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MARYLAND GEOLOGICAL SURVEY  
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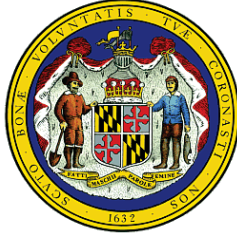
**COASTAL AND ENVIRONMENTAL GEOLOGY**  
**FILE REPORT NO. 17-13**

Conowingo Pond Dredging Secondary Site A Project:  
Coring Methodology and Results

By

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## **Executive Summary**

The Maryland Geological Survey (MGS) was asked to collect an additional twelve cores in a 600-foot by 600-foot square (8.26 acres) within Maryland's limits of the Susquehanna River, above Conowingo Dam, after determining the original 475-foot by 475-foot square (5.12 acres) was unsuitable for dredging.

Sediment cores were collected, extruded, homogenized, sampled, and sent to laboratories for testing and physical and chemical analysis.

The cores were collected in September 2017. They ranged in thickness from 49 cm (1.6 ft) to 96 cm (3.1 ft). In order for an adequate amount of sediment to be collected for chemical analysis, two cores were collected at each of the twelve sites, for a total of 24 cores, ensuring enough volume of sample would be collected at each site.

Sediment samples were collected from the cores so that these sediments could be characterized via a broad suite of physical, chemical and nutrient analyses. These analyses correspond to those listed in Appendix A2 (Tables 1, 2 and 3) of the *Innovative Reuse and Beneficial Use Dredged Material Draft Guidance Document* prepared by Maryland Department of the Environment (MDE) in March 2017.

## **Methodology**

### **Core Collection**

Due to unforeseen circumstances, the original pilot study location was determined to be unsuitable to dredge for sediment reuse purposes (Figure 1). Therefore sediments were collected from an alternative location; Secondary Site A, the results of which are detailed in this report. Utilizing the location of the test cores taken during the initial pilot study, MGS collected cores from a 600-by-600 foot square within the State of Maryland, where the depth of the water is no less than 10 feet and where the sediment is sandy in texture. Utilizing bathymetry and side-scan sonar data previously collected in October 2014 by MGS for the Conowingo Pond, MGS located areas of interest that would be more suitable for sampling.

Bathymetry, side-scan sonar data and evaluation of earlier test cores were used during the planning and placement of the Secondary Site A (Figure 2). These locations are in agreement with those provided in the *Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Project - Sampling Recommendations* memo provided from Anchor QEA to MES and MGS dated September 20, 2017.

# Conowingo Pond Secondary Site A Coring

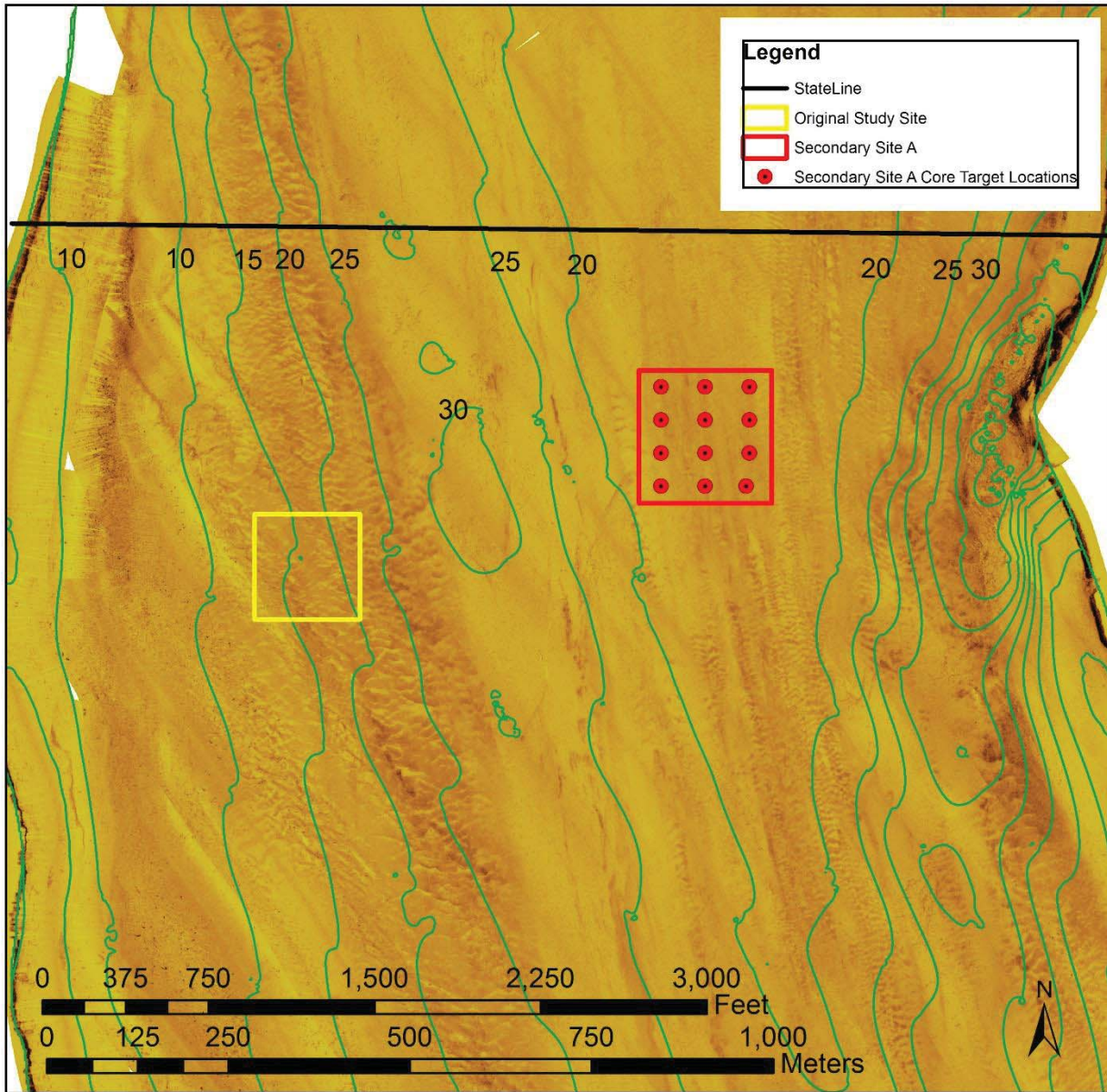


Figure 1. Conowingo Pond 475-foot pilot project study box (yellow) and the secondary study site box (red) with core locations. Imagery from 2014 side-scan sonar data with bathymetric contours labeled in feet.

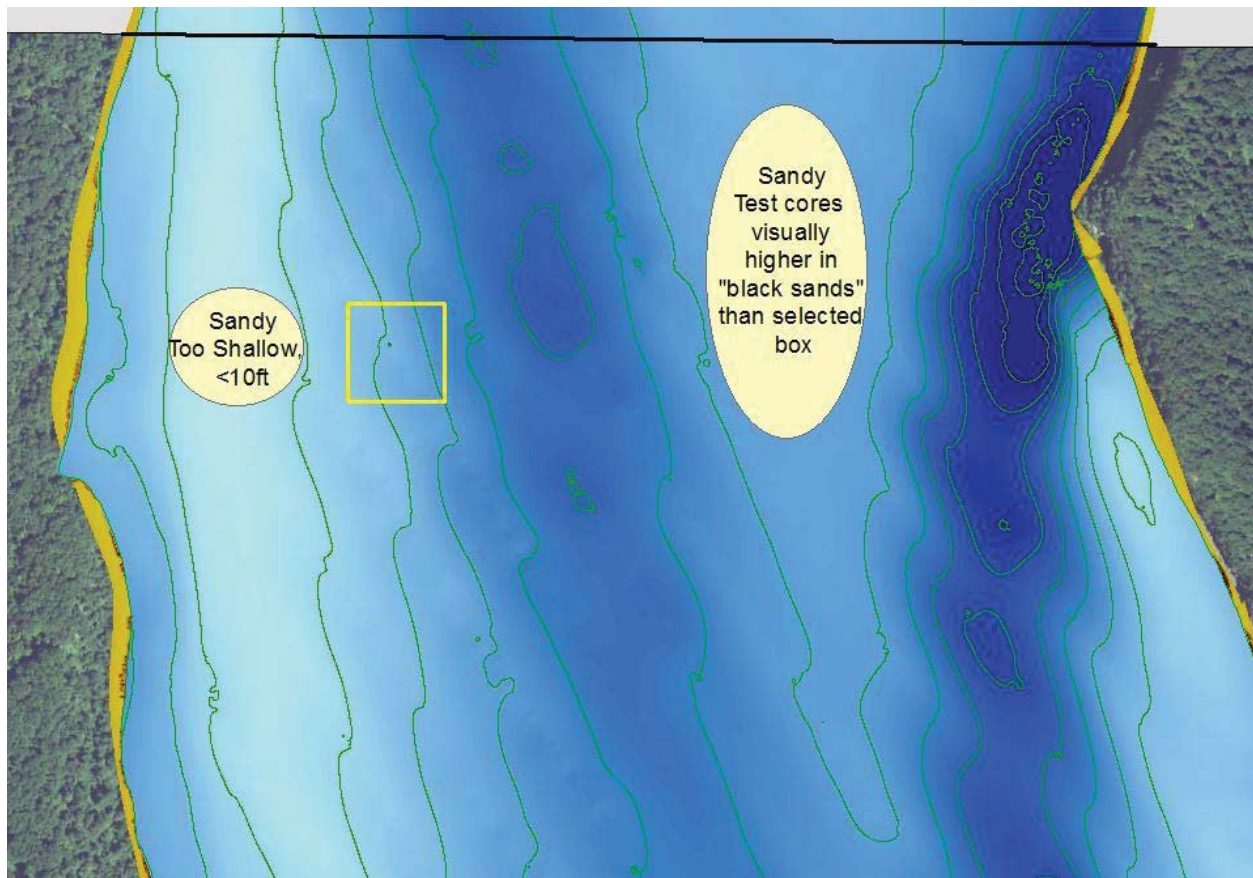


Figure 2. Summary of knowledge gained during test core collection. The yellow box indicates the original study site. The black line denotes the Maryland-Pennsylvania border.

