APPENDIX D

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GEOTECHNICAL
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WATER
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95 Glastonbury Boulevard
3rd Floor
Glastonbury, CT 06033
T: 860.286.8900
F: 860.633.5699
www.gza.com

March 3, 2021
Project No. 05.0046161.07

Mr. Scott Waitkus, P. E.
Vice President
BVH Integrated Services, P.C.
206 West Newberry Road
Bloomfield, CT 06002

Re: Historical Data Review and Findings Technical Memorandum
Mirror Lake – University of Connecticut Storrs Campus

Dear Mr. Waitkus:

GZA GeoEnvironmental, Inc. (GZA) has prepared this memorandum summarizing our review of historical water quality data reports for Mirror Lake on the University of Connecticut (UCONN) Storrs Campus provided to us by BVH Integrated Services, P.C. (BVH). This memo and the work described herein is subject to the Limitations provided at the end of this report.

BACKGROUND AND OBJECTIVE

Mirror Lake is a focal point of the UCONN Storrs Campus, providing an aesthetic feature and enhancing the wellbeing of campus life. However, over the years the lake has experienced excessive aquatic plant growth, algal/cyanobacterial blooms, elevated and problematic nutrient levels, nuisance geese populations, and sediment accumulation from the various pipe discharges including stormwater that drains into the lake.

GZA understands that UCONN is considering spillway modifications to the dam structure of Mirror Lake and dredging of the lake sediments which is providing an opportunity to implement additional lake management strategies to improve the water quality and lake aesthetics. Mirror Lake has been studied by many of the Northeast's premier limnologists (Kortmann, Knoecklein, Rich) who have been on campus as students and professors, as well as by various engineering firms. Hence, there are a number of studies that have been conducted in recent years that provide a historical database of water quality data and discussions on the ecosystem dynamics of the lake. The University is seeking to identify the factors that contribute to the degradation of lake water quality and ultimately identify lake management strategies based on the work of previous studies to improve the status of the lake.

PROJECT GOALS

The purpose of performing a historical data review was to summarize previously recognized factors contributing to water quality degradation and reduced aesthetic quality of the lake, identify potential trends in the data, identify data gaps for consideration in future monitoring sampling programs, and provide the basis of additional recommendations for lake management strategies. It is the goal of this study to use the historical data collected from the last 15 years to develop recommendations based on identified factors.

SUMMARY OF PRIOR REPORTS

Dr. Robert Kortmann of ECS, Inc., as a subconsultant to GZA, provided the following assessment of prior water quality studies for Mirror Lake. The reports reviewed for this project were provided to us by BVH. For the following analysis and discussion, the reports reviewed included:

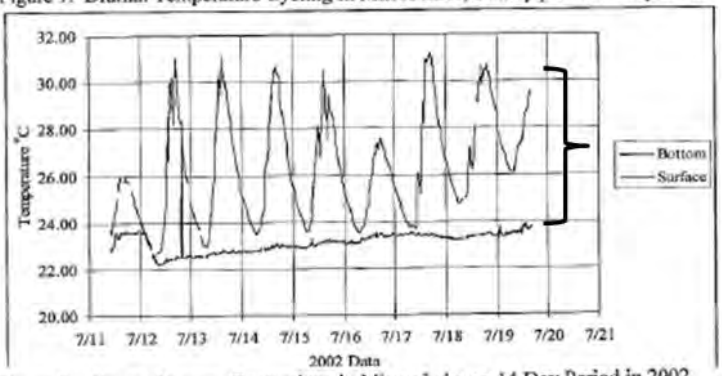
- *Water Quality Study for Swan & Mirror Lakes*, Leonard Engineering, Inc., November 2003
- *Dredge Feasibility Study for Mirror Lake and Swan Lake*, Milone & MacBroom, Inc., March 2009
- *Mirror Lake, Aquatic Plant Control and Water Quality Improvement Strategies*, Northeast Aquatic Research, LLC, February 2015

<u>Lenard Engineering Water Quality Study Report 2003</u>

The 2003 Water Quality Study Report by Lenard Engineering reveals that Mirror Lake was very high in Total Phosphorus (TP) and Nitrogen. The lake productivity (biological growth and degradation activity) wasn't limited by nutrient availability. The lake went through a progression from floating filamentous algae to cyanobacteria to diatoms as the season progressed. Aquatic plants were very scarce at the time of the study and Secchi disk transparency (a standard measure of water depth clarity) was less than 3 feet during all sampling events for that year. This indicates that little light was reaching the bottom of the lake which would stimulate aquatic plant growth.

Mirror Lake exhibited polymictic (continuous circulation) behavior on a daily cycle, meaning the lake had no to weak temperature stratification. If a stronger thermal stratification was present in the water column, it would create a slightly higher dense water layer at lower levels which tends to resist mixing. There were also wide fluctuations in daily water column temperatures as the lake water was heated during the day and cooled at night (diurnal surface temperature fluctuated by over 6 degrees C during this study). In these conditions, mixing can also regularly occur from surface disturbances during high wind and storm events. These regular mixing events also led to dissolved oxygen concentrations fluctuating by up to 10 mg/L over a diurnal cycle with episodes of low dissolved oxygen concentrations present in over-bottom waters. This is illustrated in the diagram below.

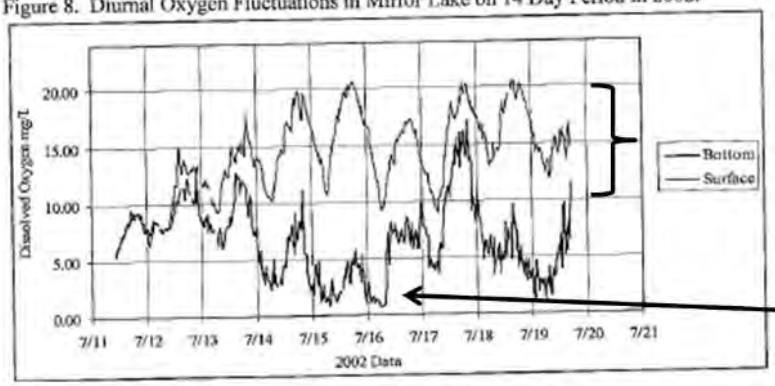
Figure 7. Diurnal Temperature Cycling In Mirror Lake, 14 Day period in July 2002.



Diurnal Temperature Fluctuation > 6 °C

Polymictic Behavior

Figure 8. Diurnal Oxygen Fluctuations in Mirror Lake on 14 Day Period in 2002.



