.2.1 Industries should review their proposed projects for the possible use of pollution prevention opportunities.

5.24.2.2 Industries are encouraged to utilize the DNREC Pollution Prevention Program's services, including non-regulatory technical assistance and information, to ensure that the potential for degradation of the quality of air, land, and water is minimal.

***Response:*** ***The applicant is already planning to employ known pollution prevention methods for a hydraulic dredging project. The DNREC Pollution Prevention Program services do not pertain to dredging projects.***

# U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR AN

# INDIVIDUAL PERMIT
FOR
# MAINTENANCE DREDGING
AT THE
# PORT OF WILMINGTON

ON BEHALF OF

DIAMOND STATE PORT CORPORATION
1 HAUSEL ROAD
WILMINGTON, DE 19801


S. T. HUDSON ENGINEERS, INC.

900 DUDLEY AVENUE
CHERRY HILL, NEW JERSEY 08002
PHONE (856) 342-6600 FAX (856) 342-8323
www.STHE.COM


SEPTEMBER 2020 H-7912

September 29, 2020

U.S. Army Corps of Engineers
Philadelphia District
Regulatory Division
100 Penn Square East
Philadelphia, PA 19107

Attention: Mr. Todd Schaible

Reference: Diamond State Port Corporation (Port of Wilmington)

Subject: Joint Permit Application
Maintenance Dredging at Port of Wilmington
Berths 1 - 7

Dear Mr. Schaible:

S. T. Hudson Engineers, Inc. (Hudson) has been retained by Diamond State Port Corporation to assist them in obtaining the necessary approvals for maintenance dredging at the Port of Wilmington, Berths 1 – 7, to occur concurrently with the regular maintenance dredging of the main channel of the Christina River by the U.S. Army Corps of Engineers.

Herein, please find a complete application for a U.S. Army Corps of Engineers Individual Permit.

Should you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Paul Ferry

Paul T. Ferry
Environmental Specialist

PTF/mle
Enclosures

H-7912-00

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# SECTION 1

# PROJECT DESCRIPTION, LOCATION PLAN AND AERIAL PHOTOGRAPH

# SECTION 1

## PROJECT DESCRIPTION

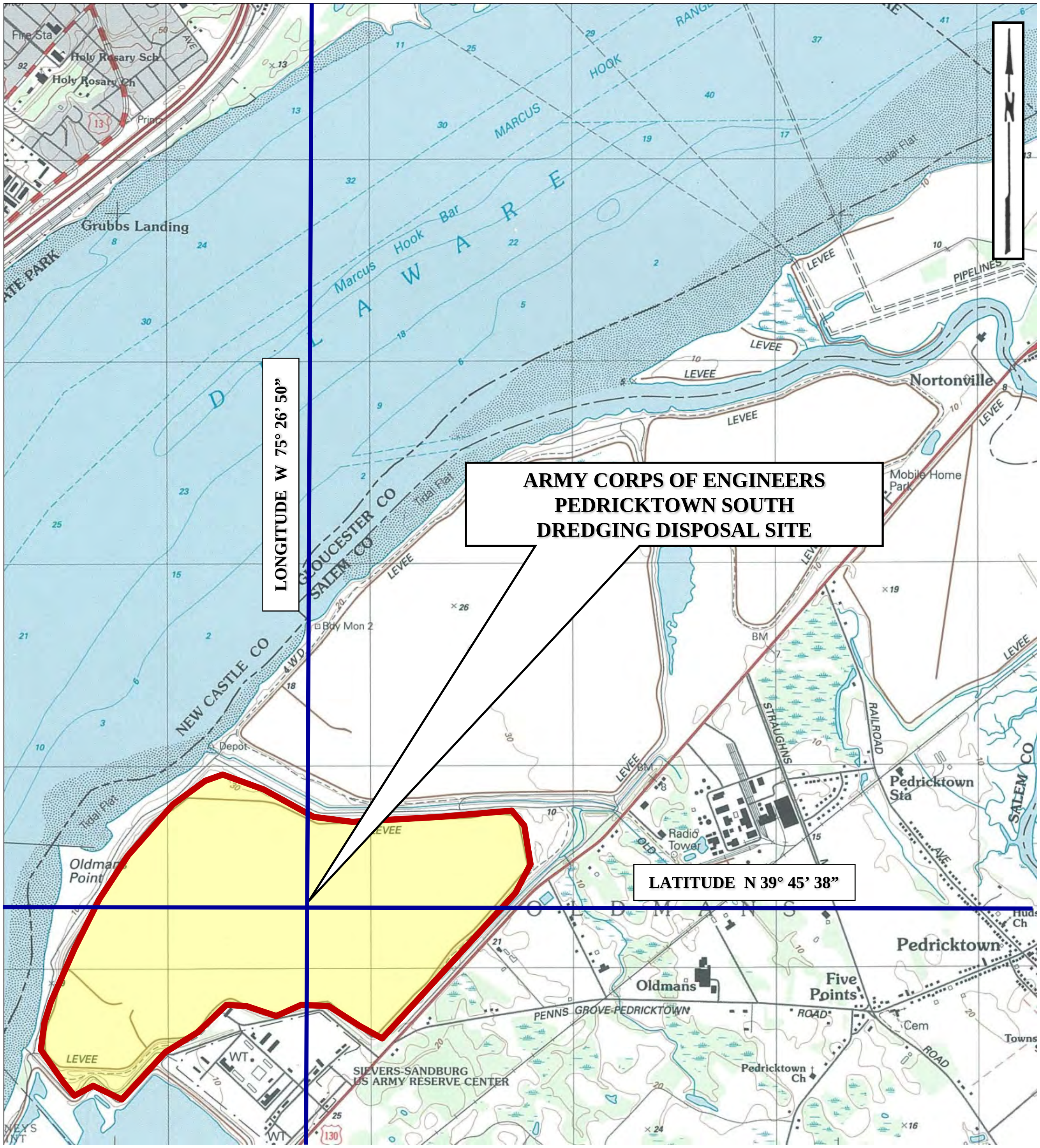
GT USA Wilmington LLC dba Diamond State Port Corporation proposes to conduct maintenance dredging at the Port of Wilmington Berths 1 through 7 located in Wilmington, DE.

Dredging will occur hydraulically to a depth of -35 feet Mean Low Water plus an allowable 2-foot of overdredge for Berths 5-7, and -38 feet Mean Low Water plus an allowable -2 foot of overdredge for Berths 1-4. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event for ten (10) years. Dredged material will be pumped in a slurry via pipeline to the Pedricktown South and/or Wilmington Harbor South Confined Disposal Facilities in Oldmans Township, Salem County, New Jersey and Wilmington Delaware, both of which are operated by the U.S. Army Corps of Engineers.

Material to be dredged is similar in nature and composition to material that has been removed regularly from the project area and adjacent main channel of the Christina River by the U.S. Army Corps of Engineers. Sampling results and methodology from previous dredging projects are included in Appendix A and Appendix B of this application.

The Christina River navigational channel is dredged regularly by the U.S. Army Corps of Engineers and dredging for this project will occur concurrently with main channel dredging.


AERIAL PHOTO OF THE WILMINGTON HARBOR SOUTH CONFINED DISPOSAL FACILITY




# PROJECT SITE LOCATION MAP

UNITED STATES GEOLOGIC SURVEY QUADRANGLE

MARCUS HOOK, PA – NJ - DEL

SCALE: N.T.S.

H-7912-00

S. T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS

# SECTION 2

## ENG 4345 FORM
## AND
## ENVIRONMENTAL QUESTIONNAIRE

| U.S. Army Corps of Engineers (USACE)<br>**APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**<br>33 CFR 325. The proponent agency is CECW-CO-R. | ***Form Approved - OMB No. 0710-0003 Expires: 01-08-2018*** |
|---|---|

The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

**(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)**

| 1. APPLICATION NO. | 2. FIELD OFFICE CODE | 3. DATE RECEIVED | 4. DATE APPLICATION COMPLETE |
|---|---|---|---|
| | | | |

***(ITEMS BELOW TO BE FILLED BY APPLICANT)***

| 5. APPLICANT'S NAME | 8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) |
|---|---|
| First - Eugene Middle - Last - Bailey | First - Paul Middle - T Last - Ferry |
| Company - Diamond State Port Corp. (Port of Wilmington) | Company - S. T. Hudson Engineers, Inc. |
| E-mail Address - gbailey@port.state.de.us | E-mail Address - pferry@sthe.com |
| 6. APPLICANT'S ADDRESS: | 9. AGENT'S ADDRESS: |
| Address- 1 Hausel Road | Address- 900 Dudley Avenue |
| City - Wilmington State - DE Zip - 19801 Country - USA | City - Cherry Hill State - NJ Zip - 08002 Country - USA |
| 7. APPLICANT'S PHONE NOs. w/AREA CODE | 10. AGENTS PHONE NOs. w/AREA CODE |
| a. Residence b. Business 302-571-4600 c. Fax | a. Residence b. Business 856-342-6600 c. Fax 856-342-8323 |

**STATEMENT OF AUTHORIZATION**

11. I hereby authorize, Paul Ferry/S.T. Hudson Eng. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Eugene Bailey 09/09/2020

SIGNATURE OF APPLICANT DATE

**NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY**

12. PROJECT NAME OR TITLE (see instructions)
Port of Wilmington Maintenance Dredging Berths 1-7

| 13. NAME OF WATERBODY, IF KNOWN (if applicable)<br>Christina River | 14. PROJECT STREET ADDRESS (if applicable)<br>Address 1 Hausel Road |
|---|---|
| 15. LOCATION OF PROJECT<br>Latitude: °N 39.719978 Longitude: °W 75.526553 | City - Wilmington State- DE Zip- 19801 |

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID 2606700003 Municipality New Castle County

Section - Township - Range -

17. DIRECTIONS TO THE SITE

I-495 to Exit 2 - Terminal Avenue east to port entrance

18. Nature of Activity (Description of project, include all features)

The applicant proposes to conduct maintenance dredging hydraulically in the amount of 75,000 cubic yards of material per year from Berths 1-7 along the Christina River at the Port of Wilmington. Dredging will occur to a depth of of -38 feet MLW for Berths 1-4 and -35 MLW for Berths 5-7, plus 2 feet of allowable overdredge. Material will be disposed of at the U.S. Army Corps of Engineers' Wilmington Harbor South and Pedricktown South disposal areas.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Maintenance dredging is necessary to ensure adequate berth depth for the draft of incoming and outgoing vessels.

**USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

| | | |
|---|---|---|
| Type<br>Amount in Cubic Yards | Type<br>Amount in Cubic Yards | Type<br>Amount in Cubic Yards |

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres
or
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- 601 CHRISTIANA AVE

City - WILMINGTON State - DE Zip - 19801

b. Address- 31 AUTO RD

City - WILMINGTON State - DE Zip - 19801

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

| AGENCY | TYPE APPROVAL* | IDENTIFICATION NUMBER | DATE APPLIED | DATE APPROVED | DATE DENIED |
|---|---|---|---|---|---|
| DNREC | Letter of Auth. | LA-159/20 | | 6/5/2020 | |
| | | | | | |
| | | | | | |
| | | | | | |

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Eugene Bailey 09/09/2020 Paul Ferg 9/29/2020

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

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

ENVIRONMENTAL QUESTIONNAIRE
FOR CORPS OF ENGINEERS PERMIT
APPLICATIONS
Philadelphia District,
Corps of Engineers
Philadelphia,
Pennsylvania 19107
CENAP-OP-R

INTRODUCTION AND INSTRUCTIONS

The District Engineer is required by law to assess the initial, cumulative, and long-term effects of any proposed permit on all aspects of the environment.

To speed the analysis of the probable impact of the proposed work, each applicant is required to submit appropriate environmental data as part of a permit application. We ask that you provide a thorough description of your proposed project and answer each question as it applies to the work and the results of that work. Complete and accurate answers will prevent unnecessary delays in processing your permit application

Parts I and II will be filled out by all applicants. Part I is self-explanatory. In Part II, the Environmental Impact Checklist, you should indicate the impacts of your project on all aspects of the environment that are listed. Use the space under "Qualifying Remarks" to indicate the specific impacts that your project will have. This may include types of plants or animals affected, specific adverse, beneficial, or mitigative effects, changes to existing conditions, etc. Although space for answers has been provided, you may wish to supply additional information on attached pages. If you do not anticipate an impact on a certain item, simply place a check in the "No" column.

Part III will be filled out by all applicants applying for a permit to perform dredging.

Part IV will be filled out by all applicants applying for a permit to perform filling operations. This includes activities such as filling behind bulkheads.

Refer any questions you may have concerning this supplemental form to the Regulatory Branch at (215) 656-6728.

# PART I

## I. PROJECT DESCRIPTION:

A. General Site Location: Accurately locate the project site with respect to State, county, or other subdivision, and in relation to streams and rivers.

***The project is located on the Christina River at the Port of Wilmington Berths 1-7 in Wilmington, Delaware.***

B. Specific Site Locations: Completely locate the project site with respect to cove, creek, property owner, plot number, etc.

***The project is located at the confluence of the Christina River and the Delaware River. The address is:***

***1 Hausel Road***
***Wilmington, DE 19801***

***Tax Parcel ID 2606700003***

***39°43'07.2" N, 75°31'20.1" W***

C. Description of Proposed Action: Carefully describe the action proposed, including the method of construction, equipment, and materials to be used. Details in your description are important. Attach additional sheets if necessary.

***The applicant proposes to conduct maintenance dredging of Berths 1-7 of the Port of Wilmington via hydraulic dredge up to a maximum of 75,000 cubic yards per year over the course of ten (10) years. Material is to be pumped to the Pedricktown South Disposal Area and Wilmington Harbor South Disposal Area owned and operated by the U.S. Army Corps of Engineers. Dredging will be performed to a depth of -38 feet MLW for Berths 1-4 and -35 MLW for Berths 5-7. Dredging will include an allowable overdredge of up to 2-feet.***

D. Purpose of Proposed Action: Define the purpose of the proposed structure or work. For example, the purpose of bulkheading may be to stabilize an eroding bank; whereas, the purpose for a pier may be for the mooring of a private boat, for access to a public or private facility, for a marina, or for another purpose.

***Maintenance dredging is necessary to ensure adequate depth of the berths to support vessel ingress and egress from the port.***

E. Submit color photographs of the site, with explanations of the views shown (prints only). Photographs help us to better understand your project. The more photographs you provide, the easier it is to understand and process your application.

***Please refer to Section 1 for photographs.***

| PART II – ENVIRONMENTAL IMPACT CHECKLIST | | | |
|---|---|---|---|
| ENVIRONMENTAL IMPACT | YES | NO | QUALIFYING REMARKS |
| A. Physical | | | |
| 1. Topography | ☒ | ☐ | Dredging by its nature alters the benthic topography, however, since this is maintenance dredging, topographic will not differ from its normal surface elevation. |
| 2. Geological Elements and Leaching | ☐ | ☒ | Results of the TCLP analyses are included in Appendix C and Section 4. |
| 3. Air | ☐ | ☒ | No impacts. |
| 4. Transportation | ☐ | ☒ | Dredging will have a net benefit to ship transportation. |
| 5. Handling of Hazardous Materials | ☐ | ☒ | Not applicable. |
| 6. Spoil Disposal | ☒ | ☐ | Material will be disposed of at the Pedricktown South and Wilmington Harbor South CDFs. These are dedicated disposal sites managed by the Army Corps of Engineers. All material has been tested to ensure compliance with soil and water quality standards for acceptable disposal. |
| 7. Sewage and Solid Wastes | ☐ | ☒ | Not applicable. |
| 8. Water Resources | | | |
| a. Water Quality | ☒ | ☐ | Some turbidity is expected to occur as a result of dredging. This effect is only temporary. Additionally, the return of decant water from a confined disposal facility poses a risk to water quality if untested. The modified elutriate test results included in Appendices A-C show that the decant water should meet all water quality criteria. |
| b. Hydrography, Circulation, Littoral Drift. | ☐ | ☒ | Dredging will restore the ship berths to their normal depth, hence, no changes. |
| c. Ground Water | ☐ | ☒ | No impact. |
| B. Biological | | | |
| 1. Vegetation | | | |
| a. Terrestrial | ☐ | ☒ | Not applicable. |
| b. Aquatic | ☐ | ☒ | No aquatic vegetation exists in the project area. |
| 2. Fish and Wildlife | | | |
| a. Mammals | ☐ | ☒ | No impacts. |
| b. Birds | ☐ | ☒ | No impacts. |
| c. Amphibians | ☐ | ☒ | No impacts. |

| | | | |
|---|---|---|---|
| d. Reptiles | ☐ | ☒ | No impacts anticipated. |
| e. Fish | ☐ | ☒ | Seasonal restrictions will be observed for migratory fish to protect nursing and larval stage fishes. Hydraulic dredging always poses a risk of entrainment; however, adult fish are highly mobile and can easily move away from the dredging area. No impact anticipated. |
| f. Shellfish | ☒ | ☐ | We do not expect there to be robust shellfish habitat due to the frequent dredging regime. No shellfish beds have been noted within the dredging footprint. Any shellfish that are present, however, will be entrained by the hydraulic dredger. |
| g. Invertebrates | ☒ | ☐ | Invertebrates are common in all tidal waters of the Delaware River and may be found at the mouth the Christina River as well. As bottom-dwelling species, some entrainment is expected, followed by recolonization. |
| 3. Rare or Endangered Species | ☐ | ☒ | No rare or endangered species are known to be protected in the Christina River. No impacts anticipated. |

| ENVIRONMENTAL IMPACT | YES | NO | QUALIFYING REMARKS |
|---|---|---|---|
| C. Cultural | | | |
| 1. Land Use | ☐ | ☒ | |
| 2. Population Density and Trends | ☐ | ☒ | |
| 3. Regional Development | ☐ | ☒ | |
| 4. Historic Places | ☐ | ☒ | |
| 5. Archaeological Sites | ☐ | ☒ | |
| 6. Aesthetics | ☐ | ☒ | |
| 7. Utilities | ☐ | ☒ | |
| 8. Transportation Systems | ☒ | ☐ | Dredging will facilitate continued vessel traffic to and from the port. |
| 9. Recreation | ☐ | ☒ | |
| 10. Public Health | ☐ | ☒ | |
| D. Other Factors | | | |
| 1. Secondary Effects | ☐ | ☒ | |
| 2. Controversiality | ☐ | ☒ | |
| 3. Is significant dredging involved? | ☒ | ☐ | Dredging up to 100,000 cubic yards per year for ten years is requested. |
| 4. Is significant filling involved? | ☐ | ☒ | |

**Part III** **Considerations of a Dredging Proposal:**

A. Describe characteristics and locations of the proposed dredged material disposal site. Provide photographs.

***Wilmington Harbor South is an Army Corps of Engineers-managed confined disposal facility occupying 170 acres. It is located approximately one kilometer (1 km) southeast of the dredge area along the Delaware River.***

***Pedricktown South is also a confined disposal facility managed by the Army Corps of Engineers. It occupies 497 acres as a distance of approximately six kilometers (6 km) northeast of the dredge area along the Delaware River.***

***Volume calculations will be performed by the Army Corps of Engineers prior to the dredging of the main channel. The Corps of Engineers will ensure that adequate capacity is present at either or both of the disposal areas before disposal will occur.***

***Aerial photographs are provided in Section 1 of this application, while recent large-scale drawings are provided in Section 8.***

B. Is there a comprehensive plan for disposal sites that takes into account the accumulative effect over time and the decreasing amount of suitable sites for disposal?

***The U.S. Army Corps of Engineers has policies in place to ensure the continued operation of its dredge material disposal areas. This site will be dredged as part of the regular Army Corps of Engineers channel dredging.***

C. Describe the present land use of the disposal site.

***The proposed disposal site is a disposal site currently managed by the U.S. Army Corps of Engineers.***

D. Describe characteristics of the material to be disposed, including:

1. Physical source of material (i.e. sand, silt, clay, etc.) Give percentages of the various fractions if available.

   ***The material is predominantly (>90%) silt. Please refer to the grain size analysis in Appendix C for exact specifications.***

2. Chemical composition of material: Many areas, especially marinas, highly industrialized areas, etc., have sediments with high concentrations of pollutants (chemicals, organic material, etc.). These materials may be re-suspended or reintroduced into the water and result in serious environmental damage. If your proposed dredging is in an area such as described above, a chemical analysis of the material to be dredged should be provided.

   ***Please refer to Appendix C for a detailed analysis of the material composition, including bulk sediment chemistry testing of inorganics, pesticides, semivolatile***

***organic compounds***.

3. Dewatering properties of the material to be disposed.

   ***Dredged material is expected to be predominantly fine-grained and fairly hydrophilic. Settling is expected to take at least 24 hours before discharge of decant water is possible.***

4. Compactability of material and settling rates of material to be disposed.

   ***The sediment at this area consists of almost entirely fine-grained material. Compactability is likely poor and the material would not be well-suited for beneficial reuse. Settling rates are likely poor but disturbed sediments will disperse quickly in a tidal waterbody. An estimated settling/retention time of 24 hours within the CDF will be observed.***

5. Dredging and disposal schedule to ensure that operations do not degrade water quality during times of anadromous fish migration.

   ***Dredging will be avoided between April 1 and June 15 of every year to avoid impacts to anadromous fish.***

E. When the project involves land disposal, discuss the following:

1. Method of disposal to be utilized, i.e., pipeline discharge, barge, hopper (underway or stationary).

   ***Material will be transported in a slurry via a pipeline to the disposal site.***

2. Describe method of dredged material containment (i.e. embankment, behind bulkhead, etc.)

   ***The confined disposal facility provides containment through earthen dikes. Discharge of decant water is regulated via an adjustable weir.***

3. What type of leachates will be produced from the spoil material and what is planned for protection of the groundwater?

   ***The dredge material has been analyzed for leachates using the TCLP method of testing. Results are included in Section 4 and Appendix C.***

4. Methods to ensure that spoil water does not adversely affect water quality, both during construction and after completion of the project.

   ***The dredge board stop logs will be maintained at the highest elevation possible to provide maximum retention time without jeopardizing the stability of the dike walls. Daily inspections by both the contractor and the Army Corps of Engineers will occur to ensure proper operation of the weir system.***

5. Provisions for monitoring during discharge: water quality, sediment transport, and precautions to prevent “short-circuiting” dumping.

   ***The contractor will be required to record daily discharge readings and keep all pipelines in good condition at all times. Any leaks or breaks along their length will result in shutdown of the operation and immediate repair. There will be no short circuit dumping.***

F. Consider and discuss the following for water disposal:

   1. Describe methods to be used for water disposal, including volumes and site selection.

      ***Not applicable. Water disposal will not be utilized.***

   2. Describe the existing water characteristics at the site, including chemical analysis for water quality.

      ***Not applicable. Water disposal will not be utilized.***

G. Discuss the frequency and amount of maintenance dredging which will be required; discuss the resulting impacts.

   ***Dredging will occur up to once per year in the amount of up to 75,000 cubic yards per dredge event. Impacts are expected to be minor and consistent from event to event. Turbidity from the disturbance of the substrate will result in the temporary resuspension of fine-grained sediment from the river bottom. This is likely to not impact finfish as they are highly motile and likely to avoid the area of disturbance while dredging takes place. Fine-grained sediments are expected to disperse quickly in a tidal environment. Benthic invertebrates are less motile and face the risk of entrainment by the dredging equipment.***

H. Alternatives:

   1. Discuss all alternatives to the project, including the “no action” alternative.

      ***Please refer to the answers to #2 and #3 below.***

   2. Discuss alternative types and methods of dredging and disposal, such as pipeline discharge, barging, or hopper method.

      ***Hydraulic dredging is the logical option because it allows for dredging to occur at the same time as the regular hydraulic dredging of the channel by the U.S. Army Corps of Engineers, reducing the number of dredging events occurring within the channel over time and therefore reducing the overall disturbance. In-water disposal is not an option in this case due to the nature of hydraulic dredging and***

***the dispersal properties of the dredge material.***

3. Discuss alternatives to dredging.

   ***No action would result in the eventual inability of vessels to move into and out of the port. Alternatives relating to dredging and disposal methods are discussed below.***

4. Discuss alternative areas of sites for spoil disposal.

   ***Hydraulic dredging requires the presence of a suitable disposal site in the immediate area. Costs increase significantly as distance to the disposal site increases. Other disposal sites are closer than the Pedricktown South disposal site, but these sites are not currently accepting new material. Wilmington Harbor South will be utilized first if there is adequate capacity when dredging occurs.***

5. Discuss impact of port docking patterns upon the demand for dredging. Can alternative patterns reduce the amount of dredging required to support port operations?

   ***Vessels dock parallel to the shoreline. This is necessary due to the design of both the ships and the port to facilitate loading and unloading. This configuration results in the smallest dredging footprint possible. Furthermore, immediately outshore of the requested dredging footprint is the federally dredged channel. Connecting the two areas creates the safest and most logistically practical pattern possible.***

6. Support alternative means of construction that would prevent or minimize water quality degradation using EPA standards for guidance.

   ***No construction is proposed.***

7. State in detail impacts resulting in alternative locations for the proposed project.

   ***Since this is an existing port, there are no alternative locations.***

## Part IV <u>CONSIDERATIONS OF A FILLING PROPOSAL:</u> N/A

A. Describe in detail the existing characteristics of the area proposed for filling (i.e. aquatic area, marsh, mudflat, swamp, etc.). In your description, be sure to include the types of vegetation present and the types of animals that use the area. Provide photographs.

B. Give the following information in regard to the project size:
   1. Total area to be filled.
   2. Size of underwater area to be filled.
   3. Area of intertidal zone to be filled.
   4. Area of wetlands to be filled.
   5. Proposed height of fill.
   6. Volume of material that will be used in filling.

C. Describe in detail the material to be used as fill including as follows:
   1. Type of fill to be used (sand, stone, rubble, etc.). If the material is a composite (i.e., rubble), list the types of materials it will contain.
   2. Give the specific location of the source of this material.
   3. What types of leachates will be produced from the fill material and what is planned for protection of surface and groundwater?

D. Carefully describe the method of fill, including the following:
   1. Method of fill placement, including equipment used in deposition and grading.
   2. Method of stabilization of banks from erosion, sloughing, wave action, boat wakes, etc.
   3. Method of stabilization of the surface of the fill.

4. Length of time needed for completion of the project. State if filling will be continuous, intermittent, etc.

5. Method of controlling turbidity when filling an underwater area.

E. Purpose of the Project:

1. What is the intended use of the filled area?

2. What structures, if any, will be constructed on the fill?

3. What benefits would you gain from the proposed fill?

F. Alternatives

1. Discuss the “no action” alternative and how this would affect your present and future plans for the development of the area.

2. Discuss alternative locations for the proposed fill.

3. Discuss the use of elevated structures (i.e. causeways, elevated platforms, etc.) in place of the proposed fill.

4. Discuss any other alternatives you have considered prior to formulating the presently submitted proposal.

# SECTION 3

## COASTAL ZONE MANAGEMENT ACT
## FEDERAL CONSISTENCY FORM
## AND
## ADDENDUM

Delaware Department of Natural Resources and Environmental Control
Delaware Coastal Management Program

Initial Review: ________
Updated On: ________
Complete: ________
Official Use Only

# Coastal Zone Management Act
# Federal Consistency Form

This document provides the Delaware Coastal Management Program (DCMP) with a Federal Consistency Determination or Certification for activities regulated under the Coastal Zone Management Act of 1972, as amended, and NOAA's Federal Consistency Regulations, 15 C.F.R. Part 930. Federal agencies and other applicants for federal consistency are not required to use this form; it is provided to applicants to facilitate the submission of a Consistency Determination or Consistency Certification. In addition, federal agencies and applicants are only required to provide the information required by NOAA's Federal Consistency Regulations.

| **Project/Activity Name:** | Port of Wilmington Maintenance Dredging |
|---|---|

## I. Federal Agency or Non-Federal Applicant Contact Information:

Contact Name/Title: Eugene Bailey (Diamond State Port Corporation)

Federal Agency Contractor Name (if applicable): ________

Federal Agency: U.S. Army Corps of Engineers
(either the federal agency proposing an action or the federal agency issuing a federal license/permit or financial assistance to a non-federal applicant)

Mailing Address: 1 Hausel Road

City: Wilmington State: DE Zip Code: 19801

E-mail: GBailey@port.state.de.us Telephone #: 302-571-4600

## II. Federal Consistency Category:

- ○ Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)
- ○ Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)
- ○ Federal Financial Assistance (15 C.F.R. Part 930, Subpart F)
- ○ Federal License or Permit Activity (15 C.F.R. Part 930, Subpart D)
- ○ Federal License or Permit Activity which occurs wholly in another state (interstate consistency activities identified in DCMP's Policy document)

## III. Detailed Project Description (attach additional sheets if necessary):

Diamond State Port Corporation proposes to conduct maintenance dredging at the Port of Wilmington Berths 1 through 7. Dredging will occur hydraulically to a depth of -35 feet Mean Low Water plus an allowable 2 feet of overdredge for Berths 5-7, and -38 feet Mean Low Water plus an allowable -2 feet of overdredge for Berths 1-4. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event for ten (10) years. Dredged material will be pumped in a slurry via pipeline to the Pedricktown South Confined Disposal Facility in Oldmans Township, Salem County, NJ or the Wilmington Harbor South Confined Disposal Facility in Wilmington, DE, both of which are operated by the U.S. Army Corps of Engineers.

The Christina River navigational channel is dredged regularly by the U.S. Army Corps of Engineers and dredging for this project will occur concurrently with main channel dredging.

## IV. **General Analysis of Coastal Effects** (attach additional sheets if necessary):

Dredging occurs frequently within the project area and adjacent channel, so new coastal effects are not anticipated. Dredging may result in an increase in turbidity during and immediately after the activity takes place. Turbidity increases are unknown, however, since this is a tidal area that is close to the mouth of the Delaware River, mixing and dispersion will occur rapidly. Turbidity may result in a decrease in photosynthetic activity along with disturbance to fish. Motile organisms will likely avoid the dredging area, while filter-feeders in the surrounding area may be negatively affected. Any immobile benthic organisms in the project area will be entrained.

## V. **Detailed Analysis of Consistency with DCMP Enforceable Policies** (attach additional sheets if necessary):

**Policy 5.1: Wetlands Management**

Not applicable, no wetlands present on site.

**Policy 5.2: Beach Management**

Not applicable, no beaches present on site.

**Policy 5.3: Coastal Waters Management** (includes wells, water supply, and stormwater management. Attach additional sheets if necessary)

Please see addendum attached.

**Policy 5.4: Subaqueous Land and Coastal Strip Management**

Please see addendum attached.

**Policy 5.5: Public Lands Management**

Not applicable, no public lands management takes place within the project area.

**Policy 5.6: Natural Lands Management**

Not applicable as there are no designated natural areas within the site.

**Policy 5.7: Flood Hazard Areas Management**

Not applicable. The entire project area is submerged therefore it is not within a flood hazard area.

**Policy 5.8: Port of Wilmington**

Please see addendum attached.

**Policy 5.9: Woodlands and Agricultural Lands Management**

Not applicable. No woodlands or agricultural lands on site.

**Policy 5.10: Historic and Cultural Areas Management**

Not applicable. No historic or cultural areas on site.

**Policy 5.11: Living Resources**

Please see addendum attached.

**Policy 5.12 Mineral Resources Management**

Not applicable. No mineral resources managed on site.

**Policy 5.13: State Owned Coastal Recreation and Conservation**

Please see addendum attached.

**Policy 5.14: Public Trust Doctrine**

Not applicable. This rule mainly applies to regulators.

**Policy 5.15: Energy Facilities**

Not applicable. This rule does not apply as the project area does not represent an energy facility.

**Policy 5.16: Public Investment**

This rule does not apply as the project does not involve public investment.

**Policy 5.17: Recreation and Tourism**

Not applicable. This policy does apply as the project does not involve the promotion or development of recreation and/or tourism.

**Policy 5.18: National Defense and Aerospace Facilities**

Not applicable. No national defense or aerospace facilities on site.

**Policy 5.19: Transportation Facilities**

Please see addendum attached.

**Policy 5.20: Air Quality Management**

| |
|---|
| Not applicable as this project does not affect air quality to the extent of being regulated. |

**Policy 5.21: Water Supply Management**

| |
|---|
| Not applicable as this project does not concern public water supply. |

**Policy 5.22: Waste Disposal Management**

| |
|---|
| Not applicable as this project does not concern waste disposal management. |

**Policy 5.23: Development**

| |
|---|
| Not applicable. This rule does not apply as the project does not involve any new development. |

**Policy 5.24: Pollution Prevention**

| |
|---|
| Please see addendum attached. |

**Policy 5.25: Coastal Management Coordination**

| |
|---|
| No applicable. This rule applies to state agencies only. |

**VI. JPP and RAS Review** (Check all that apply)**:**

Has the project been reviewed in a monthly Joint Permit Processing and/or Regulatory Advisory Service meeting?

☐ JPP ☐ RAS ☒ None

*If yes, provide the date of the meeting(s): ______________________________

**VII. Statement of Certification/Determination and Signature** (Check one and sign below):

☐ **FEDERAL AGENCY CONSISTENCY DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program.

OR

☐ **FEDERAL AGENCY NEGATIVE DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity will not have any reasonably foreseeable effects on Delaware's coastal uses or resources (Negative Determination) and is therefore consistent with the enforceable policies of the Delaware Coastal Management Program.

OR

☒ **NON-FEDERAL APPLICANT'S CONSISTENCY CERTIFICATION.** Based upon the information, data, and analysis included herein, the non-federal applicant for a federal license or permit, or state or local government agency applying for federal funding, listed in (I) above, finds that this proposed activity complies with the enforceable policies of the Delaware Coastal Management Program and will be conducted in a manner consistent with such program.

| | | | |
|---|---|---|---|
| Signature: | Eugene Bailey | | |
| Printed Name: | Eugene Bailey | Date: | 09/09/2020 |

Pursuant to 15 C.F.R. Part 930, the Delaware Coastal Management Program must provide its concurrence with or objection to this consistency determination or consistency certification in accordance with the deadlines listed below. Concurrence will be presumed if the state's response is not received within the allowable timeframe.

**Federal Consistency Review Deadlines:**

| | |
|---|---|
| Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C) | 60 days with option to extend an additional 15 days or stay review (15 C.F.R. § 930.41) |
| Federal License or Permit (15 C.F.R. Part 930, Subpart D) | Six months, with a status letter at three months. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.63) |
| Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E) | Six months, with a status letter at three months. If three month status letter not issued, then concurrence presumed. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.78) |
| Federal Financial Assistance to State or Local Governments (15 C.F.R. Part 930, Subpart F) | State Clearinghouse schedule |

**OFFICIAL USE ONLY:**

| | | |
|---|---|---|
| Reviewed By: | Fed Con ID: | Date Received: |
| Public notice dates: to | Comments Received: ☐ NO ☐ YES *[attach comments]* | |
| Decision type: (objections or conditions attach details) | Decision Date: | |

# SECTION 3

# COASTAL ZONE MANAGEMENT ACT FEDERAL CONSISTENCY FORM ADDENDUM

## 5.3 COASTAL WATERS MANAGEMENT

5.3.1.1 The development and utilization of the land and water resources of the State shall be regulated to ensure that water resources are employed for beneficial uses and not wasted, to protect beneficial uses of water resources, and to assure adequate water resources for the future. [7 Del.C. §6001 (a)(2)(3)]

***Response:*** ***Since the continued operation of the Port of Wilmington, an economic focal point of the Delaware economy, is dependent upon this project's completion, this project constitutes a beneficial use.***

5.3.1.2 The water resources of the State shall be protected from pollution which may threaten the safety and health of the general public. [7 Del.C. §§6001 (a)(5)(c)(2)]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.3 The coastal water resources of the State shall be protected and conserved to assure continued availability for public recreational purposes and for the conservation of aquatic life and wildlife. [7 Del.C. §6001(a)(4)]

***Response:*** ***Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.4 It is the policy of the DNREC to maintain within its jurisdiction surface waters of the State of satisfactory quality consistent with public health and public recreation purposes, the propagation and protection of fish and aquatic life, and other beneficial uses of the water. [7 DE Admin. Code 7401 subsection 1.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.5 The designated uses applicable to the various stream basins represent the categories of beneficial use of waters of the State which must be maintained and protected through application of appropriate criteria. Such uses shall include public water supply; industrial water supply; primary contact recreation involving any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water such as swimming and water skiing; secondary contact recreation involving a water-based form of recreation, the practice of which has a low probability for total body immersion or ingestion of water such as wading, boating and fishing; maintenance, protection and propagation of fish, shellfish, aquatic life and wildlife preservation; agricultural water supply; and waters of exceptional recreational or ecological significance (ERES waters). [7 DE Admin. Code 7401 Sections 2.0 and 3.0]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.6 Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Degradation of water quality in such a manner that results in reduced number, quality, or river or stream mileage of existing uses shall be prohibited. Degradation shall be defined for the purposes of this section as a statistically significant reduction, accounting for natural variations, in biological, chemical, or habitat quality as measured or predicted using appropriate assessment protocols. [7 DE Admin. Code 7401 subsection 5.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.7 Where the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that water quality shall be maintained and protected. In the case of E.R.E.S. waters, existing quality shall be maintained or enhanced. Limited degradation may be allowed if the DNREC finds, after review, that allowing lower water quality would result in a substantial net environmental or public health benefit and does not impede existing uses in the area in which the waters are located In while allowing for full protection of existing uses. [7 DE Admin. Code 7401 subsections 5.2 and 5.6]

***Response:*** ***The Christina River is not an E.R.E.S. waterbody, therefore this does not apply.***

5.3.1.8 Where high quality waters constitute an outstanding national resource, such as waters of national parks and wildlife refuges, existing quality shall be maintained and protected. [7 DE Admin. Code 7401 subsection 5.3]

***Response:*** ***The project area does not lie within a national park or wildlife refuge; therefore this rule does not apply.***

5.3.1.9 In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Water Quality Act of 1987. [7 DE Admin. Code 7401 subsection 5.4]

***Response:*** ***No thermal discharges are associated with this project.***

5.3.1.10 All surface waters of the State shall be free from substances that are attributable to wastes of industrial, municipal, agricultural or other human-induced origin. Examples include but are not limited to the following:

5.3.1.10.1 Floating debris, oil, grease, scum, foam, or other materials on the water surface that may create a nuisance condition, or that may in any water interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.2 Settleable solids, sediments, sludge deposits, or suspended particles that may coat or cover submerged surfaces and create a nuisance condition, or that may in any way interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.3 Any pollutants, including those of a thermal, toxic, corrosive, bacteriological, radiological, or other nature that may interfere with attainment and maintenance of designated uses of the water, may impart undesirable odors, tastes, or colors to the water or to aquatic life found therein, may endanger public health, or may result in dominance of nuisance species. [7 DE Admin. Code 7401 subsection 4.1]

***Response:*** ***It is the priority of the applicant to minimize the release of settleable solids and suspended sediment that is typically a result of dredging. While it is not possible to completely eliminate it, hydraulic dredging typically minimizes the resuspension of sediment within the water column. Hydraulic dredging will be conducted in a controlled manner and the process will be observed by attendants at the surface to ensure that activities do not result in an unforeseen release of sediment into the water column. If this should occur, dredging will halt until turbidity dissipates and the dredger and line will be inspected for defects.***

5.3.1.11 Regulatory mixing zones shall not impinge upon areas of special importance, including but not limited to drinking water supply intakes, nursery areas for aquatic life or waterfowl, approved or conditional shellfish areas or heavily utilized primary contact recreation areas. Zones shall not be located in such a manner as to interfere with passage of fishes or other organisms. Shore-hugging plumes should be avoided to the maximum extent practicable. In areas where multiple discharges are located in proximity, overlapping discharge plumes may occur. In such instances, the thermal mixing zone, which is not to exceed 25% of the cross-sectional area of the receiving water as measured from the point of discharge to the opposite shore, may be reduced to preclude acute toxicity in the overlap areas, or to ensure an adequate zone of passage for fish. [7 DE Admin. Code 7401 subsections 6.2 and 6.4]

***Response:*** ***This rule does not apply as there is no discharge associated with a mandated mixing zone.***

5.3.1.12 Streams with a designated use of public water supply shall provide waters of acceptable quality for use for drinking, culinary or food processing purposes after application of approved treatment equivalent to coagulation, filtration, and disinfection (with additional treatment as necessary to remove naturally occurring impurities). Water shall be free from substances (except natural impurities) that, alone or in combination with other substrates, result in:

5.3.1.12.1 Unacceptable levels of taste or odor in the treated water;
5.3.1.12.2 Significant disruption of the treatment processes at the treatment facility; or
5.3.1.12.3 Concentrations of toxic substances in the treated water that may be harmful to human health. [7 DE Admin. Code 7401 subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.13 Designated exceptional recreational or ecological significance (ERES) waters shall be accorded a level of protection and monitoring in excess of that provided most other waters of the State. These waters are recognized as special natural assets of the State, and must be protected and enhanced for the benefit of present and future generations of Delawareans. [7 DE Admin. Code 7401 subsection 5.6.1.1]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.14 ERES waters shall be restored, to the maximum extent practicable, to their natural condition. To this end, the DNREC shall, through adoption of a pollution control strategy for each ERES stream basin, take appropriate action to cause the systematic control, reduction, or removal of existing pollution sources, and the diversion of new pollution sources, away from ERES waters. [7 DE Admin. Code 7401 subsection 5.6.1.2]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.15 The discharge of oil from a vessel, truck, pipeline, storage, tank or tank car which causes or poses a threat of making a film on, emulsion in or sludge beneath the waters of the State or its shoreline shall be prohibited. [7 Del.C. §§6203, 6202(7)(5)(9)]

***Response:*** ***This rule does not apply.***

5.3.1.16 At a minimum, any discharge of liquid waste - sewage, industrial waste or other waste to State waters shall be subject to effluent limitations, discharge requirements and any alternate effluent control strategy that reflect a practicable level of pollutant removal technology. For the purposes of this section, a practicable level of pollutant removal technology is defined as the application of "best" treatment technology, control measures and practices, including pollution prevention, available to prevent, manage, reduce or remove pollutants taking into account the cost of applying such technology, control measures or practices in relation to the effluent reduction benefits to be achieved, the age of equipment and facilities involved, the process(es) employed, the engineering aspects of applying the various types of control, process changes, pollution prevention measures, non-water quality impacts (e.g. energy requirements) and other factors deemed appropriate. For the parameters, BOD5 (5-day biochemical oxygen demand) and suspended solids, the degree of removal reflecting an application of a practicable level of pollutant removal technology shall be at least 85% of the BOD5 and suspended solids contained in the influent to the treatment works or prior to application of the removal technology, control measures or practices. For discharges of sewage to State waters, a practicable level of pollutant removal technology shall be secondary treatment and disinfection.

5.3.1.16.1 No person shall cause or permit any discharge of liquid waste to the Delaware River, the Delaware Bay, or Atlantic Ocean except liquid waste which has received at least secondary treatment and disinfection.

5.3.1.16.2 No person shall cause or permit discharge of liquid waste to a lake or a pond or any tributary thereof, except liquid waste which has received at least secondary treatment, filtration, nutrient removal and disinfection.

5.3.1.16.3 No person shall cause or permit any discharge of liquid waste to the Little Assawoman Bay, Indian River Bay, or to Rehoboth Bay, including any tributaries to those waterbodies, except liquid waste which has received at least secondary treatment, filtration, and disinfection.

5.3.1.16.4 No person shall cause or permit any discharge of liquid waste to a stream, tidal or non-tidal, except liquid waste which has received at least secondary treatment, filtration, and disinfection. This subsection shall not govern discharge into the Delaware River, the Delaware Bay or the Atlantic Ocean, which shall be governed by subsection 5.3.1.16.1. For existing facilities, filtration may not be required if the existing facility has demonstrated the

ability to continuously meet secondary treatment levels. [7 DE Admin. Code 7201 subsections 7.1 and 7.2]

***Response:*** ***If a discharge of decant water from the designated Wilmington Harbor South and/or Pedricktown Confined Disposal Facility is necessary, it will be monitored for contaminants. The dredge material has been tested using the modified elutriate method, which simulates the constituents that are to be expected in decant water. The slurry released into the confined disposal area will be given sufficient time for solids to settle before decant water is released using an adjustable weir system to calibrate the discharge structure to the level necessary to release only water. The slurry will be monitored visually for settlement and the appropriate time for release will then be determined.***

5.3.1.17 In the event that Delaware Surface Water Quality Standards are not achieved through application of the technology based requirements, additional effluent limitations and treatment requirements shall be imposed to assure compliance with the Surface Water Quality Standards. Such additional effluent limitations and treatment requirements must control all pollutants or pollutant parameters which the DNREC determines are or may be discharged at a level which will cause, have the reasonable potential to cause or significantly contribute to an excursion of any numerical or narrative water quality criterion contained within Delaware's Surface Water Quality Standards. The need for additional effluent limitations and treatment requirements shall be based upon the results of chemical and/or biological tests in conjunction with studies or analyses designed to assess the potential of the discharge to cause or contribute to in-stream excursions of Delaware's Surface Water Quality Standards. [7 DE Admin. Code 7201 subsection 8.1]

***Response:*** ***Treatment of decant water is not anticipated to be necessary and therefore is not proposed. This rule does not apply currently.***

5.3.1.18 Where conflicts develop between stated surface water uses, stream criteria, or discharge criteria, designated uses for each segment shall be paramount in determining the required stream criteria, which, in turn, shall be the basis of specific discharge limits or other necessary controls. [7 DE Admin. Code 7401 subsection 1.2]

***Response:*** ***This rule does not apply.***

5.3.1.19 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources, undertake any activity:

5.3.1.19.1 In a way which may cause or contribute to the discharge of an air contaminant;

5.3.1.19.2 In a way which may cause or contribute to the discharge of a pollutant into any surface or ground water;

5.3.1.19.3 In a way which may cause or contribute to withdrawal of ground water or surface water or both;

5.3.1.19.4 In a way which may cause or contribute to the collection, transportation, storage, processing or disposal of solid wastes, regardless of the geographic origin or source of such solid wastes;

5.3.1.19.5 To construct, maintain or operate a pipeline system including any appurtenances such as a storage tank or pump station;

5.3.1.19.6 To construct any water facility; or

5.3.1.19.7 To plan or construct any highway corridor which may cause or contribute to the discharge of an air contaminant or discharge of pollutants into any surface or ground water. [7 Del.C. § 6003(a)]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from the State of Delaware. No other permit is necessary.***

5.3.1.20 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources and Environmental Control, construct, install, replace, modify or use any equipment or device or other article:

5.3.1.20.1 Which may cause or contribute to the discharge of an air contaminant;

5.3.1.20.2 Which may cause or contribute to the discharge of a pollutant into any surface or groundwater;

5.3.1.20.3 Which is intended to prevent or control the emission of air contaminants into the atmosphere or pollutants into surface or groundwaters;

5.3.1.20.4 Which is intended to withdraw ground water or surface water for treatment and supply; or

5.3.1.20.5 For disposal of solid waste. [7 Del.C. §6003(b)]

***Response: This rule does not apply.***

5.3.1.21 Regulatory variances for the activities identified in the preceding policy statement may be granted pursuant to 7 Del.C. §6011 if all of the following conditions exist in the opinion of the Secretary of the Delaware Department of Natural Resources and Environmental Control:

5.3.1.21.1 Good faith efforts have been made to comply with these policies;

5.3.1.21.2 The cost of compliance is disproportionately high with respect to the benefits which would be bestowed by compliance, or the necessary technology is unavailable;

5.3.1.21.3 Available alternative operating procedures or interim control measures are being or will be used to reduce adverse impacts; and

5.3.1.21.4 The activities are necessary to the national security or to the lives, health, or welfare of the occupants of Delaware. [7 Del.C. §6011(b)]

***Response:*** ***A variance is not requested, therefor this rule does not apply.***

5.3.1.22 No permit for the activities identified above shall be granted unless the activities are consistent with county and municipal zoning regulations. [7 Del.C. §6003(c)(1)]

***Response:*** ***County and municipal zoning approval is not necessary for maintenance dredging at the Port of Wilmington.***

5.3.1.23 No person or entity shall commence construction, replacement, or operation of any of the following without first having obtained a permit from DNREC:

5.3.1.23.1 Sewer;

5.3.1.23.2 Any liquid waste collection or conveyance facilities such as wastewater pump stations and force mains;

5.3.1.23.3 Liquid waste treatment facilities;

5.3.1.23.4 Any surface impoundment for liquid waste or

5.3.1.23.5 Any bulk storage, bulk transfer or pipeline facility. [7 DE Admin. Code 7201 Section 2.0 and subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.24 No person shall construct, install, modify, rehabilitate, or replace an on-site wastewater treatment and disposal system or construct or place any dwelling, building, mobile home, manufactured home or other structure capable of discharging wastewater on-site unless such person has a valid license and permit issued by the DNREC. [7 DE Admin. Code 7101 subsection 3.31.1]

***Response:*** ***This rule does not apply.***

5.3.1.25 No person shall cause or permit to be discharged, thrown, or dumped into any waters or any drainage ditch in the State any garbage, refuse, dead animal, poultry, trash, carton, bottle, container, box, lumber, timber, paper, or light material or other solid waste. [7 DE Admin. Code 7201 subsection 3.2.6]

***Response:*** ***This rule does not apply.***

5.3.1.26 No person or entity shall:

5.3.1.26.1 Engage in the drilling, boring, coring, driving, digging, construction, installation, removal, or repair of a water well or water test well, except as or under the supervision of a licensed water well contractor;

5.3.1.26.2 Construct, repair, install or replace any part of a septic tank system except by or under the supervision of a licensed septic tank installer; or

5.3.1.26.3 Operate any liquid waste treatment system without a licensed liquid waste treatment plant operator.

5.3.1.26.4 No permits or licenses shall be issued for these activities unless the DNREC finds that the applicant is prepared and willing to conduct such activities in a manner which is consistent with the CMP policies. [7 Del.C. §6023; Delaware Executive Order 43, August 15, 1996]

***Response:*** ***This rule does not apply.***

5.3.1.27 The person who has caused the contamination of a person's drinking water supply by contaminant other than bacteria, viruses, nitrate or pesticides may be required to provide, at no cost to each person who has had his drinking water supply contaminated, an interim water supply that is of a quality and quantity to meet said person's needs as shall be determined by the Secretary of DNREC, in addition to the dates on which the interim water supply shall commence and be terminated. [7 Del.C. §6037]

***Response:*** ***This rule does not apply.***

5.3.1.28 No permits shall be issued for the discharge of any radiological, chemical or biological warfare agents or high-level radioactive wastes into State waters. [7 DE Admin. Code 7201 subsection 3.2.8.1]

***Response:*** ***This rule does not apply.***

5.3.1.29 No person shall cast, put, place, discharge in or permit or suffer to be cast, put, placed, discharged in or to escape into any running stream of water within the limits of this State, from which stream the inhabitants of any borough, town or city within this State are supplied wholly or in part with water for and as drink or beverage,

any dye-stuffs, drugs, chemicals or other substance or matter of any kind whatsoever whereby the water so supplied as and for a drink or beverage is made and becomes noxious to the health or disagreeable to the senses of smell or taste. [16 Del.C. §1301]

***Response:*** ***This rule does not apply.***

5.3.1.30 Water delivered to every consumer by any public water supplier shall be so protected by natural means, by proper constructions or by treatment so as maintain or increase water quality above the level determined to be safe and not to negatively impact users of water from such systems, either directly or indirectly. [16 DE Admin. Code 4462 subsection 3.3]

***Response:*** ***This rule does not apply.***

5.3.1.31 After July 1, 1991, unless a particular activity is exempted by these regulations, a person may not disturb land without an approved sediment and stormwater management plan from the appropriate plan approval agency. [Delaware Sediment and Stormwater Regulations, Section 8(1), amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.32 The following activities are exempt from both sediment control and stormwater management requirements:

5.3.1.32.1 Agricultural land management practices, unless the local Conservation District or the DNREC determines that the land requires a new or updated soil and water conservation plan, and the owner or operator of the land has refused either to apply to a Conservation District for the development of such a plan, or to implement a plan developed by a Conservation District;

5.3.1.32.2 Developments or construction that disturbs less than 5,000 square feet.

5.3.1.32.3 Land development activities which are regulated under specific State or federal laws which provide for managing sediment control and stormwater runoff, such as specific permits required under the National Pollutant Discharge Elimination System (NPDES) when discharges are a combination of stormwater and industrial or domestic wastewater.

5.3.1.32.4 Projects which are emergency in nature that are necessary to protect life or property such as bridges, culvert, or pipe repairs and above ground or underground electric and gas utilities or public utility restoration; and

5.3.1.32.5 Qualifying commercial forest harvesting operations. [Delaware Sediment and Stormwater Regulations, subsection 3.1 amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.33 A project may be eligible for a waiver of stormwater management for both quantitative and qualitative control if the applicant can demonstrate that:

5.3.1.33.1 The proposed project will return the disturbed area to a pre-development runoff condition and the pre-development land use is unchanged at the conclusion of the project; or

5.3.1.33.2 The proposed project consists of a linear disturbance of less than ten (10) feet in width; or

5.3.1.33.3 The project is for an individual residential detached unit or agricultural structure, and the total disturbed area of the site is less than one acre; or

5.3.1.33.4 The proposed project is for agricultural structures in locations included in current soil and water conservation plans that have been approved by the appropriate Conservation District. [Delaware Sediment and Stormwater Regulations, subsection 3.2.1, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.34 All sediment and stormwater management plans shall be designed to implement water quality control measures to minimize, to the maximum extent possible, degradation of downstream water quality and habitat. Unless a particular activity is exempt, no person may disturb land without an approved sediment and stormwater management plan. [Delaware Sediment and Stormwater Regulations, subsection 10.2.2, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.35 Water quantity control is an integral component of overall stormwater management. Control of peak discharges will, to some extent, prevent increases in flooding. The following design criteria for peak flow control are established for water quantity control purposes, unless a waiver is granted based on a case-by-case basis:

5.3.1.35.1 Projects in New Castle County that are located north of the Chesapeake and Delaware Canal shall not exceed the post-development peak discharge for the 2, 10, and 100 year frequency storm events at the pre-development peak discharge rates for the 2, 10, and 100 year frequency storm events.

5.3.1.35.2 Projects in New Castle County that are located south of the Chesapeake and Delaware Canal, Kent County, and Sussex County shall not exceed the post-development peak discharge for the 2 and 10 year frequency storm events at the pre-development peak discharge rates for the 2 and 10 year frequency storm events.

5.3.1.35.3 Watersheds, other than Designated Watersheds or subwatersheds that have well documented water quantity problems may have more stringent or modified design criteria that are responsive to the specific needs of that watershed. Modified criteria for that watershed must receive Departmental approval, and all projects reviewed and approved by the appropriate plan approval agency shall meet or exceed the modified criteria. Proposed modification of criteria for a watershed shall be subject to public review and comment prior to implementation. [Delaware Sediment and Stormwater Regulations, subsection 10.3.4, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.36 Water quality control is also an integral component of stormwater management. Control of water quality on-site will prevent further degradation of downstream water quality. The following design criteria are established for water quality protection unless a waiver or variance is granted on a case-by-case basis.

5.3.1.36.1 In general, the preferred option for water quality protection shall be those practices collectively referred to as “Green Technology BMP’s”. Other practices shall be considered only after preferred practices have been eliminated for engineering or hardship reasons as approved by the appropriate plan approval agency.

5.3.1.36.2 Water quality be designed to manage the rate and volume of flow from the 2.0” NRCS Type II rainfall event, up to a maximum of 1.0” and

5.3.1.36.3 Alternative stormwater quality practices may be acceptable to the Department and/or the plan approval agency if the removal efficiency for suspended solids meets or exceeds 80% as demonstrated by scientifically independent evaluation and monitoring performance data,

5.3.1.36.4 The Department and/or plan approval agency may require other acceptable stormwater practices if a receiving waterbody has been identified as impaired or designated with a specific pollutant reduction target.

5.3.1.36.5 Water quality practices may also be acceptable to the Department and/or the plan approval agency if they are designed to reduce pollutant loading from a specific post-development source.

***Response:*** ***This rule does not apply.***

## 5.4 SUBAQUEOUS LANDS AND COASTAL STRIP MANAGEMENT

5.4.1 The “coastal zone", referred to in these policies as the “coastal strip”, is defined as all that area of the State, whether land, water or subaqueous land between the territorial limits of Delaware in the Delaware River, Delaware Bay and Atlantic Ocean, and a line formed by certain Delaware highways and roads. [7 Del.C. §7002]

***Response:*** ***We are operating under the assumption that the project is within the Delaware coastal zone.***

5.4.2 The natural environment of the coastal strip shall be protected from the impacts of heavy industry and oil pollution for the purpose of recreation, tourism, fishing, crabbing, and gathering other marine life useful in food production. [7 Del.C. §§7001, 6201]

***Response:*** ***As this project does not involve heavy industry and oil pollution, the project is in compliance with this rule.***

5.4.3 The need for protection of the natural environment in the coastal strip shall be balanced with the need for new industry in the State’s coastal areas [7 Del.C. §7001]

***Response:*** ***This rule does not apply; no new industry is proposed.***

5.4.4 The location, extent and type of industrial development in the coastal strip that will result in the degradation of the Delaware's bays and coastal areas shall be controlled [7 Del.C. §7001; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***This project involves solely existing land use; therefore, the project is in compliance with this rule.***

5.4.5 The development and use of offshore oil, gas, and other mineral resources of the State shall be managed to make the maximum contribution to the public benefit and so as to balance their utilization, conservation, and protection [Delaware Oil, Gas and Mineral Exploration Regulations, 2.1. September, 1971]

***Response:*** ***This rule does not apply.***

5.4.6 New heavy industrial uses shall be prohibited in the coastal strip. Such uses are ones characteristically involving more than 20 acres, and characteristically employing smokestacks, tanks, distillation or reaction columns, chemical processing equipment or waste-treatment lagoons. Heavy industrial uses shall not only be defined by their physical characteristics, however, but also by their potential to pollute in the event of human error or equipment failure. Examples of

heavy industry are oil refineries, basic steel manufacturing plants, basic cellulosic pulp-paper mills, and chemical plants such as petrochemical complexes. For purposes of this policy, public sewage treatment or recycling plants shall not be deemed heavy industrial uses. [7 Del.C. §§7002(e), 7003; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***No new heavy industrial uses are proposed for this project.***

5.4.7 New manufacturing uses or the expansion of existing manufacturing uses shall be allowed in the coastal strip by permit only, although in no case shall new manufacturing uses be allowed in wetlands or where inconsistent with local zoning regulations. Manufacturing uses are ones which mechanically or chemically transform substances into new products, and characteristically employ power-driven machines and materials handling equipment. Manufacturing uses typically include establishments engaged in assembling components of manufactured products, provided the new products are not fixed improvements. [7 Del.C. §§7002(d)(e), 7004(a)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.8 The following factors shall be considered in passing on requests for permission to construct or operate a manufacturing use in the coastal strip:

5.4.8.1 Environmental impact, including but not limited to, probable air and water pollution likely to be generated by the proposed use under normal operating conditions, as well as during mechanical malfunction and human error; likely destruction of wetlands and flora and fauna; impact of site preparation on drainage of the area in question, especially as it relates to flood control; impact of site preparation and facility operations on land erosion; effect of site preparation and facility operations on the quality and quantity of surface, and subsurface water resources, such as the use of water for processing, cooling, effluent removal, and other purposes; in addition, but not limited to, the likelihood of generation of glare, heat, noise, vibration, radiation, electromagnetic interference and obnoxious odors.

5.4.8.2 Economic effect, including the number of jobs created and the income which will be generated by the wages and salaries of these jobs in relation to the amount of land required, and the amount of tax revenues potentially accruing to State and local government.

5.4.8.3 Aesthetic effect, such as impact on scenic beauty of the surrounding area.

5.4.8.4 Number and type of supporting facilities required and the impact of such facilities on all factors listed in this subsection.

5.4.8.5 Effect on neighboring land uses including, but not limited to, effect on public access to tidal waters, effect on recreational areas, and effect on adjacent residential and agricultural areas.

5.4.8.6 County and municipal comprehensive plans for the development and/or conservation of their areas of jurisdiction. [7 Del.C. §7004(b)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.9 New offshore gas, liquid, or solid bulk product transfer facilities shall be prohibited in the coastal strip. Such facilities are docks or port facilities, whether artificial islands or attached to shore by any means, for the transfer of bulk quantities of any substance from vessel to onshore facility or vice versa. However, a docking facility or pier for a single industrial or manufacturing facility and docking facilities located in the City of Wilmington for the Port of Wilmington shall not be prohibited. [7 Del.C. §§7002(f), 7003; Inf. Attorney General Opinion No. 65, October 22, 1974]

***Response:*** ***New offshore gas, liquid, or solid bulk product transfer facilities are not proposed as part of this project.***

5.4.10 Offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip shall be prohibited. Such pipelines generally shall be allowed if they transit the coastal strip and environmental safeguards are observed. However, if such pipelines represent a significant danger of pollution to the coastal strip or generate pressure for construction of industrial plants in the coastal strip, they shall be prohibited. [7 Del.C. §§7001, 7002, 7003; Inf. Attorney General Opinion No. 77-33, July 6, 1977]

***Response:*** ***New offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip are not proposed as part of this project.***

5.4.11 A permit may be issued for geological, geophysical and seismic surveys, including the taking of cores and other samples, or the tide and submerged lands of this State. Such permits shall be nonexclusive and shall not give any preferential rights to any oil, gas and sulfur or other mineral lease. After consultation with those agencies of the State having an interest in the possible effects of the leasing, such rules and regulations deemed necessary to protect the fish, game, wildlife and natural resources of the State shall be included in the permit. Survey activities on any area determined to be an area where a lease should not be granted may be prohibited. The permit shall include conditions and payment proper to safeguard the interests of the State. [7 Del.C. §§6103, 6104]

***Response:*** ***This rule does not apply.***

5.4.12 No operations or activities shall be commenced on the drilling, deepening or plugging back of any offshore oil or gas wells located on underwater lands of Delaware without the permission of the State, and unless the activities are conducted in a manner which do not result in the degradation of the State's natural resources. [Delaware Oil, Gas and Mineral Exploration Regulations Numbers I-V, September 1971]

***Response:*** ***This rule does not apply.***

5.4.13 Easements for mineral exploration and exploitation underlying that part of the surface of the Atlantic shore owned by the state shall be permitted at such times and places as necessary to permit the extraction and transportation of oil, gas, sulfur or other minerals from State, federal or private lands, but permanent interference with the surface of the Atlantic shore shall be prohibited. [7 Del.C. §§6102(d), 6118, 6119(a)]

***Response:*** ***This rule does not apply.***

5.4.14 Before offering tide and submerged lands for leasing for possible mineral development, or whenever any person files a written application with the Secretary of DNREC requesting that lands be offered for leasing, accompanying the same with the required fee, a public hearing shall be held. After the public hearing, it will be determined whether an invitation for bidding to lease the area under consideration would be in the public interest. Consideration shall be made as to whether a lease or leases of the area under consideration would:

5.4.14.1 Be detrimental to the health, safety, or welfare of persons residing in, owning real property or working in the neighborhood of such areas;

5.4.14.2 Interfere with the residential or recreation areas to an extent that would render such areas unfit for recreational or residential uses or unfit for park purposes;

5.4.14.3 Destroy, impair or interfere with the aesthetic and scenic values of the Delaware coast, or other affected area;

5.4.14.4 Create any air, water and other pollution;

5.4.14.5 Substantially endanger marine life or wildlife;

5.4.14.6 Substantially interfere with commerce or navigation; and

5.4.14.7 Protect State lands from drainage of oil, gas or other minerals or objectionable substances [7 Del.C. §§6107, 6108]

***Response:*** ***This rule does not apply.***



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5.4.15 Avoidable pollution or avoidable contamination of the ocean and of the waters covering submerged lands, avoidable pollution or avoidable contamination of the beaches or land underlying the ocean or waters covering submerged lands, or any substantial impairment of and interference with the enjoyment and use thereof, including but not limited to bathing, boating, fishing, fish and wildlife production, and navigation, shall be prohibited and the lessee shall exercise a high degree of care to provide that no oil, tar, residuary product of oil or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into the waters of the ocean, any bay or inlet thereof, or any other waters covering submerged lands; provided, however, that this policy does not apply to the deposit on, or passing into, such water or waters not containing any hydrocarbons or vegetable or animal matter. [7 Del.C. §6119(a)]

***Response:*** ***The applicant will take all precautions necessary to ensure that avoidable pollution or contamination of waters does not take place.***

5.4.16 For the purposes of this section, "avoidable pollution" or "avoidable contamination" means pollution or contamination arising from:

5.4.16.1 The acts of omissions of the lessee or its officers, employees or agents; or,

5.4.16.2 Events that could have been prevented by the lessee or its officers, employees or agents through the exercise of a high degree of care. [7 Del.C. §6119(b)]

***No response required.***

5.4.17 State subaqueous lands within the boundaries of Delaware constitute an important resource of the State and shall be protected against uses or changes which may impair the public interest in the use of tidal or nontidal waters. [7 Del.C. Ch. 72]

***Response:*** ***All uses are existing, and no new uses are proposed. The project will not impair the public interest in the use of tidal waters.***

5.4.18 No person shall deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands without first having obtained a permit, lease or letter of approval from the DNREC. Such permit, lease or letter of approval, if granted, may include reasonable conditions required in the judgment of the DNREC to protect the interest of the public. If it is determined that granting the permit, lease or approval will result in loss to the public of a substantial resource, the permittee may be required to take measures which will offset or mitigate the loss. [7 Del.C. §7205]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed activity.***

5.4.19 The extent of jurisdictional authority over public or private subaqueous lands includes any activity in a navigable stream or waterbody, which have a hydrologic connection to natural waterbodies. "Activity" includes, but is not limited to, any human induced action, such as dredging, draining, filling, grading, bulkheading, mining, drilling, extraction of materials or excavation, or construction of any kind, including, but not limited to, construction of a boat ramp or slip, breakwater, residences, bridge, bulkhead, culvert, dam, derrick, deck, groin, jetty, lagoon, gabion, rip-rap, launching facility, marina, mooring facility, pier, seawall, walkway, or wharf. [7 DE Admin Code 7504 Section 1.0 and subsection 2.2.1.1]

***No response required.***

5.4.20 The following types of activities in, on, over, or under private subaqueous lands require a permit or letter of authorization from the DNREC:

5.4.20.1 Construction of a convenience structure or boat docking facility.

5.4.20.2 Construction of a shoreline erosion control structure or measure.

5.4.20.3 Dredging, filling, excavating or extracting of materials.

5.4.20.4 Excavation, creation, or alteration of any channel, lagoon, turning basin, pond, embayment, or other navigable waterway on private subaqueous lands which will make connection with public subaqueous lands.

5.4.20.5 Dredging of existing channels, ditches, dockages, lagoons and other navigable waterways to maintain or restore the approved depth and width.

5.4.20.6 Excavation of land which makes connection to public subaqueous lands.

5.4.20.7 The laying of any pipeline, electric transmission line, telephone line, or any other utility structure in, on, over, or under the beds of private subaqueous lands.

5.4.20.8 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.20.9 Establishment of an anchorage for the use of a mooring for more than two (2) boats or for appurtenant onshore services.

5.4.20.10 Anchoring or mooring a floating platform over private subaqueous lands and for a period of twenty-four (24) consecutive hours or more.

5.4.20.11 Anchoring or mooring any vessel or platform over private subaqueous lands for revenue generating purposes.

5.4.20.12 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure. [7 DE Admin. Code 7504 subsection 2.3.3.1]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.21 The following types of activities on public subaqueous lands require a lease, permit, or letter of authorization from the DNREC:

5.4.21.1 Construction or use of any structure on, in, under, or over public subaqueous lands, including but not limited to, any convenience structures, shoreline erosion control structure or measure, or boat docking facility.

5.4.21.2 Dredging, filling, excavating or extracting of materials.

5.4.21.3 Continuous anchoring or mooring of a commercial vessel used in a commercial activity on or over public subaqueous lands for thirty (30) or more calendar days during any consecutive three (3) months.

5.4.21.4 The laying of any pipeline, electric transmission line, or telephone line in, on, over, or under the beds of public subaqueous lands.

5.4.21.5 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.21.6 Establishment of an anchorage for mooring more than two (2) boats or which serves as a permanent place for resident vessels.

5.4.21.7 Anchoring or mooring a floating platform over public subaqueous lands and for a period of twenty- four (24) consecutive hours or more.

5.4.21.8 Maintenance dredging of existing or new channels, ditches, dockages, lagoon and other waterways to maintain or restore the approach depth and width.

5.4.21.9 Anchoring or mooring any vessel or platform over public subaqueous lands for revenue generating purposes.

5.4.21.10 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure.

5.4.21.11 New dredging activities of channels, ditches, dockage, or other waterways [7 DE Admin. Code 7504 subsection 2.4.2]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.22 The DNREC shall consider the public interest in any proposed activity which might affect the use of subaqueous lands. These considerations include, but are not limited to, the following:

5.4.22.1 The value to the State or the public in retaining any interest in subaqueous lands which the applicant seeks to acquire, including the potential economic value of the interest.

5.4.22.2 The value to the State or the public in conveying any interest in subaqueous lands which the applicant seeks to acquire.

5.4.22.3 The potential effect on the public with respect to commerce, navigation, recreation, aesthetic enjoyment, natural resources and other uses of the subaqueous lands.

5.4.22.4 The extent to which any disruption of the public use of such lands is temporary or permanent.

5.4.22.5 The extent to which the applicant’s primary objectives and purposes can be realized without the use of such lands (avoidance).

5.4.22.6 The extent to which the applicant's primary purpose and objectives can be realized by alternatives, i.e. minimize the scope or extent of an activity or project and its adverse impact.

5.4.22.7 Given the inability for avoidance or alternatives, the extent to which the applicant can employ mitigation measures to offset any losses incurred by the public.

5.4.22.8 The extent to which the public at large would benefit from the activity or project and the extent to which it would suffer detriment.

5.4.22.9 The extent to which the primary purpose of a project is water-dependent. [7 DE Admin. Code 7504 subsection 4.6]

***Response:*** ***The proposed project aligns with the public interest in that it allows for the continued operation of the Port of Wilmington, a vital economic engine for the State of Delaware.***

5.4.23 The DNREC shall consider the impact on the environment, including but not limited to, the following:

5.4.23.1 Any impairment of water quality, either temporary or permanent, which may reasonably be expected to cause violation of the State Surface Water Quality Standards. This impairment may include violation of criteria or degradation of existing uses;

5.4.23.2 Any effect on shell fishing, finfishing, or other recreational activities and existing or designated water uses;

5.4.23.3 Any harm to aquatic or tidal vegetation, benthic organisms or other flora and fauna, and their habitats;

5.4.23.4 Any loss of natural aquatic habitat;

5.4.23.5 Any impairment of air quality either temporarily or permanently, including noise, odors, and hazardous chemicals;

5.4.23.6 The extent to which the proposed project may adversely impact natural surface and groundwater hydrology and sediment transport functions. [7 DE Admin. Code 7504 subsection 4.7.1]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.24 The DNREC shall also consider the following to determine whether to approve the application:

5.4.24.1 The degree to which the project represents an encroachment on or otherwise interferes with public lands, waterways or surrounding private interests.

5.4.24.2 The degree to which the project incorporates sound engineering principles and appropriate materials of construction.

5.4.24.3 The degree to which the proposed project fits in with the surrounding structures, facilities, and uses of the subaqueous lands and uplands.

5.4.24.4 Whether the proposed activity complies with the State of Delaware's Surface Water Quality Standards both during construction and during subsequent operation or maintenance.

5.4.24.5 The degree to which the proposed project may adversely affect shellfish beds or finfish activity in the area. [7 DE Admin. Code 7504 subsection 4.7.5]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.25 The following concerns for protecting water quality shall be specifically considered by the DNREC in evaluating applications for dredging projects:

5.4.25.1 All dredging is to be conducted in a manner consistent with sound conservation and water pollution control practices. Spoil and fill areas are to be properly diked to contain the dredged material and prevent its entrance into any surface water. Specific requirements for spoils retention may be specified by the DNREC in the approval, permit or license.

5.4.25.2 All material excavated shall be transported, deposited, confined, and graded to drain within the disposal areas approved by the DNREC. Any material that is deposited elsewhere than in approved areas shall be removed by the applicant and deposited where directed at the applicant's expense and any required mitigation shall also be at the applicant's expense.

5.4.25.3 Materials excavated by hydraulic dredge shall be transported by pipeline directly to the approved disposal area. All pipelines shall be kept in good condition at all times and any leaks or breaks shall be immediately repaired.

5.4.25.4 Materials excavated and not deposited directly into an approved disposal area shall be placed in scows or other vessels and transported to either an approved enclosed basin, dumped, and then rehandled by hydraulic dredge to an approved disposal area, or to a mooring where scows or other vessels shall be unloaded by pumping directly to an approved disposal area.

5.4.25.5 When scows or other vessels are unloading without dumping, they shall have their contents pumped directly into an approved disposal area by a means sufficient to preclude any loss of material into the body of water.

5.4.25.6 In approved disposal areas, the applicant may construct any temporary structures or use any means necessary to control the dredge effluent, except borrowing from the outer slopes of existing embankments and/or hydraulic placing of perimeter embankments. For bermed disposal sites, a minimum freeboard of two (2) feet, measured vertically from the retained materials and water to the top of the adjacent confining embankment, shall be maintained at all times.

5.4.25.7 The applicant shall not obstruct drainage or tidal flushing on existent wetlands or upland areas adjacent thereto. The applicant shall leave free, clear, and unobstructed outfalls of sewers, drainage ditches, and other similar structures affected by the disposal operations. The dredged materials shall be distributed within the disposal area in a reasonably uniform manner to permit full drainage without ponding during and after fill operations.

5.4.25.8 The dredging operation must be suspended if water quality conditions deteriorate in the vicinity of dredging or spoil disposal site. Minimum water quality standards may be included as an element of the permit and shall be monitored by the applicant. Violation of these conditions shall be cause for immediate suspension of activity and notification of the DNREC. Dredging shall not be resumed until water quality conditions have improved and the DNREC has authorized the resumption. [7 DE Admin. Code 7504 subsection 4.11.3]

***Response:*** ***Dredging will be conducted according to best industry practices including observation from the ship deck and controlled use of the dredging equipment. Dredging will cease if excessive levels of turbidity are observed and the cause will be rectified before any dredging resumes. Pipelines will be inspected prior to dredging. All dikes are required to be in sound structural condition and are maintained by the disposal site operator. Dredge material will be placed in a managed disposal area and handled concurrently with the material dredged from the main Christina River channel through the course of its regular upkeep by the Army Corps of Engineers. The dredging and management of the dredge material will be overseen by a contractor selected by the U.S. Army Corps of Engineers.***

5.4.26 The following types of dredging projects are prohibited:

5.4.26.1 Dredging of biologically productive areas, such as nursery areas, shellfish beds, and submerged aquatic vegetation, if such dredging will have a significant or lasting impact on the biological productivity of the area.

5.4.26.2 Dredging of new dead-end lagoons, new basins and new channels, which have a length to width ratio greater than 3:1. This subsection shall not apply to marina projects governed by the Marina Regulations.

5.4.26.3 Dredging channels, lagoons or canals deeper than the existing controlling depth of the connecting or controlling waterway.

5.4.26.4 Dredging channels, cleaning marinas or other subaqueous areas by using propeller wash from boats. [7 DE Admin. Code 7504 subsection 4.11.6]

***Response:*** ***No nurseries, shellfish beds, or submerged aquatic vegetation is known to exist within the project area. The project does not consist of new dredging or the dredging of new areas including dead-end lagoons. Dredging will be conducted to existing, maintained channel depths. Dredging will not be performed using propeller wash from boats.***

## 5.8 PORT OF WILMINGTON

5.8.1 Advisory Policies

5.8.1.1 The long-term economic viability and competitiveness of the Port of Wilmington should be encouraged and supported.

5.8.1.2 The people who benefit from the Port of Wilmington should contribute to its support and help maintain the financial health of the port.

5.8.1.3 Expansion of the Port of Wilmington along the Delaware River is encouraged to meet future national and regional transshipment needs and to reduce the dredging and spoils disposal activities associated with port operations along the Christina River. Port expansion, however, should not proceed if such expansion means air and water quality standards cannot be kept.

5.8.1.4 The port should be promoted for general cargo transfer and, to the extent feasible, as a location for the support of outer continental shelf development.

***Response: The proposed project is in accordance with all the aforementioned rules.***

## 5.11 LIVING RESOURCES

5.11.1 General

5.11.1.1 No activity shall have an adverse environmental effect on living resources and shall include consideration of the effect of site preparation and the proposed activity on the following wetland values:

5.11.1.1.1 Value of tidal ebb and flow

5.11.1.1.1.1 Production Value: carving organic matter to adjacent estuaries and coastal waters which serve as breeding areas for certain animal species (especially fish and shellfish).

5.11.1.1.1.2 Value as a natural protective system of absorption of storm wave energy, flood waters, and heavy rainfall, thereby decreasing flood and erosion damage.

5.11.1.1.1.3 The prevention of silting in certain harbors and inlets thereby reducing dredging.

5.11.1.1.1.4 Removal and recycling of inorganic nutrients.

5.11.1.1.1.5 Effect on the estuarine waters.

5.11.1.1.2 Habitat Value

5.11.1.1.2.1 Habitat for resident species of wildlife including furbearers, invertebrates, finfish.

5.11.1.1.2.2 Habitat for migratory wildlife species including waterfowl, wading birds, shorebirds, passerines, finfish, shrimp.

5.11.1.1.2.3 Rearing area, nesting area, breeding grounds for various species.

5.11.1.1.2.4 Habitat for rare or endangered plants.

5.11.1.1.2.5 Presence of plants or animals known to be rare generally, or unique to the particular location.

5.11.1.1.2.6 Presence of plants or animals near the limits of their territorial range.

5.11.1.1.2.7 Presence of unique geologic or wetland features [7 DE Admin. Code 7502 subsection 12.2]

5.11.2 Fish and Wildlife

5.11.2.1 All forms of protected wildlife shall be managed and protected from negative impacts. [7 Del.C.§102(a)]

5.11.2.2 State shellfish resources shall be protected from further impairment and improved when possible [7 Del.C. §1902 (a)(1)(2)(5)]

5.11.2.3 Mosquito and other pest controls shall use techniques such as open marsh water management, which reduce the application of chemicals and which substitute biological controls. [Delaware Mosquito Control Spray Policy, revised February 26, 2018, Delaware Executive Order 43, August 15, 1996]

5.11.3 Nongame and Endangered Species

5.11.3.1 “Nongame” is that fauna, including rare and endangered species, which are not commonly trapped, killed, captured or consumed, either for sport or profit. [7 Del.C. §202(a)]

5.11.3.2 Rare and endangered species are in need of active, protective management to preserve and enhance such species. The diversity and abundance of the native flora and fauna of Delaware, particularly those deemed rare or

endangered, shall be preserved and enhanced through the protection of the habitat, natural areas, and areas of unusual scientific significance or having unusual importance to their survival. [7 Del.C. §201(1) and (2)]

5.11.4 Advisory Policy

5.11.4.1 Actions which may interfere with or otherwise adversely affect fish and wildlife in Delaware shall be implemented only after careful consultation with DNREC and exploration of alternatives less damaging to such fish and wildlife.

***Response:*** ***Seasonal dredging restrictions may be observed in order to protect migratory fish. We do not know of any other endangered or threatened species in the project area. We expect any issues to be addressed during the course of the DNREC permitting process. The dredging procedures outlined in this application are intended to minimize the effect of maintenance dredging on the surrounding environmental while allowing the activity to still take place, which is necessary in order to continue operations at the Port of Wilmington.***

## 5.13 STATE OWNED COASTAL RECREATION AND CONSERVATION

5.13.1 State owned lands whose natural condition or present state of use would maintain important recreational areas and wildlife habitat, or would maintain or enhance the conservation of natural, cultural or historic resources shall be managed, preserved, and protected, for conservation and recreational use. [7 Del.C. §§7301, 7504(6), 5305; 7 Del.C. Ch 45]

***Response:*** ***The state-owned submerged lands within the project area will be maintained free from obstruction for navigational and recreational purposes as safety permits. Open-water habitat will be preserved.***

5.13.2 Open spaces shall be preserved through the acquisition of interests or rights in real property, or donation of lands, for public recreation and conservation of natural resources promotes biological diversity, public health, prosperity and general welfare [7 Del.C. §7502]

***No response required.***

## 5.19 TRANSPORTATION FACILITIES

5.19.1 General

5.19.1.1 The DCMP supports the expansion and development of the Port of Wilmington. [7 Del.C. Ch 70]

5.19.1.2 Due to the threats posed to the natural environment, recreational activities and commercial fishing activities by the transfer of oil, petroleum products and their byproducts between vessels and vessels and onshore facilities and vessels, parties responsible for oil spills, discharges and the escape of oil in the waters of the State shall be required to immediately remove such oil pollution to DNRECs satisfaction or the responsible parties shall be required to pay for the expenses incurred in the removal of such oil pollution. [7 Del.C. §6201]

5.19.2 Advisory Policies

5.19.2.1 When essential to the national interest, the construction, maintenance and improvement of transportation systems shall predominate over less essential interests.

5.19.2.2 Transportation planning programs shall provide for alternatives to continued reliance on private motor vehicles with their associated highway requirements.

5.19.2.3 The State shall undertake an accelerated program of highway maintenance, upgrading, and safety improvements.

5.19.2.4 The DCMP supports the maintenance of an adequate and efficient railroad network to serve industry and agriculture on the Delmarva Peninsula.

5.19.2.5 The DCMP supports the establishment and maintenance of efficient public transit systems in order to reduce impacts to air quality and natural resources of the State.

5.19.2.6 New or expanded ports which involve extensive and continual dredging and spoil disposal in order to keep them useable are discouraged unless it can clearly be demonstrated that such facilities can be developed in an environmentally sound manner and without imposing continuing maintenance costs on any level of government or the general public.

***Response:*** ***The proposed activity is necessary to sustain vessel traffic to and commerce at the Port of Wilmington. No further port development or expansion is proposed.***

## 5.24 POLLUTION PREVENTION

5.24.1 General

5.24.1.1 Whenever possible, the generation of waste should be reduced or eliminated as expeditiously as possible, and that waste that is generated should be recovered, reused, recycled, treated or disposed of in a manner that


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minimizes any present or future threats to human health or the environment. [7 Del.C. §7802(a)(1)]

***Response:*** ***Not applicable. The project does not involve the generation of waste.***

5.24.2 Advisory Policies

5.24.2.1 Industries should review their proposed projects for the possible use of pollution prevention opportunities.

5.24.2.2 Industries are encouraged to utilize the DNREC Pollution Prevention Program's services, including non-regulatory technical assistance and information, to ensure that the potential for degradation of the quality of air, land, and water is minimal.

***Response:*** ***The applicant is already planning to employ known pollution prevention methods for a hydraulic dredging project. The DNREC Pollution Prevention Program services do not pertain to dredging projects.***

# SECTION 4

## SEDIMENT ANALYSIS COMPARATIVE TABLES,
## CORE PHOTOGRAPHS,
## CHAIN OF CUSTODY
## AND
## CORE LOGS

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **180-108765-1 C-1 7/21/2020 11:25 AM** | **180-108765-2 C-2 7/21/2020 11:06 AM** | **180-109048-1 C-3 7/29/2020 9:10 AM** |
| 2 | Clay | N/A | % | Grain Size | MRL | Total | **45.4** | **46.0** | **43.9** |
| 3 | Coarse Sand | N/A | % | Grain Size | MRL | Total | **0.0** | **0.0** | **0.0** |
| 4 | Fine Sand | N/A | % | Grain Size | MRL | Total | **4.3** | **5.2** | **3.5** |
| 5 | Gravel | N/A | % | Grain Size | MRL | Total | **0.0** | **0.0** | **0.0** |
| 6 | Hydrometer Reading 1 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **87.3** | **80.3** | **83.5** |
| 7 | Hydrometer Reading 2 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **74.4** | **71.7** | **68.5** |
| 8 | Hydrometer Reading 3 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **61.5** | **58.8** | **59.0** |
| 9 | Hydrometer Reading 4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **53.5** | **51.7** | **53.5** |
| 10 | Hydrometer Reading 5 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **45.4** | **46.0** | **43.9** |
| 11 | Hydrometer Reading 6 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **35.7** | **34.5** | **34.4** |
| 12 | Hydrometer Reading 7 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **26.1** | **24.5** | **23.4** |
| 13 | Medium Sand | N/A | % | Grain Size | MRL | Total | **0.5** | **2.7** | **1.3** |
| 14 | Moisture Content | N/A | % | Water (Moisture) Content | MRL | Total | **186.9** | **206.5** | **198.6** |
| 15 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | **65.6** | **64.6** | **65.2** |
| 16 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | **34.4** | **35.4** | **34.8** |
| 17 | Sand | N/A | % | Grain Size | MRL | Total | **4.8** | **7.9** | **4.8** |
| 18 | Sieve Size #10 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 19 | Sieve Size #100 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **96.8** | **93.3** | **96.7** |
| 20 | Sieve Size #20 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **99.5** | **99.4** | **99.2** |
| 21 | Sieve Size #200 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **95.2** | **92.1** | **95.2** |
| 22 | Sieve Size #4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 23 | Sieve Size #40 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **99.5** | **97.3** | **98.7** |
| 24 | Sieve Size #60 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **98.7** | **95.9** | **98.2** |
| 25 | Sieve Size #80 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **97.6** | **94.7** | **97.5** |
| 26 | Sieve Size 0.375 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 27 | Sieve Size 0.75 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 28 | Sieve Size 1 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 29 | Sieve Size 1.5 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 30 | Sieve Size 2 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 31 | Sieve Size 3 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 32 | Silt | N/A | % | Grain Size | MRL | Total | **49.8** | **46.1** | **51.3** |
| 33 | Total Organic Carbon - Duplicates | 7440-44-0 | mg/Kg | Organic Carbon, Total (TOC) | MRL | Total | **48000** | **44000** | **34000** |

| | A | J | K | L | M | N | O | P |
|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **180-109048-2<br>C-4<br>7/29/2020<br>9:52 AM** | **180-109048-3<br>C-5<br>7/29/2020<br>10:20 AM** | **180-108765-3<br>C-6<br>7/21/2020<br>10:54 AM** | **180-109048-4<br>C-7<br>7/29/2020<br>10:40 AM** | **180-108765-4<br>C-8<br>7/21/2020<br>10:30 AM** | **180-108765-5<br>C-9<br>7/21/2020<br>10:02 AM** | **180-108765-6<br>C-10<br>7/21/2020<br>9:40 AM** |
| 2 | Clay | 40.4 | 42.1 | **39.5** | **41.6** | **33.8** | **34.4** | **34.7** |
| 3 | Coarse Sand | 0.5 | 0.0 | **0.1** | **0.2** | **0.2** | **1.3** | **1.4** |
| 4 | Fine Sand | 5.0 | 4.3 | **5.2** | **2.7** | **7.8** | **3.8** | **13.8** |
| 5 | Gravel | 0.0 | 0.0 | **0.4** | **0.0** | **0.0** | **26.6** | **3.9** |
| 6 | Hydrometer Reading 1 - Percent Finer | 74.4 | 78.9 | **80.3** | **73.6** | **75.3** | **66.1** | **67.7** |
| 7 | Hydrometer Reading 2 - Percent Finer | 67.1 | 68.9 | **64.6** | **65.6** | **60.9** | **58.8** | **58.1** |
| 8 | Hydrometer Reading 3 - Percent Finer | 55.0 | 55.5 | **55.2** | **56.2** | **51.4** | **47.8** | **48.4** |
| 9 | Hydrometer Reading 4 - Percent Finer | 48.9 | 45.4 | **48.9** | **48.2** | **43.4** | **40.5** | **41.6** |
| 10 | Hydrometer Reading 5 - Percent Finer | 40.4 | 42.1 | **39.5** | **41.6** | **33.8** | **34.4** | **34.7** |
| 11 | Hydrometer Reading 6 - Percent Finer | 30.6 | 32.1 | **30.1** | **32.2** | **25.8** | **27.1** | **27.8** |
| 12 | Hydrometer Reading 7 - Percent Finer | 20.9 | 23.7 | **22.2** | **20.2** | **19.4** | **18.5** | **19.5** |
| 13 | Medium Sand | 1.7 | 1.1 | **0.9** | **1.2** | **3.1** | **1.4** | **5.5** |
| 14 | Moisture Content | 159.6 | 155.6 | **183.3** | **163.9** | **179.7** | **165.4** | **144.9** |
| 15 | Percent Moisture | 61.9 | 60.4 | **62.7** | **62.9** | **63.3** | **58.4** | **57.6** |
| 16 | Percent Solids | 38.1 | 39.6 | **37.3** | **37.1** | **36.7** | **41.6** | **42.4** |
| 17 | Sand | 7.2 | 5.4 | **6.2** | **4.1** | **11.1** | **6.5** | **20.7** |
| 18 | Sieve Size #10 - Percent Finer | 99.5 | 100.0 | **99.5** | **99.8** | **99.8** | **72.1** | **94.7** |
| 19 | Sieve Size #100 - Percent Finer | 95.8 | 96.6 | **95.4** | **97.6** | **92.1** | **67.8** | **80.2** |
| 20 | Sieve Size #20 - Percent Finer | 98.3 | 99.3 | **98.8** | **98.8** | **98.9** | **71.3** | **92.8** |
| 21 | Sieve Size #200 - Percent Finer | 92.8 | 94.6 | **93.4** | **95.9** | **88.9** | **66.9** | **75.4** |
| 22 | Sieve Size #4 - Percent Finer | 100.0 | 100.0 | **99.6** | **100.0** | **100.0** | **73.4** | **96.1** |
| 23 | Sieve Size #40 - Percent Finer | 97.8 | 98.9 | **98.6** | **98.6** | **96.7** | **70.7** | **89.2** |
| 24 | Sieve Size #60 - Percent Finer | 96.9 | 98.3 | **97.4** | **98.1** | **95.1** | **69.6** | **85.6** |
| 25 | Sieve Size #80 - Percent Finer | 96.3 | 97.4 | **96.3** | **97.9** | **93.7** | **68.6** | **82.5** |
| 26 | Sieve Size 0.375 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **75.4** | **96.6** |
| 27 | Sieve Size 0.75 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **79.5** | **100.0** |
| 28 | Sieve Size 1 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 29 | Sieve Size 1.5 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 30 | Sieve Size 2 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 31 | Sieve Size 3 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 32 | Silt | 52.4 | 52.5 | **53.9** | **54.3** | **55.1** | **32.5** | **40.7** |
| 33 | Total Organic Carbon - Duplicates | 34000 | 30000 | **52000** | **32000** | **49000** | **36000** | **38000** |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 2 | 1,1'-Biphenyl | 92-52-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 61000 |
| 3 | 1,1,1-Trichloroethane | 71-55-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 160000000 |
| 4 | 1,1,2,2-Tetrachloroethane | 79-34-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 1000 |
| 5 | 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 6 | 1,1,2-Trichloroethane | 79-00-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 7 | 1,1-Dichloroethane | 75-34-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 8000 |
| 8 | 1,1-Dichloroethene | 75-35-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 11000 |
| 9 | 1,1-Dichloroethene | 75-35-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 10 | 1,2,4-Trichlorobenzene | 120-82-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 73000 |
| 11 | 1,2,4-Trichlorobenzene | 120-82-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 73000 |
| 12 | 1,2-Dibromo-3-Chloropropane | 96-12-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 80 |
| 13 | 1,2-Dibromoethane | 106-93-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 8[a] |
| 14 | 1,2-Dichlorobenzene | 95-50-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5300000 |
| 15 | 1,2-Dichlorobenzene | 95-50-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5300000 |
| 16 | 1,2-Dichloroethane | 107-06-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 900 |
| 17 | 1,2-Dichloroethane | 107-06-2 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 18 | 1,2-Dichloropropane | 78-87-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 19 | 1,2-Diphenylhydrazine(as Azobenzene) | 122-66-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 20 | 1,3-Dichlorobenzene | 541-73-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5300000 |
| 21 | 1,3-Dichlorobenzene | 541-73-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5300000 |
| 22 | 1,4-Dichlorobenzene | 106-46-7 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 23 | 1,4-Dichlorobenzene | 106-46-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5000 |
| 24 | 1,4-Dichlorobenzene | 106-46-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5000 |
| 25 | 1,4-Dioxane | 123-91-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 26 | 2,4,5-Trichlorophenol | 95-95-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6100000 |
| 27 | 2,4,5-Trichlorophenol | 95-95-4 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 28 | 2,4,6-Trichlorophenol | 88-06-2 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 29 | 2,4,6-Trichlorophenol | 88-06-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 19000 |
| 30 | 2,4-Dichlorophenol | 120-83-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 180000 |
| 31 | 2,4-Dimethylphenol | 105-67-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1200000 |
| 32 | 2,4-Dinitrophenol | 51-28-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 120000 |
| 33 | 2,4-Dinitrotoluene | 121-14-2 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 34 | 2,4-Dinitrotoluene | 121-14-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 35 | 2,6-Dinitrotoluene | 606-20-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 36 | 2-Butanone (MEK) | 78-93-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3100000 |
| 37 | 2-Butanone (MEK) | 78-93-3 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 38 | 2-Chloronaphthalene | 91-58-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 39 | 2-Chlorophenol | 95-57-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 310000 |
| 40 | 2-Hexanone | 591-78-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 41 | 2-Methylnaphthalene | 91-57-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 230000 |
| 42 | 2-Methylphenol | 95-48-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 310000 |
| 43 | 2-Methylphenol | 95-48-7 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1<br>SC-1<br>COMPOSITE [C-9+C-10]<br>7/22/2020<br>1:00 PM** | **180-109049-1<br>SC-2<br>COMPOSITE<br>[C-3+C-4]<br>7/30/2020<br>8:53 AM** | **180-109049-2<br>SC-3<br>COMPOSITE [C-5+C-6]<br>7/30/2020<br>9:40 AM** | **180-109049-3<br>SC-4<br>COMPOSITE [C-7+C-8]<br>7/30/2020<br>10:22 AM** | **180-108764-2<br>SC-5<br>COMPOSITE [C-1+C-2]<br>7/22/2020<br>1:30 PM** |
| 2 | 1,1'-Biphenyl | 240000 | 3.3 J | ND | ND | ND | 15 J |
| 3 | 1,1,1-Trichloroethane | | ND | ND | ND | ND | ND |
| 4 | 1,1,2,2-Tetrachloroethane | 3000 | ND | ND | ND | ND | ND |
| 5 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | ND | ND | ND | ND | ND |
| 6 | 1,1,2-Trichloroethane | 6000 | ND | ND | ND | ND | ND |
| 7 | 1,1-Dichloroethane | 24000 | ND | ND | ND | ND | ND |
| 8 | 1,1-Dichloroethene | 150000 | ND | ND | ND | ND | ND |
| 9 | 1,1-Dichloroethene | n/a[b] | ND | ND | ND | ND | ND |
| 10 | 1,2,4-Trichlorobenzene | 820000 | ND | ND | ND | ND | ND |
| 11 | 1,2,4-Trichlorobenzene | 820000 | ND | ND | ND | ND | ND |
| 12 | 1,2-Dibromo-3-Chloropropane | 200 | ND | ND ^c | ND ^c | ND ^c | ND |
| 13 | 1,2-Dibromoethane | 40 | ND | ND | ND | ND | ND |
| 14 | 1,2-Dichlorobenzene | 59000000 | ND | ND | ND | ND | 6.5 J |
| 15 | 1,2-Dichlorobenzene | 59000000 | ND | ND | ND | ND | ND |
| 16 | 1,2-Dichloroethane | 3000 | ND | ND | ND | ND | ND |
| 17 | 1,2-Dichloroethane | n/a[b] | ND | ND | ND | ND | ND |
| 18 | 1,2-Dichloropropane | 5000 | ND | ND | ND | ND | ND |
| 19 | 1,2-Diphenylhydrazine(as Azobenzene) | 2000 | ND | ND | ND | ND | ND |
| 20 | 1,3-Dichlorobenzene | 59000000 | ND | ND | ND | ND | ND |
| 21 | 1,3-Dichlorobenzene | 59000000 | ND | ND | ND | ND | 4.2 J |
| 22 | 1,4-Dichlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 23 | 1,4-Dichlorobenzene | 13000 | ND | ND | ND | ND | ND |
| 24 | 1,4-Dichlorobenzene | 13000 | ND | ND | ND | ND | 10 J |
| 25 | 1,4-Dioxane | | ND | ND | ND | ND | ND |
| 26 | 2,4,5-Trichlorophenol | 68000000 | ND | ND | ND | ND | ND |
| 27 | 2,4,5-Trichlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 28 | 2,4,6-Trichlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 29 | 2,4,6-Trichlorophenol | 74000 | ND | ND | ND | ND | ND |
| 30 | 2,4-Dichlorophenol | 2100000 | ND | ND | ND | ND | ND |
| 31 | 2,4-Dimethylphenol | 14000000 | ND | ND | ND | ND | ND |
| 32 | 2,4-Dinitrophenol | 1400000 | ND | ND | ND | ND | ND |
| 33 | 2,4-Dinitrotoluene | n/a[b] | ND | ND | ND | ND | ND |
| 34 | 2,4-Dinitrotoluene | 3000 | ND | ND | ND | ND | ND |
| 35 | 2,6-Dinitrotoluene | 3000 | ND | ND | ND | ND | ND |
| 36 | 2-Butanone (MEK) | 44000000 | ND | ND FL | ND | ND | ND |
| 37 | 2-Butanone (MEK) | n/a[b] | ND ^c | **22** | ND | ND | ND ^c |
| 38 | 2-Chloronaphthalene | | ND | ND | ND | ND | ND |
| 39 | 2-Chlorophenol | 2200000 | ND | ND | ND | ND | ND |
| 40 | 2-Hexanone | | ND | ND | ND | ND | ND |
| 41 | 2-Methylnaphthalene | 2400000 | 7.7 J | 15 J | 13 J | 14 J | **23** |
| 42 | 2-Methylphenol | 3400000 | ND | ND | ND | ND | ND |
| 43 | 2-Methylphenol | n/a[b] | ND | ND | ND | ND | ND |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 44 | 2-Nitroaniline | 88-74-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 39000 |
| 45 | 2-Nitrophenol | 88-75-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 46 | 3,3'-Dichlorobenzidine | 91-94-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1000 |
| 47 | 3-Nitroaniline | 99-09-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 48 | 4,4'-DDD | 72-54-8 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 3000 |
| 49 | 4,4'-DDE | 72-55-9 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 2000 |
| 50 | 4,4'-DDT | 50-29-3 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 2000 |
| 51 | 4,6-Dinitro-2-methylphenol | 534-52-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6000 |
| 52 | 4-Bromophenyl phenyl ether | 101-55-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 53 | 4-Chloro-3-methylphenol | 59-50-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 54 | 4-Chloroaniline | 106-47-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 55 | 4-Chlorophenyl phenyl ether | 7005-72-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 56 | 4-Methyl-2-pentanone (MIBK) | 108-10-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 57 | 4-Nitroaniline | 100-01-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 58 | 4-Nitrophenol | 100-02-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 59 | Acenaphthene | 83-32-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 3400000 |
| 60 | Acenaphthylene | 208-96-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 61 | Acetone | 67-64-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 70000000 |
| 62 | Acetophenone | 98-86-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 2000 |
| 63 | Aldrin | 309-00-2 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 40 |
| 64 | alpha-BHC | 319-84-6 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 100 |
| 65 | Aluminum | 7429-90-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78000 |
| 66 | Anthracene | 120-12-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 17000000 |
| 67 | Antimony | 7440-36-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | 31 |
| 68 | Arsenic | 7440-38-2 | mg/L | Metals (ICP) | MRL | TCLP | n/a[b] |
| 69 | Arsenic | 7440-38-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 19 |
| 70 | Atrazine | 1912-24-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 210000 |
| 71 | Barium | 7440-39-3 | mg/L | Metals (ICP) | MRL | TCLP | n/a[b] |
| 72 | Barium | 7440-39-3 | mg/Kg | Metals (ICP/MS) | MRL | Total | 16000 |
| 73 | Benzaldehyde | 100-52-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 6100000 |
| 74 | Benzene | 71-43-2 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 75 | Benzene | 71-43-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 76 | Benzidine | 92-87-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 77 | Benzo[a]anthracene | 56-55-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 78 | Benzo[a]pyrene | 50-32-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 500 |
| 79 | Benzo[b]fluoranthene | 205-99-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 80 | Benzo[g,h,i]perylene | 191-24-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 380000000 |
| 81 | Benzo[k]fluoranthene | 207-08-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 45000 |
| 82 | Beryllium | 7440-41-7 | mg/Kg | Metals (ICP/MS) | MRL | Total | 16 |
| 83 | beta-BHC | 319-85-7 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 400 |
| 84 | bis (2-chloroisopropyl) ether | 108-60-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 23000 |
| 85 | Bis(2-chloroethoxy)methane | 111-91-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 86 | Bis(2-chloroethyl)ether | 111-44-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 400 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 44 | 2-Nitroaniline | 23000000 | ND | ND | ND | ND | ND |
| 45 | 2-Nitrophenol | | ND | ND | ND | ND | ND |
| 46 | 3,3'-Dichlorobenzidine | 4000 | ND | ND | ND | ND | ND |
| 47 | 3-Nitroaniline | | ND | ND | ND | ND | ND |
| 48 | 4,4'-DDD | 13000 | **4.1 *H** | **3.9** | **3.7** | **4.1** | **5.3 *H** |
| 49 | 4,4'-DDE | 9000 | **4.4 *H** | **5.2** | **4.5** | **4.5** | **8.3 *H** |
| 50 | 4,4'-DDT | 8000 | **4.5 *H** | **7.5** | ND | ND | ND *H |
| 51 | 4,6-Dinitro-2-methylphenol | 68000 | ND | ND | ND | ND | ND |
| 52 | 4-Bromophenyl phenyl ether | | ND | ND | ND | ND | ND |
| 53 | 4-Chloro-3-methylphenol | | ND | ND | ND | ND | ND |
| 54 | 4-Chloroaniline | | ND | ND *L | ND *L | ND *L | ND |
| 55 | 4-Chlorophenyl phenyl ether | | ND | ND | ND | ND | ND |
| 56 | 4-Methyl-2-pentanone (MIBK) | | ND | ND | ND | ND | ND |
| 57 | 4-Nitroaniline | | ND | ND | ND | ND | ND |
| 58 | 4-Nitrophenol | | ND | ND | ND | ND | ND |
| 59 | Acenaphthene | 37000000 | 5.5 J | ND | ND | ND | **38** |
| 60 | Acenaphthylene | 300000000 | 7.7 J | 16 J | 13 J | 20 J | **23** |
| 61 | Acetone | | ND | **65 ^c** | ND ^c | ND ^c | 8.6 J |
| 62 | Acetophenone | 5000 | ND | ND | ND | ND | ND |
| 63 | Aldrin | 200 | ND *H | ND | ND | 0.18 J p | ND *H |
| 64 | alpha-BHC | 500 | ND *H | ND | ND | ND | ND *H |
| 65 | Aluminum | | **19000 ^** | **17000 ^** | **15000 ^** | **15000 ^** | **19000 ^** |
| 66 | Anthracene | 30000000 | 9.3 J | 34 J | 17 J | 31 J | **41** |
| 67 | Antimony | 450 | **0.38** | **0.37 FL** | **0.35** | **0.38** | **0.65 FL** |
| 68 | Arsenic | n/a[b] | 0.064 J | ND | ND | ND | 0.061 J |
| 69 | Arsenic | 19 | **14** | **15** | **13** | **12** | **14** |
| 70 | Atrazine | 2400000 | ND | ND | ND | ND | ND |
| 71 | Barium | n/a[b] | 0.33 J | **120** | **130** | **120** | 0.30 J |
| 72 | Barium | 59000 | **120** | 0.40 J | 0.47 J | 0.46 J | **160** |
| 73 | Benzaldehyde | 68000000 | 6.1 J | ND | ND | ND | 15 J |
| 74 | Benzene | n/a[b] | ND | ND | ND | ND | ND |
| 75 | Benzene | 5000 | ND | ND | ND | ND | ND |
| 76 | Benzidine | 700 | ND | ND | ND | ND | ND |
| 77 | Benzo[a]anthracene | 17000 | **26** | **80** | **72** | **110** | **86** |
| 78 | Benzo[a]pyrene | 2000 | **28** | **86** | **77** | **120** | **90** |
| 79 | Benzo[b]fluoranthene | 17000 | **36** | **110** | **96** | **140** | **120** |
| 80 | Benzo[g,h,i]perylene | 30000000 | **29** | **85** | **88** | **120** | **79** |
| 81 | Benzo[k]fluoranthene | 170000 | **13** | 28 J | 35 J | **58** | **40** |
| 82 | Beryllium | 140 | **1.2** | **1.2** | **1.1** | **1.0** | **1.2** |
| 83 | beta-BHC | 2000 | ND *H | ND | ND | ND | ND *H |
| 84 | bis (2-chloroisopropyl) ether | 67000 | ND | ND | ND | ND | ND |
| 85 | Bis(2-chloroethoxy)methane | | ND | ND | ND | ND | ND |
| 86 | Bis(2-chloroethyl)ether | 2000 | ND | ND | ND | ND | ND |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 87 | Bis(2-ethylhexyl) phthalate | 117-81-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 35000 |
| 88 | Bromoform | 75-25-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 81000 |
| 89 | Bromomethane | 74-83-9 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 25000 |
| 90 | Butyl benzyl phthalate | 85-68-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1200000 |
| 91 | Cadmium | 7440-43-9 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 92 | Cadmium | 7440-43-9 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78 |
| 93 | Calcium | 7440-70-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 94 | Caprolactam | 105-60-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 31000000 |
| 95 | Carbazole | 86-74-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 24000 |
| 96 | Carbon disulfide | 75-15-0 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 7800000 |
| 97 | Carbon tetrachloride | 56-23-5 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 98 | Carbon tetrachloride | 56-23-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 99 | Chlordane (technical) | 12789-03-6 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 100 | Chlorobenzene | 108-90-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 510000 |
| 101 | Chlorobenzene | 108-90-7 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 102 | Chlorodibromomethane | 124-48-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3000 |
| 103 | Chloroethane | 75-00-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 220000 |
| 104 | Chloroform | 67-66-3 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 105 | Chloroform | 67-66-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 600 |
| 106 | Chloromethane | 74-87-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 4000 |
| 107 | Chromium | 7440-47-3 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 108 | Chromium | 7440-47-3 | mg/L | Metals (ICP) | MRL | TCLP | |
| 109 | Chrysene | 218-01-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 450000 |
| 110 | cis-1,2-Dichloroethene | 156-59-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 230000 |
| 111 | cis-1,3-Dichloropropene | 10061-01-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 112 | cis-Chlordane | 5103-71-9 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | |
| 113 | Clay | N/A | % | Grain Size | MRL | Total | |
| 114 | Coarse Sand | N/A | % | Grain Size | MRL | Total | |
| 115 | Cobalt | 7440-48-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | 1600 |
| 116 | Copper | 7440-50-8 | mg/Kg | Metals (ICP/MS) | MRL | Total | 3100 |
| 117 | Cr (III) | 16065-83-1 | ug/Kg | Chromium, Trivalent (Colorimetric) | MRL | Total | |
| 118 | Cr (VI) | 18540-29-9 | ug/Kg | Chromium, Hexavalent | MDL | Total | |
| 119 | Cresols, Total | 1319-77-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 120 | Cyanide, Total | 57-12-5 | ug/Kg | Cyanide | MRL | Total | 47000 |
| 121 | Cyclohexane | 110-82-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 122 | delta-BHC | 319-86-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 123 | Dibenz(a,h)anthracene | 53-70-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 500 |
| 124 | Dibenzofuran | 132-64-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 125 | Dichlorobromomethane | 75-27-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 1000 |
| 126 | Dichlorodifluoromethane | 75-71-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 490000 |
| 127 | Dieldrin | 60-57-1 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 40 |
| 128 | Diethyl phthalate | 84-66-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 49000000 |
| 129 | Dimethyl phthalate | 131-11-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1<br>SC-1<br>COMPOSITE [C-9+C-10]<br>7/22/2020<br>1:00 PM** | **180-109049-1<br>SC-2<br>COMPOSITE [C-3+C-4]<br>7/30/2020<br>8:53 AM** | **180-109049-2<br>SC-3<br>COMPOSITE [C-5+C-6]<br>7/30/2020<br>9:40 AM** | **180-109049-3<br>SC-4<br>COMPOSITE [C-7+C-8]<br>7/30/2020<br>10:22 AM** | **180-108764-2<br>SC-5<br>COMPOSITE [C-1+C-2]<br>7/22/2020<br>1:30 PM** |
| 87 | Bis(2-ethylhexyl) phthalate | 140000 | ND | ND | ND | ND | ND |
| 88 | Bromoform | 280000 | ND | ND | ND | ND | ND |
| 89 | Bromomethane | 59000 | ND | ND | ND | ND | ND |
| 90 | Butyl benzyl phthalate | 14000000 | ND | ND | ND | ND | ND |
| 91 | Cadmium | n/a[b] | ND | 0.0035 J | 0.0041 J | 0.0051 J | ND |
| 92 | Cadmium | 78 | **0.57** | **0.64** | **0.61** | **0.59** | **1.0** |
| 93 | Calcium | | **4500** | **3900 FL** | **3700** | **3100** | **4300 FL** |
| 94 | Caprolactam | 340000000 | ND | ND | ND | ND | ND |
| 95 | Carbazole | 96000 | 4.2 J | 13 J | ND | 15 J | 9.9 J |
| 96 | Carbon disulfide | 110000000 | ND | ND *1 | ND *1 | ND *1 | ND |
| 97 | Carbon tetrachloride | n/a[b] | ND | ND | ND | ND | ND |
| 98 | Carbon tetrachloride | 4000 | ND | ND | ND | ND | ND |
| 99 | Chlordane (technical) | n/a[b] | ND | ND | ND | ND | ND |
| 100 | Chlorobenzene | 7400000 | ND | ND | ND | ND | ND |
| 101 | Chlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 102 | Chlorodibromomethane | 8000 | ND | ND | ND | ND | ND |
| 103 | Chloroethane | 1100000 | ND | ND | ND | ND | ND |
| 104 | Chloroform | n/a[b] | ND | ND FL | ND | ND | ND |
| 105 | Chloroform | 2000 | ND | ND | ND | ND | ND |
| 106 | Chloromethane | 12000 | ND | ND | ND | ND | ND |
| 107 | Chromium | | **52** | ND | 0.011 J | ND | **55 FL** |
| 108 | Chromium | | 0.010 J | **62** | **55** | **52** | ND |
| 109 | Chrysene | 1700000 | **31** | **110** | **91** | **150** | **130** |
| 110 | cis-1,2-Dichloroethene | 560000 | ND | ND | ND | ND | ND |
| 111 | cis-1,3-Dichloropropene | | ND | ND | ND | ND | ND |
| 112 | cis-Chlordane | | **0.68 *H** | 0.45 J p | **0.80** | **0.62 p** | **0.57 *H** |
| 113 | Clay | | **42.4** | **43.5** | **43.9** | **45.5** | **38.8** |
| 114 | Coarse Sand | | **0.0** | **0.8** | **0.0** | **0.2** | **0.6** |
| 115 | Cobalt | 590 | **17** | **17** | **15** | **14** | **17** |
| 116 | Copper | 45000 | **32** | **37** | **33** | **33** | **49 ^** |
| 117 | Cr (III) | | **52000** | **62000** | **55000** | **52000** | **55000** |
| 118 | Cr (VI) | | ND | ND | ND | ND | 680 J |
| 119 | Cresols, Total | | ND | ND | ND | ND | ND |
| 120 | Cyanide, Total | 680000 | 360 J | 190 J | 190 J | ND | 370 J |
| 121 | Cyclohexane | | ND | ND | ND | ND | ND |
| 122 | delta-BHC | | ND *H | ND | ND | ND | ND *H |
| 123 | Dibenz(a,h)anthracene | 2000 | **14** | ND | ND | 26 J | **31** |
| 124 | Dibenzofuran | | 4.2 J | 9.1 J | ND | ND | 14 J |
| 125 | Dichlorobromomethane | 3000 | ND | ND | ND | ND | ND |
| 126 | Dichlorodifluoromethane | 230000000 | ND *H | ND | ND | ND | ND *H |
| 127 | Dieldrin | 200 | **1.1 *H** | ND | **0.97** | ND | ND *H |
| 128 | Diethyl phthalate | 550000000 | ND | ND | ND | ND | ND |
| 129 | Dimethyl phthalate | | ND | ND | ND | ND | ND |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 130 | Di-n-butyl phthalate | 84-74-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6100000 |
| 131 | Di-n-octyl phthalate | 117-84-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 2400000 |
| 132 | Endosulfan I | 959-98-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 133 | Endosulfan II | 33213-65-9 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 134 | Endosulfan sulfate | 1031-07-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 470000 |
| 135 | Endrin | 72-20-8 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 23000 |
| 136 | Endrin | 72-20-8 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 137 | Endrin aldehyde | 7421-93-4 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 138 | Endrin ketone | 53494-70-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 139 | Ethylbenzene | 100-41-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 7800000 |
| 140 | Fine Sand | N/A | % | Grain Size | MRL | Total | |
| 141 | Fluoranthene | 206-44-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 2300000 |
| 142 | Fluorene | 86-73-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 2300000 |
| 143 | gamma-BHC (Lindane) | 58-89-9 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 400 |
| 144 | gamma-BHC (Lindane) | 58-89-9 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 145 | Gravel | N/A | % | Grain Size | MRL | Total | |
| 146 | Heptachlor | 76-44-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 100 |
| 147 | Heptachlor | 76-44-8 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 148 | Heptachlor epoxide | 1024-57-3 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 70 |
| 149 | Heptachlor epoxide | 1024-57-3 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 150 | Hexachlorobenzene | 118-74-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 300 |
| 151 | Hexachlorobenzene | 118-74-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 152 | Hexachlorobutadiene | 87-68-3 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 153 | Hexachlorobutadiene | 87-68-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6000 |
| 154 | Hexachlorocyclopentadiene | 77-47-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 45000 |
| 155 | Hexachloroethane | 67-72-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 156 | Hexachloroethane | 67-72-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 12000 |
| 157 | Hydrometer Reading 1 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 158 | Hydrometer Reading 2 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 159 | Hydrometer Reading 3 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 160 | Hydrometer Reading 4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 161 | Hydrometer Reading 5 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 162 | Hydrometer Reading 6 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 163 | Hydrometer Reading 7 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 164 | Indeno[1,2,3-cd]pyrene | 193-39-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 165 | Iron | 7439-89-6 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 166 | Isophorone | 78-59-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 510000 |
| 167 | Isopropylbenzene | 98-82-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 168 | Lead | 7439-92-1 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 169 | Lead | 7439-92-1 | mg/Kg | Metals (ICP/MS) | MRL | Total | 400 |
| 170 | Magnesium | 7439-95-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 171 | Manganese | 7439-96-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | 11000 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 130 | Di-n-butyl phthalate | 68000000 | ND | ND | ND | ND | ND |
| 131 | Di-n-octyl phthalate | 27000000 | ND | ND | ND | ND | ND |
| 132 | Endosulfan I | | ND *H | ND | ND | ND | ND *H |
| 133 | Endosulfan II | | ND *H | ND | ND | ND | ND *H |
| 134 | Endosulfan sulfate | 6800000 | ND *H | ND | ND | ND | ND *H |
| 135 | Endrin | 340000 | 0.57 J p *H | ND | ND | ND | **1.5 p *H** |
| 136 | Endrin | n/a[b] | ND | **0.66 p** | **0.62 p** | **1.1** | ND |
| 137 | Endrin aldehyde | | ND B *H | ND | ND | ND | ND B *H |
| 138 | Endrin ketone | | ND *H | ND | ND | ND | ND *H |
| 139 | Ethylbenzene | 110000000 | ND | ND | ND | ND | ND |
| 140 | Fine Sand | | **5.0** | **4.3** | **3.6** | **4.4** | **10.4** |
| 141 | Fluoranthene | 24000000 | **44** | **150** | **130** | **210** | **190** |
| 142 | Fluorene | 24000000 | 5.5 J | 14 J | 11 J | ND | **32** |
| 143 | gamma-BHC (Lindane) | 2000 | ND *H | ND | ND | ND | ND *H |
| 144 | gamma-BHC (Lindane) | n/a[b] | ND | ND | ND | ND | ND |
| 145 | Gravel | | **0.0** | **0.0** | **0.0** | **0.0** | **4.8** |
| 146 | Heptachlor | 700 | ND *H | ND | ND | ND | ND *H |
| 147 | Heptachlor | n/a[b] | ND | ND | ND | ND | ND |
| 148 | Heptachlor epoxide | 300 | ND *H | ND | 0.15 J p | ND | ND *H |
| 149 | Heptachlor epoxide | n/a[b] | ND | ND | ND | ND | ND |
| 150 | Hexachlorobenzene | 1000 | ND | ND | ND | ND | ND |
| 151 | Hexachlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 152 | Hexachlorobutadiene | n/a[b] | ND | ND | ND | ND | ND |
| 153 | Hexachlorobutadiene | 25000 | ND | ND | ND | ND | ND |
| 154 | Hexachlorocyclopentadiene | 110000 | ND | ND | ND | ND | ND |
| 155 | Hexachloroethane | n/a[b] | ND | ND | ND | ND | ND |
| 156 | Hexachloroethane | 48000 | ND | ND | ND | ND | ND |
| 157 | Hydrometer Reading 1 - Percent Finer | | **73.1** | **77.8** | **75.6** | **74.7** | **78.7** |
| 158 | Hydrometer Reading 2 - Percent Finer | | **65.0** | **67.7** | **63.5** | **68.9** | **64.6** |
| 159 | Hydrometer Reading 3 - Percent Finer | | **56.9** | **53.7** | **56.0** | **63.0** | **54.3** |
| 160 | Hydrometer Reading 4 - Percent Finer | | **50.5** | **49.8** | **50.0** | **57.2** | **46.5** |
| 161 | Hydrometer Reading 5 - Percent Finer | | **42.4** | **43.5** | **43.9** | **45.5** | **38.8** |
| 162 | Hydrometer Reading 6 - Percent Finer | | **32.7** | **34.6** | **33.4** | **33.8** | **31.1** |
| 163 | Hydrometer Reading 7 - Percent Finer | | **24.6** | **24.4** | **24.4** | **23.6** | **22.1** |
| 164 | Indeno[1,2,3-cd]pyrene | 17000 | **21** | **69** | **57** | **90** | **65** |
| 165 | Iron | | **32000** | **31000** | **28000** | **27000** | **30000** |
| 166 | Isophorone | 2000000 | ND | ND | ND | ND | ND |
| 167 | Isopropylbenzene | | ND | ND | ND | ND | ND |
| 168 | Lead | n/a[b] | ND | **53** | **46** | **45** | ND |
| 169 | Lead | 800 | **47** | ND | ND | ND | **73 ^** |
| 170 | Magnesium | | **6900** | **6200 FL** | **5500** | **5300** | **5900** |
| 171 | Manganese | 5900 | **1500** | **1500** | **1400** | **1200** | **1200** |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 172 | Medium Sand | N/A | % | Grain Size | MRL | Total | |
| 173 | Mercury | 7439-97-6 | mg/Kg | Mercury (CVAA) | MRL | Total | 23 |
| 174 | Mercury | 7439-97-6 | mg/L | Mercury (CVAA) | MDL | TCLP | n/a[b] |
| 175 | Methoxychlor | 72-43-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 390000 |
| 176 | Methoxychlor | 72-43-5 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 177 | Methyl acetate | 79-20-9 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 78000000 |
| 178 | Methyl tert-butyl ether | 1634-04-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 110000 |
| 179 | Methylcyclohexane | 108-87-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 180 | Methylene Chloride | 75-09-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 46000 |
| 181 | Methylphenol, 3 & 4 | 106-44-5 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 182 | Methylphenol, 3 & 4 | 106-44-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 31000 |
| 183 | Mirex | 2385-85-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 184 | Moisture Content | N/A | % | Water (Moisture) Content | MRL | Total | |
| 185 | Naphthalene | 91-20-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 6000 |
| 186 | Nickel | 7440-02-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | 1600 |
| 187 | Nitrobenzene | 98-95-3 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 188 | Nitrobenzene | 98-95-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5000 |
| 189 | N-Nitrosodimethylamine | 62-75-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 190 | N-Nitrosodi-n-propylamine | 621-64-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 200 |
| 191 | N-Nitrosodiphenylamine | 86-30-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 99000 |
| 192 | PCB-1016 | 12674-11-2 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 193 | PCB-1221 | 11104-28-2 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 194 | PCB-1232 | 11141-16-5 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 195 | PCB-1242 | 53469-21-9 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 196 | PCB-1248 | 12672-29-6 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 197 | PCB-1254 | 11097-69-1 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MRL | Total | |
| 198 | PCB-1260 | 11096-82-5 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 199 | Pentachlorophenol | 87-86-5 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 200 | Pentachlorophenol | 87-86-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 900 |
| 201 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | |
| 202 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | |
| 203 | Phenanthrene | 85-01-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 204 | Phenol | 108-95-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 18000000 |
| 205 | Polychlorinated biphenyls, Total | 1336-36-3 | ug/Kg | Total PCB Calculation | MRL | Total | 200 |
| 206 | Potassium | 7440-09-7 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 207 | Pyrene | 129-00-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 1700000 |
| 208 | Pyridine | 110-86-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 209 | Pyridine | 110-86-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | |
| 210 | Sand | N/A | % | Grain Size | MRL | Total | |
| 211 | Selenium | 7782-49-2 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 212 | Selenium | 7782-49-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 390 |
| 213 | Sieve Size #10 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 172 | Medium Sand | | **1.5** | **1.4** | **1.4** | **1.0** | **3.1** |
| 173 | Mercury | 65 | **0.19** | **0.18** | **0.20** | **0.20** | **0.26** |
| 174 | Mercury | n/a[b] | ND | ND | ND | ND | ND |
| 175 | Methoxychlor | 5700000 | ND *H | ND | ND | ND | ND *H |
| 176 | Methoxychlor | n/a[b] | ND | ND | ND | ND | ND |
| 177 | Methyl acetate | | ND | ND | ND | ND | ND |
| 178 | Methyl tert-butyl ether | 320000 | ND | ND | ND | ND | ND |
| 179 | Methylcyclohexane | | ND | ND | ND | ND | ND |
| 180 | Methylene Chloride | 230000 | ND ^c | ND | ND | ND | ND ^c |
| 181 | Methylphenol, 3 & 4 | n/a[b] | ND | ND | ND | ND | ND |
| 182 | Methylphenol, 3 & 4 | 340000 | ND | ND | ND | ND | ND |
| 183 | Mirex | | ND *H | ND | ND | ND | ND *H |
| 184 | Moisture Content | | **189.9** | **171.4** | **167.3** | **172.0** | **152.2** |
| 185 | Naphthalene | 17000 | **11** | 28 J | 23 J | 27 J | **55** |
| 186 | Nickel | 23000 | **33** | **33** | **29** | **28** | **29 FL** |
| 187 | Nitrobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 188 | Nitrobenzene | 14000 | ND | ND | ND | ND | ND |
| 189 | N-Nitrosodimethylamine | 700 | ND ^c | ND | ND | ND | ND ^c |
| 190 | N-Nitrosodi-n-propylamine | 300 | ND | ND | ND | ND | ND |
| 191 | N-Nitrosodiphenylamine | 390000 | ND | ND | ND | ND | ND |
| 192 | PCB-1016 | | ND | ND | ND | ND | ND |
| 193 | PCB-1221 | | ND | ND | ND | ND | ND |
| 194 | PCB-1232 | | ND | ND | ND | ND | ND |
| 195 | PCB-1242 | | ND | ND | ND | ND | ND |
| 196 | PCB-1248 | | ND | **7.7** | **7.1** | **7.0** | ND |
| 197 | PCB-1254 | | **12** | **8.2** | **6.4** | **7.6** | **18** |
| 198 | PCB-1260 | | ND | **10** | **8.6** | **10** | ND |
| 199 | Pentachlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 200 | Pentachlorophenol | 3000 | ND | ND | ND | ND | ND |
| 201 | Percent Moisture | | **66.3** | **65.4** | **63.9** | **65.1** | **63.2** |
| 202 | Percent Solids | | **33.7** | **34.6** | **36.1** | **34.9** | **36.8** |
| 203 | Phenanthrene | 300000000 | **22** | **69** | **57** | **84** | **100** |
| 204 | Phenol | 210000000 | ND | ND | ND | ND | ND |
| 205 | Polychlorinated biphenyls, Total | 1000 | **12** | **26** | **22** | **25** | **18** |
| 206 | Potassium | | **2800** | **2600 FL** | **2300** | **2200** | **2600** |
| 207 | Pyrene | 18000000 | **48** | **120** | **100** | **170** | **180** |
| 208 | Pyridine | | ND | ND | ND | ND | ND |
| 209 | Pyridine | | ND | ND | ND | ND | ND |
| 210 | Sand | | **6.5** | **6.5** | **5.0** | **5.6** | **14.1** |
| 211 | Selenium | n/a[b] | ND B | ND | ND | ND | ND B |
| 212 | Selenium | 5700 | **0.73** | **0.73** | **0.72** | 0.62 J | **0.71 FL** |
| 213 | Sieve Size #10 - Percent Finer | | **100.0** | **99.2** | **100.0** | **99.8** | **94.6** |

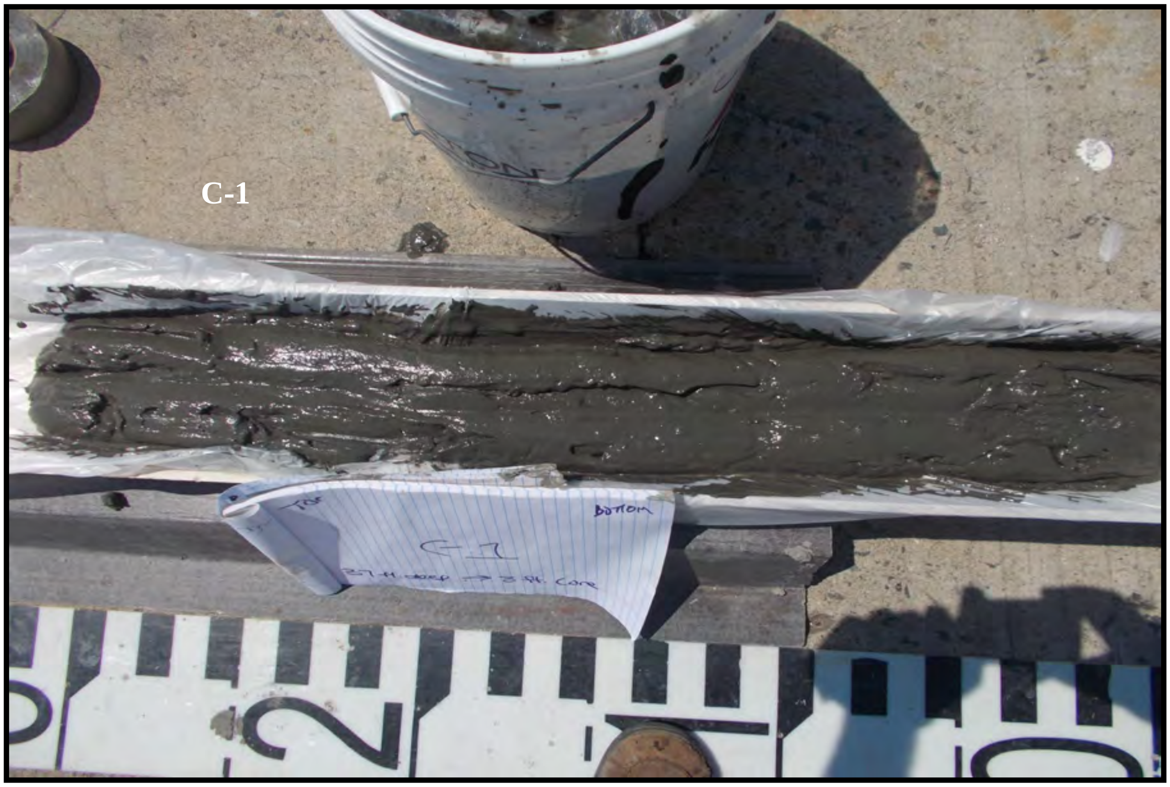
| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 214 | Sieve Size #100 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 215 | Sieve Size #20 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 216 | Sieve Size #200 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 217 | Sieve Size #4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 218 | Sieve Size #40 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 219 | Sieve Size #60 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 220 | Sieve Size #80 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 221 | Sieve Size 0.375 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 222 | Sieve Size 0.75 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 223 | Sieve Size 1 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 224 | Sieve Size 1.5 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 225 | Sieve Size 2 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 226 | Sieve Size 3 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 227 | Silt | N/A | % | Grain Size | MRL | Total | |
| 228 | Silver | 7440-22-4 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 229 | Silver | 7440-22-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | 390 |
| 230 | Sodium | 7440-23-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 231 | Styrene | 100-42-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 90000 |
| 232 | Tetrachloroethene | 127-18-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 233 | Tetrachloroethene | 127-18-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 43000 |
| 234 | Thallium | 7440-28-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 235 | Toluene | 108-88-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 6300000 |
| 236 | Total Organic Carbon - Duplicates | 7440-44-0 | mg/Kg | Organic Carbon, Total (TOC) | MRL | Total | |
| 237 | Toxaphene | 8001-35-2 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 600 |
| 238 | Toxaphene | 8001-35-2 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 239 | trans-1,2-Dichloroethene | 156-60-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 300000 |
| 240 | trans-1,3-Dichloropropene | 10061-02-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 241 | trans-Chlordane | 5103-74-2 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | |
| 242 | Trichloroethene | 79-01-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3000 |
| 243 | Trichloroethene | 79-01-6 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 244 | Trichlorofluoromethane | 75-69-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 23000000 |
| 245 | Vanadium | 7440-62-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78 |
| 246 | Vinyl chloride | 75-01-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 700 |
| 247 | Vinyl chloride | 75-01-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 248 | Xylenes, Total | 1330-20-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 12000000 |
| 249 | Zinc | 7440-66-6 | mg/Kg | Metals (ICP/MS) | MRL | Total | 23000 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1<br>SC-1<br>COMPOSITE [C-9+C-10]<br>7/22/2020<br>1:00 PM** | **180-109049-1<br>SC-2<br>COMPOSITE [C-3+C-4]<br>7/30/2020<br>8:53 AM** | **180-109049-2<br>SC-3<br>COMPOSITE [C-5+C-6]<br>7/30/2020<br>9:40 AM** | **180-109049-3<br>SC-4<br>COMPOSITE [C-7+C-8]<br>7/30/2020<br>10:22 AM** | **180-108764-2<br>SC-5<br>COMPOSITE [C-1+C-2]<br>7/22/2020<br>1:30 PM** |
| 214 | Sieve Size #100 - Percent Finer | | **95.0** | **95.6** | **96.9** | **96.7** | **84.7** |
| 215 | Sieve Size #20 - Percent Finer | | **98.6** | **98.4** | **98.9** | **99.2** | **93.4** |
| 216 | Sieve Size #200 - Percent Finer | | **93.5** | **93.5** | **95.0** | **94.4** | **81.1** |
| 217 | Sieve Size #4 - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **95.2** |
| 218 | Sieve Size #40 - Percent Finer | | **98.5** | **97.8** | **98.6** | **98.8** | **91.5** |
| 219 | Sieve Size #60 - Percent Finer | | **97.3** | **97.2** | **97.8** | **98.2** | **89.0** |
| 220 | Sieve Size #80 - Percent Finer | | **96.1** | **96.4** | **97.3** | **97.4** | **86.7** |
| 221 | Sieve Size 0.375 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **97.1** |
| 222 | Sieve Size 0.75 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 223 | Sieve Size 1 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 224 | Sieve Size 1.5 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 225 | Sieve Size 2 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 226 | Sieve Size 3 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 227 | Silt | | **51.1** | **50.0** | **51.1** | **48.9** | **42.3** |
| 228 | Silver | n/a[b] | ND | ND | ND | ND | ND |
| 229 | Silver | 5700 | **0.29** | **0.27** | **0.25** | **0.20** | **0.45** |
| 230 | Sodium | | **880** | **780 FL** | **710** | **770** | **780 FL** |
| 231 | Styrene | 260000 | ND | ND | ND | ND | ND |
| 232 | Tetrachloroethene | n/a[b] | ND | ND | ND | ND | ND |
| 233 | Tetrachloroethene | 1500000 | ND | ND | ND | ND | ND |
| 234 | Thallium | | **0.34** | **0.23** | **0.28** | **0.25** | **0.31** |
| 235 | Toluene | 91000000 | ND | ND | ND | ND | ND |
| 236 | Total Organic Carbon - Duplicates | | **36000** | **44000** | **30000** | **45000** | **44000 ^** |
| 237 | Toxaphene | 3000 | ND *H | ND | ND | ND | ND *H |
| 238 | Toxaphene | n/a[b] | ND | ND | ND | ND | ND |
| 239 | trans-1,2-Dichloroethene | 720000 | ND | ND | ND | ND | ND |
| 240 | trans-1,3-Dichloropropene | | ND | ND | ND | ND | ND |
| 241 | trans-Chlordane | | **1.7 *H** | **1.3** | **1.6** | **1.6** | **2.2 *H** |
| 242 | Trichloroethene | 10000 | ND | ND | ND | ND | ND |
| 243 | Trichloroethene | n/a[b] | ND | ND FL | ND | ND | ND |
| 244 | Trichlorofluoromethane | 340000000 | ND ^c | ND ^c | ND ^c | ND ^c | ND ^c |
| 245 | Vanadium | 1100 | **47** | **48** | **43** | **41** | **55** |
| 246 | Vinyl chloride | 2000 | ND | ND | ND | ND | ND |
| 247 | Vinyl chloride | n/a[b] | ND | ND | ND | ND | ND |
| 248 | Xylenes, Total | 170000000 | ND | ND | ND | ND | ND |
| 249 | Zinc | 110000 | **200** | **190** | **170** | **170** | **330 ^** |

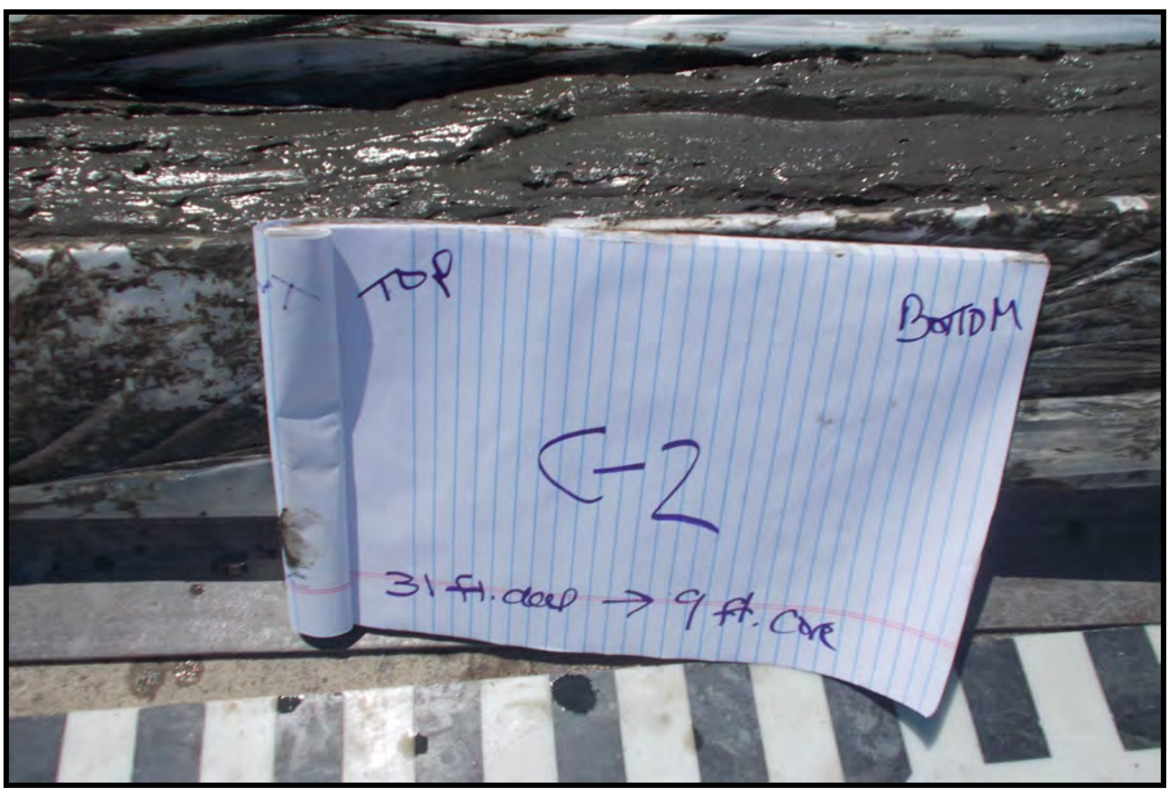
| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** | **Reg 2** | **180-108767-1 SC-1 MODIFIED ELUTRIATE [C-1+C-2] 7/21/2020 12:00 AM** | **180-109050-1 SC-2 MODIFIED ELUTRIATE [C-3+C-4] 7/30/2020 12:00 AM** | **180-109050-4 SC- 3 MODIFIED ELUTRIATE [C-5+C-6] 7/30/2020 12:00 AM** | **180-109050-9 SC- 4 MODIFIED ELUTRIATE [C-7+C-8] 7/30/2020 12:00 AM** | **180-108767-5 SC- 5 MODIFIED ELUTRIATE [C-9+C-10] 7/21/2020 12:00 AM** |
| 2 | Elutriate Generated | N/A | g/L | Modified Elutriate Test Technique | MRL | Total | | | **150** | **150** | **150** | **150** | **150** |
| 3 | Elutriate Generated | N/A | g/L | Modified Elutriate Test Technique, Dissolved | MRL | Dissolved | | | **150** | **150** | **150** | **150** | **150** |
| 4 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | | | **67.7** | **64.3** | **63.6** | **66.1** | **63.7** |
| 5 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | | | **32.3** | **35.7** | **36.4** | **33.9** | **36.3** |


**<u>PHOTO No. 1:</u> C-1**


**<u>PHOTO No. 2:</u> C-1 CORE**




**<u>PHOTO No. 3:</u> C-1 CORE**




**<u>PHOTO No. 4:</u> C-2**

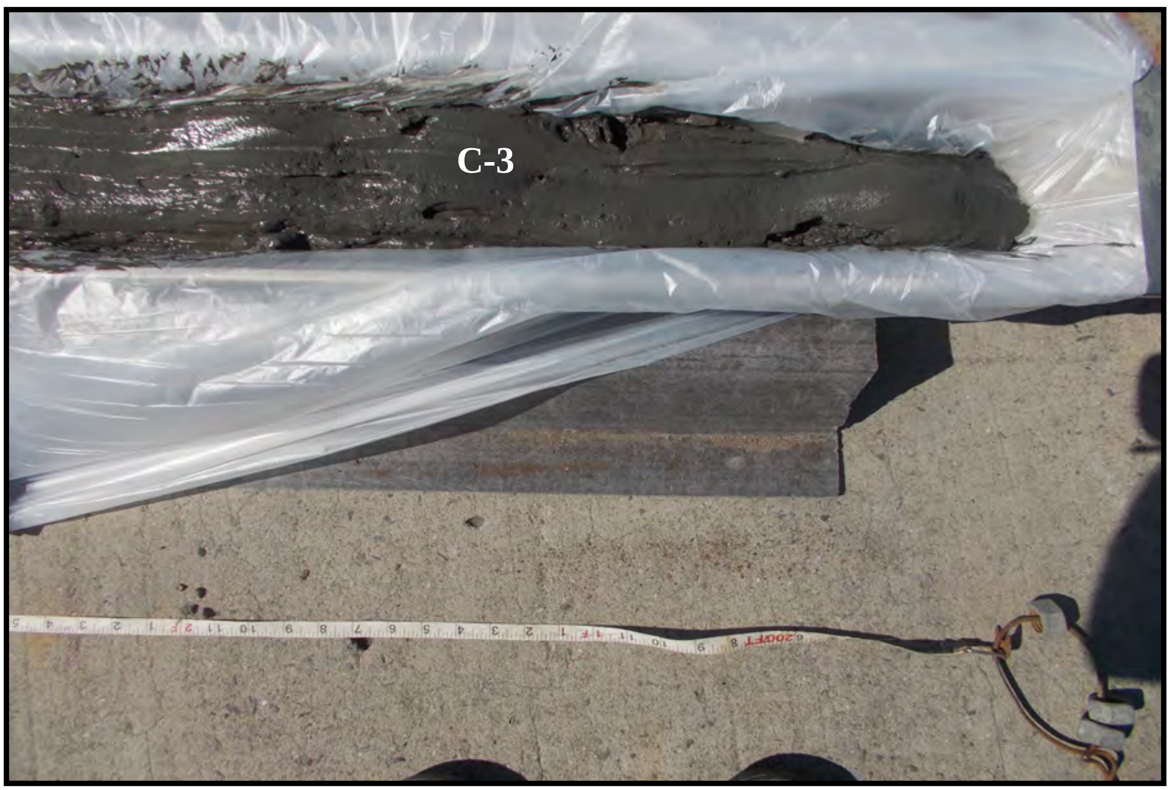

**<u>PHOTO No. 5:</u>** **C-2 CORE, TOP**


**<u>PHOTO No. 6:</u>** **C-2 CORE, CENTER**

**PHOTO No. 7:** **C-2 CORE, BOTTOM**


**PHOTO No. 8:** **C-3**

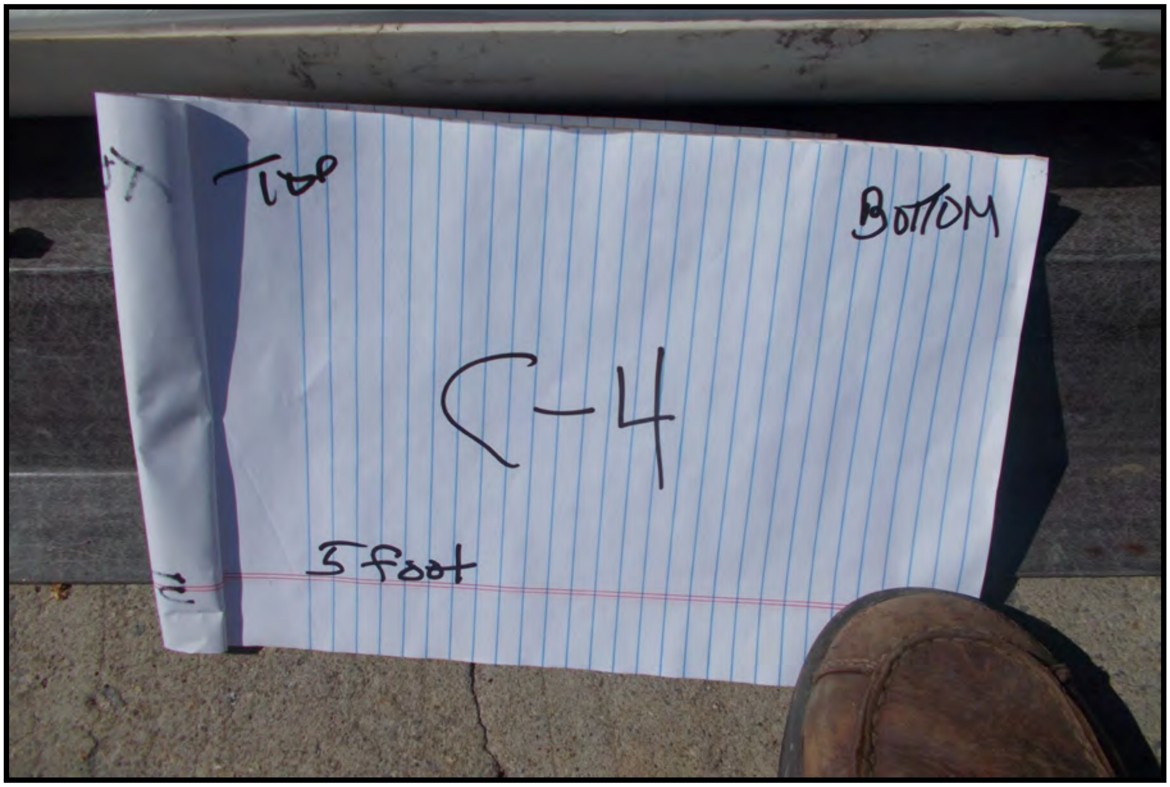

**<u>PHOTO No. 9:</u> C-3 CORE**




**<u>PHOTO No. 10:</u> C-3, BOTTOM**


**<u>PHOTO No. 11:</u> C-3, CENTER**

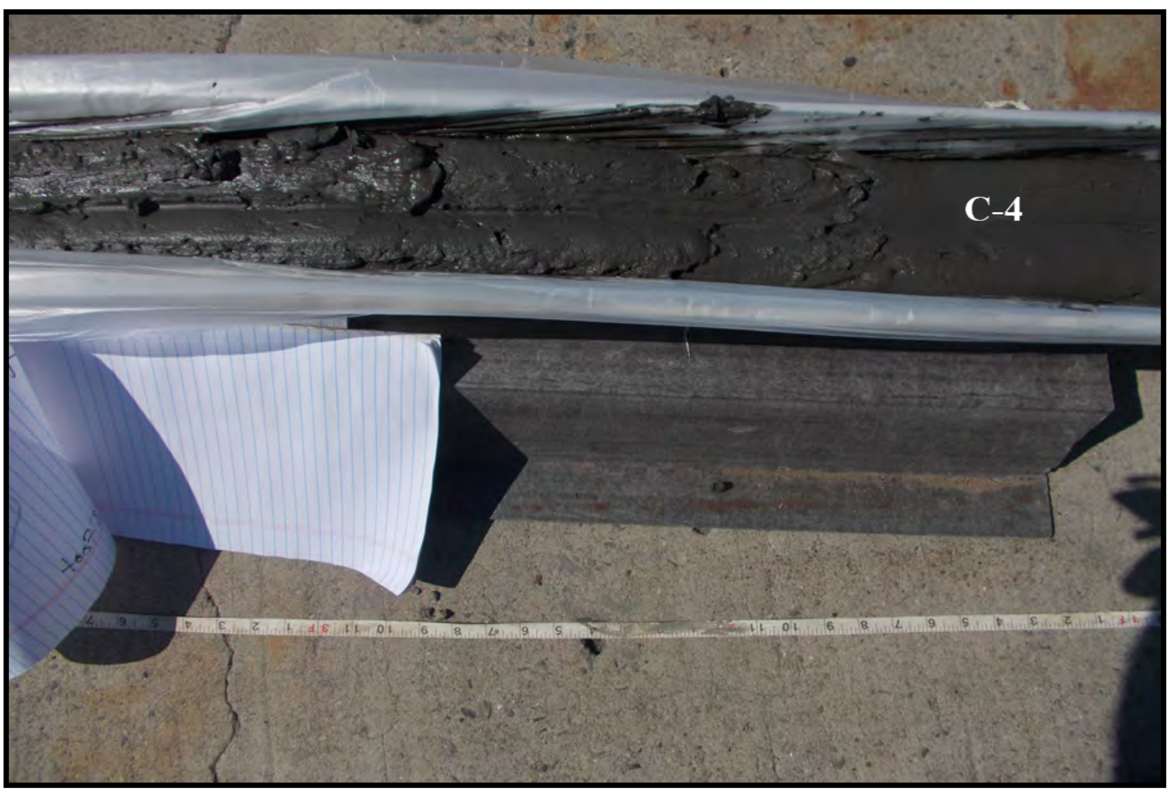

**<u>PHOTO No. 12:</u> C-3, TOP**




**<u>PHOTO No. 13:</u> C-4**

**<u>PHOTO No. 14:</u> C-4 CORE**


**<u>PHOTO No. 15:</u> C-4, BOTTOM**




**<u>PHOTO No. 16:</u> C-4, CENTER**

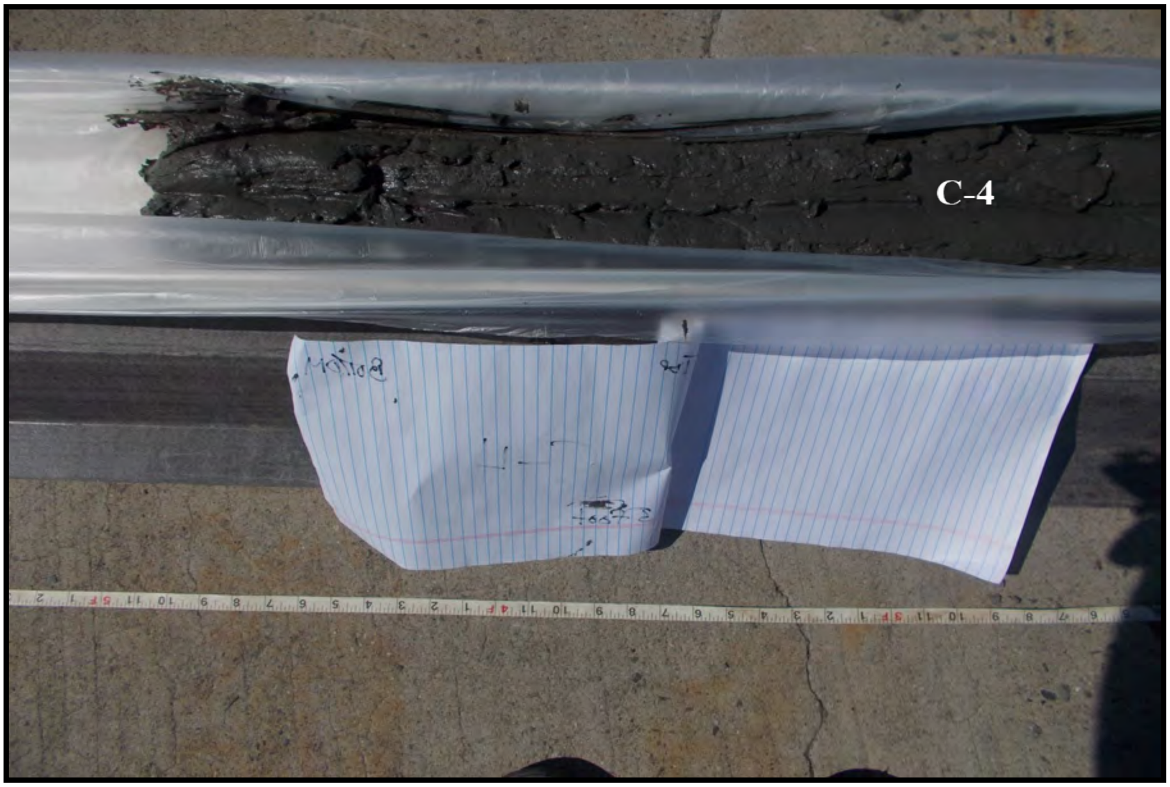



**PHOTO No. 17:** **C-4, TOP**

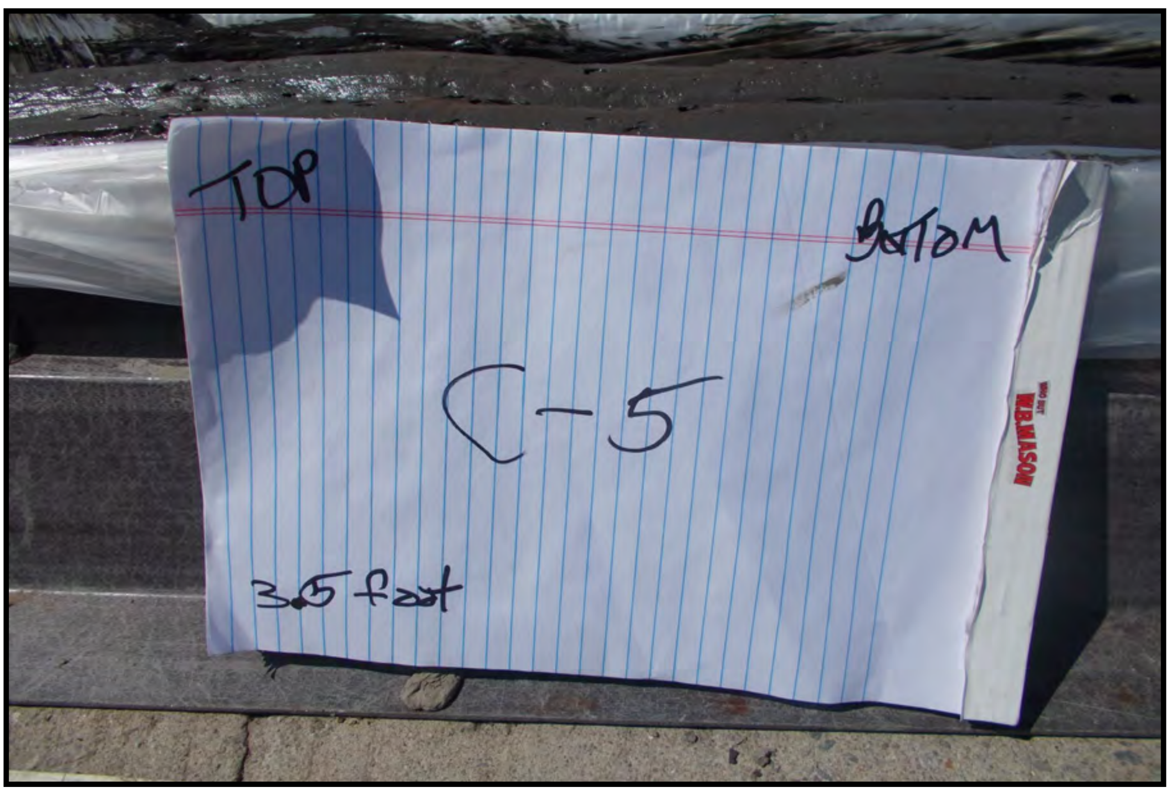
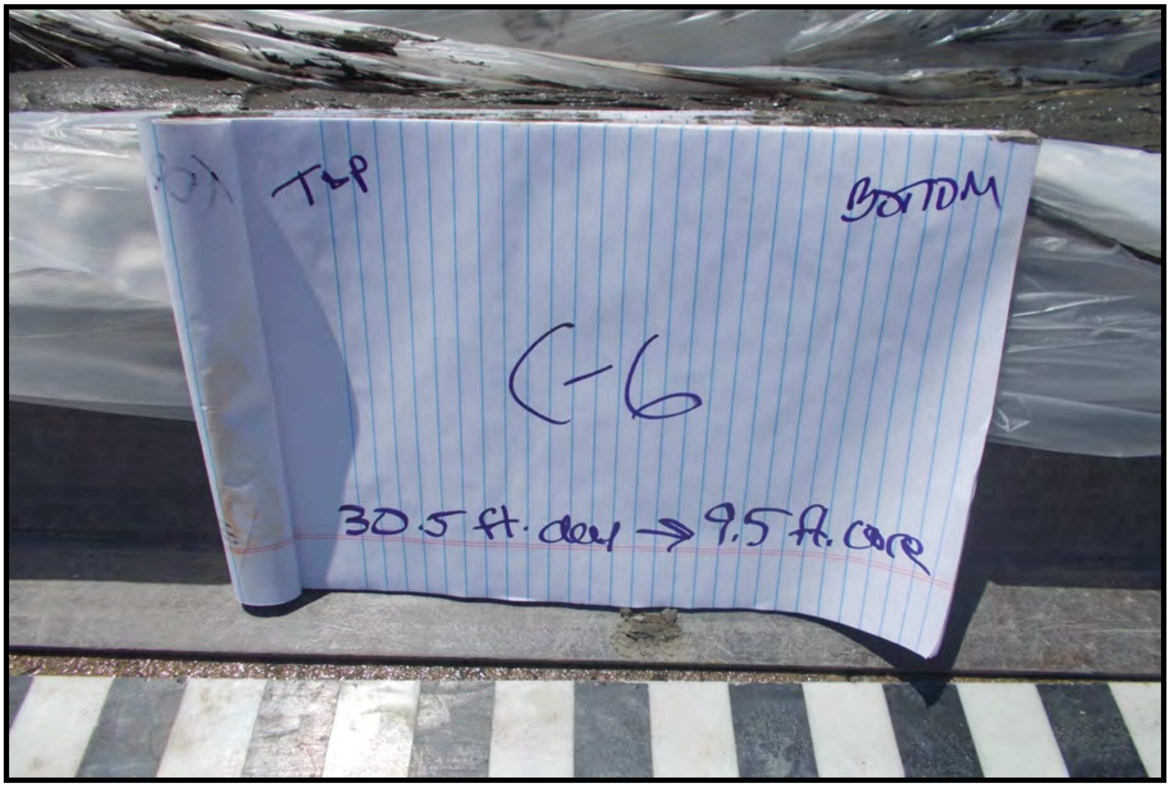



**PHOTO No. 18:** **C-5**


**PHOTO No. 19:**


**<u>PHOTO No. 23:</u> C-5, CENTER**


**<u>PHOTO No. 24:</u> C-5, TOP**




**<u>PHOTO No. 25:</u> C-6**


**<u>PHOTO No. 26:</u> C-6, TOP**


**<u>PHOTO No. 27:</u> C-6, TOP-CENTER**


**<u>PHOTO No. 28:</u> C-6, BOTTOM-CENTER**


**PHOTO No. 28:** **C-6, BOTTOM**

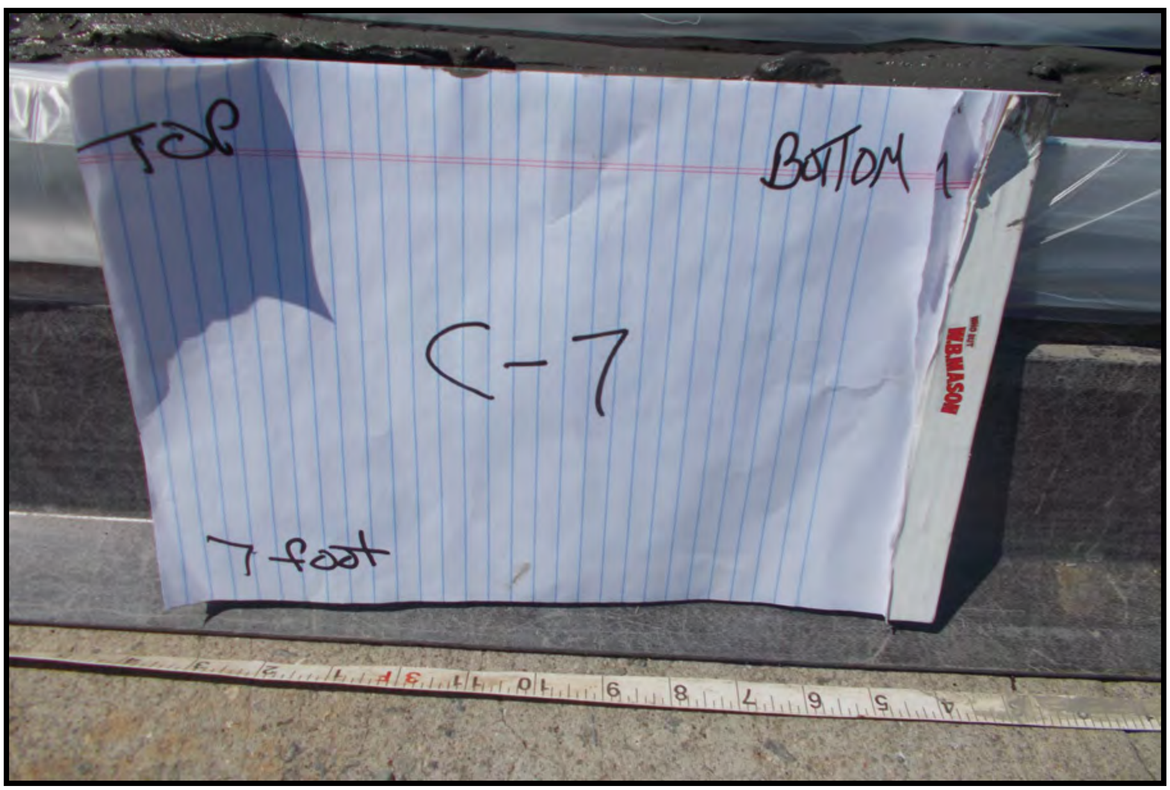



**PHOTO No. 29:** **C-7**


**<u>PHOTO No. 30:</u> C-7 CORE**


**<u>PHOTO No. 31:</u> C-7, BOTTOM**


**PHOTO No. 32:** **C-7, CENTER**

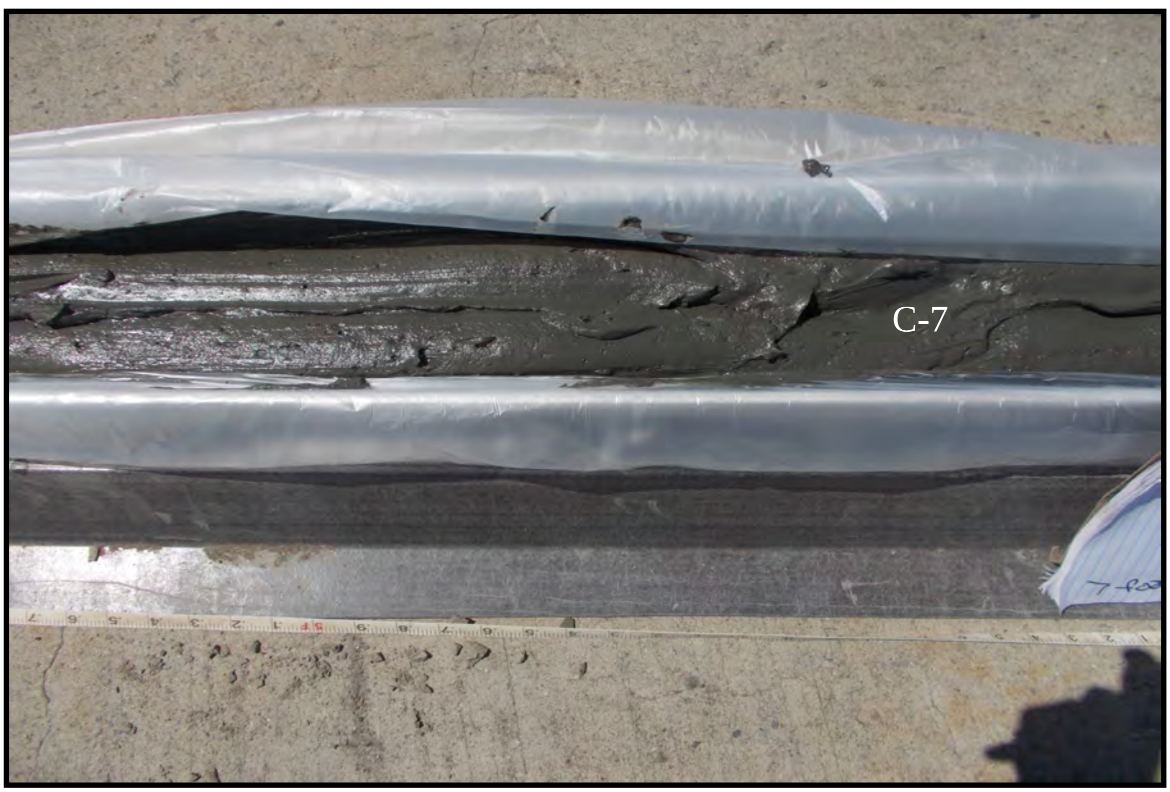
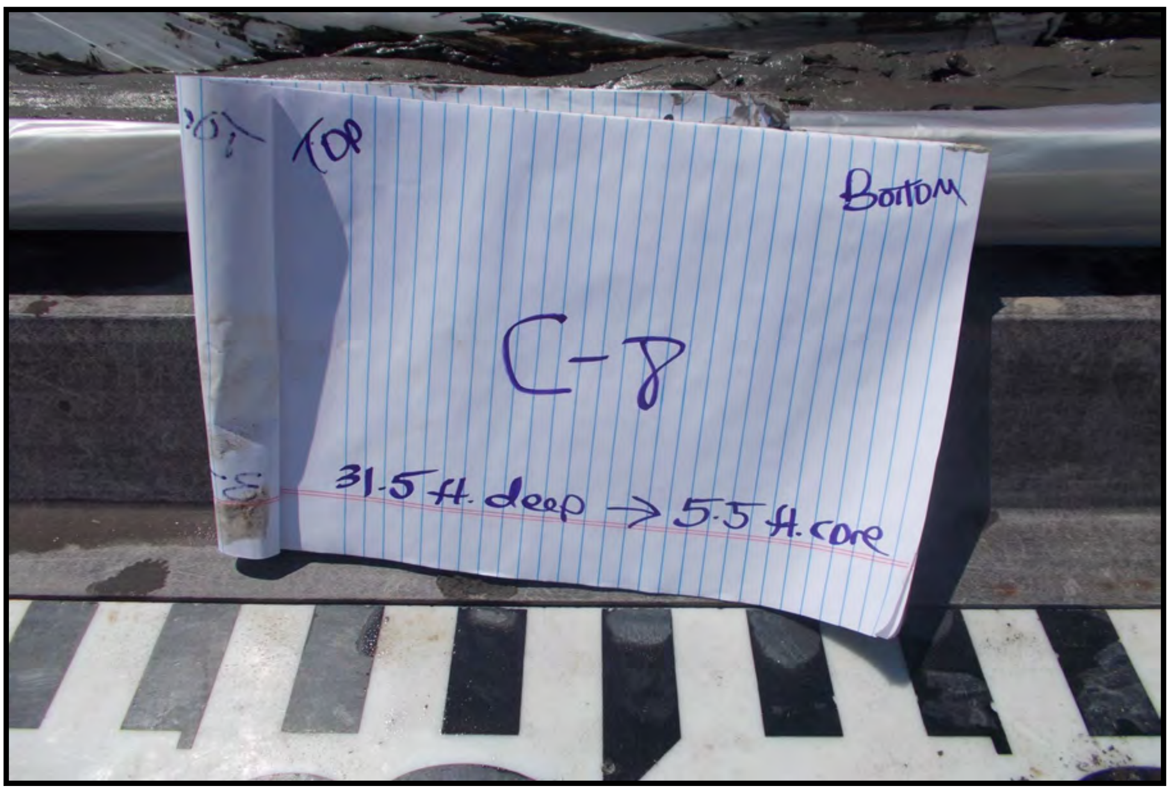


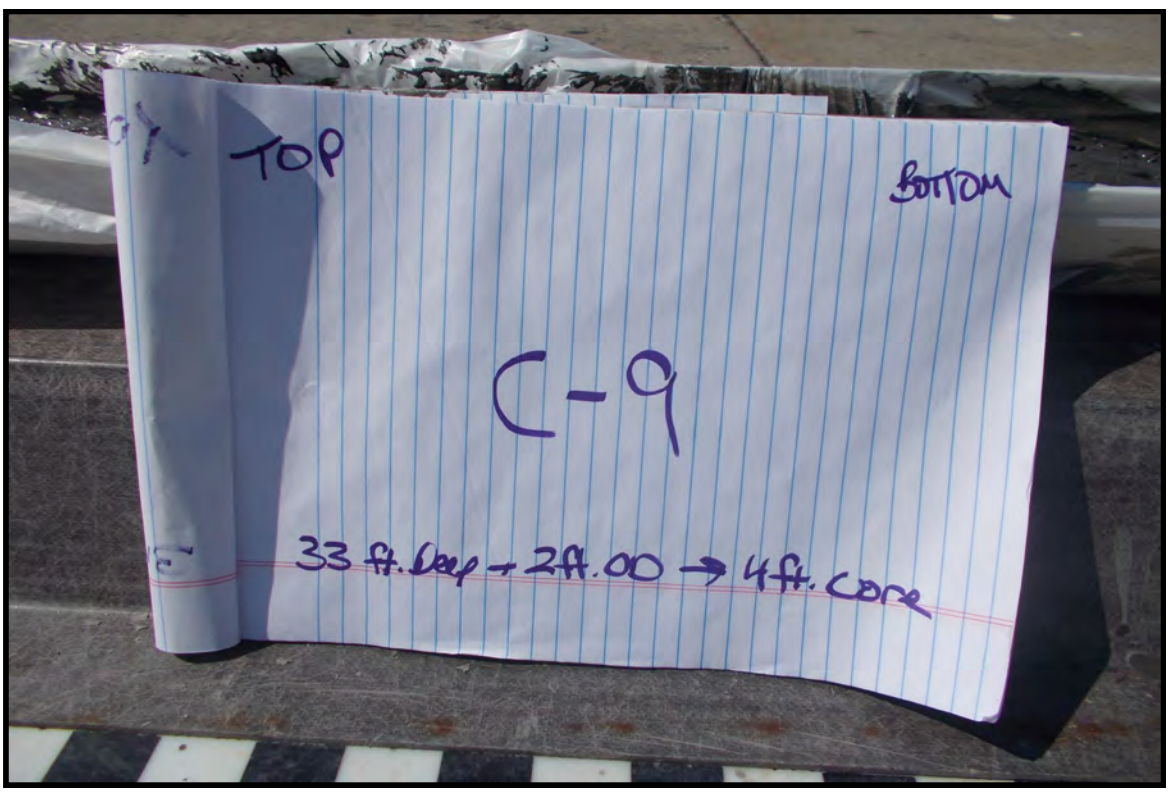

**PHOTO No. 33:** **C-7, BOTTOM-CENTER**


**<u>PHOTO No. 34:</u> C-7, BOTTOM**



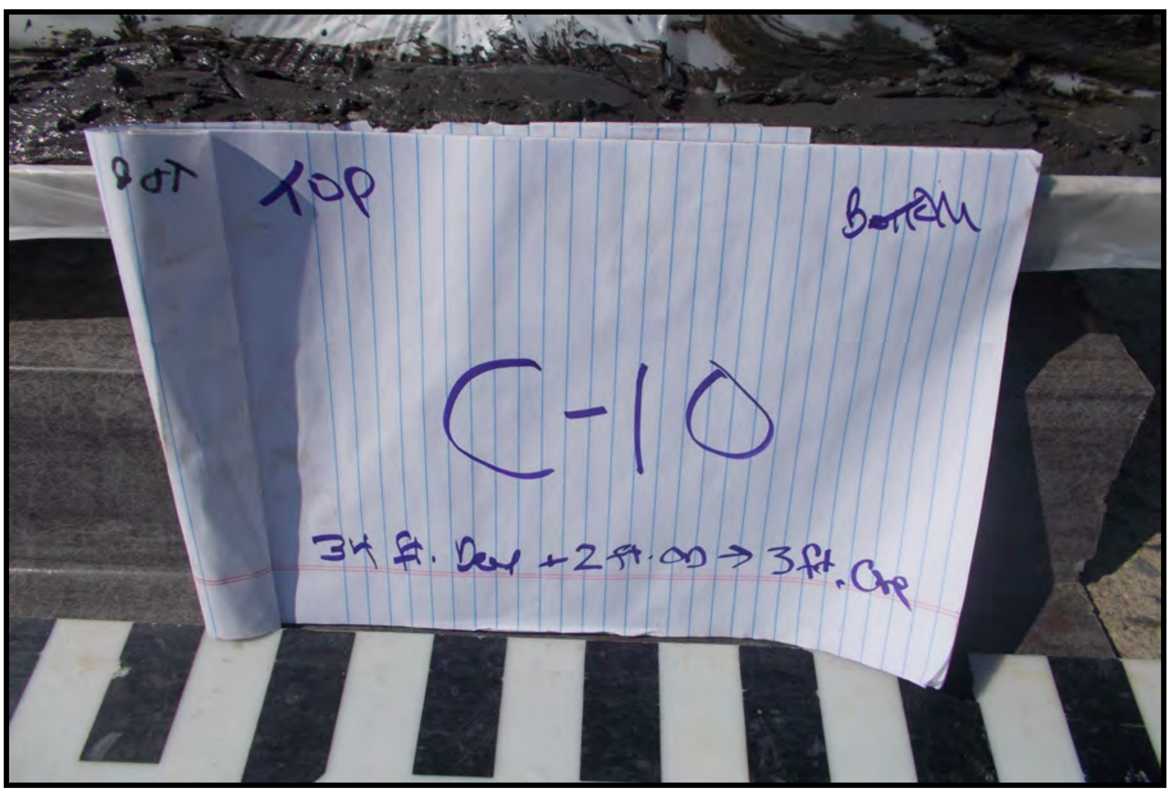

**<u>PHOTO No. 35:</u> C-8**


**<u>PHOTO No. 36:</u> C-8 CORE**




**<u>PHOTO No. 37:</u> C-9**


**<u>PHOTO No. 38:</u> C-9 CORE**




**<u>PHOTO No. 39:</u> C-10**


**<u>PHOTO No. 40:</u> C-10 CORE**

eurofins | QC

702 Electronic Drive Phone: 215-355-3900
Horsham, PA 19044 Fax: 215-392-0626

# CHAIN OF CUSTODY

Page ____ of ____

Lab LIMS No:

MATRIX CODES

Bill to/Report to (if different)

Sampling Site Address (if different) Include State
1 Hausel Road
Wilmington, DE 19801

Client/Acct. No.
Address S.T. Hudson Engineers
900 Dudley Ave
City/State/Zip Cherry Hill, NJ 08002
Phone/Fax 856-342-6600
Client Contact: Paul Ferry

P.O. No. PWSID #:
Quote #
e-mail: pferry@sthe.com

LAB USE ONLY:

- # ____ Ascorbic/HCL Vials # ____ HCl Vials
- # ____ $Na_2S_2O_3$ ________________
- # ____ Na OH/Zn acetate pH ____________
- # ____ $HNO_3$ pH ________________
- # ____ $H_2SO_4$ pH ________________
- # ____ NaOH pH ________________
- # ____ Unpreserved
- # ____ HCl # ____ NH4Cl # ____ MeOH
- # ____ DI Water

DW: DRINKING WATER
GW: GROUND WATER
WW: WASTEWATER
SO: SOIL
SL: SLUDGE
OIL: OIL
SOL: NON SOIL SOLID
MI: MISCELLANEOUS
X: OTHER

LAB USE ONLY

| PROJECT / FIELD ID | Collection Date | Collection Military Time | GRAB | COMP | Matrix Code | Total | $H_2SO_4$ | HCl | Vials | $HNO_3$ | NaOH | ZnAc | UNPRE | BACT | ANALYSIS REQUESTED | Field pH, Temp (ºC), DO, Cl2, Cond. etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | 7/21 | 1125 | | | | | | | | | | | | | | |
| C-2 | 7/21 | 1106 | | | | | | | | | | | | | | |
| C-6 | 7/21 | 1054 | | | | | | | | | | | | | | |
| C-8 | 7/21 | 1030 | | | | | | | | | | | | | | |
| C-9 | 7/21 | 1002 | | | | | | | | | | | | | | |
| C-10 | 7/21 | 0940 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

SAMPLED BY: (Name/Company)

TAT: ☐ STANDARD (10 DAY)
or DUE DATE____/_____/_____

Report Format: ☐ Standard ☐ NJ-RDD ☐ SRP-RDD
☐ Standard + QC ☐ Forms ☐ EDD

*Please call for pricing and availability for rush (<10 day) turnaround and for all but standard reporting format.*

Field Parameters Analyzed By:
Initials Date/Time:

**SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)**

| RELINQUISHED BY | DATE | TIME | RECEIVED BY | DATE | TIME |
|---|---|---|---|---|---|
| RELINQUISHED BY SAMPLER 1. Paul Ferry | 7/22 | 0951 | 1. Erin Dougherty | 07/22/20 | 0951 |
| 2. | | | 2. | | |
| 3. | | | 3. | | |
| 4. | | | 4. | | |
| 5. | | | 5. | | |

DELIVERY: ☐ EQC COURIER ☐ CLIENT ☐UPS ☐FEDEX ☐OTHER ________

Custody Seal Number

Rec'd Temp.: _______ Initials: ______ Ice Y / N Location:____

COMMENTS:

Hazardous: yes / no

eurofins | QC

702 Electronic Drive
Horsham, PA 19044
Phone: 215-355-3900
Fax: 215-392-0626

# CHAIN OF CUSTODY

Page ____ of ____

Bill to/Report to (if different) Stacey Williams

Sampling Site Address (if different) Include State
1 Hawk Road
Wilmington, DE

Client/Acct. No. STHE
Address 900 Dudley Ave.
City/State/Zip Cherry Hill, NJ 08002
Phone/Fax (856) 342-6600
Client Contact: PAUL FERRY

P.O. No.
PWSID #:
Quote #
e-mail: pferry@sthe.com

Lab LIMS No:

LAB USE ONLY:

# ____ Ascorbic/HCL Vials # ____ HCl Vials
# ____ $Na_2S_2O_3$
# ____ Na OH/Zn acetate pH
# ____ $HNO_3$ pH
# ____ $H_2SO_4$ pH
# ____ NaOH pH
# ____ Unpreserved
# ____ HCl # ____ NH4Cl # ____ MeOH
# ____ DI Water

MATRIX CODES

DW: DRINKING WATER
GW: GROUND WATER
WW: WASTEWATER
SO: SOIL
SL: SLUDGE
OIL: OIL
SOL: NON SOIL SOLID
MI: MISCELLANEOUS
X: OTHER

PROJECT

| FIELD ID | Collection Date | Collection Military Time | GRAB | COMP | Matrix Code | Total | H2SO4 | HCl | Vials | HNO3 | NaOH | ZnAc | UNPRE | BACT | ANALYSIS REQUESTED | Field pH, Temp (°C), DO, Cl2, Cond. etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Blank | 7/29 | 0907 | | | | | | | | | | | | | | |
| | 7/29 | 0920 | | | | | | | | | | | | | TAL Metals, PCBs, | |
| Site Water | 7/29 | 1151 | | | | | | | | | | | | | Pesticides, %H2O, | |
| | 7/29 | 1155 | | | | | | | | | | | | | TOC, Grain Size | |
| C-4 | 7/29 | 0952 | | | | | | | | | | | | | SVOCs + TCLP | |
| C-3 | 7/29 | 0910 | | | | | | | | | | | | | | |
| C-5 | 7/29 | 1020 | | | | | | | | | | | | | | |
| C-7 | 7/29 | 1040 | | | | | | | | | | | | | | |

SAMPLED BY: (Name/Company)

TAT: ☐ STANDARD (10 DAY)
or DUE DATE____/____/____

Report Format: ☐ Standard ☐ NJ-RDD ☐ SRP-RDD
☐ Standard + QC ☐ Forms ☐ EDD

*Please call for pricing and availability for rush (<10 day) turnaround and for all but standard reporting format.*

Field Parameters Analyzed By:
Initials | Date/Time:

SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)

| RELINQUISHED BY | DATE | TIME | RECEIVED BY | DATE | TIME |
|---|---|---|---|---|---|
| RELINQUISHED BY SAMPLER 1. Paul Ferry | 7/29 | 1410 | 1. Allison Leadham | 7/29/2020 | 1410 |
| 2. | | | 2. | | |
| 3. | | | 3. | | |
| 4. | | | 4. | | |
| 5. | | | 5. | | |

DELIVERY: ☐ EQC COURIER ☐ CLIENT
☐UPS ☐FEDEX ☐OTHER ________

Custody Seal Number

Rec'd Temp.: 3.2°C Initials: ADL Ice Y / N Location: EQC

COMMENTS:

Hazardous: yes / no

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1125 |
| Coordinates: 323063.21, 207003.37 | | |

| | |
|---|---|
| **CORE #**: C-1 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 2 |
| Existing Depth @ MLW: -37 ft. | Recovered Core Length (ft.): ] 10 ft. x 2 |
| Required Sample Core Length: 3 ft. | Sample Length Retained (ft.): 3 ft. x 2 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: Y N |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniformly grayish-brown |
| | | Fine-grained |
| | | Moderately moist |
| | | Retains shape |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-1a.docx

S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1106 |
| Coordinates: 323274.91, 206414.46 | | |

| | |
|---|---|
| **CORE** #: C-2 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 |
| Existing Depth @ MLW: -31 ft. | Recovered Core Length (ft.): 10 ft. x 1 |
| Required Sample Core Length: 9 ft. | Sample Length Retained (ft.): 9 ft. x 1 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: **Y** **N** |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | uniformly grayish-brown |
| | | Fine-grained |
| | | Moderately moist |
| | | Retains shape |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-2a.docx

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 0910 |
| Coordinates: 323449.70, 205994.35 | | |
| **CORE #**: C-3 | Datum: MLW = 0 ft. | |
| Project Depth: -38 ft. (inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -35 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 5 ft. | Sample Length Retained (ft.): 5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Grayish-brown |
| | | Fine-grained |
| | | Slick |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-3a.docx

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 0952 |
| Coordinates: 323757.66, 205375.99 | | |

| | |
|---|---|
| **CORE #**: C-4 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 |
| Existing Depth @ MLW: -35 ft. | Recovered Core Length (ft.): 10 ft. x 1 |
| Required Sample Core Length:5 ft. | Sample Length Retained (ft.): 5 ft. x 1 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: **Y** **N** |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Grayish-brown |
| | | Fine-grained |
| | | Slick |
| | | Retains Shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-4a.docx

## S. T. HUDSON ENGINEERS, INC.

### SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 1020 |
| Coordinates: 323966.31, 205140.65 | | |

| | |
|---|---|
| **CORE #**: C-5 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 2 |
| Existing Depth @ MLW: -36.5 ft. | Recovered Core Length (ft.): 10 ft. x 2 |
| Required Sample Core Length: 3.5 ft. | Sample Length Retained (ft.): 3.5 ft. x 2 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: Y N |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Fine-grained |
| | | Gray/brown |
| | | Slick, moderately moist |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1054 |
| Coordinates: 324069.15, 204669.68 | | |
| **CORE** #: C-6 | Datum: MLW = 0' | |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -30.5 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 9.5 ft. | Sample Length Retained (ft.): 9.5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Fine-grained |
| | | Brownish gray |
| | | Slick; moderately moist |
| | | Retains shape/semi-consolidated |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 1040 |
| Coordinates: 324319.70, 204178.73 | | |
| **CORE** #: C-7 | Datum: MLW = 0' | |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -33 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 7 ft. | Sample Length Retained (ft.): 7 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained / sticky |
| | | Gray-brown |
| | | Semi-consolidated gel-like |
| | | Moderately moist |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-7a.docx

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1030 |
| Coordinates: 324521.64, 203645.56 | | |
| **CORE #**: C-8 | Datum: MLW = 0 ft. | |
| Project Depth: -35 ft.<br>(inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -31.5 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 5.5 ft. | Sample Length Retained (ft.): 5.5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained |
| | | Gray / brown |
| | | Semi-consolidated, retains shape |
| | | Moderate moisture level |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-8a.docx

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1002 |
| Coordinates: 324706.93, 203123.36 | | |
| **CORE** #: C-9 | Datum: MLW = 0' | |
| Project Depth: -35 ft.<br>(inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 2 | |
| Existing Depth @ MLW: -33 ft. | Recovered Core Length (ft.): 10 ft. x 2 | |
| Required Sample Core Length: 4 ft. | Sample Length Retained (ft.): 4 ft. x 2 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: Y N | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained throughout |
| | | Brown-gray |
| | | Moderate moisture, consolidation |
| | | |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 0940 |
| Coordinates: 324902.13 , 202728.66 | | |

| | |
|---|---|
| **CORE** #: C-10 | Datum: MLW = 0 ft. |
| Project Depth: -35 ft.<br>(inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 2 |
| Existing Depth @ MLW: -34 ft. | Recovered Core Length (ft.): 10 ft. x 2 |
| Required Sample Core Length: 3 ft. | Sample Length Retained (ft.): 3 ft. x 2 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: **Y** **N** |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform throughout |
| | | Fine-grained |
| | | Brown / gray |
| | | Moderate moisture |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# SECTION 5

## SAMPLING PLAN APPROVAL PERMIT
## AND
## SAMPLING METHODOLOGY

# SECTION 6

## PREVIOUSLY ISSUED DNREC PERMIT

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

APR - 4 2012

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Re: Supplemental Approval: SU-028/12
Original Permit - Water Quality Certification No.: WQ-521/07
Associated Permit: - Supplemental Approval No.: SU-051/11

Dear Mr. DePasquale:

Enclosed is the Supplemental Approval granted by the State of Delaware to allow use of the Wilmington Harbor North confined disposal facility. The permittee is responsible to ensure that all the conditions, responsibilities and requirements of the Supplemental Approval are strictly observed. Additionally, the permittee is required to observe all the conditions in the original Water Quality Certification, except those revised by this Supplemental Approval.

The Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus)* is a State and federally listed endangered species. Coordination with the National Marine Fisheries Service and the State of Delaware Division of Fish and Wildlife Fisheries Section is required to identify any impacts and/or mitigating efforts required to protect the sturgeon. The Wetlands and Subaqueous Lands Section contacted the DNREC Fisheries Section on your behalf and there are currently no additional restrictions on the permit for this upcoming dredging event. However, future coordination for subsequent dredging events is the responsibility of the permittee.

If you have any questions, please feel free to contact Joanne Lee of my staff at (302) 739-9943.

Sincerely,

Laura M. Herr
Section Manager
Wetlands & Subaqueous
Lands Section

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Supplemental Approval: SU-028/12
Date of Issuance: 4\4\2012
Original Permit:
- Water Quality Certification No.: WQ-521/07
Associated Permit:
- Supplemental Approval No.: SU-051/11
Construction Expiration Date: 11/3/2018

**SUPPLEMENTAL APPROVAL**
**GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT TO MODIFY THE EXISTING WATER QUALITY CERTIFICATION WQ-521/07, ISSUED TO MAINTENANCE DREDGE THE CHRISTINA RIVER AT THE PORT OF WILMINGTON, WILMINGTON, NEW CASTLE COUNTY, DELAWARE TO INCLUDE THE USE OF THE WILMINGTON HARBOR NORTH CONFINED DISPOSAL FACILITY, LOCATED ON THE NORTHERN SIDE OF THE CHRISTINA RIVER IN WILMINGTON, DELAWARE, FOR DISPOSAL OF DREDGED MATERIAL GENERATED BY THE AUTHORIZED DREDGING IN THE CHRISTINA RIVER**

Pursuant to the provisions of 7 Del. C., §6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 4th day of April A.D. 2012 to perform the above referenced project in accordance with the approved plans for this Supplemental Approval (Certification) (2 Sheets), as approved on April 2, 2012; and the application dated January 25, 2012 and received by this Division on January 27, 2012.

Whereas, pursuant to the provisions of Section 401 of the Clean Water Act, 33 U.S.C Section 1341, and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Supplemental Approval is an addendum to Water Quality Certification No. WQ-521/07 granted to the U.S. Army Corps of Engineers. This Supplemental Approval shall be attached thereto and made a part thereof.

7. The work authorized herein shall be completed in accordance with the terms and conditions of all State permits and certifications.

8. Failure to comply with any of the terms or conditions of this Supplemental Approval may result in enforcement action, which could include the revocation of this Approval.

IN WITNESS WHEREOF, I, Laura M. Herr, the duly authorized representative of Collin P. O'Mara, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 4th day of April, 2012.

for By Laura M. Herr, the duly authorized representative of the Secretary of the Department of Natural Resources and Environmental Control

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM

5 E. REED STREET, SUITE 201
DOVER, DELAWARE 19901

Phone: (302) 739- 9283
Fax: (302) 739-2048

June 7, 2011

Mark Eberle
Department of the Army
Philadelphia District, Corps of Engineers
Wannamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

RE: Delaware Coastal Management Program Federal Consistency Determination Modification
Wilmington Harbor Maintenance Dredging (FC 2011.0080)

Dear Mr. Eberle:

The Delaware Coastal Management Program (DCMP) has reviewed your request for a modification of the consistency determination issued on May 27, 2011 for the above mentioned project. The modification is based upon a refinement of the area to be dredged and time-of-year and method of placement for the hydraulic pipeline to be utilized during the course of the proposed action. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your request for the modification of the consistency determination for the proposed maintenance plan to dredge 650,000 cubic yards of material annually from the Christina River at the Port of Wilmington, New Castle County, Delaware.

As a result of this modification, all dredging activity should be scheduled to avoid migratory and spawning activity of fisheries of concern and should not be conducted from April 1 to June 15 (DCMP Policies 5.11.1.1, 5.11.2.1, 5.11.3.1, and 5.11.3.2). All previously issued conditions, including conducting dredging and material disposal in manner such that Delaware Surface Water Quality Standards will not be violated (DCMP Policies 5.3.1.4, 5.3.1.6, and 5.3.2.7) and receiving and adhering to all necessary permits and their conditions remain in effect.

If you have any questions, please contact me or Bonnie Arvay of my staff at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 2011.0080
Joanne Lee – DNREC/DW

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Supplemental Approval: SU-051/11
Original Permit:
- Water Quality Certification No.: WQ-521/07
Date of Issuance: 5\27\2011
Construction Expiration Date: November 3, 2018

**WATER QUALITY CERTIFICATION**
**GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT**
**TO MODIFY EXISTING WATER QUALITY CERTIFICATION WQ-521/07**
**TO INCLUDE THE FOLLOWING:**

- **To authorize an additional disposal site, the Pedricktown South disposal facility in Pedricktown, New Jersey, for disposal of dredged material from the Christina River at the Port of Wilmington, Wilmington, New Castle County, Delaware; and**
- **To place, use and remove a 24-inch to 27-inch diameter steel pipeline for the conveyance of dredged material, extending from the Christina River and across the Delaware River to the Pedricktown South confined disposal facility in Pedricktown, New Jersey.**

Pursuant to the provisions of 7 Del. C., §6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 27th day of May A.D. 2011 to perform the above referenced project in accordance with the approved plans for this Water Quality Certification (Certification) (3 Sheets), as approved on May 27, 2011; and the application dated February 14, 2011 and received by this Division on February 15, 2001.

Whereas, pursuant to the provisions of Section 401 of the Clean Water Act, 33 U.S.C Section 1341, and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Supplemental Approval is an addendum to Water Quality Certification No. WQ-521/07 granted to the U.S. Army Corps of Engineers. This Supplemental Approval shall be attached thereto and made a part thereof.

This Supplemental Approval is issued subject to the following conditions:

**PERMIT CONDITIONS**

1. This Supplemental Approval is an addendum to Water Quality Certification WQ-521/07 granted to U.S. Army Corps of Engineers on November 3, 2008. All work shall be completed in accordance with the Terms and Conditions of the originally authorized Certification, which shall remain in full force and effect, except as indicated herein.

2. Special Condition 5 of the original Certification, which required disposal of dredged material at Wilmington Harbor South disposal area and the Delaware portion of the Killcohook disposal area, is modified by this Approval. By this Approval, the WSLS authorizes the use of the Pedricktown South disposal site as an additional disposal facility for the authorized dredging at the Port of Wilmington. Dredge spoil disposal shall occur only in these designated, approved disposal areas.

3. The placement, use, and removal of the pipelines are not subject to the time of year dredging restrictions identified in Special Condition 8 of the original Certification. The time of year restrictions in Special Condition 8 for dredging in Delaware subaqueous lands remain in full force.

4. A copy of this Supplemental Approval and the originally authorized Certification must be available on site during all phases of the dredging.

5. The work authorized herein shall be completed in accordance with the terms and conditions of all state permits and certifications.

IN WITNESS WHEREOF, I, Laura M. Herr, the duly authorized representative of Collin P. O'Mara, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 27th day of May, 2011.

By Laura M. Herr, the duly authorized representative of the Secretary of the Department of Natural Resources and Environmental Control

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM

5 E. REED STREET, SUITE 201
DOVER, DELAWARE 19901

Phone: (302) 739- 9283
Fax: (302) 739-2048

May 27, 2011

Mark Eberle
Department of the Army
Philadelphia District, Corps of Engineers
Wannamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

RE: Delaware Coastal Management Program Federal Consistency Determination
Wilmington Harbor Maintenance Dredging (FC 2011.0080)

Dear Mr. Eberle:

The Delaware Coastal Management Program (DCMP) has reviewed your consistency determination request for the above mentioned project. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your consistency determination for the proposed dredging maintenance plan for the federal channel located within the berthing area of Wilmington Harbor.

This concurrence is conditioned upon the following:

1) Dredging Restrictions: The proposed activity is in an area utilized by important resident, migratory, and commercially important fish species [including American shad (*Alosa sapidissima*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and striped bass (*Morone saxatilis*)]. These species, along with Atlantic sturgeon (*Acipenser oxyrinchus)*, a species of local and regional concern and the federally endangered short-nosed sturgeon (*Acipenser brevirostrum)*, utilize the Delaware River during upstream migrations. Additionally, atriped bass spawn in this area of the Delaware River from April-June. The protection of spawning areas, nursery habitats, and migratory corridors during the spawning season is important in maintaining and protecting these fisheries resources. As such, all dredging activity should be scheduled to avoid migratory and spawning activity and should not be conducted from March 15 to June 30. (DCMP Policies 5.11.1.1, 5.11.2.1, 5.11.3.1, and 5.11.3.2);
2) Water Quality: Dredging and dewatering shall be conducted in a manner such that Delaware Surface Water Quality Standards will not be violated, excluding whatever temporary and minimal turbidity is unavoidable when using sound dredging and dewatering practices. (DCMP Policies 5.3.1.4, 5.3.1.6, and 5.3.2.7); and

3) The issuance of all required permits, including but not limited to a Delaware Subaqueous Lands Permit, and adherence to the restrictions and/or conditions placed on any and all permits issued to the applicant for this project.

If you have any questions, please contact me or Bonnie Arvay of my staff at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 2011.0080
Joanne Lee – DNREC/DW

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF SOIL AND WATER CONSERVATION
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

DELAWARE COASTAL MANAGEMENT PROGRAM

TELEPHONE: (302) 739-9283
FAX: (302) 739-2048

January 29, 2009

Minas M. Arabatzis
Philadelphia District, Corps of Engineers
Wannamaker Building, 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

***RE: Delaware Coastal Management Federal Consistency Determination***
***Wilmington Harbor Operation and Maintenance Project (08.103)***

Dear Mr. Arabatzis:

The Delaware Coastal Management Program (DCMP) has received your consistency determination request for the above mentioned project. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your consistency determination for the mechanical dredging of approximately 650,000 cubic yards of sediment from the federal channel, turning basin, and the private berthing area by the Diamond State Port Corporation with disposal at Wilmington Harbor South CDF and Killcohook CDF for the 2009 – 2018 dredging cycles.

This concurrence is conditioned the following:

1) Submission of an annual report to the DCMP prior to each dredging cycle detailing the proposed work to be completed during that cycle and the actual work that was completed during the previous cycle. This report should include the amounts of sediment dredged or to be dredged and the disposal facility(ies) utilized. If more than one disposal site is used during a dredging cycle, indicate the amount of sediment disposed in each.
2) No dredging activities shall occur from April 1 – June 15 of each year,
3) The submission of the fate analysis of PCB's as conditioned by the Division of Water Resources and adherence to any additional water quality monitoring requirements resulting from said analysis;
4) Adherence to any Coast Guard restrictions issued when pipeline is to cross the navigation channel to reduce impacts to navigation; and
5) The issuance of all required permits and adherence to the restrictions and/or conditions placed on any and all permits issued to you and/or your client for this project.

If you have any questions please do not hesitate to contact me or Bonnie Arvay at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 08.103
John Brundage – USACE/Dover Office
Joanne Lee – DNREC/DWR

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. David Olsen
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107

NOV 3 - 2006

Dear Mr. Olsen:

Enclosed is the Water Quality Certification granted by the State of Delaware. Please read carefully all the Special and General Conditions contained within the Certification. The permittee is responsible to ensure that all conditions of the Certification are strictly observed.

Also enclosed is a copy of the **Contractor's Post-Construction Completion Report**. Within ten days of the completion of the project, the contractor must mail a completed and signed Post-Construction form to this office.

If you have any questions, please feel free to contact this office.

Sincerely,

Laura M. Herr

Laura M. Herr
Section Manager
Wetlands & Subaqueous
Lands Section

Enclosures

Cc: Charles Myers, U.S. Army Corps of Engineers

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. David Olsen
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Water Quality Certification: WQ-521/07
Date of Issuance: 11\3\2008
Expiration Date: 11\3\2018
Amended Date:

**WATER QUALITY CERTIFICATION
GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS
TO MAINTENANCE DREDGE THE CHRISTINA RIVER
TO DEPTHS RANGING FROM 35 FEET BELOW MEAN LOW WATER
TO 40 FEET BELOW MEAN LOW WATER,
DREDGING UP TO 650,000 CUBIC YARDS OF MATERIAL ANNUALLY,
AT THE PORT OF WILMINGTON, 1 HAUSEL ROAD,
WILMINGTON, NEW CASTLE COUNTY, DELAWARE**

Pursuant to the provisions of 7 Del. C., Section 6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 3rd day of November A.D. 2008 to perform the above referenced project in accordance with the approved plans for this Certification (7 Sheets), as approved on October 30, 2008; and the application dated November 29, 2007 and received by this Division on December 3, 2007, with additional information received January 22, 2008 and September 19, 2008.

Whereas, in accordance with the provisions of Section 401 of the Clean Water Act, 33 U.S.C. Section 1341 and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Certification is issued subject to the following conditions:

## SPECIAL CONDITIONS

1. The conditions contained herein shall be included as part of the main body of the construction contract and other ancillary documents associated with earth disturbance and any other activities directly or indirectly associated with construction which may impact subaqueous lands associated with this project. The permittee is responsible for ensuring that the contractor and/or workers executing the activities authorized by this Certification have full knowledge of the terms and conditions of this Certification.

2. Dredging shall be conducted so as not to violate the State of Delaware Department of Natural Resources and Environmental Control Surface Water Quality Standards dated July 2004.

3. Dredging shall be conducted in a manner that minimizes the suspension of solids in the water column.

4. **The permittee shall perform additional analysis to evaluate the fate of polychlorinated biphenyls in the sediments to be disturbed during the dredging operation and the effect of this contaminant on water quality. The analytical results shall be submitted to the WSLS at least 30 days prior to the first dredging event. If these results indicate that Water Quality Standards may be exceeded, the WSLS may require the permittee to conduct water column sampling during dredging operations and may also require the permittee to create and implement a plan that further minimizes the suspension of sediments and pollutants during dredging operations.**

5. The WSLS authorizes the use of the Wilmington Harbor South disposal area and the Delaware portion of the Killcohook disposal areas as confined disposal facilities for the dredging authorized by this Certification. Dredge spoil disposal shall occur only in these designated, approved disposal areas.

6. The effluent shall be detained in the detention basin for sufficient time to allow for the maximum feasible settling of the sediments suspended in the dredge spoil effluent. **The concentration of suspended solids in the water leaving the disposal site shall not exceed the concentration of the suspended solids in the receiving water body by more than 4 grams per liter.**

7. **Monitoring of the discharge from the disposal site shall be conducted during each dredging event. This data shall be submitted to the WSLS within 30 days of the completion of the dredging. Corrective action shall be taken and the WSLS shall be contacted within 24 hours if concentrations of suspended sediments exceed background condition by more than 4 grams per liter. The minimum monitoring shall include the following:**
   - **One composite sample of the effluent discharge water shall be collected daily and analyzed for Total Suspended Solids.**
   - **The effluent flow rate from the disposal site shall be recorded daily.**
   - **One water sample shall be collected daily from a background site on the Delaware River and analyzed for Total Suspended Solids. However, if the effluent discharge is managed so that no more than four grams of sediment per liter of water is discharged, background sampling is not required.**

8. **The schedule for the dredging shall be arranged so as to minimize the impact on anadromous fish passage. Specifically, no dredging shall be untaken between April 1 and June 15 annually.**

9. All dredging and filling is to be conducted in a manner consistent with sound conservation and water pollution practices.

10. All pipelines shall be kept in good conditions at all times and any leaks or breaks shall be promptly and properly repaired

11. The submerged pipeline shall be placed in a manner that avoids impacts to navigation. The pipeline, when crossing the Delaware River navigation channel, shall be at a depth authorized by the U.S. Coast Guard.

12. The disposal areas shall be inspected prior to dredging and effectively managed and maintained in a manner that prevents the entrance of dredged materials into any waters or wetlands.

13. Prior to the commencement of each dredging event, the permittee shall notify the WSLS of the location of the proposed disposal area.

14. A minimum freeboard of two (2) feet, measured vertically between the retained material and water and the top of the adjacent confining embankment, shall be maintained at all times.

15. **The Department reserves the right to modify the sampling parameters and other conditions for subsequent dredging events. The applicant shall contact the Wetlands and Subaqueous Lands Section prior to the commencement of subsequent dredging events so that specific details of the monitoring plans can be determined.**

16. This Certification replaces the previously authorized Water Quality Certification WQ-250/04. All special and general conditions contained in this Certification shall supersede conditions set forth in WQ-250/04 which has become null and void.

17. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook, so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

18. A copy of this Certification must be available on site during all phases of construction activity.

19. This Certification shall be valid for ten (10) years and authorizes a total of 10 dredging events, as depicted in the permit application and drawings. This Certification authorizes the dredging of 650,000 cubic yards of material during each dredge event.

## GENERAL CONDITIONS

1. The project is to be undertaken in accordance with the plans submitted and attached hereto. Any activities not specifically authorized herein may require a supplemental approval from this office prior to the initiation of construction. A determination on the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes to this office.

2. Representatives of the Department of Natural Resources and Environmental Control may inspect such work during any phase of the construction and may collect any samples or conduct any tests that are deemed necessary.

3. This Certification does not cover the structural stability of the project units.

4. Any actions, operations or installations which are considered by the Department to be contrary to the best interests of the public shall constitute reason for the discontinuance and/or removal of said action, operation or installation.

5. The issuance of this Certification does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.

6. This Certification is subject to the terms and conditions contained in any easement, license or lease that may have been granted by the State or any political subdivision, board, commission or agency of the State in the vicinity of the project.

7. This Certification and authorization are granted for the purposes as stated herein. Any other use without prior approval may constitute reason for this Certification being revoked.

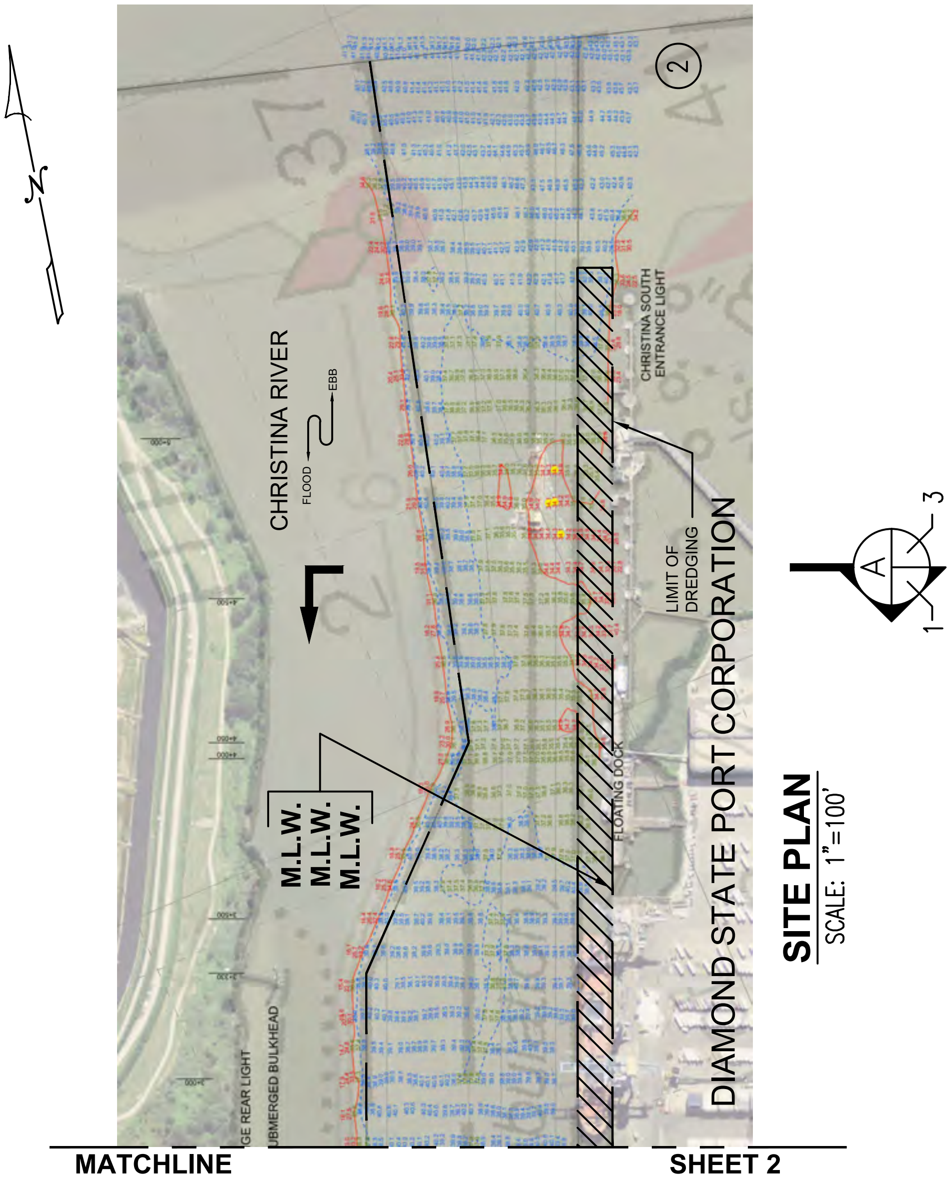
8. The permittee shall notify the Department of Natural Resources and Environmental Control within ten (10) days of the date work will be commenced, for each dredging event.

9. The permittee shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.

10. The issuance of this Certification does not constitute approval for any of the activities as may be required by any other local, state or federal governmental agency.

# SECTION 7

## PERMIT DRAWINGS, SAMPLING PLAN AND USACE DISPOSAL SITE PLANS




## ADJACENT PROPERTY OWNERS:

1. ALMA PROPERTIES LLC.
2. NONE (DELAWARE RIVER)

## AREA TO BE DREDGED

476,150 SQUARE FEET

## DREDGE QUANTITY

ESTIMATED 75,000 CUBIC YARDS
PENDING PRE-DREDGE SURVEY

## DATUM CHART:

HIGH TIDE LINE (H.T.L.)+6.42

MEAN HIGH WATER (M.H.W.)+5.21

5.21'

MEAN LOW WATER (M.L.W.) 0.0

## REFERENCE DRAWING:

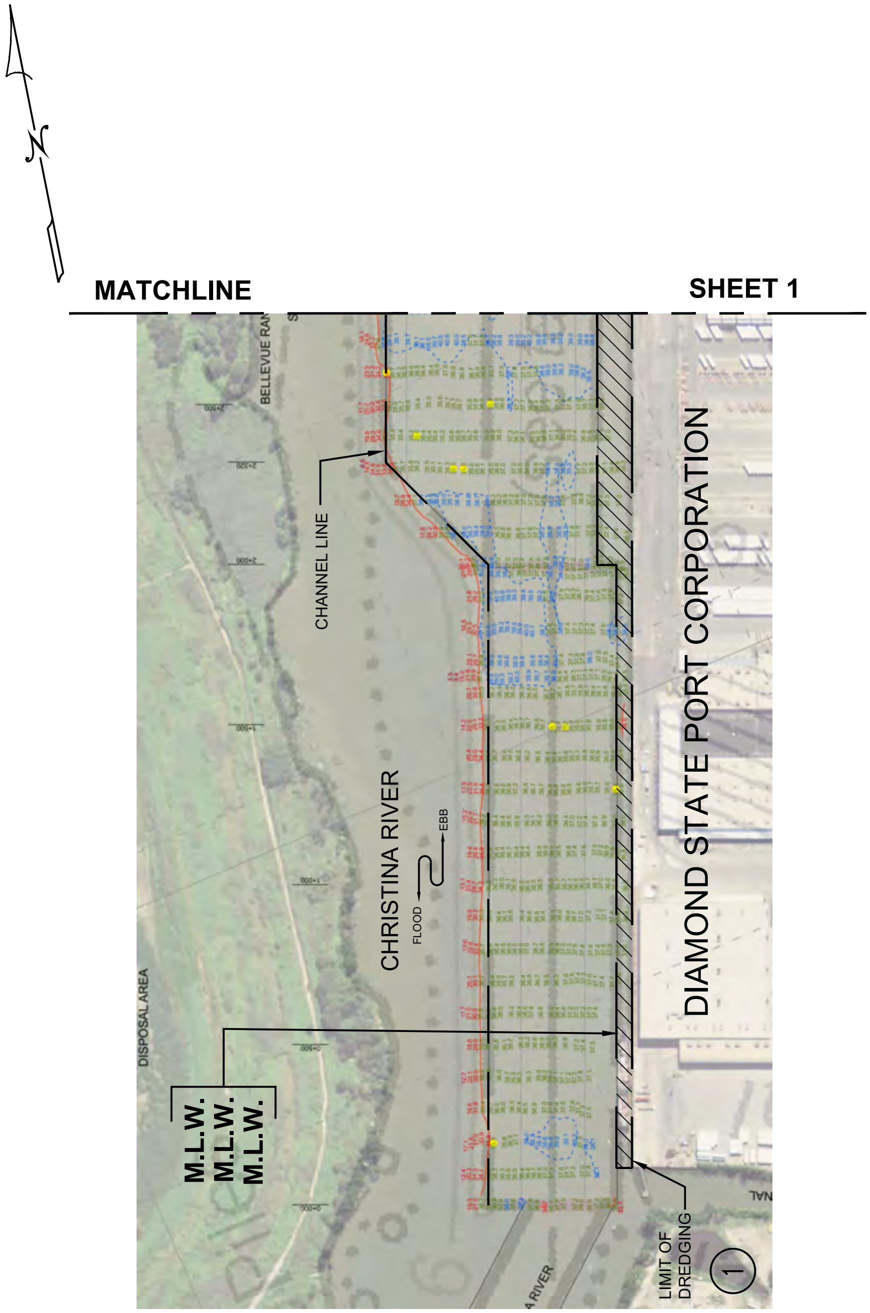
1. PLAN TITLE: " WILMINGTON HARBOR, STA 0+00 TO STA 6+236.8 EXAMINATION+
   BY: U.S. ARMY CORPS OF ENGINEERS
   FILE No.: E-WH-08

FILE No. G–2138
CONTRACT No. H–7912
DATE 9/29/2020
SHEET No. 1 of 3

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.

| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, NJ 08002
Phone 856–342–6600
Fax No. 856–342–8323




**SITE PLAN**
SCALE: 1"=100'

| | |
|---|---|
| FILE No. | G-2138 |
| CONTRACT No. | H-7912 |
| DATE | 9/29/2020 |
| SHEET No. | 2 of 3 |

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.

S.T. HUDSON ENGINEERS, INC.
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900 Dudley Avenue
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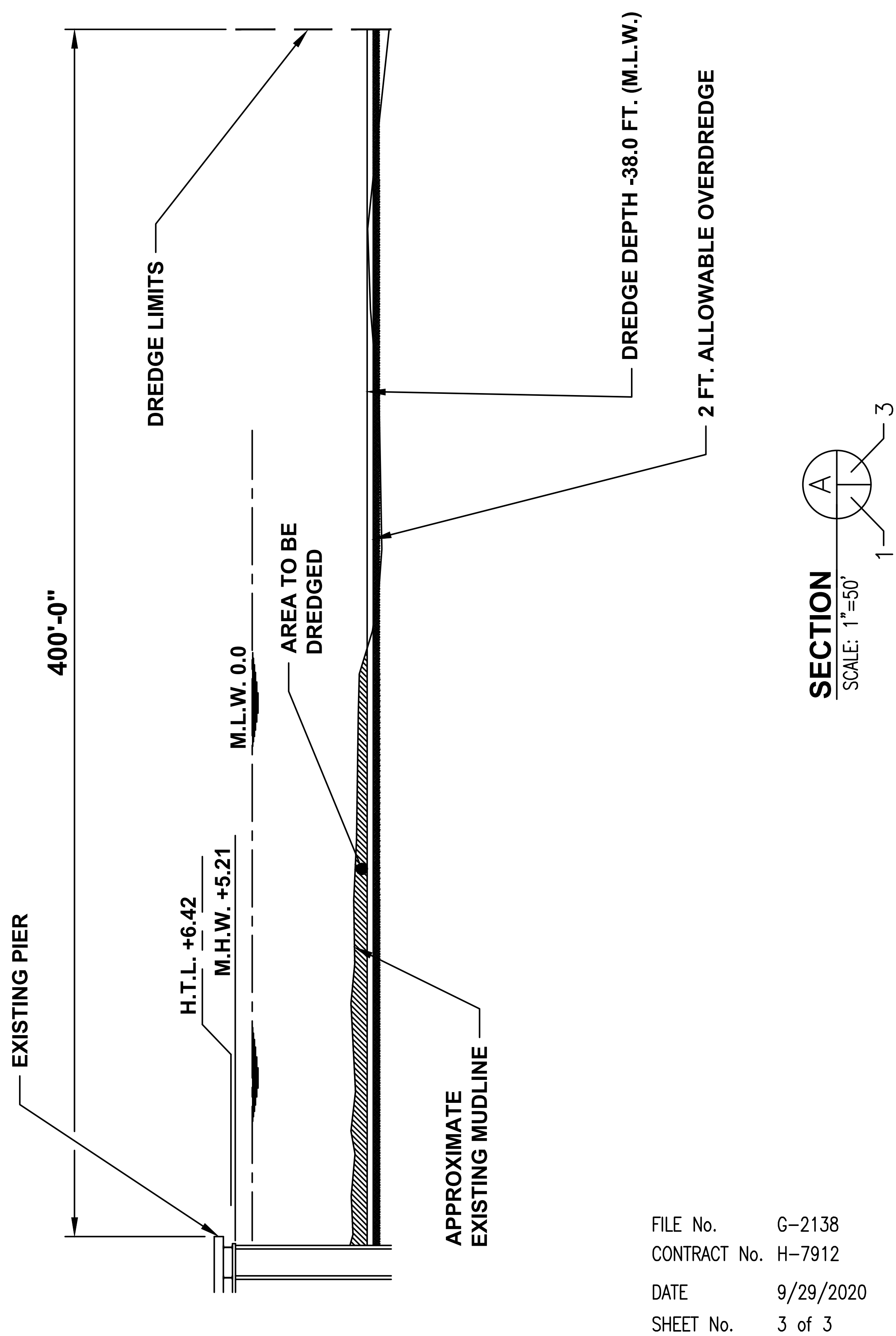
| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |




**SECTION**
SCALE: 1"=50'

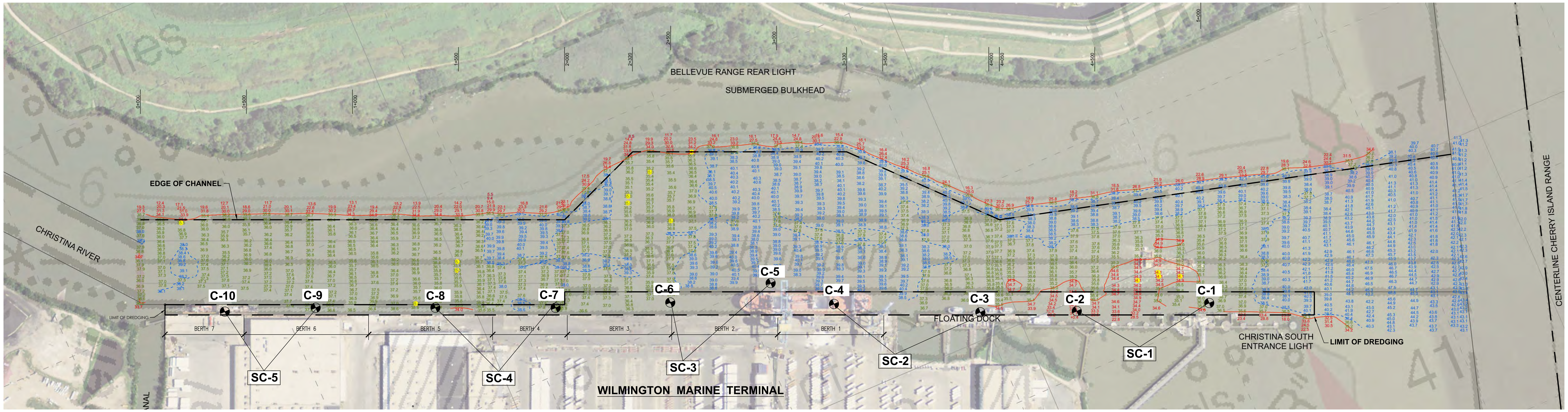
FILE No. G–2138
CONTRACT No. H–7912
DATE 9/29/2020
SHEET No. 3 of 3

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.


S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, NJ 08002
Phone 856–342–6600
Fax No. 856–342–8323


| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |

ISSUED PRINTS




## SITE PLAN

SCALE: 1" = 200'

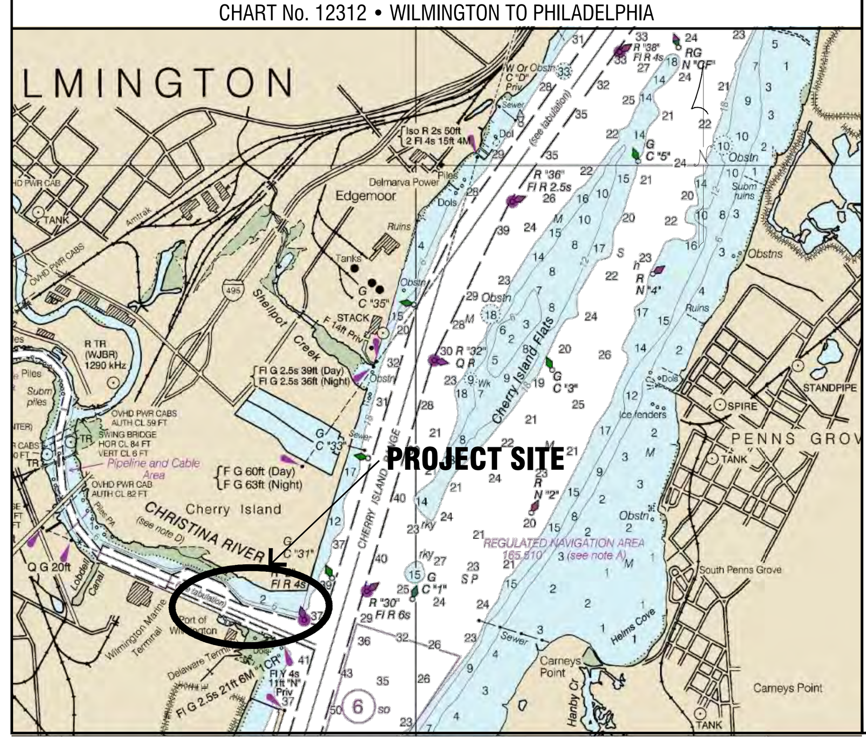
| CORE SAMPLE LOCATION CHART | | | | |
|---|---|---|---|---|
| CALCULATED LOCATIONS VIA PLAN | | | ACTUAL LOCATIONS VIA DGPS | |
| NORTHING | EASTING | I.D. | NORTHING | EASTING |
| 323058.780 | 207000.379 | C-1 | 323063.21 | 207003.37 |
| 323270118 | 206416.467 | C-2 | 323274.91 | 206414.46 |
| 323437.795 | 205989.616 | C-3 | 323449.70 | 205994.35 |
| 323748.673 | 205368.029 | C-4 | 323757.66 | 205375.99 |
| 323953.496 | 205135.731 | C-5 | 323966.31 | 205140.65 |
| 324060.093 | 204668.255 | C-6 | 324069.15 | 204669.68 |
| 324268.886 | 204120.646 | C-7 | 324295.16 | 204152.73 |
| 324523.430 | 203650.933 | C-8 | 324521.64 | 203645.56 |
| 324685.149 | 203112.368 | C-9 | 324706.93 | 203123.36 |
| 324891.785 | 202723.986 | C-10 | 324902.13 | 202728.66 |

## HYDROGRAPHIC SURVEY NOTES:

1. THIS SURVEY MEETS STANDARDS AS OUTLINED IN CORPS OF ENGINEERS' HYDROGRAPHIC SURVEY MANUAL EM1110-2-1003, DATED NOVEMBER 30, 2013 FOR NAVIGATION AND DREDGING SUPPORT SURVEYS.
2. HORIZONTAL REFERENCE-NAD 83, NEW JERSEY STATE PLANE, ZONE 2900, U.S. FOOT.
3. VERTICAL REFERENCE-MEAN LOWER LOW WATER WHICH IS 2.98' BELOW NAVD88
4. GEOID 09 AND NOAA TIDAL EPOCH: 1983-2001 WERE USED. SOUNDINGS ARE EXPRESSED IN FEET AND TENTHS AND REFER TO MEAN LOWER LOW WATER.
5. CONTOURS WERE GENERATED USING THE MINIMUM DEPTH WITHIN SEARCH RADIUS OF 18'.
6. HYPACK INC. SOFTWARE WAS USED TO PERFORM THE SOUNDING SELECTION AND CONTOUR GENERATION.
7. THIS INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
8. POSITIONS OF THE AIDS TO NAVIGATION ARE PROVIDED FOR INFORMATION ONLY, AND SHOULD NOT BE USED FOR NAVIGATION.
9. THE LIMITS OF THE FEDERAL CHANNEL DEPICT THE MOST CURRENT CHANNEL.
10. BASE MAPPING LINEWORK OR ORTHOPHOTOGRAPHY HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND DATES AND IS INTENDED TO PORTRAY GENERAL CHARACTERISTICS OF THE SHORELINE AND OTHER FEATURES TEMPORAL CHANGES MAY HAVE OCCURED SINCE THIS DATA SET WAS COLLECTED AND SOME PARTS OF THE DATA MAY NO LONGER BE AN ACCURATE REPRESENTATION OF THE SURFACE CONDITIONS.
11. HYDRO DATA AND DRAWING BACKGROUND TAKEN FROM U.S. ARMY CORPS OF ENGINEERS DRAWING NUMBER E-WH-08.

## NOAA NAUTICAL CHART LOCATION MAP

CHART No. 12312 • WILMINGTON TO PHILADELPHIA




## CORE SAMPLING NOTES:

1. FOR CORE SAMPLE LOCATIONS, SEE "ACTUAL LOCATIONS VIA DGPS" IN THE SAMPLE LOCATION CHART.

2. CORE SAMPLES WERE TAKEN ON JULY 21,2020 and JULY 29, 2020.

## DATUM CHART:

NGVD (1929 ADJUSTED) ELEV O.O

2.98'

MEAN LOWER LOW WATER (M.L.L.W.) ELEV. -2.98'

TOTAL DREDGE AREA = 476,150 Sq. Ft.

TOTAL DREDGE VOLUME = ESTIMATED 75,000 C.Y. PENDING PER-DREDGE SURVEY

| rev. | date | description | by | appr. |
|---|---|---|---|---|
| 1 | 8/10/20 | Added actual sample locations | djd | tk |

approvals

| approved by | for | date |
|---|---|---|
| | | |

seal

seal

"Drawings issued in electronic form are provided for the convenience of the recipient and are used at the sole risk of the user. Reliance may be placed only on hard copies of drawings issued by S.T. Hudson Engineers. in the event of any discrepancy, the hard copy will govern."

S. T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Ave
Cherry Hill, NJ 08002
Phone No. 856-342-6600
Fax No. 856-342-8323

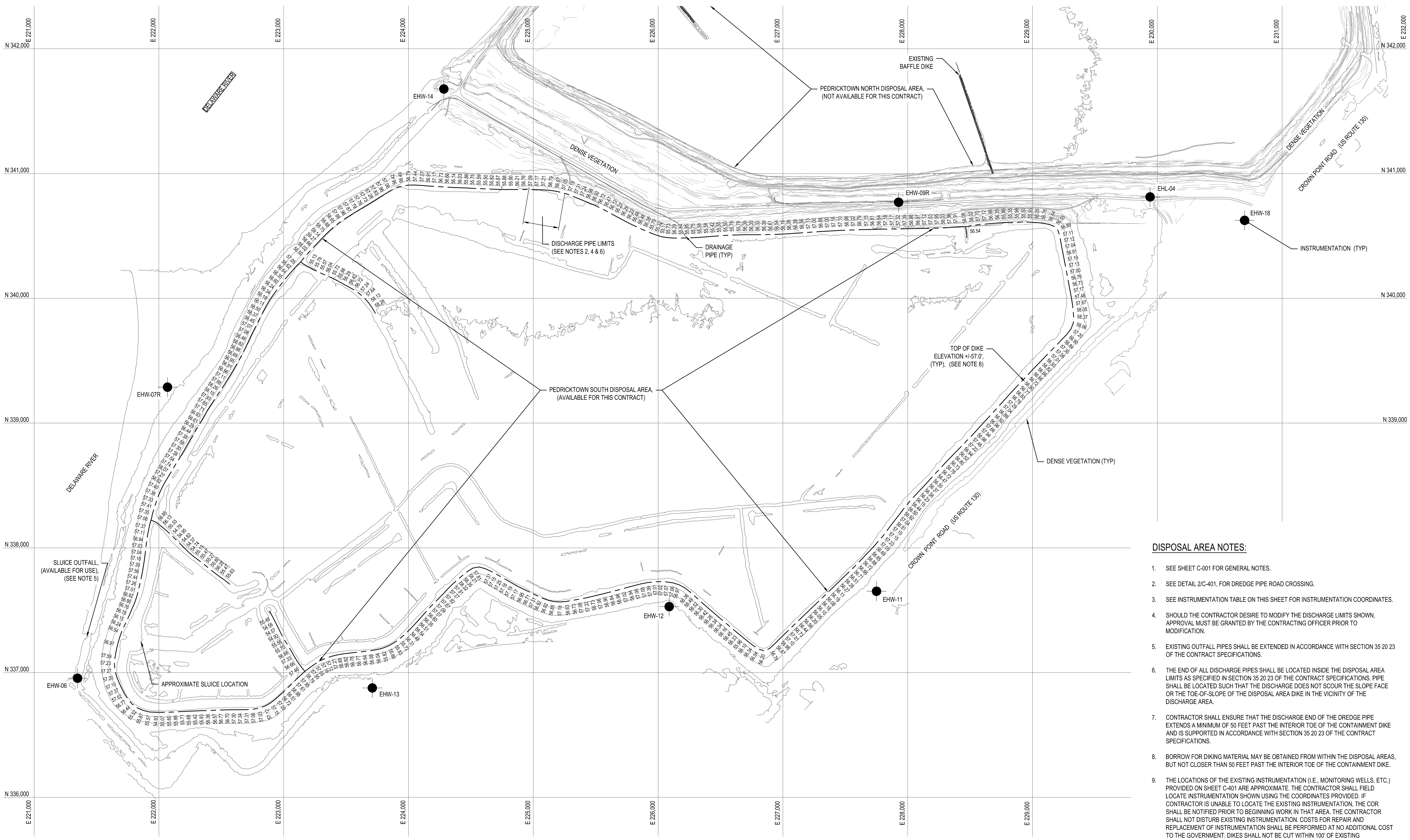
GT USA WILMINGTON, LLC.
WILMINGTON MARINE TERMINAL
WILMINGTON, DELAWARE

drawn STAFF
checked PF
drftg. approval ADS
date 04/21/20
FILE G-1172
contract H-7912

SAMPLING PLAN

dwg. no. 1

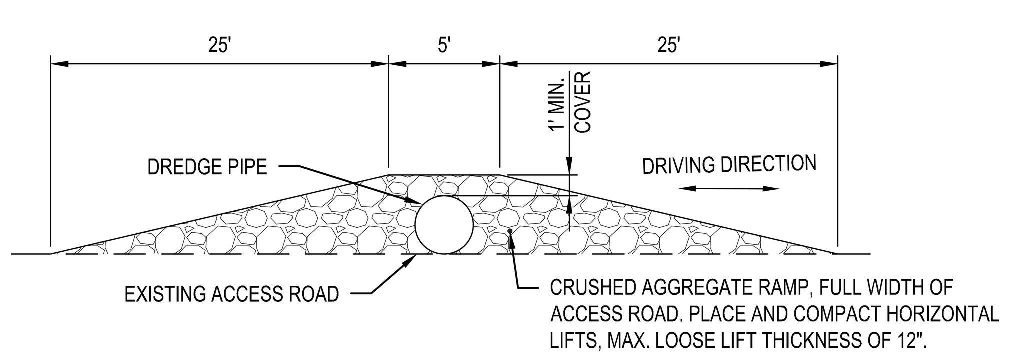
rev. 1




PLAN NORTH

## 1 PLAN - PEDRICKTOWN SOUTH DISPOSAL AREA

300' 150' 0 300'
SCALE IN FEET




## 2 DETAIL - DREDGE PIPE ROAD CROSSING
SCALE: NTS

## INSTRUMENTATION

| MONITORING WELL DESIGNATION | N.J. PLANE, NAD1983 NORTHING | EASTING |
|---|---|---|
| PEDRICKTOWN SOUTH DISPOSAL AREA | | |
| EHL-04 | 340808 | 229942 |
| EHW-06 | 336953 | 221348 |
| EHW-07R | 339284 | 222069 |
| EHW-09R | 340766 | 227926 |
| EHW-11 | 337649 | 227752 |
| EHW-12 | 337525 | 226088 |
| EHW-13 | 336872 | 223710 |
| EHW-14 | 341673 | 224284 |
| EHW-18 | 340623 | 230698 |

## DISPOSAL AREA NOTES:

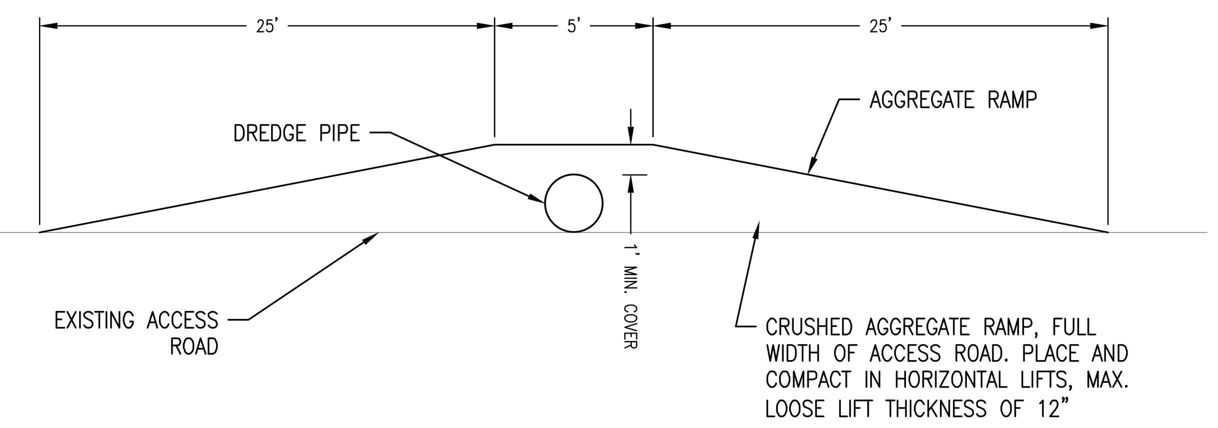
1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE DETAIL 2/C-401, FOR DREDGE PIPE ROAD CROSSING.
3. SEE INSTRUMENTATION TABLE ON THIS SHEET FOR INSTRUMENTATION COORDINATES.
4. SHOULD THE CONTRACTOR DESIRE TO MODIFY THE DISCHARGE LIMITS SHOWN, APPROVAL MUST BE GRANTED BY THE CONTRACTING OFFICER PRIOR TO MODIFICATION.
5. EXISTING OUTFALL PIPES SHALL BE EXTENDED IN ACCORDANCE WITH SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS.
6. THE END OF ALL DISCHARGE PIPES SHALL BE LOCATED INSIDE THE DISPOSAL AREA LIMITS AS SPECIFIED IN SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS. PIPE SHALL BE LOCATED SUCH THAT THE DISCHARGE DOES NOT SCOUR THE SLOPE FACE OR THE TOE-OF-SLOPE OF THE DISPOSAL AREA DIKE IN THE VICINITY OF THE DISCHARGE AREA.
7. CONTRACTOR SHALL ENSURE THAT THE DISCHARGE END OF THE DREDGE PIPE EXTENDS A MINIMUM OF 50 FEET PAST THE INTERIOR TOE OF THE CONTAINMENT DIKE AND IS SUPPORTED IN ACCORDANCE WITH SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS.
8. BORROW FOR DIKING MATERIAL MAY BE OBTAINED FROM WITHIN THE DISPOSAL AREAS, BUT NOT CLOSER THAN 50 FEET PAST THE INTERIOR TOE OF THE CONTAINMENT DIKE.
9. THE LOCATIONS OF THE EXISTING INSTRUMENTATION (I.E., MONITORING WELLS, ETC.) PROVIDED ON SHEET C-401 ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD LOCATE INSTRUMENTATION SHOWN USING THE COORDINATES PROVIDED. IF CONTRACTOR IS UNABLE TO LOCATE THE EXISTING INSTRUMENTATION, THE COR SHALL BE NOTIFIED PRIOR TO BEGINNING WORK IN THAT AREA. THE CONTRACTOR SHALL NOT DISTURB EXISTING INSTRUMENTATION. COSTS FOR REPAIR AND REPLACEMENT OF INSTRUMENTATION SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE GOVERNMENT. DIKES SHALL NOT BE CUT WITHIN 100' OF EXISTING INSTRUMENTATION.
10. ELEVATIONS SHOWN ON TOP OF DIKE ARE FROM A SURVEY PERFORMED IN NOVEMBER 2019 AND CAN ONLY BE CONSIDERED INDICATIVE OF THE CONDITIONS AT THAT TIME.
11. PEDRICKTOWN SOUTH DISPOSAL AREA IS ALSO BEING UTILIZED FOR USACE PHILADELPHIA TO SEA DREDGING PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE AND FAMILIARIZE HIM/HERSELF WITH THE CURRENT CONDITIONS THAT COULD AFFECT THE PROJECT COST.
12. CONTROL: PROVIDED BY US ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT. COORDINATES SHOWN ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (HARN) - NEW JERSEY STATE PLANE ZONE 2900. ELEVATIONS SHOWN ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).

US Army Corps of Engineers
PHILADELPHIA DISTRICT

U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT

MAINTENANCE DREDGING - WILMINGTON HARBOR CHRISTINA RIVER, DELAWARE PLAN - PEDRICKTOWN SOUTH DISPOSAL AREA

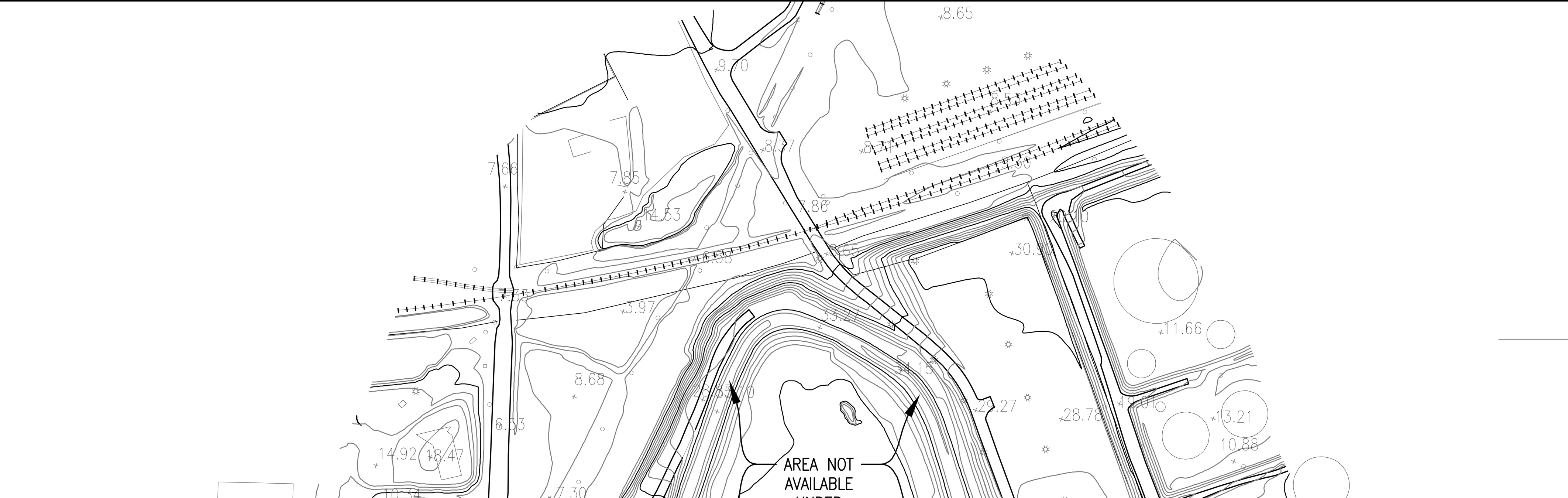
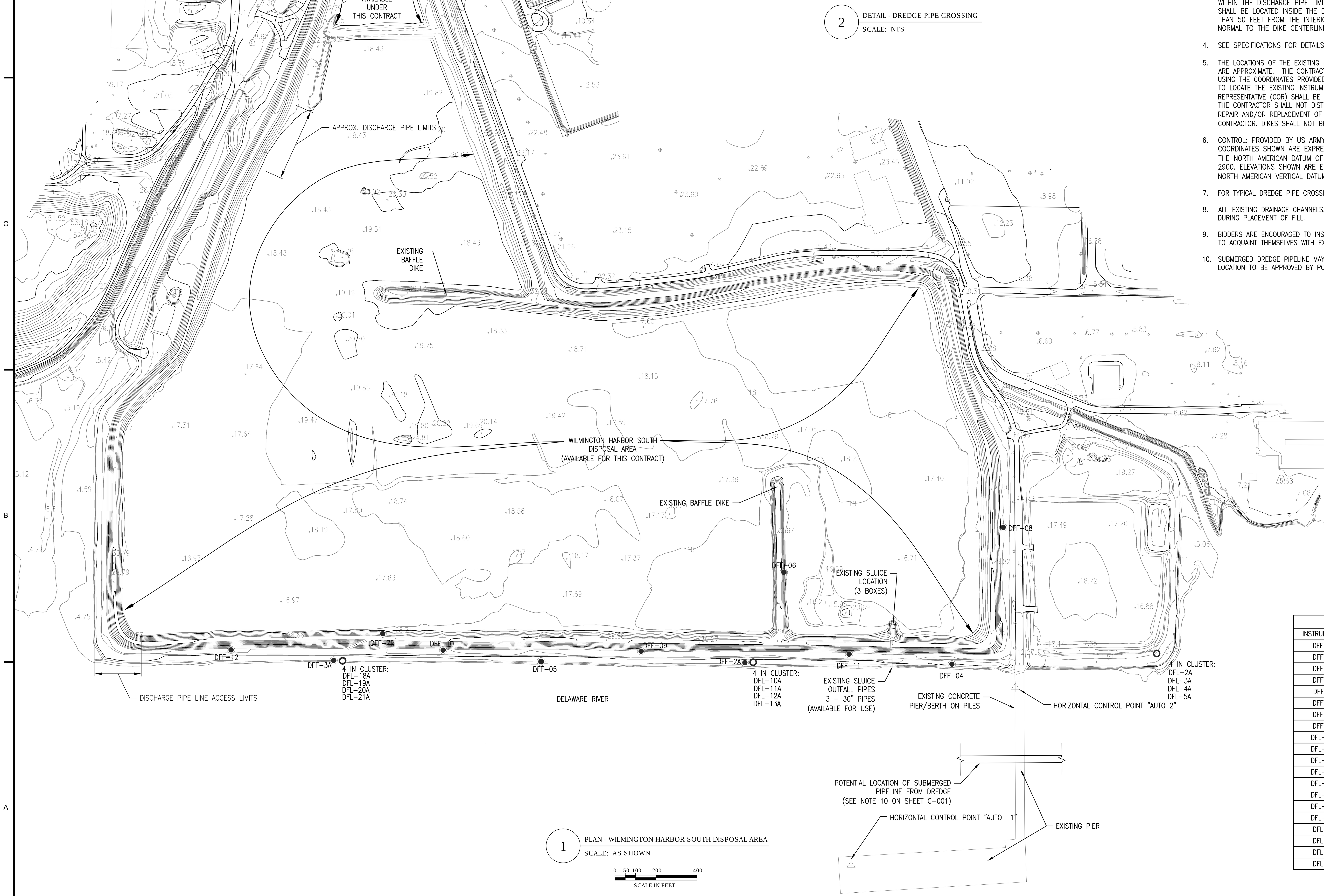
SHEET NUMBER
C-401




2 DETAIL - DREDGE PIPE CROSSING
SCALE: NTS

## DISPOSAL AREA NOTES:

1. BASE FIGURE REPRODUCED FROM AERIAL MAPPING COMPILED BY OPTIMAL GEOMATICS USING PHOTOGRAMMETRIC METHODS AND CHECKED BY TVGA CONSULTANTS, FOR AERIAL PHOTOGRAPHY FLOWN IN MAY 2007.
2. DREDGED MATERIAL PLACEMENT AND EARTHWORK ACTIVITIES HAVE OCCURRED SINCE THE PERFORMANCE OF THE MAY 2007 SURVEY. EARTHWORK ACTIVITIES HAVE INCLUDED A FULL SCALE RAISIING OF THE PERIMETER AND BAFFLE DIKES TO A CREST ELEVATION VARYING FORM APPROXIMATELY 33 TO 36 FEET (NAVD 88). DISPOSAL AREA FLOOR ELEVATION IS TYPICALLY ABOUT 26 FEET (NAVD88).
3. CONTRACTOR SHALL ENSURE THAT THE DREDGE DISCHARGE PIPE(S) IS PLACED WITHIN THE DISCHARGE PIPE LIMITS SHOWN. THE ENDS OF ALL DISCHARGE PIPES SHALL BE LOCATED INSIDE THE DISPOSAL AREA LIMITS A DISTANCE OF NOT LESS THAN 50 FEET FROM THE INTERIOR TOE OF THE CONTAINMENT DIKE MEASURED NORMAL TO THE DIKE CENTERLINE, UNLESS OTHERWISE NOTED.
4. SEE SPECIFICATIONS FOR DETAILS ON SUPPORTING DISCHARGE PIPE.
5. THE LOCATIONS OF THE EXISTING INSTRUMENTATION (I.E., INCLINOMETERS, PIEZOMETERS) ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD LOCATE INSTRUMENTATION SHOWN USING THE COORDINATES PROVIDED IN THE TABLE ABOVE. IF CONTRACTOR IS UNABLE TO LOCATE THE EXISTING INSTRUMENTATION, THE CONTRACTING OFFICER REPRESENTATIVE (COR) SHALL BE NOTIFIED PRIOR TO BEGINNING WORK IN THAT AREA. THE CONTRACTOR SHALL NOT DISTURB EXISTING INSTRUMENTATION. ANY COSTS FOR REPAIR AND/OR REPLACEMENT OF INSTRUMENTATION SHALL BE INCURRED BY THE CONTRACTOR. DIKES SHALL NOT BE CUT WITHIN 100' OF EXISTING INSTRUMENTATION.
6. CONTROL: PROVIDED BY US ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT. COORDINATES SHOWN ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (HARN) – NEW JERSEY STATE PLANE ZONE 2900. ELEVATIONS SHOWN ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
7. FOR TYPICAL DREDGE PIPE CROSSING DETAIL, SEE VIEW 2 ON SHEET C-401.
8. ALL EXISTING DRAINAGE CHANNELS, CULVERTS OR DRAIN LINES SHALL BE MAINTAINED DURING PLACEMENT OF FILL.
9. BIDDERS ARE ENCOURAGED TO INSPECT THE SITE WHERE WORK IS TO BE PERFORMED TO ACQUAINT THEMSELVES WITH EXISTING CONDITIONS THAT COULD AFFECT THEIR BID.
10. SUBMERGED DREDGE PIPELINE MAY GO UNDER EXISTING PIER AT AN APPROVED LOCATION TO BE APPROVED BY PORT OF WILMINGTON.


1 PLAN - WILMINGTON HARBOR SOUTH DISPOSAL AREA
SCALE: AS SHOWN

| INSTRUMENTATION | | |
|---|---|---|
| INSTRUMENT # | NORTHING | EASTING |
| DFF-04 | 321,161.33 | 206,288.47 |
| DFF-05 | 319,322.81 | 205,494.31 |
| DFF-09 | 319,790.65 | 205,638.43 |
| DFF-10 | 318,904.63 | 205,256.42 |
| DFF-11 | 320,718.85 | 206,047.79 |
| DFF-12 | 317,953.41 | 204,851.07 |
| DFF-2A | 320,234.89 | 205,887.10 |
| DFF-3A | 318,394.04 | 205,094.06 |
| DFL-10A | 320,272.71 | 205,901.01 |
| DFL-11A | 320,256.14 | 205,898.18 |
| DFL-12A | 320,249.80 | 205,892.94 |
| DFL-13A | 320,238.11 | 205,889.63 |
| DFL-18A | 318,433.06 | 205,112.58 |
| DFL-19A | 318,419.53 | 205,105.35 |
| DFL-20A | 318,409.15 | 205,102.60 |
| DFL-21A | 318,402.68 | 205,099.54 |
| DFL-2A | 322,112.97 | 206,616.83 |
| DFL-3A | 322,100.54 | 206,630.44 |
| DFL-4A | 322,090.82 | 206,636.81 |
| DFL-5A | 322,081.44 | 206,643.05 |

US Army Corps of Engineers
Philadelphia District

| MARK | ACTION | DATE | BY | DESCRIPTION |
|---|---|---|---|---|
| - | - | - | - | - |

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
PHILADELPHIA, PA 19107-3390
www.nap.usace.army.mil

| | | |
|---|---|---|
| DWN BY: SSP | DESIGNED BY: SSP | ISSUE/RELEASE DATE: FOR 100% 5 APR 2016 |
| CKD BY: DAN | REVIEWED BY: TEH | PROJ. NUMBER: - |
| | | SOLICITATION NUMBER: IFB W912BU-16-B-0008 |
| DWG SCALE: 1"=200' | | CONTRACT NUMBER: - |
| DWG. SIZE: 30"x42" Arch E1 | FILE NAME: C-103 PLAN WHS DISPOSAL AREA.dwg | |

WILMINGTON HARBOR
CHRISTINA RIVER, DELAWARE
MAINTENANCE DREDGING

PLAN - WILMINGTON HARBOR SOUTH DISPOSAL AREA

SHEET NUMBER
C-401

# APPENDIX A

## *WILMINGTON HARBOR DREDGING – ENVIRONMENTAL EFFECTS COMPILATION REPORT AND HISTORICAL DATABASE*

## PRODUCED BY USACE (FEBRUARY 1997)

B. Conlin

# WILMINGTON HARBOR DREDGING - ENVIRONMENTAL EFFECTS COMPILATION REPORT AND HISTORICAL DATABASE

Versar INC.

# WILMINGTON HARBOR DREDGING - ENVIRONMENTAL EFFECTS COMPILATION REPORT AND HISTORICAL DATABASE

Prepared for

U.S. Army Corps of Engineers
Philadelphia District
Philadelphia, PA 19107

Prepared by

Frederick S. Kelley
Thuzar Myint

Versar, Inc.
9200 Rumsey Road
Columbia, MD 21045

Contract No. DACW61-95-D-0011
Delivery Order No. 0029

Prepared Under the Supervision of

Principal Investigator

William H. Burton

William H. Burton

February 1997

# FOREWORD

This report, entitled, *Wilmington Harbor Dredging - Environmental Effects Compilation Report and Historical Database* was prepared by Versar, Inc. for Ms Barbara Conlin, Environmental Resources Branch, U.S. Army Corps of Engineers, Philadelphia District under Contract No. DACW61-95-D-0011; Task Order 0029.

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# 1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) is responsible for maintaining safe navigation within the port of Wilmington Harbor, Delaware. One aspect of maintaining safe navigation is the routine dredging of the harbor channel. Over the past 15 years, the USACE has conducted 18 maintenance dredging projects within the harbor. For each maintenance dredging project, the USACE was required to obtain a permit from the Delaware Department of Natural Resources and Environmental Control (DNREC). Over the years, the permits required environmental monitoring of the effects of dredging including: water quality monitoring at the dredge disposal site weir discharges and mixing zones, measurements of contaminant concentrations in sediments and elutriates from the harbor, and groundwater monitoring at wells located in the upland dredge disposal site. The USACE is currently pursuing a five year maintenance dredging permit from DNREC. As a condition to authorizing the current permit, DNREC has requested that the USACE summarize all of the results from environmental monitoring conducted during previous maintenance dredging projects, and provide an overview of the environmental effects of maintenance dredging at Wilmington Harbor.

The analytical results of water quality testing conducted during Wilmington Harbor dredging operations are summarized in approximately 300 pages of data tables and laboratory certificates. Sediments contaminant testing results have been summarized in two separate Greeley-Polhemus reports (Greeley-Polhemus Group 1993, 1994). Past monitoring programs were conducted by a number of other contractors who reported their results in a variety of formats including project specific data reports, laboratory analysis certificates, and data summary tables. A chronological history of the dredge monitoring studies is presented in Table 1-1. To date, none of monitoring results have been summarized in a comprehensive report and evaluated to determine if Wilmington Harbor maintenance dredging is having significant effects on ecological resources in the Delaware River.

To comply with DNREC's request for a summary of the results of maintenance dredge monitoring, and an overview of the environmental effects of maintenance dredging at Wilmington Harbor, the USACE contracted Versar to compile 15 years of monitoring data from 1980 to 1994. An electronic database was created that would facilitate data interpretation and statistical analysis, compare the monitoring results to existing criteria, and provide interpretation relating to the environmental effects of maintenance dredging on Wilmington Harbor.

Table 1-1. A chronological history of maintenance dredge monitoring at Wilmington Harbor from 1980 to 1994

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1980 (January-March) | - On 1/22/80, water was collected at the weir outfall, 8 sites in the mixing zone, and at a background site.<br>- On 8 sampling dates from 1/23/80 to 3/10/80, water was collected at the weir outfall, and adjacent, upstream, and downstream of the weir outfall. | - Waters collected at all sites were tested for metals and physical parameters on all dates; and PCB's on 3/10/80. |
| 1980 (October) - 1981 (February) | - Pre-dredge monitoring was conducted on 10/09/80; water was collected at 2 sites in the mixing zone, and at a background site.<br>- During-dredge monitoring was conducted on 4 sampling dates (from 12/09/80 to 2/25/81); water was collected at the weir outfall, 8 mixing zone sites, and a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates. |
| 1981 (September-December) | - Pre-dredge monitoring was conducted on 9/14/81; water was collected at 2 sites in the mixing zone, and at a background site.<br>- During-dredge monitoring was conducted on 4 sampling dates (from 10/13/81 to 12/7/81); water was collected at the weir outfall, 4 mixing zone sites, and a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates. |
| 1982 (October-December) | - Pre-, during- and post-dredge monitoring were conducted on 10/27, 11/02 and 12/15/82, respectively; water was collected at the weir, 6 sites in the mixing zone, and at a background site. (No samples were collected at the weir during post-dredge monitoring.) | - Waters collected at all sites were tested for metals and physical parameters on all dates.<br>- A composite water sample collected at the weir on 11/03/82 was measured for BOD5, COD, and flow. |
| 1983 (June) | - During-dredge monitoring was conducted on 3 sampling dates (from 6/15/83 to 6/27/83); water was collected at the weir, 6 sites in the mixing zone, and at a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates.<br>- Composite water samples collected at the weir on 2 dates were measured for BOD5, COD fecal coliforms, and flow. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1983 (December) - 1984 (February) | - During-dredge monitoring was conducted on 2 dates (12/19/83 and 1/05/84); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 12/27/83 and 1/10/84.<br><br>- Post-dredge monitoring was conducted on 2/07/84; except for the weir-outfall, water was collected as before. | - All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms. |
| 1985 (January - February) | - During-dredge monitoring was conducted on 2 dates (1/03/85 and 1/14/85); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 1/7/85 and 1/15/85.<br><br>- Post-dredge monitoring was conducted on 2/07/85; except for the weir-outfall, mixing zone water was collected as before. | - All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms and BOD. |
| 1985 (June - August) | - Elutriate monitoring was conducted on 6/19/85; 10 samples were collected in the harbor.<br><br>- During-dredge monitoring was conducted on 2 dates (6/28/85 and 7/17/85); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 6/30/85.<br><br>- Post-dredge monitoring was conducted on 8/08/85; except for the weir-outfall, mixing zone water was collected as before. | - Elutriate samples were tested for metals, PCBs, and physical parameters<br><br>- All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1986 (January - March) | - During-dredge monitoring was conducted on 2 dates (1/09/86 and 1/13/86); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 1/13/86 and 1/22/86.<br>- Post-dredge monitoring was conducted on 2/13/86; except for the weir-outfall, mixing zone water was collected as before.<br>- Groundwater well monitoring was conducted on 3/11/86; samples were collected from 6 wells. | - All water samples were tested for metals and physical parameters, and PCBs.<br>- Additional weir-outfall samples were tested for coliforms and BOD.<br>- Groundwater samples were tested for zinc, total nitrogen, TOC and pH. |
| 1986 (September) | - During-dredge monitoring was conducted on 2 dates (9/04/86 and 9/12/86); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 9/10/86. | - All water samples were tested for metals, physical parameters, and PCBs.<br>- The additional weir-outfall sample was tested for BOD. |
| 1987 (April) | - Groundwater well monitoring was conducted between 4/07/87 and 4/14/87; 11 samples were collected. | - Groundwater samples were tested for TOC, chloride, zinc, TKN and pH. |
| 1988 (October - December) | - During-dredge monitoring was conducted on 2 dates (10/24/88 and 11/07/88); water was collected at the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 11/04/88 and 11/08/88.<br>- Post-dredge monitoring was conducted 12/01/88; mixing zone water samples were collected as before, except no weir-outfall sample was taken. | - All water samples were tested for metals, physical parameters, and PCBs.<br>- Additional weir-outfall samples were tested for coliforms and BOD. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1989 (August - September) | - During-dredge monitoring was conducted on 8/15/89; water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 8/21/89.<br><br>- Post-dredge monitoring was conducted 9/12/89; mixing zone water samples were collected as before, except no weir-outfall sample was taken. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample was tested for coliforms. |
| 1990 (May - June) | - During-dredge monitoring was conducted on two dates (5/02/90 and 6/15/90); water samples were collected at 8 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 5/15/90 and 5/24/90. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample was tested for coliforms and BOD. |
| 1991 (January) | - During-dredge monitoring was conducted on two dates (1/25/91 and 1/30/91); water samples were collected at 7 sites in the mixing zone, and at a background site. Water samples from the weir-outfall were collected on 1/24/91 and 1/30/91. | - Water samples collected in the mixing zone and at the background site were tested for metal, physical parameters, and PCBs. Samples from the weir-outfall were tested for coliforms and BOD. |
| 1991 (October - December) | - During-dredge monitoring conducted on 5 dates from 11/07/91 to 12/05/91; water samples were collected from the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected almost continuously from the weir-outfall from 10/30/91 to 12/07/91. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample were tested for TSS and coliforms. |
| 1992 (July - August) | - During-dredge monitoring was conducted on two dates (7/22/92 and 7/27/92); water was collected at the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected at the weir-outfall from 7/20/92 to 8/10/92. | - Water samples of the mixing zone and background were tested for physical, metals and organic parameters; weir outfall samples were tested for TSS (63 samples), coliforms (3 samples), and once for physical, metals, and organic parameters. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1993 (March - April) | - Pre-dredge monitoring was conducted 3/10-11/93; 6 sediment and elutriate, and a background water sample were collected in the Harbor.<br><br>- During-dredge monitoring was conducted from 3/23/93 to 4/09/93; samples were collected from the weir-outfall, 4 mixing zone sites and a background site on 3 dates. Additional water samples were collected from the weir-outfall on 3 dates.<br><br>- Post-dredge monitoring was conducted on 4/16/93; mixing zone water samples were collected as above excluding the weir-outfall sample. | - Sediment and elutriate samples were tested for metals, organics, and PCBs.<br><br>- Water samples collected from the weir-outfall were tested for metals, organics, and PCBs. Mixing zone and background samples were tested for metals and organics. Additional weir-outfall samples were tested for TSS. |
| 1993 (December) - 1994 (April) | - Pre-dredge monitoring was conducted on 12/22/93; 2 water samples at one site, and 2 composite sediment samples at 2 sites were collected in the mixing zone.<br><br>- During-dredge monitoring was conducted on three dates; 2 water samples were collected in the mixing zone on 1/13/94, and 24-hr composite samples collected at weir outfall on 1/04/94 and 2/25/94. Additional water samples were collected every three days at weir-outfall.<br><br>- Post-dredge monitoring was conducted on two dates; water samples were collected from the weir-outfall and the two mixing zone sites on 4/15/94, and at the weir-outfall on 5/20/94. | - All water and sediment samples were tested for metals, PCBs, PAHs, and physical parameters. Additional during-dredge weir-outfall samples were tested for TSS. |

# 2.0 METHODS

## 2.1 DATABASE DEVELOPMENT

All of the monitoring data from 1980 to 1994 were entered into a Lotus spreadsheet from hard copy format. Each data entry included common identifiers including project name, study year, date, station identification, contractor name, and comments on specific values. Separate database files were created for water quality, groundwater, and sediment contaminant monitoring. Concentrations of each parameter monitored were adjusted to a common unit of measure (in water, mg/L for metals and miscellaneous parameters, and $\mu$g/L for organics and pesticides; in sediment for the parameters groups, mg/kg and $\mu$g/kg, respectively). Database quality control was administered by comparing data entries with the original tables or analysis certificates, checking parameter reporting units, and use of a computer program to check for out-of-range parameters and other data anomalies (e.g., missing data or invalid station names). Finally, the Lotus database spreadsheets were converted to SAS (SAS Institute 1990) data sets for data manipulation, statistical analysis, and final storage.

## 2.2 DATA ANALYSIS

### 2.2.1 Criteria Comparison

The concentrations and measurements of parameters analyzed for water quality, sediment and elutriate contaminants, and groundwater well-monitoring were compared with current federal and state regulatory criteria (Tables 2-1 and 2-2). Water quality and elutriate parameter concentrations were compared to EPA's marine chronic criteria, or acute chronic criteria in absence of the former value (Wilmington Harbor is at the transition zone between freshwater and salt water). Sediment contaminant concentrations were compared to Long et al's (1995) effects range-low (ER-L), or effects range-median (ER-M) guidance values for sediment quality in the absence of state guidelines. A few sediment parameters had neither effects range criteria and were compared to the EPA's (1988) overall apparent effects threshold (OAET) or threshold effects levels (TEL). Groundwater well-monitoring parameter concentrations were compared to National Secondary Drinking Water Regulations (CFR 40 1996).

### 2.2.2 Effects of Dredging on Water Quality

Of the four dredge monitoring components, groundwater, sediment, elutriate and weir-outfall water quality, only the latter was conducted frequently enough to permit meaningful statistical comparisons. Data from sediment and elutriate, and groundwater monitoring were collected during only 2 and 3 of the 18 maintenance dredge projects. Additionally, data for

| Table 2-2. Cont'd | | |
|---|---|---|
| **Parameter** | **Criteria** | |
| | **Water (µg/L)** | **Sediments (µg/kg)** |
| Chlorobenzene | 129 | |
| Chrysene | | 384 |
| Dibenzo(a,h)anthracene | | 63.4 |
| Ethylbenzene | 430 | |
| Fluoranthene | 16 | 600 |
| Fluorene | | 19 |
| Hexachlorobutadiene | 32 | |
| Hexachlorocyclopentadiene | 7 | |
| Hexachloroethane | 940 | |
| Isophorone | 12900 | |
| Naphthalene | 2350 | 160 |
| Nitrobenzene | 6680 | |
| Pentachlorophenol | 7.9 | |
| Phenanthrene | 4.6 | 240 |
| Phenol | 5800 | |
| Pyrene | | 865 |
| Tetrachloroethene | 450 | |
| Toluene | 5000 | |
| Trichloroethene | 2000 | |
| **Pesticides** | | |
| 2,4'-DDD | 3.6 | 1.22 |
| 2,4'-DDE | 14 | 2.2 |
| 2,4'-DDT | 0.001 | 1.58 |
| 4,4'-DDD | 3.6 | 1.22 |
| 4,4'-DDE | 14 | 2.2 |

| Table 2-2. Cont'd | | |
|---|---|---|
| Parameter | Criteria | |
| | Water ($\mu$g/L) | Sediments ($\mu$g/kg) |
| 4,4'-DDT | 0.001 | 1.58 |
| A-BHC | 0.34 | |
| Aldrin | 1.3 | |
| B-BHC | 0.34 | |
| Chlordane | 0.004 | 2 |
| Cis-chlordane | 0.004 | |
| D-BHC | 0.34 | |
| Dieldrin | 0.0019 | 0.715 |
| Endosulfan I | 0.0087 | |
| Endosulfan II | 0.0087 | |
| Endrin | 0.0023 | |
| G-BHC | 0.34 | |
| Heptachlor | 0.0036 | |
| Heptachlor epoxide | 0.0036 | |
| Mirex | 0.001 | |
| Toxaphene | 0.0002 | |
| Trans-chlordane | 0.004 | |

many of the parameters lacked variation as many concentrations were below test detection limits. Low data variability was especially true for the organic and pesticide parameters.

Statistical comparisons among water quality parameters were limited to the during-dredge phase of dredge monitoring projects. Most of the data for dredge projects were collected repeatedly through the during-dredge phase, and only once, if at all, for pre- and post-dredge monitoring. In addition, low data variability due to a high incidence of concentrations below test detection limits restricted the application of statistical comparisons. For a total of 19 water quality parameters, analysis of variance (ANOVA) tests were made to determine differences between weir-outfall sites, mixing zone sites, and background sites. Duncan's Multiple Range Test was conducted to determine statistical differences between site variables (Sokal and Rohlf 1981). Parameter measurements were treated independently for all sites; parameter means for each site category were calculated by averaging all of the concentrations measured over the 15 years of monitoring. Concentrations less than test detection limits were given the value of the detection limit for each calculation.

Water quality of the mixing zone was monitored by collecting samples within the weir turbidity plume. Fixed sites for sample collection were established within the plume at different distances from the outfall. The number of samples collected in the mixing zone on each monitoring date varied according to maintenance dredge project. In addition, different project sampling schemes often used site numbers to identify sampling locations, but did not consistently assign the same site number to a location relative to the weir-outfall. Collection site locations varied according to tide cycle, as they were always collected on the down current. These combined factors made it impossible to categorize mixing zone stations by distance from the weir-outfall with confidence, consequently, all data from samples collected within the mixing zone were pooled.

# 3.0 RESULTS

Over 100 parameters were measured for each of the monitoring components (e.g., water quality, and sediment and elutriate contaminants). This section addresses the monitoring components in order, and divides the list of parameters into general groups that include: metals, inorganic non-metals, and physical parameters; PCBs and organics; and pesticides. Only a few parameters were measured during groundwater well-monitoring of the upland disposal site, and are presented collectively.

## 3.1 WATER QUALITY MONITORING

### 3.1.1 Criteria Comparison

A total of 164 water quality parameters were monitored during maintenance dredging of Wilmington Harbor over the past 15 years (Table 3-1, 3-2, and 3-4). The parameters comprised several general groupings and included physical, metals, inorganic non-metals, and organics such as polychlorinated biphenyls (PCBs) and pesticides. The frequency of measurement among all parameters ranged from 428 for Zinc to a single measurement for two of the organics. Initially, the frequencies of measure and criteria exceedence were calculated for each parameter among all measurements disregarding the dredge phase in which it was collected and the station location. For parameters that chronically exceeded criteria discussion is included relative to the station type and dredge phase for which the exceedences occurred.

#### 3.1.1.1 Metals, Physical, and Miscellaneous Parameters

Thirty-seven water quality parameters comprising metals, inorganic non-metals, nutrient measures, physical measures, and bacteria counts were analyzed during maintenance dredge monitoring at Wilmington Harbor (Table 3-1). Among these parameters, 37 had listed criteria concentrations or measures. A comparison of the criteria with water quality monitoring data identified 7 parameters that had concentrations exceeding or not in compliance with their respective criteria. These included cadmium, chromium, lead, nickel, zinc, dissolved oxygen, and pH (criteria given as a range from 6.5 to 8.5).

Cadmium concentrations were measured 127 times over the 15 years of water quality monitoring (Table 3-1). Approximately 20% (25 samples) of the concentrations measured at all sites exceeded the criterion for cadmium of less than 0.009 mg/L. However, 23 of the exceeding concentrations at 0.010 mg/L were only slightly greater than the criterion. The maximum concentration of cadmium (0.025 mg/L) was measured in a sample collected from the weir-outfall in February 1980.

Table 3-1. Frequencies of water quality parameter measurement for metals, inorganic non-metals, nutrients, physical measures, and bacteria counts monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Aluminum | 109 | 0 | NL | | | |
| Antimony | 8 | 8 | 0.5 | 0 | 0 | 0.0 |
| Arsenic | 38 | 13 | 0.036 | 0 | 0 | 0.0 |
| Beryllium | 28 | 26 | NL | | | |
| Cadmium | 127 | 44 | 0.0093 | 1 | 25 | 19.7 |
| Chloride | 3 | 0 | NL | | | |
| Chromium | 147 | 84 | 0.05 | 0 | 2 | 1.4 |
| Copper | 147 | 53 | 2.9 | 0 | 0 | 0.0 |
| Lead | 147 | 47 | 0.0085 | 40 | 78 | 53.1 |
| Mercury | 281 | 261 | 0.025 | 0 | 0 | 0.0 |
| Nickel | 38 | 28 | 0.0083 | 28 | 8 | 21.1 |
| Selenium | 18 | 18 | 0.071 | 0 | 0 | 0.0 |
| Silver | 18 | 18 | 0.0092 | 16 | 0 | 0.0 |
| Thallium | 8 | 8 | 2.13 | 0 | 0 | 0.0 |
| Zinc | 428 | 46 | 0.086 | 0 | 144 | 33.6 |
| Cyanide | 6 | 6 | 0.001 | 6 | 0 | 0.0 |
| Dissolved Oxygen | 394 | 2 | <5 | 0 | 29 | 7.4 |
| BOD | 414 | 192 | NL | | | |
| COD | 159 | 7 | NL | | | |
| Ammonia | 3 | 0 | 0 | | | |
| Nitrate | 61 | 1 | 0 | | | |
| Nitrite | 3 | 0 | NL | | | |
| Nitrate + Nitrite | 24 | 0 | 10 | 0 | 0 | 0.0 |
| Total Nitrogen | 327 | 0 | NL | | | |
| Total Kjeldahl Nitrogen | 152 | 0 | NL | | | |
| Total Phosphate | 128 | 29 | NL | | | |

Table 3-1. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Hardness | 10 | 0 | NL | | | |
| Oil & Grease | 19 | 16 | NL | | | |
| pH | 404 | 0 | 6.5-8.5 | 0 | 7* | 1.7 |
| Settleable Solids | 19 | 8 | NL | | | |
| Temperature (°C) | 394 | 1 | NL | | | |
| Total Organic Carbon | 407 | 0 | NL | | | |
| Total Petroleum Hydrocarbons | 10 | 10 | NL | | | |
| Total Suspended Solids | 925 | 3 | NL | | | |
| Turbidity (ntu) | 396 | 0 | NL | | | |
| Fecal Coliform (#/100 ml) | 56 | 0 | NL | | | |
| Total Coliform (#/100 ml) | 49 | 1 | NL | | | |

* - pH always below the criteria range
NL - Not listed

Chromium concentrations were measured 147 times over the 15 years of water quality monitoring (Table 3-1). Less than 2% (2 samples) of the concentrations measured at all sites exceeded the criterion for chromium of less than 0.05 mg/L. However, the frequency of chromium concentrations exceeding the criterion may be less. The water quality criterion used in the comparison was based on the EPA chronic saltwater criterion for hexavalent chromium which represents only a fraction of total chromium. Applying this criterion to total chromium concentrations may have resulted in an overestimate of the number of exceeding concentrations. The exceeding chromium concentrations, approximately 2 and 11 times greater than the criterion, were measured in samples collected from the weir-outfall during February 1980.

Lead concentrations were measured 147 times over the 15 years of water quality monitoring (Table 3-1). Greater than 50% (78 samples) of the concentrations measured at all sites exceeded the criterion of less than 0.009 mg/L. The frequency of concentrations exceeding the criterion was probably underestimated. Among all samples analyzed for lead, 47 had concentrations less than test detection limits, and were not counted as exceeding the criterion. However, among these samples, 43 had test detection limits that exceeded the criterion. The distribution pattern of exceeding lead concentrations was not clearly defined. Leading concentrations above criteria were observed during all phases of dredge monitoring (pre, during, and post), and at all station types including the background station. However, the greatest concentrations of lead were measured in samples collected from the during-dredge phase of water quality monitoring.

Nickel concentrations were measured 38 times over the 15 years of water quality monitoring (Table 3-1). Approximately 20% (8 samples) of the concentrations measured among all sites exceeded the criterion for nickel of less than 0.008 mg/L. The frequency of exceeding concentrations was probably underestimated. Among all samples analyzed for nickel, 28 had concentrations less than the test detection limits. However, the test detection limit for all of these samples was greater than the criterion. All but one of the exceeding concentrations were observed in samples collected from the weir-outfall, and all but one of these was collected in the during-dredge phase of water quality monitoring. The maximum concentration of nickel (0.0320 mg/L) observed during maintenance dredge monitoring was 4 times greater than the criterion.

Zinc concentrations were measured 428 times over the 15 years of water quality monitoring (Table 3-1). Approximately 30% (144 samples) of the concentrations measured among all sites exceeded the criterion for zinc of less than 0.086 mg/L. Exceeding concentrations of zinc were observed at all station types. The weir-outfall had the greatest number of exceedences at 93, and the greatest concentration of zinc observed during monitoring at 21.0 mg/L. The mixing zone had 34 exceeding concentrations, while the background had 17.

Dissolved oxygen (DO) concentrations were measured 394 times during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-1). Less than 10% (29 measures) of the concentrations measured among all sites were below the minimum criteria for DO of 5.0 mg/L. Low DO concentrations were observed at all of the site types. Most of the low DO concentrations (17) were observed at the mixing zone sites; low concentrations at the weir-outfall and background sites numbered 9 and 2, respectively. However, based on the percentage of DO concentrations measured below criteria, the weir-outfall was greatest (25%) followed by the mixing zone (5%) and background (4%). The concentrations of DO below criteria were different between the weir-outfall and the mixing zone-background sites. All but one of the weir-outfall DO concentrations were below 2 mg/L, while all of the mixing zone and background concentrations were greater than 4 mg/L.

Measurements of pH were collected 404 times during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-1). Less than 2% (7 measures) were outside of the criteria range for pH of 6.5 to 8.5. All but one of the noncompliant measures were too acidic and fell below the criteria range. Six of the measurements were observed at mixing zone sites, and the seventh was from the background. The lowest measurement of pH (2.89) and the only measurement exceeding the criteria range (8.55) were both recorded from mixing zone stations on the same monitoring date.

Nine other parameters were compared to water quality criteria, and had no exceeding measures during the 15 years of monitoring at Wilmington Harbor (Table 3-1). Of these, silver and cyanide had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In both cases, the test detection limits exceeded criteria concentrations. Twenty-one water quality parameters were measured that had no criteria.

#### 3.1.1.2 PCBs and Organics

A total of 98 PCB and organic parameters were monitored during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-2). Among these parameters, 32 had listed criteria concentrations. A comparison of the criteria with water quality monitoring data identified only PCBs as the only parameter that had concentrations exceeding criteria.

PCB concentrations were measured 247 times over the 15 years of water quality monitoring (Table 3-2). Fourteen percent (35 samples) of the concentrations measured among all sites exceeded the water quality criterion for PCBs of less than 0.03 $\mu$g/L. The number of concentrations exceeding the criterion was probably underestimated. Among all 247 samples, 212 had concentrations less than test detection limits and were regarded as not exceeding the criterion. However, among the 212 samples, 201 had test detection limits that were greater than the criterion. All of the site types had concentrations of PCBs that exceeded the criterion. The weir-outfall and background had the least number of exceeding concentrations at 4 and 5, respectively, while the mixing zone had 26. The greatest concentration (2.70

Table 3-2. Frequencies of water quality parameter measurement for PCBs and organics monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (μg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| PCB's | 247 | 212 | 0.03 | 201 | 35 | 14.2 |
| 1-Methylnaphthalene | 10 | 10 | NL | | | |
| 1-Methylphenanthrene | 10 | 10 | NL | | | |
| 1,1-Dichloroethane | 4 | 4 | NL | | | |
| 1,1-Dichloroethene | 4 | 4 | NL | | | |
| 1,1,1-Trichloroethane | 4 | 4 | 31200 | 0 | 0 | 0.0 |
| 1,1,2-Trichloroethane | 4 | 4 | NL | | | |
| 1,1,2,2-Tetrachloroethane | 4 | 4 | 9020 | 0 | 0 | 0.0 |
| 1,2-Dichlorobenzene | 4 | 4 | NL | | | |
| 1,2-Dichloroethane | 3 | 3 | 113000 | 0 | 0 | 0.0 |
| 1,2-Dichloroethene | 4 | 4 | NL | | | |
| 1,2-Dichloropropane | 4 | 4 | 3040 | 0 | 0 | 0.0 |
| 1,2-Diphenyl Hydrazine | 4 | 4 | NL | | | |
| 1,2,4-Trichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 1,3-Dichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 1,4 & 1,2-Dichlorobenzene | 3 | 3 | 129 | 0 | 0 | 0.0 |
| 1,4-Dichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 2-Chloroethylvinylether | 1 | 1 | NL | | | |
| 2-Chloronaphthalene | 4 | 4 | 7.5 | 4 | 0 | 0.0 |
| 2-Chlorophenol | 4 | 4 | 29700 | 0 | 0 | 0.0 |
| 2-Methylnaphthalene | 10 | 10 | NL | | | |
| 2-Nitrophenol | 4 | 4 | 4850 | 0 | 0 | 0.0 |
| 2,3,5-Trimethyl-naphthalene | 10 | 10 | NL | | | |
| 2,4-Dichlorophenol | 4 | 4 | NL | | | |
| 2,4-Dimethylphenol | 4 | 4 | NL | | | |
| 2,4-Dinitrophenol | 4 | 4 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (µg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| 2,4-Dinitrotoluene | 4 | 4 | NL | | | |
| 2,4,6-Trichlorophenol | 4 | 4 | NL | | | |
| 2,6-Dimethylnaphthalene | 10 | 10 | NL | | | |
| 2,6-Dinitrotoluene | 4 | 4 | NL | | | |
| 3,3'-Dichlorobenzidine | 4 | 4 | NL | | | |
| 4-Bromophenyl-phenylether | 4 | 4 | NL | | | |
| 4-Chlorophenyl-phenylether | 4 | 4 | NL | | | |
| 4-Nitrophenol | 4 | 4 | 4850 | 0 | 0 | 0.0 |
| 4,6-Dinitro-2-methylphenol | 4 | 4 | NL | | | |
| 4,-Chloro-3-methylphenol | 4 | 4 | NL | | | |
| Acenaphthene | 14 | 14 | 710 | 0 | 0 | 0.0 |
| Acenaphthylene | 14 | 14 | NL | | | |
| Acrolein | 4 | 4 | 55 | 0 | 0 | 0.0 |
| Acrylonitrile | 4 | 4 | NL | | | |
| Anthracene | 14 | 14 | NL | | | |
| Benzene | 4 | 4 | 700 | 0 | 0 | 0.0 |
| Benzidine | 4 | 4 | NL | | | |
| Benzo(a)anthracene | 14 | 14 | NL | | | |
| Benzo(a)pyrene | 34 | 34 | NL | | | |
| Benzo(b)fluoranthene | 14 | 14 | NL | | | |
| Benzo(e)pyrene | 10 | 10 | NL | | | |
| Benzo(g,h,i)perylene | 14 | 14 | NL | | | |
| Benzo(k)fluoranthene | 14 | 14 | NL | | | |
| Biphenyl | 10 | 10 | NL | | | |
| Bis(2-chloroethoxy)methane | 4 | 4 | NL | | | |
| Bis(2-chloroethyl)ether | 4 | 4 | NL | | | |
| Bis(2-chloroisopropyl)ether | 4 | 4 | NL | | | |
| Bis(2-ethylhexyl)phthalate | 24 | 24 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (µg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Bromodichloromethane | 4 | 4 | NL | | | |
| Bromoform | 4 | 4 | NL | | | |
| Bromomethane | 4 | 4 | NL | | | |
| Butlybenzylphthalate | 4 | 4 | NL | | | |
| Carbon Tetrachloride | 4 | 4 | 50000 | 0 | 0 | 0.0 |
| Chlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| Chloroethane | 4 | 4 | NL | | | |
| Chloroform | 24 | 24 | NL | | | |
| Chloromethane | 4 | 4 | NL | | | |
| Chrysene | 14 | 14 | NL | | | |
| Cis-1,3-Dichloropropene | 4 | 4 | NL | | | |
| Cis,trans,1,2-Dichloroethene | 1 | 1 | NL | | | |
| Dibenzo(a,h)anthracene | 14 | 14 | NL | | | |
| Dibromochloromethane | 4 | 4 | NL | | | |
| Diethylphthalate | 4 | 4 | NL | | | |
| Dimethylphthalate | 4 | 4 | NL | | | |
| Di-n-butylphthalate | 4 | 4 | NL | | | |
| Di-n-octylphthalate | 4 | 4 | NL | | | |
| Ethylbenzene | 4 | 4 | 430 | 0 | 0 | 0.0 |
| Fluoranthene | 34 | 34 | 16 | 0 | 0 | 0.0 |
| Fluorene | 14 | 14 | NL | | | |
| Hexachlorobenzene | 4 | 4 | NL | | | |
| Hexachlorobutadiene | 4 | 4 | 32 | 0 | 0 | 0.0 |
| Hexachlorocyclopentadiene | 4 | 4 | 7 | 4 | 0 | 0.0 |
| Hexachloroethane | 4 | 4 | 940 | 0 | 0 | 0.0 |
| Indeno(1,2,3-c,d)pyrene | 14 | 14 | NL | | | |
| Isophorone | 4 | 4 | 12900 | 0 | 0 | 0.0 |
| Methylene Chloride | 4 | 4 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (µg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Naphthalene | 14 | 14 | 2350 | 0 | 0 | 0.0 |
| Nitrobenzene | 4 | 4 | 6680 | 0 | 0 | 0.0 |
| N-nitrosodimethylamine | 4 | 4 | NL | | | |
| N-nitroso-Di-n-propylamine | 4 | 4 | NL | | | |
| N-nitrosodiphenylamine | 4 | 4 | NL | | | |
| Pentachlorophenol | 4 | 4 | 7.9 | 4 | 0 | 0.0 |
| Perylene | 10 | 10 | NL | | | |
| Phenanthrene | 14 | 14 | 4.6 | 14 | 0 | 0.0 |
| Phenol | 53 | 36 | 5800 | 0 | 0 | 0.0 |
| Pyrene | 14 | 14 | NL | | | |
| Tetrachloroethene | 24 | 24 | 450 | 0 | 0 | 0.0 |
| Toluene | 4 | 4 | 5000 | 0 | 0 | 0.0 |
| Trans-1,3-Dichloropropene | 4 | 4 | NL | | | |
| Trichloroethene | 4 | 4 | 2000 | 0 | 0 | 0.0 |
| Trichlorofluoromethane | 3 | 3 | NL | | | |
| Vinyl Chloride | 4 | 4 | NL | | | |

NL - Not listed

$\mu$g/L) among all PCB measurements was observed at a mixing zone site during January 1985, and was 90 times greater than the criterion.

For several of the dredge water quality monitoring projects, PCBs were measured with different units of precision. In 1980 and 1993, PCBs were measured by industrial groups (Aroclors 1254, 1260, 1242, 1248, and 1221). All of the concentrations during both of these years were below test detection limits. In 1994, concentrations of total PCBs were measured in units of $\mu$g/L (parts per billion), and that of PCB specific congeners, in units of ng/L (parts per trillion) and pg/L (parts per quadrillion). At the total PCB level, no PCBs were detected in any of samples analyzed, however, at the specific congener level, several species were detected (Table 3-3). Predredge water quality monitoring resulted in the detection of one congener in harbor water; during-dredge monitoring resulted in 4 detections at the weir-outfall and 1 in the mixing zone; and post-dredge monitoring resulted in two detections at both weir-outfall and mixing zones. The sample with the greatest PCB concentration calculated by summing all congeners detected (475 pg/L at the weir-outfall, 25 February) was more than 60 times less than the criterion for PCBs. No regulatory criteria are published for specific PCB congeners.

Table 3-3. PCB congeners (pg/L) measured during Wilmington Harbor water quality monitoring in 1994

| PCB Congeners | Pre | | During | | Post | |
|---|---|---|---|---|---|---|
| Weir-outfall | | | | | | |
| 77 Tetra | Not sampled | | 319 | 368 | 41.1 | 118 |
| 81 Tetra | | | 11.1 | ND | ND | ND |
| 126 Penta | | | 52.9 | 58 | 5.6 | ND |
| 169 Hexa | | | ND | 47.4 | ND | ND |
| Mixing Zone | | | | | | |
| | Station 1 | Station 1 | Station 1 | Station 2 | Station 1 | Station 2 |
| 77 Tetra | 51.2 | 31 | 31 | 64.2 | 31.2 | 28.7 |
| 126 Penta | ND | ND | ND | ND | 4.9 | 4.6 |

Thirty-one other organic parameters were compared to water quality criteria, and none had exceeding concentrations during the 15 years of monitoring at Wilmington Harbor (Table 3-2). Among these, the organics, 2-chloronaphthalene, hexachlorocyclopentadiene, pentachlorophenol, and phenanthrene had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In both cases, the test detection limits exceeded criteria concentrations.

Sixty-six organic parameters of water quality that were measured had no criteria. All of the concentrations measured for these parameters were less than their respective test detection limits.

#### 3.1.1.3 Pesticides

A total of 29 pesticide parameters were monitored during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-4). Among these parameters, 22 had listed criteria concentrations. A comparison of the criteria with water quality monitoring data found no parameters with concentrations exceeding a criterion. However, among the parameters with criteria, 13 had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In all cases, the test detection limits exceeded criteria concentrations.

Seven pesticide parameters of water quality that were measured had no criteria (Table 3-4). All of the concentrations measured for these parameters were less than their respective test detection limits with one exception. Oxychlordane was detected in a sample collected from the weir-outfall in the during-dredge phase in 1994.

### 3.1.2 Effects of Dredging on Water Quality

Analysis of variance (ANOVA) was used to compare water quality of the weir-outfall, mixing zone, and background site for 19 of the water quality parameters (Table 3-5). These 19 parameters were the only ones that had enough data variability to apply a statistically meaningful comparison. The water quality comparison was restricted to data collected in the during-dredge phase of maintenance dredge monitoring.

Significant differences between monitoring sites were observed for 14 of the 19 parameters compared by ANOVA. In all 14 instances, the water quality of the weir-outfall was different from the mixing zone and background site, and that between the mixing zone and the background site was not different. Among the metals, aluminum in the weir-outfall was 5 times greater than the mixing zone and background sites. Weir concentration of arsenic was at least twice mixing zone and background levels while chromium was three times as great. Lead concentration in the weir were approximately three times higher than mixing zone and background and zinc was at least 8 times higher. No significant differences between sites were observed for cadmium or copper. Among nutrient parameters, both total nitrogen and TKN in the weir-outfall were almost 10 times greater than in the mixing zone and background sites. Total phosphorus was also greater in the weir-outfall but only by a factor of 2. The differences between sites were greatest for turbidity and total suspended solids;

Table 3-4. Frequencies of water quality parameter measurement for pesticides monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (μg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| 2,4'-DDD | 10 | 10 | 3.6 | 0 | 0 | 0.0 |
| 2,4'-DDE | 10 | 10 | 14 | 0 | 0 | 0.0 |
| 2,4'-DDT | 10 | 10 | 0.001 | 10 | 0 | 0.0 |
| 4,4'-DDD | 13 | 13 | 3.6 | 0 | 0 | 0.0 |
| 4,4'-DDE | 13 | 13 | 14 | 0 | 0 | 0.0 |
| 4,4'-DDT | 13 | 13 | 0.001 | 13 | 0 | 0.0 |
| A-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Aldrin | 13 | 13 | 1.3 | 0 | 0 | 0.0 |
| B-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Chlordane | 7 | 3 | 0.004 | 3 | 4 | 57.1 |
| Cis-chlordane | 10 | 10 | 0.004 | 10 | 0 | 0.0 |
| Cis-nonachlor | 10 | 10 | NL | | | |
| D-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Dicofol | 10 | 10 | NL | | | |
| Dieldrin | 13 | 13 | 0.0019 | 13 | 0 | 0.0 |
| Endosulfan I | 13 | 13 | 0.0087 | 13 | 0 | 0.0 |
| Endosulfan II | 13 | 13 | 0.0087 | 13 | 0 | 0.0 |
| Endosulfan sulfate | 13 | 13 | NL | | | |
| Endrin | 13 | 13 | 0.0023 | 13 | 0 | 0.0 |
| Endrin aldehyde | 13 | 13 | NL | | | |
| G-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Heptachlor | 13 | 13 | 0.0036 | 13 | 0 | 0.0 |
| Heptachlor epoxide | 13 | 13 | 0.0036 | 13 | 0 | 0.0 |
| Hexychlorobenzene | 10 | 10 | NL | | | |
| Mirex | 10 | 10 | 0.001 | 10 | 0 | 0.0 |
| Oxychlordane | 10 | 9 | NL | | | |

Table 3-4. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (μg/L) | # of Detection Limits > Criteria | # of Observation >Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Toxaphene | 17 | 17 | 0.0002 | 17 | 0 | 0.0 |
| Trans-chlordane | 10 | 10 | 0.004 | 10 | 0 | 0.0 |
| Trans-nonachlor | 10 | 10 | NL | | | |

NL - Not listed

Table 3-5. ANOVA comparison of means for water quality parameters monitored in the during-dredge phase of maintenance dredging at Wilmington Harbor from 1980 to 1994. (Means with the same letter are not significantly different; a is significantly greater than b; total sample size is indicated in parentheses.)

| Parameter | Weir-Outfall | Mixing Zone | Background |
|---|---|---|---|
| BOD (mg/L) | 31.6[a] (54) | 3.2[b] (266) | 3.7[b] (38) |
| COD (mg/L) | 142[a] (21) | 38[b] (92) | 39[b] (11) |
| pH | 7.2[a] (35) | 7.2[a] (269) | 7.2[a] (38) |
| Dissolved Oxygen (mg/L) | 7.4[b] (33) | 8.8[a] (267) | 8.4[a] (38) |
| Fecal Coliform (# of colonies) | 1913[a] (41) | 316[a] (12) | 200[a] (2) |
| Total Coliform (# of colonies) | 14657[a] (34) | 1758[a] (12) | 3250[a] (2) |
| TOC (mg/L) | 63.8[a] (38) | 5.6[b] (269) | 4.8[b] (38) |
| Total Phosphate (mg/L) | 0.53[a] (20) | 0.21[b] (86) | 0.18[b] (10) |
| Total Suspended Solids (mg/L) | 1430[a] (557) | 71[b] (268) | 64[b] (38) |
| Turbidity (NTUs) | 3065[a] (36) | 42[b] (266) | 31[b] (38) |
| TKN (mg/L) | 18.1[a] (11) | 2.0[b] (105) | 1.6[b] (16) |
| Total Nitrogen (mg/L) | 38.1[(a)] (27) | 4.0[b] (225) | 3.5[b] (31) |
| Aluminum (mg/L) | 12.7[(a)] (15) | 2.2[b] (74) | 2.3[B] (8) |
| Arsenic (mg/L) | 0.0105[a] (9) | 0.0040[b] (15) | 0.0023[b] (3) |

| Table 3-5. Cont'd | | | |
|---|---|---|---|
| **Parameter** | **Weir-Outfall** | **Mixing Zone** | **Background** |
| Cadmium (mg/L) | 0.0053[a] (24) | 0.0039[a] (77) | 0.0038[a] (8) |
| Chromium (mg/L) | 0.0474[a] (24) | 0.0147[b] (89) | 0.0149[b] (11) |
| Copper (mg/L) | 0.0522[a] (24) | 0.0283[a] (89) | 0.0315[a] (11) |
| Lead (mg/L) | 0.0889[a] (24) | 0.0301[b] (89) | 0.0215[b] (11) |
| Zinc (mg/L) | 1.34[a] (40) | 0.07[b] (280) | 0.16[b] (41) |

the former was greater in the weir-outfall by and factor of 70, and the latter was greater by a factor of 30. Concentrations of BOD, COD and TOC were greater in the weir-outfall by factors of 10, 4, and 12, respectively. Dissolved oxygen in the weir-outfall, although only 12% less than the mixing zone and background site, was still significantly lower. No differences were observed between sites for pH or the coliform parameters.

## 3.2 SEDIMENT AND ELUTRIATE TESTING

### 3.2.1 Sediments

Sediment contaminant testing was conducted twice during the 15 years of maintenance dredging at Wilmington Harbor. In total, the concentrations of 141 parameters were analyzed in sediments collected from Wilmington Harbor prior to dredging (Tables 3-6 3-7, and 3-8). Only 33 of the sediment contaminant parameters had listed sediment quality criteria. Three parameters had at least one concentration that exceeded the criterion for all of the sediment testing data (mercury, silver and phenanthrene).

Mercury was measured 8 times in sediments and exceeded the criterion of 0.15 mg/kg for only one sediment sample. This sample was collected during pre-dredge monitoring in December 1993 and exceeded the criterion by a factor of two.

Silver concentrations in sediments were also measured 8 times and exceeded the criterion of 1.0 mg/kg twice. Both exceeding concentrations were measured during pre-dredge in December 1993 and were 3 and 4 times over the criterion.

Lastly, phenanthrene concentrations, measured 8 times, exceeded the criterion of 240 $\mu$g/kg twice during pre-dredge monitoring conducted during March 1993 (Table 3-7). The exceeding concentrations were 2 to 2.5 times greater than the criterion. The number of exceeding phenanthrene concentrations may have been greater than 2; two concentrations, also measured in March 1993, were less than a test detection limit that was greater than the criterion.

Among the 33 sediment parameters with criteria, 17 had concentrations that may have exceeded their respective criteria. In all instances, result concentrations were less than detection limits that were in turn greater than parameter criteria. Also among the 33 parameters, 13 had concentrations that were unambiguously less than their respective criteria. These parameters included antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc, total PCBs, benzo(a)pyrene, chrysene, flouranthene, and pyrene.

A total of 108 sediment contaminant parameters had no listed sediment quality criteria. Of these parameters, 100 had resulting concentrations that were always less than their

Table 3-6. Frequencies of sediment and elutriate parameters measurement for metals, inorganic non-metals, nutrient parameters and physical measures monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment (mg/kg, where applicable) | | | | | Elutriate (mg/L, where applicable) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > criteria | # of Detection Limits > Criteria |
| Aluminum | NM | | | | | 3 | 1 | NL | | |
| Antimony | 6 | 6 | 25 | 0 | 0 | 7 | 7 | 0.5 | 0 | 0 |
| Arsenic | 8 | 0 | 8.2 | 0 | 0 | 7 | 6 | 0.036 | 0 | 6 |
| Beryllium | 6 | 0 | NL | | | 7 | 5 | NL | | |
| Cadmium | 8 | 6 | 1.2 | 0 | 0 | 10 | 10 | 0.0093 | 0 | 9 |
| Chromium | 8 | 0 | 81 | 0 | 0 | 10 | 9 | 0.05 | 0 | 0 |
| Copper | 8 | 0 | 34 | 0 | 0 | 10 | 7 | 2.9 | 0 | 0 |
| Lead | 8 | 0 | 48.7 | 0 | 0 | 10 | 8 | 0.0085 | 1 | 8 |
| Mercury | 8 | 6 | 0.15 | 1 | 0 | 21 | 21 | 0.025 | 0 | 0 |
| Nickel | 8 | 0 | 20.9 | 0 | 0 | 7 | 7 | 0.0083 | 0 | 7 |
| Selenium | 8 | 3 | NL | | | 7 | 7 | 0.071 | 0 | 6 |
| Silver | 8 | 6 | 1.0 | 2 | 0 | 7 | 7 | 0.0009 | 0 | 7 |
| Thallium | 6 | 6 | NL | | | 7 | 7 | 2.13 | 0 | 0 |
| Zinc | 8 | 0 | 150 | 0 | 0 | 21 | 5 | 0.086 | 3 | 0 |
| Cyanide | 6 | 0 | NL | | | 7 | 7 | 0.001 | 0 | 7 |
| BOD | NM | | | | | 14 | 9 | NL | | |
| COD | NM | | | | | 3 | 0 | NL | | |
| Total Nitrogen | NM | | | | | 11 | 0 | NL | | |
| Total Kjeldahl Nitrogen | NM | | | | | 3 | 0 | NL | | |

| Table 3-6. Cont'd | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Sediment (mg/kg, where applicable) | | | | | Elutriate (mg/L, where applicable) | | | | |
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Total Phosphate | NM | | | | | 3 | 1 | NL | | |
| Oil & Grease | NM | | | | | 3 | 3 | NL | | |
| pH | NM | | | | | 14 | 0 | 6.5-8.5 | 0 | 0 |
| Total Organic Carbon | 2 | 0 | NL | | | 14 | 0 | NL | | |
| Total Petroleum Hydrocarbons | 2 | 0 | NL | | | NM | | | | |

Table 3-7. Frequencies of sediment and elutriate parameters measurement for organics monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment ($\mu$g/kg) | | | | | Elutriate ($\mu$g/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > criteria | # of Detection Limits > Criteria |
| PCBs | 8 | 6 | 0.0227 | 0 | 0 | 21 | 21 | 0.03 | 0 | 11 |
| 1-Methylnaphthalene | 2 | 2 | 70 | 0 | 2 | NM | | | | |
| 1-Methylphenanthrene | 2 | 2 | NL | | | NM | | | | |
| 1,1-Dichloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,1-Dichloroethene | 7 | 7 | NL | | | 7 | 7 | NL | | |
| 1,1,1-Trichloroethane | 6 | 6 | NL | | | 7 | 7 | 31200 | 0 | 0 |
| 1,1,2-Trichloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,1,2,2-Tetrachloroethane | 6 | 6 | NL | | | 7 | 7 | 9020 | 0 | 0 |
| 1,2-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,2-Dichloroethane | 6 | 6 | NL | | | 7 | 7 | 113000 | 0 | 0 |
| 1,2-Dichloroethene | 7 | 7 | NL | | | 7 | 7 | NL | | |
| 1,2-Dichloropropane | 6 | 6 | NL | | | 7 | 7 | 3040 | 0 | 0 |
| 1,2-Diphenyl Hydrazine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,2,4-Trichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,3-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,4 & 1,2-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,4-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 2-Chloronaphthalene | 6 | 6 | NL | | | 7 | 7 | 7.5 | 0 | 7 |
| 2-Chlorophenol | 6 | 6 | NL | | | 7 | 7 | 29700 | 0 | 0 |
| 2-Methylnaphthalene | 2 | 2 | 70 | 0 | 2 | NM | | | | |

Table 3-7. Cont'd

| Parameter | Sediment (µg/kg) | | | | | Elutriate (µg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| 2-Nitrophenol | 6 | 6 | NL | | | 7 | 7 | 4850 | 0 | 0 |
| 2,3,5-Trimethyl-naphthalene | 2 | 2 | NL | | | NM | | | | |
| 2,4-Dichlorophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dimethylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dinitrophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dinitrotoluene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4,6-Trichlorophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,6-Dimethylnaphthalene | 2 | 2 | NL | | | NM | | | | |
| 2,6-Dinitrotoluene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 3,3'-Dichlorobenzidine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Bromophenyl-phenylether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Chlorophenyl-phenylether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Nitrophenol | 6 | 6 | NL | | | 7 | 7 | 4850 | 0 | 0 |
| 4,6-Dinitro-2-methylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4,-Chloro-3-methylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Acenaphthene | 8 | 8 | 16 | 0 | 8 | 7 | 7 | 710 | 0 | 0 |
| Acenaphthylene | 8 | 8 | 44 | 0 | 8 | 7 | 7 | NL | | |
| Acrolein | 6 | 6 | NL | | | 7 | 7 | 55 | 0 | 0 |
| Acrylonitrile | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Anthracene | 8 | 8 | 85.3 | 0 | 8 | 7 | 7 | NL | | |
| Benzene | 6 | 6 | NL | | | 7 | 7 | 700 | 0 | 0 |

Table 3-7. Cont'd

| Parameter | Sediment (µg/kg) | | | | | Elutriate (µg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Benzidine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Benzo(a)anthracene | 8 | 8 | 261 | 0 | 8 | 7 | 7 | NL | | |
| Benzo(a)pyrene | 8 | 8 | 430 | 0 | 0 | 7 | 7 | NL | | |
| Benzo(b)fluoranthene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Benzo(e)pyrene | 2 | 2 | NL | | | NM | | | | |
| Benzo(g,h,i)perylene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Benzo(k)fluoranthene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Biphenyl | 2 | 2 | NL | | | NM | | NL | | |
| Bis(2-chloroethoxy)methane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-chloroethyl)ether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-chloroisopropyl)ether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-ethylhexyl)phthalate | 6 | 3 | NL | | | 7 | 7 | NL | | |
| Bromodichloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bromoform | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bromomethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Butlybenzylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Carbon Tetrachloride | 6 | 6 | NL | | | 7 | 7 | 50000 | 0 | 0 |
| Chlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| Chloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Chloroform | 6 | 6 | NL | | | 7 | 5 | NL | | |
| Chloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-7. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Chrysene | 8 | 8 | 384 | 0 | 0 | 7 | 7 | NL | | |
| Cis-1,3-Dichloropropene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Dibenzo(a,h)anthracene | 8 | 8 | 63.4 | 0 | 8 | 7 | 7 | NL | | |
| Dibromochloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Diethylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Dimethylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Di-n-butylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Di-n-octylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Ethylbenzene | 6 | 6 | NL | | | 7 | 7 | 430 | 0 | 0 |
| Fluoranthene | 8 | 8 | 600 | 0 | 0 | 7 | 7 | 16 | 0 | 0 |
| Fluorene | 8 | 8 | 19 | 0 | 8 | 7 | 7 | NL | | |
| Hexachlorobenzene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Hexachlorobutadiene | 6 | 6 | NL | | | 7 | 7 | 32 | 0 | 0 |
| Hexachlorocyclopentadiene | 6 | 6 | NL | | | 7 | 7 | 7 | 0 | 7 |
| Hexachloroethane | 6 | 6 | NL | | | 7 | 7 | 940 | 0 | 0 |
| Indeno(1,2,3-c,d)pyrene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Isophorone | 6 | 6 | NL | | | 7 | 7 | 12900 | 0 | 0 |
| Methylene Chloride | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Naphthalene | 8 | 8 | 160 | 0 | 8 | 7 | 7 | 2350 | 0 | 0 |
| Nitrobenzene | 6 | 6 | NL | | | 7 | 7 | 6680 | 0 | 0 |
| N-nitrosodimethylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-7. Cont'd

| Parameter | Sediment (µg/kg) | | | | | Elutriate (µg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| N-nitroso-Di-n-propylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| N-nitrosodiphenylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Pentachlorophenol | 6 | 6 | NL | | | 7 | 7 | 7.9 | 0 | 7 |
| Perylene | 2 | 2 | NL | | | NM | | | | |
| Phenanthrene | 8 | 6 | 240 | 2 | 2 | 7 | 7 | 4.6 | 0 | 7 |
| Phenol | 6 | 0 | NL | | | 7 | 1 | 5800 | 0 | 0 |
| Pyrene | 8 | 8 | 865 | 0 | 0 | 7 | 7 | NL | | |
| Tetrachloroethene | 6 | 6 | NL | | | 7 | 7 | 450 | 0 | 0 |
| Toluene | 6 | 6 | NL | | | 7 | 7 | 5000 | 0 | 0 |
| Trans-1,3-Dichloropropene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Trichloroethene | 6 | 6 | NL | | | 7 | 7 | 2000 | 0 | 0 |
| Trichlorofluoromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Vinyl Chloride | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-8. Frequencies of sediment and elutriate parameters measurement for pesticides monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment ($\mu$g/kg) | | | | | Elutriate ($\mu$g/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| 2,4'-DDD | 2 | 2 | 1.22 | 0 | 2 | NM | | | | |
| 2,4'-DDE | 2 | 2 | 2.2 | 0 | 2 | NM | | | | |
| 2,4'-DDT | 2 | 2 | 1.58 | 0 | 2 | NM | | | | |
| 4,4'-DDD | 8 | 8 | 1.22 | 0 | 8 | 7 | 7 | 3.6 | 0 | 0 |
| 4,4'-DDE | 8 | 8 | 2.2 | 0 | 8 | 7 | 7 | 14 | 0 | 0 |
| 4,4'-DDT | 8 | 8 | 1.58 | 0 | 8 | 7 | 7 | 0.001 | 0 | 7 |
| A-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Aldrin | 8 | 8 | NL | | | 7 | 7 | 1.3 | 0 | 0 |
| B-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Chlordane | 6 | 6 | 2 | 0 | 6 | 7 | 7 | 0.004 | 0 | 7 |
| Cis-chlordane | 2 | 2 | NL | | | NM | | | | |
| Cis-nonachlor | 2 | 2 | NL | | | NM | | | | |
| D-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Dicofol | 2 | 2 | NL | | | NM | | | | |
| Dieldrin | 8 | 8 | 0.715 | 0 | 8 | 7 | 7 | 0.0019 | 0 | 7 |
| Endosulfan I | 8 | 8 | NL | | | 7 | 7 | 0.0087 | 0 | 7 |
| Endosulfan II | 8 | 8 | NL | | | 7 | 7 | 0.0087 | 0 | 7 |
| Endosulfan sulfate | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Endrin | 8 | 8 | NL | | | 7 | 7 | 0.0023 | 0 | 7 |
| Endrin aldehyde | 8 | 8 | NL | | | 7 | 7 | NL | | |

Table 3-8. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| G-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Heptachlor | 8 | 8 | NL | | | 7 | 7 | 0.0036 | 0 | 7 |
| Heptachlor epoxide | 8 | 8 | NL | | | 7 | 7 | 0.0036 | 0 | 7 |
| Hexychlorobenzene | 2 | 2 | NL | | | NM | | | | |
| Mirex | 2 | 2 | NL | | | NM | | | | |
| Oxychlordane | 2 | 1 | NL | | | NM | | | | |
| Toxaphene | 8 | 8 | NL | | | 7 | 7 | 0.0002 | 0 | 7 |
| Trans-chlordane | 2 | 2 | NL | | | NM | | | | |
| Trans-nonachlor | 2 | 2 | NL | | | NM | | | | |

NL - Not listed
NM - Not measured

respective test detection limits. The remaining 8 parameters with at least one concentration measured above test detection limits included cyanide, total organic carbon, total petroleum hydrocarbons, beryllium, selenium, bis(2-ethylhexyl)phthalate, phenol, and oxychlordane.

### 3.2.2 Elutriate Testing

Elutriate testing was conducted three times during the 15 years of maintenance dredging at Wilmington Harbor. In total, the concentrations of 129 elutriate parameters were analyzed from samples collected in Wilmington Harbor prior to dredging (Tables 3-6, 3-7, and 3-8). Of these, 61 parameters had listed water quality criteria. In a comparison with criteria, only 2 parameters had at least one concentration that exceeded it's criterion for all of the elutriate monitoring data (lead and zinc).

Lead was measured in 10 elutriate samples and exceeded the water quality criterion of 0.0085 mg/L only once (Table 3-6). The elutriate sample, collected during pre-dredge monitoring in December 1979, exceeded the criterion by a factor of 27. The number of lead concentrations exceeding the criterion may have been greater; 8 of the remaining concentrations were less than detection limits that were in turn greater than the criterion. The only elutriate concentration that was measured less than the criteria was from the background sample collected during March 1993.

Zinc was measured in 21 elutriate samples and exceeded the criterion of 0.086 mg/L only 3 times (Table 3-6). All of the exceeding concentrations were approximately 33% higher than the criterion. One of the elutriate samples was collected in March 1979; the remaining two were collected in June 1995.

Nineteen parameters had concentrations that may have exceeded their respective criteria, but were indeterminate because of high test detection limits. In most instances, concentrations were less than detection limits that were in turn greater than parameter criteria. Among the 61 parameters compared to water quality criteria, 41 had concentrations that were unambiguously less than their respective criteria. These parameters included pH, antimony, chromium, copper, mercury, thallium and 36 parameters comprised of organics and pesticides (Tables 3-6, 3-7, and 3-8).

A total of 67 elutriate parameters had no listed water quality criteria. Of these parameters, 58 had resulting concentrations that were always less than their respective test detection limits. The remaining 9 parameters with at least one concentration measured above test detection limits included BOD, COD, TKN, total nitrogen, TOC, total phosphate, aluminum, beryllium, and chloroform (Table 3-6).

### 3.2.3 PCBs in Sediment Elutriates

PCBs were monitored in elutriates during two of the 15 years of maintenance dredging at Wilmington Harbor (Table 3-7). In June 1985, total PCB concentrations among 11 samples analyzed were all less than test detection limits (2 mg/L), however, the detection limits were at least 6000 times greater than the criterion of 0.00003 mg/L. In 1993, PCB concentrations were measured by industrial groups (Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260) for 7 elutriate samples. Again, all of the resulting concentrations were less than test detection limits for each industrial group, however, all of the industrial group detection limits (0.5-1.0 $\mu$g/L) were greater than the parameter criterion by a factor greater than 10.

## 3.3 GROUNDWATER MONITORING

Groundwater well-monitoring was conducted twice during the 15 years of maintenance-dredging environmental effects monitoring. Six parameters were analyzed for groundwater well-monitoring (Table 3-9). Of these, only three had EPA National Interim Secondary Drinking Water Maximum Contaminant Levels (MCL). Chloride had the highest percentage of exceedence (55%), but was only monitored once. The average chloride concentration was slightly below the MCL. Measurements of pH were in compliance with the MCL except for two measures in 1987 that were below the range. Zinc was measured during both monitoring years and was always at least three times below the MCL.

Table 3-9. Groundwater parameters monitored for Wilmington Harbor environmental effects of maintenance dredging. (samples collected 11-12 March 1986 and 7-14 April 1987)

| Parameter | EPA MCL | N | Exceed | AVG |
|---|---|---|---|---|
| Chloride (mg/L) | 250 mg/L | 11 | 6 | 236 |
| pH | 6.5-8.5 | 23 | 2 | 6.8 |
| Zinc (mg/L) | 5 mg/L | 23 | 0 | 0.09 |
| Total Organic Carbon (mg/L) | NL | 23 | - | 74 |
| Total Nitrogen (mg/L) | NL | 12 | - | 58.7 |
| TKN (mg/L) | NL | 11 | - | 17.6 |

# 4.0 SUMMARY AND CONCLUSIONS

Environmental monitoring associated with maintenance dredging projects has been conducted at Wilmington Harbor during the past 15 years. Monitoring has focused primarily on water quality of the weir-outfall and mixing zone. A few of the monitoring studies investigated sediment and elutriate contaminant concentrations, and groundwater quality at the upland dredge disposal site. Parameters monitored among studies included metals, inorganic non-metals, nutrients, physical measures, PCBs, organics and pesticides.

All of the data collected during the dredge monitoring was compiled into an electronic database. The database facilitated parameter comparisons with federal or state criteria, and provided means for making statistical comparisons between sites monitored for water quality. These data are now available electronically and are attached to this report.

The number of parameters that exceeded water quality standards was relatively low over the 15 years of monitoring. Of the 164 water quality parameters measured during maintenance dredge monitoring, only 8 had concentrations that were not compliant with water quality criteria. Most of the exceeding parameters were metals including cadmium, chromium, lead, nickel, and zinc. Concentrations of dissolved oxygen were low at times for all sites, but were lowest in the weir-outfall. Noncompliant measurements of pH were usually below the criteria range. PCB monitoring suggested that concentrations exceeding criteria occur at a relatively low frequency, however, the frequency was confounded by many concentrations that were less than test detection limits but were in turn greater than the criteria.

Water quality comparisons between weir-outfall, mixing zone and background sites suggest that the effects of dredging activities dissipated in the approximately 0.25 acre mixing zone. Statistical comparisons for 14 of 19 water quality parameters indicated that the water quality of the weir-outfall was poorer relative to the mixing zone and background sites, but no differences existed between the mixing zone samples and background sites.

Sediment contaminant concentrations have been relatively low over the years of maintenance dredging at Wilmington Harbor. Sediment and elutriate contaminant monitoring resulted in low frequencies of exceedence among 141 and 129 parameters monitored respectively. Among sediments parameters, only mercury, silver, and the organic compound phenanthrene had concentrations exceeding criteria. Furthermore, the combined number of exceeding concentrations was only 5. Among elutriate parameters, only lead and zinc had concentrations exceeding criteria, and the total number of exceedences was 4.

Groundwater monitoring of the upland disposal site indicated minimal contamination. Only a few parameters were monitored over the 15 years and the frequencies of exceedence were low.

# 5.0 RECOMMENDATIONS

Based on 15 years of data compiled from over 100 different parameters monitored or tested in water, sediment, sediments elutriates, and groundwater, the weight of evidence suggests that past maintenance dredging operations in Wilmington Harbor has not caused significant environmental impacts to Delaware River water quality. Thus, for future maintenance dredging projects the intensive levels of environmental monitoring conducted in past studies may be not be necessary.

However, the effectiveness of upland dredge disposal operations is to a large degree dependent on the efficient operation of the disposal site. For example, weir monitoring conducted by the USACOE in 1995 during the last disposal operation in Wilmington Harbor revealed that the suspended solids coming out of the weir were often lower than background concentrations (Versar 1995). Proper gaging of the weir height is an important factor in the operation of these facilities as increasing the retention time of water in the site increases the removal of suspended solids. Since the former studies have shown the dissolved contaminants are rarely above levels of concern, and that mixing zone concentration are not different from background levels, decreasing the suspended solids loadings is probably the most important environmental factor the can readily be controlled by the dredge operators. Thus, at minimum, we recommend that for future projects total suspended solids and turbidity be measured at the weir-outfall throughout dredging operation. This will provide a general characterization of the function of the dredge disposal weir and will provide the operator immediate feedback as to whether they need to alter the operation (e.g., increase the weir height, decrease the flow rate) to minimize the dredging operations affects on water quality effects in the Delaware River.

# 6.0 REFERENCES


Code of Federal Regulations (CFR). 1996. Title 40 - Protection of Environment. Part 143 - National Secondary Drinking Water Regulations.

Delaware Department of Natural Resources and Environmental Control. 1993. State of Delaware, surface water quality standards. Dover, DE.

Greeley-Polhemus Group, Inc., and RMC Environmental Services, Inc. 1994. Water quality monitoring for Wilmington Harbor maintenance dredging operations, Winter 1994. Prepared for U.S. Army Corps of Engineers, Philadelphia District, Philadelphia, PA.

Greeley-Polhemus Group, Inc., and RMC Environmental Services, Inc. 1993. Water quality monitoring for Wilmington Harbor maintenance dredging operations, Spring 1993. Prepared for U.S. Army Corps of Engineers, Philadelphia District, Philadelphia, PA.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19:81-97.

SAS Institute Inc. 1990. SAS Language: Reference, Version 6, First Edition, 1042 pp. Cary, NC.

Sokal, R.R., and F.J. Rohlf. 1981. Biometry. W.H. Freeman and Company. New York, NY.

U.S. EPA. 1992. Quality criteria for water

U.S. EPA. 1988. The apparent effects threshold approach; briefing report to the EPA Science Advisory Board.

Versar. 1995. Water quality monitoring for Wilmington Harbor maintenance dredging operations. Prepared for U.S. Army Corps of Engineers Philadelphia District. Philadelphia, PA.

# 7.0 DATABASE DESCRIPTION

All testing data from 1979 through the most recent studies in 1994 were entered into a series of Lotus spreadsheets for four packets of data received from the Corps of Engineers. The data packets included old laboratory analysis certificates, handwritten station location maps, and in some cases data reports. These materials were reviewed to identify the test results which were entered into a spreadsheet. Each data record included common identifiers such as sample type, study year, date, and station identification. Quality control for the data included: comparing all data entries with the original report tables or analysis certificates, checking parameter reporting units, and use of computer programs to check for out-of-range parameters and other data anomalies (e.g., missing data or invalid station names). Specific parameters are reported in the same units for all years and are described in the data dictionaries presented in the following appendices. The Lotus spreadsheets were combined into four separate SAS data sets each of which contain:

- discharge water quality monitoring related to the upland disposal sites,
- groundwater testing at the upland site,
- elutriate testing of dredged sediment, and
- bulk analysis of sediment contaminant concentrations.

The data are stored as SAS data sets to facilitate statistical analysis and because of the large number of variables (over 400 for the water quality data set) is beyond the number of columns a Lotus spreadsheet can handle. In addition, a hard copy appendix of all data was not produced as it would be excessively long (over 2,000 pages just for the water quality data set). Therefore, the electronic data set contained on the attached computer disk is intended to served as the data appendix for the Wilmington Harbor Compilation Report.

# Appendix A - Water Quality Database

Name: WQ.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 1001 observations and 479 variables in the dataset. Each observation represents a water quality sample and a series of chemical and biological measurements. A sample can be uniquely identified by station type, station name, sampling date, time, tide, tributary, and dredging period. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

Samples are categorized into four types of stations: Background, Mixing Zone, Outfall, and Weir; and four types of dredging periods: Pre, During, Post, and Drawdown. There are two water bodies associated with the samples: Christina River and Delaware River. If a sample does not have tributary information, blank space is stored in its variable.

