# Lake Master Plan: Dredging

| | |
|---|---|
| **Date:** | August 10, 2023 |
| **Project Name:** | Village Engineering Services: Task Order No. 23 – Lake Master Plan |
| **Project No:** | 690666CH |
| **Attention:** | The Honorable Tiffany Southard, Mayor |
| **Client:** | Village of Minerva Park, Ohio |

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## 1. Introduction

The Village of Minerva Park's (Village) overall stormwater system consists of sewers, streets, detention basins, open channels, and an urban pond system. The pond system is created by the Village's earthen dam located near the municipal building and is divided into two ponds by Minerva Lake Road with an interconnecting conduit under the road to allow flow from the north to the south. These two ponds are commonly referred to as North Lake and South Lake; "lakes" will be used herein in lieu of ponds. The Village's goal is to restore the lakes to being community assets which can offer recreational opportunities and a central gathering place for community events.

The Village is working through an overall planning effort to reach this goal. One key component of that effort is identifying ways to improve and maintain the lake system's water quality. This technical memorandum identifies alternatives to restore water depth and storage capacity to the lakes through recommended dredging technologies based on the Village's specific constraints.

## 2. Goals for Potential Dredging Project

Based on conversations with Village staff and personnel over the span of more than 15 years, the overall goal for a dredging project aligns with the overall goal of the master plan as noted above: restore the Village's lake system to a community asset. Because this overall goal does not have quantifiably measurable results in the near term, the success factors are more qualitative. Therefore, the Village's goals are as follows.

- Restore the storm water storage capacity to earlier volumes to ensure the system continues to provide sufficient storm drainage support.
- Improve water quality by removing trash, dead vegetation, and other debris.
- Increase recreational opportunities, specifically fishing, by providing opportunities for an improved ecosystem that can support a variety of fish species.
- With the potential for increased activations in the area due to the renovated municipal building and proposed amphitheater, serve as a Village focal point and aesthetically pleasing backdrop.
- Consider how the lakes can be part of the Village's plans for improving overall mobility and connectivity within the Village, specifically for residents in the northwest portion of the Village.
- Balance the above goals with the Village's financial standing and stability.

## 3. Data Collection

When reviewing dredging technology alternatives and developing proposed alternatives, Jacobs relied on both newly-collected information and available existing information as described below.

## 3.1 Bathymetric Survey of Lake System

As part of the lake master plan task order, Jacobs prepared scopes of work for bathymetric survey services and solicited proposals from surveying consultants on behalf of the Village. Bathymetric surveys are water-based surveys that map the shape and the depth of underwater terrain, including the elevations of the top and bottom of silt layers. This information is used, in part, to determine the amount of material to be removed during the dredging process.

Based on the proposals, the Village contracted directly with Evans, Mechwart, Hambleton & Tilton, Inc. (EMH&T). EMH&T had previous experience with the Village's lake system, providing a preliminary bathymetric survey in September 2016 and as the design professional for the Village's dam replacement project constructed in 2017. EMH&T delivered the final bathymetric survey information to Jacobs in May 2023. The bathymetric survey is included in Attachment A.

## 3.2 Water and Soil Sampling and Lab Analysis

To identify feasible disposal options for the material to be removed from the lakes, the material needed to be characterized to determine if it would be considered hazardous or non-hazardous. Jacobs personnel collected eight water samples and seven soil samples from various locations in North Lake and South Lake in May 2023 and sent the samples to MASI Environmental Laboratories (MASI) for analysis. MASI is a full-service environmental laboratory, certified by the Ohio Environmental Protection Agency (EPA).

MASI analyzed the water samples for the following parameters.

- Dissolved organic carbon.
- Hardness, total.
- Phosphorous, total.
- Sulfate.
- Aluminum, total.

MASI analyzed the soil samples for the following parameters.

- Toxic characteristic leaching procedure (TCLP) metals.
- TCLP pesticides.
- TCLP herbicides.
- TCLP volatile organic compounds.
- TCLP semi volatile organic compounds.
- Polychlorinated biphenyls (PCB).

Based on the analysis results, the material to be removed from the lakes is characterized as non-hazardous material, which can potentially offer more disposal options. MASI's sample analyses are included in Attachment B.

## 3.3 Existing Information and Documentation

There is not a significant amount of existing documentation about the lake system. While reviewing dredging technologies and developing proposed alternatives, Jacobs used the following existing documentation.

- Village of Minerva Park Lakes Profiles & Core Borings (undated) prepared by Allied Engineering.
- Village of Minerva Park Lake Cross Sections (December 1994) prepared by BBC&M Engineering, Inc. (now part of S&ME, Inc.).
- Bathymetric Survey for Minerva Park Lake (September 2016) prepared by EMH&T.
- Minerva Park Lake Dam (April 2017) prepared by EMH&T.
- "Minerva Lake Road Hydraulics Analysis" (April 2017) technical memorandum prepared by CH2M Hill.

# 4. Historical Lake Bottom Elevations and Future Maintenance

As noted above, there is not much historical information available for the lake system. The parcels reserved to the Village and the general shape of the lakes are shown on the record plat for Minerva Park recorded in October 1926. The lake cross sections prepared by BBC&M in 1994 represent the only known historical record of the lakes' changing topography. The cross sections include callouts for the original ground surface, the lake bottom in 1978, and the lake bottom in 1994. The basis for the original ground surface and 1978 elevations is unknown. Jacobs reviewed the cross sections to determine if there were consistent changes to the lake bottom elevations which could determine a recommended dredging frequency for planning future maintenance projects.

There is no consistency to the changing topography. Some cross sections show the 1994 lake bottom to be lower than the corresponding 1978 elevation, potentially due to scouring. These locations are primarily in North Lake. Other cross sections show the 1994 lake bottom to be higher than the corresponding 1978 elevation, potentially due to organic material and silts settling in low-flow areas.

There is no set time to assume between dredging projects or major maintenance activities. Rather, the amount of time is a combination of several factors including frequency of storm events, the amount of sediment deposited in the lakes by runoff, the amount of organic sediments collecting in the lakes, shoreline erosion, and overall water quality.

Jacobs recommends establishing an annual inspection program to confirm that the lake system is operating as intended and to identify potential issues when they are generally easier to manage. This inspection program should include inspection items recommended in companion technical memoranda such as trash and debris inspections and tree surveys.

Additionally, Jacobs recommends that the Village consider establishing a fund dedicated to maintaining the lake system and setting aside funds during the annual budgeting process, if practicable. Jacobs can assist with this process as needed.

# 5. Dredging Technology Alternatives

Two dredging options were evaluated for dredging the lakes: hydraulic dredging with geotextile tube dewatering and mechanical dredging with scows including bulk dewatering and solidification. Two additional options – mechanical dredging with amphibious equipment and hydraulic dredging with filter presses – were also briefly considered but determined to be either too costly or not technically feasible. The two feasible options are described below.

## 5.1 Hydraulic Dredging and Sediment Dewatering with Geotextile Tubes

Solids removal using hydraulic dredging is commonly conducted with an 8- to 10-inch diameter cutter head hydraulic dredge. Additional specialty hydraulic dredge options are available using high-solids dredge pumps and dredges without cutter heads. These can include plain suction, eddy pumps, pneumatic submersible pumps, and diver-assisted handheld hydraulic suctions, which are typically used in more sensitive areas near critical structures like utilities. A hydraulic dredge is connected to a leak-tight, high density polyethylene (HDPE) dredge pipeline, and the dredged solids are pumped directly into geotextile tubes within the dewatering area. The hydraulic dredge cutter head is controlled by the operator and uses real-time kinematic-global positioning system (RTK-GPS) equipment with integrated software to allow real-time location and elevation tracking.

Hydraulic dredging typically generates fewer dredge residuals than mechanical dredging methods; however, turbidity control measures, such as a silt curtains installed near outlets are a necessary

precaution to prevent solids from being discharged into downstream water bodies. The solids pumped from the hydraulic dredge will typically be treated with polymers to coagulate solids to facilitate passive dewatering through the geotextile tubes. The tubes retain the dredged material and allow the entrained water to pass through. The water released from the tubes is collected and pumped back to the water body being dredged. After a period when the tubes have released the water and the solids have been effectively dewatered, the tubes are opened, and the solids disposed.

An example of this setup is shown in Figure 1.

Figure 1: Example of a cutter head hydraulic dredge with floating HDPE pipeline

Advantages of hydraulic dredging with geotextile tubes include the following.

- Decreases or eliminates the need for sediment solidification prior to disposal.
- Decreased disposal costs by reducing the moisture content of the sediment prior to offsite transportation.
- Decreased in-lake turbidity versus mechanical dredging.

Disadvantages of hydraulic dredging with geotextile tubes include the following.

- Typically requires 24-hour operations to be cost effective due to the large amount of specialized equipment required.
- The area of influence can be much larger than the exact location of the actual cutterhead and suction when working with easily resuspended fine organics, silts, and clays, resulting in overdredging.
- Requires significant vacant land for sediment dewatering.
- May require land access agreement(s) depending on the location of the geotextile tubes and sediment conveyance pipe.
- Significant amounts of debris can reduce productivity.

- Requires long term treatment and discharge of the water released from the geotextile tubes.
- Fine organics, silts, and clays can blind off the dewatering weep ports and prevent the free water and pore water from being released. This would require the use of a solidification agent after opening the tubes and before offsite transport and disposal.
- High cost of mobilization and deployment for dredge, dewatering, and auxiliary equipment.

## 5.2 Mechanical Dredging with Scows

Solids removal using mechanical dredging is typically performed using an excavator or a crane placed on a barge. The excavator dredge has many advantages over the crane style except for depth of cut. The excavator can be outfitted with many attachments, including specially designed level-cut environmental clamshell bucket with flat cut surface and no teeth, and is the preferred equipment for management of suspended solids. The bucket on the excavator dredge is controlled by the operator and uses RTK-GPS machine control with integrated software that allows the bucket's position to be monitored in real-time. This specialty bucket is also able to be controlled in a full 360-degree rotating position for precision dredging and vertical angle adjustment for slope work.

Like hydraulic dredging, implementation of turbidity control, such as a silt or bubble curtain, is required to minimize suspended solids from reaching the lake outlet structure. Excavated sediments are placed in scows, barges, and/or transported through pipeline by high solids pumps. They are then transported to the offloading and processing area where they are dewatered either using active or passive dewatering means.

Examples of active dewatering by mechanical means includes belt presses, plate-and-frame presses, and Total Clean Systems by DEL Corporation.

Examples of passive dewatering includes using time and gravity with geotextile bags, gravity bins, clarifier frac tanks, or GeoPool systems.

The sediments can also be immediately solidified or stabilized using a pozzolan additive such as Portland cement, lime, bed ash, or super absorbent polymers. Depending on regulations, the separated water is either returned to the lake or sent to a wastewater treatment plant. After the solidification process is complete, the dredge solids are loaded onto trucks, barges, or rail cars and transported to either a nearby disposal facility or beneficially used in other areas.

An example of this setup is shown in Figure 2.

Advantages of mechanical dredging with scows include the following.

- Uses conventional excavation equipment which is easier to mobilize and deploy.
- Simpler process and less equipment intensive.
- Higher production versus hydraulic dredging.
- Better suited to remove debris.
- Precision dredging without the need for large overdredging tolerances.
- Area of influence does not extend outward from the bucket like with cutter suction dredging.
- Many attachments for varying conditions.

Disadvantages of mechanical dredging with scows include the following.

- Saturated sediments typically require either dewatering or solidification prior to offsite transport.
- If used, there is an additional cost for solidification agents (Portland cement, polymer, lime, etc)
- Solidification agents can sometimes increase the overall tonnage to be disposed.
- Depending on the equipment used, there is a potential for increased turbidity in lake during dredging operations.


Figure 2: Example of a mechanical dredging operation

## 5.3 Recommended Dredging Technology

Due to the limited amount of nearby vacant land, the limited work hours (assumed to be 8:00 am to 5:00 pm Monday through Friday), and the relatively high mobilization and setup costs of a hydraulic dredging operation, Jacobs recommends mechanical excavation with scows as the preferred alternative. More specifically, Jacobs recommends that the mechanical dredging of the lakes be accomplished by using an excavator on a barge loading the material into small scow barges. To increase production and reduce the amount of water being transported to the offloading area, the dredged material would be allowed to gravity drain for a minimal amount of time (less than one minute) before being placed into the scows. At a minimum, two scows should be used so one can be loaded while the other is offloaded, thereby minimizing dredging cycle time. Once the scow arrives at the offloading area, the solids would be off loaded, bulk dewatered by removing the top free water if present, solidified or stabilized, and loaded onto trucks for offsite disposal. A conceptual layout of this option is included in Attachment C.

Jacobs' initial recommendation is to use a super absorbent polymer to solidify the sediments, however bench scale testing performed during the design phase will help identify the most cost-effective solidification agent.

For mechanical dredging to be feasible and the presented cost estimates to be valid, Jacobs has made the following assumptions:

- Dredge bucket draining and bulk dewatering of the scows will yield an as shipped sediment density of 1.1 tons per cubic yard.
- Minerva Lake Road could be closed for the duration of the project to stage and deploy equipment, and act as a material laydown area.
- Downstream turbidity impacts could be mitigated to satisfy all regulatory requirements, including those during times of high flow into the lakes.
- The dredge sediment is non-hazardous and doesn't trigger any other regulatory thresholds as it pertains to its handling, transportation, and disposal.

# 6. Proposed Alternatives

The intent of this technical memorandum is to provide the Village with sufficient information to allow for discussing, planning, budgeting, and eventually executing a project if funding allows. With this intent, rather than providing a detailed design, Jacobs developed simplified yet feasible alternatives to allow for planning-level opinions of probable construction costs. The alternatives described below include two alternatives for dredging in both lakes as well as two alternatives for consideration.

## 6.1 Assumptions Used in Developing Alternatives

### 6.1.1 Lake System Elevations

Based on the data collected specifically for the project and the existing information as described above, Jacobs assumed the following information when developing the alternatives.

- Water surface elevation: EL 849.20.
- Average top of silt elevation: EL 846.09.
- Average bottom of silt elevation: EL 844.69.

When computing quantities of material to be removed, the actual silt elevations as determined through the bathymetric survey were used.

### 6.1.2 Disposal Options

Locations for disposing of the dredged material have a significant impact on the overall construction price when factoring in the travel time between the project site and the disposal site and the disposal facility's fees for accepting the materials. For preparing this technical memorandum Jacobs was able to identify four potential disposal locations; additional facilities could potentially be identified during detailed design or even during construction. The four disposal facilities identified are described below.