Diurnal Dissolved Oxygen Fluctuation up to 10 mg/L

Episodes of Low DO

Table 16. Dissolved Oxygen Concentrations (mg/L) in Mirror Lake

Depth (m)	7/10/2003	7/28/2003	8/18/2003	9/3/2003	9/25/2003	10/14/2003
0	6.6	4.0	7.3	7.1	10.8	8.0
0.5		3.8	6.9	6.8	10.6	8.0
1	6.0	3.3	4.7	6.0	9.5	8.0
1.2		0.0	3.8	2.5	4.0	6.5

Point-in-daytime sampling misses fluctuations

Table 18. Secchi Disk Depth Readings Taken in Mirror Lake 2003.

	7/10/2003	7/28/2003	8/18/2003	9/3/2003	9/25/2003	10/14/2003
Secchi Disk Depth (m)	1.0	0.8	0.8	0.7	0.5	0.5
(ft)	3.3	2.6	2.6	2.3	1.6	1.6

Very Poor Light Penetration (Little light reaches bottom)

Table 19. Total Phosphorus Concentrations (ppb) for Mirror Lake, 2003.

Station	10-Jul	29-Jul	18-Aug	3-Sep	25-Sep	14-Oct
South	55	139	107	124	130	182
North	62	158	70	147	156	182
Mean	58	148	88	135	143	182

Very High TP; Not P or N Limited

- Floating filamentous algae (Hydrodictyon)
- Anabaena then Melosira after Hydrodictyon.
- Very sparse plants.

In 2002-2003, Mirror Lake productivity was dominated by phytoplankton (algae/cyanobacteria) versus aquatic plants, perhaps related to both the depth of light penetration and herbicide treatments that were applied during that timeframe. The nutrient concentrations (total phosphorus, total nitrogen) measured during the study were very high. Summary data from the report are presented in the above diagram with annotations.

All reports reviewed, including the Lenard Engineering report, have indicated the need to remove the flocculent, nutrient-rich, sediment deposits that have accumulated over the years in Mirror Lake.

Northeast Aquatic Research Water Quality Assessment Report 2015

The Northeast Aquatic Research (NEAR) 2015 report presents a good description of the limnology of Mirror Lake, as well as describing the influences of the watershed loads on the lake water quality. The report focuses on aquatic macrophytes (plants) but provides very little information regarding phytoplankton (algae/cyanobacteria) abundance and composition. That focus was understandable given the character of Mirror Lake during the study; however, it is important to anticipate what the nature of Mirror Lake might be in the future after restoration activities take place.

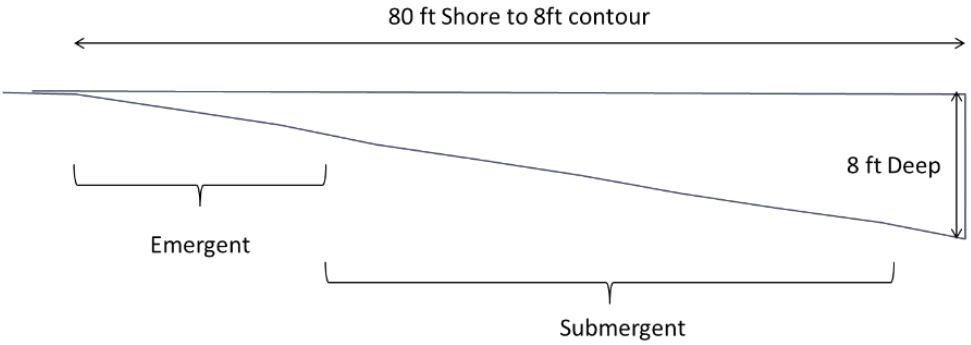
Dr. Kortmann noted many of the management recommendations are very good, though there are alternative approaches for some of the recommendations that should be considered. Specifically, the NEAR study discusses the import of sediment into the lake and that “sediment in the Lake needs to be removed. However, dredging of sediments need only target the upper organic sediment layer and it is unnecessary to include the removal of significant amounts of deep till layers”. Dr. Kortmann disagrees with this limiting statement in that other benefits occur as a result of deeper dredging.

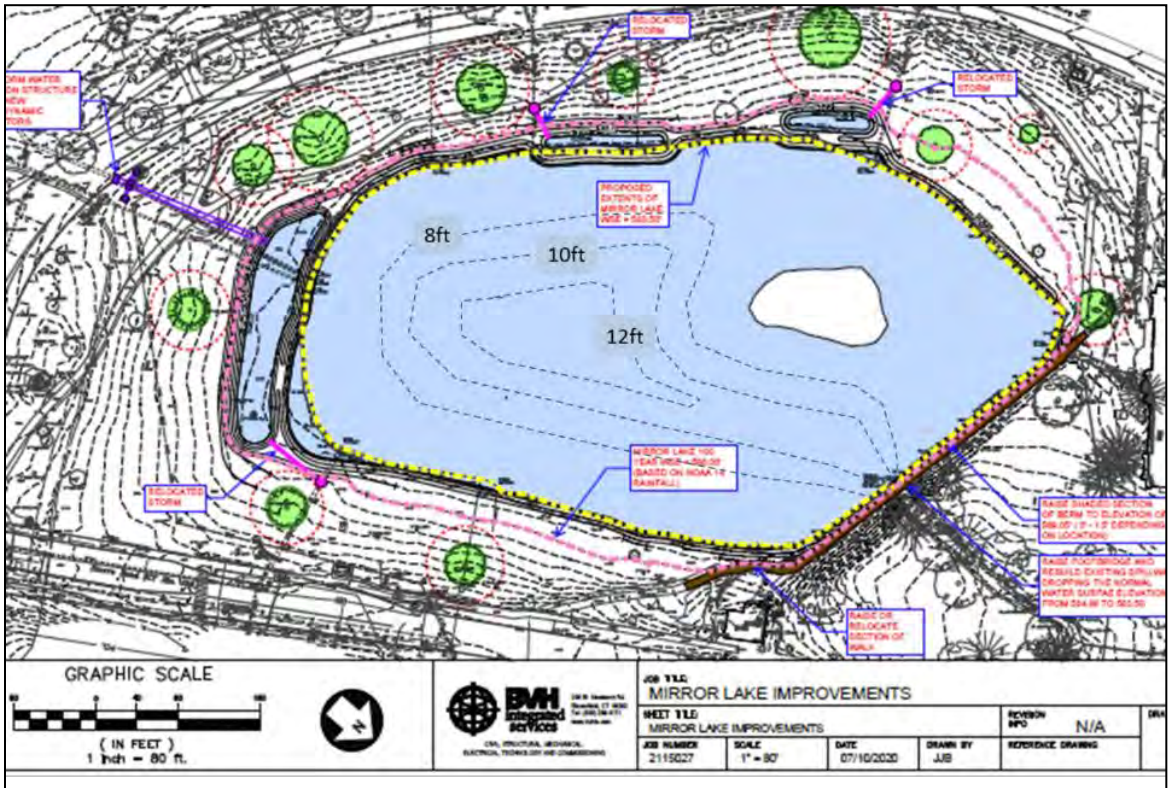
The goal of a restoration project is to make the aesthetic quality and ecological function of Mirror Lake a centerpiece of campus. Limiting sediment removal to the suggested 5-6 feet (or less) will keep the entire lake as a littoral (aquatic plant growth near shore) zone. Dredging deeper will allow a gradient from the deeper water to shore where plants will naturally grow in the shallower ‘near shore’ area. Dr. Kortmann agrees it would be prudent to select desirable growing plants like Vallisneria in the littoral zone.