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.WQ | Observations: | 1001 |
| Member Type: | DATA | Variables: | 479 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 4699 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 14336 |
| Number of Data Set Pages: | 338 |
| File Format: | 607 |
| First Data Page: | 5 |
| Max Obs per Page: | 3 |
| Obs in First Data Page: | 2 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 72 | AG | Num | 8 | 662 | | Silver (mg/l) |
| 54 | AL | Num | 8 | 519 | | Aluminum (mg/l) |
| 55 | AS | Num | 8 | 527 | | Arsenic (mg/l) |
| 57 | BE | Num | 8 | 541 | | Beryllium (mg/l) |
| 23 | BOD | Num | 8 | 243 | | Biochemical Oxygen Demand (mg/l) |
| 60 | CD | Num | 8 | 569 | | Cadmium (mg/l) |
| 58 | CHLR | Num | 8 | 549 | | Chloride (mg/l) |
| 37 | COD | Num | 8 | 368 | | Chemical Oxygen Demand (mg/l) |
| 6 | COMMENT | Char | 32 | 52 | 32. | Sample Comment |
| 62 | CR | Num | 8 | 589 | | Chromium (mg/l) |
| 64 | CU | Num | 8 | 609 | | Copper (mg/l) |
| 76 | CY | Num | 8 | 704 | | Cyanide (mg/l) |
| 5 | DATE | Num | 8 | 44 | MMDDYY8. | Sampling Date |
| 28 | DO | Num | 8 | 287 | | Dissolved Oxygen (mg/l) |
| 396 | D_8 | Num | 8 | 4019 | | 8 Di (ng/L) |
| 395 | D_209 | Num | 8 | 4011 | | 209 Deca (ng/L) |
| 20 | FC | Num | 8 | 215 | | Fecal Coliform (#/100 ml) |
| 38 | FLOW | Num | 8 | 376 | | Flow (mgd) |
| 397 | H38_58 | Num | 8 | 4027 | | 138,158 Hexa (ng/L) |
| 398 | H70_90 | Num | 8 | 4035 | | 170,190 Hepta (ng/L) |
| 399 | HARD | Num | 8 | 4043 | | Hardness (mg/L) |
| 35 | HG | Num | 8 | 348 | | Mercury (mg/l) |
| 400 | H_128 | Num | 8 | 4051 | | 128 Hexa (ng/L) |
| 401 | H_137 | Num | 8 | 4059 | | 137 Hexa (ng/L) |
| 402 | H_149 | Num | 8 | 4067 | | 149 Hexa (ng/L) |
| 403 | H_151 | Num | 8 | 4075 | | 151 Hexa (ng/L) |
| 404 | H_153 | Num | 8 | 4083 | | 153 Hexa (ng/L) |
| 405 | H_156 | Num | 8 | 4091 | | 156 Hexa (ng/L) |
| 406 | H_157 | Num | 8 | 4099 | | 157 Hexa (ng/L) |
| 407 | H_166 | Num | 8 | 4107 | | 166 Hexa (ng/L) |
| 408 | H_167 | Num | 8 | 4115 | | 167 Hexa (ng/L) |
| 409 | H_168 | Num | 8 | 4123 | | 168 Hexa (ng/L) |

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 410 | H_169 | Num | 8 | 4131 | | 169 Hexa (pg/L) |
| 411 | H_177 | Num | 8 | 4139 | | 177 Hepta (ng/L) |
| 412 | H_179 | Num | 8 | 4147 | | 179 Hepta (ng/L) |
| 413 | H_180 | Num | 8 | 4155 | | 180 Hepta (ng/L) |
| 414 | H_183 | Num | 8 | 4163 | | 183 Hepta (ng/L) |
| 415 | H_185 | Num | 8 | 4171 | | 185 Hepta (ng/L) |
| 416 | H_187 | Num | 8 | 4179 | | 187 Hepta (ng/L) |
| 417 | H_189 | Num | 8 | 4187 | | 189 Hepta (ng/L) |
| 418 | H_191 | Num | 8 | 4195 | | 191 Hepta (ng/L) |
| 296 | NH3 | Num | 8 | 3219 | | Ammonia (mg/L) |
| 68 | NI | Num | 8 | 640 | | Nickel (mg/l) |
| 39 | NN | Num | 8 | 384 | | Nitrate+Nitrite (mg/l) |
| 297 | NO2 | Num | 8 | 3227 | | Nitrite (mg/l) |
| 88 | NO3 | Num | 8 | 794 | | Nitrate (mg/l) |
| 419 | N_206 | Num | 8 | 4203 | | 206 Nona (ng/L) |
| 420 | N_207 | Num | 8 | 4211 | | 207 Nona (ng/L) |
| 421 | N_208 | Num | 8 | 4219 | | 208 Nona (ng/L) |
| 48 | OG | Num | 8 | 472 | | Oil & Grease (mg/l) |
| 422 | ORG_1 | Num | 8 | 4227 | | 1-Methylnaphthalene (ug/L) |
| 423 | ORG_2 | Num | 8 | 4235 | | 1-Methylphenanthrene (ug/L) |
| 314 | ORG_3 | Num | 8 | 3363 | | 1,1-Dichloroethane (ug/L) |
| 325 | ORG_4 | Num | 8 | 3451 | | 1,1-Dichloroethene (ug/L) |
| 333 | ORG_5 | Num | 8 | 3515 | | 1,1,1-Trichloroethane (ug/L) |
| 343 | ORG_6 | Num | 8 | 3595 | | 1,1,2-Trichloroethane (ug/L) |
| 352 | ORG_7 | Num | 8 | 3667 | | 1,1,2,2-Tetrachloroethane (ug/L) |
| 362 | ORG_8 | Num | 8 | 3747 | | 1,2-Dichlorobenzene (ug/L) |
| 372 | ORG_9 | Num | 8 | 3827 | | 1,2-Dichloroethane (ug/L) |
| 298 | ORG_10 | Num | 8 | 3235 | | 1,2-Dichloroethene (ug/L) |
| 299 | ORG_11 | Num | 8 | 3243 | | 1,2-Dichloropropane (ug/L) |
| 300 | ORG_12 | Num | 8 | 3251 | | 1,2-Diphenyl Hydrazine (ug/L) |
| 301 | ORG_13 | Num | 8 | 3259 | | 1,2,4-Trichlorobenzene (ug/L) |
| 302 | ORG_14 | Num | 8 | 3267 | | 1,3-Dichlorobenzene (ug/L) |
| 303 | ORG_15 | Num | 8 | 3275 | | 1,4 & 1,2-Dichlorobenzene (ug/L) |
| 304 | ORG_16 | Num | 8 | 3283 | | 1,4-Dichlorobenzene (ug/L) |
| 478 | ORG_17 | Num | 8 | 4683 | | 2-Chloroethylvinylether (ug/l) |
| 305 | ORG_18 | Num | 8 | 3291 | | 2-Chloronaphthalene (ug/L) |
| 306 | ORG_19 | Num | 8 | 3299 | | 2-Chlorophenol (ug/L) |
| 424 | ORG_20 | Num | 8 | 4243 | | 2-Methylnaphthalene (ug/L) |
| 307 | ORG_21 | Num | 8 | 3307 | | 2-Nitrophenol (ug/L) |
| 425 | ORG_22 | Num | 8 | 4251 | | 2,3,5-Trimethyl-naphthalene (ug/L) |
| 308 | ORG_23 | Num | 8 | 3315 | | 2,4-Dichlorophenol (ug/L) |
| 309 | ORG_24 | Num | 8 | 3323 | | 2,4-Dimethylphenol (ug/L) |
| 310 | ORG_25 | Num | 8 | 3331 | | 2,4-Dinitrophenol (ug/L) |
| 311 | ORG_26 | Num | 8 | 3339 | | 2,4-Dinitrotoluene (ug/L) |
| 312 | ORG_27 | Num | 8 | 3347 | | 2,4,6-Trichlorophenol (ug/L) |
| 426 | ORG_28 | Num | 8 | 4259 | | 2,6-Dimethylnaphthalene (ug/L) |
| 313 | ORG_29 | Num | 8 | 3355 | | 2,6-Dinitrotoluene (ug/L) |
| 315 | ORG_30 | Num | 8 | 3371 | | 3,3'-Dichlorobenzidine (ug/L) |
| 316 | ORG_31 | Num | 8 | 3379 | | 4-Bromophenyl-phenylether (ug/L) |
| 317 | ORG_32 | Num | 8 | 3387 | | 4-Chlorophenyl-phenylether (ug/L) |
| 318 | ORG_33 | Num | 8 | 3395 | | 4-Nitrophenol (ug/L) |
| 319 | ORG_34 | Num | 8 | 3403 | | 4,6-Dinitro-2-methylphenol (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 320 | ORG_35 | Num | 8 | 3411 | | 4,-Chloro-3-methylphenol (ug/L) |
| 321 | ORG_36 | Num | 8 | 3419 | | Acenaphthene (ug/L) |
| 322 | ORG_37 | Num | 8 | 3427 | | Acenaphthylene (ug/L) |
| 323 | ORG_38 | Num | 8 | 3435 | | Acrolein (ug/L) |
| 324 | ORG_39 | Num | 8 | 3443 | | Acrylonitrile (ug/L) |
| 326 | ORG_40 | Num | 8 | 3459 | | Anthracene (ug/L) |
| 327 | ORG_41 | Num | 8 | 3467 | | Benzene (ug/L) |
| 328 | ORG_42 | Num | 8 | 3475 | | Benzidine (ug/L) |
| 329 | ORG_43 | Num | 8 | 3483 | | Benzo(a)anthracene (ug/L) |
| 291 | ORG_44 | Num | 8 | 3179 | | Benzo(a)pyrene (ug/L) |
| 330 | ORG_45 | Num | 8 | 3491 | | Benzo(b)fluoranthene (ug/L) |
| 427 | ORG_46 | Num | 8 | 4267 | | Benzo(e)pyrene (ug/L) |
| 331 | ORG_47 | Num | 8 | 3499 | | Benzo(g,h,i)perylene (ug/L) |
| 332 | ORG_48 | Num | 8 | 3507 | | Benzo(k)fluoranthene (ug/L) |
| 428 | ORG_49 | Num | 8 | 4275 | | Biphenyl (ug/L) |
| 334 | ORG_50 | Num | 8 | 3523 | | Bis(2-chloroethoxy)methane (ug/L) |
| 335 | ORG_51 | Num | 8 | 3531 | | Bis(2-chloroethyl)ether (ug/L) |
| 336 | ORG_52 | Num | 8 | 3539 | | Bis(2-chloroisopropyl)ether (ug/L) |
| 292 | ORG_53 | Num | 8 | 3187 | | Bis(2-ethylhexyl)phthalate (ug/L) |
| 337 | ORG_54 | Num | 8 | 3547 | | Bromodichloromethane (ug/L) |
| 338 | ORG_55 | Num | 8 | 3555 | | Bromoform (ug/L) |
| 339 | ORG_56 | Num | 8 | 3563 | | Bromomethane (ug/L) |
| 340 | ORG_57 | Num | 8 | 3571 | | Butlybenzylphthalate (ug/L) |
| 341 | ORG_58 | Num | 8 | 3579 | | Carbon Tetrachloride (ug/L) |
| 342 | ORG_59 | Num | 8 | 3587 | | Chlorobenzene (ug/L) |
| 344 | ORG_60 | Num | 8 | 3603 | | Chloroethane (ug/L) |
| 293 | ORG_61 | Num | 8 | 3195 | | Chloroform (ug/L) |
| 345 | ORG_62 | Num | 8 | 3611 | | Chloromethane (ug/L) |
| 346 | ORG_63 | Num | 8 | 3619 | | Chrysene (ug/L) |
| 347 | ORG_64 | Num | 8 | 3627 | | Cis-1,3-Dichloropropene (ug/L) |
| 479 | ORG_65 | Num | 8 | 4691 | | Cis,trans,1,2-Dichloroethene (ug/l) |
| 348 | ORG_66 | Num | 8 | 3635 | | Dibenzo(a,h)anthracene (ug/L) |
| 349 | ORG_67 | Num | 8 | 3643 | | Dibromochloromethane (ug/L) |
| 350 | ORG_68 | Num | 8 | 3651 | | Diethylphthalate (ug/L) |
| 351 | ORG_69 | Num | 8 | 3659 | | Dimethylphthalate (ug/L) |
| 353 | ORG_70 | Num | 8 | 3675 | | Di-n-butylphthalate (ug/L) |
| 354 | ORG_71 | Num | 8 | 3683 | | Di-n-octylphthalate (ug/L) |
| 355 | ORG_72 | Num | 8 | 3691 | | Ethylbenzene (ug/L) |
| 294 | ORG_73 | Num | 8 | 3203 | | Fluoranthene (ug/L) |
| 356 | ORG_74 | Num | 8 | 3699 | | Fluorene (ug/L) |
| 357 | ORG_75 | Num | 8 | 3707 | | Hexachlorobenzene (ug/L) |
| 358 | ORG_76 | Num | 8 | 3715 | | Hexachlorobutadiene (ug/L) |
| 359 | ORG_77 | Num | 8 | 3723 | | Hexachlorocyclopentadiene (ug/L) |
| 360 | ORG_78 | Num | 8 | 3731 | | Hexachloroethane (ug/L) |
| 361 | ORG_79 | Num | 8 | 3739 | | Indeno(1,2,3-c,d)pyrene (ug/L) |
| 363 | ORG_80 | Num | 8 | 3755 | | Isophorone (ug/L) |
| 364 | ORG_81 | Num | 8 | 3763 | | Methylene Chloride (ug/L) |
| 365 | ORG_82 | Num | 8 | 3771 | | Naphthalene (ug/L) |
| 366 | ORG_83 | Num | 8 | 3779 | | Nitrobenzene (ug/L) |
| 367 | ORG_84 | Num | 8 | 3787 | | N-nitrosodimethylamine (ug/L) |
| 368 | ORG_85 | Num | 8 | 3795 | | N-nitroso-Di-n-propylamine (ug/L) |
| 369 | ORG_86 | Num | 8 | 3803 | | N-nitrosodiphenylamine (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 370 | ORG_87 | Num | 8 | 3811 | | Pentachlorophenol (ug/L) |
| 429 | ORG_88 | Num | 8 | 4283 | | Perylene (ug/L) |
| 371 | ORG_89 | Num | 8 | 3819 | | Phenanthrene (ug/L) |
| 42 | ORG_90 | Num | 8 | 412 | | Phenol (mg/l) |
| 373 | ORG_91 | Num | 8 | 3835 | | Pyrene (ug/L) |
| 295 | ORG_92 | Num | 8 | 3211 | | Tetrachloroethene (ug/L) |
| 374 | ORG_93 | Num | 8 | 3843 | | Toluene (ug/L) |
| 375 | ORG_94 | Num | 8 | 3851 | | Trans-1,3-Dichloropropene (ug/L) |
| 376 | ORG_95 | Num | 8 | 3859 | | Trichloroethene (ug/L) |
| 377 | ORG_96 | Num | 8 | 3867 | | Trichlorofluoromethane (ug/L) |
| 378 | ORG_97 | Num | 8 | 3875 | | Vinyl Chloride (ug/L) |
| 430 | O_194 | Num | 8 | 4291 | | 194 Octa (ng/L) |
| 431 | O_195 | Num | 8 | 4299 | | 195 Octa (ng/L) |
| 432 | O_196 | Num | 8 | 4307 | | 196 Octa (ng/L) |
| 433 | O_200 | Num | 8 | 4315 | | 200 Octa (ng/L) |
| 434 | O_201 | Num | 8 | 4323 | | 201 Octa (ng/L) |
| 435 | O_203 | Num | 8 | 4331 | | 203 Octa (ng/L) |
| 436 | O_205 | Num | 8 | 4339 | | 205 Octa (ng/L) |
| 93 | P1016 | Num | 8 | 831 | | PCB-1016 (ug/l) |
| 16 | P1221 | Num | 8 | 180 | | PCB-1221 (ug/l) |
| 95 | P1232 | Num | 8 | 851 | | PCB-1232 (ug/l) |
| 97 | P1242 | Num | 8 | 871 | | PCB-1242 (ug/l) |
| 99 | P1248 | Num | 8 | 891 | | PCB-1248 (ug/l) |
| 101 | P1254 | Num | 8 | 911 | | PCB-1254 (ug/l) |
| 103 | P1260 | Num | 8 | 931 | | PCB-1260 (ug/l) |
| 14 | P42_48 | Num | 8 | 160 | | PCB-1242,1248 (ug/l) |
| 12 | P54_60 | Num | 8 | 140 | | PCB-1254,1260 (ug/l) |
| 2 | PAGE | Num | 8 | 12 | | Report Page Number |
| 66 | PB | Num | 8 | 629 | | Lead (mg/l) |
| 18 | PBB | Num | 8 | 200 | | PBB (mg/l) |
| 10 | PCB | Num | 8 | 120 | | PCB's (ug/l) |
| 8 | PERIOD | Char | 12 | 96 | 12. | Dredging (PRE,D=During,POST,Drawdown) |
| 50 | PEST | Num | 8 | 492 | | Pesticides (mg/l) |
| 437 | PES_1 | Num | 8 | 4347 | | 2,4'-DDD (ug/L) |
| 441 | PES_2 | Num | 8 | 4379 | | 2,4'-DDE (ug/L) |
| 447 | PES_3 | Num | 8 | 4427 | | 2,4'-DDT (ug/L) |
| 389 | PES_4 | Num | 8 | 3963 | | 4,4'-DDD (ug/L) |
| 390 | PES_5 | Num | 8 | 3971 | | 4,4'-DDE (ug/L) |
| 391 | PES_6 | Num | 8 | 3979 | | 4,4'-DDT (ug/L) |
| 392 | PES_7 | Num | 8 | 3987 | | A-BHC (ug/L) |
| 393 | PES_8 | Num | 8 | 3995 | | Aldrin (ug/L) |
| 394 | PES_9 | Num | 8 | 4003 | | B-BHC (ug/L) |
| 79 | PES_10 | Num | 8 | 732 | | Chlorodane (ug/l) |
| 438 | PES_11 | Num | 8 | 4355 | | Cis-chlordane (ug/L) |
| 439 | PES_12 | Num | 8 | 4363 | | Cis-nonachlor (ug/L) |
| 379 | PES_13 | Num | 8 | 3883 | | D-BHC (ug/L) |
| 440 | PES_14 | Num | 8 | 4371 | | Dicofol (ug/L) |
| 380 | PES_15 | Num | 8 | 3891 | | Dieldrin (ug/L) |
| 381 | PES_16 | Num | 8 | 3899 | | Endosulfan I (ug/L) |
| 382 | PES_17 | Num | 8 | 3907 | | Endosulfan II (ug/L) |
| 383 | PES_18 | Num | 8 | 3915 | | Endosulfan sulfate (ug/L) |
| 384 | PES_19 | Num | 8 | 3923 | | Endrin (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 385 | PES_20 | Num | 8 | 3931 | | Endrin aldehyde (ug/L) |
| 386 | PES_21 | Num | 8 | 3939 | | G-BHC (ug/L) |
| 387 | PES_22 | Num | 8 | 3947 | | Heptachlor (ug/L) |
| 388 | PES_23 | Num | 8 | 3955 | | Heptachlor epoxide (ug/L) |
| 442 | PES_24 | Num | 8 | 4387 | | Hexychlorobenzene (ug/L) |
| 443 | PES_25 | Num | 8 | 4395 | | Mirex (ug/L) |
| 444 | PES_26 | Num | 8 | 4403 | | Oxychlordane (ug/L) |
| 78 | PES_27 | Num | 8 | 724 | | Toxaphene (ug/l) |
| 445 | PES_28 | Num | 8 | 4411 | | Trans-chlordane (ug/L) |
| 446 | PES_29 | Num | 8 | 4419 | | Trans-nonachlor (ug/L) |
| 26 | PH | Num | 8 | 267 | | pH |
| 457 | P_82 | Num | 8 | 4507 | | 82 Penta (ng/L) |
| 458 | P_87 | Num | 8 | 4515 | | 87 Penta (ng/L) |
| 459 | P_95 | Num | 8 | 4523 | | 95 Penta (ng/L) |
| 460 | P_99 | Num | 8 | 4531 | | 99 Penta (ng/L) |
| 448 | P_101 | Num | 8 | 4435 | | 101 Penta (ng/L) |
| 449 | P_105 | Num | 8 | 4443 | | 105 Penta (ng/L) |
| 450 | P_110 | Num | 8 | 4451 | | 110 Penta (ng/L) |
| 451 | P_114 | Num | 8 | 4459 | | 114 Penta (ng/L) |
| 452 | P_118 | Num | 8 | 4467 | | 118 Penta (ng/L) |
| 453 | P_119 | Num | 8 | 4475 | | 119 Penta (ng/L) |
| 454 | P_123 | Num | 8 | 4483 | | 123 Penta (ng/L) |
| 455 | P_126 | Num | 8 | 4491 | | 126 Penta (pg/L) |
| 456 | P_127 | Num | 8 | 4499 | | 127 Penta (ng/L) |
| 52 | SB | Num | 8 | 506 | | Antimony (mg/l) |
| 70 | SE | Num | 8 | 651 | | Selenium (mg/l) |
| 46 | SS | Num | 8 | 452 | | Settleable Solids (mg/l) |
| 4 | STATION | Char | 12 | 32 | 12. | Sampling Station |
| 71 | S_AG | Char | 3 | 659 | 3. | Flag for AG (Less than DL) |
| 53 | S_AL | Char | 5 | 514 | 5. | Flag for AL (Less than DL) |
| 90 | S_AS | Char | 5 | 807 | 5. | Flag for AS (Less than DL) |
| 56 | S_BE | Char | 6 | 535 | 6. | Flag for BE (Less than DL) |
| 22 | S_BOD | Char | 12 | 231 | 12. | Flag for BOD (Less than DL) |
| 59 | S_CD | Char | 12 | 557 | 12. | Flag for CD (Less than DL) |
| 36 | S_COD | Char | 12 | 356 | 12. | Flag for COD (Less than DL) |
| 61 | S_CR | Char | 12 | 577 | 12. | Flag for CR (Less than DL) |
| 63 | S_CU | Char | 12 | 597 | 12. | Flag for CU (Less than DL) |
| 75 | S_CY | Char | 12 | 692 | 12. | Flag for CY (Less than DL) |
| 27 | S_DO | Char | 12 | 275 | 12. | Flag for DO (Less than DL) |
| 211 | S_D_8 | Char | 12 | 2219 | 12. | Flag for D_8 (Less than DL) |
| 210 | S_D_209 | Char | 12 | 2207 | 12. | Flag for D_209 (Less than DL) |
| 19 | S_FC | Char | 7 | 208 | 7. | Flag for FC (Less than DL) |
| 212 | S_H38_58 | Char | 12 | 2231 | 12. | Flag for H38_58 (Less than DL) |
| 213 | S_H70_90 | Char | 12 | 2243 | 12. | Flag for H70_90 (Less than DL) |
| 214 | S_HARD | Char | 12 | 2255 | 12. | Flag for HARD (Less than DL) |
| 34 | S_HG | Char | 12 | 336 | 12. | Flag for HG (Less than DL) |
| 215 | S_H_128 | Char | 12 | 2267 | 12. | Flag for H_128 (Less than DL) |
| 216 | S_H_137 | Char | 12 | 2279 | 12. | Flag for H_137 (Less than DL) |
| 217 | S_H_149 | Char | 12 | 2291 | 12. | Flag for H_149 (Less than DL) |
| 218 | S_H_151 | Char | 12 | 2303 | 12. | Flag for H_151 (Less than DL) |
| 219 | S_H_153 | Char | 12 | 2315 | 12. | Flag for H_153 (Less than DL) |
| 220 | S_H_156 | Char | 12 | 2327 | 12. | Flag for H_156 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 221 | S_H_157 | Char | 12 | 2339 | 12. | Flag for H_157 (Less than DL) |
| 222 | S_H_166 | Char | 12 | 2351 | 12. | Flag for H_166 (Less than DL) |
| 223 | S_H_167 | Char | 12 | 2363 | 12. | Flag for H_167 (Less than DL) |
| 224 | S_H_168 | Char | 12 | 2375 | 12. | Flag for H_168 (Less than DL) |
| 225 | S_H_169 | Char | 12 | 2387 | 12. | Flag for H_169 (Less than DL) |
| 226 | S_H_177 | Char | 12 | 2399 | 12. | Flag for H_177 (Less than DL) |
| 227 | S_H_179 | Char | 12 | 2411 | 12. | Flag for H_179 (Less than DL) |
| 228 | S_H_180 | Char | 12 | 2423 | 12. | Flag for H_180 (Less than DL) |
| 229 | S_H_183 | Char | 12 | 2435 | 12. | Flag for H_183 (Less than DL) |
| 230 | S_H_185 | Char | 12 | 2447 | 12. | Flag for H_185 (Less than DL) |
| 231 | S_H_187 | Char | 12 | 2459 | 12. | Flag for H_187 (Less than DL) |
| 232 | S_H_189 | Char | 12 | 2471 | 12. | Flag for H_189 (Less than DL) |
| 233 | S_H_191 | Char | 12 | 2483 | 12. | Flag for H_191 (Less than DL) |
| 110 | S_NH3 | Char | 12 | 1007 | 12. | Flag for NH3 (Less than DL) |
| 67 | S_NI | Char | 3 | 637 | 3. | Flag for NI (Less than DL) |
| 91 | S_NN | Char | 7 | 812 | 7. | Flag for NN (Less than DL) |
| 111 | S_NO2 | Char | 12 | 1019 | 12. | Flag for NO2 (Less than DL) |
| 87 | S_NO3 | Char | 6 | 788 | 6. | Flag for NO3 (Less than DL) |
| 234 | S_N_206 | Char | 12 | 2495 | 12. | Flag for N_206 (Less than DL) |
| 235 | S_N_207 | Char | 12 | 2507 | 12. | Flag for N_207 (Less than DL) |
| 236 | S_N_208 | Char | 12 | 2519 | 12. | Flag for N_208 (Less than DL) |
| 47 | S_OG | Char | 12 | 460 | 12. | Flag for OG (Less than DL) |
| 237 | S_ORG_1 | Char | 12 | 2531 | 12. | Flag for ORG_1 (Less than DL) |
| 238 | S_ORG_2 | Char | 12 | 2543 | 12. | Flag for ORG_2 (Less than DL) |
| 128 | S_ORG_3 | Char | 12 | 1223 | 12. | Flag for ORG_3 (Less than DL) |
| 139 | S_ORG_4 | Char | 12 | 1355 | 12. | Flag for ORG_4 (Less than DL) |
| 147 | S_ORG_5 | Char | 12 | 1451 | 12. | Flag for ORG_5 (Less than DL) |
| 157 | S_ORG_6 | Char | 12 | 1571 | 12. | Flag for ORG_6 (Less than DL) |
| 166 | S_ORG_7 | Char | 12 | 1679 | 12. | Flag for ORG_7 (Less than DL) |
| 176 | S_ORG_8 | Char | 12 | 1799 | 12. | Flag for ORG_8 (Less than DL) |
| 186 | S_ORG_9 | Char | 12 | 1919 | 12. | Flag for ORG_9 (Less than DL) |
| 112 | S_ORG_10 | Char | 12 | 1031 | 12. | Flag for ORG_10 (Less than DL) |
| 113 | S_ORG_11 | Char | 12 | 1043 | 12. | Flag for ORG_11 (Less than DL) |
| 114 | S_ORG_12 | Char | 12 | 1055 | 12. | Flag for ORG_12 (Less than DL) |
| 115 | S_ORG_13 | Char | 12 | 1067 | 12. | Flag for ORG_13 (Less than DL) |
| 116 | S_ORG_14 | Char | 12 | 1079 | 12. | Flag for ORG_14 (Less than DL) |
| 117 | S_ORG_15 | Char | 12 | 1091 | 12. | Flag for ORG_15 (Less than DL) |
| 118 | S_ORG_16 | Char | 12 | 1103 | 12. | Flag for ORG_16 (Less than DL) |
| 476 | S_ORG_17 | Char | 12 | 4659 | 12. | Flag for ORG_17 (Less than DL) |
| 119 | S_ORG_18 | Char | 12 | 1115 | 12. | Flag for ORG_18 (Less than DL) |
| 120 | S_ORG_19 | Char | 12 | 1127 | 12. | Flag for ORG_19 (Less than DL) |
| 239 | S_ORG_20 | Char | 12 | 2555 | 12. | Flag for ORG_20 (Less than DL) |
| 121 | S_ORG_21 | Char | 12 | 1139 | 12. | Flag for ORG_21 (Less than DL) |
| 240 | S_ORG_22 | Char | 12 | 2567 | 12. | Flag for ORG_22 (Less than DL) |
| 122 | S_ORG_23 | Char | 12 | 1151 | 12. | Flag for ORG_23 (Less than DL) |
| 123 | S_ORG_24 | Char | 12 | 1163 | 12. | Flag for ORG_24 (Less than DL) |
| 124 | S_ORG_25 | Char | 12 | 1175 | 12. | Flag for ORG_25 (Less than DL) |
| 125 | S_ORG_26 | Char | 12 | 1187 | 12. | Flag for ORG_26 (Less than DL) |
| 126 | S_ORG_27 | Char | 12 | 1199 | 12. | Flag for ORG_27 (Less than DL) |
| 241 | S_ORG_28 | Char | 12 | 2579 | 12. | Flag for ORG_28 (Less than DL) |
| 127 | S_ORG_29 | Char | 12 | 1211 | 12. | Flag for ORG_29 (Less than DL) |
| 129 | S_ORG_30 | Char | 12 | 1235 | 12. | Flag for ORG_30 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 130 | S_ORG_31 | Char | 12 | 1247 | 12. | Flag for ORG_31 (Less than DL) |
| 131 | S_ORG_32 | Char | 12 | 1259 | 12. | Flag for ORG_32 (Less than DL) |
| 132 | S_ORG_33 | Char | 12 | 1271 | 12. | Flag for ORG_33 (Less than DL) |
| 133 | S_ORG_34 | Char | 12 | 1283 | 12. | Flag for ORG_34 (Less than DL) |
| 134 | S_ORG_35 | Char | 12 | 1295 | 12. | Flag for ORG_35 (Less than DL) |
| 135 | S_ORG_36 | Char | 12 | 1307 | 12. | Flag for ORG_36 (Less than DL) |
| 136 | S_ORG_37 | Char | 12 | 1319 | 12. | Flag for ORG_37 (Less than DL) |
| 137 | S_ORG_38 | Char | 12 | 1331 | 12. | Flag for ORG_38 (Less than DL) |
| 138 | S_ORG_39 | Char | 12 | 1343 | 12. | Flag for ORG_39 (Less than DL) |
| 140 | S_ORG_40 | Char | 12 | 1367 | 12. | Flag for ORG_40 (Less than DL) |
| 141 | S_ORG_41 | Char | 12 | 1379 | 12. | Flag for ORG_41 (Less than DL) |
| 142 | S_ORG_42 | Char | 12 | 1391 | 12. | Flag for ORG_42 (Less than DL) |
| 143 | S_ORG_43 | Char | 12 | 1403 | 12. | Flag for ORG_43 (Less than DL) |
| 105 | S_ORG_44 | Char | 12 | 947 | 12. | Flag for ORG_44 (Less than DL) |
| 144 | S_ORG_45 | Char | 12 | 1415 | 12. | Flag for ORG_45 (Less than DL) |
| 242 | S_ORG_46 | Char | 12 | 2591 | 12. | Flag for ORG_46 (Less than DL) |
| 145 | S_ORG_47 | Char | 12 | 1427 | 12. | Flag for ORG_47 (Less than DL) |
| 146 | S_ORG_48 | Char | 12 | 1439 | 12. | Flag for ORG_48 (Less than DL) |
| 243 | S_ORG_49 | Char | 12 | 2603 | 12. | Flag for ORG_49 (Less than DL) |
| 148 | S_ORG_50 | Char | 12 | 1463 | 12. | Flag for ORG_50 (Less than DL) |
| 149 | S_ORG_51 | Char | 12 | 1475 | 12. | Flag for ORG_51 (Less than DL) |
| 150 | S_ORG_52 | Char | 12 | 1487 | 12. | Flag for ORG_52 (Less than DL) |
| 106 | S_ORG_53 | Char | 12 | 959 | 12. | Flag for ORG_53 (Less than DL) |
| 151 | S_ORG_54 | Char | 12 | 1499 | 12. | Flag for ORG_54 (Less than DL) |
| 152 | S_ORG_55 | Char | 12 | 1511 | 12. | Flag for ORG_55 (Less than DL) |
| 153 | S_ORG_56 | Char | 12 | 1523 | 12. | Flag for ORG_56 (Less than DL) |
| 154 | S_ORG_57 | Char | 12 | 1535 | 12. | Flag for ORG_57 (Less than DL) |
| 155 | S_ORG_58 | Char | 12 | 1547 | 12. | Flag for ORG_58 (Less than DL) |
| 156 | S_ORG_59 | Char | 12 | 1559 | 12. | Flag for ORG_59 (Less than DL) |
| 158 | S_ORG_60 | Char | 12 | 1583 | 12. | Flag for ORG_60 (Less than DL) |
| 107 | S_ORG_61 | Char | 12 | 971 | 12. | Flag for ORG_61 (Less than DL) |
| 159 | S_ORG_62 | Char | 12 | 1595 | 12. | Flag for ORG_62 (Less than DL) |
| 160 | S_ORG_63 | Char | 12 | 1607 | 12. | Flag for ORG_63 (Less than DL) |
| 161 | S_ORG_64 | Char | 12 | 1619 | 12. | Flag for ORG_64 (Less than DL) |
| 477 | S_ORG_65 | Char | 12 | 4671 | 12. | Flag for ORG_65 (Less than DL) |
| 162 | S_ORG_66 | Char | 12 | 1631 | 12. | Flag for ORG_66 (Less than DL) |
| 163 | S_ORG_67 | Char | 12 | 1643 | 12. | Flag for ORG_67 (Less than DL) |
| 164 | S_ORG_68 | Char | 12 | 1655 | 12. | Flag for ORG_68 (Less than DL) |
| 165 | S_ORG_69 | Char | 12 | 1667 | 12. | Flag for ORG_69 (Less than DL) |
| 167 | S_ORG_70 | Char | 12 | 1691 | 12. | Flag for ORG_70 (Less than DL) |
| 168 | S_ORG_71 | Char | 12 | 1703 | 12. | Flag for ORG_71 (Less than DL) |
| 169 | S_ORG_72 | Char | 12 | 1715 | 12. | Flag for ORG_72 (Less than DL) |
| 108 | S_ORG_73 | Char | 12 | 983 | 12. | Flag for ORG_73 (Less than DL) |
| 170 | S_ORG_74 | Char | 12 | 1727 | 12. | Flag for ORG_74 (Less than DL) |
| 171 | S_ORG_75 | Char | 12 | 1739 | 12. | Flag for ORG_75 (Less than DL) |
| 172 | S_ORG_76 | Char | 12 | 1751 | 12. | Flag for ORG_76 (Less than DL) |
| 173 | S_ORG_77 | Char | 12 | 1763 | 12. | Flag for ORG_77 (Less than DL) |
| 174 | S_ORG_78 | Char | 12 | 1775 | 12. | Flag for ORG_78 (Less than DL) |
| 175 | S_ORG_79 | Char | 12 | 1787 | 12. | Flag for ORG_79 (Less than DL) |
| 177 | S_ORG_80 | Char | 12 | 1811 | 12. | Flag for ORG_80 (Less than DL) |
| 178 | S_ORG_81 | Char | 12 | 1823 | 12. | Flag for ORG_81 (Less than DL) |
| 179 | S_ORG_82 | Char | 12 | 1835 | 12. | Flag for ORG_82 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 180 | S_ORG_83 | Char | 12 | 1847 | 12. | Flag for ORG_83 (Less than DL) |
| 181 | S_ORG_84 | Char | 12 | 1859 | 12. | Flag for ORG_84 (Less than DL) |
| 182 | S_ORG_85 | Char | 12 | 1871 | 12. | Flag for ORG_85 (Less than DL) |
| 183 | S_ORG_86 | Char | 12 | 1883 | 12. | Flag for ORG_86 (Less than DL) |
| 184 | S_ORG_87 | Char | 12 | 1895 | 12. | Flag for ORG_87 (Less than DL) |
| 244 | S_ORG_88 | Char | 12 | 2615 | 12. | Flag for ORG_88 (Less than DL) |
| 185 | S_ORG_89 | Char | 12 | 1907 | 12. | Flag for ORG_89 (Less than DL) |
| 41 | S_ORG_90 | Char | 12 | 400 | 12. | Flag for ORG_90 (Less than DL) |
| 187 | S_ORG_91 | Char | 12 | 1931 | 12. | Flag for ORG_91 (Less than DL) |
| 109 | S_ORG_92 | Char | 12 | 995 | 12. | Flag for ORG_92 (Less than DL) |
| 188 | S_ORG_93 | Char | 12 | 1943 | 12. | Flag for ORG_93 (Less than DL) |
| 189 | S_ORG_94 | Char | 12 | 1955 | 12. | Flag for ORG_94 (Less than DL) |
| 190 | S_ORG_95 | Char | 12 | 1967 | 12. | Flag for ORG_95 (Less than DL) |
| 191 | S_ORG_96 | Char | 12 | 1979 | 12. | Flag for ORG_96 (Less than DL) |
| 192 | S_ORG_97 | Char | 12 | 1991 | 12. | Flag for ORG_97 (Less than DL) |
| 245 | S_O_194 | Char | 12 | 2627 | 12. | Flag for O_194 (Less than DL) |
| 246 | S_O_195 | Char | 12 | 2639 | 12. | Flag for O_195 (Less than DL) |
| 247 | S_O_196 | Char | 12 | 2651 | 12. | Flag for O_196 (Less than DL) |
| 248 | S_O_200 | Char | 12 | 2663 | 12. | Flag for O_200 (Less than DL) |
| 249 | S_O_201 | Char | 12 | 2675 | 12. | Flag for O_201 (Less than DL) |
| 250 | S_O_203 | Char | 12 | 2687 | 12. | Flag for O_203 (Less than DL) |
| 251 | S_O_205 | Char | 12 | 2699 | 12. | Flag for O_205 (Less than DL) |
| 92 | S_P1016 | Char | 12 | 819 | 12. | Flag for P1016 (Less than DL) |
| 15 | S_P1221 | Char | 12 | 168 | 12. | Flag for P1221 (Less than DL) |
| 94 | S_P1232 | Char | 12 | 839 | 12. | Flag for P1232 (Less than DL) |
| 96 | S_P1242 | Char | 12 | 859 | 12. | Flag for P1242 (Less than DL) |
| 98 | S_P1248 | Char | 12 | 879 | 12. | Flag for P1248 (Less than DL) |
| 100 | S_P1254 | Char | 12 | 899 | 12. | Flag for P1254 (Less than DL) |
| 102 | S_P1260 | Char | 12 | 919 | 12. | Flag for P1260 (Less than DL) |
| 13 | S_P42_48 | Char | 12 | 148 | 12. | Flag for P42_48 (Less than DL) |
| 11 | S_P54_60 | Char | 12 | 128 | 12. | Flag for P54_60 (Less than DL) |
| 65 | S_PB | Char | 12 | 617 | 12. | Flag for PB (Less than DL) |
| 17 | S_PBB | Char | 12 | 188 | 12. | Flag for PBB (Less than DL) |
| 9 | S_PCB | Char | 12 | 108 | 12. | Flag for PCB (Less than DL) |
| 49 | S_PEST | Char | 12 | 480 | 12. | Flag for PEST (Less than DL) |
| 252 | S_PES_1 | Char | 12 | 2711 | 12. | Flag for PES_1 (Less than DL) |
| 256 | S_PES_2 | Char | 12 | 2759 | 12. | Flag for PES_2 (Less than DL) |
| 262 | S_PES_3 | Char | 12 | 2831 | 12. | Flag for PES_3 (Less than DL) |
| 204 | S_PES_4 | Char | 12 | 2135 | 12. | Flag for PES_4 (Less than DL) |
| 205 | S_PES_5 | Char | 12 | 2147 | 12. | Flag for PES_5 (Less than DL) |
| 206 | S_PES_6 | Char | 12 | 2159 | 12. | Flag for PES_6 (Less than DL) |
| 207 | S_PES_7 | Char | 12 | 2171 | 12. | Flag for PES_7 (Less than DL) |
| 208 | S_PES_8 | Char | 12 | 2183 | 12. | Flag for PES_8 (Less than DL) |
| 209 | S_PES_9 | Char | 12 | 2195 | 12. | Flag for PES_9 (Less than DL) |
| 193 | S_PES_10 | Char | 12 | 2003 | 12. | Flag for PES_10 (Less than DL) |
| 253 | S_PES_11 | Char | 12 | 2723 | 12. | Flag for PES_11 (Less than DL) |
| 254 | S_PES_12 | Char | 12 | 2735 | 12. | Flag for PES_12 (Less than DL) |
| 194 | S_PES_13 | Char | 12 | 2015 | 12. | Flag for PES_13 (Less than DL) |
| 255 | S_PES_14 | Char | 12 | 2747 | 12. | Flag for PES_14 (Less than DL) |
| 195 | S_PES_15 | Char | 12 | 2027 | 12. | Flag for PES_15 (Less than DL) |
| 196 | S_PES_16 | Char | 12 | 2039 | 12. | Flag for PES_16 (Less than DL) |
| 197 | S_PES_17 | Char | 12 | 2051 | 12. | Flag for PES_17 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 198 | S_PES_18 | Char | 12 | 2063 | 12. | Flag for PES_18 (Less than DL) |
| 199 | S_PES_19 | Char | 12 | 2075 | 12. | Flag for PES_19 (Less than DL) |
| 200 | S_PES_20 | Char | 12 | 2087 | 12. | Flag for PES_20 (Less than DL) |
| 201 | S_PES_21 | Char | 12 | 2099 | 12. | Flag for PES_21 (Less than DL) |
| 202 | S_PES_22 | Char | 12 | 2111 | 12. | Flag for PES_22 (Less than DL) |
| 203 | S_PES_23 | Char | 12 | 2123 | 12. | Flag for PES_23 (Less than DL) |
| 257 | S_PES_24 | Char | 12 | 2771 | 12. | Flag for PES_24 (Less than DL) |
| 258 | S_PES_25 | Char | 12 | 2783 | 12. | Flag for PES_25 (Less than DL) |
| 259 | S_PES_26 | Char | 12 | 2795 | 12. | Flag for PES_26 (Less than DL) |
| 77 | S_PES_27 | Char | 12 | 712 | 12. | Flag for TOXAPE (Less than DL) |
| 260 | S_PES_28 | Char | 12 | 2807 | 12. | Flag for PES_28 (Less than DL) |
| 261 | S_PES_29 | Char | 12 | 2819 | 12. | Flag for PES_29 (Less than DL) |
| 84 | S_PH | Char | 5 | 770 | 5. | Flag for pH (Less than DL) |
| 272 | S_P_82 | Char | 12 | 2951 | 12. | Flag for P_82 (Less than DL) |
| 273 | S_P_87 | Char | 12 | 2963 | 12. | Flag for P_87 (Less than DL) |
| 274 | S_P_95 | Char | 12 | 2975 | 12. | Flag for P_95 (Less than DL) |
| 275 | S_P_99 | Char | 12 | 2987 | 12. | Flag for P_99 (Less than DL) |
| 263 | S_P_101 | Char | 12 | 2843 | 12. | Flag for P_101 (Less than DL) |
| 264 | S_P_105 | Char | 12 | 2855 | 12. | Flag for P_105 (Less than DL) |
| 265 | S_P_110 | Char | 12 | 2867 | 12. | Flag for P_110 (Less than DL) |
| 266 | S_P_114 | Char | 12 | 2879 | 12. | Flag for P_114 (Less than DL) |
| 267 | S_P_118 | Char | 12 | 2891 | 12. | Flag for P_118 (Less than DL) |
| 268 | S_P_119 | Char | 12 | 2903 | 12. | Flag for P_119 (Less than DL) |
| 269 | S_P_123 | Char | 12 | 2915 | 12. | Flag for P_123 (Less than DL) |
| 270 | S_P_126 | Char | 12 | 2927 | 12. | Flag for P_126 (Less than DL) |
| 271 | S_P_127 | Char | 12 | 2939 | 12. | Flag for P_127 (Less than DL) |
| 51 | S_SB | Char | 6 | 500 | 6. | Flag for SB (Less than DL) |
| 69 | S_SE | Char | 3 | 648 | 3. | Flag for SE (Less than DL) |
| 45 | S_SS | Char | 12 | 440 | 12. | Flag for SS (Less than DL) |
| 82 | S_TC | Char | 5 | 760 | 5. | Flag for TC (Less than DL) |
| 83 | S_TEMP | Char | 5 | 765 | 5. | Flag for TEMP (Less than DL) |
| 89 | S_TKN | Char | 5 | 802 | 5. | Flag for TKN (Less than DL) |
| 73 | S_TL | Char | 14 | 670 | 14. | Flag for TL (Less than DL) |
| 85 | S_TN | Char | 7 | 775 | 7. | Flag for TN (Less than DL) |
| 32 | S_TOC | Char | 5 | 323 | 5. | Flag for TOC (Less than DL) |
| 43 | S_TP | Char | 12 | 420 | 12. | Flag for TP (Less than DL) |
| 276 | S_TPH | Char | 12 | 2999 | 12. | Flag for TPH (Less than DL) |
| 81 | S_TSS | Char | 12 | 748 | 12. | Flag for TSS (Less than DL) |
| 86 | S_TURB | Char | 6 | 782 | 6. | Flag for TURB (Less than DL) |
| 277 | S_T_18 | Char | 12 | 3011 | 12. | Flag for T_18 (Less than DL) |
| 278 | S_T_28 | Char | 12 | 3023 | 12. | Flag for T_28 (Less than DL) |
| 279 | S_T_37 | Char | 12 | 3035 | 12. | Flag for T_37 (Less than DL) |
| 280 | S_T_44 | Char | 12 | 3047 | 12. | Flag for T_44 (Less than DL) |
| 281 | S_T_47 | Char | 12 | 3059 | 12. | Flag for T_47 (Less than DL) |
| 282 | S_T_49 | Char | 12 | 3071 | 12. | Flag for T_49 (Less than DL) |
| 283 | S_T_52 | Char | 12 | 3083 | 12. | Flag for T_52 (Less than DL) |
| 284 | S_T_60 | Char | 12 | 3095 | 12. | Flag for T_60 (Less than DL) |
| 285 | S_T_66 | Char | 12 | 3107 | 12. | Flag for T_66 (Less than DL) |
| 286 | S_T_70 | Char | 12 | 3119 | 12. | Flag for T_70 (Less than DL) |
| 287 | S_T_74 | Char | 12 | 3131 | 12. | Flag for T_74 (Less than DL) |
| 288 | S_T_77 | Char | 12 | 3143 | 12. | Flag for T_77 (Less than DL) |
| 289 | S_T_80 | Char | 12 | 3155 | 12. | Flag for T_80 (Less than DL) |

Wilmington Harbor - Water Quality Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 290 | S_T_81 | Char | 12 | 3167 | 12. | Flag for T_81 (Less than DL) |
| 30 | S_ZN | Char | 12 | 303 | 12. | Flag for ZN (Less than DL) |
| 21 | TC | Num | 8 | 223 | | Total Coliform (#/100 ml) |
| 25 | TEMP | Num | 8 | 259 | | Temperature (Degrees Centigrade) |
| 1 | TIDE | Char | 12 | 0 | 12. | Tide |
| 104 | TIME | Num | 8 | 939 | TIME5. | Sampling Time |
| 40 | TKN | Num | 8 | 392 | | Total Kjeldahl Nitrogen (mg/l) |
| 74 | TL | Num | 8 | 684 | | Thallium (mg/l) |
| 80 | TN | Num | 8 | 740 | | Total Nitrogen (mg/l) |
| 33 | TOC | Num | 8 | 328 | | Total Organic Carbon (mg/l) |
| 44 | TP | Num | 8 | 432 | | Total Phosphate (mg/l) |
| 461 | TPH | Num | 8 | 4539 | | Total Petroleum Hydrocarbons (mg/l) |
| 7 | TRIB | Char | 12 | 84 | 12. | CR=Christina River,DR=Delaware River |
| 29 | TSS | Num | 8 | 295 | | Total Suspended Solids (mg/l) |
| 24 | TURB | Num | 8 | 251 | | Turbidity (ntu) |
| 3 | TYPE | Char | 12 | 20 | 12. | B=Backgrnd,M=Mixing Z.,O=Outfall,W=Weir |
| 462 | T_18 | Num | 8 | 4547 | | 18 Tri (ng/L) |
| 463 | T_28 | Num | 8 | 4555 | | 28 Tri (ng/L) |
| 464 | T_37 | Num | 8 | 4563 | | 37 Tri (ng/L) |
| 465 | T_44 | Num | 8 | 4571 | | 44 Tetra (ng/L) |
| 466 | T_47 | Num | 8 | 4579 | | 47 Tetra (ng/L) |
| 467 | T_49 | Num | 8 | 4587 | | 49 Tetra (ng/L) |
| 468 | T_52 | Num | 8 | 4595 | | 52 Tetra (ng/L) |
| 469 | T_60 | Num | 8 | 4603 | | 60 Tetra (ng/L) |
| 470 | T_66 | Num | 8 | 4611 | | 66 Tetra (ng/L) |
| 471 | T_70 | Num | 8 | 4619 | | 70 Tetra (ng/L) |
| 472 | T_74 | Num | 8 | 4627 | | 74 Tetra (ng/L) |
| 473 | T_77 | Num | 8 | 4635 | | 77 Tetra (pg/L) |
| 474 | T_80 | Num | 8 | 4643 | | 80 Tetra (ng/L) |
| 475 | T_81 | Num | 8 | 4651 | | 81 Tetra (pg/L) |
| 31 | ZN | Num | 8 | 315 | | Zinc (mg/l) |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 1001 | 0 | 402.9500500 | 1.0000000 | 858.0000000 |
| DATE | Sampling Date | 1001 | 0 | 10729.62 | 7326.00 | 13328.00 |
| PCB | PCB's (ug/l) | 237 | 764 | 7.6258650 | 0 | 500.0000000 |
| P54_60 | PCB-1254,1260 (ug/l) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| P42_48 | PCB-1242,1248 (ug/l) | 4 | 997 | 50.0000000 | 50.0000000 | 50.0000000 |
| P1221 | PCB-1221 (ug/l) | 25 | 976 | 17.1600000 | 0.5000000 | 100.0000000 |
| PBB | PBB (mg/l) | 4 | 997 | 20.0000000 | 20.0000000 | 20.0000000 |
| FC | Fecal Coliform (#/100 ml) | 56 | 945 | 1497.43 | 30.0000000 | 10000.00 |
| TC | Total Coliform (#/100 ml) | 49 | 952 | 11549.80 | 500.0000000 | 160000.00 |
| BOD | Biochemical Oxygen Demand (mg/l) | 414 | 587 | 6.9205314 | 2.4000000 | 310.0000000 |
| TURB | Turbidity (ntu) | 396 | 605 | 316.9184343 | 6.2000000 | 55000.00 |
| TEMP | Temperature (Degrees Centigrade) | 394 | 607 | 12.0651015 | 0 | 58.0000000 |
| PH | pH | 404 | 597 | 7.2137129 | 2.8900000 | 8.5500000 |
| DO | Dissolved Oxygen (mg/l) | 394 | 607 | 8.6180203 | 0.2000000 | 15.0000000 |
| TSS | Total Suspended Solids (mg/l) | 924 | 77 | 890.1643939 | 0 | 77700.00 |
| ZN | Zinc (mg/l) | 428 | 573 | 0.2139019 | 0.0090000 | 21.0000000 |
| TOC | Total Organic Carbon (mg/l) | 407 | 594 | 11.2146437 | 1.4000000 | 1000.00 |
| HG | Mercury (mg/l) | 281 | 720 | 0.000804626 | 0.000100000 | 0.0200000 |
| COD | Chemical Oxygen Demand (mg/l) | 159 | 842 | 60.3647799 | 5.0000000 | 430.0000000 |
| FLOW | Flow (mgd) | 4 | 997 | 26.9700000 | 2.9600000 | 70.8000000 |
| NN | Nitrate+Nitrite (mg/l) | 24 | 977 | 1.7166667 | 1.4100000 | 2.1500000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 152 | 849 | 3.2377632 | 0.5000000 | 25.0000000 |
| ORG_90 | Phenol (mg/l) | 53 | 948 | 0.0068755 | 0.0040000 | 0.0200000 |
| TP | Total Phosphate (mg/l) | 128 | 873 | 0.2504688 | 0.0300000 | 2.0000000 |
| SS | Settleable Solids (mg/l) | 19 | 982 | 60.4931579 | 0.0700000 | 640.0000000 |
| OG | Oil & Grease (mg/l) | 19 | 982 | 1.7894737 | 1.0000000 | 7.0000000 |
| PEST | Pesticides (mg/l) | 5 | 996 | 0.0804000 | 0.0020000 | 0.1000000 |
| SB | Antimony (mg/l) | 8 | 993 | 0.0042500 | 0.0020000 | 0.0100000 |
| AL | Aluminum (mg/l) | 109 | 892 | 3.6431193 | 0.6000000 | 110.0000000 |
| AS | Arsenic (mg/l) | 38 | 963 | 0.0051816 | 0.0020000 | 0.0176000 |
| BE | Beryllium (mg/l) | 28 | 973 | 0.0025750 | 0.000200000 | 0.0200000 |
| CHLR | Chloride (mg/l) | 3 | 998 | 1400.00 | 1100.00 | 1800.00 |
| CD | Cadmium (mg/l) | 127 | 874 | 0.0046614 | 0.000300000 | 0.0250000 |
| CR | Chromium (mg/l) | 147 | 854 | 0.0222238 | 0.0010000 | 0.5800000 |
| CU | Copper (mg/l) | 147 | 854 | 0.0340612 | 0.0040000 | 0.4400000 |
| PB | Lead (mg/l) | 147 | 854 | 0.0419320 | 0.0010000 | 0.9600000 |
| NI | Nickel (mg/l) | 38 | 963 | 0.0141947 | 0.0066000 | 0.1000000 |
| SE | Selenium (mg/l) | 18 | 983 | 0.0024444 | 0.0020000 | 0.0050000 |
| AG | Silver (mg/l) | 18 | 983 | 0.0048889 | 0.000500000 | 0.0200000 |
| TL | Thallium (mg/l) | 8 | 993 | 0.0170000 | 0.0020000 | 0.1000000 |
| CY | Cyanide (mg/l) | 6 | 995 | 0.0075000 | 0.0050000 | 0.0100000 |
| PES_27 | Toxaphene (ug/l) | 17 | 984 | 1.2941176 | 1.0000000 | 2.0000000 |
| PES_10 | Chlorodane (ug/l) | 7 | 994 | 1.9285714 | 0.5000000 | 3.0000000 |
| TN | Total Nitrogen (mg/l) | 327 | 674 | 6.8274618 | 0.4500000 | 260.0000000 |
| NO3 | Nitrate (mg/l) | 61 | 940 | 2.0440984 | 0.0500000 | 2.8000000 |
| P1016 | PCB-1016 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1232 | PCB-1232 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1242 | PCB-1242 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1248 | PCB-1248 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1254 | PCB-1254 (ug/l) | 21 | 980 | 1.7142857 | 1.0000000 | 5.0000000 |
| P1260 | PCB-1260 (ug/l) | 21 | 980 | 1.7142857 | 1.0000000 | 5.0000000 |
| TIME | Sampling Time | 945 | 56 | 44172.38 | 3600.00 | 84900.00 |
| ORG_44 | Benzo(a)pyrene (ug/L) | 34 | 967 | 10.0000000 | 10.0000000 | 10.0000000 |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/L) | 24 | 977 | 9.8333333 | 6.0000000 | 10.0000000 |
| ORG_61 | Chloroform (ug/L) | 24 | 977 | 4.8333333 | 1.0000000 | 5.0000000 |
| ORG_73 | Fluoranthene (ug/L) | 34 | 967 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_92 | Tetrachloroethene (ug/L) | 24 | 977 | 4.8333333 | 1.0000000 | 5.0000000 |
| NH3 | Ammonia (mg/L) | 3 | 998 | 9.7000000 | 6.1000000 | 12.0000000 |
| NO2 | Nitrite (mg/l) | 3 | 998 | 0.1726667 | 0.1350000 | 0.2180000 |
| ORG_10 | 1,2-Dichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/L) | 4 | 997 | 6.2500000 | 5.0000000 | 10.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_19 | 2-Chlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_21 | 2-Nitrophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_26 | 2,4-Dinitrotoluene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/L) | 4 | 997 | 17.5000000 | 10.0000000 | 20.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_33 | 4-Nitrophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/L) | 4 | 997 | 40.0000000 | 10.0000000 | 50.0000000 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_36 | Acenaphthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_37 | Acenaphthylene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_38 | Acrolein (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_39 | Acrylonitrile (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_40 | Anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_41 | Benzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_42 | Benzidine (ug/L) | 4 | 997 | 67.5000000 | 30.0000000 | 80.0000000 |
| ORG_43 | Benzo(a)anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_54 | Bromodichloromethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_55 | Bromoform (ug/L) | 4 | 997 | 4.2500000 | 2.0000000 | 5.0000000 |
| ORG_56 | Bromomethane (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_59 | Chlorobenzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_60 | Chloroethane (ug/L) | 4 | 997 | 7.7500000 | 1.0000000 | 10.0000000 |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_62 | Chloromethane (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_63 | Chrysene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_67 | Dibromochloromethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_68 | Diethylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_69 | Dimethylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/L) | 4 | 997 | 4.2500000 | 2.0000000 | 5.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_72 | Ethylbenzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_74 | Fluorene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_75 | Hexachlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_78 | Hexachloroethane (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_80 | Isophorone (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_81 | Methylene Chloride (ug/L) | 4 | 997 | 4.7500000 | 1.0000000 | 7.0000000 |
| ORG_82 | Naphthalene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_83 | Nitrobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_87 | Pentachlorophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_89 | Phenanthrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_91 | Pyrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_93 | Toluene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_95 | Trichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_97 | Vinyl Chloride (ug/L) | 4 | 997 | 7.7500000 | 1.0000000 | 10.0000000 |
| PES_13 | D-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_15 | Dieldrin (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_16 | Endosulfan I (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_17 | Endosulfan II (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_18 | Endosulfan sulfate (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_19 | Endrin (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_20 | Endrin aldehyde (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_21 | G-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_22 | Heptachlor (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_23 | Heptachlor epoxide (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_4 | 4,4'-DDD (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_5 | 4,4'-DDE (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_6 | 4,4'-DDT (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_7 | A-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_8 | Aldrin (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_9 | B-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| D_209 | 209 Deca (ng/L) | 10 | 991 | 62.5000000 | 62.5000000 | 62.5000000 |
| D_8 | 8 Di (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| H38_58 | 138,158 Hexa (ng/L) | 10 | 991 | 50.0000000 | 50.0000000 | 50.0000000 |

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| H70_90 | 170,190 Hepta (ng/L) | 10 | 991 | 62.5000000 | 62.5000000 | 62.5000000 |
| HARD | Hardness (mg/L) | 10 | 991 | 168.1200000 | 58.6000000 | 444.0000000 |
| H_128 | 128 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_137 | 137 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_149 | 149 Hexa (ng/L) | 10 | 991 | 20.0000000 | 20.0000000 | 20.0000000 |
| H_151 | 151 Hexa (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| H_153 | 153 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_156 | 156 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_157 | 157 Hexa (ng/L) | 10 | 991 | 24.1000000 | 24.1000000 | 24.1000000 |
| H_166 | 166 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_167 | 167 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_168 | 168 Hexa (ng/L) | 10 | 991 | 21.8000000 | 21.8000000 | 21.8000000 |
| H_169 | 169 Hexa (pg/L) | 10 | 991 | 40.7400000 | 40.0000000 | 47.4000000 |
| H_177 | 177 Hepta (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| H_179 | 179 Hepta (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| H_180 | 180 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_183 | 183 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_185 | 185 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_187 | 187 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_189 | 189 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_191 | 191 Hepta (ng/L) | 10 | 991 | 27.3000000 | 27.3000000 | 27.3000000 |
| N_206 | 206 Nona (ng/L) | 10 | 991 | 62.0000000 | 62.0000000 | 62.0000000 |
| N_207 | 207 Nona (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| N_208 | 208 Nona (ng/L) | 10 | 991 | 40.0000000 | 40.0000000 | 40.0000000 |
| ORG_1 | 1-Methylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_2 | 1-Methylphenanthrene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_20 | 2-Methylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_22 | 2,3,5-Trimethyl-naphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_28 | 2,6-Dimethylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_46 | Benzo(e)pyrene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_49 | Biphenyl (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_88 | Perylene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| O_194 | 194 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| O_195 | 195 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_196 | 196 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_200 | 200 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| O_201 | 201 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_203 | 203 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_205 | 205 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| PES_1 | 2,4'-DDD (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_11 | Cis-chlordane (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_12 | Cis-nonachlor (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_14 | Dicofol (ug/L) | 10 | 991 | 0.4000000 | 0.4000000 | 0.4000000 |
| PES_2 | 2,4'-DDE (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_24 | Hexychlorobenzene (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_25 | Mirex (ug/L) | 10 | 991 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_26 | Oxychlordane (ug/L) | 10 | 991 | 0.1996000 | 0.1960000 | 0.2000000 |
| PES_28 | Trans-chlordane (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_29 | Trans-nonachlor (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_3 | 2,4'-DDT (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| P_101 | 101 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_105 | 105 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_110 | 110 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| P_114 | 114 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_118 | 118 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_119 | 119 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_123 | 123 Penta (ng/L) | 10 | 991 | 20.8000000 | 20.8000000 | 20.8000000 |
| P_126 | 126 Penta (pg/L) | 10 | 991 | 32.6000000 | 4.6000000 | 58.0000000 |
| P_127 | 127 Penta (ng/L) | 10 | 991 | 20.0000000 | 20.0000000 | 20.0000000 |
| P_82 | 82 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_87 | 87 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_95 | 95 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_99 | 99 Penta (ng/L) | 10 | 991 | 14.0000000 | 14.0000000 | 14.0000000 |
| TPH | Total Petroleum Hydrocarbons (mg/l) | 10 | 991 | 0.2460000 | 0.2400000 | 0.2500000 |
| T_18 | 18 Tri (ng/L) | 10 | 991 | 12.5000000 | 12.5000000 | 12.5000000 |
| T_28 | 28 Tri (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_37 | 37 Tri (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_44 | 44 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_47 | 47 Tetra (ng/L) | 10 | 991 | 28.1000000 | 28.1000000 | 28.1000000 |
| T_49 | 49 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_52 | 52 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_60 | 60 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_66 | 66 Tetra (ng/L) | 10 | 991 | 32.6000000 | 32.6000000 | 32.6000000 |
| T_70 | 70 Tetra (ng/L) | 10 | 991 | 28.4000000 | 28.4000000 | 28.4000000 |
| T_74 | 74 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_77 | 77 Tetra (pg/L) | 10 | 991 | 108.3400000 | 28.7000000 | 368.0000000 |
| T_80 | 80 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_81 | 81 Tetra (pg/L) | 10 | 991 | 37.1100000 | 11.1000000 | 40.0000000 |
| ORG_17 | 2-Chloroethylvinylether (ug/l) | 1 | 1000 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_65 | Cis,trans,1,2-Dichloroethene (ug/l) | 1 | 1000 | 1.0000000 | 1.0000000 | 1.0000000 |

# Appendix B - Groundwater Database

Name: GW.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 22 observations and 16 variables in the dataset. Each observation represents a groundwater sample and a series of chemical and biological measurements. A sample can be uniquely identified by station name and sampling date. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Chloride is detected the concentration value is stored in the CHLR variable and a blank space exists in S_CHLR (Flag variable for Chloride). If the parameter was not detected, the detection limit is stored in CHLR and less than sign (<) is stored in S_CHLR. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.GW | Observations: | 22 |
| Member Type: | DATA | Variables: | 16 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 12:12 Wednesday, February 19, 1997 | Observation Length: | 93 |
| Last Modified: | 12:12 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 8192 |
| Number of Data Set Pages: | 1 |
| File Format: | 607 |
| First Data Page: | 1 |
| Max Obs per Page: | 87 |
| Obs in First Data Page: | 22 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 9 | CHLR | Num | 8 | 22 | | Chloride (mg/l) |
| 15 | DATE | Num | 8 | 77 | MMDDYY8. | Sampling Date |
| 14 | LOCATION | Char | 15 | 62 | | Study Site |
| 16 | PAGE | Num | 8 | 85 | | Report Page Number |
| 12 | PH | Num | 8 | 46 | | pH |
| 1 | STATION | Char | 8 | 0 | | Sampling Well Identification |
| 3 | S_CHLR | Char | 1 | 9 | | Flag for CHLR (Less than DL) |
| 6 | S_PH | Char | 1 | 12 | | Flag for PH (Less than DL) |
| 5 | S_TKN | Char | 1 | 11 | | Flag for TKN (Less than DL) |
| 7 | S_TN | Char | 1 | 13 | | Flag for TN (Less than DL) |
| 2 | S_TOC | Char | 1 | 8 | | Flag for TOC (Less than DL) |
| 4 | S_ZN | Char | 1 | 10 | | Flag for ZN (Less than DL) |
| 11 | TKN | Num | 8 | 38 | | Total Kjeldahl Nitrogen (mg/l) |
| 13 | TN | Num | 8 | 54 | | Total Nitrogen (mg/l) |
| 8 | TOC | Num | 8 | 14 | | Total Organic Carbon (mg/l) |
| 10 | ZN | Num | 8 | 30 | | Zinc (mg/l) |

Wilmington Harbor - Groundwater Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| TOC | Total Organic Carbon (mg/l) | 22 | 0 | 74.4454545 | 1.1000000 | 170.0000000 |
| CHLR | Chloride (mg/l) | 10 | 12 | 258.0000000 | 20.0000000 | 437.0000000 |
| ZN | Zinc (mg/l) | 22 | 0 | 0.0981818 | 0.0100000 | 1.4000000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 10 | 12 | 16.6230000 | 0.4000000 | 54.0000000 |
| PH | pH | 22 | 0 | 6.8004545 | 5.5500000 | 8.1500000 |
| TN | Total Nitrogen (mg/l) | 12 | 10 | 58.6666667 | 26.0000000 | 80.0000000 |
| DATE | Sampling Date | 22 | 0 | 9746.41 | 9566.00 | 9965.00 |
| PAGE | Report Page Number | 22 | 0 | 104.6363636 | 73.0000000 | 131.0000000 |

# Appendix C - Elutriate Database

Name: ELU.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 21 observations and 273 variables in the dataset. Each observation represents an elutriate sample and a series of chemical and biological measurements. A sample can be uniquely identified by station name, sampling date, time, and tributary. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

There are two water bodies associated with the samples: Christina River and Delaware River. If a sample does not have tributary information, blank space is stored in its variable.

Wilmington Harbor - Elutriate Data

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.ELU | Observations: | 21 |
| Member Type: | DATA | Variables: | 273 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 2714 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 16384 |
| Number of Data Set Pages: | 6 |
| File Format: | 607 |
| First Data Page: | 3 |
| Max Obs per Page: | 6 |
| Obs in First Data Page: | 5 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 154 | AG | Num | 8 | 1754 | | Silver (mg/L) |
| 30 | AL | Num | 8 | 278 | | Aluminum (mg/l) |
| 155 | AS | Num | 8 | 1762 | | Arsenic (mg/L) |
| 156 | BE | Num | 8 | 1770 | | Beryllium (mg/L) |
| 8 | BOD | Num | 8 | 75 | | Biochemical Oxygen Demand (mg/l) |
| 25 | CD | Num | 8 | 230 | | Cadmium (mg/l) |
| 31 | COD | Num | 8 | 286 | | Chemical Oxygen Demand (mg/l) |
| 4 | COMMENT | Char | 21 | 28 | 21. | Sample Comment |
| 28 | CR | Num | 8 | 258 | | Chromium (mg/l) |
| 26 | CU | Num | 8 | 238 | | Copper (mg/l) |
| 157 | CY | Num | 8 | 1778 | | Cyanide (mg/L) |
| 3 | DATE | Num | 8 | 20 | MMDDYY8. | Sampling Date |
| 14 | HG | Num | 8 | 131 | | Mercury (mg/l) |
| 158 | NI | Num | 8 | 1786 | | Nickel (mg/L) |
| 18 | OG | Num | 8 | 171 | | Oil & Grease (mg/l) |
| 175 | ORG_3 | Num | 8 | 1922 | | 1,1-Dichloroethane (ug/L) |
| 186 | ORG_4 | Num | 8 | 2010 | | 1,1-Dichloroethene (ug/L) |
| 195 | ORG_5 | Num | 8 | 2082 | | 1,1,1-Trichloroethane (ug/L) |
| 206 | ORG_6 | Num | 8 | 2170 | | 1,1,2-Trichloroethane (ug/L) |
| 216 | ORG_7 | Num | 8 | 2250 | | 1,1,2,2-Tetrachloroethane (ug/L) |
| 227 | ORG_8 | Num | 8 | 2338 | | 1,2-Dichlorobenzene (ug/L) |
| 237 | ORG_9 | Num | 8 | 2418 | | 1,2-Dichloroethane (ug/L) |
| 159 | ORG_10 | Num | 8 | 1794 | | 1,2-Dichloroethene (ug/L) |
| 160 | ORG_11 | Num | 8 | 1802 | | 1,2-Dichloropropane (ug/L) |
| 161 | ORG_12 | Num | 8 | 1810 | | 1,2-Diphenyl Hydrazine (ug/L) |
| 162 | ORG_13 | Num | 8 | 1818 | | 1,2,4-Trichlorobenzene (ug/L) |
| 163 | ORG_14 | Num | 8 | 1826 | | 1,3-Dichlorobenzene (ug/L) |
| 164 | ORG_15 | Num | 8 | 1834 | | 1,4 & 1,2-Dichlorobenzene (ug/L) |
| 165 | ORG_16 | Num | 8 | 1842 | | 1,4-Dichlorobenzene (ug/L) |
| 166 | ORG_18 | Num | 8 | 1850 | | 2-Chloronaphthalene (ug/L) |
| 167 | ORG_19 | Num | 8 | 1858 | | 2-Chlorophenol (ug/L) |
| 168 | ORG_21 | Num | 8 | 1866 | | 2-Nitrophenol (ug/L) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 169 | ORG_23 | Num | 8 | 1874 | | 2,4-Dichlorophenol (ug/L) |
| 170 | ORG_24 | Num | 8 | 1882 | | 2,4-Dimethylphenol (ug/L) |
| 171 | ORG_25 | Num | 8 | 1890 | | 2,4-Dinitrophenol (ug/L) |
| 172 | ORG_26 | Num | 8 | 1898 | | 2,4-Dinitrotoluene (ug/L) |
| 173 | ORG_27 | Num | 8 | 1906 | | 2,4,6-Trichlorophenol (ug/L) |
| 174 | ORG_29 | Num | 8 | 1914 | | 2,6-Dinitrotoluene (ug/L) |
| 176 | ORG_30 | Num | 8 | 1930 | | 3,3'-Dichlorobenzidine (ug/L) |
| 177 | ORG_31 | Num | 8 | 1938 | | 4-Bromophenyl-phenylether (ug/L) |
| 178 | ORG_32 | Num | 8 | 1946 | | 4-Chlorophenyl-phenylether (ug/L) |
| 179 | ORG_33 | Num | 8 | 1954 | | 4-Nitrophenol (ug/L) |
| 180 | ORG_34 | Num | 8 | 1962 | | 4,6-Dinitro-2-methylphenol (ug/L) |
| 181 | ORG_35 | Num | 8 | 1970 | | 4,-Chloro-3-methylphenol (ug/L) |
| 182 | ORG_36 | Num | 8 | 1978 | | Acenaphthene (ug/L) |
| 183 | ORG_37 | Num | 8 | 1986 | | Acenaphthylene (ug/L) |
| 184 | ORG_38 | Num | 8 | 1994 | | Acrolein (ug/L) |
| 185 | ORG_39 | Num | 8 | 2002 | | Acrylonitrile (ug/L) |
| 187 | ORG_40 | Num | 8 | 2018 | | Anthracene (ug/L) |
| 188 | ORG_41 | Num | 8 | 2026 | | Benzene (ug/L) |
| 189 | ORG_42 | Num | 8 | 2034 | | Benzidine (ug/L) |
| 190 | ORG_43 | Num | 8 | 2042 | | Benzo(a)anthracene (ug/L) |
| 191 | ORG_44 | Num | 8 | 2050 | | Benzo(a)pyrene (ug/L) |
| 192 | ORG_45 | Num | 8 | 2058 | | Benzo(b)fluoranthene (ug/L) |
| 193 | ORG_47 | Num | 8 | 2066 | | Benzo(g,h,i)perylene (ug/L) |
| 194 | ORG_48 | Num | 8 | 2074 | | Benzo(k)fluoranthene (ug/L) |
| 196 | ORG_50 | Num | 8 | 2090 | | Bis(2-chloroethoxy)methane (ug/L) |
| 197 | ORG_51 | Num | 8 | 2098 | | Bis(2-chloroethyl)ether (ug/L) |
| 198 | ORG_52 | Num | 8 | 2106 | | Bis(2-chloroisopropyl)ether (ug/L) |
| 199 | ORG_53 | Num | 8 | 2114 | | Bis(2-ethylhexyl)phthalate (ug/L) |
| 200 | ORG_54 | Num | 8 | 2122 | | Bromodichloromethane (ug/L) |
| 201 | ORG_55 | Num | 8 | 2130 | | Bromoform (ug/L) |
| 202 | ORG_56 | Num | 8 | 2138 | | Bromomethane (ug/L) |
| 203 | ORG_57 | Num | 8 | 2146 | | Butlybenzylphthalate (ug/L) |
| 204 | ORG_58 | Num | 8 | 2154 | | Carbon Tetrachloride (ug/L) |
| 205 | ORG_59 | Num | 8 | 2162 | | Chlorobenzene (ug/L) |
| 207 | ORG_60 | Num | 8 | 2178 | | Chloroethane (ug/L) |
| 208 | ORG_61 | Num | 8 | 2186 | | Chloroform (ug/L) |
| 209 | ORG_62 | Num | 8 | 2194 | | Chloromethane (ug/L) |
| 210 | ORG_63 | Num | 8 | 2202 | | Chrysene (ug/L) |
| 211 | ORG_64 | Num | 8 | 2210 | | Cis-1,3-Dichloropropene (ug/L) |
| 212 | ORG_66 | Num | 8 | 2218 | | Dibenzo(a,h)anthracene (ug/L) |
| 213 | ORG_67 | Num | 8 | 2226 | | Dibromochloromethane (ug/L) |
| 214 | ORG_68 | Num | 8 | 2234 | | Diethylphthalate (ug/L) |
| 215 | ORG_69 | Num | 8 | 2242 | | Dimethylphthalate (ug/L) |
| 217 | ORG_70 | Num | 8 | 2258 | | Di-n-butylphthalate (ug/L) |
| 218 | ORG_71 | Num | 8 | 2266 | | Di-n-octylphthalate (ug/L) |
| 219 | ORG_72 | Num | 8 | 2274 | | Ethylbenzene (ug/L) |
| 220 | ORG_73 | Num | 8 | 2282 | | Fluoranthene (ug/L) |
| 221 | ORG_74 | Num | 8 | 2290 | | Fluorene (ug/L) |
| 222 | ORG_75 | Num | 8 | 2298 | | Hexachlorobenzene (ug/L) |
| 223 | ORG_76 | Num | 8 | 2306 | | Hexachlorobutadiene (ug/L) |
| 224 | ORG_77 | Num | 8 | 2314 | | Hexachlorocyclopentadiene (ug/L) |
| 225 | ORG_78 | Num | 8 | 2322 | | Hexachloroethane (ug/L) |

Wilmington Harbor - Elutriate Data

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 226 | ORG_79 | Num | 8 | 2330 | | Indeno(1,2,3-c,d)pyrene (ug/L) |
| 228 | ORG_80 | Num | 8 | 2346 | | Isophorone (ug/L) |
| 229 | ORG_81 | Num | 8 | 2354 | | Methylene Chloride (ug/L) |
| 230 | ORG_82 | Num | 8 | 2362 | | Naphthalene (ug/L) |
| 231 | ORG_83 | Num | 8 | 2370 | | Nitrobenzene (ug/L) |
| 232 | ORG_84 | Num | 8 | 2378 | | N-nitrosodimethylamine (ug/L) |
| 233 | ORG_85 | Num | 8 | 2386 | | N-nitroso-Di-n-propylamine (ug/L) |
| 234 | ORG_86 | Num | 8 | 2394 | | N-nitrosodiphenylamine (ug/L) |
| 235 | ORG_87 | Num | 8 | 2402 | | Pentachlorophenol (ug/L) |
| 236 | ORG_89 | Num | 8 | 2410 | | Phenanthrene (ug/L) |
| 238 | ORG_90 | Num | 8 | 2426 | | Phenol (mg/L) |
| 239 | ORG_91 | Num | 8 | 2434 | | Pyrene (ug/L) |
| 240 | ORG_92 | Num | 8 | 2442 | | Tetrachloroethene (ug/L) |
| 241 | ORG_93 | Num | 8 | 2450 | | Toluene (ug/L) |
| 242 | ORG_94 | Num | 8 | 2458 | | Trans-1,3-Dichloropropene (ug/L) |
| 243 | ORG_95 | Num | 8 | 2466 | | Trichloroethene (ug/L) |
| 244 | ORG_96 | Num | 8 | 2474 | | Trichlorofluoromethane (ug/L) |
| 245 | ORG_97 | Num | 8 | 2482 | | Vinyl Chloride (ug/L) |
| 246 | P1016 | Num | 8 | 2490 | | PCB-1016 (ug/L) |
| 247 | P1221 | Num | 8 | 2498 | | PCB-1221 (ug/L) |
| 248 | P1232 | Num | 8 | 2506 | | PCB-1232 (ug/L) |
| 249 | P1242 | Num | 8 | 2514 | | PCB-1242 (ug/L) |
| 250 | P1248 | Num | 8 | 2522 | | PCB-1248 (ug/L) |
| 251 | P1254 | Num | 8 | 2530 | | PCB-1254 (ug/L) |
| 252 | P1260 | Num | 8 | 2538 | | PCB-1260 (ug/L) |
| 1 | PAGE | Num | 8 | 0 | | Report Page Number |
| 23 | PB | Num | 8 | 210 | | Lead (mg/l) |
| 16 | PCB | Num | 8 | 151 | | PCB's (mg/l) |
| 265 | PES_4 | Num | 8 | 2642 | | 4,4'-DDD (ug/L) |
| 266 | PES_5 | Num | 8 | 2650 | | 4,4'-DDE (ug/L) |
| 267 | PES_6 | Num | 8 | 2658 | | 4,4'-DDT (ug/L) |
| 268 | PES_7 | Num | 8 | 2666 | | A-BHC (ug/L) |
| 269 | PES_8 | Num | 8 | 2674 | | Aldrin (ug/L) |
| 270 | PES_9 | Num | 8 | 2682 | | B-BHC (ug/L) |
| 253 | PES_10 | Num | 8 | 2546 | | Chlordane (ug/L) |
| 254 | PES_13 | Num | 8 | 2554 | | D-BHC (ug/L) |
| 255 | PES_15 | Num | 8 | 2562 | | Dieldrin (ug/L) |
| 256 | PES_16 | Num | 8 | 2570 | | Endosulfan I (ug/L) |
| 257 | PES_17 | Num | 8 | 2578 | | Endosulfan II (ug/L) |
| 258 | PES_18 | Num | 8 | 2586 | | Endosulfan sulfate (ug/L) |
| 259 | PES_19 | Num | 8 | 2594 | | Endrin (ug/L) |
| 260 | PES_20 | Num | 8 | 2602 | | Endrin aldehyde (ug/L) |
| 261 | PES_21 | Num | 8 | 2610 | | G-BHC (ug/L) |
| 262 | PES_22 | Num | 8 | 2618 | | Heptachlor (ug/L) |
| 263 | PES_23 | Num | 8 | 2626 | | Heptachlor epoxide (ug/L) |
| 264 | PES_27 | Num | 8 | 2634 | | Toxaphene (ug/L) |
| 6 | PH | Num | 8 | 55 | | pH |
| 271 | SB | Num | 8 | 2690 | | Antimony (mg/L) |
| 272 | SE | Num | 8 | 2698 | | Selenium (mg/L) |
| 2 | STATION | Char | 12 | 8 | 12. | Sampling Station |
| 33 | S_AG | Char | 12 | 302 | 12. | Flag for AG (Less than DL) |
| 29 | S_AL | Char | 12 | 266 | 12. | Flag for AL (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 34 | S_AS | Char | 12 | 314 | 12. | Flag for AS (Less than DL) |
| 35 | S_BE | Char | 12 | 326 | 12. | Flag for BE (Less than DL) |
| 7 | S_BOD | Char | 12 | 63 | 12. | Flag for BOD (Less than DL) |
| 24 | S_CD | Char | 12 | 218 | 12. | Flag for CD (Less than DL) |
| 27 | S_CR | Char | 12 | 246 | 12. | Flag for CR (Less than DL) |
| 36 | S_CU | Char | 12 | 338 | 12. | Flag for CU (Less than DL) |
| 37 | S_CY | Char | 12 | 350 | 12. | Flag for CY (Less than DL) |
| 13 | S_HG | Char | 12 | 119 | 12. | Flag for HG (Less than DL) |
| 38 | S_NI | Char | 12 | 362 | 12. | Flag for NI (Less than DL) |
| 17 | S_OG | Char | 12 | 159 | 12. | Flag for OG (Less than DL) |
| 55 | S_ORG_3 | Char | 12 | 566 | 12. | Flag for ORG_3 (Less than DL) |
| 66 | S_ORG_4 | Char | 12 | 698 | 12. | Flag for ORG_4 (Less than DL) |
| 75 | S_ORG_5 | Char | 12 | 806 | 12. | Flag for ORG_5 (Less than DL) |
| 86 | S_ORG_6 | Char | 12 | 938 | 12. | Flag for ORG_6 (Less than DL) |
| 96 | S_ORG_7 | Char | 12 | 1058 | 12. | Flag for ORG_7 (Less than DL) |
| 107 | S_ORG_8 | Char | 12 | 1190 | 12. | Flag for ORG_8 (Less than DL) |
| 117 | S_ORG_9 | Char | 12 | 1310 | 12. | Flag for ORG_9 (Less than DL) |
| 39 | S_ORG_10 | Char | 12 | 374 | 12. | Flag for ORG_10 (Less than DL) |
| 40 | S_ORG_11 | Char | 12 | 386 | 12. | Flag for ORG_11 (Less than DL) |
| 41 | S_ORG_12 | Char | 12 | 398 | 12. | Flag for ORG_12 (Less than DL) |
| 42 | S_ORG_13 | Char | 12 | 410 | 12. | Flag for ORG_13 (Less than DL) |
| 43 | S_ORG_14 | Char | 12 | 422 | 12. | Flag for ORG_14 (Less than DL) |
| 44 | S_ORG_15 | Char | 12 | 434 | 12. | Flag for ORG_15 (Less than DL) |
| 45 | S_ORG_16 | Char | 12 | 446 | 12. | Flag for ORG_16 (Less than DL) |
| 46 | S_ORG_18 | Char | 12 | 458 | 12. | Flag for ORG_18 (Less than DL) |
| 47 | S_ORG_19 | Char | 12 | 470 | 12. | Flag for ORG_19 (Less than DL) |
| 48 | S_ORG_21 | Char | 12 | 482 | 12. | Flag for ORG_21 (Less than DL) |
| 49 | S_ORG_23 | Char | 12 | 494 | 12. | Flag for ORG_23 (Less than DL) |
| 50 | S_ORG_24 | Char | 12 | 506 | 12. | Flag for ORG_24 (Less than DL) |
| 51 | S_ORG_25 | Char | 12 | 518 | 12. | Flag for ORG_25 (Less than DL) |
| 52 | S_ORG_26 | Char | 12 | 530 | 12. | Flag for ORG_26 (Less than DL) |
| 53 | S_ORG_27 | Char | 12 | 542 | 12. | Flag for ORG_27 (Less than DL) |
| 54 | S_ORG_29 | Char | 12 | 554 | 12. | Flag for ORG_29 (Less than DL) |
| 56 | S_ORG_30 | Char | 12 | 578 | 12. | Flag for ORG_30 (Less than DL) |
| 57 | S_ORG_31 | Char | 12 | 590 | 12. | Flag for ORG_31 (Less than DL) |
| 58 | S_ORG_32 | Char | 12 | 602 | 12. | Flag for ORG_32 (Less than DL) |
| 59 | S_ORG_33 | Char | 12 | 614 | 12. | Flag for ORG_33 (Less than DL) |
| 60 | S_ORG_34 | Char | 12 | 626 | 12. | Flag for ORG_34 (Less than DL) |
| 61 | S_ORG_35 | Char | 12 | 638 | 12. | Flag for ORG_35 (Less than DL) |
| 62 | S_ORG_36 | Char | 12 | 650 | 12. | Flag for ORG_36 (Less than DL) |
| 63 | S_ORG_37 | Char | 12 | 662 | 12. | Flag for ORG_37 (Less than DL) |
| 64 | S_ORG_38 | Char | 12 | 674 | 12. | Flag for ORG_38 (Less than DL) |
| 65 | S_ORG_39 | Char | 12 | 686 | 12. | Flag for ORG_39 (Less than DL) |
| 67 | S_ORG_40 | Char | 12 | 710 | 12. | Flag for ORG_40 (Less than DL) |
| 68 | S_ORG_41 | Char | 12 | 722 | 12. | Flag for ORG_41 (Less than DL) |
| 69 | S_ORG_42 | Char | 12 | 734 | 12. | Flag for ORG_42 (Less than DL) |
| 70 | S_ORG_43 | Char | 12 | 746 | 12. | Flag for ORG_43 (Less than DL) |
| 71 | S_ORG_44 | Char | 12 | 758 | 12. | Flag for ORG_44 (Less than DL) |
| 72 | S_ORG_45 | Char | 12 | 770 | 12. | Flag for ORG_45 (Less than DL) |
| 73 | S_ORG_47 | Char | 12 | 782 | 12. | Flag for ORG_47 (Less than DL) |
| 74 | S_ORG_48 | Char | 12 | 794 | 12. | Flag for ORG_48 (Less than DL) |
| [illegible] | S_ORG_50 | Char | 12 | 818 | 12. | Flag for ORG_50 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 77 | S_ORG_51 | Char | 12 | 830 | 12. | Flag for ORG_51 (Less than DL) |
| 78 | S_ORG_52 | Char | 12 | 842 | 12. | Flag for ORG_52 (Less than DL) |
| 79 | S_ORG_53 | Char | 12 | 854 | 12. | Flag for ORG_53 (Less than DL) |
| 80 | S_ORG_54 | Char | 12 | 866 | 12. | Flag for ORG_54 (Less than DL) |
| 81 | S_ORG_55 | Char | 12 | 878 | 12. | Flag for ORG_55 (Less than DL) |
| 82 | S_ORG_56 | Char | 12 | 890 | 12. | Flag for ORG_56 (Less than DL) |
| 83 | S_ORG_57 | Char | 12 | 902 | 12. | Flag for ORG_57 (Less than DL) |
| 84 | S_ORG_58 | Char | 12 | 914 | 12. | Flag for ORG_58 (Less than DL) |
| 85 | S_ORG_59 | Char | 12 | 926 | 12. | Flag for ORG_59 (Less than DL) |
| 87 | S_ORG_60 | Char | 12 | 950 | 12. | Flag for ORG_60 (Less than DL) |
| 88 | S_ORG_61 | Char | 12 | 962 | 12. | Flag for ORG_61 (Less than DL) |
| 89 | S_ORG_62 | Char | 12 | 974 | 12. | Flag for ORG_62 (Less than DL) |
| 90 | S_ORG_63 | Char | 12 | 986 | 12. | Flag for ORG_63 (Less than DL) |
| 91 | S_ORG_64 | Char | 12 | 998 | 12. | Flag for ORG_64 (Less than DL) |
| 92 | S_ORG_66 | Char | 12 | 1010 | 12. | Flag for ORG_66 (Less than DL) |
| 93 | S_ORG_67 | Char | 12 | 1022 | 12. | Flag for ORG_67 (Less than DL) |
| 94 | S_ORG_68 | Char | 12 | 1034 | 12. | Flag for ORG_68 (Less than DL) |
| 95 | S_ORG_69 | Char | 12 | 1046 | 12. | Flag for ORG_69 (Less than DL) |
| 97 | S_ORG_70 | Char | 12 | 1070 | 12. | Flag for ORG_70 (Less than DL) |
| 98 | S_ORG_71 | Char | 12 | 1082 | 12. | Flag for ORG_71 (Less than DL) |
| 99 | S_ORG_72 | Char | 12 | 1094 | 12. | Flag for ORG_72 (Less than DL) |
| 100 | S_ORG_73 | Char | 12 | 1106 | 12. | Flag for ORG_73 (Less than DL) |
| 101 | S_ORG_74 | Char | 12 | 1118 | 12. | Flag for ORG_74 (Less than DL) |
| 102 | S_ORG_75 | Char | 12 | 1130 | 12. | Flag for ORG_75 (Less than DL) |
| 103 | S_ORG_76 | Char | 12 | 1142 | 12. | Flag for ORG_76 (Less than DL) |
| 104 | S_ORG_77 | Char | 12 | 1154 | 12. | Flag for ORG_77 (Less than DL) |
| 105 | S_ORG_78 | Char | 12 | 1166 | 12. | Flag for ORG_78 (Less than DL) |
| 106 | S_ORG_79 | Char | 12 | 1178 | 12. | Flag for ORG_79 (Less than DL) |
| 108 | S_ORG_80 | Char | 12 | 1202 | 12. | Flag for ORG_80 (Less than DL) |
| 109 | S_ORG_81 | Char | 12 | 1214 | 12. | Flag for ORG_81 (Less than DL) |
| 110 | S_ORG_82 | Char | 12 | 1226 | 12. | Flag for ORG_82 (Less than DL) |
| 111 | S_ORG_83 | Char | 12 | 1238 | 12. | Flag for ORG_83 (Less than DL) |
| 112 | S_ORG_84 | Char | 12 | 1250 | 12. | Flag for ORG_84 (Less than DL) |
| 113 | S_ORG_85 | Char | 12 | 1262 | 12. | Flag for ORG_85 (Less than DL) |
| 114 | S_ORG_86 | Char | 12 | 1274 | 12. | Flag for ORG_86 (Less than DL) |
| 115 | S_ORG_87 | Char | 12 | 1286 | 12. | Flag for ORG_87 (Less than DL) |
| 116 | S_ORG_89 | Char | 12 | 1298 | 12. | Flag for ORG_89 (Less than DL) |
| 118 | S_ORG_90 | Char | 12 | 1322 | 12. | Flag for ORG_90 (Less than DL) |
| 119 | S_ORG_91 | Char | 12 | 1334 | 12. | Flag for ORG_91 (Less than DL) |
| 120 | S_ORG_92 | Char | 12 | 1346 | 12. | Flag for ORG_92 (Less than DL) |
| 121 | S_ORG_93 | Char | 12 | 1358 | 12. | Flag for ORG_93 (Less than DL) |
| 122 | S_ORG_94 | Char | 12 | 1370 | 12. | Flag for ORG_94 (Less than DL) |
| 123 | S_ORG_95 | Char | 12 | 1382 | 12. | Flag for ORG_95 (Less than DL) |
| 124 | S_ORG_96 | Char | 12 | 1394 | 12. | Flag for ORG_96 (Less than DL) |
| 125 | S_ORG_97 | Char | 12 | 1406 | 12. | Flag for ORG_97 (Less than DL) |
| 126 | S_P1016 | Char | 12 | 1418 | 12. | Flag for P1016 (Less than DL) |
| 127 | S_P1221 | Char | 12 | 1430 | 12. | Flag for P1221 (Less than DL) |
| 128 | S_P1232 | Char | 12 | 1442 | 12. | Flag for P1232 (Less than DL) |
| 129 | S_P1242 | Char | 12 | 1454 | 12. | Flag for P1242 (Less than DL) |
| 130 | S_P1248 | Char | 12 | 1466 | 12. | Flag for P1248 (Less than DL) |
| 131 | S_P1254 | Char | 12 | 1478 | 12. | Flag for P1254 (Less than DL) |
| 132 | S_P1260 | Char | 12 | 1490 | 12. | Flag for P1260 (Less than DL) |

Wilmington Harbor - Elutriate Data

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 22 | S_PB | Char | 12 | 198 | 12. | Flag for PB (Less than DL) |
| 15 | S_PCB | Char | 12 | 139 | 12. | Flag for PCB (Less than DL) |
| 145 | S_PES_4 | Char | 12 | 1646 | 12. | Flag for PES_4 (Less than DL) |
| 146 | S_PES_5 | Char | 12 | 1658 | 12. | Flag for PES_5 (Less than DL) |
| 147 | S_PES_6 | Char | 12 | 1670 | 12. | Flag for PES_6 (Less than DL) |
| 148 | S_PES_7 | Char | 12 | 1682 | 12. | Flag for PES_7 (Less than DL) |
| 149 | S_PES_8 | Char | 12 | 1694 | 12. | Flag for PES_8 (Less than DL) |
| 150 | S_PES_9 | Char | 12 | 1706 | 12. | Flag for PES_9 (Less than DL) |
| 133 | S_PES_10 | Char | 12 | 1502 | 12. | Flag for PES_10 (Less than DL) |
| 134 | S_PES_13 | Char | 12 | 1514 | 12. | Flag for PES_13 (Less than DL) |
| 135 | S_PES_15 | Char | 12 | 1526 | 12. | Flag for PES_15 (Less than DL) |
| 136 | S_PES_16 | Char | 12 | 1538 | 12. | Flag for PES_16 (Less than DL) |
| 137 | S_PES_17 | Char | 12 | 1550 | 12. | Flag for PES_17 (Less than DL) |
| 138 | S_PES_18 | Char | 12 | 1562 | 12. | Flag for PES_18 (Less than DL) |
| 139 | S_PES_19 | Char | 12 | 1574 | 12. | Flag for PES_19 (Less than DL) |
| 140 | S_PES_20 | Char | 12 | 1586 | 12. | Flag for PES_20 (Less than DL) |
| 141 | S_PES_21 | Char | 12 | 1598 | 12. | Flag for PES_21 (Less than DL) |
| 142 | S_PES_22 | Char | 12 | 1610 | 12. | Flag for PES_22 (Less than DL) |
| 143 | S_PES_23 | Char | 12 | 1622 | 12. | Flag for PES_23 (Less than DL) |
| 144 | S_PES_27 | Char | 12 | 1634 | 12. | Flag for PES_27 (Less than DL) |
| 151 | S_SB | Char | 12 | 1718 | 12. | Flag for SB (Less than DL) |
| 152 | S_SE | Char | 12 | 1730 | 12. | Flag for SE (Less than DL) |
| 153 | S_TL | Char | 12 | 1742 | 12. | Flag for TL (Less than DL) |
| 20 | S_TP | Char | 3 | 187 | 3. | Flag for TP (Less than DL) |
| 11 | S_ZN | Char | 12 | 99 | 12. | Flag for ZN (Less than DL) |
| 32 | TIME | Num | 8 | 294 | TIME5. | Sampling Time |
| 19 | TKN | Num | 8 | 179 | | Total Kjeldahl Nitrogen (mg/l) |
| 273 | TL | Num | 8 | 2706 | | Thallium (mg/L) |
| 10 | TN | Num | 8 | 91 | | Total Nitrogen (mg/l) |
| 9 | TOC | Num | 8 | 83 | | Total Organic Carbon (mg/l) |
| 21 | TP | Num | 8 | 190 | | Total Phosphate (mg/l) |
| 5 | TRIB | Char | 6 | 49 | 6. | CR=Christina River,DR=Delaware River |
| 12 | ZN | Num | 8 | 111 | | Zinc (mg/l) |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 21 | 0 | 360.0952381 | 170.0000000 | 671.0000000 |
| DATE | Sampling Date | 21 | 0 | 9953.24 | 7284.00 | 12123.00 |
| PH | pH | 14 | 7 | 7.5357143 | 6.6000000 | 8.1000000 |
| BOD | Biochemical Oxygen Demand (mg/l) | 14 | 7 | 8.4642857 | 2.4000000 | 11.0000000 |
| TOC | Total Organic Carbon (mg/l) | 14 | 7 | 27.7857143 | 8.0000000 | 44.0000000 |
| TN | Total Nitrogen (mg/l) | 11 | 10 | 15.4000000 | 3.4000000 | 28.0000000 |
| ZN | Zinc (mg/l) | 21 | 0 | 0.0645238 | 0.0300000 | 0.1200000 |
| HG | Mercury (mg/l) | 21 | 0 | 0.000733333 | 0.000200000 | 0.0010000 |
| PCB | PCB's (mg/l) | 11 | 10 | 2.0000000 | 2.0000000 | 2.0000000 |
| OG | Oil & Grease (mg/l) | 3 | 18 | 1.0000000 | 1.0000000 | 1.0000000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 3 | 18 | 5.0000000 | 1.1000000 | 10.0000000 |
| TP | Total Phosphate (mg/l) | 3 | 18 | 0.1933333 | 0.0600000 | 0.4500000 |
| PB | Lead (mg/l) | 10 | 11 | 0.0933000 | 0.0030000 | 0.2300000 |
| CD | Cadmium (mg/l) | 10 | 11 | 0.0332000 | 0.0020000 | 0.0500000 |
| CU | Copper (mg/l) | 10 | 11 | 0.0480000 | 0.0300000 | 0.0600000 |
| CR | Chromium (mg/l) | 10 | 11 | 0.0365000 | 0.0050000 | 0.0500000 |
| AL | Aluminum (mg/l) | 3 | 18 | 1.3000000 | 0.1000000 | 3.3000000 |
| COD | Chemical Oxygen Demand (mg/l) | 3 | 18 | 38.0000000 | 17.0000000 | 72.0000000 |
| TIME | Sampling Time | 14 | 7 | 42724.29 | 38700.00 | 47700.00 |
| AG | Silver (mg/L) | 7 | 14 | 0.0435714 | 0.0050000 | 0.0500000 |
| AS | Arsenic (mg/L) | 7 | 14 | 0.0861429 | 0.0030000 | 0.1000000 |
| BE | Beryllium (mg/L) | 7 | 14 | 0.000500000 | 0.000500000 | 0.000500000 |
| CY | Cyanide (mg/L) | 7 | 14 | 0.0050000 | 0.0050000 | 0.0050000 |
| NI | Nickel (mg/L) | 7 | 14 | 0.0442857 | 0.0100000 | 0.0500000 |
| ORG_10 | 1,2-Dichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_19 | 2-Chlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_21 | 2-Nitrophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_26 | 2,4-Dinitrotoluene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/L) | 7 | 14 | 20.0000000 | 20.0000000 | 20.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_33 | 4-Nitrophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_36 | Acenaphthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_37 | Acenaphthylene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_38 | Acrolein (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_39 | Acrylonitrile (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_40 | Anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_41 | Benzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_42 | Benzidine (ug/L) | 7 | 14 | 80.0000000 | 80.0000000 | 80.0000000 |
| ORG_43 | Benzo(a)anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_44 | Benzo(a)pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/L) | 7 | 14 | 8.0000000 | 2.0000000 | 10.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_54 | Bromodichloromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_55 | Bromoform (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_56 | Bromomethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_59 | Chlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_60 | Chloroethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_61 | Chloroform (ug/L) | 7 | 14 | 4.4285714 | 3.0000000 | 6.0000000 |
| ORG_62 | Chloromethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_63 | Chrysene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_67 | Dibromochloromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_68 | Diethylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_69 | Dimethylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_72 | Ethylbenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_73 | Fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_74 | Fluorene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_75 | Hexachlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_78 | Hexachloroethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_80 | Isophorone (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_81 | Methylene Chloride (ug/L) | 7 | 14 | 9.7142857 | 5.0000000 | 12.0000000 |
| ORG_82 | Naphthalene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_83 | Nitrobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_87 | Pentachlorophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_89 | Phenanthrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_90 | Phenol (mg/L) | 7 | 14 | 0.0067143 | 0.0050000 | 0.0090000 |
| ORG_91 | Pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_92 | Tetrachloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_93 | Toluene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_95 | Trichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_97 | Vinyl Chloride (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| P1016 | PCB-1016 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1221 | PCB-1221 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1232 | PCB-1232 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1242 | PCB-1242 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1248 | PCB-1248 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1254 | PCB-1254 (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| P1260 | PCB-1260 (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| PES_10 | Chlordane (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| PES_13 | D-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_15 | Dieldrin (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_16 | Endosulfan I (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_17 | Endosulfan II (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_18 | Endosulfan sulfate (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_19 | Endrin (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_20 | Endrin aldehyde (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_21 | G-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_22 | Heptachlor (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_23 | Heptachlor epoxide (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_27 | Toxaphene (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| PES_4 | 4,4'-DDD (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_5 | 4,4'-DDE (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_6 | 4,4'-DDT (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_7 | A-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_8 | Aldrin (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_9 | B-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| SB | Antimony (mg/L) | 7 | 14 | 0.0860000 | 0.0020000 | 0.1000000 |
| SE | Selenium (mg/L) | 7 | 14 | 0.0860000 | 0.0020000 | 0.1000000 |
| TL | Thallium (mg/L) | 7 | 14 | 0.0431429 | 0.0020000 | 0.0500000 |

# Appendix D - Sediment Database

Name: SED.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 8 observations and 425 variables in the dataset. Each observation represents a sediment sample and a series of chemical and biological measurements. A sample can be uniquely identified by station type, station name, sampling date, tributary, and dredging period. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

All sediment samples were taken from Christina River, Background station type, and were before dredging period.

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 17 | S_ORG_10 | Char | 12 | 198 | 12. | Flag for ORG_10 (Less than DL) |
| 18 | S_ORG_11 | Char | 12 | 210 | 12. | Flag for ORG_11 (Less than DL) |
| 19 | S_ORG_12 | Char | 12 | 222 | 12. | Flag for ORG_12 (Less than DL) |
| 20 | S_ORG_13 | Char | 12 | 234 | 12. | Flag for ORG_13 (Less than DL) |
| 21 | S_ORG_14 | Char | 12 | 246 | 12. | Flag for ORG_14 (Less than DL) |
| 22 | S_ORG_15 | Char | 12 | 258 | 12. | Flag for ORG_15 (Less than DL) |
| 23 | S_ORG_16 | Char | 12 | 270 | 12. | Flag for ORG_16 (Less than DL) |
| 24 | S_ORG_18 | Char | 12 | 282 | 12. | Flag for ORG_18 (Less than DL) |
| 25 | S_ORG_19 | Char | 12 | 294 | 12. | Flag for ORG_19 (Less than DL) |
| 162 | S_ORG_20 | Char | 12 | 1938 | 12. | Flag for ORG_20 (Less than DL) |
| 26 | S_ORG_21 | Char | 12 | 306 | 12. | Flag for ORG_21 (Less than DL) |
| 163 | S_ORG_22 | Char | 12 | 1950 | 12. | Flag for ORG_22 (Less than DL) |
| 27 | S_ORG_23 | Char | 12 | 318 | 12. | Flag for ORG_23 (Less than DL) |
| 28 | S_ORG_24 | Char | 12 | 330 | 12. | Flag for ORG_24 (Less than DL) |
| 29 | S_ORG_25 | Char | 12 | 342 | 12. | Flag for ORG_25 (Less than DL) |
| 30 | S_ORG_26 | Char | 12 | 354 | 12. | Flag for ORG_26 (Less than DL) |
| 31 | S_ORG_27 | Char | 12 | 366 | 12. | Flag for ORG_27 (Less than DL) |
| 164 | S_ORG_28 | Char | 12 | 1962 | 12. | Flag for ORG_28 (Less than DL) |
| 32 | S_ORG_29 | Char | 12 | 378 | 12. | Flag for ORG_29 (Less than DL) |
| 34 | S_ORG_30 | Char | 12 | 402 | 12. | Flag for ORG_30 (Less than DL) |
| 35 | S_ORG_31 | Char | 12 | 414 | 12. | Flag for ORG_31 (Less than DL) |
| 36 | S_ORG_32 | Char | 12 | 426 | 12. | Flag for ORG_32 (Less than DL) |
| 37 | S_ORG_33 | Char | 12 | 438 | 12. | Flag for ORG_33 (Less than DL) |
| 38 | S_ORG_34 | Char | 12 | 450 | 12. | Flag for ORG_34 (Less than DL) |
| 39 | S_ORG_35 | Char | 12 | 462 | 12. | Flag for ORG_35 (Less than DL) |
| 40 | S_ORG_36 | Char | 12 | 474 | 12. | Flag for ORG_36 (Less than DL) |
| 41 | S_ORG_37 | Char | 12 | 486 | 12. | Flag for ORG_37 (Less than DL) |
| 42 | S_ORG_38 | Char | 12 | 498 | 12. | Flag for ORG_38 (Less than DL) |
| 43 | S_ORG_39 | Char | 12 | 510 | 12. | Flag for ORG_39 (Less than DL) |
| 45 | S_ORG_40 | Char | 12 | 534 | 12. | Flag for ORG_40 (Less than DL) |
| 46 | S_ORG_41 | Char | 12 | 546 | 12. | Flag for ORG_41 (Less than DL) |
| 47 | S_ORG_42 | Char | 12 | 558 | 12. | Flag for ORG_42 (Less than DL) |
| 48 | S_ORG_43 | Char | 12 | 570 | 12. | Flag for ORG_43 (Less than DL) |
| 49 | S_ORG_44 | Char | 12 | 582 | 12. | Flag for ORG_44 (Less than DL) |
| 50 | S_ORG_45 | Char | 12 | 594 | 12. | Flag for ORG_45 (Less than DL) |
| 165 | S_ORG_46 | Char | 12 | 1974 | 12. | Flag for ORG_46 (Less than DL) |
| 51 | S_ORG_47 | Char | 12 | 606 | 12. | Flag for ORG_47 (Less than DL) |
| 52 | S_ORG_48 | Char | 12 | 618 | 12. | Flag for ORG_48 (Less than DL) |
| 166 | S_ORG_49 | Char | 12 | 1986 | 12. | Flag for ORG_49 (Less than DL) |
| 54 | S_ORG_50 | Char | 12 | 642 | 12. | Flag for ORG_50 (Less than DL) |
| 55 | S_ORG_51 | Char | 12 | 654 | 12. | Flag for ORG_51 (Less than DL) |
| 56 | S_ORG_52 | Char | 12 | 666 | 12. | Flag for ORG_52 (Less than DL) |
| 57 | S_ORG_53 | Char | 12 | 678 | 12. | Flag for ORG_53 (Less than DL) |
| 58 | S_ORG_54 | Char | 12 | 690 | 12. | Flag for ORG_54 (Less than DL) |
| 59 | S_ORG_55 | Char | 12 | 702 | 12. | Flag for ORG_55 (Less than DL) |
| 60 | S_ORG_56 | Char | 12 | 714 | 12. | Flag for ORG_56 (Less than DL) |
| 61 | S_ORG_57 | Char | 12 | 726 | 12. | Flag for ORG_57 (Less than DL) |
| 62 | S_ORG_58 | Char | 12 | 738 | 12. | Flag for ORG_58 (Less than DL) |
| 63 | S_ORG_59 | Char | 12 | 750 | 12. | Flag for ORG_59 (Less than DL) |
| 65 | S_ORG_60 | Char | 12 | 774 | 12. | Flag for ORG_60 (Less than DL) |
| 66 | S_ORG_61 | Char | 12 | 786 | 12. | Flag for ORG_61 (Less than DL) |
| 67 | S_ORG_62 | Char | 12 | 798 | 12. | Flag for ORG_62 (Less than DL) |

Wilmington Harbor - Sediment Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 68 | S_ORG_63 | Char | 12 | 810 | 12. | Flag for ORG_63 (Less than DL) |
| 69 | S_ORG_64 | Char | 12 | 822 | 12. | Flag for ORG_64 (Less than DL) |
| 70 | S_ORG_66 | Char | 12 | 834 | 12. | Flag for ORG_66 (Less than DL) |
| 71 | S_ORG_67 | Char | 12 | 846 | 12. | Flag for ORG_67 (Less than DL) |
| 72 | S_ORG_68 | Char | 12 | 858 | 12. | Flag for ORG_68 (Less than DL) |
| 73 | S_ORG_69 | Char | 12 | 870 | 12. | Flag for ORG_69 (Less than DL) |
| 75 | S_ORG_70 | Char | 12 | 894 | 12. | Flag for ORG_70 (Less than DL) |
| 76 | S_ORG_71 | Char | 12 | 906 | 12. | Flag for ORG_71 (Less than DL) |
| 77 | S_ORG_72 | Char | 12 | 918 | 12. | Flag for ORG_72 (Less than DL) |
| 78 | S_ORG_73 | Char | 12 | 930 | 12. | Flag for ORG_73 (Less than DL) |
| 79 | S_ORG_74 | Char | 12 | 942 | 12. | Flag for ORG_74 (Less than DL) |
| 80 | S_ORG_75 | Char | 12 | 954 | 12. | Flag for ORG_75 (Less than DL) |
| 81 | S_ORG_76 | Char | 12 | 966 | 12. | Flag for ORG_76 (Less than DL) |
| 82 | S_ORG_77 | Char | 12 | 978 | 12. | Flag for ORG_77 (Less than DL) |
| 83 | S_ORG_78 | Char | 12 | 990 | 12. | Flag for ORG_78 (Less than DL) |
| 84 | S_ORG_79 | Char | 12 | 1002 | 12. | Flag for ORG_79 (Less than DL) |
| 86 | S_ORG_80 | Char | 12 | 1026 | 12. | Flag for ORG_80 (Less than DL) |
| 87 | S_ORG_81 | Char | 12 | 1038 | 12. | Flag for ORG_81 (Less than DL) |
| 88 | S_ORG_82 | Char | 12 | 1050 | 12. | Flag for ORG_82 (Less than DL) |
| 89 | S_ORG_83 | Char | 12 | 1062 | 12. | Flag for ORG_83 (Less than DL) |
| 90 | S_ORG_84 | Char | 12 | 1074 | 12. | Flag for ORG_84 (Less than DL) |
| 91 | S_ORG_85 | Char | 12 | 1086 | 12. | Flag for ORG_85 (Less than DL) |
| 92 | S_ORG_86 | Char | 12 | 1098 | 12. | Flag for ORG_86 (Less than DL) |
| 93 | S_ORG_87 | Char | 12 | 1110 | 12. | Flag for ORG_87 (Less than DL) |
| 167 | S_ORG_88 | Char | 12 | 1998 | 12. | Flag for ORG_88 (Less than DL) |
| 94 | S_ORG_89 | Char | 12 | 1122 | 12. | Flag for ORG_89 (Less than DL) |
| 96 | S_ORG_90 | Char | 12 | 1146 | 12. | Flag for ORG_90 (Less than DL) |
| 97 | S_ORG_91 | Char | 12 | 1158 | 12. | Flag for ORG_91 (Less than DL) |
| 98 | S_ORG_92 | Char | 12 | 1170 | 12. | Flag for ORG_92 (Less than DL) |
| 99 | S_ORG_93 | Char | 12 | 1182 | 12. | Flag for ORG_93 (Less than DL) |
| 100 | S_ORG_94 | Char | 12 | 1194 | 12. | Flag for ORG_94 (Less than DL) |
| 101 | S_ORG_95 | Char | 12 | 1206 | 12. | Flag for ORG_95 (Less than DL) |
| 102 | S_ORG_96 | Char | 12 | 1218 | 12. | Flag for ORG_96 (Less than DL) |
| 103 | S_ORG_97 | Char | 12 | 1230 | 12. | Flag for ORG_97 (Less than DL) |
| 168 | S_O_194 | Char | 12 | 2010 | 12. | Flag for O_194 (Less than DL) |
| 169 | S_O_195 | Char | 12 | 2022 | 12. | Flag for O_195 (Less than DL) |
| 170 | S_O_196 | Char | 12 | 2034 | 12. | Flag for O_196 (Less than DL) |
| 171 | S_O_200 | Char | 12 | 2046 | 12. | Flag for O_200 (Less than DL) |
| 172 | S_O_201 | Char | 12 | 2058 | 12. | Flag for O_201 (Less than DL) |
| 173 | S_O_203 | Char | 12 | 2070 | 12. | Flag for O_203 (Less than DL) |
| 174 | S_O_205 | Char | 12 | 2082 | 12. | Flag for O_205 (Less than DL) |
| 104 | S_P1016 | Char | 12 | 1242 | 12. | Flag for P1016 (Less than DL) |
| 105 | S_P1221 | Char | 12 | 1254 | 12. | Flag for P1221 (Less than DL) |
| 106 | S_P1232 | Char | 12 | 1266 | 12. | Flag for P1232 (Less than DL) |
| 107 | S_P1242 | Char | 12 | 1278 | 12. | Flag for P1242 (Less than DL) |
| 108 | S_P1248 | Char | 12 | 1290 | 12. | Flag for P1248 (Less than DL) |
| 109 | S_P1254 | Char | 12 | 1302 | 12. | Flag for P1254 (Less than DL) |
| 110 | S_P1260 | Char | 12 | 1314 | 12. | Flag for P1260 (Less than DL) |
| 111 | S_PB | Char | 12 | 1326 | 12. | Flag for PB (Less than DL) |
| 175 | S_PCB | Char | 12 | 2094 | 12. | Flag for PCB (Less than DL) |
| 176 | S_PES_1 | Char | 12 | 2106 | 12. | Flag for PES_1 (Less than DL) |
| 180 | S_PES_2 | Char | 12 | 2154 | 12. | Flag for PES_2 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 186 | S_PES_3 | Char | 12 | 2226 | 12. | Flag for PES_3 (Less than DL) |
| 124 | S_PES_4 | Char | 12 | 1482 | 12. | Flag for PES_4 (Less than DL) |
| 125 | S_PES_5 | Char | 12 | 1494 | 12. | Flag for PES_5 (Less than DL) |
| 126 | S_PES_6 | Char | 12 | 1506 | 12. | Flag for PES_6 (Less than DL) |
| 127 | S_PES_7 | Char | 12 | 1518 | 12. | Flag for PES_7 (Less than DL) |
| 128 | S_PES_8 | Char | 12 | 1530 | 12. | Flag for PES_8 (Less than DL) |
| 129 | S_PES_9 | Char | 12 | 1542 | 12. | Flag for PES_9 (Less than DL) |
| 112 | S_PES_10 | Char | 12 | 1338 | 12. | Flag for PES_10 (Less than DL) |
| 177 | S_PES_11 | Char | 12 | 2118 | 12. | Flag for PES_11 (Less than DL) |
| 178 | S_PES_12 | Char | 12 | 2130 | 12. | Flag for PES_12 (Less than DL) |
| 113 | S_PES_13 | Char | 12 | 1350 | 12. | Flag for PES_13 (Less than DL) |
| 179 | S_PES_14 | Char | 12 | 2142 | 12. | Flag for PES_14 (Less than DL) |
| 114 | S_PES_15 | Char | 12 | 1362 | 12. | Flag for PES_15 (Less than DL) |
| 115 | S_PES_16 | Char | 12 | 1374 | 12. | Flag for PES_16 (Less than DL) |
| 116 | S_PES_17 | Char | 12 | 1386 | 12. | Flag for PES_17 (Less than DL) |
| 117 | S_PES_18 | Char | 12 | 1398 | 12. | Flag for PES_18 (Less than DL) |
| 118 | S_PES_19 | Char | 12 | 1410 | 12. | Flag for PES_19 (Less than DL) |
| 119 | S_PES_20 | Char | 12 | 1422 | 12. | Flag for PES_20 (Less than DL) |
| 120 | S_PES_21 | Char | 12 | 1434 | 12. | Flag for PES_21 (Less than DL) |
| 121 | S_PES_22 | Char | 12 | 1446 | 12. | Flag for PES_22 (Less than DL) |
| 122 | S_PES_23 | Char | 12 | 1458 | 12. | Flag for PES_23 (Less than DL) |
| 181 | S_PES_24 | Char | 12 | 2166 | 12. | Flag for PES_24 (Less than DL) |
| 182 | S_PES_25 | Char | 12 | 2178 | 12. | Flag for PES_25 (Less than DL) |
| 183 | S_PES_26 | Char | 12 | 2190 | 12. | Flag for PES_26 (Less than DL) |
| 123 | S_PES_27 | Char | 12 | 1470 | 12. | Flag for PES_27 (Less than DL) |
| 184 | S_PES_28 | Char | 12 | 2202 | 12. | Flag for PES_28 (Less than DL) |
| 185 | S_PES_29 | Char | 12 | 2214 | 12. | Flag for PES_29 (Less than DL) |
| 196 | S_P_82 | Char | 12 | 2346 | 12. | Flag for P_82 (Less than DL) |
| 197 | S_P_87 | Char | 12 | 2358 | 12. | Flag for P_87 (Less than DL) |
| 198 | S_P_95 | Char | 12 | 2370 | 12. | Flag for P_95 (Less than DL) |
| 199 | S_P_99 | Char | 12 | 2382 | 12. | Flag for P_99 (Less than DL) |
| 187 | S_P_101 | Char | 12 | 2238 | 12. | Flag for P_101 (Less than DL) |
| 188 | S_P_105 | Char | 12 | 2250 | 12. | Flag for P_105 (Less than DL) |
| 189 | S_P_110 | Char | 12 | 2262 | 12. | Flag for P_110 (Less than DL) |
| 190 | S_P_114 | Char | 12 | 2274 | 12. | Flag for P_114 (Less than DL) |
| 191 | S_P_118 | Char | 12 | 2286 | 12. | Flag for P_118 (Less than DL) |
| 192 | S_P_119 | Char | 12 | 2298 | 12. | Flag for P_119 (Less than DL) |
| 193 | S_P_123 | Char | 12 | 2310 | 12. | Flag for P_123 (Less than DL) |
| 194 | S_P_126 | Char | 12 | 2322 | 12. | Flag for P_126 (Less than DL) |
| 195 | S_P_127 | Char | 12 | 2334 | 12. | Flag for P_127 (Less than DL) |
| 130 | S_SB | Char | 12 | 1554 | 12. | Flag for SB (Less than DL) |
| 131 | S_SE | Char | 12 | 1566 | 12. | Flag for SE (Less than DL) |
| 200 | S_SOLID | Char | 12 | 2394 | 12. | Flag for SOLID (Less than DL) |
| 132 | S_TL | Char | 12 | 1578 | 12. | Flag for TL (Less than DL) |
| 201 | S_TOC | Char | 12 | 2406 | 12. | Flag for TOC (Less than DL) |
| 202 | S_TPH | Char | 12 | 2418 | 12. | Flag for TPH (Less than DL) |
| 203 | S_T_18 | Char | 12 | 2430 | 12. | Flag for T_18 (Less than DL) |
| 204 | S_T_28 | Char | 12 | 2442 | 12. | Flag for T_28 (Less than DL) |
| 205 | S_T_37 | Char | 12 | 2454 | 12. | Flag for T_37 (Less than DL) |
| 206 | S_T_44 | Char | 12 | 2466 | 12. | Flag for T_44 (Less than DL) |
| 207 | S_T_47 | Char | 12 | 2478 | 12. | Flag for T_47 (Less than DL) |
| 208 | S_T_49 | Char | 12 | 2490 | 12. | Flag for T_49 (Less than DL) |

Wilmington Harbor - Sediment Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 209 | S_T_52 | Char | 12 | 2502 | 12. | Flag for T_52 (Less than DL) |
| 210 | S_T_60 | Char | 12 | 2514 | 12. | Flag for T_60 (Less than DL) |
| 211 | S_T_66 | Char | 12 | 2526 | 12. | Flag for T_66 (Less than DL) |
| 212 | S_T_70 | Char | 12 | 2538 | 12. | Flag for T_70 (Less than DL) |
| 213 | S_T_74 | Char | 12 | 2550 | 12. | Flag for T_74 (Less than DL) |
| 214 | S_T_77 | Char | 12 | 2562 | 12. | Flag for T_77 (Less than DL) |
| 215 | S_T_80 | Char | 12 | 2574 | 12. | Flag for T_80 (Less than DL) |
| 216 | S_T_81 | Char | 12 | 2586 | 12. | Flag for T_81 (Less than DL) |
| 133 | S_ZN | Char | 12 | 1590 | 12. | Flag for ZN (Less than DL) |
| 341 | TL | Num | 8 | 3590 | | Thallium (mg/kg) |
| 410 | TOC | Num | 8 | 4142 | | Total Organic Carbon (mg/kg) |
| 411 | TPH | Num | 8 | 4150 | | Total Petroleum Hydrocarbons (mg/kg) |
| 5 | TRIB | Char | 12 | 40 | 12. | CR=Christina River,DR=Delaware River |
| 2 | TYPE | Char | 12 | 8 | 12. | B=Backgrnd,M=Mixing Z.,O=Outfall,W=Weir |
| 412 | T_18 | Num | 8 | 4158 | | 18 Tri (ng/g) |
| 413 | T_28 | Num | 8 | 4166 | | 28 Tri (ng/g) |
| 414 | T_37 | Num | 8 | 4174 | | 37 Tri (ng/g) |
| 415 | T_44 | Num | 8 | 4182 | | 44 Tetra (ng/g) |
| 416 | T_47 | Num | 8 | 4190 | | 47 Tetra (ng/g) |
| 417 | T_49 | Num | 8 | 4198 | | 49 Tetra (ng/g) |
| 418 | T_52 | Num | 8 | 4206 | | 52 Tetra (ng/g) |
| 419 | T_60 | Num | 8 | 4214 | | 60 Tetra (ng/g) |
| 420 | T_66 | Num | 8 | 4222 | | 66 Tetra (ng/g) |
| 421 | T_70 | Num | 8 | 4230 | | 70 Tetra (ng/g) |
| 422 | T_74 | Num | 8 | 4238 | | 74 Tetra (ng/g) |
| 423 | T_77 | Num | 8 | 4246 | | 77 Tetra (pg/g) |
| 424 | T_80 | Num | 8 | 4254 | | 80 Tetra (ng/g) |
| 425 | T_81 | Num | 8 | 4262 | | 81 Tetra (pg/g) |
| 342 | ZN | Num | 8 | 3598 | | Zinc (mg/kg) |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 8 | 0 | 714.0000000 | 669.0000000 | 849.0000000 |
| DATE | Sampling Date | 8 | 0 | 12193.75 | 12122.00 | 12409.00 |
| AG | Silver (mg/kg) | 8 | 0 | 1.6350000 | 1.0000000 | 4.1000000 |
| AS | Arsenic (mg/kg) | 8 | 0 | 2.8837500 | 1.6100000 | 4.2400000 |
| BE | Beryllium (mg/kg) | 6 | 2 | 0.3300000 | 0.2600000 | 0.4200000 |
| CD | Cadmium (mg/kg) | 8 | 0 | 0.9625000 | 0.5000000 | 1.2000000 |
| CR | Chromium (mg/kg) | 8 | 0 | 17.2875000 | 12.2000000 | 25.2000000 |
| CU | Copper (mg/kg) | 8 | 0 | 15.3250000 | 9.5000000 | 24.8000000 |
| CY | Cyanide (mg/kg) | 6 | 2 | 0.0716667 | 0.0400000 | 0.1000000 |
| HG | Mercury (mg/kg) | 8 | 0 | 0.1100000 | 0.0700000 | 0.3300000 |
| NI | Nickel (mg/kg) | 8 | 0 | 11.3375000 | 8.0000000 | 16.3000000 |
| ORG_10 | 1,2-Dichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_19 | 2-Chlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_21 | 2-Nitrophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_26 | 2,4-Dinitrotoluene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/kg) | 6 | 2 | 660.0000000 | 660.0000000 | 660.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_33 | 4-Nitrophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_36 | Acenaphthene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_37 | Acenaphthylene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_38 | Acrolein (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_39 | Acrylonitrile (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_40 | Anthracene (ug/kg) | 8 | 0 | 277.5000000 | 110.0000000 | 330.0000000 |
| ORG_41 | Benzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_42 | Benzidine (ug/kg) | 6 | 2 | 2700.00 | 2700.00 | 2700.00 |
| ORG_43 | Benzo(a)anthracene (ug/kg) | 8 | 0 | 161.1250000 | 72.0000000 | 330.0000000 |
| ORG_44 | Benzo(a)pyrene (ug/kg) | 8 | 0 | 175.3750000 | 68.0000000 | 330.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/kg) | 8 | 0 | 177.2500000 | 78.0000000 | 330.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/kg) | 8 | 0 | 266.7500000 | 68.0000000 | 330.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/kg) | 8 | 0 | 167.0000000 | 50.0000000 | 330.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/kg) | 6 | 2 | 340.0000000 | 220.0000000 | 530.0000000 |
| ORG_54 | Bromodichloromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_55 | Bromoform (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_56 | Bromomethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_59 | Chlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_60 | Chloroethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_61 | Chloroform (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_62 | Chloromethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_63 | Chrysene (ug/kg) | 8 | 0 | 192.3750000 | 89.0000000 | 330.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_67 | Dibromochloromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_68 | Diethylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_69 | Dimethylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_72 | Ethylbenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_73 | Fluoranthene (ug/kg) | 8 | 0 | 257.1250000 | 82.0000000 | 835.0000000 |
| ORG_74 | Fluorene (ug/kg) | 8 | 0 | 272.1250000 | 87.0000000 | 330.0000000 |
| ORG_75 | Hexachlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_78 | Hexachloroethane (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/kg) | 8 | 0 | 259.1250000 | 43.0000000 | 330.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_80 | Isophorone (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_81 | Methylene Chloride (ug/kg) | 6 | 2 | 30.8333333 | 29.0000000 | 33.0000000 |
| ORG_82 | Naphthalene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_83 | Nitrobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/kg) | 6 | 2 | 265.0000000 | 110.0000000 | 330.0000000 |
| ORG_87 | Pentachlorophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_89 | Phenanthrene (ug/kg) | 8 | 0 | 294.7500000 | 98.0000000 | 640.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_90 | Phenol (mg/kg) | 6 | 2 | 1.5016667 | 0.1800000 | 7.8000000 |
| ORG_91 | Pyrene (ug/kg) | 8 | 0 | 184.2500000 | 74.0000000 | 320.0000000 |
| ORG_92 | Tetrachloroethene (ug/kg) | 6 | 2 | 23.1666667 | 14.0000000 | 25.0000000 |
| ORG_93 | Toluene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_95 | Trichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_97 | Vinyl Chloride (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| P1016 | PCB-1016 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1221 | PCB-1221 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1232 | PCB-1232 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1242 | PCB-1242 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1248 | PCB-1248 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1254 | PCB-1254 (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| P1260 | PCB-1260 (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| PB | Lead (mg/kg) | 8 | 0 | 28.4000000 | 13.8000000 | 42.1000000 |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PES_10 | Chlordane (ug/kg) | 6 | 2 | 400.0000000 | 400.0000000 | 400.0000000 |
| PES_13 | D-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_15 | Dieldrin (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_16 | Endosulfan I (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_17 | Endosulfan II (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_18 | Endosulfan sulfate (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_19 | Endrin (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_20 | Endrin aldehyde (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_21 | G-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_22 | Heptachlor (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_23 | Heptachlor epoxide (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_27 | Toxaphene (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| PES_4 | 4,4'-DDD (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_5 | 4,4'-DDE (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_6 | 4,4'-DDT (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_7 | A-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_8 | Aldrin (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_9 | B-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| SB | Antimony (mg/kg) | 6 | 2 | 0.2000000 | 0.2000000 | 0.2000000 |
| SE | Selenium (mg/kg) | 8 | 0 | 0.2480000 | 0.2000000 | 0.3510000 |
| TL | Thallium (mg/kg) | 6 | 2 | 0.2000000 | 0.2000000 | 0.2000000 |
| ZN | Zinc (mg/kg) | 8 | 0 | 91.3000000 | 52.3000000 | 150.0000000 |
| D_209 | 209 Deca (ng/g) | 2 | 6 | 3.1300000 | 3.1300000 | 3.1300000 |
| D_8 | 8 Di (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| H38_58 | 138,158 Hexa (ng/g) | 2 | 6 | 5.2750000 | 4.7500000 | 5.8000000 |
| H70_90 | 170,190 Hepta (ng/g) | 2 | 6 | 3.1300000 | 3.1300000 | 3.1300000 |
| H_128 | 128 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_137 | 137 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_149 | 149 Hexa (ng/g) | 2 | 6 | 1.0000000 | 1.0000000 | 1.0000000 |
| H_151 | 151 Hexa (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| H_153 | 153 Hexa (ng/g) | 2 | 6 | 3.3100000 | 2.9400000 | 3.6800000 |
| H_156 | 156 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_157 | 157 Hexa (ng/g) | 2 | 6 | 1.2000000 | 1.2000000 | 1.2000000 |
| H_166 | 166 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_167 | 167 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_168 | 168 Hexa (ng/g) | 2 | 6 | 1.0900000 | 1.0900000 | 1.0900000 |
| H_169 | 169 Hexa (pg/g) | 2 | 6 | 1.6650000 | 1.4900000 | 1.8400000 |
| H_177 | 177 Hepta (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| H_179 | 179 Hepta (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| H_180 | 180 Hepta (ng/g) | 2 | 6 | 2.0150000 | 1.7700000 | 2.2600000 |
| H_183 | 183 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_185 | 185 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_187 | 187 Hepta (ng/g) | 2 | 6 | 1.0380000 | 0.9560000 | 1.1200000 |
| H_189 | 189 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_191 | 191 Hepta (ng/g) | 2 | 6 | 1.3700000 | 1.3700000 | 1.3700000 |
| N_206 | 206 Nona (ng/g) | 2 | 6 | 3.1000000 | 3.1000000 | 3.1000000 |
| N_207 | 207 Nona (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| N_208 | 208 Nona (ng/g) | 2 | 6 | 2.0000000 | 2.0000000 | 2.0000000 |
| ORG_1 | 1-Methylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_2 | 1-Methylphenanthrene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_20 | 2-Methylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_22 | 2,3,5-Trimethyl-naphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_28 | 2,6-Dimethylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_46 | Benzo(e)pyrene (ug/kg) | 2 | 6 | 54.0000000 | 51.0000000 | 57.0000000 |
| ORG_49 | Biphenyl (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_88 | Perylene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| O_194 | 194 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| O_195 | 195 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_196 | 196 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_200 | 200 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| O_201 | 201 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_203 | 203 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_205 | 205 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| PCB | PCB's (ng/g) | 2 | 6 | 27.4000000 | 25.6000000 | 29.2000000 |
| PES_1 | 2,4'-DDD (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_11 | Cis-chlordane (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_12 | Cis-nonachlor (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_14 | Dicofol (ug/kg) | 2 | 6 | 0.0800000 | 0.0800000 | 0.0800000 |
| PES_2 | 2,4'-DDE (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_24 | Hexychlorobenzene (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_25 | Mirex (ug/kg) | 2 | 6 | 0.0200000 | 0.0200000 | 0.0200000 |
| PES_26 | Oxychlordane (ug/kg) | 2 | 6 | 2.3550000 | 2.3500000 | 2.3600000 |
| PES_28 | Trans-chlordane (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_29 | Trans-nonachlor (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_3 | 2,4'-DDT (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| P_101 | 101 Penta (ng/g) | 2 | 6 | 3.4900000 | 3.3000000 | 3.6800000 |
| P_105 | 105 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_110 | 110 Penta (ng/g) | 2 | 6 | 2.8500000 | 1.5600000 | 4.1400000 |
| P_114 | 114 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_118 | 118 Penta (ng/g) | 2 | 6 | 4.1100000 | 3.5900000 | 4.6300000 |
| P_119 | 119 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_123 | 123 Penta (ng/g) | 2 | 6 | 1.0400000 | 1.0400000 | 1.0400000 |
| P_126 | 126 Penta (pg/g) | 2 | 6 | 11.2500000 | 11.1000000 | 11.4000000 |
| P_127 | 127 Penta (ng/g) | 2 | 6 | 1.0000000 | 1.0000000 | 1.0000000 |
| P_82 | 82 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_87 | 87 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_95 | 95 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_99 | 99 Penta (ng/g) | 2 | 6 | 0.7000000 | 0.7000000 | 0.7000000 |
| SOLID | % Solids (%) | 2 | 6 | 27.0000000 | 27.0000000 | 27.0000000 |
| TOC | Total Organic Carbon (mg/kg) | 2 | 6 | 8500.00 | 8000.00 | 9000.00 |
| TPH | Total Petroleum Hydrocarbons (mg/kg) | 2 | 6 | 242.5000000 | 228.0000000 | 257.0000000 |
| T_18 | 18 Tri (ng/g) | 2 | 6 | 0.6300000 | 0.6300000 | 0.6300000 |
| T_28 | 28 Tri (ng/g) | 2 | 6 | 1.6700000 | 1.4800000 | 1.8600000 |
| T_37 | 37 Tri (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_44 | 44 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_47 | 47 Tetra (ng/g) | 2 | 6 | 1.4100000 | 1.4100000 | 1.4100000 |
| T_49 | 49 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_52 | 52 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_60 | 60 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_66 | 66 Tetra (ng/g) | 2 | 6 | 1.6300000 | 1.6300000 | 1.6300000 |
| T_70 | 70 Tetra (ng/g) | 2 | 6 | 1.4200000 | 1.4200000 | 1.4200000 |
| T_74 | 74 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_77 | 77 Tetra (pg/g) | 2 | 6 | 102.0500000 | 73.1000000 | 131.0000000 |
| T_80 | 80 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_81 | 81 Tetra (pg/g) | 2 | 6 | 2.6600000 | 2.0300000 | 3.2900000 |

Wilmington Harbor - Sediment Data

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| | | | |
|---|---|---|---|
| Data Set Name: | WORK.SED | Observations: | 8 |
| Member Type: | DATA | Variables: | 425 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 4270 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 13312 |
| Number of Data Set Pages: | 7 |
| File Format: | 607 |
| First Data Page: | 5 |
| Max Obs per Page: | 3 |
| Obs in First Data Page: | 3 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 217 | AG | Num | 8 | 2598 | | Silver (mg/kg) |
| 218 | AS | Num | 8 | 2606 | | Arsenic (mg/kg) |
| 219 | BE | Num | 8 | 2614 | | Beryllium (mg/kg) |
| 220 | CD | Num | 8 | 2622 | | Cadmium (mg/kg) |
| 7 | COMMENT | Char | 26 | 64 | 26. | Sample Comment |
| 221 | CR | Num | 8 | 2630 | | Chromium (mg/kg) |
| 222 | CU | Num | 8 | 2638 | | Copper (mg/kg) |
| 223 | CY | Num | 8 | 2646 | | Cyanide (mg/kg) |
| 4 | DATE | Num | 8 | 32 | MMDDYY8. | Sampling Date |
| 344 | D_8 | Num | 8 | 3614 | | 8 Di (ng/g) |
| 343 | D_209 | Num | 8 | 3606 | | 209 Deca (ng/g) |
| 345 | H38_58 | Num | 8 | 3622 | | 138,158 Hexa (ng/g) |
| 346 | H70_90 | Num | 8 | 3630 | | 170,190 Hepta (ng/g) |
| 224 | HG | Num | 8 | 2654 | | Mercury (mg/kg) |
| 347 | H_128 | Num | 8 | 3638 | | 128 Hexa (ng/g) |
| 348 | H_137 | Num | 8 | 3646 | | 137 Hexa (ng/g) |
| 349 | H_149 | Num | 8 | 3654 | | 149 Hexa (ng/g) |
| 350 | H_151 | Num | 8 | 3662 | | 151 Hexa (ng/g) |
| 351 | H_153 | Num | 8 | 3670 | | 153 Hexa (ng/g) |
| 352 | H_156 | Num | 8 | 3678 | | 156 Hexa (ng/g) |
| 353 | H_157 | Num | 8 | 3686 | | 157 Hexa (ng/g) |
| 354 | H_166 | Num | 8 | 3694 | | 166 Hexa (ng/g) |
| 355 | H_167 | Num | 8 | 3702 | | 167 Hexa (ng/g) |
| 356 | H_168 | Num | 8 | 3710 | | 168 Hexa (ng/g) |
| 357 | H_169 | Num | 8 | 3718 | | 169 Hexa (pg/g) |
| 358 | H_177 | Num | 8 | 3726 | | 177 Hepta (ng/g) |
| 359 | H_179 | Num | 8 | 3734 | | 179 Hepta (ng/g) |
| 360 | H_180 | Num | 8 | 3742 | | 180 Hepta (ng/g) |
| 361 | H_183 | Num | 8 | 3750 | | 183 Hepta (ng/g) |
| 362 | H_185 | Num | 8 | 3758 | | 185 Hepta (ng/g) |
| 363 | H_187 | Num | 8 | 3766 | | 187 Hepta (ng/g) |
| 364 | H_189 | Num | 8 | 3774 | | 189 Hepta (ng/g) |

Wilmington Harbor - Sediment Data

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 365 | H_191 | Num | 8 | 3782 | | 191 Hepta (ng/g) |
| 225 | NI | Num | 8 | 2662 | | Nickel (mg/kg) |
| 366 | N_206 | Num | 8 | 3790 | | 206 Nona (ng/g) |
| 367 | N_207 | Num | 8 | 3798 | | 207 Nona (ng/g) |
| 368 | N_208 | Num | 8 | 3806 | | 208 Nona (ng/g) |
| 369 | ORG_1 | Num | 8 | 3814 | | 1-Methylnaphthalene (ug/kg) |
| 370 | ORG_2 | Num | 8 | 3822 | | 1-Methylphenanthrene (ug/kg) |
| 242 | ORG_3 | Num | 8 | 2798 | | 1,1-Dichloroethane (ug/kg) |
| 253 | ORG_4 | Num | 8 | 2886 | | 1,1-Dichloroethene (ug/kg) |
| 262 | ORG_5 | Num | 8 | 2958 | | 1,1,1-Trichloroethane (ug/kg) |
| 273 | ORG_6 | Num | 8 | 3046 | | 1,1,2-Trichloroethane (ug/kg) |
| 283 | ORG_7 | Num | 8 | 3126 | | 1,1,2,2-Tetrachloroethane (ug/kg) |
| 294 | ORG_8 | Num | 8 | 3214 | | 1,2-Dichlorobenzene (ug/kg) |
| 304 | ORG_9 | Num | 8 | 3294 | | 1,2-Dichloroethane (ug/kg) |
| 226 | ORG_10 | Num | 8 | 2670 | | 1,2-Dichloroethene (ug/kg) |
| 227 | ORG_11 | Num | 8 | 2678 | | 1,2-Dichloropropane (ug/kg) |
| 228 | ORG_12 | Num | 8 | 2686 | | 1,2-Diphenyl Hydrazine (ug/kg) |
| 229 | ORG_13 | Num | 8 | 2694 | | 1,2,4-Trichlorobenzene (ug/kg) |
| 230 | ORG_14 | Num | 8 | 2702 | | 1,3-Dichlorobenzene (ug/kg) |
| 231 | ORG_15 | Num | 8 | 2710 | | 1,4 & 1,2-Dichlorobenzene (ug/kg) |
| 232 | ORG_16 | Num | 8 | 2718 | | 1,4-Dichlorobenzene (ug/kg) |
| 233 | ORG_18 | Num | 8 | 2726 | | 2-Chloronaphthalene (ug/kg) |
| 234 | ORG_19 | Num | 8 | 2734 | | 2-Chlorophenol (ug/kg) |
| 371 | ORG_20 | Num | 8 | 3830 | | 2-Methylnaphthalene (ug/kg) |
| 235 | ORG_21 | Num | 8 | 2742 | | 2-Nitrophenol (ug/kg) |
| 372 | ORG_22 | Num | 8 | 3838 | | 2,3,5-Trimethyl-naphthalene (ug/kg) |
| 236 | ORG_23 | Num | 8 | 2750 | | 2,4-Dichlorophenol (ug/kg) |
| 237 | ORG_24 | Num | 8 | 2758 | | 2,4-Dimethylphenol (ug/kg) |
| 238 | ORG_25 | Num | 8 | 2766 | | 2,4-Dinitrophenol (ug/kg) |
| 239 | ORG_26 | Num | 8 | 2774 | | 2,4-Dinitrotoluene (ug/kg) |
| 240 | ORG_27 | Num | 8 | 2782 | | 2,4,6-Trichlorophenol (ug/kg) |
| 373 | ORG_28 | Num | 8 | 3846 | | 2,6-Dimethylnaphthalene (ug/kg) |
| 241 | ORG_29 | Num | 8 | 2790 | | 2,6-Dinitrotoluene (ug/kg) |
| 243 | ORG_30 | Num | 8 | 2806 | | 3,3'-Dichlorobenzidine (ug/kg) |
| 244 | ORG_31 | Num | 8 | 2814 | | 4-Bromophenyl-phenylether (ug/kg) |
| 245 | ORG_32 | Num | 8 | 2822 | | 4-Chlorophenyl-phenylether (ug/kg) |
| 246 | ORG_33 | Num | 8 | 2830 | | 4-Nitrophenol (ug/kg) |
| 247 | ORG_34 | Num | 8 | 2838 | | 4,6-Dinitro-2-methylphenol (ug/kg) |
| 248 | ORG_35 | Num | 8 | 2846 | | 4,-Chloro-3-methylphenol (ug/kg) |
| 249 | ORG_36 | Num | 8 | 2854 | | Acenaphthene (ug/kg) |
| 250 | ORG_37 | Num | 8 | 2862 | | Acenaphthylene (ug/kg) |
| 251 | ORG_38 | Num | 8 | 2870 | | Acrolein (ug/kg) |
| 252 | ORG_39 | Num | 8 | 2878 | | Acrylonitrile (ug/kg) |
| 254 | ORG_40 | Num | 8 | 2894 | | Anthracene (ug/kg) |
| 255 | ORG_41 | Num | 8 | 2902 | | Benzene (ug/kg) |
| 256 | ORG_42 | Num | 8 | 2910 | | Benzidine (ug/kg) |
| 257 | ORG_43 | Num | 8 | 2918 | | Benzo(a)anthracene (ug/kg) |
| 258 | ORG_44 | Num | 8 | 2926 | | Benzo(a)pyrene (ug/kg) |
| 259 | ORG_45 | Num | 8 | 2934 | | Benzo(b)fluoranthene (ug/kg) |
| 374 | ORG_46 | Num | 8 | 3854 | | Benzo(e)pyrene (ug/kg) |
| 260 | ORG_47 | Num | 8 | 2942 | | Benzo(g,h,i)perylene (ug/kg) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 375 | ORG_49 | Num | 8 | 3862 | | Biphenyl (ug/kg) |
| 263 | ORG_50 | Num | 8 | 2966 | | Bis(2-chloroethoxy)methane (ug/kg) |
| 264 | ORG_51 | Num | 8 | 2974 | | Bis(2-chloroethyl)ether (ug/kg) |
| 265 | ORG_52 | Num | 8 | 2982 | | Bis(2-chloroisopropyl)ether (ug/kg) |
| 266 | ORG_53 | Num | 8 | 2990 | | Bis(2-ethylhexyl)phthalate (ug/kg) |
| 267 | ORG_54 | Num | 8 | 2998 | | Bromodichloromethane (ug/kg) |
| 268 | ORG_55 | Num | 8 | 3006 | | Bromoform (ug/kg) |
| 269 | ORG_56 | Num | 8 | 3014 | | Bromomethane (ug/kg) |
| 270 | ORG_57 | Num | 8 | 3022 | | Butlybenzylphthalate (ug/kg) |
| 271 | ORG_58 | Num | 8 | 3030 | | Carbon Tetrachloride (ug/kg) |
| 272 | ORG_59 | Num | 8 | 3038 | | Chlorobenzene (ug/kg) |
| 274 | ORG_60 | Num | 8 | 3054 | | Chloroethane (ug/kg) |
| 275 | ORG_61 | Num | 8 | 3062 | | Chloroform (ug/kg) |
| 276 | ORG_62 | Num | 8 | 3070 | | Chloromethane (ug/kg) |
| 277 | ORG_63 | Num | 8 | 3078 | | Chrysene (ug/kg) |
| 278 | ORG_64 | Num | 8 | 3086 | | Cis-1,3-Dichloropropene (ug/kg) |
| 279 | ORG_66 | Num | 8 | 3094 | | Dibenzo(a,h)anthracene (ug/kg) |
| 280 | ORG_67 | Num | 8 | 3102 | | Dibromochloromethane (ug/kg) |
| 281 | ORG_68 | Num | 8 | 3110 | | Diethylphthalate (ug/kg) |
| 282 | ORG_69 | Num | 8 | 3118 | | Dimethylphthalate (ug/kg) |
| 284 | ORG_70 | Num | 8 | 3134 | | Di-n-butylphthalate (ug/kg) |
| 285 | ORG_71 | Num | 8 | 3142 | | Di-n-octylphthalate (ug/kg) |
| 286 | ORG_72 | Num | 8 | 3150 | | Ethylbenzene (ug/kg) |
| 287 | ORG_73 | Num | 8 | 3158 | | Fluoranthene (ug/kg) |
| 288 | ORG_74 | Num | 8 | 3166 | | Fluorene (ug/kg) |
| 289 | ORG_75 | Num | 8 | 3174 | | Hexachlorobenzene (ug/kg) |
| 290 | ORG_76 | Num | 8 | 3182 | | Hexachlorobutadiene (ug/kg) |
| 291 | ORG_77 | Num | 8 | 3190 | | Hexachlorocyclopentadiene (ug/kg) |
| 292 | ORG_78 | Num | 8 | 3198 | | Hexachloroethane (ug/kg) |
| 293 | ORG_79 | Num | 8 | 3206 | | Indeno(1,2,3-c,d)pyrene (ug/kg) |
| 295 | ORG_80 | Num | 8 | 3222 | | Isophorone (ug/kg) |
| 296 | ORG_81 | Num | 8 | 3230 | | Methylene Chloride (ug/kg) |
| 297 | ORG_82 | Num | 8 | 3238 | | Naphthalene (ug/kg) |
| 298 | ORG_83 | Num | 8 | 3246 | | Nitrobenzene (ug/kg) |
| 299 | ORG_84 | Num | 8 | 3254 | | N-nitrosodimethylamine (ug/kg) |
| 300 | ORG_85 | Num | 8 | 3262 | | N-nitroso-Di-n-propylamine (ug/kg) |
| 301 | ORG_86 | Num | 8 | 3270 | | N-nitrosodiphenylamine (ug/kg) |
| 302 | ORG_87 | Num | 8 | 3278 | | Pentachlorophenol (ug/kg) |
| 376 | ORG_88 | Num | 8 | 3870 | | Perylene (ug/kg) |
| 303 | ORG_89 | Num | 8 | 3286 | | Phenanthrene (ug/kg) |
| 305 | ORG_90 | Num | 8 | 3302 | | Phenol (mg/kg) |
| 306 | ORG_91 | Num | 8 | 3310 | | Pyrene (ug/kg) |
| 307 | ORG_92 | Num | 8 | 3318 | | Tetrachloroethene (ug/kg) |
| 308 | ORG_93 | Num | 8 | 3326 | | Toluene (ug/kg) |
| 309 | ORG_94 | Num | 8 | 3334 | | Trans-1,3-Dichloropropene (ug/kg) |
| 310 | ORG_95 | Num | 8 | 3342 | | Trichloroethene (ug/kg) |
| 311 | ORG_96 | Num | 8 | 3350 | | Trichlorofluoromethane (ug/kg) |
| 312 | ORG_97 | Num | 8 | 3358 | | Vinyl Chloride (ug/kg) |
| 377 | O_194 | Num | 8 | 3878 | | 194 Octa (ng/g) |
| 378 | O_195 | Num | 8 | 3886 | | 195 Octa (ng/g) |
| 379 | O_196 | Num | 8 | 3894 | | 196 Octa (ng/g) |
| 380 | O_200 | Num | 8 | 3902 | | 200 Octa (ng/g) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 381 | O_201 | Num | 8 | 3910 | | 201 Octa (ng/g) |
| 382 | O_203 | Num | 8 | 3918 | | 203 Octa (ng/g) |
| 383 | O_205 | Num | 8 | 3926 | | 205 Octa (ng/g) |
| 313 | P1016 | Num | 8 | 3366 | | PCB-1016 (ug/kg) |
| 314 | P1221 | Num | 8 | 3374 | | PCB-1221 (ug/kg) |
| 315 | P1232 | Num | 8 | 3382 | | PCB-1232 (ug/kg) |
| 316 | P1242 | Num | 8 | 3390 | | PCB-1242 (ug/kg) |
| 317 | P1248 | Num | 8 | 3398 | | PCB-1248 (ug/kg) |
| 318 | P1254 | Num | 8 | 3406 | | PCB-1254 (ug/kg) |
| 319 | P1260 | Num | 8 | 3414 | | PCB-1260 (ug/kg) |
| 1 | PAGE | Num | 8 | 0 | | Report Page Number |
| 320 | PB | Num | 8 | 3422 | | Lead (mg/kg) |
| 384 | PCB | Num | 8 | 3934 | | PCB's (ng/g) |
| 6 | PERIOD | Char | 12 | 52 | 12. | Dredging (PRE,D=During,POST,Drawdown) |
| 385 | PES_1 | Num | 8 | 3942 | | 2,4'-DDD (ug/kg) |
| 389 | PES_2 | Num | 8 | 3974 | | 2,4'-DDE (ug/kg) |
| 395 | PES_3 | Num | 8 | 4022 | | 2,4'-DDT (ug/kg) |
| 333 | PES_4 | Num | 8 | 3526 | | 4,4'-DDD (ug/kg) |
| 334 | PES_5 | Num | 8 | 3534 | | 4,4'-DDE (ug/kg) |
| 335 | PES_6 | Num | 8 | 3542 | | 4,4'-DDT (ug/kg) |
| 336 | PES_7 | Num | 8 | 3550 | | A-BHC (ug/kg) |
| 337 | PES_8 | Num | 8 | 3558 | | Aldrin (ug/kg) |
| 338 | PES_9 | Num | 8 | 3566 | | B-BHC (ug/kg) |
| 321 | PES_10 | Num | 8 | 3430 | | Chlordane (ug/kg) |
| 386 | PES_11 | Num | 8 | 3950 | | Cis-chlordane (ug/kg) |
| 387 | PES_12 | Num | 8 | 3958 | | Cis-nonachlor (ug/kg) |
| 322 | PES_13 | Num | 8 | 3438 | | D-BHC (ug/kg) |
| 388 | PES_14 | Num | 8 | 3966 | | Dicofol (ug/kg) |
| 323 | PES_15 | Num | 8 | 3446 | | Dieldrin (ug/kg) |
| 324 | PES_16 | Num | 8 | 3454 | | Endosulfan I (ug/kg) |
| 325 | PES_17 | Num | 8 | 3462 | | Endosulfan II (ug/kg) |
| 326 | PES_18 | Num | 8 | 3470 | | Endosulfan sulfate (ug/kg) |
| 327 | PES_19 | Num | 8 | 3478 | | Endrin (ug/kg) |
| 328 | PES_20 | Num | 8 | 3486 | | Endrin aldehyde (ug/kg) |
| 329 | PES_21 | Num | 8 | 3494 | | G-BHC (ug/kg) |
| 330 | PES_22 | Num | 8 | 3502 | | Heptachlor (ug/kg) |
| 331 | PES_23 | Num | 8 | 3510 | | Heptachlor epoxide (ug/kg) |
| 390 | PES_24 | Num | 8 | 3982 | | Hexychlorobenzene (ug/kg) |
| 391 | PES_25 | Num | 8 | 3990 | | Mirex (ug/kg) |
| 392 | PES_26 | Num | 8 | 3998 | | Oxychlordane (ug/kg) |
| 332 | PES_27 | Num | 8 | 3518 | | Toxaphene (ug/kg) |
| 393 | PES_28 | Num | 8 | 4006 | | Trans-chlordane (ug/kg) |
| 394 | PES_29 | Num | 8 | 4014 | | Trans-nonachlor (ug/kg) |
| 405 | P_82 | Num | 8 | 4102 | | 82 Penta (ng/g) |
| 406 | P_87 | Num | 8 | 4110 | | 87 Penta (ng/g) |
| 407 | P_95 | Num | 8 | 4118 | | 95 Penta (ng/g) |
| 408 | P_99 | Num | 8 | 4126 | | 99 Penta (ng/g) |
| 396 | P_101 | Num | 8 | 4030 | | 101 Penta (ng/g) |
| 397 | P_105 | Num | 8 | 4038 | | 105 Penta (ng/g) |
| 398 | P_110 | Num | 8 | 4046 | | 110 Penta (ng/g) |
| 399 | P_114 | Num | 8 | 4054 | | 114 Penta (ng/g) |
| 400 | P_118 | Num | 8 | 4062 | | 118 Penta (ng/g) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 401 | P_119 | Num | 8 | 4070 | | 119 Penta (ng/g) |
| 402 | P_123 | Num | 8 | 4078 | | 123 Penta (ng/g) |
| 403 | P_126 | Num | 8 | 4086 | | 126 Penta (pg/g) |
| 404 | P_127 | Num | 8 | 4094 | | 127 Penta (ng/g) |
| 339 | SB | Num | 8 | 3574 | | Antimony (mg/kg) |
| 340 | SE | Num | 8 | 3582 | | Selenium (mg/kg) |
| 409 | SOLID | Num | 8 | 4134 | | % Solids (%) |
| 3 | STATION | Char | 12 | 20 | 12. | Sampling Station |
| 8 | S_AG | Char | 12 | 90 | 12. | Flag for AG (Less than DL) |
| 9 | S_AS | Char | 12 | 102 | 12. | Flag for AS (Less than DL) |
| 10 | S_BE | Char | 12 | 114 | 12. | Flag for BE (Less than DL) |
| 11 | S_CD | Char | 12 | 126 | 12. | Flag for CD (Less than DL) |
| 12 | S_CR | Char | 12 | 138 | 12. | Flag for CR (Less than DL) |
| 13 | S_CU | Char | 12 | 150 | 12. | Flag for CU (Less than DL) |
| 14 | S_CY | Char | 12 | 162 | 12. | Flag for CY (Less than DL) |
| 135 | S_D_8 | Char | 12 | 1614 | 12. | Flag for D_8 (Less than DL) |
| 134 | S_D_209 | Char | 12 | 1602 | 12. | Flag for D_209 (Less than DL) |
| 136 | S_H38_58 | Char | 12 | 1626 | 12. | Flag for H38_58 (Less than DL) |
| 137 | S_H70_90 | Char | 12 | 1638 | 12. | Flag for H70_90 (Less than DL) |
| 15 | S_HG | Char | 12 | 174 | 12. | Flag for HG (Less than DL) |
| 138 | S_H_128 | Char | 12 | 1650 | 12. | Flag for H_128 (Less than DL) |
| 139 | S_H_137 | Char | 12 | 1662 | 12. | Flag for H_137 (Less than DL) |
| 140 | S_H_149 | Char | 12 | 1674 | 12. | Flag for H_149 (Less than DL) |
| 141 | S_H_151 | Char | 12 | 1686 | 12. | Flag for H_151 (Less than DL) |
| 142 | S_H_153 | Char | 12 | 1698 | 12. | Flag for H_153 (Less than DL) |
| 143 | S_H_156 | Char | 12 | 1710 | 12. | Flag for H_156 (Less than DL) |
| 144 | S_H_157 | Char | 12 | 1722 | 12. | Flag for H_157 (Less than DL) |
| 145 | S_H_166 | Char | 12 | 1734 | 12. | Flag for H_166 (Less than DL) |
| 146 | S_H_167 | Char | 12 | 1746 | 12. | Flag for H_167 (Less than DL) |
| 147 | S_H_168 | Char | 12 | 1758 | 12. | Flag for H_168 (Less than DL) |
| 148 | S_H_169 | Char | 12 | 1770 | 12. | Flag for H_169 (Less than DL) |
| 149 | S_H_177 | Char | 12 | 1782 | 12. | Flag for H_177 (Less than DL) |
| 150 | S_H_179 | Char | 12 | 1794 | 12. | Flag for H_179 (Less than DL) |
| 151 | S_H_180 | Char | 12 | 1806 | 12. | Flag for H_180 (Less than DL) |
| 152 | S_H_183 | Char | 12 | 1818 | 12. | Flag for H_183 (Less than DL) |
| 153 | S_H_185 | Char | 12 | 1830 | 12. | Flag for H_185 (Less than DL) |
| 154 | S_H_187 | Char | 12 | 1842 | 12. | Flag for H_187 (Less than DL) |
| 155 | S_H_189 | Char | 12 | 1854 | 12. | Flag for H_189 (Less than DL) |
| 156 | S_H_191 | Char | 12 | 1866 | 12. | Flag for H_191 (Less than DL) |
| 16 | S_NI | Char | 12 | 186 | 12. | Flag for NI (Less than DL) |
| 157 | S_N_206 | Char | 12 | 1878 | 12. | Flag for N_206 (Less than DL) |
| 158 | S_N_207 | Char | 12 | 1890 | 12. | Flag for N_207 (Less than DL) |
| 159 | S_N_208 | Char | 12 | 1902 | 12. | Flag for N_208 (Less than DL) |
| 160 | S_ORG_1 | Char | 12 | 1914 | 12. | Flag for ORG_1 (Less than DL) |
| 161 | S_ORG_2 | Char | 12 | 1926 | 12. | Flag for ORG_2 (Less than DL) |
| 33 | S_ORG_3 | Char | 12 | 390 | 12. | Flag for ORG_3 (Less than DL) |
| 44 | S_ORG_4 | Char | 12 | 522 | 12. | Flag for ORG_4 (Less than DL) |
| 53 | S_ORG_5 | Char | 12 | 630 | 12. | Flag for ORG_5 (Less than DL) |
| 64 | S_ORG_6 | Char | 12 | 762 | 12. | Flag for ORG_6 (Less than DL) |
| 74 | S_ORG_7 | Char | 12 | 882 | 12. | Flag for ORG_7 (Less than DL) |
| 85 | S_ORG_8 | Char | 12 | 1014 | 12. | Flag for ORG_8 (Less than DL) |
| 95 | S_ORG_9 | Char | 12 | 1134 | 12. | Flag for ORG_9 (Less than DL) |

# APPENDIX B

## *WATER QUALITY AND CHEMICAL SEDIMENT TESTING WILMINGTON HARBOR DREDGED MATERIAL MANAGEMENT PLAN*

## PRODUCED BY USACE (NOVEMBER 2008)

# WATER QUALITY AND SEDIMENT CHEMICAL TESTING WILMINGTON HARBOR DREDGED MATERIAL MANAGEMENT PLAN

Versar INC.

ENCL 7

# WATER QUALITY AND SEDIMENT CHEMICAL TESTING WILMINGTON HARBOR DREDGED MATERIAL MANAGEMENT PLAN

Prepared for

U.S. Army Corps of Engineers
Philadelphia District
Philadelphia, PA 19107-3390

Prepared by

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November 2008

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Versar INC.

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# STUDY OVERVIEW AND ORGANIZATION OF DATA REPORT

The U.S. Army Corps of Engineers, Philadelphia District is completing a Dredged Material Management Plan (DMMP) for Wilmington Harbor, New Castle County, Delaware. The proposed study is investigating the possibility of beneficial use of dredged material from the federal channel, as well as, from the Wilmington South upland disposal area. The current channel has an authorized depth of 38 from the Delaware River to a point 4,237 feet upstream.

This chemical data report provides baseline conditions of the dredged material at Wilmington Harbor and its potential use in beneficial projects. The data was collected using vibracore sediment samples from eight stations within the federal channel in the Wilmington Harbor and soil cores samples from six locations within the Wilmington Harbor South disposal area (Figures 1 and 2). Soil and sediment coring locations were recorded with differential GPS (Tables 1 and 2) and the sampling was conducted in June 2008.

Vibracoring services were provided by Energy & Environmental Analysts, Inc., from Garden City, New York using a Rossfelder P-1 Electric Vibracorer with a 10' 304 stainless 3" core barrel. The barrel was lined with a 6 mil soft plastic liner that retained in place with a stainless core cutter/catcher. After retrieving the core, the plastic liners were cut longitudinally to remove VOC sub-samples. Sufficient amount of sediment cores were then transferred into 5 gallon bucket (lined with a decontaminated food quality plastic bag) and homogenized. After homogenizing, the sample was put into the appropriate container to conduct bulk sediment analysis. The remainder of the sample was retained in the bucket for modified elutriate and TCLP analysis. Grain size and TOC analysis were also conducted.

Soil sampling was conducted by Versar personnel with a 4-foot soil auger. Cores of approximately 4 feet were collected and put into a stainless steel bowls. All of the stainless steel handling equipment was decontaminated using an alconox detergent wash, DI water rinse, nitric acid rinse, DI water rinse, ethanol rinse, and DI water rinse. Prior to homogenizing, the VOC sub-sample was placed into the appropriate container. The homogenized sample was then placed into appropriate containers for bulk sedimentary chemistry, PCBs, TOC and grain size.

An equipment blank was prepared half way through the field collections by filling a lined 5 gallon bucket with laboratory grade DI water, stirring the field decontaminated stainless steel spoons in the water (the spoons used to composite and transfer sediment to sample jars). The water was then transferred to appropriate jars for later analysis. Site water was collected for testing by filling sample jars opened a few inches under the surface of the Delaware River.

## SUMMARY/CONCLUSIONS

The testing for this study was done for two primary reasons: 1) to evaluate the potential environmental impacts on aquatic biota of the next scheduled maintenance dredging operating at Wilmington Harbor, Delaware and 2) to provide data on the contaminant levels within Wilmington Harbor and the Wilmington Harbor South CDF to assess whether the existing material is suitable for beneficial use such as land reclamation, road fill, land fill caps, and other non-residential uses.

Contaminant levels in bulk sediment from the river and CDF soil auger samples were compared to Delaware Natural Resources and Environmental Control (DNREC) Site Investigation and Restoration Branch Uniform Risk Based levels (URS) for soils in non critical drinking water resource protection areas. River sediments were also compared to NOAA concentrations known to cause adverse biological effects to marine organisms as summarized by Long et al. (1995). NOAA guidelines are divided into Effects Range-Low (ER-L) concentrations (where 10% of all the toxicity studies reviewed showed an adverse effect) and Effects Range-Medium (ER-M) concentrations (where 50% of all the toxicity studies showed an adverse effect). The guidelines are listed in the summary tables to provide a measure of the relative toxicity of the Christina River sediments prior to dredging. Assessments of the existing CDF's soils suitability for beneficial use and the new sediments that will be placed in the CDF was based on non-residential contaminant guidelines since it is not anticipated that the material will be used in residential settings. Residential (non-restricted) guidelines were also compared to the observed contaminant concentrations to show a range of potential human health issues. Restricted soil contaminant guidelines are typically higher than un-restricted (residential use) since human exposure to soils used in a residential setting would be higher that in an industrial use like brown field or land fill capping,

Modified elutriated testing was conducted to help assess whether aquatic biota will encounter toxic levels in the surface water during dredging operations. The dissolved contaminant results were compared to DNREC acute and chronic water quality aquatic life criteria for marine waters. Only the dissolved component was measured since water quality criteria are based on dissolved concentrations. Since dredging is a short term activity, potential toxic releases to aquatic biota were weighed against the acute criteria.

In addition, since the river sediment may leach contaminants into the groundwater once it is placed in the CDF and is also subject to acidic rainfall, the Toxicity Characteristic Leaching Procedure (TCLP) was performed on the material. TCLP tests simulate the effects of acid rain (by mixing material with acidified laboratory grade water) and measuring contaminant levels that leach out. TCLP tests were conducted on the river sediments and the existing soils in the Wilmington Harbor South soil auger samples.

**Christina River Sediments**

Bulk sediment testing revealed that with the exception of arsenic the contaminant levels were all below DNREC restricted URS (Table 3). Residential projects are not recommended for use of the material since a number of inorganics (aluminum, arsenic, iron and manganese) were over criteria as well as a few semivolatile organics (primarily pyrenes or coal tars) particularly from station WH1. Total PCB levels in the sediment samples were mostly below DNREC's restricted criterion of 1000 ng/kg with the exception of sediments from WH1 near the mouth of Lobell Canal (Table 5). Total PCB concentration at sediment sampling stations WH1 and WH8 were also over ER-M sediment guidelines of 180 ng/g while all other stations were over the ER-L levels. Dredging theses sediments will have a net benefit with respect to PCB toxicity since the material will be removed from the aquatic habitat. In addition, previous USACE funded studies on CDF retention rates indicated that over 99% of the PCB in dredged sediment is retained by the CDF1.

Organic and inorganic contaminant levels relative to ER-L and ER-M sediment guidelines indicate that when exceedances occurred, they were mostly below ER-M suggesting that while toxicity exists, the levels would be considered moderate, but not high. Only zinc concentrations at station WH1 were above ER-M guideline values (Table 3).

Modified elutriate testing revealed that with the exception of copper at station WH 7 no water quality exceedances are anticipated during the maintenance dredging (Table 4). The sum of dissolved PCB congeners in the elutriate tests showed that levels were above levels listed for chronic criteria for total PCBs (Table 9). No acute criterion for total PCBs is listed by DNREC. Total dissolved PCBs in the elutriate tests for station WH7 at the mouth of the Christina River had about an order of magnitude higher PCB elutriate concentration than all other river stations.

TCLP testing for potential contaminant leaching into ground water once the material is placed in a CDF and subject to rainfall suggests that no leaching above the regulatory limits is likely (Table 10).

**Wilmington Harbor South CDF Soils**

Similar to the bulk sediment results for the Christina River sediments, soil testing in the CDF revealed that with the exception of arsenic all contaminant levels were below DNREC's non-residential URS criteria (Table 11). Several inorganics were over the residential criteria in the existing CDF soils (aluminum, arsenic, iron, vanadium, and manganese). In addition, some organics (e.g., Benzo(a)pyrene) were over the criteria. High resolution PBC congener

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[1] Burton, W.H., J. Farrar, and J. Pasquale. Contaminant Sequestering and Water Quality Discharges At Confined Disposal Facilities. In: M. Pellei and A. Porta (Eds.), *Remediation of Contaminated Sediments—2003.* Proceedings of the Second International Conference on Remediation of Contaminated Sediments (Venice, Italy; 30 Sep–3 Oct 2003). ISBN 1-57477-143-4, published by Battelle Press, Columbus, OH,

concentrations were below the 1000 $\mu$g/kg PCB URS criteria listed by DNREC (Table 13). TCPL testing of the exiting soils in the CDF resulted in no parameter concentrations above the regulatory limits (Table 14).

**Beneficial Use of Material**

In conclusion, based on the above discussion, material from Wilmington Harbor and Wilmington Harbor South CDF would be suitable for use in non-residential situations (i.e., brownfields). However, prior to any beneficial use of the material, contaminant testing of the proposed recipient site should be completed. Once that analysis is completed, a comparison of the contaminant levels between the Wilmington Harbor material and the recipient location can then be performed to determine if the two sites are compatible.


