Exhibit 25

JOINT FEDERAL/STATE APPLICATION FOR THE ALTERATION OF ANY FLOODPLAIN, WATERWAY, TIDAL OR NONTIDAL WETLAND IN MARYLAND

FOR AGENCY USE ONLY

Application Number		**Date Determined Complete**	
Date Received by State		**Date(s) Returned**	
Date Received by Corps			
Type of State permit needed		**Date of Field Review**	
Type of Corps permit needed		**Agency Performed Field Review**	

++

- Please submit 1 original and 6 copies of this form, required maps and plans to the Wetlands and Waterways Program as noted on the last page of this form.
- Any application which is not completed in full or is accompanied by poor quality drawings may be considered incomplete and result in a time delay to the applicant.

Please check one of the following:

RESUBMITTAL: ____ **APPLICATION AMENDMENT:** ____ **MODIFICATION TO AN EXISTING PERMIT:** ____
JURISDICTIONAL DETERMINATION ONLY ____ **APPLYING FOR AUTHORIZATION** X
PREVIOUSLY ASSIGNED NUMBER (RESUBMITTALS AND AMENDMENTS) ____
DATE 5/8/2018

1. APPLICANT INFORMATION:
APPLICANT NAME:

A. Name: Roy McGrath B. Daytime Telephone: 410-729-8201
C. Company: Maryland Environmental Service D. Email Address: rmcgrath@menv.com
E. Address: 259 Najoles Road
F. City: Millersville State: MD Zip: 21108

AGENT/ENGINEER INFORMATION:

A. Name: Walter Dinicola B. Daytime Telephone: 443-280-2815
C. Company: Anchor QEA, LLC D. Email Address: wdinicola@anchorqea.com
E. Address: 10320 Little Patuxent Parkway, Suite 1140
F. City: Columbia State: MD Zip: 21044

ENVIRONMENTAL CONSULTANT:

A. Name: Karin Olsen, P.G. B. Daytime Telephone: 410-794-7779
C. Company: Anchor QEA, LLC D. Email Address: kolsen@anchorqea.com
E. Address: 10320 Little Patuxent Parkway, Suite 1140
F. City: Columbia State: MD Zip: 21044

CONTRACTOR (If known):

A. Name: B. Daytime Telephone:
C. Company: D. Email Address:
E. Address:
F. City: State: Zip:

PRINCIPAL CONTACT:

A. Name: Melissa Slatnick B. Daytime Telephone: 410-729-8342
C. Company: Maryland Environmental Service D. Email Address: mslat@menv.com
E. Address: 259 Najoles Road
F. City: Millersville State: MD Zip: 21108

2. PROJECT DESCRIPTION

a. GIVE WRITTEN DESCRIPTION OF PROJECT:

This Joint Permit Application is being submitted for the purpose of obtaining a Non-Tidal Wetland License, a 404 Dredging Permit, and a Water Quality Certification. The project includes dredging approximately 25,000 cubic yards of sediment from the Maryland portion of the Susquehanna River, ~5 miles upstream of the Conowingo Dam. Sediment will be hydraulically dredged and transported via floating pipeline to a land-side staging area. The dredged area will be approximately 600 feet by 450 feet with a depth of 2.5 feet. Dredged material will be dewatered and temporarily stockpiled within a 5-acre staging area for up to 1 year from contractor Notice to Proceed. Dredged material will ultimately be transported from the staging area to an approved innovative reuse and beneficial use project within the State of Maryland. The selected construction contractor will be responsible for adhering to all guidelines specified in Maryland Department of the Environment's *Innovative Reuse and Beneficial Use of Dredged Material Guidance Document*. See **Attachments 1 and 2** for project related drawings and additional project information.

Has any portion of the project been completed? _____ Yes __X__ No If yes, explain _____

Is this a residential subdivision or commercial development? _____ Yes __X__ No
If yes, total number of acres on property _____ acres

b. ACTIVITY: Check all activities that are proposed in the wetland, waterway, floodplain, and nontidal wetland buffer as appropriate.

A. _____ filling
B. __X__ dredging
C. _____ excavating
D. _____ flooding or impounding water
E. _____ draining
F. __X__ grading
G. __X__ removing or destroying vegetation
H. _____ building structures

Area for item(s) checked: Wetland N/A (sq. ft.) Buffer (Nontidal Wetland Only) N/A (sq. ft.)

Expanded Buffer (Nontidal Wetland Only) N/A (sq. ft.)

Area of stream impact (sq. ft.) -

Length of stream affected (LF) -

c. TYPE OF PROJECTS: Project Dimensions

For each activity, give overall length and width (in feet), in columns 1 and 2. For multiple activities, give total area of disturbance in square feet in column 3. For activities in tidal waters, give maximum distance channelward (in feet) in column 4. For dam or small ponds, give average depth (in feet) for the completed project in column 5. Give the volume of fill or dredged material in column 6.

		Length (Ft.) 1	Width (Ft.) 2	Area Sq. Ft. 3	Maximum/Average Channelward Encroachment 4		Pond Depth 5	Volume of fill/dredge material (cubic yards) below MHW or OHW 6
A.	Bulkhead							
B.	Revetment							
C.	Vegetative Stabilization							
D.	Gabions							
E.	Groins							
F.	Jetties							
G.	Boat Ramp							
H.	Pier							
I.	Breakwater							
J.	Repair & Maintenance							
K.	Road Crossing							
L.	Utility Line							
M.	Outfall Construction							
N.	Small Pond							
O.	Dam							
P.	Lot Fill							
Q.	Building Structures							
R.	Culvert							

S.		Bridge						
T.		Stream Channelization						
U.		Parking Area						
V.	X	Dredging	600	450				25,000

1. X New 2. ____ Maintenance 3. X Hydraulic 4. ____ Mechanical

W. ____ Other (explain) ____

d. PROJECT PURPOSE: Give brief written description of the project purpose:

The purpose of the Conowingo capacity recovery and innovative reuse and beneficial use pilot project is to evaluate the feasibility of a scalable project to dredge accumulated sediments and beneficially or innovatively reuse them within the new Maryland guidance framework. The proposed pilot dredging will remove 25,000 cubic yards of sediment in the Maryland portion of the Susquehanna River, approximately five (5) miles north of the Conowingo Dam. All of the dredged material will be subsequently dewatered at a nearby staging site and is intended for an innovative and/or beneficial end use. The end use application(s) must be performed in the State of Maryland and adhere to the guidelines described in the most recent version of the Maryland Department of the Environment (MDE) *Innovative Reuse and Beneficial Use of Dredged Material Guidance Document.*

3. PROJECT LOCATION:

a. LOCATION INFORMATION:

A. County: Harford B. City: Whiteford C. Name of waterway or closest waterway Susquehanna River

D. State stream use class designation: Class I-P: Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply

E. Site Address or Location: Dredging: Approximately 5 miles north of the Conowingo Dam in the lower Susquehanna River Staging Area: Line Bridge Road, Whiteford, Maryland 21160

F. Directions from nearest intersection of two state roads: Route 1 North to 623 North, approximately 6.5 miles. Turn right onto Line Bridge Road. The entrance to the staging area is approximately 0.5 miles on the left.

G. Is your project located in the Chesapeake Bay Critical Area (generally within 1,000 feet of tidal waters or tidal wetlands)?
____ Yes X No

H. County Book Map Coordinates (Alexandria Drafting Co.); Excluding Garrett and Somerset Counties:
Map: 5 & 6 Letter: K (M5) & A (M6) Number: 1 (M5) & 1(M6) (Staging area)
6 C 1 (Dredging area)

I. FEMA Floodplain Map Panel Number (if known): 24025C0080E and 24025C0060E

J. 1. 39.719654 latitude 2. -76.250404 longitude (Staging Area)
1. 39.718669 latitude 2. - 76.230461 longitude (Dredging Area)

b. ACTIVITY LOCATION: Check one or more of the following as appropriate for the type of wetland/waterway where you are proposing an activity:

A.		Tidal Waters	F.		100-foot buffer (nontidal wetland of special State concern)
B.		Tidal Wetlands	G.		In stream channel
C.		Special Aquatic Site (e.g., mudflat, vegetated shallows)		1.	Tidal 2. Nontidal
D.		Nontidal Wetland			
E.		25-foot buffer (nontidal wetlands only)			

H.	X	100-year floodplain (outside stream channel)			
I.	X	River, lake, pond			
J.		Other (Explain)			

c. LAND USE:

A. Current Use of Parcel Is: 1. X Agriculture: Has SCS designated project site as a prior converted cropland?
____ Yes X No 2. X Wooded 3. ____ Marsh/Swamp 4. ____ Developed
5. ____ Other ____

B. Present Zoning Is: 1. ____ Residential 2. ____ Commercial/Industrial 3. X Agriculture 4. ____ Marina 5. ____ Other

C. Project complies with current zoning X Yes ____ No

THE FOLLOWING INFORMATION IS REQUIRED BY THE STATE (blocks 4-7):

4. REDUCTION OF IMPACTS: Explain measures taken or considered to avoid or minimize wetland losses in F. Also check Items A-E if any of these apply to your project.

A. ____ Reduced the area of disturbance
B. ____ Reduced size/scope of project
C. ____ Relocated structures
D. ____ Redesigned project

E. ____ Other ____

F. Explanation This project area does not contain wetlands.

Describe reasons why impacts were not avoided or reduced in Q. Also check Items G-P that apply to your project.

G. ____ Cost
H. ____ Extensive wetlands on site
I. X Engineering/design constraints
J. X Other natural features
K. ____ Parcel size
L. ____ Other regulatory requirement
M. ____ Failure to accomplish project purpose
N. ____ Safety/public welfare issue
O. ____ Inadequate zoning
P. ____ Other ____

Q. Description Project area includes steep slopes adjacent to the river. Pipeline routes were designed to accommodate the best route to safely manage slope stability concerns. Multiple options were investigated, and the preferred routes allow for safe pipeline operation regarding slope stability, while minimizing impacts to wetlands and streams. See **Attachment 2** for additional information.

5. LETTER OF EXEMPTION: If you are applying for a letter of exemption for activities in nontidal wetlands and/or their buffers, explain why the project qualifies:

A. ____ No significant plant or wildlife value and wetland impact
1. ____ Less than 5,000 square feet
2. ____ In an isolated nontidal wetland less than 1 acre in size
B. ____ Repair existing structure/fill
C. ____ Mitigation Project
D. ____ Utility Line
1. ____ Overhead
2. ____ Underground
E. Other (explain) ____

F. X Check here if you are **not** applying for a letter of exemption.

IF YOU ARE APPLYING FOR A LETTER OF EXEMPTION, PROCEED TO BLOCK 11

6. ALTERNATIVE SITE ANALYSIS: Explain why other sites that were considered for this project were rejected in M. Also check any items in D-L if they apply to your project. **(If you are applying for a letter of exemption, do not complete this block):**

A. ____ 1 site
B. ____ 2 - 4 sites
C. X 5 or more sites

Alternative sites were rejected/not considered for the following reason(s):

D. ____ Cost
E. X Lack of availability
F. X Failure to meet project purpose
G. ____ Located outside general/market area
H. ____ Greater wetlands impact
I. X Water dependency
J. ____ Inadequate zoning
K. X Engineering/design constraints
L. ____ Other ____

M. Explanation: See **Attachment 3** for information regarding the alternative site analysis**.**

7. PUBLIC NEED: Describe the public need or benefits that the project will provide in F. Also check Items in A-E that apply to your project. **(If you are applying for a letter of exemption, do not complete this block):**

A. ____ Economic
B. ____ Safety
C. ____ Health/welfare
D. ____ Does not provide public benefits
E. X Other ____

F. Description The Conowingo Pilot Project will determine if dredging and innovative reuse and beneficial use can be performed on a larger scale. If so, such a project could have a lasting beneficial effect on Chesapeake Bay water quality.

8. OTHER APPROVALS NEEDED/GRANTED:

A. Agency	B. Date Sought	C. Decision 1. Granted	2. Denied	D. Decision Date	E. Other Status
Federal Energy Regulatory Commission (FERC)					
US Fish and Wildlife Service	12/14/17	X		1/10/18	
Maryland Historic Trust	12/14/17	X		1/17/18	
MD Department of Natural Resources	12/14/17	X		2/5/18	
(See Attachment 4)					

9. MITIGATION PLAN: Please provide the following information:

a. Description of a monetary compensation proposal, if applicable (for **state requirements** only). Attach another sheet if necessary.

b. Give a brief description of the proposed mitigation project.

c. Describe why you selected your proposed mitigation site, including what other areas were considered and why they were rejected.

d. Describe how the mitigation site will be protected in the future.

10. HAVE ADJACENT PROPERTY OWNERS BEEN NOTIFIED?: A. X Yes B. ____ No

Provide names and mailing addresses below :

a. See **Attachment 5**
b.
c.

11. HISTORIC PROPERTIES: Is your project located in the vicinity of historic properties? (For example: structures over 50 years old, archeological sites, shell mounds, Indian or Colonial artifacts). Provide any supplemental information in Section 13.

A. _____ Yes B. __X__ No C. _____ Unknown

12. ADDITIONAL INFORMATION: Use this space for detailed responses to any of the previous items. Attach another sheet if a necessary:
See **Attachment 6** for letters of acceptance of activities from the staging area property owners and Exelon Corporation LLC.

Check box if data is enclosed for any one or more of the following (see checklist for required information):

A. _____ Soil borings	D. __X__ Field surveys	G. __X__ Site plan
B. __X__ Wetland data sheets- **Att. 7**	E. __X__ Alternate site analysis	H. _____ Avoidance and minimization analysis
C. _____ Photographs	F. _____ Market analysis	

I. __X__ Other (explain) Sediment Core Analysis (**Attachment 8**)

CERTIFICATION:

I hereby designate and authorize the agent named above to act on my behalf in the processing of this application and to furnish any information that is requested. I certify that the information on this form and on the attached plans and specifications is true and accurate to the best of my knowledge and belief. I understand that any of the agencies involved in authorizing the proposed works may request information in addition to that set forth herein as may be deemed appropriate in considering this proposal. I certify that all Waters of the United States have been identified and delineated on site, and that all jurisdictional wetlands have been delineated in accordance with the Corps of Engineers Wetlands Delineation Manual (Wetlands Research Program Technical Report Y-87-1). I grant permission to the agencies responsible for authorization of this work, or their duly authorized representative, to enter the project site for inspection purposes during working hours. I will abide by the conditions of the permit or license if issued and will not begin work without the appropriate authorization. I also certify that the proposed works are consistent with Maryland's Coastal Zone Management Plan. I understand that none of the information contained in the application form is confidential and that I may request that additional required information be considered confidential under applicable laws. I further understand that failure of the landowner to sign the application will result in the application being deemed incomplete.

LANDOWNER MUST SIGN: Roy C. Wittle for MES DATE: 5/8/18

WHERE TO MAIL APPLICATION

Maryland Department of the Environment
Water Management Administration
Regulatory Services Coordination Office
1800 Washington Boulevard, Suite 430
Baltimore, Maryland 21230
Telephone: (410) 537-3762
1-800-876-0200

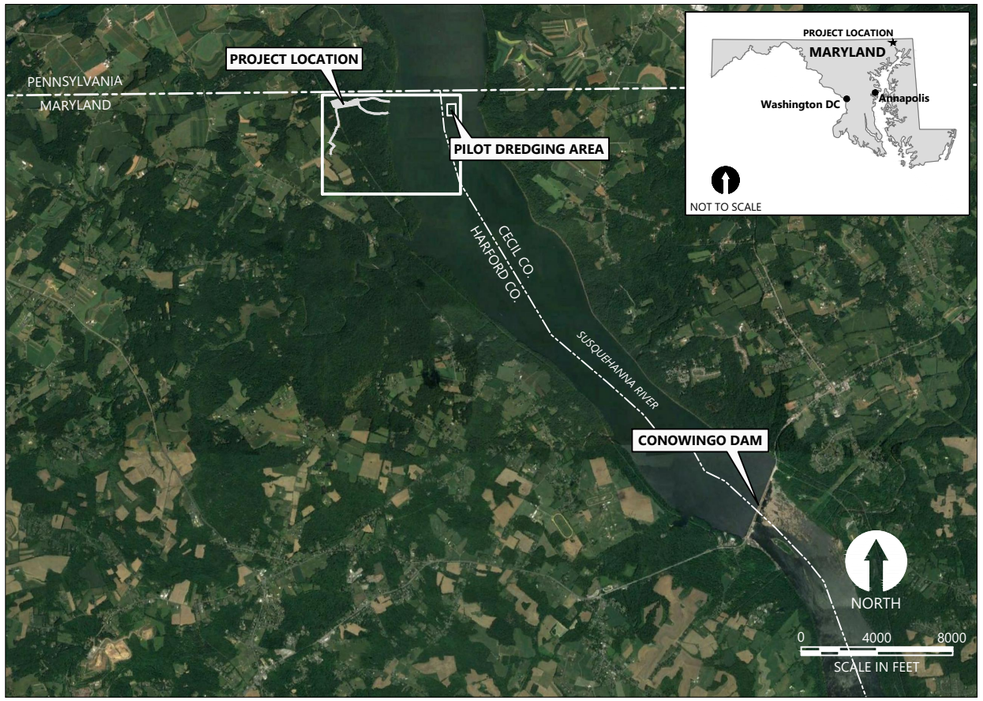
Attachment 1:

Location and Plans

PROJECT ID NO. 1-18-3-21-8

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

HARFORD AND CECIL COUNTIES, MARYLAND



SOURCE: ©2017 Google Earth Pro.

VICINITY MAP

DRAWING INDEX		
SHEET	DWG	TITLE
1	G-1	TITLE SHEET
2	G-2	GENERAL NOTES, LEGEND AND ABBREVIATIONS
3	G-3	OVERALL KEY MAP
4	EX-1	EXISTING CONDITIONS - DREDGE AREA
5	EX-2	EXISTING CONDITIONS - STAGING AREA
6	SA-1	STAGING AREA, ACCESS AND PIPELINE ROUTES PLAN VIEW
7	SA-2	CONCEPTUAL LAYOUT OF STAGING AREA AND DETAILS
8	SA-3	STAGING AREA SECTIONS A, B AND C
9	SA-4	CONCEPTUAL PIPELINE ROUTE OPTIONS PROFILE VIEW
10	SA-5	ACCESS ROAD PLAN AND PROFILE
11	SA-6	TRUCK ROUTE
12	EC-1	TEMPORARY SEDIMENT EROSION CONTROL PLAN
13	EC-2	TEMPORARY SEDIMENT EROSION CONTROL DETAILS
14	D-1	PILOT DREDGING AREA PLAN
15	D-2	DREDGE CROSS SECTIONS A, B AND C
16	D-3	DREDGE CROSS SECTIONS D, E AND F
17	R-1	RESTORATION PLAN
18	R-2	RESTORATION DETAILS

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

TITLE SHEET

G-1
REVISED

SHEET NO. 1 OF 18

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-G SERIES.dwg G-1
Apr 04, 2018 12:21pm tgriga

GENERAL NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BEFORE BEGINNING CONSTRUCTION AND WILL IMMEDIATELY INFORM THE SERVICE OF ANY DISCREPANCIES FOUND BETWEEN THE PROJECT PLANS AND CONTRACT SPECIFICATIONS PRIOR TO PROCEEDING WITH THE WORK.
2. CONTRACTOR SHALL STRICTLY ENFORCE ALL APPLICABLE HEALTH AND SAFETY LAWS (I.E. OSHA) AND MAINTAIN SITE SECURITY.
3. CONSTRUCTION KICK-OFF MEETING WITH THE SERVICE, ENGINEER AND REGULATORY AGENCIES IS REQUIRED AFTER LIMITS OF WORK STAKE OUT AND PRIOR TO CONSTRUCTION ACTIVITIES TAKING PLACE.
4. CONTRACTOR SHALL FIELD VERIFY THE EXISTING CONDITIONS WITHIN THE LIMITS OF WORK AND WILL BE RESPONSIBLE FOR DETERMINING APPROPRIATE QUANTITIES AND REQUIRED MATERIALS TO COMPLETE THE WORK.
5. CLEARING TO BE LIMITED TO THE LIMITS OF WORK AS SHOWN ON THE PLANS.
6. THE HORIZONTAL DATUM SHALL BE BASED ON MARYLAND STATE PLANE, NAD83, U.S. SURVEY FEET. THE VERTICAL DATUM SHALL BE BASED ON NAVD88. THE HYDROGRAPHIC SURVEY WAS PERFORMED BY MARYLAND GEOLOGICAL SURVEY IN OCTOBER 2014. UPLAND TOPOGRAPHY WAS OBTAINED FROM HARFORD COUNTY MARYLAND GIS CATALOG (TOPOGRAPHIC MAPPING UPDATE 2013). SUPPLEMENTAL TOPOGRAPHIC SURVEY WITHIN THE LOD EXTENTS WAS PERFORMED BY MARYLAND ENVIRONMENTAL SERVICE IN JANUARY 2018.
7. CALL "MISS UTILITY" AT 1-800-257-7777 FORTY-EIGHT (48) HOURS PRIOR TO BEGINNING EXCAVATION OR DREDGING TO DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES.
8. UNDERWATER UTILITIES EXIST WITHIN THE MARKED RESTRICTED AREA. ADDITIONAL UNDERWATER UTILITIES MAY EXIST ELSEWHERE WITHIN THE PROJECT EXTENTS. CONTRACTOR SHALL FIELD VERIFY ANY IN-WATER UTILITIES, CROSSINGS OR POTENTIAL IMPEDIMENTS TO THE WORK AND TAKE ADEQUATE PRECAUTIONS TO AVOID THEM.
9. REPAIR TO UTILITIES OR PROPERTY DAMAGE AS A RESULT OF THE CONTRACTOR'S NEGLIGENCE OR METHOD OF OPERATION MUST BE MADE AT THE CONTRACTOR'S EXPENSE BEFORE CONTINUING WITH CONSTRUCTION.
10. ALL GRADING SHALL BE DONE IN SUCH A MANNER AS TO PROVIDE POSITIVE DRAINAGE. INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS, BUT THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT LOCATIONS AND ELEVATIONS OF THE LINES BY DIGGING TEST PITS BY HAND AT ALL UTILITY CROSSINGS, WELL IN ADVANCE OF TRENCHING. IF CLEARANCES ARE LESS THAN SHOWN OR SIX (6) INCHES, WHICHEVER IS LESS, CONTACT THE SERVICE IMMEDIATELY.
11. DISTURBED AREAS SHALL BE GRADED AND RESTORED TO ORIGINAL CONDITIONS. DISTURBED AREAS ADJACENT TO ESTABLISHED LAWNS SHALL BE SODDED. OTHER DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
12. THE CONTRACTOR SHALL OBEY ALL COUNTY HEIGHT, WEIGHT AND UNDERCLEARANCE RESTRICTIONS.
13. THE CONTRACTOR SHALL OPERATE WITHIN THE NOISE RESTRICTIONS DESCRIBED IN THE HARFORD COUNTY CODE, CHAPTER 193, SECTION 8.
14. ALL SITE ACTIVITIES INCLUDING BUT NOT LIMITED TO CLEARING, DREDGING, DEWATERING, WATER TREATMENT, TRANSPORTATION, AND DISPOSAL, SHALL FOLLOW ALL APPLICABLE PERMITS AND CONTRACT DOCUMENTS.
15. VEHICLES TRANSPORTING DEWATERED MATERIAL FROM THE STAGING AREA TO THE FINAL SELECTED INNOVATIVE REUSE AND BENEFICIAL USE LOCATION MUST FOLLOW POSTED SPEED LIMITS, TRAFFIC SIGNS AND SIGNALS, AND ALL COUNTY HEIGHT, WEIGHT AND UNDERCLEARANCE RESTRICTIONS.
16. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS NECESSARY FOR CONSTRUCTION NOT SUPPLIED BY THE SERVICE. THIS SHALL INCLUDE BUT NOT BE LIMITED TO: ANY REQUIRED NPDES, CITY OR COUNTY BUILDING PERMITS, OR ROADWAY PERMITS. THE COSTS FOR THE PERMITS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
17. CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENT CONTROL AND MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES AS NECESSARY TO COMPLY WITH COUNTY, STATE, AND FEDERAL LAWS AND REGULATIONS.

SEQUENCE OF CONSTRUCTION

1. ATTEND CONSTRUCTION KICK-OFF MEETING WITH THE SERVICE, ENGINEER AND REGULATORY AGENCIES AFTER LIMITS OF WORK STAKE OUT AND PRIOR TO CONSTRUCTION ACTIVITIES.
2. FIELD VERIFY ALL UTILITIES AND OTHER STRUCTURES AND FEATURES ALONG THE WORK AREAS. CONTACT MISS UTILITY AT 1-800-257-7777 A MINIMUM OF 48 HOURS PRIOR TO START OF DREDGING OR EXCAVATION.
3. CLEARING AND GRUBBING AS NECESSARY FOR THE INSTALLATION OF PERIMETER EROSION AND SEDIMENTATION CONTROLS.
4. INSTALL SILT FENCE, STABILIZED CONSTRUCTION ENTRANCE AND OTHER SEDIMENT CONTROLS.
5. REMAINING CLEARING AND GRUBBING WITHIN INSTALLED PERIMETER CONTROLS.
6. ROADWAY GRADING AND REPAIRS AND CONSTRUCT ADDITIONAL ACCESS ROADS AS NECESSARY.
7. GRADING FOR THE REMAINDER OF SITE REQUIRED FOR USE BY THE CONTRACTOR.
8. CONSTRUCTION OF STAGING AREA AND CONOWINGO POND ACCESS AREA.
9. MOBILIZATION OF DREDGING AND DEWATERING EQUIPMENT TO THE SITE.
10. HYDRAULIC DREDGING OF SEDIMENT FROM WITHIN THE PILOT DREDGING AREA, TRANSPORT OF MATERIAL TO AND DEWATERING OF DREDGED MATERIAL WITHIN THE STAGING AREA.
11. DEMOBILIZATION OF DREDGING AND DEWATERING EQUIPMENT.
12. OFFSITE TRANSPORT OF DEWATERED DREDGED MATERIAL FOR CONTRACTOR PROVIDED INNOVATIVE REUSE/BENEFICIAL USE END PRODUCT OR PROCESS.
13. REMOVAL OF TEMPORARY STAGING AREA, POND ACCESS AREA, AND ACCESS ROADWAY.
14. FINAL GRADING, LANDSCAPING AND STABILIZATION OF ALL DISTURBED AREAS.
15. APPROVAL BY APPROPRIATE INSPECTION/ENFORCEMENT AGENCIES PRIOR TO REMOVAL OF EROSION AND SEDIMENTATION CONTROLS.
16. REMOVAL OF EROSION AND SEDIMENTATION CONTROLS.