Creating a mix of littoral and open water pelagic (deep water) zones would be a healthy feature for the lake. In addition, dredging to 5 to 6 feet may reduce plant densities if nutrient poor soils become the new bottom, but Dr. Kortmann questions how long this low nutrient bottom can be maintained. In many ways Mirror Lake functions as a stormwater management system, retaining nutrients and sediments from watershed run off. The many plans for additional watershed management systems as proposed by BVH (see the BVH Mirror Lake Improvements figure dated 7/10/2020 below) are excellent and needed. UCONN has already made substantial improvements over the years. The forebays at drainage system outfalls are an excellent plan, especially if they can focus on the first flush, and if the design facilitates routine maintenance. However, no matter how well watershed management improves inflow, Mirror Lake will continue to provide both water quality and quantity functions for the campus stormwater system.

Dr. Kortmann believes the alternative of creating some area(s) of Mirror Lake deeper than twice the Secchi depth (about 8-10 feet) should be examined. Perhaps a 10 percent slope from the water's edge to a depth of 8 feet as a littoral plant zone ("wetscaped" with selected macrophytes), and a central area greater than 8 feet should be considered to encourage the growth of a diversity of aquatic plants, both emergent and submergent as depicted in the diagram below.

It may also be desirable to create several plant-free lanes from deeper water to shore in selected visual corridor locations (such as stone covered liners).





CD = approx. 2.5m (8ft) Slope 1ft in 10 ft; 10%

The NEAR report does a very good job of describing the aquatic plant community, sediment characteristics, the watershed inputs, and aspects of watershed management. However, Dr. Kortmann concludes that additional attention and thought to the landscape design is needed surrounding the lake. Due to the importance of the lake to the campus community, reducing rather than eliminating the lawn/turf around the lake might be a better solution to accomplish the natural and aesthetic goals for the lake. The landscape immediately surrounding the lake can also be designed in a manner that reduces the attractiveness of the lake to both drop-out flocks and resident geese (by breaking the visual connection from the lake surface to feeding turf/lawn areas).

If the lake is excavated deeper than 5 to 6 feet, it would be prudent to include designs for an artificial circulation system to avoid intermittent thermal stratification which could result in low oxygen at depth and could provide a competitive advantage to nuisance cyanobacteria over more desirable eukaryotic phytoplankton (green algae). The 2002 continuous data-logging study by Torgerson as discussed and presented in the Lenard Engineering 2003 report revealed the lake stratification dynamics and polymictic behavior of the lake which had an impact on dissolved oxygen concentrations. The existing spray fountain is an aesthetic landscape feature but is not likely to maintain a mixed aerobic condition in the lake. A deeper Mirror Lake will likely have more primary productivity driven by phytoplankton and less by aquatic plants. If the buoyant N-fixing cyanobacteria become a problem, installation of a sonic algae control device could be deployed, either powered by electricity or solar powered.

Summary Review of 2009 MMI Dredge Study Report

This report provides necessary information about the feasibility of dredging Mirror Lake, sediment composition and contamination. Water quality and limnology information is less useful from this report as sampling was only conducted during the Fall.

The 2009 dredging feasibility report by Milone and MacBroom and the 2015 Mirror Lake Report by NEAR disagree regarding the amount of dredging that is appropriate for Mirror Lake. The MMI Report suggests final depths up to 12 feet while the NEAR report suggests a final maximum lake depth of 5 to 6 feet. If dredged to only 5 to 6 feet, the entire bottom will be within the photic zone (zone of light penetration) and will support the growth of aquatic plants and filamentous algae. If dredged deeper with a gradual slope from shore to deep center (as illustrated above), the lake will support a variety of emergent and submerged vegetation, while also having more open water in the center of the lake. The deeper dredging alternative would provide a larger water volume and is anticipated to sustain conditions for a longer timeframe before repeat dredging would be needed. The shallower dredging alternative would likely reduce the abundance and density of aquatic plants by exposing bottom soils that are less habitable by plants. However, through time bottom sediments will likely accumulate and again support more aquatic plant growth. Given the anticipated nitrogen loading, filamentous algae that create a floating mat (like the Hydrodictyon in 2003) may pose a nuisance condition in the future. Vigorous artificial circulation would help to minimize the risk of floating filamentous algae mats and the buoyant, nitrogen-fixing cyanobacteria.

Mirror Lake does provide a stormwater management function (despite the impressive improvements in watershed load management since 2003) and is anticipated to remain a productive water body. Management strategies that favor a desirable plant community composition and desirable phytoplankton composition (greens algae favored, cyanobacteria avoided) are important.