Figure 1. Vibracore station locations for sediment samples taken in June 2008

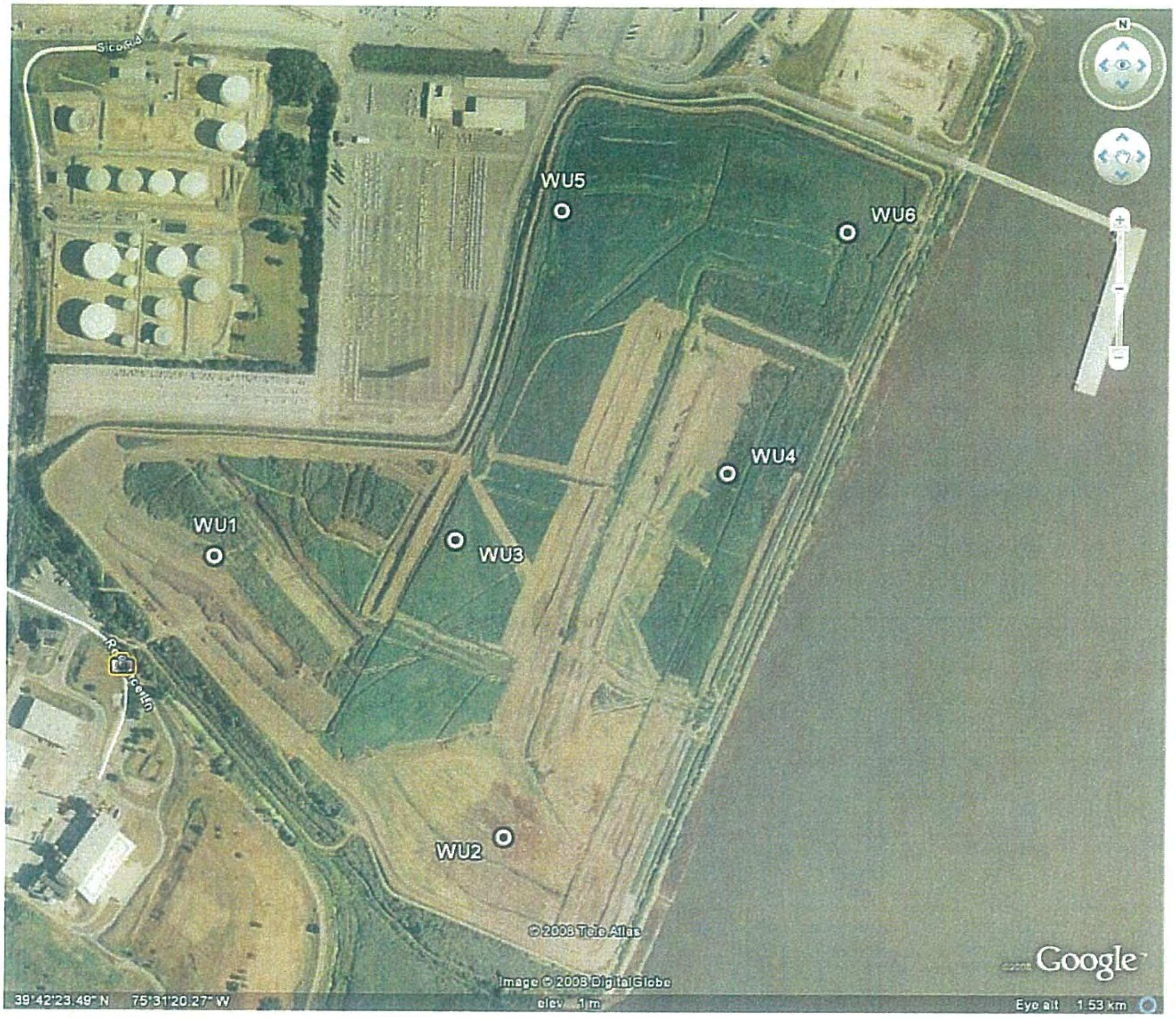



Figure 2. Soil hand auger sampling locations in the Wilmington South CDF collected in June 2008

| Table 1. Sampling coordinates for the Wilmington Harbor stations | | | | | | |
|---|---|---|---|---|---|---|
| **Station** | **Date** | **Time** | **Latitude** | | **Longitude** | |
| WH1 | 6/6/2008 | 13:12:25 | 39 | 43.300 | -75 | 31.783 |
| WH2 | 6/6/2008 | 12:15:10 | 39 | 43.197 | -75 | 31.421 |
| WH3 | 6/6/2008 | 11:22:56 | 39 | 43.135 | -75 | 31.251 |
| WH4 | 6/6/2008 | 10:54:43 | 39 | 43.065 | -75 | 31.029 |
| WH5 | 6/6/2008 | 14:18:36 | 39 | 43.026 | -75 | 30.913 |
| WH6 | 6/6/2008 | 14:53:48 | 39 | 42.982 | -75 | 30.784 |
| WH7 | 6/6/2008 | 15:24:25 | 39 | 42.944 | -75 | 30.666 |
| WH8 | 6/6/2008 | 16:11:11 | 39 | 43.185 | -75 | 31.201 |

| Table 2. Sampling coordinates for the Wilmington Harbor CDF stations | | | | | | |
|---|---|---|---|---|---|---|
| **Station** | **Date** | **Time** | **Latitude** | | **Longitude** | |
| WU1 | 6/12/08 | 8:37 | 39 | 42.354 | -75 | 31.734 |
| WU2 | 6/12/08 | 9:35 | 39 | 42.122 | -75 | 31.425 |
| WU3 | 6/12/08 | 10:16 | 39 | 42.368 | -75 | 31.479 |
| WU4 | 6/12/08 | 12:35 | 39 | 42.424 | -75 | 31.188 |
| WU5 | 6/12/08 | 11:15 | 39 | 42.64 | -75 | 31.368 |
| WU6 | 6/12/08 | 11:53 | 39 | 42.623 | -75 | 31.062 |

# CHRISTINA RIVER SEDIMENT SAMPLING RESULTS

Table 3. Testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over DNREC unrestricted criteria, while values in green are over restricted levels. Bolded concentrations are over ER-L sediment guidelines while underlined values are over ER-M levels.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | | | | | |
| Aroclor 1016 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 5000 | 82000 | | |
| Aroclor 1221 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1232 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1242 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1248 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | 310 | <21 | 300 | 3000 | | |
| Aroclor 1254 | µg/kg | 150 | 78 | 76 | <23 | <27 | <22 | 310 | <21 | 300 | 3000 | | |
| Aroclor 1260 | µg/kg | 52 | 29 | 27 | 42 | 33 | 49 | 64 | 32 | 300 | 3000 | | |
| **Pesticides** | | | | | | | | | | | | | |
| 4,4-DDD | µg/kg | 18 | 11 | 11 | 15 | 20 | 13 | 23 | 11 | 3,000 | 24,000 | | |
| 4,4-DDE | µg/kg | 15 | 7.5 | 11 | 16 | 8.7 | 16 | 56 | 11 | 2,000 | 17,000 | | |
| 4,4-DDT | µg/kg | <11 | <11 | <9.9 | <12 | **12** | <11 | <8.2 | <10 | 2,000 | 17,000 | 1.58 | 46.1 |
| Aldrin | µg/kg | <11 | 1.8 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 40 | 300 | | |
| alpha-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 100 | 900 | | |
| alpha-Chlordane | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| beta-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 400 | 3,000 | | |
| delta-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | 1.7 | <10 | | | | |
| Dieldrin | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 40 | 400 | | |
| Endosulfan I | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endosulfan II | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endosulfan sulfate | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endrin | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 2,000 | 61,000 | | |
| Endrin aldehyde | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 2,000 | 61,000 | | |
| Endrin ketone | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| gamma-BHC (Lindane) | µg/kg | 3.3 | 1.5 | <9.9 | <12 | <14 | <11 | <8.2 | 2 | 500 | 4,000 | | |
| gamma-Chlordane | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| Heptachlor | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 100 | 1,000 | | |
| Heptachlor epoxide | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | 3 | <10 | 70 | 600 | | |
| Methoxychlor | µg/kg | <22 | <20 | <19 | <22 | <26 | <22 | <16 | <20 | 39,000 | 1,000,000 | | |
| Toxaphene | µg/kg | <450 | <420 | <390 | <450 | <530 | <440 | <320 | <410 | 600 | 5,000 | | |
| **Inorganics** | | | | | | | | | | | | | |
| Aluminum | mg/kg | 14,800 | 15,600 | 15,600 | 15,600 | 16,600 | 16,800 | 14,300 | 15,700 | 7,800 | 200,000 | | |
| Antimony | mg/kg | 0.57 | <1.2 | <1.2 | <1.4 | <1.6 | 0.3 | 0.44 | <1.2 | 3 | 82 | | |
| Arsenic | mg/kg | 11.6 | 10.6 | 11.4 | 11.9 | 13.4 | 12.7 | 13.6 | 11.8 | 0.4 | 4 | 8.2 | 70 |
| Barium | mg/kg | 154 | 110 | 109 | 111 | 110 | 90.2 | 66.6 | 97.7 | 550 | 14,000 | | |
| Beryllium | mg/kg | 1.2 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.1 | 1.3 | 16 | 410 | | |

| Table 3. (Continued) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
| **Inorganics (Continued)** | | | | | | | | | | | | | |
| Cadmium | mg/kg | **1.2** | 0.22 | 0.27 | 0.21 | <0.80 | <0.66 | <0.48 | 0.19 | 4 | 100 | 1.2 | 9.6 |
| Calcium | mg/kg | 2,990 | 3,260 | 3,120 | 3,800 | 4,110 | 3,220 | 2,890 | 3,310 | | | | |
| Chromium | mg/kg | 64.6 | 47.6 | 48.5 | 48.3 | 53 | 53.3 | 61.3 | 49.3 | 270 | 610 | 81 | 370 |
| Cobalt | mg/kg | 13.6 | 13.1 | 13.6 | 13.7 | 14.6 | 14.5 | 12.2 | 13.7 | 470 | 12,000 | | |
| Copper | mg/kg | **44** | 33.4 | **35.2** | **34.5** | **34.7** | 33.7 | **34.4** | 33 | 310 | 8,200 | 34 | 270 |
| Iron | mg/kg | 28,300 | 28,900 | 29,300 | 30,100 | 32,500 | 32,100 | 31,600 | 30,200 | 2,300 | 61,000 | | |
| Lead | mg/kg | **78.8** | 46.4 | **49.5** | **47.2** | **49** | **47.3** | **89** | 46.5 | 400 | 1,000 | 47 | 218 |
| Magnesium | mg/kg | 5,250 | 5,780 | 5,730 | 5,840 | 6,580 | 6,790 | 5,730 | 6,170 | | | | |
| Manganese | mg/kg | 908 | 1,290 | 1,250 | 1,430 | 1,580 | 1,470 | 1,020 | 1,430 | 160 | 4,100 | | |
| Mercury | mg/kg | **0.37** | **0.34** | **0.37** | **0.35** | **0.36** | **0.37** | **0.37** | **0.32** | 10 | 610 | 0.15 | 0.71 |
| Nickel | mg/kg | **27.5** | **26.4** | **27.3** | **27.3** | **29.3** | **29.2** | **28.4** | **27.3** | 160 | 4,100 | 20.9 | 51.6 |
| Potassium | mg/kg | 2,080 | 2,160 | 2,130 | 2,190 | 2,420 | 2,530 | 2,130 | 2,260 | | | | |
| Selenium | mg/kg | <0.69 | <0.62 | <0.58 | <0.68 | <0.80 | <0.66 | <0.48 | <0.62 | 39 | 1,000 | | |
| Silver | mg/kg | 0.43 | 0.55 | 0.58 | 0.58 | 0.71 | 0.59 | 0.56 | 0.62 | 39 | 1,000 | 1 | 3.7 |
| Sodium | mg/kg | 942 | 1,030 | 885 | 586 | 751 | 1,310 | 512 | 1,040 | | | | |
| Thallium | mg/kg | <1.4 | <1.2 | <1.2 | <1.4 | <1.6 | <1.3 | <0.97 | <1.2 | 18 | 220 | | |
| Vanadium | mg/kg | 45.9 | 42.9 | 45.1 | 43.6 | 48 | 49.1 | 48.9 | 44.1 | 55 | 1,400 | | |
| Zinc | mg/kg | **445** | **221** | **231** | **219** | **223** | **209** | **157** | **214** | 2,300 | 61,000 | 150 | 410 |
| **Semivolatiles** | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,2-Dichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,3-Dichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,4-Dichlorobenzene | µg/kg | 41 | <83 | <78 | <91 | <100 | <88 | 20 | <83 | | | | |
| 2,2-oxybis(1-Chloropropane) | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2,4,5-Trichlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4,6-Trichlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4-Dichlorophenol | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2,4-Dimethylphenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4-Dinitrophenol | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 2,4-Dinitrotoluene | µg/kg | <440 | <410 | <390 | <450 | <510 | 230 | <320 | <410 | | | | |
| 2,6-Dinitrotoluene | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2-Chloronaphthalene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2-Chlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2-Methylnaphthalene | µg/kg | 99 | 47 | 62 | 57 | 44 | 24 | 27 | 47 | | | | |
| 2-Methylphenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | 38 | <410 | | | | |
| 2-Nitroaniline | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 2-Nitrophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 3,3-Dichlorobenzidine | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |

Table 3. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | | | |
| 3-Nitroaniline | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4,6-Dinitro-2-methylphenol | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4-Bromophenyl phenyl ether | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Chloro-3-methylphenol | µ/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Chloroaniline | µg/kg | <440 | <410 | 49 | 45 | <510 | <430 | 55 | <410 | | | | |
| 4-Chlorophenyl phenyl ether | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Methylphenol | µg/kg | 190 | 430 | 120 | 680 | 520 | 56 | 37 | 90 | | | | |
| 4-Nitroaniline | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4-Nitrophenol | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| Acenaphthene | µg/kg | **140** | **21** | **34** | <91 | <100 | <88 | <65 | **30** | 470,000 | 5,000,000 | 16 | 500 |
| Acenaphthylene | µg/kg | **180** | 42 | **60** | **53** | 42 | <88 | <65 | **46** | | | 44 | 640 |
| Anthracene | µg/kg | **440** | 80 | 79 | 68 | 73 | 30 | 21 | **99** | 1,000,000 | 5,000,000 | 85.3 | 1,100 |
| Benzo(a)anthracene | µg/kg | **1100** | 220 | 230 | 180 | 140 | 92 | 59 | 190 | 900 | 8,000 | 261 | 1,600 |
| Benzo(a)pyrene | µg/kg | 940 | 220 | 240 | 180 | 170 | 69 | 35 | 180 | 90 | 800 | 430 | 1,600 |
| Benzo(b)fluoranthene | µg/kg | 1500 | 380 | 430 | 330 | 290 | 130 | 51 | 310 | 900 | 8,000 | | |
| Benzo(ghi)perylene | µg/kg | 680 | 230 | 230 | 200 | 170 | 94 | 33 | 190 | | | | |
| Benzo(k)fluoranthene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | 9,000 | 78,000 | | |
| bis(2-Chloroethoxy)methane | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| bis(2-Chloroethyl) ether | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| bis(2-Ethylhexyl) phthalate | µg/kg | 590 | 420 | 440 | 440 | 390 | 140 | 140 | 290 | | | | |
| Butyl benzyl phthalate | µg/kg | 78 | <410 | 48 | 53 | 55 | 37 | <320 | 42 | | | | |
| Carbazole | µg/kg | 74 | 39 | 41 | 48 | <100 | <88 | 16 | 23 | | | | |
| Chrysene | µg/kg | **1300** | 290 | 300 | 230 | 210 | 95 | 48 | 270 | 87,000 | 780,000 | 384 | 2,800 |
| Di-n-butyl phthalate | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Di-n-octyl phthalate | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Dibenz(a,h)anthracene | µg/kg | **170** | 51 | 50 | 44 | 44 | <88 | <65 | 42 | 90 | 800 | 63 | 260 |
| Dibenzofuran | µg/kg | 89 | 29 | 41 | 32 | 33 | <430 | <320 | 28 | | | | |
| Diethyl phthalate | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Dimethyl phthalate | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Fluoranthene | µg/kg | **1900** | 420 | 470 | 390 | 330 | 140 | 71 | 370 | 310,000 | 5,000,000 | 600 | 5,100 |
| Fluorene | µg/kg | **180** | **47** | **72** | **33** | <100 | **74** | <65 | 53 | 310,000 | 5,000,000 | 19 | 540 |
| Hexachlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Hexachlorobutadiene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Hexachlorocyclopentadiene | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Hexachloroethane | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Indeno(1,2,3-cd)pyrene | µg/kg | 570 | 170 | 220 | 160 | 130 | 61 | 33 | 160 | 900 | 8,000 | | |
| Isophorone | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |

Table 3. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | | | |
| N-Nitrosodi-n-propylamine | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| N-Nitrosodiphenylamine | µg/kg | 53 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Naphthalene | µg/kg | **1100** | 76 | 97 | 94 | 75 | <88 | 54 | 79 | 160,000 | 4,100,000 | 160 | 2,100 |
| Nitrobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Pentachlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Phenanthrene | µg/kg | **980** | 220 | 220 | 190 | 180 | 87 | 56 | 220 | 1,000,000 | 5,000,000 | 240 | 1,500 |
| Phenol | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Pyrene | µg/kg | **1300** | 330 | 360 | 290 | 240 | 120 | 56 | 290 | | | 665 | 2,600 |
| **VOCs** | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 160,000 | 4,100,000 | | |
| 1,1,2,2-Tetrachloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 600 | 29,000 | | |
| 1,1,2-Trichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 1,000 | 100,000 | | |
| 1,1-Dichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 780,000 | 5,000,000 | | |
| 1,1-Dichloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| 1,2-Dichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| 1,2-Dichloroethene (total) | µg/kg | <27 | <25 | <23 | <27 | <32 | <26 | <19 | <25 | 400 | 63,000 | | |
| 1,2-Dichloropropane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 9,000 | 84,000 | | |
| 2-Butanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | 11 | <12 | | | | |
| 2-Hexanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 310,000 | 5,000,000 | | |
| 4-Methyl-2-pentanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Acetone | µg/kg | 15 | <50 | <47 | <54 | <64 | <53 | 55 | <49 | 780,000 | 5,000,000 | | |
| Benzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 800 | 200,000 | | |
| Bromodichloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 10,000 | 92,000 | | |
| Bromoform | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 53,000 | 720,000 | | |
| Bromomethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 11,000 | 290,000 | | |
| Carbon disulfide | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 780,000 | 5,000,000 | | |
| Carbon tetrachloride | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 300 | 44,000 | | |
| Chlorobenzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 130,000 | 4,100,000 | | |
| Chloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 220,000 | 2,000,000 | | |
| Chloroform | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 300 | 940,000 | | |
| Chloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 49,000 | 440,000 | | |
| cis-1,3-Dichloropropene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 100 | 32,000 | | |
| Dibromochloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 8,000 | 68,000 | | |
| Ethylbenzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 400,000 | 5,000,000 | | |
| Methylene chloride | µg/kg | 16 | 6 | 4.5 | 6.5 | 5.7 | 5.8 | 82 | 6 | 13,000 | 760,000 | | |
| Styrene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 1,000,000 | 5,000,000 | | |
| Tetrachloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Toluene | µg/kg | 48 | 180 | 2.5 | 67 | 77 | 34 | <9.7 | 21 | 650,000 | 5,000,000 | | |

Table 3. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOCs (Continued)** | | | | | | | | | | | | | |
| trans-1,3-Dichloropropene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 100 | 32,000 | | |
| Trichloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Vinyl chloride | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 30 | 3,000 | | |
| Xylenes (total) | µg/kg | <41 | <37 | <35 | <41 | <48 | <40 | <29 | <37 | 420,000 | 5,000,000 | | |
| | | | | | | | | | | | | | |
| Cyanide, Total | mg/kg | 0.27 | <1.2 | 0.61 | 0.36 | 0.4 | 0.28 | <0.97 | 0.33 | | | | |
| Total Sulfide | mg/kg | 110 | 59.5 | <70.2 | <81.2 | <95.5 | <79.1 | <58.2 | 39.5 | | | | |

Table 4. PCB congener testing results for samples collected from Wilmington Harbor sediments

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 1 (BZ) | ng/g | 0.34 | <0.99 | 0.11 | <0.14 | 0.047 | 0.035 | <0.78 | 0.036 |
| PCB 2 (BZ) | ng/g | 0.13 | <0.99 | 0.053 | 0.054 | 0.066 | 0.063 | 0.15 | 0.046 |
| PCB 3 (BZ) | ng/g | 0.69 | <0.99 | 0.09 | 0.082 | 0.081 | 0.065 | 0.33 | 0.066 |
| PCB 4 (BZ) | ng/g | 4.4 | 0.086 | 0.14 | 0.18 | 0.14 | 0.087 | 1.5 | 0.14 |
| PCB 5 (BZ) | ng/g | <1.1 | <0.99 | 0.0075 | 0.0074 | 0.012 | 0.0053 | <0.78 | 0.0094 |
| PCB 6 (BZ) | ng/g | 3.5 | <0.99 | 0.088 | 0.09 | 0.1 | 0.07 | 0.68 | 0.079 |
| PCB 7 (BZ) | ng/g | 0.14 | <0.99 | 0.018 | 0.016 | 0.016 | 0.011 | 0.13 | 0.016 |
| PCB 8 (BZ) | ng/g | 4.3 | 0.27 | 0.24 | 0.26 | 0.23 | 0.17 | 1.5 | 0.24 |
| PCB 9 (BZ) | ng/g | 0.27 | <0.99 | 0.018 | 0.017 | 0.011 | 0.015 | 0.19 | 0.014 |
| PCB 10 (BZ) | ng/g | 0.18 | <0.99 | 0.0096 | 0.01 | 0.011 | <0.026 | 0.11 | 0.0082 |
| PCB 11 (BZ) | ng/g | 0.93 | 0.47 | 0.29 | 0.43 | 0.63 | 0.39 | 0.58 | 0.42 |
| PCB 12 (BZ) | ng/g | 51 | <0.99 | 0.11 | 0.078 | 0.13 | 0.12 | 0.56 | 0.13 |
| PCB 13 (BZ) | ng/g | 51 | <0.99 | 0.11 | 0.078 | 0.13 | 0.12 | 0.56 | 0.13 |
| PCB 14 (BZ) | ng/g | <1.1 | <0.99 | 0.0027 | 0.0045 | 0.0059 | 0.0055 | <0.78 | <0.025 |
| PCB 15 (BZ) | ng/g | 23 | 0.49 | 0.45 | 0.46 | 0.55 | 0.44 | 2.2 | 0.47 |
| PCB 16 (BZ) | ng/g | 3.5 | <0.99 | 0.13 | 0.17 | 0.18 | 0.1 | 4.8 | 0.16 |
| PCB 17 (BZ) | ng/g | 38 | 0.18 | 0.25 | 0.3 | 0.33 | 0.16 | 6.3 | 0.26 |
| PCB 18 (BZ) | ng/g | 28 | 0.32 | 0.35 | 0.45 | 0.6 | 0.26 | 15 | 0.39 |
| PCB 19 (BZ) | ng/g | 12 | <0.99 | 0.089 | 0.11 | 0.13 | 0.051 | 1.3 | 0.092 |
| PCB 20 (BZ) | ng/g | 17 | 0.89 | 1 | 1.2 | 1.4 | 0.85 | 18 | 1.1 |
| PCB 21 (BZ) | ng/g | 4.5 | 0.16 | 0.24 | 0.27 | 0.27 | 0.19 | 5 | 0.27 |
| PCB 22 (BZ) | ng/g | 2.9 | 0.16 | 0.19 | 0.23 | 0.26 | 0.15 | 3.8 | 0.23 |
| PCB 23 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 24 (BZ) | ng/g | <1.1 | <0.99 | 0.0076 | <0.027 | <0.032 | 0.0043 | 0.11 | 0.0037 |
| PCB 25 (BZ) | ng/g | 19 | 0.13 | 0.17 | 0.18 | 0.28 | 0.12 | 1.3 | 0.16 |
| PCB 26 (BZ) | ng/g | 47 | 0.19 | 0.24 | 0.25 | 0.46 | 0.17 | 2.5 | 0.23 |
| PCB 27 (BZ) | ng/g | 38 | <0.99 | 0.11 | 0.053 | 0.12 | 0.061 | 0.76 | 0.098 |
| PCB 28 (BZ) | ng/g | 17 | 0.89 | 1 | 1.2 | 1.4 | 0.85 | 18 | 1.1 |
| PCB 29 (BZ) | ng/g | 47 | 0.19 | 0.24 | 0.25 | 0.46 | 0.17 | 2.5 | 0.23 |
| PCB 30 (BZ) | ng/g | 28 | 0.32 | 0.35 | 0.45 | 0.6 | 0.26 | 15 | 0.39 |
| PCB 31 (BZ) | ng/g | 27 | 0.51 | 0.68 | 0.81 | 0.96 | 0.55 | 17 | 0.7 |
| PCB 32 (BZ) | ng/g | 67 | 0.2 | 0.22 | 0.28 | 0.37 | 0.16 | 4.7 | 0.25 |
| PCB 33 (BZ) | ng/g | 4.5 | 0.16 | 0.24 | 0.27 | 0.27 | 0.19 | 5 | 0.27 |
| PCB 34 (BZ) | ng/g | 0.64 | <0.99 | 0.0091 | 0.01 | 0.012 | 0.0068 | 0.2 | 0.011 |
| PCB 35 (BZ) | ng/g | 0.33 | <0.99 | 0.056 | 0.086 | 0.068 | 0.061 | 0.33 | 0.057 |
| PCB 36 (BZ) | ng/g | 0.16 | <0.99 | 0.0073 | 0.012 | 0.012 | 0.012 | <0.78 | 0.0097 |
| PCB 37 (BZ) | ng/g | 2.2 | 0.3 | 0.35 | 0.42 | 0.47 | 0.37 | 3 | 0.4 |
| PCB 38 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 39 (BZ) | ng/g | 0.25 | <0.99 | 0.0092 | 0.013 | 0.014 | 0.0071 | 0.13 | 0.011 |
| PCB 40 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 41 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 42 (BZ) | ng/g | 9.5 | 0.4 | 0.34 | 0.41 | 0.54 | 0.27 | 8.4 | 0.37 |
| PCB 43 (BZ) | ng/g | <1.1 | <0.99 | 0.041 | 0.05 | 0.086 | 0.019 | 0.89 | 0.044 |
| PCB 44 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 45 (BZ) | ng/g | 55 | <0.99 | 0.34 | 0.34 | 0.45 | 0.19 | 5.5 | 0.31 |
| PCB 46 (BZ) | ng/g | 10 | <0.99 | 0.086 | 0.093 | 0.13 | 0.052 | 2 | 0.09 |
| PCB 47 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 48 (BZ) | ng/g | 3.1 | <0.99 | 0.14 | 0.17 | 0.23 | 0.097 | 4.9 | 0.18 |
| PCB 49 (BZ) | ng/g | 150 | 0.92 | 1.1 | 1.2 | 1.6 | 0.71 | 23 | 1.1 |

| Table 4. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
| PCB 50 (BZ) | ng/g | 63 | 0.15 | 0.27 | 0.27 | 0.33 | 0.16 | 4.4 | 0.23 |
| PCB 51 (BZ) | ng/g | 55 | <0.99 | 0.34 | 0.34 | 0.45 | 0.19 | 5.5 | 0.31 |
| PCB 52 (BZ) | ng/g | 88 | 1.4 | 1.8 | 1.9 | 2.6 | 1.1 | 40 | 1.7 |
| PCB 53 (BZ) | ng/g | 63 | 0.15 | 0.27 | 0.27 | 0.33 | 0.16 | 4.4 | 0.23 |
| PCB 54 (BZ) | ng/g | 6.5 | <0.99 | 0.023 | <0.027 | 0.024 | 0.015 | <0.78 | 0.015 |
| PCB 55 (BZ) | ng/g | 0.13 | <0.99 | 0.028 | 0.032 | 0.025 | 0.015 | 0.27 | 0.012 |
| PCB 56 (BZ) | ng/g | 3.8 | 0.43 | 0.5 | 0.59 | 0.64 | 0.38 | 9.6 | 0.56 |
| PCB 57 (BZ) | ng/g | 0.55 | <0.99 | 0.011 | 0.013 | 0.026 | 0.0082 | <0.78 | 0.012 |
| PCB 58 (BZ) | ng/g | 0.2 | <0.99 | <0.023 | 0.011 | 0.015 | <0.026 | 0.29 | 0.01 |
| PCB 59 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 60 (BZ) | ng/g | 0.97 | <0.99 | 0.16 | 0.2 | 0.22 | 0.13 | 0.54 | 0.22 |
| PCB 61 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 62 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 63 (BZ) | ng/g | 0.92 | <0.99 | 0.05 | 0.059 | 0.081 | 0.037 | 0.88 | 0.056 |
| PCB 64 (BZ) | ng/g | 4.9 | 0.4 | 0.49 | 0.57 | 0.71 | 0.37 | 11 | 0.54 |
| PCB 65 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 66 (BZ) | ng/g | 11 | 1.3 | 1.3 | 1.5 | 1.7 | 1.1 | 25 | 1.4 |
| PCB 67 (BZ) | ng/g | 0.52 | <0.99 | 0.048 | 0.059 | 0.076 | 0.037 | 0.49 | <0.025 |
| PCB 68 (BZ) | ng/g | 2.8 | <0.99 | 0.039 | 0.033 | 0.041 | 0.025 | 0.4 | 0.034 |
| PCB 69 (BZ) | ng/g | 150 | 0.92 | 1.1 | 1.2 | 1.6 | 0.71 | 23 | 1.1 |
| PCB 70 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 71 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 72 (BZ) | ng/g | 3.4 | <0.99 | 0.044 | 0.051 | 0.067 | 0.027 | 0.76 | 0.041 |
| PCB 73 (BZ) | ng/g | <1.1 | <0.99 | 0.041 | 0.05 | 0.086 | 0.019 | 0.89 | 0.044 |
| PCB 74 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 75 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 76 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 77 (BZ) | ng/g | 0.71 | 0.15 | 0.22 | 0.28 | 0.27 | 0.19 | 1.8 | 0.22 |
| PCB 78 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 79 (BZ) | ng/g | 0.24 | <0.99 | 0.025 | 0.024 | 0.027 | 0.019 | 0.26 | 0.02 |
| PCB 80 (BZ) | ng/g | <1.1 | <0.99 | 0.016 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 81 (BZ) | ng/g | <1.1 | <0.99 | 0.0046 | 0.0055 | <0.032 | 0.0072 | <0.78 | <0.025 |
| PCB 82 (BZ) | ng/g | 2.4 | 0.34 | 0.25 | 0.37 | 0.35 | 0.17 | 3 | 0.32 |
| PCB 83 (BZ) | ng/g | 14 | 1.3 | 1.8 | 2.1 | 2.1 | 1.3 | 26 | 1.8 |
| PCB 84 (BZ) | ng/g | 6.7 | 0.63 | 0.66 | 0.75 | 0.88 | 0.43 | 10 | 0.7 |
| PCB 85 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 86 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 87 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 88 (BZ) | ng/g | 5.3 | 0.36 | 0.48 | 0.55 | 0.62 | 0.35 | 5.8 | 0.48 |
| PCB 89 (BZ) | ng/g | <1.1 | <0.99 | 0.019 | 0.037 | 0.032 | 0.016 | 0.52 | 0.029 |
| PCB 90 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 91 (BZ) | ng/g | 5.3 | 0.36 | 0.48 | 0.55 | 0.62 | 0.35 | 5.8 | 0.48 |
| PCB 92 (BZ) | ng/g | 6.1 | 0.46 | 0.55 | 0.66 | 0.69 | 0.37 | 7.9 | 0.59 |
| PCB 93 (BZ) | ng/g | 2.6 | <0.99 | 0.12 | 0.15 | 0.12 | 0.066 | 0.92 | 0.12 |
| PCB 94 (BZ) | ng/g | 0.87 | <0.99 | 0.029 | 0.041 | 0.038 | 0.021 | <0.78 | 0.032 |
| PCB 95 (BZ) | ng/g | 19 | 2 | 2 | 2.3 | 2.6 | 1.3 | 32 | 2 |
| PCB 96 (BZ) | ng/g | 0.38 | <0.99 | 0.026 | 0.031 | 0.039 | 0.015 | 0.51 | 0.029 |
| PCB 97 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 98 (BZ) | ng/g | 1.8 | <0.99 | 0.13 | 0.15 | 0.16 | 0.088 | 1.5 | 0.14 |
| PCB 99 (BZ) | ng/g | 14 | 1.3 | 1.8 | 2.1 | 2.1 | 1.3 | 26 | 1.8 |

| Table 4. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
| PCB 100 (BZ) | ng/g | 2.6 | <0.99 | 0.12 | 0.15 | 0.12 | 0.066 | 0.92 | 0.12 |
| PCB 101 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 102 (BZ) | ng/g | 1.8 | <0.99 | 0.13 | 0.15 | 0.16 | 0.088 | 1.5 | 0.14 |
| PCB 103 (BZ) | ng/g | 2.8 | <0.99 | 0.077 | 0.075 | 0.093 | 0.054 | 0.89 | 0.067 |
| PCB 104 (BZ) | ng/g | 0.27 | <0.99 | 0.0063 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 105 (BZ) | ng/g | 4.3 | 0.69 | 0.77 | 0.91 | 0.94 | 0.54 | 5.2 | 0.89 |
| PCB 106 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 107 (BZ) | ng/g | 1.4 | 0.16 | 0.21 | 0.25 | 0.25 | 0.17 | 3.2 | 0.22 |
| PCB 108 (BZ) | ng/g | 0.49 | <0.99 | 0.075 | 0.1 | 0.099 | 0.06 | 0.54 | 0.1 |
| PCB 109 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 110 (BZ) | ng/g | 25 | 2.6 | 3.1 | 3.6 | 3.8 | 2 | 39 | 3.3 |
| PCB 111 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | 0.012 | <0.032 | 0.009 | 0.1 | <0.025 |
| PCB 112 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 113 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 114 (BZ) | ng/g | 0.19 | <0.99 | 0.043 | 0.055 | 0.063 | 0.023 | 0.26 | 0.048 |
| PCB 115 (BZ) | ng/g | 25 | 2.6 | 3.1 | 3.6 | 3.8 | 2 | 39 | 3.3 |
| PCB 116 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 117 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 118 (BZ) | ng/g | 15 | 2 | 2.3 | 2.4 | 2.5 | 1.5 | 30 | 2.3 |
| PCB 119 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 120 (BZ) | ng/g | 0.27 | <0.99 | 0.026 | 0.035 | 0.022 | 0.018 | 0.27 | 0.026 |
| PCB 121 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 122 (BZ) | ng/g | <1.1 | <0.99 | 0.042 | 0.046 | 0.044 | 0.019 | 0.24 | 0.047 |
| PCB 123 (BZ) | ng/g | 0.2 | <0.99 | 0.053 | 0.05 | 0.041 | 0.033 | 0.13 | 0.054 |
| PCB 124 (BZ) | ng/g | 0.49 | <0.99 | 0.075 | 0.1 | 0.099 | 0.06 | 0.54 | 0.1 |
| PCB 125 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 126 (BZ) | ng/g | <1.1 | <0.99 | 0.016 | 0.02 | 0.019 | 0.012 | <0.78 | 0.012 |
| PCB 127 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 128 (BZ) | ng/g | 2.7 | 0.5 | 0.52 | 0.58 | 0.63 | 0.36 | 3.7 | 0.55 |
| PCB 129 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 130 (BZ) | ng/g | 1.4 | <0.99 | 0.21 | 0.26 | 0.25 | 0.18 | 2.2 | 0.26 |
| PCB 131 (BZ) | ng/g | <1.1 | <0.99 | 0.031 | 0.05 | 0.053 | 0.025 | 0.18 | 0.048 |
| PCB 132 (BZ) | ng/g | 6.7 | 0.97 | 1.1 | 1.2 | 1.3 | 0.76 | 11 | 1.1 |
| PCB 133 (BZ) | ng/g | 0.46 | <0.99 | 0.1 | 0.12 | 0.14 | 0.08 | 0.56 | 0.089 |
| PCB 134 (BZ) | ng/g | 1.5 | <0.99 | 0.21 | 0.25 | 0.23 | 0.14 | 2.2 | 0.23 |
| PCB 135 (BZ) | ng/g | 7.9 | 1 | 1.3 | 1.6 | 1.7 | 0.92 | 11 | 1.4 |
| PCB 136 (BZ) | ng/g | 3.1 | 0.32 | 0.48 | 0.58 | 0.62 | 0.35 | 4.2 | 0.5 |
| PCB 137 (BZ) | ng/g | 0.68 | <0.99 | 0.11 | 0.12 | 0.12 | 0.082 | 0.9 | 0.12 |
| PCB 138 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 139 (BZ) | ng/g | 0.3 | <0.99 | 0.06 | 0.061 | 0.08 | 0.037 | 0.59 | 0.075 |
| PCB 140 (BZ) | ng/g | 0.3 | <0.99 | 0.06 | 0.061 | 0.08 | 0.037 | 0.59 | 0.075 |
| PCB 141 (BZ) | ng/g | 3.3 | 0.34 | 0.52 | 0.64 | 0.67 | 0.35 | 3.6 | 0.58 |
| PCB 142 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 143 (BZ) | ng/g | 1.5 | <0.99 | 0.21 | 0.25 | 0.23 | 0.14 | 2.2 | 0.23 |
| PCB 144 (BZ) | ng/g | 0.78 | <0.99 | 0.13 | 0.17 | 0.19 | 0.11 | 0.81 | 0.17 |
| PCB 145 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 146 (BZ) | ng/g | 3.5 | 0.61 | 0.71 | 0.8 | 0.86 | 0.57 | 6.4 | 0.72 |
| PCB 147 (BZ) | ng/g | 15 | 2.6 | 2.9 | 3.4 | 3.6 | 2.3 | 24 | 2.9 |
| PCB 148 (BZ) | ng/g | <1.1 | <0.99 | 0.026 | 0.029 | 0.028 | 0.022 | <0.78 | 0.022 |
| PCB 149 (BZ) | ng/g | 15 | 2.6 | 2.9 | 3.4 | 3.6 | 2.3 | 24 | 2.9 |

| Table 4. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 150 (BZ) | ng/g | <1.1 | <0.99 | 0.025 | 0.032 | 0.036 | 0.021 | <0.78 | 0.029 |
| PCB 151 (BZ) | ng/g | 7.9 | 1 | 1.3 | 1.6 | 1.7 | 0.92 | 11 | 1.4 |
| PCB 152 (BZ) | ng/g | <1.1 | <0.99 | 0.0027 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 153 (BZ) | ng/g | 15 | 2.8 | 3.1 | 3.6 | 3.8 | 2.4 | 24 | 3.2 |
| PCB 154 (BZ) | ng/g | 0.6 | <0.99 | 0.16 | 0.19 | 0.22 | 0.16 | 0.72 | 0.15 |
| PCB 155 (BZ) | ng/g | <1.1 | <0.99 | 0.012 | <0.027 | <0.032 | 0.013 | <0.78 | 0.015 |
| PCB 156 (BZ) | ng/g | 1.5 | 0.23 | 0.3 | 0.37 | 0.37 | 0.22 | 2.6 | 0.34 |
| PCB 157 (BZ) | ng/g | 1.5 | 0.23 | 0.3 | 0.37 | 0.37 | 0.22 | 2.6 | 0.34 |
| PCB 158 (BZ) | ng/g | 1.6 | 0.28 | 0.28 | 0.34 | 0.37 | 0.19 | 2.1 | 0.3 |
| PCB 159 (BZ) | ng/g | <1.1 | <0.99 | 0.026 | 0.026 | 0.045 | 0.018 | 0.14 | 0.033 |
| PCB 160 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 161 (BZ) | ng/g | <1.1 | <0.99 | 0.0043 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 162 (BZ) | ng/g | <1.1 | <0.99 | 0.018 | 0.018 | 0.027 | 0.017 | <0.78 | 0.027 |
| PCB 163 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 164 (BZ) | ng/g | 1.4 | 0.11 | 0.28 | 0.31 | 0.33 | 0.2 | 2.1 | 0.3 |
| PCB 165 (BZ) | ng/g | <1.1 | <0.99 | 0.0041 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 166 (BZ) | ng/g | 2.7 | 0.5 | 0.52 | 0.58 | 0.63 | 0.36 | 3.7 | 0.55 |
| PCB 167 (BZ) | ng/g | 0.58 | <0.99 | 0.13 | 0.15 | 0.17 | 0.096 | 0.89 | 0.13 |
| PCB 168 (BZ) | ng/g | 15 | 2.8 | 3.1 | 3.6 | 3.8 | 2.4 | 24 | 3.2 |
| PCB 169 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | 0.0037 | <0.032 | <0.026 | <0.78 | 0.0058 |
| PCB 170 (BZ) | ng/g | 3.4 | 0.58 | 0.86 | 1 | 1.1 | 0.59 | 4.7 | 0.94 |
| PCB 171 (BZ) | ng/g | 1.1 | 0.16 | 0.27 | 0.32 | 0.33 | 0.2 | 1.5 | 0.3 |
| PCB 172 (BZ) | ng/g | 0.53 | 0.2 | 0.17 | 0.18 | 0.22 | 0.12 | 0.8 | 0.17 |
| PCB 173 (BZ) | ng/g | 1.1 | 0.16 | 0.27 | 0.32 | 0.33 | 0.2 | 1.5 | 0.3 |
| PCB 174 (BZ) | ng/g | 3.6 | 0.69 | 0.89 | 1.1 | 1.1 | 0.66 | 5.5 | 0.97 |
| PCB 175 (BZ) | ng/g | 0.17 | <0.99 | 0.044 | 0.058 | 0.062 | 0.035 | 0.16 | 0.048 |
| PCB 176 (BZ) | ng/g | 0.53 | <0.99 | 0.12 | 0.13 | 0.16 | 0.097 | 0.68 | 0.13 |
| PCB 177 (BZ) | ng/g | 2.5 | 0.35 | 0.61 | 0.74 | 0.77 | 0.44 | 3.4 | 0.63 |
| PCB 178 (BZ) | ng/g | 1.1 | 0.17 | 0.26 | 0.33 | 0.37 | 0.21 | 1.3 | 0.28 |
| PCB 179 (BZ) | ng/g | 1.7 | 0.4 | 0.48 | 0.56 | 0.59 | 0.36 | 2.6 | 0.5 |
| PCB 180 (BZ) | ng/g | 7.2 | 1.8 | 1.9 | 2.3 | 2.4 | 1.3 | 10 | 2 |
| PCB 181 (BZ) | ng/g | <1.1 | <0.99 | 0.0089 | <0.027 | <0.032 | <0.026 | <0.78 | 0.01 |
| PCB 182 (BZ) | ng/g | <1.1 | <0.99 | 0.021 | 0.037 | 0.032 | 0.02 | 0.11 | <0.025 |
| PCB 183 (BZ) | ng/g | 2.5 | 0.39 | 0.64 | 0.79 | 0.81 | 0.51 | 3.3 | 0.74 |
| PCB 184 (BZ) | ng/g | <1.1 | <0.99 | 0.0089 | 0.019 | 0.015 | 0.009 | <0.78 | 0.0091 |
| PCB 185 (BZ) | ng/g | 2.5 | 0.39 | 0.64 | 0.79 | 0.81 | 0.51 | 3.3 | 0.74 |
| PCB 186 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 187 (BZ) | ng/g | 4.7 | 1.6 | 1.5 | 1.7 | 1.8 | 1.2 | 7.5 | 1.5 |
| PCB 188 (BZ) | ng/g | <1.1 | <0.99 | 0.023 | 0.032 | 0.037 | 0.037 | <0.78 | 0.025 |
| PCB 189 (BZ) | ng/g | 0.13 | <0.99 | 0.039 | 0.046 | 0.043 | 0.03 | 0.17 | 0.047 |
| PCB 190 (BZ) | ng/g | 0.48 | <0.99 | 0.17 | 0.2 | 0.22 | 0.11 | 0.91 | 0.18 |
| PCB 191 (BZ) | ng/g | 0.18 | <0.99 | 0.038 | 0.043 | 0.053 | 0.024 | 0.22 | 0.04 |
| PCB 192 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 193 (BZ) | ng/g | 7.2 | 1.8 | 1.9 | 2.3 | 2.4 | 1.3 | 10 | 2 |
| PCB 194 (BZ) | ng/g | 2.3 | 0.69 | 0.61 | 0.73 | 0.81 | 0.51 | 3.2 | 0.66 |
| PCB 195 (BZ) | ng/g | 0.67 | <0.99 | 0.22 | 0.26 | 0.27 | 0.19 | 0.95 | 0.22 |
| PCB 196 (BZ) | ng/g | 1.2 | 0.49 | 0.47 | 0.56 | 0.61 | 0.46 | 1.3 | 0.5 |
| PCB 197 (BZ) | ng/g | <1.1 | <0.99 | 0.059 | 0.078 | 0.073 | 0.069 | 0.21 | 0.06 |
| PCB 198 (BZ) | ng/g | 3.7 | 1.5 | 1.6 | 1.9 | 2.2 | 1.6 | 5.9 | 1.7 |
| PCB 199 (BZ) | ng/g | 0.31 | 0.088 | 0.074 | 0.1 | 0.11 | 0.061 | 0.3 | 0.081 |

Table 4. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 200 (BZ) | ng/g | 0.31 | 0.14 | 0.2 | 0.25 | 0.27 | 0.22 | 0.57 | 0.2 |
| PCB 201 (BZ) | ng/g | 3.7 | 1.5 | 1.6 | 1.9 | 2.2 | 1.6 | 5.9 | 1.7 |
| PCB 202 (BZ) | ng/g | 1 | 0.54 | 0.54 | 0.65 | 0.75 | 0.61 | 1.6 | 0.55 |
| PCB 203 (BZ) | ng/g | 1.5 | 0.8 | 0.7 | 0.8 | 0.85 | 0.6 | 2.1 | 0.74 |
| PCB 204 (BZ) | ng/g | <1.1 | <0.99 | 0.0087 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 205 (BZ) | ng/g | <1.1 | <0.99 | 0.037 | 0.043 | 0.058 | 0.027 | <0.78 | 0.04 |
| PCB 206 (BZ) | ng/g | 7.2 | 5.6 | 5.9 | 6.1 | 7.7 | 7.4 | 14 | 5.5 |
| PCB 207 (BZ) | ng/g | 0.83 | 0.64 | 0.48 | 0.55 | 0.7 | 0.64 | 1.2 | 0.47 |
| PCB 208 (BZ) | ng/g | 3 | 2.4 | 2.5 | 2.8 | 3.5 | 3.4 | 6.1 | 2.4 |
| PCB 209 (BZ) | ng/g | 21 | 11 | 10 | 11 | 13 | 11 | 88 | 9.2 |

Table 5. PCB congener totals testing results for samples collected from Wilmington Harbor sediments. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels. Bolded concentrations are over ER-L sediment guidelines while underlined values are over ER-M levels

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Un-restricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monochlorobiphenyl | ng/g | 1.2 | <0.99 | 0.25 | 0.14 | 0.19 | 0.16 | 0.47 | 0.15 | | | | |
| Dichlorobiphenyl | ng/g | 88 | 1.3 | 1.4 | 1.5 | 1.8 | 1.3 | 7.5 | 1.5 | | | | |
| Trichlorobiphenyl | ng/g | 310 | 3 | 4.1 | 4.9 | 5.9 | 3.3 | 84 | 4.4 | | | | |
| Tetrachlorobiphenyl | ng/g | 530 | 8.9 | 11 | 13 | 16 | 8 | 230 | 11 | | | | |
| Pentachlorobiphenyl | ng/g | 150 | 15 | 17 | 20 | 21 | 12 | 230 | 18 | | | | |
| Hexachlorobiphenyl | ng/g | 87 | 13 | 16 | 19 | 20 | 12 | 130 | 17 | | | | |
| Heptachlorobiphenyl | ng/g | 30 | 6.4 | 8 | 9.6 | 10 | 5.9 | 43 | 8.6 | | | | |
| Octachlorobiphenyl | ng/g | 11 | 4.2 | 4.6 | 5.4 | 6 | 4.3 | 16 | 4.7 | | | | |
| Nonachlorobiphenyl | ng/g | 11 | 8.6 | 8.9 | 9.5 | 12 | 11 | 21 | 8.3 | | | | |
| Decachlorobiphenyl | ng/g | 21 | 11 | 10 | 11 | 13 | 11 | 88 | 9.2 | | | | |
| Total | | **1239.2** | **71.4** | **81.3** | **94.0** | **105.9** | **69.0** | **850.0** | **82.9** | 1000 | 1000 | 22.7 | 180 |

Table 6. Dissolved modified elutriate testing results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | | | |
| Aroclor 1016 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1221 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1232 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1242 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1248 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | 0.8 | <0.38 | | |
| Aroclor 1254 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | 1.9 | <0.38 | | |
| Aroclor 1260 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| **Pesticides** | | | | | | | | | | | |
| 4,4-DDD | µg/L | <0.050 | <0.050 | <0.050 | 0.0075 | <0.048 | <0.048 | 0.021 | <0.048 | 0.13 | 0.001 |
| 4,4-DDE | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.045 | <0.048 | 0.13 | 0.001 |
| 4,4-DDT | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.13 | 0.001 |
| Aldrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| alpha-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| alpha-Chlordane | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| beta-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| delta-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Dieldrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.71 | 0.0019 |
| Endosulfan I | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.034 | 0.0087 |
| Endosulfan II | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endosulfan sulfate | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.037 | 0.0023 |
| Endrin aldehyde | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endrin ketone | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| gamma-BHC (Lindane) | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| gamma-Chlordane | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.037 | <0.048 | | |
| Heptachlor | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.01 | <0.048 | 0.053 | 0.0036 |
| Heptachlor epoxide | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Methoxychlor | µg/L | <0.099 | <0.099 | <0.099 | <0.096 | <0.097 | <0.096 | <0.097 | <0.096 | | 0.03 |
| Toxaphene | µg/L | <2.0 | <2.0 | <2.0 | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | 0.21 | 0.002 |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | | | | |
| Aluminum | µg/L | 336 | 105 | 973 | 119 | 95.7 | 62.3 | 51.5 | 52.7 | | |
| Antimony | µg/L | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | 6.1 | <10.0 | | |
| Arsenic | µg/L | 13.6 | 32.3 | 30.3 | 27 | 23.7 | 35.4 | 29.1 | 29.6 | 69 | 36 |
| Barium | µg/L | 66.9 | 112 | 71 | 104 | 115 | 48 | 13.1 | 78.9 | | |
| Beryllium | µg/L | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | | |
| Cadmium | µg/L | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | 40 | 8.8 |
| Calcium | µg/L | 17,900 | 44,700 | 26,100 | 43,800 | 54,600 | 22,400 | 6,010 | 32,800 | | |
| Chromium | µg/L | 2.9 | 2.2 | 4.2 | 2.4 | 3.8 | 2.1 | 2.9 | 1.6 | 1100 | 50 |
| Cobalt | µg/L | 2 | 2.3 | 2.3 | 2.6 | 2.5 | 2.2 | 1.9 | 2.3 | | |
| Copper | µg/L | 1.1 | 1.1 | 2.5 | <25.0 | 1.4 | 2.4 | 6.2 | 1.1 | 4.8 | 3.1 |
| Iron | µg/L | 929 | 197 | 1190 | 639 | 85.5 | <100 | 47.9 | <100 | | |
| Lead | µg/L | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | 210 | 8.1 |
| Magnesium | µg/L | 16,200 | 39,700 | 29,300 | 27,900 | 32,500 | 27,300 | 7,380 | 33,100 | | |
| Manganese | µg/L | 1590 | 3810 | 1980 | 4470 | 6740 | 1740 | 86.6 | 2530 | | |
| Mercury | µg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 1.8 | 0.94 |
| Nickel | µg/L | 9.3 | 10 | 9.4 | 8 | 9.7 | 7.9 | 7.1 | 7.8 | 74 | 8.2 |
| Potassium | µg/L | 13,800 | 16,700 | 15,300 | 11,300 | 10,900 | 16,500 | 8,380 | 15,400 | | |
| Selenium | µg/L | 3.1 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | 290 | 71 |
| Silver | µg/L | 0.77 | <5.0 | 0.76 | 1 | 1.7 | <5.0 | <5.0 | 0.81 | 1.9 | |
| Sodium | µg/L | 142,000 | 175,000 | 161,000 | 94,200 | 96,300 | 165,000 | 71,800 | 161,000 | | |
| Thallium | µg/L | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | | |
| Vanadium | µg/L | 4.7 | 4.5 | 9.2 | 4.7 | 4.8 | 10.2 | 20.2 | 5.5 | | |
| Zinc | µg/L | 14.2 | 11 | 25.8 | 7.5 | 6.8 | 10.6 | 26.7 | 6.7 | 90 | 81 |
| **Semivolatiles** | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,2-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,3-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,4-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,2-oxybis(1-Chloropropane) | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,4,5-Trichlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,4,6-Trichlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,4-Dichlorophenol | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,4-Dimethylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | |
| 2,4-Dinitrophenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 2,4-Dinitrotoluene | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,6-Dinitrotoluene | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Chloronaphthalene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2-Chlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Methylnaphthalene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2-Methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 2-Nitrophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 3,3-Dichlorobenzidine | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 3-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4,6-Dinitro-2-methylphenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4-Bromophenyl phenyl ether | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chloro-3-methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chloroaniline | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chlorophenyl phenyl ether | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4-Nitrophenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| Acenaphthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Acenaphthylene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Anthracene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(a)anthracene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(a)pyrene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(b)fluoranthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(ghi)perylene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(k)fluoranthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| bis(2-Chloroethoxy)methane | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| bis(2-Chloroethyl) ether | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| bis(2-Ethylhexyl) phthalate | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Butyl benzyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | 2.1 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Carbazole | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Chrysene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | |
| Di-n-butyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | 0.56 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Di-n-octyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Dibenz(a,h)anthracene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Dibenzofuran | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Diethyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Dimethyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Fluoranthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Fluorene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorobutadiene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorocyclopentadiene | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Hexachloroethane | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Indeno(1,2,3-cd)pyrene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Isophorone | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| N-Nitrosodi-n-propylamine | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| N-Nitrosodiphenylamine | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Naphthalene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Nitrobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Pentachlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Phenanthrene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Phenol | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Pyrene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| **WET** | | | | | | | | | | | |
| Dissolved Cyanide | µg/L | 2.4 | 5.4 | 2.8 | 3 | 4.9 | 4.8 | 3.8 | 3.7 | | |
| Dissolved Sulfide | mg/L | <3.0 | <3.0 | <3.0 | 1.6 | <3.0 | <3.0 | <3.0 | <3.0 | | |
| Total Suspended Solids | mg/L | 16 | 102 | 13 | 62 | 46 | 218 | 7 | 20 | | |

Table 7. Background and Site Water testing results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria.

| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|
| **PCBs** | | | | | |
| Aroclor 1016 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1221 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1232 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1242 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1248 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1254 | μg/L | <0.39 | <0.38 | | |
| Aroclor 1260 | g/L | <0.39 | <0.38 | | |
| **Pesticides** | | | | | |
| 4,4-DDD | μg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| 4,4-DDE | μg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| 4,4-DDT | μg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| Aldrin | μg/L | <0.048 | <0.048 | | |
| alpha-BHC | μg/L | <0.048 | <0.048 | | |
| alpha-Chlordane | μg/L | <0.048 | <0.048 | | |
| beta-BHC | μg/L | <0.048 | <0.048 | | |
| delta-BHC | μg/L | <0.048 | <0.048 | | |
| Dieldrin | μg/L | <0.048 | <0.048 | 0.71 | 0.0019 |
| Endosulfan I | μg/L | <0.048 | <0.048 | 0.034 | 0.0087 |
| Endosulfan II | μg/L | <0.048 | <0.048 | | |
| Endosulfan sulfate | μg/L | <0.048 | <0.048 | | |
| Endrin | μg/L | <0.048 | <0.048 | 0.037 | 0.0023 |
| Endrin aldehyde | μg/L | <0.048 | <0.048 | | |
| Endrin ketone | μg/L | <0.048 | <0.048 | | |
| gamma-BHC (Lindane) | μg/L | <0.048 | <0.048 | | |
| gamma-Chlordane | μg/L | <0.048 | <0.048 | | |
| Heptachlor | μg/L | <0.048 | <0.048 | 0.053 | 0.0036 |
| Heptachlor epoxide | μg/L | <0.048 | <0.048 | | |
| Methoxychlor | μg/L | <0.097 | <0.095 | | 0.03 |
| Toxaphene | μg/L | <1.9 | <1.9 | 0.21 | 0.002 |
| **Dissolved Inorganics** | | | | | |
| Aluminum | μg/L | 436 | 34.6 | | |
| Antimony | μg/L | <10.0 | <10.0 | | |
| Arsenic | μg/L | 2.2 | <10.0 | 69 | 36 |
| Barium | μg/L | 31 | <200 | | |
| Beryllium | μg/L | 0.77 | 0.97 | | |
| Cadmium | μg/L | <5.0 | <5.0 | 40 | 8.8 |
| Calcium | μg/L | 20400 | <5000 | | |
| Chromium | μg/L | 1.3 | <5.0 | 1100 | 50 |
| Cobalt | μg/L | 0.78 | <50.0 | | |
| Copper | μg/L | <25.0 | <25.0 | 4.8 | 3.1 |
| Iron | μg/L | 630 | <100 | | |
| Lead | μg/L | <3.0 | <3.0 | 210 | 8.1 |
| Magnesium | μg/L | 9070 | <5000 | | |
| Manganese | μg/L | 56.2 | <15.0 | | |
| Mercury | μg/L | <0.20 | <0.20 | 1.8 | 0.94 |

Table 7. (Continued)

| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|
| **Dissolved Inorganics (Continued)** | | | | | |
| Nickel | µg/L | 2.3 | <40.0 | 75 | 8.2 |
| Potassium | µg/L | 2950 | <5000 | | |
| Selenium | µg/L | <5.0 | <5.0 | 290 | 71 |
| Silver | µg/L | <5.0 | <5.0 | 1.9 | |
| Sodium | µg/L | 32800 | <5000 | | |
| Thallium | µg/L | <10.0 | <10.0 | | |
| Vanadium | µg/L | 2.6 | <50.0 | | |
| Zinc | µg/L | 11.7 | 1.4 | 90 | 81 |
| **Semivolatiles** | | | | | |
| 1,2,4-Trichlorobenzene | µg/L | <1.9 | <1.9 | | |
| 1,2-Dichlorobenzene | µg/L | <1.9 | <1.9 | | |
| 1,3-Dichlorobenzene | µg/L | <1.9 | <1.9 | | |
| 1,4-Dichlorobenzene | µg/L | <1.9 | <1.9 | | |
| 2,2-oxybis(1-Chloropropane) | µg/L | <1.9 | <1.9 | | |
| 2,4,5-Trichlorophenol | µg/L | <9.6 | <9.4 | | |
| 2,4,6-Trichlorophenol | µg/L | <9.6 | <9.4 | | |
| 2,4-Dichlorophenol | µg/L | <1.9 | <1.9 | | |
| 2,4-Dimethylphenol | µg/L | <9.6 | <9.4 | | |
| 2,4-Dinitrophenol | µg/L | <48 | <47 | | |
| 2,4-Dinitrotoluene | µg/L | <9.6 | <9.4 | | |
| 2,6-Dinitrotoluene | µg/L | <9.6 | <9.4 | | |
| 2-Chloronaphthalene | µg/L | <1.9 | <1.9 | | |
| 2-Chlorophenol | µg/L | <9.6 | <9.4 | | |
| 2-Methylnaphthalene | µg/L | <1.9 | <1.9 | | |
| 2-Methylphenol | µg/L | <9.6 | <9.4 | | |
| 2-Nitroaniline | µg/L | <48 | <47 | | |
| 2-Nitrophenol | µg/L | <9.6 | <9.4 | | |
| 3,3-Dichlorobenzidine | µg/L | <9.6 | <9.4 | | |
| 3-Nitroaniline | µg/L | <48 | <47 | | |
| 4,6-Dinitro-2-methylphenol | µg/L | <48 | <47 | | |
| 4-Bromophenyl phenyl ether | µg/L | <9.6 | <9.4 | | |
| 4-Chloro-3-methylphenol | µg/L | <9.6 | <9.4 | | |
| 4-Chloroaniline | µg/L | <9.6 | <9.4 | | |
| 4-Chlorophenyl phenyl ether | µg/L | <9.6 | <9.4 | | |
| 4-Methylphenol | µg/L | <9.6 | <9.4 | | |
| 4-Nitroaniline | µg/L | <48 | <47 | | |
| 4-Nitrophenol | µg/L | <48 | <47 | | |
| Acenaphthene | µg/L | <1.9 | <1.9 | | |
| Acenaphthylene | µg/L | <1.9 | <1.9 | | |
| Anthracene | µg/L | <1.9 | <1.9 | | |
| Benzo(a)anthracene | µg/L | <1.9 | <1.9 | | |
| Benzo(a)pyrene | µg/L | <1.9 | <1.9 | | |
| Benzo(b)fluoranthene | µg/L | <1.9 | <1.9 | | |
| Benzo(ghi)perylene | µg/L | <1.9 | <1.9 | | |
| Benzo(k)fluoranthene | µg/L | <1.9 | <1.9 | | |
| bis(2-Chloroethoxy)methane | µg/L | <9.6 | <9.4 | | |
| bis(2-Chloroethyl) ether | µg/L | <1.9 | <1.9 | | |

| Table 7. (Continued) | | | | | |
|---|---|---|---|---|---|
| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
| **Semivolatiles (Continued)** | | | | | |
| bis(2-Ethylhexyl) phthalate | µg/L | <9.6 | <9.4 | | |
| Butyl benzyl phthalate | µg/L | <9.6 | <9.4 | | |
| Carbazole | µg/L | <1.9 | <1.9 | | |
| Chrysene | µg/L | <1.9 | <1.9 | | |
| Di-n-butyl phthalate | µg/L | <9.6 | <9.4 | | |
| Di-n-octyl phthalate | µg/L | <9.6 | <9.4 | | |
| Dibenz(a,h)anthracene | µg/L | <1.9 | <1.9 | | |
| Dibenzofuran | µg/L | <9.6 | <9.4 | | |
| Diethyl phthalate | µg/L | <9.6 | <9.4 | | |
| Dimethyl phthalate | µg/L | <9.6 | <9.4 | | |
| Fluoranthene | µg/L | <1.9 | <1.9 | | |
| Fluorene | µg/L | <1.9 | <1.9 | | |
| Hexachlorobenzene | µg/L | <1.9 | <1.9 | | |
| Hexachlorobutadiene | µg/L | <1.9 | <1.9 | | |
| Hexachlorocyclopentadiene | µg/L | <9.6 | <9.4 | | |
| Hexachloroethane | µg/L | <9.6 | <9.4 | | |
| Indeno(1,2,3-cd)pyrene | µg/L | <1.9 | <1.9 | | |
| Isophorone | µg/L | <9.6 | <9.4 | | |
| N-Nitrosodi-n-propylamine | µg/L | <1.9 | <1.9 | | |
| N-Nitrosodiphenylamine | µg/L | <1.9 | <1.9 | | |
| Naphthalene | µg/L | <1.9 | <1.9 | | |
| Nitrobenzene | µg/L | <1.9 | <1.9 | | |
| Pentachlorophenol | µg/L | <9.6 | <9.4 | | |
| Phenanthrene | µg/L | <1.9 | <1.9 | | |
| Phenol | µg/L | <1.9 | <1.9 | | |
| Pyrene | µg/L | <1.9 | <1.9 | | |
| **VOCs** | | | | | |
| 1,1,1-Trichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1,2,2-Tetrachloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1,2-Trichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1-Dichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1-Dichloroethene | µg/L | <5.0 | <5.0 | | |
| 1,2-Dichloroethane | µg/L | <5.0 | 1.7 | | |
| 1,2-Dichloroethene (total) | µg/L | <10 | <10 | | |
| 1,2-Dichloropropane | µg/L | <5.0 | <5.0 | | |
| 2-Butanone | µg/L | <5.0 | <5.0 | | |
| 2-Hexanone | µg/L | <5.0 | <5.0 | | |
| 4-Methyl-2-pentanone | µg/L | <5.0 | <5.0 | | |
| Acetone | µg/L | <20 | <20 | | |
| Benzene | µg/L | <5.0 | <5.0 | | |
| Bromodichloromethane | µg/L | <5.0 | <5.0 | | |
| Bromoform | µg/L | <5.0 | <5.0 | | |
| Bromomethane | µg/L | <5.0 | <5.0 | | |
| Carbon disulfide | µg/L | <5.0 | <5.0 | | |
| Carbon tetrachloride | µg/L | <5.0 | <5.0 | | |
| Chlorobenzene | µg/L | <5.0 | <5.0 | | |
| Chloroethane | µg/L | <5.0 | <5.0 | | |

| Table 7. (Continued) | | | | | |
|---|---|---|---|---|---|
| | **Units** | **Site Water** | **Equipment Blank** | **DNREC Marine Acute Criteria** | **DNREC Marine Chronic Criteria** |
| **VOCs (Continued)** | | | | | |
| Chloroform | µg/L | <5.0 | <5.0 | | |
| Chloromethane | µg/L | <5.0 | <5.0 | | |
| cis-1,3-Dichloropropene | µg/L | <5.0 | <5.0 | | |
| Dibromochloromethane | µg/L | <5.0 | <5.0 | | |
| Ethylbenzene | µg/L | <5.0 | <5.0 | | |
| Methylene chloride | µg/L | <5.0 | 3.7 | | |
| Styrene | µg/L | <5.0 | <5.0 | | |
| Tetrachloroethene | µg/L | <5.0 | <5.0 | | |
| Toluene | µg/L | <5.0 | <5.0 | | |
| trans-1,3-Dichloropropene | µg/L | <5.0 | <5.0 | | |
| Trichloroethene | µg/L | <5.0 | 3.1 | | |
| Vinyl chloride | µg/L | <5.0 | <5.0 | | |
| Xylenes (total) | µg/L | <15 | <15 | | |
| **WET** | | | | | |
| Cyanide, Total | µg/L | <10.0 | <10.0 | 1.0 | |
| Total Sulfide | mg/L | <3.0 | <3.0 | | |

Table 8. Elutriate results for dissolved PCB congener testing results for samples collected from Wilmington Harbor

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| **Congener Elutriates** | | | | | | | | | |
| PCB 1 (BZ) | ng/L | 0.26 | 0.019 | 0.012 | 0.013 | 0.011 | <0.038 | 0.23 | <0.038 |
| PCB 2 (BZ) | ng/L | 0.027 | 0.016 | 0.018 | 0.0087 | 0.0072 | 0.013 | 0.068 | 0.0059 |
| PCB 3 (BZ) | ng/L | 0.041 | 0.018 | 0.019 | 0.011 | 0.0086 | 0.012 | 0.091 | <0.038 |
| PCB 4 (BZ) | ng/L | 2 | 0.12 | 0.1 | 0.12 | 0.099 | 0.062 | 1.9 | 0.045 |
| PCB 5 (BZ) | ng/L | 0.0095 | 0.0059 | 0.0042 | 0.0025 | 0.003 | <0.038 | 0.071 | 0.0031 |
| PCB 6 (BZ) | ng/L | 0.53 | 0.042 | 0.056 | 0.027 | 0.024 | 0.064 | 0.92 | 0.015 |
| PCB 7 (BZ) | ng/L | 0.037 | 0.0072 | 0.017 | 0.0044 | 0.0069 | 0.0097 | 0.11 | 0.0033 |
| PCB 8 (BZ) | ng/L | 0.77 | 0.1 | 0.11 | 0.067 | 0.061 | 0.091 | 2.1 | 0.038 |
| PCB 9 (BZ) | ng/L | 0.048 | 0.0051 | 0.012 | 0.0056 | 0.011 | 0.0075 | 0.21 | 0.0062 |
| PCB 10 (BZ) | ng/L | 0.059 | 0.0084 | <0.038 | 0.0074 | 0.0068 | <0.038 | 0.15 | 0.0028 |
| PCB 11 (BZ) | ng/L | 0.14 | 0.14 | 0.13 | 0.1 | 0.086 | 0.16 | 0.33 | 0.077 |
| PCB 12 (BZ) | ng/L | 0.19 | 0.038 | 0.034 | 0.026 | 0.016 | 0.04 | 0.36 | 0.016 |
| PCB 13 (BZ) | ng/L | 0.19 | 0.038 | 0.034 | 0.026 | 0.016 | 0.04 | 0.36 | 0.016 |
| PCB 14 (BZ) | ng/L | 0.0024 | 0.0039 | <0.038 | 0.0019 | <0.038 | 0.0035 | 0.036 | 0.0022 |
| PCB 15 (BZ) | ng/L | 0.35 | 0.13 | 0.12 | 0.086 | 0.071 | 0.1 | 1.2 | 0.059 |
| PCB 16 (BZ) | ng/L | 0.4 | 0.076 | 0.11 | 0.072 | 0.062 | 0.088 | 5.8 | 0.042 |
| PCB 17 (BZ) | ng/L | 1.4 | 0.16 | 0.2 | 0.14 | 0.11 | 0.16 | 7.4 | 0.073 |
| PCB 18 (BZ) | ng/L | 1.4 | 0.21 | 0.3 | 0.19 | 0.15 | 0.23 | 16 | 0.12 |
| PCB 19 (BZ) | ng/L | 0.63 | 0.073 | 0.086 | 0.06 | 0.057 | 0.047 | 1.8 | 0.037 |
| PCB 20 (BZ) | ng/L | 1.5 | 0.39 | 0.45 | 0.31 | 0.29 | 0.4 | 19 | 0.22 |
| PCB 21 (BZ) | ng/L | 0.36 | 0.095 | 0.12 | 0.076 | 0.062 | 0.11 | 5.8 | 0.057 |
| PCB 22 (BZ) | ng/L | 0.25 | 0.073 | 0.076 | 0.057 | 0.055 | 0.069 | 4.1 | 0.039 |
| PCB 23 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 24 (BZ) | ng/L | 0.014 | 0.0067 | <0.038 | 0.0059 | <0.038 | <0.038 | 0.23 | <0.038 |
| PCB 25 (BZ) | ng/L | 0.55 | 0.077 | 0.1 | 0.062 | 0.048 | 0.11 | 1.5 | 0.038 |
| PCB 26 (BZ) | ng/L | 0.85 | 0.12 | 0.14 | 0.083 | 0.068 | 0.15 | 2.9 | 0.055 |
| PCB 27 (BZ) | ng/L | 0.6 | 0.064 | 0.081 | 0.053 | 0.037 | 0.051 | 1 | 0.031 |
| PCB 28 (BZ) | ng/L | 1.5 | 0.39 | 0.45 | 0.31 | 0.29 | 0.4 | 19 | 0.22 |
| PCB 29 (BZ) | ng/L | 0.85 | 0.12 | 0.14 | 0.083 | 0.068 | 0.15 | 2.9 | 0.055 |
| PCB 30 (BZ) | ng/L | 1.4 | 0.21 | 0.3 | 0.19 | 0.15 | 0.23 | 16 | 0.12 |
| PCB 31 (BZ) | ng/L | 1.3 | 0.28 | 0.32 | 0.22 | 0.2 | 0.3 | 17 | 0.15 |
| PCB 32 (BZ) | ng/L | 0.89 | 0.13 | 0.16 | 0.11 | 0.09 | 0.13 | 5 | 0.063 |
| PCB 33 (BZ) | ng/L | 0.36 | 0.095 | 0.12 | 0.076 | 0.062 | 0.11 | 5.8 | 0.057 |
| PCB 34 (BZ) | ng/L | 0.033 | 0.0049 | 0.0063 | 0.0043 | <0.038 | 0.007 | 0.33 | <0.038 |
| PCB 35 (BZ) | ng/L | 0.025 | 0.016 | 0.013 | 0.0093 | 0.0079 | 0.02 | 0.33 | 0.01 |
| PCB 36 (BZ) | ng/L | <0.038 | 0.0036 | <0.038 | 0.0035 | <0.038 | 0.0068 | <0.19 | 0.0034 |
| PCB 37 (BZ) | ng/L | 0.18 | 0.11 | 0.095 | 0.075 | 0.067 | 0.088 | 2.3 | 0.051 |
| PCB 38 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.029 | <0.038 |
| PCB 39 (BZ) | ng/L | 0.013 | 0.01 | 0.0097 | 0.0041 | 0.0053 | 0.0067 | 0.23 | 0.0036 |
| PCB 40 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 41 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 42 (BZ) | ng/L | 0.63 | 0.19 | 0.25 | 0.19 | 0.16 | 0.26 | 10 | 0.12 |
| PCB 43 (BZ) | ng/L | 0.068 | 0.022 | 0.019 | 0.02 | 0.019 | 0.017 | 1.1 | 0.01 |
| PCB 44 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 45 (BZ) | ng/L | 0.96 | 0.21 | 0.27 | 0.21 | 0.18 | 0.19 | 7.1 | 0.12 |
| PCB 46 (BZ) | ng/L | 0.24 | 0.063 | 0.075 | 0.052 | 0.046 | 0.057 | 2.5 | 0.034 |
| PCB 47 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 48 (BZ) | ng/L | 0.27 | 0.087 | 0.092 | 0.078 | 0.072 | 0.069 | 6.4 | 0.038 |
| PCB 49 (BZ) | ng/L | 2.7 | 0.67 | 0.91 | 0.61 | 0.49 | 0.83 | 29 | 0.35 |

| Table 8. (Continued) | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 50 (BZ) | ng/L | 0.83 | 0.19 | 0.22 | 0.16 | 0.14 | 0.17 | 5.7 | 0.094 |
| PCB 51 (BZ) | ng/L | 0.96 | 0.21 | 0.27 | 0.21 | 0.18 | 0.19 | 7.1 | 0.12 |
| PCB 52 (BZ) | ng/L | 3.7 | 1.1 | 1.4 | 0.93 | 0.81 | 1.2 | 49 | 0.56 |
| PCB 53 (BZ) | ng/L | 0.83 | 0.19 | 0.22 | 0.16 | 0.14 | 0.17 | 5.7 | 0.094 |
| PCB 54 (BZ) | ng/L | 0.076 | 0.019 | 0.016 | 0.011 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 55 (BZ) | ng/L | 0.028 | 0.017 | 0.0081 | <0.038 | 0.0066 | <0.038 | 0.35 | 0.012 |
| PCB 56 (BZ) | ng/L | 0.47 | 0.23 | 0.24 | 0.19 | 0.18 | 0.2 | 11 | 0.14 |
| PCB 57 (BZ) | ng/L | 0.03 | 0.009 | 0.012 | 0.0057 | 0.0058 | 0.0064 | 0.14 | <0.038 |
| PCB 58 (BZ) | ng/L | <0.038 | 0.0083 | <0.038 | 0.0051 | 0.0052 | 0.0095 | 0.34 | <0.038 |
| PCB 59 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 60 (BZ) | ng/L | 0.12 | 0.077 | 0.062 | 0.057 | 0.057 | 0.044 | 0.71 | 0.04 |
| PCB 61 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 62 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 63 (BZ) | ng/L | 0.079 | 0.026 | 0.034 | 0.023 | 0.024 | 0.024 | 1.1 | 0.013 |
| PCB 64 (BZ) | ng/L | 0.69 | 0.27 | 0.32 | 0.25 | 0.23 | 0.28 | 14 | 0.16 |
| PCB 65 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 66 (BZ) | ng/L | 1.4 | 0.62 | 0.69 | 0.52 | 0.45 | 0.56 | 28 | 0.34 |
| PCB 67 (BZ) | ng/L | 0.063 | 0.025 | 0.028 | 0.025 | 0.02 | 0.021 | 0.67 | 0.013 |
| PCB 68 (BZ) | ng/L | 0.079 | 0.023 | 0.034 | 0.022 | 0.016 | 0.027 | 0.6 | 0.018 |
| PCB 69 (BZ) | ng/L | 2.7 | 0.67 | 0.91 | 0.61 | 0.49 | 0.83 | 29 | 0.35 |
| PCB 70 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 71 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 72 (BZ) | ng/L | 0.11 | 0.027 | 0.046 | 0.028 | 0.016 | 0.035 | 0.95 | 0.017 |
| PCB 73 (BZ) | ng/L | 0.068 | 0.022 | 0.019 | 0.02 | 0.019 | 0.017 | 1.1 | 0.01 |
| PCB 74 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 75 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 76 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 77 (BZ) | ng/L | 0.097 | 0.071 | 0.067 | 0.047 | 0.044 | 0.058 | 1.6 | 0.041 |
| PCB 78 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.032 | <0.038 |
| PCB 79 (BZ) | ng/L | 0.031 | 0.018 | 0.016 | 0.014 | 0.0097 | 0.0068 | 0.38 | 0.0083 |
| PCB 80 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 81 (BZ) | ng/L | <0.038 | 0.0066 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 82 (BZ) | ng/L | 0.26 | 0.16 | 0.17 | 0.1 | 0.13 | 0.11 | 3.1 | 0.1 |
| PCB 83 (BZ) | ng/L | 2.2 | 1.1 | 1.4 | 0.98 | 0.88 | 1.1 | 30 | 0.74 |
| PCB 84 (BZ) | ng/L | 0.83 | 0.37 | 0.44 | 0.32 | 0.31 | 0.36 | 11 | <0.038 |
| PCB 85 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 86 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 87 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 88 (BZ) | ng/L | 0.66 | 0.3 | 0.4 | 0.26 | 0.22 | 0.4 | 6.7 | <0.038 |
| PCB 89 (BZ) | ng/L | 0.025 | <0.038 | <0.038 | <0.038 | 0.017 | <0.038 | 0.6 | 0.015 |
| PCB 90 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |
| PCB 91 (BZ) | ng/L | 0.66 | 0.3 | 0.4 | 0.26 | 0.22 | 0.4 | 6.7 | <0.038 |
| PCB 92 (BZ) | ng/L | 0.73 | 0.36 | 0.45 | 0.3 | 0.28 | 0.3 | 9.2 | 0.24 |
| PCB 93 (BZ) | ng/L | 0.21 | 0.076 | 0.08 | 0.061 | 0.041 | 0.079 | 0.68 | 0.042 |
| PCB 94 (BZ) | ng/L | 0.064 | 0.024 | 0.026 | 0.023 | 0.017 | 0.021 | 0.44 | 0.013 |
| PCB 95 (BZ) | ng/L | 2.8 | 1.2 | 1.5 | 1 | 0.95 | 1.2 | 36 | 0.78 |
| PCB 96 (BZ) | ng/L | 0.042 | 0.012 | 0.014 | 0.012 | 0.0096 | 0.013 | 0.59 | 0.01 |
| PCB 97 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 98 (BZ) | ng/L | 0.19 | 0.081 | 0.11 | 0.077 | 0.063 | 0.076 | 2 | 0.058 |
| PCB 99 (BZ) | ng/L | 2.2 | 1.1 | 1.4 | 0.98 | 0.88 | 1.1 | 30 | 0.74 |
| PCB 100 (BZ) | ng/L | 0.21 | 0.076 | 0.08 | 0.061 | 0.041 | 0.079 | 0.68 | 0.042 |
| PCB 101 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |

| Table 8. (Continued) | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 102 (BZ) | ng/L | 0.19 | 0.081 | 0.11 | 0.077 | 0.063 | 0.076 | 2 | 0.058 |
| PCB 103 (BZ) | ng/L | 0.13 | 0.043 | 0.062 | 0.048 | 0.039 | 0.081 | 1.1 | 0.027 |
| PCB 104 (BZ) | ng/L | 0.016 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 105 (BZ) | ng/L | 0.57 | 0.37 | 0.35 | 0.28 | 0.29 | 0.22 | 4.7 | 0.23 |
| PCB 106 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 107 (BZ) | ng/L | 0.23 | 0.11 | 0.14 | 0.11 | 0.088 | 0.11 | 3.2 | 0.072 |
| PCB 108 (BZ) | ng/L | 0.067 | 0.038 | 0.046 | 0.034 | 0.037 | 0.027 | 0.64 | 0.021 |
| PCB 109 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 110 (BZ) | ng/L | 3.2 | 1.7 | 2 | 1.4 | 1.3 | 1.4 | 42 | 1.2 |
| PCB 111 (BZ) | ng/L | 0.013 | <0.038 | <0.038 | 0.0068 | <0.038 | 0.0063 | 0.14 | 0.0052 |
| PCB 112 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 113 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |
| PCB 114 (BZ) | ng/L | 0.036 | 0.022 | 0.021 | 0.017 | 0.025 | <0.038 | 0.32 | 0.016 |
| PCB 115 (BZ) | ng/L | 3.2 | 1.7 | 2 | 1.4 | 1.3 | 1.4 | 42 | 1.2 |
| PCB 116 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 117 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 118 (BZ) | ng/L | 2.1 | 1.1 | 1.2 | 0.91 | 0.86 | 0.78 | 28 | 0.65 |
| PCB 119 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 120 (BZ) | ng/L | 0.037 | 0.019 | 0.021 | 0.017 | 0.012 | 0.016 | 0.48 | 0.013 |
| PCB 121 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 122 (BZ) | ng/L | 0.028 | 0.016 | 0.013 | 0.014 | 0.019 | 0.014 | 0.26 | 0.014 |
| PCB 123 (BZ) | ng/L | 0.033 | 0.027 | 0.017 | 0.012 | 0.011 | 0.015 | 0.29 | 0.015 |
| PCB 124 (BZ) | ng/L | 0.067 | 0.038 | 0.046 | 0.034 | 0.037 | 0.027 | 0.64 | 0.021 |
| PCB 125 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 126 (BZ) | ng/L | 0.0095 | 0.0054 | <0.038 | 0.004 | 0.0032 | 0.0076 | 0.034 | <0.038 |
| PCB 127 (BZ) | ng/L | 0.0036 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 128 (BZ) | ng/L | 0.46 | 0.32 | 0.34 | 0.26 | 0.27 | 0.2 | 3.9 | 0.2 |
| PCB 129 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 130 (BZ) | ng/L | 0.27 | 0.17 | 0.18 | 0.15 | 0.16 | 0.14 | 2.3 | 0.1 |
| PCB 131 (BZ) | ng/L | 0.04 | 0.028 | 0.026 | 0.026 | 0.025 | 0.016 | 0.42 | 0.015 |
| PCB 132 (BZ) | ng/L | 1.1 | 0.68 | 0.72 | 0.58 | 0.6 | 0.5 | 11 | 0.4 |
| PCB 133 (BZ) | ng/L | 0.11 | 0.074 | 0.095 | 0.073 | 0.076 | 0.071 | 0.98 | 0.053 |
| PCB 134 (BZ) | ng/L | 0.21 | 0.13 | 0.14 | 0.12 | 0.12 | 0.082 | 2.1 | 0.072 |
| PCB 135 (BZ) | ng/L | 1.3 | 0.84 | 0.94 | 0.74 | 0.7 | 0.73 | 13 | 0.57 |
| PCB 136 (BZ) | ng/L | 0.5 | 0.29 | 0.34 | 0.25 | 0.25 | 0.3 | 5.1 | 0.19 |
| PCB 137 (BZ) | ng/L | 0.14 | 0.082 | 0.093 | 0.077 | 0.073 | 0.043 | 1.1 | 0.047 |
| PCB 138 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 139 (BZ) | ng/L | 0.073 | 0.05 | 0.049 | 0.05 | 0.044 | 0.047 | 0.77 | 0.028 |
| PCB 140 (BZ) | ng/L | 0.073 | 0.05 | 0.049 | 0.05 | 0.044 | 0.047 | 0.77 | 0.028 |
| PCB 141 (BZ) | ng/L | 0.52 | 0.34 | 0.37 | 0.32 | 0.32 | 0.21 | 3.9 | 0.19 |
| PCB 142 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 143 (BZ) | ng/L | 0.21 | 0.13 | 0.14 | 0.12 | 0.12 | 0.082 | 2.1 | 0.072 |
| PCB 144 (BZ) | ng/L | 0.14 | 0.11 | 0.098 | 0.077 | 0.081 | 0.12 | 1 | 0.06 |
| PCB 145 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 146 (BZ) | ng/L | 0.77 | 0.5 | 0.62 | 0.5 | 0.48 | 0.51 | 7.6 | 0.31 |
| PCB 147 (BZ) | ng/L | 3.1 | 1.9 | 2.3 | 1.9 | 1.8 | 1.9 | 28 | 1.2 |
| PCB 148 (BZ) | ng/L | <0.038 | <0.038 | 0.028 | 0.016 | 0.019 | 0.024 | 0.22 | 0.0095 |
| PCB 149 (BZ) | ng/L | 3.1 | 1.9 | 2.3 | 1.9 | 1.8 | 1.9 | 28 | 1.2 |
| PCB 150 (BZ) | ng/L | 0.02 | 0.012 | 0.022 | 0.018 | 0.013 | 0.039 | 0.12 | 0.01 |
| PCB 151 (BZ) | ng/L | 1.3 | 0.84 | 0.94 | 0.74 | 0.7 | 0.73 | 13 | 0.57 |
| PCB 152 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |

| Table 8. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 153 (BZ) | ng/L | 3.4 | 2.1 | 2.7 | 2.1 | 2 | 1.9 | 29 | 1.3 |
| PCB 154 (BZ) | ng/L | 0.14 | 0.11 | 0.14 | 0.095 | 0.086 | 0.17 | 1.2 | 0.076 |
| PCB 155 (BZ) | ng/L | 0.016 | 0.011 | 0.017 | 0.0086 | <0.038 | 0.021 | 0.042 | <0.038 |
| PCB 156 (BZ) | ng/L | 0.29 | 0.19 | 0.21 | 0.17 | 0.17 | 0.13 | 2.5 | 0.11 |
| PCB 157 (BZ) | ng/L | 0.29 | 0.19 | 0.21 | 0.17 | 0.17 | 0.13 | 2.5 | 0.11 |
| PCB 158 (BZ) | ng/L | 0.29 | 0.19 | 0.2 | 0.17 | 0.17 | 0.11 | 2.4 | 0.11 |
| PCB 159 (BZ) | ng/L | 0.035 | 0.02 | 0.029 | 0.019 | 0.018 | 0.017 | 0.24 | 0.015 |
| PCB 160 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 161 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 162 (BZ) | ng/L | 0.019 | 0.019 | 0.016 | 0.018 | 0.015 | 0.012 | 0.14 | 0.012 |
| PCB 163 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 164 (BZ) | ng/L | 0.26 | 0.16 | 0.19 | 0.15 | 0.16 | 0.1 | 2.4 | 0.11 |
| PCB 165 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | 0.0049 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 166 (BZ) | ng/L | 0.46 | 0.32 | 0.34 | 0.26 | 0.27 | 0.2 | 3.9 | 0.2 |
| PCB 167 (BZ) | ng/L | 0.13 | 0.086 | 0.09 | 0.08 | 0.074 | 0.058 | 0.93 | 0.055 |
| PCB 168 (BZ) | ng/L | 3.4 | 2.1 | 2.7 | 2.1 | 2 | 1.9 | 29 | 1.3 |
| PCB 169 (BZ) | ng/L | 0.0057 | <0.038 | <0.038 | <0.038 | 0.0061 | <0.038 | <0.19 | <0.038 |
| PCB 170 (BZ) | ng/L | 0.84 | 0.59 | 0.67 | 0.55 | 0.54 | 0.5 | 5.4 | 0.35 |
| PCB 171 (BZ) | ng/L | 0.28 | 0.2 | 0.25 | 0.19 | 0.18 | 0.2 | 1.9 | 0.12 |
| PCB 172 (BZ) | ng/L | 0.18 | 0.13 | 0.15 | 0.12 | 0.12 | 0.13 | 1.2 | 0.085 |
| PCB 173 (BZ) | ng/L | 0.28 | 0.2 | 0.25 | 0.19 | 0.18 | 0.2 | 1.9 | 0.12 |
| PCB 174 (BZ) | ng/L | 0.92 | 0.62 | 0.79 | 0.62 | 0.58 | 0.61 | 6.5 | 0.39 |
| PCB 175 (BZ) | ng/L | 0.046 | 0.038 | 0.048 | 0.037 | 0.033 | 0.033 | 0.28 | 0.02 |
| PCB 176 (BZ) | ng/L | 0.13 | 0.098 | 0.12 | 0.083 | 0.087 | 0.094 | 0.9 | 0.053 |
| PCB 177 (BZ) | ng/L | 0.59 | 0.43 | 0.51 | 0.41 | 0.38 | 0.33 | 3.9 | 0.28 |
| PCB 178 (BZ) | ng/L | 0.29 | 0.21 | 0.26 | 0.22 | 0.2 | 0.2 | 1.8 | 0.13 |
| PCB 179 (BZ) | ng/L | 0.46 | 0.36 | 0.41 | 0.33 | 0.33 | 0.29 | 3.2 | 0.21 |
| PCB 180 (BZ) | ng/L | 2.1 | 1.3 | 1.7 | 1.4 | 1.2 | 1.3 | 13 | 0.87 |
| PCB 181 (BZ) | ng/L | 0.0077 | <0.038 | <0.038 | 0.0088 | <0.038 | <0.038 | 0.071 | <0.038 |
| PCB 182 (BZ) | ng/L | 0.014 | 0.016 | 0.026 | 0.012 | 0.018 | 0.021 | 0.13 | 0.0095 |
| PCB 183 (BZ) | ng/L | 0.72 | 0.5 | 0.61 | 0.51 | 0.51 | 0.54 | 4.4 | 0.33 |
| PCB 184 (BZ) | ng/L | 0.0063 | <0.038 | 0.01 | 0.0059 | 0.0089 | 0.016 | <0.19 | 0.0066 |
| PCB 185 (BZ) | ng/L | 0.72 | 0.5 | 0.61 | 0.51 | 0.51 | 0.54 | 4.4 | 0.33 |
| PCB 186 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 187 (BZ) | ng/L | 1.5 | 1.1 | 1.4 | 1.1 | 1 | 0.9 | 9.5 | 0.68 |
| PCB 188 (BZ) | ng/L | 0.018 | 0.022 | 0.033 | 0.026 | 0.026 | 0.04 | 0.048 | 0.016 |
| PCB 189 (BZ) | ng/L | 0.04 | 0.027 | 0.029 | 0.022 | 0.023 | 0.026 | 0.24 | 0.011 |
| PCB 190 (BZ) | ng/L | 0.17 | 0.12 | 0.15 | 0.12 | 0.12 | 0.11 | 1 | 0.071 |
| PCB 191 (BZ) | ng/L | 0.04 | 0.025 | 0.025 | 0.026 | 0.025 | 0.024 | 0.3 | 0.019 |
| PCB 192 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 193 (BZ) | ng/L | 2.1 | 1.3 | 1.7 | 1.4 | 1.2 | 1.3 | 13 | 0.87 |
| PCB 194 (BZ) | ng/L | 0.64 | 0.48 | 0.58 | 0.49 | 0.46 | 0.48 | 3.2 | 0.3 |
| PCB 195 (BZ) | ng/L | 0.19 | 0.15 | 0.19 | 0.16 | 0.15 | 0.15 | 1 | 0.1 |
| PCB 196 (BZ) | ng/L | 0.43 | 0.36 | 0.48 | 0.42 | 0.36 | 0.49 | 2 | 0.29 |
| PCB 197 (BZ) | ng/L | 0.045 | 0.048 | 0.058 | 0.041 | 0.039 | 0.074 | 0.16 | 0.037 |
| PCB 198 (BZ) | ng/L | 1.4 | 1.2 | 1.6 | 1.4 | 1.2 | 1.5 | 6.4 | 0.98 |
| PCB 199 (BZ) | ng/L | 0.071 | 0.061 | 0.071 | 0.071 | 0.048 | 0.079 | 0.39 | 0.045 |
| PCB 200 (BZ) | ng/L | 0.14 | 0.16 | 0.19 | 0.16 | 0.15 | 0.24 | 0.63 | 0.12 |
| PCB 201 (BZ) | ng/L | 1.4 | 1.2 | 1.6 | 1.4 | 1.2 | 1.5 | 6.4 | 0.98 |
| PCB 202 (BZ) | ng/L | 0.44 | 0.49 | 0.57 | 0.51 | 0.47 | 0.55 | 2 | 0.36 |
| PCB 203 (BZ) | ng/L | 0.59 | 0.51 | 0.69 | 0.61 | 0.56 | 0.57 | 2.8 | 0.42 |
| PCB 204 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.011 | <0.19 | <0.038 |

Table 8. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 205 (BZ) | ng/L | 0.035 | 0.038 | 0.047 | 0.042 | 0.041 | 0.034 | 0.18 | 0.018 |
| PCB 206 (BZ) | ng/L | 3.8 | 5 | 6.3 | 5.6 | 5 | 5.8 | 13 | 3.4 |
| PCB 207 (BZ) | ng/L | 0.34 | 0.42 | 0.5 | 0.43 | 0.39 | 0.45 | 1.1 | 0.28 |
| PCB 208 (BZ) | ng/L | 1.7 | 2.3 | 2.9 | 2.6 | 2.4 | 2.7 | 6.4 | 1.7 |
| PCB 209 (BZ) | ng/L | 8.5 | 8 | 9.5 | 7.5 | 6.6 | 7.9 | 32 | 5 |

Table 9. Elutriate results for dissolved PCB congeners totals results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Congener Elutriates** | | | | | | | | | | | |
| Monochlorobiphenyl | ng/L | 0.33 | 0.052 | 0.049 | 0.032 | 0.027 | 0.025 | 0.39 | 0.0059 | | |
| Dichlorobiphenyl | ng/L | 4.1 | 0.6 | 0.58 | 0.45 | 0.39 | 0.53 | 7.4 | 0.27 | | |
| Trichlorobiphenyl | ng/L | 10 | 1.9 | 2.3 | 1.5 | 1.3 | 2 | 92 | 1 | | |
| Tetrachlorobiphenyl | ng/L | 20 | 6.2 | 7.5 | 5.5 | 4.8 | 6.4 | 270 | 3.4 | | |
| Pentachlorobiphenyl | ng/L | 20 | 9.8 | 12 | 8.3 | 7.8 | 8.5 | 250 | 6 | | |
| Hexachlorobiphenyl | ng/L | 17 | 11 | 12 | 9.9 | 9.8 | 8.3 | 150 | 6.6 | | |
| Heptachlorobiphenyl | ng/L | 8.3 | 5.8 | 7.2 | 5.7 | 5.4 | 5.3 | 54 | 3.7 | | |
| Octachlorobiphenyl | ng/L | 4 | 3.5 | 4.5 | 3.9 | 3.5 | 4.1 | 19 | 2.7 | | |
| Nonachlorobiphenyl | ng/L | 5.9 | 7.8 | 9.7 | 8.7 | 7.8 | 8.9 | 21 | 5.4 | | |
| Decachlorobiphenyl | ng/L | 8.5 | 8 | 9.5 | 7.5 | 6.6 | 7.9 | 32 | 5 | | |
| Total | ng/L | **98** | **55** | **65** | **51** | **47** | **52** | **896** | **34** | | **30** |

Table 10. TCLP testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over regulatory limits.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | | | |
| Arsenic | mg/L | 0.16 | 0.16 | 0.14 | 0.11 | 0.12 | 0.13 | 0.16 | 0.12 | 5 |
| Barium | mg/L | 0.48 | 0.49 | 0.36 | 0.47 | 0.43 | 0.34 | 0.21 | 0.31 | 100 |
| Cadmium | mg/L | 0.0054 | 0.005 | 0.0056 | 0.0065 | 0.0057 | 0.005 | <0.10 | 0.0054 | 1 |
| Chromium | mg/L | 0.0053 | 0.0054 | 0.004 | 0.0062 | 0.0043 | 0.0052 | 0.0043 | 0.0041 | 5 |
| Lead | mg/L | 0.061 | 0.027 | 0.03 | 0.022 | 0.014 | 0.024 | 0.053 | 0.02 | 5 |
| Mercury | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.2 |
| Selenium | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 1 |
| Silver | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| **Semi-volatile Organics** | | | | | | | | | | |
| 1,4-Dichlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 7.5 |
| 2,4,5-TP (Silvex) | mg/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 1 |
| 2,4,5-Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 400 |
| 2,4,6-Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| 2,4-Dinitrotoluene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| 2,4-D | mg/L | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | 10 |
| 3-Methylphenol & 4-Methylphenol | mg/L | NA | NA | NA | NA | NA | NA | NA | NA | |
| Chlordane (technical) | mg/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.03 |
| Cresols (total) | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 200 |
| Endrin | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.02 |
| Heptachlor epoxide | mg/L | <0.00050 | <0.00050 | 0.0002 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Heptachlor | mg/L | <0.00050 | <0.00050 | 0.00016 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Hexachlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| Hexachlorobutadiene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.5 |
| Hexachloroethane | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 3 |
| Lindane | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.4 |
| Methoxychlor | mg/L | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 10 |
| Nitrobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| Pentachlorophenol | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 100 |
| Pyridine | mg/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 5 |
| Toxaphene | mg/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.5 |
| **Volatile Organics** | | | | | | | | | | |
| 1,1-Dichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| 1,2-Dichloroethane | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| 2-Butanone | mg/L | <0.20 | <0.20 | <0.20 | 1.6 | <0.20 | <0.20 | <0.20 | <0.20 | 200 |

Table 10. TCLP testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over regulatory limits.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Onorganics (Continued)** | | | | | | | | | | |
| Benzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Carbon tetrachloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Chlorobenzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 100 |
| Chloroform | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 6 |
| Tetrachloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| Trichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Vinyl chloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.2 |

# SOIL SAMPLING RESULTS

# FROM WILMINGTON HARBOR SOUTH CDF

Table 11. Testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | |
| Aroclor 1016 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 5000 | 82000 |
| Aroclor 1221 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1232 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1242 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1248 | μg/kg | 13 | 17 | 15 | 14 | 13 | 15 | 300 | 3000 |
| Aroclor 1254 | μg/kg | 18 | 48 | 33 | 31 | 44 | 43 | 300 | 3000 |
| Aroclor 1260 | μg/kg | 21 | 28 | 19 | 18 | 26 | 25 | 300 | 3000 |
| **Pesticides** | | | | | | | | | |
| 4,4-DDD | μg/kg | 7.4 | 11 | 6.1 | 5.3 | 8.1 | 6.6 | 3,000 | 24,000 |
| 4,4-DDE | μg/kg | 6.5 | 10 | 5.1 | 5 | 7.6 | 5.7 | 2,000 | 17,000 |
| 4,4-DDT | μg/kg | <3.4 | 9.1 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 17,000 |
| Aldrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 40 | 300 |
| alpha-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 100 | 900 |
| alpha-Chlordane | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| beta-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 400 | 3,000 |
| delta-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| Dieldrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 40 | 400 |
| Endosulfan I | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 47,000 | 1,200,000 |
| Endosulfan II | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 47,000 | 1,200,000 |
| Endosulfan sulfate | μg/kg | <3.4 | 0.8 | <3.5 | <3.6 | 0.55 | <3.2 | 47,000 | 1,200,000 |
| Endrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 61,000 |
| Endrin aldehyde | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 61,000 |
| Endrin ketone | μg/kg | 1.3 | 1.7 | <3.5 | 0.73 | 1.6 | 0.9 | | |
| gamma-BHC (Lindane) | μg/kg | <3.4 | <3.6 | <3.5 | 0.66 | <3.3 | 0.71 | 500 | 4,000 |
| gamma-Chlordane | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| Heptachlor | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 100 | 1,000 |
| Heptachlor epoxide | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 70 | 600 |
| Methoxychlor | μg/kg | <6.6 | <7.0 | <6.7 | <7.0 | <6.4 | <6.2 | 39,000 | 1,000,000 |
| Toxaphene | μg/kg | <130 | <140 | <140 | <140 | <130 | <130 | 600 | 5,000 |
| **Inorganics** | | | | | | | | | |
| Aluminum | mg/kg | 17,200 | 18,300 | 17,800 | 20,300 | 20,100 | 17,400 | 7,800 | 200,000 |
| Antimony | mg/kg | 0.24 | 0.28 | 0.22 | 0.32 | 0.2 | 0.21 | 3 | 82 |
| Arsenic | mg/kg | 12.3 | 12.6 | 11.8 | 13 | 14.4 | 11.8 | 0.4 | 4 |
| Barium | mg/kg | 114 | 132 | 127 | 145 | 131 | 135 | 550 | 14,000 |
| Beryllium | mg/kg | 1.3 | 1.4 | 1.3 | 1.5 | 1.4 | 1.3 | 16 | 410 |
| Cadmium | mg/kg | 0.26 | 0.42 | 0.36 | 0.39 | 0.26 | 0.43 | 4 | 100 |
| Calcium | mg/kg | 3530 | 3750 | 3540 | 3580 | 3370 | 3320 | | |
| Chromium | mg/kg | 51.6 | 55 | 53.2 | 60 | 61.4 | 53.6 | 270 | 610 |
| Cobalt | mg/kg | 15.4 | 16.4 | 15.6 | 16.7 | 17.3 | 15.8 | 470 | 12,000 |
| Copper | mg/kg | 36.9 | 41.3 | 39.8 | 45.2 | 42.7 | 41.4 | 310 | 8,200 |
| Iron | mg/kg | 32,300 | 34,300 | 32,500 | 35,700 | 37,000 | 33,200 | 2,300 | 61,000 |
| Lead | mg/kg | 52 | 57.1 | 55.8 | 63.3 | 59.6 | 57.9 | 400 | 1,000 |
| Magnesium | mg/kg | 6020 | 6240 | 5920 | 6430 | 6660 | 5780 | | |
| Manganese | mg/kg | 1,520 | 1,540 | 1,390 | 1,380 | 1,500 | 1,270 | 160 | 4,100 |
| Mercury | mg/kg | 0.27 | 0.29 | 0.26 | 0.32 | 0.31 | 0.29 | 10 | 610 |

Table 11. (Continued)

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| **Inorganics (Continued)** | | | | | | | | | |
| Nickel | mg/kg | 29.8 | 31.9 | 30.6 | 33.3 | 33.4 | 30.4 | 160 | 4,100 |
| Potassium | mg/kg | 2320 | 2380 | 2300 | 2520 | 2760 | 2050 | | |
| Selenium | mg/kg | <0.50 | <0.53 | <0.51 | <0.53 | <0.49 | <0.47 | 39 | 1,000 |
| Silver | mg/kg | 0.72 | 0.73 | 0.7 | 0.74 | 0.79 | 0.66 | 39 | 1,000 |
| Sodium | mg/kg | 635 | 648 | 605 | 711 | 568 | 471 | | |
| Thallium | mg/kg | 0.72 | 0.71 | <1.0 | <1.1 | 0.57 | 0.69 | 18 | 220 |
| Vanadium | mg/kg | 47.1 | 50.3 | 48.8 | 54.8 | 57.6 | 48.5 | 55 | 1,400 |
| Zinc | mg/kg | 237 | 275 | 270 | 302 | 271 | 278 | 2,300 | 61,000 |
| **Semivolatiles** | | | | | | | | | |
| 1,2,4-Trichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,2-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,3-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,4-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,2-oxybis(1-Chloropropane) | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,4,5-Trichlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4,6-Trichlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4-Dichlorophenol | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,4-Dimethylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4-Dinitrophenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 2,4-Dinitrotoluene | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,6-Dinitrotoluene | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Chloronaphthalene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2-Chlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Methylnaphthalene | μg/kg | 47 | 43 | 44 | 24 | 30 | 21 | | |
| 2-Methylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 2-Nitrophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 3,3-Dichlorobenzidine | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 3-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4,6-Dinitro-2-methylphenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4-Bromophenyl phenyl ether | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chloro-3-methylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chloroaniline | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chlorophenyl phenyl ether | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Methylphenol | μg/kg | 45 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4-Nitrophenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| Acenaphthene | μg/kg | <67 | <71 | 21 | <71 | <65 | <63 | 470,000 | 5,000,000 |
| Acenaphthylene | μg/kg | <67 | <71 | 40 | <71 | <65 | <63 | | |
| Anthracene | μg/kg | 52 | 47 | 57 | 49 | 36 | 39 | 1,000,000 | 5,000,000 |
| Benzo(a)anthracene | μg/kg | 150 | 140 | 150 | 100 | 100 | 120 | 900 | 8,000 |
| Benzo(a)pyrene | μg/kg | 130 | 140 | 150 | 100 | 83 | 140 | 90 | 800 |
| Benzo(b)fluoranthene | μg/kg | 260 | 270 | 200 | 130 | 130 | 150 | 900 | 8,000 |
| Benzo(ghi)perylene | μg/kg | 270 | 130 | 120 | 100 | 71 | 110 | | |
| Benzo(k)fluoranthene | μg/kg | <67 | <71 | 94 | 89 | <65 | 95 | 9,000 | 78,000 |
| bis(2-Chloroethoxy)methane | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| bis(2-Chloroethyl) ether | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| bis(2-Ethylhexyl) phthalate | μg/kg | 680 | 270 | 230 | 170 | 140 | 160 | | |

| Table 11. (Continued) | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | |
| Butyl benzyl phthalate | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Carbazole | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Chrysene | μg/kg | 150 | 180 | 220 | 150 | 110 | 170 | 87,000 | 780,000 |
| Di-n-butyl phthalate | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Di-n-octyl phthalate | μg/kg | 130 | <350 | <340 | <350 | <320 | <310 | | |
| Dibenz(a,h)anthracene | μg/kg | <67 | 57 | <68 | <71 | <65 | 32 | 90 | 800 |
| Dibenzofuran | μg/kg | 25 | <350 | 25 | <350 | <320 | <310 | | |
| Diethyl phthalate | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Dimethyl phthalate | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Fluoranthene | μg/kg | 240 | 290 | 280 | 200 | 160 | 230 | 310,000 | 5,000,000 |
| Fluorene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | 310,000 | 5,000,000 |
| Hexachlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Hexachlorobutadiene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Hexachlorocyclopentadiene | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Hexachloroethane | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Indeno(1,2,3-cd)pyrene | μg/kg | 130 | 130 | 120 | 87 | 79 | 110 | 900 | 8,000 |
| Isophorone | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| N-Nitrosodi-n-propylamine | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| N-Nitrosodiphenylamine | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Naphthalene | μg/kg | 85 | <71 | <68 | <71 | <65 | 59 | 160,000 | 4,100,000 |
| Nitrobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Pentachlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Phenanthrene | μg/kg | 130 | 140 | 140 | 94 | 78 | 100 | 1,000,000 | 5,000,000 |
| Phenol | μg/kg | 250 | 210 | 180 | 180 | 96 | 140 | | |
| Pyrene | μg/kg | 220 | 240 | 230 | 170 | 130 | 170 | | |
| **VOCs** | | | | | | | | | |
| 1,1,1-Trichloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 160,000 | 4,100,000 |
| 1,1,2,2-Tetrachloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 600 | 29,000 |
| 1,1,2-Trichloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 1,000 | 100,000 |
| 1,1-Dichloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 780,000 | 5,000,000 |
| 1,1-Dichloroethene | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 1,2-Dichloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 1,2-Dichloroethene (total) | μg/kg | <20 | <21 | <20 | <21 | <18 | <19 | 400 | 63,000 |
| 1,2-Dichloropropane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 9,000 | 84,000 |
| 2-Butanone | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 2-Hexanone | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 310,000 | 5,000,000 |
| 4-Methyl-2-pentanone | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Acetone | μg/kg | <40 | <43 | <41 | <43 | <35 | <37 | 780,000 | 5,000,000 |
| Benzene | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 800 | 200,000 |
| Bromodichloromethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 10,000 | 92,000 |
| Bromoform | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 53,000 | 720,000 |
| Bromomethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 11,000 | 290,000 |
| Carbon disulfide | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 780,000 | 5,000,000 |
| Carbon tetrachloride | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 300 | 44,000 |
| Chlorobenzene | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 130,000 | 4,100,000 |
| Chloroethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 220,000 | 2,000,000 |
| Chloroform | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 300 | 940,000 |
| Chloromethane | μg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 49,000 | 440,000 |

| Table 11. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
| **VOCs (Continued)** | | | | | | | | | |
| cis-1,3-Dichloropropene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 100 | 32,000 |
| Dibromochloromethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 8,000 | 68,000 |
| Ethylbenzene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 400,000 | 5,000,000 |
| Methylene chloride | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 13,000 | 760,000 |
| Styrene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 1,000,000 | 5,000,000 |
| Tetrachloroethene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Toluene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 650,000 | 5,000,000 |
| trans-1,3-Dichloropropene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 100 | 32,000 |
| Trichloroethene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Vinyl chloride | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 30 | 3,000 |
| Xylenes (total) | µg/kg | <30 | <32 | <31 | <32 | <27 | <28 | 420,000 | 5,000,000 |
| Cyanide, Total | mg/kg | 0.32 | 0.42 | 0.34 | 0.5 | 0.88 | 0.61 | | |
| Total Sulfide | mg/kg | 80.1 | 68.1 | 32.6 | 119 | 28.3 | <56.0 | | |

| Table 12. PCB congener testing results for samples collected from Wilmington Harbor CDF | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 1 (BZ) | ng/g | 0.056 | 0.062 | 0.065 | 0.049 | 0.051 | 0.1 |
| PCB 2 (BZ) | ng/g | 0.059 | 0.06 | 0.12 | 0.059 | 0.066 | 0.063 |
| PCB 3 (BZ) | ng/g | 0.085 | 0.084 | 0.099 | 0.076 | 0.087 | 0.083 |
| PCB 4 (BZ) | ng/g | 0.16 | 0.19 | 0.21 | 0.14 | 0.2 | 0.22 |
| PCB 5 (BZ) | ng/g | 0.0098 | 0.013 | <0.020 | 0.0084 | 0.012 | 0.0044 |
| PCB 6 (BZ) | ng/g | 0.093 | 0.13 | 0.12 | 0.093 | 0.13 | 0.11 |
| PCB 7 (BZ) | ng/g | 0.015 | 0.02 | 0.022 | 0.011 | 0.017 | 0.014 |
| PCB 8 (BZ) | ng/g | 0.25 | 0.34 | 0.29 | 0.26 | 0.25 | 0.3 |
| PCB 9 (BZ) | ng/g | 0.023 | 0.02 | 0.026 | 0.017 | 0.022 | 0.018 |
| PCB 10 (BZ) | ng/g | 0.011 | 0.014 | 0.012 | 0.0072 | 0.011 | 0.012 |
| PCB 11 (BZ) | ng/g | 0.32 | 0.35 | 0.39 | 0.36 | 0.49 | 0.3 |
| PCB 12 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.15 | 0.16 | 0.16 |
| PCB 13 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.15 | 0.16 | 0.16 |
| PCB 14 (BZ) | ng/g | 0.0051 | 0.0049 | <0.020 | 0.0064 | 0.0099 | <0.019 |
| PCB 15 (BZ) | ng/g | 0.6 | 0.64 | 0.57 | 0.6 | 0.54 | 0.58 |
| PCB 16 (BZ) | ng/g | 0.14 | 0.2 | 0.18 | 0.15 | 0.14 | 0.17 |
| PCB 17 (BZ) | ng/g | 0.27 | 0.37 | 0.33 | 0.27 | 0.29 | 0.36 |
| PCB 18 (BZ) | ng/g | 0.43 | 0.49 | 0.46 | 0.39 | 0.42 | 0.46 |
| PCB 19 (BZ) | ng/g | 0.13 | 0.17 | 0.11 | 0.14 | 0.13 | 0.18 |
| PCB 20 (BZ) | ng/g | 1.2 | 1.4 | 1.3 | 1.3 | 1 | 1.3 |
| PCB 21 (BZ) | ng/g | 0.26 | 0.32 | 0.3 | 0.28 | 0.21 | 0.28 |
| PCB 22 (BZ) | ng/g | 0.22 | 0.24 | 0.24 | 0.21 | 0.19 | 0.23 |
| PCB 23 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 24 (BZ) | ng/g | 0.0075 | 0.0098 | <0.020 | 0.01 | <0.018 | 0.011 |
| PCB 25 (BZ) | ng/g | 0.18 | 0.24 | 0.21 | 0.19 | 0.16 | 0.22 |
| PCB 26 (BZ) | ng/g | 0.25 | 0.34 | 0.31 | 0.29 | 0.24 | 0.34 |
| PCB 27 (BZ) | ng/g | 0.12 | 0.19 | 0.13 | 0.13 | 0.16 | 0.21 |
| PCB 28 (BZ) | ng/g | 1.2 | 1.4 | 1.3 | 1.3 | 1 | 1.3 |
| PCB 29 (BZ) | ng/g | 0.25 | 0.34 | 0.31 | 0.29 | 0.24 | 0.34 |
| PCB 30 (BZ) | ng/g | 0.43 | 0.49 | 0.46 | 0.39 | 0.42 | 0.46 |
| PCB 31 (BZ) | ng/g | 0.77 | 0.89 | 0.81 | 0.82 | 0.68 | 0.84 |
| PCB 32 (BZ) | ng/g | 0.27 | 0.36 | 0.36 | 0.3 | <0.018 | 0.36 |
| PCB 33 (BZ) | ng/g | 0.26 | 0.32 | 0.3 | 0.28 | 0.21 | 0.28 |
| PCB 34 (BZ) | ng/g | 0.012 | 0.014 | <0.020 | 0.011 | 0.0073 | 0.01 |
| PCB 35 (BZ) | ng/g | 0.082 | 0.084 | 0.077 | 0.064 | 0.086 | 0.071 |
| PCB 36 (BZ) | ng/g | 0.017 | 0.013 | 0.011 | 0.006 | 0.0082 | 0.0062 |
| PCB 37 (BZ) | ng/g | 0.44 | 0.48 | 0.46 | 0.46 | 0.43 | 0.47 |
| PCB 38 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 39 (BZ) | ng/g | 0.016 | 0.014 | <0.020 | 0.013 | 0.012 | 0.015 |
| PCB 40 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 41 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 42 (BZ) | ng/g | 0.43 | 0.5 | 0.41 | 0.44 | 0.4 | 0.45 |
| PCB 43 (BZ) | ng/g | 0.053 | 0.066 | 0.048 | 0.043 | 0.039 | 0.044 |
| PCB 44 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 45 (BZ) | ng/g | 0.39 | 0.53 | 0.45 | 0.43 | 0.38 | 0.53 |
| PCB 46 (BZ) | ng/g | 0.11 | 0.15 | 0.11 | 0.12 | 0.11 | 0.13 |
| PCB 47 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 48 (BZ) | ng/g | 0.17 | 0.2 | 0.17 | 0.16 | 0.16 | 0.16 |
| PCB 49 (BZ) | ng/g | 1.2 | 1.7 | 1.4 | 1.4 | 1.3 | 1.7 |
| PCB 50 (BZ) | ng/g | 0.31 | 0.44 | 0.35 | 0.35 | 0.31 | 0.42 |
| PCB 51 (BZ) | ng/g | 0.39 | 0.53 | 0.45 | 0.43 | 0.38 | 0.53 |
| PCB 52 (BZ) | ng/g | 2 | 2.7 | 2.2 | 2.3 | 2 | 2.7 |
| PCB 53 (BZ) | ng/g | 0.31 | 0.44 | 0.35 | 0.35 | 0.31 | 0.42 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 54 (BZ) | ng/g | 0.033 | 0.043 | 0.03 | 0.033 | 0.021 | 0.038 |
| PCB 55 (BZ) | ng/g | 0.037 | 0.039 | 0.032 | 0.028 | <0.018 | <0.019 |
| PCB 56 (BZ) | ng/g | 0.59 | 0.67 | 0.63 | 0.61 | 0.56 | 0.63 |
| PCB 57 (BZ) | ng/g | 0.016 | 0.017 | 0.019 | 0.012 | 0.0092 | 0.033 |
| PCB 58 (BZ) | ng/g | 0.018 | 0.021 | 0.08 | 0.014 | 0.012 | 0.013 |
| PCB 59 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 60 (BZ) | ng/g | 0.2 | 0.23 | 0.2 | 0.21 | 0.16 | 0.21 |
| PCB 61 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 62 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 63 (BZ) | ng/g | 0.056 | 0.073 | 0.071 | 0.059 | 0.054 | 0.06 |
| PCB 64 (BZ) | ng/g | 0.58 | 0.7 | 0.67 | 0.6 | 0.54 | 0.61 |
| PCB 65 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 66 (BZ) | ng/g | 1.6 | 1.9 | 1.6 | 1.7 | 1.5 | 1.8 |
| PCB 67 (BZ) | ng/g | 0.058 | 0.065 | 0.049 | 0.054 | 0.05 | 0.058 |
| PCB 68 (BZ) | ng/g | 0.039 | 0.067 | 0.052 | 0.048 | 0.044 | 0.063 |
| PCB 69 (BZ) | ng/g | 1.2 | 1.7 | 1.4 | 1.4 | 1.3 | 1.7 |
| PCB 70 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 71 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 72 (BZ) | ng/g | 0.051 | 0.086 | 0.051 | 0.06 | 0.059 | 0.077 |
| PCB 73 (BZ) | ng/g | 0.053 | 0.066 | 0.048 | 0.043 | 0.039 | 0.044 |
| PCB 74 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 75 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 76 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 77 (BZ) | ng/g | 0.26 | 0.27 | 0.24 | 0.26 | 0.26 | 0.24 |
| PCB 78 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 79 (BZ) | ng/g | 0.029 | 0.031 | 0.036 | 0.034 | 0.031 | 0.035 |
| PCB 80 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 81 (BZ) | ng/g | 0.0067 | 0.0066 | <0.020 | 0.0066 | 0.0028 | 0.0066 |
| PCB 82 (BZ) | ng/g | 0.36 | 0.42 | 0.33 | 0.4 | 0.33 | 0.43 |
| PCB 83 (BZ) | ng/g | 2.3 | 2.8 | 2.2 | 2.6 | <0.018 | 2.8 |
| PCB 84 (BZ) | ng/g | 0.78 | 1 | 0.84 | 0.95 | 0.81 | 1 |
| PCB 85 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 86 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 87 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 88 (BZ) | ng/g | 0.57 | 0.74 | 0.59 | 0.64 | 0.59 | 0.72 |
| PCB 89 (BZ) | ng/g | 0.035 | 0.031 | 0.046 | 0.038 | 0.03 | 0.041 |
| PCB 90 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 91 (BZ) | ng/g | 0.57 | 0.74 | 0.59 | 0.64 | 0.59 | 0.72 |
| PCB 92 (BZ) | ng/g | 0.68 | 0.85 | 0.69 | 0.81 | 0.7 | 1.1 |
| PCB 93 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.19 | 0.13 | 0.24 |
| PCB 94 (BZ) | ng/g | 0.042 | 0.056 | <0.020 | 0.048 | 0.037 | 0.076 |
| PCB 95 (BZ) | ng/g | 2.4 | 3.2 | 2.5 | 2.8 | 2.4 | 3 |
| PCB 96 (BZ) | ng/g | 0.034 | 0.033 | <0.020 | 0.038 | 0.032 | 0.037 |
| PCB 97 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 98 (BZ) | ng/g | 0.16 | 0.23 | 0.16 | 0.17 | 0.15 | 0.27 |
| PCB 99 (BZ) | ng/g | 2.3 | 2.8 | 2.2 | 2.6 | <0.018 | 2.8 |
| PCB 100 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.19 | 0.13 | 0.24 |
| PCB 101 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 102 (BZ) | ng/g | 0.16 | 0.23 | 0.16 | 0.17 | 0.15 | 0.27 |
| PCB 103 (BZ) | ng/g | 0.094 | 0.12 | 0.075 | 0.1 | 0.088 | 0.13 |
| PCB 104 (BZ) | ng/g | <0.020 | 0.0068 | <0.020 | 0.0088 | <0.018 | 0.0091 |
| PCB 105 (BZ) | ng/g | 0.96 | 1 | 0.9 | 1 | 0.88 | 1.1 |
| PCB 106 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 107 (BZ)/109 (IUPAC) | ng/g | 0.28 | 0.32 | 0.3 | 0.3 | 0.28 | 0.33 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 |
| PCB 108 (BZ)/107 (IUPAC) | ng/g | 0.11 | 0.12 | 0.11 | 0.1 | 0.088 | 0.12 |
| PCB 109 (BZ)/108 (IUPAC) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 110 (BZ) | ng/g | 3.9 | 4.8 | 3.8 | 4.4 | 4 | 4.8 |
| PCB 111 (BZ) | ng/g | 0.014 | 0.015 | <0.020 | 0.0093 | 0.013 | 0.012 |
| PCB 112 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | 1.7 | <0.019 |
| PCB 113 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 114 (BZ) | ng/g | 0.049 | 0.065 | 0.044 | 0.053 | 0.044 | 0.047 |
| PCB 115 (BZ) | ng/g | 3.9 | 4.8 | 3.8 | 4.4 | 4 | 4.8 |
| PCB 116 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 117 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 118 (BZ) | ng/g | 2.8 | 3.2 | 2.6 | 2.9 | 2.7 | 3.2 |
| PCB 119 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 120 (BZ) | ng/g | 0.039 | 0.04 | 0.041 | 0.04 | 0.034 | 0.044 |
| PCB 121 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 122 (BZ) | ng/g | 0.053 | 0.057 | 0.056 | 0.044 | 0.04 | 0.043 |
| PCB 123 (BZ) | ng/g | 0.029 | 0.05 | 0.044 | 0.053 | 0.049 | 0.052 |
| PCB 124 (BZ) | ng/g | 0.11 | 0.12 | 0.11 | 0.1 | 0.088 | 0.12 |
| PCB 125 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 126 (BZ) | ng/g | 0.016 | 0.014 | 0.029 | 0.02 | 0.014 | 0.016 |
| PCB 127 (BZ) | ng/g | <0.020 | 0.0077 | <0.020 | 0.0071 | <0.018 | <0.019 |
| PCB 128 (BZ) | ng/g | 0.68 | 0.74 | 0.65 | 0.65 | 0.63 | 0.71 |
| PCB 129 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 130 (BZ) | ng/g | 0.31 | 0.36 | 0.32 | 0.31 | 0.3 | 0.36 |
| PCB 131 (BZ) | ng/g | 0.054 | 0.054 | 0.074 | 0.045 | 0.04 | 0.051 |
| PCB 132 (BZ) | ng/g | 1.4 | 1.6 | 1.5 | 1.4 | 1.3 | 1.6 |
| PCB 133 (BZ) | ng/g | 0.15 | 0.16 | 0.16 | 0.13 | 0.12 | 0.17 |
| PCB 134 (BZ) | ng/g | 0.26 | 0.31 | 0.34 | 0.26 | 0.24 | 0.29 |
| PCB 135 (BZ) | ng/g | 1.9 | 2.2 | 1.7 | 1.9 | 1.9 | 2.3 |
| PCB 136 (BZ) | ng/g | 0.64 | 0.74 | 0.6 | 0.7 | 0.67 | 0.77 |
| PCB 137 (BZ) | ng/g | 0.18 | 0.14 | 0.13 | 0.14 | 0.14 | 0.16 |
| PCB 138 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 139 (BZ) | ng/g | 0.082 | 0.11 | 0.079 | 0.084 | 0.077 | 0.092 |
| PCB 140 (BZ) | ng/g | 0.082 | 0.11 | 0.079 | 0.084 | 0.077 | 0.092 |
| PCB 141 (BZ) | ng/g | 0.67 | 0.76 | 0.59 | 0.67 | 0.64 | 0.75 |
| PCB 142 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 143 (BZ) | ng/g | 0.26 | 0.31 | 0.34 | 0.26 | 0.24 | 0.29 |
| PCB 144 (BZ) | ng/g | 0.19 | 0.25 | 0.17 | 0.2 | 0.18 | 0.19 |
| PCB 145 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 146 (BZ) | ng/g | 0.91 | 1 | 1 | 0.92 | 0.9 | 1.1 |
| PCB 147 (BZ) | ng/g | 3.7 | 4.3 | 4 | 3.8 | 3.5 | 4.2 |
| PCB 148 (BZ) | ng/g | 0.043 | 0.028 | 0.031 | 0.027 | 0.032 | 0.049 |
| PCB 149 (BZ) | ng/g | 3.7 | 4.3 | 4 | 3.8 | 3.5 | 4.2 |
| PCB 150 (BZ) | ng/g | 0.044 | 0.041 | 0.037 | 0.033 | 0.047 | 0.042 |
| PCB 151 (BZ) | ng/g | 1.9 | 2.2 | 1.7 | 1.9 | 1.9 | 2.3 |
| PCB 152 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 153 (BZ) | ng/g | 4 | 4.4 | 3.9 | 4.1 | 3.8 | 4.4 |
| PCB 154 (BZ) | ng/g | 0.23 | 0.25 | 0.17 | 0.2 | 0.22 | 0.29 |
| PCB 155 (BZ) | ng/g | 0.017 | 0.016 | <0.020 | 0.015 | 0.014 | 0.0091 |
| PCB 156 (BZ) | ng/g | 0.44 | 0.45 | 0.36 | 0.43 | 0.39 | 0.47 |
| PCB 157 (BZ) | ng/g | 0.44 | 0.45 | 0.36 | 0.43 | 0.39 | 0.47 |
| PCB 158 (BZ) | ng/g | 0.39 | 0.39 | 0.35 | 0.38 | 0.34 | 0.4 |
| PCB 159 (BZ) | ng/g | 0.034 | 0.029 | 0.032 | 0.033 | 0.028 | 0.027 |
| PCB 160 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 161 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 162 (BZ) | ng/g | 0.028 | 0.025 | 0.046 | 0.032 | 0.031 | 0.031 |
| PCB 163 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 164 (BZ) | ng/g | 0.33 | 0.38 | 0.36 | 0.35 | 0.32 | 0.37 |
| PCB 165 (BZ) | ng/g | <0.020 | 0.017 | <0.020 | <0.021 | <0.018 | 0.011 |
| PCB 166 (BZ) | ng/g | 0.68 | 0.74 | 0.65 | 0.65 | 0.63 | 0.71 |
| PCB 167 (BZ) | ng/g | 0.17 | 0.18 | 0.15 | 0.17 | 0.17 | 0.19 |
| PCB 168 (BZ) | ng/g | 4 | 4.4 | 3.9 | 4.1 | 3.8 | 4.4 |
| PCB 169 (BZ) | ng/g | 0.0053 | 0.003 | <0.020 | 0.0041 | 0.0075 | 0.016 |
| PCB 170 (BZ) | ng/g | 1.1 | 1.2 | 1 | 1.2 | 1.1 | 1.2 |
| PCB 171 (BZ) | ng/g | 0.36 | 0.39 | 0.37 | 0.38 | 0.34 | 0.38 |
| PCB 172 (BZ) | ng/g | 0.21 | 0.25 | 0.27 | 0.24 | 0.22 | 0.24 |
| PCB 173 (BZ) | ng/g | 0.36 | 0.39 | 0.37 | 0.38 | 0.34 | 0.38 |
| PCB 174 (BZ) | ng/g | 1.2 | 1.4 | 1.1 | 1.3 | 1.2 | 1.3 |
| PCB 175 (BZ) | ng/g | 0.058 | 0.066 | 0.094 | 0.057 | 0.055 | 0.065 |
| PCB 176 (BZ) | ng/g | 0.17 | 0.18 | 0.16 | 0.16 | 0.15 | 0.17 |
| PCB 177 (BZ) | ng/g | 0.78 | 0.89 | 0.8 | 0.85 | 0.75 | 0.88 |
| PCB 178 (BZ) | ng/g | 0.35 | 0.39 | 0.44 | 0.38 | 0.35 | 0.4 |
| PCB 179 (BZ) | ng/g | 0.61 | 0.73 | 0.65 | 0.64 | 0.6 | 0.68 |
| PCB 180 (BZ) | ng/g | 2.4 | 2.7 | 2.2 | 2.8 | 2.5 | 2.8 |
| PCB 181 (BZ) | ng/g | 0.01 | 0.01 | <0.020 | 0.014 | 0.0095 | 0.0088 |
| PCB 182 (BZ) | ng/g | <0.020 | <0.021 | 0.047 | <0.021 | 0.035 | <0.019 |
| PCB 183 (BZ) | ng/g | 0.85 | 0.96 | 0.92 | 0.94 | 0.8 | 0.93 |
| PCB 184 (BZ) | ng/g | 0.013 | 0.013 | <0.020 | 0.013 | 0.015 | 0.0097 |
| PCB 185 (BZ) | ng/g | 0.85 | 0.96 | 0.92 | 0.94 | 0.8 | 0.93 |
| PCB 186 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 187 (BZ) | ng/g | 1.9 | 2.1 | 1.8 | 2 | 1.9 | 2 |
| PCB 188 (BZ) | ng/g | 0.041 | 0.04 | 0.046 | 0.037 | 0.041 | 0.031 |
| PCB 189 (BZ) | ng/g | 0.047 | 0.056 | 0.047 | 0.052 | 0.048 | 0.044 |
| PCB 190 (BZ) | ng/g | 0.22 | 0.24 | 0.14 | 0.25 | 0.21 | 0.25 |
| PCB 191 (BZ) | ng/g | 0.057 | 0.061 | 0.062 | 0.052 | 0.038 | 0.051 |
| PCB 192 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 193 (BZ) | ng/g | 2.4 | 2.7 | 2.2 | 2.8 | 2.5 | 2.8 |
| PCB 194 (BZ) | ng/g | 0.79 | 0.87 | 1.3 | 0.89 | 0.78 | 0.87 |
| PCB 195 (BZ) | ng/g | 0.26 | 0.29 | 0.4 | 0.29 | 0.23 | 0.3 |
| PCB 196 (BZ) | ng/g | 0.63 | 0.65 | 1.1 | 0.69 | 0.66 | 0.63 |
| PCB 197 (BZ) | ng/g | 0.073 | 0.078 | 0.23 | 0.065 | 0.08 | 0.076 |
| PCB 198 (BZ) | ng/g | 2.2 | 2.1 | 2.4 | 2.4 | 2.2 | 2 |
| PCB 199 (BZ)/200 (IUPAC) | ng/g | 0.1 | 0.12 | 0.13 | 0.12 | 0.11 | 0.11 |
| PCB 200 (BZ)/201 (IUPAC) | ng/g | 0.25 | 0.26 | 0.76 | 0.28 | 0.26 | 0.22 |
| PCB 201 (BZ)/199 (IUPAC) | ng/g | 2.2 | 2.1 | 2.4 | 2.4 | 2.2 | 2 |
| PCB 202 (BZ) | ng/g | 0.71 | 0.75 | 1 | 0.8 | 0.76 | 0.67 |
| PCB 203 (BZ) | ng/g | 0.88 | 0.97 | 0.62 | 1 | 0.9 | 0.89 |
| PCB 204 (BZ) | ng/g | 0.011 | 0.01 | <0.020 | 0.0088 | 0.0085 | <0.019 |
| PCB 205 (BZ) | ng/g | 0.055 | 0.054 | <0.020 | 0.063 | 0.044 | 0.051 |
| PCB 206 (BZ) | ng/g | 7.4 | 7.7 | 8.1 | 8.5 | 7.7 | 6.3 |
| PCB 207 (BZ) | ng/g | 0.59 | 0.65 | 2 | 0.74 | 0.68 | 0.57 |
| PCB 208 (BZ) | ng/g | 3.3 | 3.4 | 4.5 | 3.9 | 3.5 | 2.7 |

Table 13. PCB congener totals testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| Monochlorobiphenyl | ng/g | 0.2 | 0.21 | 0.28 | 0.18 | 0.2 | 0.25 | | |
| Dichlorobiphenyl | ng/g | 1.6 | 1.9 | 1.8 | 1.7 | 1.9 | 1.7 | | |
| Trichlorobiphenyl | ng/g | 4.8 | 5.8 | 5.3 | 5 | 4.2 | 5.6 | | |
| Tetrachlorobiphenyl | ng/g | 13 | 17 | 14 | 14 | 13 | 16 | | |
| Pentachlorobiphenyl | ng/g | 21 | 26 | 21 | 24 | 21 | 27 | | |
| Hexachlorobiphenyl | ng/g | 21 | 24 | 21 | 22 | 20 | 24 | | |
| Heptachlorobiphenyl | ng/g | 10 | 12 | 10 | 11 | 10 | 12 | | |
| Octachlorobiphenyl | ng/g | 5.9 | 6.1 | 8 | 6.6 | 6.1 | 5.8 | | |
| Nonachlorobiphenyl | ng/g | 11 | 12 | 15 | 13 | 12 | 9.6 | | |
| Decachlorobiphenyl | ng/g | 12 | 16 | 12 | 16 | 15 | 14 | | |
| Total | | 101 | 121 | 108 | 113 | 103 | 116 | 1000 | 1000 |

Table 14. TCLP testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over regulatory limits.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | |
| Arsenic | mg/L | 0.17 | 0.15 | 0.18 | 0.18 | 0.17 | <0.50 | 5 |
| Barium | mg/L | 0.37 | 0.45 | 0.48 | 0.52 | 0.33 | <10.0 | 100 |
| Cadmium | mg/L | 0.0047 | 0.0047 | 0.0074 | 0.0062 | 0.0028 | <0.10 | 1 |
| Chromium | mg/L | 0.0024 | 0.0034 | 0.004 | 0.0039 | 0.0036 | <0.50 | 5 |
| Lead | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| Mercury | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.2 |
| Selenium | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 1 |
| Silver | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| **Semivolatile Organics** | | | | | | | | |
| 1,4Dichlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 7.5 |
| 2,4,5TP (Silvex) | mg/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 1 |
| 2,4,5Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 400 |
| 2,4,6Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| 2,4Dinitrotoluene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| 2,4D | mg/L | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | 10 |
| 3Methylphenol & 4Methylphenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Chlordane (technical) | mg/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.03 |
| Cresols (total) | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 200 |
| Endrin | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.02 |
| Heptachlor epoxide | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Heptachlor | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Hexachlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| Hexachlorobutadiene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.5 |
| Hexachloroethane | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 3 |
| Lindane | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.4 |
| Methoxychlor | mg/L | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 10 |
| Nitrobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| Pentachlorophenol | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 100 |
| Pyridine | mg/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 5 |
| Toxaphene | mg/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.5 |
| **Volatile Organics** | | | | | | | | |
| 1,1Dichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| 1,2Dichloroethane | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| 2Butanone | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 200 |
| Benzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Carbon tetrachloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Chlorobenzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 100 |
| Chloroform | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 6 |
| Tetrachloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| Trichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Vinyl chloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.2 |

# APPENDIX A

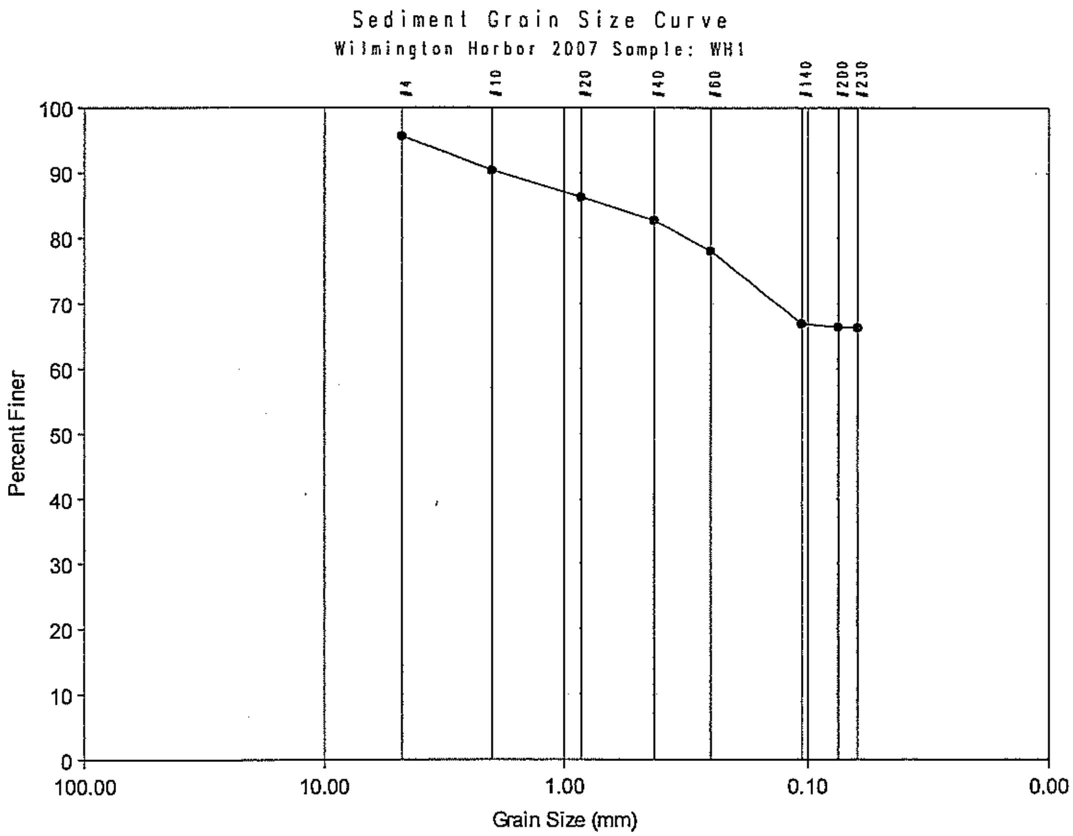
## Severn Trent
## Laboratory Analysis Certificates

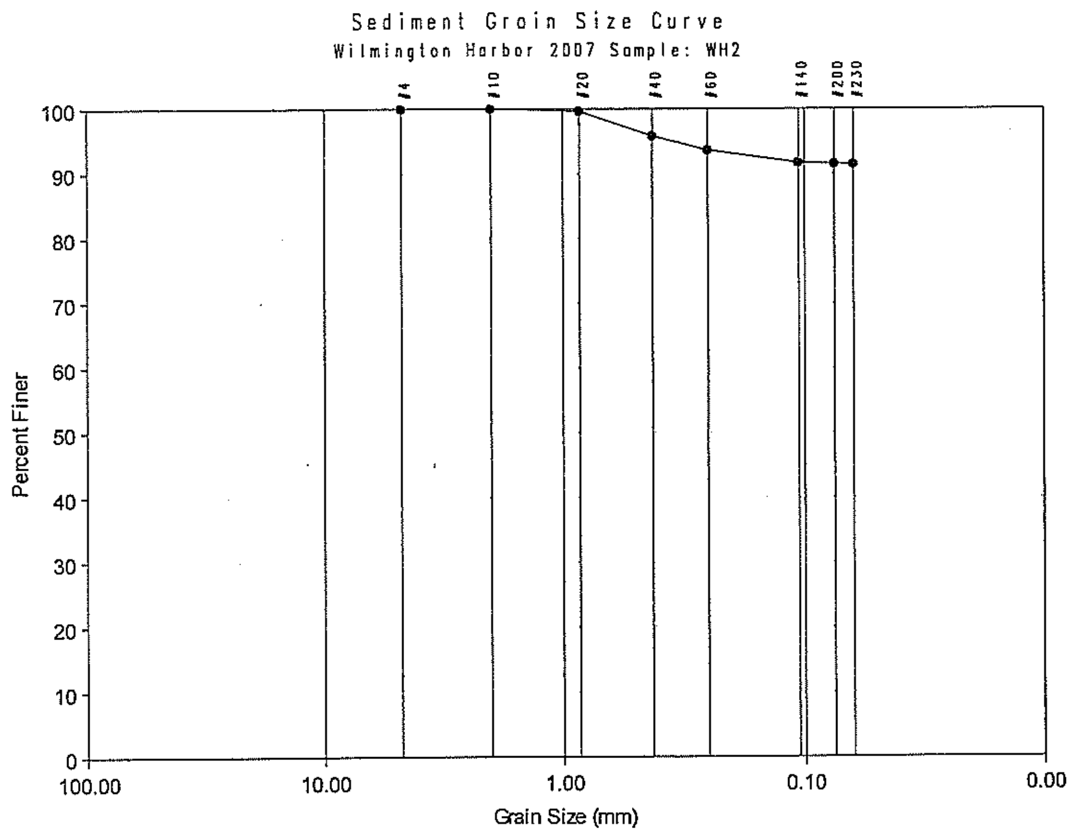
# APPENDIX B

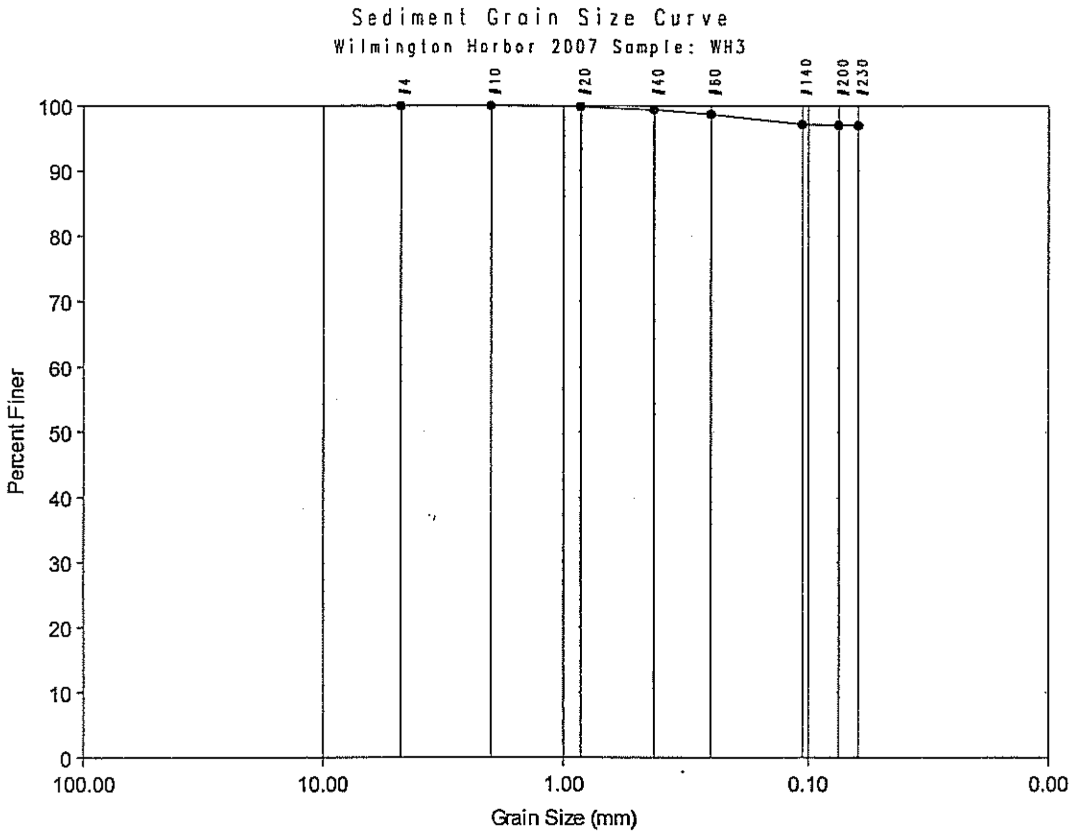
## Grain Size and TOC Results

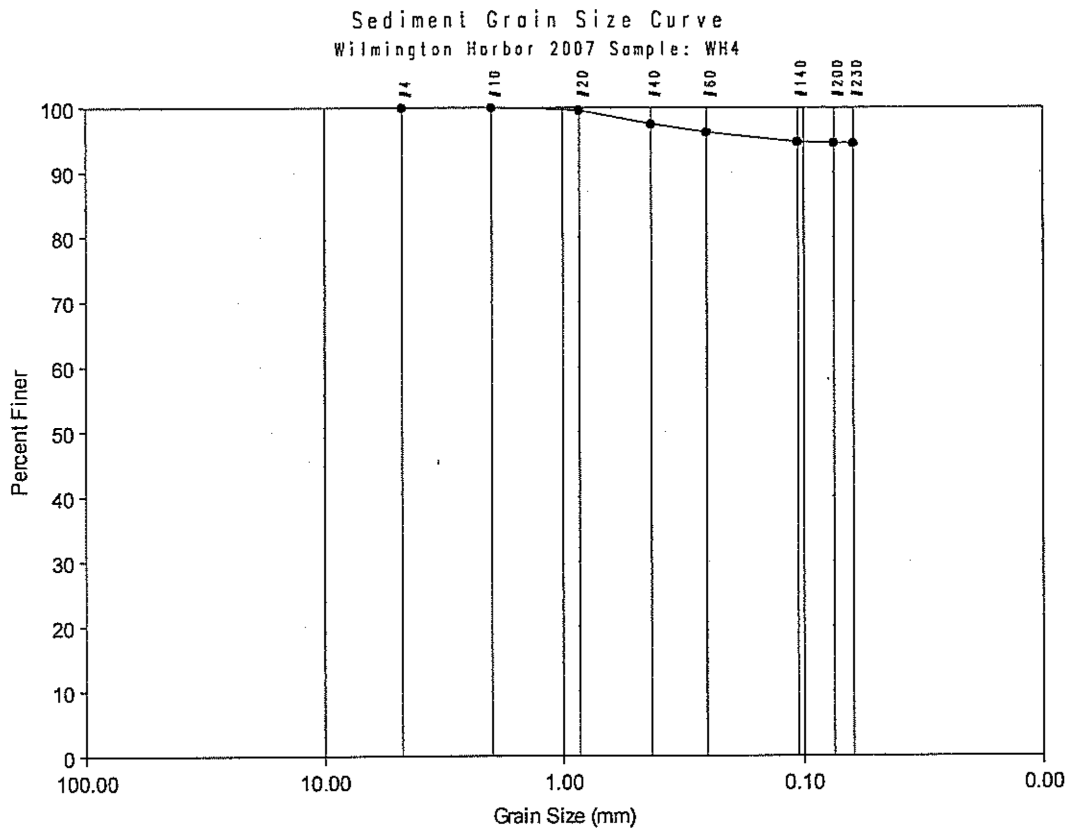
| Table B-1. Total organic carbon and percent silt/clay for the eight cores collected at Wilmington Harbor | | | | |
|---|---|---|---|---|
| **Station** | **Gravel (%)** | **Sand (%)** | **Silt/clay (%)** | **TOC (%)** |
| WH1 | 9.6 | 24.0 | 66.45 | 13.7 |
| WH2 | 0.0 | 8.50 | 91.50 | 9.01 |
| WH3 | 0.0 | 2.98 | 97.02 | 8.35 |
| WH4 | 0.0 | 5.47 | 94.53 | 8.40 |
| WH5 | 0.03 | 2.44 | 97.53 | 8.70 |
| WH6 | 0.0 | 3.32 | 96.68 | 8.74 |
| WH7 | 5.5 | 9.62 | 84.85 | 5.39 |
| WH8 | 0.0 | 3.65 | 96.35 | 7.87 |

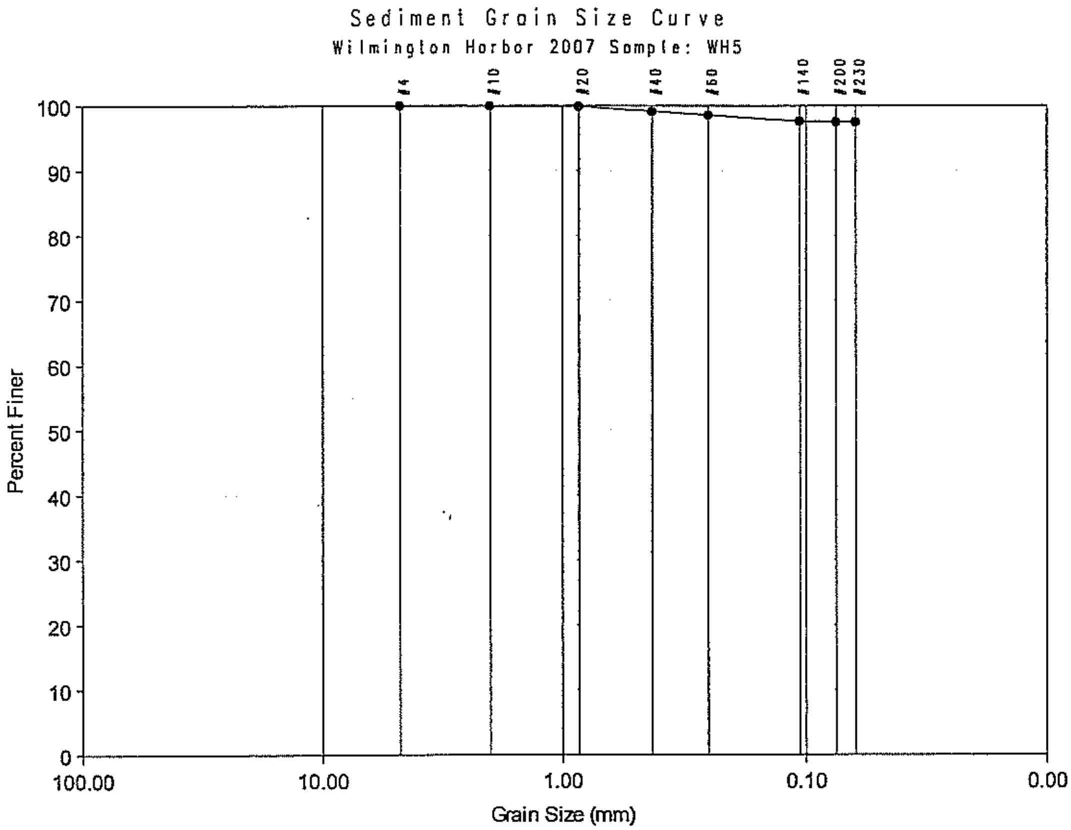
| Table B-2. Total organic carbon and percent silt/clay for the six cores collected at Wilmington Harbor CDF | | | | |
|---|---|---|---|---|
| **Station** | **Gravel (%)** | **Sand (%)** | **Silt/clay (%)** | **TOC (%)** |
| WU1 | 0.0 | 2.53 | 97.47 | 7.94 |
| WU2 | 0.0 | 3.31 | 96.69 | 8.81 |
| WU3 | 0.15 | 3.13 | 96.73 | 8.22 |
| WU4 | 0.0 | 4.32 | 95.68 | 10.00 |
| WU5 | 0.0 | 3.05 | 96.95 | 7.33 |
| WU6 | 0.0 | 8.31 | 91.69 | 9.52 |

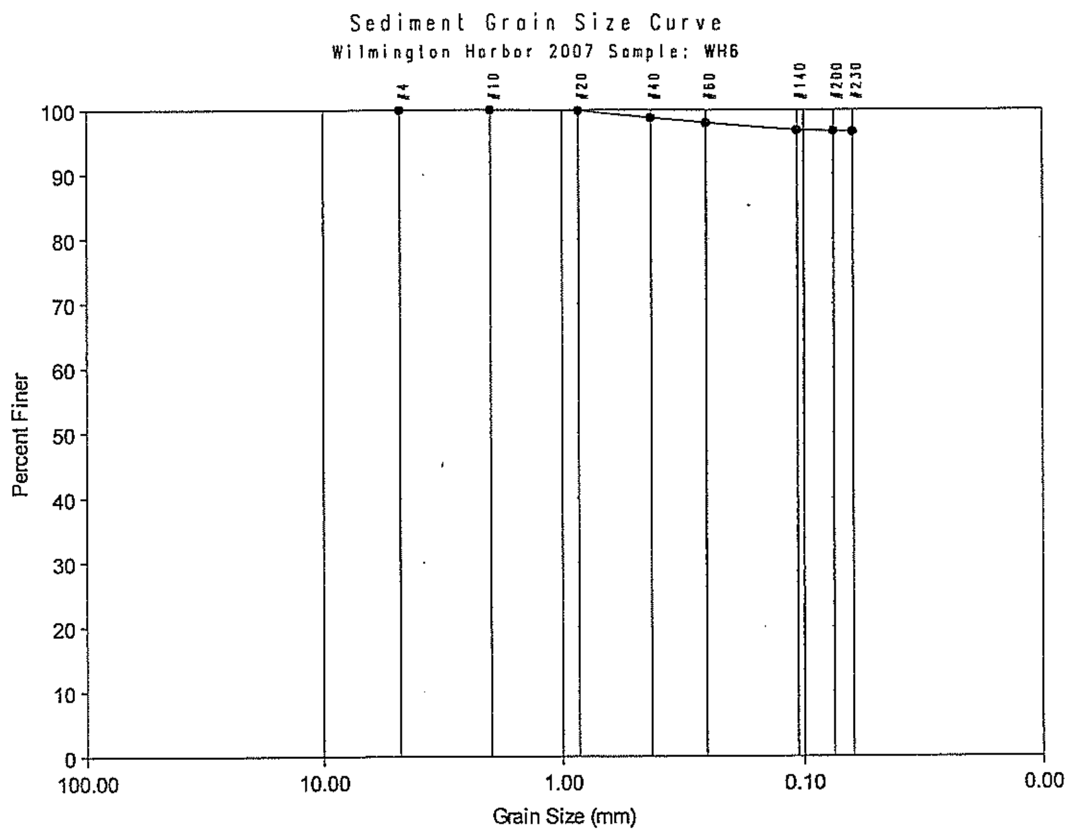

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH1
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

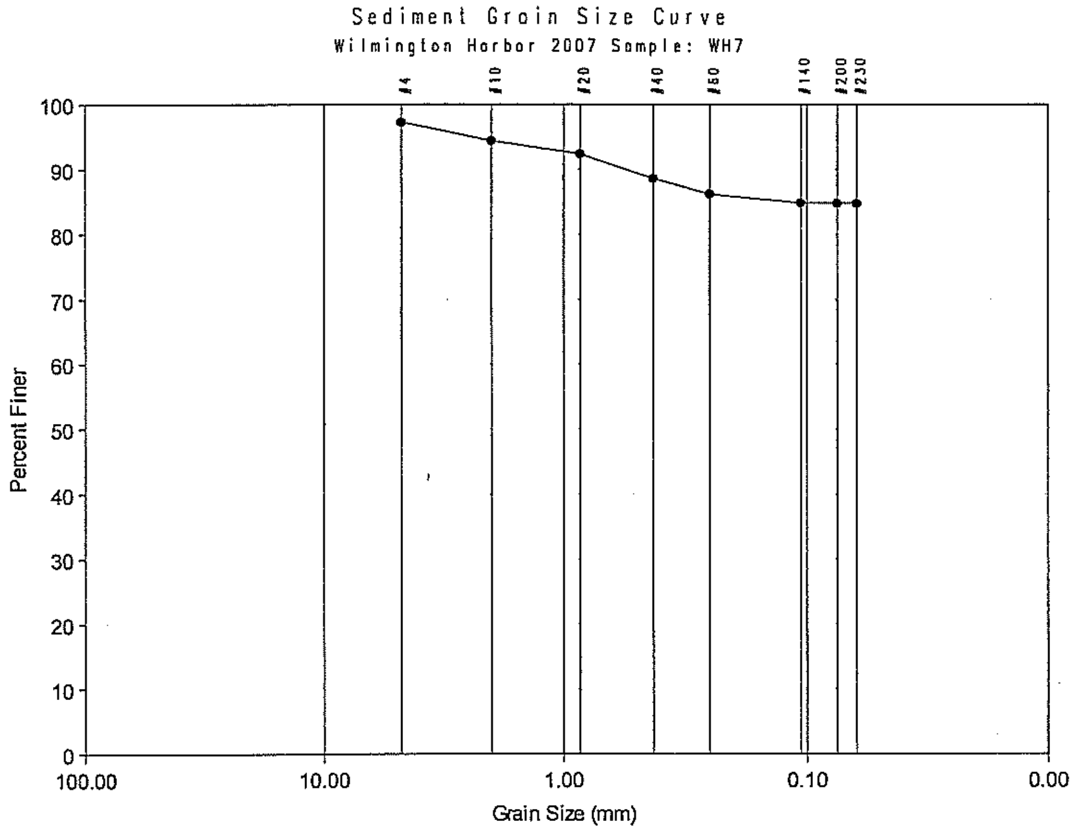

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH2
#4
#10
#20
#40
#60
#140
#200
#230
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

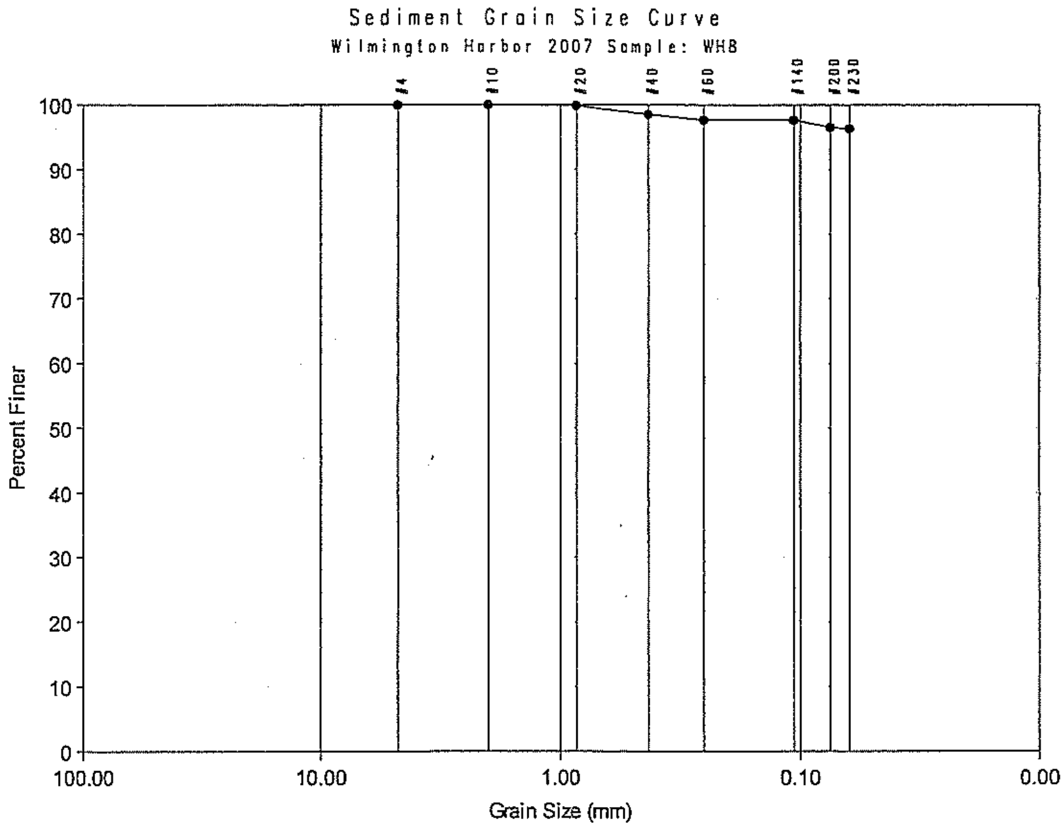

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH3
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

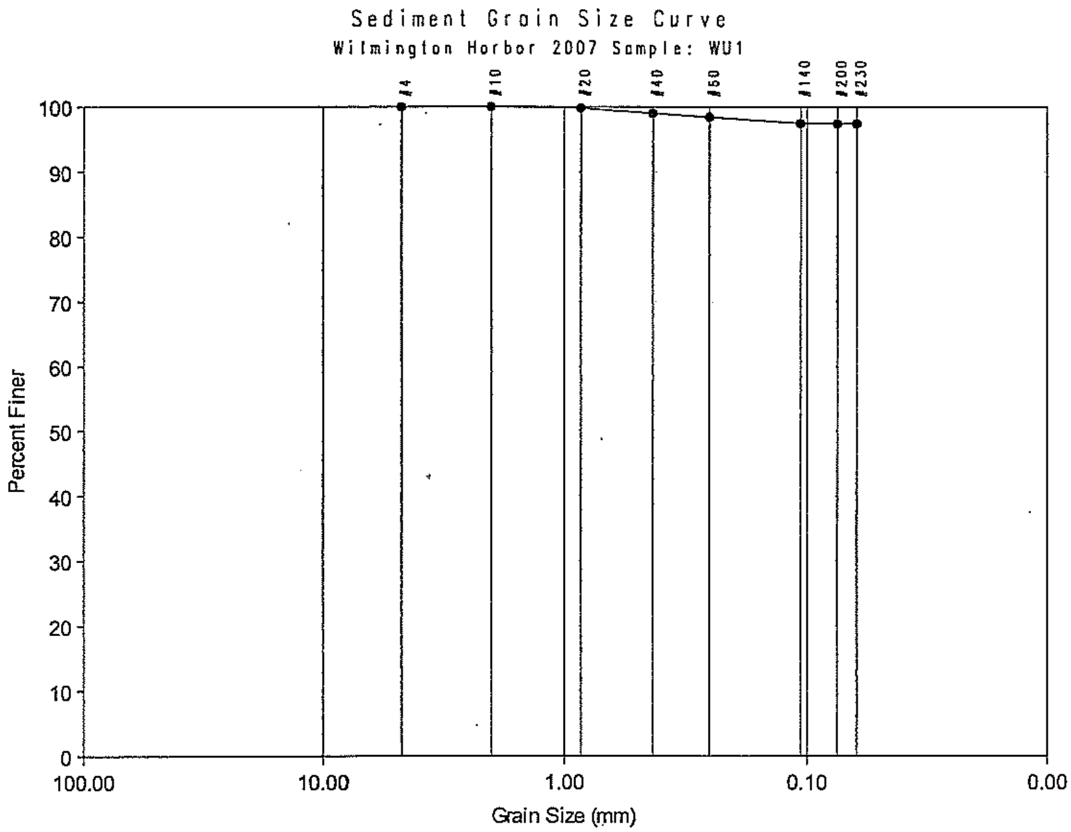

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH4
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

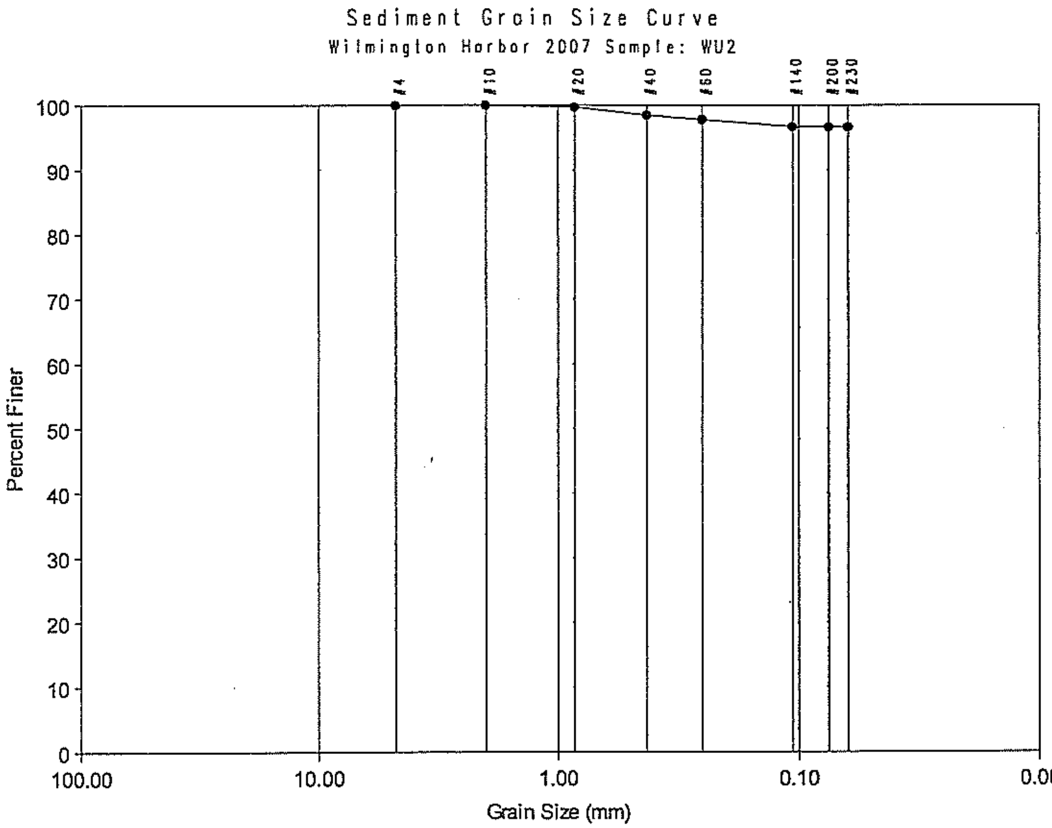

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH5
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

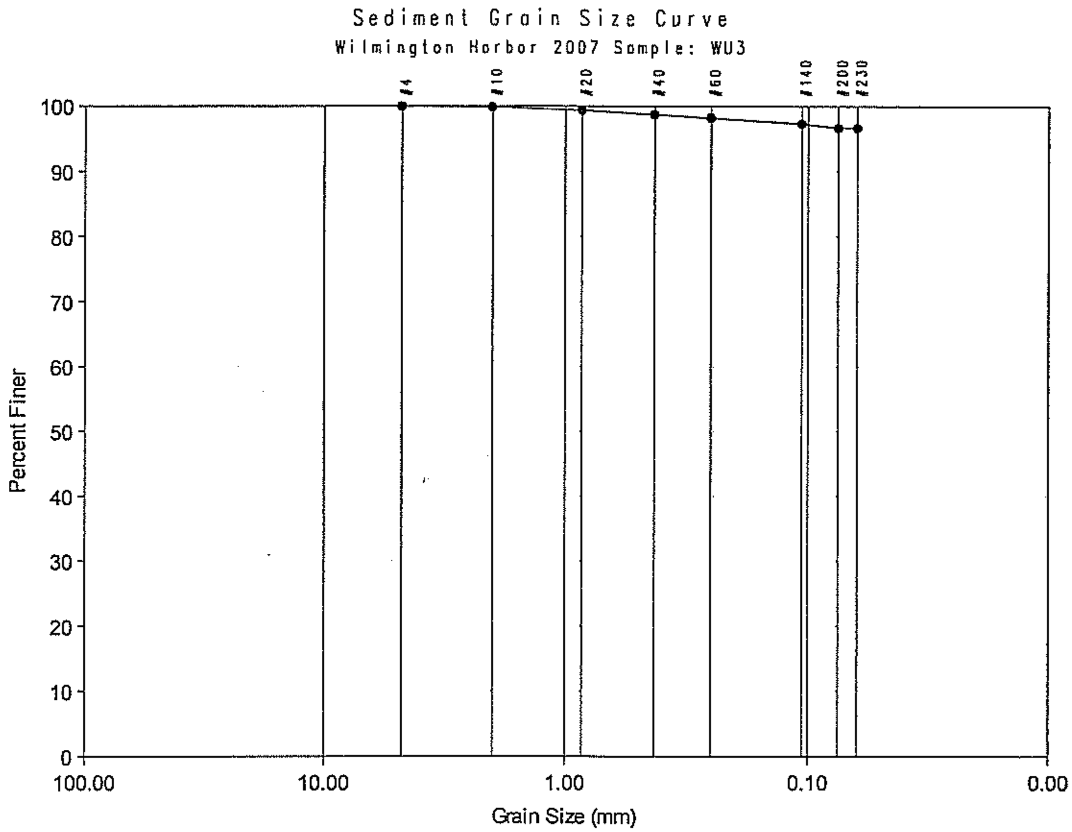

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH6
#4
#10
#20
#40
#60
#140
#200
#230
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

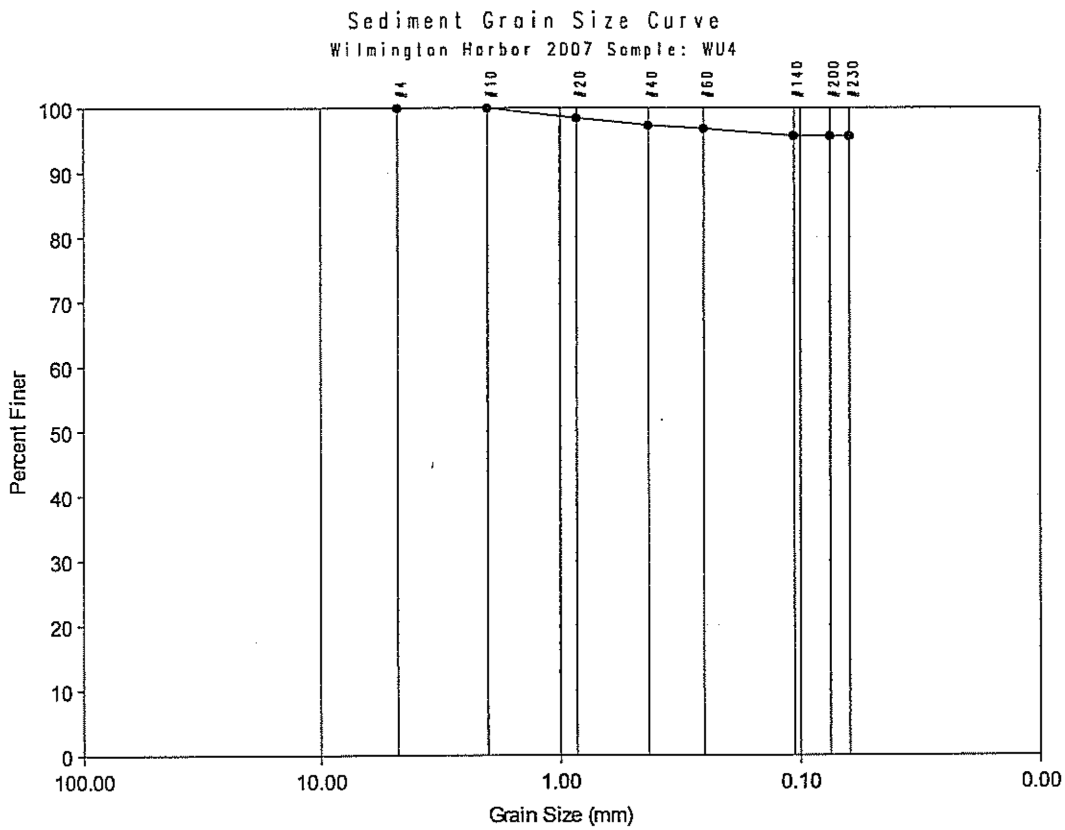

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH7
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WHB
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU1
#4
#10
#20
#40
#50
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU2
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU3
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU4
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

# APPENDIX C

## Core Logs

Grainsize TMG
Photo COC for all
Keys for all
Grab 2 more Coolers

# Wilmington

## Sediment Project

Station #: WH1

Core #'s

Date: 6/6, ~~2007~~ 2008

Tide:

Start Time: 13 : 15

Weather: OC

Composite Time: ___:___

Took 2 drops to achieve target depth

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| 13:15.20 | 43' | 17" | | | 2' | 3 | 40" | |
| | | 19" | | | | 3 | | |
| | | 18" | | | | 3 | 42" | |

Depths measured in feet

Comments\ Descriptions: 24" 6 6" 6" 35"

(10 ft. cores)

3 3 5 2' 35"

Sediment [illegible] muddy, some detritus & a little sandy -

Station at confluence at Drainage Canal took bottom ~~[illegible]~~

Gray

18
24
[illegible]

C-3

C-4

# Wilmington

## Sediment Project

Station #: WH2

Date: 5/6 , ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: OC

every time dropped

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| 12:15, 10 | 36'.5 | 4.5 | | | 5 | 7 | 4.5 | |
| | | 28" | | | | 5 | | |
| | | 24" | | | | 5 | | |
| | | 26" | | | | 4 | | |
| | | 40" | | | | 5 | | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft. cores)

Sediment - Fine mud

C-5

# Wilmington

## Sediment Project

Station #: WH3

Date: 6/6, ~~2007~~ 2008

Start Time: ___:___

Composite Time: ___:___

Core #'s

Tide:

Weather: OC

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core ~~Depth~~ Length | Comments |
|---|---|---|---|---|---|---|---|---|
| | 4.3 | 2' | | | 2' | 6' | 4' | |
| | | | | | | 5 | 2 | |
| | | | | | | 5' | 2 | |

(depths measured in feet)

Comments\ Descriptions: (10 ft. cores)

6 22"
5 2'
6 18"

Sediment = Silt with some debris

# Wilmington

## Sediment Project

Station #: WH4

Date: 6/6 , ~~2007~~ 2008

Start Time: 10:40

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: OC

| | Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 10:38.50 | | 36 | 3.5 | | | 4 | 10' | | |
| 10:54 33 | | | 1.5 | | | | 10 | | |
| | | | 1.5 | | | | 9 | | |
| | | | 1 | | | | 10 | | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft. cores)

14"

Sediment - Fine Mud

18"

16"

18"

C-6

C-7

# Wilmington

## Sediment Project

Station #: WH5

Date: 6/6, ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ________

Tide: ________

Weather: ½ Cloudy

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| 13:55 | 40' | ~~43~~ | | | 4 | 9 | 4.3 | |
| | | ~~18"~~ | | | | 8' | 46" | |
| | | 25" | | | | | 0' | |

Depths measured in feet

Comments\ Descriptions: 25"
26"
18"

( 10 ft. cores)

9

64

Sediment - Fine mud

# Wilmington

## Sediment Project

Station #: WH 6

Date: 6/6, ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ______

Tide: ______

Weather: P ½ cloudy

C-8

| | Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 14:53.48 | | 43" | 50" | | | 2 | 9 | 52" | |
| | | | ~~18"~~ | | | | 8 | 68" | |
| | | | 25" | | | | | | |

Depths measured in feet

Comments\ Descriptions: 30"

( 10 ft. cores)

Sediment – Fine mud

# Wilmington

## Sediment Project

Station #: WH 7

Date: , ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: ½ Cloudy

15:24, 25

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 51' | 70" | | | 2' | 5" | 71" | |
| | | 51" | | | | 3' | 54" | |
| | | 64" | | | | 4" | 67" | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft, cores)

Coarse mud & some sand & gravel

# Wilmington

## Sediment Project

Station #: WH 8

Date: 6/6 , ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: [illegible]

16.11.11

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 41' | ~~61"~~ | | | 5' | 7' | ~~61"~~ | |
| | | ~~52"~~ | | | | 4' | 54" | |
| | | 53" | | | | 8' | 53" | |

Depths measured in feet

( 10 ft. cores)

Comments\ Descriptions:

Sediment fine mud

C-10

# Wilmington

## Sediment Project

Station #: WHU 1

Date: 6/12 ~~2007~~2008

Start Time: 8 :37am

Composite Time: ___:___

Sample taken 160 ft from point

Core #'s ________

Tide: ________

Weather: ~~Cl~~ Sunny

39°

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.354 | 075° 31.734 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment type Silty Clay

C-11

# Wilmington

## Sediment Project

Station #: WHV 2

Date: 6/12 ~~2007~~2008

Start Time: 9 : 35

Composite Time: ____:____

Sample taken 123 ft
from way point

Core #'s ____________

Tide: ____________

Weather: Sunny

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.122 | W 75° 31.425 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment silty creamy peanut butter

Hit water at 3ft depth of sampling

# Wilmington
CDF
# Sediment Project

Station #: WU3

Date: 6-12 , ~~2007~~ 2008

Start Time: 10 : 16

Composite Time: ____:____

189 ft to pt

open area in middle of phrag

Core #'s ________

~~Tide:~~ ________

Weather: Hot

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.368 | 75° 31.479 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft, cores)

38° 39' 42.642
75° ~~75~~° 31.314

# Wilmington

## Sediment Project

Station #: W05

Date: 6 / 12 , ~~2007~~ 2008

Start Time: 11 : 15

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: ____________

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.640 | 75° 31.368 | | 4 | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

( 10 ft. cores)

Comments\ Descriptions:

Next to moat

silty Clay

water filling in hole

C-14

# Wilmington

## Sediment Project

Station #: WD 4

Date: 5/12 ~~2007~~ 2008

Start Time: 12 : 35

Composite Time: ____:____

Core #'s ________

Tide: ________

Weather: Sunny

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.424 | 75° 31.188 | | 4" | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

(10 ft. cores)

Comments\ Descriptions:

Sediment - Silty Clay

C-15

# Wilmington

## Sediment Project

Station #: W06

Date: 6.12 ~~2007~~2008

Start Time: 11:53

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: ____________

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.623 | 75° 31.062 | | ~~4~~ 3 | | |
| | | | | | | | | |
| | | | | | | | | |

depths measured in feet

Comments\ Descriptions: (10 ft. cores)

water about 3' too wet

silty clay

## APPENDIX C

## ANALYTICAL REPORT
## (ON CD)

Phone 856-342-6600 Fax 856-342-8323

# S.T. HUDSON ENGINEERS, INC.

## PROFESSIONAL ENGINEERS & CONSULTANTS

900 Dudley Avenue, Cherry Hill, New Jersey 08002

Visit Our Website at www.STHE.com

# DELAWARE DEPARTMENT OF NATURIAL RESOURCES AND ENVIRONMENTAL CONTROL

APPLICATION FOR AN

# INDIVIDUAL PERMIT

FOR

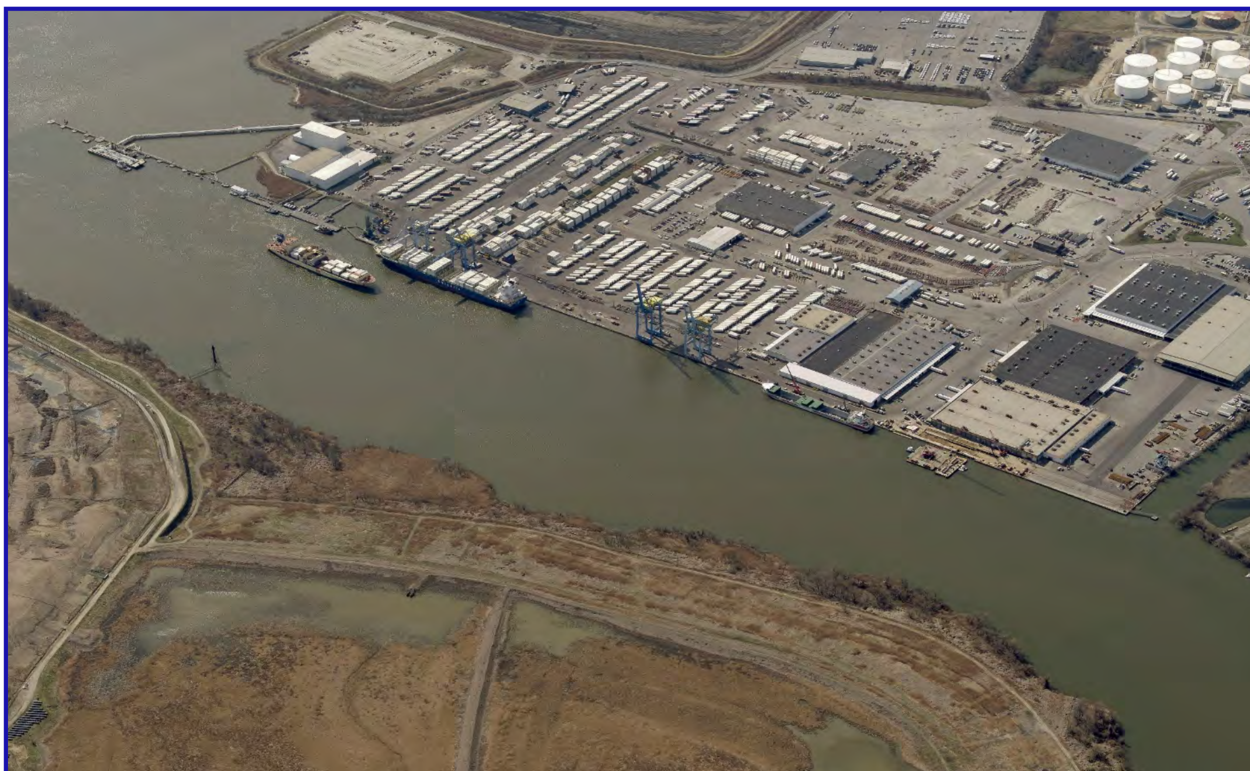
# MAINTENANCE DREDGING

AT THE

# PORT OF WILMINGTON

**ON BEHALF OF**

**DIAMOND STATE PORT CORPORATION**
**1 HAUSEL ROAD**
**WILMINGTON, DE 19801**




**S. T. HUDSON ENGINEERS, INC.**

900 DUDLEY AVENUE
CHERRY HILL, NEW JERSEY 08002
PHONE (856) 342-6600 FAX (856) 342-8323
www.STHE.COM


SEPTEMBER 2020 H-7912

S.T. HUDSON ENGINEERS, INC.
Professional Engineers and Consultants

September 30, 2020

Delaware Dept. of Natural Resources and Environmental Control
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, DE 19901

Attention: Mr. Steve Smailer
Environmental Program Administrator & Section Manager

Reference: Diamond State Port Corporation (Port of Wilmington)

Subject: Joint Permit Application
Maintenance Dredging at Port of Wilmington
Berths 1 - 7

Dear Mr. Smailer:

S. T. Hudson Engineers, Inc. has been retained by Diamond State Port Corporation to assist them in obtaining the necessary approvals for maintenance dredging at the Port of Wilmington, Berths 1 – 7, to occur concurrently with the Christina River Main Channel Maintenance Dredging by the U.S. Army Corps of Engineers.

Herein, please find a complete application for a Wetlands and Subaqueous Lands Permit and a 401 Water Quality Certification.

Included in this submittal is a check in the amount of $1,300.00 made payable to *State of Delaware*.

Should you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Paul T. Ferry

Paul T. Ferry
Environmental Specialist

PTF/mle
Enclosures

H-7912-00

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| **6** | **PREVIOUSLY ISSUED DNREC PERMIT** |
| **7** | **PERMIT DRAWINGS, SAMPLING PLAN, AND U.S. ARMY CORPS OF ENGINEERS DISPOSAL SITE PLANS** |
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| **C** | **ANALYTICAL RESULTS** |

# SECTION 1

## PROJECT DESCRIPTION, LOCATION PLAN
## AND
## AERIAL PHOTOGRAPH

# SECTION 1

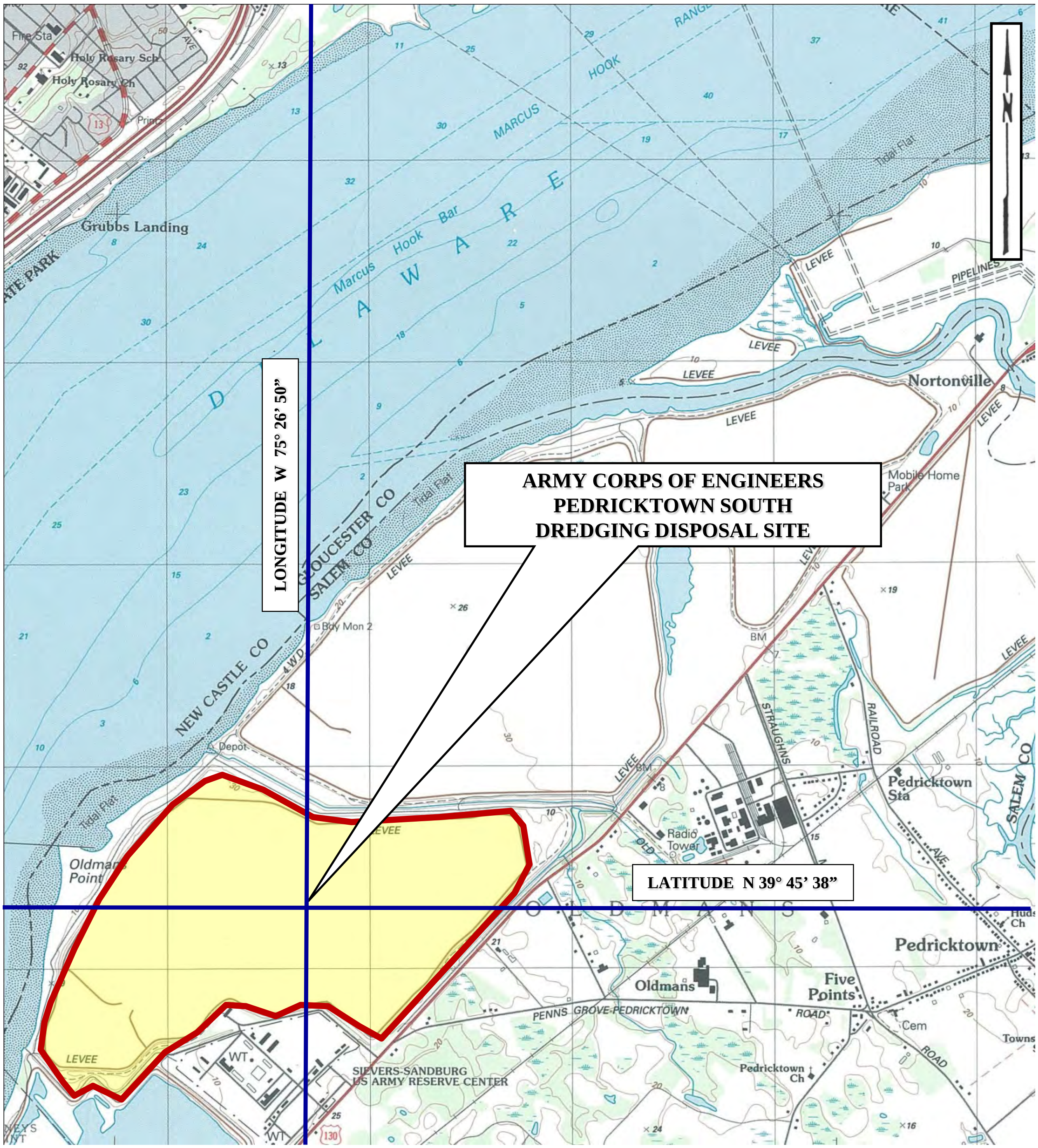
## PROJECT DESCRIPTION

GT USA Wilmington LLC dba Diamond State Port Corporation proposes to conduct maintenance dredging at the Port of Wilmington Berths 1 through 7 located in Wilmington, DE.

Dredging will occur hydraulically to a depth of -35 feet Mean Low Water plus an allowable 2-foot of overdredge for Berths 5-7, and -38 feet Mean Low Water plus an allowable -2 foot of overdredge for Berths 1-4. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event for ten (10) years. Dredged material will be pumped in a slurry via pipeline to the Pedricktown South and/or Wilmington Harbor South Confined Disposal Facilities in Oldmans Township, Salem County, New Jersey and Wilmington Delaware, both of which are operated by the U.S. Army Corps of Engineers.

Material to be dredged is similar in nature and composition to material that has been removed regularly from the project area and adjacent main channel of the Christina River by the U.S. Army Corps of Engineers. Sampling results and methodology from previous dredging projects are included in Appendix A and Appendix B of this application.

The Christina River navigational channel is dredged regularly by the U.S. Army Corps of Engineers and dredging for this project will occur concurrently with main channel dredging.




# PROJECT SITE LOCATION MAP

UNITED STATES GEOLOGIC SURVEY QUADRANGLE

MARCUS HOOK, PA – NJ - DEL

SCALE: N.T.S.

H-7912-00

S. T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS


**AERIAL PHOTO OF THE WILMINGTON HARBOR SOUTH CONFINED DISPOSAL FACILITY**

# SECTION 2

# BASIC APPLICATION FORM
# WITH
# APPENDIX R

# WETLANDS AND SUBAQUEOUS LANDS SECTION PERMIT APPLICATION FORM

## For Subaqueous Lands, Wetlands, Marina and 401 Water Quality Certification Projects

## State of Delaware
## Department of Natural Resources and Environmental Control
## Division of Water

## Wetlands and Subaqueous Lands Section

APPLICATION FOR APPROVAL OF
SUBAQUEOUS LANDS, WETLANDS, MARINA
AND WATER QUALITY CERTIFICATION PROJECTS

Last Revised on: March 28, 2017

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

**Application Instructions:**

1. Complete each section of this basic application and appropriate appendices as thoroughly and accurately as possible. Incomplete or inaccurate applications will be returned.

2. All applications must be accompanied by a scaled plan view and cross-section view plans that show the location and design details for the proposed project. Full construction plans must be submitted for major projects.

3. All applications must have an original signature page and proof of ownership or permitted land use agreement.

4. Submit an original and two (2) additional copies of the application (total of 3) with the appropriate application fee and public notice fee* (prepared in separate checks) to:

**Department of Natural Resources and Environmental Control**
**Wetlands and Subaqueous Lands Section**
**89 Kings Highway**
**Dover, Delaware 19901**

*Application and public notice fees are non-refundable regardless of the Permit decision or application status.