GENERAL LEGEND:

PROPOSED:

- PROPOSED POST-DREDGE BATHYMETRIC CONTOUR IN FEET (NAVD88, 1' INTERVAL)
- HAUL ROUTE
- PIPELINE ROUTE
- SITE ACCESS ROAD
- STAGING AREA

EXISTING:

- TOPOGRAPHIC CONTOUR IN FEET (NAVD88, INTERVAL VARIES BY DRAWING)
- BATHYMETRIC CONTOUR IN FEET (NAVD88, 1' INTERVAL)
- BUILDING/STRUCTURE
- FLOODPLAIN (100-YEAR)
- PARCEL (HARFORD CO.)
- RESTRICTED AREA
- ROAD/DRIVEWAY (PRIVATE)
- ROAD (HARFORD CO.)
- C-9 SEDIMENT SAMPLE LOCATION
- SHORELINE
- STREAM

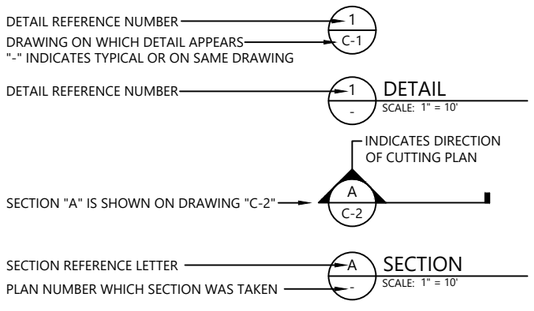
EROSION CONTROL LEGEND:

- LOD — LIMIT OF DISTURBANCE (LOD)
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE (SCE)

ABBREVIATIONS:

@	AT
℄	CENTERLINE
Δ	DELTA
°	DEGREE
'	FEET
"	INCHES
AC	ASPHALT CONCRETE
ALIGN	ALIGNMENT
AVE	AVENUE
CB	CATCH BASIN
CONC.	CONCRETE
CONST.	CONSTRUCT
CT	COURT
DIA	DIAMETER
DR	DRIVE
DIP	DUCTILE IRON PIPE
E	EAST
EL	ELEVATION
EXIST.	EXISTING
FT	FEET
H	HEIGHT
HMAC	HOT MIX ASPHALT CONCRETE
HORIZ.	HORIZONTAL
ID	IDENTIFICATION
I.D.	INSIDE DIAMETER
IE	INVERT ELEVATION
LN	LANE
LR	LEFT AND RIGHT
LF	LINEAR FEET
MAX.	MAXIMUM
MH	MANHOLE
MIN.	MINIMUM
N	NORTH
NE	NORTH EAST
N.T.S.	NOT TO SCALE
OHWL	ORDINARY HIGH WATER LINE
P.C.	POINT ON CURVE
PKWY.	PARKWAY
PVMT.	PAVEMENT
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PC	POINT OF CURVATURE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RMP	REINFORCED METAL PIPE
RT	RIGHT
S	SOUTH OR SLOPE
SDMH	STORM DRAIN MANHOLE
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA.	STATION
STS.	STORM SEWER
ST	STREET
SW	SOUTHWEST
TOP	TOP OF PIPE
TSS	TEMPORARY SIGN SUPPORT
TYP.	TYPICAL
VAR.	VARIES
VERT.	VERTICAL
VC	VERTICAL CURVE
W	WEST

DETAIL AND SECTION REFERENCING:



ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-G SERIES.dwg G-2
Apr 04, 2018 12:21pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

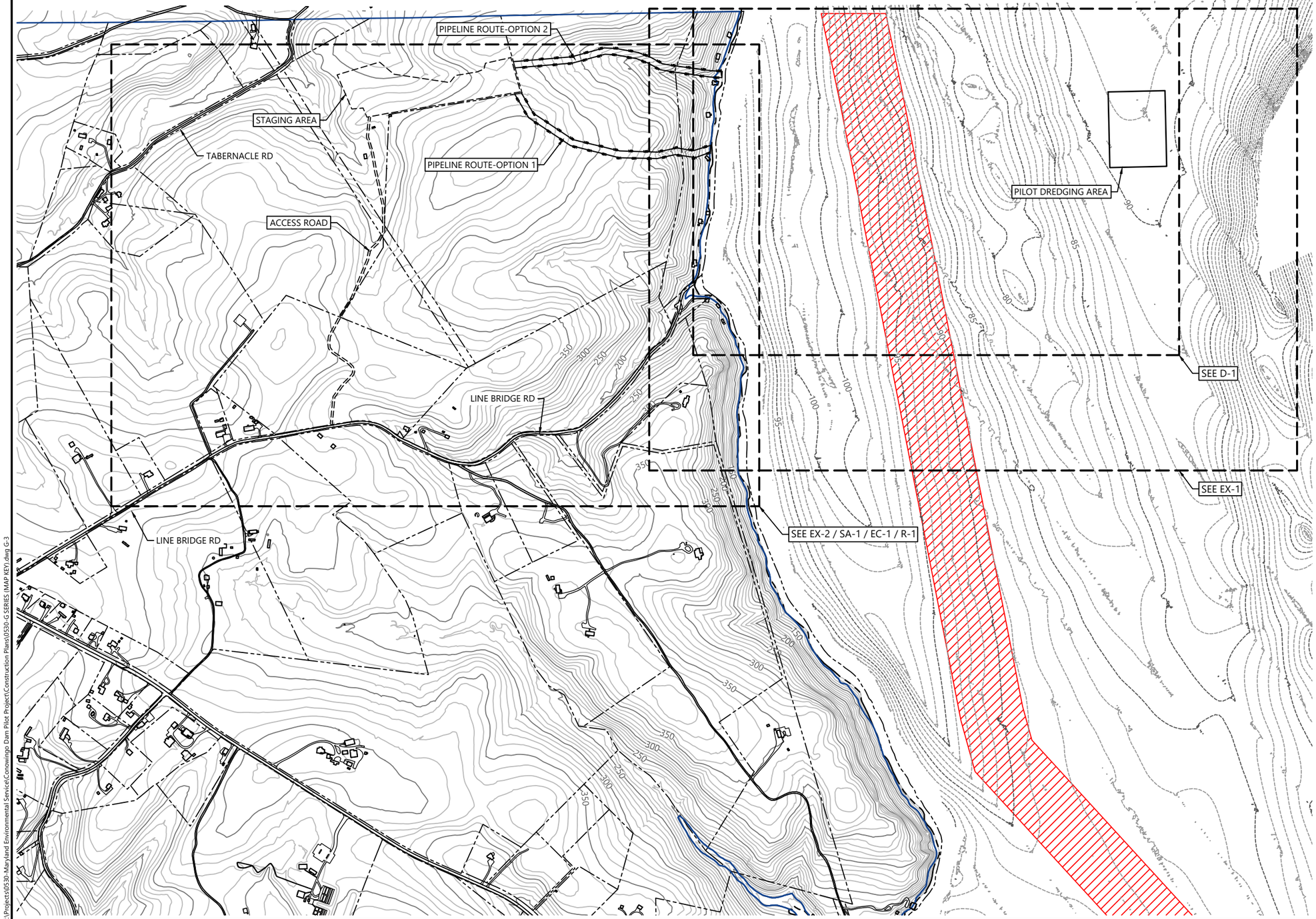
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

GENERAL NOTES, LEGEND AND ABBREVIATIONS

G-2
REVISED

SHEET NO. 2 OF 18



LEGEND:

EXTENT OF DRAWING COVERAGE

RESTRICTED AREA

NOTE:

NO ANCHORING, SPUDDING, OR DRAGGING ALLOWED WITHIN RESTRICTED AREA SHOWN. ALL PIPELINES MUST BE FLOATED ACROSS THIS AREA AND MAY NOT BE ON BOTTOM.

NORTH

0 400 800

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-G SERIES (MAP KEY).dwg G-3

Apr 04, 2018 12:22pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

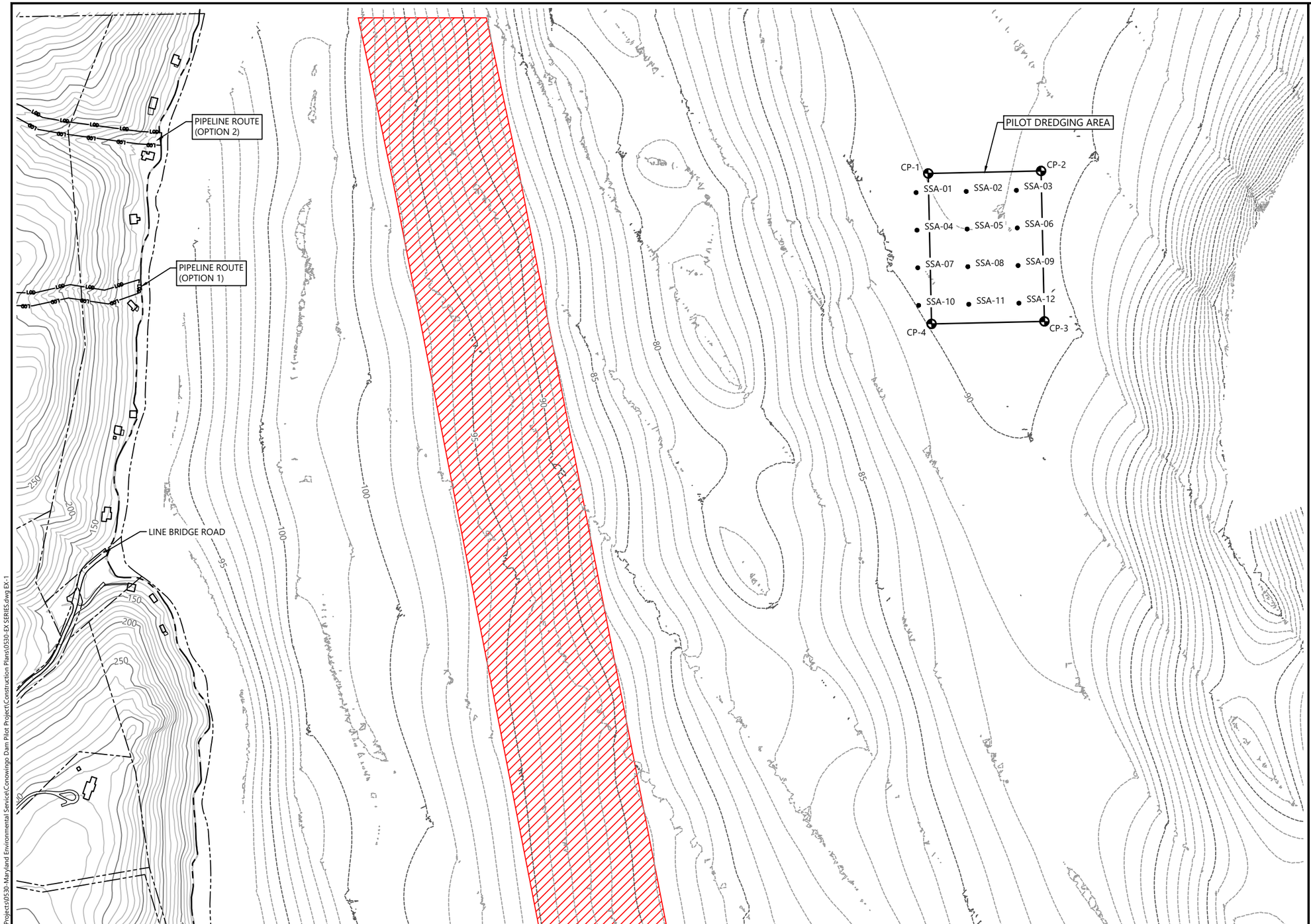
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

OVERALL KEY MAP

G-3
REVISED

SHEET NO. 3 OF 18



CONTROL POINTS		
POINT #	NORTHING	EASTING
CP-1	748561.1	1528590.3
CP-2	748571.1	1529040.1
CP-3	747971.2	1529053.4
CP-4	747961.2	1528603.5

GEOTECHNICAL CORES		
CORE #	NORTHING	EASTING
SSA-01	748485.0	1528541.9
SSA-02	748489.4	1528741.9
SSA-03	748493.9	1528941.8
SSA-04	748335.0	1528545.3
SSA-05	748339.5	1528745.2
SSA-06	748343.9	1528945.2
SSA-07	748185.1	1528548.6
SSA-08	748189.5	1528748.2
SSA-09	748193.9	1528948.5
SSA-10	748035.1	1528551.9
SSA-11	748039.5	1528751.9
SSA-12	748044.0	1528951.8

LEGEND:

RESTRICTED AREA

NOTE:

NO ANCHORING, SPUDDING, OR DRAGGING ALLOWED WITHIN RESTRICTED AREA SHOWN. ALL PIPELINES MUST BE FLOATED ACROSS THIS AREA AND MAY NOT BE ON BOTTOM.

NORTH

0 200 400

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-EX SERIES.dwg EX-1

Apr 04, 2018 12:24pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

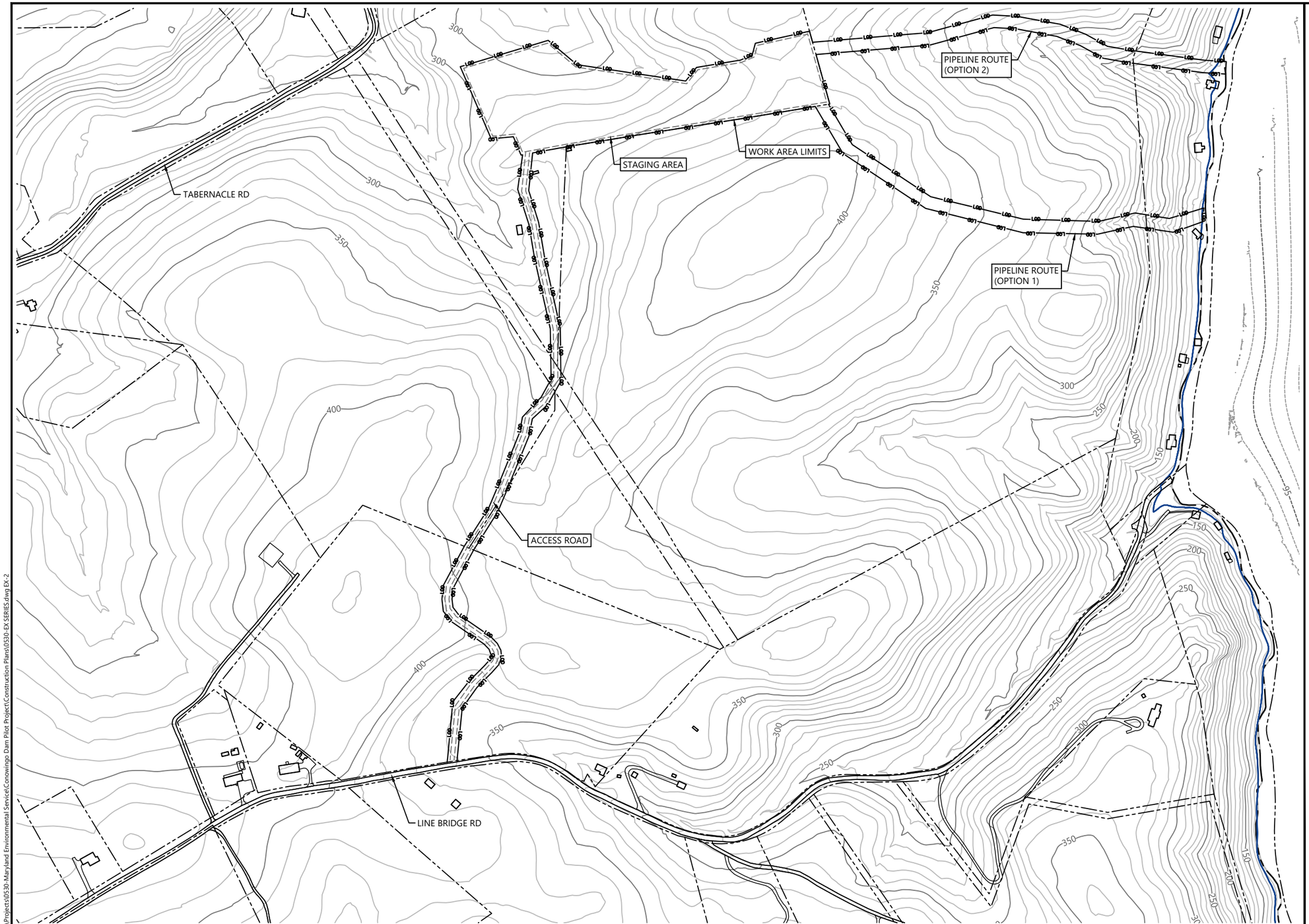
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

EXISTING CONDITIONS - DREDGE AREA

EX-1
REVISED

SHEET NO. 4 OF 18



NOTE:

THE CONTRACTOR IS RESPONSIBLE FOR DELINEATING, CHARACTERIZING AND TESTING THE PROPOSED STAGING AREA FOR CONSTRUCTION PURPOSES.

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-EX SERIES.dwg EX-2

Apr 04, 2018 12:25pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

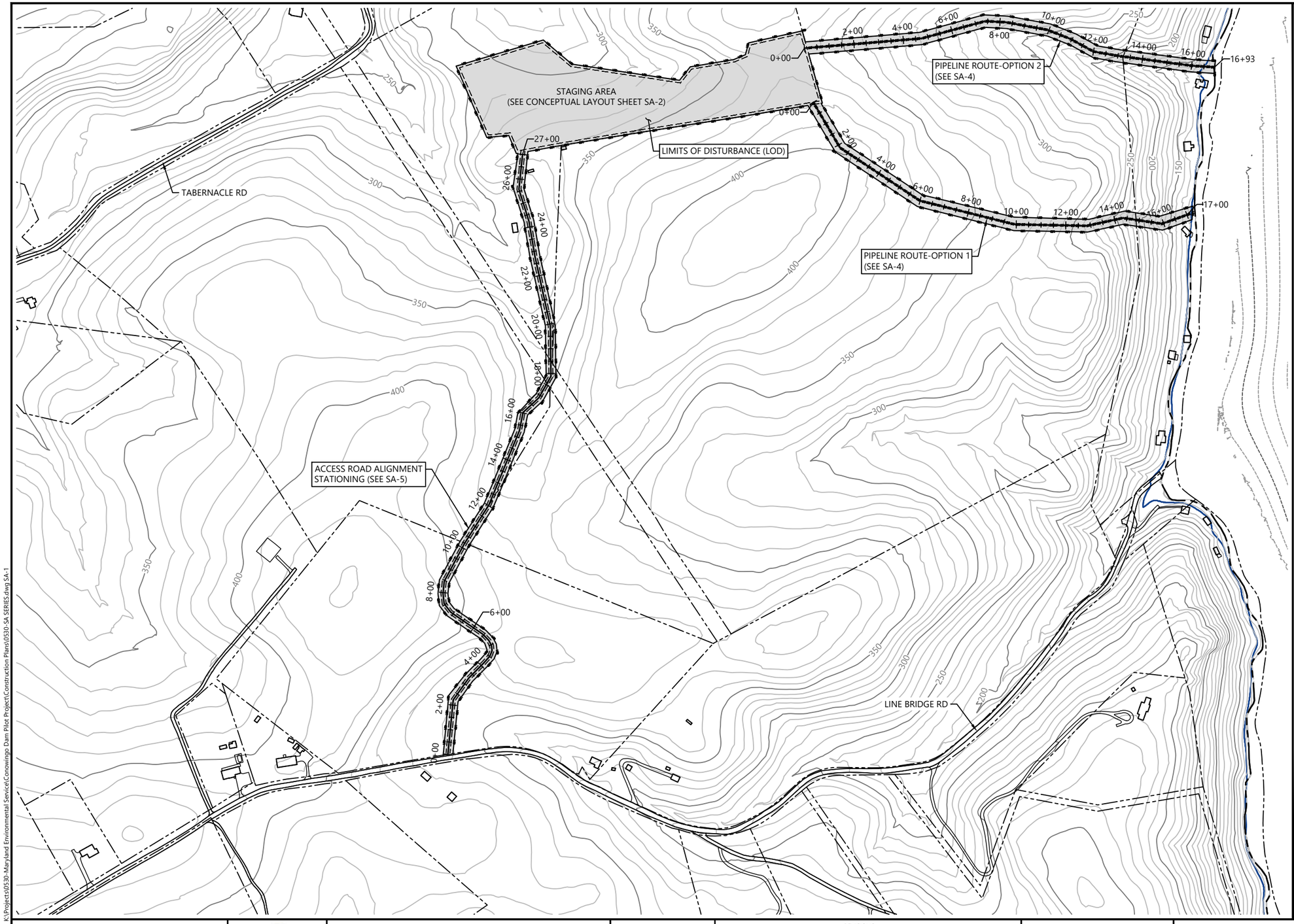
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

EXISTING CONDITIONS - STAGING AREA

EX-2
REVISED

SHEET NO. 5 OF 18



NOTES:

1. STAGING AREA AND PIPELINE ROUTES SHOWN ARE SUBJECT TO CHANGE BASED ON FINAL ACCESS AGREEMENTS.
2. MULTIPLE LOW ELECTRICAL LINE CROSSINGS EXIST ON LINE BRIDGE ROAD. CONTRACTOR TO VERIFY CLEARANCES AND COORDINATE ANY NECESSARY RAISING OR RELOCATIONS NECESSARY FOR EQUIPMENT.
3. PIPELINE ROUTES ARE POSSIBLE OPTIONS FOR PLACEMENT OF HYDRAULIC SLURRY AND WATER RETURN PIPELINES BETWEEN CONOWINGO POND AND THE CONCEPTUAL STAGING AREA. OPTION 1 REQUIRES CLEARING A ROUTE FROM THE STAGING AREA SOUTHEAST DOWN THE SLOPE TO THE WATER SURFACE FOR POND ACCESS, THIS OPTION PRESENTS POSSIBILITY FOR EQUIPMENT ACCESS TO THE SHORELINE. OPTION 2 INCLUDES A STRAIGHT LINE ROUTE TO WATER ACCESS, DUE TO THE EXISTING STEEP SLOPE IT IS ANTICIPATED THAT EQUIPMENT ACCESS AND EXTENSIVE TREE CLEARING MAY NOT BE POSSIBLE IN THIS CONFIGURATION.
4. IN-WATER PIPELINE ROUTING AS WELL AS ANY BOOSTER PUMP LOCATIONS SHALL BE PROPOSED TO THE SERVICE FOR APPROVAL PRIOR TO INSTALLATION.
5. CONTRACTOR SHALL COORDINATE WITH THE SERVICE PRIOR TO PERFORMING TREE REMOVAL AS NEEDED THROUGHOUT THE EXTENTS OF THE LIMIT OF DISTURBANCE.
6. PIPELINE ROUTE OPTIONS CROSS PRIVATE PATH ACCESS TO CABINS ALONG THE SUSQUEHANNA POND SHORELINE. CONTRACTOR SHALL COORDINATE ACCESS FOR RESIDENTS DURING PIPELINE INSTALLATION AND PROVIDE UNIMPEDED ACCESS DURING ALL PHASES OF THE WORK. ACCESS SHALL INCLUDE, AT A MINIMUM, CONSTRUCTION OF PIPELINE CROSSINGS FOR SAFE RESIDENT ACCESS DURING WORK.

NORTH

0 200 400
SCALE IN FEET

ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-SA SERIES.dwg SA-1

Apr 04, 2018 12:26pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

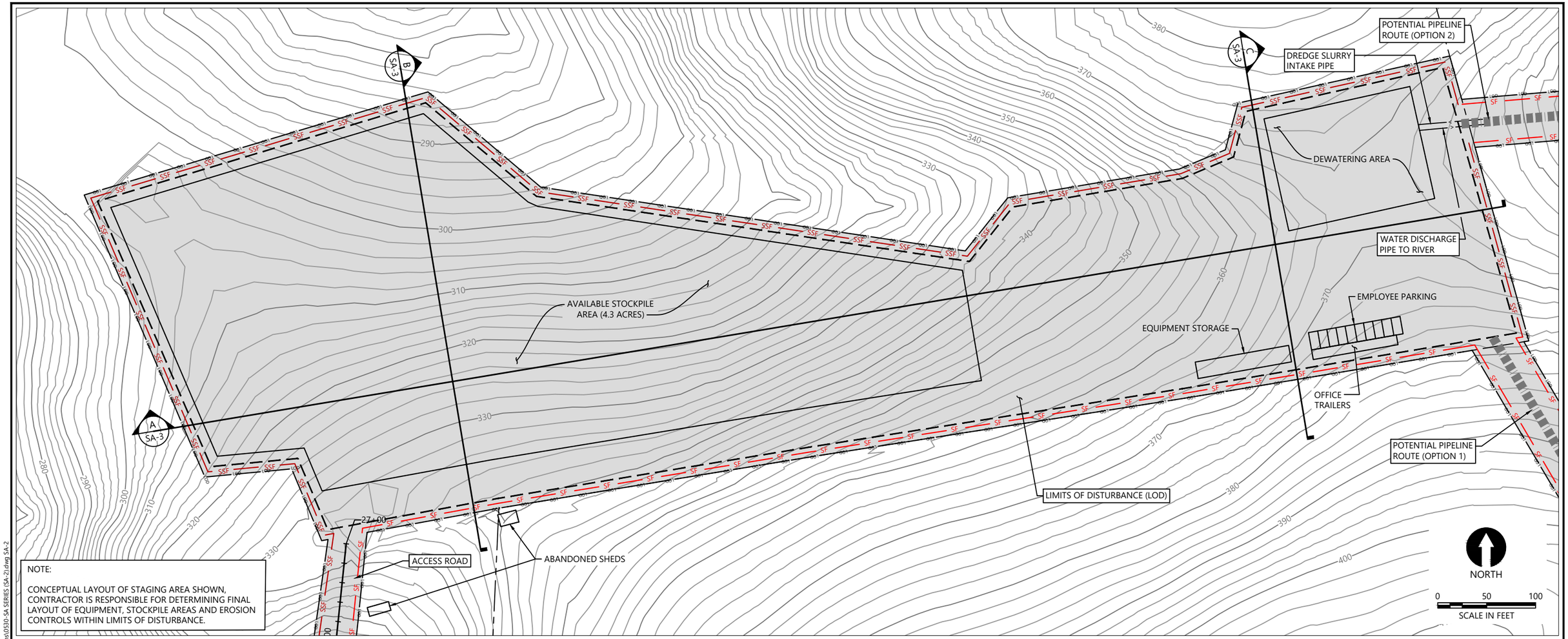
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

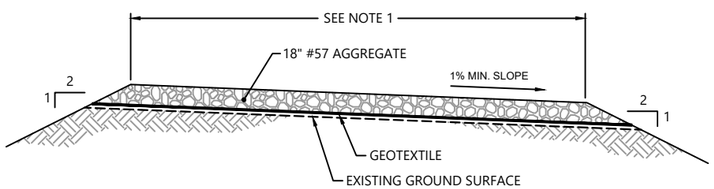
STAGING AREA, ACCESS AND PIPELINE ROUTES PLAN VIEW

SA-1
REVISED

SHEET NO. 6 OF 18



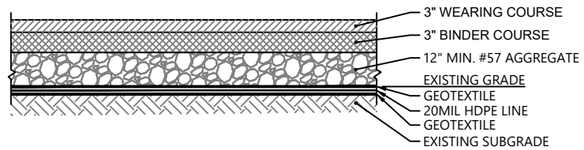
A SA-1 CONCEPTUAL LAYOUT OF STAGING AREA
SCALE: 1" = 50'



1 TYPICAL HAUL ROAD AND GENERAL STAGING LAYDOWN AREAS
SCALE: NOT TO SCALE

NOTES:

1. WIDTH DIMENSION VARIES TO ACCOMMODATE EXISTING FEATURES AND TOPOGRAPHY.
2. PLACEMENT OF FILL FOR ACCESS ROADS SHALL BE AS REQUIRED TO SUPPORT CONSTRUCTION EQUIPMENT.
3. SEE SECTION 01 50 00 - TEMPORARY ACCESS AND HAUL ROADS FOR DETAILS.



NOTES:

1. PAVEMENT DESIGN SHALL CONFORM TO THE MARYLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
2. SEE SPECIFICATIONS SECTION 01 50 00 - TEMPORARY ACCESS AND HAUL ROADS.
3. ALL MATERIAL STOCKPILE AND DEWATERING AREAS MUST INCORPORATE LINER.

2 TYPICAL STOCKPILE AND DEWATERING AREA DETAIL
SCALE: NOT TO SCALE

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-SA SERIES (SA-2).dwg SA-2
Apr 04, 2018 12:27pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

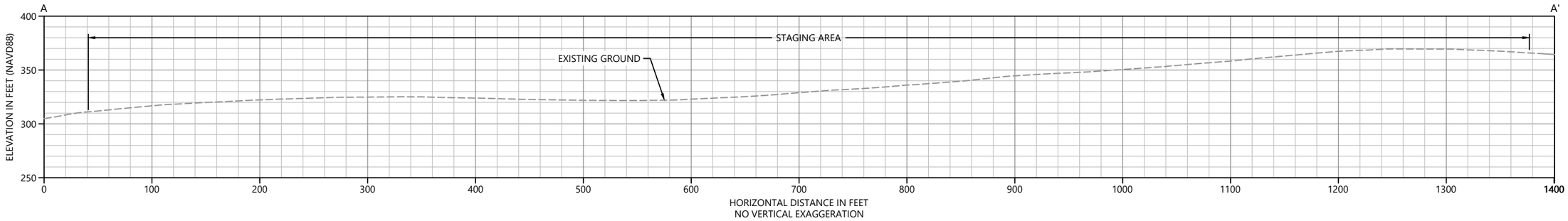
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

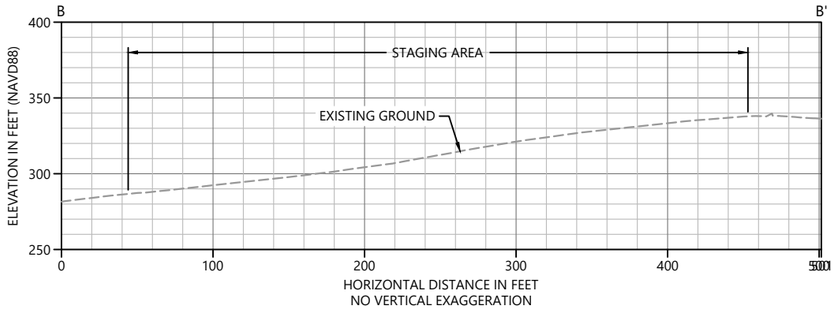
CONCEPTUAL LAYOUT OF STAGING AREA AND DETAILS

SA-2
REVISED

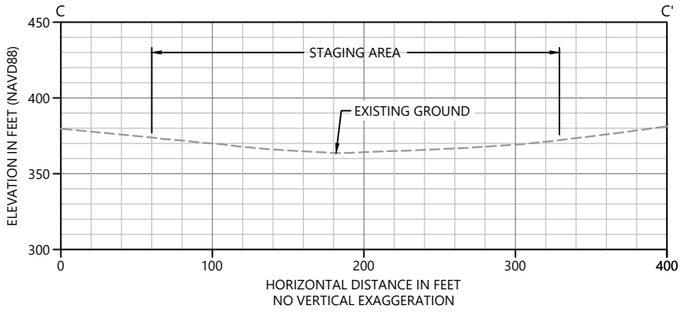
SHEET NO. 7 OF 18



A / SA-2 SECTION
SCALE: 1" = 50'



B / SA-2 SECTION
SCALE: 1" = 50'



C / SA-2 SECTION
SCALE: 1" = 50'

ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

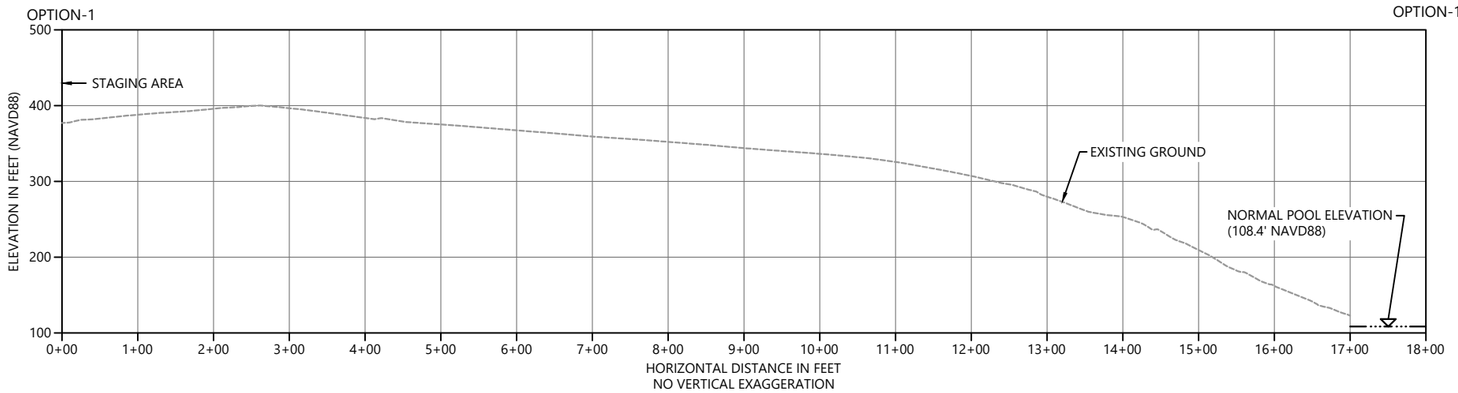
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

