# Supplemental Norfolk Harbor Navigation Improvements Project – Thimble Shoal Channel, Chesapeake Bay Bridge Tunnel – Protective Rock Blanket Project

# Virginia Beach, Virginia

## Appendix H:
## Preliminary Sampling Data Report

## January 2021

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# EVALUATION OF DREDGED MATERIAL

# CHESAPEAKE BAY BRIDGE TUNNEL COVER MATERIAL AND WATER INJECTION DREDGING TRENCH

# DRAFT DATA PACKAGE

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This draft data package provides the results of sediment, elutriate, and bioassay testing for Chesapeake Bay Bridge Tunnel (CBBT) cover material that is proposed for removal and replacement as part of the navigation improvements for Norfolk Harbor. The material is proposed for removal using a water injection dredge (WID). A WID trench will be constructed east of and adjacent to the cover removal area to receive the cover material. Results of sediment, elutriate, and bioassay testing for the WID trench material is also provided in this draft data package.

Collection of the sediment was conducted using vibracoring equipment at ten sampling locations within the CBBT cover and WID trench areas 6 August 2020 through 31 August 2020 (Figure 1) Grab sampling was conducted at six sampling locations in the CBBT cover area with a stainless steel Van Veen on 1 September 2020 (Figure 1).

Cores collected for the CBBT cover area were to collected to elevation -65 ft MLLW. The length of the cores ranged from approximately 9 to 11.1 ft. Cores collected for the WID trench evaluation were collected to elevation-70 ft MLLW. The length of the cores ranged from approximately 15.8 to 22.2 ft. Cores were split into 5-ft elevation increments for physical and chemical testing. In addition, one composite sample was created for each dredging area (CBBT cover grabs, CBBT cover cores, and WID trench cores) using sediments from each sampling location. The three composites were each tested for physical, chemical, and ecotoxicological characteristics. The sample compositing scheme is provided in Table 1.

Reference sediments were collected at the Atlantic Ocean Reference Site (surface sediments) and the Willoughby Bank Reference Site (surface and subsurface sediments) (Figure 2). The samples from these sites were representative of sediments with different grain size characteristics (sands, mix of sand/fines, and silt/clay, respectively). Control sediment for laboratory whoel sediment bioassays was collected at the Lower Chesapeake Bay Control Site (Figure 2).

The full suite of physical and chemical, ecotoxicological analyses that were conducted for the CBBT Cover, WID Trench, and reference sediments is provided in Table 2. Table 3 provides a summary of the sample location and sediment collection information.

Results of the bulk sediment testing are provided in Tables 4 through 15.
Results of the site water and elutriate testing are provided in Tables 16 through 23.
Results of the water column bioassays and whole sediment bioassays are provided in Tables 24 through 27.
Results of the laboratory bioaccumulation exposures and tissue chemical analysis are not included in this draft data package and expected to be available by early February 2021.

Detailed information regarding sampling, testing, and data management/analysis are provided in the following report (available electronically upon request):

EA Engineering, Science, and Technology, Inc, PBC. 2021. *Evaluation of Dredged Material: Chespaeake Bay Bridge Cover Material and Water Injection Dredging Trench, Draft Interim Data Report. January.*

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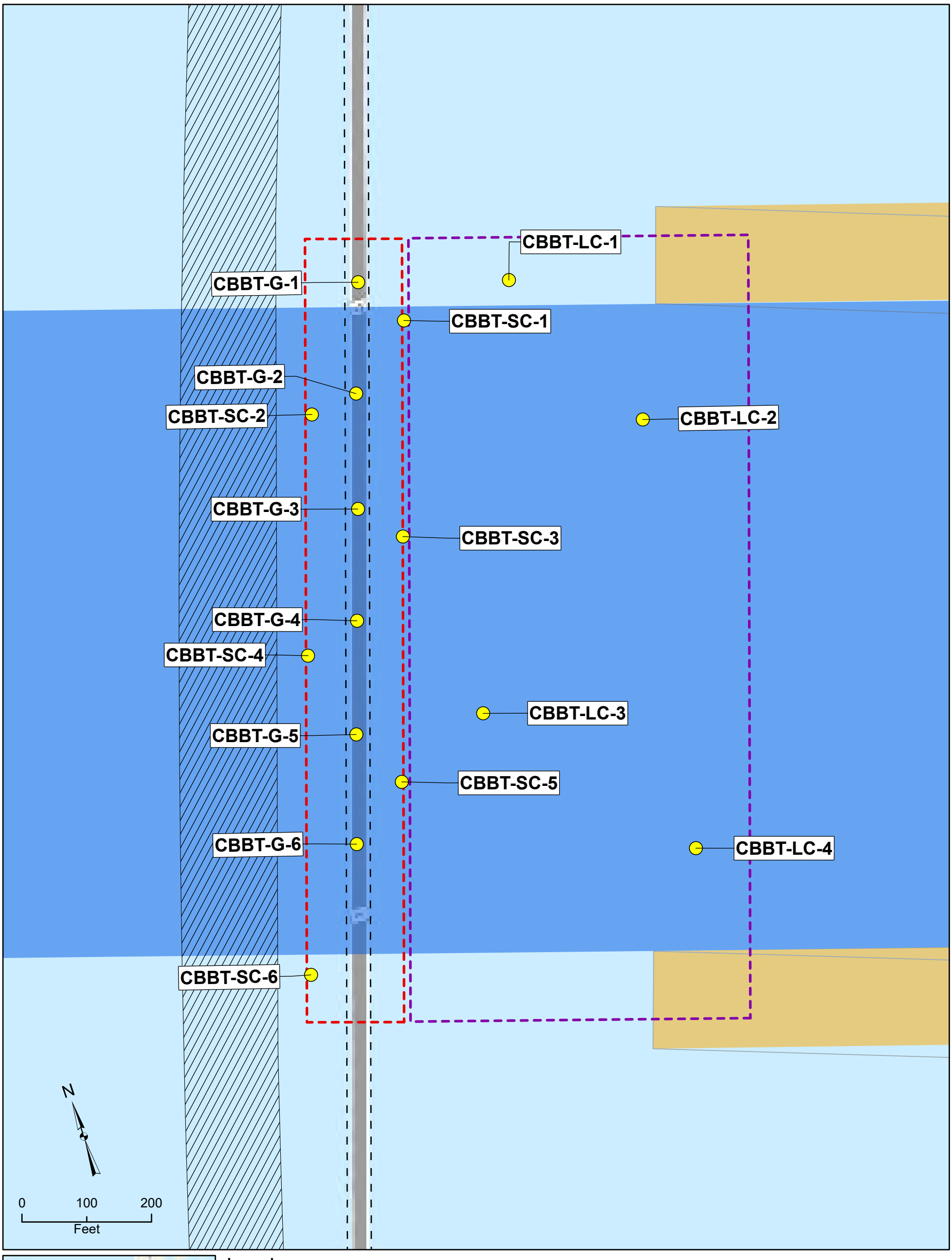




**Legend**

- Actual Sample Location
- Existing Tunnel
- PTST Alignment

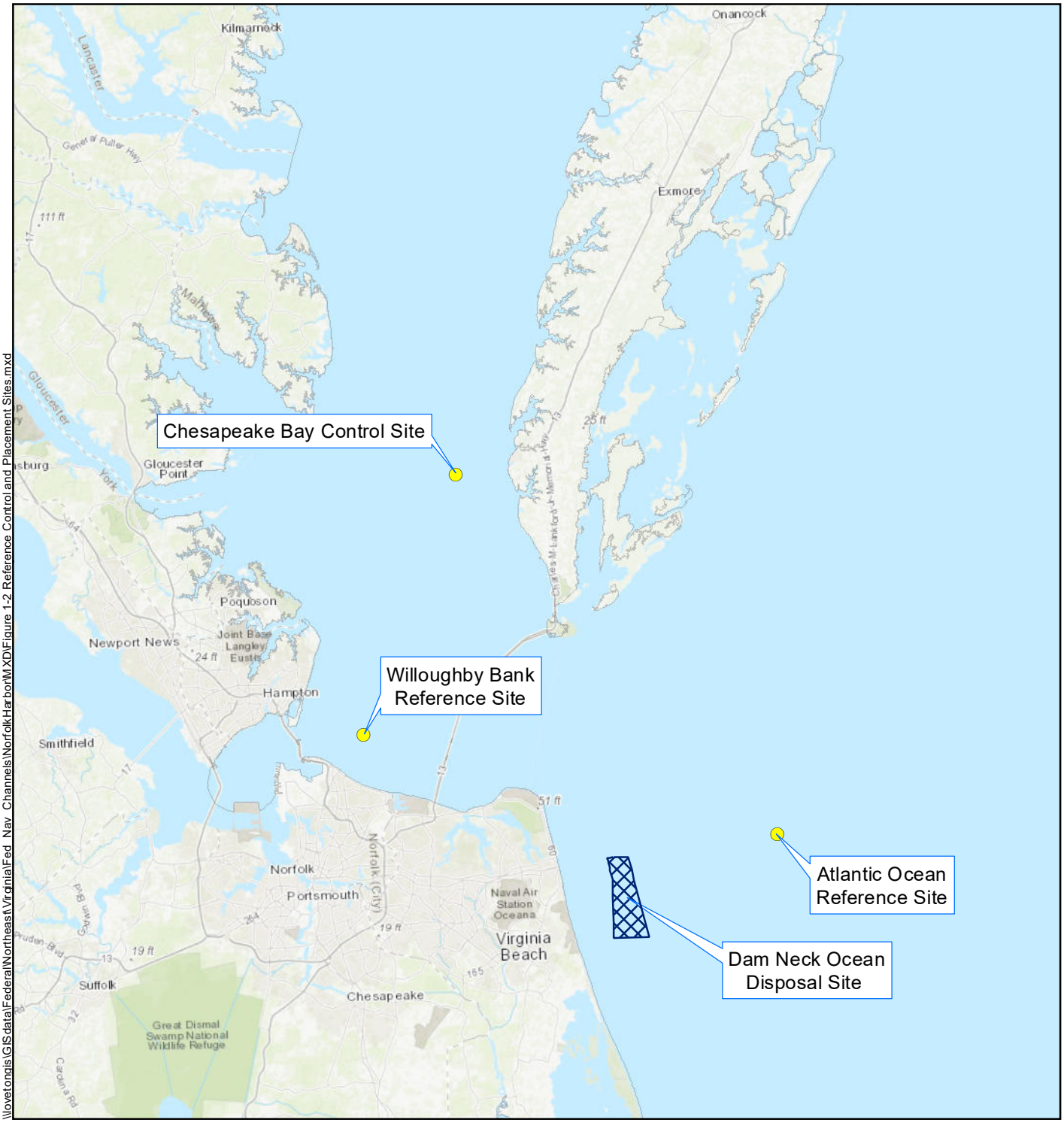
**Decision Units**

- CBBT DU1 and DU2
- CBBT DU3
- Meeting Area #2 Boundary
- Thimble Shoal Channel

Date: 1/6/2021
Source: ESRI, 2020
Spatial Reference
Path: \\lovetongis\GISdata\Federal\Northeast\Virginia\Fed_Nav_Channels\ThimbleShoal\PROJECTS\ThimbleShoal_NavChannel

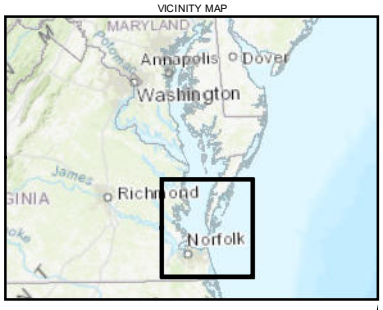
**Figure 1.**
**CBBT Cover and WID Trench Sampling Locations**

Lower Chesapeake Bay, Virginia




\\lovetongis\GIS\data\Federal\Northeast\Virginia\Fed Nav Channels\NorfolkHarbor\MXD\Figure 1-2 Reference Control and Placement Sites.mxd

VICINITY MAP




**Legend**

- Reference/Control Site
- Disposal Site

0 5 10

Miles

N

**Figure 2.**
**Location Map: Willoughby Bank Reference Site, Atlantic Ocean Reference Site, Chesapeake Bay Control Site, and Dam Neck Ocean Disposal Site**

Map Date: 7/1/2020

Projection: NAD 1983 State Plane Virginia South US Feet

## TABLE 1. SAMPLING AND COMPOSITING SCHEME

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| Dredging Unit | Sampling Location | Sediment Composite Sample Identification | Sediment Composite Sample Analysis [(a)] | Standard Elutriate Composite Sample Identification | Water Sample Identification | Water Sample Analysis [(a)] |
|---|---|---|---|---|---|---|
| **CBBT TUNNEL COVER - GRABS AND SHORT CORES** | | | | | | |
| 1 | CBBT-G-1 | CBBT-G-DU1-SED | Physical Constituents, Sediment Chemistry, Standard Elutriate Preparation/Chemistry, Water Column Bioassays, Sediment Bioassays & Bioaccumulation | CBBT-G-DU1-SET | CBBT-1/2-WAT | Site Water Chemistry, Standard Elutriate Preparation/Chemistry |
| | CBBT-G-2 | | | | | |
| | CBBT-G-3 | | | | | |
| | CBBT-G-4 | | | | | |
| | CBBT-G-5 | | | | | |
| | CBBT-G-6 | | | | | |
| 2 | CBBT-SC-1 | CBBT-SC-DU2-SED | | CBBT-SC-DU2-SET | | |
| | CBBT-SC-2 | | | | | |
| | CBBT-SC-3 | | | | | |
| | CBBT-SC-4 | | | | | |
| | CBBT-SC-5 | | | | | |
| | CBBT-SC-6 | | | | | |
| **WID TRENCH - LONG CORES (20 FT)** | | | | | | |
| 3 | CBBT-LC-1 | CBBT-LC-DU3-SED | Physical Constituents, Sediment Chemistry, Standard Elutriate Preparation/Chemistry, Water Column Bioassays, Sediment Bioassays & Bioaccumulation | CBBT-LC-DU3-SET | CBBT-3-WAT | Site Water Chemistry, Standard Elutriate Preparation/Chemistry |
| | CBBT-LC-2 | | | | | |
| | CBBT-LC-3 | | | | | |
| | CBBT-LC-4 | | | | | |
| **WILLOUGHBY BANK REFERENCE** | | | | | | |
| NA | WBREF-SUB-A | WBREF-SUB-SED | Physical Constituents, Sediment Chemistry, Sediment Bioassay, Bioaccumulation | NT | NT | |
| | WBREF-SUB-B | | | | | |
| | WBREF-SUB-C | | | | | |
| | WBREF-SUB-D | | | | | |
| | WBREF-SURF | WBREF-SURF-SED | Physical Constituents, Sediment Chemistry, Sediment Bioassay, Bioaccumulation | | | |
| **OCEAN DREDGED MATERIAL PLACEMENT SITE** | | | | | | |
| NA | Dam Neck Ocean Disposal Site | NT | | NT | DNODS-WAT | Receiving Water Chemistry |
| **ATLANTIC OCEAN REFERENCE** | | | | | | |
| NA | Atlantic Ocean Reference Site | OCREF-SED | Physical Constituents, Sediment Chemistry, Sediment Bioassay, Bioaccumulation | NT | NT | |
| **CHESAPEAKE BAY CONTROL** | | | | | | |
| NA | Chesapeake Bay Control Site | CBCON-SED | Physical Constituents, Sediment Chemistry, Sediment Bioassay | NT | NT | |

(a) See Table 1-2 for specifics on analytical testing program and methods.

Note:

NT = Not tested

**TABLE 2. ANALYTICAL AND ECOTOXICOLOGICAL TESTING SCHEME**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | CBBT Cover and WID Trench | | | | | | Atlantic Ocean Reference | Willoughby Bank Reference | Willoughby Bank Reference | Chesapeake Bay Control | Dam Neck Ocean Disposal Site |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sediment | | | | Water and Standard Elutriate | Tissue | Surficial Sediment (Grab Composite) | Surficial Sediment (Grab Composite) | Subsurface Sediment (Core Composite) | Surficial Sediment (Grab Composite) | Receiving Water |
| | CBBT Grabs | CBBT Short Cores | WID Trench Long Cores | Dredging Unit Composites | | | | | | | |
| **Physical Constituents** | | | | | | | | | | | |
| Grain Size | X | X | X | X | -- | -- | X | X | X | X | -- |
| Specific Gravity | X | X | X | X | -- | -- | X | X | X | X | -- |
| Atterberg Limits | X | X | X | X | -- | -- | X | X | X | X | -- |
| Total Solids | X | X | X | X | -- | -- | X | X | X | X | -- |
| Bulk Density | X | X | X | X | -- | -- | X | X | X | X | -- |
| Flashpoint/Ignitability | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Paint Filter Test | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| pH | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Percent Moisture | -- | -- | -- | -- | -- | X | -- | -- | -- | -- | -- |
| Lipids | -- | -- | -- | -- | -- | X | -- | -- | -- | -- | -- |
| **Chemical Constituents** | | | | | | | | | | | |
| Semivolatile Organic Compounds (SVOCs) | X | X | X | X | X | -- | X | X | X | X | X |
| Metals | X | X | X | X | X | X | X | X | X | X | X |
| Mercury | X | X | X | X | X | X | X | X | X | X | X |
| Chlorinated Pesticides | X | X | X | X | X | -- | X | X | X | X | X |
| Organophosphorus Pesticides | X | X | X | X | X | -- | X | X | X | X | X |
| Polynuclear Aromatic Hydrocarbons (PAHs) | X | X | X | X | X | -- | X | X | X | X | X |
| PCB Congeners | X | X | X | X | X | X | X | X | X | X | X |
| Dioxin and Furan Congeners | X | X | X | X | X | -- | X | X | X | X | X |
| Butyltins | X | X | X | X | X | -- | X | X | X | X | X |
| Cyanide | X | X | X | X | X | -- | X | X | X | X | X |
| Total Sulfide | X | X | X | X | X | -- | X | X | X | X | X |
| Acid Volatile Sulfide (AVS) | X | X | X | X | -- | -- | X | X | X | X | -- |
| Simultaneously Extracted Metals (SEM) | X | X | X | X | -- | -- | X | X | X | X | -- |
| Ammonia | X | X | X | X | X | -- | X | X | X | X | X |
| Total Kjeldahl Nitrogen (TKN) | X | X | X | X | X | -- | X | X | X | X | X |
| Nitrate + Nitrite | X | X | X | X | X | -- | X | X | X | X | X |
| Total Phosphorous | X | X | X | X | X | -- | X | X | X | X | X |
| Total Organic Carbon (TOC) | X | X | X | X | X | -- | X | X | X | X | X |
| PCB Aroclors | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Extractable Organic Halides (EOX) | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| BTEX | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Total Phenols | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Reactive Cyanide | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Reactive Sulfide | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Total Petroleum Hydrocarbons-DRO (C10 to C34) | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Total Petroleum Hydrocarbons-GRO (C6 to C10) | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Saturated Paste pH & Conductivity | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Neutralization Potential | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Pyritic Sulfur (Fizz Rating) | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Maximum Potential Acidity | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| Net Neutralization Potential | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| TCLP Analysis (Includes Volatiles, Semivolatiles, Pesticides, Herbicides, Metals, Mercury) | -- | -- | -- | X | -- | -- | -- | -- | -- | -- | -- |
| **Ecotoxicological Tests** | | | | | | | | | | | |
| Water Column Bioassays | -- | -- | -- | -- | X | -- | X | X | X | -- | -- |
| Whole Sediment Bioassays | -- | -- | -- | X | -- | -- | X | X | X | X | -- |
| Bioaccumulation Exposures | -- | -- | -- | X | -- | -- | X | X | X | -- | -- |

NOTES:
-- = Not analyzed.