Grain-size and visual observations gained by advancing test cores aided in preparation with selecting Secondary Site A. Using the test core sites and the Side Scan Sonar imagery, a 600-by-600 foot box was placed in a location that showed to have a high sand content relative to finer sediments accumulated in areas with greater water depth. Once an appropriate area was determined (Figure 3), coordinates for the corners of the square were noted and each of the twelve site locations for the cores were calculated based on equal spaced intervals within the square box (Figure 4). Coordinates for the corners and each of the collected cores were calculated with ArcGIS. The projected coordinate system is UTM-NAD 83 Zone 18 in meters. Target locations were input into the Carlson SurvPC software to get all cores spaced out evenly over the study box (Figure 4). The outer core locations were placed about 100 feet inside of the study box extents. Due to sample volume concerns for lab analysis, two cores were collected at each site which were differentiated by 'A' and 'B' after the core number. Separate coordinates were recorded for both 'A' and 'B' cores, as close to the target locations as possible.

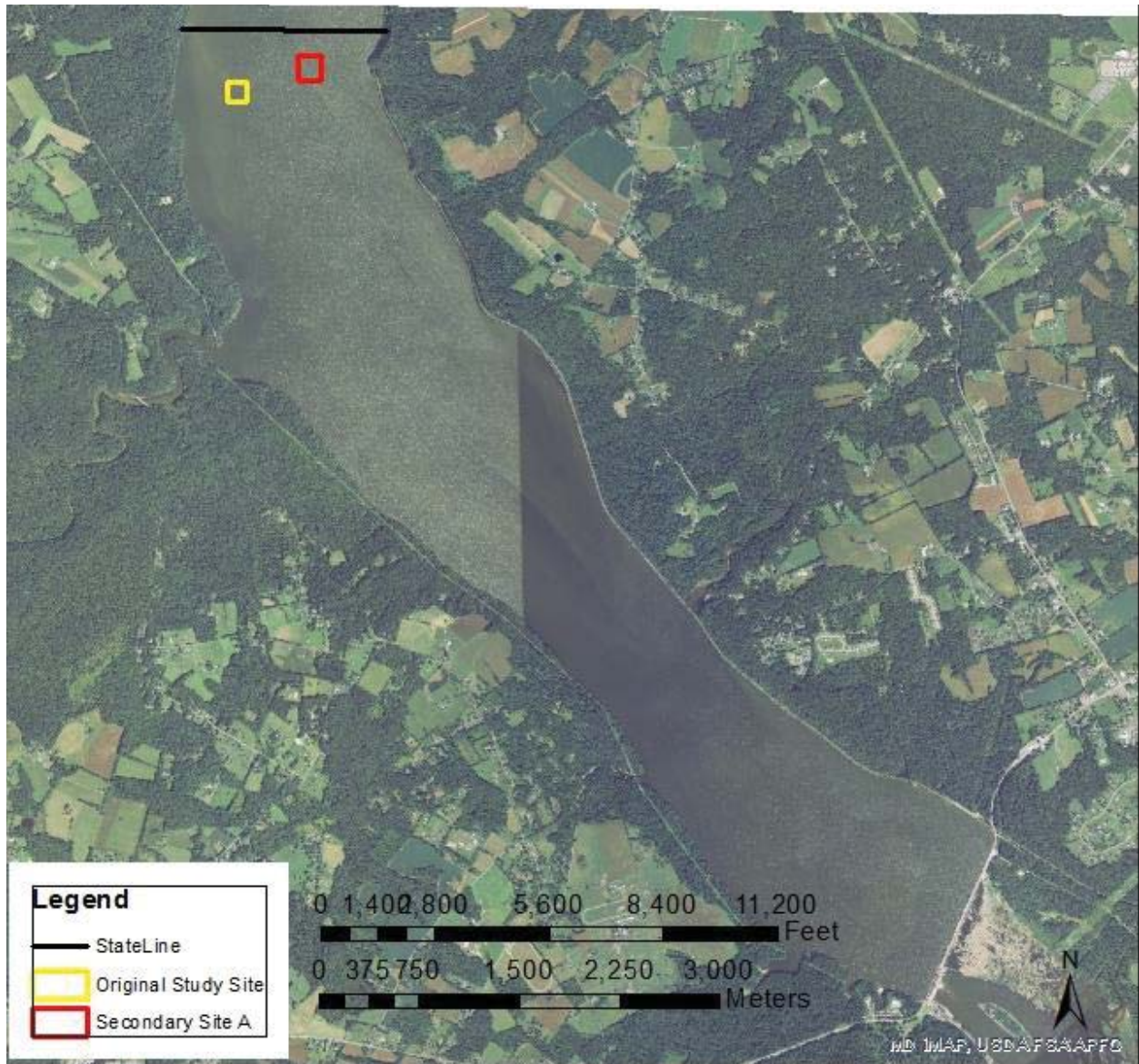


Figure 3. Maryland's portion of the Susquehanna River, above Conowingo Dam. The yellow box outlines the area of the original study site. The red box illustrates the 600-foot square box used for Secondary Site A.

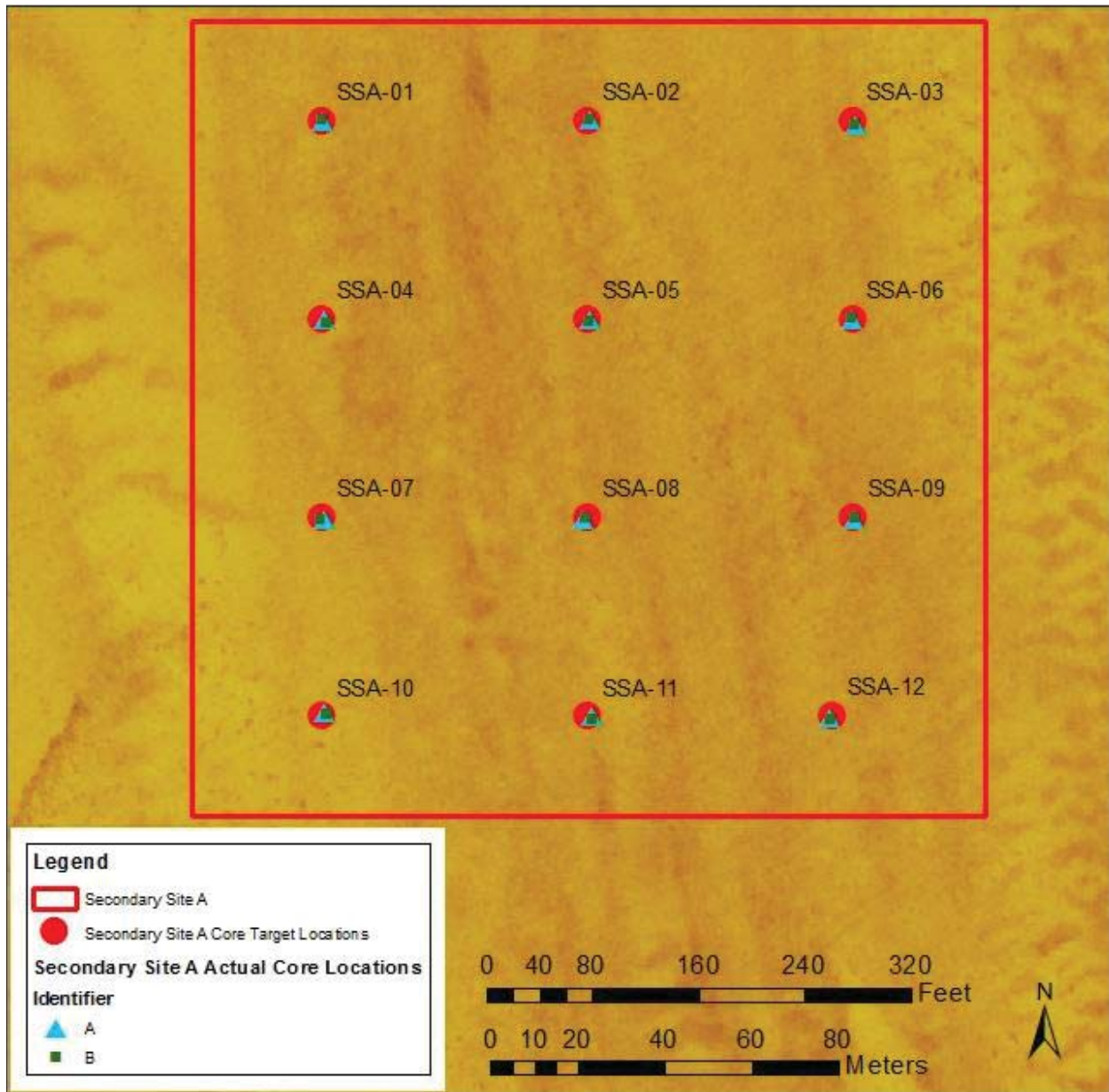


Figure 4. Target core locations mapped within the secondary study box, with 'A' and 'B' variations for each core site mapped at their extraction location. Background is 2014 side-scan imagery.