STAGING AREA SECTIONS A, B AND C

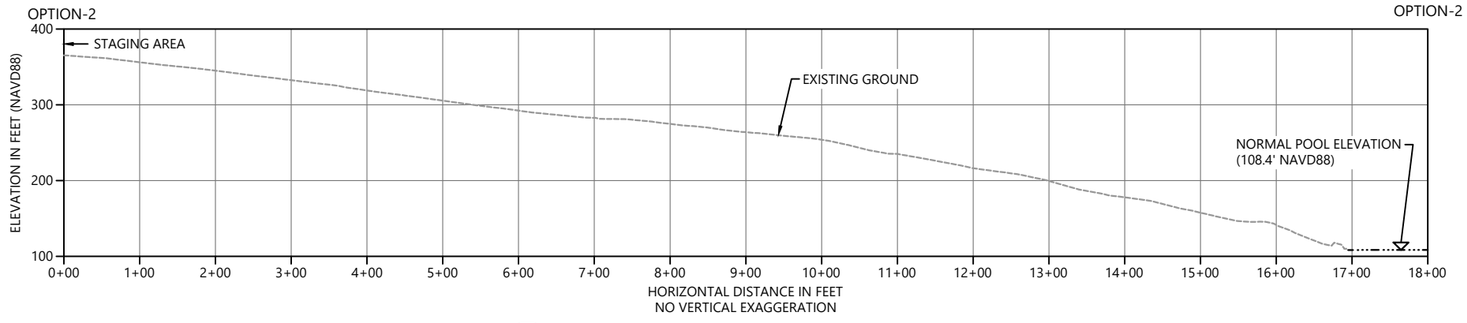
SA-3
REVISED

SHEET NO. 8 OF 18

Apr 04, 2018 12:27pm tgriga K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-SA SERIES (SA-2).dwg SA-3



- / SA-1 PROFILE ALONG PIPELINE ROUTE - OPTION 1
SCALE: 1" = 100'



- / SA-1 PROFILE ALONG PIPELINE ROUTE - OPTION 2
SCALE: 1" = 100'

ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

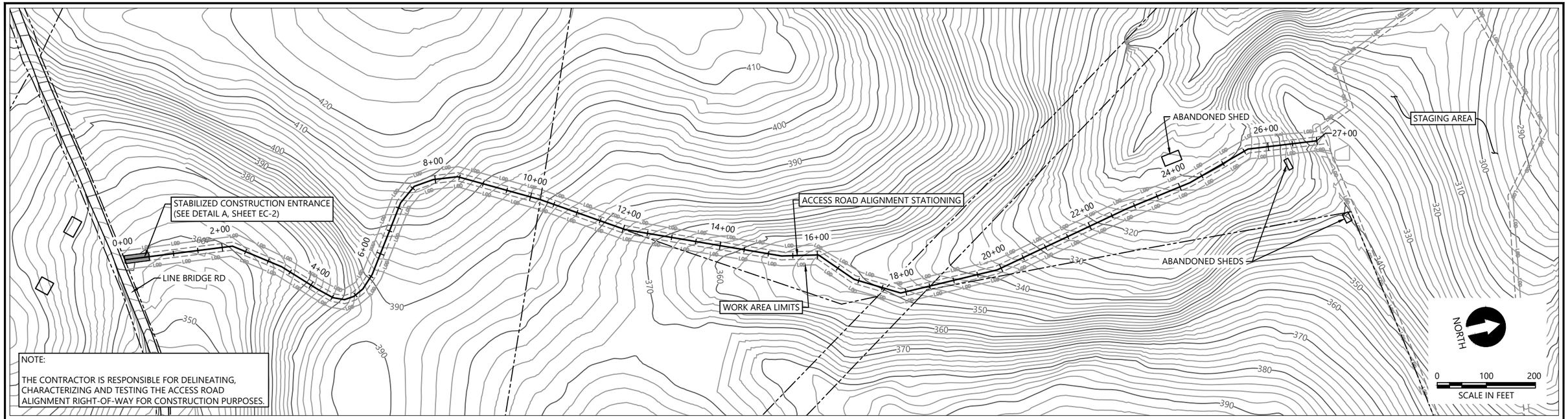
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

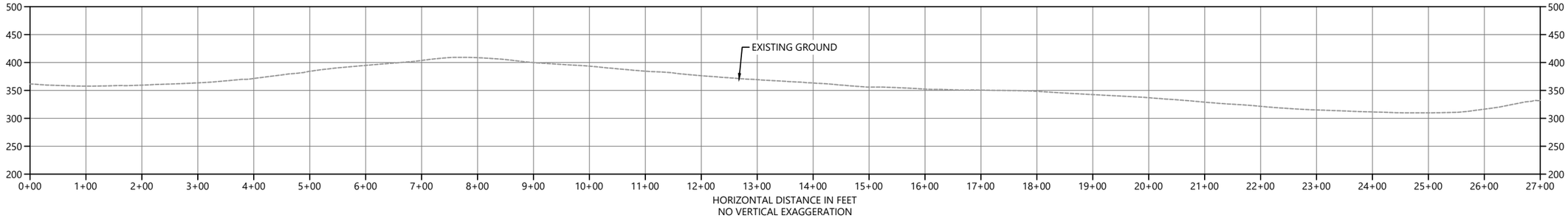
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

CONCEPTUAL PIPELINE ROUTE OPTIONS PROFILE VIEW

SA-4
REVISED
SHEET NO. 9 OF 18

Apr 04, 2018 12:29pm tgriga K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-SA SERIES.dwg SA-4





ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

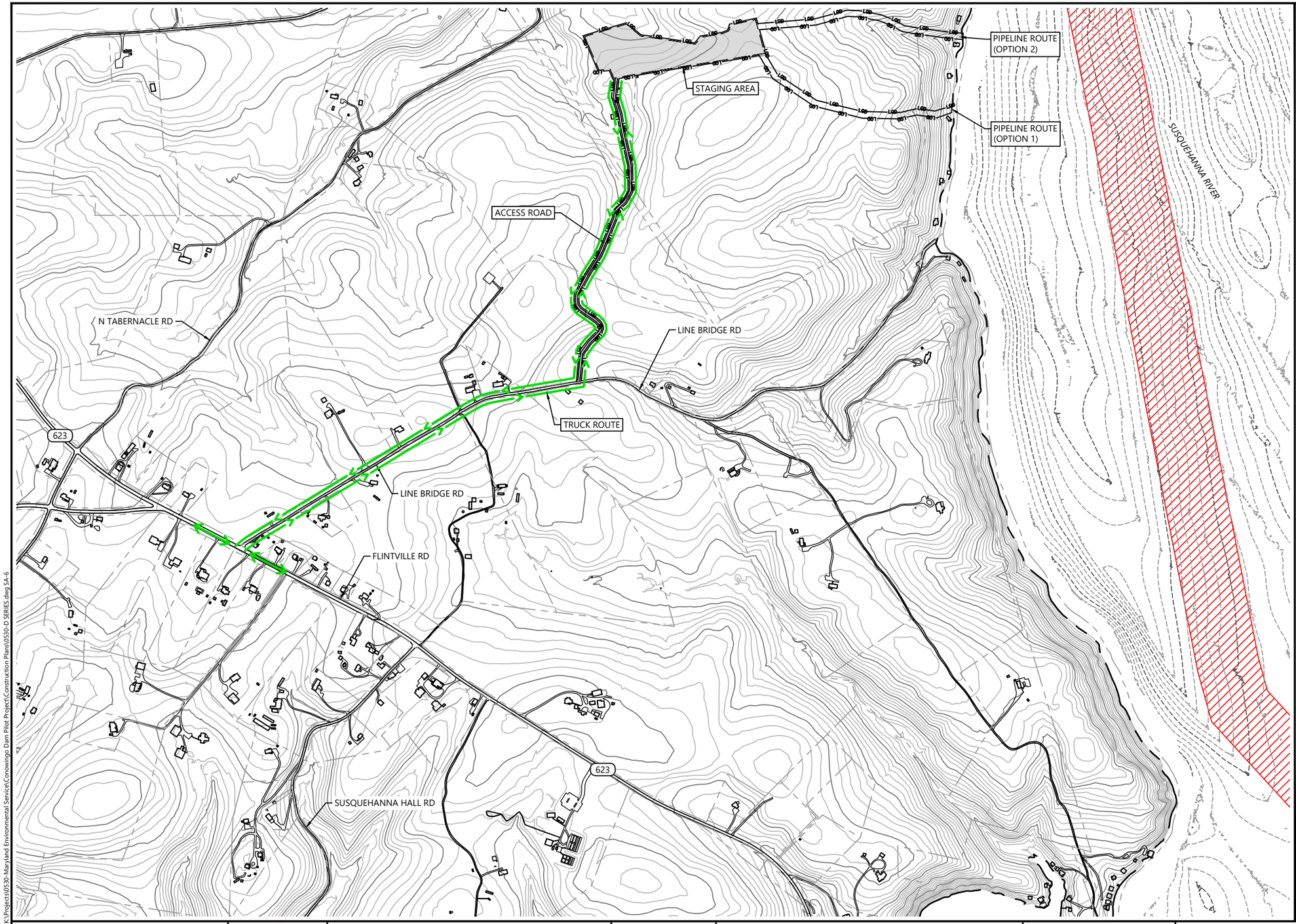
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

ACCESS ROAD PLAN AND PROFILE

SA-5
REVISED

SHEET NO. **10** OF **18**

Apr 04, 2018 12:29pm tgriga K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-AC SERIES.dwg SA-5



LEGEND:

RESTRICTED AREA

NOTES:

1. TRUCKING ROUTE PRESENTS MOST LIKELY ROUTE FROM STAGING AREA TO COUNTY ROUTE 623 FOR TRANSPORT AND FINAL END USE OF DEWATERED MATERIAL.
2. CONTRACTOR TO BE RESPONSIBLE FOR SELECTING FINAL END USE OF DEWATERED MATERIAL AND IDENTIFYING TRUCKING ROUTE TO FINAL DESTINATION THAT IS APPROPRIATE FOR TRUCK SIZE, QUANTITY AND BRIDGE LOADING CONSTRAINTS. CONTRACTOR TRUCK ROUTES MUST BE APPROVED BY THE SERVICE.
3. NO ANCHORING, SPUDDING, OR DRAGGING ALLOWED WITHIN RESTRICTED AREA SHOWN. ALL PIPELINES MUST BE FLOATED ACROSS THIS AREA AND MAY NOT BE ON BOTTOM.

NORTH

0 400 800

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-D SERIES.dwg SA-6

Apr 04, 2018 12:30pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

TRUCK ROUTE

SA-6
REVISED

SHEET NO. 11 OF 18

PIPELINE ROUTE (OPTION 2)

LIMITS OF DISTURBANCE (LOD)

STAGING AREA

ABANDONED SHEDS

PIPELINE ROUTE (OPTION 1)

ACCESS ROAD

LINE BRIDGE RD

STABILIZED CONSTRUCTION ENTRANCE

EROSION CONTROL LEGEND:

- LOD — LIMIT OF DISTURBANCE (LOD)
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE (SCE)

GENERAL LEGEND:

- SLOPES STEEPER THAN 15%

PROPOSED:

- PIPELINE ROUTE
- STAGING AREA

EXISTING:

- TOPOGRAPHIC CONTOUR IN FEET (NAVD88, 10' INTERVAL)
- BATHYMETRIC CONTOUR IN FEET (NAVD88, 1' INTERVAL)
- BUILDING/STRUCTURE
- FLOODPLAIN (100-YEAR)
- PARCEL (HARFORD CO.)
- ROAD/DRIVEWAY (PRIVATE)
- ROAD (HARFORD CO.)
- SHORELINE
- STREAM

NORTH

0 200 400

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-EC SERIES.dwg EC-1

Apr 04, 2018 12:32pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

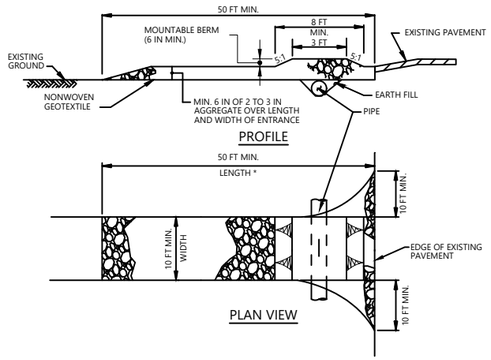
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

TEMPORARY SEDIMENT EROSION CONTROL PLAN

EC-1
REVISED

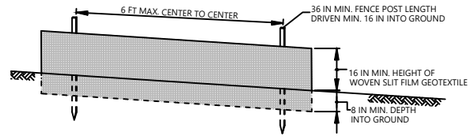
SHEET NO. 12 OF 18



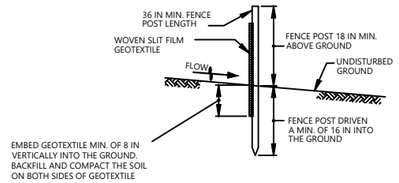
STABILIZED CONSTRUCTION ENTRANCE CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

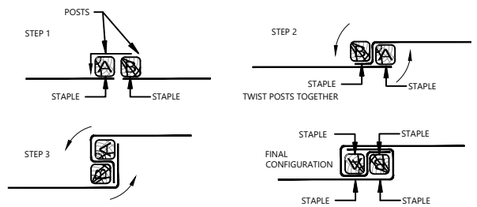
A — STABILIZED CONSTRUCTION ENTRANCE
SCALE: NOT TO SCALE



ELEVATION



CROSS SECTION

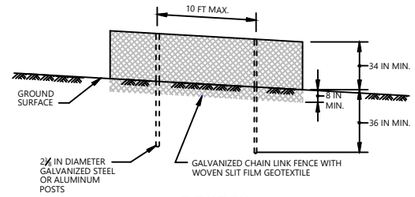


JOINING TWO ADJACENT SILT FENCE SECTIONS (TOP VIEW)

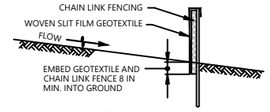
SILT FENCE CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1½ X 1½ ± 1/16 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

B — SILT FENCE
SCALE: NOT TO SCALE



ELEVATION

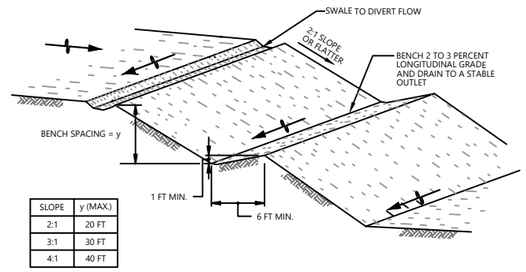


CROSS SECTION

CONSTRUCTION SPECIFICATIONS

1. INSTALL 2½ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2½ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HOG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

C — SUPER SILT FENCE
SCALE: NOT TO SCALE



SLOPE	y (MAX.)
2:1	20 FT
3:1	30 FT
4:1	40 FT

CONSTRUCTION SPECIFICATIONS

1. USE FILL MATERIAL FREE OF BRUSH, RUBBISH, ROCKS, LOGS, STUMPS, BUILDING DEBRIS, AND OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
2. DO NOT INCORPORATE FROZEN, SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS INTO FILL SLOPES OR STRUCTURAL FILLS. DO NOT PLACE FILL ON A FROZEN FOUNDATION.
3. PLACE ALL FILL IN LOOSE LIFTS NOT TO EXCEED 8 INCHES AND THEN COMPACT.
4. COMPACT ALL FILLS AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, OR OTHER RELATED PROBLEMS. COMPACT FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES, CONDUITS, ETC., IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
5. HANDLE SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION IN ACCORDANCE WITH SECTION H-2 SUBSURFACE DRAINS OR OTHER APPROVED METHODS.
6. MAINTAIN LINE, GRADE, AND CROSS SECTION OF BENCHING. STABILIZE IN ACCORDANCE WITH THE 3/7 DAY STABILIZATION CRITERIA OR AS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN. INSTALLATION OF EROSION CONTROL MATTING MAY BE NECESSARY IN BENCH/SWALE INVERTS. CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
7. KEEP ALL BENCHES FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.

D — BENCHING DETAIL
SCALE: NOT TO SCALE

ISSUED FOR PERMITTING

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

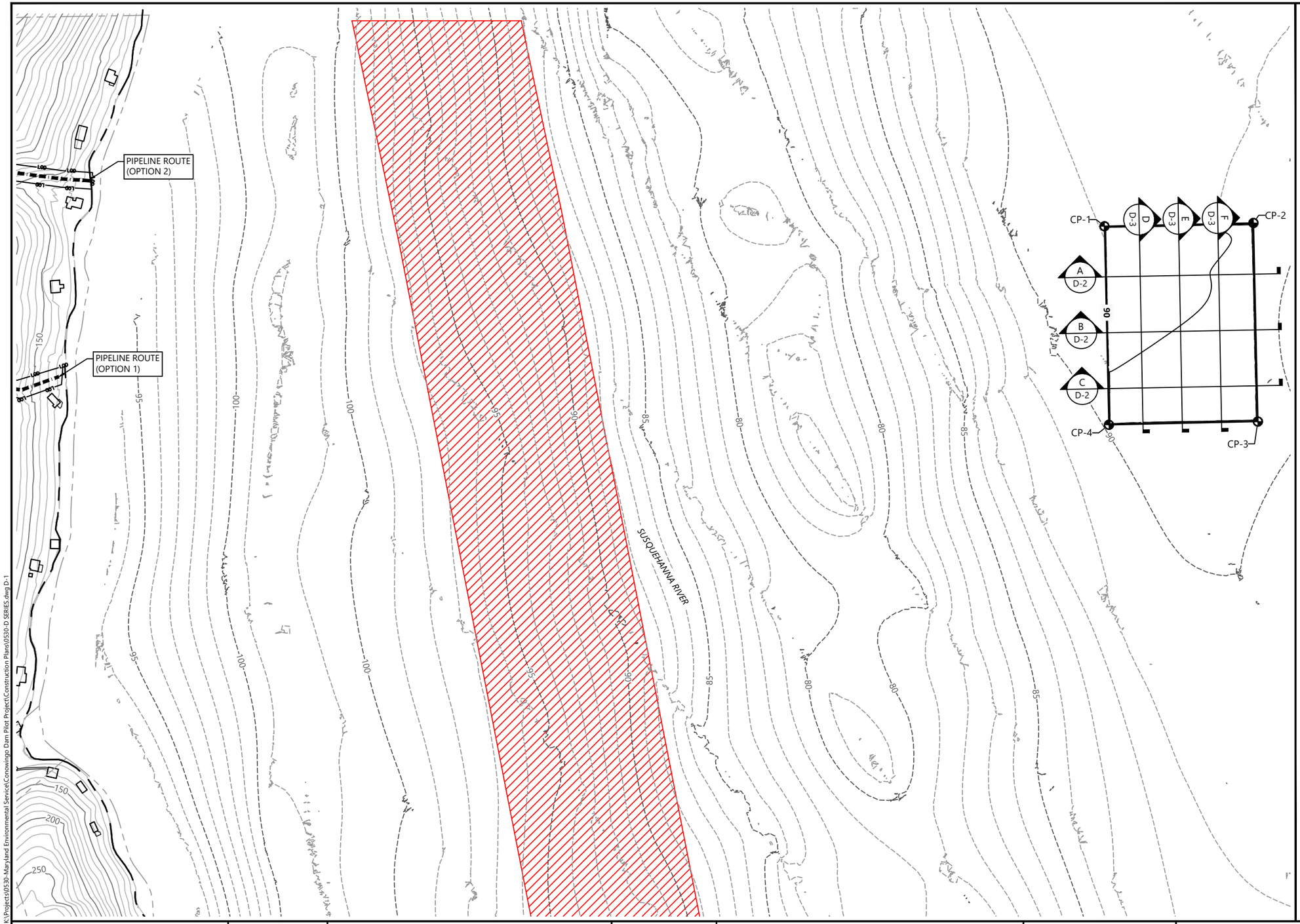
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

TEMPORARY SEDIMENT EROSION CONTROL DETAILS

EC-2

SHEET NO. 13 OF 18

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-EC SERIES-DETAILS.dwg EC-2
Apr 04, 2018 12:32pm tgriga



LEGEND:

RESTRICTED AREA

NOTE:

NO ANCHORING, SPUDDING, OR DRAGGING ALLOWED WITHIN RESTRICTED AREA SHOWN. ALL PIPELINES MUST BE FLOATED ACROSS THIS AREA AND MAY NOT BE ON BOTTOM.

CONTROL POINTS		
POINT #	NORTHING	EASTING
CP-1	748561.1	1528590.3
CP-2	748571.1	1529040.1
CP-3	747971.2	1529053.4
CP-4	747961.2	1528603.5

NORTH

0 150 300

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-D SERIES.dwg D-1

Apr 04, 2018 12:33pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

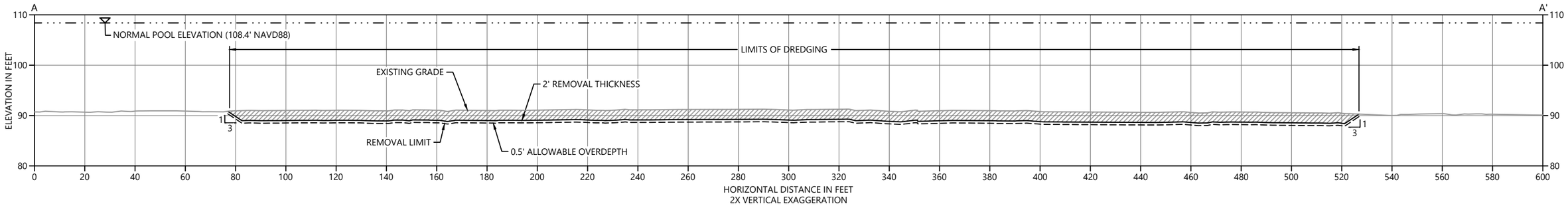
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

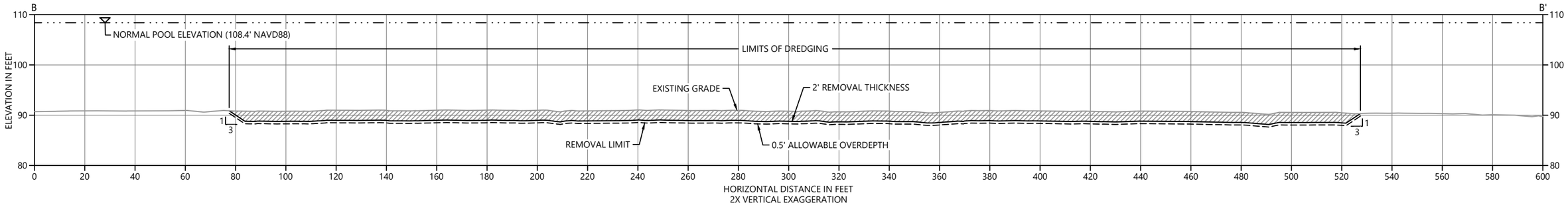
PILOT DREDGING AREA PLAN

D-1
REVISED

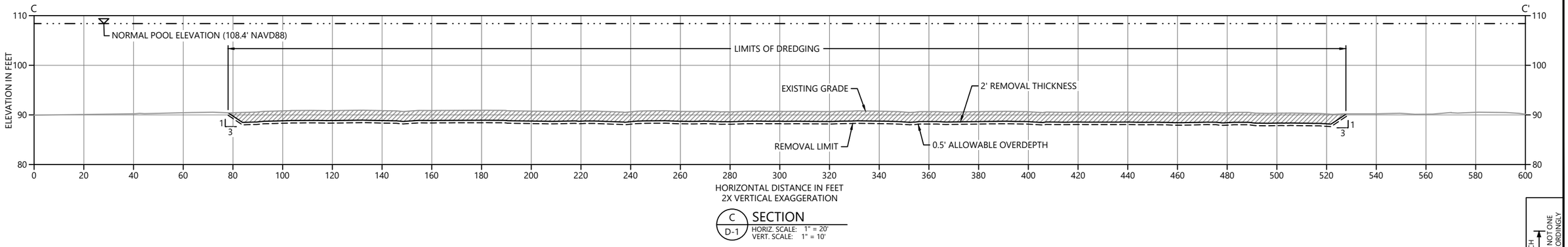
SHEET NO. 14 OF 18



A / D-1 SECTION
HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'



B / D-1 SECTION
HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'



C / D-1 SECTION
HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-D SERIES.dwg D-2
Apr 04, 2018 12:33pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

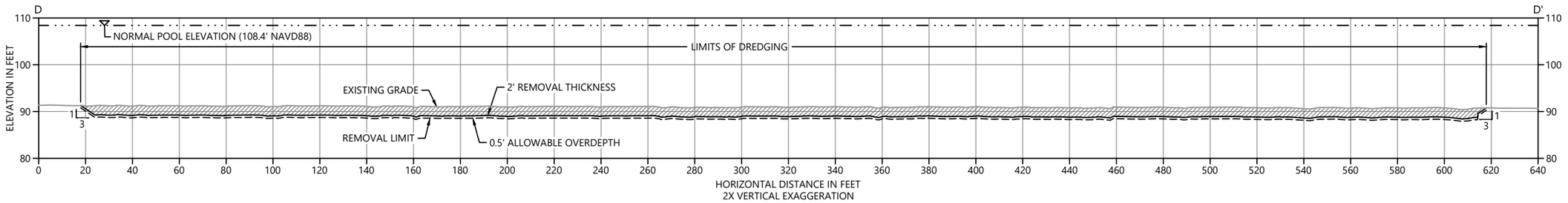
DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

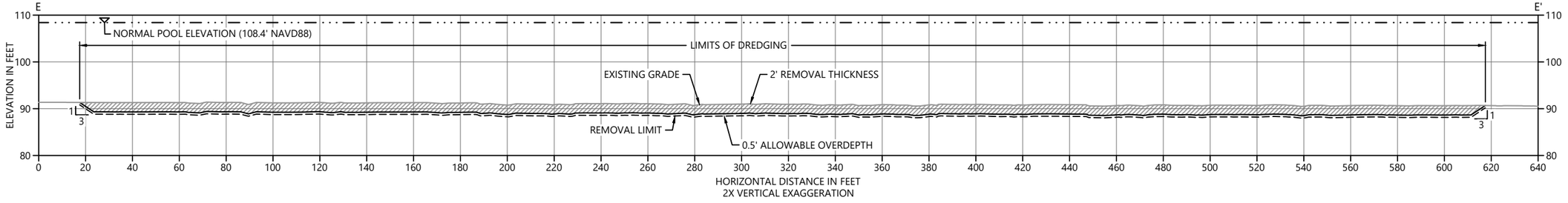
DREDGE CROSS SECTIONS A, B AND C

D-2
REVISED

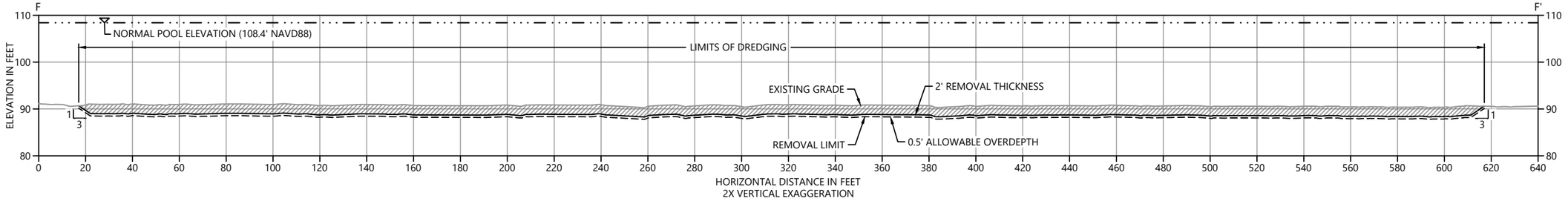
SHEET NO. 15 OF 18



D / D-1 SECTION
HORIZ. SCALE: 1" = 24'
VERT. SCALE: 1" = 12'



E / D-1 SECTION
HORIZ. SCALE: 1" = 24'
VERT. SCALE: 1" = 12'



F / D-1 SECTION
HORIZ. SCALE: 1" = 24'
VERT. SCALE: 1" = 12'

ONE INCH
AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

DREDGE CROSS SECTIONS D, E AND F

D-3
REVISED

SHEET NO. 16 OF 18

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-D SERIES.dwg D-3
Apr 04, 2018 12:33pm tgriga

RESTORATION AREA

LINE BRIDGE RD

NOTE:

FOLLOWING COMPLETION OF DREDGING AND DEWATERING OPERATIONS AND AFTER STAGING AREA HAS BEEN CLEARED AND CLEANED AND PRIOR TO REMOVING ECS, CONTRACTOR TO RESTORE ALL AREAS WITHIN THE LIMITS OF DISTURBANCE TO ORIGINAL CONDITIONS WHICH MAY INCLUDE GRADING, PLACEMENT OF FILL AND/OR TOPSOIL, SEEDING AND TREE REPLANTING.