## TABLE 3. SAMPLING LOCATIONS AND SUMMARY OF SEDIMENT COLLECTION INFORMATION
### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST/SEPTEMBER 2020)

| Dredging Unit | Location ID | Actual Coordinates NAD83, Virginia South State Plane (ft) | | Time Sampled | Replicate | Date Sampled | Tide Corrected Water Depth (ft MLLW) | Target Core Depth (ft MLLW) | Target Core Length (ft) | Core Recovery (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Easting | Northing | | | | | | | |
| **CBBT TUNNEL COVER - GRABS AND SHORT CORES** | | | | | | | | | | |
| DU1 | CBBT-G-1 | 12181310.27 | 3523328.13 | 11:07 | NA | 9/1/2020 | NA | NA | NA | NA |
| | CBBT-G-2 | 12181256.95 | 3523164.59 | 12:03 | NA | | NA | NA | NA | NA |
| | CBBT-G-3 | 12181207.65 | 3522993.23 | 13:00 | NA | | NA | NA | NA | NA |
| | CBBT-G-4 | 12181155.75 | 3522828.51 | 13:39 | NA | | NA | NA | NA | NA |
| | CBBT-G-5 | 12181103.31 | 3522660.97 | 15:20 | NA | | NA | NA | NA | NA |
| | CBBT-G-6 | 12181054.46 | 3522498.69 | 14:38 | NA | | NA | NA | NA | NA |
| DU2 | SC-1 | 12181360.63 | 3523250.97 | 10:59 | A | 8/24/2020 | -54.8 | -65 | 10.2 | 7.5 |
| | | | | 11:19 | B | | | | | 11.2 |
| | | | | 11:37 | C | | | | | 9.8 |
| | | | | 11:55 | D | | | | | 10.2 |
| | SC-2 | 12181182.09 | 3523153.65 | 17:02 | A | 8/24/2020 | -55.3 | -65 | 9.7 | 7.6 |
| | | | | 17:25 | B | | | | | 9.5 |
| | | | | 18:04 | C | | | | | 0.0 |
| | | | | 18:45 | D | | | | | 0.0 |
| | | | | 19:06 | E | | | | | 8.7 |
| | | | | 19:31 | F | | | | | 0.0 |
| | | | | 11:19 | G | 8/25/2020 | | | | 9.7 |
| | SC-3 | 12181261.51 | 3522932.27 | 16:26 | A | 8/30/2020 | -56.2 | -65 | 8.8 | 8.8 |
| | | | | 16:59 | B | | | | | 8.8 |
| | | | | 17:22 | C | | | | | 7.3 |
| | | | | 11:40 | D | 8/31/2020 | | | | 4.6 |
| | | | | 12:20 | E | | | | | 2.5 |
| | SC-4 | 12181067.45 | 3522799.10 | 20:06 | A | 8/26/2020 | -53.4 | -65 | 11.6 | 10.4 |
| | | | | 11:10 | B | 8/30/2020 | | | | 9.9 |
| | | | | 11:37 | C | | | | | 10.1 |
| | | | | 12:09 | D | | | | | 10.1 |
| | SC-5 | 12181149.07 | 3522570.31 | 12:44 | A | 8/26/2020 | -54 | -65 | 11 | 11.0 |
| | | | | 13:15 | B | | | | | 10.8 |
| | | | | 13:42 | C | | | | | 0.0 |
| | | | | 14:02 | D | | | | | 5.0 |
| | SC-6 | 12180927.85 | 3522326.28 | 12:45 | A | 8/24/2020 | -54.9 | -65 | 10.1 | 6.7 |
| | | | | 11:56 | B | 8/25/2020 | -54.2 | -65 | 10.8 | 10.8 |
| | | | | 12:31 | C | | | | | 7.2 |
| | | | | 12:56 | D | | | | | 10.8 |
| **WID TRENCH - LONG CORES** | | | | | | | | | | |
| DU3 | LC-1 | 12181533.96 | 3523263.21 | 17:09 | A | 8/6/2020 | -48.6 | -70 | 21.4 | 26.0 |
| | | | | 8:27 | B | 8/7/2020 | -48.5 | -70 | 21.5 | 26.0 |
| | | | | 9:45 | C | | | | | 26.0 |
| | | | | 10:43 | D | | | | | 24.6 |
| | LC-2 | 12181668.79 | 3522996.80 | 16:20 | A | 8/10/2020 | -54.1 | -70 | 15.9 | 15.9 |
| | | | | 17:56 | B | | | | | 8.5 |
| | | | | 11:59 | C | 8/11/2020 | | | | 15.9 |
| | | | | 12:43 | D | | | | | 15.9 |
| | | | | 13:20 | E | | | | | 15.9 |
| | LC-3 | 12181300.24 | 3522634.88 | 11:54 | A | 8/10/2020 | -53.9 | -70 | 16.1 | 16.1 |
| | | | | 12:44 | B | | | | | 16.1 |
| | | | | 13:21 | C | | | | | 16.1 |
| | | | | 13:56 | D | | | | | 16.1 |
| | LC-4 | 12181553.65 | 3522339.59 | 8:36 | A | 8/11/2020 | -53 | -70 | 17 | 17.0 |
| | | | | 9:26 | B | | | | | 17.0 |
| | | | | 9:57 | C | | | | | 17.0 |
| | | | | 10:31 | D | | | | | 17.0 |
| **WILLOUGHBY BANK SUBSURFACE REFERENCE** | | | | | | | | | | |
| WBREF | WBREF-SUB-A | 12144078.46 | 3529628.35 | 9:21 | A | 8/5/2020 | -19.1 | -38.1 | 20.0 | 15.0 |
| | | | | 10:13 | B | | | | | 15.0 |
| | WBREF-SUB-B | 12149386.56 | 3527603.81 | 11:58 | A | 8/5/2020 | -24.1 | -44.1 | 20.0 | 15.0 |
| | | | | 12:36 | B | | | | | 15.0 |
| | WBREF-SUB-C | 12154944.88 | 3526014.78 | 13:59 | A | 8/5/2020 | -27.8 | -47.8 | 20.0 | 15.0 |
| | WBREF-SUB-D | 12150437.27 | 3523203.78 | 15:33 | A | 8/5/2020 | -19.4 | -39.4 | 20.0 | 15.0 |
| **WILLOUGHBY BANK SURFACE REFERENCE** | | | | | | | | | | |
| NA | WBREF-SURF | 12154944.88 | 3526014.78 | 16:20 | NA | 9/10/2020 | NA | NA | NA | NA |
| **ATLANTIC OCEAN REFERENCE** | | | | | | | | | | |
| NA | OCREF | 12303685.19 | 3491505.29 | 15:00 | NA | 9/11/2020 | NA | NA | NA | NA |
| **CHESAPEAKE BAY CONTROL** | | | | | | | | | | |
| NA | CBCON | 12183188.92 | 3624418.68 | 11:26 | NA | 9/10/2020 | NA | NA | NA | NA |
| **DAM NECK OCEAN DISPOSAL SITE** | | | | | | | | | | |
| NA | DNODS | 12247288.09 | 3474177.43 | 17:05 | NA | 9/11/2020 | NA | NA | NA | NA |

**NOTES:**
NA - not applicable for grab sample

**TABLE 4a. PHYSICAL CHARACTERISTICS FOR CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GRAIN SIZE** | | | | | | | | | | | | |
| GRAVEL | % | -- | 0 | 0 | 0 | **24.2** | **8.6** | **25.3** | **60.4** | **71.6** | **65.2** | **11.9** |
| SAND | % | -- | **94.8** | **22.7** | **44.9** | **68.2** | **84.4** | **70.5** | **36.6** | **27.2** | **31.5** | **79.8** |
| COARSE SAND | % | -- | 0 | 0 | **0.7** | **13.8** | **6.8** | **11.3** | **12.1** | **6.8** | **5.6** | **7.9** |
| MEDIUM SAND | % | -- | **1.7** | **1.6** | **5.6** | **31.7** | **39.2** | **22** | **17.4** | **13.3** | **15.6** | **30.7** |
| FINE SAND | % | -- | **93.1** | **21.1** | **38.6** | **22.7** | **38.4** | **37.2** | **7.1** | **7.2** | **10.3** | **41.2** |
| SILT | % | -- | **2.4** | **52.5** | **37.6** | **4.7** | **4.2** | **1.8** | **2** | **0.02** | **0.4** | **6** |
| CLAY | % | -- | **2.8** | **24.8** | **17.5** | **2.9** | **2.8** | **2.4** | **1** | **1.2** | **2.9** | **2.3** |
| SILTCLAY | % | -- | **5.2** | **77.3** | **55.1** | **7.6** | **7** | **4.2** | **3** | **1.22** | **3.3** | **8.3** |
| **PHYSICAL PROPERTIES** | | | | | | | | | | | | |
| LIQUID LIMIT | NONE | -- | 0 | **32** | **29** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERCENT MOISTURE | % | 0.1 | **20.1** | **29.9** | **34** | **14.1** | **17.7** | **12.8** | **15.4** | **14.4** | **20.3** | **21.5** |
| PERCENT SOLIDS | % | 0.1 | **79.9** | **70.1** | **66** | **85.9** | **82.3** | **87.2** | **84.6** | **85.6** | **79.7** | **78.5** |
| PLASTIC LIMIT | NONE | -- | 0 | **22** | **21** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PLASTICITY INDEX | NONE | -- | NP | **10** | **8** | NP | NP | NP | NP | NP | NP | NP |
| SPECIFIC GRAVITY | NONE | -- | **2.72** | **2.71** | **2.71** | **2.68** | **2.68** | **2.69** | **2.68** | **2.68** | **2.67** | **2.69** |
| IN PLACE DENSITY | G/CC | | **1.5** | **1.24** | **1.11** | **1.8** | **1.79** | **1.76** | **1.52** | **1.73** | **1.88** | **1.6** |

**NP** = no plasticity

**RL** = laboratory reporting limit

**TABLE 4b. PHYSICAL CHARACTERISTICS FOR CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | | CBBT-SC-2 | | | CBBT-SC-3 | | | CBBT-SC-4 | | | CBBT-SC-5 | | | CBBT-SC-6 | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | -55 to -60 | -60 to -65 | -55 to -65 | -55 to -60 | -60 to -65 | -55 to -65 | -56 to -60 | -60 to -65 | -56 to -65 | -53 to -60 | -60 to -65 | -53 to 65 | -54 to -60 | -60 to -65 | -53 to -65 | -54 to -60 | -60 to -65 | -53 to -65 | DU2 |
| **GRAIN SIZE** | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRAVEL | % | -- | 0 | 0 | 0 | | 1.1 | 2.6 | 7.1 | 4.6 | 8.6 | 19.2 | 12.4 | 3.1 | 6.3 | 17.4 | 6.8 | 7.4 | 2.3 | 0 | 1.7 | 1.1 | 0 | 2.8 | 2.2 |
| SAND | % | -- | 94.8 | 22.7 | 44.9 | | 89.4 | 91.8 | 87.3 | 90.4 | 71.3 | 77.3 | 82.8 | 89.7 | 87.9 | 76.8 | 88.7 | 87.6 | 89 | 74.8 | 88.7 | 95.1 | 76.6 | 91.9 | 92.8 |
| COARSE SAND | % | -- | 0 | 0 | 0.7 | | 4.8 | 3.3 | 4.7 | 11.2 | 10.9 | 9.8 | 8.7 | 5.6 | 7.2 | 5.8 | 3.9 | 7.5 | 4.4 | 0.3 | 2.7 | 2.1 | 0.5 | 2.8 | 6 |
| MEDIUM SAND | % | -- | 1.7 | 1.6 | 5.6 | | 37.5 | 43.4 | 37.2 | 50.6 | 23.2 | 39 | 30.6 | 42.6 | 40.4 | 27.4 | 24.4 | 41.4 | 37.8 | 3 | 29.9 | 35.6 | 4 | 33.8 | 38.7 |
| FINE SAND | % | -- | 93.1 | 21.1 | 38.6 | | 47.1 | 45.1 | 45.4 | 28.6 | 37.2 | 28.5 | 43.5 | 41.5 | 40.3 | 43.6 | 60.4 | 38.7 | 46.8 | 71.5 | 56.1 | 57.4 | 72.1 | 55.3 | 48.1 |
| SILT | % | -- | 2.4 | 52.5 | 37.6 | | 4.9 | 3.2 | 2.9 | 3.3 | 11.5 | 1.9 | 2.4 | 5.1 | 3.1 | 3.3 | 1.6 | 3.1 | 3.7 | 13.7 | 3.3 | 2.8 | 13.1 | 2.6 | 2.4 |
| CLAY | % | -- | 2.8 | 24.8 | 17.5 | | 4.6 | 2.5 | 2.6 | 1.7 | 8.6 | 1.6 | 2.4 | 2.2 | 2.8 | 2.5 | 2.9 | 1.8 | 5 | 11.5 | 6.3 | 0.9 | 10.3 | 2.7 | 2.6 |
| SILTCLAY | % | -- | 5.2 | 77.3 | 55.1 | | 9.5 | 5.7 | 5.5 | 5 | 20.1 | 3.5 | 4.8 | 7.3 | 5.9 | 5.8 | 4.5 | 4.9 | 8.7 | 25.2 | 9.6 | 3.7 | 23.4 | 5.3 | 5 |
| **PHYSICAL PROPERTIES** | | | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID LIMIT | NONE | -- | 0 | 32 | 29 | | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 |
| PERCENT MOISTURE | % | 0.1 | 20.1 | 29.9 | 34 | | 19 | 22 | 18 | 9 | 18.1 | 16.1 | 11.4 | 21 | 16.9 | 17 | 14.1 | 13.3 | 21.5 | 22.9 | 21.1 | 10.9 | 22.9 | 19 | 18.2 |
| PERCENT SOLIDS | % | 0.1 | 79.9 | 70.1 | 66 | | 81 | 78 | 82 | 91 | 81.9 | 83.9 | 88.6 | 79 | 83.1 | 83 | 85.9 | 86.7 | 78.5 | 77.1 | 78.9 | 89.1 | 77.1 | 81 | 81.8 |
| PLASTIC LIMIT | NONE | -- | 0 | 22 | 21 | | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 | 0 | -- | 0 |
| PLASTICITY INDEX | NONE | -- | NP | 10 | 8 | | NP | NP | -- | NP | NP | -- | NP | NP | -- | NP | NP | -- | NP | NP | -- | NP | NP | -- | -- |
| SPECIFIC GRAVITY | NONE | -- | 2.72 | 2.71 | 2.71 | | 2.67 | 2.67 | -- | 2.66 | 2.7 | -- | 2.68 | 2.66 | -- | 2.68 | 2.67 | -- | 2.68 | 2.72 | -- | 2.66 | 2.72 | -- | 2.65 |
| IN PLACE DENSITY | G/CC | -- | 1.5 | 1.24 | 1.11 | | 1.64 | 1.57 | -- | 1.73 | 1.74 | -- | 1.72 | 1.59 | -- | 1.76 | 1.59 | -- | 1.58 | 1.52 | -- | 1.49 | 1.44 | -- | 1.64 |

**NP** = no plasticity
**RL** = laboratory reporting limit

**TABLE 4c. PHYSICAL CHARACTERISTICS FOR WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL MATERIAL (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | | CBBT-LC-1 | | | | | CBBT-LC-2 | | | | CBBT-LC-3 | | | | CBBT-LC-4 | | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | FT MLLW | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -48 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | -53 to -70 | DU3 |
| **GRAIN SIZE** | | | | | | | | | | | | | | | | | | | | | | | | |
| GRAVEL | % | -- | 0 | 0 | 0 | | 10.7 | 20.2 | 0 | 0 | 4.3 | 3.1 | 0.2 | 0 | 1.9 | 1.9 | 0 | 0 | 0 | 0.9 | 0 | 0 | 0 | 0 | 5.5 |
| SAND | % | -- | 94.8 | 22.7 | 44.9 | | 61.3 | 46.3 | 73.9 | 71.4 | 63.5 | 55 | 71.4 | 75.9 | 65.9 | 73.1 | 74.6 | 69.2 | 70.1 | 77.5 | 68.9 | 70.1 | 77 | 73 | 69.6 |
| COARSE SAND | % | -- | 0 | 0 | 0.7 | | 11 | 5.8 | 0.8 | 2.1 | 4.6 | 1.5 | 0.7 | 1.5 | 2.9 | 2.6 | 0.1 | 0.7 | 0.8 | 2.5 | 0.6 | 0.5 | 1.3 | 1.9 | 3.7 |
| MEDIUM SAND | % | -- | 1.7 | 1.6 | 5.6 | | 25.5 | 13.9 | 7.3 | 10 | 14.6 | 7.3 | 7.7 | 11.3 | 11.2 | 6 | 4.4 | 5.7 | 4.1 | 7.2 | 3.7 | 4.1 | 8.9 | 7.2 | 14.2 |
| FINE SAND | % | -- | 93.1 | 21.1 | 38.6 | | 24.8 | 26.6 | 65.8 | 59.3 | 44.3 | 46.2 | 63 | 63.1 | 51.8 | 64.5 | 70.1 | 62.8 | 65.2 | 67.8 | 64.6 | 65.5 | 66.8 | 63.9 | 51.7 |
| SILT | % | -- | 2.4 | 52.5 | 37.6 | | 13.6 | 16.5 | 14.4 | 20.4 | 18 | 26.9 | 18.8 | 15.8 | 21.9 | 14.8 | 11.6 | 17.9 | 18.5 | 13 | 19.3 | 18.6 | 11.5 | 16.7 | 12.4 |
| CLAY | % | -- | 2.8 | 24.8 | 17.5 | | 14.4 | 17 | 11.7 | 8.2 | 14.2 | 15 | 9.6 | 8.3 | 10.3 | 10.2 | 13.8 | 12.9 | 11.4 | 8.6 | 11.8 | 11.3 | 11.5 | 10.3 | 12.5 |
| SILTCLAY | % | -- | 5.2 | 77.3 | 55.1 | | 28 | 33.5 | 26.1 | 28.6 | 32.2 | 41.9 | 28.4 | 24.1 | 32.2 | 25 | 25.4 | 30.8 | 29.9 | 21.6 | 31.1 | 29.9 | 23 | 27 | 24.9 |
| **PHYSICAL PROPERTIES** | | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID LIMIT | NONE | -- | 0 | 32 | 29 | | 26 | 29 | 0 | 0 | -- | 27 | 0 | 0 | -- | 0 | 0 | 0 | -- | 0 | 0 | 0 | 0 | -- | 25 |
| PERCENT MOISTURE | % | 0.1 | 20.1 | 29.9 | 34 | | 20.4 | 21.3 | 22.8 | 20.4 | 22.4 | 22.3 | 24.4 | 23.7 | 22.4 | 21.7 | 24.4 | 23.7 | 23.4 | 21.5 | 23.7 | 24.1 | 24 | 31.5 | 21.1 |
| PERCENT SOLIDS | % | 0.1 | 79.9 | 70.1 | 66 | | 79.6 | 78.7 | 77.2 | 79.6 | 77.6 | 77.7 | 75.6 | 76.3 | 77.6 | 78.3 | 75.6 | 76.3 | 76.6 | 78.5 | 76.3 | 75.9 | 76 | 68.5 | 78.9 |
| PLASTIC LIMIT | NONE | -- | 0 | 22 | 21 | | 19 | 19 | 0 | 0 | -- | 23 | 0 | 0 | -- | 0 | 0 | 0 | -- | 0 | 0 | 0 | 0 | -- | 21 |
| PLASTICITY INDEX | NONE | -- | NP | 10 | 8 | | 7 | 10 | NP | NP | -- | 4 | NP | NP | -- | NP | NP | NP | -- | NP | NP | NP | NP | -- | 4 |
| SPECIFIC GRAVITY | NONE | -- | 2.72 | 2.71 | 2.71 | | 2.75 | 2.79 | 2.75 | 2.74 | -- | 2.76 | 2.74 | 2.75 | -- | 2.73 | 2.73 | 2.74 | -- | 2.73 | 2.74 | 2.74 | 2.74 | -- | 2.72 |
| IN PLACE DENSITY | G/CC | | 1.5 | 1.24 | 1.11 | | 1.67 | 1.61 | 1.42 | 1.45 | -- | 1.41 | 1.52 | 1.41 | -- | 1.51 | 1.4 | 1.45 | -- | 1.49 | 1.44 | 1.5 | 1.51 | -- | 1.42 |

**NP** = no plasticity
**RL** = laboratory reporting limit

**TABLE 5a. GENERAL CHEMISTRY CONCENTRATIONS (mg/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AMMONIA, DISTILLED | mg/kg | 11.8 | 11 U | **24** | 16 U | 11 U | 12 U | 10 U | 12 U | 10 U | 11 U | 12 U |
| CHLORIDE | mg/kg | 62 | -- | **--** | -- | **2,100** | **3,100** | **2,000** | **2,300** | **2,200** | **3,600** | **3,800** |
| CYANIDE, TOTAL | mg/kg | 0.24 | 0.24 U | 0.26 U | 0.32 U | 0.24 U | 0.23 U | 0.21 U | 0.21 U | 0.24 U | 0.23 U | 0.25 U |
| FLUORIDE | mg/kg | 1.25 | -- | -- | -- | **0.8 J** | 1.2 U | 1.1 U | 1.2 U | 1.2 U | **1.2** | 1.3 U |
| NITRATE AS N | mg/kg | 0.62 | -- | -- | -- | 0.58 U | 0.61 U | 0.57 U | 0.59 U | 0.58 U | 0.62 U | 0.63 U |
| NITRATE NITRITE AS N | mg/kg | 1.25 | 1.2 U | **0.77 J** | 1.5 U | 1.2 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.2 U | 1.3 U |
| NITRITE AS N | mg/kg | 0.62 | -- | **--** | -- | 0.58 U | 0.61 U | 0.57 U | 0.59 U | 0.58 U | 0.62 U | 0.63 U |
| NITROGEN, KJELDAHL | mg/kg | 179 | **280** | **580** | **780** | **240** | **190** | **260** | **280** | **300** | **360** | **110 J** |
| PHOSPHORUS | mg/kg | 3 | **280** | **220** | **180** | **96** | **45** | **180** | **64** | **38** | **72** | **39** |
| TOTAL ORGANIC CARBON | % | -- | **1,800** | **6,900** | **5,100** | 0.12 U | 0.12 U | **0.16** | **1.6** | **0.15** | **0.12 J** | 0.13 U |