Sediment cores were collected in cellulose acetate butyrate (CAB) liners with a Benthos gravity corer with 60 kg (132 lbs) of lead weights to collect as much core as possible. Using the gravity corer system, the recovery thickness is determined by the coarseness and density of the accumulated sediments. Coarser, denser, sandy sediments limit the recovery thickness due to the internal friction within the core tube. The coarser surficial sediments are denoted in the side scan imagery as darker shades of yellow/brown (higher acoustic reflectivity) and finer surficial sediments are denoted as brighter shades of yellow (lower acoustic reflectivity) (Figures 1 and 4). The side scan imagery shows the surficial sediment characteristics at the time of acoustic data collection in October 2014. The accumulation 8-12 cm of finer silty sediments on the surface of all cores is indicative of a lower energy depositional environment during the period leading up to the coring dates. This can also be seen in the many alternating episodic layers

throughout all cores whereas the fines are winnowed out and coarser sands deposited during high flow events versus the deposition of fines during low flow periods (Appendix A). The secondary site study box was placed on a relatively flat, predominately sandy bar deposit that extends beyond the box to the south towards the dam. In addition to core locations, water depth below the vessel transducer was also recorded (Table 1). The transducer was approximately 1 foot below the water surface. Cores were capped onsite and stored on ice to be transported to the laboratory.

Table 1. Target coordinates for each core.

Core ID	Target Northing (UTM)	Target Easting (UTM)
SSA Core 1	4397325.2	394453.1
SSA Core 2	4397325.2	394514.1
SSA Core 3	4397325.2	394575.0
SSA Core 4	4397279.5	394453.1
SSA Core 5	4397279.5	394514.1
SSA Core 6	4397279.5	394575.0
SSA Core 7	4397233.8	394453.1
SSA Core 8	4397233.8	394511.0
SSA Core 9	4397233.8	394575.0
SSA Core 10	4397188.1	394453.1
SSA Core 11	4397188.1	394514.1
SSA Core 12	4397188.2	394570.5

Table 2. Actual collection coordinates for each core. Water depth is depth below transducer. Time is in DST.

Core ID	Actual Northing (UTM)	Actual Easting (UTM)	Water Depth (ft)	Collection Date	Collection Time
SSA Core 1A	4397324.9	394453.1	15	9/25/17	11:19 AM
SSA Core 1B	4397325.3	394452.6			11:42 AM
SSA Core 2A	4397325.4	394514.3	15	9/25/17	11:51 AM
SSA Core 2B	4397325.3	394514.3			12:15 AM
SSA Core 3A	4397324.3	394575.4	15	9/25/17	12:45 PM
SSA Core 3B	4397324.2	394575.2			12:43 PM
SSA Core 4A	4397279.3	394453.3	16.5	9/25/17	2:49 PM
SSA Core 4B	4397278.7	394453.9			3:03 PM
SSA Core 5A	4397279.5	394514.5	15.5	9/25/17	1:31 PM
SSA Core 5B	4397279.2	394514.1			1:42 PM
SSA Core 6A	4397279.5	394574.9	15.8	9/25/17	1:02 PM
SSA Core 6B	4397279.6	394574.4			1:08 PM
SSA Core 7A	4397233.6	394453.5	16.6	9/25/17	3:18 PM
SSA Core 7B	4397233.2	394452.3			3:33 PM
SSA Core 8A	4397233.3	394512.9	16.5	9/25/17	3:44 PM
SSA Core 8B	4397233.7	394513.2			3:57 PM
SSA Core 9A	4397233.5	394575.2	16.8	9/25/17	4:20 PM
SSA Core 9B	4397233.9	394575.1			4:29 PM
SSA Core 10A	4397189.0	394453.5	16	9/26/17	8:44 AM
SSA Core 10B	4397188.7	394453.9			8:59 AM
SSA Core 11A	4397188.1	394514.9	15.8	9/26/17	9:07 AM
SSA Core 11B	4397187.4	394514.7			9:15 AM
SSA Core 12A	4397187.6	394569.5	16.1	9/26/17	10:45 AM
SSA Core 12B	4397187.4	394569.6			11:30 AM



## Core Processing Methodology

Cores were taken back to the laboratory and placed in a refrigerator at 4°C until they were opened. One site at a time, the longer of the two cores was removed from the fridge, cut open using a circular saw and laid on the lab bench. If necessary for sampling volume for the shorter cores (Cores 2, 5 and 8), the second of the two cores was also opened and the two cores laid side by side for processing. Pictures and sediment description logs were recorded to document pertinent observations regarding each core (Appendix A).

The longer of the two cores were placed on the lab bench to be sampled, while both 'A' and 'B' cores for Cores 2, 5 and 8 were placed next to each other to be sampled due to their shorter length. For Secondary Site A, Maryland Environmental Service and Maryland Department of the Environment chose to have MGS composite sample each of the cores over its length, and for Cores 2, 5, and 8, to composite sample the pair. The core sediments were homogenized, representatively sampled and placed into labeled glass jars.

Prior to sampling processes, the performance of a screening tool photo-ionization detector (PID) was evaluated via a bump-test. The PID detected 103.6 ppmv (parts per million by volume) in a 100 ppmv isobutylene standard gas, and detected 25% of the lower explosive limit (LEL) in a 25% LEL standard gas, indicating satisfactory performance. PID screening values ranged from 0.0 to 1.7 parts ppmv, only trace amounts, and no strong odors were observed. The sample for volatiles analysis was collected prior to homogenization from the approximate mid-point of length using a Terracore sampler and placed into vials with deionized (DI) water and/or methanol (MeOH) preservation. All remaining analytical samples were collected from a composite of the entire 30-36" length of the core. Composites were obtained by collecting sample mass distributed representatively from the entire 30-36" length of recovered core and homogenizing. Sample mass was placed into pre-labelled containers using clean, dedicated plastic scoops. Samples for acid volatile sulfide/simultaneously extracted materials (AVS/SEM) and total petroleum hydrocarbons – gasoline range organics (TPH-GRO) were sampled as completely filled containers with zero head space in accordance with the preservation requirements of their respective methods.

A broad suite of various geotechnical, environmental and agricultural analyses were performed on the sediment samples. An index file listing which sediment samples were submitted for which analysis is provided in Table 3.

In broadest overview, most samples were submitted for every analysis.

Additional specifics regarding the samples selected to complete the scope of work are as follows:

- Four out of 12 sediment samples (*i.e.* 33%) were analyzed for Dioxins. Dioxins were analyzed for in the sediments collected from Cores 3, 4, 9 and 11.
- Two out of 12 sediment samples (*i.e.* 16%) were analyzed for Volatiles. Volatiles were analyzed for in the sediments collected from Cores 4 and 11.
- All sediment samples were submitted as "extract and hold" for Toxicity Characteristic Leaching Potential Analysis (TCLP) in order to facilitate later selection of full list analysis on a subset of these samples. Following receipt and evaluation of the total concentrations data and spatial coverage, a subset of three samples were then chosen for full TCLP. These were Cores 3, 5 and 9.
- In exception, all sediment samples were analyzed for TCLP volatiles since no extract and hold option is feasible for this analysis.
- All remaining samples were submitted for all remaining analyses.

Sediment samples were shipped overnight air to TestAmerica (Pittsburgh PA) where they were received at proper temperature the following morning. Some analyses were performed at sister TestAmerica facilities (*e.g.* TestAmerica Burlington VT, Edison NJ, Knoxville TN and Canton OH). Sediment samples for agricultural analyses were sent to Agro Lab (Harrington DE) via coordination with MES.

Analytical results from the sediment samples are provided in table form (Appendix B). Analytical results are grouped by compound class and are divided into fifteen tables.




# Appendix A

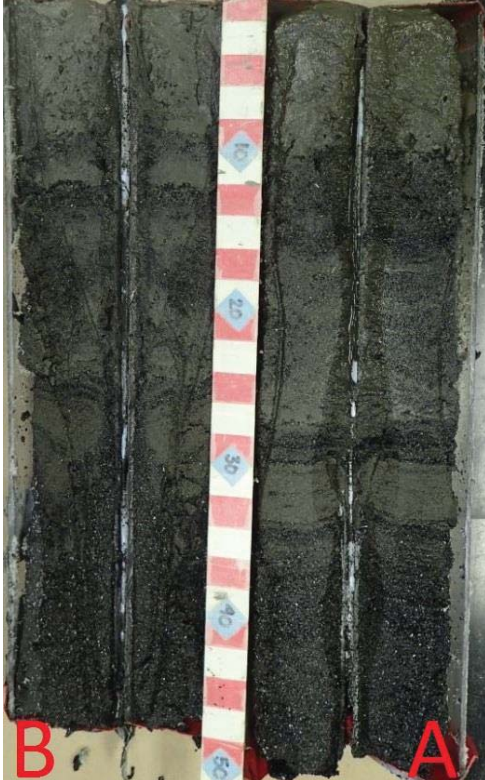
Core Logs

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Conowingo SSA Core #1A                      Total length of A – 89 cm  
 Water Depth – 15 ft  
 Date collected – 9/25/17, Date opened – 9/27/17, PID = 1.3 ppmv

Photograph	Interval (cm)	Description
	0-8	5Y 4/1 Olive Gray, soft, soupy, watery mud
	8-13	Firm, gritty, silty black sand
	13-23	5Y 4/1 Olive Gray, soft, soupy, watery silty mud
	23-28	Firmer than above section, silty sand
	28-36	5Y 4/1 Olive Gray, soft, soupy, watery, silty mud
	36-42	Firm, silty sand
	42-50	5Y 4/1 Olive Gray, soft, silty mud
	50-76	Very firm, laminated, slightly silty black sand (suspected coal)
76-89	Very firm, slightly silty, fine sand with a lower black sand percentage than above section	

Conowingo SSA Core #2A      Total length of A – 51 cm      Total length of B – 47 cm  
 Water Depth – 15 ft  
 Date collected – 9/25/17, Date opened – 9/28/17, PID = 1.3 ppmv