- The Solid Waste Authority of Central Ohio (SWACO) operates a sanitary landfill in Grove City. Per SWACO's bylaws, the Village is a District Member. The material to be removed from the lakes would be classified as "Special Waste" in SWACO's rate schedule, and the cost to dispose material with SWACO is currently $39.75/ton. SWACO is currently unable to accept the dredged material as fill. However, pending additional coordination – specifically, reviewing the soil sample analyses and establishing dryness requirements – SWACO might be able to accept the dredged material with no disposal cost as they could potentially use the material for landfill operations such as daily cover and building berms.

- Ohio Soil Recycling, LLC operates a facility in Columbus that uses a combination of enhanced bioremediation and mechanically-induced volatilization to reduce non-hazardous contaminants in soils. Ohio Soil Recycling uses the remediated soil to construct a cap for the abandoned former landfill on their site. The cost to dispose material with Ohio Soil Recycling is currently $15.00/ton and they can accept the dredged material.

- Frank Road Recycling Solutions operates a facility in Grove City that operates as a construction and demolition debris landfill. Dredged material would be used for landfill operations such as daily cover and building berms. The cost to dispose material with Frank Road Recycling Solutions is currently $25/truck or approximately $3/ton. Currently they are not accepting the type of material to be removed from the lakes due to the amount they are regularly accepting, though their ability to accept more material could change in 2024.

- Price Farms Organics, Ltd. operates a facility in Delaware that accepts various materials – yard trimmings, manure, personal food scraps, sod and soil – for use in producing mulch and composting products for sale. The cost to dispose material with Price Farms is currently $50/ton and they can accept the dredged material, but they likely would not want to accept the entire

amount to minimize the truck traffic into their site. However, pending additional coordination – specifically, reviewing the soil sample analyses and establishing dryness requirements – Price Farms might be able to offer a lower disposal fee.

Although there is the potential for SWACO to accept the dredged material at no disposal charge, Jacobs based the disposal costs in the opinions of probable construction cost on Ohio Soil Recycling's disposal fee of $15/ton.

## 6.2 Alternative No. 1 – Provide Average Water Depth of 5 Feet in Both Lakes

In this alternative, Jacobs assumed providing an average water depth of 5 feet in both lakes. The sides of the lakes would be graded at a 3:1 (horizontal to vertical) slope from their existing elevations to a lake bottom elevation of EL 844.20. Preliminary topographic plans and cross sections for this alternative are included in Attachment D. As noted above, this is a simplified version of this alternative. During detailed design, Jacobs would refine the excavation limits and depths as needed to provide varying depths to promote a vibrant ecology.

This alternative would require approximately 6,700 cubic yards (CY) of material to be removed from North Lake and approximately 14,800 CY to be removed from South Lake for a total volume of approximately 21,500 CY to be removed from the site.

The greatest benefits provided by this alternative include the significant storage volume provided (approximately 35 acre-feet) and the consistent average depth of 5 feet across the entire lake system for aquatic life. The greatest drawback to this alternative is its cost-prohibitive estimate: the opinion of probable construction cost for this alternative, based on a Class 5 cost estimate, is approximately $3.8 million for construction, excluding design fees and services during construction. Opinions of probable construction cost are included in Attachment G.

Table 1: Alternative No. 1 Key Information

| Description | Value |
|---|---|
| Total quantity of material to be removed from site | 21,500 CY |
| Estimated length of contractor being on-site | 5.75 months |
| Estimated construction cost | $3,800,000 |
| Estimated design cost and overall project management cost | $260,000 |
| Estimated construction oversight cost | $240,000 |
| Estimated total project cost | $4,300,000 |

## 6.3 Alternative No. 2 – Provide Sloping Bottoms in Both Lakes

In this alternative – included in Attachment E – Jacobs assumed providing an average water depth of 5 feet only in the eastern portion of South Lake, generally in the area with publicly-accessible shorelines. Along their longer dimensions North Lake and remaining portion of South Lake would be sloped to generally restore the lake bottoms to their 1978 depths as shown on the BBC&M Engineering, Inc. document.

- North Lake: Provide a 0.50% slope from the northern-most point for approximately 400 feet to a bottom elevation of EL 846.00, which is the existing grade of the lake bottom in that area.
- South Lake: Provide a 0.25% slope from the western-most point for approximately 775 feet to a bottom elevation of EL 844.20, which is 5 feet of depth.

As with the previous alternative, the final excavation limits and depths would be refined during detailed design.

This alternative would require approximately 2,500 CY of material to be removed from North Lake and approximately 13,000 CY of material to be removed from South Lake for a total volume of approximately 15,500 CY to be removed from the site.

The greatest benefits provided by this alternative include a reduced opinion of probable construction cost as compared to the previous alternative while still providing 5 feet of water in the publicly-accessible portion of the lake for fishing. The greatest drawback to this alternative is despite being less expensive than Alternative No. 1, its $2.7 million opinion of probable construction cost may still be cost-prohibitive.

Table 2: Alternative No. 2 Key Information

| Description | Value |
|---|---|
| Total quantity of material to be removed from site | 15,500 CY |
| Estimated length of contractor being on-site | 2.50 months |
| Estimated construction cost | $2,670,000 |
| Estimated design cost and overall project management cost | $225,000 |
| Estimated construction oversight cost | $105,000 |
| Estimated total project cost | $3,000,000 |

## 6.4 Alternative No. 3 – Perform Dredging Only in South Lake

This alternative is a variation of Alternative No. 2, with the same work proposed for South Lake as described above but with no work being performed in North Lake. This alternative would require approximately 13,000 CY of material to be removed from the site.

The greatest benefits provided by this alternative include a reduced opinion of probable construction cost in the near term while still providing 5 feet of water in the publicly-accessible portion of South Lake. An additional benefit is that by deferring work in North Lake, the Village could develop an overall comprehensive plan for North Lake, including potential improvements to the lake's north feed channel and a potential shared use path providing connectivity to the Jordan Road area.

The greatest drawbacks to this alternative include a near-term opinion of probable construction cost of $2.3 million which could still be cost prohibitive. An additional drawback is that by delaying work in North Lake, the cost of that work is likely to be more expensive than performing the work in the near-term with work in South Lake.

Table 3: Alternative No. 3 Key Information

| Description | Value |
|---|---|
| Total quantity of material to be removed from site | 13,000 CY |
| Estimated length of contractor being on-site | 2.00 months |
| Estimated construction cost | $2,300,000 |
| Estimated design cost and overall project management cost | $192,000 |
| Estimated construction oversight cost | $83,000 |
| Estimated total project cost | $2,575,000 |

## 6.5 Alternative No. 4 – Convert North Lake to Green Space

This alternative represents a significant change to the overall look of the Village: using dredged material from South Lake to fill in North Lake, converting the area to a large green space set aside for future recreational development. A rendering of this alternative is included in Attachment F. Potential benefits to this alternative include the following.

- Reduced quantity of material to be removed from the site, reducing the construction costs associated with hauling and disposing of dredged material.
- Eliminate future dredging projects in North Lake that would be required for the lake's continued functionality.
- Additional space available for public use, whether it remains as open green space or is developed for future recreational uses.
- Simplified route for providing connectivity from the northwest section of the Village to the central area, including the municipal building and the municipal swimming pool.

Eliminating North Lake would require changes to the Village's storm water system; North Lake receives storm water from west of Cleveland Avenue via Jordan Road, Northland Plaza, roadway drainage from the northwest section of the Village, roadway drainage from North Bay Drive, and roadway drainage from East Shore Drive.

Fully vetting this alternative is beyond the scope of this technical memorandum but is provided to offer the Village an additional alternative to consider. If authorized, Jacobs can develop preliminary storm water management concepts and prepare a planning level opinion of probable construction cost should the Village wish to investigate this alternative in more detail.

# 7. Summary and Conclusion

This technical memorandum includes four dredging project alternatives, which represent the basic framework of potential projects. Each alternative can be adjusted during detailed design to increase or decrease the amount of dredging work; the cost impacts of those refinements were not significant enough to present them as separate alternatives.

Each alternative presented satisfies the Village's goals as described in Section 2, though to varying degrees. Rather than being a decision based primarily on technical aspects, the alternative selected to be implemented is likely primarily a financial decision. As such, Jacobs cannot recommend an alternative to implement. Jacobs recommends hosting a workshop involving Village staff, Village council members, and Jacobs personnel to review the alternatives, discuss available funding, and determine which alternative to pursue.

# Attachment A – 2023 Bathymetric Survey

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

# TOPOGRAPHIC SURVEY

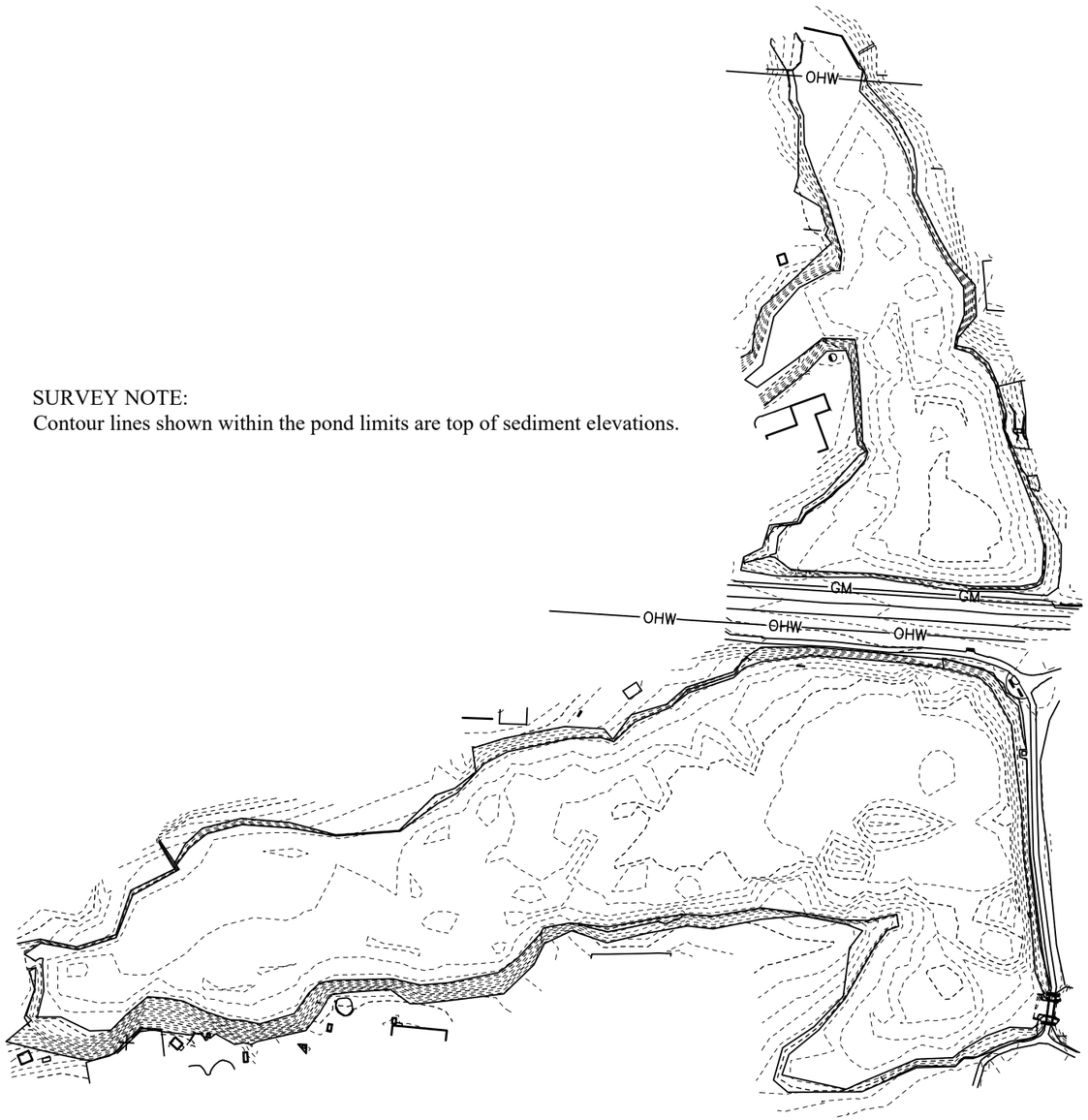
## LOTS 5 AND 6, QUARTER TOWNSHIP 3, TOWNSHIP 2, RANGE 17
## UNITED STATES MILITARY DISTRICT
## TOWNSHIP OF BLENDON, COUNTY OF FRANKLIN, STATE OF OHIO

| | |
|---|---|
| Date: | August 07, 2023 |
| Scale: | 1" = 150' |
| Job No: | 2023-0137 |
| Sheet No: | 1 of 2 |

LINE LEGEND

- Fence Line
- GM — Gas Line
- OHW — Overhead Wires

SURVEY NOTE:
Contour lines shown within the pond limits are top of sediment elevations.