**NOTES**: Bold values represent detected concentrations.

**RL =** laboratory reporting limit

**B** = compound detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 5b. GENERAL CHEMISTRY CONCENTRATIONS (mg/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED |
|---|---|---|---|---|---|
| AMMONIA, DISTILLED | mg/kg | 11.8 | 11 U | **24** | 16 U |
| CHLORIDE | mg/kg | 62 | -- | **--** | -- |
| CYANIDE, TOTAL | mg/kg | 0.24 | 0.24 U | 0.26 U | 0.32 U |
| FLUORIDE | mg/kg | 1.25 | -- | -- | -- |
| NITRATE AS N | mg/kg | 0.62 | -- | -- | -- |
| NITRATE NITRITE AS N | mg/kg | 1.25 | 1.2 U | **0.77 J** | 1.5 U |
| NITRITE AS N | mg/kg | 0.62 | -- | **--** | -- |
| NITROGEN, KJELDAHL | mg/kg | 179 | **280** | **580** | **780** |
| PHOSPHORUS | mg/kg | 3 | **280** | **220** | **180** |
| TOTAL ORGANIC CARBON | % | -- | **0.18** | **0.69** | **0.51** |

| | CBBT-SC-1 | | | CBBT-SC-2 | | | CBBT-SC-3 | | | CBBT-SC-4 | | | CBBT-SC-5 | | | CBBT-SC-6 | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FT MLLW | -55 to -60 | -60 to -65 | -55 to -65* | -55 to -60 | -60 to -65 | -55 to -65* | -56 to -60 | -60 to -65 | -56 to -65* | -53 to -60 | -60 to -65 | -53 to -65* | -54 to -60 | -60 to -65 | -53 to -65* | -54 to -60 | -60 to -65 | -53 to -65* | DU2 |
| | 11 U | 12 U | -- | 10 U | 12 U | -- | 9.8 U | 12 U | -- | 11 U | 12 U | -- | 12 U | 14 U | -- | 9.8 U | 13 U | -- | 12 U |
| | **2,200** | **2,100** | -- | **1,600** | **2,900** | -- | **1,800** | **2,500** | -- | **2,900** | **2,100** | -- | **4,300** | **4,800** | -- | **1,900** | **4,400** | -- | **3,400** |
| | 0.26 U | 0.24 U | -- | 0.23 U | 0.23 U | -- | 0.24 U | 0.23 U | -- | 0.23 U | 0.23 U | -- | 0.23 U | 0.26 U | -- | 0.23 U | 0.27 U | -- | 0.23 U |
| | 1.2 U | 1.3 U | -- | 1.1 U | **0.98 J** | -- | 1.1 U | 1.3 U | -- | **0.86 J** | 1.2 U | -- | **0.88 J** | 1.3 U | -- | 1.1 U | **1.3** | -- | **0.86 J** |
| | 0.61 U | 0.64 U | -- | 0.55 U | 0.61 U | -- | 0.56 U | 0.63 U | -- | 0.6 U | 0.58 U | -- | 0.63 U | 0.65 U | -- | 0.56 U | 0.65 U | -- | 0.61 U |
| | 1.2 U | 1.3 U | -- | 1.1 U | 1.2 U | -- | 1.1 U | 1.3 U | -- | 1.2 U | 1.2 U | -- | 1.3 U | 1.3 U | -- | **0.48 J** | 1.3 U | -- | **1.1 J** |
| | 0.61 U | 0.64 U | -- | 0.55 U | 0.61 U | -- | 0.56 U | 0.63 U | -- | 0.6 U | 0.58 U | -- | 0.63 U | 0.65 U | -- | 0.56 U | 0.65 U | -- | 0.61 U |
| | **160 J** | 180 U | -- | 150 U | **160 J** | -- | 170 U | 190 U | -- | 160 U | **120 J** | -- | **130 J** | **200** | -- | **120 J** | **140 J** | -- | **160 J** |
| | **41** | **24** | -- | **27** | **140** | -- | **76** | **44** | -- | **51** | **51** | -- | **140** | **160** | -- | **25** | **170** | -- | **33** |
| | **0.16** | **0.16** | 0.12 U | **0.11** | **0.91** | 0.12 U | **0.13** | **0.10** | 0.12 U | **0.16** | **0.26** | 0.12 U | **0.15** | **0.21** | 0.13 U | **0.35** | **0.22** | 0.12 U | **0.2** |

**NOTES**: Bold values represent detected concentrations.
*TOC and grain size only
**RL =** laboratory reporting limit
**B** = compound detected in the laboratory method blank
**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected

**TABLE 5c. GENERAL CHEMISTRY CONCENTRATIONS (mg/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | | CBBT-LC-2 | | | | CBBT-LC-3 | | | | CBBT-LC-4 | | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -48 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | -53 to -70 | DU3 |
| AMMONIA, DISTILLED | mg/kg | 11.8 | 11 U | **24** | 16 U | | 11 U | 12 U | 12 U | 13 U | -- | 12 U | 12 U | 12 U | -- | 12 U | 13 U | 13 U | -- | 13 U | 12 U | 12 U | 13 U | -- | 13 U |
| CHLORIDE | mg/kg | 62 | -- | **--** | -- | | **3,500** | **3,100** | **4,000** | **3,900** | -- | **4,100** | **4,300** | **4,000** | -- | **4,400** | **4,500** | **4,500** | -- | **4,200** | **4,800** | **4,700** | **4,600** | -- | **4,000** |
| CYANIDE, TOTAL | mg/kg | 0.24 | 0.24 U | 0.26 U | 0.32 U | | 0.24 U | 0.26 U | 0.27 U | 0.25 U | -- | 0.24 U | 0.25 U | 0.27 U | -- | 0.25 U | 0.26 U | 0.26 U | -- | 0.24 U | 0.26 U | 0.26 U | 0.26 U | -- | **0.44** |
| FLUORIDE | mg/kg | 1.25 | -- | -- | -- | | **3.1** | **0.93 J** | 1.3 U | 1.2 U | -- | **1.2 J** | 1.3 U | 1.3 U | -- | **1.4** | **0.9 J** | 1.3 U | -- | **1.3** | **1 J** | **1 J** | 1.3 U | -- | **1.3** |
| NITRATE AS N | mg/kg | 0.62 | -- | -- | -- | | 0.63 U | 0.63 U | 0.65 U | 0.62 U | -- | 0.64 U | **0.54 J** | 0.65 U | -- | 0.64 U | 0.66 U | 0.65 U | -- | 0.63 U | 0.65 U | 0.66 U | 0.66 U | -- | 0.63 U |
| NITRATE NITRITE AS N | mg/kg | 1.25 | 1.2 U | **0.77 J** | 1.5 U | | 1.2 U | 1.3 U | 1.3 U | 1.3 U | -- | 1.3 U | 1.3 U | 1.3 U | -- | 1.3 U | 1.3 U | 1.3 U | -- | 1.3 U | 1.3 U | 1.3 U | 1.3 U | -- | 1.3 U |
| NITRITE AS N | mg/kg | 0.62 | -- | **--** | -- | | 0.63 U | 0.63 U | 0.65 U | 0.62 U | -- | 0.64 U | 0.66 U | 0.65 U | -- | 0.64 U | 0.66 U | 0.65 U | -- | 0.63 U | 0.65 U | 0.66 U | 0.66 U | -- | 0.63 U |
| NITROGEN, KJELDAHL | mg/kg | 179 | **280** | **580** | **780** | | **270** | **300** | **360** | **330** | -- | **410** | **330** | **220** | -- | **220** | **250** | **240** | -- | **180 J** | **210** | **170 J** | **200** | -- | **200** |
| PHOSPHORUS | mg/kg | 3 | **280** | **220** | **180** | | **230 B** | **770 B** | **170 B** | **190 B** | -- | **410 B** | **170 B** | **200 B** | -- | **500 B** | **250 B** | **230 B** | -- | **190 B** | **180 B** | **170 B** | **64 B** | -- | **290** |
| TOTAL ORGANIC CARBON | % | -- | **0.18** | **0.69** | **0.51** | | **0.17** | **1.7** | **0.13** | **0.28** | **0.34** | **0.11 J** | 0.13 U | **1.2** | **0.39** | **0.11 J** | 0.13 U | **0.16** | **0.69** | **0.099 J** | 0.13 U | 0.13 U | 0.13 U | **0.45** | **0.23** |

**NOTES**: Bold values represent detected concentrations.
**RL =** laboratory reporting limit
**B** = compound detected in the laboratory method blank
**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected

**TABLE 6a. METALS CONCENTRATIONS (mg/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALUMINUM | mg/kg | 3.2-4 | -- | -- | **2,300** | **9,100** | **7,000** | **1,300** | **1,000** | **790** | **580** | **760** | **970** | **790** |
| ANTIMONY | mg/kg | 0.11-0.13 | -- | -- | **0.03 J** | **0.055 J** | **0.051 J** | **0.029 J** | **0.028 J** | **0.032 J** | **0.039 J** | 0.12 U | 0.12 U | **0.036 J** |
| ARSENIC | mg/kg | 0.054-0.066 | 7.24 | 41.6 | **2** | **4.6** | **4.2** | **2.1** | **1.7** | **3** | **4.2** | **1.6** | **1.3** | **3.6** |
| BARIUM | mg/kg | 0.54-0.66 | -- | -- | **4.2** | **23** | **18** | **3.2** | **2.6** | **4.2** | **4.9** | **3.2** | **3.1** | **4.5** |
| BERYLLIUM | mg/kg | 0.054-0.62 | -- | -- | **0.13** | **0.43** | **0.33** | **0.13** | **0.1** | **0.089** | **0.094** | **0.091** | **0.082** | **0.11** |
| CADMIUM | mg/kg | 0.054-0.066 | 0.676 | 4.21 | **0.022 J** | **0.041 J** | **0.059 J** | **0.016 J** | **0.016 J** | **0.012 J** | **0.018 J** | **0.02 J** | **0.016 J** | **0.012 J** |
| CHROMIUM | mg/kg | 0.11-0.13 | 52.3 | 160 | **6.4** | **19** | **15** | **4.7** | **3.5** | **3.8** | **2.9** | **3.1** | **3.1** | **3.9** |
| COBALT | mg/kg | 0.027-0.033 | -- | -- | **2.2** | **6.1** | **4.4** | **1.3** | **1** | **1** | **0.92** | **0.71** | **0.83** | **1.2** |
| COPPER | mg/kg | 0.16-0.2 | 18.7 | 108 | **1.1** | **5.1** | **4.8** | **1.0** | **0.8** | **1** | **0.58** | **0.66** | **0.86** | **0.66** |
| IRON | mg/kg | 2.7-3.3 | -- | -- | **5,400** | **15,000** | **12,000** | **5,400** | **3,500** | **3,400** | **3,400** | **2,500** | **2,700** | **4,000** |
| LEAD | mg/kg | 0.054-0.066 | 30.2 | 112 | **2.1** | **6.5** | **7.3** | **1.9** | **1.6** | **2** | **1.3** | **1.3** | **1.4** | **2.1** |
| MANGANESE | mg/kg | 0.27-0.33 | -- | -- | **78** | **170** | **140** | **37** | **27** | **36** | **65** | **24** | **23** | **35** |
| MERCURY | mg/kg | 0.015-0.021 | 0.13 | 0.696 | 0.016 U | 0.022 U | 0.023 U | 0.016 U | 0.016 U | 0.016 U | 0.019 U | 0.019 U | 0.017 U | 0.017 U |
| NICKEL | mg/kg | 0.054-0.066 | 15.9 | 42.8 | **3.8** | **12** | **8.8** | **2.5** | **1.9** | **1.3** | **1.1** | **1.2** | **1.6** | **1.4** |
| SELENIUM | mg/kg | 0.27-0.33 | -- | -- | **0.1 J** | **0.18 J** | **0.18 J** | 0.29 U | 0.3 U | 0.28 U | 0.29 U | 0.29 U | 0.31 U | 0.32 U |
| SILVER | mg/kg | 0.054-0.066 | 0.73 | 1.77 | 0.063 U | 0.07 U | **0.022 J** | 0.058 U | 0.061 U | 0.056 U | 0.058 U | 0.058 U | 0.061 U | 0.063 U |
| THALLIUM | mg/kg | 0.054-0.066 | -- | -- | **0.083** | **0.12** | **0.095** | 0.058 U | 0.061 U | 0.056 U | **0.056 J** | 0.058 U | 0.061 U | 0.063 U |
| TIN | mg/kg | 0.54-0.66 | 48 | -- | **0.3 J** | **0.48 J** | **0.56 J** | **0.21 J** | **0.2 J** | **0.16 J** | **0.15 J** | 0.58 U | 0.61 U | **0.16 J** |
| VANADIUM | mg/kg | 0.054-0.066 | -- | -- | **8.1** | **22** | **19** | **6.7** | **5** | **4.2** | **4.5** | **3.9** | **4.1** | **4.6** |
| ZINC | mg/kg | 0.27-0.33 | 124 | 271 | **14** | **35** | **31** | **8.5** | **6.3** | **5.7** | **4.8** | **4.8** | **5.9** | **5.9** |
| SEM/AVS RATIO | -- | -- | -- | -- | NC | NC | **0.26** | 0.11 | NC | NC | NC | NC | 0.071 | NC |

**Source*: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines

RL is reported for non-detected constituents
**--** = no value available.

**NC** = not calculated; AVS was not detected

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 6b. METALS CONCENTRATIONS (mg/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to-65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| ALUMINUM | mg/kg | 3.2-4 | -- | -- | **2,300** | **9,100** | **7,000** | | **1,600** | **840** | **530** | **3,200** | **1,100** | **1,200** | **1,800** | **1,700** | **2,300** | **4,700** | **800** | **4,300** | **1,500** |
| ANTIMONY | mg/kg | 0.11-0.13 | -- | -- | **0.03 J** | **0.055 J** | **0.051 J** | | **0.032 J** | 0.13 U | 0.11 U | **0.036 J** | **0.033 J** | **0.029 J** | **0.04 J** | **0.035 J** | **0.033 J** | **0.035 J** | **0.031 J** | **0.041 J** | **0.037 J** |
| ARSENIC | mg/kg | 0.054-0.066 | 7.24 | 41.6 | **2** | **4.6** | **4.2** | | **2.1** | **1.7** | **1.5** | **4.2** | **3.3** | **2.2** | **2.9** | **2.3** | **3.7** | **4.8** | **1.4** | **4.6** | **2.1** |
| BARIUM | mg/kg | 0.54-0.66 | -- | -- | **4.2** | **23** | **18** | | **4.4** | **2.9** | **1.9** | **9.8** | **4.3** | **3.8** | **6.5** | **4.4** | **6.9** | **13** | **2.6** | **12** | **5.4** |
| BERYLLIUM | mg/kg | 0.054-0.62 | -- | -- | **0.13** | **0.43** | **0.33** | | **0.13** | **0.095** | **0.086** | **0.3** | **0.12** | **0.12** | **0.21** | **0.14** | **0.22** | **0.45** | **0.086** | **0.35** | **0.13** |
| CADMIUM | mg/kg | 0.054-0.066 | 0.676 | 4.21 | **0.022 J** | **0.041 J** | **0.059 J** | | **0.021 J** | 0.064 U | 0.054 U | **0.05 J** | **0.019 J** | 0.063 U | **0.02 J** | **0.018 J** | **0.032 J** | **0.084** | 0.055 U | **0.057 J** | **0.021 J** |
| CHROMIUM | mg/kg | 0.11-0.13 | 52.3 | 160 | **6.4** | **19** | **15** | | **4.3** | **2.5** | **2.6** | **11** | **4.5** | **3.3** | **4.9** | **4.3** | **7.6** | **15** | **2.5** | **14** | **4.6** |
| COBALT | mg/kg | 0.027-0.033 | -- | -- | **2.2** | **6.1** | **4.4** | | **1.6 B** | **1.3 B** | **1.1 B** | **2.8 B** | **1.4 B** | **1.6 B** | **1.7 B** | **1.8 B** | **2.2 B** | **3.8 B** | **1.1** | **3.4** | **1.4** |
| COPPER | mg/kg | 0.16-0.2 | 18.7 | 108 | **1.1** | **5.1** | **4.8** | | **1.5** | **0.85** | **0.65** | **2** | **0.97** | **1.3** | **1.8** | **2.1** | **1.4** | **2.4** | **0.95** | **2** | **1.3** |
| IRON | mg/kg | 2.7-3.3 | -- | -- | **5,400** | **15,000** | **12,000** | | **4100 B** | **2700 B** | **2300 B** | **8600 B** | **4100 B** | **3700 B** | **5500 B** | **4500 B** | **6500 B** | **11000 B** | **2,700** | **12,000** | **4,300** |
| LEAD | mg/kg | 0.054-0.066 | 30.2 | 112 | **2.1** | **6.5** | **7.3** | | **2.3** | **1.5** | **1.1** | **3.7** | **2.1** | **1.9** | **3.1** | **3.6** | **2.5** | **4.3** | **1.6** | **3.9** | **2** |
| MANGANESE | mg/kg | 0.27-0.33 | -- | -- | **78** | **170** | **140** | | **34** | **23** | **13** | **68** | **34** | **34** | **35** | **34** | **47** | **86** | **14** | **81** | **30** |
| MERCURY | mg/kg | 0.015-0.021 | 0.13 | 0.696 | 0.016 U | 0.022 U | 0.023 U | | 0.018 U | 0.02 U | 0.015 U | 0.018 U | 0.017 U | 0.02 U | 0.018 U | 0.016 U | 0.019 U | 0.017 U | 0.017 U | 0.017 U | 0.017 U |
| NICKEL | mg/kg | 0.054-0.066 | 15.9 | 42.8 | **3.8** | **12** | **8.8** | | **2.9** | **1.9** | **1.6** | **5.1** | **1.9** | **2.5** | **3.4** | **3.4** | **3.6** | **6.8** | **1.7** | **6** | **2.6** |
| SELENIUM | mg/kg | 0.27-0.33 | -- | -- | **0.1 J** | **0.18 J** | **0.18 J** | | 0.31 U | 0.32 U | 0.27 U | 0.3 U | 0.28 U | 0.31 U | 0.29 U | 0.29 U | 0.31 U | 0.32 U | 0.27 U | **0.16 J** | 0.3 U |
| SILVER | mg/kg | 0.054-0.066 | 0.73 | 1.77 | 0.063 U | 0.07 U | **0.022 J** | | 0.061 U | 0.064 U | 0.054 U | 0.06 U | 0.056 U | 0.063 U | 0.059 U | 0.058 U | 0.062 U | 0.064 U | 0.055 U | 0.064 U | 0.06 U |
| THALLIUM | mg/kg | 0.054-0.066 | -- | -- | **0.083** | **0.12** | **0.095** | | 0.061 U | 0.064 U | 0.054 U | **0.044 J** | 0.056 U | 0.063 U | 0.059 U | 0.058 U | 0.062 U | **0.059 J** | 0.055 U | **0.058 J** | 0.06 U |
| TIN | mg/kg | 0.54-0.66 | 48 | -- | **0.3 J** | **0.48 J** | **0.56 J** | | **0.17 J** | **0.17 J** | 0.54 U | **0.24 J** | 0.56 U | **0.15 J** | **0.18 J** | **0.18 J** | **0.16 J** | **0.27 J** | 0.55 U | **0.24 J** | **0.15 J** |
| VANADIUM | mg/kg | 0.054-0.066 | -- | -- | **8.1** | **22** | **19** | | **6** | **3.9** | **3.3** | **9.9** | **5.5** | **5.2** | **7.1** | **6.8** | **7.7** | **13** | **4.2** | **12** | **5.7** |
| ZINC | mg/kg | 0.27-0.33 | 124 | 271 | **14** | **35** | **31** | | **9.8** | **5.9** | **4.4** | **18** | **8.5** | **9.1** | **12** | **12** | **13** | **25** | **5.2** | **20** | **9.1** |
| SEM/AVS RATIO | -- | -- | -- | -- | NC | NC | **0.26** | | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC |

**Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines

RL is reported for non-detected constituents
-- = no value available.