Photograph	Interval (cm)	Description
 <p>The photograph shows two vertical sections of sediment core, labeled 'A' and 'B' in red at the bottom. A central depth scale with red and white horizontal stripes and blue diamond-shaped markers is visible. The markers are labeled with numbers: 25, 30, 35, 40, and 45. The sediment is dark grey to black. Section A is on the right and section B is on the left.</p>	0-8	Soft, soupy silty mud
	8-34	Soft, muddy fine sand with 2cm thick laminations of black sand; firmer with depth starting at 26cm; less silty and more sandy with depth
	34-51	Medium to coarse grained black, angular, shiny sand (suspected coal)

Conowingo SSA Core #3A                      Total length of A – 83.5 cm  
 Water Depth – 15.0 ft  
 Date collected – 9/25/17, Date opened – 9/27/17, PID = 1.7 ppmv

Photograph	Interval (cm)	Description
	0-8	5Y 4/1 Olive Gray, soft, not gritty, silty mud
	8-20	Firm, silty, muddy sand; laminations of black (N1-N2) sand (suspected coal) between 12-14cm
	20-24	Soft, silty mud
	24-38	Gritty, silty, muddy sand
	38-40	Silty, muddy, firm sand (suspected coal)
	40-50	5Y 4/1 Olive Gray, soft, silty, not gritty mud
	50-58	Mostly coarse, firm black (N1-N2) sand (suspected coal)
	58-74	Gritty, silty, muddy, sand (suspected coal- less abundant)
	74-83.5	Firm, gritty, coarse black (N1-N2) sand (suspected coal)




Conowingo SSA Core #4A                      Total length of A – 85 cm  
 Water Depth – 16.5 ft  
 Date collected – 9/25/17, Date opened – 9/27/17, PID = 1.1 ppmv


Photograph	Interval (cm)	Description
	0-10	5Y 4/1 Olive Gray, soft, soupy, not gritty, silty mud
	10-12	Firm, coarse angular grained black sand
	12-18	Smooth, soft, watery, jiggly, silty mud
	18-25	Some black angular sand, increasing with depth; sandier, firmer, gritty, sandy mud with depth; gradational contact
	25-48	Silty, muddy sand
	48-52	< 2cm thick alternating laminations of 5Y 4/1 Olive Gray fine sand and coarse, angular, black sand (suspected coal)
	52-58	Weakly laminated, firm, mostly coarse black sand
	58-62	Finely laminated 5Y 4/1 Olive Gray sand and black sand
	62-72	Coarse, angular, black sand (suspected coal)
	72-74	5Y 4/1 Olive Gray, firm, fine sand
	74-85	Firm, weakly laminated sands (black sands)

Conowingo SSA Core #5A      Total length of A – 49 cm      Total length of B – 37 cm Water Depth – 15.8 ft Date collected – 9/25/17, Date opened – 9/28/17, PID = 1.3 ppmv		
Photograph	Interval (cm)	Description
	0-8	Soft, soupy, silty mud
	8-12	Slightly firm, medium black, coarse, angular sand with 5Y 4/1 Olive Gray mixed
	12-14	Medium black angular sand
	14-18	Mix of some black angular sand with 5Y 4/1 Olive Gray silt; medium firm
	18-24	Alternating laminations of 5Y 4/1 Olive Gray silt and black sand
	24-32	Medium black (N1-N2), angular sand (suspected coal)
	32-49	5Y 4/1 Olive Gray, fine quartz sand

Conowingo SSA Core #6A                      Total length of A – 94 cm  
 Water Depth – 15.8 ft  
 Date collected – 9/25/17, Date opened – 9/27/17

Photograph	Interval (cm)	Description
	0-8	5Y 4/1 Olive Gray, medium firm silty mud
	8-18	Medium firm muddy sand; ½cm thick band of coarse black angular sand at 18cm
	18-26	Soft, muddy sand with gas pockets. No odor.
	26-30	Softer than above layer, silty muddy sand
	30-32	Sandier than above; medium firm, fine silty sand
	32-42	Soft, smooth, silty mud with gas pockets; finer with depth
	42-94	Alternating laminations of fine 5Y 4/1 Olive Gray sand and black (N1-N2) coarse angular sand (suspected coal); laminations up to 1cm in thickness and grading to a majority of black angular sand at depth

Conowingo SSA Core #7A                      Total length of A – 93 cm  
 Water Depth – 16.6 ft  
 Date collected – 9/25/17, Date opened – 9/27/17, PID = 1.7 ppmv

Photograph	Interval (cm)	Description
	0-12	5Y 4/1 Olive Gray, soft, soupy, watery silty mud with a clam at 6cm
	12-14	Soft, fine sand, some black (N2) sand with silty mud
	14-26	5Y 4/1 Olive Gray, soft, soupy, silty mud
	26-32	Medium firm, medium black (N2) sand
	32-46	5Y 4/1 Olive Gray, soft, soupy, watery mud
	46-52	Medium firm, fine-medium grained black sand
	52-60	Soft, soupy, watery mud
	60-76	Many alternating laminations of coarse, angular black sand (suspected coal) and fine quartz sand
	76-93	Coarse black, angular sand (suspected coal)


Conowingo SSA Core #8

Total length of A – 56 cm


Total length of B – 56 cm

Water Depth – 16.5 ft


Date collected – 9/25/17, Date opened – 9/28/17

Photograph	Interval (cm)	Description
 The photograph shows two vertical sections of sediment core, labeled 'B' on the left and 'A' on the right. A central depth scale is visible, marked in centimeters from 0 to 50. The sediment is dark gray to black, with visible horizontal laminations. The texture appears soft and silty in the upper sections, becoming more firm and sandy in the lower sections. A thick banding of black sand is visible between 42 and 46 cm depth. <p data-bbox="224 1402 277 1480"><b>B</b></p> <p data-bbox="722 1402 776 1480"><b>A</b></p>	0-8	5Y 4/1 Olive Gray, soft, soupy, watery, silty mud
	8-15	Black (N1) slightly silty, slightly firm black sand (suspected coal)
	15-22	5Y 4/1 Olive Gray, very fine, silty sand
	22-27	Very firm, fine to medium grained black sands (suspected coal)
	27-30	5Y 4/1 Olive Gray, very fine, silty sand
	30-56	Very firm, fine, very silty sand with many alternating laminations of coal and quartz sands with a thick banding of black sand (suspected coal) from 42-46cm


Conowingo SSA Core #9B                      Total length of B – 96 cm  
 Water Depth – 16.8 ft  
 Date collected – 9/25/17, Date opened – 9/27/17, PID = 1.3 ppmv

Photograph	Interval (cm)	Description
	0-16	5Y 4/1 Olive Gray, soft, soupy, watery mud
	16-28	Medium grained, angular, black sand (suspected coal) with some silty mud; two lamina of medium black angular sand from 36-38cm
	38-42	Soft, soupy, silty mud with gas pockets
	42-48	Fine to medium grained sand
	48-64	Alternating laminations of 5Y 4/1 Olive Gray, fine to medium grained sand with coarse, angular, black sand (suspected coal), which is increasing with depth
	64-73	Coarse, angular, black, shiny sand (suspected coal)
	73-96	5Y 4/1 Olive Gray, very firm, fine silty quartz sand

Conowingo SSA Core #10A      Total length of A – 91.5 cm  
 Water Depth – 16 ft  
 Date collected – 9/26/17, Date opened – 9/27/17, PID = 0.7 ppmv


Photograph	Interval (cm)	Description
	0-10	5Y 4/1 Olive Gray, soft, soupy, sandy mud
	10-18	Silty mud coarsening with depth from fine grained to coarse grained with angular sand at bottom
	18-28	Soft, soupy, watery mud
	28-34	Firm, fine to medium grained quartz sand and black, angular sand
	34-42	5Y 4/1 Olive Gray, soft, silty, watery mud with gas pockets
	42-50	Fine to medium grained sand
	50-52	Medium to coarse grained, black, angular sand (suspected coal)
	52-58	Soft, soupy, watery, silty mud
	58-74	Alternating laminations of angular, black, coarse sand (suspected coal) and fine quartz sand (thickness of 1-2cm)
	74-90	Angular, black sand fragments (suspected coal)
90-91.5	Firm, fine to medium quartz sand	

Conowingo SSA Core #11A      Total length of B – 96 cm  
 Water Depth – 15.8 ft  
 Date collected – 9/26/17, Date opened – 9/27/17, PID = 0.7 ppmv

Photograph	Interval (cm)	Description
	0-8	Soft, soupy, watery, silty mud
	8-18	Medium to coarse sand with many angular, black grains (suspected coal)
	18-30	Soft to firmer muddy sand with fine to medium, black, angular sand grains
	30-34	Abundant black angular sand (suspected coal)
	34-52	Fine sand with many thin laminations of medium grained, coarse, angular sand with 5Y 4/1 Olive Gray, fine grained silty quartz sand
	52-60	Firm, not gritty silty mud with gas pockets
	60-68	Firm, medium to coarse grained, black, angular sand (suspected coal)
	68-76	Quartz sand and black sand mixture
	76-92.5	Medium to fine grained gravel, angular, black sand (suspected coal)
	92.5-96	5Y 4/1 Olive Gray, firm, fine sand



Conowingo SSA Core #12A      Total length of A – 88 cm  
 Water Depth – 16.1 ft  
 Date collected – 9/26/17, Date opened – 9/27/17, PID = 0.6 ppmv

Photograph	Interval (cm)	Description
	0-10	5Y 4/1 Olive Gray, very soft, soupy, watery, silty mud
	10-28	Medium firm, medium black, angular sand with silt mixed
	28-32	Black (N1-N2) angular sand (suspected coal)
	32-38	Very soft, watery, silty mud with trace sand
	38-46	Soft, silty sand
	46-60	5Y 4/1 Olive Gray, silty mud
	60-62	5Y 4/1 Olive Gray, soft, fine, silty sand
	62-72	Angular, coarse, black, shiny sand (suspected coal); no laminations
	72-84	5Y 4/1 Olive Gray, firm, fine to medium sand with angular, black sand
	84-88	Fine to medium sand