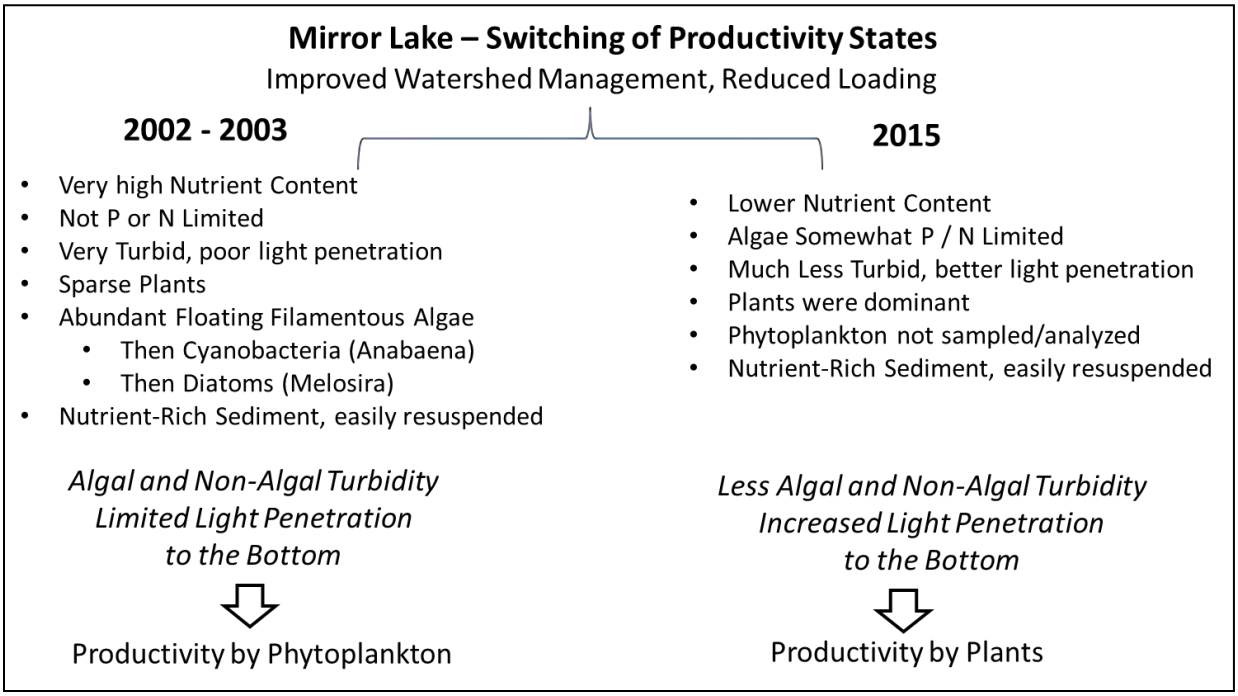
DATA GAPS

The data-logging performed in 2002 provided a great deal of diagnostic insight into the nature of Mirror Lake. Dr. Kortmann has used such data loggers for many years. The continuous logging of data reveals what is typically missed by manual sampling at varying intervals during daytime hours only. Dr. Kortmann recommends the use of dissolved oxygen/temperature data loggers as a component of ongoing monitoring (with potential additional educational benefit to UCONN students). However, that may be less useful under the existing lake configuration. The data captured by continuous data loggers will be much more important in a newly dredged lake.

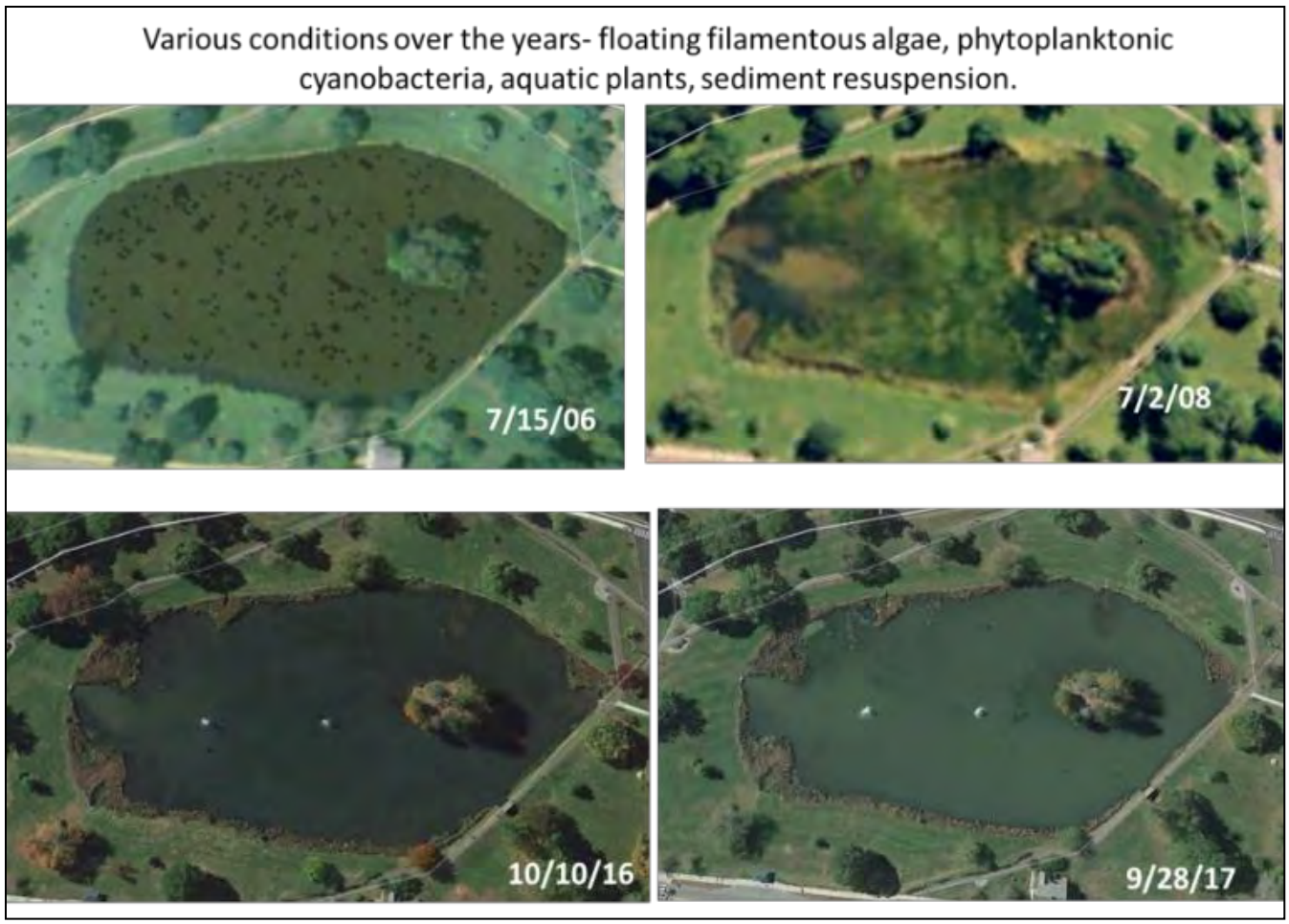
Phytoplankton data was not included in the NEAR 2015 study, which was understandable because productivity was dominated by aquatic plants. However, if herbicide treatments are performed as in 2015, subsequent monitoring should include detailed phytoplankton analysis.

SUMMARY REVIEW

The character of Mirror Lake has varied over the years as depicted by the diagram below.



Primary productivity in Mirror Lake varies between filamentous algae, cyanobacteria, and aquatic vegetation in response to nutrient availability and light penetration. The reviewed reports demonstrate significant improvements (reductions) in watershed loading. All reviewed reports have concluded that the nutrient-rich, flocculent sediments should be removed. The question remains as to whether the dredging project should deepen the lake more than just the removal of the surficial sediments currently present over the hard bottom sediments.



RECOMMENDATIONS

Dr. Kortmann provides the following recommendations:

- Dredging to remove the accumulated nutrient-rich sediment is clearly needed. Whether to create deeper areas beyond 6 feet deep is an alternative to consider.
    - Conventional excavation is probably the preferred method.
    - A means for conveyance of stormwater input during conventional excavation will be needed. Perhaps construction of stabilized channels between the outfall forebays and a deep area in

the lake is needed to convey storm flows while water level is down. Doing so may also facilitate future maintenance dredging if needed.