**NC** = not calculated; AVS was not detected

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte concentration is between TEL and PEL value**

**TABLE 6c. METALS CONCENTRATIONS (mg/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| ALUMINUM | mg/kg | 3.2-4 | -- | -- | **2,300** | **9,100** | **7,000** | | **6900 B** | **5700 B** | **4300 B** | **3300 B** | **6000 B** | **3800 B** | **3800 B** | **3800 B** | **4100 B** | **4200 B** | **3100 B** | **3900 B** | **4000 B** | **3900 B** | **5,600** |
| ANTIMONY | mg/kg | 0.11-0.13 | -- | -- | **0.03 J** | **0.055 J** | **0.051 J** | | **0.091 J** | **0.2** | **0.078 J** | **0.052 J** | **0.13** | **0.048 J** | **0.042 J** | **0.098 J** | **0.046 J** | **0.045 J** | **0.077 J** | **0.043 J** | **0.056 J** | **0.053 J** | **0.081 J** |
| ARSENIC | mg/kg | 0.054-0.066 | 7.24 | 41.6 | **2** | **4.6** | **4.2** | | **0** | **18** | **6.8** | **6** | **13** | **5.9** | **6.1** | **8.9** | **4.4** | **4.7** | **6.4** | **4.7** | **4.9** | **5.7** | **9.4** |
| BARIUM | mg/kg | 0.54-0.66 | -- | -- | **4.2** | **23** | **18** | | **42** | **32** | **16** | **13** | **34** | **15** | **16** | **14** | **12** | **13** | **12** | **12** | **12** | **13** | **22** |
| BERYLLIUM | mg/kg | 0.054-0.62 | -- | -- | **0.13** | **0.43** | **0.33** | | **0.56** | **0.5 J** | **0.34** | 0.62 U | **0.43** | **0.33** | **0.34** | **0.32** | **0.32** | **0.33** | **0.31** | **0.31** | **0.35** | **0.34** | **0.39** |
| CADMIUM | mg/kg | 0.054-0.066 | 0.676 | 4.21 | **0.022 J** | **0.041 J** | **0.059 J** | | **0.064** | **0.093** | **0.084** | **0.053 J** | **0.083** | **0.061 J** | **0.045 J** | **0.088** | **0.067** | **0.065** | **0.097** | **0.065** | **0.068** | **0.065** | **0.073** |
| CALCIUM | mg/kg | 27-310 | -- | -- | **4,900** | **3,100** | **3,200** | | **27,000** | **130000 B** | **56,000** | **65,000** | **44,000** | **59,000** | **68,000** | **50,000** | **34,000** | **43,000** | **44,000** | **39,000** | **35,000** | **53,000** | **47,000** |
| CHROMIUM | mg/kg | 0.11-0.13 | 52.3 | 160 | **6.4** | **19** | **15** | | **17 B** | **15 B** | **16 B** | **13 B** | **17 B** | **15 B** | **15 B** | **15 B** | **15 B** | **16 B** | **16 B** | **15 B** | **15 B** | **15 B** | **15** |
| COBALT | mg/kg | 0.027-0.033 | -- | -- | **2.2** | **6.1** | **4.4** | | **7.7** | **7.2** | **3.9** | **3.3** | **6.2** | **3.7** | **3.5** | **4** | **3.8** | **3.8** | **3** | **3.6** | **3.7** | **3.5** | **4.8** |
| COPPER | mg/kg | 0.16-0.2 | 18.7 | 108 | **1.1** | **5.1** | **4.8** | | **10** | **6.7** | **2.8** | **1.9** | **6.3** | **2.7** | **2.6** | **2.6** | **2.7** | **2.8** | **2** | **2.5** | **2.7** | **2.3** | **4.1** |
| IRON | mg/kg | 2.7-3.3 | -- | -- | **5,400** | **15,000** | **12,000** | | **19,000** | **19,000** | **13,000** | **11,000** | **19,000** | **12,000** | **13,000** | **13,000** | **12,000** | **13,000** | **12,000** | **12,000** | **13,000** | **13,000** | **13,000** |
| LEAD | mg/kg | 0.054-0.066 | 30.2 | 112 | **2.1** | **6.5** | **7.3** | | **7.6** | **7.2** | **4.7** | **3.9** | **6.8** | **4.4** | **4.6** | **3.8** | **4.4** | **4.6** | **3.3** | **4.2** | **4.5** | **4.5** | **5.1** |
| MAGNESIUM | mg/kg | 27-33 | -- | -- | **2,500** | **4,700** | **3,800** | | **2700** | **3300** | **2800** | **2400** | **3000** | **2700** | **2700** | **2400** | **2600** | **2800** | **2400** | **2600** | **2700** | **2700** | **2700** |
| MANGANESE | mg/kg | 0.27-0.33 | -- | -- | **78** | **170** | **140** | | **220** | **230** | **99** | **88** | **190** | **84** | **91** | **77** | **79** | **85** | **80** | **76** | **78** | **80** | **140** |
| MERCURY | mg/kg | 0.015-0.021 | 0.13 | 0.696 | 0.016 U | 0.022 U | 0.023 U | | 0.017 U | 0.02 U | 0.018 U | 0.019 U | 0.019 U | 0.019 U | 0.019 U | 0.017 U | 0.021 U | 0.02 U | 0.018 U | 0.021 U | 0.019 U | 0.02 U | 0.02 U |
| NICKEL | mg/kg | 0.054-0.066 | 15.9 | 42.8 | **3.8** | **12** | **8.8** | | **11** | **9.6** | **6.7** | **5.4** | **10** | **6.1** | **6** | **6.1** | **6.5** | **6.8** | **4.7** | **6.3** | **6.6** | **6.4** | **7.6** |
| POTASSIUM | mg/kg | 27-33 | -- | -- | **600** | **2000** | **1500** | | **1300** | **1300** | **1500** | **1300** | **1600** | **1500** | **1500** | **1300** | **1500** | **1600** | **1100** | **1500** | **1600** | **1600** | **1500** |
| SELENIUM | mg/kg | 0.27-0.33 | -- | -- | **0.1 J** | **0.18 J** | **0.18 J** | | **0.11 J** | **0.14 J** | **0.11 J** | **0.084 J** | **0.13 J** | **0.096 J** | **0.08 J** | **0.13 J** | **0.087 J** | **0.094 J** | **0.093 J** | **0.086 J** | **0.11 J** | **0.088 J** | **0.18 J** |
| SILVER | mg/kg | 0.054-0.066 | 0.73 | 1.77 | 0.063 U | 0.07 U | **0.022 J** | | 0.063 U | 0.062 U | 0.064 U | 0.062 U | 0.064 U | 0.066 U | 0.064 U | 0.063 U | 0.065 U | 0.065 U | 0.063 U | 0.064 U | 0.065 U | 0.065 U | 0.062 U |
| SODIUM | mg/kg | 27-33 | -- | -- | **3,800 B** | **3,500 B** | **5,000 B** | | **3,100** | **3,800** | **3,100** | **3,000** | **3,300** | **3,300** | **3,300** | **3,200** | **3,300** | **3,400** | **3,000** | **3,300** | **3,400** | **3,400** | **2,900** |
| THALLIUM | mg/kg | 0.054-0.066 | -- | -- | **0.083** | **0.12** | **0.095** | | **0.16** | **0.14** | **0.078** | **0.054 J** | **0.11** | **0.063 J** | **0.059 J** | **0.083** | **0.061 J** | **0.063 J** | **0.092** | **0.059 J** | **0.1** | **0.084** | **0.077** |
| TIN | mg/kg | 0.54-0.66 | 48 | -- | **0.3 J** | **0.48 J** | **0.56 J** | | **0.56 J** | **0.38 J** | **0.32 J** | **0.27 J** | **0.43 J** | **0.33 J** | **0.28 J** | **0.26 J** | **0.3 J** | **0.32 J** | **0.3 J** | **0.45 J** | **0.36 J** | **0.29 J** | **0.29 J** |
| VANADIUM | mg/kg | 0.054-0.066 | -- | -- | **8.1** | **22** | **19** | | **23** | **25** | **15** | **13** | **20** | **14** | **15** | **14** | **13** | **14** | **12** | **13** | **13** | **15** | **18** |
| ZINC | mg/kg | 0.27-0.33 | 124 | 271 | **14** | **35** | **31** | | **35** | **27** | **23** | **19** | **30** | **22** | **23** | **22** | **23** | **24** | **20** | **22** | **23** | **22** | **22** |
| SEM/AVS RATIO | NONE | -- | -- | -- | NC | NC | **0.26** | | NC | **0.13** | **0.09** | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC | NC |

**Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines

RL is reported for non-detected constituents
**--** = no value available.

**NC** = not calculated; AVS was not detected

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte concentration is between TEL and PEL value**

**TABLE 7a. PCB CONGENER CONCENTRATIONS (ug/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL[b] | PEL[b] | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB 8 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 18 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 28 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 44 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 49 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 52 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 66 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 77 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 87 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 101 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 105 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 118 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 126 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 128 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 138 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 153 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 156 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 169 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 170 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 180 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 183 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 184 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 187 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 195 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 206 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| PCB 209 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | 0.58 U | 0.59 U | 0.57 U | 0.57 U | 0.57 U | 0.6 U | 0.62 U |
| TOTAL PCBs (ND=0) | ug/kg | -- | 21.6 | 189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PCBs (ND=1/2RL) | ug/kg | -- | 21.6 | 189 | 10.8 | 12.8 | 13.1 | 10.4 | 10.6 | 10.3 | 10.3 | 10.3 | 10.8 | 11.2 |
| TOTAL PCBs (ND=RL) | ug/kg | -- | 21.6 | 189 | 21.6 | 25.6 | 26.3 | 20.9 | 21.2 | 20.5 | 20.5 | 20.5 | 21.6 | 22.3 |

(a) PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)

(b) *Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: **Bold values** represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

**--** = no value available.

**RL** = laboratory reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte concentration is between TEL and PEL value**

**TABLE 7b. PCB CONGENER CONCENTRATIONS (ug/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL[b] | PEL[b] | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to -65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| PCB 8 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 18 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | **0.5 J P** |
| PCB 28 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | **0.83** |
| PCB 44 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 49 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 52 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 66 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 77 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 87 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 101 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | **0.2 J** | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 105 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 118 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 126 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 128 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 138 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 153 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | **0.16 J** | 0.54 U | 0.64 U | 0.58 U |
| PCB 156 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 169 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 170 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 180 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 183 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 184 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 187 (BZ)[a] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 195 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 206 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| PCB 209 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.61 U | 0.62 U | 0.53 U | 0.58 U | 0.56 U | 0.6 U | 0.6 U | 0.56 U | 0.62 U | 0.62 U | 0.54 U | 0.64 U | 0.58 U |
| TOTAL PCBs (ND=0) | ug/kg | -- | 21.6 | 189 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | **0.4** | 0 | 0 | **0.32** | 0 | 0 | **2.66** |
| TOTAL PCBs (ND=1/2RL) | ug/kg | -- | 21.6 | 189 | 10.8 | 12.8 | 13.1 | | 11.0 | 11.2 | 9.5 | 10.4 | 10.1 | 10.8 | **10.6** | 10.1 | 11.2 | **10.9** | 9.7 | 11.5 | **11.9** |
| TOTAL PCBs (ND=RL) | ug/kg | -- | 21.6 | 189 | 21.6 | 25.6 | 26.3 | | 22.0 | 22.3 | 19.1 | 20.9 | 20.2 | 21.6 | **20.8** | 20.2 | 22.3 | **21.4** | 19.4 | 23.0 | **21.2** |

(a) PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)

(b) *Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: **Bold values** represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

**--** = no value available.

**RL** = laboratory reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte concentration is between TEL and PEL value**

**TABLE 7c. PCB CONGENER CONCENTRATIONS (ug/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL[(b)] | PEL[(b)] | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| PCB 8 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 18 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 28 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 44 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 49 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 52 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 66 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 77 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 87 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 101 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 105 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 118 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 126 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 128 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 138 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 153 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 156 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 169 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 170 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 180 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 183 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 184 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 187 (BZ)[(a)] | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 195 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 206 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| PCB 209 (BZ) | ug/kg | 0.53-0.66 | -- | -- | 0.6 U | 0.71 U | 0.73 U | | 0.63 U | 0.64 U | 0.65 U | 0.63 U | 0.64 U | 0.66 U | 0.65 U | 0.64 U | 0.66 U | 0.66 U | 0.64 U | 0.65 U | 0.66 U | 0.65 U | 0.63 U |
| TOTAL PCBs (ND=0) | ug/kg | -- | 21.6 | 189 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PCBs (ND=1/2RL) | ug/kg | -- | 21.6 | 189 | 10.8 | 12.8 | 13.1 | | 11.3 | 11.5 | 11.7 | 11.3 | 11.5 | 11.9 | 11.7 | 11.5 | 11.9 | 11.9 | 11.5 | 11.7 | 11.9 | 11.7 | 11.3 |
| TOTAL PCBs (ND=RL) | ug/kg | -- | 21.6 | 189 | 21.6 | 25.6 | 26.3 | | 22.7 | 23.0 | 23.4 | 22.7 | 23.0 | 23.8 | 23.4 | 23.0 | 23.8 | 23.8 | 23.0 | 23.4 | 23.8 | 23.4 | 22.7 |

(a) PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)
(b) *Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.
**NOTES**: **Bold values** represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.
RL is reported for non-detected constituents.
**--** = no value available.
**RL =** laboratory reporting limit
**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected
**Analyte concentration is between TEL and PEL value**

**TABLE 8. PCB AROCLOR CONCENTRATIONS (ug/kg) IN CBBT COVER AND WID TRENCH COMPOSITES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | | | CBBT COVER | | WID TRENCH |
|---|---|---|---|---|---|---|---|
| | | | | | GRAB | CORE | |
| ANALYTE | UNITS | RL Range | TEL[(b)] | PEL[(b)] | DU1 | DU2 | DU3 |
| PCB-1016 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| PCB-1221 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| PCB-1232 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| PCB-1242 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| PCB-1248 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| PCB-1254 | ug/kg | 0.5-0.53 | 63.3 | 709 | 0.52 U | **0.46 J** | 0.53 U |
| PCB-1260 | ug/kg | 0.5-0.53 | -- | -- | 0.52 U | 0.5 U | 0.53 U |
| TOTAL PCBs (ND=0) | ug/kg | -- | -- | -- | 0 | **0.46** | 0 |
| TOTAL PCBs (ND=1/2RL) | ug/kg | -- | -- | -- | 1.82 | **1.96** | 1.86 |
| TOTAL PCBs (ND=RL) | ug/kg | -- | -- | -- | 3.64 | **3.46** | 3.71 |

**NOTES**: **Bold values** represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents.

**--** = no value available.

**RL =** laboratory reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 9a. POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATIONS (ug/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LOW MOLECULAR WEIGHT PAHs (LPAH)** | | | | | | | | | | | | | | |
| 1-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| 2-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | 20.2 | 201.3 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| ACENAPHTHENE | ug/kg | 3.7-4.4 | 6.7 | 88.9 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| ACENAPHTHYLENE | ug/kg | 3.7-4.4 | 5.9 | 127.9 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| ANTHRACENE | ug/kg | 3.7-4.4 | 46.9 | 245.0 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| FLUORENE | ug/kg | 3.7-4.4 | 21.2 | 144.4 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| NAPHTHALENE | ug/kg | 3.7-4.4 | 34.6 | 390.6 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| PHENANTHRENE | ug/kg | 3.7-4.4 | 86.7 | 543.5 | 4.1 U | 4.7 U | **4.1 J** | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| TOTAL LPAHs (ND=0) | ug/kg | -- | -- | -- | **0** | **0** | **4.1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL LPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 16.4 | 18.8 | **56.6** | 15.2 | 16 | 15.2 | 15.6 | 15.6 | 16.8 | 17 |
| TOTAL LPAHs (ND=RL) | ug/kg | -- | -- | -- | 32.8 | 37.6 | **109.1** | 30.4 | 32 | 30.4 | 31.2 | 31.2 | 33.6 | 34 |
| **HIGH MOLECULAR WEIGHT PAHs (HPAH)** | | | | | | | | | | | | | | |
| BENZO(A)ANTHRACENE | ug/kg | 3.7-4.4 | 74.8 | 692.5 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| BENZO(A)PYRENE | ug/kg | 3.7-4.4 | 88.8 | 763.2 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| BENZO(B)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| BENZO(GHI)PERYLENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| BENZO(K)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| CHRYSENE | ug/kg | 3.7-4.4 | 107.8 | 846.0 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| DIBENZO(A,H)ANTHRACENE | ug/kg | 3.7-4.4 | 6.2 | 134.6 | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| FLUORANTHENE | ug/kg | 3.7-4.4 | 112.8 | 1493.5 | 4.1 U | 4.7 U | **6.1 J** | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| INDENO(1,2,3-CD)PYRENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| PYRENE | ug/kg | 3.7-4.4 | 152.7 | 1397.6 | 4.1 U | 4.7 U | **6.8 J** | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| TOTAL HPAHs (ND=0) | ug/kg | -- | -- | -- | 0 | 0 | **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL HPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 20.5 | 23.5 | **72.9** | 19.0 | 20.0 | 19.0 | 19.5 | 19.5 | 21.0 | 21.0 |
| TOTAL HPAHs (ND=RL) | ug/kg | -- | -- | -- | 41.0 | 47.0 | **132.9** | 38.0 | 40.0 | 38.0 | 39.0 | 39.0 | 42.0 | 42.0 |
| **TOTAL PAHs** | | | | | | | | | | | | | | |
| TOTAL PAHs (ND=0) | ug/kg | -- | 1,684 | 16,770 | 0 | 0 | **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PAHs (ND=1/2RL) | ug/kg | -- | 1,684 | 16,770 | 36.9 | 42.3 | **129.5** | 34.2 | 36.0 | 34.2 | 35.1 | 35.1 | 37.8 | 37.8 |
| TOTAL PAHs (ND=RL) | ug/kg | -- | 1,684 | 16,770 | 73.8 | 84.6 | **242** | 68.4 | 72.0 | 68.4 | 70.2 | 70.2 | 75.6 | 75.6 |

**Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

-- no value available.

**RL** = laboratory reporting limit
**TEL** = threshold effects level
**PEL** = probable effects level

RL is reported for non-detected constituents

**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected

**Analyte concentration is between TEL and PEL value**

**TABLE 9b. POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATIONS (ug/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to -65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| **LOW MOLECULAR WEIGHT PAHs (LPAH)** | | | | | | | | | | | | | | | | | | | | | |
| 1-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | **3.3 J** | 3.8 U | **2.8 J** | **2.3 J** | 3.7 U | 4.3 U | 4.1 U |
| 2-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | 20.2 | 201.3 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | **5.7** | 3.8 U | **3.7 J** | **2.7 J** | 3.7 U | 4.3 U | 4.1 U |
| ACENAPHTHENE | ug/kg | 3.7-4.4 | 6.7 | 88.9 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| ACENAPHTHYLENE | ug/kg | 3.7-4.4 | 5.9 | 127.9 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| ANTHRACENE | ug/kg | 3.7-4.4 | 46.9 | 245.0 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **3.1 J** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| FLUORENE | ug/kg | 3.7-4.4 | 21.2 | 144.4 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| NAPHTHALENE | ug/kg | 3.7-4.4 | 34.6 | 390.6 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | **1.9 J** | 3.8 U | 4.1 U | **1.2 J** | 3.7 U | 4.3 U | 4.1 U |
| PHENANTHRENE | ug/kg | 3.7-4.4 | 86.7 | 543.5 | 4.1 U | 4.7 U | **4.1 J** | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **11** | **1.2 J** | **2.4 J** | 3.8 U | **1.6 J** | **1.5 J** | 3.7 U | 4.3 U | 4.1 U |
| TOTAL LPAHs (ND=0) | ug/kg | -- | -- | -- | **0** | **0** | **4.1** | | 0 | 0 | 0 | 0 | 14.1 | **1.2** | **13.3** | 0 | **8.1** | **7.7** | 0 | 0 | 0 |
| TOTAL LPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 16.4 | 18.8 | **56.6** | | 16.4 | 16.8 | 14.8 | 16.4 | 25.2 | **15.9** | **21.3** | 15.2 | **18.35** | **16.3** | 14.8 | 17.2 | 16.4 |
| TOTAL LPAHs (ND=RL) | ug/kg | -- | -- | -- | 32.8 | 37.6 | **109.1** | | 33 | 34 | 29.6 | 32.8 | 36.3 | **30.6** | **29.3** | 30.4 | **28.6** | **24.9** | 29.6 | 34.4 | 32.8 |
| **HIGH MOLECULAR WEIGHT PAHs (HPAH)** | | | | | | | | | | | | | | | | | | | | | |
| BENZO(A)ANTHRACENE | ug/kg | 3.7-4.4 | 74.8 | 692.5 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **9.1** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| BENZO(A)PYRENE | ug/kg | 3.7-4.4 | 88.8 | 763.2 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **7.9** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| BENZO(B)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **8.8** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| BENZO(GHI)PERYLENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **4.1** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| BENZO(K)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **3.6 J** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| CHRYSENE | ug/kg | 3.7-4.4 | 107.8 | 846.0 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **9** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| DIBENZO(A,H)ANTHRACENE | ug/kg | 3.7-4.4 | 6.2 | 134.6 | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **4.3** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| FLUORANTHENE | ug/kg | 3.7-4.4 | 112.8 | 1493.5 | 4.1 U | 4.7 U | **6.1 J** | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **16** | 4.2 U | 4 U | 3.8 U | **1.1 J** | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| INDENO(1,2,3-CD)PYRENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **4.3** | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| PYRENE | ug/kg | 3.7-4.4 | 152.7 | 1397.6 | 4.1 U | 4.7 U | **6.8 J** | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | **16** | 4.2 U | 4 U | 3.8 U | **1 J** | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| TOTAL HPAHs (ND=0) | ug/kg | -- | -- | -- | 0 | 0 | **13** | | 0 | 0 | 0 | 0 | **83.1** | **0** | **0** | 0 | **2.10** | 0 | 0 | 0 | 0 |
| TOTAL HPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 20.5 | 23.5 | **72.9** | | 20.5 | 21.0 | 18.5 | 20.5 | **83.1** | **21.0** | **20.0** | 19.0 | **18.5** | 21.5 | 18.5 | 21.5 | 20.5 |
| TOTAL HPAHs (ND=RL) | ug/kg | -- | -- | -- | 41.0 | 47.0 | **132.9** | | 41.0 | 42.0 | 37.0 | 41.0 | **83.1** | **42.0** | **40.0** | 38.0 | **34.9** | 43.0 | 37.0 | 43.0 | 41.0 |
| **TOTAL PAHs** | | | | | | | | | | | | | | | | | | | | | |
| TOTAL PAHs (ND=0) | ug/kg | -- | 1,684 | 16,770 | 0 | 0 | **17** | | 0 | 0 | 0 | 0 | **97.2** | **1.20** | **13.3** | 0 | **10.2** | **7.70** | 0 | 0 | 0 |
| TOTAL PAHs (ND=1/2RL) | ug/kg | -- | 1,684 | 16,770 | 36.9 | 42.3 | **129.5** | | 36.9 | 37.8 | 33.3 | 36.9 | **108** | **36.9** | **41.3** | 34.2 | **36.9** | **37.8** | 33.3 | 38.7 | 36.9 |
| TOTAL PAHs (ND=RL) | ug/kg | -- | 1,684 | 16,770 | 73.8 | 84.6 | **242** | | 73.8 | 75.6 | 66.6 | 73.8 | **119** | **72.6** | **69.3** | 68.4 | **63.5** | **67.9** | 66.6 | 77.4 | 73.8 |

**Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents

-- = no value available.