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# Appendix B

Core Physical and Chemical Characterization Results

Conowingo SSA Sediments September 2017		Physical / Geotech														
		ASTM: 422 Grain Size (%)							ASTM: 854 Specific Gravity	ASTM: 2216 Percent Moisture	ASTM: 4318 Atterberg Limits			ASTM: 2487 Unified Soil Classification System (USCS)		ASTM: 2937 In Place Density
		clay	silt	f sand	m sand	c sand	all sand	gravel	%		LL	PL	PI	Name	Symbol	g/cc
CONOWINGO SSA-1	9/27/2017	5	11.1	66	17.7	0.2	83.9	0	2.14	43	0	0	NP	SI-SAND	SM	1.01
CONOWINGO SSA-2	9/28/2017	5.2	10.8	62.2	20.4	0.2	82.8	1.3	2.17	33.2	0	0	NP	SI-SAND	SM	1.12
CONOWINGO SSA-3	9/27/2017	5	10.5	65.5	18.6	0.5	84.6	0	2.29	41.7	0	0	NP	SI-SAND	SM	1.14
CONOWINGO SSA-4	9/27/2017	6.5	19.2	57.5	16.6	0.2	74.3	0	2.27	47.6	0	0	NP	SI-SAND	SM	1.07
CONOWINGO SSA-5	9/28/2017	4.5	10.1	63.2	21.7	0.4	85.3	0.1	2.19	35.2	0	0	NP	SI-SAND	SM	1.12
CONOWINGO SSA-6	9/27/2017	4.4	16	63.7	15.7	0.2	79.6	0	2.07	37.1	0	0	NP	SI-SAND	SM	1.08
CONOWINGO SSA-7	9/27/2017	7	19.4	56	17.4	0.2	73.6	0	2.08	49.6	0	0	NP	SI-SAND	SM	1.03
CONOWINGO SSA-8	9/28/2017	4.1	5.7	70.3	19.8	0.1	90.2	0	2.25	42.2	0	0	NP	PG-SAND-W-SILT	SP-SM	1.15
CONOWINGO SSA-9	9/27/2017	1.4	4.3	60.3	31.6	2.3	94.2	0.1	2.06	37.9	0	0	NP	SI-SAND	SM	1.10
CONOWINGO SSA-10	9/27/2017	8	9.7	61.3	20.6	0.4	82.3	0	2.26	62.8	0	0	NP	SI-SAND	SM	0.921
CONOWINGO SSA-11	9/27/2017	4.8	11.5	57	26.3	0.3	83.6	0.1	2.06	44.6	36	30	6	SI-SAND	SM	1.04
CONOWINGO SSA-12	9/27/2017	4.8	15.5	53.8	24.3	1.6	79.7	0	2.08	47	0	0	NP	SI-SAND	SM	1.06

LL = LIQUID LIMIT  
 PL = LASTIC LIMIT  
 PI = PLASTICITY INDEX  
 USCS CLASSES  
 SI-SAND = SILTY SAND  
 PG-SAND WITH SILT = POORLY GRADED SAND WITH SILT  
 SM = SAND, SILTY  
 SP = SAND, POORLY GRADED

Conowingo SSA Sediments September 2017		Priority Pollutant List Metals inc. Mercury and Hexavalent Chromium													Total Nutrients				
		Silver (Ag)	Arsenic (As)	Beryllium (Be)	Cadmium (Cd)	Total Chromium (Cr)	Hexavalent Chromium	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Antimony (Sb)	Selenium (Se)	Thallium (Tl)	Zinc (Zn)	Total Potassium (K)	Total Magnesium (Mg)	Total Calcium (Ca)	Total Organic Carbon (C)
Category 1 (HQ 0.1, risk 10E-06 Residential)		39	0.68	16	7.1		0.3	310	1.1	82	400		39	0.078	2,300				
Category 2 (HQ 0.1, risk 10E-06) Industrial		580	3	230	98		6.3	4,700	4.6	1,100	800		580	1.2	35,000				
Category 3 (HQ 1.0, risk 10E-05) Construction		1,700	142	613	275		420	13,600	8.1	2,020	800		1,700	3.4	102,000				
Category 3 (HQ 1.0, risk 10E-05) Composite		5,840	30	2,290	982		63	46,700	36.7	11,100	3,850		5,840	11.7	350,000				
		mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg	mg/kg	mg/kg	wt%
CONOWINGO SSA-1	9/27/2017	0.13	4.7	0.79	0.27	6.0 B	0.16 U	21	0.038	25	17	0.27	1.4	0.094	91	430	820	690	25
CONOWINGO SSA-2	9/28/2017	0.20	5.5	0.95	0.37	8.3 B	0.16 U	26	0.035	32	19	0.24	1.6	0.11	110	500	1300	990	24
CONOWINGO SSA-3	9/27/2017	0.30	6.1	1.1	0.52	9.3 B	0.17 U	26	0.033	34	22	0.25	1.4	0.12	130	510	1300	950	40
CONOWINGO SSA-4	9/27/2017	0.30	6.0	1.1	0.53	9.9 B	0.17 U	28	0.057	36	23	0.28	1.5	0.13	130	590	1400	1100	49
CONOWINGO SSA-5	9/28/2017	0.15	5.7	1.0	0.32	7.2 B	0.16 U	23	0.044	32	17	0.25	1.3	0.11	110	510	1100	820	28
CONOWINGO SSA-6	9/27/2017	0.18	5.3	1.1	0.41	11 B	0.15 U	23	0.062	35	22	0.24	1.1	0.12	120	650	1900	1300	20
CONOWINGO SSA-7	9/27/2017	0.23	6.2	1.1	0.46	8.4 B	0.18 U	28	0.038	35	22	0.30	1.8	0.13	120	520	1100	910	38
CONOWINGO SSA-8	9/28/2017	0.13	5.7	1.1	0.29	6.9 B	0.17 U	25	0.039	32	18	0.28	1.6	0.11	110	550	1100	940	18
CONOWINGO SSA-9	9/27/2017	0.26	5.7	1.1	0.45	8.9 B	0.16 U	24	0.035	38	20	0.33	1.4	0.12	130	560	1200	890	26
CONOWINGO SSA-10	9/27/2017	0.39	5.7	1.2	0.58	10 B	0.17 U	28	0.062	32	24	0.27	1.5	0.12	130	600	1400	1100	53
CONOWINGO SSA-11	9/27/2017	0.29	6.3	1.3	0.51	10 B	0.17 U	29	0.042	36	24	0.30	1.6	0.12	140	630	1400	1200	44
CONOWINGO SSA-12	9/27/2017	0.19	5.2	1.1	0.36	7.4 B	0.18 U	24	0.061	31	18	0.28	1.4	0.11	110	510	1100	910	21

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 U = Undetected at the indicated reporting limit  
 J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value

Conowingo SSA Sediments September 2017		Acid-Volatile Sulfide and Simultaneously Extracted Material, Total Sulfide, Sulfate, Cyanide and pH																								
		Cadmium as SEM	Copper as SEM	Lead as SEM	Mercury as SEM	Nickel as SEM	Zinc as SEM	Acid Volatile Sulfide (AVS)	SEMAVS Ratio	Total Sulfides	Total Sulfates (denitized water leach)	Total Cyanide	Free Cyanide	pH												
Category 1 (HQ 0.1, risk 10E-06 Residential)															2.3											
Category 2 (HQ 0.1, risk 10E-06 Industrial)															15											
Category 3 (HQ 1.0, risk 10E-05) Construction															32.6											
Category 3 (HQ 1.0, risk 10E-05) Composite															147											
		mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	s.u.	Q							
CONOWINGO SSA-1	9/27/2017	0.17	B	5.7	B	12	B	0.0023	U	15		70	B	17	J	2.8		22	J	30	0.11	U	0.61	J	6.9	HF
CONOWINGO SSA-2	9/28/2017	0.23	B	5.5	B	14	B	0.0023	U	19		79	B	43		1.3		45		40	0.10	U	0.42	U	6.8	HF
CONOWINGO SSA-3	9/27/2017	0.36	B	8.4	B	18	B	0.0024	U	24		100	B	28		2.5		47		78	0.10	U	0.42	U	6.7	HF
CONOWINGO SSA-4	9/27/2017	0.33	B	7.3	B	18	B	0.0025	U	24		100	B	25		2.7		24	J	88	0.12	U	0.47	U	6.7	HF
CONOWINGO SSA-5	9/28/2017	0.23		3.7		13		0.0023	U	16		67		18	JB	2.5		21	U	30	0.11	U	0.43	U	6.9	HF
CONOWINGO SSA-6	9/27/2017	0.18	B	7.8	B	12	B	0.0023	U	18		71	B	10	J	4.9		45		23	0.10	U	0.46	J	6.9	HF
CONOWINGO SSA-7	9/27/2017	0.30	B	4.8	B	19	B	0.0026	U	24		100	B	37		1.8		63		72	0.12	U	0.51	J	6.8	HF
CONOWINGO SSA-8	9/28/2017	0.18	B	5.5	BF1	14	B	0.0024	U	19		91	B	32	F1F2	1.9		63		54	0.11	U	0.48	J	6.8	HF
CONOWINGO SSA-9	9/27/2017	0.22	B	5.8	B	13	B	0.0024	U	21		82	B	24		2.3		47		79	0.10	U	0.49	J	6.8	HF
CONOWINGO SSA-10	9/27/2017	0.35	B	7.1	B	18	B	0.0025	U	23		100	B	44		1.6		50		72	0.11	U	0.48	J	6.8	HF
CONOWINGO SSA-11	9/27/2017	0.32	B	7.7	B	18	B	0.0025	U	20		95	B	ND		-		24	J	30	0.11	U	0.44	U	6.8	HF
CONOWINGO SSA-12	9/27/2017	0.31	B	7.6	B	18	B	0.0025	U	23		98	B	17	J	4.0		23	U	42	0.11	U	0.44	U	6.7	HF