0 150
SCALE (in feet)

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

# TOPOGRAPHIC SURVEY

## QUARTER TOWNSHIP 3, TOWNSHIP 2, RANGE 17
## UNITED STATES MILITARY DISTRICT
## CITY OF BLENDON, COUNTY OF FRANKLIN, STATE OF OHIO

| | |
|---|---|
| Date: | August 07, 2023 |
| Scale: | 1" = 150' |
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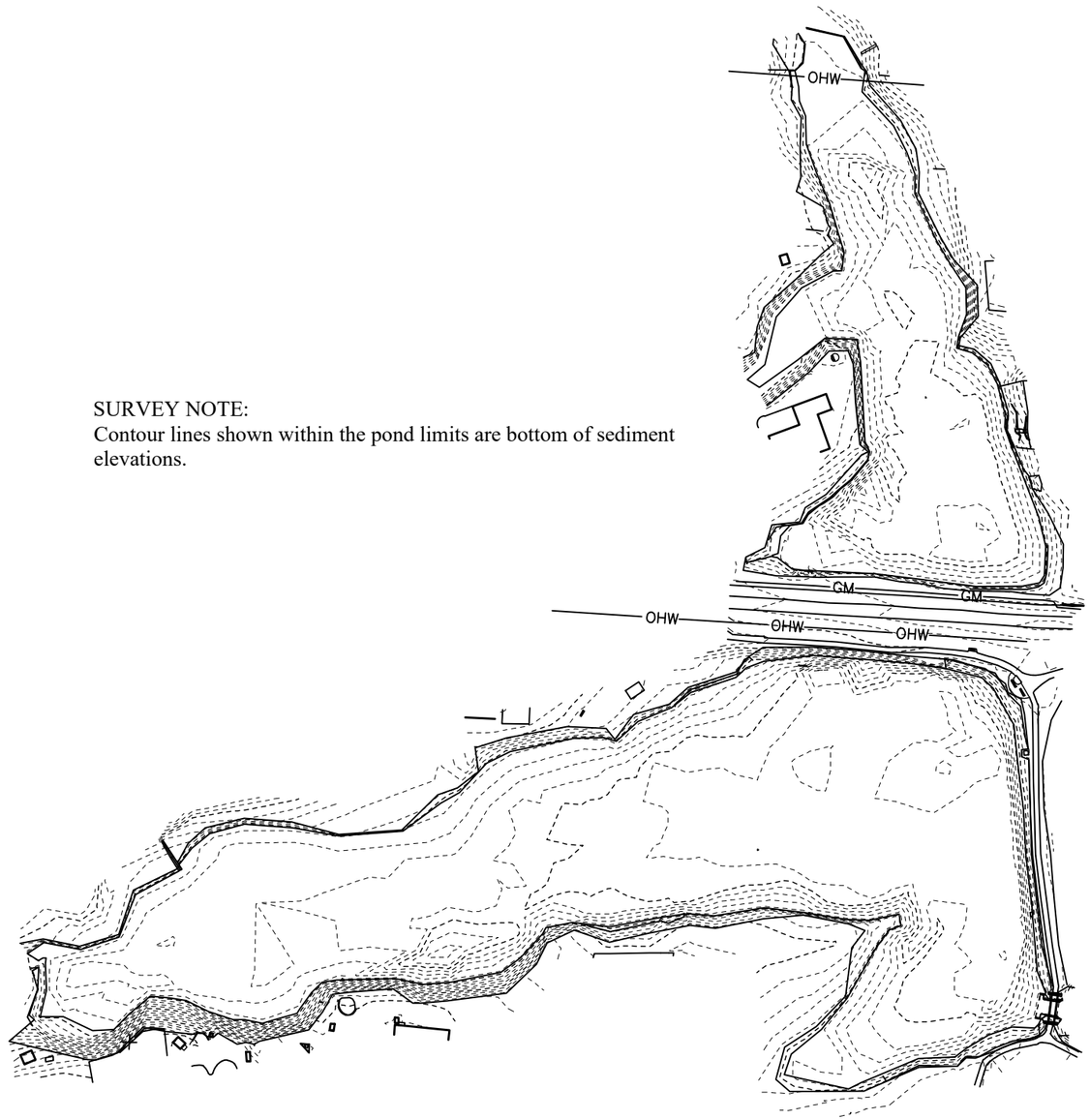
| Sheet No: | 2 of 2 |

LINE LEGEND

- Fence Line
- GM — Gas Line
- OHW — Overhead Wires

SURVEY NOTE:
Contour lines shown within the pond limits are bottom of sediment elevations.




0 150
SCALE (in feet)

# Attachment B – Water and Soil Sample Analyses

7940 Memorial Drive  Plain City, Ohio 43064  (614) 873-4654

Date: June 08, 2023

Jacobs Engineering (6784)
Attn: Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

RE:  Certificate of Analysis for Project - Minerva Park Lake Samples

The following report contains analytical results for samples submitted on the chain of custody dated May 30, 2023.

I have reviewed the validity of the analytical data generated.  All data is reported in accordance to our laboratory QA/QC plan. Any exceptions are noted in the Case Narrative or with qualifiers in the report.

If you have any questions or need additional documentation, please contact our Office.

Sincerely,

Cheryl Rex
MASI Laboratories
QA/QC Officer
cheryl@masilabs.com
(614) 873-4654

# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 L 15

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146524**
**Lab Sample # : 3E04328-01 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.7** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 01:17 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **151** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:36 | 06/05/23 12:36 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.23** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **26.4** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **940** | ug/L | | 30.0 | 3.8 | 06/02/23 10:36 | 06/02/23 10:36 | KRM | EPA 200.7 1994 |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
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Jacobs Engineering
Lauren Erickson
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Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 L 14

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146525**
**Lab Sample # : 3E04328-02 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.4** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 06:27 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **175** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:37 | 06/05/23 12:37 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.12** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **23.5** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **149** | ug/L | | 30.0 | 3.8 | 06/02/23 10:37 | 06/02/23 10:37 | KRM | EPA 200.7 1994 |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 L13

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146522**
**Lab Sample # : 3E04328-03 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.7** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 06:50 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **180** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:39 | 06/05/23 12:39 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.13** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **26.3** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **176** | ug/L | | 30.0 | 3.8 | 06/02/23 10:39 | 06/02/23 10:39 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 L 12

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146521**
**Lab Sample # : 3E04328-04 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **7.4** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 07:14 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **199** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:41 | 06/05/23 12:41 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.21** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **28.6** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **4310** | ug/L | | 30.0 | 3.8 | 06/02/23 10:41 | 06/02/23 10:41 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*

*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 Location 11

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146520**

**Lab Sample # : 3E04328-05 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **7.0** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 09:38 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **178** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:43 | 06/05/23 12:43 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.22** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **29.5** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **1020** | ug/L | | 30.0 | 3.8 | 06/02/23 10:43 | 06/02/23 10:43 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 Location 10

**Sample ID: 146523**
**Lab Sample # : 3E04328-06 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.3** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 10:02 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **164** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:45 | 06/05/23 12:45 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.17** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **22.3** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **208** | ug/L | | 30.0 | 3.8 | 06/02/23 10:45 | 06/02/23 10:45 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

*Microbiological/Inorganic Certification - 877*
*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 Location 9

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146518**
**Lab Sample # : 3E04328-07 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.3** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 10:26 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **207** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:46 | 06/05/23 12:46 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.68** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **25.3** | mg/L | | 5.0 | 0.7 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **6770** | ug/L | | 30.0 | 3.8 | 06/02/23 10:46 | 06/02/23 10:46 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

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*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

Sampler Name: Lauren Erickson
Sample Date/Time: 5/30/23 00:00
Sample Monitoring Point:
Sample Type: SP
Sample Tap/Address: Minerva Park Lake Minerva Lake Rd Columbus OH 43231 Location 8

PWSID: Facility ID:
Repeat Sample #:
Total Chlorine (mg/L):
Free Chlorine (mg/L):
Combined Chlorine (mg/L):

**Sample ID: 146519**

**Lab Sample # : 3E04328-08 (Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Date/Time Prepared | Date/Time Analyzed | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry Analysis** | | | | | | | | | |
| **Dissolved organic carbon** | **6.2** | mg/L | | 1.0 | 0.04 | 06/06/23 12:00 | 06/07/23 11:13 | JAC | SM 5310C 2011 |
| **Hardness, Total** | **170** | mg/L CaCO3 | | 25.6 | 0.391 | 06/05/23 12:48 | 06/05/23 12:48 | KRM | SM 2340 B 2011 |
| **Phos, Total** | **0.34** | mg/L | | 0.05 | 0.02 | 05/31/23 11:40 | 05/31/23 11:40 | JOL | SM 4500P E 2011 |
| **Sulfate** | **40.8** | mg/L | | 25.0 | 3.3 | 06/05/23 16:00 | 06/05/23 16:00 | JOL | SM 4500 SO42 E 2011 |
| **Metals Analysis** | | | | | | | | | |
| **Aluminum, Total** | **1490** | ug/L | | 30.0 | 3.8 | 06/02/23 10:48 | 06/02/23 10:48 | KRM | EPA 200.7 1994 |





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# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:
Date Received: 5/30/23 15:49
Ohio EPA Analyzed Date: 6/8/23 08:32

## Notes and Definitions

| Item | Definition |
|---|---|
| J | Analyte was positively identified, the associated numerical value is estimated. |
| ND | Analyte NOT DETECTED at or above the minimum detection limit (MDL) |
| mg/kg Dry | Sample results reported on a dry weight basis. |
| ug/L | ppb/Part per Billion. |
| mg/L | ppm/Part per Million. |
| ! | Analyte is at or above the Maximum Contaminate Level. |
| RPD | Relative Percent Difference |
| %REC | Percent Recovery |
| Source | Sample that was matrix spiked or duplicated. |

Notes:
1. Calculated analytes are based on raw data and may not reflect the rounding of the individual compounds.
2. Samples are analyzed using the information received on the request sheet and may not be analyzed when the parameters fall outside required guidelines.





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

**MASI ®**
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

C 3E04328-01 er
A AR # 146524 uest Sheet
Received: 5/30/2023
** Matrix: Potable Appear on Bottle: 146524
information **

L 15

Project Name: Minerva Park Lake Sample

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 05/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 30.5 FD 1545

N: S: U: Total Containers: 4

Route

Office/Lab

COOLER:

Revised 04-14-23 DN

**MASI ®**
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

C 3E04328-02 r
uest Sheet
Ar AR # 146525
Received: 5/30/2023
** S Matrix: Potable
Appear on Bottle: 146525
information **
L14

Project Name: Minerva Park Lake Sample

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 05/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 30.5 FD 15745

N: _____ S: _____ U: _____ Total Containers: 4

Route
Office/Lab
COOLER: Temp CO

Revised 04-14-23 DN

**MASI** ®
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

# Chemical ... eet

3E04328-03
AR # 146522
Received: 5/30/2023
Matrix: Potable

Analysis Requ... ** See revers... ...on **

...ottle: 146522

L 13

Project Name: Minerva Park Lake Sample

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Parktake Date Collected: 05/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 27.9 FD 1535

N: _____ S: _____ U: _____ Total Containers: 4

Route

Office/Lab CO

COOLER:

Revised 04-14-23 DN

**MASI** ®
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Che … st Sheet
Analy … ear on Bottle: 146521
** See … formation **

**3E04328-04**
AR # 146521
Received: 5/30/2023
Matrix: Potable

L12

Project Name: Minerva Park Village Lake Samples

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 05/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | ( ) Other | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | (X) Other DOC | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 27.9 FD 1546

N: _____ S: _____ U: _____ Total Containers: 4

Route

Office/Lab CO

COOLER:

Revised 04-14-23 DN

**MASI** ®
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

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**3E04328-05**
AR # 146520
Received: 5/30/2023
Matrix: Potable

r
uest Sheet
Appear on Bottle: 146520
information **
location 11

Project Name: Minerva Park Lake Samples

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.# _____

Sampler Name: Lauren Erickson SMP ID: _____ Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 5/30/23 (MM/DD/YY) Time Collected: _____ (hh:mm am/pm)

Tap Address: Minerva Lake Rd Dublin, OH 43231

( ) Public Sample ( ) PWS ID #: _____ ( ) Facility ID #: _____ (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | ( ) Other | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | (X) Other DOC | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 27.9 FD 1545

N: _____ Total Containers: 4
S: _____
U: _____

Route
Office/Lab
COOLER: CO

Revised 04-14-23 DN

**MASI** ®
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Ch... Sheet

An... ppear on Bottle: 146523

** S... information **

Location 10

**3E04328-06**
AR # 146523
Received: 5/30/2023
Matrix: Potable

Project Name: Minerva Park Lake Sample

Client #: 0784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) ( ) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 05/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: ( ) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 30.5 FD 1545

N: _____ S: _____ U: _____ Total Containers: 4

Route

Office/Lab 10

COOLER:

Revised 04-14-23 DN

**MASI ®**
ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Che st Sheet
Analy ear on Bottle: 146518
** See formation **
Location 9

**3E04328-07**
AR # 146518
Received: 5/30/2023
Matrix: Potable

Project Name: Minerva Park Lake Samples

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: ~~Minerva Park~~ Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 5/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 27.9 FD 13745

N: S: U: Total Containers: 4

Route
Office/Lab CO

COOLER:

Revised 04-14-23 DN

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ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

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3E04328-08
AR # 146519
Received: 5/30/2023
Matrix: Potable

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uest Sheet
Appear on Bottle: 146519
information **
location 8

Project Name: Minerva Park Lake Samples

Client #: 6784 Client Name: Jacobs Engineering County: Franklin P.O.#

Sampler Name: Lauren Erickson SMP ID : Sample Type: ( ) Compliance (C) ( ) New Well (N) (X) Special/Other (O)

Sample Tap: Minerva Park Lake Date Collected: 5/30/23 (MM/DD/YY) Time Collected: (hh:mm am/pm)

Tap Address: Minerva Lake Rd Columbus, OH 43231

( ) Public Sample ( ) PWS ID #: ( ) Facility ID #: (X) Private Sample

| Non-Preserved Parameters | Parameters Preserved with Sulfuric Acid (S) | Parameters Preserved with Nitric Acid (N) |
|---|---|---|
| ( ) 004 Alkalinity, Stab. | (X) 099 Phosphate, Total (PO4) as P | ( ) 909 Antimony, Sb |
| ( ) 005 Alkalinity, Total | ( ) 337 Phosphate, Total as Po4 | ( ) 013 Arsenic, As |
| ( ) 034 Chloride | ( ) 089 Nitrate, NO3 (Reported as N+N) | ( ) 1001 Barium, Ba |
| ( ) 036 Chlorine Free, Residual | | ( ) 1002 Beryllium, Be |
| ( ) 037 Chlorine, Total | Misc. Parameters | ( ) 1003 Cadmium, Cd |
| ( ) 038 Chrome, Hexavalent; Cr+6 | | ( ) 1005 Chrome, Cr |
| ( ) 049 Conductivity | ( ) 054 Cyanide, Free | ( ) 082 Mercury, Hg |
| ( ) 062 Fluoride, Fl | ( ) 138 TOC (Phosphoric Acid) | ( ) 1012 Nickel, Ni |
| ( ) 870 Iron, Susp. | (X) Other DOC | ( ) 105 Selenium, Se |
| ( ) 880 Manganese, Susp. | ( ) Other | ( ) 975 Thallium, Tl |
| ( ) 096 pH | (X) Other Aluminum | (X) 066 Hardness, Hrd |
| ( ) 098 Phosphate, Ortho | | ( ) 868 Iron, Fe |
| ( ) 338 Phosphate, Ortho as PO4 | | ( ) 878 Manganese, Mn |
| ( ) 143 Turbidty | | ( ) 1004 Calcium, Ca |
| ( ) 78 LT2 Turbidity | | ( ) 850 Copper, Cu |
| ( ) 385 TDS/TFR | | ( ) 1009 Magnesium, Mg |
| (X) 122 Sulfate, SO4 | | ( ) 1011 Molybdenum, Mo |
| ( ) No Sample Fee | | ( ) 1015 Silver, Ag |
| ( ) Other | | ( ) 1016 Sodium, Na |
| ( ) Other | | ( ) 971 Lead, Pb |
| ( ) Other | | ( ) 1017 Zinc, Zn |
| ( ) Other | | ( ) 360 Hardness as caco3 |
| ( ) Other | | ( ) 336 Mg Hardness as caco3 |
| | | ( ) 9050 MASI Use Only |

Office Use Only: 27.9 FD
1343

N: _____ S: _____ U: _____ Total Containers: 4

Route
Office/Lab
COOLER:

Revised 04-14-23 DN

7940 Memorial Drive  Plain City, Ohio 43064  (614) 873-4654

Date: July 03, 2023

Jacobs Engineering (6784)
Attn: Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

RE:  Certificate of Analysis for Project - TCLP

The following report contains analytical results for samples submitted on the chain of custody dated May 30, 2023.