- Develop a landscaping plan for within the dredged lake (wetscaping), lake perimeter, and near-lake areas. Design landscaping for visual aesthetics from select campus locations, to discourage flocks of geese, and for water quality and habitat improvement.
- Forebay treatments at stormwater outfalls are an excellent approach. As feasible, focus use of those systems on the first flush of a storm runoff event. Also design the basins to facilitate routine maintenance.
- Further water quality improvement and protection of Mirror Lake may be accomplished by:
    - Incorporating a soil amendment in the forebays that has a high phosphorus attenuation (iron, aluminum compounds, lanthanum modified bentonite, etc.)
    - Avoid approaches that remove nitrate-nitrogen disproportionately to total phosphorus.
    - Ongoing study and monitoring of lake conditions using a continuous monitoring datalogger measuring DO, temperature, and possibly other constituents(with student participation).
    - Collection, identification, and enumeration of phytoplankton in the lake (with student participation).
    - Consider the eventual installation of a continuous mixing aeration system to control algal growth.

Thank you for the opportunity to provide this service. Please feel free to contact us should you have any questions or comments.

Very truly yours,
GZA GEOENVIRONMENTAL, INC.

Christopher D. Mayne

North American Lake Management Society
NALMS
Christopher Mayne
#03-02M
Certified Lake Manager

Christopher Mayne, CLM
Project Manager

Robert W. Kortmann

Dr. Robert Kortmann
Senior Consultant, ECS, Inc.

Stephan T. Roy, PG
Principal

Attachment: Assessment Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. Any generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

INTERPRETATION OF DATA

8. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

9. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

BVH integrated services

APPENDIX E

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Conceptual Level Dredging Design Memorandum

MIRROR LAKE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

May 5, 2021
GZA File No. 05.0046161.07

PREPARED FOR:
BVH Integrated Services, P.C.
206 West New Berry Road
Bloomfield, CT 06002

GZA GeoEnvironmental, Inc.
95 Glastonbury Boulevard, 3rd Floor | Glastonbury, CT 06033
860-286-8900

30 Offices Nationwide
www.gza.com

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GEOTECHNICAL
ENVIRONMENTAL
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WATER
CONSTRUCTION MANAGEMENT

35 Nutmeg Drive
Suite 325
Trumbull, CT 06611
T: 203.380.8188
F: 203.375.1529
www.gza.com

Via Email

May 5, 2021
File No. 05.0046161.07

Mr. Scott Waitkus, P.E.
Vice President
BVH Integrated Services, P.C.
206 West Newberry Road
Bloomfield, CT 06002

Re: Conceptual Level Dredging Design Memorandum
Mirror Lake
University of Connecticut Storrs Campus

Dear Mr. Waitkus,

GZA GeoEnvironmental, Inc. (GZA) is pleased to present to BVH Integrated Services (BVH) the following report detailing our conceptual level dredging evaluation in support of the proposed Mirror Lake Improvements. This report was prepared in accordance with our proposal dated November 10, 2020 and executed on December 8, 2020. This report is subject to the Limitations attached as **Appendix A**.

GZA's scope of services was to provide a concept-level dredging evaluation to support proposed Mirror Lake improvements. GZA completed a bathymetric survey, geophysical survey, sediment sampling, and plan review in support of the improvements. This report provides a summary of the following:

- Project background;
- Bathymetric survey;
- Sediment sampling and results;
- Geophysical survey results; and
- Previous dredging plan review.

As part of this assignment, GZA also performed a limnological data review summary and a Mirror Lake Dam Improvements feasibility study which were provided under separate covers.

We appreciate the opportunity to work with you on this project and look forward to our continued collaboration. Please contact David M. Barstow, P.E. (860-250-2131) or Thomas Jenkins, P.E. (413-563-7986) if you have any questions or require additional information.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Nathaniel Y. Arai, P.E.
Sr. Project Manager

James Davis, P.E.
Sr. Project Manager

David M. Barstow, P.E.
Principal-In-Charge

Thomas Jenkins, P.E.
Consultant/Reviewer

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APPENDICES

1.0 PROJECT BACKGROUND AND UNDERSTANDING

The University of Connecticut – Storrs Campus (UConn) is pursuing a comprehensive program to restore Mirror Lake and the Mirror Lake Dam to address aesthetic, dam safety, and stormwater management concerns. The restoration of Mirror Lake will involve the dredge removal of accumulated sediments from the lake basin and implementation of other lake management measures to improve lake depth and health and in-lake and shoreline aesthetics. GZA GeoEnvironmental, Inc. (GZA) has been retained by BVH Integrated Services, P.C. (BVH) to conduct a concept-level study to evaluate previous exploration, design, and permitting efforts, to provide limited explorations to update existing conditions, and provide recommendations for advancing a dredging program that meets the stated goals of UConn.

In 2009, Baystate Environmental Consultants, Inc., *A GZA Company* (BEC), was retained by UConn to conduct design and permitting of a lake dredging program and prepare bid-ready construction drawings and specifications for the hydraulic dredging of 17,100 cubic yards of sediments accumulated within the Mirror Lake basin. In 2012, UConn cancelled the project and withdrew permit applications filed with the State of Connecticut Department of Energy and Environmental Protection (CT DEEP, formerly CT Department of Environmental Protection). In fulfilling its contractual obligations to UConn, BEC finalized the construction documents in January 2013.

As part of GZA's current scope of services, GZA has conducted an evaluation of the prior designs and dredging methodology, performed a bathymetric survey of the existing top of sediments, prepared a watershed due-diligence evaluation to identify potential chemical releases that might impact the sediments, developed and implemented a limited sediment sampling and lab analysis program, and contracted a geophysical survey of subsurface strata within the area immediately upland of the lake shoreline to evaluate depth to bedrock. The following is a summary of findings and recommendations for the Project Team to consider in advancing a lake restoration program that can run concurrent with dam repairs and improvements.

All elevations in this report reference North American Vertical Datum of 1988 (NAVD88), unless otherwise indicated.

2.0 FIELD EXPLORATIONS

2.1 BATHYMETRIC SURVEY UPDATE

Bathymetric surveys of Mirror Lake have been completed six times, including GZA's latest survey performed in January 2021. A summary of the six bathymetric surveys is below:

SUMMARY OF BATHYMETRIC SURVEYS OF MIRROR LAKE

Survey Date	Consultant
1995	University of Connecticut- Department of Marine Services
2008	Milone and MacBroom
2009	Baystate Environmental Consultants, Inc.
2013	Northeast Aquatic Research
2014	Northeast Aquatic Research
2021	GZA GeoEnvironmental, Inc.

The 2021 GZA bathymetric survey was completed on January 18, 2021. The survey consisted of two GZA field technicians performing depth measurements with an 8-pound mushroom anchor from a work boat. The anchor line was scaled in 1/10 of a foot increments to measure the distance between the water surface and the top of sediment. The survey locations were spaced on an approximate 50-foot grid across the lake and located in the field using a Geoexplorer 6000 Series GPS. A total of 87 measurements were completed, designated SD-1 through SD-87. During our survey, the water surface was about 3 inches above the spillway, corresponding to about El. 585.1 feet.