**RL** = laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 9c. POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATIONS (ug/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 -48 to -55 | CBBT-LC-1 -55 to -60 | CBBT-LC-1 -60 to -65 | CBBT-LC-1 -65 to -70 | CBBT-LC-2 -54 to -60 | CBBT-LC-2 -60 to -65 | CBBT-LC-2 -65 to -70 | CBBT-LC-3 -54 to -60 | CBBT-LC-3 -60 to -65 | CBBT-LC-3 -65 to -70 | CBBT-LC-4 -53 to -60 | CBBT-LC-4 -60 to -65 | CBBT-LC-4 -60 to -65 FD | CBBT-LC-4 -65 to -70 | COMPOSITE DU3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LOW MOLECULAR WEIGHT PAHs (LPAH)** | | | | | | | | | | | | | | | | | | | | | | | |
| 1-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| 2-METHYLNAPHTHALENE | ug/kg | 3.7-4.4 | 20.2 | 201.3 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| ACENAPHTHENE | ug/kg | 3.7-4.4 | 6.7 | 88.9 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| ACENAPHTHYLENE | ug/kg | 3.7-4.4 | 5.9 | 127.9 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| ANTHRACENE | ug/kg | 3.7-4.4 | 46.9 | 245.0 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| FLUORENE | ug/kg | 3.7-4.4 | 21.2 | 144.4 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| NAPHTHALENE | ug/kg | 3.7-4.4 | 34.6 | 390.6 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| PHENANTHRENE | ug/kg | 3.7-4.4 | 86.7 | 543.5 | 4.1 U | 4.7 U | **4.1 J** | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| TOTAL LPAHs (ND=0) | ug/kg | -- | -- | -- | **0** | **0** | **4.1** | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL LPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 16.4 | 18.8 | **56.6** | | 16.8 | 16.8 | 17.2 | 16.8 | 17.2 | 17.6 | 17.6 | 16.8 | 17.6 | 17.6 | 16.8 | 17.6 | 17.6 | 17.2 | 16.8 |
| TOTAL LPAHs (ND=RL) | ug/kg | -- | -- | -- | 32.8 | 37.6 | **109.1** | | 33.6 | 33.6 | 34.4 | 33.6 | 34.4 | 35.2 | 35.2 | 33.6 | 35.2 | 35.2 | 33.6 | 35.2 | 35.2 | 34.4 | 33.6 |
| **HIGH MOLECULAR WEIGHT PAHs (HPAH)** | | | | | | | | | | | | | | | | | | | | | | | |
| BENZO(A)ANTHRACENE | ug/kg | 3.7-4.4 | 74.8 | 692.5 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| BENZO(A)PYRENE | ug/kg | 3.7-4.4 | 88.8 | 763.2 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| BENZO(B)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| BENZO(GHI)PERYLENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| BENZO(K)FLUORANTHENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| CHRYSENE | ug/kg | 3.7-4.4 | 107.8 | 846.0 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| DIBENZO(A,H)ANTHRACENE | ug/kg | 3.7-4.4 | 6.2 | 134.6 | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| FLUORANTHENE | ug/kg | 3.7-4.4 | 112.8 | 1493.5 | 4.1 U | 4.7 U | **6.1 J** | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | **1.8 J** |
| INDENO(1,2,3-CD)PYRENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| PYRENE | ug/kg | 3.7-4.4 | 152.7 | 1397.6 | 4.1 U | 4.7 U | **6.8 J** | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | **1.7 J** |
| TOTAL HPAHs (ND=0) | ug/kg | -- | -- | -- | 0 | 0 | **13** | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3.50** |
| TOTAL HPAHs (ND=1/2RL) | ug/kg | -- | -- | -- | 20.5 | 23.5 | **72.9** | | 21.0 | 21.0 | 21.5 | 21.0 | 21.5 | 22.0 | 22.0 | 21.0 | 22.0 | 22.0 | 21.0 | 22.0 | 22.0 | 21.5 | **20.3** |
| TOTAL HPAHs (ND=RL) | ug/kg | -- | -- | -- | 41.0 | 47.0 | **132.9** | | 42.0 | 42.0 | 43.0 | 42.0 | 43.0 | 44.0 | 44.0 | 42.0 | 44.0 | 44.0 | 42.0 | 44.0 | 44.0 | 43.0 | **37.1** |
| **TOTAL PAHs** | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL PAHs (ND=0) | ug/kg | -- | 1,684 | 16,770 | 0 | 0 | **17** | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3.5** |
| TOTAL PAHs (ND=1/2RL) | ug/kg | -- | 1,684 | 16,770 | 36.9 | 42.3 | **129.5** | | 37.8 | 37.8 | 38.7 | 37.8 | 38.7 | 39.6 | 39.6 | 37.8 | 39.6 | 39.6 | 37.8 | 39.6 | 39.6 | 38.7 | **37.1** |
| TOTAL PAHs (ND=RL) | ug/kg | -- | 1,684 | 16,770 | 73.8 | 84.6 | **242** | | 75.6 | 75.6 | 77.4 | 75.6 | 77.4 | 79.2 | 79.2 | 75.6 | 79.2 | 79.2 | 75.6 | 79.2 | 79.2 | 77.4 | **70.7** |

**Source* : MacDonald et al. 1996. Ecotoxicology 5: 253-278.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

RL is reported for non-detected constituents

-- = no value available.

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 10a. CHLORINATED AND ORGANOPHOSPHORUS PESTICIDE CONCENTRATIONS (ug/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDD | ug/kg | 0.045-0.055 | 1.22 | 7.81 | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| 4,4'-DDE | ug/kg | 0.045-0.055 | 2.07 | 374 | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| 4,4'-DDT | ug/kg | 0.045-0.055 | 1.19 | 4.77 | 0.051 U | **0.055 J** | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| **CHLORINATED PESTICIDES** | | | | | | | | | | | | | | |
| ALDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ALPHA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| BETA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| CHLORDANE (TECHNICAL) | ug/kg | 0.45-0.55 | 2.26 | 4.79 | 0.51 U | 0.59 U | 0.62 U | 0.48 U | 0.5 U | 0.47 U | 0.48 U | 0.48 U | 0.52 U | 0.53 U |
| CHLOROBENSIDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| DCPA | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| DELTA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| DIELDRIN | ug/kg | 0.045-0.055 | 0.715 | 4.3 | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ENDOSULFAN I | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ENDOSULFAN II | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ENDOSULFAN SULFATE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ENDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| ENDRIN ALDEHYDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| GAMMA-BHC (LINDANE) | ug/kg | 0.045-0.055 | 0.32 | 0.99 | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| HEPTACHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| HEPTACHLOR EPOXIDE | ug/kg | 0.045-0.055 | -- | 2.74 ** | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| METHOXYCHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| MIREX | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | 0.048 U | 0.05 U | 0.047 U | 0.048 U | 0.048 U | 0.052 U | 0.053 U |
| TOXAPHENE | ug/kg | 1.8-2.2 | 0.1 ** | -- | 2 U | 2.3 U | 2.5 U | 1.9 U | 2 U | 1.9 U | 1.9 U | 1.9 U | 2.1 U | 2.1 U |
| **ORGANOPHOSPHORUS PESTICIDES** | | | | | | | | | | | | | | |
| AZINPHOS-METHYL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 21 U |
| DEMETON, TOTAL | ug/kg | 36-44 | -- | -- | 40 U | 46 U | 48 U | 38 U | 40 U | 37 U | 39 U | 38 U | 41 U | 42 U |
| MALATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 21 U |
| METHYL PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 21 U |
| PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 21 U |

*__Source :__ MacDonald et al. 1996. Ecotoxicology 5: 253-278.

** **Source:** CCME 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

**--** = no value available.

**RL** = laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 10b. CHLORINATED AND ORGANOPHOSPHORUS PESTICIDE CONCENTRATIONS (ug/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to -65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| 4,4'-DDD | ug/kg | 0.045-0.055 | 1.22 | 7.81 | 0.051 U | 0.059 U | 0.062 U | | **0.022 J P** | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | **0.024 J P** | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| 4,4'-DDE | ug/kg | 0.045-0.055 | 2.07 | 374 | 0.051 U | 0.059 U | 0.062 U | | **0.013 J** | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | **0.024 J** | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| 4,4'-DDT | ug/kg | 0.045-0.055 | 1.19 | 4.77 | 0.051 U | **0.055 J** | 0.062 U | | **0.16** | 0.053 U | 0.045 U | **0.047 J** | 0.046 U | **0.029 J** | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| **CHLORINATED PESTICIDES** | | | | | | | | | | | | | | | | | | | | | |
| ALDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| ALPHA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| BETA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| CHLORDANE (TECHNICAL) | ug/kg | 0.45-0.55 | 2.26 | 4.79 | 0.51 U | 0.59 U | 0.62 U | | 0.51 U | 0.53 U | 0.45 U | 0.51 U | 0.46 U | 0.52 U | 0.5 U | 0.47 U | 0.53 U | 0.52 U | 0.46 U | 0.54 U | 0.5 U |
| CHLOROBENSIDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| DCPA | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| DELTA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| DIELDRIN | ug/kg | 0.045-0.055 | 0.715 | 4.3 | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| ENDOSULFAN I | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| ENDOSULFAN II | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| ENDOSULFAN SULFATE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| ENDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | **0.0099 J P** | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | **0.025 J P** | **0.098** | 0.053 U | 0.052 U | 0.046 U | 0.054 U | **0.011 J P** |
| ENDRIN ALDEHYDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| GAMMA-BHC (LINDANE) | ug/kg | 0.045-0.055 | 0.32 | 0.99 | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| HEPTACHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| HEPTACHLOR EPOXIDE | ug/kg | 0.045-0.055 | -- | 2.74 ** | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| METHOXYCHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| MIREX | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.051 U | 0.053 U | 0.045 U | 0.051 U | 0.046 U | 0.052 U | 0.05 U | 0.047 U | 0.053 U | 0.052 U | 0.046 U | 0.054 U | 0.05 U |
| TOXAPHENE | ug/kg | 1.8-2.2 | 0.1 ** | -- | 2 U | 2.3 U | 2.5 U | | 2.1 U | 2.1 U | 1.8 U | 2 U | 1.8 U | 2.1 U | 2 U | 1.9 U | 2.1 U | 2.1 U | 1.8 U | 2.1 U | 2 U |
| **ORGANOPHOSPHORUS PESTICIDES** | | | | | | | | | | | | | | | | | | | | | |
| AZINPHOS-METHYL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 21 U | 20 U | 19 U | 21 U | 21 U | 18 U | 21 U | 20 U |
| DEMETON, TOTAL | ug/kg | 36-44 | -- | -- | 40 U | 46 U | 48 U | | 40 U | 42 U | 36 U | 40 U | 37 U | 41 U | 40 U | 38 U | 42 U | 43 U | 36 U | 42 U | 40 U |
| MALATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 21 U | 20 U | 19 U | 21 U | 21 U | 18 U | 21 U | 20 U |
| METHYL PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 21 U | 20 U | 19 U | 21 U | 21 U | 18 U | 21 U | 20 U |
| PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 21 U | 20 U | 19 U | 21 U | 21 U | 18 U | 21 U | 20 U |

***Source:** MacDonald et al. 1996. Ecotoxicology 5: 253-278.

****Source:** CCME 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

**--** = no value available.

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 10c. CHLORINATED AND ORGANOPHOSPHORUS PESTICIDE CONCENTRATIONS (ug/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| 4,4'-DDD | ug/kg | 0.045-0.055 | 1.22 | 7.81 | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| 4,4'-DDE | ug/kg | 0.045-0.055 | 2.07 | 374 | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| 4,4'-DDT | ug/kg | 0.045-0.055 | 1.19 | 4.77 | 0.051 U | **0.055 J** | 0.062 U | | **0.055** | 0.053 U | 0.054 U | 0.052 U | **0.041 J** | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| **CHLORINATED PESTICIDES** | | | | | | | | | | | | | | | | | | | | | | | |
| ALDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| ALPHA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| BETA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| CHLORDANE (TECHNICAL) | ug/kg | 0.45-0.55 | 2.26 | 4.79 | 0.51 U | 0.59 U | 0.62 U | | 0.52 U | 0.53 U | 0.54 U | 0.52 U | 0.54 U | 0.55 U | 0.55 U | 0.53 U | 0.55 U | 0.55 U | 0.53 U | 0.53 U | 0.54 U | 0.54 U | 0.53 U |
| CHLOROBENSIDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| DCPA | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| DELTA-BHC | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| DIELDRIN | ug/kg | 0.045-0.055 | 0.715 | 4.3 | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| ENDOSULFAN I | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| ENDOSULFAN II | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | **0.034 J** | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| ENDOSULFAN SULFATE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| ENDRIN | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | **0.017 J P** | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | **0.018 J P** | 0.054 U | 0.053 U |
| ENDRIN ALDEHYDE | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| GAMMA-BHC (LINDANE) | ug/kg | 0.045-0.055 | 0.32 | 0.99 | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| HEPTACHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| HEPTACHLOR EPOXIDE | ug/kg | 0.045-0.055 | -- | 2.74 ** | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | 0.054 U | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| METHOXYCHLOR | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | **0.098** | 0.053 U | **0.053 J P** | 0.052 U | 0.054 U | 0.055 U | 0.055 U | **0.023 J P** | 0.055 U | **0.073** | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| MIREX | ug/kg | 0.045-0.055 | -- | -- | 0.051 U | 0.059 U | 0.062 U | | 0.052 U | 0.053 U | **0.017 J** | 0.052 U | 0.054 U | 0.055 U | 0.055 U | 0.053 U | 0.055 U | 0.055 U | 0.053 U | 0.053 U | 0.054 U | 0.054 U | 0.053 U |
| TOXAPHENE | ug/kg | 1.8-2.2 | 0.1 ** | -- | 2 U | 2.3 U | 2.5 U | | 2.1 U | 2.1 U | 2.2 U | 2.1 U | 2.1 U | 2.2 U | 2.2 U | 2.1 U | 2.2 U | 2.2 U | 2.1 U | 2.1 U | 2.2 U | 2.2 U | 2.1 U |
| **ORGANOPHOSPHORUS PESTICIDES** | | | | | | | | | | | | | | | | | | | | | | | |
| AZINPHOS-METHYL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 22 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U |
| DEMETON, TOTAL | ug/kg | 36-44 | -- | -- | 40 U | 46 U | 48 U | | 41 U | 41 U | 42 U | 41 U | 42 U | 43 U | 43 U | 41 U | 44 U | 43 U | 42 U | 42 U | 42 U | 43 U | 42 U |
| MALATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 22 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U |
| METHYL PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 22 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U |
| PARATHION | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 24 U | | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U | 22 U | 21 U | 21 U | 21 U | 21 U | 21 U | 21 U |

*__Source__: MacDonald et al. 1996. Ecotoxicology 5: 253-278.

** **Source:** CCME 2001. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

**--** = no value available.

**RL =** laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 11a. DIOXIN AND FURAN CONGENER CONCENTRATIONS (ng/kg) IN CBBT SURFICIAL GRABS**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | ISQG* | PEL* | TEF* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ng/kg | 0.53-0.66 | 0.85 | 21.5 | 1 | 0.98 U | **0.22 J** | **0.11 J Q** | **0.036 J Q** | 0.59 U | 0.56 U | 0.58 U | 0.58 U | **0.038 J Q** | 0.62 U |
| 1,2,3,7,8-PECDD | ng/kg | 2.7-3.3 | -- | -- | 1 | **0.28 J B** | **1.5 J B** | **1.2 J B** | **0.19 J** | **0.07 J Q** | **0.068 J** | 2.9 U | 2.9 U | **0.2 J** | **0.068 J Q** |
| 1,2,3,4,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.31 J B** | **2.5 J B** | **2 J Q B** | **0.3 J** | **0.15 J** | **0.16 J** | **0.1 J** | **0.12 J** | **0.35 J** | **0.16 J** |
| 1,2,3,6,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.4 J B** | **3.6 J B** | **2.5 J Q B** | **0.34 J Q** | **0.21 J** | **0.17 J** | **0.073 J Q** | **0.12 J** | **0.48 J** | **0.19 J** |
| 1,2,3,7,8,9-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.53 J B** | **9.1 B** | **7.1 B** | **0.68 J** | **0.34 J** | **0.37 J** | **0.16 J** | **0.24 J** | **0.82 J** | **0.4 J** |
| 1,2,3,4,6,7,8-HPCDD | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **2.8 J Q B** | **90 B** | **75 B** | **6.5 B** | **3.8 B** | **3.7 B** | **1.7 J B** | **2.4 J B** | **11 B** | **4 B** |
| OCDD | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **42 B** | **1300 B** | **1300 B** | **97 B** | **55 B** | **51 B** | **24 B** | **38 B** | **160 B** | **58 B** |
| 2,3,7,8-TCDF | ng/kg | 0.53-0.66 | -- | -- | 0.1 | **0.23 J** | 0.98 U | **0.32 J** | **0.12 J** | **0.07 J Q** | **0.071 J Q** | **0.037 J** | 0.58 U | **0.18 J** | **0.04 J Q** |
| 1,2,3,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.03 | **0.2 J Q** | 4.9 U | **0.16 J Q** | **0.1 J** | 3 U | 2.8 U | 2.9 U | 2.9 U | **0.046 J Q** | 3.1 U |
| 2,3,4,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.3 | **0.28 J Q** | 4.9 U | **0.2 J Q** | **0.11 J** | 3 U | 2.8 U | 2.9 U | 2.9 U | 3.1 U | 3.1 U |
| 1,2,3,4,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.22 J Q** | 4.9 U | **0.33 J** | **0.14 J Q** | 3 U | 2.8 U | 2.9 U | 2.9 U | 3.1 U | 3.1 U |
| 1,2,3,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.2 J Q** | 4.9 U | **0.14 J Q** | **0.11 J** | 3 U | 2.8 U | 2.9 U | 2.9 U | **0.062 J Q** | 3.1 U |
| 2,3,4,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.25 J** | **0.082 J Q** | **0.13 J Q** | **0.11 J** | 3 U | 2.8 U | 2.9 U | 2.9 U | 3.1 U | **0.031 J Q** |
| 1,2,3,7,8,9-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | 4.9 U | 4.9 U | 5 U | **0.096 J Q** | 3 U | 2.8 U | 2.9 U | 2.9 U | 3.1 U | 3.1 U |
| 1,2,3,4,6,7,8-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.35 J B** | **0.26 J B Q** | **1 J B** | **0.32 J B** | **0.15 J B** | **0.13 J B Q** | **0.085 J B Q** | **0.097 J B** | **0.43 J B** | **0.15 J B** |
| 1,2,3,4,7,8,9-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.22 J Q B** | 4.9 U | **0.13 J B** | **0.099 J B** | 3 U | 2.8 U | 2.9 U | 2.9 U | 3.1 U | 3.1 U |
| OCDF | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **0.52 J Q B** | **0.28 J B** | **1.4 J B** | **0.55 J B** | **0.25 J B Q** | **0.22 J B** | **0.13 J B** | **0.17 J B** | **0.76 J B** | **0.26 J Q B** |
| DIOXIN TEQ (ND=0) | ng/kg | -- | 0.85 | 21.5 | -- | **0.47** | **4.53** | **3.13** | **0.46** | **0.13** | **0.19** | **0.05** | **0.08** | **0.55** | **0.13** |
| DIOXIN TEQ (ND=1/2RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.20** | **6.15** | **3.38** | **0.46** | **1.53** | **1.51** | **2.87** | **2.93** | **1.49** | **1.44** |
| DIOXIN TEQ (ND=RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.94** | **7.76** | **3.63** | **0.46** | **2.94** | **2.82** | **5.68** | **5.77** | **2.44** | **2.74** |

**Source* : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds.

*(a) Source:* CCME 2001 and CCME 2002. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

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**ISQG** = no value available