I have reviewed the validity of the analytical data generated.  All data is reported in accordance to our laboratory QA/QC plan. Any exceptions are noted in the Case Narrative or with qualifiers in the report.

If you have any questions or need additional documentation, please contact our Office.

Sincerely,

Cheryl Rex

Cheryl Rex
MASI Laboratories
QA/QC Officer
cheryl@masilabs.com
(614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 1

**Sample ID: 146252**

**Lab Sample # : 3E04330-01 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| **Arsenic** | **0.005** | mg/L | **J** | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.105** | mg/L | | 0.025 | 0.003 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Cadmium | ND | mg/L | | 0.005 | 0.0009 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/08/23 | 06/13/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/08/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 3 & 4 Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *34%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *61%* | | | *55-117* | | | *EPA Method 8270C* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 1

**Sample ID: 146252 (Continued)**

**Lab Sample # : 3E04330-01 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Phenol-d6* | | | | | *24%* | | | *10-55* | | *EPA Method 8270C* |
| *Surrogate: Nitrobenzene-d5* | | | | | *61%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *79%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *85%* | | | *26-131* | | *EPA Method 8270C* |
| 2,4-D | ND | mg/L | | 0.001 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *89%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *92%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *90%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | **HOLD** |
| 1,1-Dichloroethene | ND | mg/L | | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **1,2-Dichloroethane** | **0.001** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.003** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| 2-Butanone | ND | mg/L | | 0.1 | 0.001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **Benzene** | **0.0005** | mg/L | **J** | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Carbon Tetrachloride | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 1

**Sample ID: 146252 (Continued)**

**Lab Sample # : 3E04330-01 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | **HOLD** |
| **Chlorobenzene** | **0.0005** | mg/L | **J** | 0.05 | 0.00006 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **Trichloroethene** | **0.0005** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Vinyl Chloride | ND | mg/L | | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *107%* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *103%* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *97%* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *95%* | | | *89-109* | | *EPA Method 8260B* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Bed of Pond Location 2

**Sample ID: 146253**

**Lab Sample # : 3E04330-02 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| **Arsenic** | **0.010** | mg/L | | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.161** | mg/L | | 0.025 | 0.003 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Cadmium** | **0.0009** | mg/L | **J** | 0.005 | 0.0009 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/08/23 | 06/13/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/08/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 3 & 4 Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *33%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *61%* | | | *55-117* | | | *EPA Method 8270C* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Bed of Pond Location 2

**Sample ID: 146253 (Continued)**

**Lab Sample # : 3E04330-02 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Phenol-d6* | | | | | *24%* | | | *10-55* | | *EPA Method 8270C* |
| *Surrogate: Nitrobenzene-d5* | | | | | *63%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *72%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *83%* | | | *26-131* | | *EPA Method 8270C* |
| 2,4-D | ND | mg/L | | 0.001 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *77%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *94%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *100%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | **HOLD** |
| 1,1-Dichloroethene | ND | mg/L | | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| 1,2-Dichloroethane | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.001** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| 2-Butanone | ND | mg/L | | 0.1 | 0.001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Carbon Tetrachloride | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |





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*Organic Certification - 4100*

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Bed of Pond Location 2

**Sample ID: 146253 (Continued)**

**Lab Sample # : 3E04330-02 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | **HOLD** |
| **Chlorobenzene** | **0.0005** | mg/L | **J** | 0.05 | 0.00006 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **Tetrachloroethene** | **0.0005** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Trichloroethene | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **Vinyl Chloride** | **0.001** | mg/L | **J** | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *107%* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *98%* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *97%* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *94%* | | | *89-109* | | *EPA Method 8260B* |





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Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 3

**Sample ID: 146254**

**Lab Sample # : 3E04330-03 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| Arsenic | ND | mg/L | | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.130** | mg/L | | 0.025 | 0.003 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Cadmium** | **0.0009** | mg/L | **J** | 0.005 | 0.0009 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/08/23 | 06/13/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/08/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/08/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| 3 & 4 Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/08/23 | 06/13/23 | 06/15/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *0.7%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *1%* | | | *55-117* | | | *EPA Method 8270C* |





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***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 3

**Sample ID: 146254 (Continued)**

**Lab Sample # : 3E04330-03 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Phenol-d6* | | | | | *1%* | | | *10-55* | | *EPA Method 8270C* |
| *Surrogate: Nitrobenzene-d5* | | | | | *0.4%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *63%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *87%* | | | *26-131* | | *EPA Method 8270C* |
| 2,4-D | ND | mg/L | | 0.001 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/08/23 | 06/12/23 | 06/21/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *78%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/08/23 | 06/14/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *93%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *97%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | **HOLD** |
| 1,1-Dichloroethene | ND | mg/L | | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| 1,2-Dichloroethane | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.0005** | mg/L | **J** | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| 2-Butanone | ND | mg/L | | 0.1 | 0.001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Carbon Tetrachloride | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |





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Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 3

**Sample ID: 146254 (Continued)**

**Lab Sample # : 3E04330-03 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | **HOLD** |
| Chlorobenzene | ND | mg/L | | 0.05 | 0.00006 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | | 0.05 | 0.0001 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| Trichloroethene | ND | mg/L | | 0.05 | 0.0002 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| **Vinyl Chloride** | **0.0005** | mg/L | **J** | 0.05 | 0.0003 | 06/07/23 | 06/15/23 | 06/15/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *107%* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *103%* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *96%* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *94%* | | | *89-109* | | *EPA Method 8260B* |





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Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 4

**Sample ID: 146255**

**Lab Sample # : 3E04330-04 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| **Arsenic** | **0.008** | mg/L | **J** | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.613** | mg/L | | 0.025 | 0.003 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Cadmium** | **0.001** | mg/L | **J** | 0.005 | 0.0009 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/11/23 | 06/14/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/11/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 3 & 4 Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | | *40%* | | | *0-82* | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | | *62%* | | | *55-117* | | *EPA Method 8270C* |





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Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 4

**Sample ID: 146255 (Continued)**
**Lab Sample # : 3E04330-04 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Phenol-d6* | | | | | *27%* | | | *10-55* | | *EPA Method 8270C* |
| *Surrogate: Nitrobenzene-d5* | | | | | *68%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *83%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *75%* | | | *26-131* | | *EPA Method 8270C* |
| **2,4-D** | **0.0007** | mg/L | **J** | 0.001 | 0.0003 | 06/11/23 | 06/14/23 | 06/26/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/11/23 | 06/14/23 | 06/26/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *55% MX* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *94%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *110%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | |
| 1,1-Dichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,2-Dichloroethane** | **0.003** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.003** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| 2-Butanone | ND | mg/L | **HOLD** | 0.1 | 0.001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 4

**Sample ID: 146255 (Continued)**

**Lab Sample # : 3E04330-04 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | |
| **Carbon Tetrachloride** | **0.0005** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Chlorobenzene** | **0.001** | mg/L | **HOLD, J** | 0.05 | 0.00006 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Trichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Vinyl Chloride** | **0.001** | mg/L | **HOLD, J** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *95% HOLD* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *106% HOLD* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *96% HOLD* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *93% HOLD* | | | *89-109* | | *EPA Method 8260B* |





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Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 5

**Sample ID: 146256**

**Lab Sample # : 3E04330-05 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| **Arsenic** | **0.006** | mg/L | **J** | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.810** | mg/L | | 0.025 | 0.003 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Cadmium | ND | mg/L | | 0.005 | 0.0009 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Mercury** | **0.00009** | mg/L | **J** | 0.0002 | 0.00008 | 06/11/23 | 06/14/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/11/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| **3 & 4 Methylphenol** | **0.04** | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *31%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *54%* | | | *55-117* | | | *EPA Method 8270C* |
| *Surrogate: Phenol-d6* | | | | *23%* | | | *10-55* | | | *EPA Method 8270C* |





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# CERTIFICATE of ANALYSIS

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***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 5

**Sample ID: 146256 (Continued)**

**Lab Sample # : 3E04330-05 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Nitrobenzene-d5* | | | | | *57%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *79%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *83%* | | | *26-131* | | *EPA Method 8270C* |
| **2,4-D** | **0.0008** | mg/L | **J** | 0.001 | 0.0003 | 06/11/23 | 06/14/23 | 06/26/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/11/23 | 06/14/23 | 06/26/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *83%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *89%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *105%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | |
| 1,1-Dichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,2-Dichloroethane** | **0.003** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.002** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| 2-Butanone | ND | mg/L | **HOLD** | 0.1 | 0.001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Carbon Tetrachloride | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |





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# CERTIFICATE of ANALYSIS

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Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 5

**Sample ID: 146256 (Continued)**

**Lab Sample # : 3E04330-05 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | |
| Chlorobenzene | ND | mg/L | **HOLD** | 0.05 | 0.00006 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Trichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Vinyl Chloride** | **0.0005** | mg/L | **HOLD, J** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *108% HOLD* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *99% HOLD* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *97% HOLD* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *94% HOLD* | | | *89-109* | | *EPA Method 8260B* |





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Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 6

**Sample ID: 146257**

**Lab Sample # : 3E04330-06 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| **Arsenic** | **0.020** | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.729** | mg/L | | 0.025 | 0.003 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Cadmium** | **0.005** | mg/L | **J** | 0.005 | 0.0009 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Lead** | **0.014** | mg/L | **J** | 0.020 | 0.010 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/11/23 | 06/14/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/11/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| 3 & 4 Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/13/23 | 06/16/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *37%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *63%* | | | *55-117* | | | *EPA Method 8270C* |
| *Surrogate: Phenol-d6* | | | | *26%* | | | *10-55* | | | *EPA Method 8270C* |





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Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 6

**Sample ID: 146257 (Continued)**

**Lab Sample # : 3E04330-06 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Nitrobenzene-d5* | | | | | *65%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *87%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *82%* | | | *26-131* | | *EPA Method 8270C* |
| 2,4-D | ND | mg/L | | 0.001 | 0.0003 | 06/11/23 | 06/14/23 | 06/27/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/11/23 | 06/14/23 | 06/27/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *81%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/11/23 | 06/15/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *86%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *93%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | |
| 1,1-Dichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,2-Dichloroethane** | **0.002** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.002** | mg/L | **HOLD, J** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **2-Butanone** | **0.06** | mg/L | **HOLD, J** | 0.1 | 0.001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 6

**Sample ID: 146257 (Continued)**

**Lab Sample # : 3E04330-06 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | |
| Carbon Tetrachloride | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Chlorobenzene | ND | mg/L | **HOLD** | 0.05 | 0.00006 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Chloroform | ND | mg/L | **HOLD** | 0.05 | 0.0001 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Trichloroethene | ND | mg/L | **HOLD** | 0.05 | 0.0002 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Vinyl Chloride | ND | mg/L | **HOLD** | 0.05 | 0.0003 | 06/08/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *96% HOLD* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *95% HOLD* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *95% HOLD* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *93% HOLD* | | | *89-109* | | *EPA Method 8260B* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

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***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 7

**Sample ID: 146258**

**Lab Sample # : 3E04330-07 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Metals** | | | | | | | | | | |
| Arsenic | ND | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| **Barium** | **0.098** | mg/L | | 0.025 | 0.003 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Cadmium | ND | mg/L | | 0.005 | 0.0009 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Chromium | ND | mg/L | | 0.010 | 0.005 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Lead | ND | mg/L | | 0.020 | 0.010 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Mercury | ND | mg/L | | 0.0002 | 0.00008 | 06/11/23 | 06/13/23 | 06/16/23 | JMB | EPA 245.1 1994 |
| Selenium | ND | mg/L | | 0.030 | 0.008 | 06/11/23 | 07/02/23 | 07/02/23 | KRM | EPA 6010B |
| Silver | ND | mg/L | | 0.010 | 0.0007 | 06/11/23 | 06/30/23 | 06/30/23 | KRM | EPA 6010B |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles** | | | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| 2,4,6-Trichlorophenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| 2,4-Dinitrotoluene | ND | mg/L | | 0.005 | 0.0008 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| 2-Methylphenol | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Hexachlorobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Hexachlorobutadiene | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Hexachloroethane | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Nitrobenzene | ND | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Pentachlorophenol | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| Pyridine | ND | mg/L | | 0.005 | 0.002 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| **3 & 4 Methylphenol** | **0.01** | mg/L | | 0.005 | 0.001 | 06/11/23 | 06/15/23 | 06/20/23 | DTS | EPA Method 8270C |
| *Surrogate: 2-Fluorophenol* | | | | *37%* | | | *0-82* | | | *EPA Method 8270C* |
| *Surrogate: 2-Fluorobiphenyl* | | | | *53%* | | | *55-117* | | | *EPA Method 8270C* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

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***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 7

**Sample ID: 146258 (Continued)**

**Lab Sample # : 3E04330-07 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Semivolatiles (Con** | | | | | | | | | | |
| *Surrogate: Phenol-d6* | | | | | *24%* | | | *10-55* | | *EPA Method 8270C* |
| *Surrogate: Nitrobenzene-d5* | | | | | *64%* | | | *50-117* | | *EPA Method 8270C* |
| *Surrogate: 2,4,6-Tribromophenol* | | | | | *78%* | | | *0-165* | | *EPA Method 8270C* |
| *Surrogate: Terphenyl-d14* | | | | | *72%* | | | *26-131* | | *EPA Method 8270C* |
| 2,4-D | ND | mg/L | | 0.001 | 0.0003 | 06/11/23 | 06/15/23 | 06/21/23 | KJT | EPA Method 8151 |
| 2,4,5-TP | ND | mg/L | | 0.0005 | 0.0003 | 06/11/23 | 06/15/23 | 06/21/23 | KJT | EPA Method 8151 |
| *Surrogate: 2,4-Dichlorophenylacetic Acid* | | | | | *82%* | | | *70-130* | | *EPA Method 8151* |
| Endrin | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| gamma-BHC | ND | mg/L | | 0.00001 | 0.000002 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| Heptachlor Epoxide | ND | mg/L | | 0.00001 | 0.000003 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| Methoxychlor | ND | mg/L | | 0.00001 | 0.000004 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| Toxaphene | ND | mg/L | | 0.002 | 0.0004 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| Chlordane | ND | mg/L | | 0.0002 | 0.00004 | 06/11/23 | 06/16/23 | 06/22/23 | KJT | EPA Method 8081 |
| *Surrogate: Tetrachloro-m-xylene* | | | | | *89%* | | | *30-125* | | *EPA Method 8081* |
| *Surrogate: Decachlorobiphenyl* | | | | | *90%* | | | *0-113* | | *EPA Method 8081* |
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles** | | | | | | | | | | |
| 1,1-Dichloroethene | ND | mg/L | | 0.05 | 0.0003 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,2-Dichloroethane** | **0.005** | mg/L | **J** | 0.05 | 0.0002 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **1,4-Dichlorobenzene** | **0.004** | mg/L | **J** | 0.05 | 0.0002 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **2-Butanone** | **0.02** | mg/L | **J** | 0.1 | 0.001 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Benzene | ND | mg/L | | 0.05 | 0.0001 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Carbon Tetrachloride | ND | mg/L | | 0.05 | 0.0002 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

