AECOM
625 West Ridge Pike
Conshohocken, PA 19428
aecom.com

Project name:
HDD 290 - Marsh Creek Sediment Investigation

Project ref: 60640004

To:
Ms. Monica Styles
Energy Transfer
100 Green Street
Marcus Hook, PA 19061

From:
Joshua Collins, AECOM

Date:
June 23, 2021

CC:
Nick Bryan, Energy Transfer

Memo

Subject: Marsh Creek Reservoir Supplemental Sediment Sampling

On May 11th, 2021 the Pennsylvania Department of Environmental Protection (PADEP; the Department) provided comments on the HDD S3-0290 Impact Assessment and Restoration Plan for Marsh Creek Reservoir (Lake Report) submitted to the Department on October 1, 2020. The supplemental sediment sampling efforts presented in this memo are intended to further document the distribution of previously deposited drilling fluids which contained trace amounts (i.e. < 5%) of bentonite in Ranger Cove. Data collected as part of this investigation will serve to confirm the appropriateness of the areas identified for remediation in the Lake Report as well as to evaluate the potential for redistribution and/or burial of these deposits associated with natural sedimentation processes.

Specifically, the objectives of this investigation are to:

- Further document the areal extent and thickness of previously deposited sediments containing trace of amounts of bentonite to refine the dredge prism.
- Determine the thickness of naturally occurring sediment deposits and detrital layers which may have accumulated on top of sediments containing drilling fluids that would affect removal volumes and the potential efficacy of the proposed remedy.

APPROACH

This work will include field verification and mapping of recently deposited sediment within the area of investigation at approximately 55 discrete locations throughout Ranger Cove, with a focus on areas with previously documented deposits of drilling fluids greater than 1" (Figure 1). Data collected at discrete sampling locations will be kriged in AutoCad Civil 3D to refine the dredge prism. Analytical samples will be collected for USGS XRD Full Clay Phase analysis within the 0-6" interval (i.e. biological active zone) at approximately 10% of the sampling locations; specific locations selected for analysis will be determined in the field and will be selected to capture the gradient of previously deposited sediments mixed with HDD fluids containing trace amounts of bentonite. Supplemental analytical samples will be collected from an additional 10% of sampling locations (for a total of 20% of the sampling locations); supplemental samples will be held at the lab pending receipt of data from the first set of analytical samples (i.e. first 10%), and will be released for analysis following review of the initial results.