**RL** = laboratory reporting limit

**TEF** = toxicity equivalency factor

**B** = compound was detected in the laboratory method blank

**Analyte concentration is between ISQG and PEL value**

**J** = compound was detected, but below the reporting limit (value is estimated)

**Q** = compound was detected, but as an estimated maximum concentration

**TABLE 11b. DIOXIN AND FURAN CONGENER CONCENTRATIONS (ng/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | ISQG* | PEL* | TEF* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to -65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| 2,3,7,8-TCDD | ng/kg | 0.53-0.66 | 0.85 | 21.5 | 1 | 0.98 U | **0.22 J** | **0.11 J Q** | | 0.61 U | 0.62 U | 0.53 U | 0.61 U | 0.54 U | 0.61 U | 0.6 U | 0.56 U | 0.62 U | 0.64 U | 0.53 U | 0.63 U | 0.6 U |
| 1,2,3,7,8-PECDD | ng/kg | 2.7-3.3 | -- | -- | 1 | **0.28 J B** | **1.5 J B** | **1.2 J B** | | **0.11 J Q** | 3.1 U | 2.7 U | **0.13 J Q** | **0.038 J Q** | 3.1 U | **0.11 J Q** | **0.14 J** | **0.057 J Q** | **0.17 J** | **0.068 J Q** | **0.21 J** | **0.12 J Q** |
| 1,2,3,4,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.31 J B** | **2.5 J B** | **2 J Q B** | | **0.24 J Q** | **0.084 J** | **0.077 J** | **0.26 J** | **0.081 J Q** | **0.095 J** | **0.2 J Q** | **0.28 J** | **0.12 J Q** | **0.31 J** | **0.11 J Q B** | **0.24 J Q B** | **0.22 J B** |
| 1,2,3,6,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.4 J B** | **3.6 J B** | **2.5 J Q B** | | **0.28 J Q** | **0.056 J** | 2.7 U | **0.32 J Q** | **0.11 J Q** | **0.053 J** | **0.3 J** | **0.35 J** | **0.2 J Q** | **0.32 J Q** | **0.075 J Q** | **0.24 J Q** | **0.22 J Q** |
| 1,2,3,7,8,9-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.53 J B** | **9.1 B** | **7.1 B** | | **0.71 J** | **0.13 J** | **0.027 J Q** | **0.81 J** | **0.28 J** | **0.078 J Q** | **0.66 J** | **0.71 J** | **0.52 J** | **0.95 J** | **0.092 J Q** | **0.85 J** | **0.62 J** |
| 1,2,3,4,6,7,8-HPCDD | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **2.8 J Q B** | **90 B** | **75 B** | | **6.9 B** | **1 J B** | **0.53 J B** | **8.1 B** | **2.8 B** | **1.2 J B** | **7.4 B** | **7.7 B** | **4.6 B** | **9.4 B** | **0.76 J** | **6.3** | **6.3** |
| OCDD | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **42 B** | **1300 B** | **1300 B** | | **110 B** | **14 B** | **8 B** | **81 B** | **38 B** | **16 B** | **110 B** | **110 B** | **45 B** | **78 B** | **13 B** | **51 B** | **90 B** |
| 2,3,7,8-TCDF | ng/kg | 0.53-0.66 | -- | -- | 0.1 | **0.23 J** | 0.98 U | **0.32 J** | | **0.12 J Q** | **0.044 J** | 0.53 U | **0.042 J Q** | **0.058 J** | 0.61 U | **0.13 J** | **0.19 J** | 0.62 U | 0.64 U | 0.53 U | 0.63 U | **0.14 J** |
| 1,2,3,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.03 | **0.2 J Q** | 4.9 U | **0.16 J Q** | | 3 U | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | 3 U | **0.1 J Q** | 3.1 U | 3.2 U | **0.056 J Q** | 3.2 U | 3 U |
| 2,3,4,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.3 | **0.28 J Q** | 4.9 U | **0.2 J Q** | | 3 U | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | **0.069 J Q** | **0.06 J Q** | 3.1 U | 3.2 U | 2.7 U | 3.2 U | 3 U |
| 1,2,3,4,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.22 J Q** | 4.9 U | **0.33 J** | | **0.12 J** | 3.1 U | 2.7 U | **0.071 J Q** | 2.7 U | 3.1 U | **0.12 J Q** | **0.15 J** | 3.1 U | 3.2 U | **0.067 J Q** | 3.2 U | **0.12 J Q** |
| 1,2,3,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.2 J Q** | 4.9 U | **0.14 J Q** | | **0.059 J Q** | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | **0.067 J Q** | 2.8 U | 3.1 U | 3.2 U | **0.038 J Q** | 3.2 U | **0.065 J Q** |
| 2,3,4,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.25 J** | **0.082 J Q** | **0.13 J Q** | | 3 U | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | 3 U | **0.058 J** | 3.1 U | 3.2 U | **0.066 J** | 3.2 U | **0.044 J Q** |
| 1,2,3,7,8,9-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | 4.9 U | 4.9 U | 5 U | | 3 U | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | 3 U | 2.8 U | 3.1 U | 3.2 U | **0.076 J B** | 3.2 U | 3 U |
| 1,2,3,4,6,7,8-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.35 J B** | **0.26 J B Q** | **1 J B** | | **0.43 J B** | **0.043 J Q B** | **0.024 J Q B** | **0.18 J B** | **0.13 J B** | **0.053 J Q B** | **0.42 J B** | **0.47 J B Q** | **0.035 J B Q** | 3.2 U | **0.063 J B** | **0.042 J Q B** | **0.33 J Q B** |
| 1,2,3,4,7,8,9-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.22 J Q B** | 4.9 U | **0.13 J B** | | **0.031 J Q B** | 3.1 U | 2.7 U | 3 U | 2.7 U | 3.1 U | 3 U | **0.056 J B** | 3.1 U | 3.2 U | **0.049 J Q B** | 3.2 U | **0.035 J Q B** |
| OCDF | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **0.52 J Q B** | **0.28 J B** | **1.4 J B** | | **0.69 J B** | **0.099 J Q B** | **0.069 J I Q B** | **0.59 J B** | **0.2 J B** | **0.064 J Q B** | **0.69 J B** | **0.92 J B** | **0.083 J B Q** | 6.4 U | **0.15 J Q B** | **0.16 J Q B** | **0.68 J B** |
| DIOXIN TEQ (ND=0) | ng/kg | -- | 0.85 | 21.5 | -- | **0.47** | **4.53** | **3.13** | | **0.19** | **0.05** | **0.02** | **0.21** | **0.07** | **0.03** | **0.22** | **0.42** | **0.11** | **0.41** | **0.03** | **0.37** | **0.19** |
| DIOXIN TEQ (ND=1/2RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.20** | **6.15** | **3.38** | | **1.29** | **3.05** | **2.79** | **1.48** | **1.34** | **3.06** | **0.88** | **0.98** | **1.60** | **1.97** | **0.72** | **1.90** | **1.13** |
| DIOXIN TEQ (ND=RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.94** | **7.76** | **3.63** | | **2.39** | **6.06** | **5.57** | **2.74** | **2.61** | **6.10** | **1.54** | **1.54** | **3.09** | **3.52** | **1.42** | **3.43** | **2.08** |

**Source* : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds.

*(a) Source:* CCME 2001 and CCME 2002. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

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ND = no data available.

**RL =** laboratory reporting limit

**TEF** = toxicity equivalency factor

**B** = compound was detected in the laboratory method blank

**Analyte concentration is between ISQG and PEL value**

**J** = compound was detected, but below the reporting limit (value is estimated)

**Q** = compound was detected, but as an estimated maximum concentration

**TABLE 11c. DIOXIN AND FURAN CONGENER CONCENTRATIONS (ng/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | TEL* | PEL* | TEF* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| 2,3,7,8-TCDD | ng/kg | 0.53-0.66 | 0.85 | 21.5 | 1 | 0.98 U | **0.22 J** | **0.11 J Q** | | 0.61 U | 0.62 U | 0.63 U | 0.61 U | 0.63 U | 0.66 U | 0.65 U | 0.62 U | 0.65 U | 0.64 U | 0.62 U | 0.64 U | 0.65 U | 0.64 U | 0.61 U |
| 1,2,3,7,8-PECDD | ng/kg | 2.7-3.3 | -- | -- | 1 | **0.28 J B** | **1.5 J B** | **1.2 J B** | | **0.11 J Q** | **0.12 J Q** | **0.13 J Q** | **0.14 J** | **0.19 J** | **0.13 J** | **0.1 J** | **0.12 J Q** | **0.15 J** | **0.04 J Q** | **0.12 J** | **0.18 J** | **0.16 J Q** | 3.2 U | **0.23 J** |
| 1,2,3,4,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.31 J B** | **2.5 J B** | **2 J Q B** | | **0.23 J B Q** | **0.28 J B Q** | **0.3 J B** | **0.25 J B** | **0.33 J B** | **0.3 J B** | **0.19 J Q B** | **0.24 J B** | **0.31 J B** | **0.18 J B Q** | **0.19 J B** | **0.23 J B Q** | **0.32 J B** | **0.23 J B** | **0.28 J B** |
| 1,2,3,6,7,8-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.4 J B** | **3.6 J B** | **2.5 J Q B** | | **0.46 J** | **0.36 J** | **0.43 J** | **0.29 J** | **0.54 J** | **0.42 J** | **0.3 J** | **0.34 J Q** | **0.4 J** | **0.13 J Q** | **0.26 J** | **0.35 J Q** | **0.43 J Q** | **0.3 J Q** | **0.32 J** |
| 1,2,3,7,8,9-HXCDD | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.53 J B** | **9.1 B** | **7.1 B** | | **1.2 J** | **1.2 J** | **1.2 J** | **0.8 J** | **1.6 J** | **1.2 J** | **0.84 J** | **1.1 J** | **1.3 J** | **0.78 J Q** | **0.82 J** | **1.3 J** | **1.2 J** | **1.2 J** | **0.91 J** |
| 1,2,3,4,6,7,8-HPCDD | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **2.8 J Q B** | **90 B** | **75 B** | | **13** | **10** | **9.2** | **6.4** | **14** | **9** | **6.6** | **9.5** | **11** | **6.6** | **8** | **8.9** | **9.1** | **8.3** | **7.2** |
| OCDD | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **42 B** | **1300 B** | **1300 B** | | **220 B** | **130 B** | **88 B** | **60 B** | **180 B** | **77 B** | **59 B** | **100 B** | **91 B** | **64 B** | **71 B** | **70 B** | **70 B** | **73 B** | **68 B** |
| 2,3,7,8-TCDF | ng/kg | 0.53-0.66 | -- | -- | 0.1 | **0.23 J** | 0.98 U | **0.32 J** | | 0.61 U | 0.62 U | 0.63 U | 0.61 U | 0.63 U | 0.66 U | 0.65 U | 0.62 U | 0.65 U | 0.64 U | 0.62 U | 0.64 U | 0.65 U | 0.64 U | **0.044 J Q** |
| 1,2,3,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.03 | **0.2 J Q** | 4.9 U | **0.16 J Q** | | 3.1 U | 3.1 U | 3.2 U | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | 3.2 U | 3.2 U | 3 U |
| 2,3,4,7,8-PECDF | ng/kg | 2.7-3.3 | -- | -- | 0.3 | **0.28 J Q** | 4.9 U | **0.2 J Q** | | 3.1 U | 3.1 U | 3.2 U | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | 3.2 U | 3.2 U | 3 U |
| 1,2,3,4,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.22 J Q** | 4.9 U | **0.33 J** | | 3.1 U | 3.1 U | 3.2 U | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | **0.061 J Q** | 3.2 U | 3 U |
| 1,2,3,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.2 J Q** | 4.9 U | **0.14 J Q** | | 3.1 U | 3.1 U | **0.032 J Q** | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | 3.2 U | 3.2 U | 3 U |
| 2,3,4,6,7,8-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | **0.25 J** | **0.082 J Q** | **0.13 J Q** | | 3.1 U | 3.1 U | 3.2 U | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | 3.2 U | 3.2 U | 3 U |
| 1,2,3,7,8,9-HXCDF | ng/kg | 2.7-3.3 | -- | -- | 0.1 | 4.9 U | 4.9 U | 5 U | | 3.1 U | 3.1 U | 3.2 U | 3.1 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | 3.2 U | 3.2 U | 3 U |
| 1,2,3,4,6,7,8-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.35 J B** | **0.26 J B Q** | **1 J B** | | **0.078 J B** | 3.1 U | **0.081 J B** | 3.1 U | **0.03 J B** | 3.3 U | **0.11 J B** | **0.026 J Q B** | 3.3 U | **0.041 J B** | **0.036 J B** | 3.2 U | **0.065 J B Q** | **0.031 J B Q** | **0.051 J B** |
| 1,2,3,4,7,8,9-HPCDF | ng/kg | 2.7-3.3 | -- | -- | 0.01 | **0.22 J Q B** | 4.9 U | **0.13 J B** | | 3.1 U | 3.1 U | **0.036 J Q** | 3.1 U | 3.1 U | **0.025 J** | 3.2 U | 3.1 U | 3.3 U | 3.2 U | 3.1 U | 3.2 U | **0.047 J** | 3.2 U | 3 U |
| OCDF | ng/kg | 5.3-6.6 | -- | -- | 0.0003 | **0.52 J Q B** | **0.28 J B** | **1.4 J B** | | **0.12 J B** | **0.07 J B Q** | **0.28 J B** | **0.13 J B Q** | **0.11 J B** | **0.083 J B** | **0.1 J Q B** | **0.064 J Q B** | 6.5 U | **0.14 J B Q** | **0.1 J B** | **0.016 J B Q** | **0.13 J B** | **0.072 J B Q** | **0.091 J B** |
| DIOXIN TEQ (ND=0) | ng/kg | -- | 0.85 | 21.5 | -- | **0.47** | **4.53** | **3.13** | | **0.36** | **0.30** | **0.31** | **0.36** | **0.63** | **0.44** | **0.30** | **0.26** | **0.49** | **0.09** | **0.35** | **0.42** | **0.26** | **0.25** | **0.47** |
| DIOXIN TEQ (ND=1/2RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.20** | **6.15** | **3.38** | | **1.85** | **1.80** | **1.67** | **1.85** | **2.12** | **2.02** | **1.84** | **1.75** | **2.08** | **1.62** | **1.84** | **1.97** | **1.63** | **3.38** | **1.89** |
| DIOXIN TEQ (ND=RL) | ng/kg | -- | 0.85 | 21.5 | -- | **1.94** | **7.76** | **3.63** | | **3.33** | **3.30** | **3.02** | **3.35** | **3.62** | **3.60** | **3.38** | **3.24** | **3.68** | **3.16** | **3.32** | **3.52** | **3.00** | **6.52** | **3.30** |

**Source* : Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds.

*(a) Source:* CCME 2001 and CCME 2002. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

**NOTES**: Bold values represent detected concentrations. Shaded concentrations exceed sediment quality guidelines.

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no value available.

**RL** = laboratory reporting limit

**TEF** = toxicity equivalency factor

**B** = compound was detected in the laboratory method blank

**Analyte concentration is between ISQG and PEL value**

**J** = compound was detected, but below the reporting limit (value is estimated)

**Q** = compound was detected, but as an estimated maximum concentration

## TABLE 12a. SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/kg) IN CBBT SURFICIAL GRABS

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 1,2-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 1,2-DIPHENYLHYDRAZINE(AS AZOBENZENE) | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 1,3-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 1,4-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2,2'-OXYBIS[1-CHLOROPROPANE] | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| 2,4,5-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | -- | -- | -- | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2,4,6-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2,4-DICHLOROPHENOL | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| 2,4-DIMETHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2,4-DINITROPHENOL | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | 190 U | 190 U | 190 U | 190 U | 190 U | 210 U | 210 U |
| 2,4-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2,6-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2-CHLORONAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| 2-CHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 2-NITROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 3,3'-DICHLOROBENZIDINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 3-NITROANILINE | ug/kg | 93-110 | -- | -- | -- | -- | -- | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| 4,6-DINITRO-2-METHYLPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| 4-BROMOPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 4-CHLORO-3-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 4-CHLOROANILINE | ug/kg | 18-22 | -- | -- | -- | -- | -- | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 4-CHLOROPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| 4-NITROANILINE | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| 4-NITROPHENOL | ug/kg | 93-110 | -- | -- | -- | -- | -- | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| BENZIDINE | ug/kg | 370-440 | -- | -- | 410 U | 470 U | 1500 U | 380 U | 400 U | 380 U | 390 U | 390 U | 420 U | 420 U |
| BENZOIC ACID | ug/kg | 93-110 | 182 | 2,647 | 100 U | 120 U | 380 U | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| BENZYL ALCOHOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| BIS(2-CHLOROETHOXY)METHANE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| BIS(2-CHLOROETHYL)ETHER | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | 190 U | 190 U | 190 U | 190 U | **22 J** | 210 U | 210 U |
| BUTYL BENZYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | **16 J** | **16 J** | **16 J** | **17 J** | **17 J** | **18 J** | **18 J** |
| DIBENZOFURAN | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| DIETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| DIMETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| DI-N-BUTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| DI-N-OCTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| HEXACHLOROBENZENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| HEXACHLOROBUTADIENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| HEXACHLOROCYCLOPENTADIENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| HEXACHLOROETHANE | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| ISOPHORONE | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| METHYLPHENOL, 3 & 4 | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| NITROBENZENE | ug/kg | 36-44 | | | 41 U | 47 U | 150 U | 38 U | 39 U | 38 U | 39 U | 39 U | 42 U | 41 U |
| N-NITROSODIMETHYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| N-NITROSODI-N-PROPYLAMINE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | 3.8 U | 4 U | 3.8 U | 3.9 U | 3.9 U | 4.2 U | 4.2 U |
| N-NITROSODIPHENYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |
| PENTACHLOROPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | 96 U | 100 U | 97 U | 100 U | 99 U | 110 U | 110 U |
| PHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | 19 U | 19 U | 19 U | 19 U | 19 U | 21 U | 21 U |

* *Source:* MacDonald et al. 1996. Ecotoxicology 5:253-278.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

**--** = no value available.

**RL** = laboratory reporting limit

**TEL** = threshold effects level

**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

## TABLE 12c. SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/kg) IN WID TRENCH SEDIMENT
### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| 1,2,4-TRICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 1,2-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 1,2-DIPHENYLHYDRAZINE(AS AZOBENZENE) | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 1,3-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 1,4-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2,2'-OXYBIS[1-CHLOROPROPANE] | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| 2,4,5-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | -- | -- | -- | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2,4,6-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2,4-DICHLOROPHENOL | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| 2,4-DIMETHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2,4-DINITROPHENOL | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | | 200 U | 210 U | 210 U | 200 U | 210 U | 220 U | 220 U | 210 U | 220 U | 220 U | 210 U | 220 U | 210 U | 210 U | 210 U |
| 2,4-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2,6-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2-CHLORONAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| 2-CHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 2-NITROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 3,3'-DICHLOROBENZIDINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 3-NITROANILINE | ug/kg | 93-110 | -- | -- | -- | -- | -- | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| 4,6-DINITRO-2-METHYLPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| 4-BROMOPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 4-CHLORO-3-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 4-CHLOROANILINE | ug/kg | 18-22 | -- | -- | -- | -- | -- | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 4-CHLOROPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| 4-NITROANILINE | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| 4-NITROPHENOL | ug/kg | 93-110 | -- | -- | -- | -- | -- | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| BENZIDINE | ug/kg | 370-440 | -- | -- | 410 U | 470 U | 1500 U | | 420 U | 420 U | 430 U | 420 U | 430 U | 440 U | 440 U | 420 U | 440 U | 440 U | 420 U | 440 U | 440 U | 430 U | 420 U |
| BENZOIC ACID | ug/kg | 93-110 | 182 | 2,647 | 100 U | 120 U | 380 U | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| BENZYL ALCOHOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| BIS(2-CHLOROETHOXY)METHANE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| BIS(2-CHLOROETHYL)ETHER | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | | 200 U | 210 U | 210 U | 200 U | 210 U | 220 U | 220 U | 210 U | 220 U | 220 U | 210 U | 220 U | 210 U | 210 U | 210 U |
| BUTYL BENZYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| DIBENZOFURAN | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| DIETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| DIMETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| DI-N-BUTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| DI-N-OCTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| HEXACHLOROBENZENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| HEXACHLOROBUTADIENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| HEXACHLOROCYCLOPENTADIENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| HEXACHLOROETHANE | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| ISOPHORONE | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| METHYLPHENOL, 3 & 4 | ug/kg | 18-22 | | | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| NITROBENZENE | ug/kg | 36-44 | | | 41 U | 47 U | 150 U | | 41 U | 42 U | 43 U | 41 U | 42 U | 44 U | 44 U | 42 U | 44 U | 44 U | 42 U | 44 U | 43 U | 43 U | 42 U |
| N-NITROSODIMETHYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| N-NITROSODI-N-PROPYLAMINE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.2 U | 4.2 U | 4.3 U | 4.2 U | 4.3 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.2 U | 4.4 U | 4.4 U | 4.3 U | 4.2 U |
| N-NITROSODIPHENYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |
| PENTACHLOROPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U | 110 U |
| PHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 21 U | 20 U | 21 U | 22 U | 22 U | 21 U | 22 U | 22 U | 21 U | 22 U | 21 U | 21 U | 21 U |

* *Source:* MacDonald et al. 1996. Ecotoxicology 5:253-278.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

-- = no value available.

**RL** = laboratory reporting limit
**TEL** = threshold effects level
**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank
**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected

## TABLE 12b. SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| ANALYTE | UNITS | RL Range | TEL* | PEL* | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 -55 to -60 | CBBT-SC-1 -60 to -65 | CBBT-SC-2 -55 to -60 | CBBT-SC-2 -60 to -65 | CBBT-SC-3 -56 to -60 | CBBT-SC-3 -60 to -65 | CBBT-SC-4 -53 to -60 | CBBT-SC-4 -60 to -65 | CBBT-SC-5 -54 to -60 | CBBT-SC-5 -60 to -65 | CBBT-SC-6 -54 to -60 | CBBT-SC-6 -60 to -65 | COMPOSITE DU2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 1,2-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 1,2-DIPHENYLHYDRAZINE(AS AZOBENZENE) | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 1,3-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 1,4-DICHLOROBENZENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2,2'-OXYBIS[1-CHLOROPROPANE] | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| 2,4,5-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | -- | -- | -- | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2,4,6-TRICHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2,4-DICHLOROPHENOL | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| 2,4-DIMETHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2,4-DINITROPHENOL | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | | 200 U | 210 U | 180 U | 200 U | 180 U | 200 U | 200 U | 190 U | 200 U | 210 U | 180 U | 210 U | 200 U |
| 2,4-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2,6-DINITROTOLUENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2-CHLORONAPHTHALENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| 2-CHLOROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 2-NITROPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 3,3'-DICHLOROBENZIDINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 3-NITROANILINE | ug/kg | 93-110 | -- | -- | -- | -- | -- | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| 4,6-DINITRO-2-METHYLPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| 4-BROMOPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 4-CHLORO-3-METHYLPHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 4-CHLOROANILINE | ug/kg | 18-22 | -- | -- | -- | -- | -- | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 4-CHLOROPHENYL PHENYL ETHER | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| 4-NITROANILINE | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| 4-NITROPHENOL | ug/kg | 93-110 | -- | -- | -- | -- | -- | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| BENZIDINE | ug/kg | 370-440 | -- | -- | 410 U | 470 U | 1500 U | | 410 U | 420 U | 370 U | 410 U | 370 U | 420 U | 400 U | 380 U | 410 U | 430 U | 370 U | 430 U | 410 U |
| BENZOIC ACID | ug/kg | 93-110 | 182 | 2,647 | 100 U | 120 U | 380 U | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| BENZYL ALCOHOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| BIS(2-CHLOROETHOXY)METHANE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| BIS(2-CHLOROETHYL)ETHER | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| BIS(2-ETHYLHEXYL) PHTHALATE | ug/kg | 180-220 | -- | -- | 200 U | 230 U | 730 U | | 200 U | 210 U | 180 U | 200 U | 180 U | 200 U | 200 U | 190 U | 200 U | 210 U | 180 U | 210 U | 200 U |
| BUTYL BENZYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| DIBENZOFURAN | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| DIETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| DIMETHYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| DI-N-BUTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| DI-N-OCTYL PHTHALATE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| HEXACHLOROBENZENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| HEXACHLOROBUTADIENE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| HEXACHLOROCYCLOPENTADIENE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| HEXACHLOROETHANE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| ISOPHORONE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| METHYLPHENOL, 3 & 4 | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| NITROBENZENE | ug/kg | 36-44 | -- | -- | 41 U | 47 U | 150 U | | 41 U | 42 U | 36 U | 41 U | 37 U | 41 U | 40 U | 38 U | 41 U | 43 U | 37 U | 43 U | 41 U |
| N-NITROSODIMETHYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| N-NITROSODI-N-PROPYLAMINE | ug/kg | 3.7-4.4 | -- | -- | 4.1 U | 4.7 U | 15 U | | 4.1 U | 4.2 U | 3.7 U | 4.1 U | 3.7 U | 4.2 U | 4 U | 3.8 U | 4.1 U | 4.3 U | 3.7 U | 4.3 U | 4.1 U |
| N-NITROSODIPHENYLAMINE | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | 21 U | 18 U | 21 U | 20 U |
| PENTACHLOROPHENOL | ug/kg | 93-110 | -- | -- | 100 U | 120 U | 380 U | | 100 U | 110 U | 93 U | 100 U | 95 U | 110 U | 100 U | 97 U | 110 U | 110 U | 93 U | 110 U | 100 U |
| PHENOL | ug/kg | 18-22 | -- | -- | 20 U | 23 U | 73 U | | 20 U | 21 U | 18 U | 20 U | 18 U | 20 U | 20 U | 19 U | 20 U | **58** | 18 U | 21 U | 20 U |

* *Source:* MacDonald et al. 1996. Ecotoxicology 5:253-278.