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***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

Sampler Name: Zachary Smith
Sampled Date/Time: 5/30/23 00:00
Sample Location: Grab Pond Bed Location 7

**Sample ID: 146258 (Continued)**

**Lab Sample # : 3E04330-07 (Non-Potable)**

| Analyte | Result | Units | Qual | Reporting Limit | MDL | Leached Date | Prepared Date | Analyzed Date | Analyst | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| **Toxic Characteristic Leaching Procedure (TCLP) EPA 1311 Volatiles (Continu** | | | | | | | | | | |
| **Chlorobenzene** | **0.001** | mg/L | **J** | 0.05 | 0.00006 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Chloroform** | **0.008** | mg/L | **J** | 0.05 | 0.0001 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| Tetrachloroethene | ND | mg/L | | 0.05 | 0.0002 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Trichloroethene** | **0.0005** | mg/L | **J** | 0.05 | 0.0002 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| **Vinyl Chloride** | **0.001** | mg/L | **J** | 0.05 | 0.0003 | 06/10/23 | 06/16/23 | 06/16/23 | DTS | EPA Method 8260B |
| *Surrogate: Dibromofluoromethane* | | | | | *109%* | | | *88-121* | | *EPA Method 8260B* |
| *Surrogate: 1,2-Dichloroethane-d4* | | | | | *102%* | | | *94-109* | | *EPA Method 8260B* |
| *Surrogate: Toluene-d8* | | | | | *101%* | | | *80-117* | | *EPA Method 8260B* |
| *Surrogate: 4-Bromofluorobenzene* | | | | | *100%* | | | *89-109* | | *EPA Method 8260B* |





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

# CERTIFICATE of ANALYSIS

***Microbiological/Inorganic Certification - 877***

***Organic Certification - 4100***

Jacobs Engineering
Lauren Erickson
2 Easton Oval / Suite 500
Columbus, OHIO 43219

Client #: 6784
PO Number:690666
Date Received: 5/30/23 16:09
Reported: 7/3/23 9:34

## Notes and Definitions

| Item | Definition |
|---|---|
| HOLD | Exceeds Recommended Holding Time |
| J | Analyte was positively identified, the associated numerical value is estimated. |
| MX | Matrix Interference |
| mg/kg Dry | Sample results reported on a dry weight basis |
| ug/L | ppb/Part per Billion |
| mg/L | ppm/Part per Million |
| ng/L | ppt/Part per Trillion |
| ND | Analyte NOT DETECTED at or above the method detection limit (MDL) |
| ! | Analyte is at or above the Maximum Contaminate Level |
| MDL | Method Dectection Limit |
| CFU | Colony Forming Units |
| MPN | Most Probable Number |
| NTU | Nephelometric Turbidity Unit |
| pCi/L | Picocuries per liter |
| SVI | Sludge Volume Index |
| RPD | Relative Percent Difference |
| %REC | Percent Recovery |
| Source | Sample that was matrix spiked or duplicated |

Notes:
1. Calculated analytes are based on raw data and may not reflect the rounding of the individual compounds.
2. Samples are analyzed using the information received on the request sheet and may not be analyzed when the parameters fall outside required guidelines.





7940 Memorial Drive Plain City, Ohio 43064 (614) 873-4654

**MASI** ® Waste Wate **3E04330-01** Sheet

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request
** See reverse fc

AR # 146252
Received: 5/30/2023
Matrix: Non-Potable

** 146252

Location 1

Project Name: Minerva Park Lake Samples

SampleType: (X) Non-Potable ( ) Solid

Client #: 10784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ~~(X)~~ 26 Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium TI |
| TCLP | | ( ) 1017 Zinc Zn |
| ~~(X)~~ TCLP Metals | ( ) pH | |
| ~~(X)~~ TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| ~~(X)~~ TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| ~~(X)~~ TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| ~~(X)~~ TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| ~~(X)~~ PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____
Total Containers: 4

Office Use: 27
FD 1546

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by:_____ Date/Time:_____

Received by:_____ Date/Time:_____

Received / Office/Lab: [signature] Date/Time: 5/30/23 1606

COOLER:

Revised 04-14-23 DN

**MASI** ® Waste Water A

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request (AR) ** See reverse for im

3E04330-02 et

AR # 146253
Received: 5/30/2023
Matrix: Non-Potable

146253

Location 2

Project Name: Minerva Park Lake Samples

SampleType: (X) Non-Potable ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Bed of Pond

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/1) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/1) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium TI |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____
Total Containers: 4

Office Use: 27
FD 1548

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by:_____ Date/Time:_____

Received by:_____ Date/Time:_____

Received Office/Lab: _____ Date/Time: 5/30/23 1606

COOLER:

Revised 04-14-23 DN

**MASI ®** Waste Water **3E04330-03** heet

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request (
** See reverse for

AR # 146254
Received: 5/30/2023
Matrix: Non-Potable

* 146254

Location 3

Project Name: Minerva Park Lake Samples

SampleType: (X) Non-Potable ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC _____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium Tl |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____ 4
Total Containers:_____

Office Use: 27
FD 1548

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by:_____ Date/Time:_____

Received by:_____ Date/Time:_____

Received / Office/Lab: _____ Date/Time: 5/30/23 1606

COOLER:

Revised 04-14-23 DN

**MASI ®** Waste Water A **3E04330-04** :et

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request (AR) ** See reverse for in

AR # 146255
Received: 5/30/2023
Matrix: Non-Potable

146255

Location 4

Project Name: Minerva Park Lake Samples

SampleType: (X) Non-Potable ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium Tl |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____
Total Containers: 4

Office Use: 17
PO 1546

Return as Chain of Custody ( ) Yes or ( ) No #____ of sample containers

Relinquished by:_____ Date/Time:_____

Received by:_____ Date/Time:_____

Received/Office/Lab:_____ Date/Time: 5/30/23 1606

COOLER:

Revised 04-14-23 DN

**MASI** ®

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Waste Wat

Analysis Reques

** See reverse

**3E04330-05**

AR # 146256
Received: 5/30/2023
Matrix: Non-Potable

Sheet

le:

1 ** 146256

Location 5

Project Name: Minerva Park lake Samples

SampleType: (X) Non-Potabl ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium TI |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____ 4
Total Containers:_____

Office Use: 27°
FD 1548

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by:_____ Date/Time:_____

Received by:_____ Date/Time:_____

Received / Office/Lab: Hammill Date/Time: 5/30/23 1806

COOLER:

Revised 04-14-23 DN

**MASI** ® Waste Wate **3E04330-06** Sheet

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request
** See reverse fc

AR # 146257
Received: 5/30/2023
Matrix: Non-Potable

:
** 146257

Location

Project Name: Minerva Park Lake Samples

SampleType: ( ) Non-Potable ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium Tl |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____
Total Containers: 4

Office Use: 27°
FD 1548

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by: Date/Time:

Received by: Date/Time:

Received / Office/Lab: Date/Time 5/30/23 1606

COOLER:

Revised 04-14-23 DN

**MASI ®** Waste Wate **3E04330-07** Sheet

ENVIRONMENTAL LABORATORIES
7940 Memorial Drive
Plain City, OH 43064
614-873-4654

Analysis Request
** See reverse fc

AR # 146258
Received: 5/30/2023
Matrix: Non-Potable

** 146258

Location 7

Project Name: Minerva Park Lake Samples

SampleType: ( ) Non-Potable ( ) Solid

Client #: 6784 Client Name: Jacobs Engineering County: Franklin PO#:

Sampler Name: Zachary Smith

Sample Location: ( ) Influent ( ) Effluent ( ) Up Stream ( ) Down Stream (X) Other Pond Bed

Collection: (X) Grab ( ) 24Hr Composite ( ) Other

Collection Date: 5/30/23 Collection Time:

| Misc. Testing | | Metals |
|---|---|---|
| ( ) 023 BOD, 5 Day | ( ) 387 O&G Hexane 1664A | ( ) 0006 Aluminum Al |
| ( ) 033 CBOD, 5 Day | ( ) 096 pH | ( ) 909 Antimony Sb |
| ( ) 034 Chloride | ( ) 097 Phenol | ( ) 1000 Arsenic As |
| ( ) 036 Chlorine, Residual | ( ) 100 Phosphorus, Total as P | ( ) 1001 Barium Ba |
| ( ) 037 Chlorine, Total | ( ) 098 Phosphate, Ortho | ( ) 1002 Beryllium Be |
| ( ) 047 COD | ( ) 116 Solids, Percent (%) | ( ) 1003 Cadmium Cd |
| ( ) 1229 COD, Low Level | ( ) 117 Solids, Suspended (mg/l) | ( ) 1005 Chrome Cr |
| ( ) 054 Cyanide, Free | ( ) 118 Solids, Total (mg/l) | ( ) 0038 Chrome Hexavalent |
| ( ) 1227 Cyanide, Low Level | ( ) 119 Solids, Volatile (%) | ( ) 1006 Copper Cu |
| ( ) 055 Cyanide, Total | ( ) 120 Solids, Volatile Susp (%) | ( ) 868 Iron Fe |
| ( ) 056 Dissolved Oxygen | ( ) 121 Specific Gravity | ( ) 870 Iron, Susp |
| ( ) 219 E-Coli | ( ) 290 SOUR | ( ) 1008 Lead Pb |
| ( ) 272 Fecal Coliform - MPN | ( ) 114 TDS/TFR | ( ) 878 Manganese Mn |
| ( ) 058 Fecal Coliform - CFU | ( ) 094 T.I.N | ( ) 880 Manganese, Susp |
| ( ) 066 Hardness | ( ) 137 TKN | ( ) 0082 Mercury Hg |
| ( ) 081 MBAS | ( ) 138 TOC (Phosphoric Acid) | ( ) 1011 Molybdenum Mo |
| ( ) 266 Nitrate+Nitrite (N+N) | ( ) 139 TON-N | ( ) 1012 Nickel Ni |
| ( ) 091 Nitrogen Ammonia | ( ) 1103 VOC_____ 624 or 8260B | ( ) 1013 Potassium K |
| ( ) Other | ( ) Other | ( ) 1014 Selenium Se |
| ( ) Other | ( ) Other | ( ) 1015 Silver Ag |
| ( ) Other | ( ) Other | ( ) 1036 Thallium TI |
| TCLP | | ( ) 1017 Zinc Zn |
| (X) TCLP Metals | ( ) pH | |
| (X) TCLP Pesticides M8081 | ( ) Flash Point, Closed Cup | ( ) 1082 Mercury Low Level 1631E |
| (X) TCLP Herbicides M8151 | ( ) Paint Filter | * See Special Sampling Instructions |
| (X) TCLP Vol Org. Compounds M8260 | | ( ) No Sample Fee |
| (X) TCLP SemiVol Org.Compounds M8270 | | ( ) 1088 QA/QC |
| (X) PCB 8082 | | ( ) 9050 MASI Use Only |

N:_____
S:_____
U:_____
Total Containers: 4

Office Use: 27
FD 1548

Return as Chain of Custody ( ) Yes or ( ) No #_____ of sample containers

Relinquished by: Date/Time:

Received by: Date/Time:

Received / Office/Lab: Date/Time: 5/30/23 1606

COOLER:

Revised 04-14-23 DN

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-01**
Lab Sample # **2318443-01**

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1016 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1221 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1232 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1242 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1248 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1254 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1260 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) TCMX | 88.7 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) DCB | 101.3 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-02**
Lab Sample # **2318443-02**

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1016 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1221 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1232 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1242 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1248 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1254 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1260 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) TCMX | 83.5 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) DCB | 95.5 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-03**
Lab Sample # **2318443-03**

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1016 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1221 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1232 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1242 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1248 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1254 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| PCB-1260 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) TCMX | 83.3 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |
| (Surrogate) DCB | 103.4 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/02/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-04**
Lab Sample # **2318443-04**

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1016 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1221 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1232 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1242 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1248 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1254 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1260 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| (Surrogate) TCMX | 105.4 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| (Surrogate) DCB | 102.2 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-05**
Lab Sample # **2318443-05**

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1016 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1221 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1232 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1242 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1248 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1254 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| PCB-1260 | <0.005 | mg/L | 0.005 | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| (Surrogate) TCMX | 88.0 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |
| (Surrogate) DCB | 100.2 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/03/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-06**
Lab Sample # **2318443-06**
Elevated PQL due to sample matrix

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1016 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1221 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1232 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1242 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1248 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1254 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1260 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| (Surrogate) TCMX | 167.6 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| | Surrogate recovery outside established limits biased high, all analytes were below detection. The biased high surrogate has no effect on the results. | | | | | | |
| (Surrogate) DCB | 73.2 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |

Analysis Certified By: Megan H. Hued

ANALYTICAL REPORT

**Lab Project #** 2318443
**Received:** 5/31/2023
**Reported:** 6/20/2023

MASI
Attn: Audrey Cooper
7940 Memorial Dr.
Plain City,Ohio 43064

**Date Sampled:** 05/30/2023
**Sampled By:** None Provided
**Sampled Matrix:** Wastewater
**Containers:** 1

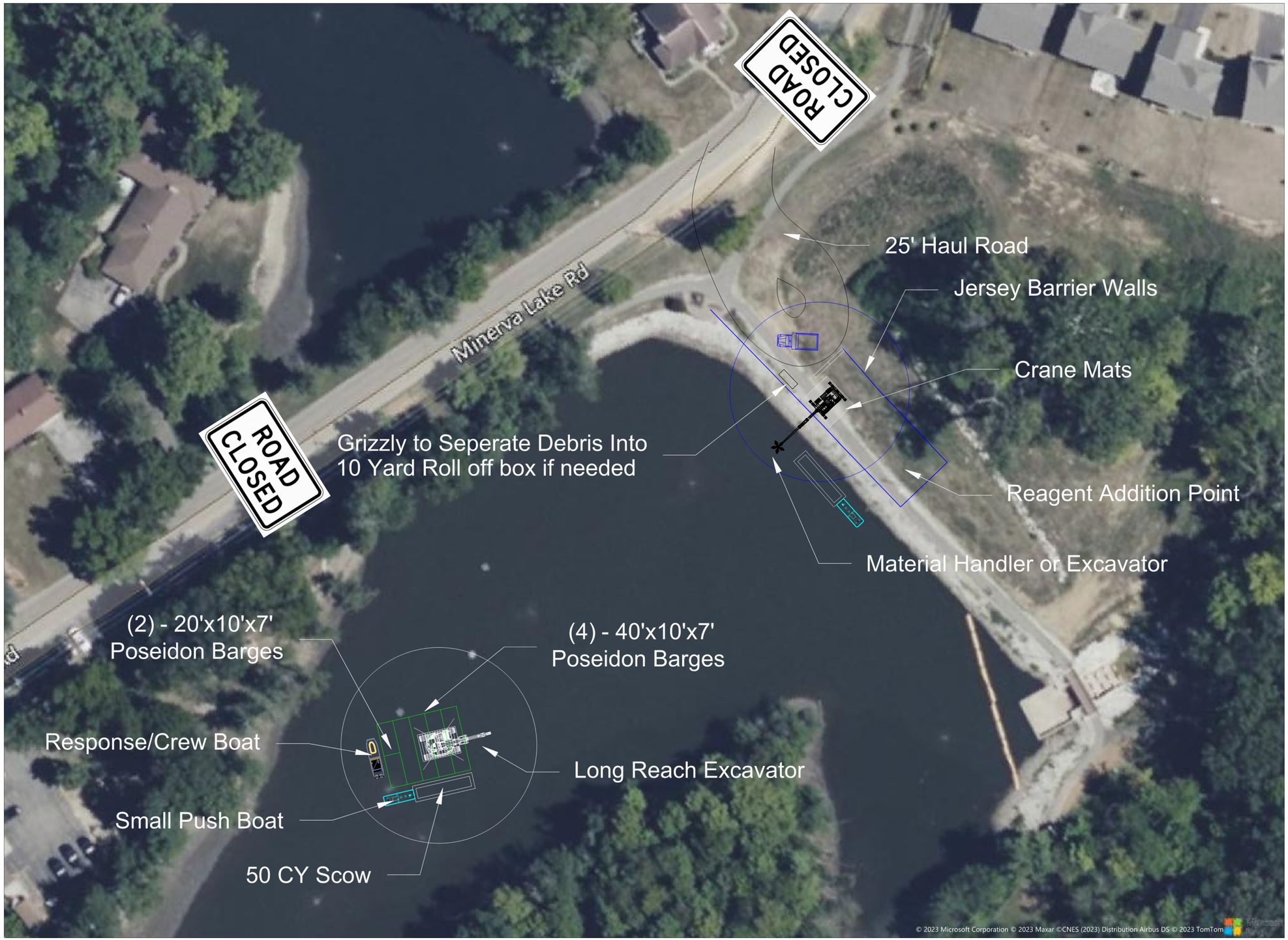
**Project Name:** **Chemical Analysis**

**Sample ID:** **3E04330-07**
Lab Sample # **2318443-07**
Elevated PQL due to sample matrix

| Analyte | Results | Units | PQL | Method | Analyst | Extraction Date | Analysis Date |
|---|---|---|---|---|---|---|---|
| Extraction for Pesticides/PCBs | * | Y/N | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1016 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1221 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1232 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1242 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1248 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1254 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| PCB-1260 | <0.050 | mg/L | 0.050 | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| (Surrogate) TCMX | 135.8 (23.6 - 140.1) | % | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |
| (Surrogate) DCB | 42.4 (37.1 - 137.7) | % | | SW-8082A | BG | 06/01/2023 | 06/14/2023 |

Analysis Certified By: Megan H. Hued

# Attachment C – Recommend Technology Conceptual Layout




DREDGING CONCEPTUAL LAYOUT

MINERVA PARK, OHIO

Jacobs

# Attachment D – Alternative No. 1 Plans and Profiles

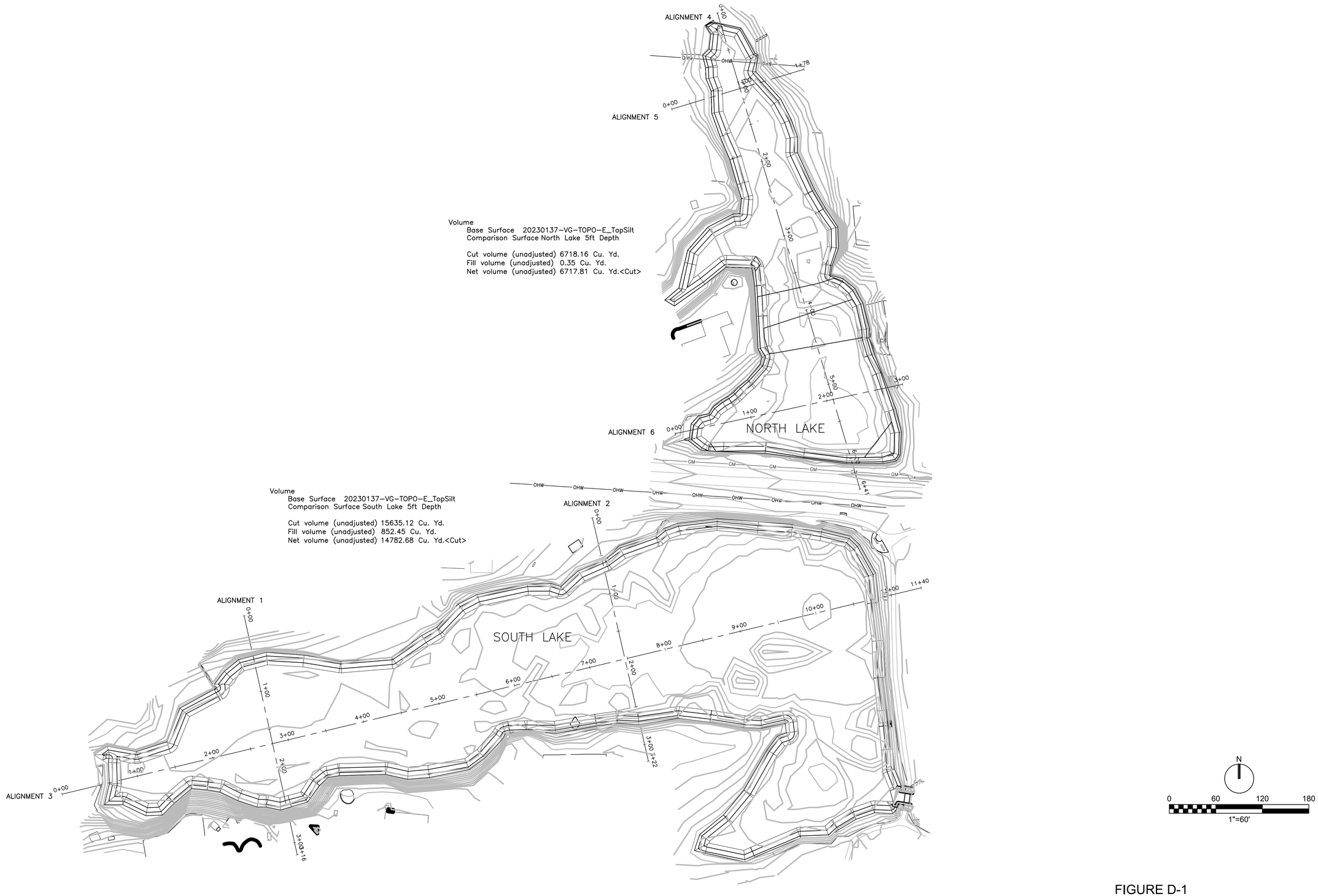
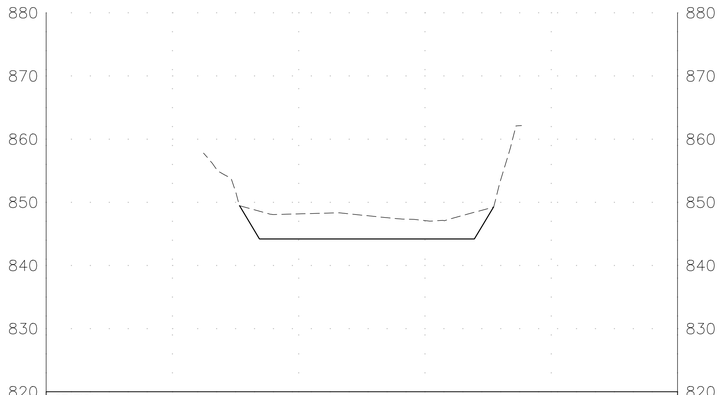


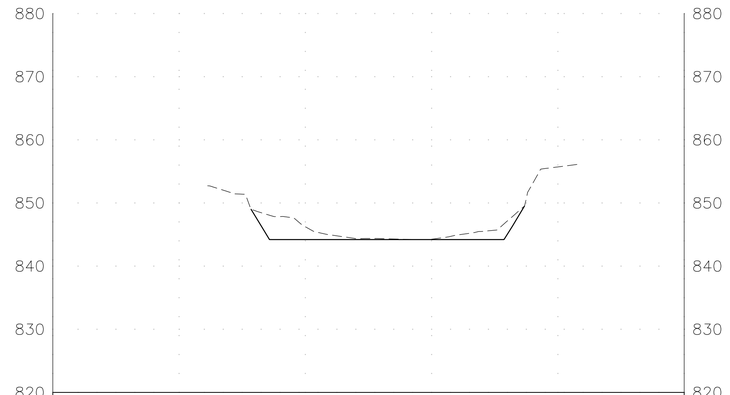

FIGURE D-1
MATERIAL REMOVED TO 5 FT DEPTH

MINERVA PARK, OHIO

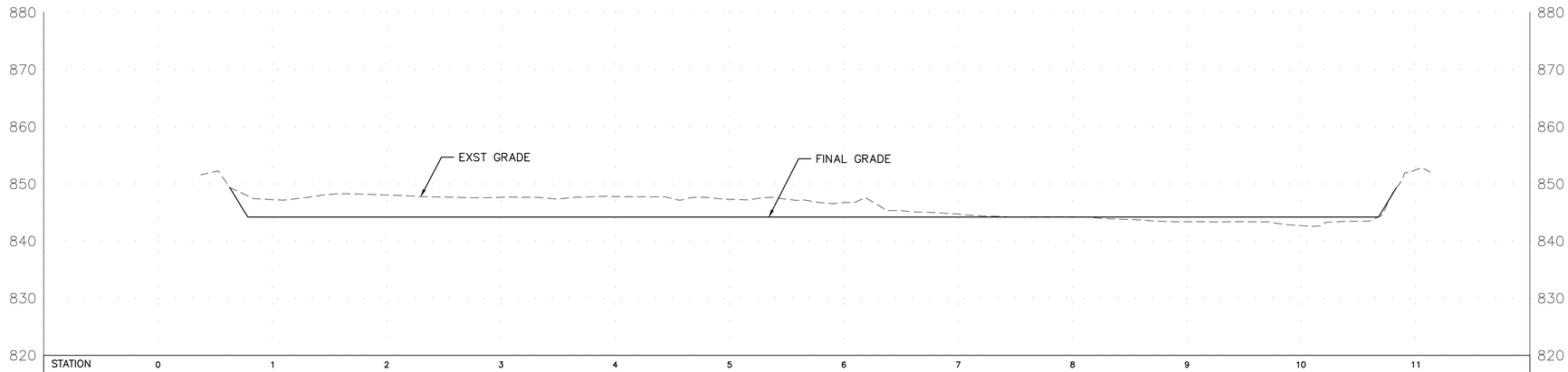
Jacobs




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 848.16 | 847.10 | |
| INVERT | | 844.20 | 844.20 | |
| CUT | | 3.96 | 2.90 | |




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 846.24 | 844.27 | 855.71 |
| INVERT | | 844.20 | 844.20 | |
| CUT | | 2.04 | 0.07 | |




| STATION | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EX GROUND | | 847.25 | 848.05 | 847.66 | 847.78 | 847.30 | 846.71 | 844.70 | 844.22 | 843.37 | 842.69 | 852.47 |
| INVERT | | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | 844.20 | |
| CUT | | 3.05 | 3.85 | 3.46 | 3.58 | 3.10 | 2.51 | 0.50 | 0.02 | −0.83 | −1.51 | |

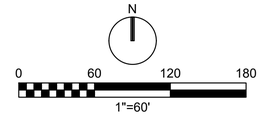
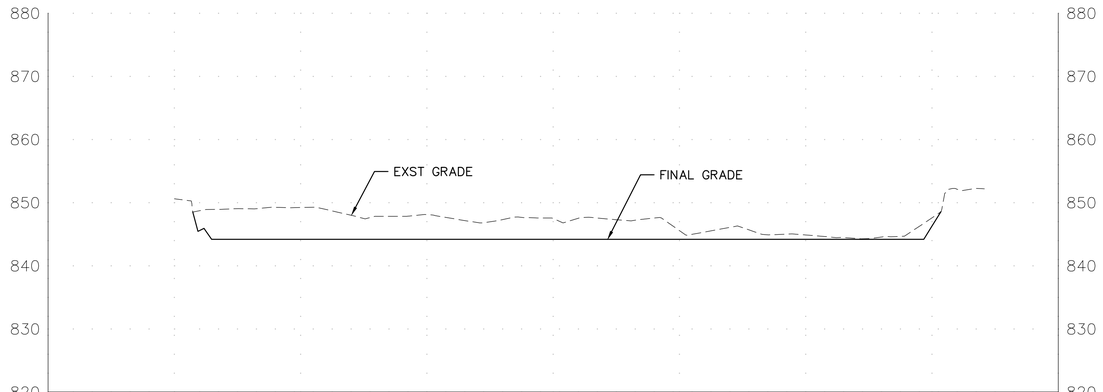


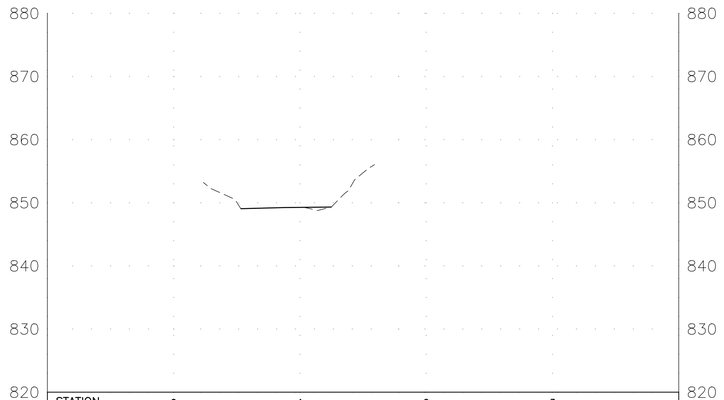

FIGURE D-2
SOUTH LAKE SECTIONS - 5FT DEPTH

MINERVA PARK, OHIO

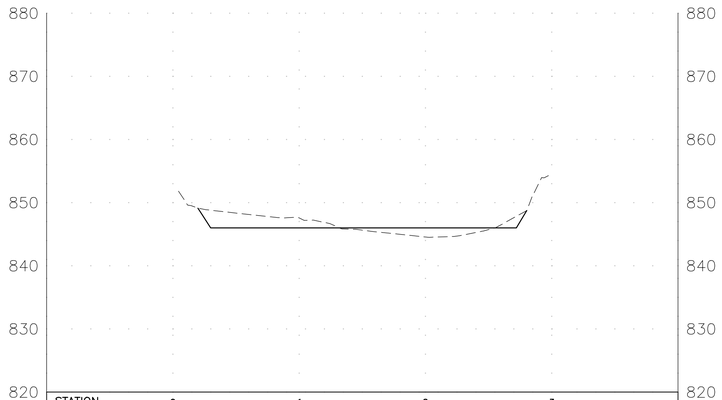
Jacobs




| STATION | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| EX GROUND | 850.63 | 849.26 | 848.12 | 847.50 | 845.58 | 844.90 | 847.60 |
| INVERT | 850.63 | 849.26 | 848.12 | 847.50 | 845.58 | 844.90 | 847.60 |
| CUT | | 5.06 | 3.92 | 3.30 | 1.38 | 0.70 | 1.31 |