LEGEND:

- RESTORE AREA TO ORIGINAL CONDITION
- SELECTIVE REPLANTING AREA
- FULL REPLANTING AREA

NORTH

0 200 400

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

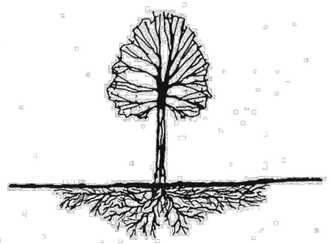
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

RESTORATION PLAN

R-1
REVISED

SHEET NO. 17 OF 18

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-R-SERIES.dwg R-1
Apr 04, 2018 12:35pm tgriga



PREVENT THE FOLLOWING IMPACTS:

CROWN
- Broken or damaged limbs
- Wounds to bark
- Disease/insect infestation
- Upper crown dieback

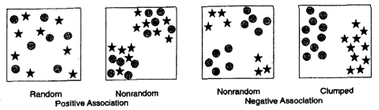
TRUNK
- Sun scald
- Wounds to bark
- Disease/insect infestation
- Wind-throw

CRITICAL ROOT ZONE
- Tearing/removal/crushing/burial
- Soil compaction
- Flooding
- Dessication
- Toxins
- Changes in soil pH
- Removal of understory

Source: Adapted from Forest Conservation Manual, 1991

Protecting Trees During Construction — **Figure A:17**

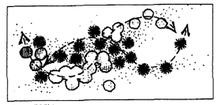
Typical Forest Tree Distribution Patterns



Note:
Naturally occurring populations of trees tend to be found in informal groupings. A cluster of trees is really a mosaic of different species groups. The objective of an afforestation/reforestation plan is to select the appropriate species and distribution pattern for a chose site that mimic natural patterns.

Source: Prince Georges County Woodland Conservation Manual.

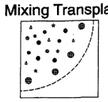
Aggregate Distribution Drift



Note:
When used, plant cluster type groupings that taper or feather out along the edges. Clusters often appear as elongated or tear drop shapes.

Source: EQR, Inc.

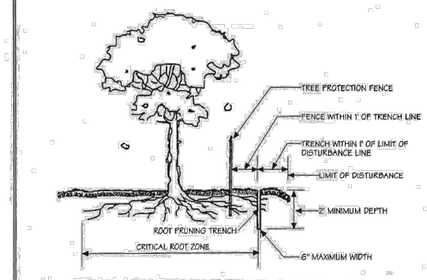
Mixing Transplant Stock



- Locate larger trees (B&B or container grown) or transplant stock at the perimeter of reforestation/afforestation plantings of whips, seedling grown stock.
- Protective Fencing
- Smaller Stock

Source: Adapted from Forest Conservation Manual, 1991

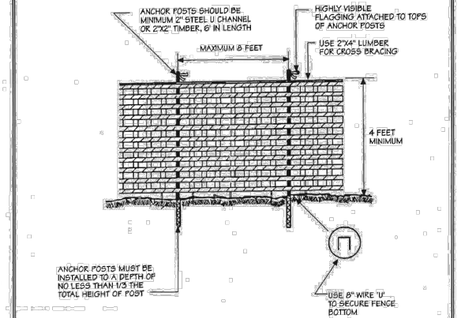
Planting Distribution Patterns — **Figure A:19**



Notes:
1. Retention Areas to be established as part of the forest conservation plan review process.
2. Boundaries of Retention Areas to be staked, flagged and/or fenced prior to trenching.
3. Exact location of trench should be identified.
4. Trench should be immediately backfilled with soil removed or organic soil.
5. Roots should be cleanly cut using vibratory knife or other acceptable equipment.

Source: Adapted from Steve Clark & Associates/ACRT, Inc. and Forest Conservation Manual, 1991

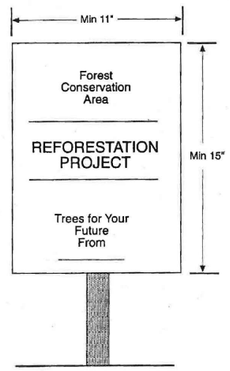
Root Pruning — **Figure D-1**



Notes:
1. Blaze orange or blue plastic mesh fence for forest protection device, only.
2. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device.
4. Avoid damage to critical root zone. Do not damage or sever large roots when installing posts.
5. Protection signs are required.
6. Device should be maintained throughout construction.

Source: Adapted from Prince George's County, Maryland Woodland Conservation Manual and Forest Conservation Manual, 1991

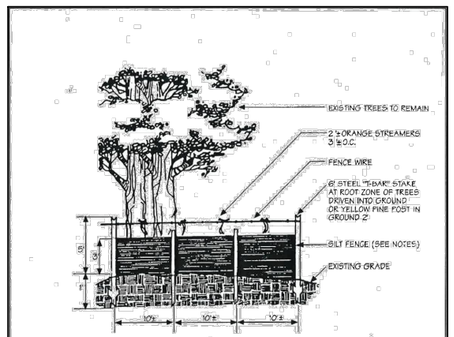
Plastic Mesh Tree Protection Fence — **Figure D-5**



Notes:
1. The signs notify construction workers and future residents of the newly planted material, improving the trees' survival rates.
2. Signs may be adapted by residents for identification of forest retention areas

Source: Adapted from Forest Conservation Manual, 1991

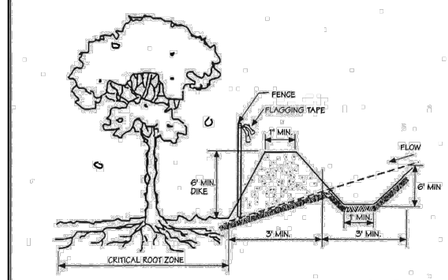
Reforestation and Afforestation Area Signs — **Figure D:21**



Notes:
1. Silt fence to be heeled into the soil.
2. Wire, snow fence, etc. for tree protection only.
3. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
4. Boundaries of Retention Area should be staked and flagged prior to installing device.
5. Avoid root damage when placing anchor posts.
6. Device should be properly maintained throughout construction.
7. Protection signs are also required.
8. Locate fence outside the Critical Root Zone.

Source: Adapted from Steve Clark & Associates/ACRT, Inc.

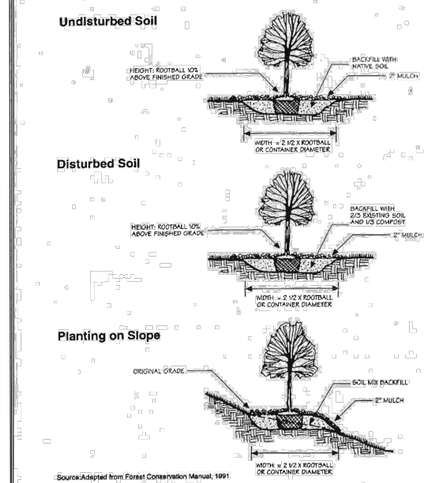
Silt Fence and Tree Protection — **Figure D:8**



Notes:
1. Combine sediment control and forest protection device.
2. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
3. Boundaries of Retention Area should be staked prior to installing protection device.
4. Root damage should be avoided.
5. Toe of slope should be outside the Critical Root Zone.
6. Equipment is prohibited within Critical Root Zone of Retention Area; place dike accordingly.
7. All standard maintenance for earth dikes and swales apply to these details.
8. All standard reclamation practices for earth dikes and swales shall apply to these details.

Source: Adapted from Prince George's County, Maryland; Woodland Conservation Manual

Earth Dike and Swale Combination Device — **Figure D:9**



Source: Adapted from Forest Conservation Manual, 1991

Container Grown and B&B Planting Techniques — **Figure D:16**

1) Sign should be minimum 11" wide by minimum 15" high.
2) Bottom of signs to be higher than top of tree protection fence.
3) Signs to be placed approximately 50' apart. Conditions on site affecting visibility my warrant placing signs closer or father apart.
4) Attachment of signs to trees is prohibited.
5) The signs notify construction workers and future residents of the newly planted material improving the trees survival rates.
6) Signs may be adapted by residents for identification of forest retention areas.

DRAWINGS FOR REPLANTING ARE FOR CONSTRUCTION PURPOSES ONLY, FINAL INSPECTION AND VERIFICATION NECESSARY FOR PERMIT COMPLIANCE TO BE BASED ON FINAL PERMIT DRAWINGS

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ISSUED FOR PERMITTING

K:\Projects\0530-Maryland Environmental Service\Conowingo Dam Pilot Project\Construction Plans\0530-R-SERIES.dwg R-2

Apr 04, 2018 12:35pm tgriga

ANCHOR QEA

MARYLAND ENVIRONMENTAL SERVICE

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. REEMTS
DRAWN BY: D. HOLMER
CHECKED BY: R. MOHAN
APPROVED BY: W. DINICOLA
SCALE: AS NOTED
DATE: APRIL 4, 2018

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

RESTORATION DETAILS

R-2

SHEET NO. 18 OF 18

Attachment 2:

Dredging, Transport, & Dewatering Summary

Attachment 2: Hydraulic Dredging, Material Transport, and Dewatering Summary

Dredging

For the proposed Pilot Project, hydraulic dredging will be conducted in the Susquehanna River within the dredge area (Attachment 1, Figure EX-1). The dredging depth will be 2.5 feet, which will result in a total dredging volume of 25,000 cubic yards.

Hydraulic dredging uses a floating dredge with a cutterhead or other attachment to loosen the sediment, mixing with site water, and then pumping the combined sediment and water slurry from the dredging location via pipeline to a landside staging area. Hydraulic dredging was selected as the method for dredging because it simplifies the transport and offloading of sediment and minimizes turbidity generation through the hydraulic collection and transport process. The proposed dredge area lies in water ranging from 18 feet to 20 feet and is subject to ongoing downstream current from the river. The combination of water depth, river currents, and sediment transport requires the use of a hydraulic dredge, and the cutterhead will minimize the likelihood of generating turbidity. It is anticipated that potential increases in turbidity will be minor, temporary, and localized at the point of dredging; therefore, turbidity curtains will not be necessary during dredging operations.

Booster Pump

To transport the dredged sediment from the target dredge area, the dredged material pipeline will run from the dredge, across the surface of the Susquehanna River, to the shoreline and up to the staging area for dewatering. Because the land surface slopes substantially toward the Susquehanna River from the staging area, it is anticipated that at least one booster pump will be located on a float in the nearshore area to provide the lift needed to get the material up to the staging area. Additional booster pumps may be required in the Susquehanna River, depending on final contractor plans and selected equipment. All in-water equipment, including the dredge, pipeline, booster pumps, and support vessels, will be marked and lighted at night according to US Coast Guard regulations.

Pipeline Options

There are two potential pipeline route options identified for this project (Attachment 1, Figure ES-2). Pipeline routes would support up to three 12-inch HDPE transport lines, including the dredged material slurry line, the return water line, and a potential secondary water intake line, as well as minor access for small equipment and personnel. Pipelines will be routed through the limit of disturbance (LOD) to avoid existing trees and to limit the extent of tree clearing wherever possible. Option 1 (the southern option) is approximately 1,750 linear feet and does not include any impacts to wetlands or streams. However, Option 1 includes a steep slope (greater than 2.5H:1V) that would severely restrict access for pipeline construction and maintenance. In addition, construction of the pipeline within the Option 1 LOD would have an increased potential for erosion along the steep slopes.

Option 2 (the northern option) is approximately 1,680 linear feet and does not include any impacts to wetlands or streams. This route follows an existing open gully with grades that are more conducive to access for pipeline construction and maintenance. Pipelines will be routed through existing trees as possible to limit tree clearing and the pipeline will be staked in place to prevent shifting or movement. The LOD will avoid an existing ephemeral stream and all work will be outside of the stream buffer. Therefore, because there are no impacts to existing

resources, the slopes are not steep, and less grading will be required for construction, Option 2 is the preferred pipeline access route.

Staging Area Dewatering Process

Once the dredged material enters the staging area via pipeline, the material runs through a series of steps to separate sediment particles from the transport water in the mixture. The process at the staging area fully contains the water throughout the dewatering process, starting with the initial dredged material mixture until clear water is piped to the Susquehanna River through a separate pipeline. Figure 1 is a flow diagram that summarizes the general processes anticipated for the dewatering of the dredged sediment and handling of process water at the staging area. Exact details of the individual dewatering steps will vary slightly depending on the contractor-selected dewatering methods. Typical mechanical dewatering methods first remove the coarse material (sands and gravels) by screens, hydrocyclone, or other methods. Remaining fines suspended in the slurry are transported to belt filter presses or plate and frame presses for additional solids removal. Remaining water with limited fines would be directed to a clarifier or other settling system for final fines removal prior to discharge. Final discharge would utilize a pump from the clarifier to discharge clear water directly to the Susquehanna River via a separate discharge line following the same pipeline route. The discharge line will be run offshore and supported on floats to avoid bank erosion from the discharged water.

Staging Area Stormwater Management

To manage the dewatered sediments, construction of the staging area will include a constructed pad specifically for dredged material dewatering and material stockpiling that will be lined to collect site water. Supplemental site water, such as precipitation and any remaining free water draining from stockpiled sediments, will be collected from the staging area pad, run through the processing system before also being transported back to the Susquehanna River for discharge. Daily monitoring of turbidity in the discharge water will be conducted at the discharge point.

Attachment 2: Hydraulic Dredging, Material Transport, and Dewatering Summary

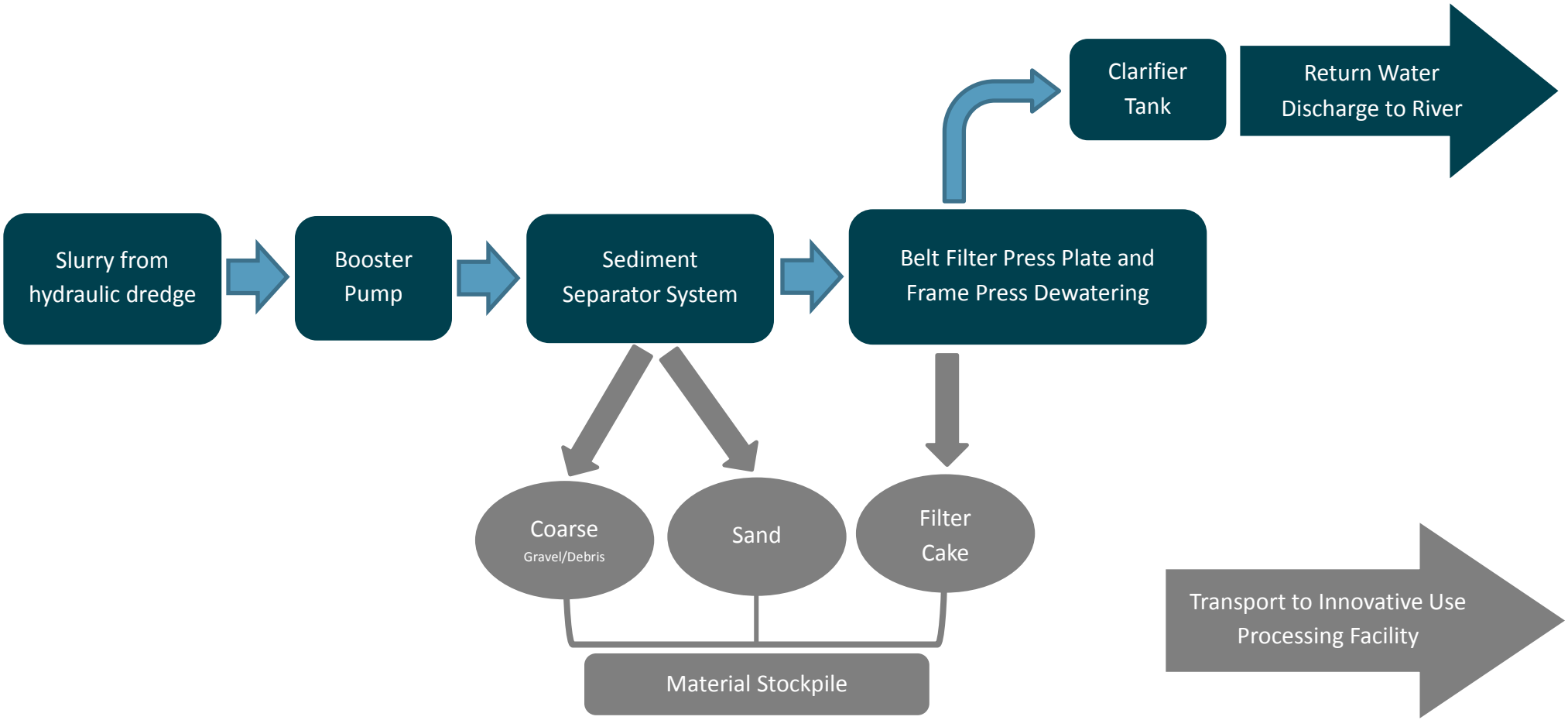


Figure 1. Dewatering process of the dredged material at the staging area

Attachment 3:

Alternative Site Analysis

Attachment 3: Alternative Site Analysis

Dredging Area

Because one of the goals of the Conowingo Pilot Project is to beneficially reuse or innovatively use the dredged material within the State of Maryland, initial site selection for the dredging area focused on identifying a site with predominantly sandy dredged material that could be readily dewatered and processed for innovative reuse and/or beneficial use. The entire extent of the Reservoir located within the State of Maryland was initially reviewed for identification of potential dredging areas. Maryland Geological Survey (MGS) reviewed the results of a bathymetric survey of the Conowingo Reservoir to identify areas with appropriate water depths and surface conditions that indicated the potential for sandy surface materials. Several areas within the northern area of the Reservoir were identified, and MGS conducted field surveys that included hand probing and sediment coring to determine bottom conditions. Once preliminary field investigations indicated one target area that met the project criteria, sediment sampling was conducted in the area that had the greatest proportion of sandy material. Sediment samples were collected from a total of nine locations and submitted for physical and chemical characterization. The dredging area selected for the project is approximately five acres in size and located approximately five miles north of the Conowingo Dam, in the eastern portion of the Conowingo Reservoir (Figure 1).

Staging Area Location

A Geographic Information Systems (GIS)-level analysis was completed to identify potential options for dredged material staging areas. The GIS analysis was an initial analysis that identified parcel owners, land use, and zoning approvals, and also incorporated information about existing wetland area from the National Wetland Inventory (NWI) maps and a list of known cultural resource areas. The boundary used in the GIS analysis included the area between Conowingo Dam and the Maryland–Pennsylvania border on both sides of the Conowingo Reservoir. Several factors were used to identify potential staging area locations within the boundary for additional data gathering before final site selection.

Western Shoreline (Harford County) versus Eastern Shoreline (Cecil County)

Review of the land use data for the western and eastern shorelines of the Reservoir indicated that a railroad line runs along the entire eastern shoreline. Because the Conowingo Pilot Project is a hydraulic dredging project, the dredged material will be transported via hydraulic pipeline from the dredging area to the staging area. The railway is active; therefore the pipeline would not be able to cross the tracks, severely limiting project access to potential staging areas in Cecil County for this project. The only available location for a pipeline route is under the low-clearance bridge at the mouth of Conowingo Creek, located approximately three miles south of the target dredging area. While this area may allow pipeline access to the shoreline, the limited clearance of the bridge (typically less than 5 feet) would restrict access to the pipeline for maintenance. In addition, this shoreline access point is not close to the target dredging area and would limit the accessibility to upland areas for staging. Because installing the hydraulic pipeline over an active railroad is not a feasible option, potential sites for a staging area within Cecil County were not considered for the Conowingo Pilot Project.

Distance from the Dredging Area

Shorter pipeline routes, both in-water and across the land, are beneficial to the efficient and cost-effective pipeline operation. In addition, having the staging area located close to the

dredging area will shorten the in-water pipeline distance and reduce potential use conflicts with recreational users of the reservoir during dredging. On the landside, an additional consideration was keeping the staging area located close to the shoreline to reduce the number of individually owned parcels that the dredging pipeline crossed. This was prioritized in order to reduce potential project impacts to existing resources. Based on prior experiences with hydraulic dredging projects, included in the costs associated with pipeline construction, operation, and maintenance, the project team refined the boundary for the GIS analysis to limit the analysis to areas located within approximately one mile of the shoreline.

Physical Site Characteristics

The physical site requirements for the staging area needed to support the Conowingo Pilot Project included a minimum of five acres of available land with a flat topography and minimal vegetation. These physical site characteristics were identified as priorities because they would provide adequate site access for construction equipment and sufficient space for dredged material management, while minimizing potential site impacts, including optimizing the site footprint and reducing the amount of grading and tree and/or vegetation clearing during staging area construction. Sites that had flat topography that were already cleared or mostly cleared were prioritized in the preliminary site identification.

Final Staging Area Site Selection

The GIS analysis indicated that seventeen parcels met the initial criteria for distance from the dredging area, distance from the shoreline, minimum site size, and physical site characteristics for the Conowingo Pilot Project staging area. Using this list, Maryland Environmental Service contacted property owners to obtain additional information about the potential availability of specific parcels and for site access to conduct initial field surveys, where applicable, to assess actual site conditions.

Based on the GIS analysis, coordination with property owners, and initial field evaluations, Site 01 (Figure 2) was identified as the parcel that met the criteria of available size in a relatively flat, cleared area that was located within approximately one mile of the shoreline and could be constructed with minimal impacts to existing resources. After coordination with the existing property owners, Site 01 was determined to be the most feasible staging area alternative option and was selected for the design process.

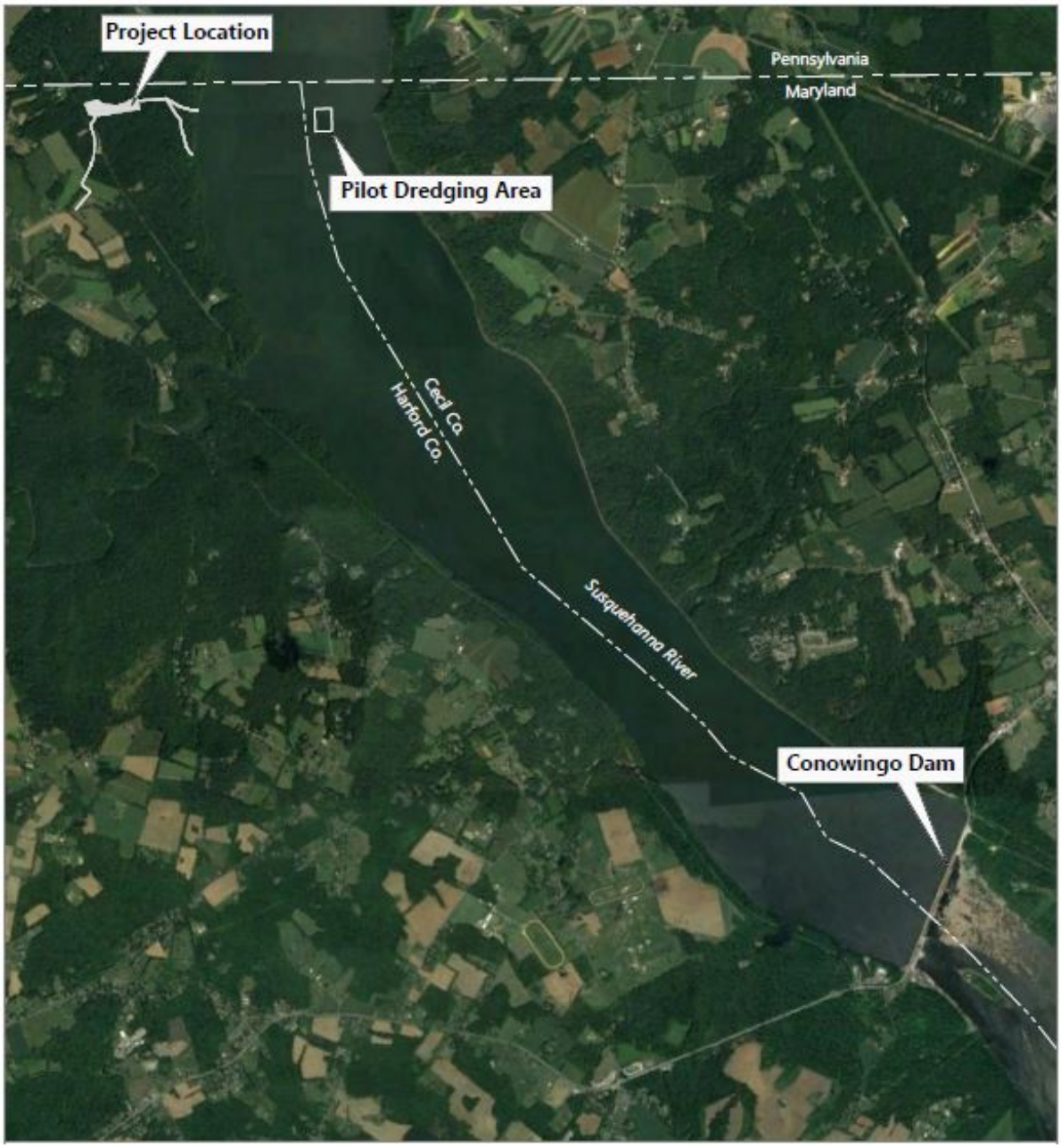


Figure 1. Location of the Area to be Dredged and Project Staging Area

Figure 2. Results of GIS Analysis of Preliminary Staging Area Alternatives

Attachment 4:

Approvals Needed-Granted

Attachment 4: Other Approvals Needed/Granted

Federal Energy Regulatory Commission (FERC) and Exelon:

Coordination with both FERC and Exelon has been performed throughout the project. In order to perform the Conowingo Pilot Project, Exelon's FERC license must be modified to include this non-project activity. MES will seek approval for this project in coordination with Exelon.

A separate authorization that allows submittal of the Joint Application Permit was received from Exelon on April 11, 2018 and is included in Attachment 6.

State and Federal Rare, Threatened, and Endangered Species Coordination:

A formal request for consultation with Maryland Department of Natural Resources (MD DNR) and US Fish and Wildlife Service (USFWS) for potential impacts to federal and state rare, threatened, and endangered species was initiated in September 2017. It was determined that proposed project activities were not likely to adversely affect listed species.

On December 14, 2018 updated project information was provided to both MD DNR and USFWS. Again, it was determined that proposed project activities were not likely to adversely affect listed species. Responses can be found in A4-Attachments 1 and 2.

A letter was received on February 5, 2018 from the Susquehanna River Anadromous Fish Restoration Cooperative (members include representatives from USFWS, MD DNR, the Pennsylvania Fish and Boat Commission, the New York Department of Environmental Conservation, and the Susquehanna River Basin Commission) regarding project pilot activities. They voiced support to the proposed timeframe of the project, stating that the project should have minimal impacts to current fish passage studies. They did request to keep the schedule, and not begin dredging before June 4, 2018 in order to avoid impacts to Exelon's and Brookfield's FERC required fish studies. Susquehanna River Anadromous Fish Restoration Cooperative's response can be found in A4-Attachment 3.

Historical Properties Coordination:

A formal project review was requested from Maryland Historical Trust (MHT) in August 2017 to assess potential effects on historic properties in the vicinity of the Conowingo Pilot Project. MHT required updated plans once more information was known, as the potential area noted was too broad to make a determination.

On December 14, 2018 updated project information was provided to MHT. Upon review of the updated project plans, MHT determined that the Conowingo Pilot Project would have no effect on historic properties. MHT's response can be found in A4-Attachment 4.

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Joanne Throwe, Deputy Secretary

February 2, 2018

Ms. Maura Morris
Maryland Environmental Service
259 Najoles Road
Millersville, MD 21108

RE: Environmental Review for Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Project - staging and dredging areas updates, Harford and Cecil Counties, Maryland.

Dear Ms. Morris:

Thank you for providing us with the revised project details and maps. For the proposed staging areas and access routes on Tax Map 6, Parcels 26, 13, 15, and Tax Map 12, Parcel 31, the Wildlife and Heritage Service has no official records of state or federal rare, threatened or endangered plant or animal species in these areas. As a result, we have no specific concerns regarding impacts or recommendations for protection measures at this time.

However, the state-listed endangered Northern Map Turtle (*Graptemys geographica*) is known to generally occur in and near the Susquehanna River, including from Conowingo Dam northward to the Pennsylvania line. This species uses deep riverine pools and impoundments as hibernacula during the winter months, and uses soft sand/soil areas exposed to full sunlight within a few meters of the shoreline for nesting during spring and summer months. Additional research on this species is being funded by Exelon and is due to be conducted in 2018. Therefore, we may have additional comments related to the protection of this species during future planning phases of the project, based on the research results or other additional information.

It is important to note that northern Harford County is within the range of the state- and federally-listed Bog Turtle (*Glyptemys muhlenbergii*), and it could potentially occur on this part of the project site in areas of appropriate habitat. Bog turtles live in fens, bogs, wet meadow-alder complexes, and freshwater marshes, often below spring seeps or in rivulets adjacent to streams. If such wetland types occur on this property, we would recommend a Phase I Bog Turtle habitat assessment be conducted by a Qualified Bog Turtle Observer; see attachments for more information on this process.

The proposed dredge site in the Susquehanna River is within a known historic waterfowl concentration area. We would not have any concerns for this waterfowl concentration area from the work as described in this project, unless there is construction of water dependent facilities proposed. There are also records for the state-listed threatened Chesapeake Logperch (*Percina bimaculata*) in this portion of the Susquehanna, and while we do not have concerns for impacts to this species from this pilot project, future expansion of these efforts may warrant a closer evaluation of impacts to the Logperch.

We would appreciate the opportunity to review any additional project details as they are developed, including proposed use of dredge spoils for possible turtle habitat. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2017.1919.ce/ha
Cc: S. A. Smith, DNR
D. Brinker, DNR
R. Limpert, DNR
Attachments (2)

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

January 10, 2018

State of Maryland
259 Najoles Road
Millersville, MD 21108

RE: Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Pro

Dear Kristen Keene:

This responds to your letter, received, December 12, 2017, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened within the vicinity of the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

This project as proposed is "not likely to adversely affect" the endangered, threatened, or candidate species listed on your IPaC species list because while the project is within the range of the species, it is unlikely that the species would occur within the project area that was submitted. Therefore, no Biological Assessment or further section 7 Consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For information on the presence of other rare species, you should contact Lori Byrne of the Maryland Wildlife and Heritage Division at (410) 260-8573.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Chesapeake Bay's remaining wetlands, and the long term goal of increasing the quality and quantity of the Chesapeake Bay's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if construction in wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Trevor Clark at (410) 573-4527.