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 HF = Hold time field (measurement is recommended as soon as possible after collection)  
 B = Substance also detected in the Blank  
 U = Undetected at the indicated method detection limit  
 J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value  
 F1 = Matrix Spike / Matrix Spike Duplicate were outside acceptance limits  
 F2 = Matrix Spike / Matrix Spike Duplicate relative percent difference exceeds control limits

Conowingo SSA Sediments September 2017		Volatile Organic Compounds									
		Benzene	Toluene	Ethylbenzene	Xylenes	Methyl tert-butyl Ether (MTBE)	Tetra-chloroethylene (PCE)	Tri-Chloroethylene (TCE)	Carbon Tetrachloride	Vinyl Chloride	Methylene Chloride
Category 1 (HQ 0.1, risk 10E-06 Residential)		1.2	490	5.8	58	47	8.1	0.41	0.65	0.059	35
Category 2 (HQ 0.1, risk 10E-06) Industrial		5.1	4,700	25	250	210	39	1.9	2.9	1.7	320
Category 3 (HQ 1.0, risk 10E-05) Construction		90.2	11,400	1,410	519	11,500	82.1	3.9	124	80.2	754
Category 3 (HQ 1.0, risk 10E-05) Composite		50.8	46,800	254	2,490	2,050	389	18.7	28.7	16.8	3,160
		mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q
CONOWINGO SSA-4	9/27/2017	0.0028 U	0.0024 U	0.0031 U	0.0062 U	0.0053 U	0.0029 U	0.0022 U	0.0048 U	0.0053 U	0.0034 U
CONOWINGO SSA-11	9/28/2017	0.0032 U	0.0027 U	0.0035 U	0.0069 U	0.0059 U	0.0032 U	0.0024 U	0.0053 U	0.0059 U	0.0038 U
mg/kg = milligram per kilogram (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated method detection limit											

Conowingo SSA Sediments September 2017		Semi-Volatile Organic Compounds																
		1,1'-BIPHENYL	2-METHYLNAPHTHALENE	ACENAPHTHENE	ACENAPHTHYLENE	ACETOPHENONE	ANTHRACENE	BENZO[A]ANTHRACENE	BENZO[A]PYRENE	BENZO[B]FLUORANTHENE	BENZO[G,H,I]PERYLENE	BENZO[K]FLUORANTHENE	BIS(2-ETHYLHEXYL)PHTHALATE	CARBAZOLE				
*detects only reported see lab package for full compound list																		
Category 1 (HQ 0.1, risk 10E-06 Residential)		4.7	24	360		780	1,800	0.16	0.016	0.16		1.6	39					
Category 2 (HQ 0.1, risk 10E-06) Industrial		20	300	4,500		12,000	23,000	2.9	0.29	2.9		29	160					
Category 3 (HQ 1.0, risk 10E-05) Construction		41.5	958	14,400		33,900	71,900	237	24	240		2,390	5,140	9,380				
Category 3 (HQ 1.0, risk 10E-05) Composite		200	3,010	45,200		11,700	226,000	28.7	2.9	28.9		289	1,640	1,150				
		mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	
CONOWINGO SSA-1	9/27/2017	0.022	J	0.092		0.012		0.03	0.0059	J	0.038	0.042	0.037	0.044	0.031	0.016	1.4	0.0075
CONOWINGO SSA-2	9/28/2017	0.029		0.12		0.016	0.041	0.006	J	0.054	0.061	0.053	0.064	0.043	0.022	0.063	0.0099	
CONOWINGO SSA-3	9/27/2017	0.027		0.11		0.023	0.045	0.0062	J	0.071	0.19	0.15	0.18	0.11	0.08	0.053	0.029	
CONOWINGO SSA-4	9/27/2017	0.024	J	0.1		0.015	0.038	0.0056	J	0.053	0.081	0.069	0.089	0.061	0.029	0.093	0.013	
CONOWINGO SSA-5	9/28/2017	0.023	J	0.091		0.012	0.041	0.0047	J	0.074	0.11	0.095	0.11	0.076	0.033	0.051	0.0073	
CONOWINGO SSA-6	9/27/2017	0.022	J	0.086		0.013	0.036	0.0059	J	0.047	0.063	0.06	0.072	0.056	0.026	0.05	0.0086	
CONOWINGO SSA-7	9/27/2017	0.026		0.11		0.019	0.085	0.0062	J	0.11	0.19	0.15	0.18	0.11	0.061	0.08	0.01	
CONOWINGO SSA-8	9/28/2017	0.023		0.095		0.013	0.034	0.0052	J	0.048	0.058	0.048	0.056	0.042	0.019	0.05	0.0078	
CONOWINGO SSA-9	9/27/2017	0.27		1		0.14	0.37	0.062	J	0.59	0.72	0.55	0.66	0.5	0.26	0.82	0.08	
CONOWINGO SSA-10	9/27/2017	1.8	J	7.6		1.2	4.4	0.5	J	5.3	5.8	5.7	6.8	5.4	1.7	6.9	0.75	
CONOWINGO SSA-11	9/27/2017	0.034		0.14		0.022	0.082	0.0095	J	0.093	0.14	0.12	0.13	0.1	0.053	0.097	0.013	
CONOWINGO SSA-12	9/27/2017	0.025		0.091		0.014	0.037	0.0045	J	0.057	0.08	0.069	0.078	0.064	0.025	0.2	0.0084	
mg/kg = milligram per kilogram (part per million)																		
Q = Data Qualifier, if applicable																		
J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value																		



Semi-Volatile Organic Compounds														
	CHRYSENE	DIBENZO(A,H) ANTHRACENE	DIBENZOFURAN	DIETHYL PHTHALATE	DI-N-BUTYL PHTHALATE	FLUORANTHENE	FLUORENE	INDENO(1,2,3-CD) PYRENE	METHYLPHENOL, 3 & 4	NAPHTHALENE	PHENANTHRENE	PHENOL	PYRENE	
Category 1 (HQ 0.1, risk 10E-06 Residential)	16	0.016	7.3	5,100	630	240	240	0.16		3.8		1,900	180	
Category 2 (HQ 0.1, risk 10E-06) Industrial	290	0.29	100	66,000	8,200	3,000	3,000	2.9		17		25,000	2,300	
Category 3 (HQ 1.0, risk 10E-05) Construction	23,900	24	310	206,000	25,700	9,580	9,580	240	257	123		77,000	22,600	
Category 3 (HQ 1.0, risk 10E-05) Composite	2,890	2.9	1,040	657,000	82,100	30,100	30,100	28.9	821	167		246,000	7,190	
	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	
CONOWINGO SSA-1	0.055	0.0077	0.017 J	0.01 J	0.0075 J	0.11	0.031	0.024	0.019 J	0.14	0.12	0.015 J	0.11	
CONOWINGO SSA-2	0.073	0.0096	0.02 J	0.0067 J	0.0052 J	0.15	0.042	0.037	0.02 J	0.19	0.16	0.0066 J	0.14	
CONOWINGO SSA-3	0.21	0.028	0.025	0.013 J	0.0065 J	0.45	0.05	0.1	0.017 J	0.18	0.29	0.021 J	0.34	
CONOWINGO SSA-4	0.093	0.017	0.019 J	0.0088 J	0.0051 J	0.18	0.037	0.053	0.024 J	0.15	0.16	0.024 J	0.16	
CONOWINGO SSA-5	0.12	0.021	0.017 J	0.0064 J	0.0062 J	0.22	0.032	0.066	0.011 J	0.14	0.15	0.0097 J	0.18	
CONOWINGO SSA-6	0.076	0.015	0.018 J	0.012 J	0.0096 J	0.16	0.035	0.046	0.021 J	0.13	0.14	0.0089 J	0.14	
CONOWINGO SSA-7	0.19	0.037	0.021 J	0.011 J	0.0075 J	0.43	0.053	0.1	0.021 J	0.17	0.29	0.016 J	0.29	
CONOWINGO SSA-8	0.067	0.011	0.017 J	0.0083 J	0.0055 J	0.14	0.032	0.033	0.013 J	0.16	0.13	0.0067 J	0.12	
CONOWINGO SSA-9	0.78	0.12	0.25	0.096 J	0.067 J	1.7	0.4	0.42	0.14 J	1.7	1.7	0.14 J	1.4	
CONOWINGO SSA-10	7.3	1.3	1.4 J	0.51 J	1.2 J	14	2.9	4.3	2.5	11	12	2.7	12	
CONOWINGO SSA-11	0.15	0.031	0.028	0.011 J	0.0082 J	0.32	0.055	0.087	0.045	0.23	0.25	0.012 J	0.24	
CONOWINGO SSA-12	0.09	0.015	0.02 J	0.0068 J	0.005 J	0.15	0.036	0.051	0.016 J	0.15	0.16	0.0081 J	0.16	