The minimum and maximum depth to the top of sediment was 0.4 and 5.2 feet, respectively. The depths correspond to top of sediment elevations that range from El. 579.9 to 584.7 feet. The survey locations and measured depths were plotted on an aerial image of Mirror Lake. GZA developed a contour plan of the top of sediment based on interpolating between survey points. **Figure 1** presents the top of sediment contours as depth below spillway crest. **Figure 2** presents the top of sediment elevations.

The 2013 BEC dredging construction documents included seven cross sections across the Lake showing top of soft sediment and top of hard bottom. The sections were spaced at an approximate 100-foot spacing and the locations are shown on **Figures 1** and **2**. GZA updated the sections with the 2021 top of soft sediment depths. The revised sections are presented on **Figure 3** through **Figure 6**. The sections include nearby boring depths that were completed as part of Milone & Macbroom's (MMI) May 2009 exploration program in the lake. The 2009 MMI boring sampling locations and tabulated results are provided in **Appendix B**. Based on MMI's report[1], the explorations consisted of a barge-mounted tripod to drive 5-foot-long, steel sleeves with a 140-pound hammer. The MMI borings advanced below the bottom of soft sediment and some distance into the harder, underlying material.

In 2009, BEC estimated about 17,100 cubic yards of soft sediment was present in the Lake. Based on the updated 2021 bathymetry data and updated sections, GZA estimated about 19,250 cubic yards of soft sediment is now in the lake. The estimated volumes are tabulated below for ease of reference.

Summary of Estimated Soft Sediment Volume

Year	Estimated Soft Sediment Volume
2009	17,100 cubic yards
2021	19,250 cubic yards

2.2 SEDIMENT SAMPLING AND LABORATORY TESTING

Between 2008 and 2009, MMI collected twenty-four (24) sediment samples and performed laboratory testing to evaluate the management of dredged sediments. MMI compared the analytical results to the CTDEEP Remediation Standard Regulations (RSRs), including the Residential Direct Exposure Criteria (R-DEC), the Industrial/Commercial Direct Exposure Criteria (I/C-DEC), and the Pollutant Mobility Criteria for a GA groundwater area (GA-PMC). The MMI testing results indicated the presence of contaminants exceeding several of the RSR criteria, indicating disposal of the dredged sediments at a licensed waste disposal facility would be required.

As part of GZA's 2021 scope of services, a watershed due diligence was performed to help select sediment sample locations to evaluate the environmental status of the sediments since the last sediment sampling performed in 2009 by MMI. The watershed due diligence included evaluating an EDR Radius Map Report (EDR) for the Mirror Lake watershed. Since 2009, relatively minor spills were reported by EDR within the Mirror Lake watershed, including:

[1] "Technical Memorandum, Supplemental Sediment Sampling, Mirror Lake, Storrs, Connecticut", dated July 2, 2009.

- October 2011: "0" gallons Cooling Grease
- March 2021: 0.5 gallons Hydraulic Oil
- April 2015: 40 gallons Cooking Oil
- April 2015: 2 gallons Transformer Oil
- August 2003: <1 gallon Hydraulic Oil
- April 2018: 1 gallon Hydraulic Oil

GZA also reviewed the previous MMI sediment sample locations and analytical results. Based on the 2009 analytical results, GZA selected 6 locations for sediment sampling and analytical testing. The six (6) sediment samples were collected on January 18, 2021, concurrently with the bathymetric surveying. The six sample locations were SD-14, -37, -39, -57, -64, and -67 and are presented on **Figure 1** and **2**. Each sample consisted of compositing the soft sediment collected with a hand auger at each test location. The hard bottom material was not sampled. The sediment samples were delivered to Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut and analyzed for the following:

- Volatile Organic Compounds (VOCs), by EPA Method 8260/5035;
- RCRA-8 Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver (method varies by metal);
- CT Extractable Total Petroleum Hydrocarbons (ETPH), by CT DPH Method;
- Polynuclear Aromatic Hydrocarbons (PAHs), by EPA Method 8270D;
- Polychlorinated Biphenyls (PCBs), by EPA Method 8082A; and
- Pesticides, by EPA Method 8081.

The analytical test results are included in **Appendix C** and summarized on the attached **Table 1- Summary of Sediment Analytical Results**. The number of detections greater than the RSRs and whether the detections were noted in the 2009 MMI samples are also summarized in the table below.

SUMMARY OF RSR EXCEEDANCES

Test	Analyte	No. of Detections	No. of Detections Greater than RSRs	Exceedance in 2009 MMI Testing
ETPH	ETPH	6 out of 6	1	Yes (12/24 samples)
Metals	Arsenic	3 out of 6	1	Yes (2/24 samples)
PAH	Benzo[a]anthracene	6 out of 6	4	Yes (17/24 samples)
PAH	Benzo[a]pyrene	6 out of 6	4	Yes (17/24 samples)
PAH	Benzo[b]fluoranthene	6 out of 6	4	Yes (17/24 samples)
PAH	Benzo[g,h,i]perylene	6 out of 6	4	Yes (13/24 samples)
PAH	Benzo(k)fluoranthene	6 out of 6	4	Yes (13/24 samples)
PAH	Chrysene	6 out of 6	4	Yes (17/24 samples)
PAH	Fluoranthene	6 out of 6	4	Yes (10/24 samples)
PAH	Indeno[1,2,3-cd]pyrene	6 out of 6	4	Yes (13/24 samples)
PAH	Phenanthrene	6 out of 6	2	Yes (6/24 samples)
PAH	Pyrene	6 out of 6	4	Yes (13/24 samples)
Pesticide	4,4'-DDD	4 out of 6	4	Undetermined, Detection Limit > GA-PMC Standard
Pesticide	4,4'-DDE	3 out of 6	3	
Pesticide	4,4'-DDT	3 out of 6	3	

As indicated in the table above, the types of contaminants detected and the RSR exceedances from the 2021 testing are similar to the 2009 MMI testing. RSR exceedances include ETPH, arsenic, PAHs, and pesticides. Note, the RSRs do not apply to sediments while they are in the lake. However, once the sediments are removed and need to be managed, the RSRs would then apply. Due to the RSR exceedances, we recommended that dredged soil is disposed of at a licensed waste disposal facility. GZA evaluated an alternative of reusing the dredged sediment on-campus. However, there are risks associated with having this impacted material on campus and some of the constituents have the potential to leach, which could transport the constituents to potentially clean soil. Therefore, GZA does not recommend reusing the dredged sediment onsite.