Sincerely,

G. LaRouche

Genevieve LaRouche
Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mid-Atlantic Fish and Wildlife Conservation Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

February 5, 2018

Melissa Slatnick
Maryland Environmental Service
mslat@menv.com

RE: Timing of 2018 Pilot Dredging Project in Conowingo Pond

Ms. Slatnick,

On behalf of the Susquehanna River Anadromous Fish Restoration Cooperative, we would like to submit a comment with respect to the upcoming pilot dredging project in Conowingo Pond. The Susquehanna River Anadromous Fish Restoration Cooperative consists of state and federal fishery management agencies working to restore migratory fish to the Susquehanna River since the 1970s. The Cooperative consists of representatives from the U.S. Fish and Wildlife Service, the Maryland Department of Natural Resources, the Pennsylvania Fish and Boat Commission, the New York Department of Environmental Conservation, and the Susquehanna River Basin Commission.

Our agencies have been working closely with the hydroelectric company owners through the Federal Energy Regulatory Commission's (FERC) relicensing process to ensure that adequate fish passage is provided at the main stem dams for both upstream and downstream migration through the lower Susquehanna River. As part of the efforts to improve fish passage, we (through our respective agency authorities) require the hydroelectric companies to conduct evaluations of their fish passage projects and these studies are also included in their FERC license conditions. Several studies evaluating upstream and downstream fish passage are scheduled to occur during 2018 at both the Holtwood Dam and Muddy Run Pumped Storage Facility.

It is our understanding that the pilot dredging work will commence in June or July of 2018 and continue for about 100 days. We support this time frame, which should have minimal impact on currently scheduled studies. However, two studies in particular could be directly impacted by dredging in Conowingo Pond if the commencement of in-water work occurs earlier in 2018. The two studies will evaluate upstream American shad passage at the Muddy Run Pumped Storage Facility and the Holtwood Dam. Fish for the studies will be released from Conowingo Dam in

April and May 2018, and they will need to swim freely past the proposed dredging area to reach the upstream projects. For the success of the upstream radio telemetry studies, it is critical that the dredging work not commence before June 4, 2018.

We request that if the timeframe for dredging should occur in April or May 2018 that you immediately notify the agencies in the Susquehanna River Anadromous Fish Restoration Cooperative as well as Exelon and Brookfield, whose FERC required studies could be impacted by dredging activities.

Thank you for your consideration,

Sheila Eyler
Secretary,
Susquehanna River Anadromous Fish Restoration Cooperative

cc:
Joshua Tryninewski, Pennsylvania Fish and Boat Commission
David Lemon, New York Department of Environmental Protection
Genine McClair, Maryland Department of Natural Resources
Aaron Henning, Susquehanna River Basin Commission
Andrea Danucalov, Exelon
Kathleen Lester, Brookfield
Jeremy Miller, Pennsylvania Department of Environmental Protection
Scott Williamson, Pennsylvania Department of Environmental Protection
Richard McCorkle, U.S. Fish and Wildlife Service

MARYLAND DEPARTMENT OF
PLANNING
MARYLAND HISTORICAL TRUST

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor

Robert S. McCord, Acting Secretary

January 17, 2018

JAN 24 2018

Mr. Joseph P. DaVia
Chief, Maryland Section Northern
Regulatory Branch, Baltimore District
U.S. Army Corps of Engineers
10 S. Howard Street
Baltimore, MD 21201

Re: Updated MHT Review of Conowingo Capacity Recovery and Beneficial Reuse Pilot Project
Harford County, Maryland

Dear Mr. DaVia:

In response to a request from the Maryland Environmental Service, the Maryland Historical Trust (MHT) is reviewing the above-referenced project to assess potential effects on historic properties in accordance with Section 106 of the National Historic Preservation Act and the Maryland Historical Trust Act, §§ 5A-325 and 5A-326 of the State Finance and Procurement Article. We understand that the proposed project will involve the hydraulic dredging of 25,000 cubic yards of material from behind the Conowingo Dam and dewatering and stockpiling the material at a temporary staging area. These activities will require a joint permit from the Corps and MDE and will therefore be subject to state and federal historic preservation law.

Following our initial pre-application review of the proposed project, MHT staff noted in a November 17, 2017 letter that the 5-acre pilot dredging study area is unlikely to contain significant submerged resources and that no underwater cultural resources investigations are recommended for this portion of the undertaking. We also noted, however, that the staging area had not yet been identified and that MHT would need to be provided with site plans illustrating the location and boundaries of all proposed impact areas associated with the staging, dewatering, and stockpiling activities. On December 14, 2017, the Maryland Environmental Service provided MHT with more detailed site plans and several figures illustrating the boundaries of the staging area (located along Line Bridge Road), pipeline routes, and access roads associated with the undertaking. We have reviewed this additional information and would like to offer the following updated comments and recommendations regarding potential effects on historic properties.

Following our review of the site plans relating to the proposed staging area, pipelines, and access roads, it is our opinion that the proposed pilot project will have NO EFFECT on historic properties. Therefore, cultural resources investigations are *not* warranted for this particular undertaking. This recommendation concludes the Section 106 review of this project.

Thank you for providing us with this opportunity to comment. If you have any questions or need further information, please do not hesitate to contact me at dixie.henry@maryland.gov or 410-697-9553.

Sincerely

Dixie Henry

Dixie L. Henry, Ph.D.
Preservation Officer
Maryland Historical Trust

DLH/201706742
cc: Abbie Hopkins (COE)
Amanda Sigillito (MDE)
Kristen Keene (Maryland Environmental Service)
Maura Morris (Maryland Environmental Service)

Attachment 5:

Adjacent Property Owners Notification

Attachment 5: Adjacent Property Owners Notification

Due to the large amount of public interest, outreach has been an important component of the Conowingo Pilot Project. To date, Maryland Environmental Service has held one meet and greet (October 23, 2017) and two community meetings (November 2, 2017 and January 25, 2018). Continued updates will be provided to adjacent property owners as well as community members and other interested parties throughout the life of the project.

The following adjacent property owners have been notified of the project.

Mary Ritchie 2209 Tabernacle Rd Whiteford, MD 21160 2213 Tabernacle Rd Whiteford, MD 21160	Alexander and Tammy Miller 2190 Line Bridge Rd Whiteford, MD 21160
Bryan Winesett 2130 Line Bridge Rd Whiteford, MD 21160 2138 Line Bridge Rd Whiteford, MD 21160 2140 Line Bridge Rd Whiteford, MD 21160	George and Jeffrey Merryman 2135 Line Bridge Rd Whiteford, MD 21160
Scott and Renee Cullum Line Bridge Rd (No street address) Whiteford, MD 21160 Mailing address: 17163 Fairfield Rd Stewartstown, PA 17363	Fred Schwer Exelon Corporation 3 Lincoln Center Oakbrook Terrace, IL 60181
Eric Rumer 899 Cooper Road Delta, PA 17314	Kenneth Gemmill Harford County Department of Public Works 1807 N Fountain Green Road Bel Air, MD 21014

Attachment 6:

Additional Letters

Exelon Generation

April 11, 2018

Roy McGrath, Director/CEO
Maryland Environmental Service
250 Najoles Road
Millersville, MD 21108

Re: MES' Application for Permit/Pilot Dredging Project

Dear Mr. McGrath:

Exelon Generation Co. LLC is the Licensee of the Conowingo Hydroelectric Project, which includes portions of the Susquehanna River north of the Conowingo Dam and adjacent shoreline areas. Exelon Generation Co. LLC is familiar with the Maryland Environmental Service's Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetland In Maryland related to a proposed pilot dredging project which involves portions of the Susquehanna River north of the Conowingo Dam and adjacent shoreline areas for which Exelon Generation Co. LLC is the Licensee.

The Licensee does not object to the work described in the Joint Federal/State Application of Maryland Environmental Service to the Army Corps of Engineers and the Maryland Department of the Environment. If you have any questions regarding this submittal, please contact Andrea Danucalov at (267) 533-1125 or by email at andrea.danucalov@exeloncorp.com.

Sincerely,

Colleen Hicks

Colleen E. Hicks
Manager Regulatory and Licensing, Hydro
Exelon Power
300 Exelon Way
Kennett Square, PA 19348
Tel: (610)765-6791
Email: colleen.hicks@exeloncorp.com

Authorization to File Application for Permit

We, the undersigned, are record owners of properties subject to this Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal or Nontidal Wetlands In Maryland. The work described in the Application will include activities on three properties owned by the undersigned.

We, Stephen T. Cooper and Lori A. Cooper, individually, are the record owners of one of the properties subject to this Application (the "Cooper Property"). We, Stephen T. Cooper and Lori A. Cooper, hereby consent to the work described in the Application, authorize Maryland Environmental Service to make application for a permit, and certify that the person signing the Application on behalf of the Maryland Environmental Service has our full authority and authorization to do so.

We, Stephen T. Cooper, and Paula Carter, are Trustees for the Stephen T. Cooper 2012 Trust. The Stephen T. Cooper 2012 Trust; Lois M. Cooper, Trustee of the Residuary Trust created under the Last Will and Testament of Levi A. Cooper dated August 10, 1999; and Lois M. Cooper, individually, are tenants in common record owners of two additional properties subject to the Application (the "Tabernacle Road Property" and the "Line Bridge Road Property"). We, Stephen T. Cooper, Trustee, Paula Carter, Trustee, Lois M. Cooper, Trustee, and Lois M. Cooper, Individually, hereby consent to the work described in the Application, authorize Maryland Environmental Service to submit the Application for the permit.

This authorization is executed this 1st day of April, 2018.

WITNESS the hands and seals of the parties hereto as to the date first written above.

WITNESSS:

By: Stephen T. Cooper [Seal]

STEPHEN

As witness my hand and Notary's Seal.

Notary Public

My Commission Expires 12.3.21

NOTARY CERTIFICATE
State of Maryland
City/County of Frederick
I Hereby Certify that on this 9th day of April, 2018, before me in and for the state and county aforesaid personally appeared PAULA CARTER, Trustee, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge that she, as Trustee of the Stephen T. Cooper 2012 Trust, being authorized to do so, executed the within instrument in the capacity and for the purpose therein contained.

As witness my hand and Notary's Seal.

ANGELA LYNN GREGORY NOTARY PUBLIC FREDERICK COUNTY, MARYLAND

Notary Public

My Commission Expires 12/8/18

NOTARY CERTIFICATE
State of Maryland
City/County of Howard
I Hereby Certify that on this 9th day of April, 2018, before me in and for the state and county aforesaid personally appeared LOIS M. COOPER, Trustee, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge that she, as Trustee of the Residuary Trust u/w/o Levi A. Cooper, being

As witness my hand and Notary's Seal.

Janet E. Miller

Notary Public

My Commission Expires 12.3.21

NOTARY CERTIFICATE
State of Maryland
City/County of Harford
I Hereby Certify that on this 7th day of April, 2018, before me in and for the state and county aforesaid personally appeared LORI A. COOPER, individually, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge the foregoing instrument to be her act.

As witness my hand and Notary's Seal.

Janet E. Miller

Notary Public

My Commission Expires 12.3.21

NOTARY CERTIFICATE
State of Maryland
City/County of Harford
I Hereby Certify that on this 7th day of April, 2018, before me in and for the state and county aforesaid personally appeared STEPHEN T. COOPER, Trustee, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge that he, as Trustee of the Stephen T. Cooper 2012 Trust, being authorized to do so, executed the within instrument in the capacity and for the purpose therein contained.

T. COOPER, Individual

By: _____ [Seal]

LORI A.

COOPER, Individual

By: _____ [Seal]

STEPHEN

T. COOPER, Trustee

By: _____ [Seal]

PAULA

CARTER, Trustee

ANGELA LYNN GREGORY NOTARY PUBLIC FREDERICK COUNTY, MARYLAND

By: _____ [Seal]

LOIS M.

COOPER, Individual

By: _____ [Seal]

LOIS M.

COOPER, Trustee

NOTARY CERTIFICATE
State of Maryland
City/County of Harford
I Hereby Certify that on this 7th day of April, 2018, before me in and for the state and county aforesaid personally appeared STEPHEN T. COOPER, individually, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge the foregoing instrument to be his act.

authorized to do so, executed the within instrument in the capacity and for the purpose therein contained.

As witness my hand and Notary's Seal.

Notary Public

My Commission Expires 12-3-21

NOTARY CERTIFICATE

State of Maryland

City/County of Harford

I Hereby Certify that on this 7th day of April, 2018, before me in and for the state and county aforesaid personally appeared LOIS M. COOPER, individually, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge the foregoing instrument to be her act.

As witness my hand and Notary's Seal.

Notary Public

My Commission Expires 12-3-21

SERVICE

_____ By:
_____[Seal]

Roy McGrath, Director/CEO

Approved for legal sufficiency
this_____day of _____, 2018

_____
Assistant Attorney General

NOTARY CERTIFICATE

State of Maryland
City/County of Harford

I Hereby Certify that on this 5th day of April, 2018, before me in and for the state and county aforesaid personally appeared STEPHEN T. COOPER, individually, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge the foregoing instrument to be his act.

As witness my hand and Notary's Seal.

Janet E. Miller
Notary Public

My Commission Expires 12.3.21

NOTARY CERTIFICATE

State of Maryland
City/County of Harford

I Hereby Certify that on this 5th day of April, 2018, before me in and for the state and county aforesaid personally appeared LORI A. COOPER, individually, known to me (or satisfactorily proven) to be the person whose name is subscribed to this Lease, who did acknowledge the foregoing instrument to be her act.

As witness my hand and Notary's Seal.

Janet E. Miller

Attachment 7:

Wetland Delineation Report

Wetland Delineation Report

***For*:**

Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Project

Harford County, Maryland
Tax Map: 0006, Parcel: 0013, Grid: 0004D
Tax Map: 0006, Parcel: 0015, Grid: 0004D
Tax Map: 0006, Parcel: 0026, Grid: 0004E
Tax Map: 0012, Parcel: 0031, Grid: 0003D

Prepared By:

Maryland Environmental Service
259 Najoles Blvd.
Millersville, MD 21108

MARYLAND ENVIRONMENTAL SERVICE

April 2018

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

I. SITE LOCATION AND EXISTING CONDITIONS

Maryland Environmental Service (MES) conducted an on-site evaluation for wetlands in the areas adjacent to the Susquehanna River where the Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Project is anticipated to occur. The Conowingo Dam was constructed in 1928 and the associated reservoir serves as a source of drinking water for Baltimore City, Harford County, and the Chester Water Authority. Although the critical function is water storage, the reservoir has also served as a significant trap for sediment and consequently nutrients (nitrogen and phosphorus) which is an important aspect of the Chesapeake Bay Total Maximum Daily Load; however, the amount of sediment behind the dam may be reaching its capacity for storage.

The purpose of this pilot project is to evaluate whether large-scale dredging of the sediment and associated nutrients behind the Conowingo Dam will help improve the health of the Chesapeake Bay. The pilot project involves the following components: 1) hydraulically dredging 25,000 cubic yards of material from behind the dam; 2) pumping the sediment from the dredging location to a project staging area; 3) dewatering the material at the staging location; 4) temporarily stockpiling the material at the staging area; and 5) beneficially using or innovatively reusing the dredged material.

The potential 5-acre staging area is on private property, with a majority of the Limits of Disturbance (LOD) being open, non-forested, agricultural land. Finalization of the staging area is dependent on the procurement of a lease agreement with a private landowner.

The anticipated staging area and pipe line routes (project site) are located in the northeast portion of Harford County, Maryland and borders the Maryland/Pennsylvania state line. The project site is located on private property that is immediately bordered by the Susquehanna River to the east and private residential lots, farm land and forested areas in all other directions. The project site does not have a physical address, but is located between 2140 and 2190 Linebridge Road, Whiteford, Maryland. The project site and LOD span over four parcels; three of which have the same property owner (Tax Map: 0006, Parcel: 0013, Grid: 0004D; Tax Map: 0006, Parcel: 0015, Grid: 0004D; and Tax Map: 0006, Parcel: 0026, Grid: 0004E), the fourth parcel is owned by PECO, an Exelon Company (Tax Map: 0012, Parcel: 0031, Grid: 0003D). See Appendix A for State Department of Assessments and Taxation parcel maps and real property data information.

The LOD is 16.3 acres which contains two possible pipeline route options. As the project progresses the contractor selected to perform the work will choose one of the two pipeline route options. Currently the project site is zoned Agricultural (AG).

II. METHODOLOGY

The entire area of the four parcels was not investigated for Waters of the United States. For this study, MES evaluated the areas within and adjacent to the proposed LOD for Waters of the

United States. The site was evaluated for wetlands on December 13, 2017 and January 8, 2018 using the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* and the *Eastern Mountains and Piedmont Region* (Environmental Laboratory, 2010). Both regional supplements were used because the site bordered both regions. The methods described in the manual were used as a guide for the field delineation of the wetland/upland boundary. The State of Maryland requires the positive identification of three parameters to confirm or deny the presence of non-tidal wetlands; these consist of hydric soils, hydrology, and a dominance of hydrophytic vegetation. The 2010 U.S. Army Corps of Engineers regional supplement also suggests that other indicators should be taken into account in making a wetland determination. In addition to confirming or denying the presence of wetlands on the property, other regulated Waters of the United States were considered as well. These waters included aquatic sites such as ponds, lakes, streams, and rivers. Should any of these other regulated Waters of the United States be found to exist on the property, they would be incorporated into the delineation of non-tidal wetlands and labeled accordingly.

The following narrative describes the delineation of the Waters of the United States encountered during the on-site evaluation.

III. RESEARCH OF AVAILABLE DOCUMENTS

A. Location Maps

The site is located in Harford County, Maryland. Refer to Appendix B for a vicinity map. An aerial image of the staging area property, including the approximate LOD and the two pipeline routes (Option 1 and Option 2) shown in yellow, is included as Appendix C.

B. Soil Survey

Soil was investigated using the Natural Resources Conservation Service's (NRCS) soil survey online mapping tool, available at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. NRCS soil characteristics for the project site are listed in Table 1 and illustrated in Appendix D. Only the soil types located in the anticipated LOD are listed. The most predominant soil type located within the LOD is McD2 - Manor channery loam, 15 to 25 percent slopes, moderately eroded.

Hydrologic groups describe the runoff potential and infiltration rates of the soil. Group A soils have low runoff potential and high infiltration rates. As the letter increases, the runoff potential increases and the infiltration rate decreases. All hydrologic groups are classified as B, which indicates there is a low to moderate runoff potential at the project site. There are no hydric soils at the project site.

Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water. K factor values within the LOD of the on-site soils range from 0.15 to 0.32; therefore, the erosion potential is low to moderate.

Table 1: Soil characteristics associated with the LOD of the staging area property.

Soil Symbol	Soil Description	Hydrologic Group	Hydric	K Factor
CgB2	Chester gravelly silt loam, 3–8 percent slopes, moderately eroded	B	No	0.28
CgC2	Chester gravelly silt loam, 8–15 percent slopes, moderately eroded	B	No	0.28
GgC2	Glenelg gravelly loam, 8–15 percent slopes, moderately eroded.	B	No	0.17
McB2	Manor channery loam, 3–8 percent slopes, moderately eroded	B	No	0.15
McD2	Manor channery loam, 15–25 percent slopes, moderately eroded	B	No	0.17
MdE	Manor very stony loam, 25–45 percent slopes	B	No	0.20
MfE	Manor soils, 25–45 percent slopes	B	No	0.17
St	Stony land, steep	B	No	0.32

C. USFWS and DNR Wetland Maps

The National Wetland Inventory (NWI) is a United States Fish and Wildlife Service (USFWS) database that has attempted to map wetland locations and types through the use of aerial photographs in conjunction with limited field analysis. Each wetland is given a wetland classification. The maps indicate wetland classifications according to a methodology described in the USFWS Classification of Wetlands and Deepwater Habitats of the United States. The classifications given are not valid until they are verified via field analysis. The NWI mapping tool is available at: https://www.fws.gov/wetlands/data/mapper.html. The Maryland's Environmental Resources and Land Information Network (MERLIN) is a Maryland Department of Natural Resources (DNR) web-based program that serves a similar function as the NWI. The MERLIN mapping tool is available at: https://gisapps.dnr.state.md.us/MERLIN/index.html. The NWI and DNR MERLIN maps show the only wetland present near the project site is the Susquehanna River, and it is classified as a lacustrine wetland discussed below. Refer to Appendix E for the maps generated by NWI and MERLIN.

D. FEMA Panel Maps/Hydrology

The entire project site drains into the Susquehanna River and is located in the Chesapeake Bay Watershed (HUC 02050306220). The Lower Susquehanna River Area is given a Maryland stream use designation of Use I-P (water contact recreation and protection of aquatic life). There are two Federal Emergency Management Agency (FEMA) Panel Maps associated with the project site. The majority of the site falls within an area of minimal flood hazard as indicated on

the FEMA Panel Map 24025C0060E. A small portion of the project site adjacent to the Susquehanna River is located within the 100-year flood plain and is shown on FEMA Panel Map 24025C0080E. Refer to Appendix F for both FEMA Panel Maps.

E. United States Geological Survey Topographic Maps

The topography of the site was investigated using the United States Geological Survey (USGS) US Topo mapping tool, which is available at http://nationalmap.gov/ustopo/index.html. Site topography is depicted in Appendix G. The areas within the LOD exhibit a wide range of slopes. The majority of the project site has a slight grade ranging from 3% to 15%. The slopes in the pipeline route options become very steep as they approach the river.

F. Rare, Threatened, and Endangered Species

Per a letter dated February 2, 2018, sent by Lori A. Byrne, Maryland Department of Natural Resources (DNR), Wildlife and Heritage Service, there are no official records of state or federal rare, threatened or endangered plant or animal species in these areas. As a result, we have no specific concerns regarding impacts or recommendations for protection measures at this time. This letter is Appendix H.

However, the DNR Wildlife and Heritage Service noted that the state-listed endangered Northern Map Turtle (*Graptemys geographica*) is known to generally occur in and near the Susquehanna River, including from Conowingo Dam northward to the Pennsylvania line. This species uses deep riverine pools and impoundments as hibernacula during the winter months, and uses soft sand/soil areas exposed to full sunlight within a few meters of the shoreline for nesting during spring and summer months. Additional research on this species is being funded by Exelon and is due to be conducted in 2018. Therefore, DNR Wildlife and Heritage Service may have additional comments related to the protection of this species during future planning phases of the project, based on the research results or other additional information.

The DNR Wildlife and Heritage Service also noted that northern Harford County is within the range of the state- and federally-listed Bog Turtle (*Glyptemys muhlenbergii*), and it could potentially occur on this part of the project site in areas of appropriate habitat. Bog turtles live in fens, bogs, wet meadow-alder complexes, and freshwater marshes, often below spring seeps or in rivulets adjacent to streams. If such wetland types occur on this property, DNR Wildlife and Heritage Service recommends a Phase I Bog Turtle habitat assessment be conducted by a Qualified Bog Turtle Observer.

The proposed dredge site in the Susquehanna River is within a known historic waterfowl concentration area. DNR Wildlife and Heritage Service would not have any concerns for this waterfowl concentration area from the work as described in this project, unless there is construction of water dependent facilities proposed which are not proposed. There are also records for the state-listed threatened Chesapeake Logperch (*Percina bimaculata*) in this portion of the Susquehanna River, and while we do not have concerns for impacts to this species from this pilot project, future expansion of these efforts may warrant a closer evaluation of impacts to the Logperch.

IV. ON-SITE ASSESSMENT

MES evaluated the areas within the proposed LOD for Waters of the United States on December 13, 2017 and January 8, 2018. Based on field observations there were no wetlands observed; therefore, no wetland determination data forms were completed. During both field days the ground was frozen. There were no areas of standing water/ice present or areas where it appeared the soil maybe be waterlogged in warmer months. There were no areas with water marks or stained leaves. Since the site evaluation occurred in the winter, there were very little herbaceous plants observed with the exception of some ferns. The tree, sapling/shrub and woody vine stratums mainly comprised of species that were classified as facultative upland (FACU, usually occur in non-wetlands, 67%–99% probability in non-wetlands) and obligate upland (UPL, occur in uplands almost always, >99% probability in non-wetlands). The Wetland Delineation Plan and Impact Plates are provided in Appendix I.

The Susquehanna River directly borders the project site to the east. The Conowingo Dam is approximately five miles south of this portion of the Susquehanna River. The Dam alters the river's ecology by impounding the water, replacing the free-flowing section with a reservoir/lake. This portion of the Susquehanna River is classified by both NWI and DNR as a lacustrine wetland with the classification code of L1UB1Hx: Lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded. As a result of a meeting on March 6, 2018 with Maryland Department of the Environment (MDE) wetland buffer impacts are not included. The dredging impacts to the Susquehanna River associated with the pilot project will be 25,000 cubic yards (CY) or 600 feet x 450 feet x 2.5 feet.

There are two streams with associated stream banks located adjacent to the LOD. There is a perennial stream (625.42 LF / 14,565.75 SF / 0.3344 AC) located just south of Pipeline Route Option 2. There was a spring head observed where the perennial stream begins. Below the spring head water was constantly flowing to the Susquehanna River. The intermittent stream (1064.55 LF / 17,176.05 SF / 0.3943 AC) is located to the west of the staging area. There would be no impacts to the streams located onsite. Table 2 shows the impacts to the 100-year floodplain and Susquehanna River associated with the project.

Table 2: Impacts to the 100-year flood plain and Susquehanna River associated with the project.