5. No construction may begin at the project site before written approval has been received from this office.

**Helpful Information:**

| | | |
|---|---|---|
| 1. Tax Parcel Information: | New Castle County | (302) 395-5400 |
| | Kent County | (302) 736-2010 |
| | Sussex County | (302) 855-7878 |
| 2. Recorder of Deeds: | New Castle County | (302) 571-7550 |
| | Kent County | (302) 744-2314 |
| | Sussex County | (302) 855-7785 |

3. A separate application and/or approval may be required through the Army Corps of Engineers. Applicants are strongly encouraged to contact the Corps for a determination of their permitting requirements. For more information, contact the Philadelphia District Regulator of the Day at (215) 656-6728 or visit their website at: http://www.nap.usace.army.mil/Missions/Regulatory.aspx.

4. For questions about this application or the Wetlands and Subaqueous Lands Section, contact us at (302) 739-9943 or visit our website at:
http://www.dnrec.delaware.gov/wr/Services/Pages/WetlandsAndSubaqueousLands.aspx.
Office hours are Monday through Friday 8:00 AM to 4:30 PM, except on State Holidays.

# APPLICANT'S REVIEW BEFORE MAILING

**DID YOU COMPLETE THE FOLLOWING?**

| | | |
|---|---|---|
| ___X___ | Yes | BASIC APPLICATION |
| ___X___ | Yes | SIGNATURE PAGE (Page 3) |
| ___X___ | Yes | APPLICABLE APPENDICES |
| ___X___ | Yes | SCALED PLAN VIEW |
| ___X___ | Yes | SCALED CROSS-SECTION OR ELEVATION VIEW PLANS |
| ___X___ | Yes | VICINITY MAP |
| ___**___ | Yes | COPY OF THE PROPERTY DEED & SURVEY |
| ___X___ | Yes | THREE (3) COMPLETE COPIES OF THE APPLICATION PACKET |
| ___X___ | Yes | APPROPRIATE APPLICATION FEE & PUBLIC NOTICE FEE (Separate checks made payable to the State of Delaware) |

**Submit 3 complete copies of the application packet to:**

**Department of Natural Resources and Environmental Control**
**Wetlands and Subaqueous Lands Section**
**89 Kings Highway**
**Dover, Delaware 19901**

**Before signing and mailing your application packet, please read the following:**

The Department requests that the contractor or party who will perform the construction of your proposed project, if other than the applicant, sign the application signature page along with the applicant in the spaces provided. When the application is signed by the contractor as well as the applicant, the Department will issue the Permit to both parties. For Leases, the contractor will receive a separate construction authorization that will make them subject to all of the terms and conditions of the Lease relating to the construction

**ON FILE WITH DNREC

**Section 1: Applicant Identification**

1. Applicant's Name: Diamond State Port Corporation
   Mailing Address: 1 Hausel Road
   Wilmington, DE 19801

   Telephone #: 302-571-4600
   Fax #:
   E-mail: GBailey@port.state.de.us

2. Consultant's Name: Paul Ferry
   Mailing Address: 900 Dudley Avenue
   Cherry Hill, NJ 08002

   Company Name: S. T. Hudson Engineers, Inc.
   Telephone #: 856-342-6600
   Fax #:
   E-mail: pferry@sthe.com

3. Contractor's Name:
   Mailing Address:

   Company Name:
   Telephone #:
   Fax #:
   E-mail:

**Section 2: Project Description**

4. Check those that apply:

☐ New Project/addition to existing project? ☐ Repair/Replace existing structure? (If checked, must answer #16)

The applicant seeks to conduct maintenance dredging at the Port of Wilmington on the Christina River. Dredging will occur to a depth of -38 feet MLW for Berths 1-4 and -35 feet MLW for Berths 5-7, plus 2 feet allowable overdredge. Dredging will be conducted hydraulically and disposed of at either the Pedricktown South or the Wilmington Harbor South confined disposal facilities operated by the U.S. Army Corps of Engineers. The applicant seeks permission to dredge up to 75,000 cubic yards of material per year for 10 years.

6. Check each Appendix that is enclosed with this application:

| | | | | | |
|---|---|---|---|---|---|
| | A. Boat Docking Facilities | | G. Bulkheads | | N. Preliminary Marina Checklist |
| | B. Boat Ramps | | H. Fill | | O. Marinas |
| | C. Road Crossings | | I. Rip-Rap Sills and Revetments | | P. Stormwater Management |
| | D. Channel Modifications/Dams | | J. Vegetative Stabilization | | Q. Ponds and Impoundments |
| | E. Utility Crossings | | K. Jetties, Groins, Breakwaters | X | R. Maintenance Dredging |
| | F. Intake or Outfall Structures | | M. Activities in State Wetlands | | S. New Dredging |

**Section 3: Project Location**

7. Project Site Address: 1 Hausel Road
   Wilmington, DE 19801

County: ☒ N.C. ☐ Kent ☐ Sussex
Site owner name (if different from applicant):
Address of site owner:

8. Driving Directions: I-495 to Exit 2 - Terminal Avenue east to port entrance

(Attach a vicinity map identifying road names and the project location)

9. Tax Parcel ID Number: 2606700003 Subdivision Name: N/A

**WSLS Use Only:** **Permit #s:** ____ ____ ____ ____
**Type** **SP** ☐ **SL** ☐ **SU** ☐ **WE** ☐ **WQ** ☐ **LA** ☐ **SA** ☐ **MP** ☐ **WA** ☐

**Corps Permit: SPGP 18** ☐ **20** ☐ **Nationwide Permit #:** ____ **Individual Permit #** ____
**Received Date:** ____ **Project Scientist:** ____
**Fee Received? Yes** ☐ **No** ☐ **Amt: $** ____ **Receipt #:** ____
**Public Notice #:** ____ **Public Notice Dates: ON** ____ **OFF** ____

**Section 3: Project Location (Continued)**

10. Name of waterbody at Project Location: Christina River waterbody is a tributary to: Delaware River

11. Is the waterbody: ☒ Tidal ☐ Non-tidal Waterbody width at mean low or ordinary high water Approx. 1,000 ft.

12. Is the project: ☒ On public subaqueous lands? ☐ On private subaqueous lands?*
☐ In State-regulated wetlands? ☐ In Federally-regulated wetlands?

*If the project is on private subaqueous lands, provide the name of the subaqueous lands owner:

(Written permission from the private subaqueous lands owner must be included with this application)

13. Present Zoning: ☐ Agricultural ☐ Residential ☐ Commercial ☒ Industrial ☐ Other

**Section 4: Miscellaneous**

14. A. List the names and complete mailing addresses of the immediately adjoining property owners on all sides of the project (attach additional sheets as necessary):
ALMA PROPERTIES LLC - 601 CHRISTIANA AVE, WILMINGTON, DE 19801
273 PROPERTIES LLC - 721 TERMINAL AVE, WILMINGTON, DE 19801
PORT CONTRACTORS INC - 341 PIGEON POINT RD, NEW CASTLE, DE 19720
MAGELLAN TERMINALS HOLDINGS LP - 1050 CHRISTIANA AVE, WILMINGTON, DE 19801

B. For wetlands and marina projects, list the names and complete mailing addresses of property owners within a 1,000 foot radius of the project (attach additional sheets as necessary):
N/A

15. Provide the names of DNREC and/or Army Corps of Engineers representatives whom you have discussed the project with:

A. Have you had a State Jurisdictional Determination performed on the property? ☐ Yes ☒ No
B. Has the project been reviewed in a monthly Joint Permit Processing Meeting? ☐ Yes ☒ No
*If yes, what was the date of the meeting?

16. Are there existing structures or fill at the project site in subaqueous lands? ☒ Yes ☐ No
*If yes, provide the permit and/or lease number(s):
LA-073/13

*If no, were structures and/or fill in place prior to 1969? ☐ Yes ☐ No

17. Have you applied for or obtained a Federal permit from the Army Corps of Engineers?
☐ No ☒ Pending ☐ Issued ☐ Denied Date:

Type of Permit: Individual Permit Federal Permit or ID #:

18. Have you applied for permits from other Sections within DNREC?
☒ No ☐ Pending ☐ Issued ☐ Denied Date: Permit or ID #:

Type of permit (circle all that apply): Septic Well NPDES Storm Water

Other:

**Section 5: Signature Page**

19. Agent Authorization:

If you choose to complete this section, all future correspondence to the Department may be signed by the duly authorized agent. In addition, the agent will become the primary point of contact for all correspondence from the Department.

I do not wish to authorize an agent to act on my behalf ☐

I wish to authorize an agent as indicated below ☒

I, Gene Bailey /Diamond State Port Corp. hereby designate and authorize Paul Ferry / S. T. Hudson Engineers, Inc.
(Name of Applicant) (Name of Agent)
to act on my behalf in the processing of this application and to furnish any additional information requested by the Department.

Authorized Agent's Name: S. T. Hudson Engineers, Inc.
Mailing Address: 900 Dudley Avenue
Cherry Hill, NJ 08002

Telephone #: 856-342-6600
Fax #: 856-342-8323
E-mail: pferry@sthe.com

20. Agent's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Paul Ferry
Agent's Signature

9/29/2020
Date

21. Applicant's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application. I grant permission to authorized Department representatives to enter upon the premises for inspection purposes during working hours.

Eugene Bailey
Applicant's Signature

09/09/2020
Date

EUGENE BAILEY
Print Name

22. Contractor's Signature:

I hereby certify that the information on this form and on the attached plans are true and accurate to the best of my knowledge, and that I am required to inform the Department of any changes or updates to the information provided in this application. I further understand that the Department may request information in addition to that set forth herein if deemed necessary to appropriately consider this application.

Contractor's Name

Date

Print Name

## MAINTENANCE DREDGING OR EXCAVATING

- If dredged material is to be placed in a disposal site, a separate map showing the location of the disposal site should be attached. This drawing must indicate the proposed retention levees, weirs, spillways, and/or devices for retaining the materials.

- Bottom samples to determine heavy metals or other toxic materials must be taken and analyzed if deemed necessary by the DNREC staff. The responsibility, as well as the expense incurred for obtaining and analyzing these samples, must be borne by the applicant.

- If maintenance dredging is to be done, evidence of previous dredging must be provided. Any previously issued permit with drawings which indicates the date the dredging occurred, the area involved and dredging depth constitutes acceptable proof.

- Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

1. How many cubic yards of material will be MAINTENANCE DREDGED or excavated channelward of the:

   a. Tidal waters: mean high water line? **75,000** cu. yds.
      mean low water line? **75,000** cu. yds.
   b. Non-tidal waters: ordinary high water line? **n/a** cu. yds.

Does this account for the total volume of proposed dredging for the project? **X** Yes ____ No
If there is new dredging associated with this project (dredging beyond previously authorized dimensions) please fill out appendix S for new dredging.

2. What will be the dimensions of the dredged or excavated area relative to mean low water (for tidal areas only) or ordinary water level (for non-tidal areas only)?
   **1-mile** length **-35/-38 ft.** depth _____ base width **50/100 ft.** top width

3. What are average existing depths in area of proposed dredging? **30-35** ft. (mlw)
   Include a survey of proposed and existing depths on application drawings.

4. What is the proposed dredging depth in relation to surrounding bathymetry? **-35/-38 + 2** ft.(mlw/ohw)
   Indicate both proposed depths and surrounding depths on attached drawings.

5. By what method(s) (hydraulic, clamshell or other) will the dredging be done? ***Hydraulic*** If other, explain:

6. What is proximity of the dredging project to the nearest creek bank or banks? **0** ft.
   What are existing land uses along this bank(s)?

   ***Existing land use is a port.***

   Describe the existing shoreline along this bank (vegetation, rip-rap, bulkhead, etc.).

   ***The bank is not vegetated. It is a port with a constructed shoreline.***

7. Describe characteristics of the material to be disposed including:

   a. Physical nature of material (i.e. sand, silt, clay, etc.). Give percentages of various fractions if available.

      ***Material is over 90% silt. Exact results of our grain size analysis can be found in Appendix C, while historical results can be found in Appendices A and B.***

   b. Chemical composition of material - Many areas have sediments with high concentration of pollutants (chemicals, organics etc.) which may be re-suspended or reintroduced into the water. For heavily industrialized sites, a chemical analysis of this material should be provided (if applicable).

      ***Sediment analysis comparative tables are included in Section 4, while the raw analytical data can be found in Appendix C (on enclosed CD).***

   c. What are the dewatering properties of material to be disposal of?

      ***Dredged material is expected to be predominantly fine-grained and fairly hydrophilic. Settling is expected to take at least 24 hours before discharge of decant water is possible.***

8. How will the dredged or excavated material be transported to its disposal area?

   ***The dredge material will be pumped in a slurry through a steel pipeline on floated pontoons with various anchor locations, where it will be discharged. The dredging contractor will submerge the pipeline across the navigation channel. If the submerged line is to be placed across a navigable channel, the contractor must submit a request for approval at least ten working days prior to the U.S. Coast Guard. The total distance from the dredge area to the Pedricktown South disposal area is approximately 31,000 feet. The Wilmington Harbor South confined disposal facility, on the other hand, is directly south of the Port of Wilmington, and would be the preferred disposal facility as long as enough freeboard is available at the time dredging will take place.***

   ***Dredged material would be transported via a slurry through a floated steel pipeline, allowing for solids to settle out before releasing the decant water through a weir. Once the slurry is pumped to the disposal facility, the solids in the slurry will undergo settlement, while the decant water will be discharged via a weir should water levels approach the capacity of the disposal site. Otherwise, the water portion of the slurry will be lost to evaporation and infiltration.***

9. Land Disposal Areas.

   a. Describe dimensions, characteristics and exact locations of the proposed dredged material disposal site (provide photographs, directions to, and complete plans of disposal site).

      ***Aerial depictions of the Wilmington Harbor South and Pedricktown South disposal facilities can be found in Section 1 of this application.***

   b. Describe method of dredged material containment (embankment, behind bulkhead, etc.)

      ***The disposal sites provide containment via dikes/embankments.***

   c. What type of leachates will be produced by the spoil material and what is planned for the protection of groundwater?

      ***The Toxicity Characteristic Leaching Procedure simulates the effects of rainfall on leachate of the dredge material. The leachate characteristics of the material are included in Section 4 and Appendix C of this application.***

   d. Pedricktown South disposal site coordinates: 39°45'39.5" N, 75°26'58.8" W

      Wilmington Harbor South disposal site coordinates: 39°42'22.2" N, 75°31'19.6" W

   e. What methods will be used to ensure that spoil water does not adversely affect water quality both during construction and after completion of the project?

      ***The dredge board stop logs will be maintained at the highest level possible to provide maximum retention time without jeopardizing dike stability. Both the contractor and the Army Corps of Engineers will perform daily on-site inspections of the disposal site weir structure and dikes to ensure that discharge back to the river meets State of Delaware water quality criteria. The contract will record daily discharge readings and keep all pipelines in good condition at all times. Any leaks or breaks along the length of the pipeline shall result in non-activity until a repair is made. Slurry will be held within the confined disposal facilities for a minimum of 24 hours. Exact retention time depends on cell capacity, temperature, wind speed and direction, dredge size, work production and the physical characteristics of the material.***

   f. Describe present land use of the disposal site.

      ***It is currently a disposal site, operated by the U.S. Army Corps of Engineers.***

10. Water Disposal Areas/ Beneficial Use Projects
    Describe methods to be used for water disposal including volumes and site selection, and containment (if applicable). Include Fill or Wetland Appendix if applicable.

    ***This is not applicable because there will be no water disposal.***

11. Describe the existing water characteristics at the site, including chemical analysis for water quality.

    ***The project area is within the migrating salt front of the Delaware River. As a result, water here is typically brackish but salinity varies by tidal stage and freshwater discharge rate. Site water was analyzed, and results are included within a spreadsheet in Appendix C.***

12. Identify the dredging and disposal schedule to ensure that operations do not degrade water quality during times of anadromous fish migration.

    ***The applicant will comply with the standard annual anadromous fish restriction timeline.***

13. Has an Erosion and Sediment Control Plan been approved by the designated plan approval agency for the project? An Erosion and Sediment Control Plan is required for any project disturbing more than 5,000 square feet of uplands. Final approved plans must be received by this office prior to permit issuance.

    ***Not required, since there is no work in the uplands.***

**Important time of year restriction information:**

Please be advised that all dredging in the Inland Bays must be undertaken between September 1 and December 31 in order to protect summer and winter flounder and other aquatic species. Dredging in other Delaware waters may also be subject to certain time of year restrictions in order to protect fish and wildlife. Contact DNREC for more specific information regarding the restrictions that may apply within your project area.

# SECTION 3

# COASTAL ZONE MANAGEMENT ACT
# FEDERAL CONSISTENCY FORM
# AND
# ADDENDUM

Delaware Department of Natural Resources and
Environmental Control
Delaware Coastal Management Program

Initial Review: ________
Updated On: ________
Complete: ________
Official Use Only

# Coastal Zone Management Act Federal Consistency Form

This document provides the Delaware Coastal Management Program (DCMP) with a Federal Consistency Determination or Certification for activities regulated under the Coastal Zone Management Act of 1972, as amended, and NOAA's Federal Consistency Regulations, 15 C.F.R. Part 930. Federal agencies and other applicants for federal consistency are not required to use this form; it is provided to applicants to facilitate the submission of a Consistency Determination or Consistency Certification. In addition, federal agencies and applicants are only required to provide the information required by NOAA's Federal Consistency Regulations.

| | |
|---|---|
| **Project/Activity Name:** | Port of Wilmington Maintenance Dredging |

## I. Federal Agency or Non-Federal Applicant Contact Information:

Contact Name/Title: Eugene Bailey (Diamond State Port Corporation)

Federal Agency Contractor Name (if applicable): ________

Federal Agency: U.S. Army Corps of Engineers
(either the federal agency proposing an action or the federal agency issuing a federal license/permit or financial assistance to a non-federal applicant)

Mailing Address: 1 Hausel Road

City: Wilmington State: DE Zip Code: 19801

E-mail: GBailey@port.state.de.us Telephone #: 302-571-4600

## II. Federal Consistency Category:

- ○ Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)
- ○ Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)
- ○ Federal Financial Assistance (15 C.F.R. Part 930, Subpart F)
- ○ Federal License or Permit Activity (15 C.F.R. Part 930, Subpart D)
- ○ Federal License or Permit Activity which occurs wholly in another state (interstate consistency activities identified in DCMP's Policy document)

## III. Detailed Project Description (attach additional sheets if necessary):

Diamond State Port Corporation proposes to conduct maintenance dredging at the Port of Wilmington Berths 1 through 7. Dredging will occur hydraulically to a depth of -35 feet Mean Low Water plus an allowable 2 feet of overdredge for Berths 5-7, and -38 feet Mean Low Water plus an allowable -2 feet of overdredge for Berths 1-4. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event for ten (10) years. Dredged material will be pumped in a slurry via pipeline to the Pedricktown South Confined Disposal Facility in Oldmans Township, Salem County, NJ or the Wilmington Harbor South Confined Disposal Facility in Wilmington, DE, both of which are operated by the U.S. Army Corps of Engineers.

The Christina River navigational channel is dredged regularly by the U.S. Army Corps of Engineers and dredging for this project will occur concurrently with main channel dredging.

## IV. **General Analysis of Coastal Effects** (attach additional sheets if necessary):

Dredging occurs frequently within the project area and adjacent channel, so new coastal effects are not anticipated. Dredging may result in an increase in turbidity during and immediately after the activity takes place. Turbidity increases are unknown, however, since this is a tidal area that is close to the mouth of the Delaware River, mixing and dispersion will occur rapidly. Turbidity may result in a decrease in photosynthetic activity along with disturbance to fish. Motile organisms will likely avoid the dredging area, while filter-feeders in the surrounding area may be negatively affected. Any immobile benthic organisms in the project area will be entrained.

## V. **Detailed Analysis of Consistency with DCMP Enforceable Policies** (attach additional sheets if necessary):

**Policy 5.1: Wetlands Management**

Not applicable, no wetlands present on site.

**Policy 5.2: Beach Management**

Not applicable, no beaches present on site.

**Policy 5.3: Coastal Waters Management** (includes wells, water supply, and stormwater management. Attach additional sheets if necessary)

Please see addendum attached.

**Policy 5.4: Subaqueous Land and Coastal Strip Management**

Please see addendum attached.

**Policy 5.5: Public Lands Management**

Not applicable, no public lands management takes place within the project area.

**Policy 5.6: Natural Lands Management**

Not applicable as there are no designated natural areas within the site.

**Policy 5.7: Flood Hazard Areas Management**

Not applicable. The entire project area is submerged therefore it is not within a flood hazard area.

**Policy 5.8: Port of Wilmington**

Please see addendum attached.

**Policy 5.9: Woodlands and Agricultural Lands Management**

Not applicable. No woodlands or agricultural lands on site.

**Policy 5.10: Historic and Cultural Areas Management**

Not applicable. No historic or cultural areas on site.

**Policy 5.11: Living Resources**

Please see addendum attached.

**Policy 5.12 Mineral Resources Management**

Not applicable. No mineral resources managed on site.

**Policy 5.13: State Owned Coastal Recreation and Conservation**

Please see addendum attached.

**Policy 5.14: Public Trust Doctrine**

Not applicable. This rule mainly applies to regulators.

**Policy 5.15: Energy Facilities**

Not applicable. This rule does not apply as the project area does not represent an energy facility.

**Policy 5.16: Public Investment**

This rule does not apply as the project does not involve public investment.

**Policy 5.17: Recreation and Tourism**

Not applicable. This policy does apply as the project does not involve the promotion or development of recreation and/or tourism.

**Policy 5.18: National Defense and Aerospace Facilities**

Not applicable. No national defense or aerospace facilities on site.

**Policy 5.19: Transportation Facilities**

Please see addendum attached.

**Policy 5.20: Air Quality Management**

Not applicable as this project does not affect air quality to the extent of being regulated.

**Policy 5.21: Water Supply Management**

Not applicable as this project does not concern public water supply.

**Policy 5.22: Waste Disposal Management**

Not applicable as this project does not concern waste disposal management.

**Policy 5.23: Development**

Not applicable. This rule does not apply as the project does not involve any new development.

**Policy 5.24: Pollution Prevention**

Please see addendum attached.

**Policy 5.25: Coastal Management Coordination**

No applicable. This rule applies to state agencies only.

**VI. JPP and RAS Review** (Check all that apply)**:**

Has the project been reviewed in a monthly Joint Permit Processing and/or Regulatory Advisory Service meeting?

☐ JPP ☐ RAS ☒ None

*If yes, provide the date of the meeting(s): ______________________________

**VII. Statement of Certification/Determination and Signature** (Check one and sign below):

☐ **FEDERAL AGENCY CONSISTENCY DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program.

OR

☐ **FEDERAL AGENCY NEGATIVE DETERMINATION.** Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity will not have any reasonably foreseeable effects on Delaware's coastal uses or resources (Negative Determination) and is therefore consistent with the enforceable policies of the Delaware Coastal Management Program.

OR

☒ **NON-FEDERAL APPLICANT'S CONSISTENCY CERTIFICATION.** Based upon the information, data, and analysis included herein, the non-federal applicant for a federal license or permit, or state or local government agency applying for federal funding, listed in (I) above, finds that this proposed activity complies with the enforceable policies of the Delaware Coastal Management Program and will be conducted in a manner consistent with such program.

| | | | |
|---|---|---|---|
| Signature: | Eugene Bailey | | |
| Printed Name: | Eugene Bailey | Date: | 09/09/2020 |

Pursuant to 15 C.F.R. Part 930, the Delaware Coastal Management Program must provide its concurrence with or objection to this consistency determination or consistency certification in accordance with the deadlines listed below. Concurrence will be presumed if the state's response is not received within the allowable timeframe.

**Federal Consistency Review Deadlines:**

| | |
|---|---|
| Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C) | 60 days with option to extend an additional 15 days or stay review (15 C.F.R. § 930.41) |
| Federal License or Permit (15 C.F.R. Part 930, Subpart D) | Six months, with a status letter at three months. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.63) |
| Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E) | Six months, with a status letter at three months. If three month status letter not issued, then concurrence presumed. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.78) |
| Federal Financial Assistance to State or Local Governments (15 C.F.R. Part 930, Subpart F) | State Clearinghouse schedule |

**OFFICIAL USE ONLY:**

| | | |
|---|---|---|
| Reviewed By: | Fed Con ID: | Date Received: |
| Public notice dates: to | Comments Received: ☐ NO ☐ YES *[attach comments]* | |
| Decision type: (objections or conditions attach details) | Decision Date: | |



H-7912

# SECTION 3

# COASTAL ZONE MANAGEMENT ACT FEDERAL CONSISTENCY FORM ADDENDUM

## 5.3 COASTAL WATERS MANAGEMENT

5.3.1.1 The development and utilization of the land and water resources of the State shall be regulated to ensure that water resources are employed for beneficial uses and not wasted, to protect beneficial uses of water resources, and to assure adequate water resources for the future. [7 Del.C. §6001 (a)(2)(3)]

***Response:*** ***Since the continued operation of the Port of Wilmington, an economic focal point of the Delaware economy, is dependent upon this project's completion, this project constitutes a beneficial use.***

5.3.1.2 The water resources of the State shall be protected from pollution which may threaten the safety and health of the general public. [7 Del.C. §§6001 (a)(5)(c)(2)]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.3 The coastal water resources of the State shall be protected and conserved to assure continued availability for public recreational purposes and for the conservation of aquatic life and wildlife. [7 Del.C. §6001(a)(4)]

***Response:*** ***Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.4 It is the policy of the DNREC to maintain within its jurisdiction surface waters of the State of satisfactory quality consistent with public health and public recreation purposes, the propagation and protection of fish and aquatic life, and other beneficial uses of the water. [7 DE Admin. Code 7401 subsection 1.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.5 The designated uses applicable to the various stream basins represent the categories of beneficial use of waters of the State which must be maintained and protected through application of appropriate criteria. Such uses shall include public water supply; industrial water supply; primary contact recreation involving any water-based form of recreation, the practice of which has a high probability for total body immersion or ingestion of water such as swimming and water skiing; secondary contact recreation involving a water-based form of recreation, the practice of which has a low probability for total body immersion or ingestion of water such as wading, boating and fishing; maintenance, protection and propagation of fish, shellfish, aquatic life and wildlife preservation; agricultural water supply; and waters of exceptional recreational or ecological significance (ERES waters). [7 DE Admin. Code 7401 Sections 2.0 and 3.0]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources. Opportunities for public recreation will not be affected by this project. It is the priority of the applicant to conduct this project in a manner which will minimize or eliminate any detriment to aquatic life and wildlife.***

5.3.1.6 Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Degradation of water quality in such a manner that results in reduced number, quality, or river or stream mileage of existing uses shall be prohibited. Degradation shall be defined for the purposes of this section as a statistically significant reduction, accounting for natural variations, in biological, chemical, or habitat quality as measured or predicted using appropriate assessment protocols. [7 DE Admin. Code 7401 subsection 5.1]

***Response:*** ***Dredged material has been analyzed for pollutants in accordance with this rule. Furthermore, it is the priority of the applicant to complete this project in a way that minimizes the release of potential contaminants into the State's water resources.***

5.3.1.7 Where the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that water quality shall be maintained and protected. In the case of E.R.E.S. waters, existing quality shall be maintained or enhanced. Limited degradation may be allowed if the DNREC finds, after review, that allowing lower water quality would result in a substantial net environmental or public health benefit and does not impede existing uses in the area in which the waters are located In while allowing for full protection of existing uses. [7 DE Admin. Code 7401 subsections 5.2 and 5.6]

***Response:*** ***The Christina River is not an E.R.E.S. waterbody, therefore this does not apply.***

5.3.1.8 Where high quality waters constitute an outstanding national resource, such as waters of national parks and wildlife refuges, existing quality shall be maintained and protected. [7 DE Admin. Code 7401 subsection 5.3]

***Response:*** ***The project area does not lie within a national park or wildlife refuge, therefore this rule does not apply.***

5.3.1.9 In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Water Quality Act of 1987. [7 DE Admin. Code 7401 subsection 5.4]

***Response:*** ***No thermal discharges are associated with this project.***

5.3.1.10 All surface waters of the State shall be free from substances that are attributable to wastes of industrial, municipal, agricultural or other human-induced origin. Examples include but are not limited to the following:

5.3.1.10.1 Floating debris, oil, grease, scum, foam, or other materials on the water surface that may create a nuisance condition, or that may in any water interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.2 Settleable solids, sediments, sludge deposits, or suspended particles that may coat or cover submerged surfaces and create a nuisance condition, or that may in any way interfere with attainment and maintenance of designated uses of the water.

5.3.1.10.3 Any pollutants, including those of a thermal, toxic, corrosive, bacteriological, radiological, or other nature that may interfere with attainment and maintenance of designated uses of the water, may impart undesirable odors, tastes, or colors to the water or to aquatic life found therein, may endanger public health, or may result in dominance of nuisance species. [7 DE Admin. Code 7401 subsection 4.1]

***Response:*** ***It is the priority of the applicant to minimize the release of settleable solids and suspended sediment that is typically a result of dredging. While it is not possible to completely eliminate it, hydraulic dredging typically minimizes the resuspension of sediment within the water column. Hydraulic dredging will be conducted in a controlled manner and the process will be observed by attendants at the surface to ensure that activities do not result in an unforeseen release of sediment into the water column. If this should occur, dredging will halt until turbidity dissipates and the dredger and line will be inspected for defects.***

5.3.1.11 Regulatory mixing zones shall not impinge upon areas of special importance, including but not limited to drinking water supply intakes, nursery areas for aquatic life or waterfowl, approved or conditional shellfish areas or heavily utilized primary contact recreation areas. Zones shall not be located in such a manner as to interfere with passage of fishes or other organisms. Shore-hugging plumes should be avoided to the maximum extent practicable. In areas where multiple discharges are located in proximity, overlapping discharge plumes may occur. In such instances, the thermal mixing zone, which is not to exceed 25% of the cross-sectional area of the receiving water as measured from the point of discharge to the opposite shore, may be reduced to preclude acute toxicity in the overlap areas, or to ensure an adequate zone of passage for fish. [7 DE Admin. Code 7401 subsections 6.2 and 6.4]

***Response:*** ***This rule does not apply as there is no discharge associated with a mandated mixing zone.***

5.3.1.12 Streams with a designated use of public water supply shall provide waters of acceptable quality for use for drinking, culinary or food processing purposes after application of approved treatment equivalent to coagulation, filtration, and disinfection (with additional treatment as necessary to remove naturally occurring impurities). Water shall be free from substances (except natural impurities) that, alone or in combination with other substrates, result in:

5.3.1.12.1 Unacceptable levels of taste or odor in the treated water;
5.3.1.12.2 Significant disruption of the treatment processes at the treatment facility; or
5.3.1.12.3 Concentrations of toxic substances in the treated water that may be harmful to human health. [7 DE Admin. Code 7401 subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.13 Designated exceptional recreational or ecological significance (ERES) waters shall be accorded a level of protection and monitoring in excess of that provided most other waters of the State. These waters are recognized as special natural assets of the State, and must be protected and enhanced for the benefit of present and future generations of Delawareans. [7 DE Admin. Code 7401 subsection 5.6.1.1]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.14 ERES waters shall be restored, to the maximum extent practicable, to their natural condition. To this end, the DNREC shall, through adoption of a pollution control strategy for each ERES stream basin, take appropriate action to cause the systematic control, reduction, or removal of existing pollution sources, and the diversion of new pollution sources, away from ERES waters. [7 DE Admin. Code 7401 subsection 5.6.1.2]

***Response:*** ***The Christina River is not an ERES waterbody, therefore this does not apply.***

5.3.1.15 The discharge of oil from a vessel, truck, pipeline, storage, tank or tank car which causes or poses a threat of making a film on, emulsion in or sludge beneath the waters of the State or its shoreline shall be prohibited. [7 Del.C. §§6203, 6202(7)(5)(9)]

***Response:*** ***This rule does not apply.***

5.3.1.16 At a minimum, any discharge of liquid waste - sewage, industrial waste or other waste to State waters shall be subject to effluent limitations, discharge requirements and any alternate effluent control strategy that reflect a practicable level of pollutant removal technology. For the purposes of this section, a practicable level of pollutant removal technology is defined as the application of "best" treatment technology, control measures and practices, including pollution prevention, available to prevent, manage, reduce or remove pollutants taking into account the cost of applying such technology, control measures or practices in relation to the effluent reduction benefits to be achieved, the age of equipment and facilities involved, the process(es) employed, the engineering aspects of applying the various types of control, process changes, pollution prevention measures, non-water quality impacts (e.g. energy requirements) and other factors deemed appropriate. For the parameters, BOD5 (5-day biochemical oxygen demand) and suspended solids, the degree of removal reflecting an application of a practicable level of pollutant removal technology shall be at least 85% of the BOD5 and suspended solids contained in the influent to the treatment works or prior to application of the removal technology, control measures or practices. For discharges of sewage to State waters, a practicable level of pollutant removal technology shall be secondary treatment and disinfection.

5.3.1.16.1 No person shall cause or permit any discharge of liquid waste to the Delaware River, the Delaware Bay, or Atlantic Ocean except liquid waste which has received at least secondary treatment and disinfection.

5.3.1.16.2 No person shall cause or permit discharge of liquid waste to a lake or a pond or any tributary thereof, except liquid waste which has received at least secondary treatment, filtration, nutrient removal and disinfection.

5.3.1.16.3 No person shall cause or permit any discharge of liquid waste to the Little Assawoman Bay, Indian River Bay, or to Rehoboth Bay, including any tributaries to those waterbodies, except liquid waste which has received at least secondary treatment, filtration, and disinfection.

5.3.1.16.4 No person shall cause or permit any discharge of liquid waste to a stream, tidal or non-tidal, except liquid waste which has received at least secondary treatment, filtration, and disinfection. This subsection shall not govern discharge into the Delaware River, the Delaware Bay or the Atlantic Ocean, which shall be governed by subsection 5.3.1.16.1. For existing facilities, filtration may not be required if the existing facility has demonstrated the

ability to continuously meet secondary treatment levels. [7 DE Admin. Code 7201 subsections 7.1 and 7.2]

***Response:*** ***If a discharge of decant water from the designated Wilmington Harbor South and/or Pedricktown Confined Disposal Facility is necessary, it will be monitored for contaminants. The dredge material has been tested using the modified elutriate method, which simulates the constituents that are to be expected in decant water. The slurry released into the confined disposal area will be given sufficient time for solids to settle before decant water is released using an adjustable weir system to calibrate the discharge structure to the level necessary to release only water. The slurry will be monitored visually for settlement and the appropriate time for release will then be determined.***

5.3.1.17 In the event that Delaware Surface Water Quality Standards are not achieved through application of the technology based requirements, additional effluent limitations and treatment requirements shall be imposed to assure compliance with the Surface Water Quality Standards. Such additional effluent limitations and treatment requirements must control all pollutants or pollutant parameters which the DNREC determines are or may be discharged at a level which will cause, have the reasonable potential to cause or significantly contribute to an excursion of any numerical or narrative water quality criterion contained within Delaware's Surface Water Quality Standards. The need for additional effluent limitations and treatment requirements shall be based upon the results of chemical and/or biological tests in conjunction with studies or analyses designed to assess the potential of the discharge to cause or contribute to in-stream excursions of Delaware's Surface Water Quality Standards. [7 DE Admin. Code 7201 subsection 8.1]

***Response:*** ***Treatment of decant water is not anticipated to be necessary and therefore is not proposed. This rule does not apply currently.***

5.3.1.18 Where conflicts develop between stated surface water uses, stream criteria, or discharge criteria, designated uses for each segment shall be paramount in determining the required stream criteria, which, in turn, shall be the basis of specific discharge limits or other necessary controls. [7 DE Admin. Code 7401 subsection 1.2]

***Response:*** ***This rule does not apply.***

5.3.1.19 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources, undertake any activity:

5.3.1.19.1 In a way which may cause or contribute to the discharge of an air contaminant;

5.3.1.19.2 In a way which may cause or contribute to the discharge of a pollutant into any surface or ground water;

5.3.1.19.3 In a way which may cause or contribute to withdrawal of ground water or surface water or both;

5.3.1.19.4 In a way which may cause or contribute to the collection, transportation, storage, processing or disposal of solid wastes, regardless of the geographic origin or source of such solid wastes;

5.3.1.19.5 To construct, maintain or operate a pipeline system including any appurtenances such as a storage tank or pump station;

5.3.1.19.6 To construct any water facility; or

5.3.1.19.7 To plan or construct any highway corridor which may cause or contribute to the discharge of an air contaminant or discharge of pollutants into any surface or ground water. [7 Del.C. § 6003(a)]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from the State of Delaware. No other permit is necessary.***

5.3.1.20 No person shall, without first having obtained a permit from the Delaware Department of Natural Resources and Environmental Control, construct, install, replace, modify or use any equipment or device or other article:

5.3.1.20.1 Which may cause or contribute to the discharge of an air contaminant;

5.3.1.20.2 Which may cause or contribute to the discharge of a pollutant into any surface or groundwater;

5.3.1.20.3 Which is intended to prevent or control the emission of air contaminants into the atmosphere or pollutants into surface or groundwaters;

5.3.1.20.4 Which is intended to withdraw ground water or surface water for treatment and supply; or

5.3.1.20.5 For disposal of solid waste. [7 Del.C. §6003(b)]

***Response: This rule does not apply.***

5.3.1.21 Regulatory variances for the activities identified in the preceding policy statement may be granted pursuant to 7 Del.C. §6011 if all of the following conditions exist in the opinion of the Secretary of the Delaware Department of Natural Resources and Environmental Control:

5.3.1.21.1 Good faith efforts have been made to comply with these policies;

5.3.1.21.2 The cost of compliance is disproportionately high with respect to the benefits which would be bestowed by compliance, or the necessary technology is unavailable;

5.3.1.21.3 Available alternative operating procedures or interim control measures are being or will be used to reduce adverse impacts; and

5.3.1.21.4 The activities are necessary to the national security or to the lives, health, or welfare of the occupants of Delaware. [7 Del.C. §6011(b)]

***Response:*** ***A variance is not requested, therefor this rule does not apply.***

5.3.1.22 No permit for the activities identified above shall be granted unless the activities are consistent with county and municipal zoning regulations. [7 Del.C. §6003(c)(1)]

***Response:*** ***County and municipal zoning approval is not necessary for maintenance dredging at the Port of Wilmington.***

5.3.1.23 No person or entity shall commence construction, replacement, or operation of any of the following without first having obtained a permit from DNREC:

5.3.1.23.1 Sewer;

5.3.1.23.2 Any liquid waste collection or conveyance facilities such as wastewater pump stations and force mains;

5.3.1.23.3 Liquid waste treatment facilities;

5.3.1.23.4 Any surface impoundment for liquid waste or

5.3.1.23.5 Any bulk storage, bulk transfer or pipeline facility. [7 DE Admin. Code 7201 Section 2.0 and subsection 4.2]

***Response:*** ***This rule does not apply.***

5.3.1.24 No person shall construct, install, modify, rehabilitate, or replace an on-site wastewater treatment and disposal system or construct or place any dwelling, building, mobile home, manufactured home or other structure capable of discharging wastewater on-site unless such person has a valid license and permit issued by the DNREC. [7 DE Admin. Code 7101 subsection 3.31.1]

***Response:*** ***This rule does not apply.***

5.3.1.25 No person shall cause or permit to be discharged, thrown, or dumped into any waters or any drainage ditch in the State any garbage, refuse, dead animal, poultry, trash, carton, bottle, container, box, lumber, timber, paper, or light material or other solid waste. [7 DE Admin. Code 7201 subsection 3.2.6]

***Response:*** ***This rule does not apply.***

5.3.1.26 No person or entity shall:

5.3.1.26.1 Engage in the drilling, boring, coring, driving, digging, construction, installation, removal, or repair of a water well or water test well, except as or under the supervision of a licensed water well contractor;

5.3.1.26.2 Construct, repair, install or replace any part of a septic tank system except by or under the supervision of a licensed septic tank installer; or

5.3.1.26.3 Operate any liquid waste treatment system without a licensed liquid waste treatment plant operator.

5.3.1.26.4 No permits or licenses shall be issued for these activities unless the DNREC finds that the applicant is prepared and willing to conduct such activities in a manner which is consistent with the CMP policies. [7 Del.C. §6023; Delaware Executive Order 43, August 15, 1996]

***Response:*** ***This rule does not apply.***

5.3.1.27 The person who has caused the contamination of a person's drinking water supply by contaminant other than bacteria, viruses, nitrate or pesticides may be required to provide, at no cost to each person who has had his drinking water supply contaminated, an interim water supply that is of a quality and quantity to meet said person's needs as shall be determined by the Secretary of DNREC, in addition to the dates on which the interim water supply shall commence and be terminated. [7 Del.C. §6037]

***Response:*** ***This rule does not apply.***

5.3.1.28 No permits shall be issued for the discharge of any radiological, chemical or biological warfare agents or high-level radioactive wastes into State waters. [7 DE Admin. Code 7201 subsection 3.2.8.1]

***Response:*** ***This rule does not apply.***

5.3.1.29 No person shall cast, put, place, discharge in or permit or suffer to be cast, put, placed, discharged in or to escape into any running stream of water within the limits of this State, from which stream the inhabitants of any borough, town or city within this State are supplied wholly or in part with water for and as drink or beverage,

any dye-stuffs, drugs, chemicals or other substance or matter of any kind whatsoever whereby the water so supplied as and for a drink or beverage is made and becomes noxious to the health or disagreeable to the senses of smell or taste. [16 Del.C. §1301]

***Response:*** ***This rule does not apply.***

5.3.1.30 Water delivered to every consumer by any public water supplier shall be so protected by natural means, by proper constructions or by treatment so as maintain or increase water quality above the level determined to be safe and not to negatively impact users of water from such systems, either directly or indirectly. [16 DE Admin. Code 4462 subsection 3.3]

***Response:*** ***This rule does not apply.***

5.3.1.31 After July 1, 1991, unless a particular activity is exempted by these regulations, a person may not disturb land without an approved sediment and stormwater management plan from the appropriate plan approval agency. [Delaware Sediment and Stormwater Regulations, Section 8(1), amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.32 The following activities are exempt from both sediment control and stormwater management requirements:

5.3.1.32.1 Agricultural land management practices, unless the local Conservation District or the DNREC determines that the land requires a new or updated soil and water conservation plan, and the owner or operator of the land has refused either to apply to a Conservation District for the development of such a plan, or to implement a plan developed by a Conservation District;

5.3.1.32.2 Developments or construction that disturbs less than 5,000 square feet.

5.3.1.32.3 Land development activities which are regulated under specific State or federal laws which provide for managing sediment control and stormwater runoff, such as specific permits required under the National Pollutant Discharge Elimination System (NPDES) when discharges are a combination of stormwater and industrial or domestic wastewater.

5.3.1.32.4 Projects which are emergency in nature that are necessary to protect life or property such as bridges, culvert, or pipe repairs and above ground or underground electric and gas utilities or public utility restoration; and

5.3.1.32.5 Qualifying commercial forest harvesting operations. [Delaware Sediment and Stormwater Regulations, subsection 3.1 amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.33 A project may be eligible for a waiver of stormwater management for both quantitative and qualitative control if the applicant can demonstrate that:

5.3.1.33.1 The proposed project will return the disturbed area to a pre-development runoff condition and the pre-development land use is unchanged at the conclusion of the project; or

5.3.1.33.2 The proposed project consists of a linear disturbance of less than ten (10) feet in width; or

5.3.1.33.3 The project is for an individual residential detached unit or agricultural structure, and the total disturbed area of the site is less than one acre; or

5.3.1.33.4 The proposed project is for agricultural structures in locations included in current soil and water conservation plans that have been approved by the appropriate Conservation District. [Delaware Sediment and Stormwater Regulations, subsection 3.2.1, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.34 All sediment and stormwater management plans shall be designed to implement water quality control measures to minimize, to the maximum extent possible, degradation of downstream water quality and habitat. Unless a particular activity is exempt, no person may disturb land without an approved sediment and stormwater management plan. [Delaware Sediment and Stormwater Regulations, subsection 10.2.2, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.35 Water quantity control is an integral component of overall stormwater management. Control of peak discharges will, to some extent, prevent increases in flooding. The following design criteria for peak flow control are established for water quantity control purposes, unless a waiver is granted based on a case-by-case basis:

5.3.1.35.1 Projects in New Castle County that are located north of the Chesapeake and Delaware Canal shall not exceed the post-development peak discharge for the 2, 10, and 100 year frequency storm events at the pre-development peak discharge rates for the 2, 10, and 100 year frequency storm events.

5.3.1.35.2 Projects in New Castle County that are located south of the Chesapeake and Delaware Canal, Kent County, and Sussex County shall not exceed the post-development peak discharge for the 2 and 10 year frequency storm events at the pre-development peak discharge rates for the 2 and 10 year frequency storm events.

5.3.1.35.3 Watersheds, other than Designated Watersheds or subwatersheds that have well documented water quantity problems may have more stringent or modified design criteria that are responsive to the specific needs of that watershed. Modified criteria for that watershed must receive Departmental approval, and all projects reviewed and approved by the appropriate plan approval agency shall meet or exceed the modified criteria. Proposed modification of criteria for a watershed shall be subject to public review and comment prior to implementation. [Delaware Sediment and Stormwater Regulations, subsection 10.3.4, amended April 11, 2005]

***Response:*** ***This rule does not apply.***

5.3.1.36 Water quality control is also an integral component of stormwater management. Control of water quality on-site will prevent further degradation of downstream water quality. The following design criteria are established for water quality protection unless a waiver or variance is granted on a case-by-case basis.

5.3.1.36.1 In general, the preferred option for water quality protection shall be those practices collectively referred to as "Green Technology BMP's". Other practices shall be considered only after preferred practices have been eliminated for engineering or hardship reasons as approved by the appropriate plan approval agency.

5.3.1.36.2 Water quality be designed to manage the rate and volume of flow from the 2.0" NRCS Type II rainfall event, up to a maximum of 1.0" and

5.3.1.36.3 Alternative stormwater quality practices may be acceptable to the Department and/or the plan approval agency if the removal efficiency for suspended solids meets or exceeds 80% as demonstrated by scientifically independent evaluation and monitoring performance data,

5.3.1.36.4 The Department and/or plan approval agency may require other acceptable stormwater practices if a receiving waterbody has been identified as impaired or designated with a specific pollutant reduction target.

5.3.1.36.5 Water quality practices may also be acceptable to the Department and/or the plan approval agency if they are designed to reduce pollutant loading from a specific post-development source.

***Response:*** ***This rule does not apply.***

## 5.4 SUBAQUEOUS LANDS AND COASTAL STRIP MANAGEMENT

5.4.1 The “coastal zone", referred to in these policies as the “coastal strip”, is defined as all that area of the State, whether land, water or subaqueous land between the territorial limits of Delaware in the Delaware River, Delaware Bay and Atlantic Ocean, and a line formed by certain Delaware highways and roads. [7 Del.C. §7002]

***Response:*** ***We are operating under the assumption that the project is within the Delaware coastal zone.***

5.4.2 The natural environment of the coastal strip shall be protected from the impacts of heavy industry and oil pollution for the purpose of recreation, tourism, fishing, crabbing, and gathering other marine life useful in food production. [7 Del.C. §§7001, 6201]

***Response:*** ***As this project does not involve heavy industry and oil pollution, the project is in compliance with this rule.***

5.4.3 The need for protection of the natural environment in the coastal strip shall be balanced with the need for new industry in the State’s coastal areas [7 Del.C. §7001]

***Response:*** ***This rule does not apply; no new industry is proposed.***

5.4.4 The location, extent and type of industrial development in the coastal strip that will result in the degradation of the Delaware's bays and coastal areas shall be controlled [7 Del.C. §7001; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***This project involves solely existing land use; therefore, the project is in compliance*** *with this rule.*

5.4.5 The development and use of offshore oil, gas, and other mineral resources of the State shall be managed to make the maximum contribution to the public benefit and so as to balance their utilization, conservation, and protection [Delaware Oil, Gas and Mineral Exploration Regulations, 2.1. September, 1971]

***Response:*** ***This rule does not apply.***

5.4.6 New heavy industrial uses shall be prohibited in the coastal strip. Such uses are ones characteristically involving more than 20 acres, and characteristically employing smokestacks, tanks, distillation or reaction columns, chemical processing equipment or waste-treatment lagoons. Heavy industrial uses shall not only be defined by their physical characteristics, however, but also by their potential to pollute in the event of human error or equipment failure. Examples of

heavy industry are oil refineries, basic steel manufacturing plants, basic cellulosic pulp-paper mills, and chemical plants such as petrochemical complexes. For purposes of this policy, public sewage treatment or recycling plants shall not be deemed heavy industrial uses. [7 Del.C. §§7002(e), 7003; Kreshtool v. Delmarva Power & Light Co., Delaware Super., 310 A. 2d 649(1973)]

***Response:*** ***No new heavy industrial uses are proposed for this project.***

5.4.7 New manufacturing uses or the expansion of existing manufacturing uses shall be allowed in the coastal strip by permit only, although in no case shall new manufacturing uses be allowed in wetlands or where inconsistent with local zoning regulations. Manufacturing uses are ones which mechanically or chemically transform substances into new products, and characteristically employ power-driven machines and materials handling equipment. Manufacturing uses typically include establishments engaged in assembling components of manufactured products, provided the new products are not fixed improvements. [7 Del.C. §§7002(d)(e), 7004(a)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.8 The following factors shall be considered in passing on requests for permission to construct or operate a manufacturing use in the coastal strip:

5.4.8.1 Environmental impact, including but not limited to, probable air and water pollution likely to be generated by the proposed use under normal operating conditions, as well as during mechanical malfunction and human error; likely destruction of wetlands and flora and fauna; impact of site preparation on drainage of the area in question, especially as it relates to flood control; impact of site preparation and facility operations on land erosion; effect of site preparation and facility operations on the quality and quantity of surface, and subsurface water resources, such as the use of water for processing, cooling, effluent removal, and other purposes; in addition, but not limited to, the likelihood of generation of glare, heat, noise, vibration, radiation, electromagnetic interference and obnoxious odors.

5.4.8.2 Economic effect, including the number of jobs created and the income which will be generated by the wages and salaries of these jobs in relation to the amount of land required, and the amount of tax revenues potentially accruing to State and local government.

5.4.8.3 Aesthetic effect, such as impact on scenic beauty of the surrounding area.

5.4.8.4 Number and type of supporting facilities required and the impact of such facilities on all factors listed in this subsection.

5.4.8.5 Effect on neighboring land uses including, but not limited to, effect on public access to tidal waters, effect on recreational areas, and effect on adjacent residential and agricultural areas.

5.4.8.6 County and municipal comprehensive plans for the development and/or conservation of their areas of jurisdiction. [7 Del.C. §7004(b)]

***Response:*** ***New or expanded manufacturing uses are not proposed as part of this project.***

5.4.9 New offshore gas, liquid, or solid bulk product transfer facilities shall be prohibited in the coastal strip. Such facilities are docks or port facilities, whether artificial islands or attached to shore by any means, for the transfer of bulk quantities of any substance from vessel to onshore facility or vice versa. However, a docking facility or pier for a single industrial or manufacturing facility and docking facilities located in the City of Wilmington for the Port of Wilmington shall not be prohibited. [7 Del.C. §§7002(f), 7003; Inf. Attorney General Opinion No. 65, October 22, 1974]

***Response:*** ***New offshore gas, liquid, or solid bulk product transfer facilities are not proposed as part of this project.***

5.4.10 Offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip shall be prohibited. Such pipelines generally shall be allowed if they transit the coastal strip and environmental safeguards are observed. However, if such pipelines represent a significant danger of pollution to the coastal strip or generate pressure for construction of industrial plants in the coastal strip, they shall be prohibited. [7 Del.C. §§7001, 7002, 7003; Inf. Attorney General Opinion No. 77-33, July 6, 1977]

***Response:*** ***New offshore pipelines which transfer bulk quantities of gas, oil, or other liquids to terminals within the coastal strip are not proposed as part of this project.***

5.4.11 A permit may be issued for geological, geophysical and seismic surveys, including the taking of cores and other samples, or the tide and submerged lands of this State. Such permits shall be nonexclusive and shall not give any preferential rights to any oil, gas and sulfur or other mineral lease. After consultation with those agencies of the State having an interest in the possible effects of the leasing, such rules and regulations deemed necessary to protect the fish, game, wildlife and natural resources of the State shall be included in the permit. Survey activities on any area determined to be an area where a lease should not be granted may be prohibited. The permit shall include conditions and payment proper to safeguard the interests of the State. [7 Del.C. §§6103, 6104]

***Response:*** ***This rule does not apply.***

5.4.12 No operations or activities shall be commenced on the drilling, deepening or plugging back of any offshore oil or gas wells located on underwater lands of Delaware without the permission of the State, and unless the activities are conducted in a manner which do not result in the degradation of the State's natural resources. [Delaware Oil, Gas and Mineral Exploration Regulations Numbers I-V, September 1971]

***Response:*** ***This rule does not apply.***

5.4.13 Easements for mineral exploration and exploitation underlying that part of the surface of the Atlantic shore owned by the state shall be permitted at such times and places as necessary to permit the extraction and transportation of oil, gas, sulfur or other minerals from State, federal or private lands, but permanent interference with the surface of the Atlantic shore shall be prohibited. [7 Del.C. §§6102(d), 6118, 6119(a)]

***Response:*** ***This rule does not apply.***

5.4.14 Before offering tide and submerged lands for leasing for possible mineral development, or whenever any person files a written application with the Secretary of DNREC requesting that lands be offered for leasing, accompanying the same with the required fee, a public hearing shall be held. After the public hearing, it will be determined whether an invitation for bidding to lease the area under consideration would be in the public interest. Consideration shall be made as to whether a lease or leases of the area under consideration would:

5.4.14.1 Be detrimental to the health, safety, or welfare of persons residing in, owning real property or working in the neighborhood of such areas;

5.4.14.2 Interfere with the residential or recreation areas to an extent that would render such areas unfit for recreational or residential uses or unfit for park purposes;

5.4.14.3 Destroy, impair or interfere with the aesthetic and scenic values of the Delaware coast, or other affected area;

5.4.14.4 Create any air, water and other pollution;

5.4.14.5 Substantially endanger marine life or wildlife;

5.4.14.6 Substantially interfere with commerce or navigation; and

5.4.14.7 Protect State lands from drainage of oil, gas or other minerals or objectionable substances [7 Del.C. §§6107, 6108]

***Response:*** ***This rule does not apply.***

5.4.15 Avoidable pollution or avoidable contamination of the ocean and of the waters covering submerged lands, avoidable pollution or avoidable contamination of the beaches or land underlying the ocean or waters covering submerged lands, or any substantial impairment of and interference with the enjoyment and use thereof, including but not limited to bathing, boating, fishing, fish and wildlife production, and navigation, shall be prohibited and the lessee shall exercise a high degree of care to provide that no oil, tar, residuary product of oil or any refuse of any kind from any well or works shall be permitted to be deposited on or pass into the waters of the ocean, any bay or inlet thereof, or any other waters covering submerged lands; provided, however, that this policy does not apply to the deposit on, or passing into, such water or waters not containing any hydrocarbons or vegetable or animal matter. [7 Del.C. §6119(a)]

***Response:*** ***The applicant will take all precautions necessary to ensure that avoidable pollution or contamination of waters does not take place.***

5.4.16 For the purposes of this section, "avoidable pollution" or "avoidable contamination" means pollution or contamination arising from:

5.4.16.1 The acts of omissions of the lessee or its officers, employees or agents; or,

5.4.16.2 Events that could have been prevented by the lessee or its officers, employees or agents through the exercise of a high degree of care. [7 Del.C. §6119(b)]

***No response required.***

5.4.17 State subaqueous lands within the boundaries of Delaware constitute an important resource of the State and shall be protected against uses or changes which may impair the public interest in the use of tidal or nontidal waters. [7 Del.C. Ch. 72]

***Response:*** ***All uses are existing, and no new uses are proposed. The project will not impair the public interest in the use of tidal waters.***

5.4.18 No person shall deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands without first having obtained a permit, lease or letter of approval from the DNREC. Such permit, lease or letter of approval, if granted, may include reasonable conditions required in the judgment of the DNREC to protect the interest of the public. If it is determined that granting the permit, lease or approval will result in loss to the public of a substantial resource, the permittee may be required to take measures which will offset or mitigate the loss. [7 Del.C. §7205]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed activity.***

5.4.19 The extent of jurisdictional authority over public or private subaqueous lands includes any activity in a navigable stream or waterbody, which have a hydrologic connection to natural waterbodies. "Activity" includes, but is not limited to, any human induced action, such as dredging, draining, filling, grading, bulkheading, mining, drilling, extraction of materials or excavation, or construction of any kind, including, but not limited to, construction of a boat ramp or slip, breakwater, residences, bridge, bulkhead, culvert, dam, derrick, deck, groin, jetty, lagoon, gabion, rip-rap, launching facility, marina, mooring facility, pier, seawall, walkway, or wharf. [7 DE Admin Code 7504 Section 1.0 and subsection 2.2.1.1]

***No response required.***

5.4.20 The following types of activities in, on, over, or under private subaqueous lands require a permit or letter of authorization from the DNREC:

5.4.20.1 Construction of a convenience structure or boat docking facility.

5.4.20.2 Construction of a shoreline erosion control structure or measure.

5.4.20.3 Dredging, filling, excavating or extracting of materials.

5.4.20.4 Excavation, creation, or alteration of any channel, lagoon, turning basin, pond, embayment, or other navigable waterway on private subaqueous lands which will make connection with public subaqueous lands.

5.4.20.5 Dredging of existing channels, ditches, dockages, lagoons and other navigable waterways to maintain or restore the approved depth and width.

5.4.20.6 Excavation of land which makes connection to public subaqueous lands.

5.4.20.7 The laying of any pipeline, electric transmission line, telephone line, or any other utility structure in, on, over, or under the beds of private subaqueous lands.

5.4.20.8 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.20.9 Establishment of an anchorage for the use of a mooring for more than two (2) boats or for appurtenant onshore services.

5.4.20.10 Anchoring or mooring a floating platform over private subaqueous lands and for a period of twenty-four (24) consecutive hours or more.

5.4.20.11 Anchoring or mooring any vessel or platform over private subaqueous lands for revenue generating purposes.

5.4.20.12 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure. [7 DE Admin. Code 7504 subsection 2.3.3.1]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.21 The following types of activities on public subaqueous lands require a lease, permit, or letter of authorization from the DNREC:

5.4.21.1 Construction or use of any structure on, in, under, or over public subaqueous lands, including but not limited to, any convenience structures, shoreline erosion control structure or measure, or boat docking facility.

5.4.21.2 Dredging, filling, excavating or extracting of materials.

5.4.21.3 Continuous anchoring or mooring of a commercial vessel used in a commercial activity on or over public subaqueous lands for thirty (30) or more calendar days during any consecutive three (3) months.

5.4.21.4 The laying of any pipeline, electric transmission line, or telephone line in, on, over, or under the beds of public subaqueous lands.

5.4.21.5 Installation of temporary or permanent mooring buoys or private marker buoys.

5.4.21.6 Establishment of an anchorage for mooring more than two (2) boats or which serves as a permanent place for resident vessels.

5.4.21.7 Anchoring or mooring a floating platform over public subaqueous lands and for a period of twenty- four (24) consecutive hours or more.

5.4.21.8 Maintenance dredging of existing or new channels, ditches, dockages, lagoon and other waterways to maintain or restore the approach depth and width.

5.4.21.9 Anchoring or mooring any vessel or platform over public subaqueous lands for revenue generating purposes.

5.4.21.10 Repair and replacement of existing serviceable structures over private subaqueous lands, except no permit or letter is required for repairs or structural replacements which are above the mean low tide and which do not increase any dimensions or change the use of the structure.

5.4.21.11 New dredging activities of channels, ditches, dockage, or other waterways [7 DE Admin. Code 7504 subsection 2.4.2]

***Response:*** ***The applicant has applied for a Wetlands and Subaqueous Lands Permit from DNREC for the proposed dredging.***

5.4.22 The DNREC shall consider the public interest in any proposed activity which might affect the use of subaqueous lands. These considerations include, but are not limited to, the following:

5.4.22.1 The value to the State or the public in retaining any interest in subaqueous lands which the applicant seeks to acquire, including the potential economic value of the interest.

5.4.22.2 The value to the State or the public in conveying any interest in subaqueous lands which the applicant seeks to acquire.

5.4.22.3 The potential effect on the public with respect to commerce, navigation, recreation, aesthetic enjoyment, natural resources and other uses of the subaqueous lands.

5.4.22.4 The extent to which any disruption of the public use of such lands is temporary or permanent.

5.4.22.5 The extent to which the applicant’s primary objectives and purposes can be realized without the use of such lands (avoidance).

5.4.22.6 The extent to which the applicant's primary purpose and objectives can be realized by alternatives, i.e. minimize the scope or extent of an activity or project and its adverse impact.

5.4.22.7 Given the inability for avoidance or alternatives, the extent to which the applicant can employ mitigation measures to offset any losses incurred by the public.

5.4.22.8 The extent to which the public at large would benefit from the activity or project and the extent to which it would suffer detriment.

5.4.22.9 The extent to which the primary purpose of a project is water-dependent. [7 DE Admin. Code 7504 subsection 4.6]

***Response:*** ***The proposed project aligns with the public interest in that it allows for the continued operation of the Port of Wilmington, a vital economic engine for the State of Delaware.***

5.4.23 The DNREC shall consider the impact on the environment, including but not limited to, the following:

5.4.23.1 Any impairment of water quality, either temporary or permanent, which may reasonably be expected to cause violation of the State Surface Water Quality Standards. This impairment may include violation of criteria or degradation of existing uses;

5.4.23.2 Any effect on shell fishing, finfishing, or other recreational activities and existing or designated water uses;

5.4.23.3 Any harm to aquatic or tidal vegetation, benthic organisms or other flora and fauna, and their habitats;

5.4.23.4 Any loss of natural aquatic habitat;

5.4.23.5 Any impairment of air quality either temporarily or permanently, including noise, odors, and hazardous chemicals;

5.4.23.6 The extent to which the proposed project may adversely impact natural surface and groundwater hydrology and sediment transport functions. [7 DE Admin. Code 7504 subsection 4.7.1]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.24 The DNREC shall also consider the following to determine whether to approve the application:

5.4.24.1 The degree to which the project represents an encroachment on or otherwise interferes with public lands, waterways or surrounding private interests.

5.4.24.2 The degree to which the project incorporates sound engineering principles and appropriate materials of construction.

5.4.24.3 The degree to which the proposed project fits in with the surrounding structures, facilities, and uses of the subaqueous lands and uplands.

5.4.24.4 Whether the proposed activity complies with the State of Delaware's Surface Water Quality Standards both during construction and during subsequent operation or maintenance.

5.4.24.5 The degree to which the proposed project may adversely affect shellfish beds or finfish activity in the area. [7 DE Admin. Code 7504 subsection 4.7.5]

***Response:*** ***Through the course of reviewing our permit application, this rule is satisfied.***

5.4.25 The following concerns for protecting water quality shall be specifically considered by the DNREC in evaluating applications for dredging projects:

5.4.25.1 All dredging is to be conducted in a manner consistent with sound conservation and water pollution control practices. Spoil and fill areas are to be properly diked to contain the dredged material and prevent its entrance into any surface water. Specific requirements for spoils retention may be specified by the DNREC in the approval, permit or license.

5.4.25.2 All material excavated shall be transported, deposited, confined, and graded to drain within the disposal areas approved by the DNREC. Any material that is deposited elsewhere than in approved areas shall be removed by the applicant and deposited where directed at the applicant's expense and any required mitigation shall also be at the applicant's expense.

5.4.25.3 Materials excavated by hydraulic dredge shall be transported by pipeline directly to the approved disposal area. All pipelines shall be kept in good condition at all times and any leaks or breaks shall be immediately repaired.

5.4.25.4 Materials excavated and not deposited directly into an approved disposal area shall be placed in scows or other vessels and transported to either an approved enclosed basin, dumped, and then rehandled by hydraulic dredge to an approved disposal area, or to a mooring where scows or other vessels shall be unloaded by pumping directly to an approved disposal area.

5.4.25.5 When scows or other vessels are unloading without dumping, they shall have their contents pumped directly into an approved disposal area by a means sufficient to preclude any loss of material into the body of water.

5.4.25.6 In approved disposal areas, the applicant may construct any temporary structures or use any means necessary to control the dredge effluent, except borrowing from the outer slopes of existing embankments and/or hydraulic placing of perimeter embankments. For bermed disposal sites, a minimum freeboard of two (2) feet, measured vertically from the retained materials and water to the top of the adjacent confining embankment, shall be maintained at all times.

5.4.25.7 The applicant shall not obstruct drainage or tidal flushing on existent wetlands or upland areas adjacent thereto. The applicant shall leave free, clear, and unobstructed outfalls of sewers, drainage ditches, and other similar structures affected by the disposal operations. The dredged materials shall be distributed within the disposal area in a reasonably uniform manner to permit full drainage without ponding during and after fill operations.

5.4.25.8 The dredging operation must be suspended if water quality conditions deteriorate in the vicinity of dredging or spoil disposal site. Minimum water quality standards may be included as an element of the permit and shall be monitored by the applicant. Violation of these conditions shall be cause for immediate suspension of activity and notification of the DNREC. Dredging shall not be resumed until water quality conditions have improved and the DNREC has authorized the resumption. [7 DE Admin. Code 7504 subsection 4.11.3]

***Response:*** ***Dredging will be conducted according to best industry practices including observation from the ship deck and controlled use of the dredging equipment. Dredging will cease if excessive levels of turbidity are observed and the cause will be rectified before any dredging resumes. Pipelines will be inspected prior to dredging. All dikes are required to be in sound structural condition and are maintained by the disposal site operator. Dredge material will be placed in a managed disposal area and handled concurrently with the material dredged from the main Christina River channel through the course of its regular upkeep by the Army Corps of Engineers. The dredging and management of the dredge material will be overseen by a contractor selected by the U.S. Army Corps of Engineers.***

5.4.26 The following types of dredging projects are prohibited:

5.4.26.1 Dredging of biologically productive areas, such as nursery areas, shellfish beds, and submerged aquatic vegetation, if such dredging will have a significant or lasting impact on the biological productivity of the area.

5.4.26.2 Dredging of new dead-end lagoons, new basins and new channels, which have a length to width ratio greater than 3:1. This subsection shall not apply to marina projects governed by the Marina Regulations.

5.4.26.3 Dredging channels, lagoons or canals deeper than the existing controlling depth of the connecting or controlling waterway.

5.4.26.4 Dredging channels, cleaning marinas or other subaqueous areas by using propeller wash from boats. [7 DE Admin. Code 7504 subsection 4.11.6]

***Response:*** ***No nurseries, shellfish beds, or submerged aquatic vegetation is known to exist within the project area. The project does not consist of new dredging or the dredging of new areas including dead-end lagoons. Dredging will be conducted to existing, maintained channel depths. Dredging will not be performed using propeller wash from boats.***

## 5.8 PORT OF WILMINGTON

5.8.1 Advisory Policies

5.8.1.1 The long-term economic viability and competitiveness of the Port of Wilmington should be encouraged and supported.

5.8.1.2 The people who benefit from the Port of Wilmington should contribute to its support and help maintain the financial health of the port.

5.8.1.3 Expansion of the Port of Wilmington along the Delaware River is encouraged to meet future national and regional transshipment needs and to reduce the dredging and spoils disposal activities associated with port operations along the Christina River. Port expansion, however, should not proceed if such expansion means air and water quality standards cannot be kept.

5.8.1.4 The port should be promoted for general cargo transfer and, to the extent feasible, as a location for the support of outer continental shelf development.

***Response:*** ***The proposed project is in accordance with all the aforementioned rules.***

## 5.11 LIVING RESOURCES

5.11.1 General

5.11.1.1 No activity shall have an adverse environmental effect on living resources and shall include consideration of the effect of site preparation and the proposed activity on the following wetland values:

5.11.1.1.1 Value of tidal ebb and flow

5.11.1.1.1.1 Production Value: carving organic matter to adjacent estuaries and coastal waters which serve as breeding areas for certain animal species (especially fish and shellfish).

5.11.1.1.1.2 Value as a natural protective system of absorption of storm wave energy, flood waters, and heavy rainfall, thereby decreasing flood and erosion damage.

5.11.1.1.1.3 The prevention of silting in certain harbors and inlets thereby reducing dredging.

5.11.1.1.1.4 Removal and recycling of inorganic nutrients.

5.11.1.1.1.5 Effect on the estuarine waters.

5.11.1.1.2 Habitat Value

5.11.1.1.2.1 Habitat for resident species of wildlife including furbearers, invertebrates, finfish.

5.11.1.1.2.2 Habitat for migratory wildlife species including waterfowl, wading birds, shorebirds, passerines, finfish, shrimp.

5.11.1.1.2.3 Rearing area, nesting area, breeding grounds for various species.

5.11.1.1.2.4 Habitat for rare or endangered plants.

5.11.1.1.2.5 Presence of plants or animals known to be rare generally, or unique to the particular location.

5.11.1.1.2.6 Presence of plants or animals near the limits of their territorial range.

5.11.1.1.2.7 Presence of unique geologic or wetland features [7 DE Admin. Code 7502 subsection 12.2]

5.11.2 Fish and Wildlife

5.11.2.1 All forms of protected wildlife shall be managed and protected from negative impacts. [7 Del.C.§102(a)]

5.11.2.2 State shellfish resources shall be protected from further impairment and improved when possible [7 Del.C. §1902 (a)(1)(2)(5)]

5.11.2.3 Mosquito and other pest controls shall use techniques such as open marsh water management, which reduce the application of chemicals and which substitute biological controls. [Delaware Mosquito Control Spray Policy, revised February 26, 2018, Delaware Executive Order 43, August 15, 1996]

5.11.3 Nongame and Endangered Species

5.11.3.1 “Nongame” is that fauna, including rare and endangered species, which are not commonly trapped, killed, captured or consumed, either for sport or profit. [7 Del.C. §202(a)]

5.11.3.2 Rare and endangered species are in need of active, protective management to preserve and enhance such species. The diversity and abundance of the native flora and fauna of Delaware, particularly those deemed rare or

endangered, shall be preserved and enhanced through the protection of the habitat, natural areas, and areas of unusual scientific significance or having unusual importance to their survival. [7 Del.C. §201(1) and (2)]

5.11.4 Advisory Policy

5.11.4.1 Actions which may interfere with or otherwise adversely affect fish and wildlife in Delaware shall be implemented only after careful consultation with DNREC and exploration of alternatives less damaging to such fish and wildlife.

***Response:*** ***Seasonal dredging restrictions may be observed in order to protect migratory fish. We do not know of any other endangered or threatened species in the project area. We expect any issues to be addressed during the course of the DNREC permitting process. The dredging procedures outlined in this application are intended to minimize the effect of maintenance dredging on the surrounding environmental while allowing the activity to still take place, which is necessary in order to continue operations at the Port of Wilmington.***

## 5.13 STATE OWNED COASTAL RECREATION AND CONSERVATION

5.13.1 State owned lands whose natural condition or present state of use would maintain important recreational areas and wildlife habitat, or would maintain or enhance the conservation of natural, cultural or historic resources shall be managed, preserved, and protected, for conservation and recreational use. [7 Del.C. §§7301, 7504(6), 5305; 7 Del.C. Ch 45]

***Response:*** ***The state-owned submerged lands within the project area will be maintained free from obstruction for navigational and recreational purposes as safety permits. Open-water habitat will be preserved.***

5.13.2 Open spaces shall be preserved through the acquisition of interests or rights in real property, or donation of lands, for public recreation and conservation of natural resources promotes biological diversity, public health, prosperity and general welfare [7 Del.C. §7502]

***No response required.***

## 5.19 TRANSPORTATION FACILITIES

5.19.1 General

5.19.1.1 The DCMP supports the expansion and development of the Port of Wilmington. [7 Del.C. Ch 70]

5.19.1.2 Due to the threats posed to the natural environment, recreational activities and commercial fishing activities by the transfer of oil, petroleum products and their byproducts between vessels and vessels and onshore facilities and vessels, parties responsible for oil spills, discharges and the escape of oil in the waters of the State shall be required to immediately remove such oil pollution to DNRECs satisfaction or the responsible parties shall be required to pay for the expenses incurred in the removal of such oil pollution. [7 Del.C. §6201]

5.19.2 Advisory Policies

5.19.2.1 When essential to the national interest, the construction, maintenance and improvement of transportation systems shall predominate over less essential interests.

5.19.2.2 Transportation planning programs shall provide for alternatives to continued reliance on private motor vehicles with their associated highway requirements.

5.19.2.3 The State shall undertake an accelerated program of highway maintenance, upgrading, and safety improvements.

5.19.2.4 The DCMP supports the maintenance of an adequate and efficient railroad network to serve industry and agriculture on the Delmarva Peninsula.

5.19.2.5 The DCMP supports the establishment and maintenance of efficient public transit systems in order to reduce impacts to air quality and natural resources of the State.

5.19.2.6 New or expanded ports which involve extensive and continual dredging and spoil disposal in order to keep them useable are discouraged unless it can clearly be demonstrated that such facilities can be developed in an environmentally sound manner and without imposing continuing maintenance costs on any level of government or the general public.

***Response:*** ***The proposed activity is necessary to sustain vessel traffic to and commerce at the Port of Wilmington. No further port development or expansion is proposed.***

## 5.24 POLLUTION PREVENTION

5.24.1 General

5.24.1.1 Whenever possible, the generation of waste should be reduced or eliminated as expeditiously as possible, and that waste that is generated should be recovered, reused, recycled, treated or disposed of in a manner that

minimizes any present or future threats to human health or the environment. [7 Del.C. §7802(a)(1)]

***Response:*** ***Not applicable. The project does not involve the generation of waste.***

5.24.2 Advisory Policies

5.24.2.1 Industries should review their proposed projects for the possible use of pollution prevention opportunities.

5.24.2.2 Industries are encouraged to utilize the DNREC Pollution Prevention Program's services, including non-regulatory technical assistance and information, to ensure that the potential for degradation of the quality of air, land, and water is minimal.

***Response:*** ***The applicant is already planning to employ known pollution prevention methods for a hydraulic dredging project. The DNREC Pollution Prevention Program services do not pertain to dredging projects.***

# SECTION 4

# SEDIMENT ANALYSIS COMPARATIVE TABLES, CORE PHOTOGRAPHS, CHAIN OF CUSTODY AND CORE LOGS

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **180-108765-1<br>C-1<br>7/21/2020<br>11:25 AM** | **180-108765-2<br>C-2<br>7/21/2020<br>11:06 AM** | **180-109048-1<br>C-3<br>7/29/2020<br>9:10 AM** |
| 2 | Clay | N/A | % | Grain Size | MRL | Total | **45.4** | **46.0** | **43.9** |
| 3 | Coarse Sand | N/A | % | Grain Size | MRL | Total | **0.0** | **0.0** | **0.0** |
| 4 | Fine Sand | N/A | % | Grain Size | MRL | Total | **4.3** | **5.2** | **3.5** |
| 5 | Gravel | N/A | % | Grain Size | MRL | Total | **0.0** | **0.0** | **0.0** |
| 6 | Hydrometer Reading 1 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **87.3** | **80.3** | **83.5** |
| 7 | Hydrometer Reading 2 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **74.4** | **71.7** | **68.5** |
| 8 | Hydrometer Reading 3 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **61.5** | **58.8** | **59.0** |
| 9 | Hydrometer Reading 4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **53.5** | **51.7** | **53.5** |
| 10 | Hydrometer Reading 5 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **45.4** | **46.0** | **43.9** |
| 11 | Hydrometer Reading 6 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **35.7** | **34.5** | **34.4** |
| 12 | Hydrometer Reading 7 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **26.1** | **24.5** | **23.4** |
| 13 | Medium Sand | N/A | % | Grain Size | MRL | Total | **0.5** | **2.7** | **1.3** |
| 14 | Moisture Content | N/A | % | Water (Moisture) Content | MRL | Total | **186.9** | **206.5** | **198.6** |
| 15 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | **65.6** | **64.6** | **65.2** |
| 16 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | **34.4** | **35.4** | **34.8** |
| 17 | Sand | N/A | % | Grain Size | MRL | Total | **4.8** | **7.9** | **4.8** |
| 18 | Sieve Size #10 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 19 | Sieve Size #100 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **96.8** | **93.3** | **96.7** |
| 20 | Sieve Size #20 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **99.5** | **99.4** | **99.2** |
| 21 | Sieve Size #200 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **95.2** | **92.1** | **95.2** |
| 22 | Sieve Size #4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 23 | Sieve Size #40 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **99.5** | **97.3** | **98.7** |
| 24 | Sieve Size #60 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **98.7** | **95.9** | **98.2** |
| 25 | Sieve Size #80 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **97.6** | **94.7** | **97.5** |
| 26 | Sieve Size 0.375 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 27 | Sieve Size 0.75 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 28 | Sieve Size 1 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 29 | Sieve Size 1.5 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 30 | Sieve Size 2 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 31 | Sieve Size 3 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | **100.0** | **100.0** | **100.0** |
| 32 | Silt | N/A | % | Grain Size | MRL | Total | **49.8** | **46.1** | **51.3** |
| 33 | Total Organic Carbon - Duplicates | 7440-44-0 | mg/Kg | Organic Carbon, Total (TOC) | MRL | Total | **48000** | **44000** | **34000** |

| | A | J | K | L | M | N | O | P |
|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **180-109048-2<br>C-4<br>7/29/2020<br>9:52 AM** | **180-109048-3<br>C-5<br>7/29/2020<br>10:20 AM** | **180-108765-3<br>C-6<br>7/21/2020<br>10:54 AM** | **180-109048-4<br>C-7<br>7/29/2020<br>10:40 AM** | **180-108765-4<br>C-8<br>7/21/2020<br>10:30 AM** | **180-108765-5<br>C-9<br>7/21/2020<br>10:02 AM** | **180-108765-6<br>C-10<br>7/21/2020<br>9:40 AM** |
| 2 | Clay | 40.4 | 42.1 | **39.5** | **41.6** | **33.8** | **34.4** | **34.7** |
| 3 | Coarse Sand | 0.5 | 0.0 | **0.1** | **0.2** | **0.2** | **1.3** | **1.4** |
| 4 | Fine Sand | 5.0 | 4.3 | **5.2** | **2.7** | **7.8** | **3.8** | **13.8** |
| 5 | Gravel | 0.0 | 0.0 | **0.4** | **0.0** | **0.0** | **26.6** | **3.9** |
| 6 | Hydrometer Reading 1 - Percent Finer | 74.4 | 78.9 | **80.3** | **73.6** | **75.3** | **66.1** | **67.7** |
| 7 | Hydrometer Reading 2 - Percent Finer | 67.1 | 68.9 | **64.6** | **65.6** | **60.9** | **58.8** | **58.1** |
| 8 | Hydrometer Reading 3 - Percent Finer | 55.0 | 55.5 | **55.2** | **56.2** | **51.4** | **47.8** | **48.4** |
| 9 | Hydrometer Reading 4 - Percent Finer | 48.9 | 45.4 | **48.9** | **48.2** | **43.4** | **40.5** | **41.6** |
| 10 | Hydrometer Reading 5 - Percent Finer | 40.4 | 42.1 | **39.5** | **41.6** | **33.8** | **34.4** | **34.7** |
| 11 | Hydrometer Reading 6 - Percent Finer | 30.6 | 32.1 | **30.1** | **32.2** | **25.8** | **27.1** | **27.8** |
| 12 | Hydrometer Reading 7 - Percent Finer | 20.9 | 23.7 | **22.2** | **20.2** | **19.4** | **18.5** | **19.5** |
| 13 | Medium Sand | 1.7 | 1.1 | **0.9** | **1.2** | **3.1** | **1.4** | **5.5** |
| 14 | Moisture Content | 159.6 | 155.6 | **183.3** | **163.9** | **179.7** | **165.4** | **144.9** |
| 15 | Percent Moisture | 61.9 | 60.4 | **62.7** | **62.9** | **63.3** | **58.4** | **57.6** |
| 16 | Percent Solids | 38.1 | 39.6 | **37.3** | **37.1** | **36.7** | **41.6** | **42.4** |
| 17 | Sand | 7.2 | 5.4 | **6.2** | **4.1** | **11.1** | **6.5** | **20.7** |
| 18 | Sieve Size #10 - Percent Finer | 99.5 | 100.0 | **99.5** | **99.8** | **99.8** | **72.1** | **94.7** |
| 19 | Sieve Size #100 - Percent Finer | 95.8 | 96.6 | **95.4** | **97.6** | **92.1** | **67.8** | **80.2** |
| 20 | Sieve Size #20 - Percent Finer | 98.3 | 99.3 | **98.8** | **98.8** | **98.9** | **71.3** | **92.8** |
| 21 | Sieve Size #200 - Percent Finer | 92.8 | 94.6 | **93.4** | **95.9** | **88.9** | **66.9** | **75.4** |
| 22 | Sieve Size #4 - Percent Finer | 100.0 | 100.0 | **99.6** | **100.0** | **100.0** | **73.4** | **96.1** |
| 23 | Sieve Size #40 - Percent Finer | 97.8 | 98.9 | **98.6** | **98.6** | **96.7** | **70.7** | **89.2** |
| 24 | Sieve Size #60 - Percent Finer | 96.9 | 98.3 | **97.4** | **98.1** | **95.1** | **69.6** | **85.6** |
| 25 | Sieve Size #80 - Percent Finer | 96.3 | 97.4 | **96.3** | **97.9** | **93.7** | **68.6** | **82.5** |
| 26 | Sieve Size 0.375 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **75.4** | **96.6** |
| 27 | Sieve Size 0.75 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **79.5** | **100.0** |
| 28 | Sieve Size 1 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 29 | Sieve Size 1.5 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 30 | Sieve Size 2 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 31 | Sieve Size 3 inch - Percent Finer | 100.0 | 100.0 | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 32 | Silt | 52.4 | 52.5 | **53.9** | **54.3** | **55.1** | **32.5** | **40.7** |
| 33 | Total Organic Carbon - Duplicates | 34000 | 30000 | **52000** | **32000** | **49000** | **36000** | **38000** |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 2 | 1,1'-Biphenyl | 92-52-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 61000 |
| 3 | 1,1,1-Trichloroethane | 71-55-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 160000000 |
| 4 | 1,1,2,2-Tetrachloroethane | 79-34-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 1000 |
| 5 | 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 6 | 1,1,2-Trichloroethane | 79-00-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 7 | 1,1-Dichloroethane | 75-34-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 8000 |
| 8 | 1,1-Dichloroethene | 75-35-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 11000 |
| 9 | 1,1-Dichloroethene | 75-35-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 10 | 1,2,4-Trichlorobenzene | 120-82-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 73000 |
| 11 | 1,2,4-Trichlorobenzene | 120-82-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 73000 |
| 12 | 1,2-Dibromo-3-Chloropropane | 96-12-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 80 |
| 13 | 1,2-Dibromoethane | 106-93-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 8[a] |
| 14 | 1,2-Dichlorobenzene | 95-50-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5300000 |
| 15 | 1,2-Dichlorobenzene | 95-50-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5300000 |
| 16 | 1,2-Dichloroethane | 107-06-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 900 |
| 17 | 1,2-Dichloroethane | 107-06-2 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 18 | 1,2-Dichloropropane | 78-87-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 19 | 1,2-Diphenylhydrazine(as Azobenzene) | 122-66-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 20 | 1,3-Dichlorobenzene | 541-73-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5300000 |
| 21 | 1,3-Dichlorobenzene | 541-73-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5300000 |
| 22 | 1,4-Dichlorobenzene | 106-46-7 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 23 | 1,4-Dichlorobenzene | 106-46-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 5000 |
| 24 | 1,4-Dichlorobenzene | 106-46-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5000 |
| 25 | 1,4-Dioxane | 123-91-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 26 | 2,4,5-Trichlorophenol | 95-95-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6100000 |
| 27 | 2,4,5-Trichlorophenol | 95-95-4 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 28 | 2,4,6-Trichlorophenol | 88-06-2 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 29 | 2,4,6-Trichlorophenol | 88-06-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 19000 |
| 30 | 2,4-Dichlorophenol | 120-83-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 180000 |
| 31 | 2,4-Dimethylphenol | 105-67-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1200000 |
| 32 | 2,4-Dinitrophenol | 51-28-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 120000 |
| 33 | 2,4-Dinitrotoluene | 121-14-2 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 34 | 2,4-Dinitrotoluene | 121-14-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 35 | 2,6-Dinitrotoluene | 606-20-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 36 | 2-Butanone (MEK) | 78-93-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3100000 |
| 37 | 2-Butanone (MEK) | 78-93-3 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 38 | 2-Chloronaphthalene | 91-58-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 39 | 2-Chlorophenol | 95-57-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 310000 |
| 40 | 2-Hexanone | 591-78-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 41 | 2-Methylnaphthalene | 91-57-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 230000 |
| 42 | 2-Methylphenol | 95-48-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 310000 |
| 43 | 2-Methylphenol | 95-48-7 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 2 | 1,1'-Biphenyl | 240000 | 3.3 J | ND | ND | ND | 15 J |
| 3 | 1,1,1-Trichloroethane | | ND | ND | ND | ND | ND |
| 4 | 1,1,2,2-Tetrachloroethane | 3000 | ND | ND | ND | ND | ND |
| 5 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | ND | ND | ND | ND | ND |
| 6 | 1,1,2-Trichloroethane | 6000 | ND | ND | ND | ND | ND |
| 7 | 1,1-Dichloroethane | 24000 | ND | ND | ND | ND | ND |
| 8 | 1,1-Dichloroethene | 150000 | ND | ND | ND | ND | ND |
| 9 | 1,1-Dichloroethene | n/a[b] | ND | ND | ND | ND | ND |
| 10 | 1,2,4-Trichlorobenzene | 820000 | ND | ND | ND | ND | ND |
| 11 | 1,2,4-Trichlorobenzene | 820000 | ND | ND | ND | ND | ND |
| 12 | 1,2-Dibromo-3-Chloropropane | 200 | ND | ND ^c | ND ^c | ND ^c | ND |
| 13 | 1,2-Dibromoethane | 40 | ND | ND | ND | ND | ND |
| 14 | 1,2-Dichlorobenzene | 59000000 | ND | ND | ND | ND | 6.5 J |
| 15 | 1,2-Dichlorobenzene | 59000000 | ND | ND | ND | ND | ND |
| 16 | 1,2-Dichloroethane | 3000 | ND | ND | ND | ND | ND |
| 17 | 1,2-Dichloroethane | n/a[b] | ND | ND | ND | ND | ND |
| 18 | 1,2-Dichloropropane | 5000 | ND | ND | ND | ND | ND |
| 19 | 1,2-Diphenylhydrazine(as Azobenzene) | 2000 | ND | ND | ND | ND | ND |
| 20 | 1,3-Dichlorobenzene | 59000000 | ND | ND | ND | ND | ND |
| 21 | 1,3-Dichlorobenzene | 59000000 | ND | ND | ND | ND | 4.2 J |
| 22 | 1,4-Dichlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 23 | 1,4-Dichlorobenzene | 13000 | ND | ND | ND | ND | ND |
| 24 | 1,4-Dichlorobenzene | 13000 | ND | ND | ND | ND | 10 J |
| 25 | 1,4-Dioxane | | ND | ND | ND | ND | ND |
| 26 | 2,4,5-Trichlorophenol | 68000000 | ND | ND | ND | ND | ND |
| 27 | 2,4,5-Trichlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 28 | 2,4,6-Trichlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 29 | 2,4,6-Trichlorophenol | 74000 | ND | ND | ND | ND | ND |
| 30 | 2,4-Dichlorophenol | 2100000 | ND | ND | ND | ND | ND |
| 31 | 2,4-Dimethylphenol | 14000000 | ND | ND | ND | ND | ND |
| 32 | 2,4-Dinitrophenol | 1400000 | ND | ND | ND | ND | ND |
| 33 | 2,4-Dinitrotoluene | n/a[b] | ND | ND | ND | ND | ND |
| 34 | 2,4-Dinitrotoluene | 3000 | ND | ND | ND | ND | ND |
| 35 | 2,6-Dinitrotoluene | 3000 | ND | ND | ND | ND | ND |
| 36 | 2-Butanone (MEK) | 44000000 | ND | ND FL | ND | ND | ND |
| 37 | 2-Butanone (MEK) | n/a[b] | ND ^c | **22** | ND | ND | ND ^c |
| 38 | 2-Chloronaphthalene | | ND | ND | ND | ND | ND |
| 39 | 2-Chlorophenol | 2200000 | ND | ND | ND | ND | ND |
| 40 | 2-Hexanone | | ND | ND | ND | ND | ND |
| 41 | 2-Methylnaphthalene | 2400000 | 7.7 J | 15 J | 13 J | 14 J | **23** |
| 42 | 2-Methylphenol | 3400000 | ND | ND | ND | ND | ND |
| 43 | 2-Methylphenol | n/a[b] | ND | ND | ND | ND | ND |

| | Analyte | CAS Number | Units | Specific Method | Reports To | Basis | Reg 1 |
|---|---|---|---|---|---|---|---|
| 44 | 2-Nitroaniline | 88-74-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 39000 |
| 45 | 2-Nitrophenol | 88-75-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 46 | 3,3'-Dichlorobenzidine | 91-94-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1000 |
| 47 | 3-Nitroaniline | 99-09-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 48 | 4,4'-DDD | 72-54-8 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 3000 |
| 49 | 4,4'-DDE | 72-55-9 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 2000 |
| 50 | 4,4'-DDT | 50-29-3 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 2000 |
| 51 | 4,6-Dinitro-2-methylphenol | 534-52-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6000 |
| 52 | 4-Bromophenyl phenyl ether | 101-55-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 53 | 4-Chloro-3-methylphenol | 59-50-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 54 | 4-Chloroaniline | 106-47-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 55 | 4-Chlorophenyl phenyl ether | 7005-72-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 56 | 4-Methyl-2-pentanone (MIBK) | 108-10-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 57 | 4-Nitroaniline | 100-01-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 58 | 4-Nitrophenol | 100-02-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 59 | Acenaphthene | 83-32-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 3400000 |
| 60 | Acenaphthylene | 208-96-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 61 | Acetone | 67-64-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 70000000 |
| 62 | Acetophenone | 98-86-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 2000 |
| 63 | Aldrin | 309-00-2 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 40 |
| 64 | alpha-BHC | 319-84-6 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 100 |
| 65 | Aluminum | 7429-90-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78000 |
| 66 | Anthracene | 120-12-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 17000000 |
| 67 | Antimony | 7440-36-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | 31 |
| 68 | Arsenic | 7440-38-2 | mg/L | Metals (ICP) | MRL | TCLP | n/a[b] |
| 69 | Arsenic | 7440-38-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 19 |
| 70 | Atrazine | 1912-24-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 210000 |
| 71 | Barium | 7440-39-3 | mg/L | Metals (ICP) | MRL | TCLP | n/a[b] |
| 72 | Barium | 7440-39-3 | mg/Kg | Metals (ICP/MS) | MRL | Total | 16000 |
| 73 | Benzaldehyde | 100-52-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 6100000 |
| 74 | Benzene | 71-43-2 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 75 | Benzene | 71-43-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 76 | Benzidine | 92-87-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 77 | Benzo[a]anthracene | 56-55-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 78 | Benzo[a]pyrene | 50-32-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 500 |
| 79 | Benzo[b]fluoranthene | 205-99-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 80 | Benzo[g,h,i]perylene | 191-24-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 380000000 |
| 81 | Benzo[k]fluoranthene | 207-08-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 45000 |
| 82 | Beryllium | 7440-41-7 | mg/Kg | Metals (ICP/MS) | MRL | Total | 16 |
| 83 | beta-BHC | 319-85-7 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 400 |
| 84 | bis (2-chloroisopropyl) ether | 108-60-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 23000 |
| 85 | Bis(2-chloroethoxy)methane | 111-91-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 86 | Bis(2-chloroethyl)ether | 111-44-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 400 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 44 | 2-Nitroaniline | 23000000 | ND | ND | ND | ND | ND |
| 45 | 2-Nitrophenol | | ND | ND | ND | ND | ND |
| 46 | 3,3'-Dichlorobenzidine | 4000 | ND | ND | ND | ND | ND |
| 47 | 3-Nitroaniline | | ND | ND | ND | ND | ND |
| 48 | 4,4'-DDD | 13000 | **4.1 *H** | **3.9** | **3.7** | **4.1** | **5.3 *H** |
| 49 | 4,4'-DDE | 9000 | **4.4 *H** | **5.2** | **4.5** | **4.5** | **8.3 *H** |
| 50 | 4,4'-DDT | 8000 | **4.5 *H** | **7.5** | ND | ND | ND *H |
| 51 | 4,6-Dinitro-2-methylphenol | 68000 | ND | ND | ND | ND | ND |
| 52 | 4-Bromophenyl phenyl ether | | ND | ND | ND | ND | ND |
| 53 | 4-Chloro-3-methylphenol | | ND | ND | ND | ND | ND |
| 54 | 4-Chloroaniline | | ND | ND *L | ND *L | ND *L | ND |
| 55 | 4-Chlorophenyl phenyl ether | | ND | ND | ND | ND | ND |
| 56 | 4-Methyl-2-pentanone (MIBK) | | ND | ND | ND | ND | ND |
| 57 | 4-Nitroaniline | | ND | ND | ND | ND | ND |
| 58 | 4-Nitrophenol | | ND | ND | ND | ND | ND |
| 59 | Acenaphthene | 37000000 | 5.5 J | ND | ND | ND | **38** |
| 60 | Acenaphthylene | 300000000 | 7.7 J | 16 J | 13 J | 20 J | **23** |
| 61 | Acetone | | ND | **65 ^c** | ND ^c | ND ^c | 8.6 J |
| 62 | Acetophenone | 5000 | ND | ND | ND | ND | ND |
| 63 | Aldrin | 200 | ND *H | ND | ND | 0.18 J p | ND *H |
| 64 | alpha-BHC | 500 | ND *H | ND | ND | ND | ND *H |
| 65 | Aluminum | | **19000 ^** | **17000 ^** | **15000 ^** | **15000 ^** | **19000 ^** |
| 66 | Anthracene | 30000000 | 9.3 J | 34 J | 17 J | 31 J | **41** |
| 67 | Antimony | 450 | **0.38** | **0.37 FL** | **0.35** | **0.38** | **0.65 FL** |
| 68 | Arsenic | n/a[b] | 0.064 J | ND | ND | ND | 0.061 J |
| 69 | Arsenic | 19 | **14** | **15** | **13** | **12** | **14** |
| 70 | Atrazine | 2400000 | ND | ND | ND | ND | ND |
| 71 | Barium | n/a[b] | 0.33 J | **120** | **130** | **120** | 0.30 J |
| 72 | Barium | 59000 | **120** | 0.40 J | 0.47 J | 0.46 J | **160** |
| 73 | Benzaldehyde | 68000000 | 6.1 J | ND | ND | ND | 15 J |
| 74 | Benzene | n/a[b] | ND | ND | ND | ND | ND |
| 75 | Benzene | 5000 | ND | ND | ND | ND | ND |
| 76 | Benzidine | 700 | ND | ND | ND | ND | ND |
| 77 | Benzo[a]anthracene | 17000 | **26** | **80** | **72** | **110** | **86** |
| 78 | Benzo[a]pyrene | 2000 | **28** | **86** | **77** | **120** | **90** |
| 79 | Benzo[b]fluoranthene | 17000 | **36** | **110** | **96** | **140** | **120** |
| 80 | Benzo[g,h,i]perylene | 30000000 | **29** | **85** | **88** | **120** | **79** |
| 81 | Benzo[k]fluoranthene | 170000 | **13** | 28 J | 35 J | **58** | **40** |
| 82 | Beryllium | 140 | **1.2** | **1.2** | **1.1** | **1.0** | **1.2** |
| 83 | beta-BHC | 2000 | ND *H | ND | ND | ND | ND *H |
| 84 | bis (2-chloroisopropyl) ether | 67000 | ND | ND | ND | ND | ND |
| 85 | Bis(2-chloroethoxy)methane | | ND | ND | ND | ND | ND |
| 86 | Bis(2-chloroethyl)ether | 2000 | ND | ND | ND | ND | ND |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 87 | Bis(2-ethylhexyl) phthalate | 117-81-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 35000 |
| 88 | Bromoform | 75-25-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 81000 |
| 89 | Bromomethane | 74-83-9 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 25000 |
| 90 | Butyl benzyl phthalate | 85-68-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 1200000 |
| 91 | Cadmium | 7440-43-9 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 92 | Cadmium | 7440-43-9 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78 |
| 93 | Calcium | 7440-70-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 94 | Caprolactam | 105-60-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 31000000 |
| 95 | Carbazole | 86-74-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 24000 |
| 96 | Carbon disulfide | 75-15-0 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 7800000 |
| 97 | Carbon tetrachloride | 56-23-5 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 98 | Carbon tetrachloride | 56-23-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 2000 |
| 99 | Chlordane (technical) | 12789-03-6 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 100 | Chlorobenzene | 108-90-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 510000 |
| 101 | Chlorobenzene | 108-90-7 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 102 | Chlorodibromomethane | 124-48-1 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3000 |
| 103 | Chloroethane | 75-00-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 220000 |
| 104 | Chloroform | 67-66-3 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 105 | Chloroform | 67-66-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 600 |
| 106 | Chloromethane | 74-87-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 4000 |
| 107 | Chromium | 7440-47-3 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 108 | Chromium | 7440-47-3 | mg/L | Metals (ICP) | MRL | TCLP | |
| 109 | Chrysene | 218-01-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 450000 |
| 110 | cis-1,2-Dichloroethene | 156-59-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 230000 |
| 111 | cis-1,3-Dichloropropene | 10061-01-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 112 | cis-Chlordane | 5103-71-9 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | |
| 113 | Clay | N/A | % | Grain Size | MRL | Total | |
| 114 | Coarse Sand | N/A | % | Grain Size | MRL | Total | |
| 115 | Cobalt | 7440-48-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | 1600 |
| 116 | Copper | 7440-50-8 | mg/Kg | Metals (ICP/MS) | MRL | Total | 3100 |
| 117 | Cr (III) | 16065-83-1 | ug/Kg | Chromium, Trivalent (Colorimetric) | MRL | Total | |
| 118 | Cr (VI) | 18540-29-9 | ug/Kg | Chromium, Hexavalent | MDL | Total | |
| 119 | Cresols, Total | 1319-77-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 120 | Cyanide, Total | 57-12-5 | ug/Kg | Cyanide | MRL | Total | 47000 |
| 121 | Cyclohexane | 110-82-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 122 | delta-BHC | 319-86-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 123 | Dibenz(a,h)anthracene | 53-70-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 500 |
| 124 | Dibenzofuran | 132-64-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 125 | Dichlorobromomethane | 75-27-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 1000 |
| 126 | Dichlorodifluoromethane | 75-71-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 490000 |
| 127 | Dieldrin | 60-57-1 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 40 |
| 128 | Diethyl phthalate | 84-66-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 49000000 |
| 129 | Dimethyl phthalate | 131-11-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 87 | Bis(2-ethylhexyl) phthalate | 140000 | ND | ND | ND | ND | ND |
| 88 | Bromoform | 280000 | ND | ND | ND | ND | ND |
| 89 | Bromomethane | 59000 | ND | ND | ND | ND | ND |
| 90 | Butyl benzyl phthalate | 14000000 | ND | ND | ND | ND | ND |
| 91 | Cadmium | n/a[b] | ND | 0.0035 J | 0.0041 J | 0.0051 J | ND |
| 92 | Cadmium | 78 | **0.57** | **0.64** | **0.61** | **0.59** | **1.0** |
| 93 | Calcium | | **4500** | **3900 FL** | **3700** | **3100** | **4300 FL** |
| 94 | Caprolactam | 340000000 | ND | ND | ND | ND | ND |
| 95 | Carbazole | 96000 | 4.2 J | 13 J | ND | 15 J | 9.9 J |
| 96 | Carbon disulfide | 110000000 | ND | ND *1 | ND *1 | ND *1 | ND |
| 97 | Carbon tetrachloride | n/a[b] | ND | ND | ND | ND | ND |
| 98 | Carbon tetrachloride | 4000 | ND | ND | ND | ND | ND |
| 99 | Chlordane (technical) | n/a[b] | ND | ND | ND | ND | ND |
| 100 | Chlorobenzene | 7400000 | ND | ND | ND | ND | ND |
| 101 | Chlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 102 | Chlorodibromomethane | 8000 | ND | ND | ND | ND | ND |
| 103 | Chloroethane | 1100000 | ND | ND | ND | ND | ND |
| 104 | Chloroform | n/a[b] | ND | ND FL | ND | ND | ND |
| 105 | Chloroform | 2000 | ND | ND | ND | ND | ND |
| 106 | Chloromethane | 12000 | ND | ND | ND | ND | ND |
| 107 | Chromium | | **52** | ND | 0.011 J | ND | **55 FL** |
| 108 | Chromium | | 0.010 J | **62** | **55** | **52** | ND |
| 109 | Chrysene | 1700000 | **31** | **110** | **91** | **150** | **130** |
| 110 | cis-1,2-Dichloroethene | 560000 | ND | ND | ND | ND | ND |
| 111 | cis-1,3-Dichloropropene | | ND | ND | ND | ND | ND |
| 112 | cis-Chlordane | | **0.68 *H** | 0.45 J p | **0.80** | **0.62 p** | **0.57 *H** |
| 113 | Clay | | **42.4** | **43.5** | **43.9** | **45.5** | **38.8** |
| 114 | Coarse Sand | | **0.0** | **0.8** | **0.0** | **0.2** | **0.6** |
| 115 | Cobalt | 590 | **17** | **17** | **15** | **14** | **17** |
| 116 | Copper | 45000 | **32** | **37** | **33** | **33** | **49 ^** |
| 117 | Cr (III) | | **52000** | **62000** | **55000** | **52000** | **55000** |
| 118 | Cr (VI) | | ND | ND | ND | ND | 680 J |
| 119 | Cresols, Total | | ND | ND | ND | ND | ND |
| 120 | Cyanide, Total | 680000 | 360 J | 190 J | 190 J | ND | 370 J |
| 121 | Cyclohexane | | ND | ND | ND | ND | ND |
| 122 | delta-BHC | | ND *H | ND | ND | ND | ND *H |
| 123 | Dibenz(a,h)anthracene | 2000 | **14** | ND | ND | 26 J | **31** |
| 124 | Dibenzofuran | | 4.2 J | 9.1 J | ND | ND | 14 J |
| 125 | Dichlorobromomethane | 3000 | ND | ND | ND | ND | ND |
| 126 | Dichlorodifluoromethane | 230000000 | ND *H | ND | ND | ND | ND *H |
| 127 | Dieldrin | 200 | **1.1 *H** | ND | **0.97** | ND | ND *H |
| 128 | Diethyl phthalate | 550000000 | ND | ND | ND | ND | ND |
| 129 | Dimethyl phthalate | | ND | ND | ND | ND | ND |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 130 | Di-n-butyl phthalate | 84-74-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6100000 |
| 131 | Di-n-octyl phthalate | 117-84-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 2400000 |
| 132 | Endosulfan I | 959-98-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 133 | Endosulfan II | 33213-65-9 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 134 | Endosulfan sulfate | 1031-07-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 470000 |
| 135 | Endrin | 72-20-8 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | 23000 |
| 136 | Endrin | 72-20-8 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 137 | Endrin aldehyde | 7421-93-4 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 138 | Endrin ketone | 53494-70-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 139 | Ethylbenzene | 100-41-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 7800000 |
| 140 | Fine Sand | N/A | % | Grain Size | MRL | Total | |
| 141 | Fluoranthene | 206-44-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 2300000 |
| 142 | Fluorene | 86-73-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 2300000 |
| 143 | gamma-BHC (Lindane) | 58-89-9 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 400 |
| 144 | gamma-BHC (Lindane) | 58-89-9 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 145 | Gravel | N/A | % | Grain Size | MRL | Total | |
| 146 | Heptachlor | 76-44-8 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 100 |
| 147 | Heptachlor | 76-44-8 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 148 | Heptachlor epoxide | 1024-57-3 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 70 |
| 149 | Heptachlor epoxide | 1024-57-3 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 150 | Hexachlorobenzene | 118-74-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 300 |
| 151 | Hexachlorobenzene | 118-74-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 152 | Hexachlorobutadiene | 87-68-3 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 153 | Hexachlorobutadiene | 87-68-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 6000 |
| 154 | Hexachlorocyclopentadiene | 77-47-4 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 45000 |
| 155 | Hexachloroethane | 67-72-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 156 | Hexachloroethane | 67-72-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 12000 |
| 157 | Hydrometer Reading 1 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 158 | Hydrometer Reading 2 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 159 | Hydrometer Reading 3 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 160 | Hydrometer Reading 4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 161 | Hydrometer Reading 5 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 162 | Hydrometer Reading 6 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 163 | Hydrometer Reading 7 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 164 | Indeno[1,2,3-cd]pyrene | 193-39-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 5000 |
| 165 | Iron | 7439-89-6 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 166 | Isophorone | 78-59-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 510000 |
| 167 | Isopropylbenzene | 98-82-8 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 168 | Lead | 7439-92-1 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 169 | Lead | 7439-92-1 | mg/Kg | Metals (ICP/MS) | MRL | Total | 400 |
| 170 | Magnesium | 7439-95-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 171 | Manganese | 7439-96-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | 11000 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 130 | Di-n-butyl phthalate | 68000000 | ND | ND | ND | ND | ND |
| 131 | Di-n-octyl phthalate | 27000000 | ND | ND | ND | ND | ND |
| 132 | Endosulfan I | | ND *H | ND | ND | ND | ND *H |
| 133 | Endosulfan II | | ND *H | ND | ND | ND | ND *H |
| 134 | Endosulfan sulfate | 6800000 | ND *H | ND | ND | ND | ND *H |
| 135 | Endrin | 340000 | 0.57 J p *H | ND | ND | ND | **1.5 p *H** |
| 136 | Endrin | n/a[b] | ND | **0.66 p** | **0.62 p** | **1.1** | ND |
| 137 | Endrin aldehyde | | ND B *H | ND | ND | ND | ND B *H |
| 138 | Endrin ketone | | ND *H | ND | ND | ND | ND *H |
| 139 | Ethylbenzene | 110000000 | ND | ND | ND | ND | ND |
| 140 | Fine Sand | | **5.0** | **4.3** | **3.6** | **4.4** | **10.4** |
| 141 | Fluoranthene | 24000000 | **44** | **150** | **130** | **210** | **190** |
| 142 | Fluorene | 24000000 | 5.5 J | 14 J | 11 J | ND | **32** |
| 143 | gamma-BHC (Lindane) | 2000 | ND *H | ND | ND | ND | ND *H |
| 144 | gamma-BHC (Lindane) | n/a[b] | ND | ND | ND | ND | ND |
| 145 | Gravel | | **0.0** | **0.0** | **0.0** | **0.0** | **4.8** |
| 146 | Heptachlor | 700 | ND *H | ND | ND | ND | ND *H |
| 147 | Heptachlor | n/a[b] | ND | ND | ND | ND | ND |
| 148 | Heptachlor epoxide | 300 | ND *H | ND | 0.15 J p | ND | ND *H |
| 149 | Heptachlor epoxide | n/a[b] | ND | ND | ND | ND | ND |
| 150 | Hexachlorobenzene | 1000 | ND | ND | ND | ND | ND |
| 151 | Hexachlorobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 152 | Hexachlorobutadiene | n/a[b] | ND | ND | ND | ND | ND |
| 153 | Hexachlorobutadiene | 25000 | ND | ND | ND | ND | ND |
| 154 | Hexachlorocyclopentadiene | 110000 | ND | ND | ND | ND | ND |
| 155 | Hexachloroethane | n/a[b] | ND | ND | ND | ND | ND |
| 156 | Hexachloroethane | 48000 | ND | ND | ND | ND | ND |
| 157 | Hydrometer Reading 1 - Percent Finer | | **73.1** | **77.8** | **75.6** | **74.7** | **78.7** |
| 158 | Hydrometer Reading 2 - Percent Finer | | **65.0** | **67.7** | **63.5** | **68.9** | **64.6** |
| 159 | Hydrometer Reading 3 - Percent Finer | | **56.9** | **53.7** | **56.0** | **63.0** | **54.3** |
| 160 | Hydrometer Reading 4 - Percent Finer | | **50.5** | **49.8** | **50.0** | **57.2** | **46.5** |
| 161 | Hydrometer Reading 5 - Percent Finer | | **42.4** | **43.5** | **43.9** | **45.5** | **38.8** |
| 162 | Hydrometer Reading 6 - Percent Finer | | **32.7** | **34.6** | **33.4** | **33.8** | **31.1** |
| 163 | Hydrometer Reading 7 - Percent Finer | | **24.6** | **24.4** | **24.4** | **23.6** | **22.1** |
| 164 | Indeno[1,2,3-cd]pyrene | 17000 | **21** | **69** | **57** | **90** | **65** |
| 165 | Iron | | **32000** | **31000** | **28000** | **27000** | **30000** |
| 166 | Isophorone | 2000000 | ND | ND | ND | ND | ND |
| 167 | Isopropylbenzene | | ND | ND | ND | ND | ND |
| 168 | Lead | n/a[b] | ND | **53** | **46** | **45** | ND |
| 169 | Lead | 800 | **47** | ND | ND | ND | **73 ^** |
| 170 | Magnesium | | **6900** | **6200 FL** | **5500** | **5300** | **5900** |
| 171 | Manganese | 5900 | **1500** | **1500** | **1400** | **1200** | **1200** |

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 172 | Medium Sand | N/A | % | Grain Size | MRL | Total | |
| 173 | Mercury | 7439-97-6 | mg/Kg | Mercury (CVAA) | MRL | Total | 23 |
| 174 | Mercury | 7439-97-6 | mg/L | Mercury (CVAA) | MDL | TCLP | n/a[b] |
| 175 | Methoxychlor | 72-43-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 390000 |
| 176 | Methoxychlor | 72-43-5 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 177 | Methyl acetate | 79-20-9 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 78000000 |
| 178 | Methyl tert-butyl ether | 1634-04-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 110000 |
| 179 | Methylcyclohexane | 108-87-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 180 | Methylene Chloride | 75-09-2 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 46000 |
| 181 | Methylphenol, 3 & 4 | 106-44-5 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 182 | Methylphenol, 3 & 4 | 106-44-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 31000 |
| 183 | Mirex | 2385-85-5 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | |
| 184 | Moisture Content | N/A | % | Water (Moisture) Content | MRL | Total | |
| 185 | Naphthalene | 91-20-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 6000 |
| 186 | Nickel | 7440-02-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | 1600 |
| 187 | Nitrobenzene | 98-95-3 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 188 | Nitrobenzene | 98-95-3 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 5000 |
| 189 | N-Nitrosodimethylamine | 62-75-9 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 700 |
| 190 | N-Nitrosodi-n-propylamine | 621-64-7 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 200 |
| 191 | N-Nitrosodiphenylamine | 86-30-6 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 99000 |
| 192 | PCB-1016 | 12674-11-2 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 193 | PCB-1221 | 11104-28-2 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 194 | PCB-1232 | 11141-16-5 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 195 | PCB-1242 | 53469-21-9 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 196 | PCB-1248 | 12672-29-6 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 197 | PCB-1254 | 11097-69-1 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MRL | Total | |
| 198 | PCB-1260 | 11096-82-5 | ug/Kg | Polychlorinated Biphenyls (PCBs) (GC) | MDL | Total | |
| 199 | Pentachlorophenol | 87-86-5 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | n/a[b] |
| 200 | Pentachlorophenol | 87-86-5 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 900 |
| 201 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | |
| 202 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | |
| 203 | Phenanthrene | 85-01-8 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | |
| 204 | Phenol | 108-95-2 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | 18000000 |
| 205 | Polychlorinated biphenyls, Total | 1336-36-3 | ug/Kg | Total PCB Calculation | MRL | Total | 200 |
| 206 | Potassium | 7440-09-7 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 207 | Pyrene | 129-00-0 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MRL | Total | 1700000 |
| 208 | Pyridine | 110-86-1 | ug/Kg | Semivolatile Organic Compounds by GC/MS - Low Level | MDL | Total | |
| 209 | Pyridine | 110-86-1 | mg/L | Semivolatile Organic Compounds (GC/MS) | MDL | TCLP | |
| 210 | Sand | N/A | % | Grain Size | MRL | Total | |
| 211 | Selenium | 7782-49-2 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 212 | Selenium | 7782-49-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 390 |
| 213 | Sieve Size #10 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 172 | Medium Sand | | **1.5** | **1.4** | **1.4** | **1.0** | **3.1** |
| 173 | Mercury | 65 | **0.19** | **0.18** | **0.20** | **0.20** | **0.26** |
| 174 | Mercury | n/a[b] | ND | ND | ND | ND | ND |
| 175 | Methoxychlor | 5700000 | ND *H | ND | ND | ND | ND *H |
| 176 | Methoxychlor | n/a[b] | ND | ND | ND | ND | ND |
| 177 | Methyl acetate | | ND | ND | ND | ND | ND |
| 178 | Methyl tert-butyl ether | 320000 | ND | ND | ND | ND | ND |
| 179 | Methylcyclohexane | | ND | ND | ND | ND | ND |
| 180 | Methylene Chloride | 230000 | ND ^c | ND | ND | ND | ND ^c |
| 181 | Methylphenol, 3 & 4 | n/a[b] | ND | ND | ND | ND | ND |
| 182 | Methylphenol, 3 & 4 | 340000 | ND | ND | ND | ND | ND |
| 183 | Mirex | | ND *H | ND | ND | ND | ND *H |
| 184 | Moisture Content | | **189.9** | **171.4** | **167.3** | **172.0** | **152.2** |
| 185 | Naphthalene | 17000 | **11** | 28 J | 23 J | 27 J | **55** |
| 186 | Nickel | 23000 | **33** | **33** | **29** | **28** | **29 FL** |
| 187 | Nitrobenzene | n/a[b] | ND | ND | ND | ND | ND |
| 188 | Nitrobenzene | 14000 | ND | ND | ND | ND | ND |
| 189 | N-Nitrosodimethylamine | 700 | ND ^c | ND | ND | ND | ND ^c |
| 190 | N-Nitrosodi-n-propylamine | 300 | ND | ND | ND | ND | ND |
| 191 | N-Nitrosodiphenylamine | 390000 | ND | ND | ND | ND | ND |
| 192 | PCB-1016 | | ND | ND | ND | ND | ND |
| 193 | PCB-1221 | | ND | ND | ND | ND | ND |
| 194 | PCB-1232 | | ND | ND | ND | ND | ND |
| 195 | PCB-1242 | | ND | ND | ND | ND | ND |
| 196 | PCB-1248 | | ND | **7.7** | **7.1** | **7.0** | ND |
| 197 | PCB-1254 | | **12** | **8.2** | **6.4** | **7.6** | **18** |
| 198 | PCB-1260 | | ND | **10** | **8.6** | **10** | ND |
| 199 | Pentachlorophenol | n/a[b] | ND | ND | ND | ND | ND |
| 200 | Pentachlorophenol | 3000 | ND | ND | ND | ND | ND |
| 201 | Percent Moisture | | **66.3** | **65.4** | **63.9** | **65.1** | **63.2** |
| 202 | Percent Solids | | **33.7** | **34.6** | **36.1** | **34.9** | **36.8** |
| 203 | Phenanthrene | 300000000 | **22** | **69** | **57** | **84** | **100** |
| 204 | Phenol | 210000000 | ND | ND | ND | ND | ND |
| 205 | Polychlorinated biphenyls, Total | 1000 | **12** | **26** | **22** | **25** | **18** |
| 206 | Potassium | | **2800** | **2600 FL** | **2300** | **2200** | **2600** |
| 207 | Pyrene | 18000000 | **48** | **120** | **100** | **170** | **180** |
| 208 | Pyridine | | ND | ND | ND | ND | ND |
| 209 | Pyridine | | ND | ND | ND | ND | ND |
| 210 | Sand | | **6.5** | **6.5** | **5.0** | **5.6** | **14.1** |
| 211 | Selenium | n/a[b] | ND B | ND | ND | ND | ND B |
| 212 | Selenium | 5700 | **0.73** | **0.73** | **0.72** | 0.62 J | **0.71 FL** |
| 213 | Sieve Size #10 - Percent Finer | | **100.0** | **99.2** | **100.0** | **99.8** | **94.6** |

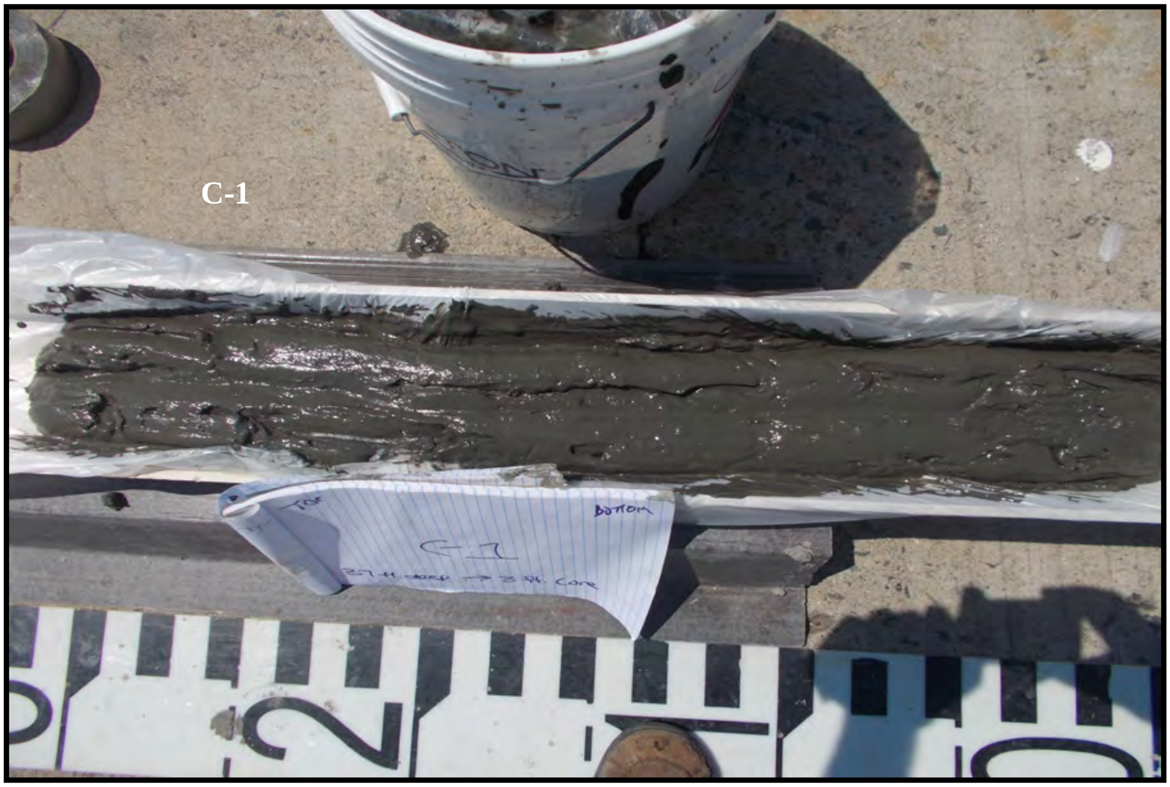
| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** |
| 214 | Sieve Size #100 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 215 | Sieve Size #20 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 216 | Sieve Size #200 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 217 | Sieve Size #4 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 218 | Sieve Size #40 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 219 | Sieve Size #60 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 220 | Sieve Size #80 - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 221 | Sieve Size 0.375 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 222 | Sieve Size 0.75 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 223 | Sieve Size 1 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 224 | Sieve Size 1.5 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 225 | Sieve Size 2 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 226 | Sieve Size 3 inch - Percent Finer | N/A | % Passing | Grain Size | MRL | Total | |
| 227 | Silt | N/A | % | Grain Size | MRL | Total | |
| 228 | Silver | 7440-22-4 | mg/L | Metals (ICP) | MDL | TCLP | n/a[b] |
| 229 | Silver | 7440-22-4 | mg/Kg | Metals (ICP/MS) | MRL | Total | 390 |
| 230 | Sodium | 7440-23-5 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 231 | Styrene | 100-42-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 90000 |
| 232 | Tetrachloroethene | 127-18-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 233 | Tetrachloroethene | 127-18-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 43000 |
| 234 | Thallium | 7440-28-0 | mg/Kg | Metals (ICP/MS) | MRL | Total | |
| 235 | Toluene | 108-88-3 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 6300000 |
| 236 | Total Organic Carbon - Duplicates | 7440-44-0 | mg/Kg | Organic Carbon, Total (TOC) | MRL | Total | |
| 237 | Toxaphene | 8001-35-2 | ug/Kg | Organochlorine Pesticides (GC) | MDL | Total | 600 |
| 238 | Toxaphene | 8001-35-2 | mg/L | Organochlorine Pesticides (GC) | MDL | TCLP | n/a[b] |
| 239 | trans-1,2-Dichloroethene | 156-60-5 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 300000 |
| 240 | trans-1,3-Dichloropropene | 10061-02-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | |
| 241 | trans-Chlordane | 5103-74-2 | ug/Kg | Organochlorine Pesticides (GC) | MRL | Total | |
| 242 | Trichloroethene | 79-01-6 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 3000 |
| 243 | Trichloroethene | 79-01-6 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 244 | Trichlorofluoromethane | 75-69-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 23000000 |
| 245 | Vanadium | 7440-62-2 | mg/Kg | Metals (ICP/MS) | MRL | Total | 78 |
| 246 | Vinyl chloride | 75-01-4 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 700 |
| 247 | Vinyl chloride | 75-01-4 | mg/L | Volatile Organic Compounds by GC/MS | MDL | TCLP | n/a[b] |
| 248 | Xylenes, Total | 1330-20-7 | ug/Kg | Volatile Organic Compounds by GC/MS | MDL | Total | 12000000 |
| 249 | Zinc | 7440-66-6 | mg/Kg | Metals (ICP/MS) | MRL | Total | 23000 |

| | A | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **Reg 2** | **180-108764-1 SC-1 COMPOSITE [C-9+C-10] 7/22/2020 1:00 PM** | **180-109049-1 SC-2 COMPOSITE [C-3+C-4] 7/30/2020 8:53 AM** | **180-109049-2 SC-3 COMPOSITE [C-5+C-6] 7/30/2020 9:40 AM** | **180-109049-3 SC-4 COMPOSITE [C-7+C-8] 7/30/2020 10:22 AM** | **180-108764-2 SC-5 COMPOSITE [C-1+C-2] 7/22/2020 1:30 PM** |
| 214 | Sieve Size #100 - Percent Finer | | **95.0** | **95.6** | **96.9** | **96.7** | **84.7** |
| 215 | Sieve Size #20 - Percent Finer | | **98.6** | **98.4** | **98.9** | **99.2** | **93.4** |
| 216 | Sieve Size #200 - Percent Finer | | **93.5** | **93.5** | **95.0** | **94.4** | **81.1** |
| 217 | Sieve Size #4 - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **95.2** |
| 218 | Sieve Size #40 - Percent Finer | | **98.5** | **97.8** | **98.6** | **98.8** | **91.5** |
| 219 | Sieve Size #60 - Percent Finer | | **97.3** | **97.2** | **97.8** | **98.2** | **89.0** |
| 220 | Sieve Size #80 - Percent Finer | | **96.1** | **96.4** | **97.3** | **97.4** | **86.7** |
| 221 | Sieve Size 0.375 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **97.1** |
| 222 | Sieve Size 0.75 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 223 | Sieve Size 1 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 224 | Sieve Size 1.5 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 225 | Sieve Size 2 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 226 | Sieve Size 3 inch - Percent Finer | | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |
| 227 | Silt | | **51.1** | **50.0** | **51.1** | **48.9** | **42.3** |
| 228 | Silver | n/a[b] | ND | ND | ND | ND | ND |
| 229 | Silver | 5700 | **0.29** | **0.27** | **0.25** | **0.20** | **0.45** |
| 230 | Sodium | | **880** | **780 FL** | **710** | **770** | **780 FL** |
| 231 | Styrene | 260000 | ND | ND | ND | ND | ND |
| 232 | Tetrachloroethene | n/a[b] | ND | ND | ND | ND | ND |
| 233 | Tetrachloroethene | 1500000 | ND | ND | ND | ND | ND |
| 234 | Thallium | | **0.34** | **0.23** | **0.28** | **0.25** | **0.31** |
| 235 | Toluene | 91000000 | ND | ND | ND | ND | ND |
| 236 | Total Organic Carbon - Duplicates | | **36000** | **44000** | **30000** | **45000** | **44000 ^** |
| 237 | Toxaphene | 3000 | ND *H | ND | ND | ND | ND *H |
| 238 | Toxaphene | n/a[b] | ND | ND | ND | ND | ND |
| 239 | trans-1,2-Dichloroethene | 720000 | ND | ND | ND | ND | ND |
| 240 | trans-1,3-Dichloropropene | | ND | ND | ND | ND | ND |
| 241 | trans-Chlordane | | **1.7 *H** | **1.3** | **1.6** | **1.6** | **2.2 *H** |
| 242 | Trichloroethene | 10000 | ND | ND | ND | ND | ND |
| 243 | Trichloroethene | n/a[b] | ND | ND FL | ND | ND | ND |
| 244 | Trichlorofluoromethane | 340000000 | ND ^c | ND ^c | ND ^c | ND ^c | ND ^c |
| 245 | Vanadium | 1100 | **47** | **48** | **43** | **41** | **55** |
| 246 | Vinyl chloride | 2000 | ND | ND | ND | ND | ND |
| 247 | Vinyl chloride | n/a[b] | ND | ND | ND | ND | ND |
| 248 | Xylenes, Total | 170000000 | ND | ND | ND | ND | ND |
| 249 | Zinc | 110000 | **200** | **190** | **170** | **170** | **330 ^** |

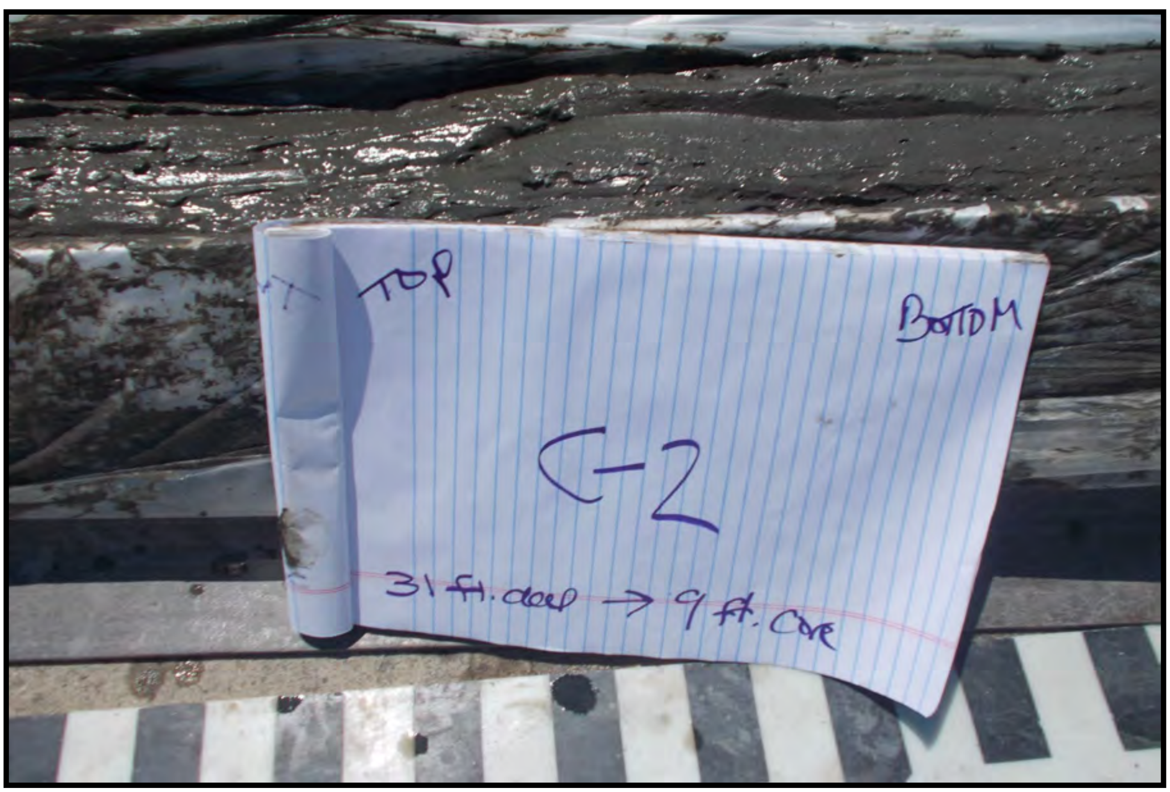
| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Analyte** | **CAS Number** | **Units** | **Specific Method** | **Reports To** | **Basis** | **Reg 1** | **Reg 2** | **180-108767-1 SC-1 MODIFIED ELUTRIATE [C-1+C-2] 7/21/2020 12:00 AM** | **180-109050-1 SC-2 MODIFIED ELUTRIATE [C-3+C-4] 7/30/2020 12:00 AM** | **180-109050-4 SC- 3 MODIFIED ELUTRIATE [C-5+C-6] 7/30/2020 12:00 AM** | **180-109050-9 SC- 4 MODIFIED ELUTRIATE [C-7+C-8] 7/30/2020 12:00 AM** | **180-108767-5 SC- 5 MODIFIED ELUTRIATE [C-9+C-10] 7/21/2020 12:00 AM** |
| 2 | Elutriate Generated | N/A | g/L | Modified Elutriate Test Technique | MRL | Total | | | **150** | **150** | **150** | **150** | **150** |
| 3 | Elutriate Generated | N/A | g/L | Modified Elutriate Test Technique, Dissolved | MRL | Dissolved | | | **150** | **150** | **150** | **150** | **150** |
| 4 | Percent Moisture | N/A | % | Percent Moisture | MRL | Total | | | **67.7** | **64.3** | **63.6** | **66.1** | **63.7** |
| 5 | Percent Solids | N/A | % | Percent Moisture | MRL | Total | | | **32.3** | **35.7** | **36.4** | **33.9** | **36.3** |


**<u>PHOTO No. 1:</u> C-1**


**<u>PHOTO No. 2:</u> C-1 CORE**




**<u>PHOTO No. 3:</u> C-1 CORE**




**<u>PHOTO No. 4:</u> C-2**


**<u>PHOTO No. 5:</u> C-2 CORE, TOP**


**<u>PHOTO No. 6:</u> C-2 CORE, CENTER**


**PHOTO No. 7:** **C-2 CORE, BOTTOM**

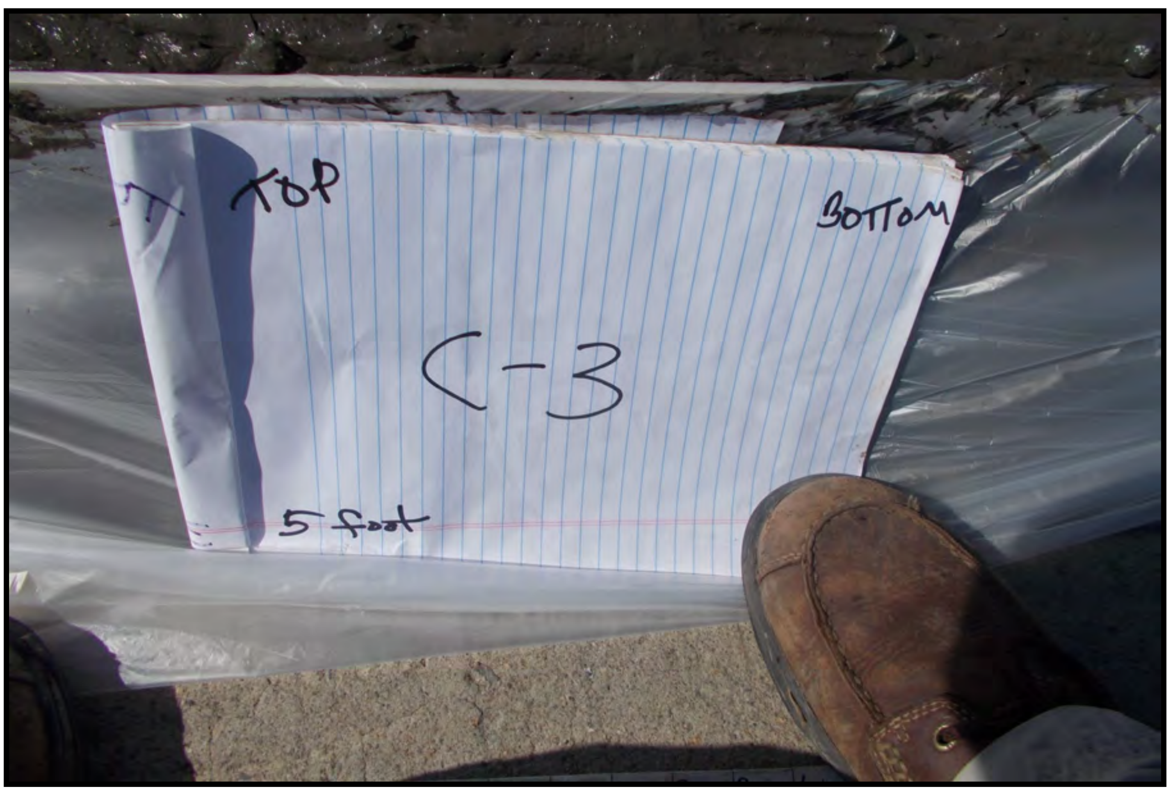
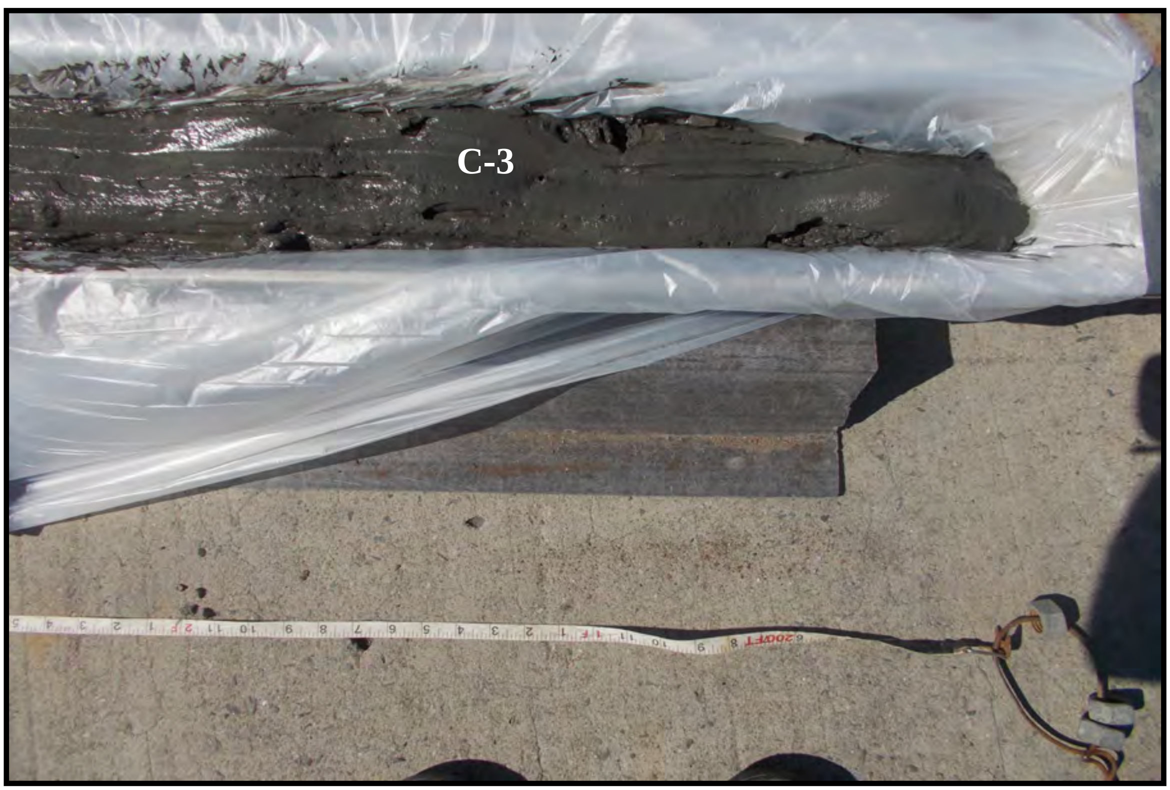



**PHOTO No. 8:** **C-3**

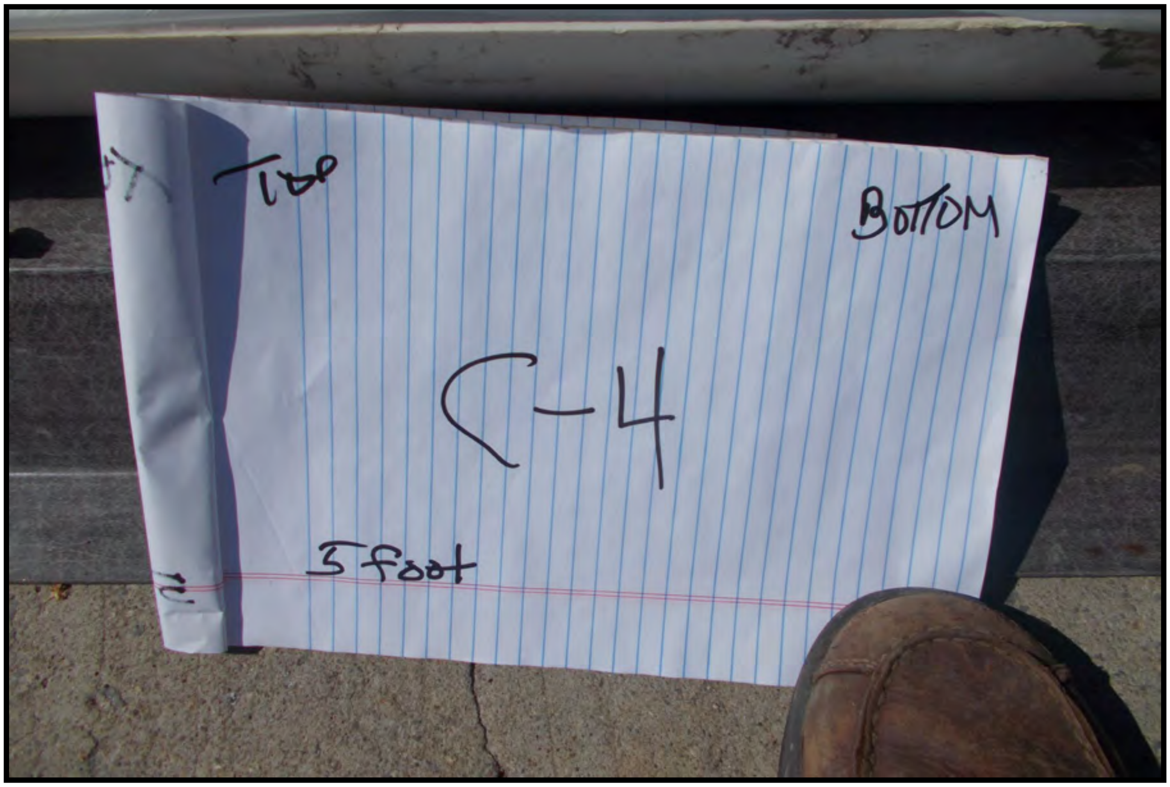

**<u>PHOTO No. 9:</u> C-3 CORE**




**<u>PHOTO No. 10:</u> C-3, BOTTOM**


**<u>PHOTO No. 11:</u> C-3, CENTER**


**<u>PHOTO No. 12:</u> C-3, TOP**




**<u>PHOTO No. 13:</u> C-4**

**<u>PHOTO No. 14:</u> C-4 CORE**


**<u>PHOTO No. 15:</u> C-4, BOTTOM**


**<u>PHOTO No. 16:</u> C-4, CENTER**

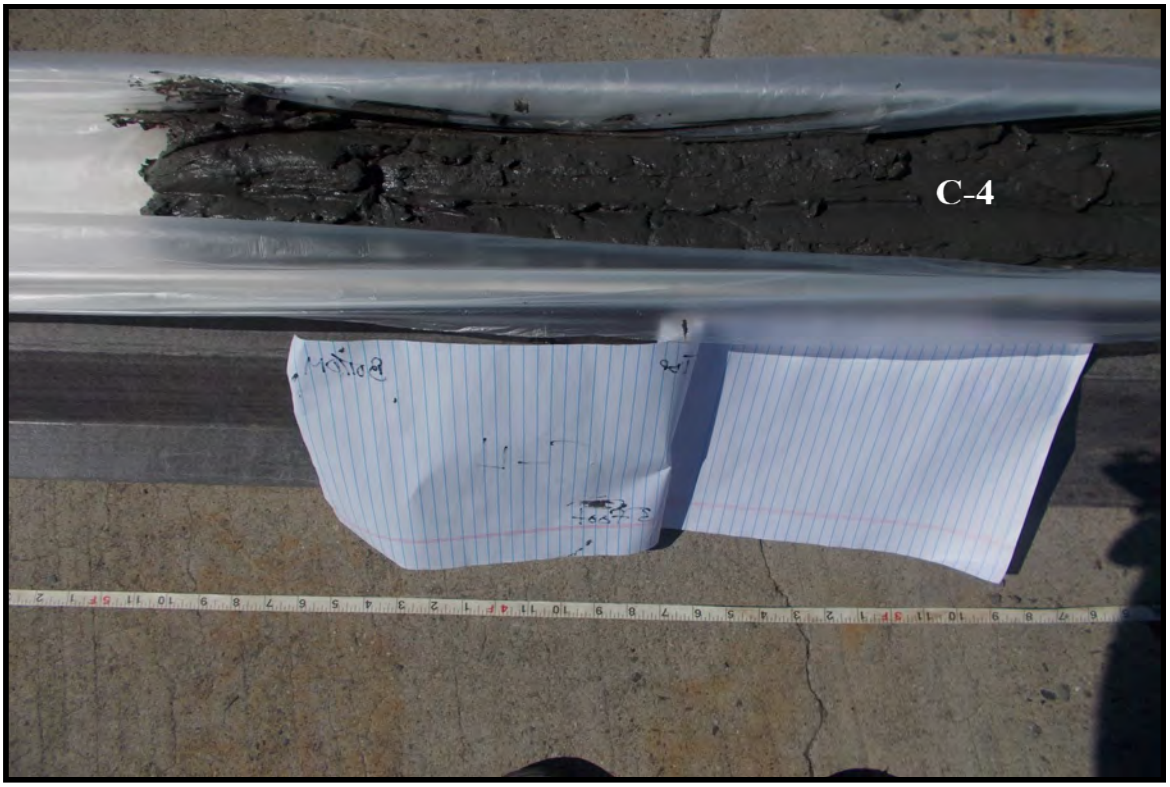



**PHOTO No. 17:** **C-4, TOP**

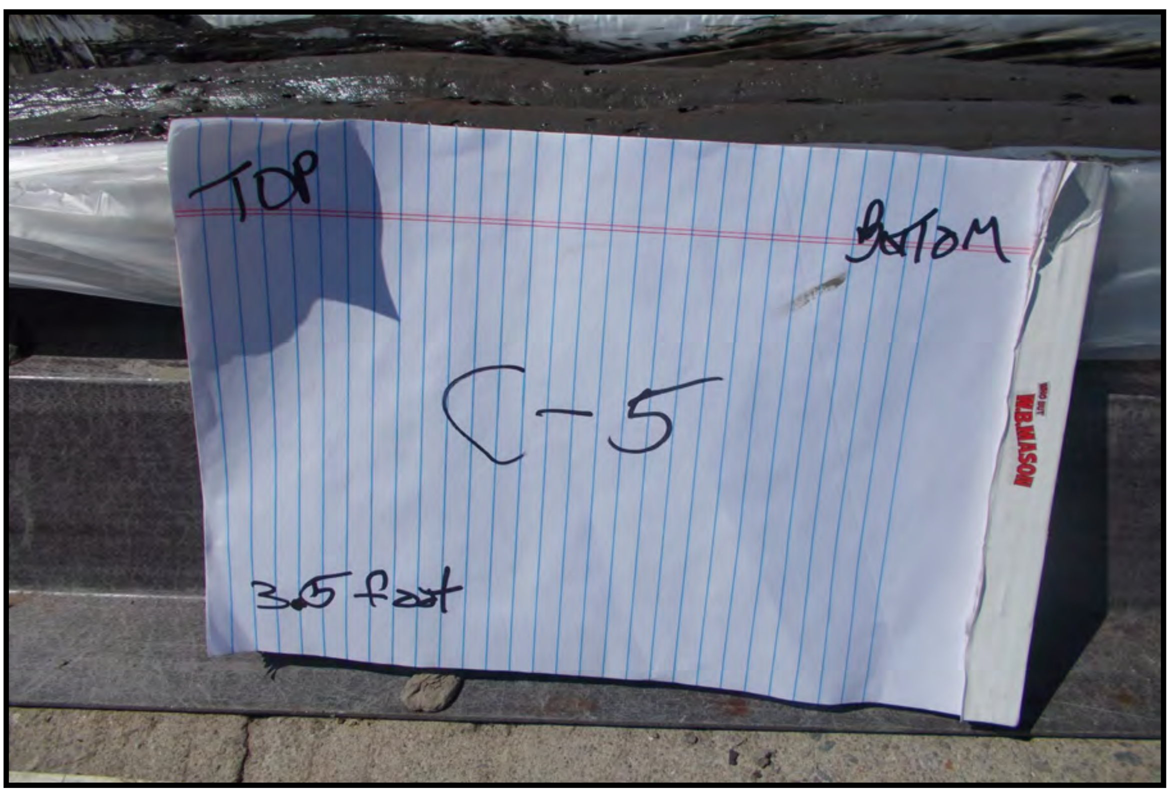



**PHOTO No. 18:** **C-5**


**PHOTO No. 19:**


**<u>PHOTO No. 23:</u> C-5, CENTER**


**<u>PHOTO No. 24:</u> C-5, TOP**

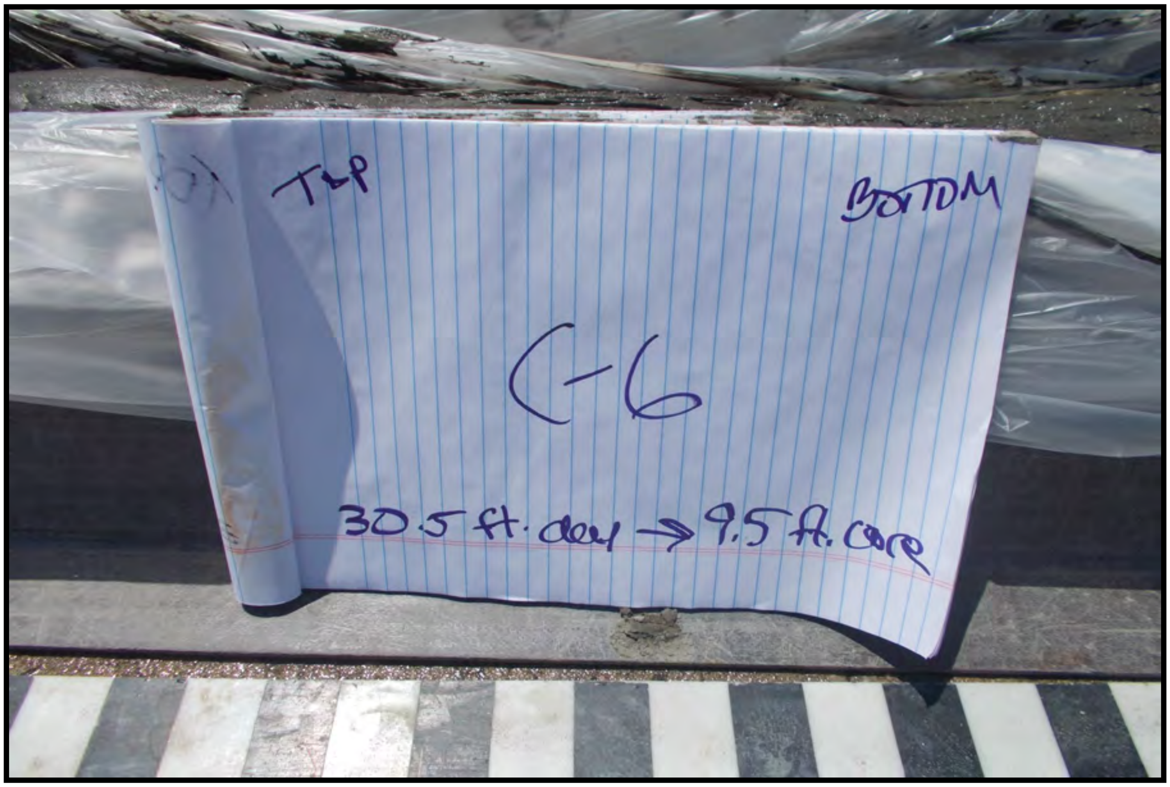



**PHOTO No. 25:** C-6


**PHOTO No. 26:** C-6, TOP


**PHOTO No. 27:** **C-6, TOP-CENTER**


**PHOTO No. 28:** **C-6, BOTTOM-CENTER**


**PHOTO No. 28:** **C-6, BOTTOM**

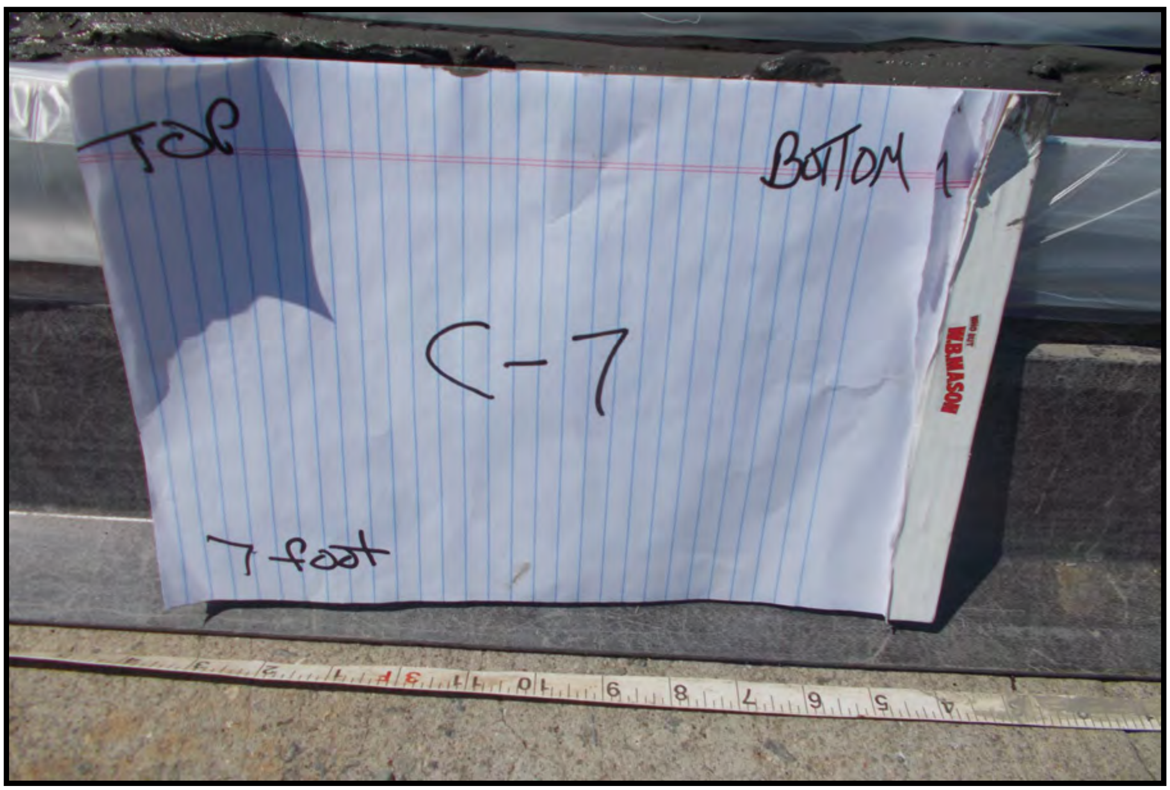
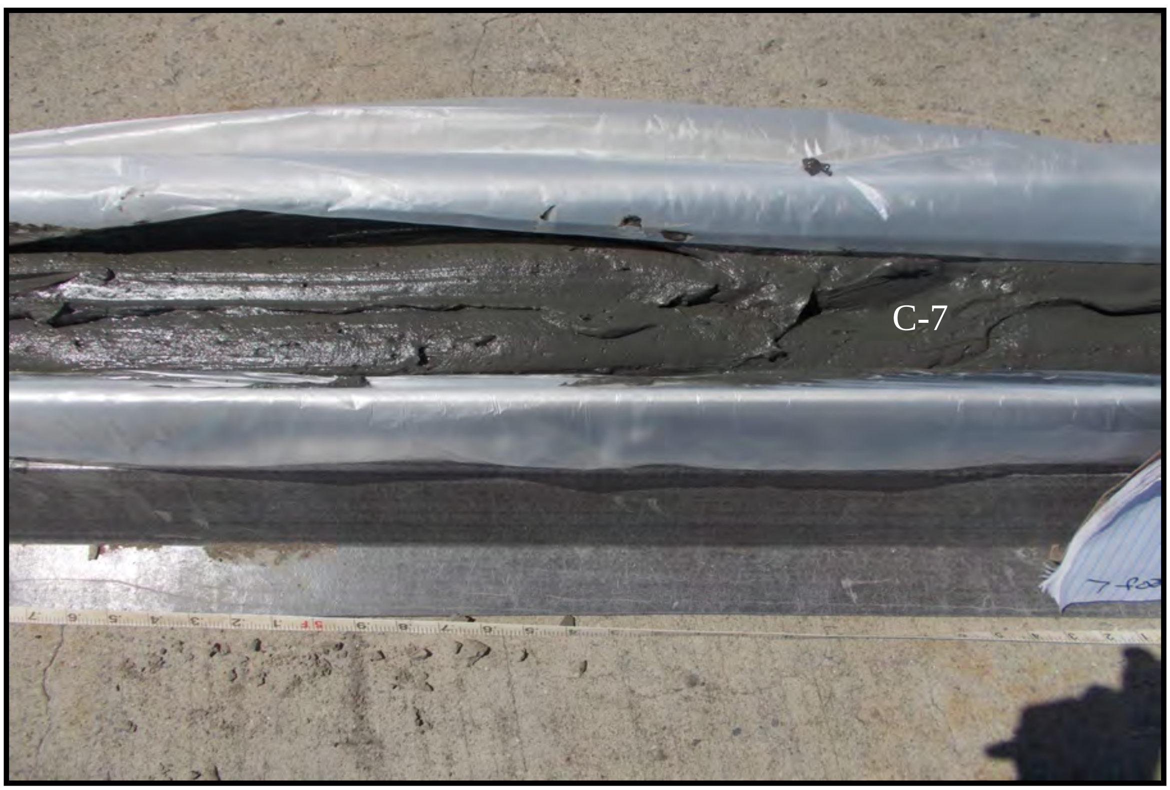



**PHOTO No. 29:** **C-7**


**PHOTO No. 30:** **C-7 CORE**


**PHOTO No. 31:** **C-7, BOTTOM**


**<u>PHOTO No. 32:</u> C-7, CENTER**




**<u>PHOTO No. 33:</u> C-7, BOTTOM-CENTER**


**PHOTO No. 34:** **C-7, BOTTOM**

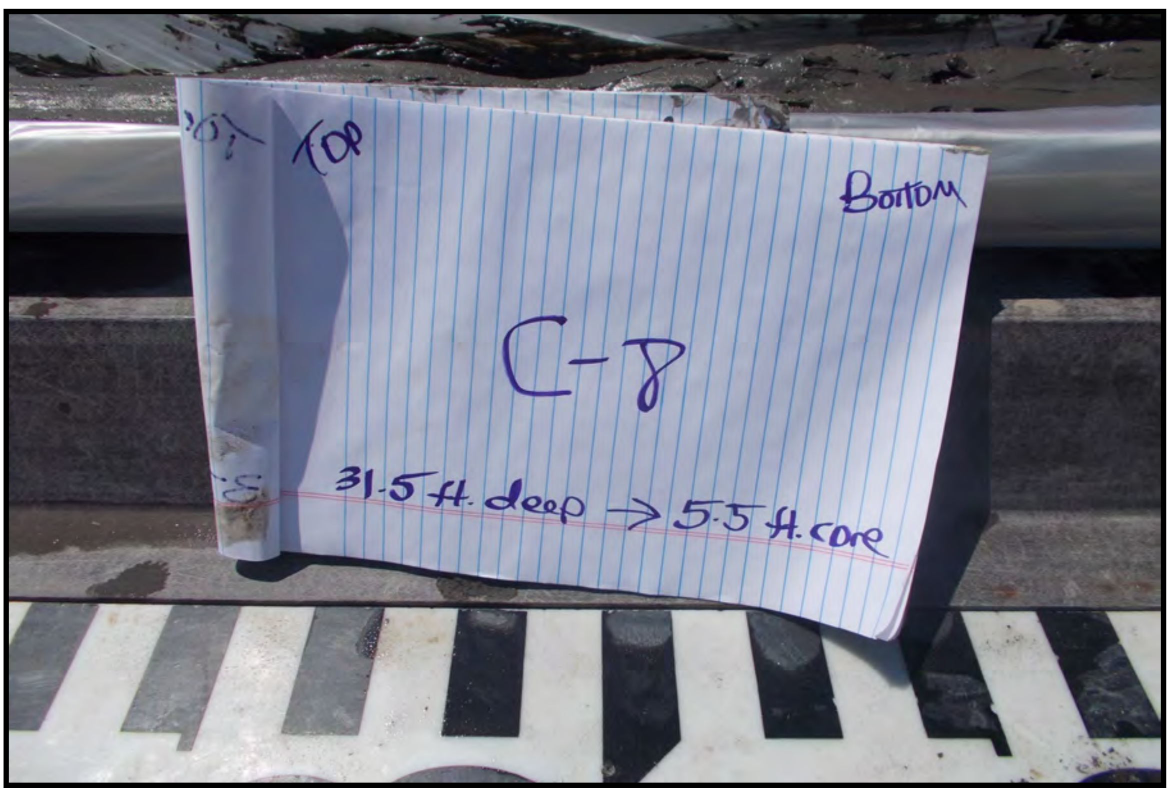
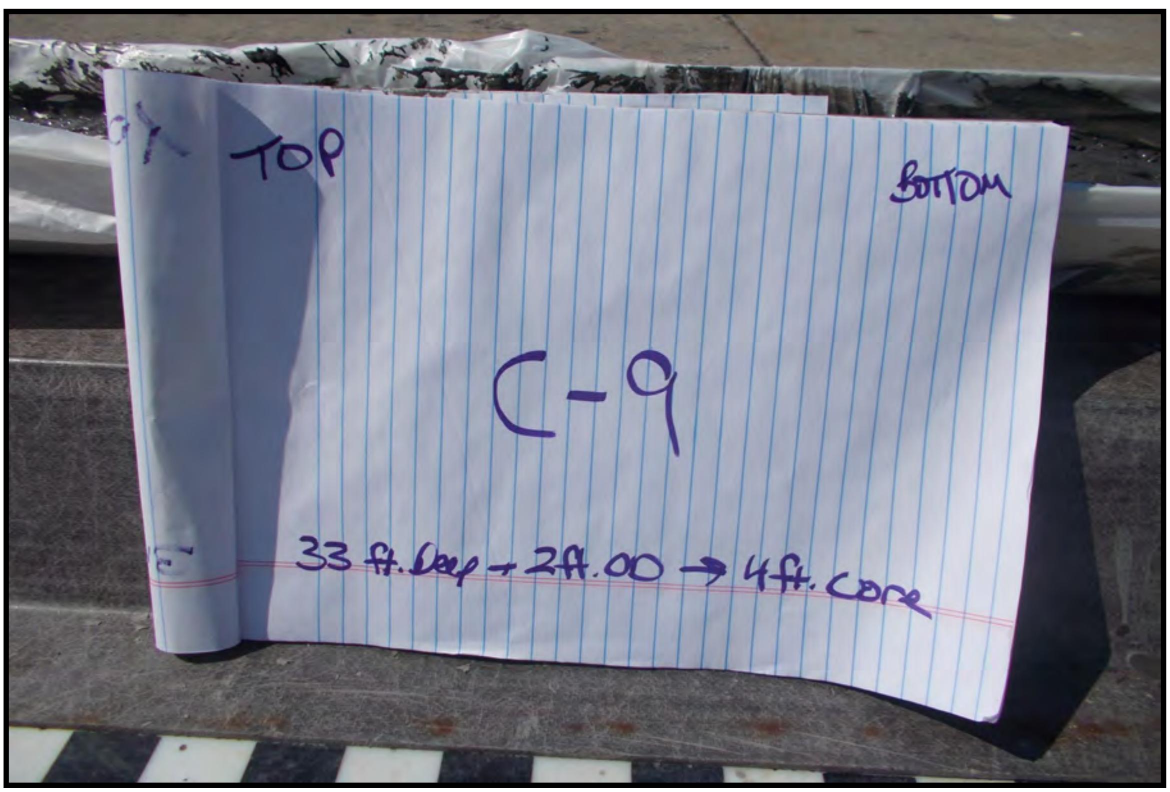



**PHOTO No. 35:** **C-8**


**<u>PHOTO No. 36:</u> C-8 CORE**




**<u>PHOTO No. 37:</u> C-9**


**PHOTO No. 38:** **C-9 CORE**

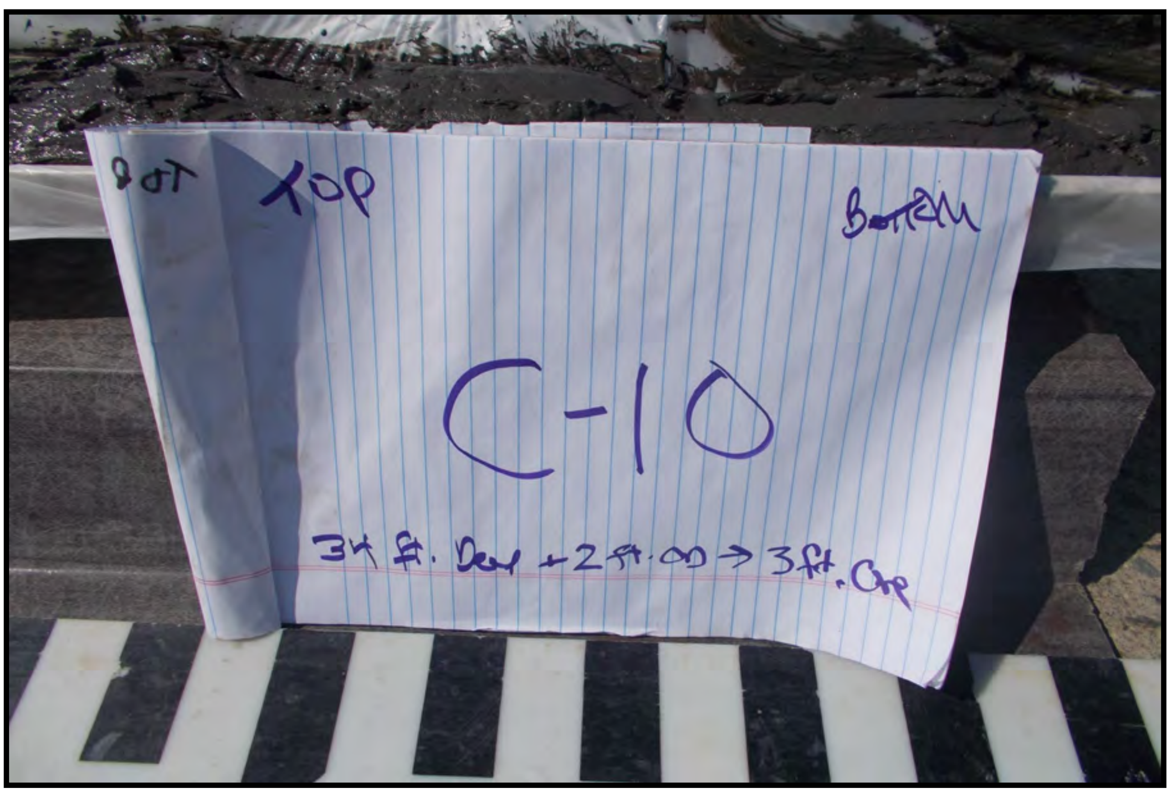



**PHOTO No. 39:** **C-10**


**<u>PHOTO No. 40:</u> C-10 CORE**

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702 Electronic Drive Phone: 215-355-3900
Horsham, PA 19044 Fax: 215-392-0626

# CHAIN OF CUSTODY
Page ____ of ____

Lab LIMS No:

MATRIX CODES

Bill to/Report to (if different)

Sampling Site Address (if different) Include State
1 Hausel Road
Wilmington, DE 19801

Client/Acct. No.
Address S.T. Hudson Engineers
900 Dudley Ave
City/State/Zip Cherry Hill, NJ 08002
Phone/Fax 856-342-6600
Client Contact: Paul Ferry

P.O. No. PWSID #:
Quote #
e-mail: pferry@sthe.com

LAB USE ONLY:
# ____ Ascorbic/HCL Vials # ____ HCl Vials
# ____ $Na_2S_2O_3$ ______
# ____ Na OH/Zn acetate pH ______
# ____ $HNO_3$ pH ______
# ____ $H_2SO_4$ pH ______
# ____ NaOH pH ______
# ____ Unpreserved
# ____ HCl # ____ NH4Cl # ____ MeOH
# ____ DI Water

DW: DRINKING WATER
GW: GROUND WATER
WW: WASTEWATER
SO: SOIL
SL: SLUDGE
OIL: OIL
SOL: NON SOIL SOLID
MI: MISCELLANEOUS
X: OTHER

PROJECT

| FIELD ID | Collection Date | Collection Military Time | GRAB | COMP | Matrix Code | Total | $H_2SO_4$ | HCl | Vials | $HNO_3$ | NaOH | ZnAc | UNPRE | BACT | ANALYSIS REQUESTED | Field pH, Temp ($^0$C), DO, Cl2, Cond. etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | 7/21 | 1125 | | | | | | | | | | | | | | |
| C-2 | 7/21 | 1106 | | | | | | | | | | | | | | |
| C-6 | 7/21 | 1054 | | | | | | | | | | | | | | |
| C-8 | 7/21 | 1030 | | | | | | | | | | | | | | |
| C-9 | 7/21 | 1002 | | | | | | | | | | | | | | |
| C-10 | 7/21 | 0940 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

LAB USE ONLY

SAMPLED BY: (Name/Company)

TAT: ☐ STANDARD (10 DAY)
or DUE DATE____/_____/_____

Report Format: ☐ Standard ☐ NJ-RDD ☐ SRP-RDD
☐ Standard + QC ☐ Forms ☐ EDD

*Please call for pricing and availability for rush (<10 day) turnaround and for all but standard reporting format.*

Field Parameters Analyzed By:
Initials Date/Time:

SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)

| RELINQUISHED BY | DATE | TIME | RECEIVED BY | DATE | TIME |
|---|---|---|---|---|---|
| RELINQUISHED BY SAMPLER 1. Paul Ferry | 7/22 | 0951 | 1. Erin Dougherty | 07/22/20 | 0951 |
| 2. | | | 2. | | |
| 3. | | | 3. | | |
| 4. | | | 4. | | |
| 5. | | | 5. | | |

DELIVERY: ☐ EQC COURIER ☐ CLIENT ☐UPS ☐FEDEX ☐OTHER ______

Custody Seal Number

Rec'd Temp.: ______ Initials: ______ Ice Y / N Location:____
COMMENTS:

Hazardous: yes / no

eurofins QC

702 Electronic Drive Phone: 215-355-3900
Horsham, PA 19044 Fax: 215-392-0626

# CHAIN OF COUSTODY

Page ___ of ___

Bill to/Report to (if different) Stacey Williams

Sampling Site Address (if different) Include State: 1 Hausel Road Wilmington, DE

Client/Acct. No. STHE
Address 900 Dudley Ave.
City/State/Zip Cherry Hill, NJ 08002
Phone/Fax (856) 342-6600
Client Contact: PAUL FERRY

P.O. No.
PWSID #:
Quote #
e-mail: pferry@sthe.com

Lab LIMS No:

LAB USE ONLY:

\# ___ Ascorbic/HCL Vials # ___ HCl Vials
\# ___ $Na_2S_2O_3$ ___
\# ___ Na OH/Zn acetate pH ___
\# ___ $HNO_3$ pH ___
\# ___ $H_2SO_4$ pH ___
\# ___ NaOH pH ___
\# ___ Unpreserved
\# ___ HCl # ___ NH4Cl # ___ MeOH
\# ___ DI Water

MATRIX CODES
DW: DRINKING WATER
GW: GROUND WATER
WW: WASTEWATER
SO: SOIL
SL: SLUDGE
OIL: OIL
SOL: NON SOIL SOLID
MI: MISCELLANEOUS
X: OTHER

PROJECT

| FIELD ID | Collection Date | Military Time | GRAB | COMP | Matrix Code | Total | $H_2SO_4$ | HCl | Vials | $HNO_3$ | NaOH | ZnAc | UNPRE | BACT | ANALYSIS REQUESTED | Field pH, Temp (°C), DO, Cl2, Cond. etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Field Blank | 7/29 | 0907 | | | | | | | | | | | | | | |
| | 7/29 | 0920 | | | | | | | | | | | | | TAL Metals, PCBs, | |
| Site Water | 7/29 | 1151 | | | | | | | | | | | | | Pesticides, %H2O, | |
| | 7/29 | 1155 | | | | | | | | | | | | | | |
| C-4 | 7/29 | 0852 | | | | | | | | | | | | | TOC, Grain Size | |
| C-3 | 7/29 | 0910 | | | | | | | | | | | | | SVOCs + TCLP | |
| C-5 | 7/29 | 1020 | | | | | | | | | | | | | | |
| C-7 | 7/29 | 1040 | | | | | | | | | | | | | | |

SAMPLED BY: (Name/Company)

TAT: ☐ STANDARD (10 DAY)
or DUE DATE ___/___/___

Report Format: ☐ Standard ☐ NJ-RDD ☐ SRP-RDD
☐ Standard + QC ☐ Forms ☐ EDD

*Please call for pricing and availability for rush (<10 day) turnaround and for all but standard reporting format.*

Field Parameters Analyzed By:
Initials
Date/Time:

SAMPLE CUSTODY EXCHANGES MUST BE DOCUMENTED BELOW. USE FULL LEGAL SIGNATURE, DATE AND MILITARY TIME (24 HOUR CLOCK, I.E. 8AM IS 0800, 4 PM IS 1600)

| RELINQUISHED BY | DATE | TIME | RECEIVED BY | DATE | TIME |
|---|---|---|---|---|---|
| SAMPLER 1. Paul Ferry | 7/29 | 1410 | 1. Allison Leahn | 7/29/2020 | 1410 |
| 2. | | | 2. | | |
| 3. | | | 3. | | |
| 4. | | | 4. | | |
| 5. | | | 5. | | |

DELIVERY: ☐ EQC COURIER ☐ CLIENT ☐UPS ☐FEDEX ☐OTHER ___

Custody Seal Number

Rec'd Temp.: 3.2°C Initials: ADL Ice Y / N Location: EQC

COMMENTS:

Hazardous: yes / no

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1125 |
| Coordinates: 323063.21, 201003.37 | | |

| | |
|---|---|
| **CORE #**: C-1 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 2 |
| Existing Depth @ MLW: -37 ft. | Recovered Core Length (ft.): ] 10 ft. x 2 |
| Required Sample Core Length: 3 ft. | Sample Length Retained (ft.): 3 ft. x 2 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: Y N |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniformly grayish-brown |
| | | Fine-grained |
| | | Moderately moist |
| | | Retains shape |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

E:\SEDIMENT CORE LOGS\C-1a.docx

S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1106 |
| Coordinates: 323274.91, 206414.46 | | |

| | |
|---|---|
| **CORE** #: C-2 | Datum: MLW = 0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 |
| Existing Depth @ MLW: -31 ft. | Recovered Core Length (ft.): 10 ft. x 1 |
| Required Sample Core Length: 9 ft. | Sample Length Retained (ft.): 9 ft. x 1 |
| | Core Volume Retained ($ft^3$): |
| | Collected to Project Depth: Y N |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniformly grayish-brown |
| | | Fine-grained |
| | | Moderately moist |
| | | Retains shape |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 0910 |
| Coordinates: 323449.70, 205994.35 | | |
| **CORE** #: C-3 | Datum: MLW = 0 ft. | |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -35 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 5 ft. | Sample Length Retained (ft.): 5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Grayish-brown |
| | | Fine-grained |
| | | Slick |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

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# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 0952 |
| Coordinates: 323757.66, 205375.99 | | |

| | |
|---|---|
| **CORE** #: C-4 | Datum: MLW=0' |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 |
| Existing Depth @ MLW: -35 ft. | Recovered Core Length (ft.): 10 ft. x 1 |
| Required Sample Core Length:5 ft. | Sample Length Retained (ft.): 5 ft. x 1 |
| | Core Volume Retained (ft$^3$): |
| | Collected to Project Depth: Y N |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Grayish-brown |
| | | Fine-grained |
| | | Slick |
| | | Retains Shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

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# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 1020 |
| Coordinates: 323966.31, 205140.65 | | |
| **CORE #**: C-5 | Datum: MLW = 0' | |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 2 | |
| Existing Depth @ MLW: -36.5 ft. | Recovered Core Length (ft.): 10 ft. x 2 | |
| Required Sample Core Length: 3.5 ft. | Sample Length Retained (ft.): 3.5 ft. x 2 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Fine-grained |
| | | Gray/brown |
| | | Slick, moderately moist |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

## S. T. HUDSON ENGINEERS, INC.

### SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1054 |
| Coordinates: 324069.15, 204669.68 | | |
| **CORE** #: C-6 | Datum: MLW = 0' | |
| Project Depth: -38 ft. (inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -30.5 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 9.5 ft. | Sample Length Retained (ft.): 9.5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform |
| | | Fine-grained |
| | | Brownish gray |
| | | Slick; moderately moist |
| | | Retains shape / semi-consolidated |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

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# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-29-2020 | Time: 1040 |
| Coordinates: 324319.70, 204178.73 | | |
| **CORE #**: C-7 | Datum: MLW = 0' | |
| Project Depth: -38 ft.<br>(inc. ft. overdredge): -40 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -33 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 7 ft. | Sample Length Retained (ft.): 7 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained / sticky |
| | | Gray-brown |
| | | Semi-consolidated gel-like |
| | | Moderately moist |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1030 |
| Coordinates: 324521.64, 203645.56 | | |
| **CORE** #: C-8 | Datum: MLW = 0ft. | |
| Project Depth: -35 ft.<br>(inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 1 | |
| Existing Depth @ MLW: -31.5 ft. | Recovered Core Length (ft.): 10 ft. x 1 | |
| Required Sample Core Length: 5.5 ft. | Sample Length Retained (ft.): 5.5 ft. x 1 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained |
| | | Gray / brown |
| | | Semi-consolidated, retains shape |
| | | Moderate moisture level |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

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# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 1002 |
| Coordinates: 324706.93, 203123.36 | | |
| **CORE #**: C-9 | Datum: MLW = 0' | |
| Project Depth: -35 ft. (inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 2 | |
| Existing Depth @ MLW: -33 ft. | Recovered Core Length (ft.): 10 ft. x 2 | |
| Required Sample Core Length: 4 ft. | Sample Length Retained (ft.): 4 ft. x 2 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: Y N | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | Uniform |
| | | Fine-grained throughout |
| | | Brown-gray |
| | | Moderate moisture, consolidation |
| | | |
| | | |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# S. T. HUDSON ENGINEERS, INC.