2.3 GEOPHYISCAL SURVEY TESTING

A seismic refraction survey was performed by Hager Richter Geoscience, Inc. (HRGS) between December 10 and 11, 2020 to evaluate the depth to bedrock around the perimeter of Mirror Lake. The seismic refraction survey used five transects identified as Seismic Lines 1, 2, 3, 4, and 5 to collect data from around Mirror Lake. Seismic Line 1 started at the left dam embankment abutment on the western side of Mirror lake. Subsequent seismic lines proceeded around Mirror Lake in a counterclockwise direction until Seismic Line 5 met seismic Line 1 to close the loop. The total length of the seismic survey was about 1,890 feet. The Seismic Line locations are provided on Figure 2 of "Seismic Refraction Report", dated February 2021 by HRGS which is presented in **Appendix D**.

The seismic refraction survey was performed with a 48-channel seismograph with 48 geophones which were spaced at intervals of 5 to 7 feet apart along each seismic survey line. A sledgehammer was used as an energy source. The ground was struck with the sledgehammer and the geophones and seismographs collected the seismic data. HRGS used a commercially licensed software (IXRefraX) to interpret the data along each seismic survey line. The results of the seismic surveys are presented as profiles and in tabular form in the HRGS report in **Appendix D**.

The software uses the change in seismic wave velocity to evaluate the soil strata (unsaturated soil and partially saturated soil/Till) and bedrock elevation. In general, the depth of competent bedrock ranges from 7 to 28 feet below grade, and the top of bedrock ranges from El. 553 to 581 feet. These elevations correspond to about 7.5 to 35 feet below current spillway elevation. The table below presents the minimum and maximum bedrock elevations for each seismic line.

Seismic Line	Station (feet)	Bedrock Depth (feet)	Ground Surface Elevation (feet)	Bedrock Elevation (feet)
1	140	22.9	587	561.4
1	35	8.2	588.1	579.9
2	415	24.9	588	563.1
2	55	7	587.8	580.9
3	204	16.3	587.2	570.9
3	0	10.8	590.74	579.9
4	440	19.2	588.2	569
4	0	10	589.5	579.9
5	28	28.4	581.7	553.3
5	329	16.5	586.5	570

The accuracy of the bedrock depth and elevation is about 2 feet and should be considered approximate. Bedrock elevations can change in short horizontal distances and the bedrock elevation was estimated only along the seismic survey lines.

3.0 PROPOSED LAKE BATHYMETRY

Based on GZA's limnological report entitled Historical Data Review and Findings Technical Memorandum, dated March 3, 2021, Towers Golde (Project Landscape Architect) developed the proposed lake bottom contours to increase lake depth, improve the water quality and lake health, improve the in-lake and shoreline aesthetics, and manage stormwater and associated sediments entering the lake. The proposed lake bottom will be up to 12 feet below current spillway elevation, corresponding to about El. 572.9 feet. The Mirror Lake Sections presented on **Figures 3** through **6** include the proposed lake bottom geometry and depths provided by Towers Golde. Based on the proposed lake bottom geometry and available subsurface information, about 18,000 cubic yards of "soft" sediment and 24,200 cubic yards of "hard" bottom soil material will need to be dredged.

4.0 2009-2013 MIRROR LAKE DREDGING DESIGN

4.1 DREDGING METHODS

Conventional (mechanical) dredging and hydraulic dredging are two methods to dredge Mirror Lake. Conventional dredging is the more common method and consists of excavating the lake sediment with either clamshell buckets, excavators, or bulldozers. Conventional dredging can be performed from barges, temporary access roads into the lake, and/or working from the lake edge. Alternately, the lake water level can be lowered, and excavation can be performed with conventional earthwork equipment in the impoundment area. The excavated sediment is typically stockpiled onsite to dewater and then transported off site or reused, as needed. Hydraulic dredging consists of a floating barge outfitted with a cutterhead suction device that is lowered into the lake bottom sediments. A slurry of sediment and lake water is suctioned and then pumped to the shoreline where the sediment is dewatered, either by gravity settlement, geotextile filter bags, belt filter press, or some combination of those. The water removed from the slurry is either returned to the lake or released to downstream areas. After adequate dewatering, the dredged material is transported off site or reused, as needed. Pros and cons of the two methods are tabulated below.

Dredge Method	Pros	Cons
Conventional Dredging	1. Availability of contractors (more common method) 2. Ability to dredge dense sediment and or sediment with gravel/cobbles 3. Can be performed with or without water within the lake	1. Much greater suspension of sediment (silt and clay) during dredging 2. Increased potential to discharge sediment to Roberts Brook 3. Risk of significant mortality to aquatic wildlife
Hydraulic Dredging	1. Less suspension of sediment (silt and clay) compared to conventional dredging 2. Less mortality to certain aquatic wildlife	1. Requires water within the lake to move barge and dredge 2. Typically limited to looser sand and silt sediment 3. Due to the limited base flow into the lake, filtrate would need to be returned to the lake to maintain water level

4.2 2009-2013 DREDGING DESIGN

Both conventional and hydraulic dredging methodologies were evaluated in 2009. Hydraulic dredging was recommended by BEC in 2009 due to the environmental sensitivity of Roberts Brook and the Fenton River downstream of the lake, existing within the greater Storrs Campus community. Due to the presence of known sediment contamination and history of flash flooding of the lake, drawing down the lake level and using conventional excavation dredging was considered infeasible and increased the risk of unintentionally discharging impacted sediments from the impoundment to the environmentally sensitive Roberts Brook.

The Mirror Lake Dredging construction drawings prepared by BEC in 2013 were based on hydraulic dredging methodology with sediment dewatering through land-based geotextile dewatering tubes. The plans include existing and proposed lake bottom bathymetry depicted in bathymetric contour maps and cross-sections, which were based on survey conducted by BEC in July 2009. Proposed bottom bathymetry was based on survey probes to "refusal" at estimated bottom of "soft" sediments (i.e. "hard" bottom) in Mirror Lake. The design goal was to dredge these sediments from the lake bottom, but not remove original lake bottom soils or rock. As designed, dredging would be conducted by a barge-mounted dredge deployed on the lake at normal water level from which sediments would be extracted by a cutterhead and pumped through a pipeline into the geotextile tubes placed on temporary, leveled pads to be constructed on campus lawn areas located to the northwest and southeast of the lake.

Geotextile tubes are often used to dewater hydraulically dredged materials of many kinds. Polymer-based flocculent is injected into the water-sediment slurry to promote the separation of water and dredged materials. The suspended particles are retained within the geotextile tubes and the clarified excess water is expelled through the pores in the geotextile fabric. For the Mirror Lake dredging, clarified water effluent would be collected and drained by gravity to the lake or pumped back to the lake, depending on the location and elevation of the dewatering areas. The effluent water would need to be returned to the lake to maintain working water levels as Mirror Lake does not have sufficient base flow to make up for water removed by the hydraulic dredging activities. Once dewatered, the sediments would be excavated from the geotextile tubes, loaded into trucks, and hauled off site to a licensed disposal facility. Geotextile tubes are one-use only and must also be hauled off site for disposal also. The pad areas would be restored to original condition upon completion of dredging and sediment disposal. Pad areas need to be level and are typically constructed of crushed stone with a liner material below.