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value

Conowingo SSA Sediments September 2017	Organo-Chlorine Pesticides																											
	4,4'-DDD	4,4'-DDE	4,4'-DDT	ALDRIN	ALPHA-BHC	BETA-BHC	CHLORDANE (TECHICAL)	CHLORO- BENSIDE	DCPA	DELTA-BHC	DIELDRIN	ENDOSULFAN I	ENDOSULFAN II	ENDOSULFAN SULFATE	ENDRIN	ENDRIN ALDEHYDE	GAMMA-BHC (LINDANE)	HEPTACHLOR	HEPTACHLOR EPOXIDE	METHOXY- CHLOR	NIREX	TOXAPHENE						
Category 1 (HQ 0.1, risk 10E-06) Residential	2.3	2	1.9	0.039	0.086	0.3	1.7				0.034	47	47		1.9		0.57	0.13	0.07	32	0.036	0.49						
Category 2 (HQ 0.1, risk 10E-06) Industrial	9.6	9.3	8.5	0.18	0.36	1.3	7.7				0.14	700	700		25		2.5	0.63	0.33	410	0.17	2.1						
Category 3 (HQ 1.0, risk 10E-05) Construction	514	693	155	10	29.8	104	130				11.7	2040	2040		77.1		90.2	44.9	4.4	1,280	12.3	171						
Category 3 (HQ 1.0, risk 10E-05) Composite	65.7	92.8	85.3	1.8	3.7	12.8	76.6				1.4	7010	7010		246		25.4	6.3	3.3	4,100	1.7	20.9						
	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q						
CONOWINGO SSA-1	9/27/2017	0.0012	0.0011	0.66 p	0.0001 U	0.0001 U	0.0001 U	0.0012 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U						
CONOWINGO SSA-2	9/28/2017	0.0012	0.001	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0012 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U						
CONOWINGO SSA-3	9/27/2017	0.0017	0.0014	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0013 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U						
CONOWINGO SSA-4	9/27/2017	0.0011	0.0014	0.60 p	0.0001 U	0.0001 U	0.0001 U	0.0014 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U						
CONOWINGO SSA-5	9/28/2017	0.001	0.0007	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0013 U	0.0001 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000076	0.0001 U	0.0001 U						
CONOWINGO SSA-6	9/27/2017	0.0013	0.0011	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0012 U	0.0001 U	0.0001 U	0.0001 U	0.00007 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000074	0.0001 U	0.0001 U						
CONOWINGO SSA-7	9/27/2017	0.0013	0.0014	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0014 U	0.0001 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000083	0.0001 U	0.0001 U						
CONOWINGO SSA-8	9/28/2017	0.0011	0.0008	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0013 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000083	0.0001 U	0.0001 U						
CONOWINGO SSA-9	9/27/2017	0.0012	0.001	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0013 U	0.0001 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000091	0.0001 U	0.0001 U						
CONOWINGO SSA-10	9/27/2017	0.0016	0.0017	0.0001 U	0.00012 Jp	0.0001 U	0.0001 U	0.0014 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000099	0.0001 U	0.0001 U						
CONOWINGO SSA-11	9/27/2017	0.0014	0.0014	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0013 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000093	0.0001 U	0.0001 U						
CONOWINGO SSA-12	9/27/2017	0.002	0.0017	0.0001 U	0.00011 Jp	0.0001 U	0.0001 U	0.0014 U	0.0001 U	0.0001 U	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.00011 Jp	0.0001 U	0.0001 U						

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 U = Undetected at the indicated reporting limit  
 J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value  
 p = The relative percent difference between the primary and confirmation column/detector is >40%. The lower value has been reported.

Conowingo SSA Sediments September 2017		Poly Chlorinated BiPhenyls (PCBs)						
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
Category 1 (HQ 0.1, risk 10E-06 Residential)		0.41	0.2	0.17	0.23	0.23	0.12	0.24
Category 2 (HQ 0.1, risk 10E-06) Industrial		5.1	0.83	0.72	0.95	0.95	0.97	0.99
Category 3 (HQ 1.0, risk 10E-05) Construction		16.4	62.8	51.6	76	76.5	4.7	81
Category 3 (HQ 1.0, risk 10E-05) Composite		51.3	8.3	7.2	9.5	9.5	9.7	9.9
		mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q	mg/kg Q
CONOWINGO SSA-1	9/27/2017	0.00030 U	0.00030 U	0.00023 U	0.00046 U	0.00027 U	0.0071	0.0045
CONOWINGO SSA-2	9/28/2017	0.00031 U	0.00030 U	0.00023 U	0.00046 U	0.00028 U	0.0048	0.0032
CONOWINGO SSA-3	9/27/2017	0.00032 U	0.00032 U	0.00024 U	0.00048 U	0.00029 U	0.0053	0.0036
CONOWINGO SSA-4	9/27/2017	0.00034 U	0.00033 U	0.00025 U	0.00051 U	0.00030 U	0.0065	0.0046
CONOWINGO SSA-5	9/28/2017	0.00032 U	0.00031 U	0.00024 U	0.00048 U	0.00029 U	0.0029	0.0019
CONOWINGO SSA-6	9/27/2017	0.00030 U	0.00030 U	0.00023 U	0.00046 U	0.00027 U	0.0041	0.0029
CONOWINGO SSA-7	9/27/2017	0.00035 U	0.00034 U	0.00026 U	0.00052 U	0.00031 U	0.0053	0.0034
CONOWINGO SSA-8	9/28/2017	0.00032 U	0.00031 U	0.00024 U	0.00048 U	0.00029 U	0.0043	0.0022
CONOWINGO SSA-9	9/27/2017	0.00032 U	0.00031 U	0.00024 U	0.00048 U	0.00029 U	0.0023	0.0015
CONOWINGO SSA-10	9/27/2017	0.00034 U	0.00033 U	0.00025 U	0.00051 U	0.00031 U	0.0055	0.0040
CONOWINGO SSA-11	9/27/2017	0.00033 U	0.00032 U	0.00025 U	0.00049 U	0.00030 U	0.0050	0.0042
CONOWINGO SSA-12	9/27/2017	0.00034 U	0.00033 U	0.00025 U	0.00051 U	0.00030 U	0.0048	0.0032
mg/kg = milligram per kilogram (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated reporting limit								

Conowingo SSA Sediments September 2017		Dioxins and Furans															
		1,2,3,4,6,7,8-HpCDD (Heptachlorodibenzo-p-dioxin)	1,2,3,4,6,7,8-HpCDF (Heptachlorodibenzo-furan)	1,2,3,4,7,8,9-HpCDF (Heptachlorodibenzo-furan)	1,2,3,4,7,8-HxCDD (Hexachlorodibenzo-p-dioxin)	1,2,3,4,7,8-HxCDF (Hexachlorodibenzo-furan)	1,2,3,6,7,8-HxCDD (Hexachlorodibenzo-p-dioxin)	1,2,3,6,7,8-HxCDF (Hexachlorodibenzo-furan)	1,2,3,7,8,9-HxCDD (Hexachlorodibenzo-p-dioxin)	1,2,3,7,8,9-HxCDF (Hexachlorodibenzo-furan)	2,3,4,6,7,8-HxCDF (Hexachlorodibenzo-furan)	1,2,3,7,8-PeCDD (Pentachlorodibenzo-p-dioxin)	1,2,3,7,8-PeCDF (Pentachlorodibenzo-p-dioxin)	2,3,4,7,8-PeCDF (Pentachlorodibenzo-furan)	2,3,7,8-TCDD (Tetrachlorodibenzo-p-dioxin)	2,3,7,8-TCDF (Tetrachlorodibenzo-furan)	OCDD (Octachlorodibenzo-p-dioxin)
Category 1 (HQ 0.1, risk 10E-06 Residential)	--	7.3	7.3	0.0001	7.3	0.0001	7.3	0.0001	7.3	0.0001	7.3	--	--	4.8E-06	--	--	--
Category 2 (HQ 0.1, risk 10E-06 Industrial)	--	100	100	0.00047	100	0.00047	100	0.00047	100	100	--	--	--	0.000022	--	--	--
Category 3 (HQ 1.0, risk 10E-05) Construction	0.022	0.022	0.022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.00740	0.00074	0.00022	0.0022	0.74	0.74
Category 3 (HQ 1.0, risk 10E-05) Composite	0.022	0.022	0.022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.00720	0.00072	0.00022	0.0022	0.72	0.72
		mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
CONOWINGO SSA-3	9/27/2017	3.10E-05		6.30E-06		4.40E-07 J		3.80E-07 J		1.30E-06 J		1.40E-06 J		1.00E-06 J		1.20E-06 J	
CONOWINGO SSA-4	9/27/2017	4.40E-05		7.30E-06		7.10E-07 J		7.30E-07 J		1.30E-06 Jq		2.00E-06 J		1.30E-06 J		1.80E-06 Jq	
CONOWINGO SSA-9	9/27/2017	3.00E-05		6.10E-06		3.20E-07 Jq		4.10E-07 Jq		1.10E-06 J		1.60E-06 J		7.80E-07 Jq		1.30E-06 J	
CONOWINGO SSA-11	9/27/2017	3.80E-05		9.00E-06		7.10E-07 J		4.10E-07 Jq		1.60E-06 J		1.70E-06 J		1.50E-06 J		1.30E-06 Jq	
		mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
		3.10E-05		6.30E-06		4.40E-07 J		3.80E-07 J		1.30E-06 J		1.40E-06 J		1.00E-06 J		1.20E-06 J	
		4.40E-05		7.30E-06		7.10E-07 J		7.30E-07 J		1.30E-06 Jq		2.00E-06 J		1.30E-06 J		1.80E-06 Jq	
		3.00E-05		6.10E-06		3.20E-07 Jq		4.10E-07 Jq		1.10E-06 J		1.60E-06 J		7.80E-07 Jq		1.30E-06 J	
		3.80E-05		9.00E-06		7.10E-07 J		4.10E-07 Jq		1.60E-06 J		1.70E-06 J		1.50E-06 J		1.30E-06 Jq	

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 U = Undetected at the indicated reporting limit  
 J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value  
 q = The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio  
 The measured ion ratio does not meet qualitative identification criteria and indicated a possible interference  
 I = Value is the estimated maximum possible concentration  
 B = Compound also detected in the Blank.