## SEDIMENT CORE LOG

| | | |
|---|---|---|
| Client: GT USA Wilmington LLC | Project: Port of Wilmington Maintenance Dredging | Logger: Paul Ferry |
| Job #: H-7912 | Date: 7-21-2020 | Time: 0940 |
| Coordinates: 324902.13, 202728.66 | | |
| **CORE #**: C-10 | Datum: MLW = 0 ft. | |
| Project Depth: -35 ft.<br>(inc. ft. overdredge): -37 ft. | Core Penetration Length (ft.): 10 ft. x 2 | |
| Existing Depth @ MLW: -34 ft. | Recovered Core Length (ft.): 10 ft. x 2 | |
| Required Sample Core Length: 3 ft. | Sample Length Retained (ft.): 3 ft. x 2 | |
| | Core Volume Retained ($ft^3$): | |
| | Collected to Project Depth: **Y** **N** | |

**All Length Measurements are in Decimal Feet**

| Sample Interval (ft.) | | Description |
|---|---|---|
| **TOP** | | |
| | | |
| | | Uniform throughout |
| | | Fine-grained |
| | | Brown / gray |
| | | Moderate moisture |
| | | Retains shape |
| | | |
| | | |
| **BOTTOM** | | |

Comments:

# SECTION 5

## SAMPLING PLAN APPROVAL PERMIT
## AND
## SAMPLING METHODOLOGY

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

GT USA Wilmington LLC
c/o: Gene Bailey
1 Hausel Road
Wilmington, DE 19801
Tax Parcel: 2606700003

Letter of Authorization: LA-159/20
Associated Permits: LA-073/13
Date of Issuance: 6/5/2020
Construction Expiration Date: 6/5/2021

# LETTER OF AUTHORIZATION

**GRANTED TO:**

**GT USA Wilmington LLC**

**TO PERFORM THE FOLLOWING AUTHORIZED ACTIVITIES:**

**To collect 10 separate vibracore sediment boring samples to a depth of 35 and 38 feet below mean low water**

**LOCATED:**

**In the Christina River,
Adjacent to Wilmington Marine Terminal,
Wilmington, New Castle County, Delaware**

Pursuant to the provisions of 7 Del. C., §7203, and the Department's Regulations Governing the Use of Subaqueous Lands, permission is hereby granted on this ___5th_____ day of _June_________ A.D. 2020, to conduct the above-referenced activities in accordance with the approved plans (2 sheets) as approved on May 27, 2020; and the application dated April 22, 2020; and received by this Division on April 22, 2020.

WHEREAS, GT USA Wilmington LLC, owners of certain adjoining lands to the Christina River, have applied for permission to perform the activities listed above; and;

WHEREAS, pursuant to the provisions of 7 Del. C., §7203, the Secretary of the Department of Natural Resources and Environmental Control through his duly authorized representative finds that it is not contrary to the public interest if this project is approved subject to the terms and conditions herein set forth.

NOW THEREFORE, this Letter of Authorization is issued subject to the attached Letter of Authorization General Conditions and the following special conditions:

## SPECIAL CONDITIONS

1. The Letter of Authorization is valid for one year according to the above-referenced construction expiration date.

2. This Letter of Authorization is granted for the purpose of collecting 10 separate vibracore sediment borings for characterization of substrate material in the anticipation of future maintenance dredging. The depth of these cores will reflect the anticipated dredge depths, which fall at 35 and 38 feet below mean low water.

3. This Letter of Authorization does not represent a dredging permit and is not permission for future dredging activities.

4. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook, so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

5. There shall be no movement of equipment within subaqueous lands not specifically authorized by this Permit and the approved plans.

6. To protect the anadromous fish species and sturgeon population in the area, no in-water work shall take place from **March 15th through June 30th.**

7. The Contractors Completion Report shall be filled out and returned **within 10 days** of completion of the authorized work.

IN WITNESS WHEREOF, I, Steven M. Smailer, the duly authorized representative of Shawn M. Garvin, Secretary, Department of Natural Resources and Environmental Control, have hereunto set my hand this ________5th________ day of ____________May____________, 2020.

______________________________________
By Steven M. Smailer, Program Administrator
the duly authorized representative of the Secretary of the
Department of Natural Resources and Environmental Control

______________________________________
George W. Geatz IV, Environmental Scientist
Wetlands and Subaqueous Lands Section

# SECTION 2

## PROPOSED ANALYSIS PLAN

Utilizing a Vibra-Core sampler, S. T. Hudson Engineers, Inc. proposes to extract seven (7) samples from the area needing to be dredged:

- C-1
- C-2
- C-3
- C-4 (Berth 1)
- C-5 (Berth 2)
- C-6 (Berth 3)
- C-7 (Berth 4)
- C-8 (Berth 5)
- C-9 (Berth 6)
- C-10 (Berth 7)

Sample retention will occur to the proposed dredge depth of -35 ft +2 Mean Low Water (MLW) for Berths 5-7 and –38 ft +2 MLW for all other locations.

Sample length will vary based on the difference between the current depth and the proposed dredge depth. Depth and necessary length will be determined immediately prior to sampling. Total volume based upon previous depths and shoaling rates can be estimated at 75,000 cubic yards per yearly dredging event. Core samples will be extracted from the Vibra-Core sampler following retrieval. Any sample retrieval past the necessary depth will be discarded prior to packaging in a 5-gallon bucket lined with a nonreactive, new plastic liner. Site water and field blanks will be collected and handled according to the recommendations of the contracted laboratory, which is yet to be determined. Trip blanks will also be handled according to the recommendations of the contracted laboratory.

Prior to compositing, samples will be analyzed independently for:

- Water Content (ASTM D422 or D4381)
- Grain Size Distribution (USEPA 440.0)
- Total Organic Carbon (ASTM D653, D2216, or D4643)

Samples will then be composited at a yet-to-be-chosen lab according to EPA protocols. The following compositing scheme has been selected:

- SC-1 = C-1 + C-2
- SC-2 = C-3 + C-4
- SC-3 = C-5 + C-6
- SC-4 = C-7 + C-8
- SC-5 = C-9 + C-10

Each of the composites SC-1 through SC-5 will then be analyzed for:

- Bulk Sediment Chemistry:

  - Inorganics (including hexavalent and trivalent chromium)
  - Semi-Volatile Organic Compounds (SVOCs)
  - Volatile Organic Compounds (VOCs)
  - Pesticides
  - PCB Aroclors

- Effluent (Modified) Elutriate

  - Inorganics (including hexavalent and trivalent chromium)
  - Semi-Volatile Organic Compounds (SVOCs)
  - Volatile Organic Compounds (VOCs)
  - Pesticides
  - PCB Aroclors

- Toxicity Characteristic Leaching Procedure

  - TCLP Metals
  - TCLP Volatile Organic Compounds
  - TCLP Semi-Volatile Organic Compounds
  - TCLP Pesticides

Analytical results will be provided in their original form, as well as in a tabulated form comparing the results to Delaware Department of Natural Resources Non-Critical Unrestricted and Non-critical Restricted Standards. The raw data and Comparative Tables will ultimately be included in the future maintenance dredging application. All procedures stated above will be performed according to New Jersey Department of Environmental Protection's *Field Sampling Procedures Manual,* dated August 2005.

# SECTION 6

## PREVIOUSLY ISSUED DNREC PERMIT

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

APR - 4 2012

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Re: Supplemental Approval: SU-028/12
Original Permit - Water Quality Certification No.: WQ-521/07
Associated Permit: - Supplemental Approval No.: SU-051/11

Dear Mr. DePasquale:

Enclosed is the Supplemental Approval granted by the State of Delaware to allow use of the Wilmington Harbor North confined disposal facility. The permittee is responsible to ensure that all the conditions, responsibilities and requirements of the Supplemental Approval are strictly observed. Additionally, the permittee is required to observe all the conditions in the original Water Quality Certification, except those revised by this Supplemental Approval.

The Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus)* is a State and federally listed endangered species. Coordination with the National Marine Fisheries Service and the State of Delaware Division of Fish and Wildlife Fisheries Section is required to identify any impacts and/or mitigating efforts required to protect the sturgeon. The Wetlands and Subaqueous Lands Section contacted the DNREC Fisheries Section on your behalf and there are currently no additional restrictions on the permit for this upcoming dredging event. However, future coordination for subsequent dredging events is the responsibility of the permittee.

If you have any questions, please feel free to contact Joanne Lee of my staff at (302) 739-9943.

Sincerely,

Janet Chacon

for Laura M. Herr
Section Manager
Wetlands & Subaqueous
Lands Section

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Supplemental Approval: SU-028/12
Date of Issuance: 4\4\2012
Original Permit:
- Water Quality Certification No.: WQ-521/07
Associated Permit:
- Supplemental Approval No.: SU-051/11
Construction Expiration Date: 11/3/2018

**SUPPLEMENTAL APPROVAL**
**GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT TO MODIFY THE EXISTING WATER QUALITY CERTIFICATION WQ-521/07, ISSUED TO MAINTENANCE DREDGE THE CHRISTINA RIVER AT THE PORT OF WILMINGTON, WILMINGTON, NEW CASTLE COUNTY, DELAWARE TO INCLUDE THE USE OF THE WILMINGTON HARBOR NORTH CONFINED DISPOSAL FACILITY, LOCATED ON THE NORTHERN SIDE OF THE CHRISTINA RIVER IN WILMINGTON, DELAWARE, FOR DISPOSAL OF DREDGED MATERIAL GENERATED BY THE AUTHORIZED DREDGING IN THE CHRISTINA RIVER**

Pursuant to the provisions of 7 Del. C., §6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 4th day of April A.D. 2012 to perform the above referenced project in accordance with the approved plans for this Supplemental Approval (Certification) (2 Sheets), as approved on April 2, 2012; and the application dated January 25, 2012 and received by this Division on January 27, 2012.

Whereas, pursuant to the provisions of Section 401 of the Clean Water Act, 33 U.S.C Section 1341, and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Supplemental Approval is an addendum to Water Quality Certification No. WQ-521/07 granted to the U.S. Army Corps of Engineers. This Supplemental Approval shall be attached thereto and made a part thereof.

7. The work authorized herein shall be completed in accordance with the terms and conditions of all State permits and certifications.

8. Failure to comply with any of the terms or conditions of this Supplemental Approval may result in enforcement action, which could include the revocation of this Approval.

IN WITNESS WHEREOF, I, Laura M. Herr, the duly authorized representative of Collin P. O'Mara, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 4th day of April, 2012.

for By Laura M. Herr, the duly authorized representative of the Secretary of the Department of Natural Resources and Environmental Control

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM
5 E. REED STREET, SUITE 201
DOVER, DELAWARE 19901
Phone: (302) 739-9283
Fax: (302) 739-2048

June 7, 2011

Mark Eberle
Department of the Army
Philadelphia District, Corps of Engineers
Wannamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

RE: Delaware Coastal Management Program Federal Consistency Determination Modification
Wilmington Harbor Maintenance Dredging (FC 2011.0080)

Dear Mr. Eberle:

The Delaware Coastal Management Program (DCMP) has reviewed your request for a modification of the consistency determination issued on May 27, 2011 for the above mentioned project. The modification is based upon a refinement of the area to be dredged and time-of-year and method of placement for the hydraulic pipeline to be utilized during the course of the proposed action. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your request for the modification of the consistency determination for the proposed maintenance plan to dredge 650,000 cubic yards of material annually from the Christina River at the Port of Wilmington, New Castle County, Delaware.

As a result of this modification, all dredging activity should be scheduled to avoid migratory and spawning activity of fisheries of concern and should not be conducted from April 1 to June 15 (DCMP Policies 5.11.1.1, 5.11.2.1, 5.11.3.1, and 5.11.3.2). All previously issued conditions, including conducting dredging and material disposal in manner such that Delaware Surface Water Quality Standards will not be violated (DCMP Policies 5.3.1.4, 5.3.1.6, and 5.3.2.7) and receiving and adhering to all necessary permits and their conditions remain in effect.

If you have any questions, please contact me or Bonnie Arvay of my staff at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 2011.0080
Joanne Lee – DNREC/DW

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. Anthony J. DePasquale
U.S. Army Corps of Engineers
Wanamaker Building – 100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Supplemental Approval: SU-051/11
Original Permit:
- Water Quality Certification No.: WQ-521/07
Date of Issuance: 5\27\2011
Construction Expiration Date: November 3, 2018

**WATER QUALITY CERTIFICATION**
**GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT**
**TO MODIFY EXISTING WATER QUALITY CERTIFICATION WQ-521/07**
**TO INCLUDE THE FOLLOWING:**

- **To authorize an additional disposal site, the Pedricktown South disposal facility in Pedricktown, New Jersey, for disposal of dredged material from the Christina River at the Port of Wilmington, Wilmington, New Castle County, Delaware; and**
- **To place, use and remove a 24-inch to 27-inch diameter steel pipeline for the conveyance of dredged material, extending from the Christina River and across the Delaware River to the Pedricktown South confined disposal facility in Pedricktown, New Jersey.**

Pursuant to the provisions of 7 Del. C., §6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 27th day of May A.D. 2011 to perform the above referenced project in accordance with the approved plans for this Water Quality Certification (Certification) (3 Sheets), as approved on May 27, 2011; and the application dated February 14, 2011 and received by this Division on February 15, 2001.

Whereas, pursuant to the provisions of Section 401 of the Clean Water Act, 33 U.S.C Section 1341, and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Supplemental Approval is an addendum to Water Quality Certification No. WQ-521/07 granted to the U.S. Army Corps of Engineers. This Supplemental Approval shall be attached thereto and made a part thereof.

This Supplemental Approval is issued subject to the following conditions:

**PERMIT CONDITIONS**

1. This Supplemental Approval is an addendum to Water Quality Certification WQ-521/07 granted to U.S. Army Corps of Engineers on November 3, 2008. All work shall be completed in accordance with the Terms and Conditions of the originally authorized Certification, which shall remain in full force and effect, except as indicated herein.

2. Special Condition 5 of the original Certification, which required disposal of dredged material at Wilmington Harbor South disposal area and the Delaware portion of the Killcohook disposal area, is modified by this Approval. By this Approval, the WSLS authorizes the use of the Pedricktown South disposal site as an additional disposal facility for the authorized dredging at the Port of Wilmington. Dredge spoil disposal shall occur only in these designated, approved disposal areas.

3. The placement, use, and removal of the pipelines are not subject to the time of year dredging restrictions identified in Special Condition 8 of the original Certification. The time of year restrictions in Special Condition 8 for dredging in Delaware subaqueous lands remain in full force.

4. A copy of this Supplemental Approval and the originally authorized Certification must be available on site during all phases of the dredging.

5. The work authorized herein shall be completed in accordance with the terms and conditions of all state permits and certifications.

IN WITNESS WHEREOF, I, Laura M. Herr, the duly authorized representative of Collin P. O'Mara, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 27th day of May, 2011.

Laura M. Herr

By Laura M. Herr, the duly authorized representative of the Secretary of the Department of Natural Resources and Environmental Control

STATE OF DELAWARE
**DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL**
**OFFICE OF THE SECRETARY**

DELAWARE COASTAL MANAGEMENT PROGRAM

5 E. REED STREET, SUITE 201
DOVER, DELAWARE 19901

Phone: (302) 739- 9283
Fax: (302) 739-2048

May 27, 2011

Mark Eberle
Department of the Army
Philadelphia District, Corps of Engineers
Wannamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

RE: Delaware Coastal Management Program Federal Consistency Determination
Wilmington Harbor Maintenance Dredging (FC 2011.0080)

Dear Mr. Eberle:

The Delaware Coastal Management Program (DCMP) has reviewed your consistency determination request for the above mentioned project. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your consistency determination for the proposed dredging maintenance plan for the federal channel located within the berthing area of Wilmington Harbor.

This concurrence is conditioned upon the following:

1) Dredging Restrictions: The proposed activity is in an area utilized by important resident, migratory, and commercially important fish species [including American shad (*Alosa sapidissima*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and striped bass (*Morone saxatilis*)]. These species, along with Atlantic sturgeon (*Acipenser oxyrinchus)*, a species of local and regional concern and the federally endangered short-nosed sturgeon (*Acipenser brevirostrum)*, utilize the Delaware River during upstream migrations. Additionally, atriped bass spawn in this area of the Delaware River from April-June. The protection of spawning areas, nursery habitats, and migratory corridors during the spawning season is important in maintaining and protecting these fisheries resources. As such, all dredging activity should be scheduled to avoid migratory and spawning activity and should not be conducted from March 15 to June 30. (DCMP Policies 5.11.1.1, 5.11.2.1, 5.11.3.1, and 5.11.3.2);
2) Water Quality: Dredging and dewatering shall be conducted in a manner such that Delaware Surface Water Quality Standards will not be violated, excluding whatever temporary and minimal turbidity is unavoidable when using sound dredging and dewatering practices. (DCMP Policies 5.3.1.4, 5.3.1.6, and 5.3.2.7); and

*Delaware's good nature depends on you!*

3) The issuance of all required permits, including but not limited to a Delaware Subaqueous Lands Permit, and adherence to the restrictions and/or conditions placed on any and all permits issued to the applicant for this project.

If you have any questions, please contact me or Bonnie Arvay of my staff at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 2011.0080
Joanne Lee – DNREC/DW

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF SOIL AND WATER CONSERVATION
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

DELAWARE COASTAL
MANAGEMENT PROGRAM

TELEPHONE: (302) 739-9283
FAX: (302) 739-2048

January 29, 2009

Minas M. Arabatzis
Philadelphia District, Corps of Engineers
Wannamaker Building, 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

***RE: Delaware Coastal Management Federal Consistency Determination***
***Wilmington Harbor Operation and Maintenance Project (08.103)***

Dear Mr. Arabatzis:

The Delaware Coastal Management Program (DCMP) has received your consistency determination request for the above mentioned project. Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs with your consistency determination for the mechanical dredging of approximately 650,000 cubic yards of sediment from the federal channel, turning basin, and the private berthing area by the Diamond State Port Corporation with disposal at Wilmington Harbor South CDF and Killcohook CDF for the 2009 – 2018 dredging cycles.

This concurrence is conditioned the following:
1) Submission of an annual report to the DCMP prior to each dredging cycle detailing the proposed work to be completed during that cycle and the actual work that was completed during the previous cycle. This report should include the amounts of sediment dredged or to be dredged and the disposal facility(ies) utilized. If more than one disposal site is used during a dredging cycle, indicate the amount of sediment disposed in each.
2) No dredging activities shall occur from April 1 – June 15 of each year,
3) The submission of the fate analysis of PCB's as conditioned by the Division of Water Resources and adherence to any additional water quality monitoring requirements resulting from said analysis;
4) Adherence to any Coast Guard restrictions issued when pipeline is to cross the navigation channel to reduce impacts to navigation; and
5) The issuance of all required permits and adherence to the restrictions and/or conditions placed on any and all permits issued to you and/or your client for this project.

If you have any questions please do not hesitate to contact me or Bonnie Arvay at (302) 739-9283.

Sincerely,

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

cc: File 08.103
John Brundage – USACE/Dover Office
Joanne Lee – DNREC/DWR

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

NOV 3 - 2008

Mr. David Olsen
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107

Dear Mr. Olsen:

Enclosed is the Water Quality Certification granted by the State of Delaware. Please read carefully all the Special and General Conditions contained within the Certification. The permittee is responsible to ensure that all conditions of the Certification are strictly observed.

Also enclosed is a copy of the **Contractor's Post-Construction Completion Report**. Within ten days of the completion of the project, the contractor must mail a completed and signed Post-Construction form to this office.

If you have any questions, please feel free to contact this office.

Sincerely,

Laura M. Herr

Laura M. Herr
Section Manager
Wetlands & Subaqueous
Lands Section

Enclosures

Cc: Charles Myers, U.S. Army Corps of Engineers

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

Mr. David Olsen
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Operations Division – 6th Floor
Philadelphia, PA 19107-3390

Water Quality Certification: WQ-521/07
Date of Issuance: 11\3\2008
Expiration Date: 11\3\2018
Amended Date:

**WATER QUALITY CERTIFICATION
GRANTED TO THE U.S. ARMY CORPS OF ENGINEERS
TO MAINTENANCE DREDGE THE CHRISTINA RIVER
TO DEPTHS RANGING FROM 35 FEET BELOW MEAN LOW WATER
TO 40 FEET BELOW MEAN LOW WATER,
DREDGING UP TO 650,000 CUBIC YARDS OF MATERIAL ANNUALLY,
AT THE PORT OF WILMINGTON, 1 HAUSEL ROAD,
WILMINGTON, NEW CASTLE COUNTY, DELAWARE**

Pursuant to the provisions of 7 Del. C., Section 6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 3rd day of November A.D. 2008 to perform the above referenced project in accordance with the approved plans for this Certification (7 Sheets), as approved on October 30, 2008; and the application dated November 29, 2007 and received by this Division on December 3, 2007, with additional information received January 22, 2008 and September 19, 2008.

Whereas, in accordance with the provisions of Section 401 of the Clean Water Act, 33 U.S.C. Section 1341 and 7 Del. C., Chapter 60, the State of Delaware, by and through the Department of Natural Resources and Environmental Control, certifies that the permitted activity will be conducted in a manner which will not violate the applicable water quality standards of the State of Delaware, subject to the terms and conditions of this approval.

This Certification is issued subject to the following conditions:

## SPECIAL CONDITIONS

1. The conditions contained herein shall be included as part of the main body of the construction contract and other ancillary documents associated with earth disturbance and any other activities directly or indirectly associated with construction which may impact subaqueous lands associated with this project. The permittee is responsible for ensuring that the contractor and/or workers executing the activities authorized by this Certification have full knowledge of the terms and conditions of this Certification.

2. Dredging shall be conducted so as not to violate the State of Delaware Department of Natural Resources and Environmental Control Surface Water Quality Standards dated July 2004.

3. Dredging shall be conducted in a manner that minimizes the suspension of solids in the water column.

4. **The permittee shall perform additional analysis to evaluate the fate of polychlorinated biphenyls in the sediments to be disturbed during the dredging operation and the effect of this contaminant on water quality. The analytical results shall be submitted to the WSLS at least 30 days prior to the first dredging event. If these results indicate that Water Quality Standards may be exceeded, the WSLS may require the permittee to conduct water column sampling during dredging operations and may also require the permittee to create and implement a plan that further minimizes the suspension of sediments and pollutants during dredging operations.**

5. The WSLS authorizes the use of the Wilmington Harbor South disposal area and the Delaware portion of the Killcohook disposal areas as confined disposal facilities for the dredging authorized by this Certification. Dredge spoil disposal shall occur only in these designated, approved disposal areas.

6. The effluent shall be detained in the detention basin for sufficient time to allow for the maximum feasible settling of the sediments suspended in the dredge spoil effluent. **The concentration of suspended solids in the water leaving the disposal site shall not exceed the concentration of the suspended solids in the receiving water body by more than 4 grams per liter.**

7. **Monitoring of the discharge from the disposal site shall be conducted during each dredging event. This data shall be submitted to the WSLS within 30 days of the completion of the dredging. Corrective action shall be taken and the WSLS shall be contacted within 24 hours if concentrations of suspended sediments exceed background condition by more than 4 grams per liter. The minimum monitoring shall include the following:**
   - **One composite sample of the effluent discharge water shall be collected daily and analyzed for Total Suspended Solids.**
   - **The effluent flow rate from the disposal site shall be recorded daily.**
   - **One water sample shall be collected daily from a background site on the Delaware River and analyzed for Total Suspended Solids. However, if the effluent discharge is managed so that no more than four grams of sediment per liter of water is discharged, background sampling is not required.**

8. **The schedule for the dredging shall be arranged so as to minimize the impact on anadromous fish passage. Specifically, no dredging shall be untaken between April 1 and June 15 annually.**

9. All dredging and filling is to be conducted in a manner consistent with sound conservation and water pollution practices.

10. All pipelines shall be kept in good conditions at all times and any leaks or breaks shall be promptly and properly repaired

11. The submerged pipeline shall be placed in a manner that avoids impacts to navigation. The pipeline, when crossing the Delaware River navigation channel, shall be at a depth authorized by the U.S. Coast Guard.

12. The disposal areas shall be inspected prior to dredging and effectively managed and maintained in a manner that prevents the entrance of dredged materials into any waters or wetlands.

13. Prior to the commencement of each dredging event, the permittee shall notify the WSLS of the location of the proposed disposal area.

14. A minimum freeboard of two (2) feet, measured vertically between the retained material and water and the top of the adjacent confining embankment, shall be maintained at all times.

15. **The Department reserves the right to modify the sampling parameters and other conditions for subsequent dredging events. The applicant shall contact the Wetlands and Subaqueous Lands Section prior to the commencement of subsequent dredging events so that specific details of the monitoring plans can be determined.**

16. This Certification replaces the previously authorized Water Quality Certification WQ-250/04. All special and general conditions contained in this Certification shall supersede conditions set forth in WQ-250/04 which has become null and void.

17. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook, so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

18. A copy of this Certification must be available on site during all phases of construction activity.

19. This Certification shall be valid for ten (10) years and authorizes a total of 10 dredging events, as depicted in the permit application and drawings. This Certification authorizes the dredging of 650,000 cubic yards of material during each dredge event.

## GENERAL CONDITIONS

1. The project is to be undertaken in accordance with the plans submitted and attached hereto. Any activities not specifically authorized herein may require a supplemental approval from this office prior to the initiation of construction. A determination on the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes to this office.

2. Representatives of the Department of Natural Resources and Environmental Control may inspect such work during any phase of the construction and may collect any samples or conduct any tests that are deemed necessary.

3. This Certification does not cover the structural stability of the project units.

4. Any actions, operations or installations which are considered by the Department to be contrary to the best interests of the public shall constitute reason for the discontinuance and/or removal of said action, operation or installation.

5. The issuance of this Certification does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.

6. This Certification is subject to the terms and conditions contained in any easement, license or lease that may have been granted by the State or any political subdivision, board, commission or agency of the State in the vicinity of the project.

7. This Certification and authorization are granted for the purposes as stated herein. Any other use without prior approval may constitute reason for this Certification being revoked.

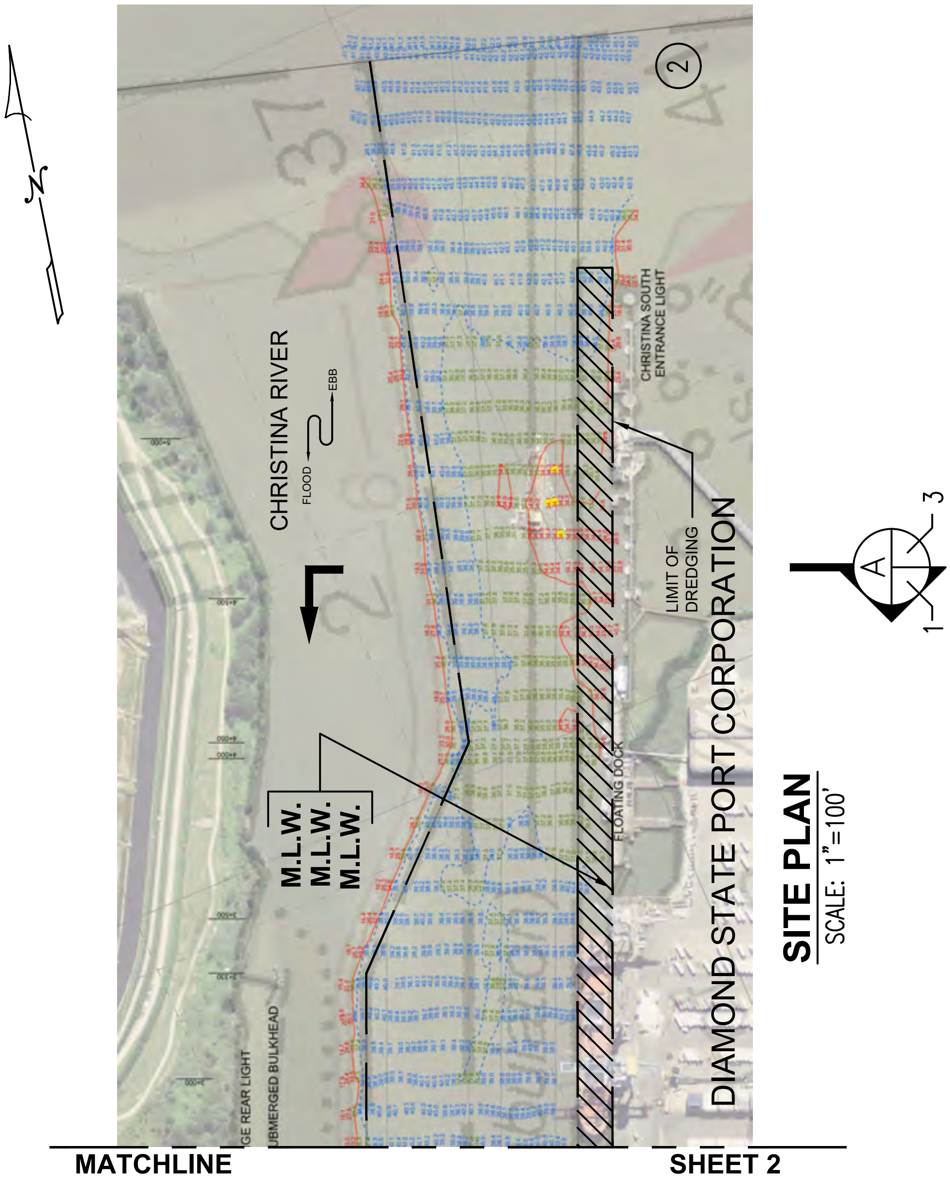
8. The permittee shall notify the Department of Natural Resources and Environmental Control within ten (10) days of the date work will be commenced, for each dredging event.

9. The permittee shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.

10. The issuance of this Certification does not constitute approval for any of the activities as may be required by any other local, state or federal governmental agency.

## SECTION 7

## PERMIT DRAWINGS, SAMPLING PLAN,
## AND
## USACE DISPOSAL SITE PLANS




**SITE PLAN**
SCALE: 1"=100'

## ADJACENT PROPERTY OWNERS:

1. **ALMA PROPERTIES LLC.**
2. **NONE (DELAWARE RIVER)**

## AREA TO BE DREDGED

**476,150 SQUARE FEET**

## DREDGE QUANTITY

**ESTIMATED 75,000 CUBIC YARDS PENDING PRE-DREDGE SURVEY**

## DATUM CHART:

HIGH TIDE LINE (H.T.L.)+6.42

MEAN HIGH WATER (M.H.W.)+5.21

5.21'

MEAN LOW WATER (M.L.W.) 0.0

## REFERENCE DRAWING:

1. PLAN TITLE: " WILMINGTON HARBOR, STA 0+00 TO STA 6+236.8 EXAMINATION+
   BY: U.S. ARMY CORPS OF ENGINEERS
   FILE No.: E-WH-08

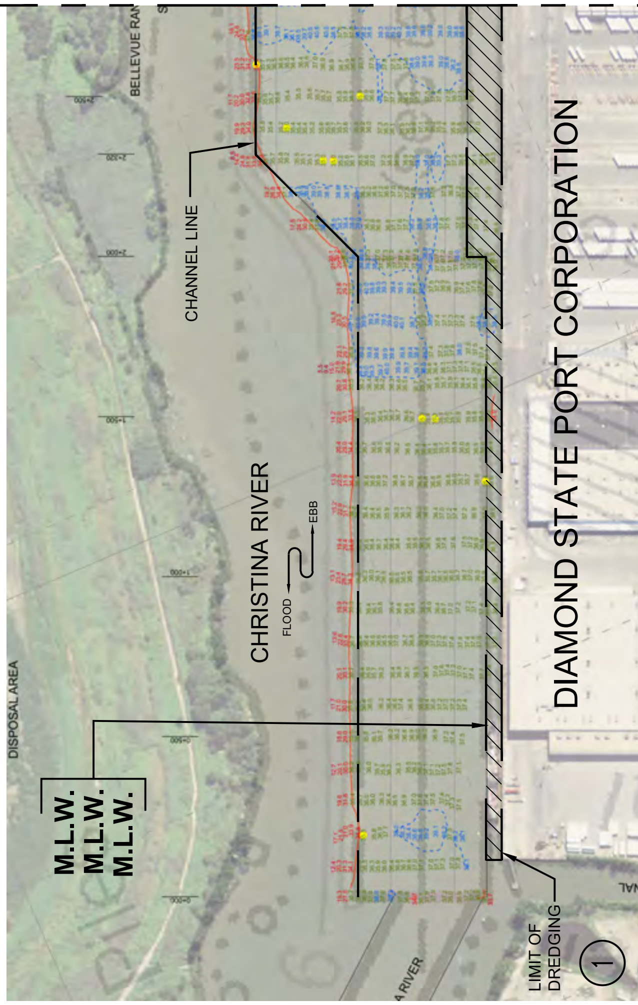
| | |
|---|---|
| FILE No. | G–2138 |
| CONTRACT No. | H–7912 |
| DATE | 9/29/2020 |
| SHEET No. | 1 of 3 |

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.

| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, NJ 08002
Phone 856-342-6600
Fax No. 856-342-8323

MATCHLINE SHEET 1



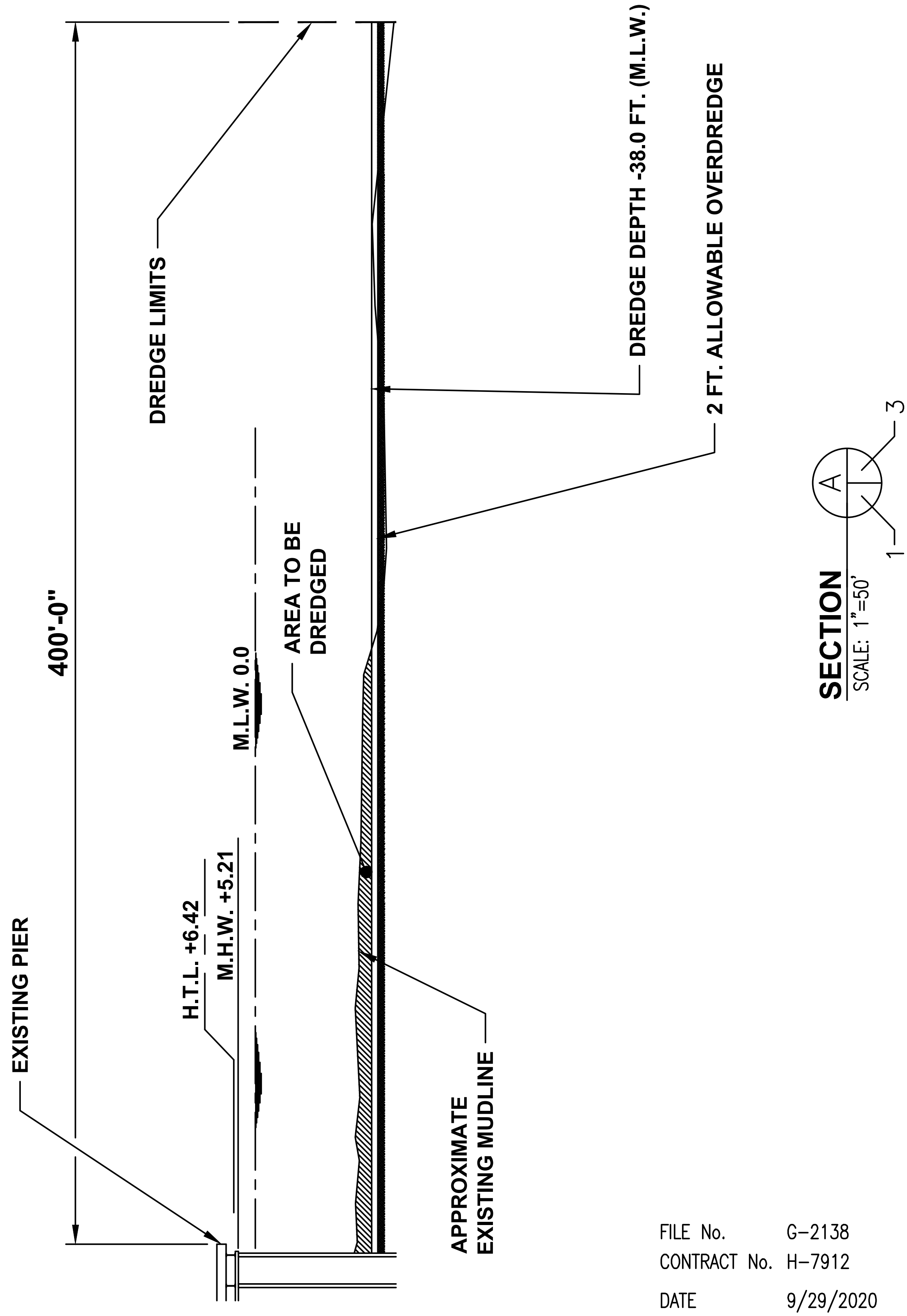

**SITE PLAN**
SCALE: 1"=100'

| | |
|---|---|
| FILE No. | G-2138 |
| CONTRACT No. | H-7912 |
| DATE | 9/29/2020 |
| SHEET No. | 2 of 3 |

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.

S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, NJ 08002
Phone 856-342-6600
Fax No. 856-342-8323

| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |



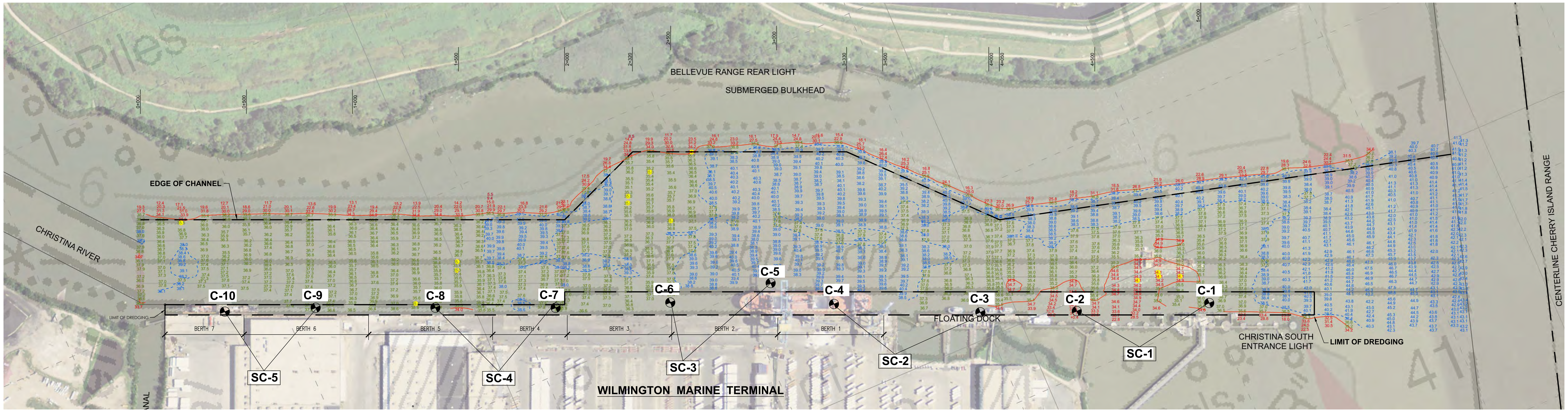

FILE No. G–2138
CONTRACT No. H–7912
DATE 9/29/2020
SHEET No. 3 of 3

NOTE: FINAL DESIGN REQUIRED FOR CONSTRUCTION.
THIS DRAWING IS FOR PERMITTING PURPOSES ONLY.


S.T. HUDSON ENGINEERS, INC.
PROFESSIONAL ENGINEERS & CONSULTANTS
900 Dudley Avenue
Cherry Hill, NJ 08002
Phone 856–342–6600
Fax No. 856–342–8323


| | |
|---|---|
| PROPOSED: | MAINTENANCE DREDGING |
| AT: | PORT OF WILMINGTON |
| COUNTY OF: | WILMINGTON |
| APPLICATION BY: | DIAMOND STATE PORT CORPORATION |

ISSUED PRINTS




## SITE PLAN

SCALE: 1" = 200'

## CORE SAMPLE LOCATION CHART

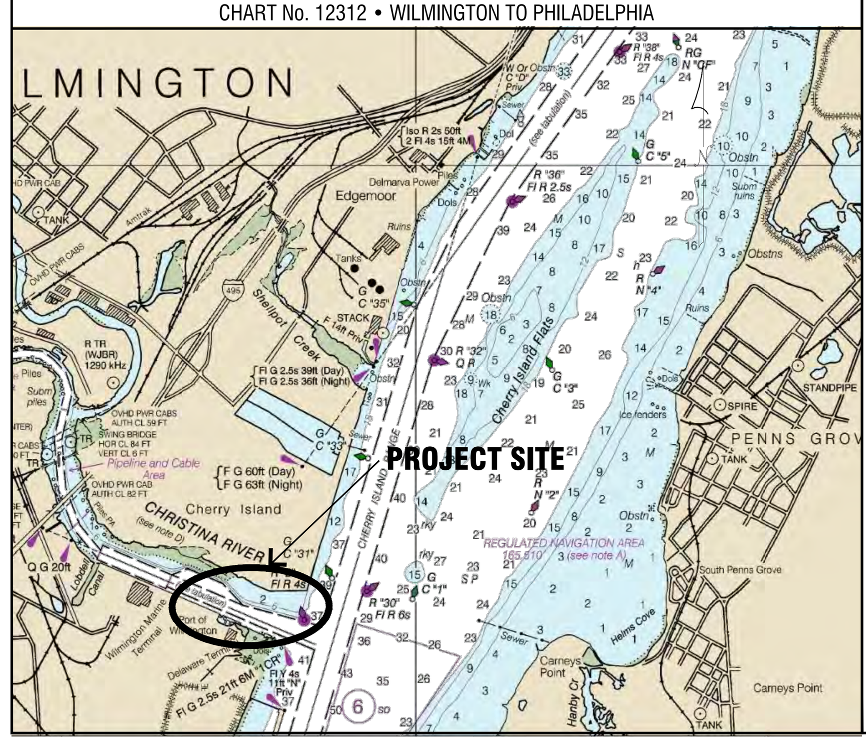
| CALCULATED LOCATIONS VIA PLAN | | | ACTUAL LOCATIONS VIA DGPS | |
|---|---|---|---|---|
| NORTHING | EASTING | I.D. | NORTHING | EASTING |
| 323058.780 | 207000.379 | C-1 | 323063.21 | 207003.37 |
| 323270118 | 206416.467 | C-2 | 323274.91 | 206414.46 |
| 323437.795 | 205989.616 | C-3 | 323449.70 | 205994.35 |
| 323748.673 | 205368.029 | C-4 | 323757.66 | 205375.99 |
| 323953.496 | 205135.731 | C-5 | 323966.31 | 205140.65 |
| 324060.093 | 204668.255 | C-6 | 324069.15 | 204669.68 |
| 324268.886 | 204120.646 | C-7 | 324295.16 | 204152.73 |
| 324523.430 | 203650.933 | C-8 | 324521.64 | 203645.56 |
| 324685.149 | 203112.368 | C-9 | 324706.93 | 203123.36 |
| 324891.785 | 202723.986 | C-10 | 324902.13 | 202728.66 |

## HYDROGRAPHIC SURVEY NOTES:

1. THIS SURVEY MEETS STANDARDS AS OUTLINED IN CORPS OF ENGINEERS' HYDROGRAPHIC SURVEY MANUAL EM1110-2-1003, DATED NOVEMBER 30, 2013 FOR NAVIGATION AND DREDGING SUPPORT SURVEYS.
2. HORIZONTAL REFERENCE-NAD 83, NEW JERSEY STATE PLANE, ZONE 2900, U.S. FOOT.
3. VERTICAL REFERENCE-MEAN LOWER LOW WATER WHICH IS 2.98' BELOW NAVD88
4. GEOID 09 AND NOAA TIDAL EPOCH: 1983-2001 WERE USED. SOUNDINGS ARE EXPRESSED IN FEET AND TENTHS AND REFER TO MEAN LOWER LOW WATER.
5. CONTOURS WERE GENERATED USING THE MINIMUM DEPTH WITHIN SEARCH RADIUS OF 18'.
6. HYPACK INC. SOFTWARE WAS USED TO PERFORM THE SOUNDING SELECTION AND CONTOUR GENERATION.
7. THIS INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THE TIME.
8. POSITIONS OF THE AIDS TO NAVIGATION ARE PROVIDED FOR INFORMATION ONLY, AND SHOULD NOT BE USED FOR NAVIGATION.
9. THE LIMITS OF THE FEDERAL CHANNEL DEPICT THE MOST CURRENT CHANNEL.
10. BASE MAPPING LINEWORK OR ORTHOPHOTOGRAPHY HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND DATES AND IS INTENDED TO PORTRAY GENERAL CHARACTERISTICS OF THE SHORELINE AND OTHER FEATURES TEMPORAL CHANGES MAY HAVE OCCURED SINCE THIS DATA SET WAS COLLECTED AND SOME PARTS OF THE DATA MAY NO LONGER BE AN ACCURATE REPRESENTATION OF THE SURFACE CONDITIONS.
11. HYDRO DATA AND DRAWING BACKGROUND TAKEN FROM U.S. ARMY CORPS OF ENGINEERS DRAWING NUMBER E-WH-08.

## NOAA NAUTICAL CHART LOCATION MAP

CHART No. 12312 • WILMINGTON TO PHILADELPHIA




## DATUM CHART:

NGVD (1929 ADJUSTED) ELEV 0.0

2.98'

MEAN LOWER LOW WATER
(M.L.L.W.)
ELEV. -2.98'

## CORE SAMPLING NOTES:

1. FOR CORE SAMPLE LOCATIONS, SEE "ACTUAL LOCATIONS VIA DGPS" IN THE SAMPLE LOCATION CHART.

2. CORE SAMPLES WERE TAKEN ON JULY 21,2020 and JULY 29, 2020.

TOTAL DREDGE AREA = 476,150 Sq. Ft.

TOTAL DREDGE VOLUME = ESTIMATED 75,000 C.Y. PENDING PER-DREDGE SURVEY

"Drawings issued in electronic form are provided for the convenience of the recipient and are used at the sole risk of the user. Reliance may be placed only on hard copies of drawings issued by S.T. Hudson Engineers. in the event of any discrepancy, the hard copy will govern."

| rev. | date | description | by | appr. |
|---|---|---|---|---|
| 1 | 8/10/20 | Added actual sample locations | djd | tk |

approvals

| approved by | for | date |
|---|---|---|
| | | |

seal

seal

S. T. HUDSON ENGINEERS, INC.
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900 Dudley Ave
Cherry Hill, NJ 08002
Phone No. 856-342-6600
Fax No. 856-342-8323

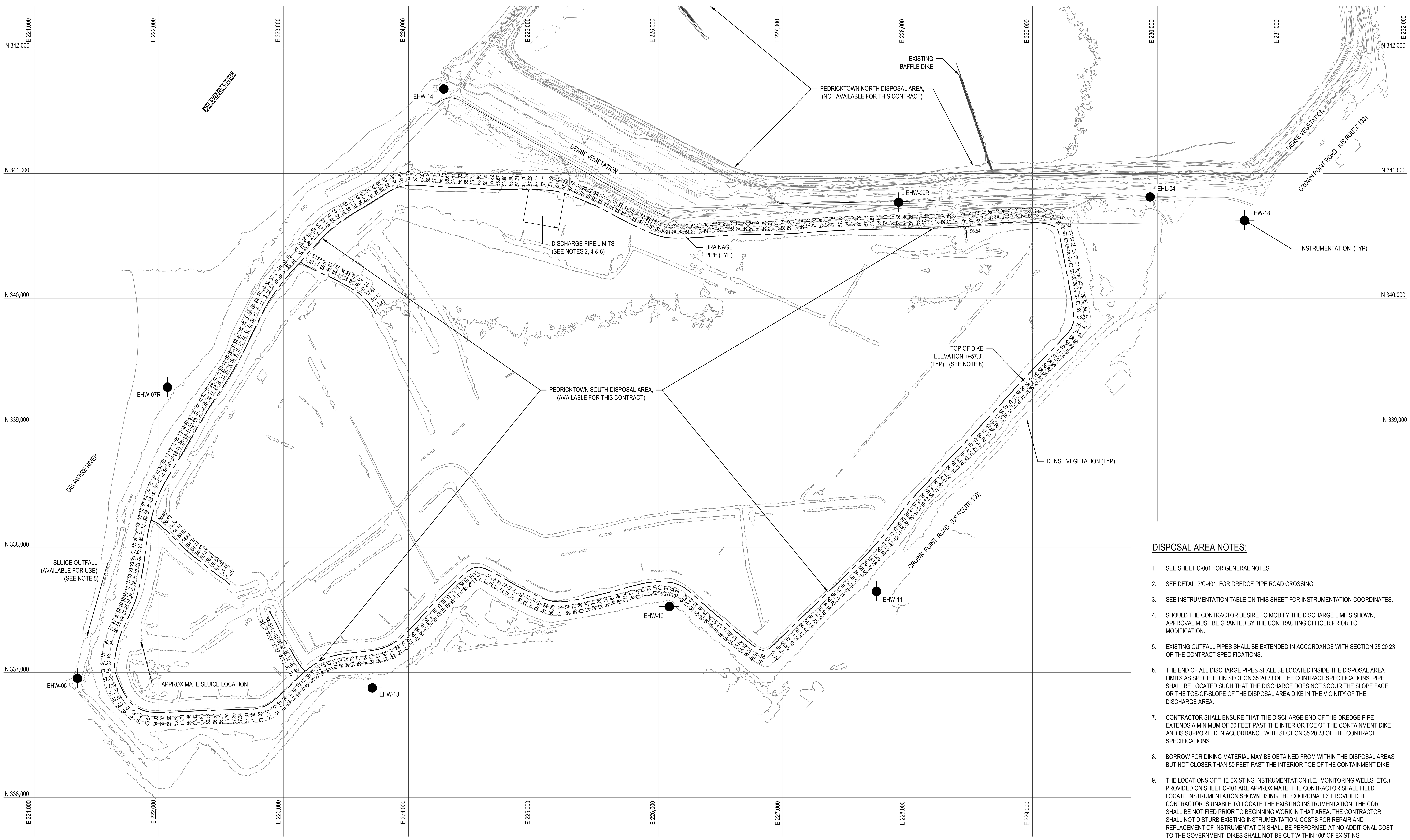
GT USA WILMINGTON, LLC.
WILMINGTON MARINE TERMINAL
WILMINGTON, DELAWARE

drawn STAFF
checked PF
drftg. approval ADS
date 04/21/20
FILE G-1172
contract H-7912

SAMPLING PLAN

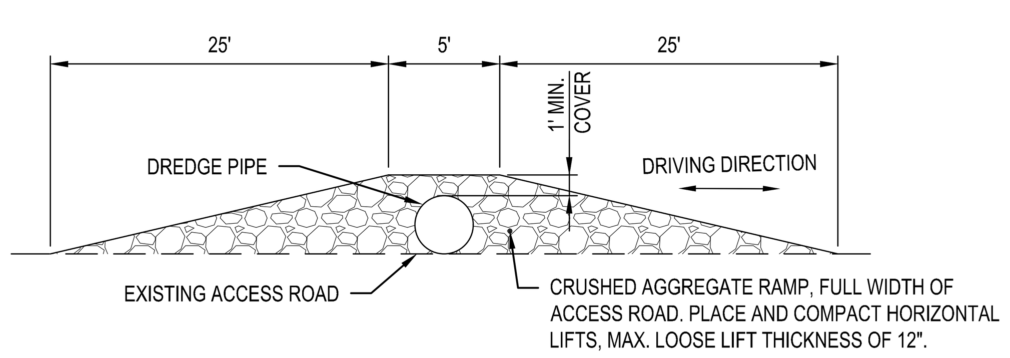
dwg. no. 1

rev. 1




1 PLAN - PEDRICKTOWN SOUTH DISPOSAL AREA

300' 150' 0 300'
SCALE IN FEET




2 DETAIL - DREDGE PIPE ROAD CROSSING
SCALE: NTS

## DISPOSAL AREA NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE DETAIL 2/C-401, FOR DREDGE PIPE ROAD CROSSING.
3. SEE INSTRUMENTATION TABLE ON THIS SHEET FOR INSTRUMENTATION COORDINATES.
4. SHOULD THE CONTRACTOR DESIRE TO MODIFY THE DISCHARGE LIMITS SHOWN, APPROVAL MUST BE GRANTED BY THE CONTRACTING OFFICER PRIOR TO MODIFICATION.
5. EXISTING OUTFALL PIPES SHALL BE EXTENDED IN ACCORDANCE WITH SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS.
6. THE END OF ALL DISCHARGE PIPES SHALL BE LOCATED INSIDE THE DISPOSAL AREA LIMITS AS SPECIFIED IN SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS. PIPE SHALL BE LOCATED SUCH THAT THE DISCHARGE DOES NOT SCOUR THE SLOPE FACE OR THE TOE-OF-SLOPE OF THE DISPOSAL AREA DIKE IN THE VICINITY OF THE DISCHARGE AREA.
7. CONTRACTOR SHALL ENSURE THAT THE DISCHARGE END OF THE DREDGE PIPE EXTENDS A MINIMUM OF 50 FEET PAST THE INTERIOR TOE OF THE CONTAINMENT DIKE AND IS SUPPORTED IN ACCORDANCE WITH SECTION 35 20 23 OF THE CONTRACT SPECIFICATIONS.
8. BORROW FOR DIKING MATERIAL MAY BE OBTAINED FROM WITHIN THE DISPOSAL AREAS, BUT NOT CLOSER THAN 50 FEET PAST THE INTERIOR TOE OF THE CONTAINMENT DIKE.
9. THE LOCATIONS OF THE EXISTING INSTRUMENTATION (I.E., MONITORING WELLS, ETC.) PROVIDED ON SHEET C-401 ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD LOCATE INSTRUMENTATION SHOWN USING THE COORDINATES PROVIDED. IF CONTRACTOR IS UNABLE TO LOCATE THE EXISTING INSTRUMENTATION, THE COR SHALL BE NOTIFIED PRIOR TO BEGINNING WORK IN THAT AREA. THE CONTRACTOR SHALL NOT DISTURB EXISTING INSTRUMENTATION. COSTS FOR REPAIR AND REPLACEMENT OF INSTRUMENTATION SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE GOVERNMENT. DIKES SHALL NOT BE CUT WITHIN 100' OF EXISTING INSTRUMENTATION.
10. ELEVATIONS SHOWN ON TOP OF DIKE ARE FROM A SURVEY PERFORMED IN NOVEMBER 2019 AND CAN ONLY BE CONSIDERED INDICATIVE OF THE CONDITIONS AT THAT TIME.
11. PEDRICKTOWN SOUTH DISPOSAL AREA IS ALSO BEING UTILIZED FOR USACE PHILADELPHIA TO SEA DREDGING PROJECT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE AND FAMILIARIZE HIM/HERSELF WITH THE CURRENT CONDITIONS THAT COULD AFFECT THE PROJECT COST.
12. CONTROL: PROVIDED BY US ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT. COORDINATES SHOWN ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (HARN) - NEW JERSEY STATE PLANE ZONE 2900. ELEVATIONS SHOWN ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).

### INSTRUMENTATION

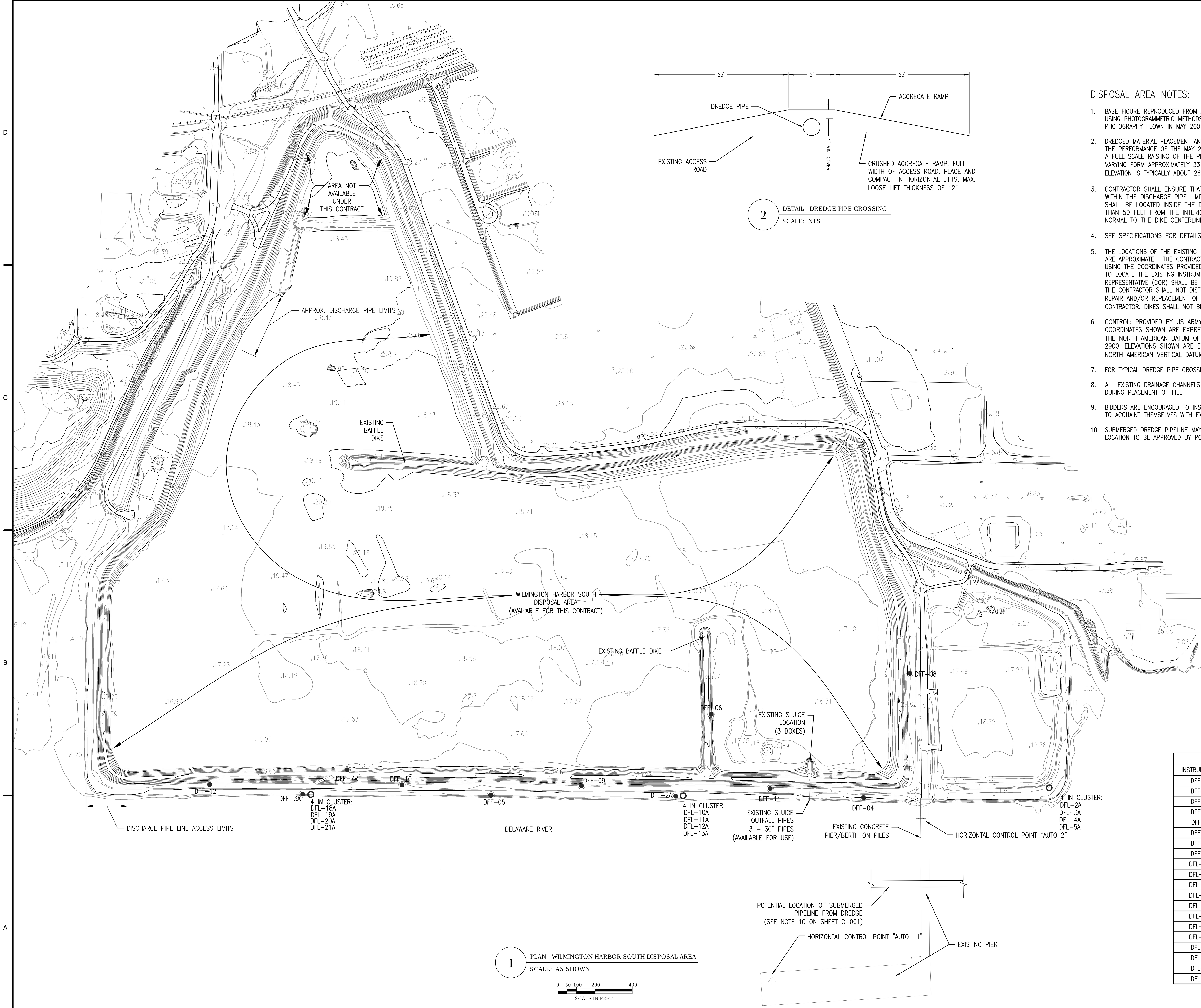
| MONITORING WELL DESIGNATION | N.J. PLANE, NAD1983 NORTHING | EASTING |
|---|---|---|
| PEDRICKTOWN SOUTH DISPOSAL AREA | | |
| EHL-04 | 340808 | 229942 |
| EHW-06 | 336953 | 221348 |
| EHW-07R | 339284 | 222069 |
| EHW-09R | 340766 | 227926 |
| EHW-11 | 337649 | 227752 |
| EHW-12 | 337525 | 226088 |
| EHW-13 | 336872 | 223710 |
| EHW-14 | 341673 | 224284 |
| EHW-18 | 340623 | 230698 |

US Army Corps of Engineers
PHILADELPHIA DISTRICT

U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT

MAINTENANCE DREDGING
-
WILMINGTON HARBOR
CHRISTINA RIVER, DELAWARE
PLAN - PEDRICKTOWN SOUTH DISPOSAL AREA

SHEET NUMBER
C-401




2 DETAIL - DREDGE PIPE CROSSING
SCALE: NTS

1 PLAN - WILMINGTON HARBOR SOUTH DISPOSAL AREA
SCALE: AS SHOWN

## DISPOSAL AREA NOTES:

1. BASE FIGURE REPRODUCED FROM AERIAL MAPPING COMPILED BY OPTIMAL GEOMATICS USING PHOTOGRAMMETRIC METHODS AND CHECKED BY TVGA CONSULTANTS, FOR AERIAL PHOTOGRAPHY FLOWN IN MAY 2007.
2. DREDGED MATERIAL PLACEMENT AND EARTHWORK ACTIVITIES HAVE OCCURRED SINCE THE PERFORMANCE OF THE MAY 2007 SURVEY. EARTHWORK ACTIVITIES HAVE INCLUDED A FULL SCALE RAISIING OF THE PERIMETER AND BAFFLE DIKES TO A CREST ELEVATION VARYING FORM APPROXIMATELY 33 TO 36 FEET (NAVD 88). DISPOSAL AREA FLOOR ELEVATION IS TYPICALLY ABOUT 26 FEET (NAVD88).
3. CONTRACTOR SHALL ENSURE THAT THE DREDGE DISCHARGE PIPE(S) IS PLACED WITHIN THE DISCHARGE PIPE LIMITS SHOWN. THE ENDS OF ALL DISCHARGE PIPES SHALL BE LOCATED INSIDE THE DISPOSAL AREA LIMITS A DISTANCE OF NOT LESS THAN 50 FEET FROM THE INTERIOR TOE OF THE CONTAINMENT DIKE MEASURED NORMAL TO THE DIKE CENTERLINE, UNLESS OTHERWISE NOTED.
4. SEE SPECIFICATIONS FOR DETAILS ON SUPPORTING DISCHARGE PIPE.
5. THE LOCATIONS OF THE EXISTING INSTRUMENTATION (I.E., INCLINOMETERS, PIEZOMETERS) ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD LOCATE INSTRUMENTATION SHOWN USING THE COORDINATES PROVIDED IN THE TABLE ABOVE. IF CONTRACTOR IS UNABLE TO LOCATE THE EXISTING INSTRUMENTATION, THE CONTRACTING OFFICER REPRESENTATIVE (COR) SHALL BE NOTIFIED PRIOR TO BEGINNING WORK IN THAT AREA. THE CONTRACTOR SHALL NOT DISTURB EXISTING INSTRUMENTATION. ANY COSTS FOR REPAIR AND/OR REPLACEMENT OF INSTRUMENTATION SHALL BE INCURRED BY THE CONTRACTOR. DIKES SHALL NOT BE CUT WITHIN 100' OF EXISTING INSTRUMENTATION.
6. CONTROL: PROVIDED BY US ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT. COORDINATES SHOWN ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (HARN) – NEW JERSEY STATE PLANE ZONE 2900. ELEVATIONS SHOWN ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
7. FOR TYPICAL DREDGE PIPE CROSSING DETAIL, SEE VIEW 2 ON SHEET C-401.
8. ALL EXISTING DRAINAGE CHANNELS, CULVERTS OR DRAIN LINES SHALL BE MAINTAINED DURING PLACEMENT OF FILL.
9. BIDDERS ARE ENCOURAGED TO INSPECT THE SITE WHERE WORK IS TO BE PERFORMED TO ACQUAINT THEMSELVES WITH EXISTING CONDITIONS THAT COULD AFFECT THEIR BID.
10. SUBMERGED DREDGE PIPELINE MAY GO UNDER EXISTING PIER AT AN APPROVED LOCATION TO BE APPROVED BY PORT OF WILMINGTON.

| INSTRUMENTATION | | |
|---|---|---|
| INSTRUMENT # | NORTHING | EASTING |
| DFF-04 | 321,161.33 | 206,288.47 |
| DFF-05 | 319,322.81 | 205,494.31 |
| DFF-09 | 319,790.65 | 205,638.43 |
| DFF-10 | 318,904.63 | 205,256.42 |
| DFF-11 | 320,718.85 | 206,047.79 |
| DFF-12 | 317,953.41 | 204,851.07 |
| DFF-2A | 320,234.89 | 205,887.10 |
| DFF-3A | 318,394.04 | 205,094.06 |
| DFL-10A | 320,272.71 | 205,901.01 |
| DFL-11A | 320,256.14 | 205,898.18 |
| DFL-12A | 320,249.80 | 205,892.94 |
| DFL-13A | 320,238.11 | 205,889.63 |
| DFL-18A | 318,433.06 | 205,112.58 |
| DFL-19A | 318,419.53 | 205,105.35 |
| DFL-20A | 318,409.15 | 205,102.60 |
| DFL-21A | 318,402.68 | 205,099.54 |
| DFL-2A | 322,112.97 | 206,616.83 |
| DFL-3A | 322,100.54 | 206,630.44 |
| DFL-4A | 322,090.82 | 206,636.81 |
| DFL-5A | 322,081.44 | 206,643.05 |

US Army Corps of Engineers
Philadelphia District

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT

WILMINGTON HARBOR
CHRISTINA RIVER, DELAWARE
MAINTENANCE DREDGING

PLAN - WILMINGTON HARBOR SOUTH DISPOSAL AREA

SHEET NUMBER
C-401

Phone 856-342-6600 Fax 856-342-8323

# S.T. HUDSON ENGINEERS, INC.

PROFESSIONAL ENGINEERS & CONSULTANTS

900 Dudley Avenue, Cherry Hill, New Jersey 08002

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B. CONLIN

# WILMINGTON HARBOR DREDGING - ENVIRONMENTAL EFFECTS COMPILATION REPORT AND HISTORICAL DATABASE

Versar INC.

# WILMINGTON HARBOR DREDGING - ENVIRONMENTAL EFFECTS COMPILATION REPORT AND HISTORICAL DATABASE

Prepared for

U.S. Army Corps of Engineers
Philadelphia District
Philadelphia, PA 19107

Prepared by

Frederick S. Kelley
Thuzar Myint

Versar, Inc.
9200 Rumsey Road
Columbia, MD 21045

Contract No. DACW61-95-D-0011
Delivery Order No. 0029

Prepared Under the Supervision of

Principal Investigator

William H. Burton

William H. Burton

February 1997

# FOREWORD

This report, entitled, *Wilmington Harbor Dredging - Environmental Effects Compilation Report and Historical Database* was prepared by Versar, Inc. for Ms Barbara Conlin, Environmental Resources Branch, U.S. Army Corps of Engineers, Philadelphia District under Contract No. DACW61-95-D-0011; Task Order 0029.

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# 1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) is responsible for maintaining safe navigation within the port of Wilmington Harbor, Delaware. One aspect of maintaining safe navigation is the routine dredging of the harbor channel. Over the past 15 years, the USACE has conducted 18 maintenance dredging projects within the harbor. For each maintenance dredging project, the USACE was required to obtain a permit from the Delaware Department of Natural Resources and Environmental Control (DNREC). Over the years, the permits required environmental monitoring of the effects of dredging including: water quality monitoring at the dredge disposal site weir discharges and mixing zones, measurements of contaminant concentrations in sediments and elutriates from the harbor, and groundwater monitoring at wells located in the upland dredge disposal site. The USACE is currently pursuing a five year maintenance dredging permit from DNREC. As a condition to authorizing the current permit, DNREC has requested that the USACE summarize all of the results from environmental monitoring conducted during previous maintenance dredging projects, and provide an overview of the environmental effects of maintenance dredging at Wilmington Harbor.

The analytical results of water quality testing conducted during Wilmington Harbor dredging operations are summarized in approximately 300 pages of data tables and laboratory certificates. Sediments contaminant testing results have been summarized in two separate Greeley-Polhemus reports (Greeley-Polhemus Group 1993, 1994). Past monitoring programs were conducted by a number of other contractors who reported their results in a variety of formats including project specific data reports, laboratory analysis certificates, and data summary tables. A chronological history of the dredge monitoring studies is presented in Table 1-1. To date, none of monitoring results have been summarized in a comprehensive report and evaluated to determine if Wilmington Harbor maintenance dredging is having significant effects on ecological resources in the Delaware River.

To comply with DNREC's request for a summary of the results of maintenance dredge monitoring, and an overview of the environmental effects of maintenance dredging at Wilmington Harbor, the USACE contracted Versar to compile 15 years of monitoring data from 1980 to 1994. An electronic database was created that would facilitate data interpretation and statistical analysis, compare the monitoring results to existing criteria, and provide interpretation relating to the environmental effects of maintenance dredging on Wilmington Harbor.

Table 1-1. A chronological history of maintenance dredge monitoring at Wilmington Harbor from 1980 to 1994

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1980 (January-March) | - On 1/22/80, water was collected at the weir outfall, 8 sites in the mixing zone, and at a background site.<br>- On 8 sampling dates from 1/23/80 to 3/10/80, water was collected at the weir outfall, and adjacent, upstream, and downstream of the weir outfall. | - Waters collected at all sites were tested for metals and physical parameters on all dates; and PCB's on 3/10/80. |
| 1980 (October) - 1981 (February) | - Pre-dredge monitoring was conducted on 10/09/80; water was collected at 2 sites in the mixing zone, and at a background site.<br>- During-dredge monitoring was conducted on 4 sampling dates (from 12/09/80 to 2/25/81); water was collected at the weir outfall, 8 mixing zone sites, and a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates. |
| 1981 (September-December) | - Pre-dredge monitoring was conducted on 9/14/81; water was collected at 2 sites in the mixing zone, and at a background site.<br>- During-dredge monitoring was conducted on 4 sampling dates (from 10/13/81 to 12/7/81); water was collected at the weir outfall, 4 mixing zone sites, and a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates. |
| 1982 (October-December) | - Pre-, during- and post-dredge monitoring were conducted on 10/27, 11/02 and 12/15/82, respectively; water was collected at the weir, 6 sites in the mixing zone, and at a background site. (No samples were collected at the weir during post-dredge monitoring.) | - Waters collected at all sites were tested for metals and physical parameters on all dates.<br>- A composite water sample collected at the weir on 11/03/82 was measured for BOD5, COD, and flow. |
| 1983 (June) | - During-dredge monitoring was conducted on 3 sampling dates (from 6/15/83 to 6/27/83); water was collected at the weir, 6 sites in the mixing zone, and at a background site. | - Waters collected at all sites were tested for metals and physical parameters on all dates.<br>- Composite water samples collected at the weir on 2 dates were measured for BOD5, COD fecal coliforms, and flow. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1983 (December) - 1984 (February) | - During-dredge monitoring was conducted on 2 dates (12/19/83 and 1/05/84); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 12/27/83 and 1/10/84.<br><br>- Post-dredge monitoring was conducted on 2/07/84; except for the weir-outfall, water was collected as before. | - All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms. |
| 1985 (January - February) | - During-dredge monitoring was conducted on 2 dates (1/03/85 and 1/14/85); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 1/7/85 and 1/15/85.<br><br>- Post-dredge monitoring was conducted on 2/07/85; except for the weir-outfall, mixing zone water was collected as before. | - All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms and BOD. |
| 1985 (June - August) | - Elutriate monitoring was conducted on 6/19/85; 10 samples were collected in the harbor.<br><br>- During-dredge monitoring was conducted on 2 dates (6/28/85 and 7/17/85); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 6/30/85.<br><br>- Post-dredge monitoring was conducted on 8/08/85; except for the weir-outfall, mixing zone water was collected as before. | - Elutriate samples were tested for metals, PCBs, and physical parameters<br><br>- All water samples were tested for metals and physical parameters, and PCBs.<br><br>- Additional weir-outfall samples were tested for coliforms. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1986 (January - March) | - During-dredge monitoring was conducted on 2 dates (1/09/86 and 1/13/86); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 1/13/86 and 1/22/86.<br>- Post-dredge monitoring was conducted on 2/13/86; except for the weir-outfall, mixing zone water was collected as before.<br>- Groundwater well monitoring was conducted on 3/11/86; samples were collected from 6 wells. | - All water samples were tested for metals and physical parameters, and PCBs.<br>- Additional weir-outfall samples were tested for coliforms and BOD.<br>- Groundwater samples were tested for zinc, total nitrogen, TOC and pH. |
| 1986 (September) | - During-dredge monitoring was conducted on 2 dates (9/04/86 and 9/12/86); water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 9/10/86. | - All water samples were tested for metals, physical parameters, and PCBs.<br>- The additional weir-outfall sample was tested for BOD. |
| 1987 (April) | - Groundwater well monitoring was conducted between 4/07/87 and 4/14/87; 11 samples were collected. | - Groundwater samples were tested for TOC, chloride, zinc, TKN and pH. |
| 1988 (October - December) | - During-dredge monitoring was conducted on 2 dates (10/24/88 and 11/07/88); water was collected at the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 11/04/88 and 11/08/88.<br>- Post-dredge monitoring was conducted 12/01/88; mixing zone water samples were collected as before, except no weir-outfall sample was taken. | - All water samples were tested for metals, physical parameters, and PCBs.<br>- Additional weir-outfall samples were tested for coliforms and BOD. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1989 (August - September) | - During-dredge monitoring was conducted on 8/15/89; water was collected at the weir-outfall, 6 sites in the mixing zone, and at a background site. An additional water sample was collected from the weir-outfall on 8/21/89.<br><br>- Post-dredge monitoring was conducted 9/12/89; mixing zone water samples were collected as before, except no weir-outfall sample was taken. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample was tested for coliforms. |
| 1990 (May - June) | - During-dredge monitoring was conducted on two dates (5/02/90 and 6/15/90); water samples were collected at 8 sites in the mixing zone, and at a background site. Additional water samples were collected from the weir-outfall on 5/15/90 and 5/24/90. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample was tested for coliforms and BOD. |
| 1991 (January) | - During-dredge monitoring was conducted on two dates (1/25/91 and 1/30/91); water samples were collected at 7 sites in the mixing zone, and at a background site. Water samples from the weir-outfall were collected on 1/24/91 and 1/30/91. | - Water samples collected in the mixing zone and at the background site were tested for metal, physical parameters, and PCBs. Samples from the weir-outfall were tested for coliforms and BOD. |
| 1991 (October - December) | - During-dredge monitoring conducted on 5 dates from 11/07/91 to 12/05/91; water samples were collected from the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected almost continuously from the weir-outfall from 10/30/91 to 12/07/91. | - All water samples were tested for metals, physical parameters, and PCBs.<br><br>- Additional weir-outfall sample were tested for TSS and coliforms. |
| 1992 (July - August) | - During-dredge monitoring was conducted on two dates (7/22/92 and 7/27/92); water was collected at the weir-outfall, 7 sites in the mixing zone, and at a background site. Additional water samples were collected at the weir-outfall from 7/20/92 to 8/10/92. | - Water samples of the mixing zone and background were tested for physical, metals and organic parameters; weir outfall samples were tested for TSS (63 samples), coliforms (3 samples), and once for physical, metals, and organic parameters. |

Table 1-1. Cont'd

| Dredge Monitoring Project | Project Description | Testing Description |
|---|---|---|
| 1993 (March - April) | - Pre-dredge monitoring was conducted 3/10-11/93; 6 sediment and elutriate, and a background water sample were collected in the Harbor.<br><br>- During-dredge monitoring was conducted from 3/23/93 to 4/09/93; samples were collected from the weir-outfall, 4 mixing zone sites and a background site on 3 dates. Additional water samples were collected from the weir-outfall on 3 dates.<br><br>- Post-dredge monitoring was conducted on 4/16/93; mixing zone water samples were collected as above excluding the weir-outfall sample. | - Sediment and elutriate samples were tested for metals, organics, and PCBs.<br><br>- Water samples collected from the weir-outfall were tested for metals, organics, and PCBs. Mixing zone and background samples were tested for metals and organics. Additional weir-outfall samples were tested for TSS. |
| 1993 (December) - 1994 (April) | - Pre-dredge monitoring was conducted on 12/22/93; 2 water samples at one site, and 2 composite sediment samples at 2 sites were collected in the mixing zone.<br><br>- During-dredge monitoring was conducted on three dates; 2 water samples were collected in the mixing zone on 1/13/94, and 24-hr composite samples collected at weir outfall on 1/04/94 and 2/25/94. Additional water samples were collected every three days at weir-outfall.<br><br>- Post-dredge monitoring was conducted on two dates; water samples were collected from the weir-outfall and the two mixing zone sites on 4/15/94, and at the weir-outfall on 5/20/94. | - All water and sediment samples were tested for metals, PCBs, PAHs, and physical parameters. Additional during-dredge weir-outfall samples were tested for TSS. |

# 2.0 METHODS

## 2.1 DATABASE DEVELOPMENT

All of the monitoring data from 1980 to 1994 were entered into a Lotus spreadsheet from hard copy format. Each data entry included common identifiers including project name, study year, date, station identification, contractor name, and comments on specific values. Separate database files were created for water quality, groundwater, and sediment contaminant monitoring. Concentrations of each parameter monitored were adjusted to a common unit of measure (in water, mg/L for metals and miscellaneous parameters, and $\mu$g/L for organics and pesticides; in sediment for the parameters groups, mg/kg and $\mu$g/kg, respectively). Database quality control was administered by comparing data entries with the original tables or analysis certificates, checking parameter reporting units, and use of a computer program to check for out-of-range parameters and other data anomalies (e.g., missing data or invalid station names). Finally, the Lotus database spreadsheets were converted to SAS (SAS Institute 1990) data sets for data manipulation, statistical analysis, and final storage.

## 2.2 DATA ANALYSIS

### 2.2.1 Criteria Comparison

The concentrations and measurements of parameters analyzed for water quality, sediment and elutriate contaminants, and groundwater well-monitoring were compared with current federal and state regulatory criteria (Tables 2-1 and 2-2). Water quality and elutriate parameter concentrations were compared to EPA's marine chronic criteria, or acute chronic criteria in absence of the former value (Wilmington Harbor is at the transition zone between freshwater and salt water). Sediment contaminant concentrations were compared to Long et al's (1995) effects range-low (ER-L), or effects range-median (ER-M) guidance values for sediment quality in the absence of state guidelines. A few sediment parameters had neither effects range criteria and were compared to the EPA's (1988) overall apparent effects threshold (OAET) or threshold effects levels (TEL). Groundwater well-monitoring parameter concentrations were compared to National Secondary Drinking Water Regulations (CFR 40 1996).

### 2.2.2 Effects of Dredging on Water Quality

Of the four dredge monitoring components, groundwater, sediment, elutriate and weir-outfall water quality, only the latter was conducted frequently enough to permit meaningful statistical comparisons. Data from sediment and elutriate, and groundwater monitoring were collected during only 2 and 3 of the 18 maintenance dredge projects. Additionally, data for

Table 2-2. Cont'd

| Parameter | Criteria | |
|---|---|---|
| | Water (µg/L) | Sediments (µg/kg) |
| Chlorobenzene | 129 | |
| Chrysene | | 384 |
| Dibenzo(a,h)anthracene | | 63.4 |
| Ethylbenzene | 430 | |
| Fluoranthene | 16 | 600 |
| Fluorene | | 19 |
| Hexachlorobutadiene | 32 | |
| Hexachlorocyclopentadiene | 7 | |
| Hexachloroethane | 940 | |
| Isophorone | 12900 | |
| Naphthalene | 2350 | 160 |
| Nitrobenzene | 6680 | |
| Pentachlorophenol | 7.9 | |
| Phenanthrene | 4.6 | 240 |
| Phenol | 5800 | |
| Pyrene | | 865 |
| Tetrachloroethene | 450 | |
| Toluene | 5000 | |
| Trichloroethene | 2000 | |
| **Pesticides** | | |
| 2,4'-DDD | 3.6 | 1.22 |
| 2,4'-DDE | 14 | 2.2 |
| 2,4'-DDT | 0.001 | 1.58 |
| 4,4'-DDD | 3.6 | 1.22 |
| 4,4'-DDE | 14 | 2.2 |

| Table 2-2. Cont'd | | |
|---|---|---|
| **Parameter** | **Criteria** | |
| | **Water ($\mu$g/L)** | **Sediments ($\mu$g/kg)** |
| 4,4'-DDT | 0.001 | 1.58 |
| A-BHC | 0.34 | |
| Aldrin | 1.3 | |
| B-BHC | 0.34 | |
| Chlordane | 0.004 | 2 |
| Cis-chlordane | 0.004 | |
| D-BHC | 0.34 | |
| Dieldrin | 0.0019 | 0.715 |
| Endosulfan I | 0.0087 | |
| Endosulfan II | 0.0087 | |
| Endrin | 0.0023 | |
| G-BHC | 0.34 | |
| Heptachlor | 0.0036 | |
| Heptachlor epoxide | 0.0036 | |
| Mirex | 0.001 | |
| Toxaphene | 0.0002 | |
| Trans-chlordane | 0.004 | |

many of the parameters lacked variation as many concentrations were below test detection limits. Low data variability was especially true for the organic and pesticide parameters.

Statistical comparisons among water quality parameters were limited to the during-dredge phase of dredge monitoring projects. Most of the data for dredge projects were collected repeatedly through the during-dredge phase, and only once, if at all, for pre- and post-dredge monitoring. In addition, low data variability due to a high incidence of concentrations below test detection limits restricted the application of statistical comparisons. For a total of 19 water quality parameters, analysis of variance (ANOVA) tests were made to determine differences between weir-outfall sites, mixing zone sites, and background sites. Duncan's Multiple Range Test was conducted to determine statistical differences between site variables (Sokal and Rohlf 1981). Parameter measurements were treated independently for all sites; parameter means for each site category were calculated by averaging all of the concentrations measured over the 15 years of monitoring. Concentrations less than test detection limits were given the value of the detection limit for each calculation.

Water quality of the mixing zone was monitored by collecting samples within the weir turbidity plume. Fixed sites for sample collection were established within the plume at different distances from the outfall. The number of samples collected in the mixing zone on each monitoring date varied according to maintenance dredge project. In addition, different project sampling schemes often used site numbers to identify sampling locations, but did not consistently assign the same site number to a location relative to the weir-outfall. Collection site locations varied according to tide cycle, as they were always collected on the down current. These combined factors made it impossible to categorize mixing zone stations by distance from the weir-outfall with confidence, consequently, all data from samples collected within the mixing zone were pooled.

# 3.0 RESULTS

Over 100 parameters were measured for each of the monitoring components (e.g., water quality, and sediment and elutriate contaminants). This section addresses the monitoring components in order, and divides the list of parameters into general groups that include: metals, inorganic non-metals, and physical parameters; PCBs and organics; and pesticides. Only a few parameters were measured during groundwater well-monitoring of the upland disposal site, and are presented collectively.

## 3.1 WATER QUALITY MONITORING

### 3.1.1 Criteria Comparison

A total of 164 water quality parameters were monitored during maintenance dredging of Wilmington Harbor over the past 15 years (Table 3-1, 3-2, and 3-4). The parameters comprised several general groupings and included physical, metals, inorganic non-metals, and organics such as polychlorinated biphenyls (PCBs) and pesticides. The frequency of measurement among all parameters ranged from 428 for Zinc to a single measurement for two of the organics. Initially, the frequencies of measure and criteria exceedence were calculated for each parameter among all measurements disregarding the dredge phase in which it was collected and the station location. For parameters that chronically exceeded criteria discussion is included relative to the station type and dredge phase for which the exceedences occurred.

#### 3.1.1.1 Metals, Physical, and Miscellaneous Parameters

Thirty-seven water quality parameters comprising metals, inorganic non-metals, nutrient measures, physical measures, and bacteria counts were analyzed during maintenance dredge monitoring at Wilmington Harbor (Table 3-1). Among these parameters, 37 had listed criteria concentrations or measures. A comparison of the criteria with water quality monitoring data identified 7 parameters that had concentrations exceeding or not in compliance with their respective criteria. These included cadmium, chromium, lead, nickel, zinc, dissolved oxygen, and pH (criteria given as a range from 6.5 to 8.5).

Cadmium concentrations were measured 127 times over the 15 years of water quality monitoring (Table 3-1). Approximately 20% (25 samples) of the concentrations measured at all sites exceeded the criterion for cadmium of less than 0.009 mg/L. However, 23 of the exceeding concentrations at 0.010 mg/L were only slightly greater than the criterion. The maximum concentration of cadmium (0.025 mg/L) was measured in a sample collected from the weir-outfall in February 1980.

Table 3-1. Frequencies of water quality parameter measurement for metals, inorganic non-metals, nutrients, physical measures, and bacteria counts monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Aluminum | 109 | 0 | NL | | | |
| Antimony | 8 | 8 | 0.5 | 0 | 0 | 0.0 |
| Arsenic | 38 | 13 | 0.036 | 0 | 0 | 0.0 |
| Beryllium | 28 | 26 | NL | | | |
| Cadmium | 127 | 44 | 0.0093 | 1 | 25 | 19.7 |
| Chloride | 3 | 0 | NL | | | |
| Chromium | 147 | 84 | 0.05 | 0 | 2 | 1.4 |
| Copper | 147 | 53 | 2.9 | 0 | 0 | 0.0 |
| Lead | 147 | 47 | 0.0085 | 40 | 78 | 53.1 |
| Mercury | 281 | 261 | 0.025 | 0 | 0 | 0.0 |
| Nickel | 38 | 28 | 0.0083 | 28 | 8 | 21.1 |
| Selenium | 18 | 18 | 0.071 | 0 | 0 | 0.0 |
| Silver | 18 | 18 | 0.0092 | 16 | 0 | 0.0 |
| Thallium | 8 | 8 | 2.13 | 0 | 0 | 0.0 |
| Zinc | 428 | 46 | 0.086 | 0 | 144 | 33.6 |
| Cyanide | 6 | 6 | 0.001 | 6 | 0 | 0.0 |
| Dissolved Oxygen | 394 | 2 | <5 | 0 | 29 | 7.4 |
| BOD | 414 | 192 | NL | | | |
| COD | 159 | 7 | NL | | | |
| Ammonia | 3 | 0 | 0 | | | |
| Nitrate | 61 | 1 | 0 | | | |
| Nitrite | 3 | 0 | NL | | | |
| Nitrate + Nitrite | 24 | 0 | 10 | 0 | 0 | 0.0 |
| Total Nitrogen | 327 | 0 | NL | | | |
| Total Kjeldahl Nitrogen | 152 | 0 | NL | | | |
| Total Phosphate | 128 | 29 | NL | | | |

Table 3-1. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Hardness | 10 | 0 | NL | | | |
| Oil & Grease | 19 | 16 | NL | | | |
| pH | 404 | 0 | 6.5-8.5 | 0 | 7* | 1.7 |
| Settleable Solids | 19 | 8 | NL | | | |
| Temperature (°C) | 394 | 1 | NL | | | |
| Total Organic Carbon | 407 | 0 | NL | | | |
| Total Petroleum Hydrocarbons | 10 | 10 | NL | | | |
| Total Suspended Solids | 925 | 3 | NL | | | |
| Turbidity (ntu) | 396 | 0 | NL | | | |
| Fecal Coliform (#/100 ml) | 56 | 0 | NL | | | |
| Total Coliform (#/100 ml) | 49 | 1 | NL | | | |

* - pH always below the criteria range
NL - Not listed

Chromium concentrations were measured 147 times over the 15 years of water quality monitoring (Table 3-1). Less than 2% (2 samples) of the concentrations measured at all sites exceeded the criterion for chromium of less than 0.05 mg/L. However, the frequency of chromium concentrations exceeding the criterion may be less. The water quality criterion used in the comparison was based on the EPA chronic saltwater criterion for hexavalent chromium which represents only a fraction of total chromium. Applying this criterion to total chromium concentrations may have resulted in an overestimate of the number of exceeding concentrations. The exceeding chromium concentrations, approximately 2 and 11 times greater than the criterion, were measured in samples collected from the weir-outfall during February 1980.

Lead concentrations were measured 147 times over the 15 years of water quality monitoring (Table 3-1). Greater than 50% (78 samples) of the concentrations measured at all sites exceeded the criterion of less than 0.009 mg/L. The frequency of concentrations exceeding the criterion was probably underestimated. Among all samples analyzed for lead, 47 had concentrations less than test detection limits, and were not counted as exceeding the criterion. However, among these samples, 43 had test detection limits that exceeded the criterion. The distribution pattern of exceeding lead concentrations was not clearly defined. Leading concentrations above criteria were observed during all phases of dredge monitoring (pre, during, and post), and at all station types including the background station. However, the greatest concentrations of lead were measured in samples collected from the during-dredge phase of water quality monitoring.

Nickel concentrations were measured 38 times over the 15 years of water quality monitoring (Table 3-1). Approximately 20% (8 samples) of the concentrations measured among all sites exceeded the criterion for nickel of less than 0.008 mg/L. The frequency of exceeding concentrations was probably underestimated. Among all samples analyzed for nickel, 28 had concentrations less than the test detection limits. However, the test detection limit for all of these samples was greater than the criterion. All but one of the exceeding concentrations were observed in samples collected from the weir-outfall, and all but one of these was collected in the during-dredge phase of water quality monitoring. The maximum concentration of nickel (0.0320 mg/L) observed during maintenance dredge monitoring was 4 times greater than the criterion.

Zinc concentrations were measured 428 times over the 15 years of water quality monitoring (Table 3-1). Approximately 30% (144 samples) of the concentrations measured among all sites exceeded the criterion for zinc of less than 0.086 mg/L. Exceeding concentrations of zinc were observed at all station types. The weir-outfall had the greatest number of exceedences at 93, and the greatest concentration of zinc observed during monitoring at 21.0 mg/L. The mixing zone had 34 exceeding concentrations, while the background had 17.

Dissolved oxygen (DO) concentrations were measured 394 times during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-1). Less than 10% (29 measures) of the concentrations measured among all sites were below the minimum criteria for DO of 5.0 mg/L. Low DO concentrations were observed at all of the site types. Most of the low DO concentrations (17) were observed at the mixing zone sites; low concentrations at the weir-outfall and background sites numbered 9 and 2, respectively. However, based on the percentage of DO concentrations measured below criteria, the weir-outfall was greatest (25%) followed by the mixing zone (5%) and background (4%). The concentrations of DO below criteria were different between the weir-outfall and the mixing zone-background sites. All but one of the weir-outfall DO concentrations were below 2 mg/L, while all of the mixing zone and background concentrations were greater than 4 mg/L.

Measurements of pH were collected 404 times during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-1). Less than 2% (7 measures) were outside of the criteria range for pH of 6.5 to 8.5. All but one of the noncompliant measures were too acidic and fell below the criteria range. Six of the measurements were observed at mixing zone sites, and the seventh was from the background. The lowest measurement of pH (2.89) and the only measurement exceeding the criteria range (8.55) were both recorded from mixing zone stations on the same monitoring date.

Nine other parameters were compared to water quality criteria, and had no exceeding measures during the 15 years of monitoring at Wilmington Harbor (Table 3-1). Of these, silver and cyanide had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In both cases, the test detection limits exceeded criteria concentrations. Twenty-one water quality parameters were measured that had no criteria.

### 3.1.1.2 PCBs and Organics

A total of 98 PCB and organic parameters were monitored during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-2). Among these parameters, 32 had listed criteria concentrations. A comparison of the criteria with water quality monitoring data identified only PCBs as the only parameter that had concentrations exceeding criteria.

PCB concentrations were measured 247 times over the 15 years of water quality monitoring (Table 3-2). Fourteen percent (35 samples) of the concentrations measured among all sites exceeded the water quality criterion for PCBs of less than 0.03 $\mu$g/L. The number of concentrations exceeding the criterion was probably underestimated. Among all 247 samples, 212 had concentrations less than test detection limits and were regarded as not exceeding the criterion. However, among the 212 samples, 201 had test detection limits that were greater than the criterion. All of the site types had concentrations of PCBs that exceeded the criterion. The weir-outfall and background had the least number of exceeding concentrations at 4 and 5, respectively, while the mixing zone had 26. The greatest concentration (2.70

Table 3-2. Frequencies of water quality parameter measurement for PCBs and organics monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (µg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| PCB's | 247 | 212 | 0.03 | 201 | 35 | 14.2 |
| 1-Methylnaphthalene | 10 | 10 | NL | | | |
| 1-Methylphenanthrene | 10 | 10 | NL | | | |
| 1,1-Dichloroethane | 4 | 4 | NL | | | |
| 1,1-Dichloroethene | 4 | 4 | NL | | | |
| 1,1,1-Trichloroethane | 4 | 4 | 31200 | 0 | 0 | 0.0 |
| 1,1,2-Trichloroethane | 4 | 4 | NL | | | |
| 1,1,2,2-Tetrachloroethane | 4 | 4 | 9020 | 0 | 0 | 0.0 |
| 1,2-Dichlorobenzene | 4 | 4 | NL | | | |
| 1,2-Dichloroethane | 3 | 3 | 113000 | 0 | 0 | 0.0 |
| 1,2-Dichloroethene | 4 | 4 | NL | | | |
| 1,2-Dichloropropane | 4 | 4 | 3040 | 0 | 0 | 0.0 |
| 1,2-Diphenyl Hydrazine | 4 | 4 | NL | | | |
| 1,2,4-Trichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 1,3-Dichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 1,4 & 1,2-Dichlorobenzene | 3 | 3 | 129 | 0 | 0 | 0.0 |
| 1,4-Dichlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| 2-Chloroethylvinylether | 1 | 1 | NL | | | |
| 2-Chloronaphthalene | 4 | 4 | 7.5 | 4 | 0 | 0.0 |
| 2-Chlorophenol | 4 | 4 | 29700 | 0 | 0 | 0.0 |
| 2-Methylnaphthalene | 10 | 10 | NL | | | |
| 2-Nitrophenol | 4 | 4 | 4850 | 0 | 0 | 0.0 |
| 2,3,5-Trimethyl-naphthalene | 10 | 10 | NL | | | |
| 2,4-Dichlorophenol | 4 | 4 | NL | | | |
| 2,4-Dimethylphenol | 4 | 4 | NL | | | |
| 2,4-Dinitrophenol | 4 | 4 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (µg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| 2,4-Dinitrotoluene | 4 | 4 | NL | | | |
| 2,4,6-Trichlorophenol | 4 | 4 | NL | | | |
| 2,6-Dimethylnaphthalene | 10 | 10 | NL | | | |
| 2,6-Dinitrotoluene | 4 | 4 | NL | | | |
| 3,3'-Dichlorobenzidine | 4 | 4 | NL | | | |
| 4-Bromophenyl-phenylether | 4 | 4 | NL | | | |
| 4-Chlorophenyl-phenylether | 4 | 4 | NL | | | |
| 4-Nitrophenol | 4 | 4 | 4850 | 0 | 0 | 0.0 |
| 4,6-Dinitro-2-methylphenol | 4 | 4 | NL | | | |
| 4,-Chloro-3-methylphenol | 4 | 4 | NL | | | |
| Acenaphthene | 14 | 14 | 710 | 0 | 0 | 0.0 |
| Acenaphthylene | 14 | 14 | NL | | | |
| Acrolein | 4 | 4 | 55 | 0 | 0 | 0.0 |
| Acrylonitrile | 4 | 4 | NL | | | |
| Anthracene | 14 | 14 | NL | | | |
| Benzene | 4 | 4 | 700 | 0 | 0 | 0.0 |
| Benzidine | 4 | 4 | NL | | | |
| Benzo(a)anthracene | 14 | 14 | NL | | | |
| Benzo(a)pyrene | 34 | 34 | NL | | | |
| Benzo(b)fluoranthene | 14 | 14 | NL | | | |
| Benzo(e)pyrene | 10 | 10 | NL | | | |
| Benzo(g,h,i)perylene | 14 | 14 | NL | | | |
| Benzo(k)fluoranthene | 14 | 14 | NL | | | |
| Biphenyl | 10 | 10 | NL | | | |
| Bis(2-chloroethoxy)methane | 4 | 4 | NL | | | |
| Bis(2-chloroethyl)ether | 4 | 4 | NL | | | |
| Bis(2-chloroisopropyl)ether | 4 | 4 | NL | | | |
| Bis(2-ethylhexyl)phthalate | 24 | 24 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria (μg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Bromodichloromethane | 4 | 4 | NL | | | |
| Bromoform | 4 | 4 | NL | | | |
| Bromomethane | 4 | 4 | NL | | | |
| Butlybenzylphthalate | 4 | 4 | NL | | | |
| Carbon Tetrachloride | 4 | 4 | 50000 | 0 | 0 | 0.0 |
| Chlorobenzene | 4 | 4 | 129 | 0 | 0 | 0.0 |
| Chloroethane | 4 | 4 | NL | | | |
| Chloroform | 24 | 24 | NL | | | |
| Chloromethane | 4 | 4 | NL | | | |
| Chrysene | 14 | 14 | NL | | | |
| Cis-1,3-Dichloropropene | 4 | 4 | NL | | | |
| Cis,trans,1,2-Dichloroethene | 1 | 1 | NL | | | |
| Dibenzo(a,h)anthracene | 14 | 14 | NL | | | |
| Dibromochloromethane | 4 | 4 | NL | | | |
| Diethylphthalate | 4 | 4 | NL | | | |
| Dimethylphthalate | 4 | 4 | NL | | | |
| Di-n-butylphthalate | 4 | 4 | NL | | | |
| Di-n-octylphthalate | 4 | 4 | NL | | | |
| Ethylbenzene | 4 | 4 | 430 | 0 | 0 | 0.0 |
| Fluoranthene | 34 | 34 | 16 | 0 | 0 | 0.0 |
| Fluorene | 14 | 14 | NL | | | |
| Hexachlorobenzene | 4 | 4 | NL | | | |
| Hexachlorobutadiene | 4 | 4 | 32 | 0 | 0 | 0.0 |
| Hexachlorocyclopentadiene | 4 | 4 | 7 | 4 | 0 | 0.0 |
| Hexachloroethane | 4 | 4 | 940 | 0 | 0 | 0.0 |
| Indeno(1,2,3-c,d)pyrene | 14 | 14 | NL | | | |
| Isophorone | 4 | 4 | 12900 | 0 | 0 | 0.0 |
| Methylene Chloride | 4 | 4 | NL | | | |

Table 3-2. Cont'd

| Parameter | # Measured | # Below Detection Limit | Criteria ($\mu g/L$) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| Naphthalene | 14 | 14 | 2350 | 0 | 0 | 0.0 |
| Nitrobenzene | 4 | 4 | 6680 | 0 | 0 | 0.0 |
| N-nitrosodimethylamine | 4 | 4 | NL | | | |
| N-nitroso-Di-n-propylamine | 4 | 4 | NL | | | |
| N-nitrosodiphenylamine | 4 | 4 | NL | | | |
| Pentachlorophenol | 4 | 4 | 7.9 | 4 | 0 | 0.0 |
| Perylene | 10 | 10 | NL | | | |
| Phenanthrene | 14 | 14 | 4.6 | 14 | 0 | 0.0 |
| Phenol | 53 | 36 | 5800 | 0 | 0 | 0.0 |
| Pyrene | 14 | 14 | NL | | | |
| Tetrachloroethene | 24 | 24 | 450 | 0 | 0 | 0.0 |
| Toluene | 4 | 4 | 5000 | 0 | 0 | 0.0 |
| Trans-1,3-Dichloropropene | 4 | 4 | NL | | | |
| Trichloroethene | 4 | 4 | 2000 | 0 | 0 | 0.0 |
| Trichlorofluoromethane | 3 | 3 | NL | | | |
| Vinyl Chloride | 4 | 4 | NL | | | |

NL - Not listed

μg/L) among all PCB measurements was observed at a mixing zone site during January 1985, and was 90 times greater than the criterion.

For several of the dredge water quality monitoring projects, PCBs were measured with different units of precision. In 1980 and 1993, PCBs were measured by industrial groups (Aroclors 1254, 1260, 1242, 1248, and 1221). All of the concentrations during both of these years were below test detection limits. In 1994, concentrations of total PCBs were measured in units of μg/L (parts per billion), and that of PCB specific congeners, in units of ng/L (parts per trillion) and pg/L (parts per quadrillion). At the total PCB level, no PCBs were detected in any of samples analyzed, however, at the specific congener level, several species were detected (Table 3-3). Predredge water quality monitoring resulted in the detection of one congener in harbor water; during-dredge monitoring resulted in 4 detections at the weir-outfall and 1 in the mixing zone; and post-dredge monitoring resulted in two detections at both weir-outfall and mixing zones. The sample with the greatest PCB concentration calculated by summing all congeners detected (475 pg/L at the weir-outfall, 25 February) was more than 60 times less than the criterion for PCBs. No regulatory criteria are published for specific PCB congeners.

Table 3-3. PCB congeners (pg/L) measured during Wilmington Harbor water quality monitoring in 1994

| PCB Congeners | Pre | During | | Post | |
|---|---|---|---|---|---|
| | | | Weir-outfall | | |
| 77 Tetra | Not sampled | 319 | 368 | 41.1 | 118 |
| 81 Tetra | | 11.1 | ND | ND | ND |
| 126 Penta | | 52.9 | 58 | 5.6 | ND |
| 169 Hexa | | ND | 47.4 | ND | ND |
| | | | Mixing Zone | | |
| | Station 1 | Station 1 | Station 1 | Station 2 | Station 1 | Station 2 |
| 77 Tetra | 51.2 | 31 | 31 | 64.2 | 31.2 | 28.7 |
| 126 Penta | ND | ND | ND | ND | 4.9 | 4.6 |

Thirty-one other organic parameters were compared to water quality criteria, and none had exceeding concentrations during the 15 years of monitoring at Wilmington Harbor (Table 3-2). Among these, the organics, 2-chloronaphthalene, hexachlorocyclopentadiene, pentachlorophenol, and phenanthrene had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In both cases, the test detection limits exceeded criteria concentrations.

Sixty-six organic parameters of water quality that were measured had no criteria. All of the concentrations measured for these parameters were less than their respective test detection limits.

#### 3.1.1.3 Pesticides

A total of 29 pesticide parameters were monitored during the 15 years of water quality monitoring at Wilmington Harbor (Table 3-4). Among these parameters, 22 had listed criteria concentrations. A comparison of the criteria with water quality monitoring data found no parameters with concentrations exceeding a criterion. However, among the parameters with criteria, 13 had concentrations that may have exceeded their respective criteria but were confounded by test detection limits. In all cases, the test detection limits exceeded criteria concentrations.

Seven pesticide parameters of water quality that were measured had no criteria (Table 3-4). All of the concentrations measured for these parameters were less than their respective test detection limits with one exception. Oxychlordane was detected in a sample collected from the weir-outfall in the during-dredge phase in 1994.

### 3.1.2 Effects of Dredging on Water Quality

Analysis of variance (ANOVA) was used to compare water quality of the weir-outfall, mixing zone, and background site for 19 of the water quality parameters (Table 3-5). These 19 parameters were the only ones that had enough data variability to apply a statistically meaningful comparison. The water quality comparison was restricted to data collected in the during-dredge phase of maintenance dredge monitoring.

Significant differences between monitoring sites were observed for 14 of the 19 parameters compared by ANOVA. In all 14 instances, the water quality of the weir-outfall was different from the mixing zone and background site, and that between the mixing zone and the background site was not different. Among the metals, aluminum in the weir-outfall was 5 times greater than the mixing zone and background sites. Weir concentration of arsenic was at least twice mixing zone and background levels while chromium was three times as great. Lead concentration in the weir were approximately three times higher than mixing zone and background and zinc was at least 8 times higher. No significant differences between sites were observed for cadmium or copper. Among nutrient parameters, both total nitrogen and TKN in the weir-outfall were almost 10 times greater than in the mixing zone and background sites. Total phosphorus was also greater in the weir-outfall but only by a factor of 2. The differences between sites were greatest for turbidity and total suspended solids;

Table 3-4. Frequencies of water quality parameter measurement for pesticides monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | # Measured | # Below Detection Limit | Criteria (μg/L) | # of Detection Limits > Criteria | # of Observation > Criteria | % of Observation > Criteria |
|---|---|---|---|---|---|---|
| 2,4'-DDD | 10 | 10 | 3.6 | 0 | 0 | 0.0 |
| 2,4'-DDE | 10 | 10 | 14 | 0 | 0 | 0.0 |
| 2,4'-DDT | 10 | 10 | 0.001 | 10 | 0 | 0.0 |
| 4,4'-DDD | 13 | 13 | 3.6 | 0 | 0 | 0.0 |
| 4,4'-DDE | 13 | 13 | 14 | 0 | 0 | 0.0 |
| 4,4'-DDT | 13 | 13 | 0.001 | 13 | 0 | 0.0 |
| A-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Aldrin | 13 | 13 | 1.3 | 0 | 0 | 0.0 |
| B-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Chlordane | 7 | 3 | 0.004 | 3 | 4 | 57.1 |
| Cis-chlordane | 10 | 10 | 0.004 | 10 | 0 | 0.0 |
| Cis-nonachlor | 10 | 10 | NL | | | |
| D-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Dicofol | 10 | 10 | NL | | | |
| Dieldrin | 13 | 13 | 0.0019 | 13 | 0 | 0.0 |
| Endosulfan I | 13 | 13 | 0.0087 | 13 | 0 | 0.0 |
| Endosulfan II | 13 | 13 | 0.0087 | 13 | 0 | 0.0 |
| Endosulfan sulfate | 13 | 13 | NL | | | |
| Endrin | 13 | 13 | 0.0023 | 13 | 0 | 0.0 |
| Endrin aldehyde | 13 | 13 | NL | | | |
| G-BHC | 13 | 13 | 0.34 | 0 | 0 | 0.0 |
| Heptachlor | 13 | 13 | 0.0036 | 13 | 0 | 0.0 |
| Heptachlor epoxide | 13 | 13 | 0.0036 | 13 | 0 | 0.0 |
| Hexychlorobenzene | 10 | 10 | NL | | | |
| Mirex | 10 | 10 | 0.001 | 10 | 0 | 0.0 |
| Oxychlordane | 10 | 9 | NL | | | |

| Table 3-4. Cont'd | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **# Measured** | **# Below Detection Limit** | **Criteria ($\mu$g/L)** | **# of Detection Limits > Criteria** | **# of Observation >Criteria** | **% of Observation > Criteria** |
| Toxaphene | 17 | 17 | 0.0002 | 17 | 0 | 0.0 |
| Trans-chlordane | 10 | 10 | 0.004 | 10 | 0 | 0.0 |
| Trans-nonachlor | 10 | 10 | NL | | | |
| NL - Not listed | | | | | | |

Table 3-5. ANOVA comparison of means for water quality parameters monitored in the during-dredge phase of maintenance dredging at Wilmington Harbor from 1980 to 1994. (Means with the same letter are not significantly different; a is significantly greater than b; total sample size is indicated in parentheses.)

| Parameter | Weir-Outfall | Mixing Zone | Background |
|---|---|---|---|
| BOD (mg/L) | 31.6[a] (54) | 3.2[b] (266) | 3.7[b] (38) |
| COD (mg/L) | 142[a] (21) | 38[b] (92) | 39[b] (11) |
| pH | 7.2[a] (35) | 7.2[a] (269) | 7.2[a] (38) |
| Dissolved Oxygen (mg/L) | 7.4[b] (33) | 8.8[a] (267) | 8.4[a] (38) |
| Fecal Coliform (# of colonies) | 1913[a] (41) | 316[a] (12) | 200[a] (2) |
| Total Coliform (# of colonies) | 14657[a] (34) | 1758[a] (12) | 3250[a] (2) |
| TOC (mg/L) | 63.8[a] (38) | 5.6[b] (269) | 4.8[b] (38) |
| Total Phosphate (mg/L) | 0.53[a] (20) | 0.21[b] (86) | 0.18[b] (10) |
| Total Suspended Solids (mg/L) | 1430[a] (557) | 71[b] (268) | 64[b] (38) |
| Turbidity (NTUs) | 3065[a] (36) | 42[b] (266) | 31[b] (38) |
| TKN (mg/L) | 18.1[a] (11) | 2.0[b] (105) | 1.6[b] (16) |
| Total Nitrogen (mg/L) | 38.1[(a)] (27) | 4.0[b] (225) | 3.5[b] (31) |
| Aluminum (mg/L) | 12.7[(a)] (15) | 2.2[b] (74) | 2.3[B] (8) |
| Arsenic (mg/L) | 0.0105[a] (9) | 0.0040[b] (15) | 0.0023[b] (3) |

| Table 3-5. Cont'd | | | |
|---|---|---|---|
| **Parameter** | **Weir-Outfall** | **Mixing Zone** | **Background** |
| Cadmium (mg/L) | 0.0053[a] (24) | 0.0039[a] (77) | 0.0038[a] (8) |
| Chromium (mg/L) | 0.0474[a] (24) | 0.0147[b] (89) | 0.0149[b] (11) |
| Copper (mg/L) | 0.0522[a] (24) | 0.0283[a] (89) | 0.0315[a] (11) |
| Lead (mg/L) | 0.0889[a] (24) | 0.0301[b] (89) | 0.0215[b] (11) |
| Zinc (mg/L) | 1.34[a] (40) | 0.07[b] (280) | 0.16[b] (41) |

the former was greater in the weir-outfall by and factor of 70, and the latter was greater by a factor of 30. Concentrations of BOD, COD and TOC were greater in the weir-outfall by factors of 10, 4, and 12, respectively. Dissolved oxygen in the weir-outfall, although only 12% less than the mixing zone and background site, was still significantly lower. No differences were observed between sites for pH or the coliform parameters.

## 3.2 SEDIMENT AND ELUTRIATE TESTING

### 3.2.1 Sediments

Sediment contaminant testing was conducted twice during the 15 years of maintenance dredging at Wilmington Harbor. In total, the concentrations of 141 parameters were analyzed in sediments collected from Wilmington Harbor prior to dredging (Tables 3-6 3-7, and 3-8). Only 33 of the sediment contaminant parameters had listed sediment quality criteria. Three parameters had at least one concentration that exceeded the criterion for all of the sediment testing data (mercury, silver and phenanthrene).

Mercury was measured 8 times in sediments and exceeded the criterion of 0.15 mg/kg for only one sediment sample. This sample was collected during pre-dredge monitoring in December 1993 and exceeded the criterion by a factor of two.

Silver concentrations in sediments were also measured 8 times and exceeded the criterion of 1.0 mg/kg twice. Both exceeding concentrations were measured during pre-dredge in December 1993 and were 3 and 4 times over the criterion.

Lastly, phenanthrene concentrations, measured 8 times, exceeded the criterion of 240 $\mu$g/kg twice during pre-dredge monitoring conducted during March 1993 (Table 3-7). The exceeding concentrations were 2 to 2.5 times greater than the criterion. The number of exceeding phenanthrene concentrations may have been greater than 2; two concentrations, also measured in March 1993, were less than a test detection limit that was greater than the criterion.

Among the 33 sediment parameters with criteria, 17 had concentrations that may have exceeded their respective criteria. In all instances, result concentrations were less than detection limits that were in turn greater than parameter criteria. Also among the 33 parameters, 13 had concentrations that were unambiguously less than their respective criteria. These parameters included antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc, total PCBs, benzo(a)pyrene, chrysene, flouranthene, and pyrene.

A total of 108 sediment contaminant parameters had no listed sediment quality criteria. Of these parameters, 100 had resulting concentrations that were always less than their

Table 3-6. Frequencies of sediment and elutriate parameters measurement for metals, inorganic non-metals, nutrient parameters and physical measures monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment (mg/kg, where applicable) | | | | | Elutriate (mg/L, where applicable) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Observation > criteria | # of Detection Limits > Criteria |
| Aluminum | NM | | | | | 3 | 1 | NL | | |
| Antimony | 6 | 6 | 25 | 0 | 0 | 7 | 7 | 0.5 | 0 | 0 |
| Arsenic | 8 | 0 | 8.2 | 0 | 0 | 7 | 6 | 0.036 | 0 | 6 |
| Beryllium | 6 | 0 | NL | | | 7 | 5 | NL | | |
| Cadmium | 8 | 6 | 1.2 | 0 | 0 | 10 | 10 | 0.0093 | 0 | 9 |
| Chromium | 8 | 0 | 81 | 0 | 0 | 10 | 9 | 0.05 | 0 | 0 |
| Copper | 8 | 0 | 34 | 0 | 0 | 10 | 7 | 2.9 | 0 | 0 |
| Lead | 8 | 0 | 48.7 | 0 | 0 | 10 | 8 | 0.0085 | 1 | 8 |
| Mercury | 8 | 6 | 0.15 | 1 | 0 | 21 | 21 | 0.025 | 0 | 0 |
| Nickel | 8 | 0 | 20.9 | 0 | 0 | 7 | 7 | 0.0083 | 0 | 7 |
| Selenium | 8 | 3 | NL | | | 7 | 7 | 0.071 | 0 | 6 |
| Silver | 8 | 6 | 1.0 | 2 | 0 | 7 | 7 | 0.0009 | 0 | 7 |
| Thallium | 6 | 6 | NL | | | 7 | 7 | 2.13 | 0 | 0 |
| Zinc | 8 | 0 | 150 | 0 | 0 | 21 | 5 | 0.086 | 3 | 0 |
| Cyanide | 6 | 0 | NL | | | 7 | 7 | 0.001 | 0 | 7 |
| BOD | NM | | | | | 14 | 9 | NL | | |
| COD | NM | | | | | 3 | 0 | NL | | |
| Total Nitrogen | NM | | | | | 11 | 0 | NL | | |
| Total Kjeldahl Nitrogen | NM | | | | | 3 | 0 | NL | | |

Table 3-6. Cont'd

| Parameter | Sediment (mg/kg, where applicable) | | | | | Elutriate (mg/L, where applicable) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Total Phosphate | NM | | | | | 3 | 1 | NL | | |
| Oil & Grease | NM | | | | | 3 | 3 | NL | | |
| pH | NM | | | | | 14 | 0 | 6.5-8.5 | 0 | 0 |
| Total Organic Carbon | 2 | 0 | NL | | | 14 | 0 | NL | | |
| Total Petroleum Hydrocarbons | 2 | 0 | NL | | | NM | | | | |

Table 3-7. Frequencies of sediment and elutriate parameters measurement for organics monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment ($\mu g/kg$) | | | | | Elutriate ($\mu g/L$) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| PCBs | 8 | 6 | 0.0227 | 0 | 0 | 21 | 21 | 0.03 | 0 | 11 |
| 1-Methylnaphthalene | 2 | 2 | 70 | 0 | 2 | NM | | | | |
| 1-Methylphenanthrene | 2 | 2 | NL | | | NM | | | | |
| 1,1-Dichloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,1-Dichloroethene | 7 | 7 | NL | | | 7 | 7 | NL | | |
| 1,1,1-Trichloroethane | 6 | 6 | NL | | | 7 | 7 | 31200 | 0 | 0 |
| 1,1,2-Trichloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,1,2,2-Tetrachloroethane | 6 | 6 | NL | | | 7 | 7 | 9020 | 0 | 0 |
| 1,2-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,2-Dichloroethane | 6 | 6 | NL | | | 7 | 7 | 113000 | 0 | 0 |
| 1,2-Dichloroethene | 7 | 7 | NL | | | 7 | 7 | NL | | |
| 1,2-Dichloropropane | 6 | 6 | NL | | | 7 | 7 | 3040 | 0 | 0 |
| 1,2-Diphenyl Hydrazine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 1,2,4-Trichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,3-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,4 & 1,2-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 1,4-Dichlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| 2-Chloronaphthalene | 6 | 6 | NL | | | 7 | 7 | 7.5 | 0 | 7 |
| 2-Chlorophenol | 6 | 6 | NL | | | 7 | 7 | 29700 | 0 | 0 |
| 2-Methylnaphthalene | 2 | 2 | 70 | 0 | 2 | NM | | | | |

Table 3-7. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| 2-Nitrophenol | 6 | 6 | NL | | | 7 | 7 | 4850 | 0 | 0 |
| 2,3,5-Trimethyl-naphthalene | 2 | 2 | NL | | | NM | | | | |
| 2,4-Dichlorophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dimethylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dinitrophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4-Dinitrotoluene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,4,6-Trichlorophenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 2,6-Dimethylnaphthalene | 2 | 2 | NL | | | NM | | | | |
| 2,6-Dinitrotoluene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 3,3'-Dichlorobenzidine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Bromophenyl-phenylether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Chlorophenyl-phenylether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4-Nitrophenol | 6 | 6 | NL | | | 7 | 7 | 4850 | 0 | 0 |
| 4,6-Dinitro-2-methylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| 4,-Chloro-3-methylphenol | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Acenaphthene | 8 | 8 | 16 | 0 | 8 | 7 | 7 | 710 | 0 | 0 |
| Acenaphthylene | 8 | 8 | 44 | 0 | 8 | 7 | 7 | NL | | |
| Acrolein | 6 | 6 | NL | | | 7 | 7 | 55 | 0 | 0 |
| Acrylonitrile | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Anthracene | 8 | 8 | 85.3 | 0 | 8 | 7 | 7 | NL | | |
| Benzene | 6 | 6 | NL | | | 7 | 7 | 700 | 0 | 0 |

Table 3-7. Cont'd

| Parameter | Sediment ($\mu g/kg$) | | | | | Elutriate ($\mu g/L$) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Benzidine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Benzo(a)anthracene | 8 | 8 | 261 | 0 | 8 | 7 | 7 | NL | | |
| Benzo(a)pyrene | 8 | 8 | 430 | 0 | 0 | 7 | 7 | NL | | |
| Benzo(b)fluoranthene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Benzo(e)pyrene | 2 | 2 | NL | | | NM | | | | |
| Benzo(g,h,i)perylene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Benzo(k)fluoranthene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Biphenyl | 2 | 2 | NL | | | NM | | NL | | |
| Bis(2-chloroethoxy)methane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-chloroethyl)ether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-chloroisopropyl)ether | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bis(2-ethylhexyl)phthalate | 6 | 3 | NL | | | 7 | 7 | NL | | |
| Bromodichloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bromoform | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Bromomethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Butlybenzylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Carbon Tetrachloride | 6 | 6 | NL | | | 7 | 7 | 50000 | 0 | 0 |
| Chlorobenzene | 6 | 6 | NL | | | 7 | 7 | 129 | 0 | 0 |
| Chloroethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Chloroform | 6 | 6 | NL | | | 7 | 5 | NL | | |
| Chloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-7. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| Chrysene | 8 | 8 | 384 | 0 | 0 | 7 | 7 | NL | | |
| Cis-1,3-Dichloropropene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Dibenzo(a,h)anthracene | 8 | 8 | 63.4 | 0 | 8 | 7 | 7 | NL | | |
| Dibromochloromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Diethylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Dimethylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Di-n-butylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Di-n-octylphthalate | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Ethylbenzene | 6 | 6 | NL | | | 7 | 7 | 430 | 0 | 0 |
| Fluoranthene | 8 | 8 | 600 | 0 | 0 | 7 | 7 | 16 | 0 | 0 |
| Fluorene | 8 | 8 | 19 | 0 | 8 | 7 | 7 | NL | | |
| Hexachlorobenzene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Hexachlorobutadiene | 6 | 6 | NL | | | 7 | 7 | 32 | 0 | 0 |
| Hexachlorocyclopentadiene | 6 | 6 | NL | | | 7 | 7 | 7 | 0 | 7 |
| Hexachloroethane | 6 | 6 | NL | | | 7 | 7 | 940 | 0 | 0 |
| Indeno(1,2,3-c,d)pyrene | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Isophorone | 6 | 6 | NL | | | 7 | 7 | 12900 | 0 | 0 |
| Methylene Chloride | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Naphthalene | 8 | 8 | 160 | 0 | 8 | 7 | 7 | 2350 | 0 | 0 |
| Nitrobenzene | 6 | 6 | NL | | | 7 | 7 | 6680 | 0 | 0 |
| N-nitrosodimethylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-7. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| N-nitroso-Di-n-propylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| N-nitrosodiphenylamine | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Pentachlorophenol | 6 | 6 | NL | | | 7 | 7 | 7.9 | 0 | 7 |
| Perylene | 2 | 2 | NL | | | NM | | | | |
| Phenanthrene | 8 | 6 | 240 | 2 | 2 | 7 | 7 | 4.6 | 0 | 7 |
| Phenol | 6 | 0 | NL | | | 7 | 1 | 5800 | 0 | 0 |
| Pyrene | 8 | 8 | 865 | 0 | 0 | 7 | 7 | NL | | |
| Tetrachloroethene | 6 | 6 | NL | | | 7 | 7 | 450 | 0 | 0 |
| Toluene | 6 | 6 | NL | | | 7 | 7 | 5000 | 0 | 0 |
| Trans-1,3-Dichloropropene | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Trichloroethene | 6 | 6 | NL | | | 7 | 7 | 2000 | 0 | 0 |
| Trichlorofluoromethane | 6 | 6 | NL | | | 7 | 7 | NL | | |
| Vinyl Chloride | 6 | 6 | NL | | | 7 | 7 | NL | | |

Table 3-8. Frequencies of sediment and elutriate parameters measurement for pesticides monitored during maintenance dredging at Wilmington Harbor from 1980 to 1994

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| 2,4'-DDD | 2 | 2 | 1.22 | 0 | 2 | NM | | | | |
| 2,4'-DDE | 2 | 2 | 2.2 | 0 | 2 | NM | | | | |
| 2,4'-DDT | 2 | 2 | 1.58 | 0 | 2 | NM | | | | |
| 4,4'-DDD | 8 | 8 | 1.22 | 0 | 8 | 7 | 7 | 3.6 | 0 | 0 |
| 4,4'-DDE | 8 | 8 | 2.2 | 0 | 8 | 7 | 7 | 14 | 0 | 0 |
| 4,4'-DDT | 8 | 8 | 1.58 | 0 | 8 | 7 | 7 | 0.001 | 0 | 7 |
| A-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Aldrin | 8 | 8 | NL | | | 7 | 7 | 1.3 | 0 | 0 |
| B-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Chlordane | 6 | 6 | 2 | 0 | 6 | 7 | 7 | 0.004 | 0 | 7 |
| Cis-chlordane | 2 | 2 | NL | | | NM | | | | |
| Cis-nonachlor | 2 | 2 | NL | | | NM | | | | |
| D-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Dicofol | 2 | 2 | NL | | | NM | | | | |
| Dieldrin | 8 | 8 | 0.715 | 0 | 8 | 7 | 7 | 0.0019 | 0 | 7 |
| Endosulfan I | 8 | 8 | NL | | | 7 | 7 | 0.0087 | 0 | 7 |
| Endosulfan II | 8 | 8 | NL | | | 7 | 7 | 0.0087 | 0 | 7 |
| Endosulfan sulfate | 8 | 8 | NL | | | 7 | 7 | NL | | |
| Endrin | 8 | 8 | NL | | | 7 | 7 | 0.0023 | 0 | 7 |
| Endrin aldehyde | 8 | 8 | NL | | | 7 | 7 | NL | | |

Table 3-8. Cont'd

| Parameter | Sediment (μg/kg) | | | | | Elutriate (μg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > Criteria | # of Detection Limits > Criteria | # Measured | # Below Detection Limit | Criteria (mg/L) | # of Obser-vation > criteria | # of Detection Limits > Criteria |
| G-BHC | 8 | 8 | NL | | | 7 | 7 | 0.34 | 0 | 0 |
| Heptachlor | 8 | 8 | NL | | | 7 | 7 | 0.0036 | 0 | 7 |
| Heptachlor epoxide | 8 | 8 | NL | | | 7 | 7 | 0.0036 | 0 | 7 |
| Hexychlorobenzene | 2 | 2 | NL | | | NM | | | | |
| Mirex | 2 | 2 | NL | | | NM | | | | |
| Oxychlordane | 2 | 1 | NL | | | NM | | | | |
| Toxaphene | 8 | 8 | NL | | | 7 | 7 | 0.0002 | 0 | 7 |
| Trans-chlordane | 2 | 2 | NL | | | NM | | | | |
| Trans-nonachlor | 2 | 2 | NL | | | NM | | | | |

NL - Not listed
NM - Not measured

respective test detection limits. The remaining 8 parameters with at least one concentration measured above test detection limits included cyanide, total organic carbon, total petroleum hydrocarbons, beryllium, selenium, bis(2-ethylhexyl)phthalate, phenol, and oxychlordane.

### 3.2.2 Elutriate Testing

Elutriate testing was conducted three times during the 15 years of maintenance dredging at Wilmington Harbor. In total, the concentrations of 129 elutriate parameters were analyzed from samples collected in Wilmington Harbor prior to dredging (Tables 3-6, 3-7, and 3-8). Of these, 61 parameters had listed water quality criteria. In a comparison with criteria, only 2 parameters had at least one concentration that exceeded it's criterion for all of the elutriate monitoring data (lead and zinc).

Lead was measured in 10 elutriate samples and exceeded the water quality criterion of 0.0085 mg/L only once (Table 3-6). The elutriate sample, collected during pre-dredge monitoring in December 1979, exceeded the criterion by a factor of 27. The number of lead concentrations exceeding the criterion may have been greater; 8 of the remaining concentrations were less than detection limits that were in turn greater than the criterion. The only elutriate concentration that was measured less than the criteria was from the background sample collected during March 1993.

Zinc was measured in 21 elutriate samples and exceeded the criterion of 0.086 mg/L only 3 times (Table 3-6). All of the exceeding concentrations were approximately 33% higher than the criterion. One of the elutriate samples was collected in March 1979; the remaining two were collected in June 1995.

Nineteen parameters had concentrations that may have exceeded their respective criteria, but were indeterminate because of high test detection limits. In most instances, concentrations were less than detection limits that were in turn greater than parameter criteria. Among the 61 parameters compared to water quality criteria, 41 had concentrations that were unambiguously less than their respective criteria. These parameters included pH, antimony, chromium, copper, mercury, thallium and 36 parameters comprised of organics and pesticides (Tables 3-6, 3-7, and 3-8).

A total of 67 elutriate parameters had no listed water quality criteria. Of these parameters, 58 had resulting concentrations that were always less than their respective test detection limits. The remaining 9 parameters with at least one concentration measured above test detection limits included BOD, COD, TKN, total nitrogen, TOC, total phosphate, aluminum, beryllium, and chloroform (Table 3-6).

### 3.2.3 PCBs in Sediment Elutriates

PCBs were monitored in elutriates during two of the 15 years of maintenance dredging at Wilmington Harbor (Table 3-7). In June 1985, total PCB concentrations among 11 samples analyzed were all less than test detection limits (2 mg/L), however, the detection limits were at least 6000 times greater than the criterion of 0.00003 mg/L. In 1993, PCB concentrations were measured by industrial groups (Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260) for 7 elutriate samples. Again, all of the resulting concentrations were less than test detection limits for each industrial group, however, all of the industrial group detection limits (0.5-1.0 $\mu$g/L) were greater than the parameter criterion by a factor greater than 10.

## 3.3 GROUNDWATER MONITORING

Groundwater well-monitoring was conducted twice during the 15 years of maintenance-dredging environmental effects monitoring. Six parameters were analyzed for groundwater well-monitoring (Table 3-9). Of these, only three had EPA National Interim Secondary Drinking Water Maximum Contaminant Levels (MCL). Chloride had the highest percentage of exceedence (55%), but was only monitored once. The average chloride concentration was slightly below the MCL. Measurements of pH were in compliance with the MCL except for two measures in 1987 that were below the range. Zinc was measured during both monitoring years and was always at least three times below the MCL.

Table 3-9. Groundwater parameters monitored for Wilmington Harbor environmental effects of maintenance dredging. (samples collected 11-12 March 1986 and 7-14 April 1987)

| Parameter | EPA MCL | N | Exceed | AVG |
|---|---|---|---|---|
| Chloride (mg/L) | 250 mg/L | 11 | 6 | 236 |
| pH | 6.5-8.5 | 23 | 2 | 6.8 |
| Zinc (mg/L) | 5 mg/L | 23 | 0 | 0.09 |
| Total Organic Carbon (mg/L) | NL | 23 | - | 74 |
| Total Nitrogen (mg/L) | NL | 12 | - | 58.7 |
| TKN (mg/L) | NL | 11 | - | 17.6 |

# 4.0 SUMMARY AND CONCLUSIONS

Environmental monitoring associated with maintenance dredging projects has been conducted at Wilmington Harbor during the past 15 years. Monitoring has focused primarily on water quality of the weir-outfall and mixing zone. A few of the monitoring studies investigated sediment and elutriate contaminant concentrations, and groundwater quality at the upland dredge disposal site. Parameters monitored among studies included metals, inorganic non-metals, nutrients, physical measures, PCBs, organics and pesticides.

All of the data collected during the dredge monitoring was compiled into an electronic database. The database facilitated parameter comparisons with federal or state criteria, and provided means for making statistical comparisons between sites monitored for water quality. These data are now available electronically and are attached to this report.

The number of parameters that exceeded water quality standards was relatively low over the 15 years of monitoring. Of the 164 water quality parameters measured during maintenance dredge monitoring, only 8 had concentrations that were not compliant with water quality criteria. Most of the exceeding parameters were metals including cadmium, chromium, lead, nickel, and zinc. Concentrations of dissolved oxygen were low at times for all sites, but were lowest in the weir-outfall. Noncompliant measurements of pH were usually below the criteria range. PCB monitoring suggested that concentrations exceeding criteria occur at a relatively low frequency, however, the frequency was confounded by many concentrations that were less than test detection limits but were in turn greater than the criteria.

Water quality comparisons between weir-outfall, mixing zone and background sites suggest that the effects of dredging activities dissipated in the approximately 0.25 acre mixing zone. Statistical comparisons for 14 of 19 water quality parameters indicated that the water quality of the weir-outfall was poorer relative to the mixing zone and background sites, but no differences existed between the mixing zone samples and background sites.

Sediment contaminant concentrations have been relatively low over the years of maintenance dredging at Wilmington Harbor. Sediment and elutriate contaminant monitoring resulted in low frequencies of exceedence among 141 and 129 parameters monitored respectively. Among sediments parameters, only mercury, silver, and the organic compound phenanthrene had concentrations exceeding criteria. Furthermore, the combined number of exceeding concentrations was only 5. Among elutriate parameters, only lead and zinc had concentrations exceeding criteria, and the total number of exceedences was 4.

Groundwater monitoring of the upland disposal site indicated minimal contamination. Only a few parameters were monitored over the 15 years and the frequencies of exceedence were low.

# 5.0 RECOMMENDATIONS

Based on 15 years of data compiled from over 100 different parameters monitored or tested in water, sediment, sediments elutriates, and groundwater, the weight of evidence suggests that past maintenance dredging operations in Wilmington Harbor has not caused significant environmental impacts to Delaware River water quality. Thus, for future maintenance dredging projects the intensive levels of environmental monitoring conducted in past studies may be not be necessary.

However, the effectiveness of upland dredge disposal operations is to a large degree dependent on the efficient operation of the disposal site. For example, weir monitoring conducted by the USACOE in 1995 during the last disposal operation in Wilmington Harbor revealed that the suspended solids coming out of the weir were often lower than background concentrations (Versar 1995). Proper gaging of the weir height is an important factor in the operation of these facilities as increasing the retention time of water in the site increases the removal of suspended solids. Since the former studies have shown the dissolved contaminants are rarely above levels of concern, and that mixing zone concentration are not different from background levels, decreasing the suspended solids loadings is probably the most important environmental factor the can readily be controlled by the dredge operators. Thus, at minimum, we recommend that for future projects total suspended solids and turbidity be measured at the weir-outfall throughout dredging operation. This will provide a general characterization of the function of the dredge disposal weir and will provide the operator immediate feedback as to whether they need to alter the operation (e.g., increase the weir height, decrease the flow rate) to minimize the dredging operations affects on water quality effects in the Delaware River.

# 6.0 REFERENCES

Code of Federal Regulations (CFR). 1996. Title 40 - Protection of Environment. Part 143 - National Secondary Drinking Water Regulations.

Delaware Department of Natural Resources and Environmental Control. 1993. State of Delaware, surface water quality standards. Dover, DE.

Greeley-Polhemus Group, Inc., and RMC Environmental Services, Inc. 1994. Water quality monitoring for Wilmington Harbor maintenance dredging operations, Winter 1994. Prepared for U.S. Army Corps of Engineers, Philadelphia District, Philadelphia, PA.

Greeley-Polhemus Group, Inc., and RMC Environmental Services, Inc. 1993. Water quality monitoring for Wilmington Harbor maintenance dredging operations, Spring 1993. Prepared for U.S. Army Corps of Engineers, Philadelphia District, Philadelphia, PA.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19:81-97.

SAS Institute Inc. 1990. SAS Language: Reference, Version 6, First Edition, 1042 pp. Cary, NC.

Sokal, R.R., and F.J. Rohlf. 1981. Biometry. W.H. Freeman and Company. New York, NY.

U.S. EPA. 1992. Quality criteria for water

U.S. EPA. 1988. The apparent effects threshold approach; briefing report to the EPA Science Advisory Board.

Versar. 1995. Water quality monitoring for Wilmington Harbor maintenance dredging operations. Prepared for U.S. Army Corps of Engineers Philadelphia District. Philadelphia, PA.

# 7.0 DATABASE DESCRIPTION

All testing data from 1979 through the most recent studies in 1994 were entered into a series of Lotus spreadsheets for four packets of data received from the Corps of Engineers. The data packets included old laboratory analysis certificates, handwritten station location maps, and in some cases data reports. These materials were reviewed to identify the test results which were entered into a spreadsheet. Each data record included common identifiers such as sample type, study year, date, and station identification. Quality control for the data included: comparing all data entries with the original report tables or analysis certificates, checking parameter reporting units, and use of computer programs to check for out-of-range parameters and other data anomalies (e.g., missing data or invalid station names). Specific parameters are reported in the same units for all years and are described in the data dictionaries presented in the following appendices. The Lotus spreadsheets were combined into four separate SAS data sets each of which contain:

- discharge water quality monitoring related to the upland disposal sites,
- groundwater testing at the upland site,
- elutriate testing of dredged sediment, and
- bulk analysis of sediment contaminant concentrations.

The data are stored as SAS data sets to facilitate statistical analysis and because of the large number of variables (over 400 for the water quality data set) is beyond the number of columns a Lotus spreadsheet can handle. In addition, a hard copy appendix of all data was not produced as it would be excessively long (over 2,000 pages just for the water quality data set). Therefore, the electronic data set contained on the attached computer disk is intended to served as the data appendix for the Wilmington Harbor Compilation Report.

# Appendix A - Water Quality Database

Name: WQ.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 1001 observations and 479 variables in the dataset. Each observation represents a water quality sample and a series of chemical and biological measurements. A sample can be uniquely identified by station type, station name, sampling date, time, tide, tributary, and dredging period. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

Samples are categorized into four types of stations: Background, Mixing Zone, Outfall, and Weir; and four types of dredging periods: Pre, During, Post, and Drawdown. There are two water bodies associated with the samples: Christina River and Delaware River. If a sample does not have tributary information, blank space is stored in its variable.