SAMPLING METHODOLOGY

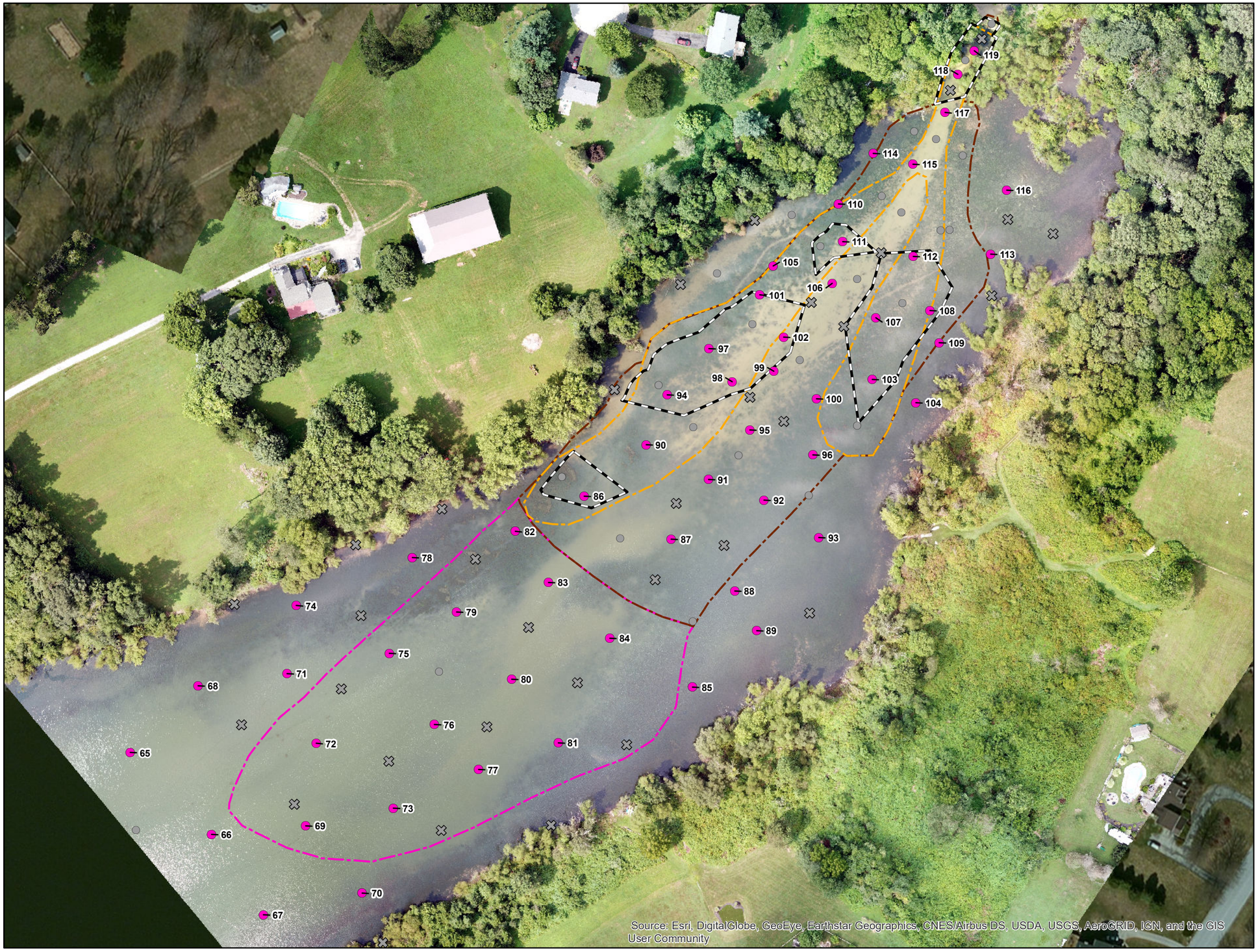
Field teams will locate each proposed sampling location using a Trimble GeoXh global positioning system (GPS) capable of achieving sub-meter accuracy. Sample locations may be field adjusted depending upon water level or obstructions (e.g. debris/rock); if a sampling location is relocated, a note will be made on the field sheet and new GPS coordinates will be collected. At depths greater than 3 feet a petite Ponar grab will be used to collect sediment samples. At depths less than 3 feet sediment cores (2" diameter) will be manually advanced to a depth of 1-foot below the sediment/water interface, or until refusal, using a clean acetate liner. Sediment samples will be photographed, visually characterized, and the thickness of previously deposited sediments potentially containing HDD fluids with trace amounts of bentonite will be documented (if present/identifiable). The following data will be collected at each boring location:

- Date and time of sample collection
- Location and setting (level bed, sloped, depression, historic channel, etc.)
- Sediment layers described
- Thickness of each layer
- Color of each layer (using a Munsell Color Chart)
- Photographic documentation
- Composition (silt, clay, sand)
- Biota presence
- Identification of sample crew

At sampling locations selected for USGS XRD Full Clay Phase analysis (approximately 20% of locations) sediment from the 0-6" interval will be thoroughly homogenized prior to being placed into laboratory supplied bottleware. AECOM will ship the sediment samples to the contract laboratory or transfer to the client's representative for laboratory analysis; half of the samples (i.e. 10% of overall locations) will be analyzed initially and the remainder will be held pending results from the first set of analyses as described above. Residual sediments from the cores/Ponar grabs will be returned to the lake at the point of collection following visual characterization and sampling.

REPORTING

A succinct field summary memorandum documenting field activities will be provided to PADEP within 15 days of the of the receipt of analytical data. The field summary memorandum will include a description of field activities, a map documenting the extent of recently deposited sediment potentially containing HDD drilling fluids, analytical reports and, a photograph log of the project area and all sediment cores.



Legend

- Proposed Substrate Monitoring Locations
- Substrate Monitoring Locations - August 17, 2020
- Substrate Monitoring Locations - September 2, 2020
- Proposed Sediment Removal Areas
- Approximate Extent of Recent Sediment Deposition - August 17, 2020
- Approximate Extent of Recent Sediment Deposition - September 2, 2020
- Approximate Extent of Trace Sediment Deposition - September 2, 2020

Key Map not to Scale

Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
False Easting: 1,968,500.0000
False Northing: 0.0000
Central Meridian: -77.7500
Standard Parallel 1: 39.9333
Standard Parallel 2: 40.9667
Latitude Of Origin: 39.3333
Units: Foot US

N

0 125 250
Feet

AECOM

Figure 1
Proposed Sediment Samapling Locations
Marsh Creek Lake
Downingtown, Pennsylvania

Prepared by: BSF	Checked by: JC
Job: 60640004	Date: 6/23/2021

Document Path: S:\Projects\IMS\DUE_DLGNCE\ENERGY TRANSFER\SamplingPlan - 20210623.mxd