June 11, 2018 Reference No. 038443

Ms. Leslie Patterson
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Region V
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Mail Code SR-6J
Chicago, Illinois
60604

Ms. Tamara McPeek
Environmental Response and Revitalization
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio
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Dear Ms. Patterson and Ms. McPeek:

Re: Quarry Pond Investigation – Hydrographic Survey
South Dayton Dump and Landfill Site, Moraine, Ohio (Site)

This letter provides the results of the Quarry Pond hydrographic survey conducted at the South Dayton Dump and Landfill Site (Site) in March 2018. GHD has prepared this letter on behalf of the Respondents to the Administrative Settlement Agreement and Order on Consent (ASAOC) for Remedial Investigation/Feasibility Study (RI/FS) of the Site, Docket No. V-W-16-C-011 (Respondents).

The Quarry Pond investigation comprises characterization of surface water and sediment quality, and determining whether the "foreign objects" in the Quarry Pond may be sources of contamination, as described in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for Operable Units 1 and 2 (RI/FS Work Plan). The presence of "foreign objects" was assessed by conducting the hydrographic survey as discussed below. Characterization of surface water and sediment quality will be completed in September.

The hydrographic survey was conducted by J.F. Brennan Co., Inc. (Brennan) and included use of a multi-beam echo sounder (MBES) and side-scan sonar (SSS) as described in the report included in Attachment 1. The MBES and SSS data were used to produce a bathymetry map and images of notable features indicated by the survey data. The maps and images are included as Attachment 1, Appendix A and Appendix B, respectively. The data provided by Brennan were further processed by GHD to produce a two dimensional interactive map with images of notable features (Attachment 2). The interactive map can be used to select or deselect object types from the legend on the lower left side of the figure, and to view images by clicking on an individual object within the map area.

The results of the hydrographic survey are summarized by the following:

- The elevation of the base of the Quarry Pond ranges from approximately 669 feet at the deepest point to approximately 713 feet at the shoreline.
- The Quarry Pond has steep banks with the deepest depths in the western section, and the shallowest depths to the south/ southwest and northeast of the island.
- Scattered debris, both manmade and natural was located throughout the Quarry Pond.
- The objects identified by Brennan, based on the hydrographic survey, are classified as: suspected vehicle/ vessel; potential boulder; potential drum; potential log; potential logs and/or boulders; potential manmade debris; potential tire; potential vertical manmade structure; and suspected debris/ rubble field.

The hydrographic survey information was reviewed by GHD with respect to the proposed surface water and sediment sampling locations shown on Figure 5.3 of the RI/FS Work Plan. This resulted in adjustments to the proposed sediment sampling locations, in the following areas: vicinity of objects 5, 6 and 17; near the "Potential Drum"; vicinity of objects 59, 60 and 61; and near the "Suspected Vehicle". Additional adjustments were made to reflect to bathymetry data, to provide representation of the various depth conditions. The map included in Attachment 2 includes proposed sample locations with above-noted adjustments. To view the proposed sample locations it is necessary to select the symbol within the legend on the lower left side of the figure.

It is anticipated that the Quarry Pond surface water and sediment sampling will be conducted in September 2018. The need for potential further action will be evaluated after the results of the surface water and sediment samples are available.

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,

GHD

Julian Hayward

JH/cb/3

Encl.

cc: (all by pdf) Ken Brown, ITW
Bryan Heath, NCR
Wendell Barner, Barner Consulting
Jim Campbell, EMI
Brett Fishwild, Jacobs
Valerie Chan, GHD

Attachment 1
Quarry Pond Hydrographic Survey Report
(Appendices provided separately due to file size)

J.F. BRENNAN CO., INC.

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This report outlines the Approach, Methods and Results for the hydrographic surveys performed by J.F. Brennan Co., Inc. to map the bathymetry and underwater features within the Quarry Pond located at Moraine, Ohio.

Approach

The purpose of this work was to locate areas of manmade and natural features and create a bathymetric surface within the bounds of the Quarry Pond.

On March 6th, 2018 J.F. Brennan Co., Inc. dispatched a hydrographic survey crew to the Quarry Pond, located in the town of Moraine, Ohio. A pre-survey meeting was held with Mr. Jason Close (GHD), Mr. Ryan Sands (JFB) and Mr. Taylor Blumenstein (JFB) to discuss the scope of the hydrographic survey to be performed as well as analyze safety risks and hazards that may be present while performing work.

1. Perform a hydrographic survey using a multi-beam echosounder (MBES) to locate prominent features and obstructions located in the pond. Perform additional hydrographic data collection using side-scan sonar (SSS) to add detail to the MBES data collected.
2. Process MBES and SSS data to create bathymetric map data and further identify notable features and their locations.

The work was to be completed and data produced relative to the following horizontal and vertical survey datum:

Horizontal Datum: U.S. State Plane NAD83

Zone: OH-3402, Ohio South

Units: U.S. Survey Feet

Vertical Datum: North American Vertical Datum 1988

Units: U.S. Survey Feet

Geoid: g2012a-CONUS

Methods

Quality Control

The following quality control measures were utilizes to ensure proper data collection.

- GPS system –Check against NGS site control monument using the Ohio DOT's VRS network

- MBES – Patch test, GAMs Calibration, water column sound velocity measurements
- IMU system – Patch test

Geodetic Control

Horizontal control and vertical control, was located by Mr. Sands and Mr. Blumenstein. The value of this control was obtained from the standard NGS control datasheet
Prior to bathymetric data collection a connection to Ohio DOT's VRS Network was established and a check-in shot was performed at the vertical and horizontal NGS control monument listed below:

PID: JZ0006
Name: E140
Northing: 645510.603'
Easting: 1484932.205'
NAVD88 Elevation: 748.284'

A check on the established point using the VRS network showed differences of less than 0.08' both vertically and horizontally.