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| | | | |
|---|---|---|---|
| Data Set Name: | WORK.WQ | Observations: | 1001 |
| Member Type: | DATA | Variables: | 479 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 4699 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 14336 |
| Number of Data Set Pages: | 338 |
| File Format: | 607 |
| First Data Page: | 5 |
| Max Obs per Page: | 3 |
| Obs in First Data Page: | 2 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 72 | AG | Num | 8 | 662 | | Silver (mg/l) |
| 54 | AL | Num | 8 | 519 | | Aluminum (mg/l) |
| 55 | AS | Num | 8 | 527 | | Arsenic (mg/l) |
| 57 | BE | Num | 8 | 541 | | Beryllium (mg/l) |
| 23 | BOD | Num | 8 | 243 | | Biochemical Oxygen Demand (mg/l) |
| 60 | CD | Num | 8 | 569 | | Cadmium (mg/l) |
| 58 | CHLR | Num | 8 | 549 | | Chloride (mg/l) |
| 37 | COD | Num | 8 | 368 | | Chemical Oxygen Demand (mg/l) |
| 6 | COMMENT | Char | 32 | 52 | 32. | Sample Comment |
| 62 | CR | Num | 8 | 589 | | Chromium (mg/l) |
| 64 | CU | Num | 8 | 609 | | Copper (mg/l) |
| 76 | CY | Num | 8 | 704 | | Cyanide (mg/l) |
| 5 | DATE | Num | 8 | 44 | MMDDYY8. | Sampling Date |
| 28 | DO | Num | 8 | 287 | | Dissolved Oxygen (mg/l) |
| 396 | D_8 | Num | 8 | 4019 | | 8 Di (ng/L) |
| 395 | D_209 | Num | 8 | 4011 | | 209 Deca (ng/L) |
| 20 | FC | Num | 8 | 215 | | Fecal Coliform (#/100 ml) |
| 38 | FLOW | Num | 8 | 376 | | Flow (mgd) |
| 397 | H38_58 | Num | 8 | 4027 | | 138,158 Hexa (ng/L) |
| 398 | H70_90 | Num | 8 | 4035 | | 170,190 Hepta (ng/L) |
| 399 | HARD | Num | 8 | 4043 | | Hardness (mg/L) |
| 35 | HG | Num | 8 | 348 | | Mercury (mg/l) |
| 400 | H_128 | Num | 8 | 4051 | | 128 Hexa (ng/L) |
| 401 | H_137 | Num | 8 | 4059 | | 137 Hexa (ng/L) |
| 402 | H_149 | Num | 8 | 4067 | | 149 Hexa (ng/L) |
| 403 | H_151 | Num | 8 | 4075 | | 151 Hexa (ng/L) |
| 404 | H_153 | Num | 8 | 4083 | | 153 Hexa (ng/L) |
| 405 | H_156 | Num | 8 | 4091 | | 156 Hexa (ng/L) |
| 406 | H_157 | Num | 8 | 4099 | | 157 Hexa (ng/L) |
| 407 | H_166 | Num | 8 | 4107 | | 166 Hexa (ng/L) |
| 408 | H_167 | Num | 8 | 4115 | | 167 Hexa (ng/L) |
| 409 | H_168 | Num | 8 | 4123 | | 168 Hexa (ng/L) |

Wilmington Harbor - Water Quality Data

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 410 | H_169 | Num | 8 | 4131 | | 169 Hexa (pg/L) |
| 411 | H_177 | Num | 8 | 4139 | | 177 Hepta (ng/L) |
| 412 | H_179 | Num | 8 | 4147 | | 179 Hepta (ng/L) |
| 413 | H_180 | Num | 8 | 4155 | | 180 Hepta (ng/L) |
| 414 | H_183 | Num | 8 | 4163 | | 183 Hepta (ng/L) |
| 415 | H_185 | Num | 8 | 4171 | | 185 Hepta (ng/L) |
| 416 | H_187 | Num | 8 | 4179 | | 187 Hepta (ng/L) |
| 417 | H_189 | Num | 8 | 4187 | | 189 Hepta (ng/L) |
| 418 | H_191 | Num | 8 | 4195 | | 191 Hepta (ng/L) |
| 296 | NH3 | Num | 8 | 3219 | | Ammonia (mg/L) |
| 68 | NI | Num | 8 | 640 | | Nickel (mg/l) |
| 39 | NN | Num | 8 | 384 | | Nitrate+Nitrite (mg/l) |
| 297 | NO2 | Num | 8 | 3227 | | Nitrite (mg/l) |
| 88 | NO3 | Num | 8 | 794 | | Nitrate (mg/l) |
| 419 | N_206 | Num | 8 | 4203 | | 206 Nona (ng/L) |
| 420 | N_207 | Num | 8 | 4211 | | 207 Nona (ng/L) |
| 421 | N_208 | Num | 8 | 4219 | | 208 Nona (ng/L) |
| 48 | OG | Num | 8 | 472 | | Oil & Grease (mg/l) |
| 422 | ORG_1 | Num | 8 | 4227 | | 1-Methylnaphthalene (ug/L) |
| 423 | ORG_2 | Num | 8 | 4235 | | 1-Methylphenanthrene (ug/L) |
| 314 | ORG_3 | Num | 8 | 3363 | | 1,1-Dichloroethane (ug/L) |
| 325 | ORG_4 | Num | 8 | 3451 | | 1,1-Dichloroethene (ug/L) |
| 333 | ORG_5 | Num | 8 | 3515 | | 1,1,1-Trichloroethane (ug/L) |
| 343 | ORG_6 | Num | 8 | 3595 | | 1,1,2-Trichloroethane (ug/L) |
| 352 | ORG_7 | Num | 8 | 3667 | | 1,1,2,2-Tetrachloroethane (ug/L) |
| 362 | ORG_8 | Num | 8 | 3747 | | 1,2-Dichlorobenzene (ug/L) |
| 372 | ORG_9 | Num | 8 | 3827 | | 1,2-Dichloroethane (ug/L) |
| 298 | ORG_10 | Num | 8 | 3235 | | 1,2-Dichloroethene (ug/L) |
| 299 | ORG_11 | Num | 8 | 3243 | | 1,2-Dichloropropane (ug/L) |
| 300 | ORG_12 | Num | 8 | 3251 | | 1,2-Diphenyl Hydrazine (ug/L) |
| 301 | ORG_13 | Num | 8 | 3259 | | 1,2,4-Trichlorobenzene (ug/L) |
| 302 | ORG_14 | Num | 8 | 3267 | | 1,3-Dichlorobenzene (ug/L) |
| 303 | ORG_15 | Num | 8 | 3275 | | 1,4 & 1,2-Dichlorobenzene (ug/L) |
| 304 | ORG_16 | Num | 8 | 3283 | | 1,4-Dichlorobenzene (ug/L) |
| 478 | ORG_17 | Num | 8 | 4683 | | 2-Chloroethylvinylether (ug/l) |
| 305 | ORG_18 | Num | 8 | 3291 | | 2-Chloronaphthalene (ug/L) |
| 306 | ORG_19 | Num | 8 | 3299 | | 2-Chlorophenol (ug/L) |
| 424 | ORG_20 | Num | 8 | 4243 | | 2-Methylnaphthalene (ug/L) |
| 307 | ORG_21 | Num | 8 | 3307 | | 2-Nitrophenol (ug/L) |
| 425 | ORG_22 | Num | 8 | 4251 | | 2,3,5-Trimethyl-naphthalene (ug/L) |
| 308 | ORG_23 | Num | 8 | 3315 | | 2,4-Dichlorophenol (ug/L) |
| 309 | ORG_24 | Num | 8 | 3323 | | 2,4-Dimethylphenol (ug/L) |
| 310 | ORG_25 | Num | 8 | 3331 | | 2,4-Dinitrophenol (ug/L) |
| 311 | ORG_26 | Num | 8 | 3339 | | 2,4-Dinitrotoluene (ug/L) |
| 312 | ORG_27 | Num | 8 | 3347 | | 2,4,6-Trichlorophenol (ug/L) |
| 426 | ORG_28 | Num | 8 | 4259 | | 2,6-Dimethylnaphthalene (ug/L) |
| 313 | ORG_29 | Num | 8 | 3355 | | 2,6-Dinitrotoluene (ug/L) |
| 315 | ORG_30 | Num | 8 | 3371 | | 3,3'-Dichlorobenzidine (ug/L) |
| 316 | ORG_31 | Num | 8 | 3379 | | 4-Bromophenyl-phenylether (ug/L) |
| 317 | ORG_32 | Num | 8 | 3387 | | 4-Chlorophenyl-phenylether (ug/L) |
| 318 | ORG_33 | Num | 8 | 3395 | | 4-Nitrophenol (ug/L) |
| 319 | ORG_34 | Num | 8 | 3403 | | 4,6-Dinitro-2-methylphenol (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 320 | ORG_35 | Num | 8 | 3411 | | 4,-Chloro-3-methylphenol (ug/L) |
| 321 | ORG_36 | Num | 8 | 3419 | | Acenaphthene (ug/L) |
| 322 | ORG_37 | Num | 8 | 3427 | | Acenaphthylene (ug/L) |
| 323 | ORG_38 | Num | 8 | 3435 | | Acrolein (ug/L) |
| 324 | ORG_39 | Num | 8 | 3443 | | Acrylonitrile (ug/L) |
| 326 | ORG_40 | Num | 8 | 3459 | | Anthracene (ug/L) |
| 327 | ORG_41 | Num | 8 | 3467 | | Benzene (ug/L) |
| 328 | ORG_42 | Num | 8 | 3475 | | Benzidine (ug/L) |
| 329 | ORG_43 | Num | 8 | 3483 | | Benzo(a)anthracene (ug/L) |
| 291 | ORG_44 | Num | 8 | 3179 | | Benzo(a)pyrene (ug/L) |
| 330 | ORG_45 | Num | 8 | 3491 | | Benzo(b)fluoranthene (ug/L) |
| 427 | ORG_46 | Num | 8 | 4267 | | Benzo(e)pyrene (ug/L) |
| 331 | ORG_47 | Num | 8 | 3499 | | Benzo(g,h,i)perylene (ug/L) |
| 332 | ORG_48 | Num | 8 | 3507 | | Benzo(k)fluoranthene (ug/L) |
| 428 | ORG_49 | Num | 8 | 4275 | | Biphenyl (ug/L) |
| 334 | ORG_50 | Num | 8 | 3523 | | Bis(2-chloroethoxy)methane (ug/L) |
| 335 | ORG_51 | Num | 8 | 3531 | | Bis(2-chloroethyl)ether (ug/L) |
| 336 | ORG_52 | Num | 8 | 3539 | | Bis(2-chloroisopropyl)ether (ug/L) |
| 292 | ORG_53 | Num | 8 | 3187 | | Bis(2-ethylhexyl)phthalate (ug/L) |
| 337 | ORG_54 | Num | 8 | 3547 | | Bromodichloromethane (ug/L) |
| 338 | ORG_55 | Num | 8 | 3555 | | Bromoform (ug/L) |
| 339 | ORG_56 | Num | 8 | 3563 | | Bromomethane (ug/L) |
| 340 | ORG_57 | Num | 8 | 3571 | | Butlybenzylphthalate (ug/L) |
| 341 | ORG_58 | Num | 8 | 3579 | | Carbon Tetrachloride (ug/L) |
| 342 | ORG_59 | Num | 8 | 3587 | | Chlorobenzene (ug/L) |
| 344 | ORG_60 | Num | 8 | 3603 | | Chloroethane (ug/L) |
| 293 | ORG_61 | Num | 8 | 3195 | | Chloroform (ug/L) |
| 345 | ORG_62 | Num | 8 | 3611 | | Chloromethane (ug/L) |
| 346 | ORG_63 | Num | 8 | 3619 | | Chrysene (ug/L) |
| 347 | ORG_64 | Num | 8 | 3627 | | Cis-1,3-Dichloropropene (ug/L) |
| 479 | ORG_65 | Num | 8 | 4691 | | Cis,trans,1,2-Dichloroethene (ug/l) |
| 348 | ORG_66 | Num | 8 | 3635 | | Dibenzo(a,h)anthracene (ug/L) |
| 349 | ORG_67 | Num | 8 | 3643 | | Dibromochloromethane (ug/L) |
| 350 | ORG_68 | Num | 8 | 3651 | | Diethylphthalate (ug/L) |
| 351 | ORG_69 | Num | 8 | 3659 | | Dimethylphthalate (ug/L) |
| 353 | ORG_70 | Num | 8 | 3675 | | Di-n-butylphthalate (ug/L) |
| 354 | ORG_71 | Num | 8 | 3683 | | Di-n-octylphthalate (ug/L) |
| 355 | ORG_72 | Num | 8 | 3691 | | Ethylbenzene (ug/L) |
| 294 | ORG_73 | Num | 8 | 3203 | | Fluoranthene (ug/L) |
| 356 | ORG_74 | Num | 8 | 3699 | | Fluorene (ug/L) |
| 357 | ORG_75 | Num | 8 | 3707 | | Hexachlorobenzene (ug/L) |
| 358 | ORG_76 | Num | 8 | 3715 | | Hexachlorobutadiene (ug/L) |
| 359 | ORG_77 | Num | 8 | 3723 | | Hexachlorocyclopentadiene (ug/L) |
| 360 | ORG_78 | Num | 8 | 3731 | | Hexachloroethane (ug/L) |
| 361 | ORG_79 | Num | 8 | 3739 | | Indeno(1,2,3-c,d)pyrene (ug/L) |
| 363 | ORG_80 | Num | 8 | 3755 | | Isophorone (ug/L) |
| 364 | ORG_81 | Num | 8 | 3763 | | Methylene Chloride (ug/L) |
| 365 | ORG_82 | Num | 8 | 3771 | | Naphthalene (ug/L) |
| 366 | ORG_83 | Num | 8 | 3779 | | Nitrobenzene (ug/L) |
| 367 | ORG_84 | Num | 8 | 3787 | | N-nitrosodimethylamine (ug/L) |
| 368 | ORG_85 | Num | 8 | 3795 | | N-nitroso-Di-n-propylamine (ug/L) |
| 369 | ORG_86 | Num | 8 | 3803 | | N-nitrosodiphenylamine (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 370 | ORG_87 | Num | 8 | 3811 | | Pentachlorophenol (ug/L) |
| 429 | ORG_88 | Num | 8 | 4283 | | Perylene (ug/L) |
| 371 | ORG_89 | Num | 8 | 3819 | | Phenanthrene (ug/L) |
| 42 | ORG_90 | Num | 8 | 412 | | Phenol (mg/l) |
| 373 | ORG_91 | Num | 8 | 3835 | | Pyrene (ug/L) |
| 295 | ORG_92 | Num | 8 | 3211 | | Tetrachloroethene (ug/L) |
| 374 | ORG_93 | Num | 8 | 3843 | | Toluene (ug/L) |
| 375 | ORG_94 | Num | 8 | 3851 | | Trans-1,3-Dichloropropene (ug/L) |
| 376 | ORG_95 | Num | 8 | 3859 | | Trichloroethene (ug/L) |
| 377 | ORG_96 | Num | 8 | 3867 | | Trichlorofluoromethane (ug/L) |
| 378 | ORG_97 | Num | 8 | 3875 | | Vinyl Chloride (ug/L) |
| 430 | O_194 | Num | 8 | 4291 | | 194 Octa (ng/L) |
| 431 | O_195 | Num | 8 | 4299 | | 195 Octa (ng/L) |
| 432 | O_196 | Num | 8 | 4307 | | 196 Octa (ng/L) |
| 433 | O_200 | Num | 8 | 4315 | | 200 Octa (ng/L) |
| 434 | O_201 | Num | 8 | 4323 | | 201 Octa (ng/L) |
| 435 | O_203 | Num | 8 | 4331 | | 203 Octa (ng/L) |
| 436 | O_205 | Num | 8 | 4339 | | 205 Octa (ng/L) |
| 93 | P1016 | Num | 8 | 831 | | PCB-1016 (ug/l) |
| 16 | P1221 | Num | 8 | 180 | | PCB-1221 (ug/l) |
| 95 | P1232 | Num | 8 | 851 | | PCB-1232 (ug/l) |
| 97 | P1242 | Num | 8 | 871 | | PCB-1242 (ug/l) |
| 99 | P1248 | Num | 8 | 891 | | PCB-1248 (ug/l) |
| 101 | P1254 | Num | 8 | 911 | | PCB-1254 (ug/l) |
| 103 | P1260 | Num | 8 | 931 | | PCB-1260 (ug/l) |
| 14 | P42_48 | Num | 8 | 160 | | PCB-1242,1248 (ug/l) |
| 12 | P54_60 | Num | 8 | 140 | | PCB-1254,1260 (ug/l) |
| 2 | PAGE | Num | 8 | 12 | | Report Page Number |
| 66 | PB | Num | 8 | 629 | | Lead (mg/l) |
| 18 | PBB | Num | 8 | 200 | | PBB (mg/l) |
| 10 | PCB | Num | 8 | 120 | | PCB's (ug/l) |
| 8 | PERIOD | Char | 12 | 96 | 12. | Dredging (PRE,D=During,POST,Drawdown) |
| 50 | PEST | Num | 8 | 492 | | Pesticides (mg/l) |
| 437 | PES_1 | Num | 8 | 4347 | | 2,4'-DDD (ug/L) |
| 441 | PES_2 | Num | 8 | 4379 | | 2,4'-DDE (ug/L) |
| 447 | PES_3 | Num | 8 | 4427 | | 2,4'-DDT (ug/L) |
| 389 | PES_4 | Num | 8 | 3963 | | 4,4'-DDD (ug/L) |
| 390 | PES_5 | Num | 8 | 3971 | | 4,4'-DDE (ug/L) |
| 391 | PES_6 | Num | 8 | 3979 | | 4,4'-DDT (ug/L) |
| 392 | PES_7 | Num | 8 | 3987 | | A-BHC (ug/L) |
| 393 | PES_8 | Num | 8 | 3995 | | Aldrin (ug/L) |
| 394 | PES_9 | Num | 8 | 4003 | | B-BHC (ug/L) |
| 79 | PES_10 | Num | 8 | 732 | | Chlorodane (ug/l) |
| 438 | PES_11 | Num | 8 | 4355 | | Cis-chlordane (ug/L) |
| 439 | PES_12 | Num | 8 | 4363 | | Cis-nonachlor (ug/L) |
| 379 | PES_13 | Num | 8 | 3883 | | D-BHC (ug/L) |
| 440 | PES_14 | Num | 8 | 4371 | | Dicofol (ug/L) |
| 380 | PES_15 | Num | 8 | 3891 | | Dieldrin (ug/L) |
| 381 | PES_16 | Num | 8 | 3899 | | Endosulfan I (ug/L) |
| 382 | PES_17 | Num | 8 | 3907 | | Endosulfan II (ug/L) |
| 383 | PES_18 | Num | 8 | 3915 | | Endosulfan sulfate (ug/L) |
| 384 | PES_19 | Num | 8 | 3923 | | Endrin (ug/L) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 385 | PES_20 | Num | 8 | 3931 | | Endrin aldehyde (ug/L) |
| 386 | PES_21 | Num | 8 | 3939 | | G-BHC (ug/L) |
| 387 | PES_22 | Num | 8 | 3947 | | Heptachlor (ug/L) |
| 388 | PES_23 | Num | 8 | 3955 | | Heptachlor epoxide (ug/L) |
| 442 | PES_24 | Num | 8 | 4387 | | Hexychlorobenzene (ug/L) |
| 443 | PES_25 | Num | 8 | 4395 | | Mirex (ug/L) |
| 444 | PES_26 | Num | 8 | 4403 | | Oxychlordane (ug/L) |
| 78 | PES_27 | Num | 8 | 724 | | Toxaphene (ug/l) |
| 445 | PES_28 | Num | 8 | 4411 | | Trans-chlordane (ug/L) |
| 446 | PES_29 | Num | 8 | 4419 | | Trans-nonachlor (ug/L) |
| 26 | PH | Num | 8 | 267 | | pH |
| 457 | P_82 | Num | 8 | 4507 | | 82 Penta (ng/L) |
| 458 | P_87 | Num | 8 | 4515 | | 87 Penta (ng/L) |
| 459 | P_95 | Num | 8 | 4523 | | 95 Penta (ng/L) |
| 460 | P_99 | Num | 8 | 4531 | | 99 Penta (ng/L) |
| 448 | P_101 | Num | 8 | 4435 | | 101 Penta (ng/L) |
| 449 | P_105 | Num | 8 | 4443 | | 105 Penta (ng/L) |
| 450 | P_110 | Num | 8 | 4451 | | 110 Penta (ng/L) |
| 451 | P_114 | Num | 8 | 4459 | | 114 Penta (ng/L) |
| 452 | P_118 | Num | 8 | 4467 | | 118 Penta (ng/L) |
| 453 | P_119 | Num | 8 | 4475 | | 119 Penta (ng/L) |
| 454 | P_123 | Num | 8 | 4483 | | 123 Penta (ng/L) |
| 455 | P_126 | Num | 8 | 4491 | | 126 Penta (pg/L) |
| 456 | P_127 | Num | 8 | 4499 | | 127 Penta (ng/L) |
| 52 | SB | Num | 8 | 506 | | Antimony (mg/l) |
| 70 | SE | Num | 8 | 651 | | Selenium (mg/l) |
| 46 | SS | Num | 8 | 452 | | Settleable Solids (mg/l) |
| 4 | STATION | Char | 12 | 32 | 12. | Sampling Station |
| 71 | S_AG | Char | 3 | 659 | 3. | Flag for AG (Less than DL) |
| 53 | S_AL | Char | 5 | 514 | 5. | Flag for AL (Less than DL) |
| 90 | S_AS | Char | 5 | 807 | 5. | Flag for AS (Less than DL) |
| 56 | S_BE | Char | 6 | 535 | 6. | Flag for BE (Less than DL) |
| 22 | S_BOD | Char | 12 | 231 | 12. | Flag for BOD (Less than DL) |
| 59 | S_CD | Char | 12 | 557 | 12. | Flag for CD (Less than DL) |
| 36 | S_COD | Char | 12 | 356 | 12. | Flag for COD (Less than DL) |
| 61 | S_CR | Char | 12 | 577 | 12. | Flag for CR (Less than DL) |
| 63 | S_CU | Char | 12 | 597 | 12. | Flag for CU (Less than DL) |
| 75 | S_CY | Char | 12 | 692 | 12. | Flag for CY (Less than DL) |
| 27 | S_DO | Char | 12 | 275 | 12. | Flag for DO (Less than DL) |
| 211 | S_D_8 | Char | 12 | 2219 | 12. | Flag for D_8 (Less than DL) |
| 210 | S_D_209 | Char | 12 | 2207 | 12. | Flag for D_209 (Less than DL) |
| 19 | S_FC | Char | 7 | 208 | 7. | Flag for FC (Less than DL) |
| 212 | S_H38_58 | Char | 12 | 2231 | 12. | Flag for H38_58 (Less than DL) |
| 213 | S_H70_90 | Char | 12 | 2243 | 12. | Flag for H70_90 (Less than DL) |
| 214 | S_HARD | Char | 12 | 2255 | 12. | Flag for HARD (Less than DL) |
| 34 | S_HG | Char | 12 | 336 | 12. | Flag for HG (Less than DL) |
| 215 | S_H_128 | Char | 12 | 2267 | 12. | Flag for H_128 (Less than DL) |
| 216 | S_H_137 | Char | 12 | 2279 | 12. | Flag for H_137 (Less than DL) |
| 217 | S_H_149 | Char | 12 | 2291 | 12. | Flag for H_149 (Less than DL) |
| 218 | S_H_151 | Char | 12 | 2303 | 12. | Flag for H_151 (Less than DL) |
| 219 | S_H_153 | Char | 12 | 2315 | 12. | Flag for H_153 (Less than DL) |
| 220 | S_H_156 | Char | 12 | 2327 | 12. | Flag for H_156 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 221 | S_H_157 | Char | 12 | 2339 | 12. | Flag for H_157 (Less than DL) |
| 222 | S_H_166 | Char | 12 | 2351 | 12. | Flag for H_166 (Less than DL) |
| 223 | S_H_167 | Char | 12 | 2363 | 12. | Flag for H_167 (Less than DL) |
| 224 | S_H_168 | Char | 12 | 2375 | 12. | Flag for H_168 (Less than DL) |
| 225 | S_H_169 | Char | 12 | 2387 | 12. | Flag for H_169 (Less than DL) |
| 226 | S_H_177 | Char | 12 | 2399 | 12. | Flag for H_177 (Less than DL) |
| 227 | S_H_179 | Char | 12 | 2411 | 12. | Flag for H_179 (Less than DL) |
| 228 | S_H_180 | Char | 12 | 2423 | 12. | Flag for H_180 (Less than DL) |
| 229 | S_H_183 | Char | 12 | 2435 | 12. | Flag for H_183 (Less than DL) |
| 230 | S_H_185 | Char | 12 | 2447 | 12. | Flag for H_185 (Less than DL) |
| 231 | S_H_187 | Char | 12 | 2459 | 12. | Flag for H_187 (Less than DL) |
| 232 | S_H_189 | Char | 12 | 2471 | 12. | Flag for H_189 (Less than DL) |
| 233 | S_H_191 | Char | 12 | 2483 | 12. | Flag for H_191 (Less than DL) |
| 110 | S_NH3 | Char | 12 | 1007 | 12. | Flag for NH3 (Less than DL) |
| 67 | S_NI | Char | 3 | 637 | 3. | Flag for NI (Less than DL) |
| 91 | S_NN | Char | 7 | 812 | 7. | Flag for NN (Less than DL) |
| 111 | S_NO2 | Char | 12 | 1019 | 12. | Flag for NO2 (Less than DL) |
| 87 | S_NO3 | Char | 6 | 788 | 6. | Flag for NO3 (Less than DL) |
| 234 | S_N_206 | Char | 12 | 2495 | 12. | Flag for N_206 (Less than DL) |
| 235 | S_N_207 | Char | 12 | 2507 | 12. | Flag for N_207 (Less than DL) |
| 236 | S_N_208 | Char | 12 | 2519 | 12. | Flag for N_208 (Less than DL) |
| 47 | S_OG | Char | 12 | 460 | 12. | Flag for OG (Less than DL) |
| 237 | S_ORG_1 | Char | 12 | 2531 | 12. | Flag for ORG_1 (Less than DL) |
| 238 | S_ORG_2 | Char | 12 | 2543 | 12. | Flag for ORG_2 (Less than DL) |
| 128 | S_ORG_3 | Char | 12 | 1223 | 12. | Flag for ORG_3 (Less than DL) |
| 139 | S_ORG_4 | Char | 12 | 1355 | 12. | Flag for ORG_4 (Less than DL) |
| 147 | S_ORG_5 | Char | 12 | 1451 | 12. | Flag for ORG_5 (Less than DL) |
| 157 | S_ORG_6 | Char | 12 | 1571 | 12. | Flag for ORG_6 (Less than DL) |
| 166 | S_ORG_7 | Char | 12 | 1679 | 12. | Flag for ORG_7 (Less than DL) |
| 176 | S_ORG_8 | Char | 12 | 1799 | 12. | Flag for ORG_8 (Less than DL) |
| 186 | S_ORG_9 | Char | 12 | 1919 | 12. | Flag for ORG_9 (Less than DL) |
| 112 | S_ORG_10 | Char | 12 | 1031 | 12. | Flag for ORG_10 (Less than DL) |
| 113 | S_ORG_11 | Char | 12 | 1043 | 12. | Flag for ORG_11 (Less than DL) |
| 114 | S_ORG_12 | Char | 12 | 1055 | 12. | Flag for ORG_12 (Less than DL) |
| 115 | S_ORG_13 | Char | 12 | 1067 | 12. | Flag for ORG_13 (Less than DL) |
| 116 | S_ORG_14 | Char | 12 | 1079 | 12. | Flag for ORG_14 (Less than DL) |
| 117 | S_ORG_15 | Char | 12 | 1091 | 12. | Flag for ORG_15 (Less than DL) |
| 118 | S_ORG_16 | Char | 12 | 1103 | 12. | Flag for ORG_16 (Less than DL) |
| 476 | S_ORG_17 | Char | 12 | 4659 | 12. | Flag for ORG_17 (Less than DL) |
| 119 | S_ORG_18 | Char | 12 | 1115 | 12. | Flag for ORG_18 (Less than DL) |
| 120 | S_ORG_19 | Char | 12 | 1127 | 12. | Flag for ORG_19 (Less than DL) |
| 239 | S_ORG_20 | Char | 12 | 2555 | 12. | Flag for ORG_20 (Less than DL) |
| 121 | S_ORG_21 | Char | 12 | 1139 | 12. | Flag for ORG_21 (Less than DL) |
| 240 | S_ORG_22 | Char | 12 | 2567 | 12. | Flag for ORG_22 (Less than DL) |
| 122 | S_ORG_23 | Char | 12 | 1151 | 12. | Flag for ORG_23 (Less than DL) |
| 123 | S_ORG_24 | Char | 12 | 1163 | 12. | Flag for ORG_24 (Less than DL) |
| 124 | S_ORG_25 | Char | 12 | 1175 | 12. | Flag for ORG_25 (Less than DL) |
| 125 | S_ORG_26 | Char | 12 | 1187 | 12. | Flag for ORG_26 (Less than DL) |
| 126 | S_ORG_27 | Char | 12 | 1199 | 12. | Flag for ORG_27 (Less than DL) |
| 241 | S_ORG_28 | Char | 12 | 2579 | 12. | Flag for ORG_28 (Less than DL) |
| 127 | S_ORG_29 | Char | 12 | 1211 | 12. | Flag for ORG_29 (Less than DL) |
| 129 | S_ORG_30 | Char | 12 | 1235 | 12. | Flag for ORG_30 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 130 | S_ORG_31 | Char | 12 | 1247 | 12. | Flag for ORG_31 (Less than DL) |
| 131 | S_ORG_32 | Char | 12 | 1259 | 12. | Flag for ORG_32 (Less than DL) |
| 132 | S_ORG_33 | Char | 12 | 1271 | 12. | Flag for ORG_33 (Less than DL) |
| 133 | S_ORG_34 | Char | 12 | 1283 | 12. | Flag for ORG_34 (Less than DL) |
| 134 | S_ORG_35 | Char | 12 | 1295 | 12. | Flag for ORG_35 (Less than DL) |
| 135 | S_ORG_36 | Char | 12 | 1307 | 12. | Flag for ORG_36 (Less than DL) |
| 136 | S_ORG_37 | Char | 12 | 1319 | 12. | Flag for ORG_37 (Less than DL) |
| 137 | S_ORG_38 | Char | 12 | 1331 | 12. | Flag for ORG_38 (Less than DL) |
| 138 | S_ORG_39 | Char | 12 | 1343 | 12. | Flag for ORG_39 (Less than DL) |
| 140 | S_ORG_40 | Char | 12 | 1367 | 12. | Flag for ORG_40 (Less than DL) |
| 141 | S_ORG_41 | Char | 12 | 1379 | 12. | Flag for ORG_41 (Less than DL) |
| 142 | S_ORG_42 | Char | 12 | 1391 | 12. | Flag for ORG_42 (Less than DL) |
| 143 | S_ORG_43 | Char | 12 | 1403 | 12. | Flag for ORG_43 (Less than DL) |
| 105 | S_ORG_44 | Char | 12 | 947 | 12. | Flag for ORG_44 (Less than DL) |
| 144 | S_ORG_45 | Char | 12 | 1415 | 12. | Flag for ORG_45 (Less than DL) |
| 242 | S_ORG_46 | Char | 12 | 2591 | 12. | Flag for ORG_46 (Less than DL) |
| 145 | S_ORG_47 | Char | 12 | 1427 | 12. | Flag for ORG_47 (Less than DL) |
| 146 | S_ORG_48 | Char | 12 | 1439 | 12. | Flag for ORG_48 (Less than DL) |
| 243 | S_ORG_49 | Char | 12 | 2603 | 12. | Flag for ORG_49 (Less than DL) |
| 148 | S_ORG_50 | Char | 12 | 1463 | 12. | Flag for ORG_50 (Less than DL) |
| 149 | S_ORG_51 | Char | 12 | 1475 | 12. | Flag for ORG_51 (Less than DL) |
| 150 | S_ORG_52 | Char | 12 | 1487 | 12. | Flag for ORG_52 (Less than DL) |
| 106 | S_ORG_53 | Char | 12 | 959 | 12. | Flag for ORG_53 (Less than DL) |
| 151 | S_ORG_54 | Char | 12 | 1499 | 12. | Flag for ORG_54 (Less than DL) |
| 152 | S_ORG_55 | Char | 12 | 1511 | 12. | Flag for ORG_55 (Less than DL) |
| 153 | S_ORG_56 | Char | 12 | 1523 | 12. | Flag for ORG_56 (Less than DL) |
| 154 | S_ORG_57 | Char | 12 | 1535 | 12. | Flag for ORG_57 (Less than DL) |
| 155 | S_ORG_58 | Char | 12 | 1547 | 12. | Flag for ORG_58 (Less than DL) |
| 156 | S_ORG_59 | Char | 12 | 1559 | 12. | Flag for ORG_59 (Less than DL) |
| 158 | S_ORG_60 | Char | 12 | 1583 | 12. | Flag for ORG_60 (Less than DL) |
| 107 | S_ORG_61 | Char | 12 | 971 | 12. | Flag for ORG_61 (Less than DL) |
| 159 | S_ORG_62 | Char | 12 | 1595 | 12. | Flag for ORG_62 (Less than DL) |
| 160 | S_ORG_63 | Char | 12 | 1607 | 12. | Flag for ORG_63 (Less than DL) |
| 161 | S_ORG_64 | Char | 12 | 1619 | 12. | Flag for ORG_64 (Less than DL) |
| 477 | S_ORG_65 | Char | 12 | 4671 | 12. | Flag for ORG_65 (Less than DL) |
| 162 | S_ORG_66 | Char | 12 | 1631 | 12. | Flag for ORG_66 (Less than DL) |
| 163 | S_ORG_67 | Char | 12 | 1643 | 12. | Flag for ORG_67 (Less than DL) |
| 164 | S_ORG_68 | Char | 12 | 1655 | 12. | Flag for ORG_68 (Less than DL) |
| 165 | S_ORG_69 | Char | 12 | 1667 | 12. | Flag for ORG_69 (Less than DL) |
| 167 | S_ORG_70 | Char | 12 | 1691 | 12. | Flag for ORG_70 (Less than DL) |
| 168 | S_ORG_71 | Char | 12 | 1703 | 12. | Flag for ORG_71 (Less than DL) |
| 169 | S_ORG_72 | Char | 12 | 1715 | 12. | Flag for ORG_72 (Less than DL) |
| 108 | S_ORG_73 | Char | 12 | 983 | 12. | Flag for ORG_73 (Less than DL) |
| 170 | S_ORG_74 | Char | 12 | 1727 | 12. | Flag for ORG_74 (Less than DL) |
| 171 | S_ORG_75 | Char | 12 | 1739 | 12. | Flag for ORG_75 (Less than DL) |
| 172 | S_ORG_76 | Char | 12 | 1751 | 12. | Flag for ORG_76 (Less than DL) |
| 173 | S_ORG_77 | Char | 12 | 1763 | 12. | Flag for ORG_77 (Less than DL) |
| 174 | S_ORG_78 | Char | 12 | 1775 | 12. | Flag for ORG_78 (Less than DL) |
| 175 | S_ORG_79 | Char | 12 | 1787 | 12. | Flag for ORG_79 (Less than DL) |
| 177 | S_ORG_80 | Char | 12 | 1811 | 12. | Flag for ORG_80 (Less than DL) |
| 178 | S_ORG_81 | Char | 12 | 1823 | 12. | Flag for ORG_81 (Less than DL) |
| 179 | S_ORG_82 | Char | 12 | 1835 | 12. | Flag for ORG_82 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 180 | S_ORG_83 | Char | 12 | 1847 | 12. | Flag for ORG_83 (Less than DL) |
| 181 | S_ORG_84 | Char | 12 | 1859 | 12. | Flag for ORG_84 (Less than DL) |
| 182 | S_ORG_85 | Char | 12 | 1871 | 12. | Flag for ORG_85 (Less than DL) |
| 183 | S_ORG_86 | Char | 12 | 1883 | 12. | Flag for ORG_86 (Less than DL) |
| 184 | S_ORG_87 | Char | 12 | 1895 | 12. | Flag for ORG_87 (Less than DL) |
| 244 | S_ORG_88 | Char | 12 | 2615 | 12. | Flag for ORG_88 (Less than DL) |
| 185 | S_ORG_89 | Char | 12 | 1907 | 12. | Flag for ORG_89 (Less than DL) |
| 41 | S_ORG_90 | Char | 12 | 400 | 12. | Flag for ORG_90 (Less than DL) |
| 187 | S_ORG_91 | Char | 12 | 1931 | 12. | Flag for ORG_91 (Less than DL) |
| 109 | S_ORG_92 | Char | 12 | 995 | 12. | Flag for ORG_92 (Less than DL) |
| 188 | S_ORG_93 | Char | 12 | 1943 | 12. | Flag for ORG_93 (Less than DL) |
| 189 | S_ORG_94 | Char | 12 | 1955 | 12. | Flag for ORG_94 (Less than DL) |
| 190 | S_ORG_95 | Char | 12 | 1967 | 12. | Flag for ORG_95 (Less than DL) |
| 191 | S_ORG_96 | Char | 12 | 1979 | 12. | Flag for ORG_96 (Less than DL) |
| 192 | S_ORG_97 | Char | 12 | 1991 | 12. | Flag for ORG_97 (Less than DL) |
| 245 | S_O_194 | Char | 12 | 2627 | 12. | Flag for O_194 (Less than DL) |
| 246 | S_O_195 | Char | 12 | 2639 | 12. | Flag for O_195 (Less than DL) |
| 247 | S_O_196 | Char | 12 | 2651 | 12. | Flag for O_196 (Less than DL) |
| 248 | S_O_200 | Char | 12 | 2663 | 12. | Flag for O_200 (Less than DL) |
| 249 | S_O_201 | Char | 12 | 2675 | 12. | Flag for O_201 (Less than DL) |
| 250 | S_O_203 | Char | 12 | 2687 | 12. | Flag for O_203 (Less than DL) |
| 251 | S_O_205 | Char | 12 | 2699 | 12. | Flag for O_205 (Less than DL) |
| 92 | S_P1016 | Char | 12 | 819 | 12. | Flag for P1016 (Less than DL) |
| 15 | S_P1221 | Char | 12 | 168 | 12. | Flag for P1221 (Less than DL) |
| 94 | S_P1232 | Char | 12 | 839 | 12. | Flag for P1232 (Less than DL) |
| 96 | S_P1242 | Char | 12 | 859 | 12. | Flag for P1242 (Less than DL) |
| 98 | S_P1248 | Char | 12 | 879 | 12. | Flag for P1248 (Less than DL) |
| 100 | S_P1254 | Char | 12 | 899 | 12. | Flag for P1254 (Less than DL) |
| 102 | S_P1260 | Char | 12 | 919 | 12. | Flag for P1260 (Less than DL) |
| 13 | S_P42_48 | Char | 12 | 148 | 12. | Flag for P42_48 (Less than DL) |
| 11 | S_P54_60 | Char | 12 | 128 | 12. | Flag for P54_60 (Less than DL) |
| 65 | S_PB | Char | 12 | 617 | 12. | Flag for PB (Less than DL) |
| 17 | S_PBB | Char | 12 | 188 | 12. | Flag for PBB (Less than DL) |
| 9 | S_PCB | Char | 12 | 108 | 12. | Flag for PCB (Less than DL) |
| 49 | S_PEST | Char | 12 | 480 | 12. | Flag for PEST (Less than DL) |
| 252 | S_PES_1 | Char | 12 | 2711 | 12. | Flag for PES_1 (Less than DL) |
| 256 | S_PES_2 | Char | 12 | 2759 | 12. | Flag for PES_2 (Less than DL) |
| 262 | S_PES_3 | Char | 12 | 2831 | 12. | Flag for PES_3 (Less than DL) |
| 204 | S_PES_4 | Char | 12 | 2135 | 12. | Flag for PES_4 (Less than DL) |
| 205 | S_PES_5 | Char | 12 | 2147 | 12. | Flag for PES_5 (Less than DL) |
| 206 | S_PES_6 | Char | 12 | 2159 | 12. | Flag for PES_6 (Less than DL) |
| 207 | S_PES_7 | Char | 12 | 2171 | 12. | Flag for PES_7 (Less than DL) |
| 208 | S_PES_8 | Char | 12 | 2183 | 12. | Flag for PES_8 (Less than DL) |
| 209 | S_PES_9 | Char | 12 | 2195 | 12. | Flag for PES_9 (Less than DL) |
| 193 | S_PES_10 | Char | 12 | 2003 | 12. | Flag for PES_10 (Less than DL) |
| 253 | S_PES_11 | Char | 12 | 2723 | 12. | Flag for PES_11 (Less than DL) |
| 254 | S_PES_12 | Char | 12 | 2735 | 12. | Flag for PES_12 (Less than DL) |
| 194 | S_PES_13 | Char | 12 | 2015 | 12. | Flag for PES_13 (Less than DL) |
| 255 | S_PES_14 | Char | 12 | 2747 | 12. | Flag for PES_14 (Less than DL) |
| 195 | S_PES_15 | Char | 12 | 2027 | 12. | Flag for PES_15 (Less than DL) |
| 196 | S_PES_16 | Char | 12 | 2039 | 12. | Flag for PES_16 (Less than DL) |
| 197 | S_PES_17 | Char | 12 | 2051 | 12. | Flag for PES_17 (Less than DL) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 198 | S_PES_18 | Char | 12 | 2063 | 12. | Flag for PES_18 (Less than DL) |
| 199 | S_PES_19 | Char | 12 | 2075 | 12. | Flag for PES_19 (Less than DL) |
| 200 | S_PES_20 | Char | 12 | 2087 | 12. | Flag for PES_20 (Less than DL) |
| 201 | S_PES_21 | Char | 12 | 2099 | 12. | Flag for PES_21 (Less than DL) |
| 202 | S_PES_22 | Char | 12 | 2111 | 12. | Flag for PES_22 (Less than DL) |
| 203 | S_PES_23 | Char | 12 | 2123 | 12. | Flag for PES_23 (Less than DL) |
| 257 | S_PES_24 | Char | 12 | 2771 | 12. | Flag for PES_24 (Less than DL) |
| 258 | S_PES_25 | Char | 12 | 2783 | 12. | Flag for PES_25 (Less than DL) |
| 259 | S_PES_26 | Char | 12 | 2795 | 12. | Flag for PES_26 (Less than DL) |
| 77 | S_PES_27 | Char | 12 | 712 | 12. | Flag for TOXAPE (Less than DL) |
| 260 | S_PES_28 | Char | 12 | 2807 | 12. | Flag for PES_28 (Less than DL) |
| 261 | S_PES_29 | Char | 12 | 2819 | 12. | Flag for PES_29 (Less than DL) |
| 84 | S_PH | Char | 5 | 770 | 5. | Flag for pH (Less than DL) |
| 272 | S_P_82 | Char | 12 | 2951 | 12. | Flag for P_82 (Less than DL) |
| 273 | S_P_87 | Char | 12 | 2963 | 12. | Flag for P_87 (Less than DL) |
| 274 | S_P_95 | Char | 12 | 2975 | 12. | Flag for P_95 (Less than DL) |
| 275 | S_P_99 | Char | 12 | 2987 | 12. | Flag for P_99 (Less than DL) |
| 263 | S_P_101 | Char | 12 | 2843 | 12. | Flag for P_101 (Less than DL) |
| 264 | S_P_105 | Char | 12 | 2855 | 12. | Flag for P_105 (Less than DL) |
| 265 | S_P_110 | Char | 12 | 2867 | 12. | Flag for P_110 (Less than DL) |
| 266 | S_P_114 | Char | 12 | 2879 | 12. | Flag for P_114 (Less than DL) |
| 267 | S_P_118 | Char | 12 | 2891 | 12. | Flag for P_118 (Less than DL) |
| 268 | S_P_119 | Char | 12 | 2903 | 12. | Flag for P_119 (Less than DL) |
| 269 | S_P_123 | Char | 12 | 2915 | 12. | Flag for P_123 (Less than DL) |
| 270 | S_P_126 | Char | 12 | 2927 | 12. | Flag for P_126 (Less than DL) |
| 271 | S_P_127 | Char | 12 | 2939 | 12. | Flag for P_127 (Less than DL) |
| 51 | S_SB | Char | 6 | 500 | 6. | Flag for SB (Less than DL) |
| 69 | S_SE | Char | 3 | 648 | 3. | Flag for SE (Less than DL) |
| 45 | S_SS | Char | 12 | 440 | 12. | Flag for SS (Less than DL) |
| 82 | S_TC | Char | 5 | 760 | 5. | Flag for TC (Less than DL) |
| 83 | S_TEMP | Char | 5 | 765 | 5. | Flag for TEMP (Less than DL) |
| 89 | S_TKN | Char | 5 | 802 | 5. | Flag for TKN (Less than DL) |
| 73 | S_TL | Char | 14 | 670 | 14. | Flag for TL (Less than DL) |
| 85 | S_TN | Char | 7 | 775 | 7. | Flag for TN (Less than DL) |
| 32 | S_TOC | Char | 5 | 323 | 5. | Flag for TOC (Less than DL) |
| 43 | S_TP | Char | 12 | 420 | 12. | Flag for TP (Less than DL) |
| 276 | S_TPH | Char | 12 | 2999 | 12. | Flag for TPH (Less than DL) |
| 81 | S_TSS | Char | 12 | 748 | 12. | Flag for TSS (Less than DL) |
| 86 | S_TURB | Char | 6 | 782 | 6. | Flag for TURB (Less than DL) |
| 277 | S_T_18 | Char | 12 | 3011 | 12. | Flag for T_18 (Less than DL) |
| 278 | S_T_28 | Char | 12 | 3023 | 12. | Flag for T_28 (Less than DL) |
| 279 | S_T_37 | Char | 12 | 3035 | 12. | Flag for T_37 (Less than DL) |
| 280 | S_T_44 | Char | 12 | 3047 | 12. | Flag for T_44 (Less than DL) |
| 281 | S_T_47 | Char | 12 | 3059 | 12. | Flag for T_47 (Less than DL) |
| 282 | S_T_49 | Char | 12 | 3071 | 12. | Flag for T_49 (Less than DL) |
| 283 | S_T_52 | Char | 12 | 3083 | 12. | Flag for T_52 (Less than DL) |
| 284 | S_T_60 | Char | 12 | 3095 | 12. | Flag for T_60 (Less than DL) |
| 285 | S_T_66 | Char | 12 | 3107 | 12. | Flag for T_66 (Less than DL) |
| 286 | S_T_70 | Char | 12 | 3119 | 12. | Flag for T_70 (Less than DL) |
| 287 | S_T_74 | Char | 12 | 3131 | 12. | Flag for T_74 (Less than DL) |
| 288 | S_T_77 | Char | 12 | 3143 | 12. | Flag for T_77 (Less than DL) |
| 289 | S_T_80 | Char | 12 | 3155 | 12. | Flag for T_80 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 290 | S_T_81 | Char | 12 | 3167 | 12. | Flag for T_81 (Less than DL) |
| 30 | S_ZN | Char | 12 | 303 | 12. | Flag for ZN (Less than DL) |
| 21 | TC | Num | 8 | 223 | | Total Coliform (#/100 ml) |
| 25 | TEMP | Num | 8 | 259 | | Temperature (Degrees Centigrade) |
| 1 | TIDE | Char | 12 | 0 | 12. | Tide |
| 104 | TIME | Num | 8 | 939 | TIME5. | Sampling Time |
| 40 | TKN | Num | 8 | 392 | | Total Kjeldahl Nitrogen (mg/l) |
| 74 | TL | Num | 8 | 684 | | Thallium (mg/l) |
| 80 | TN | Num | 8 | 740 | | Total Nitrogen (mg/l) |
| 33 | TOC | Num | 8 | 328 | | Total Organic Carbon (mg/l) |
| 44 | TP | Num | 8 | 432 | | Total Phosphate (mg/l) |
| 461 | TPH | Num | 8 | 4539 | | Total Petroleum Hydrocarbons (mg/l) |
| 7 | TRIB | Char | 12 | 84 | 12. | CR=Christina River,DR=Delaware River |
| 29 | TSS | Num | 8 | 295 | | Total Suspended Solids (mg/l) |
| 24 | TURB | Num | 8 | 251 | | Turbidity (ntu) |
| 3 | TYPE | Char | 12 | 20 | 12. | B=Backgrnd,M=Mixing Z.,O=Outfall,W=Weir |
| 462 | T_18 | Num | 8 | 4547 | | 18 Tri (ng/L) |
| 463 | T_28 | Num | 8 | 4555 | | 28 Tri (ng/L) |
| 464 | T_37 | Num | 8 | 4563 | | 37 Tri (ng/L) |
| 465 | T_44 | Num | 8 | 4571 | | 44 Tetra (ng/L) |
| 466 | T_47 | Num | 8 | 4579 | | 47 Tetra (ng/L) |
| 467 | T_49 | Num | 8 | 4587 | | 49 Tetra (ng/L) |
| 468 | T_52 | Num | 8 | 4595 | | 52 Tetra (ng/L) |
| 469 | T_60 | Num | 8 | 4603 | | 60 Tetra (ng/L) |
| 470 | T_66 | Num | 8 | 4611 | | 66 Tetra (ng/L) |
| 471 | T_70 | Num | 8 | 4619 | | 70 Tetra (ng/L) |
| 472 | T_74 | Num | 8 | 4627 | | 74 Tetra (ng/L) |
| 473 | T_77 | Num | 8 | 4635 | | 77 Tetra (pg/L) |
| 474 | T_80 | Num | 8 | 4643 | | 80 Tetra (ng/L) |
| 475 | T_81 | Num | 8 | 4651 | | 81 Tetra (pg/L) |
| 31 | ZN | Num | 8 | 315 | | Zinc (mg/l) |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 1001 | 0 | 402.9500500 | 1.0000000 | 858.0000000 |
| DATE | Sampling Date | 1001 | 0 | 10729.62 | 7326.00 | 13328.00 |
| PCB | PCB's (ug/l) | 237 | 764 | 7.6258650 | 0 | 500.0000000 |
| P54_60 | PCB-1254,1260 (ug/l) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| P42_48 | PCB-1242,1248 (ug/l) | 4 | 997 | 50.0000000 | 50.0000000 | 50.0000000 |
| P1221 | PCB-1221 (ug/l) | 25 | 976 | 17.1600000 | 0.5000000 | 100.0000000 |
| PBB | PBB (mg/l) | 4 | 997 | 20.0000000 | 20.0000000 | 20.0000000 |
| FC | Fecal Coliform (#/100 ml) | 56 | 945 | 1497.43 | 30.0000000 | 10000.00 |
| TC | Total Coliform (#/100 ml) | 49 | 952 | 11549.80 | 500.0000000 | 160000.00 |
| BOD | Biochemical Oxygen Demand (mg/l) | 414 | 587 | 6.9205314 | 2.4000000 | 310.0000000 |
| TURB | Turbidity (ntu) | 396 | 605 | 316.9184343 | 6.2000000 | 55000.00 |
| TEMP | Temperature (Degrees Centigrade) | 394 | 607 | 12.0651015 | 0 | 58.0000000 |
| PH | pH | 404 | 597 | 7.2137129 | 2.8900000 | 8.5500000 |
| DO | Dissolved Oxygen (mg/l) | 394 | 607 | 8.6180203 | 0.2000000 | 15.0000000 |
| TSS | Total Suspended Solids (mg/l) | 924 | 77 | 890.1643939 | 0 | 77700.00 |
| ZN | Zinc (mg/l) | 428 | 573 | 0.2139019 | 0.0090000 | 21.0000000 |
| TOC | Total Organic Carbon (mg/l) | 407 | 594 | 11.2146437 | 1.4000000 | 1000.00 |
| HG | Mercury (mg/l) | 281 | 720 | 0.000804626 | 0.000100000 | 0.0200000 |
| COD | Chemical Oxygen Demand (mg/l) | 159 | 842 | 60.3647799 | 5.0000000 | 430.0000000 |
| FLOW | Flow (mgd) | 4 | 997 | 26.9700000 | 2.9600000 | 70.8000000 |
| NN | Nitrate+Nitrite (mg/l) | 24 | 977 | 1.7166667 | 1.4100000 | 2.1500000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 152 | 849 | 3.2377632 | 0.5000000 | 25.0000000 |
| ORG_90 | Phenol (mg/l) | 53 | 948 | 0.0068755 | 0.0040000 | 0.0200000 |
| TP | Total Phosphate (mg/l) | 128 | 873 | 0.2504688 | 0.0300000 | 2.0000000 |
| SS | Settleable Solids (mg/l) | 19 | 982 | 60.4931579 | 0.0700000 | 640.0000000 |
| OG | Oil & Grease (mg/l) | 19 | 982 | 1.7894737 | 1.0000000 | 7.0000000 |
| PEST | Pesticides (mg/l) | 5 | 996 | 0.0804000 | 0.0020000 | 0.1000000 |
| SB | Antimony (mg/l) | 8 | 993 | 0.0042500 | 0.0020000 | 0.0100000 |
| AL | Aluminum (mg/l) | 109 | 892 | 3.6431193 | 0.6000000 | 110.0000000 |
| AS | Arsenic (mg/l) | 38 | 963 | 0.0051816 | 0.0020000 | 0.0176000 |
| BE | Beryllium (mg/l) | 28 | 973 | 0.0025750 | 0.000200000 | 0.0200000 |
| CHLR | Chloride (mg/l) | 3 | 998 | 1400.00 | 1100.00 | 1800.00 |
| CD | Cadmium (mg/l) | 127 | 874 | 0.0046614 | 0.000300000 | 0.0250000 |
| CR | Chromium (mg/l) | 147 | 854 | 0.0222238 | 0.0010000 | 0.5800000 |
| CU | Copper (mg/l) | 147 | 854 | 0.0340612 | 0.0040000 | 0.4400000 |
| PB | Lead (mg/l) | 147 | 854 | 0.0419320 | 0.0010000 | 0.9600000 |
| NI | Nickel (mg/l) | 38 | 963 | 0.0141947 | 0.0066000 | 0.1000000 |
| SE | Selenium (mg/l) | 18 | 983 | 0.0024444 | 0.0020000 | 0.0050000 |
| AG | Silver (mg/l) | 18 | 983 | 0.0048889 | 0.000500000 | 0.0200000 |
| TL | Thallium (mg/l) | 8 | 993 | 0.0170000 | 0.0020000 | 0.1000000 |
| CY | Cyanide (mg/l) | 6 | 995 | 0.0075000 | 0.0050000 | 0.0100000 |
| PES_27 | Toxaphene (ug/l) | 17 | 984 | 1.2941176 | 1.0000000 | 2.0000000 |
| PES_10 | Chlorodane (ug/l) | 7 | 994 | 1.9285714 | 0.5000000 | 3.0000000 |
| TN | Total Nitrogen (mg/l) | 327 | 674 | 6.8274618 | 0.4500000 | 260.0000000 |
| NO3 | Nitrate (mg/l) | 61 | 940 | 2.0440984 | 0.0500000 | 2.8000000 |
| P1016 | PCB-1016 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1232 | PCB-1232 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1242 | PCB-1242 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1248 | PCB-1248 (ug/l) | 21 | 980 | 1.3809524 | 0.5000000 | 5.0000000 |
| P1254 | PCB-1254 (ug/l) | 21 | 980 | 1.7142857 | 1.0000000 | 5.0000000 |
| P1260 | PCB-1260 (ug/l) | 21 | 980 | 1.7142857 | 1.0000000 | 5.0000000 |
| TIME | Sampling Time | 945 | 56 | 44172.38 | 3600.00 | 84900.00 |
| ORG_44 | Benzo(a)pyrene (ug/L) | 34 | 967 | 10.0000000 | 10.0000000 | 10.0000000 |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/L) | 24 | 977 | 9.8333333 | 6.0000000 | 10.0000000 |
| ORG_61 | Chloroform (ug/L) | 24 | 977 | 4.8333333 | 1.0000000 | 5.0000000 |
| ORG_73 | Fluoranthene (ug/L) | 34 | 967 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_92 | Tetrachloroethene (ug/L) | 24 | 977 | 4.8333333 | 1.0000000 | 5.0000000 |
| NH3 | Ammonia (mg/L) | 3 | 998 | 9.7000000 | 6.1000000 | 12.0000000 |
| NO2 | Nitrite (mg/l) | 3 | 998 | 0.1726667 | 0.1350000 | 0.2180000 |
| ORG_10 | 1,2-Dichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/L) | 4 | 997 | 6.2500000 | 5.0000000 | 10.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_19 | 2-Chlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_21 | 2-Nitrophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_26 | 2,4-Dinitrotoluene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/L) | 4 | 997 | 17.5000000 | 10.0000000 | 20.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_33 | 4-Nitrophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/L) | 4 | 997 | 40.0000000 | 10.0000000 | 50.0000000 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_36 | Acenaphthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_37 | Acenaphthylene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_38 | Acrolein (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_39 | Acrylonitrile (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_40 | Anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_41 | Benzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_42 | Benzidine (ug/L) | 4 | 997 | 67.5000000 | 30.0000000 | 80.0000000 |
| ORG_43 | Benzo(a)anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_54 | Bromodichloromethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_55 | Bromoform (ug/L) | 4 | 997 | 4.2500000 | 2.0000000 | 5.0000000 |
| ORG_56 | Bromomethane (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_59 | Chlorobenzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_60 | Chloroethane (ug/L) | 4 | 997 | 7.7500000 | 1.0000000 | 10.0000000 |

Wilmington Harbor - Water Quality Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_62 | Chloromethane (ug/L) | 4 | 997 | 8.7500000 | 5.0000000 | 10.0000000 |
| ORG_63 | Chrysene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_67 | Dibromochloromethane (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_68 | Diethylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_69 | Dimethylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/L) | 4 | 997 | 4.2500000 | 2.0000000 | 5.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_72 | Ethylbenzene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_74 | Fluorene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_75 | Hexachlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_78 | Hexachloroethane (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_80 | Isophorone (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_81 | Methylene Chloride (ug/L) | 4 | 997 | 4.7500000 | 1.0000000 | 7.0000000 |
| ORG_82 | Naphthalene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_83 | Nitrobenzene (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/L) | 4 | 997 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_87 | Pentachlorophenol (ug/L) | 4 | 997 | 45.0000000 | 30.0000000 | 50.0000000 |
| ORG_89 | Phenanthrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_91 | Pyrene (ug/L) | 14 | 987 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_93 | Toluene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_95 | Trichloroethene (ug/L) | 4 | 997 | 4.0000000 | 1.0000000 | 5.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/L) | 3 | 998 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_97 | Vinyl Chloride (ug/L) | 4 | 997 | 7.7500000 | 1.0000000 | 10.0000000 |
| PES_13 | D-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_15 | Dieldrin (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_16 | Endosulfan I (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_17 | Endosulfan II (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_18 | Endosulfan sulfate (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_19 | Endrin (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_20 | Endrin aldehyde (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_21 | G-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_22 | Heptachlor (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_23 | Heptachlor epoxide (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_4 | 4,4'-DDD (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_5 | 4,4'-DDE (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_6 | 4,4'-DDT (ug/L) | 13 | 988 | 0.1076923 | 0.1000000 | 0.2000000 |
| PES_7 | A-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_8 | Aldrin (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| PES_9 | B-BHC (ug/L) | 13 | 988 | 0.0538462 | 0.0500000 | 0.1000000 |
| D_209 | 209 Deca (ng/L) | 10 | 991 | 62.5000000 | 62.5000000 | 62.5000000 |
| D_8 | 8 Di (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| H38_58 | 138,158 Hexa (ng/L) | 10 | 991 | 50.0000000 | 50.0000000 | 50.0000000 |

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| H70_90 | 170,190 Hepta (ng/L) | 10 | 991 | 62.5000000 | 62.5000000 | 62.5000000 |
| HARD | Hardness (mg/L) | 10 | 991 | 168.1200000 | 58.6000000 | 444.0000000 |
| H_128 | 128 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_137 | 137 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_149 | 149 Hexa (ng/L) | 10 | 991 | 20.0000000 | 20.0000000 | 20.0000000 |
| H_151 | 151 Hexa (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| H_153 | 153 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_156 | 156 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_157 | 157 Hexa (ng/L) | 10 | 991 | 24.1000000 | 24.1000000 | 24.1000000 |
| H_166 | 166 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_167 | 167 Hexa (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| H_168 | 168 Hexa (ng/L) | 10 | 991 | 21.8000000 | 21.8000000 | 21.8000000 |
| H_169 | 169 Hexa (pg/L) | 10 | 991 | 40.7400000 | 40.0000000 | 47.4000000 |
| H_177 | 177 Hepta (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| H_179 | 179 Hepta (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| H_180 | 180 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_183 | 183 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_185 | 185 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_187 | 187 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_189 | 189 Hepta (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| H_191 | 191 Hepta (ng/L) | 10 | 991 | 27.3000000 | 27.3000000 | 27.3000000 |
| N_206 | 206 Nona (ng/L) | 10 | 991 | 62.0000000 | 62.0000000 | 62.0000000 |
| N_207 | 207 Nona (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| N_208 | 208 Nona (ng/L) | 10 | 991 | 40.0000000 | 40.0000000 | 40.0000000 |
| ORG_1 | 1-Methylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_2 | 1-Methylphenanthrene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_20 | 2-Methylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_22 | 2,3,5-Trimethyl-naphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_28 | 2,6-Dimethylnaphthalene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_46 | Benzo(e)pyrene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_49 | Biphenyl (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_88 | Perylene (ug/L) | 10 | 991 | 10.0000000 | 10.0000000 | 10.0000000 |
| O_194 | 194 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| O_195 | 195 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_196 | 196 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_200 | 200 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| O_201 | 201 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_203 | 203 Octa (ng/L) | 10 | 991 | 30.0000000 | 30.0000000 | 30.0000000 |
| O_205 | 205 Octa (ng/L) | 10 | 991 | 37.5000000 | 37.5000000 | 37.5000000 |
| PES_1 | 2,4'-DDD (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_11 | Cis-chlordane (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_12 | Cis-nonachlor (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_14 | Dicofol (ug/L) | 10 | 991 | 0.4000000 | 0.4000000 | 0.4000000 |
| PES_2 | 2,4'-DDE (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_24 | Hexychlorobenzene (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| PES_25 | Mirex (ug/L) | 10 | 991 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_26 | Oxychlordane (ug/L) | 10 | 991 | 0.1996000 | 0.1960000 | 0.2000000 |
| PES_28 | Trans-chlordane (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_29 | Trans-nonachlor (ug/L) | 10 | 991 | 0.5500000 | 0.5000000 | 1.0000000 |
| PES_3 | 2,4'-DDT (ug/L) | 10 | 991 | 0.1100000 | 0.1000000 | 0.2000000 |
| P_101 | 101 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_105 | 105 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_110 | 110 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| P_114 | 114 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_118 | 118 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_119 | 119 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_123 | 123 Penta (ng/L) | 10 | 991 | 20.8000000 | 20.8000000 | 20.8000000 |
| P_126 | 126 Penta (pg/L) | 10 | 991 | 32.6000000 | 4.6000000 | 58.0000000 |
| P_127 | 127 Penta (ng/L) | 10 | 991 | 20.0000000 | 20.0000000 | 20.0000000 |
| P_82 | 82 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_87 | 87 Penta (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| P_95 | 95 Penta (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| P_99 | 99 Penta (ng/L) | 10 | 991 | 14.0000000 | 14.0000000 | 14.0000000 |
| TPH | Total Petroleum Hydrocarbons (mg/l) | 10 | 991 | 0.2460000 | 0.2400000 | 0.2500000 |
| T_18 | 18 Tri (ng/L) | 10 | 991 | 12.5000000 | 12.5000000 | 12.5000000 |
| T_28 | 28 Tri (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_37 | 37 Tri (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_44 | 44 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_47 | 47 Tetra (ng/L) | 10 | 991 | 28.1000000 | 28.1000000 | 28.1000000 |
| T_49 | 49 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_52 | 52 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_60 | 60 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_66 | 66 Tetra (ng/L) | 10 | 991 | 32.6000000 | 32.6000000 | 32.6000000 |
| T_70 | 70 Tetra (ng/L) | 10 | 991 | 28.4000000 | 28.4000000 | 28.4000000 |
| T_74 | 74 Tetra (ng/L) | 10 | 991 | 25.0000000 | 25.0000000 | 25.0000000 |
| T_77 | 77 Tetra (pg/L) | 10 | 991 | 108.3400000 | 28.7000000 | 368.0000000 |
| T_80 | 80 Tetra (ng/L) | 10 | 991 | 31.3000000 | 31.3000000 | 31.3000000 |
| T_81 | 81 Tetra (pg/L) | 10 | 991 | 37.1100000 | 11.1000000 | 40.0000000 |
| ORG_17 | 2-Chloroethylvinylether (ug/l) | 1 | 1000 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_65 | Cis,trans,1,2-Dichloroethene (ug/l) | 1 | 1000 | 1.0000000 | 1.0000000 | 1.0000000 |

# Appendix B - Groundwater Database

Name: GW.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 22 observations and 16 variables in the dataset. Each observation represents a groundwater sample and a series of chemical and biological measurements. A sample can be uniquely identified by station name and sampling date. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Chloride is detected the concentration value is stored in the CHLR variable and a blank space exists in S_CHLR (Flag variable for Chloride). If the parameter was not detected, the detection limit is stored in CHLR and less than sign (<) is stored in S_CHLR. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

Wilmington Harbor - Groundwater Data

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.GW | Observations: | 22 |
| Member Type: | DATA | Variables: | 16 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 12:12 Wednesday, February 19, 1997 | Observation Length: | 93 |
| Last Modified: | 12:12 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 8192 |
| Number of Data Set Pages: | 1 |
| File Format: | 607 |
| First Data Page: | 1 |
| Max Obs per Page: | 87 |
| Obs in First Data Page: | 22 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 9 | CHLR | Num | 8 | 22 | | Chloride (mg/l) |
| 15 | DATE | Num | 8 | 77 | MMDDYY8. | Sampling Date |
| 14 | LOCATION | Char | 15 | 62 | | Study Site |
| 16 | PAGE | Num | 8 | 85 | | Report Page Number |
| 12 | PH | Num | 8 | 46 | | pH |
| 1 | STATION | Char | 8 | 0 | | Sampling Well Identification |
| 3 | S_CHLR | Char | 1 | 9 | | Flag for CHLR (Less than DL) |
| 6 | S_PH | Char | 1 | 12 | | Flag for PH (Less than DL) |
| 5 | S_TKN | Char | 1 | 11 | | Flag for TKN (Less than DL) |
| 7 | S_TN | Char | 1 | 13 | | Flag for TN (Less than DL) |
| 2 | S_TOC | Char | 1 | 8 | | Flag for TOC (Less than DL) |
| 4 | S_ZN | Char | 1 | 10 | | Flag for ZN (Less than DL) |
| 11 | TKN | Num | 8 | 38 | | Total Kjeldahl Nitrogen (mg/l) |
| 13 | TN | Num | 8 | 54 | | Total Nitrogen (mg/l) |
| 8 | TOC | Num | 8 | 14 | | Total Organic Carbon (mg/l) |
| 10 | ZN | Num | 8 | 30 | | Zinc (mg/l) |

Wilmington Harbor - Groundwater Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| TOC | Total Organic Carbon (mg/l) | 22 | 0 | 74.4454545 | 1.1000000 | 170.0000000 |
| CHLR | Chloride (mg/l) | 10 | 12 | 258.0000000 | 20.0000000 | 437.0000000 |
| ZN | Zinc (mg/l) | 22 | 0 | 0.0981818 | 0.0100000 | 1.4000000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 10 | 12 | 16.6230000 | 0.4000000 | 54.0000000 |
| PH | pH | 22 | 0 | 6.8004545 | 5.5500000 | 8.1500000 |
| TN | Total Nitrogen (mg/l) | 12 | 10 | 58.6666667 | 26.0000000 | 80.0000000 |
| DATE | Sampling Date | 22 | 0 | 9746.41 | 9566.00 | 9965.00 |
| PAGE | Report Page Number | 22 | 0 | 104.6363636 | 73.0000000 | 131.0000000 |

# Appendix C - Elutriate Database

Name: ELU.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 21 observations and 273 variables in the dataset. Each observation represents an elutriate sample and a series of chemical and biological measurements. A sample can be uniquely identified by station name, sampling date, time, and tributary. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

There are two water bodies associated with the samples: Christina River and Delaware River. If a sample does not have tributary information, blank space is stored in its variable.

Wilmington Harbor - Elutriate Data

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.ELU | Observations: | 21 |
| Member Type: | DATA | Variables: | 273 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 2714 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 16384 |
| Number of Data Set Pages: | 6 |
| File Format: | 607 |
| First Data Page: | 3 |
| Max Obs per Page: | 6 |
| Obs in First Data Page: | 5 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 154 | AG | Num | 8 | 1754 | | Silver (mg/L) |
| 30 | AL | Num | 8 | 278 | | Aluminum (mg/l) |
| 155 | AS | Num | 8 | 1762 | | Arsenic (mg/L) |
| 156 | BE | Num | 8 | 1770 | | Beryllium (mg/L) |
| 8 | BOD | Num | 8 | 75 | | Biochemical Oxygen Demand (mg/l) |
| 25 | CD | Num | 8 | 230 | | Cadmium (mg/l) |
| 31 | COD | Num | 8 | 286 | | Chemical Oxygen Demand (mg/l) |
| 4 | COMMENT | Char | 21 | 28 | 21. | Sample Comment |
| 28 | CR | Num | 8 | 258 | | Chromium (mg/l) |
| 26 | CU | Num | 8 | 238 | | Copper (mg/l) |
| 157 | CY | Num | 8 | 1778 | | Cyanide (mg/L) |
| 3 | DATE | Num | 8 | 20 | MMDDYY8. | Sampling Date |
| 14 | HG | Num | 8 | 131 | | Mercury (mg/l) |
| 158 | NI | Num | 8 | 1786 | | Nickel (mg/L) |
| 18 | OG | Num | 8 | 171 | | Oil & Grease (mg/l) |
| 175 | ORG_3 | Num | 8 | 1922 | | 1,1-Dichloroethane (ug/L) |
| 186 | ORG_4 | Num | 8 | 2010 | | 1,1-Dichloroethene (ug/L) |
| 195 | ORG_5 | Num | 8 | 2082 | | 1,1,1-Trichloroethane (ug/L) |
| 206 | ORG_6 | Num | 8 | 2170 | | 1,1,2-Trichloroethane (ug/L) |
| 216 | ORG_7 | Num | 8 | 2250 | | 1,1,2,2-Tetrachloroethane (ug/L) |
| 227 | ORG_8 | Num | 8 | 2338 | | 1,2-Dichlorobenzene (ug/L) |
| 237 | ORG_9 | Num | 8 | 2418 | | 1,2-Dichloroethane (ug/L) |
| 159 | ORG_10 | Num | 8 | 1794 | | 1,2-Dichloroethene (ug/L) |
| 160 | ORG_11 | Num | 8 | 1802 | | 1,2-Dichloropropane (ug/L) |
| 161 | ORG_12 | Num | 8 | 1810 | | 1,2-Diphenyl Hydrazine (ug/L) |
| 162 | ORG_13 | Num | 8 | 1818 | | 1,2,4-Trichlorobenzene (ug/L) |
| 163 | ORG_14 | Num | 8 | 1826 | | 1,3-Dichlorobenzene (ug/L) |
| 164 | ORG_15 | Num | 8 | 1834 | | 1,4 & 1,2-Dichlorobenzene (ug/L) |
| 165 | ORG_16 | Num | 8 | 1842 | | 1,4-Dichlorobenzene (ug/L) |
| 166 | ORG_18 | Num | 8 | 1850 | | 2-Chloronaphthalene (ug/L) |
| 167 | ORG_19 | Num | 8 | 1858 | | 2-Chlorophenol (ug/L) |
| 168 | ORG_21 | Num | 8 | 1866 | | 2-Nitrophenol (ug/L) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 169 | ORG_23 | Num | 8 | 1874 | | 2,4-Dichlorophenol (ug/L) |
| 170 | ORG_24 | Num | 8 | 1882 | | 2,4-Dimethylphenol (ug/L) |
| 171 | ORG_25 | Num | 8 | 1890 | | 2,4-Dinitrophenol (ug/L) |
| 172 | ORG_26 | Num | 8 | 1898 | | 2,4-Dinitrotoluene (ug/L) |
| 173 | ORG_27 | Num | 8 | 1906 | | 2,4,6-Trichlorophenol (ug/L) |
| 174 | ORG_29 | Num | 8 | 1914 | | 2,6-Dinitrotoluene (ug/L) |
| 176 | ORG_30 | Num | 8 | 1930 | | 3,3'-Dichlorobenzidine (ug/L) |
| 177 | ORG_31 | Num | 8 | 1938 | | 4-Bromophenyl-phenylether (ug/L) |
| 178 | ORG_32 | Num | 8 | 1946 | | 4-Chlorophenyl-phenylether (ug/L) |
| 179 | ORG_33 | Num | 8 | 1954 | | 4-Nitrophenol (ug/L) |
| 180 | ORG_34 | Num | 8 | 1962 | | 4,6-Dinitro-2-methylphenol (ug/L) |
| 181 | ORG_35 | Num | 8 | 1970 | | 4,-Chloro-3-methylphenol (ug/L) |
| 182 | ORG_36 | Num | 8 | 1978 | | Acenaphthene (ug/L) |
| 183 | ORG_37 | Num | 8 | 1986 | | Acenaphthylene (ug/L) |
| 184 | ORG_38 | Num | 8 | 1994 | | Acrolein (ug/L) |
| 185 | ORG_39 | Num | 8 | 2002 | | Acrylonitrile (ug/L) |
| 187 | ORG_40 | Num | 8 | 2018 | | Anthracene (ug/L) |
| 188 | ORG_41 | Num | 8 | 2026 | | Benzene (ug/L) |
| 189 | ORG_42 | Num | 8 | 2034 | | Benzidine (ug/L) |
| 190 | ORG_43 | Num | 8 | 2042 | | Benzo(a)anthracene (ug/L) |
| 191 | ORG_44 | Num | 8 | 2050 | | Benzo(a)pyrene (ug/L) |
| 192 | ORG_45 | Num | 8 | 2058 | | Benzo(b)fluoranthene (ug/L) |
| 193 | ORG_47 | Num | 8 | 2066 | | Benzo(g,h,i)perylene (ug/L) |
| 194 | ORG_48 | Num | 8 | 2074 | | Benzo(k)fluoranthene (ug/L) |
| 196 | ORG_50 | Num | 8 | 2090 | | Bis(2-chloroethoxy)methane (ug/L) |
| 197 | ORG_51 | Num | 8 | 2098 | | Bis(2-chloroethyl)ether (ug/L) |
| 198 | ORG_52 | Num | 8 | 2106 | | Bis(2-chloroisopropyl)ether (ug/L) |
| 199 | ORG_53 | Num | 8 | 2114 | | Bis(2-ethylhexyl)phthalate (ug/L) |
| 200 | ORG_54 | Num | 8 | 2122 | | Bromodichloromethane (ug/L) |
| 201 | ORG_55 | Num | 8 | 2130 | | Bromoform (ug/L) |
| 202 | ORG_56 | Num | 8 | 2138 | | Bromomethane (ug/L) |
| 203 | ORG_57 | Num | 8 | 2146 | | Butlybenzylphthalate (ug/L) |
| 204 | ORG_58 | Num | 8 | 2154 | | Carbon Tetrachloride (ug/L) |
| 205 | ORG_59 | Num | 8 | 2162 | | Chlorobenzene (ug/L) |
| 207 | ORG_60 | Num | 8 | 2178 | | Chloroethane (ug/L) |
| 208 | ORG_61 | Num | 8 | 2186 | | Chloroform (ug/L) |
| 209 | ORG_62 | Num | 8 | 2194 | | Chloromethane (ug/L) |
| 210 | ORG_63 | Num | 8 | 2202 | | Chrysene (ug/L) |
| 211 | ORG_64 | Num | 8 | 2210 | | Cis-1,3-Dichloropropene (ug/L) |
| 212 | ORG_66 | Num | 8 | 2218 | | Dibenzo(a,h)anthracene (ug/L) |
| 213 | ORG_67 | Num | 8 | 2226 | | Dibromochloromethane (ug/L) |
| 214 | ORG_68 | Num | 8 | 2234 | | Diethylphthalate (ug/L) |
| 215 | ORG_69 | Num | 8 | 2242 | | Dimethylphthalate (ug/L) |
| 217 | ORG_70 | Num | 8 | 2258 | | Di-n-butylphthalate (ug/L) |
| 218 | ORG_71 | Num | 8 | 2266 | | Di-n-octylphthalate (ug/L) |
| 219 | ORG_72 | Num | 8 | 2274 | | Ethylbenzene (ug/L) |
| 220 | ORG_73 | Num | 8 | 2282 | | Fluoranthene (ug/L) |
| 221 | ORG_74 | Num | 8 | 2290 | | Fluorene (ug/L) |
| 222 | ORG_75 | Num | 8 | 2298 | | Hexachlorobenzene (ug/L) |
| 223 | ORG_76 | Num | 8 | 2306 | | Hexachlorobutadiene (ug/L) |
| 224 | ORG_77 | Num | 8 | 2314 | | Hexachlorocyclopentadiene (ug/L) |
| 225 | ORG_78 | Num | 8 | 2322 | | Hexachloroethane (ug/L) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 226 | ORG_79 | Num | 8 | 2330 | | Indeno(1,2,3-c,d)pyrene (ug/L) |
| 228 | ORG_80 | Num | 8 | 2346 | | Isophorone (ug/L) |
| 229 | ORG_81 | Num | 8 | 2354 | | Methylene Chloride (ug/L) |
| 230 | ORG_82 | Num | 8 | 2362 | | Naphthalene (ug/L) |
| 231 | ORG_83 | Num | 8 | 2370 | | Nitrobenzene (ug/L) |
| 232 | ORG_84 | Num | 8 | 2378 | | N-nitrosodimethylamine (ug/L) |
| 233 | ORG_85 | Num | 8 | 2386 | | N-nitroso-Di-n-propylamine (ug/L) |
| 234 | ORG_86 | Num | 8 | 2394 | | N-nitrosodiphenylamine (ug/L) |
| 235 | ORG_87 | Num | 8 | 2402 | | Pentachlorophenol (ug/L) |
| 236 | ORG_89 | Num | 8 | 2410 | | Phenanthrene (ug/L) |
| 238 | ORG_90 | Num | 8 | 2426 | | Phenol (mg/L) |
| 239 | ORG_91 | Num | 8 | 2434 | | Pyrene (ug/L) |
| 240 | ORG_92 | Num | 8 | 2442 | | Tetrachloroethene (ug/L) |
| 241 | ORG_93 | Num | 8 | 2450 | | Toluene (ug/L) |
| 242 | ORG_94 | Num | 8 | 2458 | | Trans-1,3-Dichloropropene (ug/L) |
| 243 | ORG_95 | Num | 8 | 2466 | | Trichloroethene (ug/L) |
| 244 | ORG_96 | Num | 8 | 2474 | | Trichlorofluoromethane (ug/L) |
| 245 | ORG_97 | Num | 8 | 2482 | | Vinyl Chloride (ug/L) |
| 246 | P1016 | Num | 8 | 2490 | | PCB-1016 (ug/L) |
| 247 | P1221 | Num | 8 | 2498 | | PCB-1221 (ug/L) |
| 248 | P1232 | Num | 8 | 2506 | | PCB-1232 (ug/L) |
| 249 | P1242 | Num | 8 | 2514 | | PCB-1242 (ug/L) |
| 250 | P1248 | Num | 8 | 2522 | | PCB-1248 (ug/L) |
| 251 | P1254 | Num | 8 | 2530 | | PCB-1254 (ug/L) |
| 252 | P1260 | Num | 8 | 2538 | | PCB-1260 (ug/L) |
| 1 | PAGE | Num | 8 | 0 | | Report Page Number |
| 23 | PB | Num | 8 | 210 | | Lead (mg/l) |
| 16 | PCB | Num | 8 | 151 | | PCB's (mg/l) |
| 265 | PES_4 | Num | 8 | 2642 | | 4,4'-DDD (ug/L) |
| 266 | PES_5 | Num | 8 | 2650 | | 4,4'-DDE (ug/L) |
| 267 | PES_6 | Num | 8 | 2658 | | 4,4'-DDT (ug/L) |
| 268 | PES_7 | Num | 8 | 2666 | | A-BHC (ug/L) |
| 269 | PES_8 | Num | 8 | 2674 | | Aldrin (ug/L) |
| 270 | PES_9 | Num | 8 | 2682 | | B-BHC (ug/L) |
| 253 | PES_10 | Num | 8 | 2546 | | Chlordane (ug/L) |
| 254 | PES_13 | Num | 8 | 2554 | | D-BHC (ug/L) |
| 255 | PES_15 | Num | 8 | 2562 | | Dieldrin (ug/L) |
| 256 | PES_16 | Num | 8 | 2570 | | Endosulfan I (ug/L) |
| 257 | PES_17 | Num | 8 | 2578 | | Endosulfan II (ug/L) |
| 258 | PES_18 | Num | 8 | 2586 | | Endosulfan sulfate (ug/L) |
| 259 | PES_19 | Num | 8 | 2594 | | Endrin (ug/L) |
| 260 | PES_20 | Num | 8 | 2602 | | Endrin aldehyde (ug/L) |
| 261 | PES_21 | Num | 8 | 2610 | | G-BHC (ug/L) |
| 262 | PES_22 | Num | 8 | 2618 | | Heptachlor (ug/L) |
| 263 | PES_23 | Num | 8 | 2626 | | Heptachlor epoxide (ug/L) |
| 264 | PES_27 | Num | 8 | 2634 | | Toxaphene (ug/L) |
| 6 | PH | Num | 8 | 55 | | pH |
| 271 | SB | Num | 8 | 2690 | | Antimony (mg/L) |
| 272 | SE | Num | 8 | 2698 | | Selenium (mg/L) |
| 2 | STATION | Char | 12 | 8 | 12. | Sampling Station |
| 33 | S_AG | Char | 12 | 302 | 12. | Flag for AG (Less than DL) |
| 29 | S_AL | Char | 12 | 266 | 12. | Flag for AL (Less than DL) |

Wilmington Harbor - Elutriate Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 34 | S_AS | Char | 12 | 314 | 12. | Flag for AS (Less than DL) |
| 35 | S_BE | Char | 12 | 326 | 12. | Flag for BE (Less than DL) |
| 7 | S_BOD | Char | 12 | 63 | 12. | Flag for BOD (Less than DL) |
| 24 | S_CD | Char | 12 | 218 | 12. | Flag for CD (Less than DL) |
| 27 | S_CR | Char | 12 | 246 | 12. | Flag for CR (Less than DL) |
| 36 | S_CU | Char | 12 | 338 | 12. | Flag for CU (Less than DL) |
| 37 | S_CY | Char | 12 | 350 | 12. | Flag for CY (Less than DL) |
| 13 | S_HG | Char | 12 | 119 | 12. | Flag for HG (Less than DL) |
| 38 | S_NI | Char | 12 | 362 | 12. | Flag for NI (Less than DL) |
| 17 | S_OG | Char | 12 | 159 | 12. | Flag for OG (Less than DL) |
| 55 | S_ORG_3 | Char | 12 | 566 | 12. | Flag for ORG_3 (Less than DL) |
| 66 | S_ORG_4 | Char | 12 | 698 | 12. | Flag for ORG_4 (Less than DL) |
| 75 | S_ORG_5 | Char | 12 | 806 | 12. | Flag for ORG_5 (Less than DL) |
| 86 | S_ORG_6 | Char | 12 | 938 | 12. | Flag for ORG_6 (Less than DL) |
| 96 | S_ORG_7 | Char | 12 | 1058 | 12. | Flag for ORG_7 (Less than DL) |
| 107 | S_ORG_8 | Char | 12 | 1190 | 12. | Flag for ORG_8 (Less than DL) |
| 117 | S_ORG_9 | Char | 12 | 1310 | 12. | Flag for ORG_9 (Less than DL) |
| 39 | S_ORG_10 | Char | 12 | 374 | 12. | Flag for ORG_10 (Less than DL) |
| 40 | S_ORG_11 | Char | 12 | 386 | 12. | Flag for ORG_11 (Less than DL) |
| 41 | S_ORG_12 | Char | 12 | 398 | 12. | Flag for ORG_12 (Less than DL) |
| 42 | S_ORG_13 | Char | 12 | 410 | 12. | Flag for ORG_13 (Less than DL) |
| 43 | S_ORG_14 | Char | 12 | 422 | 12. | Flag for ORG_14 (Less than DL) |
| 44 | S_ORG_15 | Char | 12 | 434 | 12. | Flag for ORG_15 (Less than DL) |
| 45 | S_ORG_16 | Char | 12 | 446 | 12. | Flag for ORG_16 (Less than DL) |
| 46 | S_ORG_18 | Char | 12 | 458 | 12. | Flag for ORG_18 (Less than DL) |
| 47 | S_ORG_19 | Char | 12 | 470 | 12. | Flag for ORG_19 (Less than DL) |
| 48 | S_ORG_21 | Char | 12 | 482 | 12. | Flag for ORG_21 (Less than DL) |
| 49 | S_ORG_23 | Char | 12 | 494 | 12. | Flag for ORG_23 (Less than DL) |
| 50 | S_ORG_24 | Char | 12 | 506 | 12. | Flag for ORG_24 (Less than DL) |
| 51 | S_ORG_25 | Char | 12 | 518 | 12. | Flag for ORG_25 (Less than DL) |
| 52 | S_ORG_26 | Char | 12 | 530 | 12. | Flag for ORG_26 (Less than DL) |
| 53 | S_ORG_27 | Char | 12 | 542 | 12. | Flag for ORG_27 (Less than DL) |
| 54 | S_ORG_29 | Char | 12 | 554 | 12. | Flag for ORG_29 (Less than DL) |
| 56 | S_ORG_30 | Char | 12 | 578 | 12. | Flag for ORG_30 (Less than DL) |
| 57 | S_ORG_31 | Char | 12 | 590 | 12. | Flag for ORG_31 (Less than DL) |
| 58 | S_ORG_32 | Char | 12 | 602 | 12. | Flag for ORG_32 (Less than DL) |
| 59 | S_ORG_33 | Char | 12 | 614 | 12. | Flag for ORG_33 (Less than DL) |
| 60 | S_ORG_34 | Char | 12 | 626 | 12. | Flag for ORG_34 (Less than DL) |
| 61 | S_ORG_35 | Char | 12 | 638 | 12. | Flag for ORG_35 (Less than DL) |
| 62 | S_ORG_36 | Char | 12 | 650 | 12. | Flag for ORG_36 (Less than DL) |
| 63 | S_ORG_37 | Char | 12 | 662 | 12. | Flag for ORG_37 (Less than DL) |
| 64 | S_ORG_38 | Char | 12 | 674 | 12. | Flag for ORG_38 (Less than DL) |
| 65 | S_ORG_39 | Char | 12 | 686 | 12. | Flag for ORG_39 (Less than DL) |
| 67 | S_ORG_40 | Char | 12 | 710 | 12. | Flag for ORG_40 (Less than DL) |
| 68 | S_ORG_41 | Char | 12 | 722 | 12. | Flag for ORG_41 (Less than DL) |
| 69 | S_ORG_42 | Char | 12 | 734 | 12. | Flag for ORG_42 (Less than DL) |
| 70 | S_ORG_43 | Char | 12 | 746 | 12. | Flag for ORG_43 (Less than DL) |
| 71 | S_ORG_44 | Char | 12 | 758 | 12. | Flag for ORG_44 (Less than DL) |
| 72 | S_ORG_45 | Char | 12 | 770 | 12. | Flag for ORG_45 (Less than DL) |
| 73 | S_ORG_47 | Char | 12 | 782 | 12. | Flag for ORG_47 (Less than DL) |
| 74 | S_ORG_48 | Char | 12 | 794 | 12. | Flag for ORG_48 (Less than DL) |
| [illegible] | S_ORG_50 | Char | 12 | 818 | 12. | Flag for ORG_50 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 77 | S_ORG_51 | Char | 12 | 830 | 12. | Flag for ORG_51 (Less than DL) |
| 78 | S_ORG_52 | Char | 12 | 842 | 12. | Flag for ORG_52 (Less than DL) |
| 79 | S_ORG_53 | Char | 12 | 854 | 12. | Flag for ORG_53 (Less than DL) |
| 80 | S_ORG_54 | Char | 12 | 866 | 12. | Flag for ORG_54 (Less than DL) |
| 81 | S_ORG_55 | Char | 12 | 878 | 12. | Flag for ORG_55 (Less than DL) |
| 82 | S_ORG_56 | Char | 12 | 890 | 12. | Flag for ORG_56 (Less than DL) |
| 83 | S_ORG_57 | Char | 12 | 902 | 12. | Flag for ORG_57 (Less than DL) |
| 84 | S_ORG_58 | Char | 12 | 914 | 12. | Flag for ORG_58 (Less than DL) |
| 85 | S_ORG_59 | Char | 12 | 926 | 12. | Flag for ORG_59 (Less than DL) |
| 87 | S_ORG_60 | Char | 12 | 950 | 12. | Flag for ORG_60 (Less than DL) |
| 88 | S_ORG_61 | Char | 12 | 962 | 12. | Flag for ORG_61 (Less than DL) |
| 89 | S_ORG_62 | Char | 12 | 974 | 12. | Flag for ORG_62 (Less than DL) |
| 90 | S_ORG_63 | Char | 12 | 986 | 12. | Flag for ORG_63 (Less than DL) |
| 91 | S_ORG_64 | Char | 12 | 998 | 12. | Flag for ORG_64 (Less than DL) |
| 92 | S_ORG_66 | Char | 12 | 1010 | 12. | Flag for ORG_66 (Less than DL) |
| 93 | S_ORG_67 | Char | 12 | 1022 | 12. | Flag for ORG_67 (Less than DL) |
| 94 | S_ORG_68 | Char | 12 | 1034 | 12. | Flag for ORG_68 (Less than DL) |
| 95 | S_ORG_69 | Char | 12 | 1046 | 12. | Flag for ORG_69 (Less than DL) |
| 97 | S_ORG_70 | Char | 12 | 1070 | 12. | Flag for ORG_70 (Less than DL) |
| 98 | S_ORG_71 | Char | 12 | 1082 | 12. | Flag for ORG_71 (Less than DL) |
| 99 | S_ORG_72 | Char | 12 | 1094 | 12. | Flag for ORG_72 (Less than DL) |
| 100 | S_ORG_73 | Char | 12 | 1106 | 12. | Flag for ORG_73 (Less than DL) |
| 101 | S_ORG_74 | Char | 12 | 1118 | 12. | Flag for ORG_74 (Less than DL) |
| 102 | S_ORG_75 | Char | 12 | 1130 | 12. | Flag for ORG_75 (Less than DL) |
| 103 | S_ORG_76 | Char | 12 | 1142 | 12. | Flag for ORG_76 (Less than DL) |
| 104 | S_ORG_77 | Char | 12 | 1154 | 12. | Flag for ORG_77 (Less than DL) |
| 105 | S_ORG_78 | Char | 12 | 1166 | 12. | Flag for ORG_78 (Less than DL) |
| 106 | S_ORG_79 | Char | 12 | 1178 | 12. | Flag for ORG_79 (Less than DL) |
| 108 | S_ORG_80 | Char | 12 | 1202 | 12. | Flag for ORG_80 (Less than DL) |
| 109 | S_ORG_81 | Char | 12 | 1214 | 12. | Flag for ORG_81 (Less than DL) |
| 110 | S_ORG_82 | Char | 12 | 1226 | 12. | Flag for ORG_82 (Less than DL) |
| 111 | S_ORG_83 | Char | 12 | 1238 | 12. | Flag for ORG_83 (Less than DL) |
| 112 | S_ORG_84 | Char | 12 | 1250 | 12. | Flag for ORG_84 (Less than DL) |
| 113 | S_ORG_85 | Char | 12 | 1262 | 12. | Flag for ORG_85 (Less than DL) |
| 114 | S_ORG_86 | Char | 12 | 1274 | 12. | Flag for ORG_86 (Less than DL) |
| 115 | S_ORG_87 | Char | 12 | 1286 | 12. | Flag for ORG_87 (Less than DL) |
| 116 | S_ORG_89 | Char | 12 | 1298 | 12. | Flag for ORG_89 (Less than DL) |
| 118 | S_ORG_90 | Char | 12 | 1322 | 12. | Flag for ORG_90 (Less than DL) |
| 119 | S_ORG_91 | Char | 12 | 1334 | 12. | Flag for ORG_91 (Less than DL) |
| 120 | S_ORG_92 | Char | 12 | 1346 | 12. | Flag for ORG_92 (Less than DL) |
| 121 | S_ORG_93 | Char | 12 | 1358 | 12. | Flag for ORG_93 (Less than DL) |
| 122 | S_ORG_94 | Char | 12 | 1370 | 12. | Flag for ORG_94 (Less than DL) |
| 123 | S_ORG_95 | Char | 12 | 1382 | 12. | Flag for ORG_95 (Less than DL) |
| 124 | S_ORG_96 | Char | 12 | 1394 | 12. | Flag for ORG_96 (Less than DL) |
| 125 | S_ORG_97 | Char | 12 | 1406 | 12. | Flag for ORG_97 (Less than DL) |
| 126 | S_P1016 | Char | 12 | 1418 | 12. | Flag for P1016 (Less than DL) |
| 127 | S_P1221 | Char | 12 | 1430 | 12. | Flag for P1221 (Less than DL) |
| 128 | S_P1232 | Char | 12 | 1442 | 12. | Flag for P1232 (Less than DL) |
| 129 | S_P1242 | Char | 12 | 1454 | 12. | Flag for P1242 (Less than DL) |
| 130 | S_P1248 | Char | 12 | 1466 | 12. | Flag for P1248 (Less than DL) |
| 131 | S_P1254 | Char | 12 | 1478 | 12. | Flag for P1254 (Less than DL) |
| 132 | S_P1260 | Char | 12 | 1490 | 12. | Flag for P1260 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 22 | S_PB | Char | 12 | 198 | 12. | Flag for PB (Less than DL) |
| 15 | S_PCB | Char | 12 | 139 | 12. | Flag for PCB (Less than DL) |
| 145 | S_PES_4 | Char | 12 | 1646 | 12. | Flag for PES_4 (Less than DL) |
| 146 | S_PES_5 | Char | 12 | 1658 | 12. | Flag for PES_5 (Less than DL) |
| 147 | S_PES_6 | Char | 12 | 1670 | 12. | Flag for PES_6 (Less than DL) |
| 148 | S_PES_7 | Char | 12 | 1682 | 12. | Flag for PES_7 (Less than DL) |
| 149 | S_PES_8 | Char | 12 | 1694 | 12. | Flag for PES_8 (Less than DL) |
| 150 | S_PES_9 | Char | 12 | 1706 | 12. | Flag for PES_9 (Less than DL) |
| 133 | S_PES_10 | Char | 12 | 1502 | 12. | Flag for PES_10 (Less than DL) |
| 134 | S_PES_13 | Char | 12 | 1514 | 12. | Flag for PES_13 (Less than DL) |
| 135 | S_PES_15 | Char | 12 | 1526 | 12. | Flag for PES_15 (Less than DL) |
| 136 | S_PES_16 | Char | 12 | 1538 | 12. | Flag for PES_16 (Less than DL) |
| 137 | S_PES_17 | Char | 12 | 1550 | 12. | Flag for PES_17 (Less than DL) |
| 138 | S_PES_18 | Char | 12 | 1562 | 12. | Flag for PES_18 (Less than DL) |
| 139 | S_PES_19 | Char | 12 | 1574 | 12. | Flag for PES_19 (Less than DL) |
| 140 | S_PES_20 | Char | 12 | 1586 | 12. | Flag for PES_20 (Less than DL) |
| 141 | S_PES_21 | Char | 12 | 1598 | 12. | Flag for PES_21 (Less than DL) |
| 142 | S_PES_22 | Char | 12 | 1610 | 12. | Flag for PES_22 (Less than DL) |
| 143 | S_PES_23 | Char | 12 | 1622 | 12. | Flag for PES_23 (Less than DL) |
| 144 | S_PES_27 | Char | 12 | 1634 | 12. | Flag for PES_27 (Less than DL) |
| 151 | S_SB | Char | 12 | 1718 | 12. | Flag for SB (Less than DL) |
| 152 | S_SE | Char | 12 | 1730 | 12. | Flag for SE (Less than DL) |
| 153 | S_TL | Char | 12 | 1742 | 12. | Flag for TL (Less than DL) |
| 20 | S_TP | Char | 3 | 187 | 3. | Flag for TP (Less than DL) |
| 11 | S_ZN | Char | 12 | 99 | 12. | Flag for ZN (Less than DL) |
| 32 | TIME | Num | 8 | 294 | TIME5. | Sampling Time |
| 19 | TKN | Num | 8 | 179 | | Total Kjeldahl Nitrogen (mg/l) |
| 273 | TL | Num | 8 | 2706 | | Thallium (mg/L) |
| 10 | TN | Num | 8 | 91 | | Total Nitrogen (mg/l) |
| 9 | TOC | Num | 8 | 83 | | Total Organic Carbon (mg/l) |
| 21 | TP | Num | 8 | 190 | | Total Phosphate (mg/l) |
| 5 | TRIB | Char | 6 | 49 | 6. | CR=Christina River,DR=Delaware River |
| 12 | ZN | Num | 8 | 111 | | Zinc (mg/l) |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 21 | 0 | 360.0952381 | 170.0000000 | 671.0000000 |
| DATE | Sampling Date | 21 | 0 | 9953.24 | 7284.00 | 12123.00 |
| PH | pH | 14 | 7 | 7.5357143 | 6.6000000 | 8.1000000 |
| BOD | Biochemical Oxygen Demand (mg/l) | 14 | 7 | 8.4642857 | 2.4000000 | 11.0000000 |
| TOC | Total Organic Carbon (mg/l) | 14 | 7 | 27.7857143 | 8.0000000 | 44.0000000 |
| TN | Total Nitrogen (mg/l) | 11 | 10 | 15.4000000 | 3.4000000 | 28.0000000 |
| ZN | Zinc (mg/l) | 21 | 0 | 0.0645238 | 0.0300000 | 0.1200000 |
| HG | Mercury (mg/l) | 21 | 0 | 0.000733333 | 0.000200000 | 0.0010000 |
| PCB | PCB's (mg/l) | 11 | 10 | 2.0000000 | 2.0000000 | 2.0000000 |
| OG | Oil & Grease (mg/l) | 3 | 18 | 1.0000000 | 1.0000000 | 1.0000000 |
| TKN | Total Kjeldahl Nitrogen (mg/l) | 3 | 18 | 5.0000000 | 1.1000000 | 10.0000000 |
| TP | Total Phosphate (mg/l) | 3 | 18 | 0.1933333 | 0.0600000 | 0.4500000 |
| PB | Lead (mg/l) | 10 | 11 | 0.0933000 | 0.0030000 | 0.2300000 |
| CD | Cadmium (mg/l) | 10 | 11 | 0.0332000 | 0.0020000 | 0.0500000 |
| CU | Copper (mg/l) | 10 | 11 | 0.0480000 | 0.0300000 | 0.0600000 |
| CR | Chromium (mg/l) | 10 | 11 | 0.0365000 | 0.0050000 | 0.0500000 |
| AL | Aluminum (mg/l) | 3 | 18 | 1.3000000 | 0.1000000 | 3.3000000 |
| COD | Chemical Oxygen Demand (mg/l) | 3 | 18 | 38.0000000 | 17.0000000 | 72.0000000 |
| TIME | Sampling Time | 14 | 7 | 42724.29 | 38700.00 | 47700.00 |
| AG | Silver (mg/L) | 7 | 14 | 0.0435714 | 0.0050000 | 0.0500000 |
| AS | Arsenic (mg/L) | 7 | 14 | 0.0861429 | 0.0030000 | 0.1000000 |
| BE | Beryllium (mg/L) | 7 | 14 | 0.000500000 | 0.000500000 | 0.000500000 |
| CY | Cyanide (mg/L) | 7 | 14 | 0.0050000 | 0.0050000 | 0.0050000 |
| NI | Nickel (mg/L) | 7 | 14 | 0.0442857 | 0.0100000 | 0.0500000 |
| ORG_10 | 1,2-Dichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_19 | 2-Chlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_21 | 2-Nitrophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_26 | 2,4-Dinitrotoluene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/L) | 7 | 14 | 20.0000000 | 20.0000000 | 20.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_33 | 4-Nitrophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_36 | Acenaphthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_37 | Acenaphthylene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_38 | Acrolein (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_39 | Acrylonitrile (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_40 | Anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_41 | Benzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_42 | Benzidine (ug/L) | 7 | 14 | 80.0000000 | 80.0000000 | 80.0000000 |
| ORG_43 | Benzo(a)anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_44 | Benzo(a)pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/L) | 7 | 14 | 8.0000000 | 2.0000000 | 10.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_54 | Bromodichloromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_55 | Bromoform (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_56 | Bromomethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_59 | Chlorobenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_60 | Chloroethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_61 | Chloroform (ug/L) | 7 | 14 | 4.4285714 | 3.0000000 | 6.0000000 |
| ORG_62 | Chloromethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_63 | Chrysene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_67 | Dibromochloromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_68 | Diethylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_69 | Dimethylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_72 | Ethylbenzene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_73 | Fluoranthene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_74 | Fluorene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_75 | Hexachlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_78 | Hexachloroethane (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_80 | Isophorone (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_81 | Methylene Chloride (ug/L) | 7 | 14 | 9.7142857 | 5.0000000 | 12.0000000 |
| ORG_82 | Naphthalene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_83 | Nitrobenzene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_87 | Pentachlorophenol (ug/L) | 7 | 14 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_89 | Phenanthrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_90 | Phenol (mg/L) | 7 | 14 | 0.0067143 | 0.0050000 | 0.0090000 |
| ORG_91 | Pyrene (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| ORG_92 | Tetrachloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |

Wilmington Harbor - Elutriate Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_93 | Toluene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_95 | Trichloroethene (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/L) | 7 | 14 | 5.0000000 | 5.0000000 | 5.0000000 |
| ORG_97 | Vinyl Chloride (ug/L) | 7 | 14 | 10.0000000 | 10.0000000 | 10.0000000 |
| P1016 | PCB-1016 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1221 | PCB-1221 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1232 | PCB-1232 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1242 | PCB-1242 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1248 | PCB-1248 (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| P1254 | PCB-1254 (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| P1260 | PCB-1260 (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| PES_10 | Chlordane (ug/L) | 7 | 14 | 0.5000000 | 0.5000000 | 0.5000000 |
| PES_13 | D-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_15 | Dieldrin (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_16 | Endosulfan I (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_17 | Endosulfan II (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_18 | Endosulfan sulfate (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_19 | Endrin (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_20 | Endrin aldehyde (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_21 | G-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_22 | Heptachlor (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_23 | Heptachlor epoxide (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_27 | Toxaphene (ug/L) | 7 | 14 | 1.0000000 | 1.0000000 | 1.0000000 |
| PES_4 | 4,4'-DDD (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_5 | 4,4'-DDE (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_6 | 4,4'-DDT (ug/L) | 7 | 14 | 0.1000000 | 0.1000000 | 0.1000000 |
| PES_7 | A-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_8 | Aldrin (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| PES_9 | B-BHC (ug/L) | 7 | 14 | 0.0500000 | 0.0500000 | 0.0500000 |
| SB | Antimony (mg/L) | 7 | 14 | 0.0860000 | 0.0020000 | 0.1000000 |
| SE | Selenium (mg/L) | 7 | 14 | 0.0860000 | 0.0020000 | 0.1000000 |
| TL | Thallium (mg/L) | 7 | 14 | 0.0431429 | 0.0020000 | 0.0500000 |

# Appendix D - Sediment Database

Name: SED.SD2
Type: SAS dataset (Windows Version 6.11)
Location: Floppy disk attached with report

Structure: There are 8 observations and 425 variables in the dataset. Each observation represents a sediment sample and a series of chemical and biological measurements. A sample can be uniquely identified by station type, station name, sampling date, tributary, and dredging period. For each parameter there are 2 variables: one is the concentration and the other is a detection limit flag. For example, if Silver is detected the concentration value is stored in the AG variable and a blank space exists in S_AG (Flag variable for Silver). If the parameter was not detected, the detection limit is stored in AG and less than sign (<) is stored in S_AG. A list of variable names, types (Character or Numeric), and labels are contained within this appendix.

All sediment samples were taken from Christina River, Background station type, and were before dredging period.

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 17 | S_ORG_10 | Char | 12 | 198 | 12. | Flag for ORG_10 (Less than DL) |
| 18 | S_ORG_11 | Char | 12 | 210 | 12. | Flag for ORG_11 (Less than DL) |
| 19 | S_ORG_12 | Char | 12 | 222 | 12. | Flag for ORG_12 (Less than DL) |
| 20 | S_ORG_13 | Char | 12 | 234 | 12. | Flag for ORG_13 (Less than DL) |
| 21 | S_ORG_14 | Char | 12 | 246 | 12. | Flag for ORG_14 (Less than DL) |
| 22 | S_ORG_15 | Char | 12 | 258 | 12. | Flag for ORG_15 (Less than DL) |
| 23 | S_ORG_16 | Char | 12 | 270 | 12. | Flag for ORG_16 (Less than DL) |
| 24 | S_ORG_18 | Char | 12 | 282 | 12. | Flag for ORG_18 (Less than DL) |
| 25 | S_ORG_19 | Char | 12 | 294 | 12. | Flag for ORG_19 (Less than DL) |
| 162 | S_ORG_20 | Char | 12 | 1938 | 12. | Flag for ORG_20 (Less than DL) |
| 26 | S_ORG_21 | Char | 12 | 306 | 12. | Flag for ORG_21 (Less than DL) |
| 163 | S_ORG_22 | Char | 12 | 1950 | 12. | Flag for ORG_22 (Less than DL) |
| 27 | S_ORG_23 | Char | 12 | 318 | 12. | Flag for ORG_23 (Less than DL) |
| 28 | S_ORG_24 | Char | 12 | 330 | 12. | Flag for ORG_24 (Less than DL) |
| 29 | S_ORG_25 | Char | 12 | 342 | 12. | Flag for ORG_25 (Less than DL) |
| 30 | S_ORG_26 | Char | 12 | 354 | 12. | Flag for ORG_26 (Less than DL) |
| 31 | S_ORG_27 | Char | 12 | 366 | 12. | Flag for ORG_27 (Less than DL) |
| 164 | S_ORG_28 | Char | 12 | 1962 | 12. | Flag for ORG_28 (Less than DL) |
| 32 | S_ORG_29 | Char | 12 | 378 | 12. | Flag for ORG_29 (Less than DL) |
| 34 | S_ORG_30 | Char | 12 | 402 | 12. | Flag for ORG_30 (Less than DL) |
| 35 | S_ORG_31 | Char | 12 | 414 | 12. | Flag for ORG_31 (Less than DL) |
| 36 | S_ORG_32 | Char | 12 | 426 | 12. | Flag for ORG_32 (Less than DL) |
| 37 | S_ORG_33 | Char | 12 | 438 | 12. | Flag for ORG_33 (Less than DL) |
| 38 | S_ORG_34 | Char | 12 | 450 | 12. | Flag for ORG_34 (Less than DL) |
| 39 | S_ORG_35 | Char | 12 | 462 | 12. | Flag for ORG_35 (Less than DL) |
| 40 | S_ORG_36 | Char | 12 | 474 | 12. | Flag for ORG_36 (Less than DL) |
| 41 | S_ORG_37 | Char | 12 | 486 | 12. | Flag for ORG_37 (Less than DL) |
| 42 | S_ORG_38 | Char | 12 | 498 | 12. | Flag for ORG_38 (Less than DL) |
| 43 | S_ORG_39 | Char | 12 | 510 | 12. | Flag for ORG_39 (Less than DL) |
| 45 | S_ORG_40 | Char | 12 | 534 | 12. | Flag for ORG_40 (Less than DL) |
| 46 | S_ORG_41 | Char | 12 | 546 | 12. | Flag for ORG_41 (Less than DL) |
| 47 | S_ORG_42 | Char | 12 | 558 | 12. | Flag for ORG_42 (Less than DL) |
| 48 | S_ORG_43 | Char | 12 | 570 | 12. | Flag for ORG_43 (Less than DL) |
| 49 | S_ORG_44 | Char | 12 | 582 | 12. | Flag for ORG_44 (Less than DL) |
| 50 | S_ORG_45 | Char | 12 | 594 | 12. | Flag for ORG_45 (Less than DL) |
| 165 | S_ORG_46 | Char | 12 | 1974 | 12. | Flag for ORG_46 (Less than DL) |
| 51 | S_ORG_47 | Char | 12 | 606 | 12. | Flag for ORG_47 (Less than DL) |
| 52 | S_ORG_48 | Char | 12 | 618 | 12. | Flag for ORG_48 (Less than DL) |
| 166 | S_ORG_49 | Char | 12 | 1986 | 12. | Flag for ORG_49 (Less than DL) |
| 54 | S_ORG_50 | Char | 12 | 642 | 12. | Flag for ORG_50 (Less than DL) |
| 55 | S_ORG_51 | Char | 12 | 654 | 12. | Flag for ORG_51 (Less than DL) |
| 56 | S_ORG_52 | Char | 12 | 666 | 12. | Flag for ORG_52 (Less than DL) |
| 57 | S_ORG_53 | Char | 12 | 678 | 12. | Flag for ORG_53 (Less than DL) |
| 58 | S_ORG_54 | Char | 12 | 690 | 12. | Flag for ORG_54 (Less than DL) |
| 59 | S_ORG_55 | Char | 12 | 702 | 12. | Flag for ORG_55 (Less than DL) |
| 60 | S_ORG_56 | Char | 12 | 714 | 12. | Flag for ORG_56 (Less than DL) |
| 61 | S_ORG_57 | Char | 12 | 726 | 12. | Flag for ORG_57 (Less than DL) |
| 62 | S_ORG_58 | Char | 12 | 738 | 12. | Flag for ORG_58 (Less than DL) |
| 63 | S_ORG_59 | Char | 12 | 750 | 12. | Flag for ORG_59 (Less than DL) |
| 65 | S_ORG_60 | Char | 12 | 774 | 12. | Flag for ORG_60 (Less than DL) |
| 66 | S_ORG_61 | Char | 12 | 786 | 12. | Flag for ORG_61 (Less than DL) |
| 67 | S_ORG_62 | Char | 12 | 798 | 12. | Flag for ORG_62 (Less than DL) |

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 68 | S_ORG_63 | Char | 12 | 810 | 12. | Flag for ORG_63 (Less than DL) |
| 69 | S_ORG_64 | Char | 12 | 822 | 12. | Flag for ORG_64 (Less than DL) |
| 70 | S_ORG_66 | Char | 12 | 834 | 12. | Flag for ORG_66 (Less than DL) |
| 71 | S_ORG_67 | Char | 12 | 846 | 12. | Flag for ORG_67 (Less than DL) |
| 72 | S_ORG_68 | Char | 12 | 858 | 12. | Flag for ORG_68 (Less than DL) |
| 73 | S_ORG_69 | Char | 12 | 870 | 12. | Flag for ORG_69 (Less than DL) |
| 75 | S_ORG_70 | Char | 12 | 894 | 12. | Flag for ORG_70 (Less than DL) |
| 76 | S_ORG_71 | Char | 12 | 906 | 12. | Flag for ORG_71 (Less than DL) |
| 77 | S_ORG_72 | Char | 12 | 918 | 12. | Flag for ORG_72 (Less than DL) |
| 78 | S_ORG_73 | Char | 12 | 930 | 12. | Flag for ORG_73 (Less than DL) |
| 79 | S_ORG_74 | Char | 12 | 942 | 12. | Flag for ORG_74 (Less than DL) |
| 80 | S_ORG_75 | Char | 12 | 954 | 12. | Flag for ORG_75 (Less than DL) |
| 81 | S_ORG_76 | Char | 12 | 966 | 12. | Flag for ORG_76 (Less than DL) |
| 82 | S_ORG_77 | Char | 12 | 978 | 12. | Flag for ORG_77 (Less than DL) |
| 83 | S_ORG_78 | Char | 12 | 990 | 12. | Flag for ORG_78 (Less than DL) |
| 84 | S_ORG_79 | Char | 12 | 1002 | 12. | Flag for ORG_79 (Less than DL) |
| 86 | S_ORG_80 | Char | 12 | 1026 | 12. | Flag for ORG_80 (Less than DL) |
| 87 | S_ORG_81 | Char | 12 | 1038 | 12. | Flag for ORG_81 (Less than DL) |
| 88 | S_ORG_82 | Char | 12 | 1050 | 12. | Flag for ORG_82 (Less than DL) |
| 89 | S_ORG_83 | Char | 12 | 1062 | 12. | Flag for ORG_83 (Less than DL) |
| 90 | S_ORG_84 | Char | 12 | 1074 | 12. | Flag for ORG_84 (Less than DL) |
| 91 | S_ORG_85 | Char | 12 | 1086 | 12. | Flag for ORG_85 (Less than DL) |
| 92 | S_ORG_86 | Char | 12 | 1098 | 12. | Flag for ORG_86 (Less than DL) |
| 93 | S_ORG_87 | Char | 12 | 1110 | 12. | Flag for ORG_87 (Less than DL) |
| 167 | S_ORG_88 | Char | 12 | 1998 | 12. | Flag for ORG_88 (Less than DL) |
| 94 | S_ORG_89 | Char | 12 | 1122 | 12. | Flag for ORG_89 (Less than DL) |
| 96 | S_ORG_90 | Char | 12 | 1146 | 12. | Flag for ORG_90 (Less than DL) |
| 97 | S_ORG_91 | Char | 12 | 1158 | 12. | Flag for ORG_91 (Less than DL) |
| 98 | S_ORG_92 | Char | 12 | 1170 | 12. | Flag for ORG_92 (Less than DL) |
| 99 | S_ORG_93 | Char | 12 | 1182 | 12. | Flag for ORG_93 (Less than DL) |
| 100 | S_ORG_94 | Char | 12 | 1194 | 12. | Flag for ORG_94 (Less than DL) |
| 101 | S_ORG_95 | Char | 12 | 1206 | 12. | Flag for ORG_95 (Less than DL) |
| 102 | S_ORG_96 | Char | 12 | 1218 | 12. | Flag for ORG_96 (Less than DL) |
| 103 | S_ORG_97 | Char | 12 | 1230 | 12. | Flag for ORG_97 (Less than DL) |
| 168 | S_O_194 | Char | 12 | 2010 | 12. | Flag for O_194 (Less than DL) |
| 169 | S_O_195 | Char | 12 | 2022 | 12. | Flag for O_195 (Less than DL) |
| 170 | S_O_196 | Char | 12 | 2034 | 12. | Flag for O_196 (Less than DL) |
| 171 | S_O_200 | Char | 12 | 2046 | 12. | Flag for O_200 (Less than DL) |
| 172 | S_O_201 | Char | 12 | 2058 | 12. | Flag for O_201 (Less than DL) |
| 173 | S_O_203 | Char | 12 | 2070 | 12. | Flag for O_203 (Less than DL) |
| 174 | S_O_205 | Char | 12 | 2082 | 12. | Flag for O_205 (Less than DL) |
| 104 | S_P1016 | Char | 12 | 1242 | 12. | Flag for P1016 (Less than DL) |
| 105 | S_P1221 | Char | 12 | 1254 | 12. | Flag for P1221 (Less than DL) |
| 106 | S_P1232 | Char | 12 | 1266 | 12. | Flag for P1232 (Less than DL) |
| 107 | S_P1242 | Char | 12 | 1278 | 12. | Flag for P1242 (Less than DL) |
| 108 | S_P1248 | Char | 12 | 1290 | 12. | Flag for P1248 (Less than DL) |
| 109 | S_P1254 | Char | 12 | 1302 | 12. | Flag for P1254 (Less than DL) |
| 110 | S_P1260 | Char | 12 | 1314 | 12. | Flag for P1260 (Less than DL) |
| 111 | S_PB | Char | 12 | 1326 | 12. | Flag for PB (Less than DL) |
| 175 | S_PCB | Char | 12 | 2094 | 12. | Flag for PCB (Less than DL) |
| 176 | S_PES_1 | Char | 12 | 2106 | 12. | Flag for PES_1 (Less than DL) |
| 180 | S_PES_2 | Char | 12 | 2154 | 12. | Flag for PES_2 (Less than DL) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 186 | S_PES_3 | Char | 12 | 2226 | 12. | Flag for PES_3 (Less than DL) |
| 124 | S_PES_4 | Char | 12 | 1482 | 12. | Flag for PES_4 (Less than DL) |
| 125 | S_PES_5 | Char | 12 | 1494 | 12. | Flag for PES_5 (Less than DL) |
| 126 | S_PES_6 | Char | 12 | 1506 | 12. | Flag for PES_6 (Less than DL) |
| 127 | S_PES_7 | Char | 12 | 1518 | 12. | Flag for PES_7 (Less than DL) |
| 128 | S_PES_8 | Char | 12 | 1530 | 12. | Flag for PES_8 (Less than DL) |
| 129 | S_PES_9 | Char | 12 | 1542 | 12. | Flag for PES_9 (Less than DL) |
| 112 | S_PES_10 | Char | 12 | 1338 | 12. | Flag for PES_10 (Less than DL) |
| 177 | S_PES_11 | Char | 12 | 2118 | 12. | Flag for PES_11 (Less than DL) |
| 178 | S_PES_12 | Char | 12 | 2130 | 12. | Flag for PES_12 (Less than DL) |
| 113 | S_PES_13 | Char | 12 | 1350 | 12. | Flag for PES_13 (Less than DL) |
| 179 | S_PES_14 | Char | 12 | 2142 | 12. | Flag for PES_14 (Less than DL) |
| 114 | S_PES_15 | Char | 12 | 1362 | 12. | Flag for PES_15 (Less than DL) |
| 115 | S_PES_16 | Char | 12 | 1374 | 12. | Flag for PES_16 (Less than DL) |
| 116 | S_PES_17 | Char | 12 | 1386 | 12. | Flag for PES_17 (Less than DL) |
| 117 | S_PES_18 | Char | 12 | 1398 | 12. | Flag for PES_18 (Less than DL) |
| 118 | S_PES_19 | Char | 12 | 1410 | 12. | Flag for PES_19 (Less than DL) |
| 119 | S_PES_20 | Char | 12 | 1422 | 12. | Flag for PES_20 (Less than DL) |
| 120 | S_PES_21 | Char | 12 | 1434 | 12. | Flag for PES_21 (Less than DL) |
| 121 | S_PES_22 | Char | 12 | 1446 | 12. | Flag for PES_22 (Less than DL) |
| 122 | S_PES_23 | Char | 12 | 1458 | 12. | Flag for PES_23 (Less than DL) |
| 181 | S_PES_24 | Char | 12 | 2166 | 12. | Flag for PES_24 (Less than DL) |
| 182 | S_PES_25 | Char | 12 | 2178 | 12. | Flag for PES_25 (Less than DL) |
| 183 | S_PES_26 | Char | 12 | 2190 | 12. | Flag for PES_26 (Less than DL) |
| 123 | S_PES_27 | Char | 12 | 1470 | 12. | Flag for PES_27 (Less than DL) |
| 184 | S_PES_28 | Char | 12 | 2202 | 12. | Flag for PES_28 (Less than DL) |
| 185 | S_PES_29 | Char | 12 | 2214 | 12. | Flag for PES_29 (Less than DL) |
| 196 | S_P_82 | Char | 12 | 2346 | 12. | Flag for P_82 (Less than DL) |
| 197 | S_P_87 | Char | 12 | 2358 | 12. | Flag for P_87 (Less than DL) |
| 198 | S_P_95 | Char | 12 | 2370 | 12. | Flag for P_95 (Less than DL) |
| 199 | S_P_99 | Char | 12 | 2382 | 12. | Flag for P_99 (Less than DL) |
| 187 | S_P_101 | Char | 12 | 2238 | 12. | Flag for P_101 (Less than DL) |
| 188 | S_P_105 | Char | 12 | 2250 | 12. | Flag for P_105 (Less than DL) |
| 189 | S_P_110 | Char | 12 | 2262 | 12. | Flag for P_110 (Less than DL) |
| 190 | S_P_114 | Char | 12 | 2274 | 12. | Flag for P_114 (Less than DL) |
| 191 | S_P_118 | Char | 12 | 2286 | 12. | Flag for P_118 (Less than DL) |
| 192 | S_P_119 | Char | 12 | 2298 | 12. | Flag for P_119 (Less than DL) |
| 193 | S_P_123 | Char | 12 | 2310 | 12. | Flag for P_123 (Less than DL) |
| 194 | S_P_126 | Char | 12 | 2322 | 12. | Flag for P_126 (Less than DL) |
| 195 | S_P_127 | Char | 12 | 2334 | 12. | Flag for P_127 (Less than DL) |
| 130 | S_SB | Char | 12 | 1554 | 12. | Flag for SB (Less than DL) |
| 131 | S_SE | Char | 12 | 1566 | 12. | Flag for SE (Less than DL) |
| 200 | S_SOLID | Char | 12 | 2394 | 12. | Flag for SOLID (Less than DL) |
| 132 | S_TL | Char | 12 | 1578 | 12. | Flag for TL (Less than DL) |
| 201 | S_TOC | Char | 12 | 2406 | 12. | Flag for TOC (Less than DL) |
| 202 | S_TPH | Char | 12 | 2418 | 12. | Flag for TPH (Less than DL) |
| 203 | S_T_18 | Char | 12 | 2430 | 12. | Flag for T_18 (Less than DL) |
| 204 | S_T_28 | Char | 12 | 2442 | 12. | Flag for T_28 (Less than DL) |
| 205 | S_T_37 | Char | 12 | 2454 | 12. | Flag for T_37 (Less than DL) |
| 206 | S_T_44 | Char | 12 | 2466 | 12. | Flag for T_44 (Less than DL) |
| 207 | S_T_47 | Char | 12 | 2478 | 12. | Flag for T_47 (Less than DL) |
| 208 | S_T_49 | Char | 12 | 2490 | 12. | Flag for T_49 (Less than DL) |

Wilmington Harbor - Sediment Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 209 | S_T_52 | Char | 12 | 2502 | 12. | Flag for T_52 (Less than DL) |
| 210 | S_T_60 | Char | 12 | 2514 | 12. | Flag for T_60 (Less than DL) |
| 211 | S_T_66 | Char | 12 | 2526 | 12. | Flag for T_66 (Less than DL) |
| 212 | S_T_70 | Char | 12 | 2538 | 12. | Flag for T_70 (Less than DL) |
| 213 | S_T_74 | Char | 12 | 2550 | 12. | Flag for T_74 (Less than DL) |
| 214 | S_T_77 | Char | 12 | 2562 | 12. | Flag for T_77 (Less than DL) |
| 215 | S_T_80 | Char | 12 | 2574 | 12. | Flag for T_80 (Less than DL) |
| 216 | S_T_81 | Char | 12 | 2586 | 12. | Flag for T_81 (Less than DL) |
| 133 | S_ZN | Char | 12 | 1590 | 12. | Flag for ZN (Less than DL) |
| 341 | TL | Num | 8 | 3590 | | Thallium (mg/kg) |
| 410 | TOC | Num | 8 | 4142 | | Total Organic Carbon (mg/kg) |
| 411 | TPH | Num | 8 | 4150 | | Total Petroleum Hydrocarbons (mg/kg) |
| 5 | TRIB | Char | 12 | 40 | 12. | CR=Christina River,DR=Delaware River |
| 2 | TYPE | Char | 12 | 8 | 12. | B=Backgrnd,M=Mixing Z.,O=Outfall,W=Weir |
| 412 | T_18 | Num | 8 | 4158 | | 18 Tri (ng/g) |
| 413 | T_28 | Num | 8 | 4166 | | 28 Tri (ng/g) |
| 414 | T_37 | Num | 8 | 4174 | | 37 Tri (ng/g) |
| 415 | T_44 | Num | 8 | 4182 | | 44 Tetra (ng/g) |
| 416 | T_47 | Num | 8 | 4190 | | 47 Tetra (ng/g) |
| 417 | T_49 | Num | 8 | 4198 | | 49 Tetra (ng/g) |
| 418 | T_52 | Num | 8 | 4206 | | 52 Tetra (ng/g) |
| 419 | T_60 | Num | 8 | 4214 | | 60 Tetra (ng/g) |
| 420 | T_66 | Num | 8 | 4222 | | 66 Tetra (ng/g) |
| 421 | T_70 | Num | 8 | 4230 | | 70 Tetra (ng/g) |
| 422 | T_74 | Num | 8 | 4238 | | 74 Tetra (ng/g) |
| 423 | T_77 | Num | 8 | 4246 | | 77 Tetra (pg/g) |
| 424 | T_80 | Num | 8 | 4254 | | 80 Tetra (ng/g) |
| 425 | T_81 | Num | 8 | 4262 | | 81 Tetra (pg/g) |
| 342 | ZN | Num | 8 | 3598 | | Zinc (mg/kg) |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PAGE | Report Page Number | 8 | 0 | 714.0000000 | 669.0000000 | 849.0000000 |
| DATE | Sampling Date | 8 | 0 | 12193.75 | 12122.00 | 12409.00 |
| AG | Silver (mg/kg) | 8 | 0 | 1.6350000 | 1.0000000 | 4.1000000 |
| AS | Arsenic (mg/kg) | 8 | 0 | 2.8837500 | 1.6100000 | 4.2400000 |
| BE | Beryllium (mg/kg) | 6 | 2 | 0.3300000 | 0.2600000 | 0.4200000 |
| CD | Cadmium (mg/kg) | 8 | 0 | 0.9625000 | 0.5000000 | 1.2000000 |
| CR | Chromium (mg/kg) | 8 | 0 | 17.2875000 | 12.2000000 | 25.2000000 |
| CU | Copper (mg/kg) | 8 | 0 | 15.3250000 | 9.5000000 | 24.8000000 |
| CY | Cyanide (mg/kg) | 6 | 2 | 0.0716667 | 0.0400000 | 0.1000000 |
| HG | Mercury (mg/kg) | 8 | 0 | 0.1100000 | 0.0700000 | 0.3300000 |
| NI | Nickel (mg/kg) | 8 | 0 | 11.3375000 | 8.0000000 | 16.3000000 |
| ORG_10 | 1,2-Dichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_11 | 1,2-Dichloropropane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_12 | 1,2-Diphenyl Hydrazine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_13 | 1,2,4-Trichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_14 | 1,3-Dichlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_15 | 1,4 & 1,2-Dichlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_16 | 1,4-Dichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_18 | 2-Chloronaphthalene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_19 | 2-Chlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_21 | 2-Nitrophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_23 | 2,4-Dichlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_24 | 2,4-Dimethylphenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_25 | 2,4-Dinitrophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_26 | 2,4-Dinitrotoluene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_27 | 2,4,6-Trichlorophenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_29 | 2,6-Dinitrotoluene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_3 | 1,1-Dichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_30 | 3,3'-Dichlorobenzidine (ug/kg) | 6 | 2 | 660.0000000 | 660.0000000 | 660.0000000 |
| ORG_31 | 4-Bromophenyl-phenylether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_32 | 4-Chlorophenyl-phenylether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_33 | 4-Nitrophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_34 | 4,6-Dinitro-2-methylphenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_35 | 4,-Chloro-3-methylphenol (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_36 | Acenaphthene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_37 | Acenaphthylene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_38 | Acrolein (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_39 | Acrylonitrile (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_4 | 1,1-Dichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_40 | Anthracene (ug/kg) | 8 | 0 | 277.5000000 | 110.0000000 | 330.0000000 |
| ORG_41 | Benzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_42 | Benzidine (ug/kg) | 6 | 2 | 2700.00 | 2700.00 | 2700.00 |
| ORG_43 | Benzo(a)anthracene (ug/kg) | 8 | 0 | 161.1250000 | 72.0000000 | 330.0000000 |
| ORG_44 | Benzo(a)pyrene (ug/kg) | 8 | 0 | 175.3750000 | 68.0000000 | 330.0000000 |
| ORG_45 | Benzo(b)fluoranthene (ug/kg) | 8 | 0 | 177.2500000 | 78.0000000 | 330.0000000 |
| ORG_47 | Benzo(g,h,i)perylene (ug/kg) | 8 | 0 | 266.7500000 | 68.0000000 | 330.0000000 |
| ORG_48 | Benzo(k)fluoranthene (ug/kg) | 8 | 0 | 167.0000000 | 50.0000000 | 330.0000000 |
| ORG_5 | 1,1,1-Trichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_50 | Bis(2-chloroethoxy)methane (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_51 | Bis(2-chloroethyl)ether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_52 | Bis(2-chloroisopropyl)ether (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_53 | Bis(2-ethylhexyl)phthalate (ug/kg) | 6 | 2 | 340.0000000 | 220.0000000 | 530.0000000 |
| ORG_54 | Bromodichloromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_55 | Bromoform (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_56 | Bromomethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_57 | Butlybenzylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_58 | Carbon Tetrachloride (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_59 | Chlorobenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_6 | 1,1,2-Trichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_60 | Chloroethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_61 | Chloroform (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_62 | Chloromethane (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| ORG_63 | Chrysene (ug/kg) | 8 | 0 | 192.3750000 | 89.0000000 | 330.0000000 |
| ORG_64 | Cis-1,3-Dichloropropene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_66 | Dibenzo(a,h)anthracene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_67 | Dibromochloromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_68 | Diethylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_69 | Dimethylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_7 | 1,1,2,2-Tetrachloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_70 | Di-n-butylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_71 | Di-n-octylphthalate (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_72 | Ethylbenzene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_73 | Fluoranthene (ug/kg) | 8 | 0 | 257.1250000 | 82.0000000 | 835.0000000 |
| ORG_74 | Fluorene (ug/kg) | 8 | 0 | 272.1250000 | 87.0000000 | 330.0000000 |
| ORG_75 | Hexachlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_76 | Hexachlorobutadiene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_77 | Hexachlorocyclopentadiene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_78 | Hexachloroethane (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_79 | Indeno(1,2,3-c,d)pyrene (ug/kg) | 8 | 0 | 259.1250000 | 43.0000000 | 330.0000000 |
| ORG_8 | 1,2-Dichlorobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_80 | Isophorone (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_81 | Methylene Chloride (ug/kg) | 6 | 2 | 30.8333333 | 29.0000000 | 33.0000000 |
| ORG_82 | Naphthalene (ug/kg) | 8 | 0 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_83 | Nitrobenzene (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_84 | N-nitrosodimethylamine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_85 | N-nitroso-Di-n-propylamine (ug/kg) | 6 | 2 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_86 | N-nitrosodiphenylamine (ug/kg) | 6 | 2 | 265.0000000 | 110.0000000 | 330.0000000 |
| ORG_87 | Pentachlorophenol (ug/kg) | 6 | 2 | 1700.00 | 1700.00 | 1700.00 |
| ORG_89 | Phenanthrene (ug/kg) | 8 | 0 | 294.7500000 | 98.0000000 | 640.0000000 |
| ORG_9 | 1,2-Dichloroethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_90 | Phenol (mg/kg) | 6 | 2 | 1.5016667 | 0.1800000 | 7.8000000 |
| ORG_91 | Pyrene (ug/kg) | 8 | 0 | 184.2500000 | 74.0000000 | 320.0000000 |
| ORG_92 | Tetrachloroethene (ug/kg) | 6 | 2 | 23.1666667 | 14.0000000 | 25.0000000 |
| ORG_93 | Toluene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_94 | Trans-1,3-Dichloropropene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_95 | Trichloroethene (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_96 | Trichlorofluoromethane (ug/kg) | 6 | 2 | 25.0000000 | 25.0000000 | 25.0000000 |
| ORG_97 | Vinyl Chloride (ug/kg) | 6 | 2 | 50.0000000 | 50.0000000 | 50.0000000 |
| P1016 | PCB-1016 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1221 | PCB-1221 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1232 | PCB-1232 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1242 | PCB-1242 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1248 | PCB-1248 (ug/kg) | 8 | 0 | 320.0000000 | 80.0000000 | 400.0000000 |
| P1254 | PCB-1254 (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| P1260 | PCB-1260 (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| PB | Lead (mg/kg) | 8 | 0 | 28.4000000 | 13.8000000 | 42.1000000 |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| PES_10 | Chlordane (ug/kg) | 6 | 2 | 400.0000000 | 400.0000000 | 400.0000000 |
| PES_13 | D-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_15 | Dieldrin (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_16 | Endosulfan I (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_17 | Endosulfan II (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_18 | Endosulfan sulfate (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_19 | Endrin (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_20 | Endrin aldehyde (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_21 | G-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_22 | Heptachlor (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_23 | Heptachlor epoxide (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_27 | Toxaphene (ug/kg) | 8 | 0 | 640.0000000 | 160.0000000 | 800.0000000 |
| PES_4 | 4,4'-DDD (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_5 | 4,4'-DDE (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_6 | 4,4'-DDT (ug/kg) | 8 | 0 | 64.0000000 | 16.0000000 | 80.0000000 |
| PES_7 | A-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_8 | Aldrin (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| PES_9 | B-BHC (ug/kg) | 8 | 0 | 32.0000000 | 8.0000000 | 40.0000000 |
| SB | Antimony (mg/kg) | 6 | 2 | 0.2000000 | 0.2000000 | 0.2000000 |
| SE | Selenium (mg/kg) | 8 | 0 | 0.2480000 | 0.2000000 | 0.3510000 |
| TL | Thallium (mg/kg) | 6 | 2 | 0.2000000 | 0.2000000 | 0.2000000 |
| ZN | Zinc (mg/kg) | 8 | 0 | 91.3000000 | 52.3000000 | 150.0000000 |
| D_209 | 209 Deca (ng/g) | 2 | 6 | 3.1300000 | 3.1300000 | 3.1300000 |
| D_8 | 8 Di (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| H38_58 | 138,158 Hexa (ng/g) | 2 | 6 | 5.2750000 | 4.7500000 | 5.8000000 |
| H70_90 | 170,190 Hepta (ng/g) | 2 | 6 | 3.1300000 | 3.1300000 | 3.1300000 |
| H_128 | 128 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_137 | 137 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_149 | 149 Hexa (ng/g) | 2 | 6 | 1.0000000 | 1.0000000 | 1.0000000 |
| H_151 | 151 Hexa (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| H_153 | 153 Hexa (ng/g) | 2 | 6 | 3.3100000 | 2.9400000 | 3.6800000 |
| H_156 | 156 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_157 | 157 Hexa (ng/g) | 2 | 6 | 1.2000000 | 1.2000000 | 1.2000000 |
| H_166 | 166 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_167 | 167 Hexa (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| H_168 | 168 Hexa (ng/g) | 2 | 6 | 1.0900000 | 1.0900000 | 1.0900000 |
| H_169 | 169 Hexa (pg/g) | 2 | 6 | 1.6650000 | 1.4900000 | 1.8400000 |
| H_177 | 177 Hepta (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| H_179 | 179 Hepta (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| H_180 | 180 Hepta (ng/g) | 2 | 6 | 2.0150000 | 1.7700000 | 2.2600000 |
| H_183 | 183 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_185 | 185 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_187 | 187 Hepta (ng/g) | 2 | 6 | 1.0380000 | 0.9560000 | 1.1200000 |
| H_189 | 189 Hepta (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| H_191 | 191 Hepta (ng/g) | 2 | 6 | 1.3700000 | 1.3700000 | 1.3700000 |
| N_206 | 206 Nona (ng/g) | 2 | 6 | 3.1000000 | 3.1000000 | 3.1000000 |
| N_207 | 207 Nona (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| N_208 | 208 Nona (ng/g) | 2 | 6 | 2.0000000 | 2.0000000 | 2.0000000 |
| ORG_1 | 1-Methylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_2 | 1-Methylphenanthrene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_20 | 2-Methylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_22 | 2,3,5-Trimethyl-naphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_28 | 2,6-Dimethylnaphthalene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |

Wilmington Harbor - Sediment Data

| Variable | Label | N | Nmiss | Mean | Minimum | Maximum |
|---|---|---|---|---|---|---|
| ORG_46 | Benzo(e)pyrene (ug/kg) | 2 | 6 | 54.0000000 | 51.0000000 | 57.0000000 |
| ORG_49 | Biphenyl (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| ORG_88 | Perylene (ug/kg) | 2 | 6 | 330.0000000 | 330.0000000 | 330.0000000 |
| O_194 | 194 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| O_195 | 195 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_196 | 196 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_200 | 200 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| O_201 | 201 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_203 | 203 Octa (ng/g) | 2 | 6 | 1.5000000 | 1.5000000 | 1.5000000 |
| O_205 | 205 Octa (ng/g) | 2 | 6 | 1.8800000 | 1.8800000 | 1.8800000 |
| PCB | PCB's (ng/g) | 2 | 6 | 27.4000000 | 25.6000000 | 29.2000000 |
| PES_1 | 2,4'-DDD (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_11 | Cis-chlordane (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_12 | Cis-nonachlor (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_14 | Dicofol (ug/kg) | 2 | 6 | 0.0800000 | 0.0800000 | 0.0800000 |
| PES_2 | 2,4'-DDE (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_24 | Hexychlorobenzene (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| PES_25 | Mirex (ug/kg) | 2 | 6 | 0.0200000 | 0.0200000 | 0.0200000 |
| PES_26 | Oxychlordane (ug/kg) | 2 | 6 | 2.3550000 | 2.3500000 | 2.3600000 |
| PES_28 | Trans-chlordane (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_29 | Trans-nonachlor (ug/kg) | 2 | 6 | 80.0000000 | 80.0000000 | 80.0000000 |
| PES_3 | 2,4'-DDT (ug/kg) | 2 | 6 | 16.0000000 | 16.0000000 | 16.0000000 |
| P_101 | 101 Penta (ng/g) | 2 | 6 | 3.4900000 | 3.3000000 | 3.6800000 |
| P_105 | 105 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_110 | 110 Penta (ng/g) | 2 | 6 | 2.8500000 | 1.5600000 | 4.1400000 |
| P_114 | 114 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_118 | 118 Penta (ng/g) | 2 | 6 | 4.1100000 | 3.5900000 | 4.6300000 |
| P_119 | 119 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_123 | 123 Penta (ng/g) | 2 | 6 | 1.0400000 | 1.0400000 | 1.0400000 |
| P_126 | 126 Penta (pg/g) | 2 | 6 | 11.2500000 | 11.1000000 | 11.4000000 |
| P_127 | 127 Penta (ng/g) | 2 | 6 | 1.0000000 | 1.0000000 | 1.0000000 |
| P_82 | 82 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_87 | 87 Penta (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| P_95 | 95 Penta (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| P_99 | 99 Penta (ng/g) | 2 | 6 | 0.7000000 | 0.7000000 | 0.7000000 |
| SOLID | % Solids (%) | 2 | 6 | 27.0000000 | 27.0000000 | 27.0000000 |
| TOC | Total Organic Carbon (mg/kg) | 2 | 6 | 8500.00 | 8000.00 | 9000.00 |
| TPH | Total Petroleum Hydrocarbons (mg/kg) | 2 | 6 | 242.5000000 | 228.0000000 | 257.0000000 |
| T_18 | 18 Tri (ng/g) | 2 | 6 | 0.6300000 | 0.6300000 | 0.6300000 |
| T_28 | 28 Tri (ng/g) | 2 | 6 | 1.6700000 | 1.4800000 | 1.8600000 |
| T_37 | 37 Tri (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_44 | 44 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_47 | 47 Tetra (ng/g) | 2 | 6 | 1.4100000 | 1.4100000 | 1.4100000 |
| T_49 | 49 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_52 | 52 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_60 | 60 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_66 | 66 Tetra (ng/g) | 2 | 6 | 1.6300000 | 1.6300000 | 1.6300000 |
| T_70 | 70 Tetra (ng/g) | 2 | 6 | 1.4200000 | 1.4200000 | 1.4200000 |
| T_74 | 74 Tetra (ng/g) | 2 | 6 | 1.2500000 | 1.2500000 | 1.2500000 |
| T_77 | 77 Tetra (pg/g) | 2 | 6 | 102.0500000 | 73.1000000 | 131.0000000 |
| T_80 | 80 Tetra (ng/g) | 2 | 6 | 1.5600000 | 1.5600000 | 1.5600000 |
| T_81 | 81 Tetra (pg/g) | 2 | 6 | 2.6600000 | 2.0300000 | 3.2900000 |

Wilmington Harbor - Sediment Data

CONTENTS PROCEDURE

| | | | |
|---|---|---|---|
| Data Set Name: | WORK.SED | Observations: | 8 |
| Member Type: | DATA | Variables: | 425 |
| Engine: | V611 | Indexes: | 0 |
| Created: | 10:36 Wednesday, February 19, 1997 | Observation Length: | 4270 |
| Last Modified: | 10:36 Wednesday, February 19, 1997 | Deleted Observations: | 0 |
| Protection: | | Compressed: | NO |
| Data Set Type: | | Sorted: | NO |
| Label: | | | |

-----Engine/Host Dependent Information-----

| | |
|---|---|
| Data Set Page Size: | 13312 |
| Number of Data Set Pages: | 7 |
| File Format: | 607 |
| First Data Page: | 5 |
| Max Obs per Page: | 3 |
| Obs in First Data Page: | 3 |

-----Alphabetic List of Variables and Attributes-----

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 217 | AG | Num | 8 | 2598 | | Silver (mg/kg) |
| 218 | AS | Num | 8 | 2606 | | Arsenic (mg/kg) |
| 219 | BE | Num | 8 | 2614 | | Beryllium (mg/kg) |
| 220 | CD | Num | 8 | 2622 | | Cadmium (mg/kg) |
| 7 | COMMENT | Char | 26 | 64 | 26. | Sample Comment |
| 221 | CR | Num | 8 | 2630 | | Chromium (mg/kg) |
| 222 | CU | Num | 8 | 2638 | | Copper (mg/kg) |
| 223 | CY | Num | 8 | 2646 | | Cyanide (mg/kg) |
| 4 | DATE | Num | 8 | 32 | MMDDYY8. | Sampling Date |
| 344 | D_8 | Num | 8 | 3614 | | 8 Di (ng/g) |
| 343 | D_209 | Num | 8 | 3606 | | 209 Deca (ng/g) |
| 345 | H38_58 | Num | 8 | 3622 | | 138,158 Hexa (ng/g) |
| 346 | H70_90 | Num | 8 | 3630 | | 170,190 Hepta (ng/g) |
| 224 | HG | Num | 8 | 2654 | | Mercury (mg/kg) |
| 347 | H_128 | Num | 8 | 3638 | | 128 Hexa (ng/g) |
| 348 | H_137 | Num | 8 | 3646 | | 137 Hexa (ng/g) |
| 349 | H_149 | Num | 8 | 3654 | | 149 Hexa (ng/g) |
| 350 | H_151 | Num | 8 | 3662 | | 151 Hexa (ng/g) |
| 351 | H_153 | Num | 8 | 3670 | | 153 Hexa (ng/g) |
| 352 | H_156 | Num | 8 | 3678 | | 156 Hexa (ng/g) |
| 353 | H_157 | Num | 8 | 3686 | | 157 Hexa (ng/g) |
| 354 | H_166 | Num | 8 | 3694 | | 166 Hexa (ng/g) |
| 355 | H_167 | Num | 8 | 3702 | | 167 Hexa (ng/g) |
| 356 | H_168 | Num | 8 | 3710 | | 168 Hexa (ng/g) |
| 357 | H_169 | Num | 8 | 3718 | | 169 Hexa (pg/g) |
| 358 | H_177 | Num | 8 | 3726 | | 177 Hepta (ng/g) |
| 359 | H_179 | Num | 8 | 3734 | | 179 Hepta (ng/g) |
| 360 | H_180 | Num | 8 | 3742 | | 180 Hepta (ng/g) |
| 361 | H_183 | Num | 8 | 3750 | | 183 Hepta (ng/g) |
| 362 | H_185 | Num | 8 | 3758 | | 185 Hepta (ng/g) |
| 363 | H_187 | Num | 8 | 3766 | | 187 Hepta (ng/g) |
| 364 | H_189 | Num | 8 | 3774 | | 189 Hepta (ng/g) |

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 365 | H_191 | Num | 8 | 3782 | | 191 Hepta (ng/g) |
| 225 | NI | Num | 8 | 2662 | | Nickel (mg/kg) |
| 366 | N_206 | Num | 8 | 3790 | | 206 Nona (ng/g) |
| 367 | N_207 | Num | 8 | 3798 | | 207 Nona (ng/g) |
| 368 | N_208 | Num | 8 | 3806 | | 208 Nona (ng/g) |
| 369 | ORG_1 | Num | 8 | 3814 | | 1-Methylnaphthalene (ug/kg) |
| 370 | ORG_2 | Num | 8 | 3822 | | 1-Methylphenanthrene (ug/kg) |
| 242 | ORG_3 | Num | 8 | 2798 | | 1,1-Dichloroethane (ug/kg) |
| 253 | ORG_4 | Num | 8 | 2886 | | 1,1-Dichloroethene (ug/kg) |
| 262 | ORG_5 | Num | 8 | 2958 | | 1,1,1-Trichloroethane (ug/kg) |
| 273 | ORG_6 | Num | 8 | 3046 | | 1,1,2-Trichloroethane (ug/kg) |
| 283 | ORG_7 | Num | 8 | 3126 | | 1,1,2,2-Tetrachloroethane (ug/kg) |
| 294 | ORG_8 | Num | 8 | 3214 | | 1,2-Dichlorobenzene (ug/kg) |
| 304 | ORG_9 | Num | 8 | 3294 | | 1,2-Dichloroethane (ug/kg) |
| 226 | ORG_10 | Num | 8 | 2670 | | 1,2-Dichloroethene (ug/kg) |
| 227 | ORG_11 | Num | 8 | 2678 | | 1,2-Dichloropropane (ug/kg) |
| 228 | ORG_12 | Num | 8 | 2686 | | 1,2-Diphenyl Hydrazine (ug/kg) |
| 229 | ORG_13 | Num | 8 | 2694 | | 1,2,4-Trichlorobenzene (ug/kg) |
| 230 | ORG_14 | Num | 8 | 2702 | | 1,3-Dichlorobenzene (ug/kg) |
| 231 | ORG_15 | Num | 8 | 2710 | | 1,4 & 1,2-Dichlorobenzene (ug/kg) |
| 232 | ORG_16 | Num | 8 | 2718 | | 1,4-Dichlorobenzene (ug/kg) |
| 233 | ORG_18 | Num | 8 | 2726 | | 2-Chloronaphthalene (ug/kg) |
| 234 | ORG_19 | Num | 8 | 2734 | | 2-Chlorophenol (ug/kg) |
| 371 | ORG_20 | Num | 8 | 3830 | | 2-Methylnaphthalene (ug/kg) |
| 235 | ORG_21 | Num | 8 | 2742 | | 2-Nitrophenol (ug/kg) |
| 372 | ORG_22 | Num | 8 | 3838 | | 2,3,5-Trimethyl-naphthalene (ug/kg) |
| 236 | ORG_23 | Num | 8 | 2750 | | 2,4-Dichlorophenol (ug/kg) |
| 237 | ORG_24 | Num | 8 | 2758 | | 2,4-Dimethylphenol (ug/kg) |
| 238 | ORG_25 | Num | 8 | 2766 | | 2,4-Dinitrophenol (ug/kg) |
| 239 | ORG_26 | Num | 8 | 2774 | | 2,4-Dinitrotoluene (ug/kg) |
| 240 | ORG_27 | Num | 8 | 2782 | | 2,4,6-Trichlorophenol (ug/kg) |
| 373 | ORG_28 | Num | 8 | 3846 | | 2,6-Dimethylnaphthalene (ug/kg) |
| 241 | ORG_29 | Num | 8 | 2790 | | 2,6-Dinitrotoluene (ug/kg) |
| 243 | ORG_30 | Num | 8 | 2806 | | 3,3'-Dichlorobenzidine (ug/kg) |
| 244 | ORG_31 | Num | 8 | 2814 | | 4-Bromophenyl-phenylether (ug/kg) |
| 245 | ORG_32 | Num | 8 | 2822 | | 4-Chlorophenyl-phenylether (ug/kg) |
| 246 | ORG_33 | Num | 8 | 2830 | | 4-Nitrophenol (ug/kg) |
| 247 | ORG_34 | Num | 8 | 2838 | | 4,6-Dinitro-2-methylphenol (ug/kg) |
| 248 | ORG_35 | Num | 8 | 2846 | | 4,-Chloro-3-methylphenol (ug/kg) |
| 249 | ORG_36 | Num | 8 | 2854 | | Acenaphthene (ug/kg) |
| 250 | ORG_37 | Num | 8 | 2862 | | Acenaphthylene (ug/kg) |
| 251 | ORG_38 | Num | 8 | 2870 | | Acrolein (ug/kg) |
| 252 | ORG_39 | Num | 8 | 2878 | | Acrylonitrile (ug/kg) |
| 254 | ORG_40 | Num | 8 | 2894 | | Anthracene (ug/kg) |
| 255 | ORG_41 | Num | 8 | 2902 | | Benzene (ug/kg) |
| 256 | ORG_42 | Num | 8 | 2910 | | Benzidine (ug/kg) |
| 257 | ORG_43 | Num | 8 | 2918 | | Benzo(a)anthracene (ug/kg) |
| 258 | ORG_44 | Num | 8 | 2926 | | Benzo(a)pyrene (ug/kg) |
| 259 | ORG_45 | Num | 8 | 2934 | | Benzo(b)fluoranthene (ug/kg) |
| 374 | ORG_46 | Num | 8 | 3854 | | Benzo(e)pyrene (ug/kg) |
| 260 | ORG_47 | Num | 8 | 2942 | | Benzo(g,h,i)perylene (ug/kg) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 375 | ORG_49 | Num | 8 | 3862 | | Biphenyl (ug/kg) |
| 263 | ORG_50 | Num | 8 | 2966 | | Bis(2-chloroethoxy)methane (ug/kg) |
| 264 | ORG_51 | Num | 8 | 2974 | | Bis(2-chloroethyl)ether (ug/kg) |
| 265 | ORG_52 | Num | 8 | 2982 | | Bis(2-chloroisopropyl)ether (ug/kg) |
| 266 | ORG_53 | Num | 8 | 2990 | | Bis(2-ethylhexyl)phthalate (ug/kg) |
| 267 | ORG_54 | Num | 8 | 2998 | | Bromodichloromethane (ug/kg) |
| 268 | ORG_55 | Num | 8 | 3006 | | Bromoform (ug/kg) |
| 269 | ORG_56 | Num | 8 | 3014 | | Bromomethane (ug/kg) |
| 270 | ORG_57 | Num | 8 | 3022 | | Butlybenzylphthalate (ug/kg) |
| 271 | ORG_58 | Num | 8 | 3030 | | Carbon Tetrachloride (ug/kg) |
| 272 | ORG_59 | Num | 8 | 3038 | | Chlorobenzene (ug/kg) |
| 274 | ORG_60 | Num | 8 | 3054 | | Chloroethane (ug/kg) |
| 275 | ORG_61 | Num | 8 | 3062 | | Chloroform (ug/kg) |
| 276 | ORG_62 | Num | 8 | 3070 | | Chloromethane (ug/kg) |
| 277 | ORG_63 | Num | 8 | 3078 | | Chrysene (ug/kg) |
| 278 | ORG_64 | Num | 8 | 3086 | | Cis-1,3-Dichloropropene (ug/kg) |
| 279 | ORG_66 | Num | 8 | 3094 | | Dibenzo(a,h)anthracene (ug/kg) |
| 280 | ORG_67 | Num | 8 | 3102 | | Dibromochloromethane (ug/kg) |
| 281 | ORG_68 | Num | 8 | 3110 | | Diethylphthalate (ug/kg) |
| 282 | ORG_69 | Num | 8 | 3118 | | Dimethylphthalate (ug/kg) |
| 284 | ORG_70 | Num | 8 | 3134 | | Di-n-butylphthalate (ug/kg) |
| 285 | ORG_71 | Num | 8 | 3142 | | Di-n-octylphthalate (ug/kg) |
| 286 | ORG_72 | Num | 8 | 3150 | | Ethylbenzene (ug/kg) |
| 287 | ORG_73 | Num | 8 | 3158 | | Fluoranthene (ug/kg) |
| 288 | ORG_74 | Num | 8 | 3166 | | Fluorene (ug/kg) |
| 289 | ORG_75 | Num | 8 | 3174 | | Hexachlorobenzene (ug/kg) |
| 290 | ORG_76 | Num | 8 | 3182 | | Hexachlorobutadiene (ug/kg) |
| 291 | ORG_77 | Num | 8 | 3190 | | Hexachlorocyclopentadiene (ug/kg) |
| 292 | ORG_78 | Num | 8 | 3198 | | Hexachloroethane (ug/kg) |
| 293 | ORG_79 | Num | 8 | 3206 | | Indeno(1,2,3-c,d)pyrene (ug/kg) |
| 295 | ORG_80 | Num | 8 | 3222 | | Isophorone (ug/kg) |
| 296 | ORG_81 | Num | 8 | 3230 | | Methylene Chloride (ug/kg) |
| 297 | ORG_82 | Num | 8 | 3238 | | Naphthalene (ug/kg) |
| 298 | ORG_83 | Num | 8 | 3246 | | Nitrobenzene (ug/kg) |
| 299 | ORG_84 | Num | 8 | 3254 | | N-nitrosodimethylamine (ug/kg) |
| 300 | ORG_85 | Num | 8 | 3262 | | N-nitroso-Di-n-propylamine (ug/kg) |
| 301 | ORG_86 | Num | 8 | 3270 | | N-nitrosodiphenylamine (ug/kg) |
| 302 | ORG_87 | Num | 8 | 3278 | | Pentachlorophenol (ug/kg) |
| 376 | ORG_88 | Num | 8 | 3870 | | Perylene (ug/kg) |
| 303 | ORG_89 | Num | 8 | 3286 | | Phenanthrene (ug/kg) |
| 305 | ORG_90 | Num | 8 | 3302 | | Phenol (mg/kg) |
| 306 | ORG_91 | Num | 8 | 3310 | | Pyrene (ug/kg) |
| 307 | ORG_92 | Num | 8 | 3318 | | Tetrachloroethene (ug/kg) |
| 308 | ORG_93 | Num | 8 | 3326 | | Toluene (ug/kg) |
| 309 | ORG_94 | Num | 8 | 3334 | | Trans-1,3-Dichloropropene (ug/kg) |
| 310 | ORG_95 | Num | 8 | 3342 | | Trichloroethene (ug/kg) |
| 311 | ORG_96 | Num | 8 | 3350 | | Trichlorofluoromethane (ug/kg) |
| 312 | ORG_97 | Num | 8 | 3358 | | Vinyl Chloride (ug/kg) |
| 377 | O_194 | Num | 8 | 3878 | | 194 Octa (ng/g) |
| 378 | O_195 | Num | 8 | 3886 | | 195 Octa (ng/g) |
| 379 | O_196 | Num | 8 | 3894 | | 196 Octa (ng/g) |
| 380 | O_200 | Num | 8 | 3902 | | 200 Octa (ng/g) |

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| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 381 | O_201 | Num | 8 | 3910 | | 201 Octa (ng/g) |
| 382 | O_203 | Num | 8 | 3918 | | 203 Octa (ng/g) |
| 383 | O_205 | Num | 8 | 3926 | | 205 Octa (ng/g) |
| 313 | P1016 | Num | 8 | 3366 | | PCB-1016 (ug/kg) |
| 314 | P1221 | Num | 8 | 3374 | | PCB-1221 (ug/kg) |
| 315 | P1232 | Num | 8 | 3382 | | PCB-1232 (ug/kg) |
| 316 | P1242 | Num | 8 | 3390 | | PCB-1242 (ug/kg) |
| 317 | P1248 | Num | 8 | 3398 | | PCB-1248 (ug/kg) |
| 318 | P1254 | Num | 8 | 3406 | | PCB-1254 (ug/kg) |
| 319 | P1260 | Num | 8 | 3414 | | PCB-1260 (ug/kg) |
| 1 | PAGE | Num | 8 | 0 | | Report Page Number |
| 320 | PB | Num | 8 | 3422 | | Lead (mg/kg) |
| 384 | PCB | Num | 8 | 3934 | | PCB's (ng/g) |
| 6 | PERIOD | Char | 12 | 52 | 12. | Dredging (PRE,D=During,POST,Drawdown) |
| 385 | PES_1 | Num | 8 | 3942 | | 2,4'-DDD (ug/kg) |
| 389 | PES_2 | Num | 8 | 3974 | | 2,4'-DDE (ug/kg) |
| 395 | PES_3 | Num | 8 | 4022 | | 2,4'-DDT (ug/kg) |
| 333 | PES_4 | Num | 8 | 3526 | | 4,4'-DDD (ug/kg) |
| 334 | PES_5 | Num | 8 | 3534 | | 4,4'-DDE (ug/kg) |
| 335 | PES_6 | Num | 8 | 3542 | | 4,4'-DDT (ug/kg) |
| 336 | PES_7 | Num | 8 | 3550 | | A-BHC (ug/kg) |
| 337 | PES_8 | Num | 8 | 3558 | | Aldrin (ug/kg) |
| 338 | PES_9 | Num | 8 | 3566 | | B-BHC (ug/kg) |
| 321 | PES_10 | Num | 8 | 3430 | | Chlordane (ug/kg) |
| 386 | PES_11 | Num | 8 | 3950 | | Cis-chlordane (ug/kg) |
| 387 | PES_12 | Num | 8 | 3958 | | Cis-nonachlor (ug/kg) |
| 322 | PES_13 | Num | 8 | 3438 | | D-BHC (ug/kg) |
| 388 | PES_14 | Num | 8 | 3966 | | Dicofol (ug/kg) |
| 323 | PES_15 | Num | 8 | 3446 | | Dieldrin (ug/kg) |
| 324 | PES_16 | Num | 8 | 3454 | | Endosulfan I (ug/kg) |
| 325 | PES_17 | Num | 8 | 3462 | | Endosulfan II (ug/kg) |
| 326 | PES_18 | Num | 8 | 3470 | | Endosulfan sulfate (ug/kg) |
| 327 | PES_19 | Num | 8 | 3478 | | Endrin (ug/kg) |
| 328 | PES_20 | Num | 8 | 3486 | | Endrin aldehyde (ug/kg) |
| 329 | PES_21 | Num | 8 | 3494 | | G-BHC (ug/kg) |
| 330 | PES_22 | Num | 8 | 3502 | | Heptachlor (ug/kg) |
| 331 | PES_23 | Num | 8 | 3510 | | Heptachlor epoxide (ug/kg) |
| 390 | PES_24 | Num | 8 | 3982 | | Hexychlorobenzene (ug/kg) |
| 391 | PES_25 | Num | 8 | 3990 | | Mirex (ug/kg) |
| 392 | PES_26 | Num | 8 | 3998 | | Oxychlordane (ug/kg) |
| 332 | PES_27 | Num | 8 | 3518 | | Toxaphene (ug/kg) |
| 393 | PES_28 | Num | 8 | 4006 | | Trans-chlordane (ug/kg) |
| 394 | PES_29 | Num | 8 | 4014 | | Trans-nonachlor (ug/kg) |
| 405 | P_82 | Num | 8 | 4102 | | 82 Penta (ng/g) |
| 406 | P_87 | Num | 8 | 4110 | | 87 Penta (ng/g) |
| 407 | P_95 | Num | 8 | 4118 | | 95 Penta (ng/g) |
| 408 | P_99 | Num | 8 | 4126 | | 99 Penta (ng/g) |
| 396 | P_101 | Num | 8 | 4030 | | 101 Penta (ng/g) |
| 397 | P_105 | Num | 8 | 4038 | | 105 Penta (ng/g) |
| 398 | P_110 | Num | 8 | 4046 | | 110 Penta (ng/g) |
| 399 | P_114 | Num | 8 | 4054 | | 114 Penta (ng/g) |
| 400 | P_118 | Num | 8 | 4062 | | 118 Penta (ng/g) |

Wilmington Harbor - Sediment Data

CONTENTS PROCEDURE

| # | Variable | Type | Len | Pos | Format | Label |
|---|---|---|---|---|---|---|
| 401 | P_119 | Num | 8 | 4070 | | 119 Penta (ng/g) |
| 402 | P_123 | Num | 8 | 4078 | | 123 Penta (ng/g) |
| 403 | P_126 | Num | 8 | 4086 | | 126 Penta (pg/g) |
| 404 | P_127 | Num | 8 | 4094 | | 127 Penta (ng/g) |
| 339 | SB | Num | 8 | 3574 | | Antimony (mg/kg) |
| 340 | SE | Num | 8 | 3582 | | Selenium (mg/kg) |
| 409 | SOLID | Num | 8 | 4134 | | % Solids (%) |
| 3 | STATION | Char | 12 | 20 | 12. | Sampling Station |
| 8 | S_AG | Char | 12 | 90 | 12. | Flag for AG (Less than DL) |
| 9 | S_AS | Char | 12 | 102 | 12. | Flag for AS (Less than DL) |
| 10 | S_BE | Char | 12 | 114 | 12. | Flag for BE (Less than DL) |
| 11 | S_CD | Char | 12 | 126 | 12. | Flag for CD (Less than DL) |
| 12 | S_CR | Char | 12 | 138 | 12. | Flag for CR (Less than DL) |
| 13 | S_CU | Char | 12 | 150 | 12. | Flag for CU (Less than DL) |
| 14 | S_CY | Char | 12 | 162 | 12. | Flag for CY (Less than DL) |
| 135 | S_D_8 | Char | 12 | 1614 | 12. | Flag for D_8 (Less than DL) |
| 134 | S_D_209 | Char | 12 | 1602 | 12. | Flag for D_209 (Less than DL) |
| 136 | S_H38_58 | Char | 12 | 1626 | 12. | Flag for H38_58 (Less than DL) |
| 137 | S_H70_90 | Char | 12 | 1638 | 12. | Flag for H70_90 (Less than DL) |
| 15 | S_HG | Char | 12 | 174 | 12. | Flag for HG (Less than DL) |
| 138 | S_H_128 | Char | 12 | 1650 | 12. | Flag for H_128 (Less than DL) |
| 139 | S_H_137 | Char | 12 | 1662 | 12. | Flag for H_137 (Less than DL) |
| 140 | S_H_149 | Char | 12 | 1674 | 12. | Flag for H_149 (Less than DL) |
| 141 | S_H_151 | Char | 12 | 1686 | 12. | Flag for H_151 (Less than DL) |
| 142 | S_H_153 | Char | 12 | 1698 | 12. | Flag for H_153 (Less than DL) |
| 143 | S_H_156 | Char | 12 | 1710 | 12. | Flag for H_156 (Less than DL) |
| 144 | S_H_157 | Char | 12 | 1722 | 12. | Flag for H_157 (Less than DL) |
| 145 | S_H_166 | Char | 12 | 1734 | 12. | Flag for H_166 (Less than DL) |
| 146 | S_H_167 | Char | 12 | 1746 | 12. | Flag for H_167 (Less than DL) |
| 147 | S_H_168 | Char | 12 | 1758 | 12. | Flag for H_168 (Less than DL) |
| 148 | S_H_169 | Char | 12 | 1770 | 12. | Flag for H_169 (Less than DL) |
| 149 | S_H_177 | Char | 12 | 1782 | 12. | Flag for H_177 (Less than DL) |
| 150 | S_H_179 | Char | 12 | 1794 | 12. | Flag for H_179 (Less than DL) |
| 151 | S_H_180 | Char | 12 | 1806 | 12. | Flag for H_180 (Less than DL) |
| 152 | S_H_183 | Char | 12 | 1818 | 12. | Flag for H_183 (Less than DL) |
| 153 | S_H_185 | Char | 12 | 1830 | 12. | Flag for H_185 (Less than DL) |
| 154 | S_H_187 | Char | 12 | 1842 | 12. | Flag for H_187 (Less than DL) |
| 155 | S_H_189 | Char | 12 | 1854 | 12. | Flag for H_189 (Less than DL) |
| 156 | S_H_191 | Char | 12 | 1866 | 12. | Flag for H_191 (Less than DL) |
| 16 | S_NI | Char | 12 | 186 | 12. | Flag for NI (Less than DL) |
| 157 | S_N_206 | Char | 12 | 1878 | 12. | Flag for N_206 (Less than DL) |
| 158 | S_N_207 | Char | 12 | 1890 | 12. | Flag for N_207 (Less than DL) |
| 159 | S_N_208 | Char | 12 | 1902 | 12. | Flag for N_208 (Less than DL) |
| 160 | S_ORG_1 | Char | 12 | 1914 | 12. | Flag for ORG_1 (Less than DL) |
| 161 | S_ORG_2 | Char | 12 | 1926 | 12. | Flag for ORG_2 (Less than DL) |
| 33 | S_ORG_3 | Char | 12 | 390 | 12. | Flag for ORG_3 (Less than DL) |
| 44 | S_ORG_4 | Char | 12 | 522 | 12. | Flag for ORG_4 (Less than DL) |
| 53 | S_ORG_5 | Char | 12 | 630 | 12. | Flag for ORG_5 (Less than DL) |
| 64 | S_ORG_6 | Char | 12 | 762 | 12. | Flag for ORG_6 (Less than DL) |
| 74 | S_ORG_7 | Char | 12 | 882 | 12. | Flag for ORG_7 (Less than DL) |
| 85 | S_ORG_8 | Char | 12 | 1014 | 12. | Flag for ORG_8 (Less than DL) |
| 95 | S_ORG_9 | Char | 12 | 1134 | 12. | Flag for ORG_9 (Less than DL) |

**WATER QUALITY AND**
**SEDIMENT CHEMICAL TESTING**
**WILMINGTON HARBOR DREDGED**
**MATERIAL MANAGEMENT PLAN**

Versar INC.

ENCL 7

# WATER QUALITY AND SEDIMENT CHEMICAL TESTING WILMINGTON HARBOR DREDGED MATERIAL MANAGEMENT PLAN

Prepared for

U.S. Army Corps of Engineers
Philadelphia District
Philadelphia, PA 19107-3390

Prepared by

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November 2008

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# STUDY OVERVIEW AND ORGANIZATION OF DATA REPORT

The U.S. Army Corps of Engineers, Philadelphia District is completing a Dredged Material Management Plan (DMMP) for Wilmington Harbor, New Castle County, Delaware. The proposed study is investigating the possibility of beneficial use of dredged material from the federal channel, as well as, from the Wilmington South upland disposal area. The current channel has an authorized depth of 38 from the Delaware River to a point 4,237 feet upstream.

This chemical data report provides baseline conditions of the dredged material at Wilmington Harbor and its potential use in beneficial projects. The data was collected using vibracore sediment samples from eight stations within the federal channel in the Wilmington Harbor and soil cores samples from six locations within the Wilmington Harbor South disposal area (Figures 1 and 2). Soil and sediment coring locations were recorded with differential GPS (Tables 1 and 2) and the sampling was conducted in June 2008.

Vibracoring services were provided by Energy & Environmental Analysts, Inc., from Garden City, New York using a Rossfelder P-1 Electric Vibracorer with a 10' 304 stainless 3" core barrel. The barrel was lined with a 6 mil soft plastic liner that retained in place with a stainless core cutter/catcher. After retrieving the core, the plastic liners were cut longitudinally to remove VOC sub-samples. Sufficient amount of sediment cores were then transferred into 5 gallon bucket (lined with a decontaminated food quality plastic bag) and homogenized. After homogenizing, the sample was put into the appropriate container to conduct bulk sediment analysis. The remainder of the sample was retained in the bucket for modified elutriate and TCLP analysis. Grain size and TOC analysis were also conducted.

Soil sampling was conducted by Versar personnel with a 4-foot soil auger. Cores of approximately 4 feet were collected and put into a stainless steel bowls. All of the stainless steel handling equipment was decontaminated using an alconox detergent wash, DI water rinse, nitric acid rinse, DI water rinse, ethanol rinse, and DI water rinse. Prior to homogenizing, the VOC sub-sample was placed into the appropriate container. The homogenized sample was then placed into appropriate containers for bulk sedimentary chemistry, PCBs, TOC and grain size.

An equipment blank was prepared half way through the field collections by filling a lined 5 gallon bucket with laboratory grade DI water, stirring the field decontaminated stainless steel spoons in the water (the spoons used to composite and transfer sediment to sample jars). The water was then transferred to appropriate jars for later analysis. Site water was collected for testing by filling sample jars opened a few inches under the surface of the Delaware River.

## SUMMARY/CONCLUSIONS

The testing for this study was done for two primary reasons: 1) to evaluate the potential environmental impacts on aquatic biota of the next scheduled maintenance dredging operating at Wilmington Harbor, Delaware and 2) to provide data on the contaminant levels within Wilmington Harbor and the Wilmington Harbor South CDF to assess whether the existing material is suitable for beneficial use such as land reclamation, road fill, land fill caps, and other non-residential uses.

Contaminant levels in bulk sediment from the river and CDF soil auger samples were compared to Delaware Natural Resources and Environmental Control (DNREC) Site Investigation and Restoration Branch Uniform Risk Based levels (URS) for soils in non critical drinking water resource protection areas. River sediments were also compared to NOAA concentrations known to cause adverse biological effects to marine organisms as summarized by Long et al. (1995). NOAA guidelines are divided into Effects Range-Low (ER-L) concentrations (where 10% of all the toxicity studies reviewed showed an adverse effect) and Effects Range-Medium (ER-M) concentrations (where 50% of all the toxicity studies showed an adverse effect). The guidelines are listed in the summary tables to provide a measure of the relative toxicity of the Christina River sediments prior to dredging. Assessments of the existing CDF's soils suitability for beneficial use and the new sediments that will be placed in the CDF was based on non-residential contaminant guidelines since it is not anticipated that the material will be used in residential settings. Residential (non-restricted) guidelines were also compared to the observed contaminant concentrations to show a range of potential human health issues. Restricted soil contaminant guidelines are typically higher than un-restricted (residential use) since human exposure to soils used in a residential setting would be higher that in an industrial use like brown field or land fill capping,

Modified elutriated testing was conducted to help assess whether aquatic biota will encounter toxic levels in the surface water during dredging operations. The dissolved contaminant results were compared to DNREC acute and chronic water quality aquatic life criteria for marine waters. Only the dissolved component was measured since water quality criteria are based on dissolved concentrations. Since dredging is a short term activity, potential toxic releases to aquatic biota were weighed against the acute criteria.

In addition, since the river sediment may leach contaminants into the groundwater once it is placed in the CDF and is also subject to acidic rainfall, the Toxicity Characteristic Leaching Procedure (TCLP) was performed on the material. TCLP tests simulate the effects of acid rain (by mixing material with acidified laboratory grade water) and measuring contaminant levels that leach out. TCLP tests were conducted on the river sediments and the existing soils in the Wilmington Harbor South soil auger samples.

**Christina River Sediments**

Bulk sediment testing revealed that with the exception of arsenic the contaminant levels were all below DNREC restricted URS (Table 3). Residential projects are not recommended for use of the material since a number of inorganics (aluminum, arsenic, iron and manganese) were over criteria as well as a few semivolatile organics (primarily pyrenes or coal tars) particularly from station WH1. Total PCB levels in the sediment samples were mostly below DNREC's restricted criterion of 1000 ng/kg with the exception of sediments from WH1 near the mouth of Lobell Canal (Table 5). Total PCB concentration at sediment sampling stations WH1 and WH8 were also over ER-M sediment guidelines of 180 ng/g while all other stations were over the ER-L levels. Dredging theses sediments will have a net benefit with respect to PCB toxicity since the material will be removed from the aquatic habitat. In addition, previous USACE funded studies on CDF retention rates indicated that over 99% of the PCB in dredged sediment is retained by the CDF1.

Organic and inorganic contaminant levels relative to ER-L and ER-M sediment guidelines indicate that when exceedances occurred, they were mostly below ER-M suggesting that while toxicity exists, the levels would be considered moderate, but not high. Only zinc concentrations at station WH1 were above ER-M guideline values (Table 3).

Modified elutriate testing revealed that with the exception of copper at station WH 7 no water quality exceedances are anticipated during the maintenance dredging (Table 4). The sum of dissolved PCB congeners in the elutriate tests showed that levels were above levels listed for chronic criteria for total PCBs (Table 9). No acute criterion for total PCBs is listed by DNREC. Total dissolved PCBs in the elutriate tests for station WH7 at the mouth of the Christina River had about an order of magnitude higher PCB elutriate concentration than all other river stations.

TCLP testing for potential contaminant leaching into ground water once the material is placed in a CDF and subject to rainfall suggests that no leaching above the regulatory limits is likely (Table 10).

**Wilmington Harbor South CDF Soils**

Similar to the bulk sediment results for the Christina River sediments, soil testing in the CDF revealed that with the exception of arsenic all contaminant levels were below DNREC's non-residential URS criteria (Table 11). Several inorganics were over the residential criteria in the existing CDF soils (aluminum, arsenic, iron, vanadium, and manganese). In addition, some organics (e.g., Benzo(a)pyrene) were over the criteria. High resolution PBC congener

[1] Burton, W.H., J. Farrar, and J. Pasquale. Contaminant Sequestering and Water Quality Discharges At Confined Disposal Facilities. In: M. Pellei and A. Porta (Eds.), *Remediation of Contaminated Sediments—2003.* Proceedings of the Second International Conference on Remediation of Contaminated Sediments (Venice, Italy; 30 Sep–3 Oct 2003). ISBN 1-57477-143-4, published by Battelle Press, Columbus, OH,

concentrations were below the 1000 $\mu$g/kg PCB URS criteria listed by DNREC (Table 13). TCPL testing of the exiting soils in the CDF resulted in no parameter concentrations above the regulatory limits (Table 14).

**Beneficial Use of Material**

In conclusion, based on the above discussion, material from Wilmington Harbor and Wilmington Harbor South CDF would be suitable for use in non-residential situations (i.e., brownfields). However, prior to any beneficial use of the material, contaminant testing of the proposed recipient site should be completed. Once that analysis is completed, a comparison of the contaminant levels between the Wilmington Harbor material and the recipient location can then be performed to determine if the two sites are compatible.