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

-- = no value available.

**RL** = laboratory reporting limit
**TEL** = threshold effects level
**PEL** = probable effects level

**B** = compound was detected in the laboratory method blank
**J** = compound was detected, but below the reporting limit (value is estimated)
**U** = compound was analyzed, but not detected

## TABLE 13a. BUTYLTIN CONCENTRATIONS (ug/kg) IN CBBT SURFICIAL GRABS
## CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| ANALYTE | UNITS | RL Range | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | CBBT-G-1-SED | CBBT-G-2-SED | CBBT-G-3-SED | CBBT-G-4-SED | CBBT-G-5-SED | CBBT-G-6-SED | CBBT-G-DU1-COMP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONOBUTYLTIN | ug/kg | 22-28 | 26 U | 29 U | 31 U | 24 U | 25 U | 23 U | 24 U | 24 U | 26 U | 26 U |
| DIBUTYLTIN | ug/kg | 1.4-1.8 | 1.6 U | 1.8 U | 1.9 U | 1.5 U | 1.5 U | 1.5 U | **2** | 1.5 U | 1.6 U | 1.6 U |
| TRIBUTYLTIN | ug/kg | 1.6-2 | 1.9 U | 2.1 U | 2.2 U | 1.7 U | 1.8 U | 1.7 U | 1.7 U | 1.7 U | 1.9 U | 1.9 U |
| TETRABUTYLTIN | ug/kg | 1.8-2.3 | 2.1 U | 2.4 U | 2.5 U | 1.9 U | 2 U | 1.9 U | 2 U | 1.9 U | 2.1 U | 2.1 U |

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents
**RL** = laboratory reporting limit
**U** = compound was analyzed, but not detected

**TABLE 13b. BUTYLTIN CONCENTRATIONS (ug/kg) IN CBBT TUNNEL COVER SHORT CORE SEDIMENT**

**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-SC-1 | | CBBT-SC-2 | | CBBT-SC-3 | | CBBT-SC-4 | | CBBT-SC-5 | | CBBT-SC-6 | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | -55 to -60 | -60 to -65 | -55 to -60 | -60 to -65 | -56 to -60 | -60 to -65 | -53 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | -54 to -60 | -60 to -65 | DU2 |
| MONOBUTYLTIN | ug/kg | 22-28 | 26 U | 29 U | 31 U | | 25 U | 27 U | 22 U | 25 U | 23 U | 26 U | 25 U | 24 U | 26 U | 28 U | 23 U | 27 U | 25 U |
| DIBUTYLTIN | ug/kg | 1.4-1.8 | 1.6 U | 1.8 U | 1.9 U | | 1.6 U | 1.7 U | 1.4 U | 1.6 U | 1.4 U | 1.6 U | 1.6 U | 1.5 U | 1.6 U | 1.7 U | 1.5 U | 1.7 U | 1.6 U |
| TRIBUTYLTIN | ug/kg | 1.6-2 | 1.9 U | 2.1 U | 2.2 U | | 1.8 U | 2 U | 1.6 U | 1.8 U | 1.7 U | 1.9 U | 1.8 U | 1.8 U | 1.9 U | 2 U | 1.7 U | 2 U | 1.8 U |
| TETRABUTYLTIN | ug/kg | 1.8-2.3 | 2.1 U | 2.4 U | 2.5 U | | 2.1 U | 2.2 U | 1.8 U | 2.1 U | 1.9 U | 2.1 U | 2 U | 2 U | 2.1 U | 2.3 U | 1.9 U | 2.2 U | 2 U |

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents.

**RL =** laboratory reporting limit

**U =** compound was analyzed, but not detected

**TABLE 13c. BUTYLTIN CONCENTRATIONS (ug/kg) IN WID TRENCH SEDIMENT**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | RL Range | OCREF-SED | WBREF-SUB-SED | WBREF-SURF-SED | FT MLLW | CBBT-LC-1 | | | | CBBT-LC-2 | | | CBBT-LC-3 | | | CBBT-LC-4 | | | | COMPOSITE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | -48 to -55 | -55 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -54 to -60 | -60 to -65 | -65 to -70 | -53 to -60 | -60 to -65 | -60 to -65 FD | -65 to -70 | DU3 |
| MONOBUTYLTIN | ug/kg | 22-28 | 26 U | 29 U | 31 U | | 26 U | 26 U | 26 U | 25 U | 27 U | 27 U | 27 U | 27 U | 28 U | 26 U | 27 U | 28 U | 27 U | 27 U | 26 U |
| DIBUTYLTIN | ug/kg | 1.4-1.8 | 1.6 U | 1.8 U | 1.9 U | | 1.6 U | 1.7 U | 1.6 U | 1.6 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.8 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.7 U | 1.6 U |
| TRIBUTYLTIN | ug/kg | 1.6-2 | 1.9 U | 2.1 U | 2.2 U | | 1.9 U | 1.9 U | 1.9 U | 1.8 U | 1.9 U | 1.9 U | 2 U | 1.9 U | 2 U | 1.9 U | 2 U | 2 U | 2 U | 2 U | 1.9 U |
| TETRABUTYLTIN | ug/kg | 1.8-2.3 | 2.1 U | 2.4 U | 2.5 U | | 2.1 U | 2.2 U | 2.1 U | 2.1 U | 2.2 U | 2.2 U | 2.2 U | 2.2 U | 2.3 U | 2.2 U | 2.2 U | 2.3 U | 2.2 U | 2.2 U | 2.1 U |

**NOTES**: Bold values represent detected concentrations; RL is reported for non-detected constituents
**RL** = laboratory reporting limit
**U** = compound was analyzed, but not detected

**TABLE 14. OTHER UPLAND DISPOSAL CONSTITUENTS IN CBBT COVER AND WID TRENCH COMPOSITES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| ANALYTE | UNITS | Average RL | CBBT COVER | | WID TRENCH |
|---|---|---|---|---|---|
| | | | GRAB | CORE | |
| | | | DU1 | DU2 | DU3 |
| **BTEX** | | | | | |
| BENZENE | ug/kg | 6.3 | 6.4 U | 6.1 U | 6.3 U |
| ETHYLBENZENE | ug/kg | 6.3 | 6.4 U | 6.1 U | 6.3 U |
| M-XYLENE & P-XYLENE | ug/kg | 6.3 | 6.4 U | 6.1 U | 6.3 U |
| O-XYLENE | ug/kg | 6.3 | 6.4 U | 6.1 U | 6.3 U |
| TOLUENE | ug/kg | 6.3 | 6.4 U | 6.1 U | 6.3 U |
| XYLENES, TOTAL | ug/kg | 13 | 13 U | 12 U | 13 U |
| **TOTAL PETROLEUM HYDROCARBONS** | | | | | |
| TPH-GRO (C6-C10) | ug/kg | 127 | 130 U | 120 U | 130 U |
| TPH-DRO (C10-C34) | mg/kg | 20.7 | 21 U | 20 U | 21 U |
| **AGRONOMICAL ANALYSES*** | | | | | |
| NEUTRALIZATION POTENTIAL (NP) | Tcce/kT | -- | NT | 58.27 | 114.23 |
| PYRITIC SULFUR (% S) | % | -- | NT | 0.01 | 0.07 |
| MAXIMUM POTENTIAL ACIDITY (MPA) | Tcce/kT | -- | NT | 1820.94 | 3569.69 |
| NET NEUTRALIZING POTENTIAL (NNP) | Tcce/kT | -- | NT | -0.01 | -0.07 |
| NP/MPA | Tcce/kT | -- | NT | 0.00 | 0.00 |
| pH (SATURATED PASTE) | SU | -- | NT | 7.95 | 7.78 |
| CONDUCTIVITY (SATURATED PASTE) | (dS/m) | -- | NT | 32.70 | 35.40 |
| H202 Fizz | -- | -- | NT | 2=moderate | 2=moderate |
| SOBECK FIZZ | -- | -- | NT | 1=slight bubbling | 1=slight bubbling |
| **OTHER** | | | | | |
| CYANIDE, REACTIVE | mg/kg | 25 | 25 U | 25 U | 25 U |
| IGNITABILITY | °F | -- | >140 | >140 | >140 |
| PAINT FILTER | NONE | -- | CNF | CNF | CNF |
| PHENOLICS, TOTAL RECOVERABLE | mg/kg | 0.25 | 0.25 U | 0.24 U | 0.25 U |
| HALOGENS, EXTRACTABLE ORGANIC | mg/kg | 10 | 10 U | 10 U | 10 U |
| PH | SU | 0.1 | **8.1** | **8** | **8.1** |
| SULFIDE, REACTIVE | mg/kg | 20 | 20 U | 20 U | 20 U |

**NOTES**: **Bold values** represent detected concentrations; RL is reported for non-detected constituents.
*Due to physical composition, agronomical analyses were deemed unnecessary for CBBT-G-DU1-COMP
**NT** = Not tested
**%** = Percent.
**mg/kg** = Milligram(s) per kilogram.
**°F =** Degrees Fahrenheit.
**SU =** Standard unit.
**RL =** laboratory reporting limit.
**CNF =** Contains no free liquid
**DRO** = Diesel range organics.
**GRO** = Gasoline range organics.
**U** = Compound was analyzed, but not detected.

## TABLE 15. ANALYTE CONCENTRATIONS (mg/L) IN TCLP LEACHATE FOR CBBT COVER AND WID TRENCH COMPOSITES

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| ANALYTE | UNITS | | TCLP Regulatory[(a)] Levels | CBBT COVER | | WID TRENCH |
|---|---|---|---|---|---|---|
| | | | | GRAB | CORE | |
| | | | | DU1 | DU2 | DU3 |
| **TCLP HERBICIDES** | | | | | | |
| 2,4-D | mg/L | 0.04 | 10.0 | 0.02 U | 0.04 U | 0.04 U |
| SILVEX (2,4,5-TP) | mg/L | 0.01 | 1.0 | 0.005 U | 0.01 U | 0.01 U |
| **TCLP METALS** | | | | | | |
| ARSENIC | mg/L | 0.50 | 5.0 | 0.5 U | 0.5 U | 0.5 U |
| BARIUM | mg/L | 2.00 | 100 | **0.07 J** | **0.06 J** | **0.16 J** |
| CADMIUM | mg/L | 0.50 | 1.0 | 0.5 U | 0.5 U | 0.5 U |
| CHROMIUM | mg/L | 0.50 | 5.0 | 0.5 U | 0.5 U | 0.5 U |
| LEAD | mg/L | 0.50 | 5.0 | 0.5 U | 0.5 U | 0.5 U |
| MERCURY | mg/L | 0.00 | 0.2 | 0.0002 U | 0.0002 U | 0.0002 U |
| SELENIUM | mg/L | 0.50 | 1.0 | 0.5 U | 0.5 U | 0.5 U |
| SILVER | mg/L | 0.50 | 5.0 | 0.5 U | 0.5 U | 0.5 U |
| **TCLP PESTICIDES** | | | | | | |
| CHLORDANE (TECHNICAL) | mg/L | 0.005 | 0.03 | 0.005 U | 0.005 U | 0.005 U |
| ENDRIN | mg/L | 0.0005 | 0.02 | 0.0005 U | 0.0005 U | 0.0005 U |
| GAMMA-BHC (LINDANE) | mg/L | 0.0005 | 0.4 | 0.0005 U | 0.0005 U | 0.0005 U |
| HEPTACHLOR | mg/L | 0.0005 | 0.008 | 0.0005 U | 0.0005 U | 0.0005 U |
| HEPTACHLOR EPOXIDE | mg/L | 0.0005 | 0.008 | 0.0005 U | 0.0005 U | 0.0005 U |
| METHOXYCHLOR | mg/L | 0.0005 | 10 | 0.0005 U | 0.0005 U | 0.0005 U |
| TOXAPHENE | mg/L | 0.04 | 0.5 | 0.04 U | 0.04 U | 0.04 U |
| **TCLP SVOC's** | | | | | | |
| 1,4-DICHLOROBENZENE | mg/L | 0.05 | 7.5 | 0.05 U | 0.05 U | 0.05 U |
| 2,4,5-TRICHLOROPHENOL | mg/L | 0.05 | 400 | 0.05 U | 0.05 U | 0.05 U |
| 2,4,6-TRICHLOROPHENOL | mg/L | 0.05 | 2.0 | 0.05 U | 0.05 U | 0.05 U |
| 2,4-DINITROTOLUENE | mg/L | 0.05 | 0.13 | 0.05 U | 0.05 U | 0.05 U |
| 2-METHYLPHENOL | mg/L | 0.05 | 200 | 0.05 U | 0.05 U | 0.05 U |
| HEXACHLOROBENZENE | mg/L | 0.05 | 0.13 | 0.05 U | 0.05 U | 0.05 U |
| HEXACHLOROBUTADIENE | mg/L | 0.05 | 0.5 | 0.05 U | 0.05 U | 0.05 U |
| HEXACHLOROETHANE | mg/L | 0.05 | 3.0 | 0.05 U | 0.05 U | 0.05 U |
| METHYLPHENOL, 3 & 4 | mg/L | 0.05 | 200 | 0.05 U | 0.05 U | 0.05 U |
| NITROBENZENE | mg/L | 0.05 | 2.0 | 0.05 U | 0.05 U | 0.05 U |
| PENTACHLOROPHENOL | mg/L | 0.25 | 100 | 0.25 U | 0.25 U | 0.25 U |
| PYRIDINE | mg/L | 0.10 | 5.0 | 0.1 U | 0.1 U | 0.1 U |
| **TCLP VOC's** | | | | | | |
| 1,1-DICHLOROETHENE | mg/L | 0.2 | 0.7 | 0.2 U | 0.2 U | 0.2 U |
| 1,2-DICHLOROETHANE | mg/L | 0.2 | 0.5 | 0.2 U | 0.2 U | 0.2 U |
| 2-BUTANONE (MEK) | mg/L | 0.2 | 200 | 0.2 U | 0.2 U | 0.2 U |
| BENZENE | mg/L | 0.2 | 0.5 | 0.2 U | 0.2 U | 0.2 U |
| CARBON TETRACHLORIDE | mg/L | 0.2 | 0.5 | 0.2 U | 0.2 U | 0.2 U |
| CHLOROBENZENE | mg/L | 0.2 | 100 | 0.2 U | 0.2 U | 0.2 U |
| CHLOROFORM | mg/L | 0.2 | 6.0 | 0.2 U | 0.2 U | 0.2 U |
| TETRACHLOROETHENE | mg/L | 0.2 | 0.7 | 0.2 U | 0.2 U | 0.2 U |
| TRICHLOROETHENE | mg/L | 0.2 | 0.5 | 0.2 U | 0.2 U | 0.2 U |
| VINYL CHLORIDE | mg/L | 0.2 | 0.2 | 0.2 U | 0.2 U | 0.2 U |

(a) **Source:** 40 CFR 261.24 (June 2018).

**Notes:** **Bold** values represent detected concentrations.
**RL** is reported for non-detected constituents.

**--** = No value available.

**RL =** Range of reporting limits.

**J** = Compound was detected, but below the reporting limit (value is estimated).

**U** = Compound was analyzed, but not detected.

**mg/L** = Milligram(s) per liter.

## TABLE 16. GENERAL CHEMISTRY CONCENTRATIONS IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES
### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | Average RL | USEPA Acute Criteria [(a)] | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| AMMONIA, DISTILLED | MG/L | 0.27 | 3.43 (b) | 0.1 U | 0.1 U | 0.1 U | **2.8** | 0.1 U | **0.18** |
| CHLORIDE | MG/L | 200 | -- | -- | **14000** | **14000** | **12000** | **14000** | **14000** |
| CYANIDE, TOTAL | UG/L | 10 | 1 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| FLUORIDE | MG/L | 2.00 | -- | -- | **0.82 J** | **0.82 J** | **0.52 J** | **0.71 J** | 2.5 U |
| NITRATE AS N | MG/L | 2.0 | -- | -- | 2.5 U | 2.5 U | 1 U | 2.5 U | 2.5 U |
| NITRATE NITRITE AS N | MG/L | 0.10 | -- | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| NITRITE AS N | MG/L | 1 | -- | -- | 1.3 U | 1.3 U | 0.5 U | 1.3 U | 1.3 U |
| NITROGEN, KJELDAHL | MG/L | 5.00 | -- | 5 U | **1.7 J** | **2.2 J** | **7.3** | **1.7 J** | **1.7 J** |
| PHOSPHORUS | MG/L | 0.1 | -- | 0.1 U | 0.1 U | 0.1 U | **0.1** | 0.1 U | 0.1 U |
| SULFIDE | MG/L | 3.0 | -- | 3 U | 3 U | 3 U | 3 U | 3 U | 3 U |
| TOTAL ORGANIC CARBON/DISSOLVED | MG/L | 1.00 | -- | **0.83 J** | **0.78 J** | **0.66 J** | **3.1** | **0.7 J** | **0.88 J** |

(a) *Source* : U.S. Environmental Protection Agency (USEPA). September 2020. National Recommended Water Quality Criteria for saltwater.

(b) Criterion was based on salinity of 26.3 ppt, water temperature of 25.8°C, and pH of 8.05 as measured at mid-depth at the DNODS

**Notes**: **Bold values** represent detected concentrations; **RL** is reported for non-detected constituents

**--** = no value available

**mg/L** = Milligram(s) per liter

**µg/L** = Microgram(s) per liter

**RL =** reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte was not detected but RL exceeds USEPA acute criterion.**

## TABLE 17. METALS CONCENTRATIONS (µg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | RL Range | USEPA Acute Criteria [(a)] | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| ALUMINUM | µg/L | 30-30 | -- | **50** | **290** | **160** | 30 U | 30 U | 30 U |
| ANTIMONY | µg/L | 2-2 | -- | 2 U | 2 U | 2 U | **0.69 J** | **0.92 J** | **2.3** |
| ARSENIC | µg/L | 1-1 | 69 | **2.3** | **2.7** | **2.7** | **6** | **1.9** | **1.9** |
| BARIUM | µg/L | 10-10 | -- | **18** | **19** | **18** | **33** | **26** | **27** |
| BERYLLIUM | µg/L | 1-1 | -- | 1 U | 1 U | 1 U | 1 U | **0.27 J** | 1 U |
| CADMIUM | µg/L | 1-1 | 33 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| CHROMIUM | µg/L | 2-2 | 1,100 | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| COBALT | µg/L | 0.5-0.5 | -- | 0.5 U | **0.21 J** | **0.15 J** | **0.53** | **2** | **1.9** |
| COPPER | µg/L | 2-2 | 4.8 | 2 U | **6.8** | **6** | 2 U | 2 U | **5.7** |
| IRON | µg/L | 50-50 | -- | **68** | **280** | **210** | **36 J** | 50 U | **120** |
| LEAD | µg/L | 1-1 | 140 | **0.2 J** | **0.49 J B** | **0.41 J B** | 1 U | 1 U | 1 U |
| MANGANESE | µg/L | 5-5 | -- | **4.6 J** | 100 U | 100 U | **130** | **21** | **84** |
| MERCURY | µg/L | 0.2-0.2 | 1.8 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| NICKEL | µg/L | 1-10 | 74 | **0.99 J** | **1.8** | **1.9** | **1.8** | **3.8** | **4.6** |
| SELENIUM | µg/L | 5-5 | 290 | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| SILVER | µg/L | 1-1 | 1.9 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| THALLIUM | µg/L | 1-1 | -- | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| TIN | µg/L | 5-5 | -- | 5 U | **0.96 J** | **1.1 J** | **1.3 J** | **2.8 J** | 5 U |
| VANADIUM | µg/L | 1-1 | -- | **2** | **2.5** | **2.2** | **5** | **2.2** | **1.4** |
| ZINC | µg/L | 5-5 | 90 | 5 U | 5 U | 5 U | 5 U | **4 J** | **3.9 J** |

(a) *Source* : U.S. Environmental Protection Agency (USEPA). September 2020. National Recommended Water Quality Criteria for saltwater.

(b) Laboratory reporting limit exceeds acute water quality criterion.