Conowingo SSA Sediments September 2017		Total Petroleum Hydrocarbons	
		TPH - GRO (C6-C10)	TPH - DRO (C10-C28)
Category 1 (HQ 0.1, risk 10E-06 Residential)		230	230
Category 2 (HQ 0.1, risk 10E-06) Industrial		620	620
Category 3 (HQ 1.0, risk 10E-05) Construction		620	620
Category 3 (HQ 1.0, risk 10E-05) Composite		620	620
		mg/kg	Q
CONOWINGO SSA-1	9/27/2017	0.089 U	41
CONOWINGO SSA-2	9/28/2017	0.09 U	250
CONOWINGO SSA-3	9/27/2017	0.095 U	65
CONOWINGO SSA-4	9/27/2017	0.096 U	48
CONOWINGO SSA-5	9/28/2017	0.091 U	26
CONOWINGO SSA-6	9/27/2017	0.091 U	80
CONOWINGO SSA-7	9/27/2017	0.1 U	47
CONOWINGO SSA-8	9/28/2017	0.091 U	24
CONOWINGO SSA-9	9/27/2017	0.093 U	27
CONOWINGO SSA-10	9/27/2017	0.1 U	31
CONOWINGO SSA-11	9/27/2017	0.094 U	92
CONOWINGO SSA-12	9/27/2017	0.1 U	58

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 U = Undetected at the indicated reporting limit

Conowingo SSA Sediments September 2017		Total Nutrients									Exchangeable Nutrients (Mehlich-3 Extraction)							Salts	CEC	
		Total Organic Carbon (mg/kg)	Total Organic Carbon wt %	Total Phosphorus (P)	Nitrogen from Ammonia	Total Kjeldahl Nitrogen (Organic Nitrogen + Ammonia + Ammonium)	Total Potassium (K)	Total Magnesium (Mg)	Total Calcium (Ca)	Organic Matter	Exchangeable Phosphorus (P)	Exchangeable Nitrogen from Nitrate	Exchangeable Nitrogen from Ammonium	Exchangeable Potassium (K)	Exchangeable Magnesium (Mg)	Exchangeable Calcium (Ca)	Soluble Salts, as Electrical Conductivity	CEC		
Category 1 (HQ 0.1, risk 10E-06 Residential)																				
Category 2 (HQ 0.1, risk 10E-06) Industrial																				
Category 3 (HQ 1.0, risk 10E-05) Construction																				
Category 3 (HQ 1.0, risk 10E-05) Composite																				
		mg/kg	wt%	Q	mg/kg	Q	mg/kg	Q	mg/kg	mg/kg	mg/kg	mg/kg	wt%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mmhos/cm	meq/100g
CONOWINGO SSA-1	9/27/2017	250,000	25	230	91	1,800	430	820	890	1.3	25	0.3	38.0	22	46	280	0.15	2.0		
CONOWINGO SSA-2	9/28/2017	240,000	24	150	73	1,700	500	1,300	990	1.6	24	0.3	29.1	22	62	420	0.15	2.8		
CONOWINGO SSA-3	9/27/2017	400,000	40	290	72	2,100	510	1,300	950	1.3	33	0.3	29.7	21	50	320	0.13	2.2		
CONOWINGO SSA-4	9/27/2017	490,000	49	400	88	1,500 B	590	1,400	1,100	0.9	28	0.3	42.8	23	43	280	0.12	1.8		
CONOWINGO SSA-5	9/28/2017	280,000	28	200	46	1,800	510	1,100	820	1.0	19	0.3	22.7	20	44	280	0.13	2.0		
CONOWINGO SSA-6	9/27/2017	200,000	20	300	69	2,000 B	650	1,900	1,300	1.0	32	0.3	40.8	23	47	320	0.13	2.2		
CONOWINGO SSA-7	9/27/2017	380,000	38	290	140	1,300 B	520	1,100	910	1.0	31	0.3	45.4	20	47	300	0.12	2.1		
CONOWINGO SSA-8	9/28/2017	180,000	18	190	68	1,500	550	1,100	940	1.1	23	0.3	30.8	26	60	350	0.13	2.5		
CONOWINGO SSA-9	9/27/2017	260,000	26	280	63	2,300	560	1,200	890	1.2	24	0.3	33.5	20	46	270	0.12	1.9		
CONOWINGO SSA-10	9/27/2017	530,000	53	250	140	2,100	600	1,400	1,100	1.1	30	0.3	44.5	20	51	330	0.10	2.3		
CONOWINGO SSA-11	9/27/2017	440,000	44	230	130	2,100	630	1,400	1,200	1.0	28	0.3	48.6	24	50	310	0.11	2.2		
CONOWINGO SSA-12	9/27/2017	210,000	21	250 F1	100	1,900	510	1,100	910	0.9	28	0.3	42.2	20	42	270	0.10	1.9		

mg/kg = milligram per kilogram (part per million), wt% = weight percent, mmhos/cm = millimhos per centimeter, meq/100g = milliequivalents per 100 grams  
 Q = Data Qualifier, if applicable  
 B = Substance also detected in the Blank.

Conowingo SSA Sediments September 2017		Metals - Toxicity Characteristic Leaching Potential							
		Silver (Ag)	Arsenic (As)	Barium (Ba)	Cadmium (Cd)	Total Chromium (Cr)	Mercury (Hg)	Lead (Pb)	Selenium (Se)
RCRA Toxicity Threshold		5	5	100	1	5	0.2	5	1
		mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q
CONOWINGO SSA-3	9/27/2017	0.5 U	0.5 U	0.40 J	0.0057 J	0.5 U	0.0002 U	0.5 U	0.5 U
CONOWINGO SSA-5	9/28/2017	0.5 U	0.5 U	0.36 J	0.0049 J	0.5 U	0.0002 U	0.5 U	0.5 U
CONOWINGO SSA-9	9/27/2017	0.5 U	0.5 U	0.32 J	0.0049 J	0.5 U	0.0002 U	0.5 U	0.5 U
mg/L = milligram per liter (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated reporting limit J = Trace detection below the reporting limit, but above the method detection limit, and is an estimated value RCRA = Resource Conservation and Recovery Act Toxicity Threshold specified at 40th CFR, § 261.24									

Conowingo SSA Sediments September 2017		Semi Volatile Organic Compounds - Toxicity Characteristic Leaching Potential											
		1,4-DICHLOROBENZENE	2,4,5-TRICHLOROPHENOL	2,4,6-TRICHLOROPHENOL	2,4-DINITROTOLUENE	2-METHYLPHENOL	HEXACHLORO- BENZENE	HEXACHLORO- BUTADIENE	HEXACHLORO- ETHANE	3 & 4 METHYLPHENOL	NITROBENZENE	PENTA-CHLOROPHENOL	PYRIDINE
RCRA Toxicity Threshold		7.5	400	2	0.13		0.13	0.5	3		2	100	5
		mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q
CONOWINGO SSA-3	9/27/2017	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.25 U	0.1 U
CONOWINGO SSA-5	9/28/2017	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.25 U	0.1 U
CONOWINGO SSA-9	9/27/2017	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.25 U	0.1 U
mg/L = milligram per liter (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated reporting limit RCRA = Resource Conservation and Recovery Act Toxicity Threshold specified at 40th CFR, § 261.24													



Conowingo SSA Sediments September 2017		Pesticides - Toxicity Characteristic Leaching Potential						
		CHLORDANE	ENDRIN	GAMMA-BHC (LINDANE)	HEPTACHLOR	HEPTACHLOR EPOXIDE	METHOXYCHLOR	TOXAPHENE
RCRA Toxicity Threshold		0.03	0.02	0.4	0.008	0.008	10	0.5
		mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q
CONOWINGO SSA-3	9/27/2017	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.04 U
CONOWINGO SSA-5	9/28/2017	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.04 U
CONOWINGO SSA-9	9/27/2017	0.005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.04 U
mg/L = milligram per liter (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated reporting limit RCRA = Resource Conservation and Recovery Act Toxicity Threshold specified at 40th CFR, § 261.24								

Conowingo SSA Sediments September 2017		Herbicides - Toxicity Characteristic Leaching Potential	
		2,4-D	SILVEX (2,4,5-TP)
RCRA Toxicity Threshold		10	1
		mg/L      Q	mg/L      Q
CONOWINGO SSA-3	9/27/2017	0.040 U	0.010 U
CONOWINGO SSA-5	9/28/2017	0.040 U	0.010 U
CONOWINGO SSA-9	9/27/2017	0.040 U	0.010 U
mg/L = milligram per liter (part per million) Q = Data Qualifier, if applicable U = Undetected at the indicated reporting limit RCRA = Resource Conservation and Recovery Act Toxicity Threshold specified at 40th CFR, § 261.24			

Conowingo SSA Sediments September 2017		Volatile Organic Compounds - Toxicity Characteristic Leaching Potential									
		1,1-Dichloroethene	1,2-Dichloroethane	2-Butanone (MEK)	Benzene	Tetra-chloroethylene (PCE)	Tri-Chloroethylene (TCE)	Carbon Tetrachloride	Chlorobenzene	Chloroform	Vinyl Chloride
RCRA Toxicity Threshold		0.7	0.5	200	0.5	0.7	0.5	0.5	100	6	0.2
		mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q	mg/L Q			mg/L Q
CONOWINGO SSA-1	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-2	9/28/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-3	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-4	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-5	9/28/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-6	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-7	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-8	9/28/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-9	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-10	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-11	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U
CONOWINGO SSA-12	9/27/2017	0.11 U	0.058 U	0.12 U	0.079 U	0.080 U*	0.060 U	0.13 U	0.063 U	0.085 U	0.15 U

mg/kg = milligram per kilogram (part per million)  
 Q = Data Qualifier, if applicable  
 U = Undetected at the indicated method detection limit  
 \* = Laboratory Control Sample / Laboratory Control Sample Duplicate is outside acceptance limits