	Susquehanna River Dredging Impact	100-Year Floodplain Impact Area
Pipeline Option 1	NA	259.01 SF 0.0059 AC
Pipeline Option 2	NA	167.38 SF 0.0038 AC
Dredging area	(600’ x 450’ x 2.5’)	NA
TOTAL CY	**25,000**	**NA**
TOTAL SF	**NA**	**426.39**
TOTAL AC	**NA**	**0.0097**

CY – Cubic Yards
SF – Square Feet
AC – Acres
NA – Not applicable

V. CONCLUSIONS

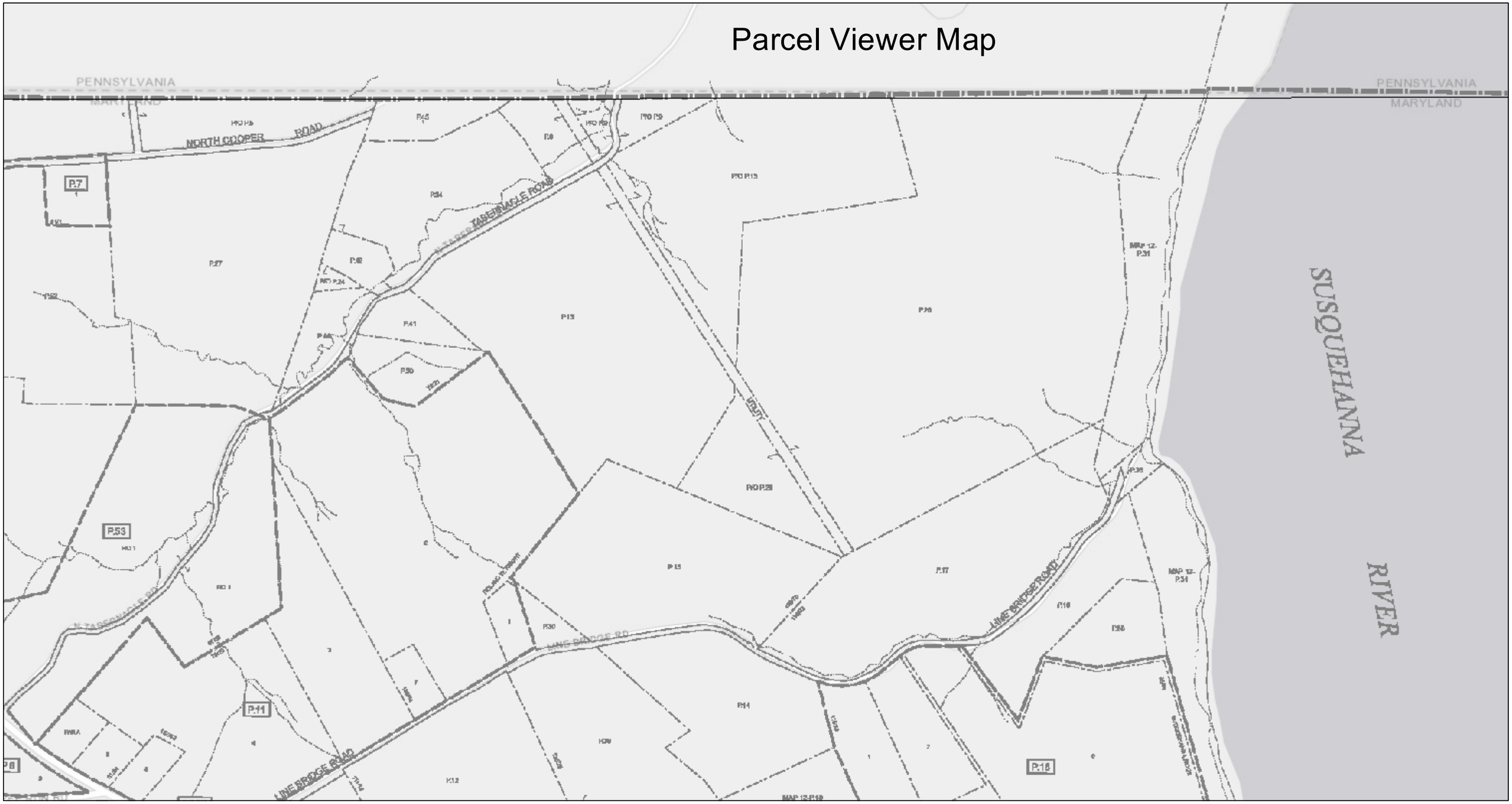
It is MES’ professional opinion that there are Waters of the United States within the boundary of the proposed site; however, there are no impacts associated to these waters. Nevertheless, this determination should be confirmed by the appropriate agencies, and cannot be considered complete until written confirmation is obtained**.**

APPENDIX A

State Department of Assessments & Taxation
Parcel Maps and Real Property Data

Maryland Department of Planning

Parcel Viewer Map



February 15, 2018

1:9,028

0 0.1 0.2 0.4 mi

0 0.175 0.35 0.7 km

Real Property Data Search (w2)

Search Result for HARFORD COUNTY

View Map | View GroundRent Redemption | View GroundRent Registration

Account Identifier: **District -** 05 **Account Number -** 018382

Owner Information

Owner Name:	COOPER STEPHEN T COOPER LORI A	**Use:** **Principal Residence:**	AGRICULTURAL NO
Mailing Address:	4719 FLINTVILLE RD WHITEFORD MD 21160-1614	**Deed Reference:**	/09038/ 00269

Location & Structure Information

Premises Address:	LINE BRIDGE RD WHITEFORD 21160-0000	**Legal Description:**	30.33 ACRES N S LINE BRIDGE ROAD LD HENRY PT 136/73

Map:	Grid:	Parcel:	Sub District:	Subdivision:	Section:	Block:	Lot:	Assessment Year:	Plat No:	
0006	0004D	0015		0000				2016	Plat Ref:	136/ 73

Special Tax Areas: **Town:** NONE
Ad Valorem:
Tax Class:

Primary Structure Built	Above Grade Living Area	Finished Basement Area	Property Land Area	County Use
			30.3300 AC	

Stories	Basement	Type	Exterior	Full/Half Bath	Garage	Last Major Renovation

Value Information

	Base Value	Value As of 01/01/2016	Phase-in Assessments As of 07/01/2017	As of 07/01/2018
Land:	119,700	119,700		
Improvements	0	0		
Total:	119,700	119,700	119,700	119,700
Preferential Land:	4,700			4,700

Transfer Information

Seller: HENRY ERNEST D JR	**Date:** 01/31/2011	**Price:** $400,000
Type: ARMS LENGTH MULTIPLE	**Deed1:** /09038/ 00269	**Deed2:**
Seller: HENRY NELLIE M	**Date:** 10/19/1982	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /00024/ 00120	**Deed2:**
Seller:	**Date:**	**Price:**
Type:	**Deed1:**	**Deed2:**

Exemption Information

Partial Exempt Assessments:	Class	07/01/2017	07/01/2018
County:	000	0.00	
State:	000	0.00	
Municipal:	000	0.00|0.00	0.00|0.00

Tax Exempt: **Special Tax Recapture:**
Exempt Class: AGRICULTURAL TRANSFER TAX

Homestead Application Information

Homestead Application Status: No Application

Homeowners' Tax Credit Application Information

Homeowners' Tax Credit Application Status: No Application **Date:**

Real Property Data Search (w2)

Search Result for HARFORD COUNTY

View Map | View GroundRent Redemption | View GroundRent Registration

Account Identifier: **District -** 05 **Account Number -** 008034

Owner Information

Owner Name:	COOPER LOIS M TRUSTEE COOPER STEPHEN T TRUSTEE	**Use:** **Principal Residence:**	AGRICULTURAL NO
Mailing Address:	4719 FLINTVILLE RD WHITEFORD MD 21160-1614	**Deed Reference:**	/10064/ 00195

Location & Structure Information

Premises Address:	TABERNACLE RD WHITEFORD 21160-0000	**Legal Description:**	90 ACRES S S TABERNACLE ROAD CARDIFF

Map:	Grid:	Parcel:	Sub District:	Subdivision:	Section:	Block:	Lot:	Assessment Year:	Plat No:
0006	0004D	0013		0000				2016	Plat Ref:

Special Tax Areas: **Town:** NONE
Ad Valorem:
Tax Class:

Primary Structure Built	Above Grade Living Area	Finished Basement Area	Property Land Area	County Use
			90.0000 AC	

Stories	Basement	Type	Exterior	Full/Half Bath	Garage	Last Major Renovation

Value Information

	Base Value	Value	Phase-in Assessments	
		As of 01/01/2016	As of 07/01/2017	As of 07/01/2018
Land:	24,700	24,700		
Improvements	1,100	1,100		
Total:	25,800	25,800	25,800	25,800
Preferential Land:	24,700			24,700

Transfer Information

Seller: COOPER LOIS M TRUSTEE	**Date:** 01/11/2013	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /10064/ 00195	**Deed2:**
Seller: COOPER LOIS M TRUSTEE	**Date:** 06/19/2009	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /08215/ 00085	**Deed2:**
Seller: COOPER LEVI A	**Date:** 06/24/2004	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /05455/ 00698	**Deed2:**

Exemption Information

Partial Exempt Assessments:	Class	07/01/2017	07/01/2018
County:	000	0.00	
State:	000	0.00	
Municipal:	000	0.00|0.00	0.00|0.00

Tax Exempt: **Special Tax Recapture:**
Exempt Class: AGRICULTURAL TRANSFER TAX

Homestead Application Information

Homestead Application Status: No Application

Homeowners' Tax Credit Application Information

Real Property Data Search (w2)

Search Result for HARFORD COUNTY

View Map | View GroundRent Redemption | View GroundRent Registration

Account Identifier: **District -** 05 **Account Number -** 008042

Owner Information

Owner Name:	COOPER LOIS M TRUSTEE COOPER STEPHEN T TRUSTEE	**Use:** **Principal Residence:**	AGRICULTURAL NO
Mailing Address:	4719 FLINTVILLE RD WHITEFORD MD 21160-1614	**Deed Reference:**	/10064/ 00195

Location & Structure Information

Premises Address:	LINE BRIDGE RD WHITEFORD 21160-0000	**Legal Description:**	109 ACRES N S LINE BRIDGE ROAD CARDIFF

Map:	Grid:	Parcel:	Sub District:	Subdivision:	Section:	Block:	Lot:	Assessment Year:	Plat No:
0006	0004E	0026		0000				2016	Plat Ref:

Special Tax Areas: **Town:** NONE
Ad Valorem:
Tax Class:

Primary Structure Built	Above Grade Living Area	Finished Basement Area	Property Land Area	County Use
			109.0000 AC	

Stories	Basement	Type	Exterior	Full/Half Bath	Garage	Last Major Renovation

Value Information

	Base Value	Value	Phase-in Assessments	
		As of 01/01/2016	As of 07/01/2017	As of 07/01/2018
Land:	32,000	32,000		
Improvements	0	0		
Total:	32,000	32,000	32,000	32,000
Preferential Land:	32,000			32,000

Transfer Information

Seller: COOPER LOIS M TRUSTEE	**Date:** 01/11/2013	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /10064/ 00195	**Deed2:**
Seller: COOPER LOIS M TRUSTEE	**Date:** 06/19/2009	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /08215/ 00085	**Deed2:**
Seller: COOPER LEVI A	**Date:** 06/24/2004	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /05455/ 00698	**Deed2:**

Exemption Information

Partial Exempt Assessments:	Class	07/01/2017	07/01/2018
County:	000	0.00	
State:	000	0.00	
Municipal:	000	0.00|0.00	0.00|0.00

Tax Exempt: **Special Tax Recapture:**
Exempt Class: AGRICULTURAL TRANSFER TAX

Homestead Application Information

Homestead Application Status: No Application

Homeowners' Tax Credit Application Information

Real Property Data Search (w2)

Search Result for HARFORD COUNTY

View Map | View GroundRent Redemption | View GroundRent Registration

Account Identifier: **District -** 05 **Account Number -** 037948

Owner Information

Owner Name:	PECO ENERGY POWER COMPANY	**Use:**	INDUSTRIAL
		Principal Residence:	NO
Mailing Address:	C/O FRED SCHWER 3 LINCOLN CTR OAKBROOK TERRACE IL 60181-4204	**Deed Reference:**	/00171/ 00405

Location & Structure Information

Premises Address:	2592 SHURESVILLE RD DARLINGTON 21034-0000	**Legal Description:**	4222.43 ACRES 2592 SHURESVILLE ROAD CONOWINGO DAM

Map:	Grid:	Parcel:	Sub District:	Subdivision:	Section:	Block:	Lot:	Assessment Year:	Plat No:
0012	0003D	0031		0000				2016	Plat Ref:

Special Tax Areas:		**Town:**	NONE
		Ad Valorem:	
		Tax Class:	

Primary Structure Built	Above Grade Living Area	Finished Basement Area	Property Land Area	County Use
	138351		4222.4300 AC	

Stories	Basement	Type	Exterior	Full/Half Bath	Garage	Last Major Renovation

Value Information

	Base Value	Value	Phase-in Assessments	
		As of 01/01/2016	As of 07/01/2017	As of 07/01/2018
Land:	5,634,500	5,634,500		
Improvements	117,807,700	117,775,200		
Total:	123,442,200	123,409,700	123,409,700	123,409,700
Preferential Land:	0			0

Transfer Information

Seller: SUSQUEHANNA POWER COMPANY THE	**Date:** 03/27/2009	**Price:** $0
Type: NON-ARMS LENGTH OTHER	**Deed1:** /00171/ 00405	**Deed2:**
Seller:	**Date:**	**Price:**
Type:	**Deed1:**	**Deed2:**
Seller:	**Date:**	**Price:**
Type:	**Deed1:**	**Deed2:**

Exemption Information

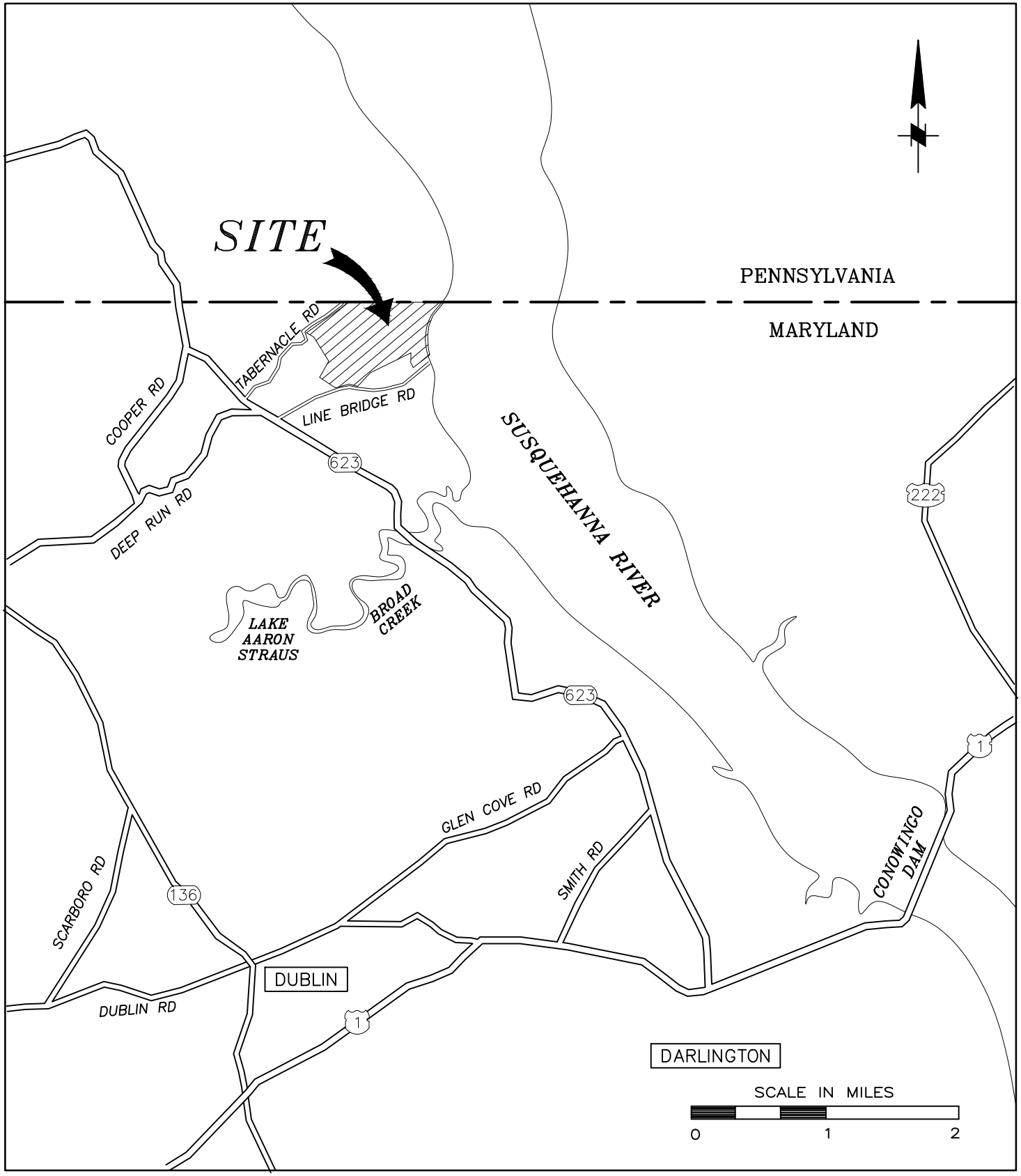
Partial Exempt Assessments:	Class	07/01/2017	07/01/2018
County:	000	0.00	
State:	000	0.00	
Municipal:	000	0.00|0.00	0.00|0.00

Tax Exempt:		**Special Tax Recapture:**	
Exempt Class:		NONE	

Homestead Application Information

APPENDIX B

Maryland Environmental Service
Vicinity Map



MARYLAND ENVIRONMENTAL SERVICE

VICINITY MAP

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

HARFORD COUNTY - WHITEFORD, MARYLAND

DRAWN BY: JBB
CHECKED BY: ERQ, KO
DATE: FEBRUARY 8, 2018
SHEET: 1 OF 1

SAVED: 2/14/2018 PLOTTED: February 14, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\MES_DREDGING\CONOWINGO DAM_PARCEL 13 - COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_24X36.DWG

APPENDIX C

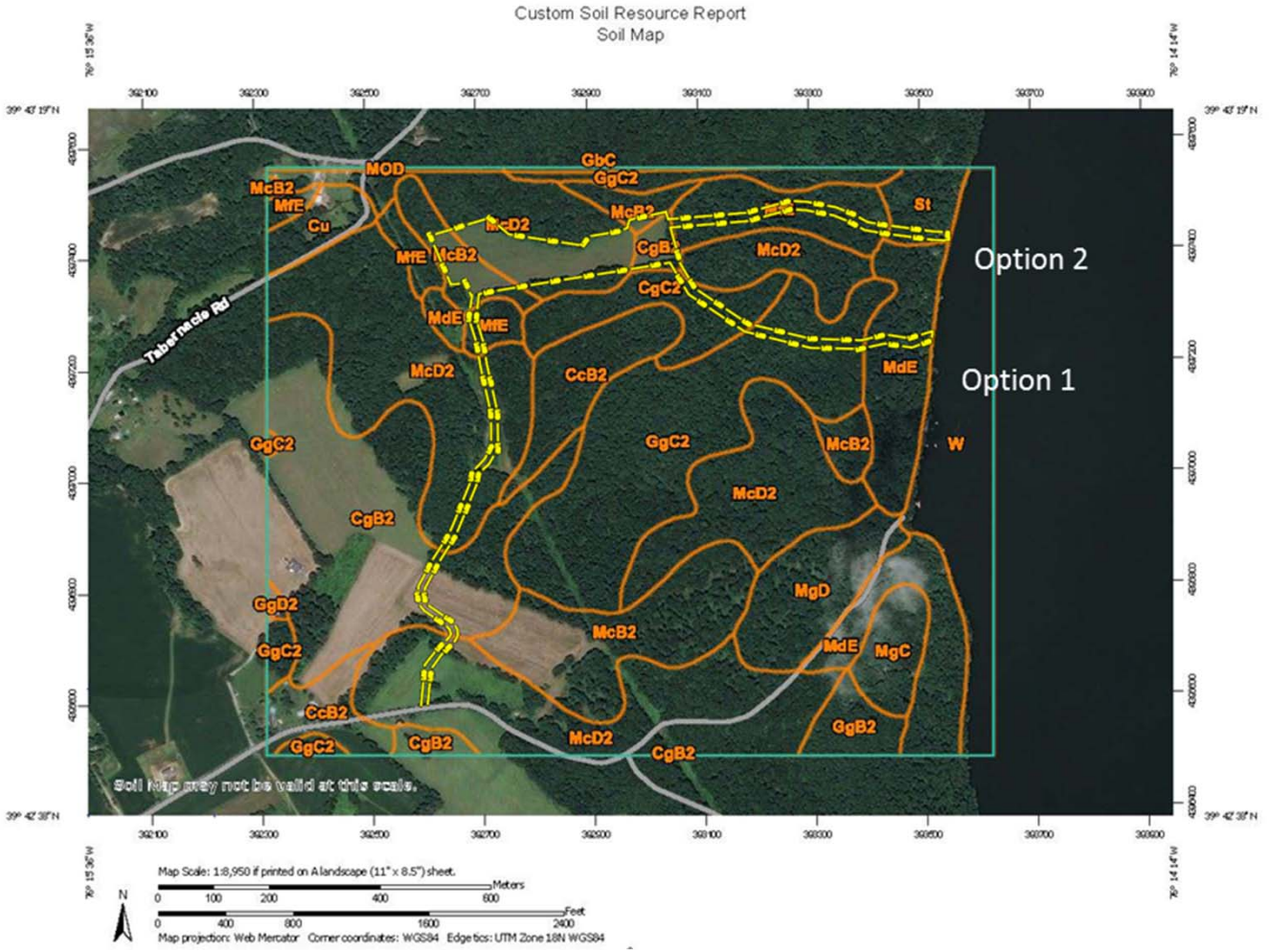
Aerial Photograph

Aerial Photograph and LOD

Aerial image of the staging area property. The proposed approximate LOD, including pipeline routes Option 1 and Option 2, are shown in yellow.

APPENDIX D

Natural Resources Conservation Service Soil Map



NRCS Soil Map and LOD

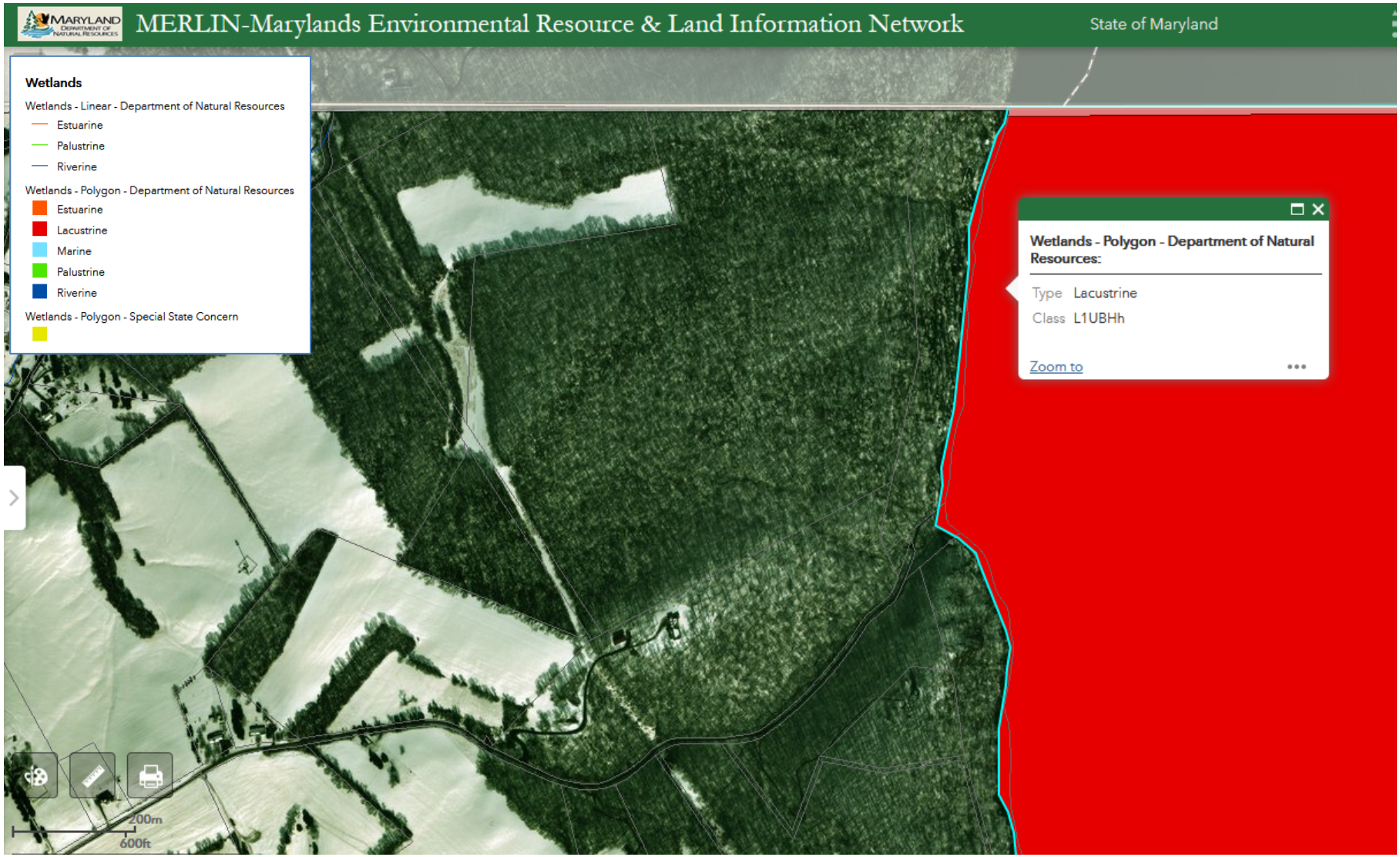
NRCS soil characteristics map of the staging area property. The proposed approximate LOD, including pipeline routes Option 1 and Option 2, are shown in yellow.

APPENDIX E

National Wetland Inventory and
Maryland's Environmental Resources and Land Information Network
Maps

Figure 1. U. S. Fish and Wildlife Service National Wetlands Inventory

Figure 2. Maryland DNR Wetlands, from MERLIN



APPENDIX F

Federal Emergency Management Agency Panel Maps

NFIP

PANEL 0060E

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

HARFORD COUNTY, MARYLAND
AND INCORPORATED AREAS

PANEL 60 OF 365

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARFORD COUNTY	240040	0060	E

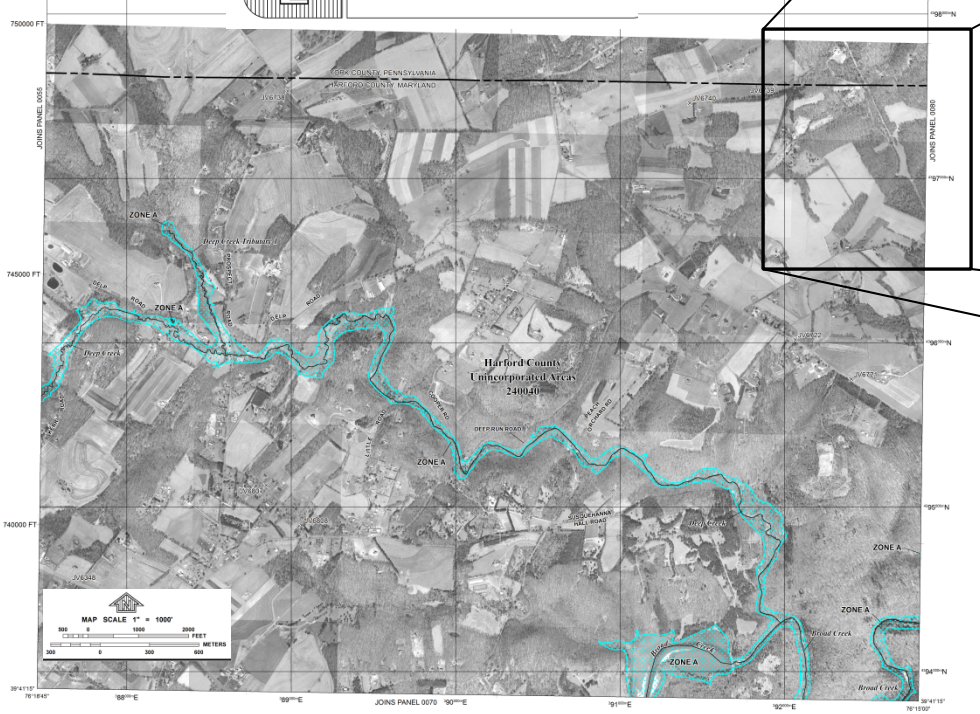
Notice to User: The **Map Number** shown below should b used when placing map orders; the **Community Numbe** shown above should be used on insurance applications for th subject community.