Positioning and Depth Measurement

RTK GPS was used as the method for horizontal and vertical positioning during the survey. Acoustic depth measurements were collected utilizing a multi-beam echo sounder in combination with an inertial navigation system for motion corrections.

Equipment and Software Utilized

J.F. Brennan 7751 Survey Launch

R2Sonic 2020, multi-beam echosounder operating at 400 kHz.

Applanix Pos MV 320, full-range of motion corrections for heave, pitch, roll, yaw, position and heading

AML MicroX, sound-speed profiler

Castaway CTD, sound-speed profiler

Edgetech 4125 SideScan Sonar

Trimble R8 GNSS, global positioning system

Ohio DOT VRS RTK Network, GNSS corrections

Hypack 2017, hydrographic data collection software

Hydrographic Survey Summary

Starting on March 6th the survey vessel was trailered to and launched at the pond, where it would remain until the survey was concluded on March 8th. Due to high water conditions at the time, the

vessel was first launched and mobilized thereafter with GPS and acoustic sounding equipment. Upon completion of mobilization, configuration and quality control checks were completed. Data collection with the MBES system at 0 degree and 45 degree tilts were completed on March 7th, while SSS collection was conducted on the morning of March 8th. All hydrographic data collection concluded on the afternoon of March 8.

MBES bathymetry and SideScan imagery was collected with approx. 100% overlap in areas where water depth and safe navigation allowed. Water conditions in the beginning stages of the survey were approximately 2-3 feet higher than typical water levels in the quarry pond; throughout the course of the survey observed water level dropped from the initial water surface elevation at 713.8'. Quarry Pond elevations surveyed at the time ranged from approximately 669' at its deepest to 713' at shoreline. The quarry pond was characterized by steep banks with heavily wooded vegetation on the shoreline, the deepest depths occurring in western section, and the shallowest occurring to the south/southwest and northeast of the island. Scattered debris, both manmade and natural, was located throughout the entire quarry pond. This data represents an area with continually changing conditions and is only representative of the conditions at the time of the data collection.

Hydrographic Data Reduction and Edit Summary

The hydrographic data was edited and reduced to the datum listed above (see *Approach*) using both Hypack software version 2017 (MBES) and Sonarwiz software version 6.0 (SSS).

MBES:

Raw point data was brought into the Hypack 2017 Hysweep editor where different files and values were applied to the raw soundings. A sound velocity file was applied to correct for sound refraction throughout the water column, and a patch test was performed and appropriate values applied to correct for pitch, roll, and yaw. Corrected multi-beam point data was then exported to XYZ files. These files include an XYZ dataset comprised of ALL corrected multi-beam soundings and a one-foot-by-one-foot gridded XYZ dataset of corrected soundings. This process involves creating a one-foot-by-one-foot grid of the entire survey surface and selecting one sounding per cell based on an average value for that cell. TIN, (triangulated irregular network) and matrix surfaces were created with Hypack software from the final sorted XYZ data set and used for charting, contouring and for use in Fledermaus and Iview4D.

SSS:

Raw data collecting using the side-scan sonar was brought into the SonarWiz software, where bottom tracking was applied and gains were adjusted to provide sharper imagery. Once imagery was processed, a mosaic was stitched together and a feature report complied. The feature report is comprised of notable features found within the side scan data and may not include all features located within the quarry pond. Images within the feature report may contain more features than those listed.

Results

Results of the hydrographic surveys are best represented in the Bathymetric chart package and SideScan features report (See *Appendix A, B*)

Deliverables

- 180306 GHD Quarry Pond MBES Bathymetry Chart Package- Printable PDF map depicting the survey results in color-shaded relief, colored shaded relief with 2' contours and aerial background, and color shaded relief with features.
- iView4D.exe - Software installation (iView4D) file for program to view .scene files (see below)
- 180306 GHD_3Dcontours_2ft_25weight_8hgt_Labeled.dxf- Labeled 2ft 3D Contours created from 1ft x 1ft gridded MBES data in AutoCAD format
- GHD Quarry Pond Side Scan Features Report.pdf- Report of notable features located during the SSS portion of the hydrographic surveys in PDF format. Includes state plane coordinates and brief descriptions
- 180308 GHD SSS Contact Features.csv- An Excel CSV provided Easting and Northing Coordinates of contact features located using SSS
- 180306 GHD Ohio Quarry Pond.scene- Surface model overlaid with Side Scan Sonar (SSS) for viewing in iView4D
- 180308_GHD_SSS_UGC.tif- Tiff image of SSS survey
- GHD_1x1res_45_220.tif- color shaded relief Tiff image of MBES survey surface, created from 1x1 gridded MBES data.
- 180306 GHD_QuarryPond_MBES_1x1_MED.xyz- 1x1 gridded multi-beam (MBES) bathymetric data in Easting, Northing, Elevation format collected from March 6-8th, 2018 in the GHD Quarry Pond
- 180306 GHD_QuarryPond_MBES_AllPoints.xyz- un-gridded multi-beam (MBES) bathymetric data in Easting, Northing, Elevation format collected from March 6-8th, 2018 in the GHD Quarry Pond

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Appendix A

Charts

1. Color-shaded Bathymetric Surface with Contours (with basemap)
2. Color-shaded Bathymetric Surface with Contours (without basemap)
3. Color-shaded Bathymetric Surface with features

Appendix B

Side Scan Sonar Feature Report

Attachment 2
Quarry Pond Features and Proposed Sampling Locations
(See separate file)