**Notes:** **Bold values** represent detected concentrations. Shaded concentrations exceed water quality criteria.

L is reported for non-detected constituents

**µg/L** = Microgram(s) per liter

**--** = no value available.

**R**

**RL =** reporting limit

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**Analyte concentration exceeds USEPA acute criterion.**

**TABLE 18. PCB CONGENER CONCENTRATIONS (ng/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|
| | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | RL Range | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| PCB 8 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | **0.57 J P** | 0.94 U | **0.68 J** | **0.67 J P** | 0.99 U |
| PCB 18 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 28 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 44 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | **0.54 J** | 0.96 U | 0.99 U |
| PCB 49 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 52 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 66 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 77 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 87 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 101 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 105 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 118 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 126 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 128 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 138 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 153 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 156 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 169 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 170 (BZ)* | ng/L | 0.94-0.99 | **0.32 J** | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 180 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 183 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 184 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 187 (BZ)* | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 195 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 206 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| PCB 209 (BZ) | ng/L | 0.94-0.99 | 0.94 U | 0.94 U | 0.94 U | 0.98 U | 0.96 U | 0.99 U |
| TOTAL PCBs (ND=0) | ng/L | -- | 1 | 1.14 | 0 | 2.44 | 1.34 | 0 |
| TOTAL PCBs (ND=1/2RL) | ng/L | -- | 16.62 | 17.12 | 16.92 | 18.12 | 17.66 | 17.8 |
| TOTAL PCBs (ND=RL) | ng/L | -- | 32.6 | 33.1 | 33.84 | 33.8 | 33.98 | 35.6 |

* PCB congeners used for Total PCB summation, as per Table 9-3 of the ITM (USEPA/USACE 1998)

There are no USEPA saltwater acute criteria for aquatic life for the tested PCB congeners.

**Notes**: **Bold values** represent detected concentrations;**RL** is reported for non-detected constituents

**--** = no value available.

**ng/L** = Nanogram(s) per liter

**RL =** reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 19. PAH CONCENTRATIONS (µg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|
| | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | RL Range | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| **LOW MOLECULAR WEIGHT PAHs (LPAHs)** | | | | | | | | |
| 1-METHYLNAPHTHALENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| 2-METHYLNAPHTHALENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| ACENAPHTHENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| ACENAPHTHYLENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| ANTHRACENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| FLUORENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| NAPHTHALENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| PHENANTHRENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | **0.058 J** | 0.18 U |
| TOTAL LPAHs (ND=0) | µg/L | -- | 0.0 | 0 | 0 | 0 | **0.058** | 0 |
| TOTAL LPAHs (ND=1/2RL) | µg/L | -- | 1 | 0.72 | 0.72 | 0.72 | **0.688** | 0.72 |
| TOTAL LPAHs (ND=RL) | µg/L | -- | 1 | 1.44 | 1.44 | 1.44 | **1.318** | 1.44 |
| **HIGH MOLECULAR WEIGHT PAHs (HPAHs)** | | | | | | | | |
| BENZO(A)ANTHRACENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| BENZO(A)PYRENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| BENZO(B)FLUORANTHENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| BENZO(GHI)PERYLENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| BENZO(K)FLUORANTHENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| CHRYSENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| DIBENZO(A,H)ANTHRACENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| FLUORANTHENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| INDENO(1,2,3-CD)PYRENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| PYRENE | µg/L | 0.18-0.18 | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| TOTAL HPAHs (ND=0) | µg/L | -- | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL HPAHs (ND=1/2RL) | µg/L | -- | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| TOTAL HPAHs (ND=RL) | µg/L | -- | 2 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| **TOTAL PAHs** | | | | | | | | |
| TOTAL PAHs (ND=0) | µg/L | -- | 0 | 0 | 0 | 0 | **0.058** | 0 |
| TOTAL PAHs (ND=1/2RL) | µg/L | -- | 2 | 1.62 | 1.62 | 1.62 | **1.59** | 1.62 |
| TOTAL PAHs (ND=RL) | µg/L | -- | 3 | 3.24 | 3.24 | 3.24 | **3.12** | 3.24 |

There are no USEPA saltwater acute criteria for aquatic life for the tested PAHs.

**Notes**: **Bold values** represent detected concentrations;**RL** is reported for non-detected constituents

**--** = no value available.

**ng/L** = Nanogram(s) per liter

**RL =** reporting limit

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 20. CHLORINATED AND ORGANOPHOSPHORUS PESTICIDE CONCENTRATIONS (µg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | RL Range | USEPA Acute Criteria [(a)] | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| 4,4'-DDD | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| 4,4'-DDE | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| 4,4'-DDT | µg/L | 0.0012-0.0013 | 0.13 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| **CHLORINATED PESTICIDES** | | | | | | | | | |
| ALDRIN | µg/L | 0.0012-0.0013 | 1.3 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ALPHA-BHC | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| BETA-BHC | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | **0.0011 J P** | **0.00093 J P** |
| CHLORDANE (TECHNICAL) | µg/L | 0.012-0.013 | 0.09 | 0.012 U | 0.012 U | 0.012 U | 0.013 U | 0.012 U | 0.012 U |
| CHLOROBENSIDE | µg/L | 0.003-0.0032 | -- | 0.003 U | 0.003 U | 0.003 U | 0.0032 U | 0.0031 U | 0.0032 U |
| DACHTAL | µg/L | 0.0024-0.0025 | -- | 0.0024 U | 0.0024 U | 0.0024 U | 0.0025 U | 0.0024 U | 0.0025 U |
| DELTA-BHC | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| DIELDRIN | µg/L | 0.0012-0.0013 | 0.71 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ENDOSULFAN I | µg/L | 0.0012-0.0013 | 0.034 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ENDOSULFAN II | µg/L | 0.0012-0.0013 | 0.034 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ENDOSULFAN SULFATE | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ENDRIN | µg/L | 0.0012-0.0013 | 0.037 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| ENDRIN ALDEHYDE | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| GAMMA-BHC | µg/L | 0.0012-0.0013 | 0.16 | **0.00034 J P** | 0.0012 U | **0.0005 J P** | 0.0013 U | 0.0013 U | 0.0013 U |
| HEPTACHLOR | µg/L | 0.0012-0.0013 | 0.053 | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| HEPTACHLOR EPOXIDE | µg/L | 0.0012-0.0013 | 0.053 | 0.0012 U | **0.00035 J P** | **0.00084 J** | 0.0013 U | 0.0013 U | 0.0013 U |
| METHOXYCHLOR | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| MIREX | µg/L | 0.0012-0.0013 | -- | 0.0012 U | 0.0012 U | 0.0012 U | 0.0013 U | 0.0013 U | 0.0013 U |
| TOXAPHENE | µg/L | 0.094-0.1 | 0.21 | 0.094 U | 0.094 U | 0.094 U | 0.1 U | 0.096 U | 0.099 U |
| **ORGANOPHOSPHORUS PESTICIDES** | | | | | | | | | |
| AZINPHOS-METHYL | µg/L | 0.94-1 | -- | 0.94 U | 0.95 U | 0.94 U | 1 U | 0.97 U | 0.96 U |
| DEMETON, TOTAL | µg/L | 1.9-2 | -- | 1.9 U | 1.9 U | 1.9 U | 2 U | 1.9 U | 1.9 U |
| MALATHION | µg/L | 0.94-1 | -- | 0.94 U | 0.95 U | 0.94 U | 1 U | 0.97 U | 0.96 U |
| METHYL PARATHION | µg/L | 0.94-1 | -- | 0.94 U | 0.95 U | 0.94 U | 1 U | 0.97 U | 0.96 U |
| PARATHION | µg/L | 0.94-1 | -- | 0.94 U | 0.95 U | 0.94 U | 1 U | 0.97 U | 0.96 U |

(a) *Source* : U.S. Environmental Protection Agency (USEPA). September 2020. National Recommended Water Quality Criteria for saltwater.

**Notes**: **Bold values** represent detected concentrations; **RL** is reported for non-detected constituents

**µg/L** = Microgram(s) per liter

**--** = no value available.

**RL =** Range of reporting limits

**J** = compound was detected, but below the reporting limit (value is estimated)

**P =** the percent difference between the original and confirmation analysis is greater than 40%

**U** = compound was analyzed, but not detected

**TABLE 21. DIOXIN AND FURAN CONGENER CONCENTRATIONS (pg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| **ANALYTE** | **UNITS** | **RL Range** | **TEF*** | **DNODS-WAT** | **CBBT-1/2-WAT** | **CBBT-3-WAT** | **CBBT-G-DU1-SET** | **CBBT-SC-DU2-SET** | **CBBT-LC-DU3-SET** |
| 2,3,7,8-TCDD | pg/L | 9.3-11 | 1 | 9.3 U | 9.4 U | 9.3 U | 11 U | 9.8 U | 10 U |
| 1,2,3,7,8-PECDD | pg/L | 47-53 | 1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,4,7,8-HXCDD | pg/L | 47-53 | 0.1 | 47 U | **1.7 J Q** | **0.98 J Q** | 53 U | 49 U | 50 U |
| 1,2,3,6,7,8-HXCDD | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,7,8,9-HXCDD | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,4,6,7,8-HPCDD | pg/L | 47-53 | 0.01 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| OCDD | pg/L | 93-110 | 0.0003 | **11 J B** | **4.4 J Q B** | **2.7 J B** | **3.5 J B** | **2.4 J B** | **13 J B** |
| 2,3,7,8-TCDF | pg/L | 9.3-11 | 0.1 | 9.3 U | 9.4 U | 9.3 U | 11 U | 9.8 U | 10 U |
| 1,2,3,7,8-PECDF | pg/L | 47-53 | 0.03 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 2,3,4,7,8-PECDF | pg/L | 47-53 | 0.3 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,4,7,8-HXCDF | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,6,7,8-HXCDF | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 2,3,4,6,7,8-HXCDF | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,7,8,9-HXCDF | pg/L | 47-53 | 0.1 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,4,6,7,8-HPCDF | pg/L | 47-53 | 0.01 | 47 U | **0.83 J Q** | 46 U | 53 U | 49 U | 50 U |
| 1,2,3,4,7,8,9-HPCDF | pg/L | 47-53 | 0.01 | 47 U | 47 U | 46 U | 53 U | 49 U | 50 U |
| OCDF | pg/L | 93-110 | 0.0003 | 93 U | **1.8 J Q B** | **0.89 J B** | 110 U | 98 U | 100 U |
| DIOXIN TEQ (ND=0) | pg/L | -- | -- | **0.003** | **0.000** | **0.001** | **0.00105** | **0.00072** | **0.0039** |
| DIOXIN TEQ (ND=1/2RL) | pg/L | -- | -- | **53.5** | **51.0** | **50.2** | **60.7** | **55.9** | **57.0** |
| DIOXIN TEQ (ND=RL) | pg/L | -- | -- | **107** | **102** | **100** | **121** | **112** | **114** |

***** *Source :* Van den Berg, M, et al. 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors Toxicological Sciences 93(2):223-241.

There are no USEPA saltwater acute criteria for aquatic life for the tested dioxins.

**Notes**; **Bold values** represent detected concentrations; **RL** is reported for non-detected constituents for Dioxins and Dioxin-Like Compounds.
**pg/L** = Picogram(s) per liter

**--** = no value available.

**RL =** Range of reporting limits

**B** = detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**Q** = estimated maximum possible concentration

**U** = compound was analyzed, but not detected

## TABLE 22. SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS (µg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES

### CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| ANALYTE | UNITS | RL Range | USEPA Acute Criteria[(a)] | DNODS-WAT | CBBT-1/2-WAT | CBBT-3-WAT | CBBT-G-DU1-SET | CBBT-SC-DU2-SET | CBBT-LC-DU3-SET |
| 1,2,4-TRICHLOROBENZENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 1,2-DICHLOROBENZENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 1,2-DIPHENYLHYDRAZINE (AS AZOBENZENE) | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 1,3-DICHLOROBENZENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 1,4-DICHLOROBENZENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2,2'-OXYBIS[1-CHLOROPROPANE] | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| 2,4,6-TRICHLOROPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2,4-DICHLOROPHENOL | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| 2,4-DIMETHYLPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2,4-DINITROPHENOL | µg/L | 9.3-9.6 | -- | 9.3 U | 9.6 U | 9.3 U | 9.3 U | 9.3 U | 9.3 U |
| 2,4-DINITROTOLUENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2,6-DINITROTOLUENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2-CHLORONAPHTHALENE | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| 2-CHLOROPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2-METHYLPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 2-NITROPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 3,3'-DICHLOROBENZIDINE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 4,6-DINITRO-2-METHYLPHENOL | µg/L | 4.6-4.8 | -- | 4.6 U | 4.8 U | 4.6 U | 4.6 U | 4.6 U | 4.6 U |
| 4-BROMOPHENYL PHENYL ETHER | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 4-CHLORO-3-METHYLPHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 4-CHLOROPHENYL PHENYL ETHER | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| 4-NITROPHENOL | µg/L | 4.6-4.8 | -- | 4.6 U | 4.8 U | 4.6 U | 4.6 U | 4.6 U | 4.6 U |
| BENZIDINE | µg/L | 19-19 | -- | 19 U | 19 U | 19 U | 19 U | 19 U | 19 U |
| BENZOIC ACID | µg/L | 4.6-4.8 | -- | 4.6 U | 4.8 U | 4.6 U | 4.6 U | 4.6 U | 4.6 U |
| BENZYL ALCOHOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| BIS(2-CHLOROETHOXY)METHANE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| BIS(2-CHLOROETHYL)ETHER | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| BIS(2-ETHYLHEXYL) PHTHALATE | µg/L | 9.3-9.6 | -- | **10.0** | 9.6 U | **8 J** | 9.3 U | 9.3 U | 9.3 U |
| BUTYL BENZYL PHTHALATE | µg/L | 0.93-0.96 | -- | **0.82 J** | **0.83 J** | **0.8 J** | **0.58 J** | **0.47 J** | **0.47 J** |
| DIBENZOFURAN | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| DIETHYL PHTHALATE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| DIMETHYL PHTHALATE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| DI-N-BUTYL PHTHALATE | µg/L | 0.93-0.96 | -- | 0.93 U | **0.74 J** | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| DI-N-OCTYL PHTHALATE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| HEXACHLOROBENZENE | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| HEXACHLOROBUTADIENE | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| HEXACHLOROCYCLOPENTADIENE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| HEXACHLOROETHANE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| ISOPHORONE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| METHYLPHENOL, 3 & 4 | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| NITROBENZENE | µg/L | 1.9-1.9 | -- | 1.9 U | 1.9 U | 1.9 U | 1.9 U | 1.9 U | 1.9 U |
| N-NITROSODIMETHYLAMINE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| N-NITROSODI-N-PROPYLAMINE | µg/L | 0.18-0.18 | -- | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U | 0.18 U |
| N-NITROSODIPHENYLAMINE | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |
| PENTACHLOROPHENOL | µg/L | 4.6-4.8 | 13 | 4.6 U | 4.8 U | 4.6 U | 4.6 U | 4.6 U | 4.6 U |
| PHENOL | µg/L | 0.93-0.96 | -- | 0.93 U | 0.96 U | 0.93 U | 0.93 U | 0.93 U | 0.93 U |

(a) *Source* : U.S. Environmental Protection Agency (USEPA). September 2020. National Recommended Water Quality Criteria for saltwater.

**Notes**: **Bold values** represent detected concentrations;**RL** is reported for non-detected constituents

**µg/L** = Microgram(s) per liter

**--** = no value available.

**RL =** Range of reporting limits

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 23. BUTYLTIN CONCENTRATIONS (µg/L) IN SITE WATER, RECEIVING WATER, AND STANDARD ELUTRIATES**
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (AUGUST-SEPTEMBER 2020)**

| | | | | Receiving Water | Site Water | | Dredging Units | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CBBT Cover | WID Trench | CBBT Cover Grabs | CBBT Cover Cores | WID Trench |
| **ANALYTE** | **UNITS** | **RL Range** | **USEPA Acute Criteria [(a)]** | **DNODS-WAT** | **CBBT-1/2-WAT** | **CBBT-3-WAT** | **CBBT-G-DU1-SET** | **CBBT-SC-DU2-SET** | **CBBT-LC-DU3-SET** |
| MONOBUTYLTIN | µg/L | 0.59-0.65 | -- | 0.59 U | 0.59 U | 0.59 U | 0.6 U | 0.62 U | 0.62 U |
| DIBUTYLTIN | µg/L | 0.037-0.041 | -- | 0.037 U | 0.037 U | 0.037 U | 0.038 U | 0.039 U | 0.039 U |
| TRIBUTYLTIN | µg/L | 0.043-0.047 | 0.42 | 0.043 U | 0.043 U | 0.043 U | 0.043 U | 0.045 U | 0.045 U |
| TETRABUTYLTIN | µg/L | 0.048-0.053 | -- | 0.047 U | 0.047 U | 0.047 U | 0.048 U | 0.05 U | 0.05 U |

(a) *Source* : U.S. Environmental Protection Agency (USEPA). September 2020. National Recommended Water Quality Criteria for saltwater.

**Notes**: **Bold values** represent detected concentrations; **RL** is reported for non-detected constituents

**µg/L** = Microgram(s) per liter

**--** = no value available.

**RL =** reporting limit

**B** = compound was detected in the laboratory method blank

**J** = compound was detected, but below the reporting limit (value is estimated)

**U** = compound was analyzed, but not detected

**TABLE 24. RESULTS OF WATER COLUMN BIOASSAYS WITH *Mytilus edulis***
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (OCTOBER 2020)**

| Sample Identification/ Dredging Unit | EA Accession Number | Test Number | 48-Hour Normal Embryo Development (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Site Water | Lab Control | Percent Elutriate | | | | 48-hour EC50 (% elutriate) |
| | | | | | 100% | 50% | 10% | 1% | |
| CBBT-G-DU1-COMP (CBBT Cover Grabs) | AT0-803 | TN-20-630 | 89 | 77 | 82 | 84 | 79 | >100 | |
| CBBT-SC-DU2-COMP (CBBT Cover Cores) | AT0-731 | TN-20-616 | 82 | 86 | 84 | 81 | 79 | 81 | >100 |
| CBBT-LC-DU3-COMP (WID Trench) | AT0-730 | TN-20-615 | 79 | 86 | 75 | 77 | 81 | 84 | >100 |

**TABLE 25. RESULTS OF WATER COLUMN BIOASSAYS WITH *Americamysis bahia***
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (SEPTEMBER 2020)**

| Sample Identification/ Dredging Unit | EA Accession Number | Test Number | 96-Hour Survival (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Site Water | Lab Control | Percent Elutriate | | | | 96-hour LC50 (% elutriate) |
| | | | | | 100% | 50% | 10% | 1% | |
| CBBT-G-DU1-COMP (CBBT Cover Grabs) | AT0-803 | TN-20-601 | --- | 100 | 100 | 98 | 98 | 100 | >100 |
| CBBT-SC-DU2-COMP (CBBT Cover Cores) | AT0-731 | TN-20-563 | --- | 100 | 98 | 98 | 98 | 94 | >100 |
| CBBT-LC-DU3-COMP (WID Trench) | AT0-730 | TN-20-562 | --- | 92 | 94 | 90 | 98 | 94 | >100 |
| CBBT-1/2-WAT | AT0-775 | TN-20-577 | 100 | --- | --- | --- | --- | --- | >100 |
| CBBT-3-WAT | AT0-776 | TN-20-577 | 98 | --- | --- | --- | --- | --- | >100 |

**TABLE 26. RESULTS OF WATER COLUMN BIOASSAYS WITH *Menidia beryllina***
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (SEPTEMBER 2020)**

| Sample Identification/ Dredging Unit | EA Accession Number | Test Number | 96-Hour Survival (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Site Water[(a)] | Lab Control | Percent Elutriate | | | | 96-hour LC50 (% elutriate) |
| | | | | | 100% | 50% | 10% | 1% | |
| CBBT-G-DU1-COMP (CBBT Cover Grabs) | AT0-803 | TN-20-602 | --- | 98 | 100 | 100 | 96 | 98 | >100 |
| CBBT-SC-DU2-COMP (CBBT Cover Cores) | AT0-731 | TN-20-537 | --- | 100 | 98 | 100 | 90 | 98 | >100 |
| CBBT-LC-DU3-COMP (WID Trench) | AT0-730 | TN-20-536 | --- | 96 | 96 | 100 | 100 | 94 | >100 |
| CBBT-1/2-WAT (Site Water) | AT0-775 | TN-20-555 | 94 | --- | --- | --- | --- | --- | >100 |
| CBBT-3-WAT (Site Water) | AT0-776 | TN-20-555 | 92 | --- | --- | --- | --- | --- | >100 |

**TABLE 27. RESULTS OF 10-DAY WHOLE SEDIMENT BIOASSAYS WITH *Ampelisca abdita* AND *Leptocheirus plumulosus***
**CHESAPEAKE BAY BRIDGE TUNNEL COVER AND WID TRENCH (OCTOBER 2020)**

| | | *Ampelisca abdita* | | *Leptocheirus plumulosus* | |
|---|---|---|---|---|---|
| **Sample Identification/ Dredging Unit** | **EA Accession Number** | **No. Alive/No. Exposed** | **10-Day Mean Percent Survival[(b)]** | **No. Alive/No. Exposed** | **10-Day Mean Percent Survival[(b)]** |
| CBBT-G-DU1-COMP (CBBT Cover Grabs) | AT0-803 | 93 / 100 | 93 | 92 / 100 | 92 |
| CBBT-SC-DU2-COMP (CBBT Cover Cores) | AT0-731 | 91 / 100 | 91(a) | 93 / 100 | 93 |
| CBBT-LC-DU3-COMP (WID Trench) | AT0-730 | 93 / 100 | 93 | 92 / 100 | 92 |
| | | | | | |
| WBREF-SURF-SED | AT0-745 | 95 / 100 | 95 | 91 / 100 | 91(a) |
| WBREF-SUB-SED | AT0-780 | 91 / 100 | 91(a) | 90 / 100 | 90 |
| OCREF-SED | AT0-781 | 90 / 100 | 90(a) | 96 / 100 | 96 |
| | | | | | |
| LABORATORY CONTROL | AT0-593 | 95 / 100 | 95 | 96 / 100 | 96 |
| CBCON-SED | AT0-783 | 91 / 100 | 91(a) | 95 / 100 | 95 |

(a) Statistically different than Laboratory Control (p=0.05), difference is not >20 percent difference criteria for amphipods.
(b) No statistical differences between site sediments and any of the reference sediments.