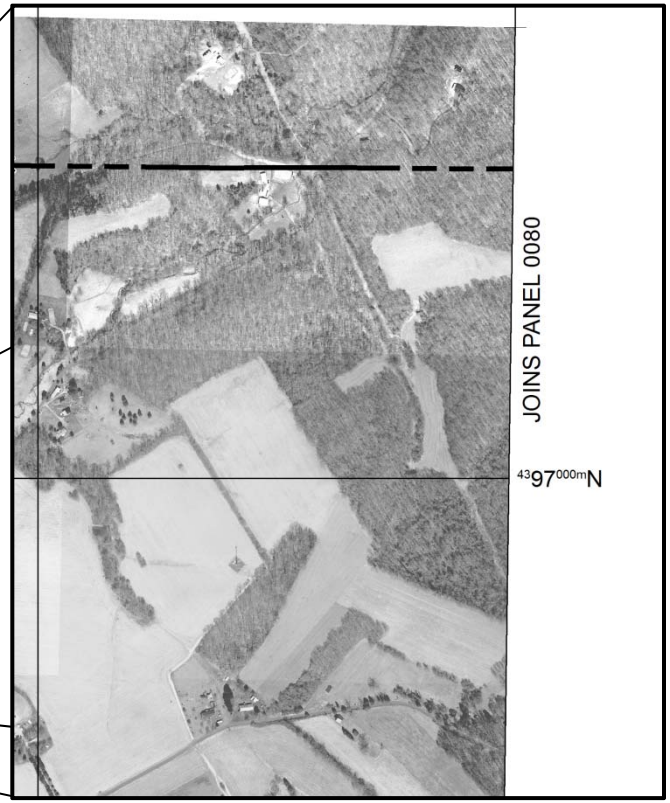
U.S. DEPARTMENT OF HOMELAND SECURITY

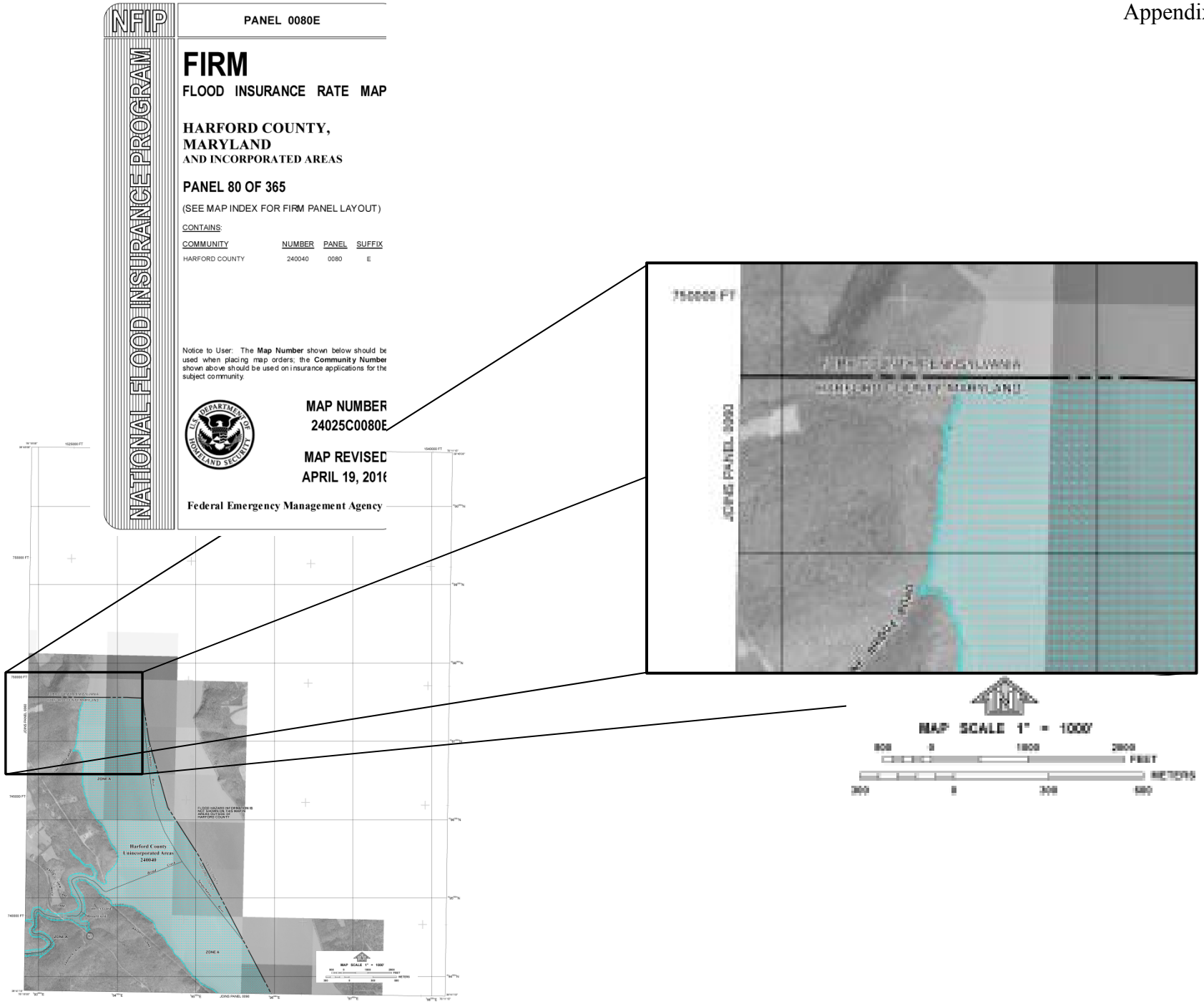
MAP NUMBEF 24025C0060E

MAP REVISED APRIL 19, 201(

Federal Emergency Management Agency

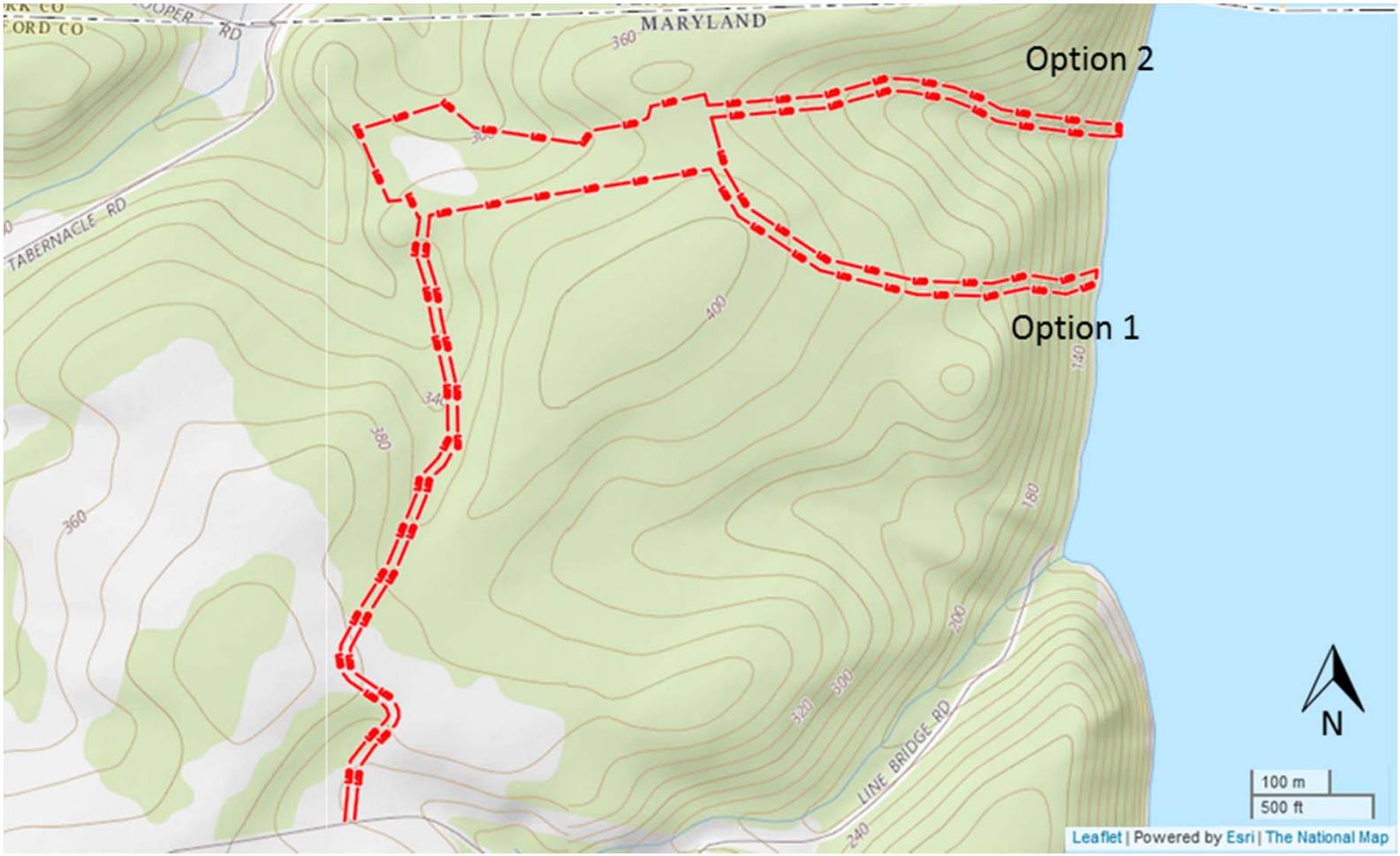





NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0080E
FIRM
FLOOD INSURANCE RATE MAP
HARFORD COUNTY, MARYLAND
AND INCORPORATED AREAS
PANEL 80 OF 365
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
HARFORD COUNTY 240040 0080 E
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
24025C0080E
MAP REVISED
APRIL 19, 2016
Federal Emergency Management Agency
MAP SCALE 1" = 1000'
FEET
METERS
Harford County
Unincorporated Areas
240040
ZONE A

APPENDIX G

United States Geological Survey Topographic Map



USGS Topographic Map and LOD

US Topo map showing staging area property topography. The proposed approximate LOD, including pipeline routes Option 1 and Option 2, are shown in red.

APPENDIX H

Maryland Department of Natural Resources Wildlife and Heritage Service Letter:
Rare, Threatened, and Endangered Species

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Joanne Throwe, Deputy Secretary

February 2, 2018

Ms. Maura Morris
Maryland Environmental Service
259 Najoles Road
Millersville, MD 21108

RE: Environmental Review for Conowingo Capacity Recovery and Innovative Reuse and Beneficial Use Pilot Project - staging and dredging areas updates, Harford and Cecil Counties, Maryland.

Dear Ms. Morris:

Thank you for providing us with the revised project details and maps. For the proposed staging areas and access routes on Tax Map 6, Parcels 26, 13, 15, and Tax Map 12, Parcel 31, the Wildlife and Heritage Service has no official records of state or federal rare, threatened or endangered plant or animal species in these areas. As a result, we have no specific concerns regarding impacts or recommendations for protection measures at this time.

However, the state-listed endangered Northern Map Turtle (*Graptemys geographica*) is known to generally occur in and near the Susquehanna River, including from Conowingo Dam northward to the Pennsylvania line. This species uses deep riverine pools and impoundments as hibernacula during the winter months, and uses soft sand/soil areas exposed to full sunlight within a few meters of the shoreline for nesting during spring and summer months. Additional research on this species is being funded by Exelon and is due to be conducted in 2018. Therefore, we may have additional comments related to the protection of this species during future planning phases of the project, based on the research results or other additional information.

It is important to note that northern Harford County is within the range of the state- and federally-listed Bog Turtle (*Glyptemys muhlenbergii*), and it could potentially occur on this part of the project site in areas of appropriate habitat. Bog turtles live in fens, bogs, wet meadow-alder complexes, and freshwater marshes, often below spring seeps or in rivulets adjacent to streams. If such wetland types occur on this property, we would recommend a Phase I Bog Turtle habitat assessment be conducted by a Qualified Bog Turtle Observer; see attachments for more information on this process.

The proposed dredge site in the Susquehanna River is within a known historic waterfowl concentration area. We would not have any concerns for this waterfowl concentration area from the work as described in this project, unless there is construction of water dependent facilities proposed. There are also records for the state-listed threatened Chesapeake Logperch (*Percina bimaculata*) in this portion of the Susquehanna, and while we do not have concerns for impacts to this species from this pilot project, future expansion of these efforts may warrant a closer evaluation of impacts to the Logperch.

We would appreciate the opportunity to review any additional project details as they are developed, including proposed use of dredge spoils for possible turtle habitat. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

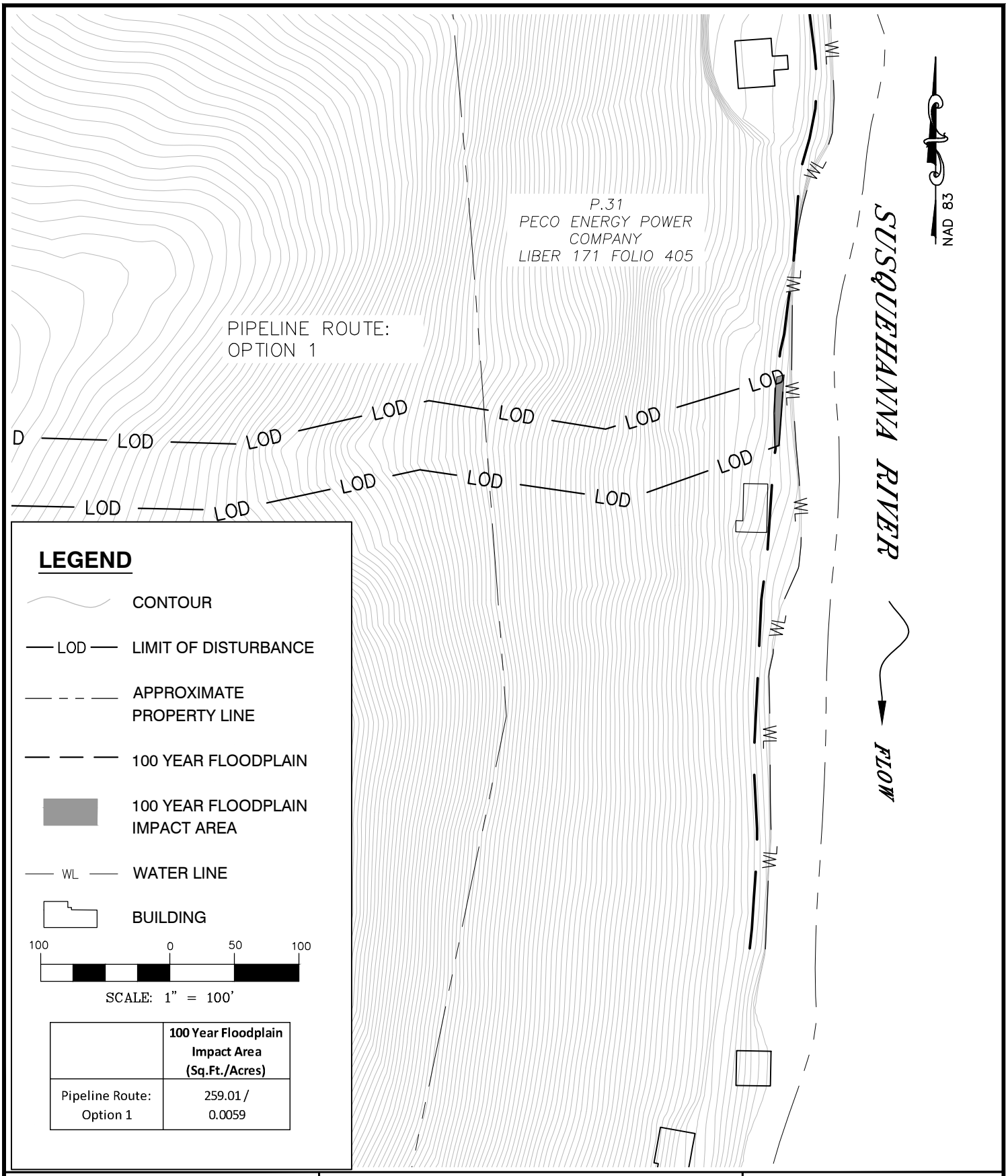
Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2017.1919.ce/ha
Cc: S. A. Smith, DNR
D. Brinker, DNR
R. Limpert, DNR
Attachments (2)

APPENDIX I

Wetland Delineation Plan



LEGEND

- CONTOUR
- LOD — LIMIT OF DISTURBANCE
- APPROXIMATE PROPERTY LINE
- 100 YEAR FLOODPLAIN
- 100 YEAR FLOODPLAIN IMPACT AREA
- WL — WATER LINE
- BUILDING

100 0 50 100

SCALE: 1" = 100'

	100 Year Floodplain Impact Area (Sq.Ft./Acres)
Pipeline Route: Option 1	259.01 / 0.0059

MARYLAND ENVIRONMENTAL SERVICE

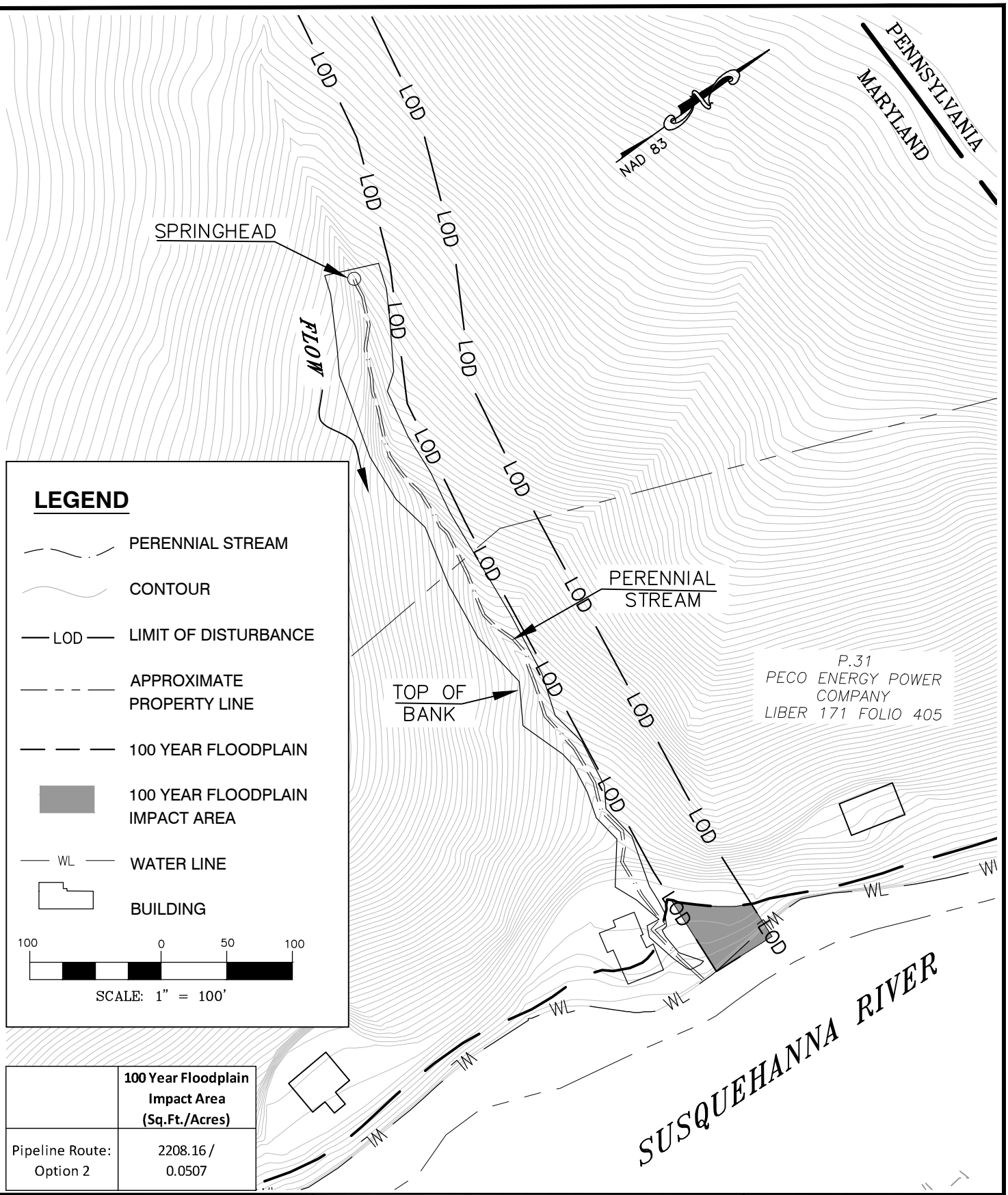
IMPACT PLATE
PIPELINE ROUTE: OPTION 1

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

HARFORD COUNTY - WHITEFORD, MARYLAND

DRAWN BY: JBB
CHECKED BY: ERQ, AP
DATE: APRIL 5, 2018
SHEET: 1 OF 3

SAVED: 4/5/2018 PLOTTED: April 5, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\MES_DREDGING\CONOWINGO DAM_PARCEL 13 - COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_IMPACT_PLATE.DWG



	100 Year Floodplain Impact Area (Sq.Ft./Acres)
Pipeline Route: Option 2	2208.16 / 0.0507

SAVED: 4/5/2018 PLOTTED: April 5, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\MES_DREDGING\CONOWINGO DAM_PARCEL 13 - COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_IMPACT_PLATE.DWG

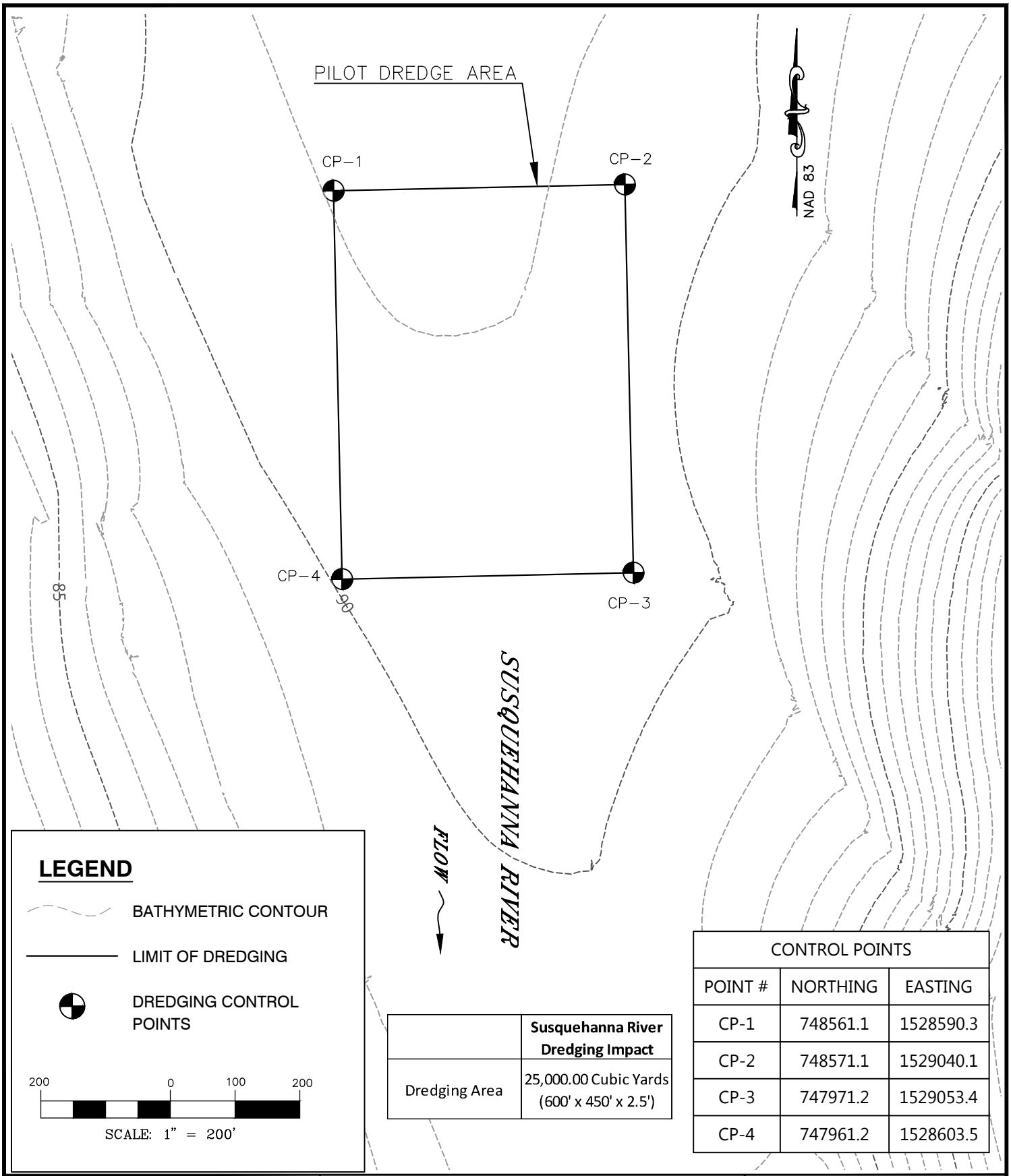
MARYLAND ENVIRONMENTAL SERVICE

IMPACT PLATE
PIPELINE ROUTE: OPTION 2

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

HARFORD COUNTY - WHITEFORD, MARYLAND

DRAWN BY: JBB, ERQ
CHECKED BY: ERQ, AP
DATE: APRIL 4, 2018
SHEET: 2 OF 3



LEGEND

- BATHYMETRIC CONTOUR
- LIMIT OF DREDGING
- DREDGING CONTROL POINTS

200 0 100 200

SCALE: 1" = 200'

	Susquehanna River Dredging Impact
Dredging Area	25,000.00 Cubic Yards (600' x 450' x 2.5')

CONTROL POINTS		
POINT #	NORTHING	EASTING
CP-1	748561.1	1528590.3
CP-2	748571.1	1529040.1
CP-3	747971.2	1529053.4
CP-4	747961.2	1528603.5

MARYLAND ENVIRONMENTAL SERVICE

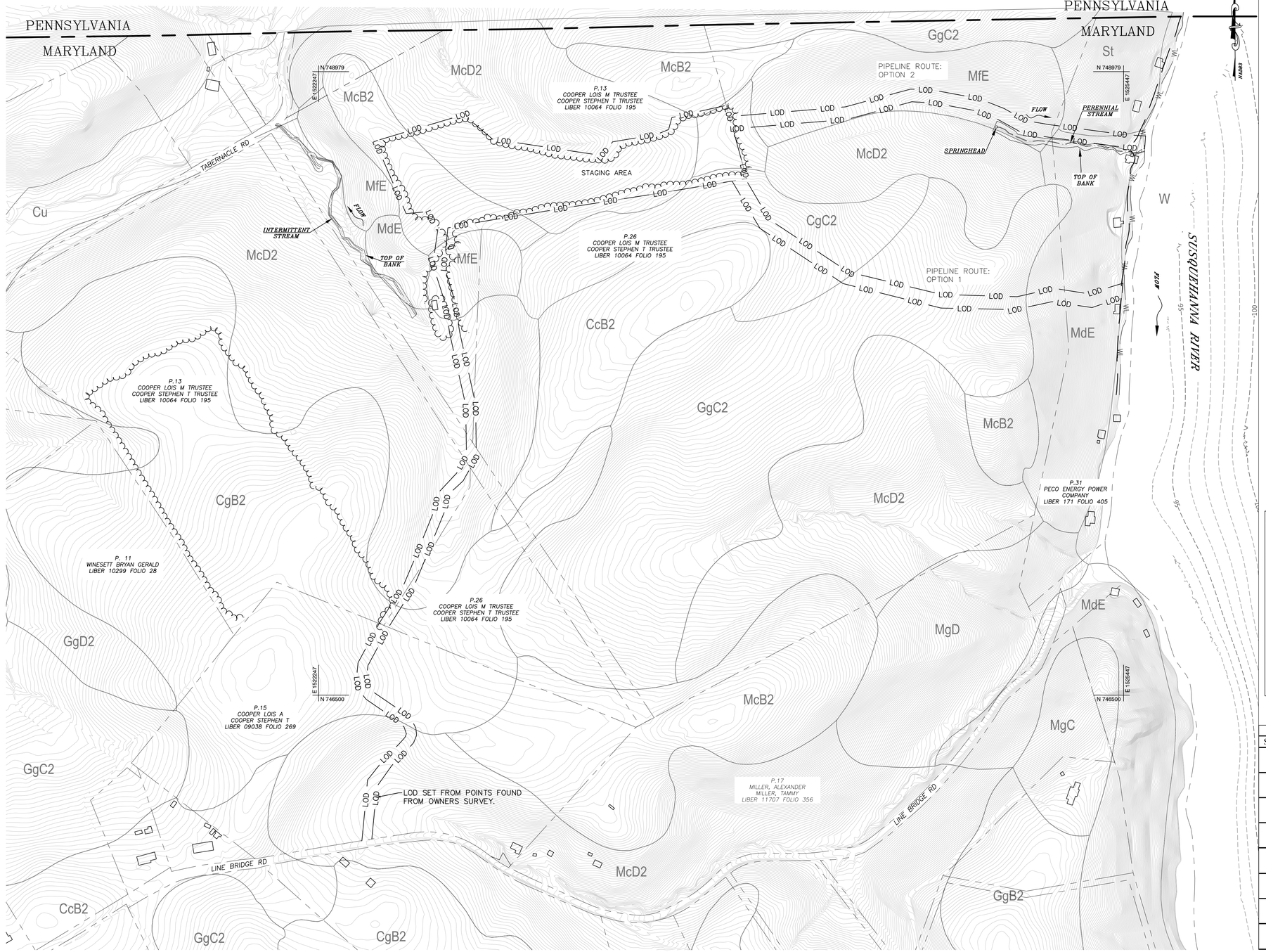
IMPACT PLATE
PILOT DREDGE AREA

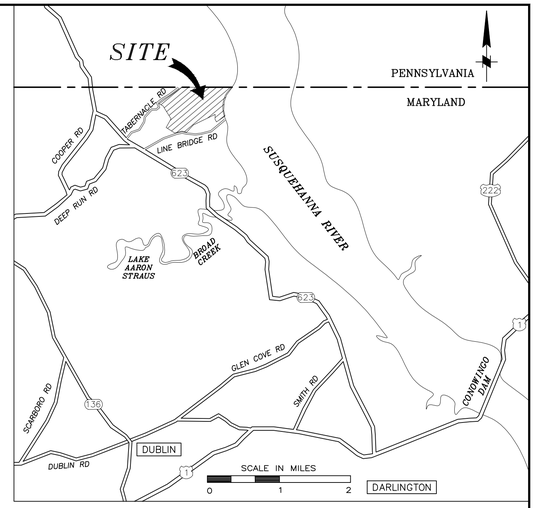
CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT

HARFORD COUNTY - WHITEFORD, MARYLAND

DRAWN BY: JBB
CHECKED BY: ERQ, AP
DATE: APRIL 5, 2018
SHEET: 3 OF 3

SAVED: 4/5/2018 PLOTTED: April 5, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\MES_DREDGING\CONOWINGO DAM_PARCEL 13 - COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_IMPACT_PLATE.DWG





	Susquehanna River Dredging Impact	100 Year Floodplain Impact Area
Pipeline Option 1	NA	259.01 SF 0.0059 AC
Pipeline Option 2	NA	2,208.16 SF 0.0507 AC
Dredging Area	(600' x 450' x 2.5')	NA
TOTAL CY	**25,000.00**	**NA**
TOTAL SF	**NA**	**2,467.17**
TOTAL AC	**NA**	**0.0566**

AC - Acres **SF - Square Feet**
NA - Not Applicable **CY - Cubic Yards**

LEGEND

- TREE LINE
- PERENNIAL STREAM
- INTERMITTENT STREAM
- CONTOUR
- BATHYMETRIC CONTOUR
- LOD — LIMIT OF DISTURBANCE
- APPROXIMATE PROPERTY LINE
- MASON DIXON LINE
- 100 YEAR FLOODPLAIN
- WL — WATER LINE
- BUILDING
- MC — SOIL TYPE

NOTES

1) STREAM LOCATIONS ARE BASED ON SURVEY FIELD DATA GATHERED BY MES IN JANUARY 2018
2) DATA SHOWN HEREON; PROPERTY DATA, BUILDINGS, CONTOURS, 100 YEAR FLOODPLAIN AND ROADS ARE FOR GRAPHICAL PURPOSES ONLY AND WERE GATHERED FROM HARFORD COUNTY AND MD DEPARTMENT OF PLANNING DATASETS.
3) BATHYMETRY PROVIDED BY ANCHOR QEA, LLC
4) HORIZONTAL DATUM: MARYLAND STATE PLANE (NAD 83)
5) VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
6) FIELD INVESTIGATION FOR WETLANDS WAS CONDUCTED ON 12/12/2017 & 1/8/2018.
7) ZONING: AGRICULTURE (AG)
8) ALL ADJACENT LAND USES ARE AGRICULTURE AND RESIDENTIAL.
9) CONTOUR INTERVAL: 1.0'
10) LOD AREA = 684,076.4 SQFT (15.7 ACRES)

Soil Types Within the LOD

Soil Symbol	Soil Description	Hydrologic Group	Hydric	K. Factor
CgB2	Chester gravelly silt loam, 3-8 percent slopes, moderately eroded	B	No	0.28
CgC2	Chester gravelly silt loam, 8-15 percent slopes, moderately eroded	B	No	0.28
GgC2	Glenelg gravelly loam, 8-15 percent slopes, moderately eroded.	B	No	0.17
McB2	Manor channery loam, 3 to 8 percent slopes, moderately eroded	B	No	0.15
McD2	Manor channery loam, 15 to 25 percent slopes, moderately eroded	B	No	0.17
MdE	Manor very stony loam, 25 to 45 percent slopes	B	No	0.2
MfE	Manor soils, 25 to 45 percent slopes	B	No	0.17
St	Stony land, steep	B	No	0.32

GRAPHIC SCALE

400 0 200 400

(IN FEET)
1 INCH = 200 FT

INITIAL	DATE	REVISIONS

X _____

AMANDA PEÑAFIEL
ENVIRONMENTAL CONSULTANT

MARYLAND ENVIRONMENTAL SERVICE

SURVEYED BY: BC, JBB
DRAWN BY: JBB
CHECKED BY: ERQ, AP
DATE: APRIL 5, 2018

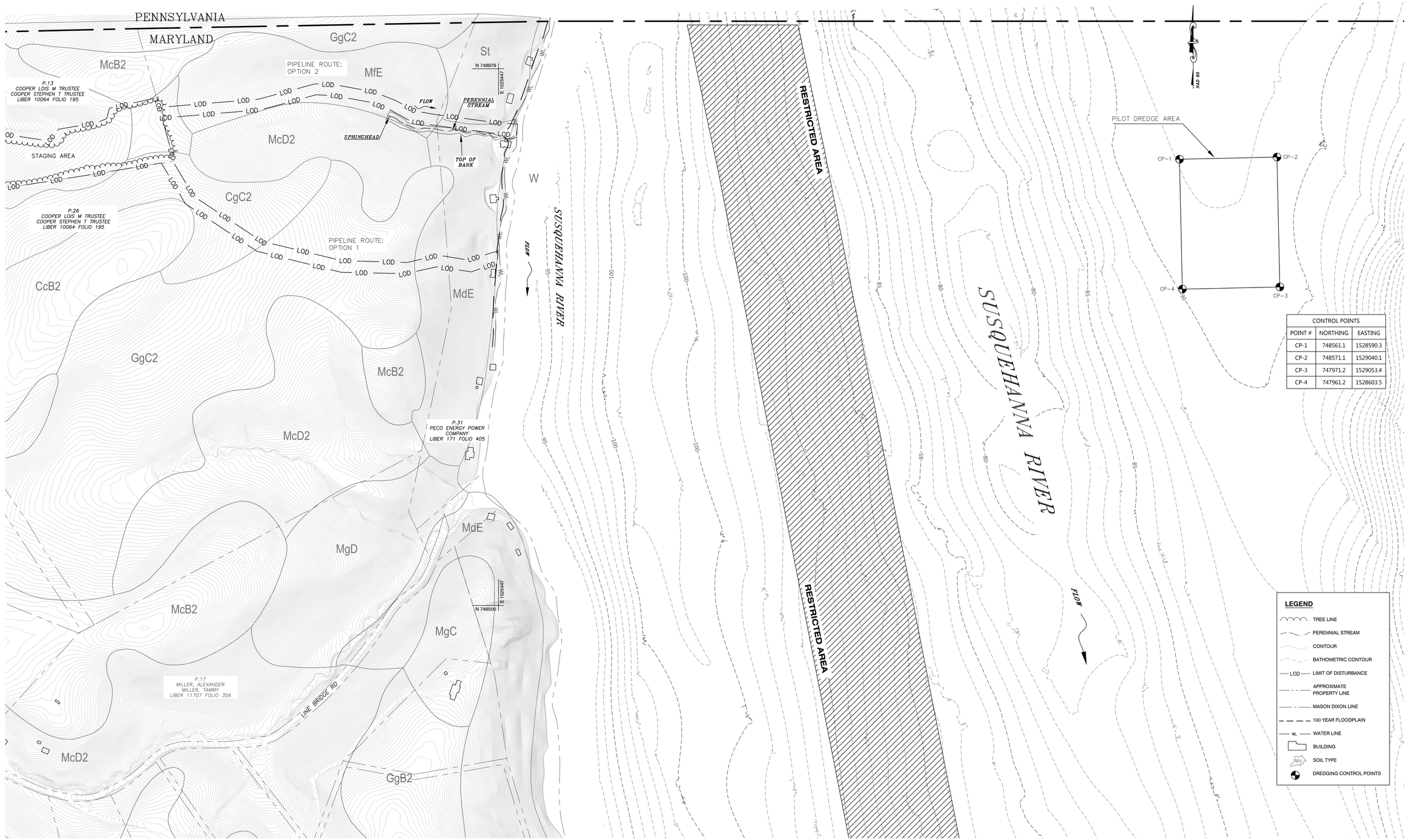
WETLAND DELINEATION PLAN

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT
HARFORD COUNTY - WHITEFORD, MARYLAND

GEOSPATIAL & ENGINEERING SECTION
259 Najoles Road - Millersville, Maryland 21108 - Office: 410-729-8200 - Fax: 410-729-8340

PROJECT NO.
SCALE: 1" = 200'
SHEET 1 OF 2
DRAWING NO.