Figure 1. Vibracore station locations for sediment samples taken in June 2008

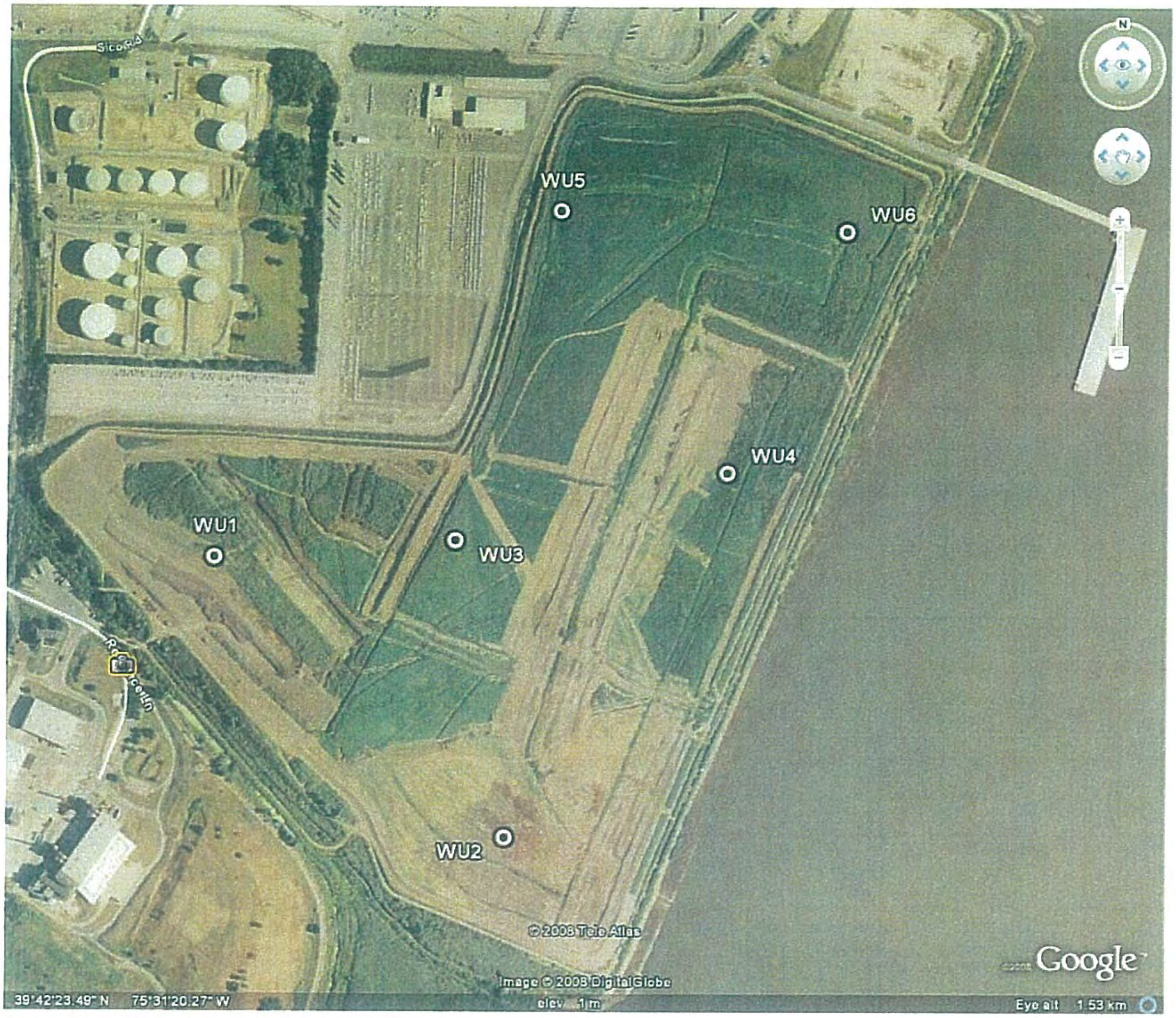



Figure 2. Soil hand auger sampling locations in the Wilmington South CDF collected in June 2008

| Table 1. Sampling coordinates for the Wilmington Harbor stations | | | | | | |
|---|---|---|---|---|---|---|
| **Station** | **Date** | **Time** | **Latitude** | | **Longitude** | |
| WH1 | 6/6/2008 | 13:12:25 | 39 | 43.300 | -75 | 31.783 |
| WH2 | 6/6/2008 | 12:15:10 | 39 | 43.197 | -75 | 31.421 |
| WH3 | 6/6/2008 | 11:22:56 | 39 | 43.135 | -75 | 31.251 |
| WH4 | 6/6/2008 | 10:54:43 | 39 | 43.065 | -75 | 31.029 |
| WH5 | 6/6/2008 | 14:18:36 | 39 | 43.026 | -75 | 30.913 |
| WH6 | 6/6/2008 | 14:53:48 | 39 | 42.982 | -75 | 30.784 |
| WH7 | 6/6/2008 | 15:24:25 | 39 | 42.944 | -75 | 30.666 |
| WH8 | 6/6/2008 | 16:11:11 | 39 | 43.185 | -75 | 31.201 |

| Table 2. Sampling coordinates for the Wilmington Harbor CDF stations | | | | | | |
|---|---|---|---|---|---|---|
| **Station** | **Date** | **Time** | **Latitude** | | **Longitude** | |
| WU1 | 6/12/08 | 8:37 | 39 | 42.354 | -75 | 31.734 |
| WU2 | 6/12/08 | 9:35 | 39 | 42.122 | -75 | 31.425 |
| WU3 | 6/12/08 | 10:16 | 39 | 42.368 | -75 | 31.479 |
| WU4 | 6/12/08 | 12:35 | 39 | 42.424 | -75 | 31.188 |
| WU5 | 6/12/08 | 11:15 | 39 | 42.64 | -75 | 31.368 |
| WU6 | 6/12/08 | 11:53 | 39 | 42.623 | -75 | 31.062 |

# CHRISTINA RIVER SEDIMENT SAMPLING RESULTS

Table 3. Testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over DNREC unrestricted criteria, while values in green are over restricted levels. Bolded concentrations are over ER-L sediment guidelines while underlined values are over ER-M levels.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | | | | | |
| Aroclor 1016 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 5000 | 82000 | | |
| Aroclor 1221 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1232 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1242 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | <16 | <21 | 300 | 3000 | | |
| Aroclor 1248 | µg/kg | <22 | <21 | <19 | <23 | <27 | <22 | 310 | <21 | 300 | 3000 | | |
| Aroclor 1254 | µg/kg | 150 | 78 | 76 | <23 | <27 | <22 | 310 | <21 | 300 | 3000 | | |
| Aroclor 1260 | µg/kg | 52 | 29 | 27 | 42 | 33 | 49 | 64 | 32 | 300 | 3000 | | |
| **Pesticides** | | | | | | | | | | | | | |
| 4,4-DDD | µg/kg | 18 | 11 | 11 | 15 | 20 | 13 | 23 | 11 | 3,000 | 24,000 | | |
| 4,4-DDE | µg/kg | 15 | 7.5 | 11 | 16 | 8.7 | 16 | 56 | 11 | 2,000 | 17,000 | | |
| 4,4-DDT | µg/kg | <11 | <11 | <9.9 | <12 | **12** | <11 | <8.2 | <10 | 2,000 | 17,000 | 1.58 | 46.1 |
| Aldrin | µg/kg | <11 | 1.8 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 40 | 300 | | |
| alpha-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 100 | 900 | | |
| alpha-Chlordane | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| beta-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 400 | 3,000 | | |
| delta-BHC | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | 1.7 | <10 | | | | |
| Dieldrin | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 40 | 400 | | |
| Endosulfan I | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endosulfan II | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endosulfan sulfate | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 47,000 | 1,200,000 | | |
| Endrin | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 2,000 | 61,000 | | |
| Endrin aldehyde | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 2,000 | 61,000 | | |
| Endrin ketone | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| gamma-BHC (Lindane) | µg/kg | 3.3 | 1.5 | <9.9 | <12 | <14 | <11 | <8.2 | 2 | 500 | 4,000 | | |
| gamma-Chlordane | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | | | | |
| Heptachlor | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | <8.2 | <10 | 100 | 1,000 | | |
| Heptachlor epoxide | µg/kg | <11 | <11 | <9.9 | <12 | <14 | <11 | 3 | <10 | 70 | 600 | | |
| Methoxychlor | µg/kg | <22 | <20 | <19 | <22 | <26 | <22 | <16 | <20 | 39,000 | 1,000,000 | | |
| Toxaphene | µg/kg | <450 | <420 | <390 | <450 | <530 | <440 | <320 | <410 | 600 | 5,000 | | |
| **Inorganics** | | | | | | | | | | | | | |
| Aluminum | mg/kg | 14,800 | 15,600 | 15,600 | 15,600 | 16,600 | 16,800 | 14,300 | 15,700 | 7,800 | 200,000 | | |
| Antimony | mg/kg | 0.57 | <1.2 | <1.2 | <1.4 | <1.6 | 0.3 | 0.44 | <1.2 | 3 | 82 | | |
| Arsenic | mg/kg | 11.6 | 10.6 | 11.4 | 11.9 | 13.4 | 12.7 | 13.6 | 11.8 | 0.4 | 4 | 8.2 | 70 |
| Barium | mg/kg | 154 | 110 | 109 | 111 | 110 | 90.2 | 66.6 | 97.7 | 550 | 14,000 | | |
| Beryllium | mg/kg | 1.2 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.1 | 1.3 | 16 | 410 | | |

Table 3. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics (Continued)** | | | | | | | | | | | | | |
| Cadmium | mg/kg | **1.2** | 0.22 | 0.27 | 0.21 | <0.80 | <0.66 | <0.48 | 0.19 | 4 | 100 | 1.2 | 9.6 |
| Calcium | mg/kg | 2,990 | 3,260 | 3,120 | 3,800 | 4,110 | 3,220 | 2,890 | 3,310 | | | | |
| Chromium | mg/kg | 64.6 | 47.6 | 48.5 | 48.3 | 53 | 53.3 | 61.3 | 49.3 | 270 | 610 | 81 | 370 |
| Cobalt | mg/kg | 13.6 | 13.1 | 13.6 | 13.7 | 14.6 | 14.5 | 12.2 | 13.7 | 470 | 12,000 | | |
| Copper | mg/kg | **44** | 33.4 | **35.2** | **34.5** | **34.7** | 33.7 | **34.4** | 33 | 310 | 8,200 | 34 | 270 |
| Iron | mg/kg | 28,300 | 28,900 | 29,300 | 30,100 | 32,500 | 32,100 | 31,600 | 30,200 | 2,300 | 61,000 | | |
| Lead | mg/kg | **78.8** | 46.4 | **49.5** | **47.2** | **49** | **47.3** | **89** | 46.5 | 400 | 1,000 | 47 | 218 |
| Magnesium | mg/kg | 5,250 | 5,780 | 5,730 | 5,840 | 6,580 | 6,790 | 5,730 | 6,170 | | | | |
| Manganese | mg/kg | 908 | 1,290 | 1,250 | 1,430 | 1,580 | 1,470 | 1,020 | 1,430 | 160 | 4,100 | | |
| Mercury | mg/kg | **0.37** | **0.34** | **0.37** | **0.35** | **0.36** | **0.37** | **0.37** | **0.32** | 10 | 610 | 0.15 | 0.71 |
| Nickel | mg/kg | **27.5** | **26.4** | **27.3** | **27.3** | **29.3** | **29.2** | **28.4** | **27.3** | 160 | 4,100 | 20.9 | 51.6 |
| Potassium | mg/kg | 2,080 | 2,160 | 2,130 | 2,190 | 2,420 | 2,530 | 2,130 | 2,260 | | | | |
| Selenium | mg/kg | <0.69 | <0.62 | <0.58 | <0.68 | <0.80 | <0.66 | <0.48 | <0.62 | 39 | 1,000 | | |
| Silver | mg/kg | 0.43 | 0.55 | 0.58 | 0.58 | 0.71 | 0.59 | 0.56 | 0.62 | 39 | 1,000 | 1 | 3.7 |
| Sodium | mg/kg | 942 | 1,030 | 885 | 586 | 751 | 1,310 | 512 | 1,040 | | | | |
| Thallium | mg/kg | <1.4 | <1.2 | <1.2 | <1.4 | <1.6 | <1.3 | <0.97 | <1.2 | 18 | 220 | | |
| Vanadium | mg/kg | 45.9 | 42.9 | 45.1 | 43.6 | 48 | 49.1 | 48.9 | 44.1 | 55 | 1,400 | | |
| Zinc | mg/kg | **445** | **221** | **231** | **219** | **223** | **209** | **157** | **214** | 2,300 | 61,000 | 150 | 410 |
| **Semivolatiles** | | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,2-Dichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,3-Dichlorobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 1,4-Dichlorobenzene | µg/kg | 41 | <83 | <78 | <91 | <100 | <88 | 20 | <83 | | | | |
| 2,2-oxybis(1-Chloropropane) | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2,4,5-Trichlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4,6-Trichlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4-Dichlorophenol | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2,4-Dimethylphenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2,4-Dinitrophenol | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 2,4-Dinitrotoluene | µg/kg | <440 | <410 | <390 | <450 | <510 | 230 | <320 | <410 | | | | |
| 2,6-Dinitrotoluene | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2-Chloronaphthalene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| 2-Chlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 2-Methylnaphthalene | µg/kg | 99 | 47 | 62 | 57 | 44 | 24 | 27 | 47 | | | | |
| 2-Methylphenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | 38 | <410 | | | | |
| 2-Nitroaniline | µg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 2-Nitrophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 3,3-Dichlorobenzidine | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |

Table 3. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | | | |
| 3-Nitroaniline | μg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4,6-Dinitro-2-methylphenol | μg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4-Bromophenyl phenyl ether | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Chloro-3-methylphenol | μ/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Chloroaniline | μg/kg | <440 | <410 | 49 | 45 | <510 | <430 | 55 | <410 | | | | |
| 4-Chlorophenyl phenyl ether | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| 4-Methylphenol | μg/kg | 190 | 430 | 120 | 680 | 520 | 56 | 37 | 90 | | | | |
| 4-Nitroaniline | μg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| 4-Nitrophenol | μg/kg | <2300 | <2100 | <2000 | <2300 | <2700 | <2200 | <1600 | <2100 | | | | |
| Acenaphthene | μg/kg | **140** | **21** | **34** | <91 | <100 | <88 | <65 | **30** | 470,000 | 5,000,000 | 16 | 500 |
| Acenaphthylene | μg/kg | **180** | 42 | **60** | **53** | 42 | <88 | <65 | **46** | | | 44 | 640 |
| Anthracene | μg/kg | **440** | 80 | 79 | 68 | 73 | 30 | 21 | **99** | 1,000,000 | 5,000,000 | 85.3 | 1,100 |
| Benzo(a)anthracene | μg/kg | **1100** | 220 | 230 | 180 | 140 | 92 | 59 | 190 | 900 | 8,000 | 261 | 1,600 |
| Benzo(a)pyrene | μg/kg | 940 | 220 | 240 | 180 | 170 | 69 | 35 | 180 | 90 | 800 | 430 | 1,600 |
| Benzo(b)fluoranthene | μg/kg | 1500 | 380 | 430 | 330 | 290 | 130 | 51 | 310 | 900 | 8,000 | | |
| Benzo(ghi)perylene | μg/kg | 680 | 230 | 230 | 200 | 170 | 94 | 33 | 190 | | | | |
| Benzo(k)fluoranthene | μg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | 9,000 | 78,000 | | |
| bis(2-Chloroethoxy)methane | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| bis(2-Chloroethyl) ether | μg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| bis(2-Ethylhexyl) phthalate | μg/kg | 590 | 420 | 440 | 440 | 390 | 140 | 140 | 290 | | | | |
| Butyl benzyl phthalate | μg/kg | 78 | <410 | 48 | 53 | 55 | 37 | <320 | 42 | | | | |
| Carbazole | μg/kg | 74 | 39 | 41 | 48 | <100 | <88 | 16 | 23 | | | | |
| Chrysene | μg/kg | **1300** | 290 | 300 | 230 | 210 | 95 | 48 | 270 | 87,000 | 780,000 | 384 | 2,800 |
| Di-n-butyl phthalate | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Di-n-octyl phthalate | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Dibenz(a,h)anthracene | μg/kg | **170** | 51 | 50 | 44 | 44 | <88 | <65 | 42 | 90 | 800 | 63 | 260 |
| Dibenzofuran | μg/kg | 89 | 29 | 41 | 32 | 33 | <430 | <320 | 28 | | | | |
| Diethyl phthalate | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Dimethyl phthalate | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Fluoranthene | μg/kg | **1900** | 420 | 470 | 390 | 330 | 140 | 71 | 370 | 310,000 | 5,000,000 | 600 | 5,100 |
| Fluorene | μg/kg | **180** | **47** | **72** | **33** | <100 | **74** | <65 | 53 | 310,000 | 5,000,000 | 19 | 540 |
| Hexachlorobenzene | μg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Hexachlorobutadiene | μg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Hexachlorocyclopentadiene | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Hexachloroethane | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Indeno(1,2,3-cd)pyrene | μg/kg | 570 | 170 | 220 | 160 | 130 | 61 | 33 | 160 | 900 | 8,000 | | |
| Isophorone | μg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |

| Table 3. (Continued) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted | ER-L | ER-M |
| **Semivolatiles (Continued)** | | | | | | | | | | | | | |
| N-Nitrosodi-n-propylamine | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| N-Nitrosodiphenylamine | µg/kg | 53 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Naphthalene | µg/kg | **1100** | 76 | 97 | 94 | 75 | <88 | 54 | 79 | 160,000 | 4,100,000 | 160 | 2,100 |
| Nitrobenzene | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Pentachlorophenol | µg/kg | <440 | <410 | <390 | <450 | <510 | <430 | <320 | <410 | | | | |
| Phenanthrene | µg/kg | **980** | 220 | 220 | 190 | 180 | 87 | 56 | 220 | 1,000,000 | 5,000,000 | 240 | 1,500 |
| Phenol | µg/kg | <90 | <83 | <78 | <91 | <100 | <88 | <65 | <83 | | | | |
| Pyrene | µg/kg | **1300** | 330 | 360 | 290 | 240 | 120 | 56 | 290 | | | 665 | 2,600 |
| **VOCs** | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 160,000 | 4,100,000 | | |
| 1,1,2,2-Tetrachloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 600 | 29,000 | | |
| 1,1,2-Trichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 1,000 | 100,000 | | |
| 1,1-Dichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 780,000 | 5,000,000 | | |
| 1,1-Dichloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| 1,2-Dichloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| 1,2-Dichloroethene (total) | µg/kg | <27 | <25 | <23 | <27 | <32 | <26 | <19 | <25 | 400 | 63,000 | | |
| 1,2-Dichloropropane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 9,000 | 84,000 | | |
| 2-Butanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | 11 | <12 | | | | |
| 2-Hexanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 310,000 | 5,000,000 | | |
| 4-Methyl-2-pentanone | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Acetone | µg/kg | 15 | <50 | <47 | <54 | <64 | <53 | 55 | <49 | 780,000 | 5,000,000 | | |
| Benzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 800 | 200,000 | | |
| Bromodichloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 10,000 | 92,000 | | |
| Bromoform | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 53,000 | 720,000 | | |
| Bromomethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 11,000 | 290,000 | | |
| Carbon disulfide | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 780,000 | 5,000,000 | | |
| Carbon tetrachloride | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 300 | 44,000 | | |
| Chlorobenzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 130,000 | 4,100,000 | | |
| Chloroethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 220,000 | 2,000,000 | | |
| Chloroform | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 300 | 940,000 | | |
| Chloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 49,000 | 440,000 | | |
| cis-1,3-Dichloropropene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 100 | 32,000 | | |
| Dibromochloromethane | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 8,000 | 68,000 | | |
| Ethylbenzene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 400,000 | 5,000,000 | | |
| Methylene chloride | µg/kg | 16 | 6 | 4.5 | 6.5 | 5.7 | 5.8 | 82 | 6 | 13,000 | 760,000 | | |
| Styrene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 1,000,000 | 5,000,000 | | |
| Tetrachloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Toluene | µg/kg | 48 | 180 | 2.5 | 67 | 77 | 34 | <9.7 | 21 | 650,000 | 5,000,000 | | |

| Table 3. (Continued) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** | **DNREC Non-critical Unrestricted** | **DNREC Non-critical Restricted** | **ER-L** | **ER-M** |
| **VOCs (Continued)** | | | | | | | | | | | | | |
| trans-1,3-Dichloropropene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 100 | 32,000 | | |
| Trichloroethene | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | | | | |
| Vinyl chloride | µg/kg | <14 | <12 | <12 | <14 | <16 | <13 | <9.7 | <12 | 30 | 3,000 | | |
| Xylenes (total) | µg/kg | <41 | <37 | <35 | <41 | <48 | <40 | <29 | <37 | 420,000 | 5,000,000 | | |
| | | | | | | | | | | | | | |
| Cyanide, Total | mg/kg | 0.27 | <1.2 | 0.61 | 0.36 | 0.4 | 0.28 | <0.97 | 0.33 | | | | |
| Total Sulfide | mg/kg | 110 | 59.5 | <70.2 | <81.2 | <95.5 | <79.1 | <58.2 | 39.5 | | | | |

Table 4. PCB congener testing results for samples collected from Wilmington Harbor sediments

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 1 (BZ) | ng/g | 0.34 | <0.99 | 0.11 | <0.14 | 0.047 | 0.035 | <0.78 | 0.036 |
| PCB 2 (BZ) | ng/g | 0.13 | <0.99 | 0.053 | 0.054 | 0.066 | 0.063 | 0.15 | 0.046 |
| PCB 3 (BZ) | ng/g | 0.69 | <0.99 | 0.09 | 0.082 | 0.081 | 0.065 | 0.33 | 0.066 |
| PCB 4 (BZ) | ng/g | 4.4 | 0.086 | 0.14 | 0.18 | 0.14 | 0.087 | 1.5 | 0.14 |
| PCB 5 (BZ) | ng/g | <1.1 | <0.99 | 0.0075 | 0.0074 | 0.012 | 0.0053 | <0.78 | 0.0094 |
| PCB 6 (BZ) | ng/g | 3.5 | <0.99 | 0.088 | 0.09 | 0.1 | 0.07 | 0.68 | 0.079 |
| PCB 7 (BZ) | ng/g | 0.14 | <0.99 | 0.018 | 0.016 | 0.016 | 0.011 | 0.13 | 0.016 |
| PCB 8 (BZ) | ng/g | 4.3 | 0.27 | 0.24 | 0.26 | 0.23 | 0.17 | 1.5 | 0.24 |
| PCB 9 (BZ) | ng/g | 0.27 | <0.99 | 0.018 | 0.017 | 0.011 | 0.015 | 0.19 | 0.014 |
| PCB 10 (BZ) | ng/g | 0.18 | <0.99 | 0.0096 | 0.01 | 0.011 | <0.026 | 0.11 | 0.0082 |
| PCB 11 (BZ) | ng/g | 0.93 | 0.47 | 0.29 | 0.43 | 0.63 | 0.39 | 0.58 | 0.42 |
| PCB 12 (BZ) | ng/g | 51 | <0.99 | 0.11 | 0.078 | 0.13 | 0.12 | 0.56 | 0.13 |
| PCB 13 (BZ) | ng/g | 51 | <0.99 | 0.11 | 0.078 | 0.13 | 0.12 | 0.56 | 0.13 |
| PCB 14 (BZ) | ng/g | <1.1 | <0.99 | 0.0027 | 0.0045 | 0.0059 | 0.0055 | <0.78 | <0.025 |
| PCB 15 (BZ) | ng/g | 23 | 0.49 | 0.45 | 0.46 | 0.55 | 0.44 | 2.2 | 0.47 |
| PCB 16 (BZ) | ng/g | 3.5 | <0.99 | 0.13 | 0.17 | 0.18 | 0.1 | 4.8 | 0.16 |
| PCB 17 (BZ) | ng/g | 38 | 0.18 | 0.25 | 0.3 | 0.33 | 0.16 | 6.3 | 0.26 |
| PCB 18 (BZ) | ng/g | 28 | 0.32 | 0.35 | 0.45 | 0.6 | 0.26 | 15 | 0.39 |
| PCB 19 (BZ) | ng/g | 12 | <0.99 | 0.089 | 0.11 | 0.13 | 0.051 | 1.3 | 0.092 |
| PCB 20 (BZ) | ng/g | 17 | 0.89 | 1 | 1.2 | 1.4 | 0.85 | 18 | 1.1 |
| PCB 21 (BZ) | ng/g | 4.5 | 0.16 | 0.24 | 0.27 | 0.27 | 0.19 | 5 | 0.27 |
| PCB 22 (BZ) | ng/g | 2.9 | 0.16 | 0.19 | 0.23 | 0.26 | 0.15 | 3.8 | 0.23 |
| PCB 23 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 24 (BZ) | ng/g | <1.1 | <0.99 | 0.0076 | <0.027 | <0.032 | 0.0043 | 0.11 | 0.0037 |
| PCB 25 (BZ) | ng/g | 19 | 0.13 | 0.17 | 0.18 | 0.28 | 0.12 | 1.3 | 0.16 |
| PCB 26 (BZ) | ng/g | 47 | 0.19 | 0.24 | 0.25 | 0.46 | 0.17 | 2.5 | 0.23 |
| PCB 27 (BZ) | ng/g | 38 | <0.99 | 0.11 | 0.053 | 0.12 | 0.061 | 0.76 | 0.098 |
| PCB 28 (BZ) | ng/g | 17 | 0.89 | 1 | 1.2 | 1.4 | 0.85 | 18 | 1.1 |
| PCB 29 (BZ) | ng/g | 47 | 0.19 | 0.24 | 0.25 | 0.46 | 0.17 | 2.5 | 0.23 |
| PCB 30 (BZ) | ng/g | 28 | 0.32 | 0.35 | 0.45 | 0.6 | 0.26 | 15 | 0.39 |
| PCB 31 (BZ) | ng/g | 27 | 0.51 | 0.68 | 0.81 | 0.96 | 0.55 | 17 | 0.7 |
| PCB 32 (BZ) | ng/g | 67 | 0.2 | 0.22 | 0.28 | 0.37 | 0.16 | 4.7 | 0.25 |
| PCB 33 (BZ) | ng/g | 4.5 | 0.16 | 0.24 | 0.27 | 0.27 | 0.19 | 5 | 0.27 |
| PCB 34 (BZ) | ng/g | 0.64 | <0.99 | 0.0091 | 0.01 | 0.012 | 0.0068 | 0.2 | 0.011 |
| PCB 35 (BZ) | ng/g | 0.33 | <0.99 | 0.056 | 0.086 | 0.068 | 0.061 | 0.33 | 0.057 |
| PCB 36 (BZ) | ng/g | 0.16 | <0.99 | 0.0073 | 0.012 | 0.012 | 0.012 | <0.78 | 0.0097 |
| PCB 37 (BZ) | ng/g | 2.2 | 0.3 | 0.35 | 0.42 | 0.47 | 0.37 | 3 | 0.4 |
| PCB 38 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 39 (BZ) | ng/g | 0.25 | <0.99 | 0.0092 | 0.013 | 0.014 | 0.0071 | 0.13 | 0.011 |
| PCB 40 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 41 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 42 (BZ) | ng/g | 9.5 | 0.4 | 0.34 | 0.41 | 0.54 | 0.27 | 8.4 | 0.37 |
| PCB 43 (BZ) | ng/g | <1.1 | <0.99 | 0.041 | 0.05 | 0.086 | 0.019 | 0.89 | 0.044 |
| PCB 44 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 45 (BZ) | ng/g | 55 | <0.99 | 0.34 | 0.34 | 0.45 | 0.19 | 5.5 | 0.31 |
| PCB 46 (BZ) | ng/g | 10 | <0.99 | 0.086 | 0.093 | 0.13 | 0.052 | 2 | 0.09 |
| PCB 47 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 48 (BZ) | ng/g | 3.1 | <0.99 | 0.14 | 0.17 | 0.23 | 0.097 | 4.9 | 0.18 |
| PCB 49 (BZ) | ng/g | 150 | 0.92 | 1.1 | 1.2 | 1.6 | 0.71 | 23 | 1.1 |

| Table 4. (Continued) | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 50 (BZ) | ng/g | 63 | 0.15 | 0.27 | 0.27 | 0.33 | 0.16 | 4.4 | 0.23 |
| PCB 51 (BZ) | ng/g | 55 | <0.99 | 0.34 | 0.34 | 0.45 | 0.19 | 5.5 | 0.31 |
| PCB 52 (BZ) | ng/g | 88 | 1.4 | 1.8 | 1.9 | 2.6 | 1.1 | 40 | 1.7 |
| PCB 53 (BZ) | ng/g | 63 | 0.15 | 0.27 | 0.27 | 0.33 | 0.16 | 4.4 | 0.23 |
| PCB 54 (BZ) | ng/g | 6.5 | <0.99 | 0.023 | <0.027 | 0.024 | 0.015 | <0.78 | 0.015 |
| PCB 55 (BZ) | ng/g | 0.13 | <0.99 | 0.028 | 0.032 | 0.025 | 0.015 | 0.27 | 0.012 |
| PCB 56 (BZ) | ng/g | 3.8 | 0.43 | 0.5 | 0.59 | 0.64 | 0.38 | 9.6 | 0.56 |
| PCB 57 (BZ) | ng/g | 0.55 | <0.99 | 0.011 | 0.013 | 0.026 | 0.0082 | <0.78 | 0.012 |
| PCB 58 (BZ) | ng/g | 0.2 | <0.99 | <0.023 | 0.011 | 0.015 | <0.026 | 0.29 | 0.01 |
| PCB 59 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 60 (BZ) | ng/g | 0.97 | <0.99 | 0.16 | 0.2 | 0.22 | 0.13 | 0.54 | 0.22 |
| PCB 61 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 62 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 63 (BZ) | ng/g | 0.92 | <0.99 | 0.05 | 0.059 | 0.081 | 0.037 | 0.88 | 0.056 |
| PCB 64 (BZ) | ng/g | 4.9 | 0.4 | 0.49 | 0.57 | 0.71 | 0.37 | 11 | 0.54 |
| PCB 65 (BZ) | ng/g | 90 | 1.4 | 1.5 | 1.6 | 2.2 | 0.99 | 31 | 1.4 |
| PCB 66 (BZ) | ng/g | 11 | 1.3 | 1.3 | 1.5 | 1.7 | 1.1 | 25 | 1.4 |
| PCB 67 (BZ) | ng/g | 0.52 | <0.99 | 0.048 | 0.059 | 0.076 | 0.037 | 0.49 | <0.025 |
| PCB 68 (BZ) | ng/g | 2.8 | <0.99 | 0.039 | 0.033 | 0.041 | 0.025 | 0.4 | 0.034 |
| PCB 69 (BZ) | ng/g | 150 | 0.92 | 1.1 | 1.2 | 1.6 | 0.71 | 23 | 1.1 |
| PCB 70 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 71 (BZ) | ng/g | 12 | 0.61 | 0.72 | 0.82 | 1.2 | 0.52 | 13 | 0.73 |
| PCB 72 (BZ) | ng/g | 3.4 | <0.99 | 0.044 | 0.051 | 0.067 | 0.027 | 0.76 | 0.041 |
| PCB 73 (BZ) | ng/g | <1.1 | <0.99 | 0.041 | 0.05 | 0.086 | 0.019 | 0.89 | 0.044 |
| PCB 74 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 75 (BZ) | ng/g | 2.8 | <0.99 | 0.13 | 0.15 | 0.19 | 0.092 | 2.7 | 0.13 |
| PCB 76 (BZ) | ng/g | 17 | 1.8 | 1.9 | 2.2 | 2.4 | 1.4 | 41 | 2 |
| PCB 77 (BZ) | ng/g | 0.71 | 0.15 | 0.22 | 0.28 | 0.27 | 0.19 | 1.8 | 0.22 |
| PCB 78 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 79 (BZ) | ng/g | 0.24 | <0.99 | 0.025 | 0.024 | 0.027 | 0.019 | 0.26 | 0.02 |
| PCB 80 (BZ) | ng/g | <1.1 | <0.99 | 0.016 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 81 (BZ) | ng/g | <1.1 | <0.99 | 0.0046 | 0.0055 | <0.032 | 0.0072 | <0.78 | <0.025 |
| PCB 82 (BZ) | ng/g | 2.4 | 0.34 | 0.25 | 0.37 | 0.35 | 0.17 | 3 | 0.32 |
| PCB 83 (BZ) | ng/g | 14 | 1.3 | 1.8 | 2.1 | 2.1 | 1.3 | 26 | 1.8 |
| PCB 84 (BZ) | ng/g | 6.7 | 0.63 | 0.66 | 0.75 | 0.88 | 0.43 | 10 | 0.7 |
| PCB 85 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 86 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 87 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 88 (BZ) | ng/g | 5.3 | 0.36 | 0.48 | 0.55 | 0.62 | 0.35 | 5.8 | 0.48 |
| PCB 89 (BZ) | ng/g | <1.1 | <0.99 | 0.019 | 0.037 | 0.032 | 0.016 | 0.52 | 0.029 |
| PCB 90 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 91 (BZ) | ng/g | 5.3 | 0.36 | 0.48 | 0.55 | 0.62 | 0.35 | 5.8 | 0.48 |
| PCB 92 (BZ) | ng/g | 6.1 | 0.46 | 0.55 | 0.66 | 0.69 | 0.37 | 7.9 | 0.59 |
| PCB 93 (BZ) | ng/g | 2.6 | <0.99 | 0.12 | 0.15 | 0.12 | 0.066 | 0.92 | 0.12 |
| PCB 94 (BZ) | ng/g | 0.87 | <0.99 | 0.029 | 0.041 | 0.038 | 0.021 | <0.78 | 0.032 |
| PCB 95 (BZ) | ng/g | 19 | 2 | 2 | 2.3 | 2.6 | 1.3 | 32 | 2 |
| PCB 96 (BZ) | ng/g | 0.38 | <0.99 | 0.026 | 0.031 | 0.039 | 0.015 | 0.51 | 0.029 |
| PCB 97 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 98 (BZ) | ng/g | 1.8 | <0.99 | 0.13 | 0.15 | 0.16 | 0.088 | 1.5 | 0.14 |
| PCB 99 (BZ) | ng/g | 14 | 1.3 | 1.8 | 2.1 | 2.1 | 1.3 | 26 | 1.8 |

| Table 4. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 100 (BZ) | ng/g | 2.6 | <0.99 | 0.12 | 0.15 | 0.12 | 0.066 | 0.92 | 0.12 |
| PCB 101 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 102 (BZ) | ng/g | 1.8 | <0.99 | 0.13 | 0.15 | 0.16 | 0.088 | 1.5 | 0.14 |
| PCB 103 (BZ) | ng/g | 2.8 | <0.99 | 0.077 | 0.075 | 0.093 | 0.054 | 0.89 | 0.067 |
| PCB 104 (BZ) | ng/g | 0.27 | <0.99 | 0.0063 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 105 (BZ) | ng/g | 4.3 | 0.69 | 0.77 | 0.91 | 0.94 | 0.54 | 5.2 | 0.89 |
| PCB 106 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 107 (BZ) | ng/g | 1.4 | 0.16 | 0.21 | 0.25 | 0.25 | 0.17 | 3.2 | 0.22 |
| PCB 108 (BZ) | ng/g | 0.49 | <0.99 | 0.075 | 0.1 | 0.099 | 0.06 | 0.54 | 0.1 |
| PCB 109 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 110 (BZ) | ng/g | 25 | 2.6 | 3.1 | 3.6 | 3.8 | 2 | 39 | 3.3 |
| PCB 111 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | 0.012 | <0.032 | 0.009 | 0.1 | <0.025 |
| PCB 112 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 113 (BZ) | ng/g | 23 | 2.5 | 2.6 | 3 | 3.2 | 1.7 | 38 | 2.8 |
| PCB 114 (BZ) | ng/g | 0.19 | <0.99 | 0.043 | 0.055 | 0.063 | 0.023 | 0.26 | 0.048 |
| PCB 115 (BZ) | ng/g | 25 | 2.6 | 3.1 | 3.6 | 3.8 | 2 | 39 | 3.3 |
| PCB 116 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 117 (BZ) | ng/g | 3.6 | 0.51 | 0.4 | 0.47 | 0.5 | 0.26 | 4.5 | 0.39 |
| PCB 118 (BZ) | ng/g | 15 | 2 | 2.3 | 2.4 | 2.5 | 1.5 | 30 | 2.3 |
| PCB 119 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 120 (BZ) | ng/g | 0.27 | <0.99 | 0.026 | 0.035 | 0.022 | 0.018 | 0.27 | 0.026 |
| PCB 121 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 122 (BZ) | ng/g | <1.1 | <0.99 | 0.042 | 0.046 | 0.044 | 0.019 | 0.24 | 0.047 |
| PCB 123 (BZ) | ng/g | 0.2 | <0.99 | 0.053 | 0.05 | 0.041 | 0.033 | 0.13 | 0.054 |
| PCB 124 (BZ) | ng/g | 0.49 | <0.99 | 0.075 | 0.1 | 0.099 | 0.06 | 0.54 | 0.1 |
| PCB 125 (BZ) | ng/g | 13 | 1.1 | 1.5 | 1.8 | 1.9 | 0.93 | 19 | 1.6 |
| PCB 126 (BZ) | ng/g | <1.1 | <0.99 | 0.016 | 0.02 | 0.019 | 0.012 | <0.78 | 0.012 |
| PCB 127 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 128 (BZ) | ng/g | 2.7 | 0.5 | 0.52 | 0.58 | 0.63 | 0.36 | 3.7 | 0.55 |
| PCB 129 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 130 (BZ) | ng/g | 1.4 | <0.99 | 0.21 | 0.26 | 0.25 | 0.18 | 2.2 | 0.26 |
| PCB 131 (BZ) | ng/g | <1.1 | <0.99 | 0.031 | 0.05 | 0.053 | 0.025 | 0.18 | 0.048 |
| PCB 132 (BZ) | ng/g | 6.7 | 0.97 | 1.1 | 1.2 | 1.3 | 0.76 | 11 | 1.1 |
| PCB 133 (BZ) | ng/g | 0.46 | <0.99 | 0.1 | 0.12 | 0.14 | 0.08 | 0.56 | 0.089 |
| PCB 134 (BZ) | ng/g | 1.5 | <0.99 | 0.21 | 0.25 | 0.23 | 0.14 | 2.2 | 0.23 |
| PCB 135 (BZ) | ng/g | 7.9 | 1 | 1.3 | 1.6 | 1.7 | 0.92 | 11 | 1.4 |
| PCB 136 (BZ) | ng/g | 3.1 | 0.32 | 0.48 | 0.58 | 0.62 | 0.35 | 4.2 | 0.5 |
| PCB 137 (BZ) | ng/g | 0.68 | <0.99 | 0.11 | 0.12 | 0.12 | 0.082 | 0.9 | 0.12 |
| PCB 138 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 139 (BZ) | ng/g | 0.3 | <0.99 | 0.06 | 0.061 | 0.08 | 0.037 | 0.59 | 0.075 |
| PCB 140 (BZ) | ng/g | 0.3 | <0.99 | 0.06 | 0.061 | 0.08 | 0.037 | 0.59 | 0.075 |
| PCB 141 (BZ) | ng/g | 3.3 | 0.34 | 0.52 | 0.64 | 0.67 | 0.35 | 3.6 | 0.58 |
| PCB 142 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 143 (BZ) | ng/g | 1.5 | <0.99 | 0.21 | 0.25 | 0.23 | 0.14 | 2.2 | 0.23 |
| PCB 144 (BZ) | ng/g | 0.78 | <0.99 | 0.13 | 0.17 | 0.19 | 0.11 | 0.81 | 0.17 |
| PCB 145 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 146 (BZ) | ng/g | 3.5 | 0.61 | 0.71 | 0.8 | 0.86 | 0.57 | 6.4 | 0.72 |
| PCB 147 (BZ) | ng/g | 15 | 2.6 | 2.9 | 3.4 | 3.6 | 2.3 | 24 | 2.9 |
| PCB 148 (BZ) | ng/g | <1.1 | <0.99 | 0.026 | 0.029 | 0.028 | 0.022 | <0.78 | 0.022 |
| PCB 149 (BZ) | ng/g | 15 | 2.6 | 2.9 | 3.4 | 3.6 | 2.3 | 24 | 2.9 |

Table 4. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 150 (BZ) | ng/g | <1.1 | <0.99 | 0.025 | 0.032 | 0.036 | 0.021 | <0.78 | 0.029 |
| PCB 151 (BZ) | ng/g | 7.9 | 1 | 1.3 | 1.6 | 1.7 | 0.92 | 11 | 1.4 |
| PCB 152 (BZ) | ng/g | <1.1 | <0.99 | 0.0027 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 153 (BZ) | ng/g | 15 | 2.8 | 3.1 | 3.6 | 3.8 | 2.4 | 24 | 3.2 |
| PCB 154 (BZ) | ng/g | 0.6 | <0.99 | 0.16 | 0.19 | 0.22 | 0.16 | 0.72 | 0.15 |
| PCB 155 (BZ) | ng/g | <1.1 | <0.99 | 0.012 | <0.027 | <0.032 | 0.013 | <0.78 | 0.015 |
| PCB 156 (BZ) | ng/g | 1.5 | 0.23 | 0.3 | 0.37 | 0.37 | 0.22 | 2.6 | 0.34 |
| PCB 157 (BZ) | ng/g | 1.5 | 0.23 | 0.3 | 0.37 | 0.37 | 0.22 | 2.6 | 0.34 |
| PCB 158 (BZ) | ng/g | 1.6 | 0.28 | 0.28 | 0.34 | 0.37 | 0.19 | 2.1 | 0.3 |
| PCB 159 (BZ) | ng/g | <1.1 | <0.99 | 0.026 | 0.026 | 0.045 | 0.018 | 0.14 | 0.033 |
| PCB 160 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 161 (BZ) | ng/g | <1.1 | <0.99 | 0.0043 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 162 (BZ) | ng/g | <1.1 | <0.99 | 0.018 | 0.018 | 0.027 | 0.017 | <0.78 | 0.027 |
| PCB 163 (BZ) | ng/g | 19 | 2.9 | 3.5 | 4 | 4.2 | 2.5 | 26 | 3.7 |
| PCB 164 (BZ) | ng/g | 1.4 | 0.11 | 0.28 | 0.31 | 0.33 | 0.2 | 2.1 | 0.3 |
| PCB 165 (BZ) | ng/g | <1.1 | <0.99 | 0.0041 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 166 (BZ) | ng/g | 2.7 | 0.5 | 0.52 | 0.58 | 0.63 | 0.36 | 3.7 | 0.55 |
| PCB 167 (BZ) | ng/g | 0.58 | <0.99 | 0.13 | 0.15 | 0.17 | 0.096 | 0.89 | 0.13 |
| PCB 168 (BZ) | ng/g | 15 | 2.8 | 3.1 | 3.6 | 3.8 | 2.4 | 24 | 3.2 |
| PCB 169 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | 0.0037 | <0.032 | <0.026 | <0.78 | 0.0058 |
| PCB 170 (BZ) | ng/g | 3.4 | 0.58 | 0.86 | 1 | 1.1 | 0.59 | 4.7 | 0.94 |
| PCB 171 (BZ) | ng/g | 1.1 | 0.16 | 0.27 | 0.32 | 0.33 | 0.2 | 1.5 | 0.3 |
| PCB 172 (BZ) | ng/g | 0.53 | 0.2 | 0.17 | 0.18 | 0.22 | 0.12 | 0.8 | 0.17 |
| PCB 173 (BZ) | ng/g | 1.1 | 0.16 | 0.27 | 0.32 | 0.33 | 0.2 | 1.5 | 0.3 |
| PCB 174 (BZ) | ng/g | 3.6 | 0.69 | 0.89 | 1.1 | 1.1 | 0.66 | 5.5 | 0.97 |
| PCB 175 (BZ) | ng/g | 0.17 | <0.99 | 0.044 | 0.058 | 0.062 | 0.035 | 0.16 | 0.048 |
| PCB 176 (BZ) | ng/g | 0.53 | <0.99 | 0.12 | 0.13 | 0.16 | 0.097 | 0.68 | 0.13 |
| PCB 177 (BZ) | ng/g | 2.5 | 0.35 | 0.61 | 0.74 | 0.77 | 0.44 | 3.4 | 0.63 |
| PCB 178 (BZ) | ng/g | 1.1 | 0.17 | 0.26 | 0.33 | 0.37 | 0.21 | 1.3 | 0.28 |
| PCB 179 (BZ) | ng/g | 1.7 | 0.4 | 0.48 | 0.56 | 0.59 | 0.36 | 2.6 | 0.5 |
| PCB 180 (BZ) | ng/g | 7.2 | 1.8 | 1.9 | 2.3 | 2.4 | 1.3 | 10 | 2 |
| PCB 181 (BZ) | ng/g | <1.1 | <0.99 | 0.0089 | <0.027 | <0.032 | <0.026 | <0.78 | 0.01 |
| PCB 182 (BZ) | ng/g | <1.1 | <0.99 | 0.021 | 0.037 | 0.032 | 0.02 | 0.11 | <0.025 |
| PCB 183 (BZ) | ng/g | 2.5 | 0.39 | 0.64 | 0.79 | 0.81 | 0.51 | 3.3 | 0.74 |
| PCB 184 (BZ) | ng/g | <1.1 | <0.99 | 0.0089 | 0.019 | 0.015 | 0.009 | <0.78 | 0.0091 |
| PCB 185 (BZ) | ng/g | 2.5 | 0.39 | 0.64 | 0.79 | 0.81 | 0.51 | 3.3 | 0.74 |
| PCB 186 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 187 (BZ) | ng/g | 4.7 | 1.6 | 1.5 | 1.7 | 1.8 | 1.2 | 7.5 | 1.5 |
| PCB 188 (BZ) | ng/g | <1.1 | <0.99 | 0.023 | 0.032 | 0.037 | 0.037 | <0.78 | 0.025 |
| PCB 189 (BZ) | ng/g | 0.13 | <0.99 | 0.039 | 0.046 | 0.043 | 0.03 | 0.17 | 0.047 |
| PCB 190 (BZ) | ng/g | 0.48 | <0.99 | 0.17 | 0.2 | 0.22 | 0.11 | 0.91 | 0.18 |
| PCB 191 (BZ) | ng/g | 0.18 | <0.99 | 0.038 | 0.043 | 0.053 | 0.024 | 0.22 | 0.04 |
| PCB 192 (BZ) | ng/g | <1.1 | <0.99 | <0.023 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 193 (BZ) | ng/g | 7.2 | 1.8 | 1.9 | 2.3 | 2.4 | 1.3 | 10 | 2 |
| PCB 194 (BZ) | ng/g | 2.3 | 0.69 | 0.61 | 0.73 | 0.81 | 0.51 | 3.2 | 0.66 |
| PCB 195 (BZ) | ng/g | 0.67 | <0.99 | 0.22 | 0.26 | 0.27 | 0.19 | 0.95 | 0.22 |
| PCB 196 (BZ) | ng/g | 1.2 | 0.49 | 0.47 | 0.56 | 0.61 | 0.46 | 1.3 | 0.5 |
| PCB 197 (BZ) | ng/g | <1.1 | <0.99 | 0.059 | 0.078 | 0.073 | 0.069 | 0.21 | 0.06 |
| PCB 198 (BZ) | ng/g | 3.7 | 1.5 | 1.6 | 1.9 | 2.2 | 1.6 | 5.9 | 1.7 |
| PCB 199 (BZ) | ng/g | 0.31 | 0.088 | 0.074 | 0.1 | 0.11 | 0.061 | 0.3 | 0.081 |

| Table 4. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 200 (BZ) | ng/g | 0.31 | 0.14 | 0.2 | 0.25 | 0.27 | 0.22 | 0.57 | 0.2 |
| PCB 201 (BZ) | ng/g | 3.7 | 1.5 | 1.6 | 1.9 | 2.2 | 1.6 | 5.9 | 1.7 |
| PCB 202 (BZ) | ng/g | 1 | 0.54 | 0.54 | 0.65 | 0.75 | 0.61 | 1.6 | 0.55 |
| PCB 203 (BZ) | ng/g | 1.5 | 0.8 | 0.7 | 0.8 | 0.85 | 0.6 | 2.1 | 0.74 |
| PCB 204 (BZ) | ng/g | <1.1 | <0.99 | 0.0087 | <0.027 | <0.032 | <0.026 | <0.78 | <0.025 |
| PCB 205 (BZ) | ng/g | <1.1 | <0.99 | 0.037 | 0.043 | 0.058 | 0.027 | <0.78 | 0.04 |
| PCB 206 (BZ) | ng/g | 7.2 | 5.6 | 5.9 | 6.1 | 7.7 | 7.4 | 14 | 5.5 |
| PCB 207 (BZ) | ng/g | 0.83 | 0.64 | 0.48 | 0.55 | 0.7 | 0.64 | 1.2 | 0.47 |
| PCB 208 (BZ) | ng/g | 3 | 2.4 | 2.5 | 2.8 | 3.5 | 3.4 | 6.1 | 2.4 |
| PCB 209 (BZ) | ng/g | 21 | 11 | 10 | 11 | 13 | 11 | 88 | 9.2 |

Table 5. PCB congener totals testing results for samples collected from Wilmington Harbor sediments. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels. Bolded concentrations are over ER-L sediment guidelines while underlined values are over ER-M levels

| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** | **DNREC Non-critical Un-restricted** | **DNREC Non-critical Restricted** | **ER-L** | ER-M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monochlorobiphenyl | ng/g | 1.2 | <0.99 | 0.25 | 0.14 | 0.19 | 0.16 | 0.47 | 0.15 | | | | |
| Dichlorobiphenyl | ng/g | 88 | 1.3 | 1.4 | 1.5 | 1.8 | 1.3 | 7.5 | 1.5 | | | | |
| Trichlorobiphenyl | ng/g | 310 | 3 | 4.1 | 4.9 | 5.9 | 3.3 | 84 | 4.4 | | | | |
| Tetrachlorobiphenyl | ng/g | 530 | 8.9 | 11 | 13 | 16 | 8 | 230 | 11 | | | | |
| Pentachlorobiphenyl | ng/g | 150 | 15 | 17 | 20 | 21 | 12 | 230 | 18 | | | | |
| Hexachlorobiphenyl | ng/g | 87 | 13 | 16 | 19 | 20 | 12 | 130 | 17 | | | | |
| Heptachlorobiphenyl | ng/g | 30 | 6.4 | 8 | 9.6 | 10 | 5.9 | 43 | 8.6 | | | | |
| Octachlorobiphenyl | ng/g | 11 | 4.2 | 4.6 | 5.4 | 6 | 4.3 | 16 | 4.7 | | | | |
| Nonachlorobiphenyl | ng/g | 11 | 8.6 | 8.9 | 9.5 | 12 | 11 | 21 | 8.3 | | | | |
| Decachlorobiphenyl | ng/g | 21 | 11 | 10 | 11 | 13 | 11 | 88 | 9.2 | | | | |
| Total | | 1239.2 | **71.4** | **81.3** | **94.0** | **105.9** | **69.0** | **850.0** | **82.9** | 1000 | 1000 | 22.7 | 180 |

Table 6. Dissolved modified elutriate testing results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | | | |
| Aroclor 1016 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1221 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1232 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1242 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| Aroclor 1248 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | 0.8 | <0.38 | | |
| Aroclor 1254 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | 1.9 | <0.38 | | |
| Aroclor 1260 | µg/L | <0.40 | <0.40 | <0.40 | <0.38 | <0.39 | <0.38 | <0.39 | <0.38 | | |
| **Pesticides** | | | | | | | | | | | |
| 4,4-DDD | µg/L | <0.050 | <0.050 | <0.050 | 0.0075 | <0.048 | <0.048 | 0.021 | <0.048 | 0.13 | 0.001 |
| 4,4-DDE | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.045 | <0.048 | 0.13 | 0.001 |
| 4,4-DDT | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.13 | 0.001 |
| Aldrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| alpha-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| alpha-Chlordane | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| beta-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| delta-BHC | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Dieldrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.71 | 0.0019 |
| Endosulfan I | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.034 | 0.0087 |
| Endosulfan II | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endosulfan sulfate | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endrin | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | 0.037 | 0.0023 |
| Endrin aldehyde | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Endrin ketone | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| gamma-BHC (Lindane) | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| gamma-Chlordane | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.037 | <0.048 | | |
| Heptachlor | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | 0.01 | <0.048 | 0.053 | 0.0036 |
| Heptachlor epoxide | µg/L | <0.050 | <0.050 | <0.050 | <0.048 | <0.048 | <0.048 | <0.048 | <0.048 | | |
| Methoxychlor | µg/L | <0.099 | <0.099 | <0.099 | <0.096 | <0.097 | <0.096 | <0.097 | <0.096 | | 0.03 |
| Toxaphene | µg/L | <2.0 | <2.0 | <2.0 | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | 0.21 | 0.002 |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | | | | |
| Aluminum | µg/L | 336 | 105 | 973 | 119 | 95.7 | 62.3 | 51.5 | 52.7 | | |
| Antimony | µg/L | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | 6.1 | <10.0 | | |
| Arsenic | µg/L | 13.6 | 32.3 | 30.3 | 27 | 23.7 | 35.4 | 29.1 | 29.6 | 69 | 36 |
| Barium | µg/L | 66.9 | 112 | 71 | 104 | 115 | 48 | 13.1 | 78.9 | | |
| Beryllium | µg/L | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | <4.0 | | |
| Cadmium | µg/L | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | 40 | 8.8 |
| Calcium | µg/L | 17,900 | 44,700 | 26,100 | 43,800 | 54,600 | 22,400 | 6,010 | 32,800 | | |
| Chromium | µg/L | 2.9 | 2.2 | 4.2 | 2.4 | 3.8 | 2.1 | 2.9 | 1.6 | 1100 | 50 |
| Cobalt | µg/L | 2 | 2.3 | 2.3 | 2.6 | 2.5 | 2.2 | 1.9 | 2.3 | | |
| Copper | µg/L | 1.1 | 1.1 | 2.5 | <25.0 | 1.4 | 2.4 | 6.2 | 1.1 | 4.8 | 3.1 |
| Iron | µg/L | 929 | 197 | 1190 | 639 | 85.5 | <100 | 47.9 | <100 | | |
| Lead | µg/L | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | <3.0 | 210 | 8.1 |
| Magnesium | µg/L | 16,200 | 39,700 | 29,300 | 27,900 | 32,500 | 27,300 | 7,380 | 33,100 | | |
| Manganese | µg/L | 1590 | 3810 | 1980 | 4470 | 6740 | 1740 | 86.6 | 2530 | | |
| Mercury | µg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 1.8 | 0.94 |
| Nickel | µg/L | 9.3 | 10 | 9.4 | 8 | 9.7 | 7.9 | 7.1 | 7.8 | 74 | 8.2 |
| Potassium | µg/L | 13,800 | 16,700 | 15,300 | 11,300 | 10,900 | 16,500 | 8,380 | 15,400 | | |
| Selenium | µg/L | 3.1 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | 290 | 71 |
| Silver | µg/L | 0.77 | <5.0 | 0.76 | 1 | 1.7 | <5.0 | <5.0 | 0.81 | 1.9 | |
| Sodium | µg/L | 142,000 | 175,000 | 161,000 | 94,200 | 96,300 | 165,000 | 71,800 | 161,000 | | |
| Thallium | µg/L | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | | |
| Vanadium | µg/L | 4.7 | 4.5 | 9.2 | 4.7 | 4.8 | 10.2 | 20.2 | 5.5 | | |
| Zinc | µg/L | 14.2 | 11 | 25.8 | 7.5 | 6.8 | 10.6 | 26.7 | 6.7 | 90 | 81 |
| **Semivolatiles** | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,2-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,3-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 1,4-Dichlorobenzene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,2-oxybis(1-Chloropropane) | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,4,5-Trichlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,4,6-Trichlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,4-Dichlorophenol | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2,4-Dimethylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | |
| 2,4-Dinitrophenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 2,4-Dinitrotoluene | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2,6-Dinitrotoluene | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Chloronaphthalene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2-Chlorophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Methylnaphthalene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| 2-Methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 2-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 2-Nitrophenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 3,3-Dichlorobenzidine | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 3-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4,6-Dinitro-2-methylphenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4-Bromophenyl phenyl ether | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chloro-3-methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chloroaniline | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Chlorophenyl phenyl ether | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Methylphenol | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| 4-Nitroaniline | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| 4-Nitrophenol | µg/L | <48 | <48 | <48 | <48 | <48 | <49 | <48 | <47 | | |
| Acenaphthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Acenaphthylene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Anthracene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(a)anthracene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(a)pyrene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(b)fluoranthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(ghi)perylene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Benzo(k)fluoranthene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| bis(2-Chloroethoxy)methane | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| bis(2-Chloroethyl) ether | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| bis(2-Ethylhexyl) phthalate | µg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Butyl benzyl phthalate | µg/L | <9.5 | <9.6 | <9.7 | 2.1 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Carbazole | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Chrysene | µg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |

Table 6. (Continued)

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Semivolatiles (Continued)** | | | | | | | | | | | |
| Di-n-butyl phthalate | μg/L | <9.5 | <9.6 | <9.7 | 0.56 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Di-n-octyl phthalate | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Dibenz(a,h)anthracene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Dibenzofuran | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Diethyl phthalate | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Dimethyl phthalate | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Fluoranthene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Fluorene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorobenzene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorobutadiene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Hexachlorocyclopentadiene | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Hexachloroethane | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Indeno(1,2,3-cd)pyrene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Isophorone | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| N-Nitrosodi-n-propylamine | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| N-Nitrosodiphenylamine | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Naphthalene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Nitrobenzene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Pentachlorophenol | μg/L | <9.5 | <9.6 | <9.7 | <9.6 | <9.6 | <9.8 | <9.5 | <9.4 | | |
| Phenanthrene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Phenol | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| Pyrene | μg/L | <1.9 | <1.9 | <1.9 | <1.9 | <1.9 | <2.0 | <1.9 | <1.9 | | |
| **WET** | | | | | | | | | | | |
| Dissolved Cyanide | μg/L | 2.4 | 5.4 | 2.8 | 3 | 4.9 | 4.8 | 3.8 | 3.7 | | |
| Dissolved Sulfide | mg/L | <3.0 | <3.0 | <3.0 | 1.6 | <3.0 | <3.0 | <3.0 | <3.0 | | |
| Total Suspended Solids | mg/L | 16 | 102 | 13 | 62 | 46 | 218 | 7 | 20 | | |

| Table 7. Background and Site Water testing results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria. | | | | | |
|---|---|---|---|---|---|
| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
| **PCBs** | | | | | |
| Aroclor 1016 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1221 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1232 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1242 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1248 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1254 | µg/L | <0.39 | <0.38 | | |
| Aroclor 1260 | g/L | <0.39 | <0.38 | | |
| **Pesticides** | | | | | |
| 4,4-DDD | µg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| 4,4-DDE | µg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| 4,4-DDT | µg/L | <0.048 | <0.048 | 0.13 | 0.001 |
| Aldrin | µg/L | <0.048 | <0.048 | | |
| alpha-BHC | µg/L | <0.048 | <0.048 | | |
| alpha-Chlordane | µg/L | <0.048 | <0.048 | | |
| beta-BHC | µg/L | <0.048 | <0.048 | | |
| delta-BHC | µg/L | <0.048 | <0.048 | | |
| Dieldrin | µg/L | <0.048 | <0.048 | 0.71 | 0.0019 |
| Endosulfan I | µg/L | <0.048 | <0.048 | 0.034 | 0.0087 |
| Endosulfan II | µg/L | <0.048 | <0.048 | | |
| Endosulfan sulfate | µg/L | <0.048 | <0.048 | | |
| Endrin | µg/L | <0.048 | <0.048 | 0.037 | 0.0023 |
| Endrin aldehyde | µg/L | <0.048 | <0.048 | | |
| Endrin ketone | µg/L | <0.048 | <0.048 | | |
| gamma-BHC (Lindane) | µg/L | <0.048 | <0.048 | | |
| gamma-Chlordane | µg/L | <0.048 | <0.048 | | |
| Heptachlor | µg/L | <0.048 | <0.048 | 0.053 | 0.0036 |
| Heptachlor epoxide | µg/L | <0.048 | <0.048 | | |
| Methoxychlor | µg/L | <0.097 | <0.095 | | 0.03 |
| Toxaphene | µg/L | <1.9 | <1.9 | 0.21 | 0.002 |
| **Dissolved Inorganics** | | | | | |
| Aluminum | µg/L | 436 | 34.6 | | |
| Antimony | µg/L | <10.0 | <10.0 | | |
| Arsenic | µg/L | 2.2 | <10.0 | 69 | 36 |
| Barium | µg/L | 31 | <200 | | |
| Beryllium | µg/L | 0.77 | 0.97 | | |
| Cadmium | µg/L | <5.0 | <5.0 | 40 | 8.8 |
| Calcium | µg/L | 20400 | <5000 | | |
| Chromium | µg/L | 1.3 | <5.0 | 1100 | 50 |
| Cobalt | µg/L | 0.78 | <50.0 | | |
| Copper | µg/L | <25.0 | <25.0 | 4.8 | 3.1 |
| Iron | µg/L | 630 | <100 | | |
| Lead | µg/L | <3.0 | <3.0 | 210 | 8.1 |
| Magnesium | µg/L | 9070 | <5000 | | |
| Manganese | µg/L | 56.2 | <15.0 | | |
| Mercury | µg/L | <0.20 | <0.20 | 1.8 | 0.94 |

Table 7. (Continued)

| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|
| **Dissolved Inorganics (Continued)** | | | | | |
| Nickel | μg/L | 2.3 | <40.0 | 75 | 8.2 |
| Potassium | μg/L | 2950 | <5000 | | |
| Selenium | μg/L | <5.0 | <5.0 | 290 | 71 |
| Silver | μg/L | <5.0 | <5.0 | 1.9 | |
| Sodium | μg/L | 32800 | <5000 | | |
| Thallium | μg/L | <10.0 | <10.0 | | |
| Vanadium | μg/L | 2.6 | <50.0 | | |
| Zinc | μg/L | 11.7 | 1.4 | 90 | 81 |
| **Semivolatiles** | | | | | |
| 1,2,4-Trichlorobenzene | μg/L | <1.9 | <1.9 | | |
| 1,2-Dichlorobenzene | μg/L | <1.9 | <1.9 | | |
| 1,3-Dichlorobenzene | μg/L | <1.9 | <1.9 | | |
| 1,4-Dichlorobenzene | μg/L | <1.9 | <1.9 | | |
| 2,2-oxybis(1-Chloropropane) | μg/L | <1.9 | <1.9 | | |
| 2,4,5-Trichlorophenol | μg/L | <9.6 | <9.4 | | |
| 2,4,6-Trichlorophenol | μg/L | <9.6 | <9.4 | | |
| 2,4-Dichlorophenol | μg/L | <1.9 | <1.9 | | |
| 2,4-Dimethylphenol | μg/L | <9.6 | <9.4 | | |
| 2,4-Dinitrophenol | μg/L | <48 | <47 | | |
| 2,4-Dinitrotoluene | μg/L | <9.6 | <9.4 | | |
| 2,6-Dinitrotoluene | μg/L | <9.6 | <9.4 | | |
| 2-Chloronaphthalene | μg/L | <1.9 | <1.9 | | |
| 2-Chlorophenol | μg/L | <9.6 | <9.4 | | |
| 2-Methylnaphthalene | μg/L | <1.9 | <1.9 | | |
| 2-Methylphenol | μg/L | <9.6 | <9.4 | | |
| 2-Nitroaniline | μg/L | <48 | <47 | | |
| 2-Nitrophenol | μg/L | <9.6 | <9.4 | | |
| 3,3-Dichlorobenzidine | μg/L | <9.6 | <9.4 | | |
| 3-Nitroaniline | μg/L | <48 | <47 | | |
| 4,6-Dinitro-2-methylphenol | μg/L | <48 | <47 | | |
| 4-Bromophenyl phenyl ether | μg/L | <9.6 | <9.4 | | |
| 4-Chloro-3-methylphenol | μg/L | <9.6 | <9.4 | | |
| 4-Chloroaniline | μg/L | <9.6 | <9.4 | | |
| 4-Chlorophenyl phenyl ether | μg/L | <9.6 | <9.4 | | |
| 4-Methylphenol | μg/L | <9.6 | <9.4 | | |
| 4-Nitroaniline | μg/L | <48 | <47 | | |
| 4-Nitrophenol | μg/L | <48 | <47 | | |
| Acenaphthene | μg/L | <1.9 | <1.9 | | |
| Acenaphthylene | μg/L | <1.9 | <1.9 | | |
| Anthracene | μg/L | <1.9 | <1.9 | | |
| Benzo(a)anthracene | μg/L | <1.9 | <1.9 | | |
| Benzo(a)pyrene | μg/L | <1.9 | <1.9 | | |
| Benzo(b)fluoranthene | μg/L | <1.9 | <1.9 | | |
| Benzo(ghi)perylene | μg/L | <1.9 | <1.9 | | |
| Benzo(k)fluoranthene | μg/L | <1.9 | <1.9 | | |
| bis(2-Chloroethoxy)methane | μg/L | <9.6 | <9.4 | | |
| bis(2-Chloroethyl) ether | μg/L | <1.9 | <1.9 | | |

| Table 7. (Continued) | | | | | |
|---|---|---|---|---|---|
| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
| **Semivolatiles (Continued)** | | | | | |
| bis(2-Ethylhexyl) phthalate | µg/L | <9.6 | <9.4 | | |
| Butyl benzyl phthalate | µg/L | <9.6 | <9.4 | | |
| Carbazole | µg/L | <1.9 | <1.9 | | |
| Chrysene | µg/L | <1.9 | <1.9 | | |
| Di-n-butyl phthalate | µg/L | <9.6 | <9.4 | | |
| Di-n-octyl phthalate | µg/L | <9.6 | <9.4 | | |
| Dibenz(a,h)anthracene | µg/L | <1.9 | <1.9 | | |
| Dibenzofuran | µg/L | <9.6 | <9.4 | | |
| Diethyl phthalate | µg/L | <9.6 | <9.4 | | |
| Dimethyl phthalate | µg/L | <9.6 | <9.4 | | |
| Fluoranthene | µg/L | <1.9 | <1.9 | | |
| Fluorene | µg/L | <1.9 | <1.9 | | |
| Hexachlorobenzene | µg/L | <1.9 | <1.9 | | |
| Hexachlorobutadiene | µg/L | <1.9 | <1.9 | | |
| Hexachlorocyclopentadiene | µg/L | <9.6 | <9.4 | | |
| Hexachloroethane | µg/L | <9.6 | <9.4 | | |
| Indeno(1,2,3-cd)pyrene | µg/L | <1.9 | <1.9 | | |
| Isophorone | µg/L | <9.6 | <9.4 | | |
| N-Nitrosodi-n-propylamine | µg/L | <1.9 | <1.9 | | |
| N-Nitrosodiphenylamine | µg/L | <1.9 | <1.9 | | |
| Naphthalene | µg/L | <1.9 | <1.9 | | |
| Nitrobenzene | µg/L | <1.9 | <1.9 | | |
| Pentachlorophenol | µg/L | <9.6 | <9.4 | | |
| Phenanthrene | µg/L | <1.9 | <1.9 | | |
| Phenol | µg/L | <1.9 | <1.9 | | |
| Pyrene | µg/L | <1.9 | <1.9 | | |
| **VOCs** | | | | | |
| 1,1,1-Trichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1,2,2-Tetrachloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1,2-Trichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1-Dichloroethane | µg/L | <5.0 | <5.0 | | |
| 1,1-Dichloroethene | µg/L | <5.0 | <5.0 | | |
| 1,2-Dichloroethane | µg/L | <5.0 | 1.7 | | |
| 1,2-Dichloroethene (total) | µg/L | <10 | <10 | | |
| 1,2-Dichloropropane | µg/L | <5.0 | <5.0 | | |
| 2-Butanone | µg/L | <5.0 | <5.0 | | |
| 2-Hexanone | µg/L | <5.0 | <5.0 | | |
| 4-Methyl-2-pentanone | µg/L | <5.0 | <5.0 | | |
| Acetone | µg/L | <20 | <20 | | |
| Benzene | µg/L | <5.0 | <5.0 | | |
| Bromodichloromethane | µg/L | <5.0 | <5.0 | | |
| Bromoform | µg/L | <5.0 | <5.0 | | |
| Bromomethane | µg/L | <5.0 | <5.0 | | |
| Carbon disulfide | µg/L | <5.0 | <5.0 | | |
| Carbon tetrachloride | µg/L | <5.0 | <5.0 | | |
| Chlorobenzene | µg/L | <5.0 | <5.0 | | |
| Chloroethane | µg/L | <5.0 | <5.0 | | |

Table 7. (Continued)

| | Units | Site Water | Equipment Blank | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|
| **VOCs (Continued)** | | | | | |
| Chloroform | µg/L | <5.0 | <5.0 | | |
| Chloromethane | µg/L | <5.0 | <5.0 | | |
| cis-1,3-Dichloropropene | µg/L | <5.0 | <5.0 | | |
| Dibromochloromethane | µg/L | <5.0 | <5.0 | | |
| Ethylbenzene | µg/L | <5.0 | <5.0 | | |
| Methylene chloride | µg/L | <5.0 | 3.7 | | |
| Styrene | µg/L | <5.0 | <5.0 | | |
| Tetrachloroethene | µg/L | <5.0 | <5.0 | | |
| Toluene | µg/L | <5.0 | <5.0 | | |
| trans-1,3-Dichloropropene | µg/L | <5.0 | <5.0 | | |
| Trichloroethene | µg/L | <5.0 | 3.1 | | |
| Vinyl chloride | µg/L | <5.0 | <5.0 | | |
| Xylenes (total) | µg/L | <15 | <15 | | |
| **WET** | | | | | |
| Cyanide, Total | µg/L | <10.0 | <10.0 | 1.0 | |
| Total Sulfide | mg/L | <3.0 | <3.0 | | |

Table 8. Elutriate results for dissolved PCB congener testing results for samples collected from Wilmington Harbor

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| **Congener Elutriates** | | | | | | | | | |
| PCB 1 (BZ) | ng/L | 0.26 | 0.019 | 0.012 | 0.013 | 0.011 | <0.038 | 0.23 | <0.038 |
| PCB 2 (BZ) | ng/L | 0.027 | 0.016 | 0.018 | 0.0087 | 0.0072 | 0.013 | 0.068 | 0.0059 |
| PCB 3 (BZ) | ng/L | 0.041 | 0.018 | 0.019 | 0.011 | 0.0086 | 0.012 | 0.091 | <0.038 |
| PCB 4 (BZ) | ng/L | 2 | 0.12 | 0.1 | 0.12 | 0.099 | 0.062 | 1.9 | 0.045 |
| PCB 5 (BZ) | ng/L | 0.0095 | 0.0059 | 0.0042 | 0.0025 | 0.003 | <0.038 | 0.071 | 0.0031 |
| PCB 6 (BZ) | ng/L | 0.53 | 0.042 | 0.056 | 0.027 | 0.024 | 0.064 | 0.92 | 0.015 |
| PCB 7 (BZ) | ng/L | 0.037 | 0.0072 | 0.017 | 0.0044 | 0.0069 | 0.0097 | 0.11 | 0.0033 |
| PCB 8 (BZ) | ng/L | 0.77 | 0.1 | 0.11 | 0.067 | 0.061 | 0.091 | 2.1 | 0.038 |
| PCB 9 (BZ) | ng/L | 0.048 | 0.0051 | 0.012 | 0.0056 | 0.011 | 0.0075 | 0.21 | 0.0062 |
| PCB 10 (BZ) | ng/L | 0.059 | 0.0084 | <0.038 | 0.0074 | 0.0068 | <0.038 | 0.15 | 0.0028 |
| PCB 11 (BZ) | ng/L | 0.14 | 0.14 | 0.13 | 0.1 | 0.086 | 0.16 | 0.33 | 0.077 |
| PCB 12 (BZ) | ng/L | 0.19 | 0.038 | 0.034 | 0.026 | 0.016 | 0.04 | 0.36 | 0.016 |
| PCB 13 (BZ) | ng/L | 0.19 | 0.038 | 0.034 | 0.026 | 0.016 | 0.04 | 0.36 | 0.016 |
| PCB 14 (BZ) | ng/L | 0.0024 | 0.0039 | <0.038 | 0.0019 | <0.038 | 0.0035 | 0.036 | 0.0022 |
| PCB 15 (BZ) | ng/L | 0.35 | 0.13 | 0.12 | 0.086 | 0.071 | 0.1 | 1.2 | 0.059 |
| PCB 16 (BZ) | ng/L | 0.4 | 0.076 | 0.11 | 0.072 | 0.062 | 0.088 | 5.8 | 0.042 |
| PCB 17 (BZ) | ng/L | 1.4 | 0.16 | 0.2 | 0.14 | 0.11 | 0.16 | 7.4 | 0.073 |
| PCB 18 (BZ) | ng/L | 1.4 | 0.21 | 0.3 | 0.19 | 0.15 | 0.23 | 16 | 0.12 |
| PCB 19 (BZ) | ng/L | 0.63 | 0.073 | 0.086 | 0.06 | 0.057 | 0.047 | 1.8 | 0.037 |
| PCB 20 (BZ) | ng/L | 1.5 | 0.39 | 0.45 | 0.31 | 0.29 | 0.4 | 19 | 0.22 |
| PCB 21 (BZ) | ng/L | 0.36 | 0.095 | 0.12 | 0.076 | 0.062 | 0.11 | 5.8 | 0.057 |
| PCB 22 (BZ) | ng/L | 0.25 | 0.073 | 0.076 | 0.057 | 0.055 | 0.069 | 4.1 | 0.039 |
| PCB 23 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 24 (BZ) | ng/L | 0.014 | 0.0067 | <0.038 | 0.0059 | <0.038 | <0.038 | 0.23 | <0.038 |
| PCB 25 (BZ) | ng/L | 0.55 | 0.077 | 0.1 | 0.062 | 0.048 | 0.11 | 1.5 | 0.038 |
| PCB 26 (BZ) | ng/L | 0.85 | 0.12 | 0.14 | 0.083 | 0.068 | 0.15 | 2.9 | 0.055 |
| PCB 27 (BZ) | ng/L | 0.6 | 0.064 | 0.081 | 0.053 | 0.037 | 0.051 | 1 | 0.031 |
| PCB 28 (BZ) | ng/L | 1.5 | 0.39 | 0.45 | 0.31 | 0.29 | 0.4 | 19 | 0.22 |
| PCB 29 (BZ) | ng/L | 0.85 | 0.12 | 0.14 | 0.083 | 0.068 | 0.15 | 2.9 | 0.055 |
| PCB 30 (BZ) | ng/L | 1.4 | 0.21 | 0.3 | 0.19 | 0.15 | 0.23 | 16 | 0.12 |
| PCB 31 (BZ) | ng/L | 1.3 | 0.28 | 0.32 | 0.22 | 0.2 | 0.3 | 17 | 0.15 |
| PCB 32 (BZ) | ng/L | 0.89 | 0.13 | 0.16 | 0.11 | 0.09 | 0.13 | 5 | 0.063 |
| PCB 33 (BZ) | ng/L | 0.36 | 0.095 | 0.12 | 0.076 | 0.062 | 0.11 | 5.8 | 0.057 |
| PCB 34 (BZ) | ng/L | 0.033 | 0.0049 | 0.0063 | 0.0043 | <0.038 | 0.007 | 0.33 | <0.038 |
| PCB 35 (BZ) | ng/L | 0.025 | 0.016 | 0.013 | 0.0093 | 0.0079 | 0.02 | 0.33 | 0.01 |
| PCB 36 (BZ) | ng/L | <0.038 | 0.0036 | <0.038 | 0.0035 | <0.038 | 0.0068 | <0.19 | 0.0034 |
| PCB 37 (BZ) | ng/L | 0.18 | 0.11 | 0.095 | 0.075 | 0.067 | 0.088 | 2.3 | 0.051 |
| PCB 38 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.029 | <0.038 |
| PCB 39 (BZ) | ng/L | 0.013 | 0.01 | 0.0097 | 0.0041 | 0.0053 | 0.0067 | 0.23 | 0.0036 |
| PCB 40 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 41 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 42 (BZ) | ng/L | 0.63 | 0.19 | 0.25 | 0.19 | 0.16 | 0.26 | 10 | 0.12 |
| PCB 43 (BZ) | ng/L | 0.068 | 0.022 | 0.019 | 0.02 | 0.019 | 0.017 | 1.1 | 0.01 |
| PCB 44 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 45 (BZ) | ng/L | 0.96 | 0.21 | 0.27 | 0.21 | 0.18 | 0.19 | 7.1 | 0.12 |
| PCB 46 (BZ) | ng/L | 0.24 | 0.063 | 0.075 | 0.052 | 0.046 | 0.057 | 2.5 | 0.034 |
| PCB 47 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 48 (BZ) | ng/L | 0.27 | 0.087 | 0.092 | 0.078 | 0.072 | 0.069 | 6.4 | 0.038 |
| PCB 49 (BZ) | ng/L | 2.7 | 0.67 | 0.91 | 0.61 | 0.49 | 0.83 | 29 | 0.35 |

| Table 8. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 50 (BZ) | ng/L | 0.83 | 0.19 | 0.22 | 0.16 | 0.14 | 0.17 | 5.7 | 0.094 |
| PCB 51 (BZ) | ng/L | 0.96 | 0.21 | 0.27 | 0.21 | 0.18 | 0.19 | 7.1 | 0.12 |
| PCB 52 (BZ) | ng/L | 3.7 | 1.1 | 1.4 | 0.93 | 0.81 | 1.2 | 49 | 0.56 |
| PCB 53 (BZ) | ng/L | 0.83 | 0.19 | 0.22 | 0.16 | 0.14 | 0.17 | 5.7 | 0.094 |
| PCB 54 (BZ) | ng/L | 0.076 | 0.019 | 0.016 | 0.011 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 55 (BZ) | ng/L | 0.028 | 0.017 | 0.0081 | <0.038 | 0.0066 | <0.038 | 0.35 | 0.012 |
| PCB 56 (BZ) | ng/L | 0.47 | 0.23 | 0.24 | 0.19 | 0.18 | 0.2 | 11 | 0.14 |
| PCB 57 (BZ) | ng/L | 0.03 | 0.009 | 0.012 | 0.0057 | 0.0058 | 0.0064 | 0.14 | <0.038 |
| PCB 58 (BZ) | ng/L | <0.038 | 0.0083 | <0.038 | 0.0051 | 0.0052 | 0.0095 | 0.34 | <0.038 |
| PCB 59 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 60 (BZ) | ng/L | 0.12 | 0.077 | 0.062 | 0.057 | 0.057 | 0.044 | 0.71 | 0.04 |
| PCB 61 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 62 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 63 (BZ) | ng/L | 0.079 | 0.026 | 0.034 | 0.023 | 0.024 | 0.024 | 1.1 | 0.013 |
| PCB 64 (BZ) | ng/L | 0.69 | 0.27 | 0.32 | 0.25 | 0.23 | 0.28 | 14 | 0.16 |
| PCB 65 (BZ) | ng/L | 3.2 | 0.91 | 1.1 | 0.82 | 0.71 | 0.96 | 38 | 0.5 |
| PCB 66 (BZ) | ng/L | 1.4 | 0.62 | 0.69 | 0.52 | 0.45 | 0.56 | 28 | 0.34 |
| PCB 67 (BZ) | ng/L | 0.063 | 0.025 | 0.028 | 0.025 | 0.02 | 0.021 | 0.67 | 0.013 |
| PCB 68 (BZ) | ng/L | 0.079 | 0.023 | 0.034 | 0.022 | 0.016 | 0.027 | 0.6 | 0.018 |
| PCB 69 (BZ) | ng/L | 2.7 | 0.67 | 0.91 | 0.61 | 0.49 | 0.83 | 29 | 0.35 |
| PCB 70 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 71 (BZ) | ng/L | 1.4 | 0.45 | 0.56 | 0.38 | 0.36 | 0.57 | 16 | 0.24 |
| PCB 72 (BZ) | ng/L | 0.11 | 0.027 | 0.046 | 0.028 | 0.016 | 0.035 | 0.95 | 0.017 |
| PCB 73 (BZ) | ng/L | 0.068 | 0.022 | 0.019 | 0.02 | 0.019 | 0.017 | 1.1 | 0.01 |
| PCB 74 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 75 (BZ) | ng/L | 0.24 | 0.078 | 0.098 | 0.071 | 0.063 | 0.087 | 3.3 | 0.04 |
| PCB 76 (BZ) | ng/L | 2.2 | 0.87 | 0.98 | 0.73 | 0.69 | 0.77 | 44 | 0.48 |
| PCB 77 (BZ) | ng/L | 0.097 | 0.071 | 0.067 | 0.047 | 0.044 | 0.058 | 1.6 | 0.041 |
| PCB 78 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.032 | <0.038 |
| PCB 79 (BZ) | ng/L | 0.031 | 0.018 | 0.016 | 0.014 | 0.0097 | 0.0068 | 0.38 | 0.0083 |
| PCB 80 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 81 (BZ) | ng/L | <0.038 | 0.0066 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 82 (BZ) | ng/L | 0.26 | 0.16 | 0.17 | 0.1 | 0.13 | 0.11 | 3.1 | 0.1 |
| PCB 83 (BZ) | ng/L | 2.2 | 1.1 | 1.4 | 0.98 | 0.88 | 1.1 | 30 | 0.74 |
| PCB 84 (BZ) | ng/L | 0.83 | 0.37 | 0.44 | 0.32 | 0.31 | 0.36 | 11 | <0.038 |
| PCB 85 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 86 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 87 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 88 (BZ) | ng/L | 0.66 | 0.3 | 0.4 | 0.26 | 0.22 | 0.4 | 6.7 | <0.038 |
| PCB 89 (BZ) | ng/L | 0.025 | <0.038 | <0.038 | <0.038 | 0.017 | <0.038 | 0.6 | 0.015 |
| PCB 90 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |
| PCB 91 (BZ) | ng/L | 0.66 | 0.3 | 0.4 | 0.26 | 0.22 | 0.4 | 6.7 | <0.038 |
| PCB 92 (BZ) | ng/L | 0.73 | 0.36 | 0.45 | 0.3 | 0.28 | 0.3 | 9.2 | 0.24 |
| PCB 93 (BZ) | ng/L | 0.21 | 0.076 | 0.08 | 0.061 | 0.041 | 0.079 | 0.68 | 0.042 |
| PCB 94 (BZ) | ng/L | 0.064 | 0.024 | 0.026 | 0.023 | 0.017 | 0.021 | 0.44 | 0.013 |
| PCB 95 (BZ) | ng/L | 2.8 | 1.2 | 1.5 | 1 | 0.95 | 1.2 | 36 | 0.78 |
| PCB 96 (BZ) | ng/L | 0.042 | 0.012 | 0.014 | 0.012 | 0.0096 | 0.013 | 0.59 | 0.01 |
| PCB 97 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 98 (BZ) | ng/L | 0.19 | 0.081 | 0.11 | 0.077 | 0.063 | 0.076 | 2 | 0.058 |
| PCB 99 (BZ) | ng/L | 2.2 | 1.1 | 1.4 | 0.98 | 0.88 | 1.1 | 30 | 0.74 |
| PCB 100 (BZ) | ng/L | 0.21 | 0.076 | 0.08 | 0.061 | 0.041 | 0.079 | 0.68 | 0.042 |
| PCB 101 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |

| Table 8. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
| PCB 102 (BZ) | ng/L | 0.19 | 0.081 | 0.11 | 0.077 | 0.063 | 0.076 | 2 | 0.058 |
| PCB 103 (BZ) | ng/L | 0.13 | 0.043 | 0.062 | 0.048 | 0.039 | 0.081 | 1.1 | 0.027 |
| PCB 104 (BZ) | ng/L | 0.016 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 105 (BZ) | ng/L | 0.57 | 0.37 | 0.35 | 0.28 | 0.29 | 0.22 | 4.7 | 0.23 |
| PCB 106 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 107 (BZ) | ng/L | 0.23 | 0.11 | 0.14 | 0.11 | 0.088 | 0.11 | 3.2 | 0.072 |
| PCB 108 (BZ) | ng/L | 0.067 | 0.038 | 0.046 | 0.034 | 0.037 | 0.027 | 0.64 | 0.021 |
| PCB 109 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 110 (BZ) | ng/L | 3.2 | 1.7 | 2 | 1.4 | 1.3 | 1.4 | 42 | 1.2 |
| PCB 111 (BZ) | ng/L | 0.013 | <0.038 | <0.038 | 0.0068 | <0.038 | 0.0063 | 0.14 | 0.0052 |
| PCB 112 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 113 (BZ) | ng/L | 3.3 | 1.6 | 1.9 | 1.4 | 1.3 | 1.4 | 42 | 1.1 |
| PCB 114 (BZ) | ng/L | 0.036 | 0.022 | 0.021 | 0.017 | 0.025 | <0.038 | 0.32 | 0.016 |
| PCB 115 (BZ) | ng/L | 3.2 | 1.7 | 2 | 1.4 | 1.3 | 1.4 | 42 | 1.2 |
| PCB 116 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 117 (BZ) | ng/L | 0.42 | 0.23 | 0.25 | 0.21 | 0.19 | 0.17 | 4.6 | 0.16 |
| PCB 118 (BZ) | ng/L | 2.1 | 1.1 | 1.2 | 0.91 | 0.86 | 0.78 | 28 | 0.65 |
| PCB 119 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 120 (BZ) | ng/L | 0.037 | 0.019 | 0.021 | 0.017 | 0.012 | 0.016 | 0.48 | 0.013 |
| PCB 121 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 122 (BZ) | ng/L | 0.028 | 0.016 | 0.013 | 0.014 | 0.019 | 0.014 | 0.26 | 0.014 |
| PCB 123 (BZ) | ng/L | 0.033 | 0.027 | 0.017 | 0.012 | 0.011 | 0.015 | 0.29 | 0.015 |
| PCB 124 (BZ) | ng/L | 0.067 | 0.038 | 0.046 | 0.034 | 0.037 | 0.027 | 0.64 | 0.021 |
| PCB 125 (BZ) | ng/L | 1.6 | 0.84 | 0.96 | 0.68 | 0.68 | 0.65 | 20 | 0.56 |
| PCB 126 (BZ) | ng/L | 0.0095 | 0.0054 | <0.038 | 0.004 | 0.0032 | 0.0076 | 0.034 | <0.038 |
| PCB 127 (BZ) | ng/L | 0.0036 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 128 (BZ) | ng/L | 0.46 | 0.32 | 0.34 | 0.26 | 0.27 | 0.2 | 3.9 | 0.2 |
| PCB 129 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 130 (BZ) | ng/L | 0.27 | 0.17 | 0.18 | 0.15 | 0.16 | 0.14 | 2.3 | 0.1 |
| PCB 131 (BZ) | ng/L | 0.04 | 0.028 | 0.026 | 0.026 | 0.025 | 0.016 | 0.42 | 0.015 |
| PCB 132 (BZ) | ng/L | 1.1 | 0.68 | 0.72 | 0.58 | 0.6 | 0.5 | 11 | 0.4 |
| PCB 133 (BZ) | ng/L | 0.11 | 0.074 | 0.095 | 0.073 | 0.076 | 0.071 | 0.98 | 0.053 |
| PCB 134 (BZ) | ng/L | 0.21 | 0.13 | 0.14 | 0.12 | 0.12 | 0.082 | 2.1 | 0.072 |
| PCB 135 (BZ) | ng/L | 1.3 | 0.84 | 0.94 | 0.74 | 0.7 | 0.73 | 13 | 0.57 |
| PCB 136 (BZ) | ng/L | 0.5 | 0.29 | 0.34 | 0.25 | 0.25 | 0.3 | 5.1 | 0.19 |
| PCB 137 (BZ) | ng/L | 0.14 | 0.082 | 0.093 | 0.077 | 0.073 | 0.043 | 1.1 | 0.047 |
| PCB 138 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 139 (BZ) | ng/L | 0.073 | 0.05 | 0.049 | 0.05 | 0.044 | 0.047 | 0.77 | 0.028 |
| PCB 140 (BZ) | ng/L | 0.073 | 0.05 | 0.049 | 0.05 | 0.044 | 0.047 | 0.77 | 0.028 |
| PCB 141 (BZ) | ng/L | 0.52 | 0.34 | 0.37 | 0.32 | 0.32 | 0.21 | 3.9 | 0.19 |
| PCB 142 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 143 (BZ) | ng/L | 0.21 | 0.13 | 0.14 | 0.12 | 0.12 | 0.082 | 2.1 | 0.072 |
| PCB 144 (BZ) | ng/L | 0.14 | 0.11 | 0.098 | 0.077 | 0.081 | 0.12 | 1 | 0.06 |
| PCB 145 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 146 (BZ) | ng/L | 0.77 | 0.5 | 0.62 | 0.5 | 0.48 | 0.51 | 7.6 | 0.31 |
| PCB 147 (BZ) | ng/L | 3.1 | 1.9 | 2.3 | 1.9 | 1.8 | 1.9 | 28 | 1.2 |
| PCB 148 (BZ) | ng/L | <0.038 | <0.038 | 0.028 | 0.016 | 0.019 | 0.024 | 0.22 | 0.0095 |
| PCB 149 (BZ) | ng/L | 3.1 | 1.9 | 2.3 | 1.9 | 1.8 | 1.9 | 28 | 1.2 |
| PCB 150 (BZ) | ng/L | 0.02 | 0.012 | 0.022 | 0.018 | 0.013 | 0.039 | 0.12 | 0.01 |
| PCB 151 (BZ) | ng/L | 1.3 | 0.84 | 0.94 | 0.74 | 0.7 | 0.73 | 13 | 0.57 |
| PCB 152 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |

| Table 8. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **WH1** | **WH2** | **WH3** | **WH4** | **WH5** | **WH6** | **WH7** | **WH8** |
| PCB 153 (BZ) | ng/L | 3.4 | 2.1 | 2.7 | 2.1 | 2 | 1.9 | 29 | 1.3 |
| PCB 154 (BZ) | ng/L | 0.14 | 0.11 | 0.14 | 0.095 | 0.086 | 0.17 | 1.2 | 0.076 |
| PCB 155 (BZ) | ng/L | 0.016 | 0.011 | 0.017 | 0.0086 | <0.038 | 0.021 | 0.042 | <0.038 |
| PCB 156 (BZ) | ng/L | 0.29 | 0.19 | 0.21 | 0.17 | 0.17 | 0.13 | 2.5 | 0.11 |
| PCB 157 (BZ) | ng/L | 0.29 | 0.19 | 0.21 | 0.17 | 0.17 | 0.13 | 2.5 | 0.11 |
| PCB 158 (BZ) | ng/L | 0.29 | 0.19 | 0.2 | 0.17 | 0.17 | 0.11 | 2.4 | 0.11 |
| PCB 159 (BZ) | ng/L | 0.035 | 0.02 | 0.029 | 0.019 | 0.018 | 0.017 | 0.24 | 0.015 |
| PCB 160 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 161 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 162 (BZ) | ng/L | 0.019 | 0.019 | 0.016 | 0.018 | 0.015 | 0.012 | 0.14 | 0.012 |
| PCB 163 (BZ) | ng/L | 3.4 | 2.2 | 2.5 | 2 | 2.1 | 0.89 | 28 | 1.4 |
| PCB 164 (BZ) | ng/L | 0.26 | 0.16 | 0.19 | 0.15 | 0.16 | 0.1 | 2.4 | 0.11 |
| PCB 165 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | 0.0049 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 166 (BZ) | ng/L | 0.46 | 0.32 | 0.34 | 0.26 | 0.27 | 0.2 | 3.9 | 0.2 |
| PCB 167 (BZ) | ng/L | 0.13 | 0.086 | 0.09 | 0.08 | 0.074 | 0.058 | 0.93 | 0.055 |
| PCB 168 (BZ) | ng/L | 3.4 | 2.1 | 2.7 | 2.1 | 2 | 1.9 | 29 | 1.3 |
| PCB 169 (BZ) | ng/L | 0.0057 | <0.038 | <0.038 | <0.038 | 0.0061 | <0.038 | <0.19 | <0.038 |
| PCB 170 (BZ) | ng/L | 0.84 | 0.59 | 0.67 | 0.55 | 0.54 | 0.5 | 5.4 | 0.35 |
| PCB 171 (BZ) | ng/L | 0.28 | 0.2 | 0.25 | 0.19 | 0.18 | 0.2 | 1.9 | 0.12 |
| PCB 172 (BZ) | ng/L | 0.18 | 0.13 | 0.15 | 0.12 | 0.12 | 0.13 | 1.2 | 0.085 |
| PCB 173 (BZ) | ng/L | 0.28 | 0.2 | 0.25 | 0.19 | 0.18 | 0.2 | 1.9 | 0.12 |
| PCB 174 (BZ) | ng/L | 0.92 | 0.62 | 0.79 | 0.62 | 0.58 | 0.61 | 6.5 | 0.39 |
| PCB 175 (BZ) | ng/L | 0.046 | 0.038 | 0.048 | 0.037 | 0.033 | 0.033 | 0.28 | 0.02 |
| PCB 176 (BZ) | ng/L | 0.13 | 0.098 | 0.12 | 0.083 | 0.087 | 0.094 | 0.9 | 0.053 |
| PCB 177 (BZ) | ng/L | 0.59 | 0.43 | 0.51 | 0.41 | 0.38 | 0.33 | 3.9 | 0.28 |
| PCB 178 (BZ) | ng/L | 0.29 | 0.21 | 0.26 | 0.22 | 0.2 | 0.2 | 1.8 | 0.13 |
| PCB 179 (BZ) | ng/L | 0.46 | 0.36 | 0.41 | 0.33 | 0.33 | 0.29 | 3.2 | 0.21 |
| PCB 180 (BZ) | ng/L | 2.1 | 1.3 | 1.7 | 1.4 | 1.2 | 1.3 | 13 | 0.87 |
| PCB 181 (BZ) | ng/L | 0.0077 | <0.038 | <0.038 | 0.0088 | <0.038 | <0.038 | 0.071 | <0.038 |
| PCB 182 (BZ) | ng/L | 0.014 | 0.016 | 0.026 | 0.012 | 0.018 | 0.021 | 0.13 | 0.0095 |
| PCB 183 (BZ) | ng/L | 0.72 | 0.5 | 0.61 | 0.51 | 0.51 | 0.54 | 4.4 | 0.33 |
| PCB 184 (BZ) | ng/L | 0.0063 | <0.038 | 0.01 | 0.0059 | 0.0089 | 0.016 | <0.19 | 0.0066 |
| PCB 185 (BZ) | ng/L | 0.72 | 0.5 | 0.61 | 0.51 | 0.51 | 0.54 | 4.4 | 0.33 |
| PCB 186 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 187 (BZ) | ng/L | 1.5 | 1.1 | 1.4 | 1.1 | 1 | 0.9 | 9.5 | 0.68 |
| PCB 188 (BZ) | ng/L | 0.018 | 0.022 | 0.033 | 0.026 | 0.026 | 0.04 | 0.048 | 0.016 |
| PCB 189 (BZ) | ng/L | 0.04 | 0.027 | 0.029 | 0.022 | 0.023 | 0.026 | 0.24 | 0.011 |
| PCB 190 (BZ) | ng/L | 0.17 | 0.12 | 0.15 | 0.12 | 0.12 | 0.11 | 1 | 0.071 |
| PCB 191 (BZ) | ng/L | 0.04 | 0.025 | 0.025 | 0.026 | 0.025 | 0.024 | 0.3 | 0.019 |
| PCB 192 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | <0.19 | <0.038 |
| PCB 193 (BZ) | ng/L | 2.1 | 1.3 | 1.7 | 1.4 | 1.2 | 1.3 | 13 | 0.87 |
| PCB 194 (BZ) | ng/L | 0.64 | 0.48 | 0.58 | 0.49 | 0.46 | 0.48 | 3.2 | 0.3 |
| PCB 195 (BZ) | ng/L | 0.19 | 0.15 | 0.19 | 0.16 | 0.15 | 0.15 | 1 | 0.1 |
| PCB 196 (BZ) | ng/L | 0.43 | 0.36 | 0.48 | 0.42 | 0.36 | 0.49 | 2 | 0.29 |
| PCB 197 (BZ) | ng/L | 0.045 | 0.048 | 0.058 | 0.041 | 0.039 | 0.074 | 0.16 | 0.037 |
| PCB 198 (BZ) | ng/L | 1.4 | 1.2 | 1.6 | 1.4 | 1.2 | 1.5 | 6.4 | 0.98 |
| PCB 199 (BZ) | ng/L | 0.071 | 0.061 | 0.071 | 0.071 | 0.048 | 0.079 | 0.39 | 0.045 |
| PCB 200 (BZ) | ng/L | 0.14 | 0.16 | 0.19 | 0.16 | 0.15 | 0.24 | 0.63 | 0.12 |
| PCB 201 (BZ) | ng/L | 1.4 | 1.2 | 1.6 | 1.4 | 1.2 | 1.5 | 6.4 | 0.98 |
| PCB 202 (BZ) | ng/L | 0.44 | 0.49 | 0.57 | 0.51 | 0.47 | 0.55 | 2 | 0.36 |
| PCB 203 (BZ) | ng/L | 0.59 | 0.51 | 0.69 | 0.61 | 0.56 | 0.57 | 2.8 | 0.42 |
| PCB 204 (BZ) | ng/L | <0.038 | <0.038 | <0.038 | <0.038 | <0.038 | 0.011 | <0.19 | <0.038 |

| Table 8. (Continued) | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 |
|---|---|---|---|---|---|---|---|---|---|
| PCB 205 (BZ) | ng/L | 0.035 | 0.038 | 0.047 | 0.042 | 0.041 | 0.034 | 0.18 | 0.018 |
| PCB 206 (BZ) | ng/L | 3.8 | 5 | 6.3 | 5.6 | 5 | 5.8 | 13 | 3.4 |
| PCB 207 (BZ) | ng/L | 0.34 | 0.42 | 0.5 | 0.43 | 0.39 | 0.45 | 1.1 | 0.28 |
| PCB 208 (BZ) | ng/L | 1.7 | 2.3 | 2.9 | 2.6 | 2.4 | 2.7 | 6.4 | 1.7 |
| PCB 209 (BZ) | ng/L | 8.5 | 8 | 9.5 | 7.5 | 6.6 | 7.9 | 32 | 5 |

Table 9. Elutriate results for dissolved PCB congeners totals results for samples collected from Wilmington Harbor. Values highlighted in yellow are over acute criteria.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | DNREC Marine Acute Criteria | DNREC Marine Chronic Criteria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Congener Elutriates** | | | | | | | | | | | |
| Monochlorobiphenyl | ng/L | 0.33 | 0.052 | 0.049 | 0.032 | 0.027 | 0.025 | 0.39 | 0.0059 | | |
| Dichlorobiphenyl | ng/L | 4.1 | 0.6 | 0.58 | 0.45 | 0.39 | 0.53 | 7.4 | 0.27 | | |
| Trichlorobiphenyl | ng/L | 10 | 1.9 | 2.3 | 1.5 | 1.3 | 2 | 92 | 1 | | |
| Tetrachlorobiphenyl | ng/L | 20 | 6.2 | 7.5 | 5.5 | 4.8 | 6.4 | 270 | 3.4 | | |
| Pentachlorobiphenyl | ng/L | 20 | 9.8 | 12 | 8.3 | 7.8 | 8.5 | 250 | 6 | | |
| Hexachlorobiphenyl | ng/L | 17 | 11 | 12 | 9.9 | 9.8 | 8.3 | 150 | 6.6 | | |
| Heptachlorobiphenyl | ng/L | 8.3 | 5.8 | 7.2 | 5.7 | 5.4 | 5.3 | 54 | 3.7 | | |
| Octachlorobiphenyl | ng/L | 4 | 3.5 | 4.5 | 3.9 | 3.5 | 4.1 | 19 | 2.7 | | |
| Nonachlorobiphenyl | ng/L | 5.9 | 7.8 | 9.7 | 8.7 | 7.8 | 8.9 | 21 | 5.4 | | |
| Decachlorobiphenyl | ng/L | 8.5 | 8 | 9.5 | 7.5 | 6.6 | 7.9 | 32 | 5 | | |
| Total | ng/L | **98** | **55** | **65** | **51** | **47** | **52** | **896** | **34** | | **30** |

Table 10. TCLP testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over regulatory limits.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | | | |
| Arsenic | mg/L | 0.16 | 0.16 | 0.14 | 0.11 | 0.12 | 0.13 | 0.16 | 0.12 | 5 |
| Barium | mg/L | 0.48 | 0.49 | 0.36 | 0.47 | 0.43 | 0.34 | 0.21 | 0.31 | 100 |
| Cadmium | mg/L | 0.0054 | 0.005 | 0.0056 | 0.0065 | 0.0057 | 0.005 | <0.10 | 0.0054 | 1 |
| Chromium | mg/L | 0.0053 | 0.0054 | 0.004 | 0.0062 | 0.0043 | 0.0052 | 0.0043 | 0.0041 | 5 |
| Lead | mg/L | 0.061 | 0.027 | 0.03 | 0.022 | 0.014 | 0.024 | 0.053 | 0.02 | 5 |
| Mercury | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.2 |
| Selenium | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 1 |
| Silver | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| **Semi-volatile Organics** | | | | | | | | | | |
| 1,4-Dichlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 7.5 |
| 2,4,5-TP (Silvex) | mg/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 1 |
| 2,4,5-Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 400 |
| 2,4,6-Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| 2,4-Dinitrotoluene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| 2,4-D | mg/L | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | 10 |
| 3-Methylphenol & 4-Methylphenol | mg/L | NA | NA | NA | NA | NA | NA | NA | NA | |
| Chlordane (technical) | mg/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.03 |
| Cresols (total) | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 200 |
| Endrin | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.02 |
| Heptachlor epoxide | mg/L | <0.00050 | <0.00050 | 0.0002 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Heptachlor | mg/L | <0.00050 | <0.00050 | 0.00016 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Hexachlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| Hexachlorobutadiene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.5 |
| Hexachloroethane | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 3 |
| Lindane | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.4 |
| Methoxychlor | mg/L | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 10 |
| Nitrobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| Pentachlorophenol | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 100 |
| Pyridine | mg/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 5 |
| Toxaphene | mg/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.5 |
| **Volatile Organics** | | | | | | | | | | |
| 1,1-Dichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| 1,2-Dichloroethane | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| 2-Butanone | mg/L | <0.20 | <0.20 | <0.20 | 1.6 | <0.20 | <0.20 | <0.20 | <0.20 | 200 |

Table 10. TCLP testing results for sediment samples collected from Wilmington Harbor. Values highlighted in yellow are over regulatory limits.

| | Units | WH1 | WH2 | WH3 | WH4 | WH5 | WH6 | WH7 | WH8 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Onorganics (Continued)** | | | | | | | | | | |
| Benzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Carbon tetrachloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Chlorobenzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 100 |
| Chloroform | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 6 |
| Tetrachloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| Trichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Vinyl chloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.2 |

# SOIL SAMPLING RESULTS

# FROM WILMINGTON HARBOR SOUTH CDF

Table 11. Testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| **PCBs** | | | | | | | | | |
| Aroclor 1016 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 5000 | 82000 |
| Aroclor 1221 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1232 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1242 | μg/kg | <33 | <35 | <34 | <36 | <32 | <31 | 300 | 3000 |
| Aroclor 1248 | μg/kg | 13 | 17 | 15 | 14 | 13 | 15 | 300 | 3000 |
| Aroclor 1254 | μg/kg | 18 | 48 | 33 | 31 | 44 | 43 | 300 | 3000 |
| Aroclor 1260 | μg/kg | 21 | 28 | 19 | 18 | 26 | 25 | 300 | 3000 |
| **Pesticides** | | | | | | | | | |
| 4,4-DDD | μg/kg | 7.4 | 11 | 6.1 | 5.3 | 8.1 | 6.6 | 3,000 | 24,000 |
| 4,4-DDE | μg/kg | 6.5 | 10 | 5.1 | 5 | 7.6 | 5.7 | 2,000 | 17,000 |
| 4,4-DDT | μg/kg | <3.4 | 9.1 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 17,000 |
| Aldrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 40 | 300 |
| alpha-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 100 | 900 |
| alpha-Chlordane | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| beta-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 400 | 3,000 |
| delta-BHC | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| Dieldrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 40 | 400 |
| Endosulfan I | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 47,000 | 1,200,000 |
| Endosulfan II | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 47,000 | 1,200,000 |
| Endosulfan sulfate | μg/kg | <3.4 | 0.8 | <3.5 | <3.6 | 0.55 | <3.2 | 47,000 | 1,200,000 |
| Endrin | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 61,000 |
| Endrin aldehyde | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 2,000 | 61,000 |
| Endrin ketone | μg/kg | 1.3 | 1.7 | <3.5 | 0.73 | 1.6 | 0.9 | | |
| gamma-BHC (Lindane) | μg/kg | <3.4 | <3.6 | <3.5 | 0.66 | <3.3 | 0.71 | 500 | 4,000 |
| gamma-Chlordane | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | | |
| Heptachlor | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 100 | 1,000 |
| Heptachlor epoxide | μg/kg | <3.4 | <3.6 | <3.5 | <3.6 | <3.3 | <3.2 | 70 | 600 |
| Methoxychlor | μg/kg | <6.6 | <7.0 | <6.7 | <7.0 | <6.4 | <6.2 | 39,000 | 1,000,000 |
| Toxaphene | μg/kg | <130 | <140 | <140 | <140 | <130 | <130 | 600 | 5,000 |
| **Inorganics** | | | | | | | | | |
| Aluminum | mg/kg | 17,200 | 18,300 | 17,800 | 20,300 | 20,100 | 17,400 | 7,800 | 200,000 |
| Antimony | mg/kg | 0.24 | 0.28 | 0.22 | 0.32 | 0.2 | 0.21 | 3 | 82 |
| Arsenic | mg/kg | 12.3 | 12.6 | 11.8 | 13 | 14.4 | 11.8 | 0.4 | 4 |
| Barium | mg/kg | 114 | 132 | 127 | 145 | 131 | 135 | 550 | 14,000 |
| Beryllium | mg/kg | 1.3 | 1.4 | 1.3 | 1.5 | 1.4 | 1.3 | 16 | 410 |
| Cadmium | mg/kg | 0.26 | 0.42 | 0.36 | 0.39 | 0.26 | 0.43 | 4 | 100 |
| Calcium | mg/kg | 3530 | 3750 | 3540 | 3580 | 3370 | 3320 | | |
| Chromium | mg/kg | 51.6 | 55 | 53.2 | 60 | 61.4 | 53.6 | 270 | 610 |
| Cobalt | mg/kg | 15.4 | 16.4 | 15.6 | 16.7 | 17.3 | 15.8 | 470 | 12,000 |
| Copper | mg/kg | 36.9 | 41.3 | 39.8 | 45.2 | 42.7 | 41.4 | 310 | 8,200 |
| Iron | mg/kg | 32,300 | 34,300 | 32,500 | 35,700 | 37,000 | 33,200 | 2,300 | 61,000 |
| Lead | mg/kg | 52 | 57.1 | 55.8 | 63.3 | 59.6 | 57.9 | 400 | 1,000 |
| Magnesium | mg/kg | 6020 | 6240 | 5920 | 6430 | 6660 | 5780 | | |
| Manganese | mg/kg | 1,520 | 1,540 | 1,390 | 1,380 | 1,500 | 1,270 | 160 | 4,100 |
| Mercury | mg/kg | 0.27 | 0.29 | 0.26 | 0.32 | 0.31 | 0.29 | 10 | 610 |

Table 11. (Continued)

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| **Inorganics (Continued)** | | | | | | | | | |
| Nickel | mg/kg | 29.8 | 31.9 | 30.6 | 33.3 | 33.4 | 30.4 | 160 | 4,100 |
| Potassium | mg/kg | 2320 | 2380 | 2300 | 2520 | 2760 | 2050 | | |
| Selenium | mg/kg | <0.50 | <0.53 | <0.51 | <0.53 | <0.49 | <0.47 | 39 | 1,000 |
| Silver | mg/kg | 0.72 | 0.73 | 0.7 | 0.74 | 0.79 | 0.66 | 39 | 1,000 |
| Sodium | mg/kg | 635 | 648 | 605 | 711 | 568 | 471 | | |
| Thallium | mg/kg | 0.72 | 0.71 | <1.0 | <1.1 | 0.57 | 0.69 | 18 | 220 |
| Vanadium | mg/kg | 47.1 | 50.3 | 48.8 | 54.8 | 57.6 | 48.5 | 55 | 1,400 |
| Zinc | mg/kg | 237 | 275 | 270 | 302 | 271 | 278 | 2,300 | 61,000 |
| **Semivolatiles** | | | | | | | | | |
| 1,2,4-Trichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,2-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,3-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 1,4-Dichlorobenzene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,2-oxybis(1-Chloropropane) | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,4,5-Trichlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4,6-Trichlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4-Dichlorophenol | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2,4-Dimethylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,4-Dinitrophenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 2,4-Dinitrotoluene | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2,6-Dinitrotoluene | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Chloronaphthalene | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| 2-Chlorophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Methylnaphthalene | μg/kg | 47 | 43 | 44 | 24 | 30 | 21 | | |
| 2-Methylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 2-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 2-Nitrophenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 3,3-Dichlorobenzidine | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 3-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4,6-Dinitro-2-methylphenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4-Bromophenyl phenyl ether | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chloro-3-methylphenol | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chloroaniline | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Chlorophenyl phenyl ether | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Methylphenol | μg/kg | 45 | <350 | <340 | <350 | <320 | <310 | | |
| 4-Nitroaniline | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| 4-Nitrophenol | μg/kg | <1700 | <1800 | <1700 | <1800 | <1700 | <1600 | | |
| Acenaphthene | μg/kg | <67 | <71 | 21 | <71 | <65 | <63 | 470,000 | 5,000,000 |
| Acenaphthylene | μg/kg | <67 | <71 | 40 | <71 | <65 | <63 | | |
| Anthracene | μg/kg | 52 | 47 | 57 | 49 | 36 | 39 | 1,000,000 | 5,000,000 |
| Benzo(a)anthracene | μg/kg | 150 | 140 | 150 | 100 | 100 | 120 | 900 | 8,000 |
| Benzo(a)pyrene | μg/kg | 130 | 140 | 150 | 100 | 83 | 140 | 90 | 800 |
| Benzo(b)fluoranthene | μg/kg | 260 | 270 | 200 | 130 | 130 | 150 | 900 | 8,000 |
| Benzo(ghi)perylene | μg/kg | 270 | 130 | 120 | 100 | 71 | 110 | | |
| Benzo(k)fluoranthene | μg/kg | <67 | <71 | 94 | 89 | <65 | 95 | 9,000 | 78,000 |
| bis(2-Chloroethoxy)methane | μg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| bis(2-Chloroethyl) ether | μg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| bis(2-Ethylhexyl) phthalate | μg/kg | 680 | 270 | 230 | 170 | 140 | 160 | | |

| Table 11. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
| **Semivolatiles (Continued)** | | | | | | | | | |
| Butyl benzyl phthalate | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Carbazole | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Chrysene | µg/kg | 150 | 180 | 220 | 150 | 110 | 170 | 87,000 | 780,000 |
| Di-n-butyl phthalate | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Di-n-octyl phthalate | µg/kg | 130 | <350 | <340 | <350 | <320 | <310 | | |
| Dibenz(a,h)anthracene | µg/kg | <67 | 57 | <68 | <71 | <65 | 32 | 90 | 800 |
| Dibenzofuran | µg/kg | 25 | <350 | 25 | <350 | <320 | <310 | | |
| Diethyl phthalate | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Dimethyl phthalate | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Fluoranthene | µg/kg | 240 | 290 | 280 | 200 | 160 | 230 | 310,000 | 5,000,000 |
| Fluorene | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | 310,000 | 5,000,000 |
| Hexachlorobenzene | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Hexachlorobutadiene | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Hexachlorocyclopentadiene | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Hexachloroethane | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Indeno(1,2,3-cd)pyrene | µg/kg | 130 | 130 | 120 | 87 | 79 | 110 | 900 | 8,000 |
| Isophorone | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| N-Nitrosodi-n-propylamine | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| N-Nitrosodiphenylamine | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Naphthalene | µg/kg | 85 | <71 | <68 | <71 | <65 | 59 | 160,000 | 4,100,000 |
| Nitrobenzene | µg/kg | <67 | <71 | <68 | <71 | <65 | <63 | | |
| Pentachlorophenol | µg/kg | <330 | <350 | <340 | <350 | <320 | <310 | | |
| Phenanthrene | µg/kg | 130 | 140 | 140 | 94 | 78 | 100 | 1,000,000 | 5,000,000 |
| Phenol | µg/kg | 250 | 210 | 180 | 180 | 96 | 140 | | |
| Pyrene | µg/kg | 220 | 240 | 230 | 170 | 130 | 170 | | |
| **VOCs** | | | | | | | | | |
| 1,1,1-Trichloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 160,000 | 4,100,000 |
| 1,1,2,2-Tetrachloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 600 | 29,000 |
| 1,1,2-Trichloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 1,000 | 100,000 |
| 1,1-Dichloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 780,000 | 5,000,000 |
| 1,1-Dichloroethene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 1,2-Dichloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 1,2-Dichloroethene (total) | µg/kg | <20 | <21 | <20 | <21 | <18 | <19 | 400 | 63,000 |
| 1,2-Dichloropropane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 9,000 | 84,000 |
| 2-Butanone | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| 2-Hexanone | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 310,000 | 5,000,000 |
| 4-Methyl-2-pentanone | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Acetone | µg/kg | <40 | <43 | <41 | <43 | <35 | <37 | 780,000 | 5,000,000 |
| Benzene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 800 | 200,000 |
| Bromodichloromethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 10,000 | 92,000 |
| Bromoform | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 53,000 | 720,000 |
| Bromomethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 11,000 | 290,000 |
| Carbon disulfide | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 780,000 | 5,000,000 |
| Carbon tetrachloride | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 300 | 44,000 |
| Chlorobenzene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 130,000 | 4,100,000 |
| Chloroethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 220,000 | 2,000,000 |
| Chloroform | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 300 | 940,000 |
| Chloromethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 49,000 | 440,000 |

| Table 11. (Continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
| **VOCs (Continued)** | | | | | | | | | |
| cis-1,3-Dichloropropene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 100 | 32,000 |
| Dibromochloromethane | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 8,000 | 68,000 |
| Ethylbenzene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 400,000 | 5,000,000 |
| Methylene chloride | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 13,000 | 760,000 |
| Styrene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 1,000,000 | 5,000,000 |
| Tetrachloroethene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Toluene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 650,000 | 5,000,000 |
| trans-1,3-Dichloropropene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 100 | 32,000 |
| Trichloroethene | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | | |
| Vinyl chloride | µg/kg | <10 | <11 | <10 | <11 | <8.8 | <9.3 | 30 | 3,000 |
| Xylenes (total) | µg/kg | <30 | <32 | <31 | <32 | <27 | <28 | 420,000 | 5,000,000 |
| Cyanide, Total | mg/kg | 0.32 | 0.42 | 0.34 | 0.5 | 0.88 | 0.61 | | |
| Total Sulfide | mg/kg | 80.1 | 68.1 | 32.6 | 119 | 28.3 | <56.0 | | |

| Table 12. PCB congener testing results for samples collected from Wilmington Harbor CDF | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 1 (BZ) | ng/g | 0.056 | 0.062 | 0.065 | 0.049 | 0.051 | 0.1 |
| PCB 2 (BZ) | ng/g | 0.059 | 0.06 | 0.12 | 0.059 | 0.066 | 0.063 |
| PCB 3 (BZ) | ng/g | 0.085 | 0.084 | 0.099 | 0.076 | 0.087 | 0.083 |
| PCB 4 (BZ) | ng/g | 0.16 | 0.19 | 0.21 | 0.14 | 0.2 | 0.22 |
| PCB 5 (BZ) | ng/g | 0.0098 | 0.013 | <0.020 | 0.0084 | 0.012 | 0.0044 |
| PCB 6 (BZ) | ng/g | 0.093 | 0.13 | 0.12 | 0.093 | 0.13 | 0.11 |
| PCB 7 (BZ) | ng/g | 0.015 | 0.02 | 0.022 | 0.011 | 0.017 | 0.014 |
| PCB 8 (BZ) | ng/g | 0.25 | 0.34 | 0.29 | 0.26 | 0.25 | 0.3 |
| PCB 9 (BZ) | ng/g | 0.023 | 0.02 | 0.026 | 0.017 | 0.022 | 0.018 |
| PCB 10 (BZ) | ng/g | 0.011 | 0.014 | 0.012 | 0.0072 | 0.011 | 0.012 |
| PCB 11 (BZ) | ng/g | 0.32 | 0.35 | 0.39 | 0.36 | 0.49 | 0.3 |
| PCB 12 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.15 | 0.16 | 0.16 |
| PCB 13 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.15 | 0.16 | 0.16 |
| PCB 14 (BZ) | ng/g | 0.0051 | 0.0049 | <0.020 | 0.0064 | 0.0099 | <0.019 |
| PCB 15 (BZ) | ng/g | 0.6 | 0.64 | 0.57 | 0.6 | 0.54 | 0.58 |
| PCB 16 (BZ) | ng/g | 0.14 | 0.2 | 0.18 | 0.15 | 0.14 | 0.17 |
| PCB 17 (BZ) | ng/g | 0.27 | 0.37 | 0.33 | 0.27 | 0.29 | 0.36 |
| PCB 18 (BZ) | ng/g | 0.43 | 0.49 | 0.46 | 0.39 | 0.42 | 0.46 |
| PCB 19 (BZ) | ng/g | 0.13 | 0.17 | 0.11 | 0.14 | 0.13 | 0.18 |
| PCB 20 (BZ) | ng/g | 1.2 | 1.4 | 1.3 | 1.3 | 1 | 1.3 |
| PCB 21 (BZ) | ng/g | 0.26 | 0.32 | 0.3 | 0.28 | 0.21 | 0.28 |
| PCB 22 (BZ) | ng/g | 0.22 | 0.24 | 0.24 | 0.21 | 0.19 | 0.23 |
| PCB 23 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 24 (BZ) | ng/g | 0.0075 | 0.0098 | <0.020 | 0.01 | <0.018 | 0.011 |
| PCB 25 (BZ) | ng/g | 0.18 | 0.24 | 0.21 | 0.19 | 0.16 | 0.22 |
| PCB 26 (BZ) | ng/g | 0.25 | 0.34 | 0.31 | 0.29 | 0.24 | 0.34 |
| PCB 27 (BZ) | ng/g | 0.12 | 0.19 | 0.13 | 0.13 | 0.16 | 0.21 |
| PCB 28 (BZ) | ng/g | 1.2 | 1.4 | 1.3 | 1.3 | 1 | 1.3 |
| PCB 29 (BZ) | ng/g | 0.25 | 0.34 | 0.31 | 0.29 | 0.24 | 0.34 |
| PCB 30 (BZ) | ng/g | 0.43 | 0.49 | 0.46 | 0.39 | 0.42 | 0.46 |
| PCB 31 (BZ) | ng/g | 0.77 | 0.89 | 0.81 | 0.82 | 0.68 | 0.84 |
| PCB 32 (BZ) | ng/g | 0.27 | 0.36 | 0.36 | 0.3 | <0.018 | 0.36 |
| PCB 33 (BZ) | ng/g | 0.26 | 0.32 | 0.3 | 0.28 | 0.21 | 0.28 |
| PCB 34 (BZ) | ng/g | 0.012 | 0.014 | <0.020 | 0.011 | 0.0073 | 0.01 |
| PCB 35 (BZ) | ng/g | 0.082 | 0.084 | 0.077 | 0.064 | 0.086 | 0.071 |
| PCB 36 (BZ) | ng/g | 0.017 | 0.013 | 0.011 | 0.006 | 0.0082 | 0.0062 |
| PCB 37 (BZ) | ng/g | 0.44 | 0.48 | 0.46 | 0.46 | 0.43 | 0.47 |
| PCB 38 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 39 (BZ) | ng/g | 0.016 | 0.014 | <0.020 | 0.013 | 0.012 | 0.015 |
| PCB 40 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 41 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 42 (BZ) | ng/g | 0.43 | 0.5 | 0.41 | 0.44 | 0.4 | 0.45 |
| PCB 43 (BZ) | ng/g | 0.053 | 0.066 | 0.048 | 0.043 | 0.039 | 0.044 |
| PCB 44 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 45 (BZ) | ng/g | 0.39 | 0.53 | 0.45 | 0.43 | 0.38 | 0.53 |
| PCB 46 (BZ) | ng/g | 0.11 | 0.15 | 0.11 | 0.12 | 0.11 | 0.13 |
| PCB 47 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 48 (BZ) | ng/g | 0.17 | 0.2 | 0.17 | 0.16 | 0.16 | 0.16 |
| PCB 49 (BZ) | ng/g | 1.2 | 1.7 | 1.4 | 1.4 | 1.3 | 1.7 |
| PCB 50 (BZ) | ng/g | 0.31 | 0.44 | 0.35 | 0.35 | 0.31 | 0.42 |
| PCB 51 (BZ) | ng/g | 0.39 | 0.53 | 0.45 | 0.43 | 0.38 | 0.53 |
| PCB 52 (BZ) | ng/g | 2 | 2.7 | 2.2 | 2.3 | 2 | 2.7 |
| PCB 53 (BZ) | ng/g | 0.31 | 0.44 | 0.35 | 0.35 | 0.31 | 0.42 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 54 (BZ) | ng/g | 0.033 | 0.043 | 0.03 | 0.033 | 0.021 | 0.038 |
| PCB 55 (BZ) | ng/g | 0.037 | 0.039 | 0.032 | 0.028 | <0.018 | <0.019 |
| PCB 56 (BZ) | ng/g | 0.59 | 0.67 | 0.63 | 0.61 | 0.56 | 0.63 |
| PCB 57 (BZ) | ng/g | 0.016 | 0.017 | 0.019 | 0.012 | 0.0092 | 0.033 |
| PCB 58 (BZ) | ng/g | 0.018 | 0.021 | 0.08 | 0.014 | 0.012 | 0.013 |
| PCB 59 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 60 (BZ) | ng/g | 0.2 | 0.23 | 0.2 | 0.21 | 0.16 | 0.21 |
| PCB 61 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 62 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 63 (BZ) | ng/g | 0.056 | 0.073 | 0.071 | 0.059 | 0.054 | 0.06 |
| PCB 64 (BZ) | ng/g | 0.58 | 0.7 | 0.67 | 0.6 | 0.54 | 0.61 |
| PCB 65 (BZ) | ng/g | 1.7 | 2.2 | 1.9 | 1.8 | 1.6 | 2.2 |
| PCB 66 (BZ) | ng/g | 1.6 | 1.9 | 1.6 | 1.7 | 1.5 | 1.8 |
| PCB 67 (BZ) | ng/g | 0.058 | 0.065 | 0.049 | 0.054 | 0.05 | 0.058 |
| PCB 68 (BZ) | ng/g | 0.039 | 0.067 | 0.052 | 0.048 | 0.044 | 0.063 |
| PCB 69 (BZ) | ng/g | 1.2 | 1.7 | 1.4 | 1.4 | 1.3 | 1.7 |
| PCB 70 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 71 (BZ) | ng/g | 0.9 | 1.1 | 0.96 | 0.92 | 0.83 | 1 |
| PCB 72 (BZ) | ng/g | 0.051 | 0.086 | 0.051 | 0.06 | 0.059 | 0.077 |
| PCB 73 (BZ) | ng/g | 0.053 | 0.066 | 0.048 | 0.043 | 0.039 | 0.044 |
| PCB 74 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 75 (BZ) | ng/g | 0.15 | 0.2 | 0.18 | 0.16 | 0.13 | 0.17 |
| PCB 76 (BZ) | ng/g | 2.2 | 2.6 | 2.4 | 2.3 | 2.1 | 2.5 |
| PCB 77 (BZ) | ng/g | 0.26 | 0.27 | 0.24 | 0.26 | 0.26 | 0.24 |
| PCB 78 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 79 (BZ) | ng/g | 0.029 | 0.031 | 0.036 | 0.034 | 0.031 | 0.035 |
| PCB 80 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 81 (BZ) | ng/g | 0.0067 | 0.0066 | <0.020 | 0.0066 | 0.0028 | 0.0066 |
| PCB 82 (BZ) | ng/g | 0.36 | 0.42 | 0.33 | 0.4 | 0.33 | 0.43 |
| PCB 83 (BZ) | ng/g | 2.3 | 2.8 | 2.2 | 2.6 | <0.018 | 2.8 |
| PCB 84 (BZ) | ng/g | 0.78 | 1 | 0.84 | 0.95 | 0.81 | 1 |
| PCB 85 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 86 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 87 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 88 (BZ) | ng/g | 0.57 | 0.74 | 0.59 | 0.64 | 0.59 | 0.72 |
| PCB 89 (BZ) | ng/g | 0.035 | 0.031 | 0.046 | 0.038 | 0.03 | 0.041 |
| PCB 90 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 91 (BZ) | ng/g | 0.57 | 0.74 | 0.59 | 0.64 | 0.59 | 0.72 |
| PCB 92 (BZ) | ng/g | 0.68 | 0.85 | 0.69 | 0.81 | 0.7 | 1.1 |
| PCB 93 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.19 | 0.13 | 0.24 |
| PCB 94 (BZ) | ng/g | 0.042 | 0.056 | <0.020 | 0.048 | 0.037 | 0.076 |
| PCB 95 (BZ) | ng/g | 2.4 | 3.2 | 2.5 | 2.8 | 2.4 | 3 |
| PCB 96 (BZ) | ng/g | 0.034 | 0.033 | <0.020 | 0.038 | 0.032 | 0.037 |
| PCB 97 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 98 (BZ) | ng/g | 0.16 | 0.23 | 0.16 | 0.17 | 0.15 | 0.27 |
| PCB 99 (BZ) | ng/g | 2.3 | 2.8 | 2.2 | 2.6 | <0.018 | 2.8 |
| PCB 100 (BZ) | ng/g | 0.15 | 0.17 | 0.16 | 0.19 | 0.13 | 0.24 |
| PCB 101 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 102 (BZ) | ng/g | 0.16 | 0.23 | 0.16 | 0.17 | 0.15 | 0.27 |
| PCB 103 (BZ) | ng/g | 0.094 | 0.12 | 0.075 | 0.1 | 0.088 | 0.13 |
| PCB 104 (BZ) | ng/g | <0.020 | 0.0068 | <0.020 | 0.0088 | <0.018 | 0.0091 |
| PCB 105 (BZ) | ng/g | 0.96 | 1 | 0.9 | 1 | 0.88 | 1.1 |
| PCB 106 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 107 (BZ)/109 (IUPAC) | ng/g | 0.28 | 0.32 | 0.3 | 0.3 | 0.28 | 0.33 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 |
| PCB 108 (BZ)/107 (IUPAC) | ng/g | 0.11 | 0.12 | 0.11 | 0.1 | 0.088 | 0.12 |
| PCB 109 (BZ)/108 (IUPAC) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 110 (BZ) | ng/g | 3.9 | 4.8 | 3.8 | 4.4 | 4 | 4.8 |
| PCB 111 (BZ) | ng/g | 0.014 | 0.015 | <0.020 | 0.0093 | 0.013 | 0.012 |
| PCB 112 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | 1.7 | <0.019 |
| PCB 113 (BZ) | ng/g | 3.3 | 4 | 3.2 | 3.7 | 3.3 | 4.2 |
| PCB 114 (BZ) | ng/g | 0.049 | 0.065 | 0.044 | 0.053 | 0.044 | 0.047 |
| PCB 115 (BZ) | ng/g | 3.9 | 4.8 | 3.8 | 4.4 | 4 | 4.8 |
| PCB 116 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 117 (BZ) | ng/g | 0.53 | 0.64 | 0.52 | 0.57 | 0.49 | 0.63 |
| PCB 118 (BZ) | ng/g | 2.8 | 3.2 | 2.6 | 2.9 | 2.7 | 3.2 |
| PCB 119 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 120 (BZ) | ng/g | 0.039 | 0.04 | 0.041 | 0.04 | 0.034 | 0.044 |
| PCB 121 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 122 (BZ) | ng/g | 0.053 | 0.057 | 0.056 | 0.044 | 0.04 | 0.043 |
| PCB 123 (BZ) | ng/g | 0.029 | 0.05 | 0.044 | 0.053 | 0.049 | 0.052 |
| PCB 124 (BZ) | ng/g | 0.11 | 0.12 | 0.11 | 0.1 | 0.088 | 0.12 |
| PCB 125 (BZ) | ng/g | 1.9 | 2.3 | 1.9 | 2 | 1.9 | 2.3 |
| PCB 126 (BZ) | ng/g | 0.016 | 0.014 | 0.029 | 0.02 | 0.014 | 0.016 |
| PCB 127 (BZ) | ng/g | <0.020 | 0.0077 | <0.020 | 0.0071 | <0.018 | <0.019 |
| PCB 128 (BZ) | ng/g | 0.68 | 0.74 | 0.65 | 0.65 | 0.63 | 0.71 |
| PCB 129 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 130 (BZ) | ng/g | 0.31 | 0.36 | 0.32 | 0.31 | 0.3 | 0.36 |
| PCB 131 (BZ) | ng/g | 0.054 | 0.054 | 0.074 | 0.045 | 0.04 | 0.051 |
| PCB 132 (BZ) | ng/g | 1.4 | 1.6 | 1.5 | 1.4 | 1.3 | 1.6 |
| PCB 133 (BZ) | ng/g | 0.15 | 0.16 | 0.16 | 0.13 | 0.12 | 0.17 |
| PCB 134 (BZ) | ng/g | 0.26 | 0.31 | 0.34 | 0.26 | 0.24 | 0.29 |
| PCB 135 (BZ) | ng/g | 1.9 | 2.2 | 1.7 | 1.9 | 1.9 | 2.3 |
| PCB 136 (BZ) | ng/g | 0.64 | 0.74 | 0.6 | 0.7 | 0.67 | 0.77 |
| PCB 137 (BZ) | ng/g | 0.18 | 0.14 | 0.13 | 0.14 | 0.14 | 0.16 |
| PCB 138 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 139 (BZ) | ng/g | 0.082 | 0.11 | 0.079 | 0.084 | 0.077 | 0.092 |
| PCB 140 (BZ) | ng/g | 0.082 | 0.11 | 0.079 | 0.084 | 0.077 | 0.092 |
| PCB 141 (BZ) | ng/g | 0.67 | 0.76 | 0.59 | 0.67 | 0.64 | 0.75 |
| PCB 142 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 143 (BZ) | ng/g | 0.26 | 0.31 | 0.34 | 0.26 | 0.24 | 0.29 |
| PCB 144 (BZ) | ng/g | 0.19 | 0.25 | 0.17 | 0.2 | 0.18 | 0.19 |
| PCB 145 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 146 (BZ) | ng/g | 0.91 | 1 | 1 | 0.92 | 0.9 | 1.1 |
| PCB 147 (BZ) | ng/g | 3.7 | 4.3 | 4 | 3.8 | 3.5 | 4.2 |
| PCB 148 (BZ) | ng/g | 0.043 | 0.028 | 0.031 | 0.027 | 0.032 | 0.049 |
| PCB 149 (BZ) | ng/g | 3.7 | 4.3 | 4 | 3.8 | 3.5 | 4.2 |
| PCB 150 (BZ) | ng/g | 0.044 | 0.041 | 0.037 | 0.033 | 0.047 | 0.042 |
| PCB 151 (BZ) | ng/g | 1.9 | 2.2 | 1.7 | 1.9 | 1.9 | 2.3 |
| PCB 152 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 153 (BZ) | ng/g | 4 | 4.4 | 3.9 | 4.1 | 3.8 | 4.4 |
| PCB 154 (BZ) | ng/g | 0.23 | 0.25 | 0.17 | 0.2 | 0.22 | 0.29 |
| PCB 155 (BZ) | ng/g | 0.017 | 0.016 | <0.020 | 0.015 | 0.014 | 0.0091 |
| PCB 156 (BZ) | ng/g | 0.44 | 0.45 | 0.36 | 0.43 | 0.39 | 0.47 |
| PCB 157 (BZ) | ng/g | 0.44 | 0.45 | 0.36 | 0.43 | 0.39 | 0.47 |
| PCB 158 (BZ) | ng/g | 0.39 | 0.39 | 0.35 | 0.38 | 0.34 | 0.4 |
| PCB 159 (BZ) | ng/g | 0.034 | 0.029 | 0.032 | 0.033 | 0.028 | 0.027 |
| PCB 160 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 161 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |

| Table 12. (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Units** | **WU1** | **WU2** | **WU3** | **WU4** | **WU5** | **WU6** |
| PCB 162 (BZ) | ng/g | 0.028 | 0.025 | 0.046 | 0.032 | 0.031 | 0.031 |
| PCB 163 (BZ) | ng/g | 4.5 | 5 | 4.5 | 4.6 | 4.3 | 5.1 |
| PCB 164 (BZ) | ng/g | 0.33 | 0.38 | 0.36 | 0.35 | 0.32 | 0.37 |
| PCB 165 (BZ) | ng/g | <0.020 | 0.017 | <0.020 | <0.021 | <0.018 | 0.011 |
| PCB 166 (BZ) | ng/g | 0.68 | 0.74 | 0.65 | 0.65 | 0.63 | 0.71 |
| PCB 167 (BZ) | ng/g | 0.17 | 0.18 | 0.15 | 0.17 | 0.17 | 0.19 |
| PCB 168 (BZ) | ng/g | 4 | 4.4 | 3.9 | 4.1 | 3.8 | 4.4 |
| PCB 169 (BZ) | ng/g | 0.0053 | 0.003 | <0.020 | 0.0041 | 0.0075 | 0.016 |
| PCB 170 (BZ) | ng/g | 1.1 | 1.2 | 1 | 1.2 | 1.1 | 1.2 |
| PCB 171 (BZ) | ng/g | 0.36 | 0.39 | 0.37 | 0.38 | 0.34 | 0.38 |
| PCB 172 (BZ) | ng/g | 0.21 | 0.25 | 0.27 | 0.24 | 0.22 | 0.24 |
| PCB 173 (BZ) | ng/g | 0.36 | 0.39 | 0.37 | 0.38 | 0.34 | 0.38 |
| PCB 174 (BZ) | ng/g | 1.2 | 1.4 | 1.1 | 1.3 | 1.2 | 1.3 |
| PCB 175 (BZ) | ng/g | 0.058 | 0.066 | 0.094 | 0.057 | 0.055 | 0.065 |
| PCB 176 (BZ) | ng/g | 0.17 | 0.18 | 0.16 | 0.16 | 0.15 | 0.17 |
| PCB 177 (BZ) | ng/g | 0.78 | 0.89 | 0.8 | 0.85 | 0.75 | 0.88 |
| PCB 178 (BZ) | ng/g | 0.35 | 0.39 | 0.44 | 0.38 | 0.35 | 0.4 |
| PCB 179 (BZ) | ng/g | 0.61 | 0.73 | 0.65 | 0.64 | 0.6 | 0.68 |
| PCB 180 (BZ) | ng/g | 2.4 | 2.7 | 2.2 | 2.8 | 2.5 | 2.8 |
| PCB 181 (BZ) | ng/g | 0.01 | 0.01 | <0.020 | 0.014 | 0.0095 | 0.0088 |
| PCB 182 (BZ) | ng/g | <0.020 | <0.021 | 0.047 | <0.021 | 0.035 | <0.019 |
| PCB 183 (BZ) | ng/g | 0.85 | 0.96 | 0.92 | 0.94 | 0.8 | 0.93 |
| PCB 184 (BZ) | ng/g | 0.013 | 0.013 | <0.020 | 0.013 | 0.015 | 0.0097 |
| PCB 185 (BZ) | ng/g | 0.85 | 0.96 | 0.92 | 0.94 | 0.8 | 0.93 |
| PCB 186 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 187 (BZ) | ng/g | 1.9 | 2.1 | 1.8 | 2 | 1.9 | 2 |
| PCB 188 (BZ) | ng/g | 0.041 | 0.04 | 0.046 | 0.037 | 0.041 | 0.031 |
| PCB 189 (BZ) | ng/g | 0.047 | 0.056 | 0.047 | 0.052 | 0.048 | 0.044 |
| PCB 190 (BZ) | ng/g | 0.22 | 0.24 | 0.14 | 0.25 | 0.21 | 0.25 |
| PCB 191 (BZ) | ng/g | 0.057 | 0.061 | 0.062 | 0.052 | 0.038 | 0.051 |
| PCB 192 (BZ) | ng/g | <0.020 | <0.021 | <0.020 | <0.021 | <0.018 | <0.019 |
| PCB 193 (BZ) | ng/g | 2.4 | 2.7 | 2.2 | 2.8 | 2.5 | 2.8 |
| PCB 194 (BZ) | ng/g | 0.79 | 0.87 | 1.3 | 0.89 | 0.78 | 0.87 |
| PCB 195 (BZ) | ng/g | 0.26 | 0.29 | 0.4 | 0.29 | 0.23 | 0.3 |
| PCB 196 (BZ) | ng/g | 0.63 | 0.65 | 1.1 | 0.69 | 0.66 | 0.63 |
| PCB 197 (BZ) | ng/g | 0.073 | 0.078 | 0.23 | 0.065 | 0.08 | 0.076 |
| PCB 198 (BZ) | ng/g | 2.2 | 2.1 | 2.4 | 2.4 | 2.2 | 2 |
| PCB 199 (BZ)/200 (IUPAC) | ng/g | 0.1 | 0.12 | 0.13 | 0.12 | 0.11 | 0.11 |
| PCB 200 (BZ)/201 (IUPAC) | ng/g | 0.25 | 0.26 | 0.76 | 0.28 | 0.26 | 0.22 |
| PCB 201 (BZ)/199 (IUPAC) | ng/g | 2.2 | 2.1 | 2.4 | 2.4 | 2.2 | 2 |
| PCB 202 (BZ) | ng/g | 0.71 | 0.75 | 1 | 0.8 | 0.76 | 0.67 |
| PCB 203 (BZ) | ng/g | 0.88 | 0.97 | 0.62 | 1 | 0.9 | 0.89 |
| PCB 204 (BZ) | ng/g | 0.011 | 0.01 | <0.020 | 0.0088 | 0.0085 | <0.019 |
| PCB 205 (BZ) | ng/g | 0.055 | 0.054 | <0.020 | 0.063 | 0.044 | 0.051 |
| PCB 206 (BZ) | ng/g | 7.4 | 7.7 | 8.1 | 8.5 | 7.7 | 6.3 |
| PCB 207 (BZ) | ng/g | 0.59 | 0.65 | 2 | 0.74 | 0.68 | 0.57 |
| PCB 208 (BZ) | ng/g | 3.3 | 3.4 | 4.5 | 3.9 | 3.5 | 2.7 |

Table 13. PCB congener totals testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over DNREC unrestricted criteria while values in green are over restricted levels.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | DNREC Non-critical Unrestricted | DNREC Non-critical Restricted |
|---|---|---|---|---|---|---|---|---|---|
| Monochlorobiphenyl | ng/g | 0.2 | 0.21 | 0.28 | 0.18 | 0.2 | 0.25 | | |
| Dichlorobiphenyl | ng/g | 1.6 | 1.9 | 1.8 | 1.7 | 1.9 | 1.7 | | |
| Trichlorobiphenyl | ng/g | 4.8 | 5.8 | 5.3 | 5 | 4.2 | 5.6 | | |
| Tetrachlorobiphenyl | ng/g | 13 | 17 | 14 | 14 | 13 | 16 | | |
| Pentachlorobiphenyl | ng/g | 21 | 26 | 21 | 24 | 21 | 27 | | |
| Hexachlorobiphenyl | ng/g | 21 | 24 | 21 | 22 | 20 | 24 | | |
| Heptachlorobiphenyl | ng/g | 10 | 12 | 10 | 11 | 10 | 12 | | |
| Octachlorobiphenyl | ng/g | 5.9 | 6.1 | 8 | 6.6 | 6.1 | 5.8 | | |
| Nonachlorobiphenyl | ng/g | 11 | 12 | 15 | 13 | 12 | 9.6 | | |
| Decachlorobiphenyl | ng/g | 12 | 16 | 12 | 16 | 15 | 14 | | |
| Total | | 101 | 121 | 108 | 113 | 103 | 116 | 1000 | 1000 |

Table 14. TCLP testing results for samples collected from Wilmington Harbor CDF. Values highlighted in yellow are over regulatory limits.

| | Units | WU1 | WU2 | WU3 | WU4 | WU5 | WU6 | TCLP Regulatory Limit |
|---|---|---|---|---|---|---|---|---|
| **Inorganics** | | | | | | | | |
| Arsenic | mg/L | 0.17 | 0.15 | 0.18 | 0.18 | 0.17 | <0.50 | 5 |
| Barium | mg/L | 0.37 | 0.45 | 0.48 | 0.52 | 0.33 | <10.0 | 100 |
| Cadmium | mg/L | 0.0047 | 0.0047 | 0.0074 | 0.0062 | 0.0028 | <0.10 | 1 |
| Chromium | mg/L | 0.0024 | 0.0034 | 0.004 | 0.0039 | 0.0036 | <0.50 | 5 |
| Lead | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| Mercury | mg/L | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | 0.2 |
| Selenium | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 1 |
| Silver | mg/L | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | 5 |
| **Semivolatile Organics** | | | | | | | | |
| 1,4Dichlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 7.5 |
| 2,4,5TP (Silvex) | mg/L | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 1 |
| 2,4,5Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 400 |
| 2,4,6Trichlorophenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| 2,4Dinitrotoluene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| 2,4D | mg/L | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | <0.040 | 10 |
| 3Methylphenol & 4Methylphenol | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Chlordane (technical) | mg/L | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | 0.03 |
| Cresols (total) | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 200 |
| Endrin | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.02 |
| Heptachlor epoxide | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Heptachlor | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.008 |
| Hexachlorobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.13 |
| Hexachlorobutadiene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.5 |
| Hexachloroethane | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 3 |
| Lindane | mg/L | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | <0.00050 | 0.4 |
| Methoxychlor | mg/L | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 10 |
| Nitrobenzene | mg/L | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 2 |
| Pentachlorophenol | mg/L | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | 100 |
| Pyridine | mg/L | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 5 |
| Toxaphene | mg/L | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | 0.5 |
| **Volatile Organics** | | | | | | | | |
| 1,1Dichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| 1,2Dichloroethane | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| 2Butanone | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 200 |
| Benzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Carbon tetrachloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Chlorobenzene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 100 |
| Chloroform | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 6 |
| Tetrachloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.7 |
| Trichloroethene | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.5 |
| Vinyl chloride | mg/L | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | 0.2 |

# APPENDIX A

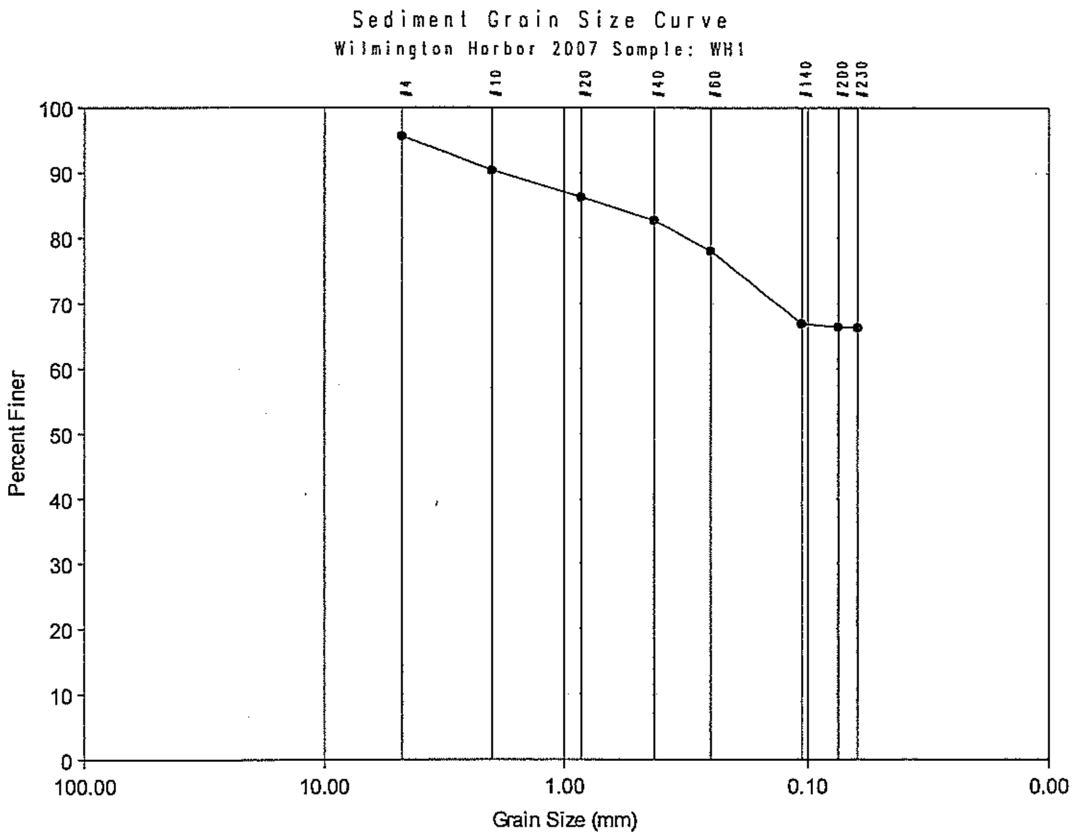
## Severn Trent
## Laboratory Analysis Certificates

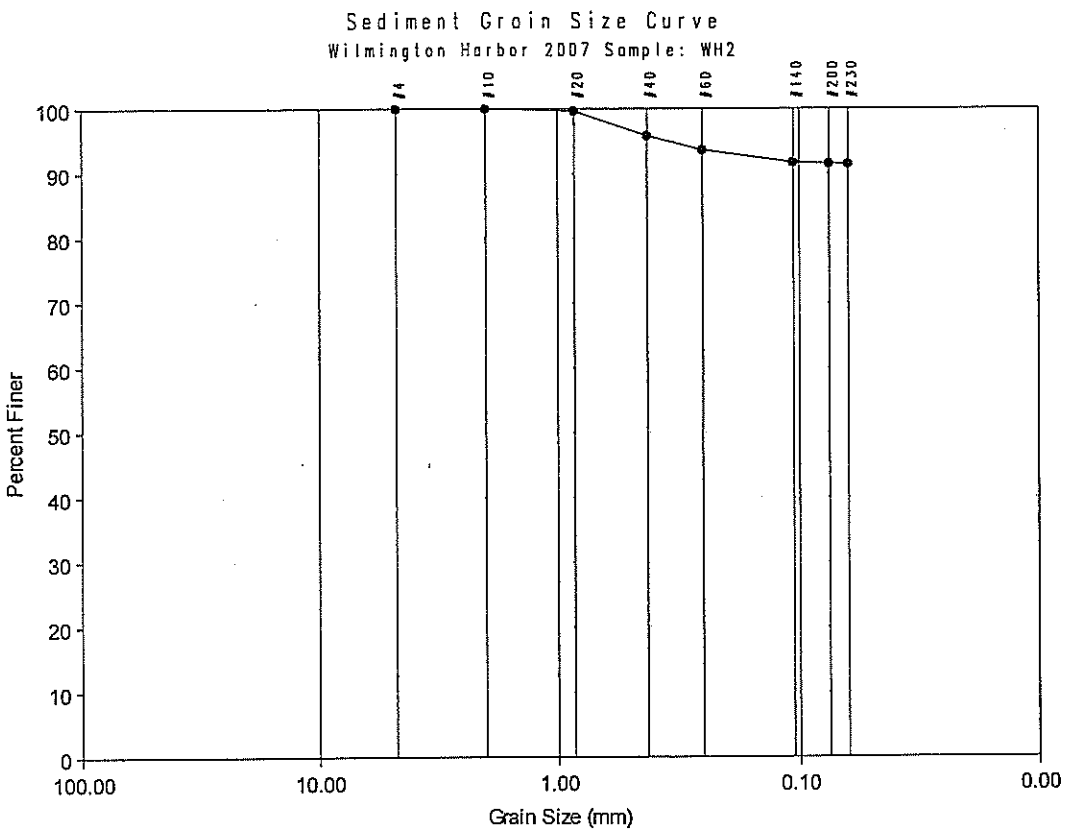
# APPENDIX B

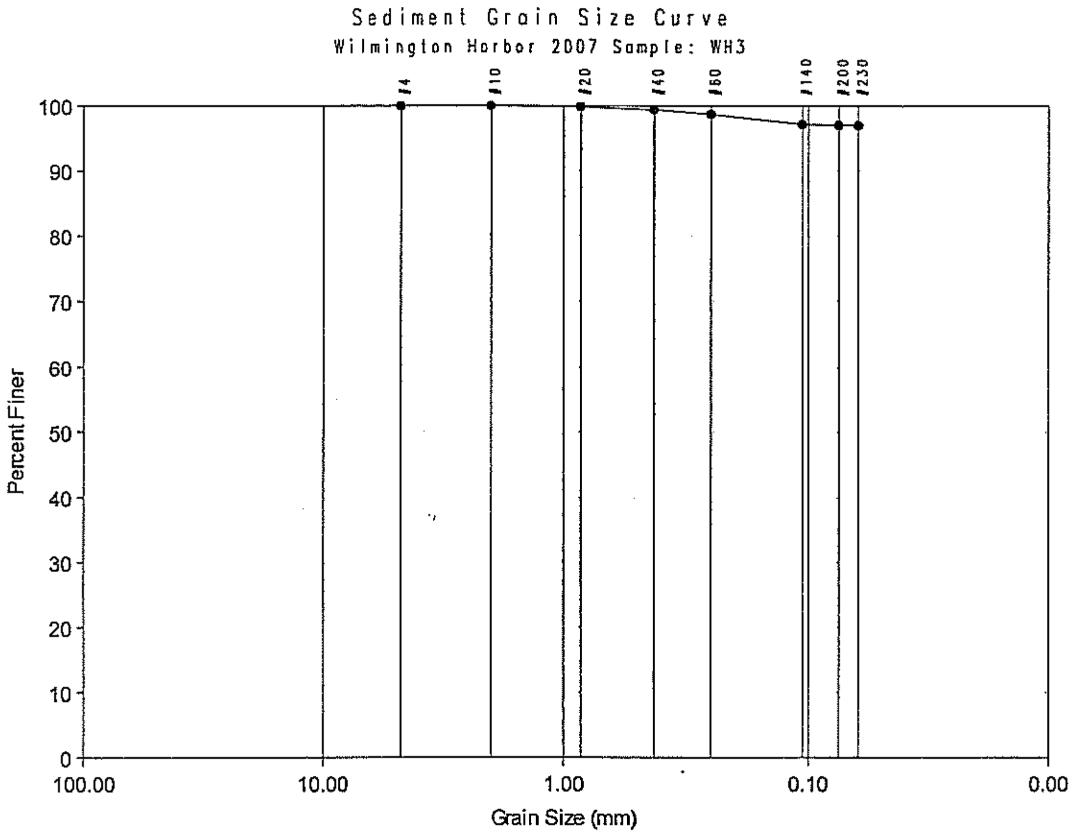
## Grain Size and TOC Results

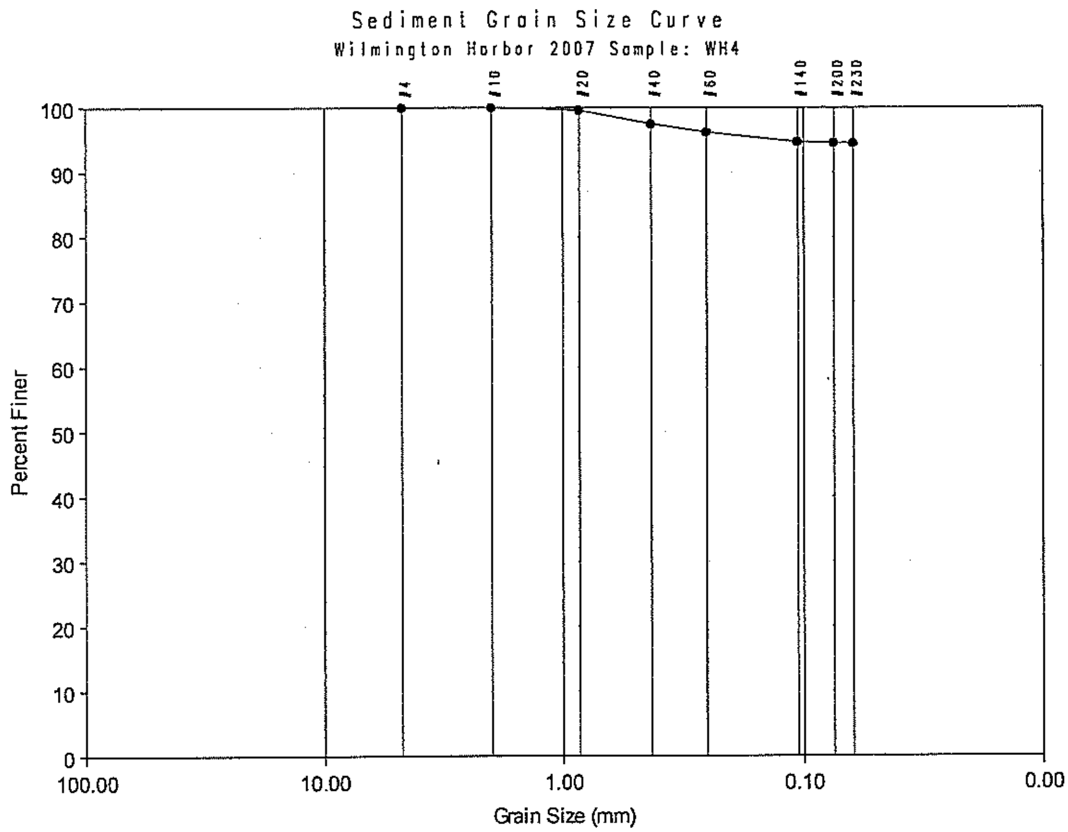
| Table B-1. Total organic carbon and percent silt/clay for the eight cores collected at Wilmington Harbor | | | | |
|---|---|---|---|---|
| **Station** | **Gravel (%)** | **Sand (%)** | **Silt/clay (%)** | **TOC (%)** |
| WH1 | 9.6 | 24.0 | 66.45 | 13.7 |
| WH2 | 0.0 | 8.50 | 91.50 | 9.01 |
| WH3 | 0.0 | 2.98 | 97.02 | 8.35 |
| WH4 | 0.0 | 5.47 | 94.53 | 8.40 |
| WH5 | 0.03 | 2.44 | 97.53 | 8.70 |
| WH6 | 0.0 | 3.32 | 96.68 | 8.74 |
| WH7 | 5.5 | 9.62 | 84.85 | 5.39 |
| WH8 | 0.0 | 3.65 | 96.35 | 7.87 |

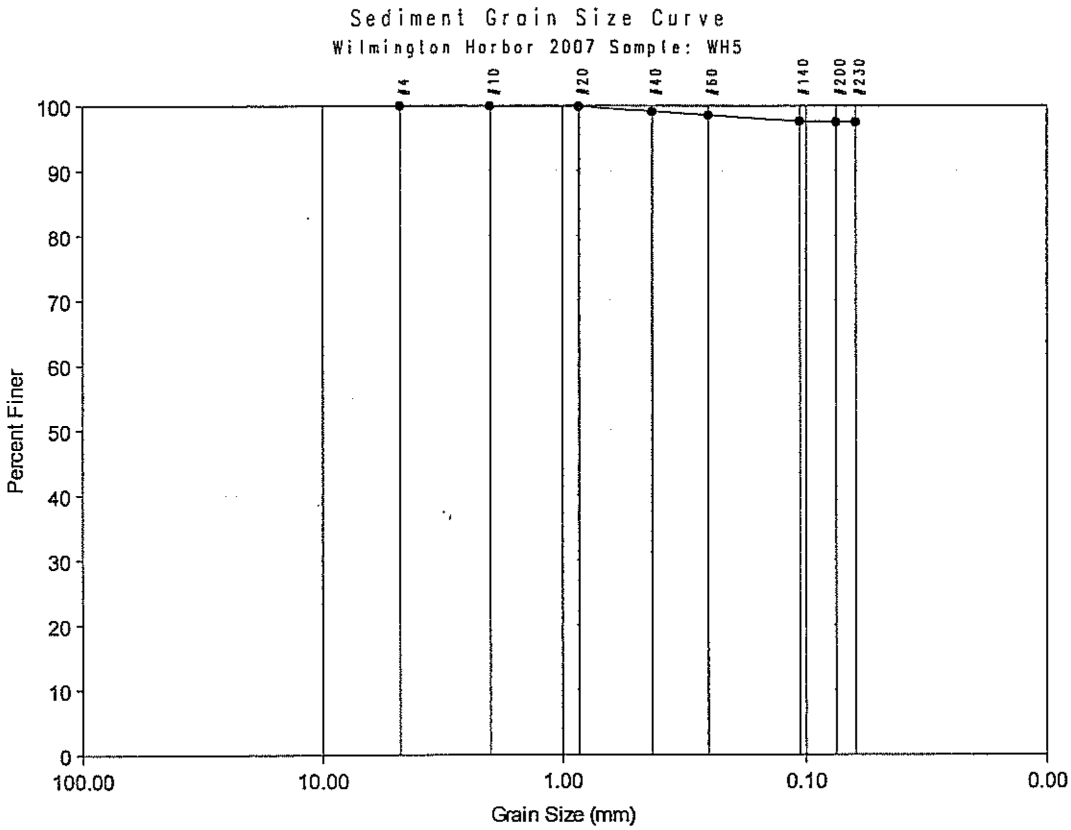
| Table B-2. Total organic carbon and percent silt/clay for the six cores collected at Wilmington Harbor CDF | | | | |
|---|---|---|---|---|
| **Station** | **Gravel (%)** | **Sand (%)** | **Silt/clay (%)** | **TOC (%)** |
| WU1 | 0.0 | 2.53 | 97.47 | 7.94 |
| WU2 | 0.0 | 3.31 | 96.69 | 8.81 |
| WU3 | 0.15 | 3.13 | 96.73 | 8.22 |
| WU4 | 0.0 | 4.32 | 95.68 | 10.00 |
| WU5 | 0.0 | 3.05 | 96.95 | 7.33 |
| WU6 | 0.0 | 8.31 | 91.69 | 9.52 |

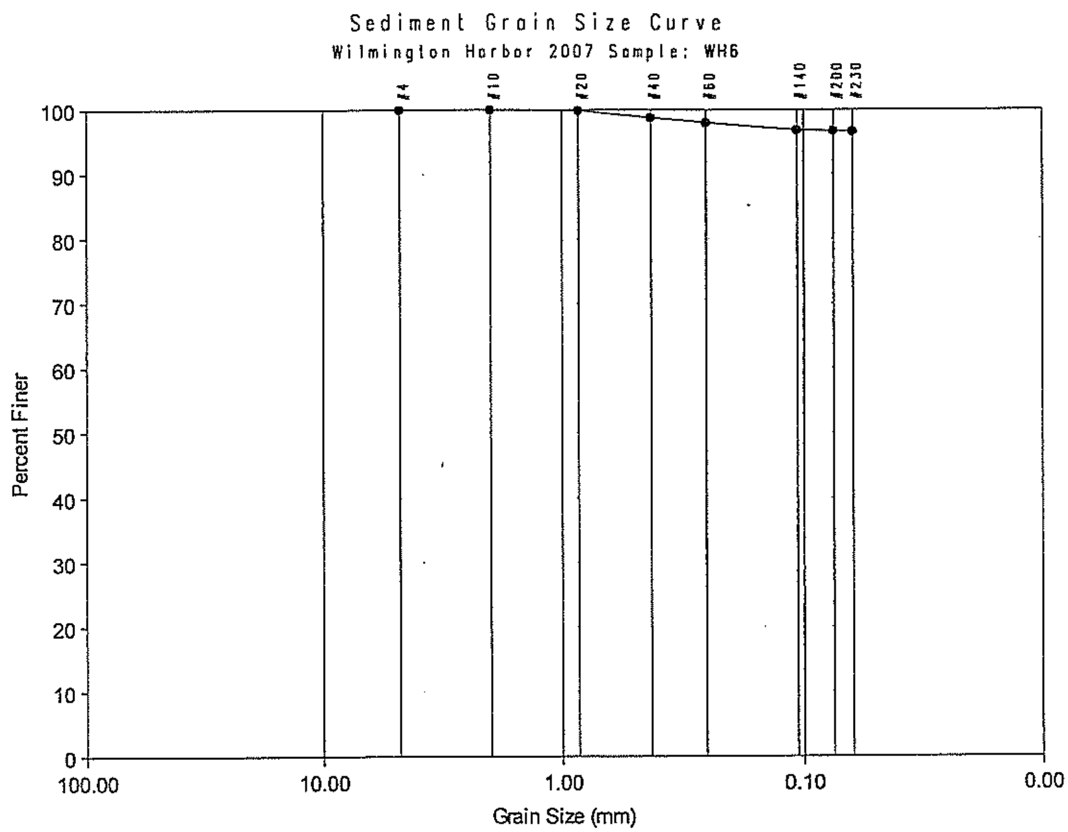

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH1
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

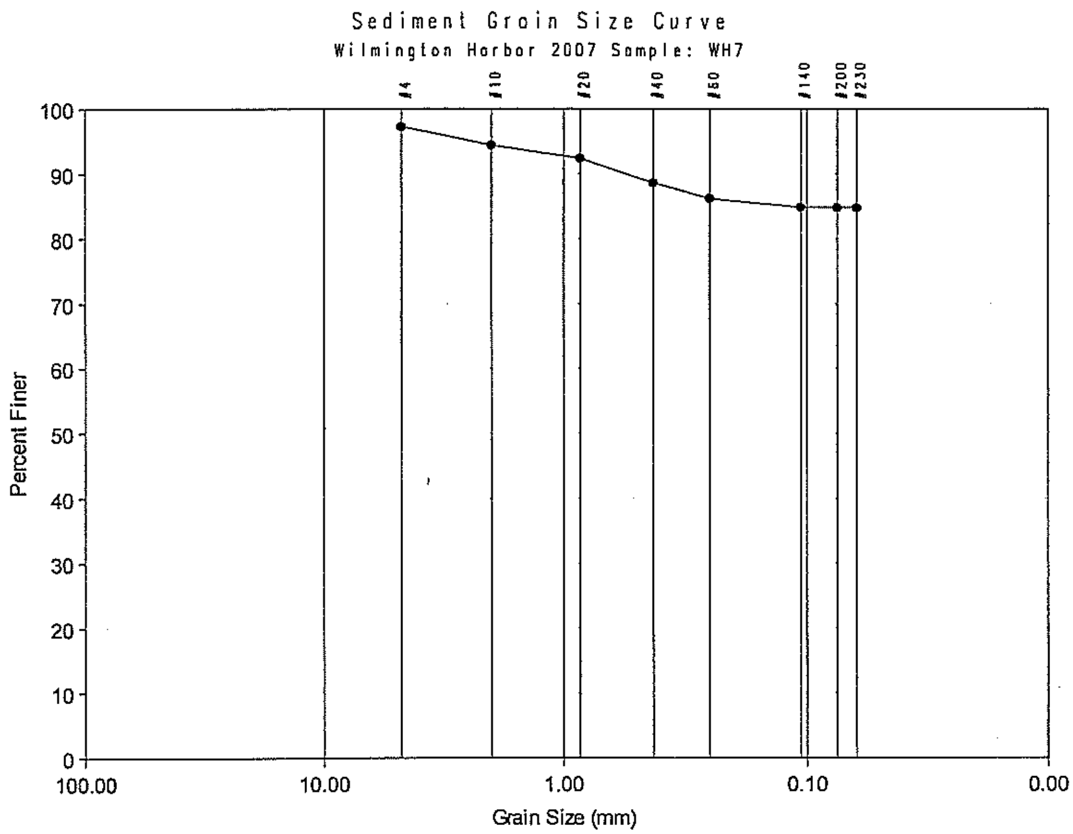

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH2
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

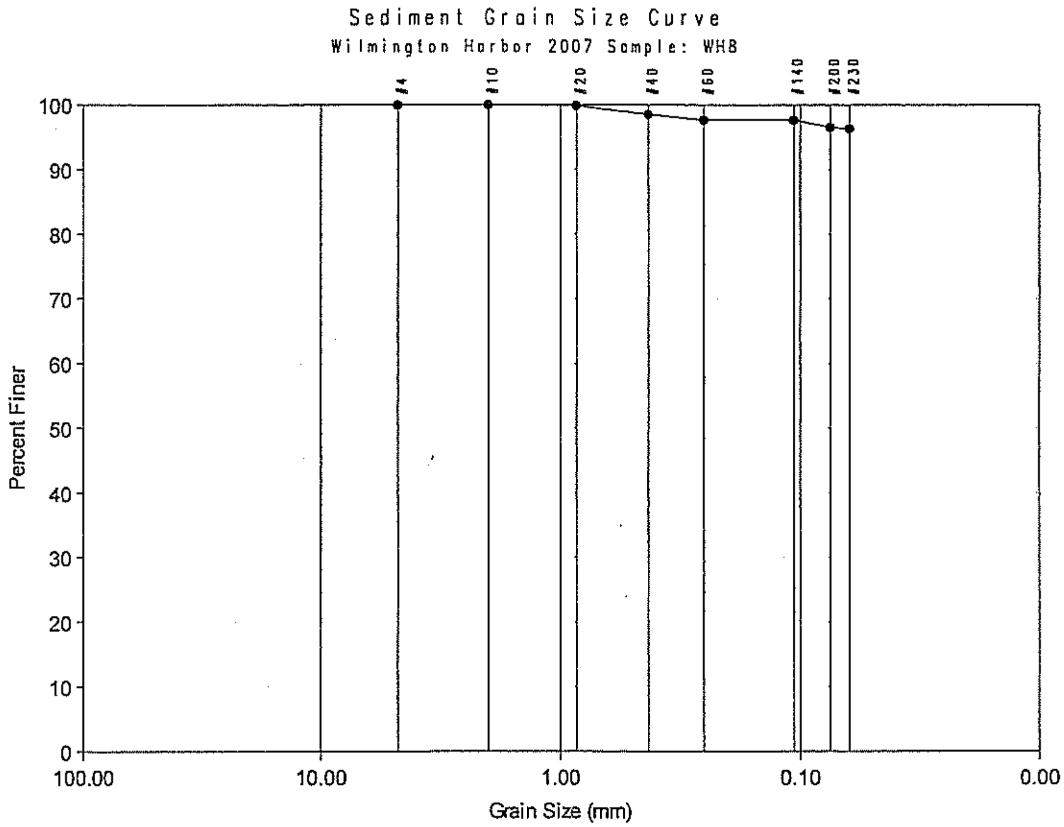

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH3
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

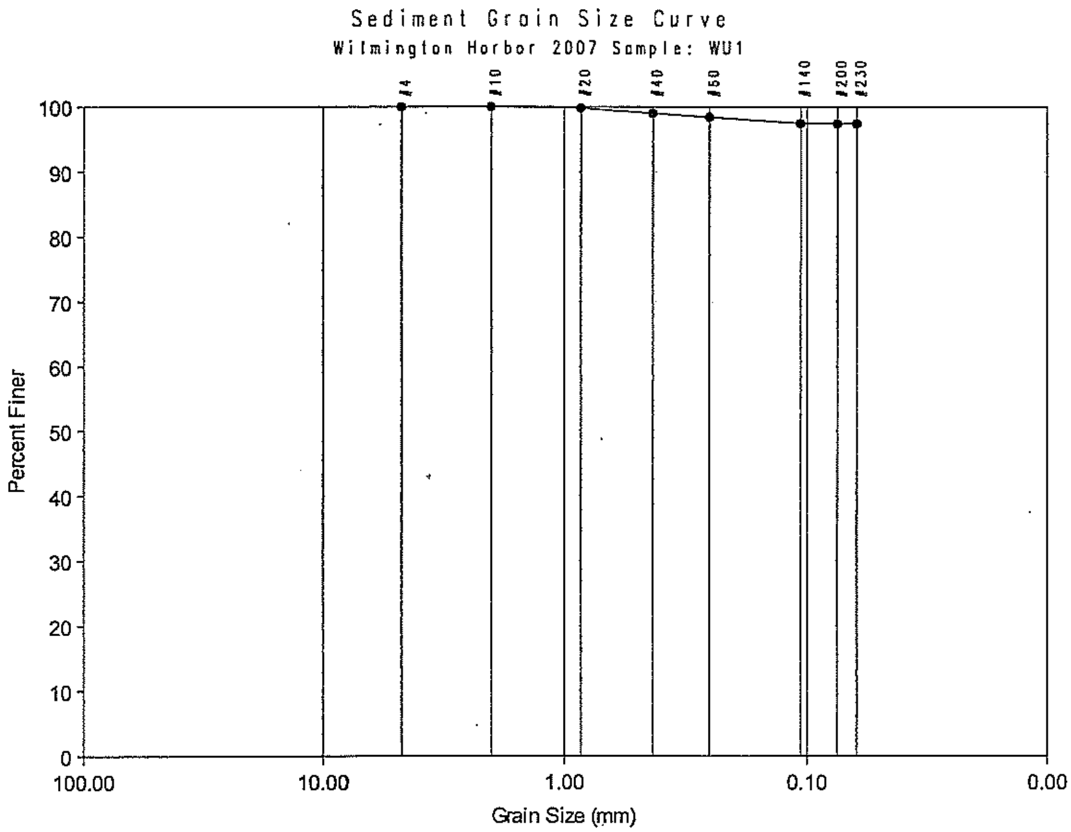

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH4
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

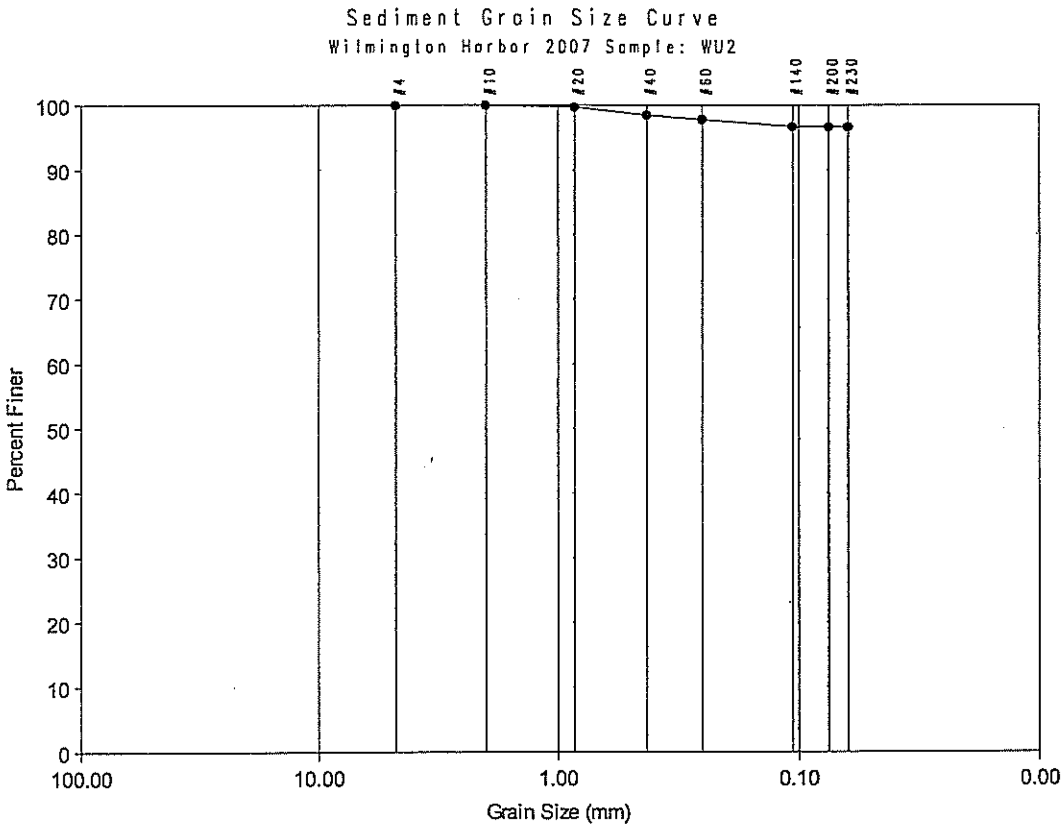

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH5
#4
#10
#20
#40
#60
#140
#200
#230
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

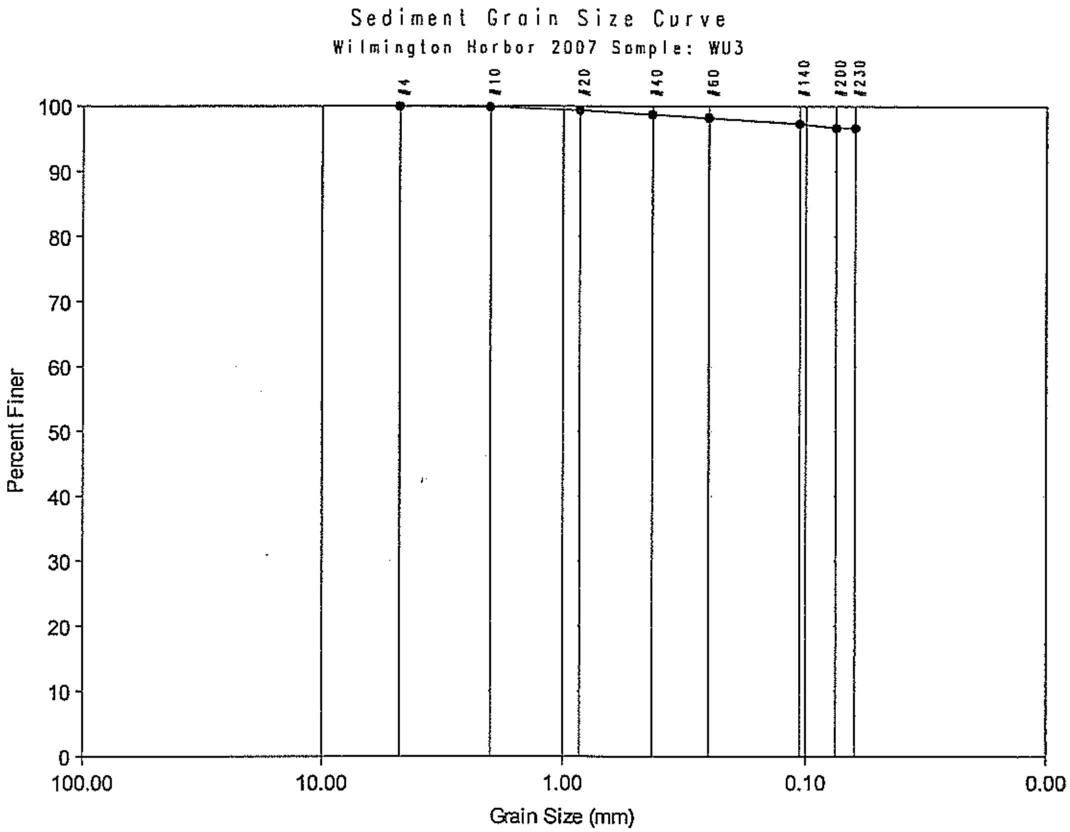

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH6
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

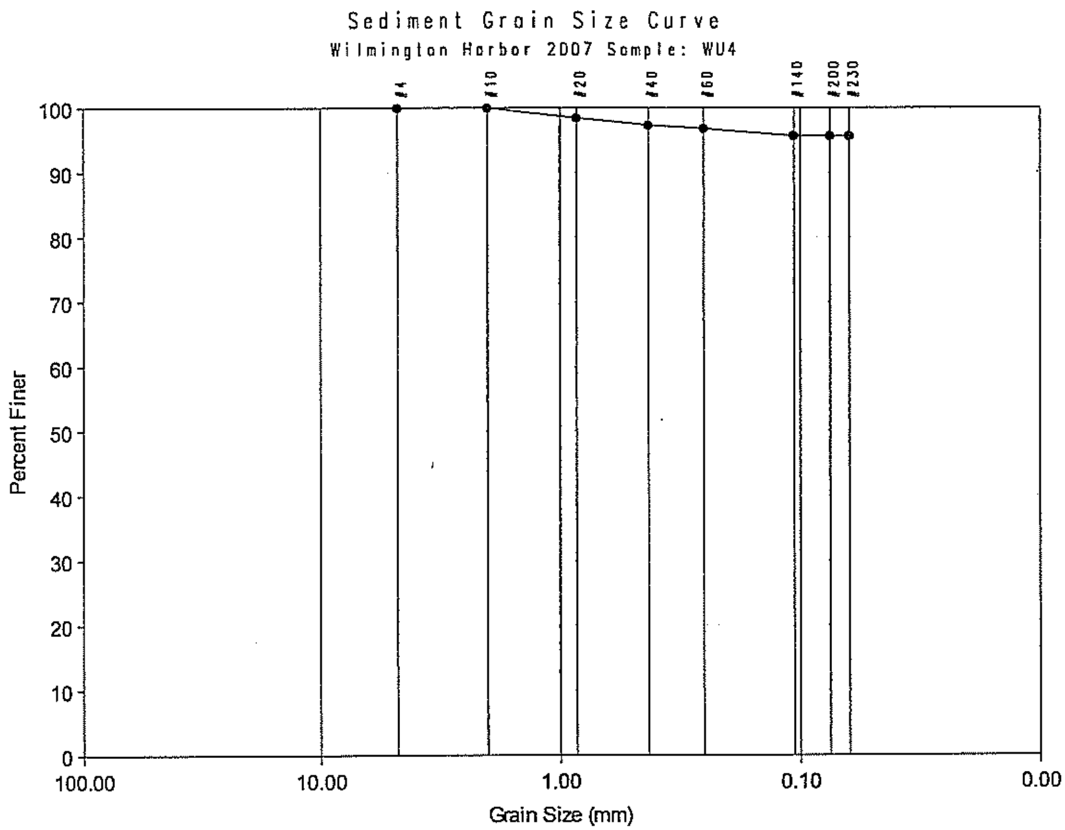

Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WH7
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WHB
#4
#10
#20
#40
#60
#140
#200
#230
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU1
#4
#10
#20
#40
#50
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU2
#4
#10
#20
#40
#60
#140
#200
#230
Percent Finer
100
90
80
70
60
50
40
30
20
10
0
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU3
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)


Sediment Grain Size Curve
Wilmington Harbor 2007 Sample: WU4
#4
#10
#20
#40
#60
#140
#200
#230
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
100.00
10.00
1.00
0.10
0.00
Grain Size (mm)

# APPENDIX C

## Core Logs

~~[illegible]~~
Grainsize TMG
photo COC for [illegible]
Keys for [illegible]
Grab 2 more Coolers

# Wilmington

## Sediment Project

Station #: WH1

Core #'s

Date: 6/6, ~~2007~~ 2008

Tide:

Start Time: 13 : 15

Weather: OC

Composite Time: ___ : ___

Took 2 drops to achieve target depth

13:15.20

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 43' | 17" | | | 2' | 3 | 40" | |
| | | ~~19"~~ | | | | 3 | | |
| | | 18" | | | | 3 | 42" | |

Depths measured in feet

Comments\ Descriptions: 24" ~~6~~ 6 — (10 ft. cores) — 3 — 2'

Sediment [illegible] muddy, ~~[illegible]~~ some detritus & a little sandy -

6" 5

Station at confluence at Drainage Canal took bottom ~~[illegible]~~

~~6~~ 6"

Grab

18
24
[illegible]

35" 5 35"

C-4

# Wilmington

## Sediment Project

Station #: WH2

Date: 5/6 , ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ______________

Tide: ______________

Weather: OC

every time dropped

| | Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | ~~Core Depth~~ Core Length | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 12:15, 10 | | 36'.5 | 4.5 | | | 5 | 7 | 4.5 | |
| | | | 29" | | | | 5 | | |
| | | | 24" | | | | 5 | | |
| | | | 26" | | | | 4 | | |
| | | | 40" | | | | 5 | | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft. cores)

Sediment - Fine mud

# Wilmington

## Sediment Project

Station #: WH3

Date: 6/6, ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s __________

Tide: __________

Weather: OC

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core ~~Depth~~ Length | Comments |
|---|---|---|---|---|---|---|---|---|
| | 4.3 | 2' | | | 2' | 6' | 4' | |
| | | | | | | 5 | 2 | |
| | | | | | | 5' | 2 | |

(depths measured in feet)

Comments\ Descriptions: (10 ft. cores)

6 22"
5 2'
6 1.5'

Sediment - silt with some debris

# Wilmington

## Sediment Project

Station #: WH4

Date: 6/6, ~~2007~~ 2008

Start Time: 10:40

Composite Time: ____:____

Core #'s ________

Tide: ________

Weather: OC

C-6

| | Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 10:38.50 | | 36 | 3.5 | | | 4 | 10' | | |
| 10:54 33 | | | 1.5 | | | | 10 | | |
| | | | 1.5 | | | | 9 | | |

Depths measured in feet

Comments\ Descriptions: 1 14" (10 ft. cores) 10

Sediment – Fine Mud

18"
16"
18"

# Wilmington

## Sediment Project

Station #: WH5

Date: 6/6, ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ____________

Tide: ____________

Weather: ½ Cloudy

13:55

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 40' | ~~43~~ | | | 4 | 9. | 4.3 | |
| | | 18" | | | | 8' | 46" | |
| | | 25" | | | | | 8' | |

Depths measured in feet

Comments\ Descriptions: 25" 26" 18" ( 10 ft. cores) 9 64

Sediment - Fine mud

C-7

# Wilmington

## Sediment Project

Station #: WH6

Date: 6/6 , ~~2007~~2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ________________

Tide: ________________

Weather: P ½ cloudy

________________

14:53.48

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 43" | 50" | | | 2 | 9 | 52" | |
| | | 18" | | | | 8 | 68" | |
| | | 25" | | | | | | |

Depths measured in feet

Comments\ Descriptions: 30"

( 10 ft. cores)

Sediment – Fine mud

C-8

# Wilmington

## Sediment Project

Station #: WH7

Date: , ~~2007~~ 2008

Start Time: ____:____

Composite Time: ____:____

Core #'s ________

Tide: ________

Weather: ½ Cloudy

15:24, 25

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 51' | 70" | | | 2' | 5" | 71" | |
| | | 51" | | | | 3' | 54" | |
| | | 64" | | | | 4" | 67" | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft, cores)

Coarse mud & some sand & gravel

## Wilmington

## Sediment Project

Station #: WH 8

Core #'s ____________

Date: 6/6 , ~~2007~~2008

Tide: ____________

Start Time: ____:____

Weather: 82, cloudy

Composite Time: ____:____

16.11.11

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | 41' | 61" | | | 5' | 7' | 61" | |
| | | 52" | | | | 4' | 54" | |
| | | 53" | | | | 8' | 53" | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment Fine Mud

# Wilmington

## Sediment Project

Station #: WHU 1

Date: 6/12 ~~2007~~2008

Start Time: 8 : 32am

Composite Time: ___:___

Sample taken 160 ft from point

Core #'s ___

Tide: ___

Weather: ~~Cl~~ Sunny

39°

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.354 | 075° 31 734 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment type Silty Clay

# Wilmington

## Sediment Project

Station #: WHV 2

Date: 6/12 ~~2007~~ 2008

Start Time: 9 : 35

Composite Time: ____:____

Sample taken 12379 from way point

Core #'s ____

Tide: ____

Weather: Sunny

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.122 | w 75° 31.425 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment silty creamy peanut butter

Hit water at 3ft depth of sampling

**Wilmington**
CDF
**Sediment Project**

Station #: WU3

Date: 6-12 , ~~2007~~ 2008

Start Time: 10 : 16

Composite Time: ___:___

189 ft to pt

open area in middle of phrag

Core #'s ____

~~Tide:~~ ____

Weather: Hot

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.368 | 75° 31.479 | | 4' | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions:

(10 ft, cores)

C-13

38° 39' 42.642
75° 75° 31.314

# Wilmington

## Sediment Project

Station #: WU5

Date: 6 / 12 , ~~2007~~2008

Start Time: 11 : 15

Composite Time: ____:____

Core #'s ____

Tide: ____

Weather: ____

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.640 | 75° 31.368 | | 4 | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: ( 10 ft. cores)

Next to moat

silty Clay

water filling in hole

C-14

# Wilmington

## Sediment Project

Station #: WD 4

Date: 5/12 ~~2007~~ 2008

Start Time: 12 : 35

Composite Time: ___ : ___

Core #'s ___

Tide: ___

Weather: Sunny

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.424 | 75° 31.188 | | 4" | | |
| | | | | | | | | |
| | | | | | | | | |

Depths measured in feet

Comments\ Descriptions: (10 ft. cores)

Sediment - Silty Clay

C-15

# Wilmington

## Sediment Project

Station #: W06

Core #'s __________

Date: 6.12 ,~~2007~~2008

Tide: __________

Start Time: 11:53

Weather: __________

Composite Time: ____:____

| Sample # | Station Depth | Sample Length | Latitude | Longitude | Target Depth | Pen. Depth | Core Depth | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | 39° 42.623 | 75° 31.062 | | ~~4~~ 3 | | |
| | | | | | | | | |
| | | | | | | | | |

(10 ft. cores)

depths measured in feet

Comments\ Descriptions:

water about 3' too wet

silty clay