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 849.30 | | |
| INVERT | | 849.30 | | |
| CUT | | 0.00 | | |




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 847.57 | 844.56 | |
| INVERT | | 847.57 | 844.56 | |
| CUT | | 0.00 | 0.00 | |

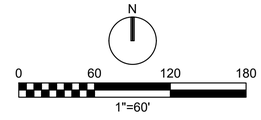



FIGURE D-3
NORTH LAKE SECTIONS - 5FT DEPTH

MINERVA PARK, OHIO

Jacobs

# Attachment E – Alternative No. 2 Plans and Profiles

Volume of North Lake sloped and flat bottom
Base Surface 20230137-VG-TOPO-E_TopSilt
Comparison Surface NORTH POND CUT

Cut volume (unadjusted) 2441.74 Cu. Yd.
Fill volume (unadjusted) 559.67 Cu. Yd.
Net volume (unadjusted) 1882.07 Cu. Yd.<Cut>

Volume of North Lake sloped and flat bottom
Base Surface 20230137-VG-TOPO-E_TopSilt
Comparison Surface SOUTH POND CUT

Cut volume (unadjusted) 13012.64 Cu. Yd.
Fill volume (unadjusted) 852.96 Cu. Yd.
Net volume (unadjusted) 12159.68 Cu. Yd.<Cut>

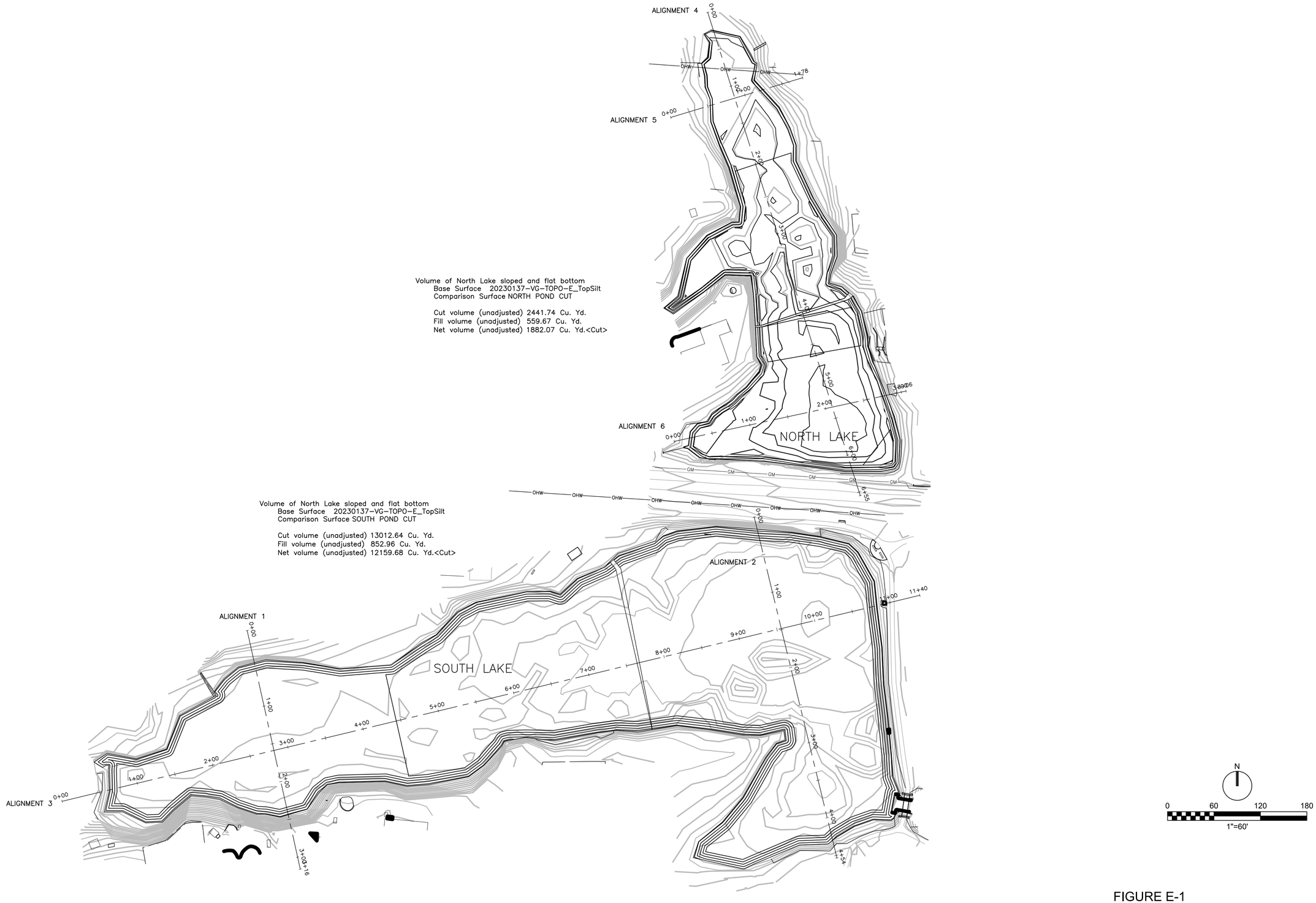
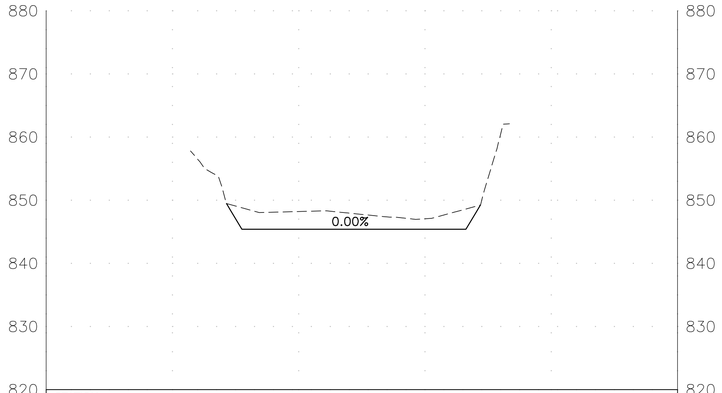


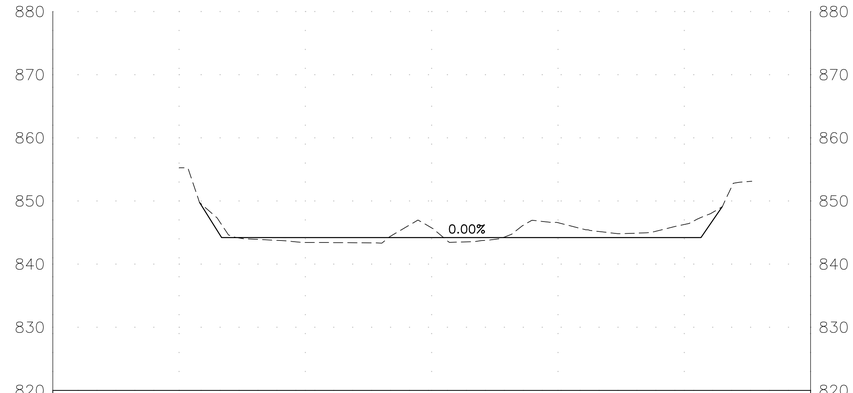

FIGURE E-1
POND MATERIAL REMOVAL PLAN

MINERVA PARK, OHIO

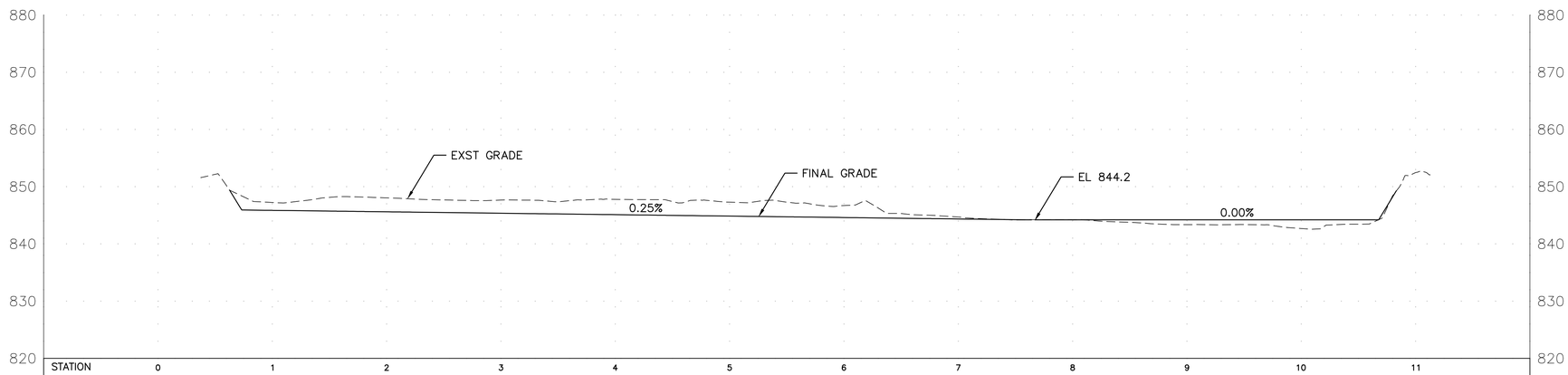
Jacobs




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 848.21 | 847.06 | |
| INVERT | | 845.41 | 845.41 | |
| CUT | | 2.80 | 1.65 | |




| STATION | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| EX GROUND | 855.24 | 843.43 | 845.73 | 846.57 | 846.27 |
| INVERT | | 844.20 | 844.20 | 844.20 | 844.20 |
| CUT | | −0.77 | 1.53 | 2.37 | 2.07 |




| STATION | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EX GROUND | | 847.25 | 848.05 | 847.66 | 847.78 | 847.30 | 846.71 | 844.70 | 844.22 | 843.37 | 842.69 | 852.47 |
| INVERT | | 845.86 | 845.61 | 845.36 | 845.11 | 844.86 | 844.61 | 844.36 | 844.20 | 844.20 | 844.20 | |
| CUT | | 1.39 | 2.44 | 2.30 | 2.67 | 2.44 | 2.10 | 0.34 | 0.02 | −0.83 | −1.51 | |

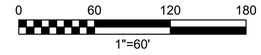
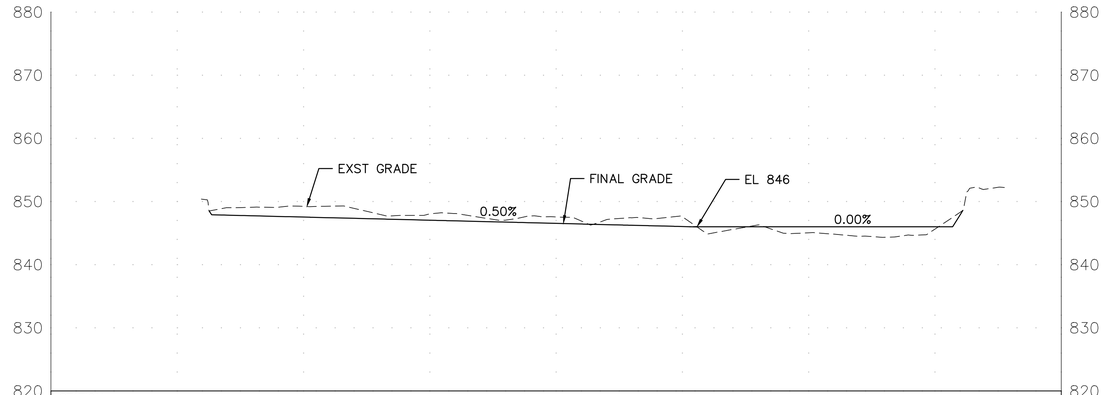


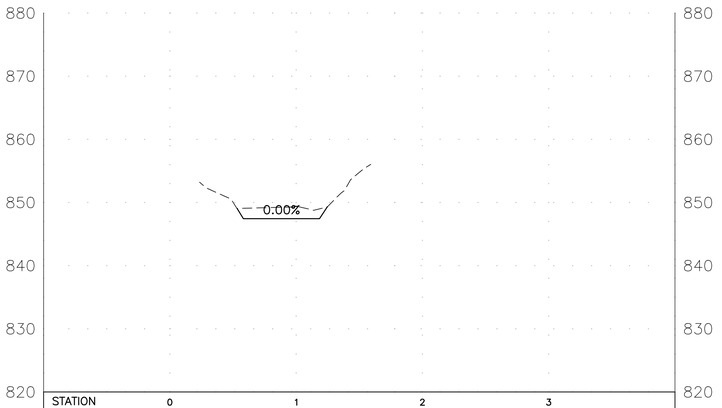

FIGURE E-2
SOUTH LAKE SECTIONS - SLOPED BOTTOM

MINERVA PARK, OHIO

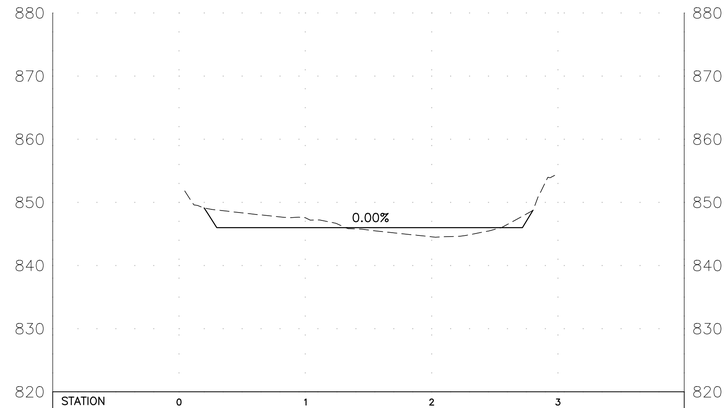
Jacobs




| STATION | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| EX GROUND | | 849.22 | 848.03 | 847.55 | 847.58 | 845.04 | 845.62 |
| INVERT | | 847.53 | 847.03 | 846.53 | 846.03 | 846.00 | 846.00 |
| CUT | | 1.69 | 1.00 | 1.02 | 1.55 | −0.96 | −0.38 |