SAVED: 4/5/2018 PLOTTED: April 5, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\MES_DREDGING\CONOWINGO DAM_PARCEL 13 – COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_24X36.DWG



CONTROL POINTS		
POINT #	NORTHING	EASTING
CP-1	748561.1	1528590.3
CP-2	748571.1	1529040.1
CP-3	747971.2	1529053.4
CP-4	747961.2	1528603.5

LEGEND

- TREE LINE
- PERENNIAL STREAM
- CONTOUR
- BATHOMETRIC CONTOUR
- LOD — LIMIT OF DISTURBANCE
- APPROXIMATE PROPERTY LINE
- MASON DIXON LINE
- 100 YEAR FLOODPLAIN
- WL — WATER LINE
- BUILDING
- MC — SOIL TYPE
- DREDGING CONTROL POINTS

GRAPHIC SCALE

400 0 200 400

(IN FEET)
1 INCH = 200 FT

INITIAL	DATE	REVISIONS

X _____
AMANDA PEÑAFIEL
ENVIRONMENTAL CONSULTANT

MARYLAND ENVIRONMENTAL SERVICE

SURVEYED BY: BC, JBB
DRAWN BY: JBB
CHECKED BY: ERQ, AP
DATE: APRIL 5, 2018

WETLAND DELINEATION PLAN

CONOWINGO CAPACITY RECOVERY AND INNOVATIVE REUSE AND BENEFICIAL USE PILOT PROJECT
HARFORD COUNTY - WHITEFORD, MARYLAND

GEOSPATIAL & ENGINEERING SECTION
259 Najoles Road - Millersville, Maryland 21108 - Office: 410-729-8200 - Fax: 410-729-8340

PROJECT NO.
SCALE: 1" = 200'
SHEET 2 OF 2
DRAWING NO.

SAVED: 4/5/2018 PLOTTED: April 5, 2018
FILE PATH: I:\GIS\PROJECTS_SURVEY PROJECTS\WES_DREDGING\CONOWINGO DAM_PARCEL 13 - COOPER PROPERTY\WETLAND DELINEATION PLAN\C-WETL-CONOWINGO_24X36.DWG

Attachment 8:

Sediment Core Analysis

Department of Natural Resources
Resource Assessment Service
MARYLAND GEOLOGICAL SURVEY
Richard A. Ortt, Jr., Director

COASTAL AND ENVIRONMENTAL GEOLOGY

FILE REPORT NO. 17-13

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

By

Stephen Van Ryswick, Elizabeth Sylvia, and Anna Gillmor

October 2017

Lawrence J. Hogan, Jr.
Governor

Boyd K. Rutherford
Lieutenant Governor

Mark J. Belton
Secretary

MARYLAND DEPARTMENT OF NATURAL RESOURCES
Resource Assessment Service
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401
Toll Free Number: 1-(877) 620-8DNR
Out of State call: (410) 260-8021
www.dnr.state.md.us

MARYLAND GEOLOGICAL SURVEY
2300 Saint Paul Street
Baltimore, Maryland 21218
410-554-5500
www.mgs.md.gov
Richard A. Ortt, Jr., Director

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.

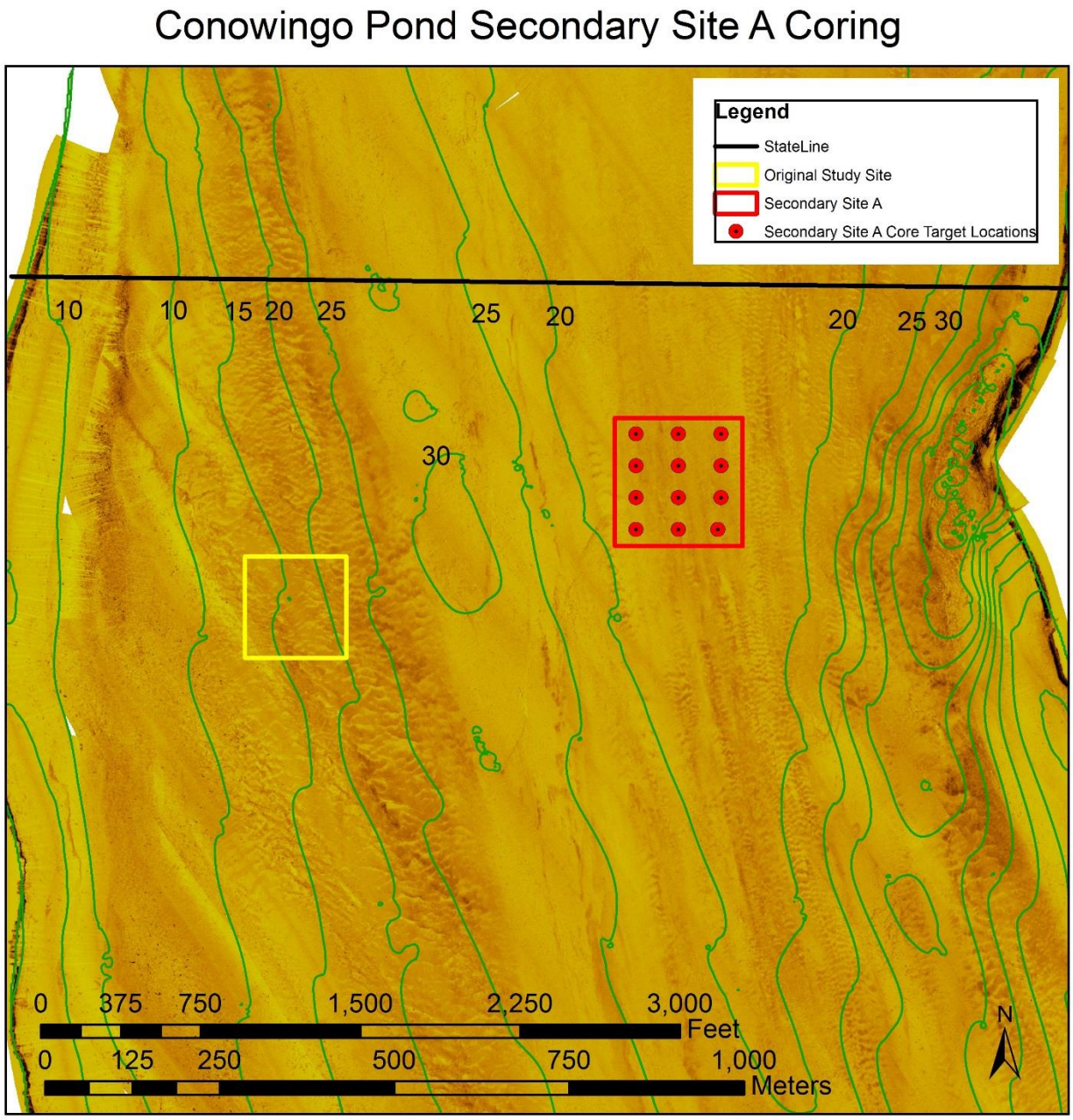


Figure 1. Conowingo Pond 475-foot pilot project study box (yellow) and the secondary study site box (red) with core locations. Imagery from 2014 side-scan sonar data with bathymetric contours labeled in feet.

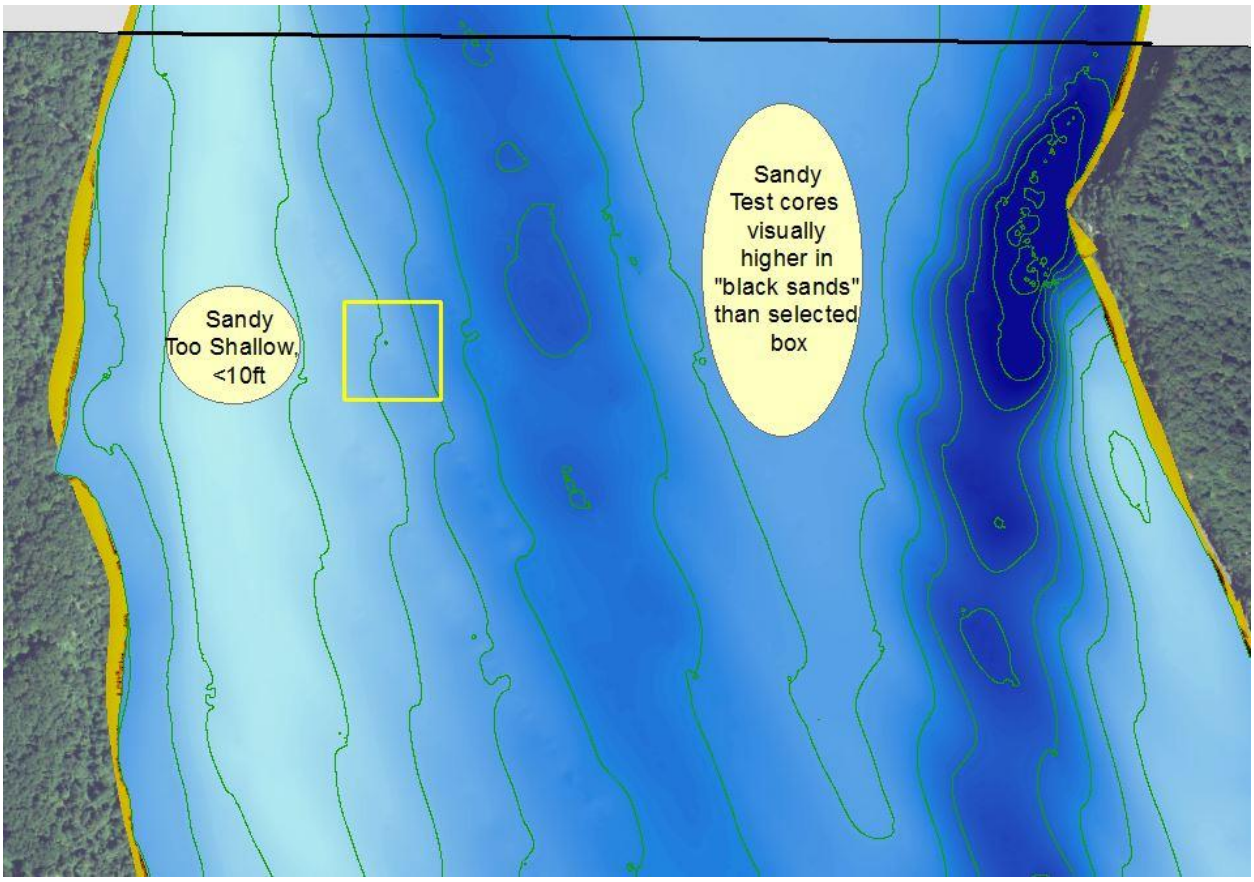


Figure 2. Summary of knowledge gained during test core collection. The yellow box indicates the original study site. The black line denotes the Maryland-Pennsylvania border.

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.

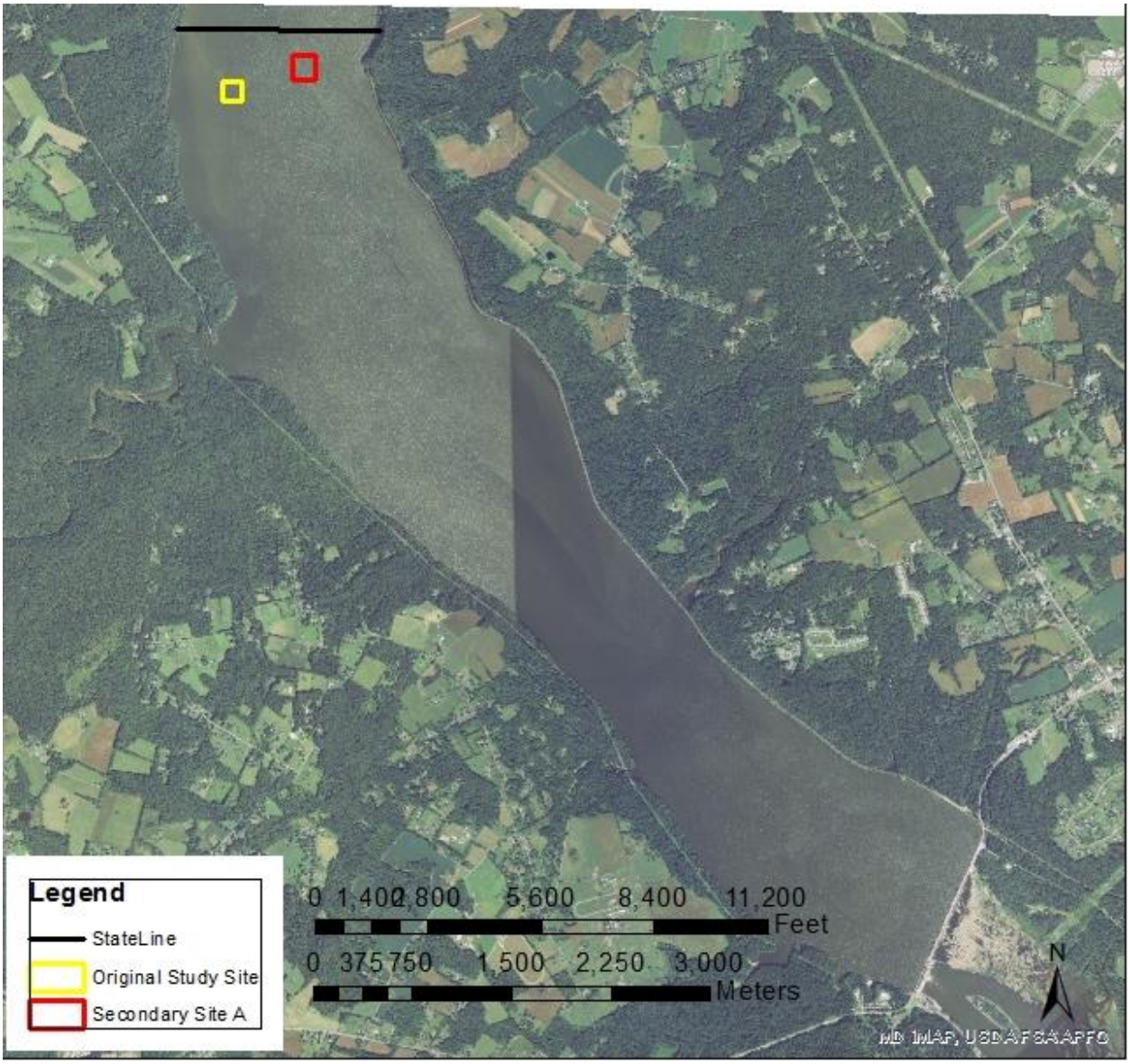


Figure 3. Maryland's portion of the Susquehanna River, above Conowingo Dam. The yellow box outlines the area of the original study stie. The red box illustrates the 600-foot square box used for Secondary Site A.

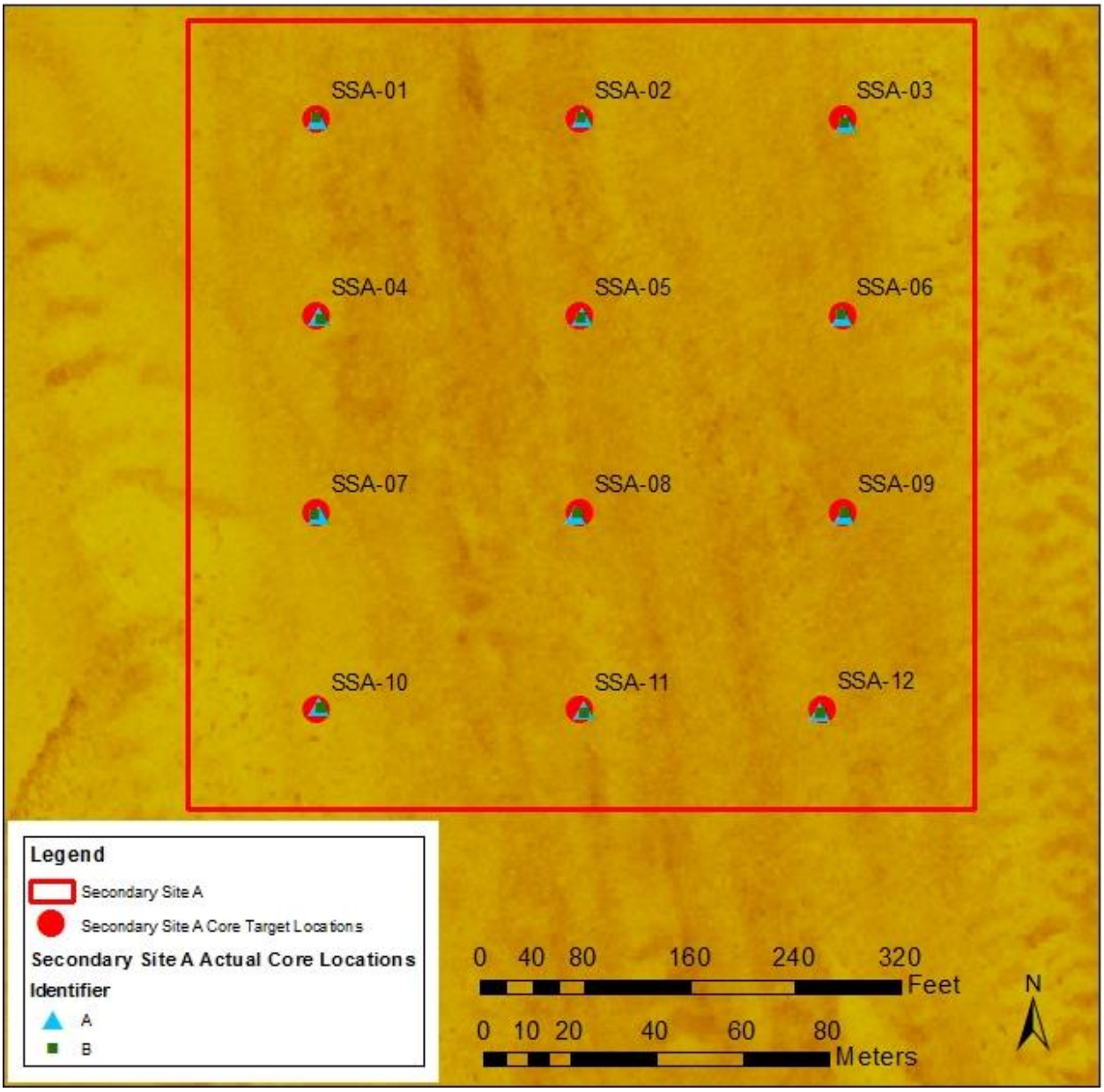


Figure 4. Target core locations mapped within the secondary study box, with 'A' and 'B' variations for each core site mapped at their extraction location. Background is 2014 side-scan imagery.

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 been 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 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.

Table 3. List of analyses performed on each core.

Index Conowingo SSA Sediments September 2017		Physical Geotech	TCLP	Metals and Inorganics							Organics							Nutrients and Agricultural		
		ASTMs: 422, 854, 2216, 4318 and 2487	Full TCLP Metals, SVOCs, VOCs, Pest, Herb + PCB	PPL Metals inc. Hg + P, K, Mg, Ca	Hexavalent Chromium	AVS /SEM	Total Sulfides	Total Sulfates	Cyanide, Total and Free	pH	Total Organic Carbon (Lloyd Kahn)	VOCs - Select List	SVOCs -TCL inc. PAHs	Organochlorine Pesticides	PCBs inc. Arochlors	Dioxins / Furans	TPH-DRO and GRO	Nutrients: P, NH3-N and TKN	Nutrients: P, K, Mg and Ca	Soluble Salts (Electrical Cond. 1:2, V:V)
CONOWINGO SSA-1	9/27/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-2	9/28/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-3	9/27/2017	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
CONOWINGO SSA-4	9/27/2017	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CONOWINGO SSA-5	9/28/2017	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-6	9/27/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-7	9/27/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-8	9/28/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-9	9/27/2017	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
CONOWINGO SSA-10	9/27/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
CONOWINGO SSA-11	9/27/2017	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CONOWINGO SSA-12	9/27/2017	X		X	X	X	X	X	X	X	X		X	X	X		X	X	X	X

Appendix A

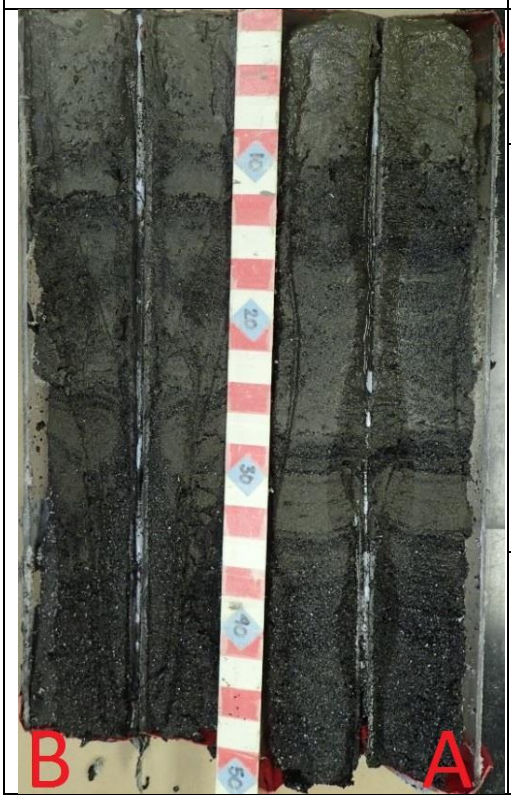
Core Logs

This page is intentionally left blank.

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
	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)

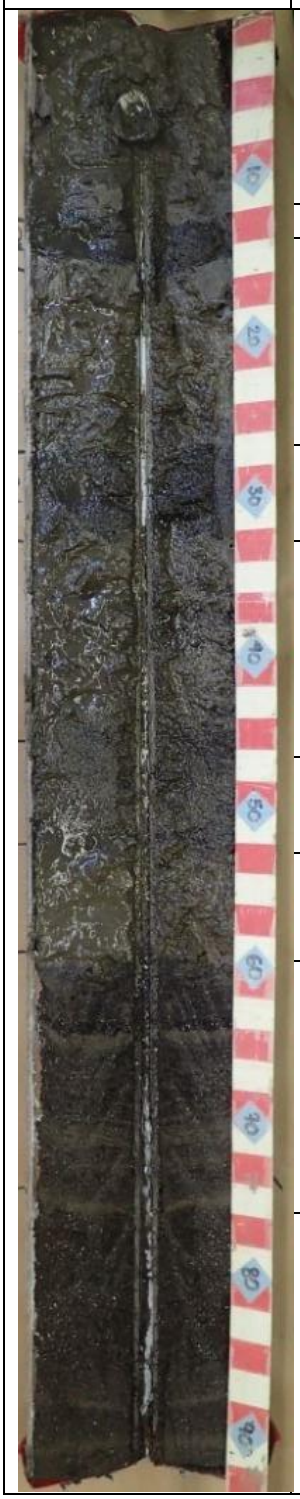
Conowingo SSA Core #5A **Total length of A – 49 cm** **Total length of B – 37 cm**
Water Depth – 15.8 ft
Date collected – 9/25/17, Date opened – 9/28/17, PID = 1.3 ppmv

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
	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

This page is intentionally left blank.

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)	SEM/AVS Ratio	Total Sulfides	Total Sulfates (deionized 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	molar	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 *detects only reported see lab package for full compound list		Semi-Volatile Organic Compounds												
		1,1'-BIPHENYL	2-METHYL-NAPHTHALENE	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
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	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	DIBENZ(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

B-5 (SVOCs in two halves)

Conowingo SSA Sediments September 2017		Organo-Chlorine Pesticides																					
		4,4'-DDD	4,4'-DDE	4,4'-DDT	ALDRIN	ALPHA-BHC	BETA-BHC	CHLORDANE (TECHNICAL)	CHLORO-BENSIDE	DCPA	DELTA-BHC	DIELDRIN	ENDOSULFAN I	ENDOSULFAN II	ENDOSULFAN SULFATE	ENDRIN	ENDRIN ALDEHYDE	GAMMA-BHC (LINDANE)	HEPTACHLOR	HEPTACHLOR EPOXIDE	METHOXY-CHLOR	MIREX	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		95.7	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 JP	0.00007 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.00014 Jp	0.0001 U	0.0001 U	0.0078 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	0.00007 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000073	0.0001 U	0.0001 U	0.0078 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	0.00008 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000078	0.0001 U	0.0001 U	0.0083 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	0.00008 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	0.0086 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	0.0081 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	0.0078 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	0.0088 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	0.0001 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 Jp	0.0001 U	0.0001 U	0.0081 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 Jp	0.0001 U	0.0001 U	0.0082 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	0.0001 U	0.00008 U	0.0001 J	0.0001	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000099 Jp	0.0001 U	0.0001 U	0.0087 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	0.0001 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	0.000093 Jp	0.0001 U	0.0001 U	0.0085 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	0.0001 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	0.00011 Jp	0.0001 U	0.0001 U	0.0087 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)	OCDF (Octachlorodibenzo-furan)
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	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	0.00022	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	0.00022	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	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-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 Jl	1.20E-06 J	4.90E-06 U	3.70E-07 Jq	4.90E-06 U	5.70E-07 J	6.50E-07 Jq	2.30E-07 Jq	2.30E-06	9.30E-04 B	9.20E-06 JB
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 Jl	1.60E-06 Jq	1.80E-07 Jq	5.20E-07 J	6.30E-07 Jq	5.60E-07 J	9.00E-07 Jq	2.10E-07 Jq	3.10E-06	1.40E-03 B	1.10E-05 B
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	5.00E-06 U	4.40E-07 Jq	4.80E-07 Jq	4.70E-07 Jq	6.50E-07 J	3.70E-07 Jq	2.50E-06	1.00E-03 B	8.70E-06 JB
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 Jl	1.30E-06 Jq	4.80E-06	5.80E-07 J	4.40E-07 Jq	5.80E-07 Jq	3.20E-07 J	3.20E-07 J	3.30E-06	1.10E-03 B	1.10E-05 B

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
l = 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	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 Kjedahl 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	Cation Exchange Capacity
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	mg/kg	mmhos/cm	meq/100g
CONOWINGO SSA-1	9/27/2017	250,000	25	230	91	1,800	430	820	690	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/com = 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