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 849.30 | | |
| INVERT | | 847.45 | | |
| CUT | | 1.85 | | |




| STATION | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| EX GROUND | | 847.57 | 844.56 | |
| INVERT | | 846.00 | 846.00 | |
| CUT | | 1.57 | −1.44 | |

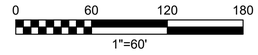



FIGURE E-3
NORTH LAKE SECTIONS - SLOPED BOTTOM

MINERVA PARK, OHIO

Jacobs

# Attachment F – Alternative No. 4 Rendering


FIGURE F-1
ALTERNATIVE NO. 4 RENDERING

MINERVA PARK, OHIO

Jacobs

# Attachment G – Opinions of Probable Construction Cost

Jacobs

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Project: Lakes Master Plan - Dredging Alternative No. 1
Estimate By: Scott Lamb Date: 08/08/23
Checked By: Mike Flickinger Date: 08/09/23

| Item No. | Item Description | Estimated Quantity | Unit of Measure | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Contractor Capital Costs | | | | |
| 1 | Contractor Submittals | 1 | LS | $ 16,974.20 | $ 16,974 |
| 2 | Mobilization | 1 | LS | $ 55,330.59 | $ 55,331 |
| 3 | Site Setup | 1 | LS | $ 123,585.58 | $ 123,586 |
| 4 | Erosion Control | 1 | LS | $ 14,689.17 | $ 14,689 |
| 5 | Mechanical Dredging | 21,500 | CY | $ 23.03 | $ 495,178 |
| 6 | Sediment Stabilization | 21,500 | CY | $ 41.22 | $ 886,304 |
| 7 | Transportation - Stabilized Sediment | 23,650 | TN | $ 21.12 | $ 499,438 |
| 8 | Disposal - Stabilized Sediment | 23,650 | TN | $ 15.00 | $ 354,750 |
| 9 | Contractor Temporary Site Facilities | 5.75 | MTH | $ 5,198.00 | $ 29,889 |
| 10 | Contractor Onsite Project Support | 5.75 | MTH | $ 69,296.12 | $ 398,453 |
| 11 | Contractor Home Office Support | 5.75 | MTH | $ 15,473.23 | $ 88,971 |
| 12 | In-Pond Water Quality Monitoring | 1 | LS | $ 8,333.33 | $ 8,333 |
| 13 | Bathymetric Surveying | 4 | DY | $ 6,237.00 | $ 24,948 |
| 14 | Site Restoration | 1 | LS | $ 10,000.00 | $ 10,000 |
| 15 | Demobilization | 1 | LS | $ 85,724.35 | $ 85,724 |
| 16 | Record Drawings | 1 | LS | $ 6,982.32 | $ 6,982 |
| | | | | | |
| | Subtotal Contractor Costs | | | | $ 3,099,549 |
| | Contingency at | 25.00% | | | $ 561,340 |
| | Subtotal with Contingency | | | | $ 3,660,890 |
| | | | | | |
| | Escalation to Midpoint of Construction (08/2023 to 08/2024) | 3.68% | | | $ 134,814 |
| | | | | | |
| | Total Capital Costs | | | | $ 3,795,703 |
| | | | | | |
| | | | | | |
| | Design Professional Costs | | | | |
| 17 | Remedial Design | 1 | LS | $ 75,000.00 | $ 75,000 |
| 18 | Project Management (percentage of Total Capital Costs) | 5.00% | | | $ 189,785 |
| 19 | Construction Management | 125 | DY | $ 1,900.00 | $ 237,500 |
| | | | | | |
| | Total Design Professional Costs | | | | $ 502,285 |
| | | | | | |
| | | | | TOTAL PROJECT COST | $ 4,297,988 |
| | | | | | |
| | Class 5 Cost Estimate - High Range at | +50% | | | $6,447,000 |
| | Class 5 Cost Estimate - Low Range at | -30% | | | $3,009,000 |
| | | | | | |

In providing opinions of cost, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that actual project costs will not vary from Jacobs' opinion of cost.

Jacobs

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Project: Lakes Master Plan - Dredging Alternative No. 2
Estimate By: Scott Lamb Date: 08/08/23
Checked By: Mike Flickinger Date: 08/09/23

| Item No. | Item Description | Estimated Quantity | Unit of Measure | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | Contractor Capital Costs | | | | |
| 1 | Contractor Submittals | 1 | LS | $ 16,974.20 | $ 16,974 |
| 2 | Mobilization | 1 | LS | $ 55,330.59 | $ 55,331 |
| 3 | Site Setup | 1 | LS | $ 123,585.58 | $ 123,586 |
| 4 | Erosion Control | 1 | LS | $ 14,689.17 | $ 14,689 |
| 5 | Mechanical Dredging | 15,500 | CY | $ 23.03 | $ 356,989 |
| 6 | Sediment Stabilization | 15,500 | CY | $ 41.22 | $ 638,963 |
| 7 | Transportation - Stabilized Sediment | 17,050 | TN | $ 21.12 | $ 360,060 |
| 8 | Disposal - Stabilized Sediment | 17,050 | TN | $ 15.00 | $ 255,750 |
| 9 | Contractor Temporary Site Facilities | 2.5 | MTH | $ 5,198.00 | $ 12,995 |
| 10 | Contractor Onsite Project Support | 2.5 | MTH | $ 69,296.12 | $ 173,240 |
| 11 | Contractor Home Office Support | 2.5 | MTH | $ 15,473.23 | $ 38,683 |
| 12 | In-Pond Water Quality Monitoring | 1 | LS | $ 8,333.33 | $ 8,333 |
| 13 | Bathymetric Surveying | 4 | DY | $ 6,237.00 | $ 24,948 |
| 14 | Site Restoration | 1 | LS | $ 10,000.00 | $ 10,000 |
| 15 | Demobilization | 1 | LS | $ 85,724.35 | $ 85,724 |
| 16 | Record Drawings | 1 | LS | $ 6,982.32 | $ 6,982 |
| | | | | | |
| | Subtotal Contractor Costs | | | | $ 2,183,248 |
| | Contingency at | 25.00% | | | $ 391,859 |
| | Subtotal with Contingency | | | | $ 2,575,107 |
| | | | | | |
| | Escalation to Midpoint of Construction (08/2023 to 08/2024) | 3.68% | | | $ 94,829 |
| | | | | | |
| | Total Capital Costs | | | | $ 2,669,936 |
| | | | | | |
| | | | | | |
| | Design Professional Costs | | | | |
| 17 | Remedial Design | 1 | LS | $ 75,000.00 | $ 75,000 |
| 18 | Project Management (percentage of Total Capital Costs) | 5.00% | | | $ 133,497 |
| 19 | Construction Management | 55 | DY | $ 1,900.00 | $ 104,500 |
| | | | | | |
| | Total Design Professional Costs | | | | $ 312,997 |
| | | | | | |
| | | | | TOTAL PROJECT COST | $ 2,982,933 |
| | | | | | |
| | Class 5 Cost Estimate - High Range at | +50% | | | $4,475,000 |
| | Class 5 Cost Estimate - Low Range at | -30% | | | $2,089,000 |
| | | | | | |

In providing opinions of cost, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that actual project costs will not vary from Jacobs' opinion of cost.

Jacobs

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

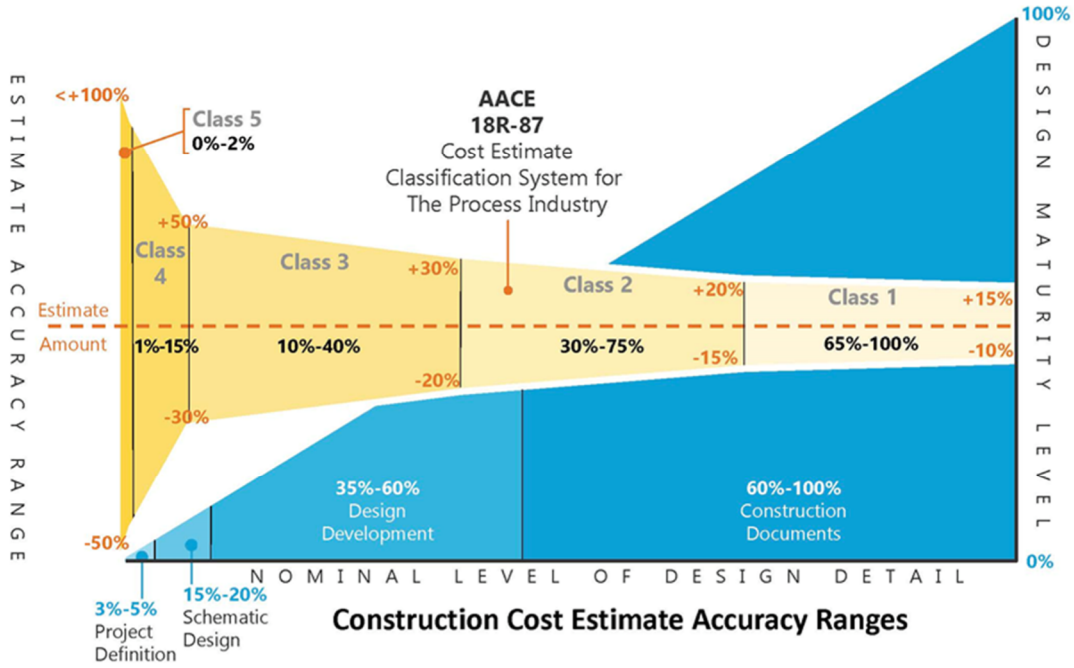
Project: Lakes Master Plan - Dredging Alternative No. 3
Estimate By: Scott Lamb Date: 08/08/23
Checked By: Mike Flickinger Date: 08/09/23

| Item No. | Item Description | Estimated Quantity | Unit of Measure | Unit Cost | Extended Cost |
|---|---|---|---|---|---|
| | **Contractor Capital Costs** | | | | |
| 1 | Contractor Submittals | 1 | LS | $ 16,974.20 | $ 16,974 |
| 2 | Mobilization | 1 | LS | $ 55,330.59 | $ 55,331 |
| 3 | Site Setup | 1 | LS | $ 123,585.58 | $ 123,586 |
| 4 | Erosion Control | 1 | LS | $ 14,689.17 | $ 14,689 |
| 5 | Mechanical Dredging | 13,000 | CY | $ 23.03 | $ 299,410 |
| 6 | Sediment Stabilization | 13,000 | CY | $ 41.22 | $ 535,905 |
| 7 | Transportation - Stabilized Sediment | 14,300 | TN | $ 21.12 | $ 301,986 |
| 8 | Disposal - Stabilized Sediment | 14,300 | TN | $ 15.00 | $ 214,500 |
| 9 | Contractor Temporary Site Facilities | 2.0 | MTH | $ 5,198.00 | $ 10,396 |
| 10 | Contractor Onsite Project Support | 2.0 | MTH | $ 69,296.12 | $ 138,592 |
| 11 | Contractor Home Office Support | 2.0 | MTH | $ 15,473.23 | $ 30,946 |
| 12 | In-Pond Water Quality Monitoring | 1 | LS | $ 8,333.33 | $ 8,333 |
| 13 | Bathymetric Surveying | 4 | DY | $ 6,237.00 | $ 24,948 |
| 14 | Site Restoration | 1 | LS | $ 10,000.00 | $ 10,000 |
| 15 | Demobilization | 1 | LS | $ 85,724.35 | $ 85,724 |
| 16 | Record Drawings | 1 | LS | $ 6,982.32 | $ 6,982 |
| | | | | | |
| | Subtotal Contractor Costs | | | | $ 1,878,302 |
| | Contingency at | 25.00% | | | $ 340,454 |
| | Subtotal with Contingency | | | | $ 2,218,756 |
| | | | | | |
| | Escalation to Midpoint of Construction (08/2023 to 08/2024) | 3.68% | | | $ 81,707 |
| | | | | | |
| | Total Capital Costs | | | | $ 2,300,463 |
| | | | | | |
| | | | | | |
| | **Design Professional Costs** | | | | |
| 17 | Remedial Design | 1 | LS | $ 75,000.00 | $ 75,000 |
| 18 | Project Management (percentage of Total Capital Costs) | 5.00% | | | $ 115,023 |
| 19 | Construction Management | 44 | DY | $ 1,900.00 | $ 83,600 |
| | | | | | |
| | Total Design Professional Costs | | | | $ 273,623 |
| | | | | | |
| | | | | TOTAL PROJECT COST | $ 2,574,086 |
| | | | | | |
| | Class 5 Cost Estimate - High Range at | +50% | | | $3,862,000 |
| | Class 5 Cost Estimate - Low Range at | -30% | | | $1,802,000 |
| | | | | | |

In providing opinions of cost, Jacobs has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, Jacobs makes no warranty that actual project costs will not vary from Jacobs' opinion of cost.

Jacobs assumed the following when preparing the opinions of probable construction costs.

- Item No. 3 – Site Setup: Includes closing Minerva Lake Road, temporary fencing with privacy screens, ground protection, and temporary dock for access.
- Item No. 4 – Erosion Control: Includes land and in-water erosion control features.
- Item No. 5 – Mechanical Dredging: Productivity set at 400 CY/shift.
- Item No. 6 – Sediment Stabilization: Pricing based on 1% Waste Lock® A110 SAP by $M^2$ Polymer Technologies, Inc.
- Item No. 7 – Transportation – Stabilized Sediment: Cycle time of 2 hours per truck for loading, hauling, dumping, and return. Cost also includes truck loading time.
- Item No. 12 – In-Pond Water Quality Monitoring: 1 data buoy with turbidity sensor.
- Contingency: Contingency percentage not applied to transportation and disposal costs.
- Item No. 19 – Construction Management: 9 hours/day and includes a site vehicle, miscellaneous consumables, and per diem.


ESTIMATE ACCURACY RANGE
<+100%
Class 5
0%-2%
AACE
18R-87
Cost Estimate
Classification System for
The Process Industry
+50%
Class 4
Class 3
+30%
Class 2
+20%
Class 1
+15%
Estimate
Amount
1%-15%
10%-40%
30%-75%
65%-100%
-15%
-10%
-20%
-30%
-50%
35%-60%
Design
Development
60%-100%
Construction
Documents
100%
DESIGN MATURITY LEVEL
0%
NOMINAL LEVEL OF DESIGN DETAIL
3%-5%
Project
Definition
15%-20%
Schematic
Design
Construction Cost Estimate Accuracy Ranges
JACOBS