5.0 RECOMMENDED DREDGING METHODOLOGY AND DESIGN MODIFICATIONS

As indicated above, the 2009-2013 dredging plans were based on hydraulic dredging of the soft sediment from Mirror Lake. Based on several conference calls with the Project team and recommendations included in GZA's limnological report entitled Historical Data Review and Findings Technical Memorandum, dated March 3, 2021, we understand the current proposed lake bottom concept will include deeper areas which extend beyond the soft sediments and below the hard bottom of the Lake. Up to 6 feet of hard bottom soils will need to be excavated to meet the proposed lake bottom contours developed by Towers Golde. Removal of hard bottom soil materials was not included as part of the 2009-2013 dredging program. It may be possible to hydraulically dredge the hard bottom soil materials depending on the relative density and gradation of the materials. However, based on the estimated hard bottom volume, the density increase, and the likely presence of gravel/cobbles, conventional dredging with excavation equipment will be more efficient and will likely be required. The conventional dredging can be performed during either a full or partial drawdown of the lake. Additionally, the seismic survey indicated that the top of bedrock ranged from El. 553 to 581 feet around the perimeter

of the lake. The top of bedrock below the lake is not known. From a practicality standpoint, neither conventional nor hydraulic dredging will be able to remove bedrock if the bedrock extends above the proposed lake bottom elevation.

The 2009-2013 dredging plans did not consider concurrently performing improvements to Mirror Lake Dam. We understand that UConn would prefer to complete the dredging of Mirror Lake and Mirror Lake Dam repairs concurrently, which are both presently in conceptual design. The concurrent projects present a logistical challenge as the most significant dam repair element is replacement of the concrete spillway structure, which must be done in the dry, while hydraulic dredging requires water within the lake to maneuver the barge and equipment.

Based on our understanding of UConn's project goals, we recommend sequencing the two project elements (dredging and dam repairs) by completing hydraulic dredging of the soft bottom sediment of the lake first. Once the hydraulic dredging of the soft sediments is completed, the lake would be drawn down and the incoming stormwater diverted downstream of the dam to continue the dam repair work and conventional dredging of the lake hard bottom. The stormwater diversion to the downstream channel may consist of either an open channel constructed around the perimeter of the lake to the downstream channel; consolidating the inflow pipes where possible and installing new pipes around the perimeter of the lake to the downstream channel; or constructing temporary detentions basins at the proposed forebay locations and pumping stormwater from the basins to the downstream channel. The lake can be refilled following completion of the dam repair, conventional dredging, and construction of the forebays and other lake features along the perimeter of Mirror Lake.

This project approach limits the risk of mobilizing environmentally-impacted sediment to the downstream Roberts Brook because the sediment will be hydraulically dredged. Once the hard bottom is encountered, a partial or full drawdown of Mirror Lake may be needed to conventionally dredge. However, to our knowledge, a full drawdown of Mirror Lake has not been discussed with regulators. In Schematic Design, the Project Team should make it a priority to discuss a full drawdown with Regulators (ACOE & CTDEEP) to evaluate the feasibility. Prior to discussions with regulators, the Project Team should perform analytical testing to evaluate whether the hard bottom soils beneath the sediments are environmentally impacted, as the answer may impact the proposed dredging approach.

A detailed alternatives analysis of performing the two overall projects (dam improvements and lake dredging) simultaneously was not performed. However, once the entire scope of the project, including dam improvements, final dredging depths, and civil improvements around the lake are finalized, GZA recommends that such an evaluation be conducted to determine a preferred project approach that meets the goals of UConn.

With minor updates, including incorporation of the 2021 updated lake bathymetry, the 2013 Mirror Lake Dredging construction drawings and specifications would be sufficient for proceeding with the hydraulic dredging of the "soft" sediments within the lake. However, the addition of the dam repairs and excavation of lake hard bottom would require the following plan and specification modifications:

- Distinguish between "soft" sediments, hard bottom soil, and bedrock on proposed bathymetry and cross-sections;
- Identify potential stockpile areas for the hard bottom soil materials;
- Construction phase water control and diversion; and
- Construction access.

6.0 ANTICPATED PERMITS

Lake dredging projects typically require significant environmental permitting through local, state, and often Federal regulatory agencies. Dredging methodology and area of impact generally determine the extent of required permits. As UConn is a State of Connecticut entity, required permitting for the project will not necessarily be the same as they may be for non-state entities. In 2009, BEC prepared and filed an application package to the CT DEEP's Inland Water Resources Division (IWRD) for Inland Wetlands and Watercourses, Dam Construction, and Flood Management Certification, and a separate application package to the CT DEEP's Permit, Enforcement, and Remediation Division (PERD) for Wastewater Discharges (to allow the discharge of treated effluent from the dewatering activities). The applications were under review for over two years, during which time additional information was provided to CT DEEP reviewers upon their request. As previously mentioned, the 2009 application was based on hydraulic dredging and was withdrawn by UCONN in early 2012.

While CT DEEP has undergone many organizational changes in recent years, similar permits will need to be obtained for the dredging project. Anticipated environmental permits for the Mirror Lake Dredging include the following:

- Inland Wetlands and Waterways – CT DEEP
- Section 401 Water Quality Certification / Water Diversion Permit – CT DEEP
- Flood Management Certification – CT DEEP
- Wastewater Discharges from Manufacturing, Commercial, and Other Activities - CTDEEP
- Section 404 Authorization - U.S. Army Corps of Engineers (not required for the hydraulic dredging methodology, as a stand-alone project)
- Construction Stormwater General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities – CT DEEP

Because permit applications and processes have changed since 2009, GZA recommends that UConn arrange and attend pre-permitting consultations with applicable divisions within CT DEEP prior to preparing permit applications. In general, the same permits will be required whether hydraulic or conventional dredging methods are utilized, with the exception of the U.S. Army Corps of Engineers Section 404 of the U.S. Clean Water Act, which has historically not been required for dredging projects conducted by hydraulic methods. The biggest impact the proposed dredging method could have on permitting is the approval process and schedule. Between 2009 to 2012, BEC performed additional studies to support how the proposed hydraulic dredging would have limited impacts on Roberts Brook and the Fenton River. Public and regulatory input were the main reasons hydraulic dredging was proposed in 2009. Therefore, the inclusion of conventional dredging may require public outreach and additional meetings with regulatory agencies to discuss precautions that will be used to limit sediment migration during the hard bottom dredging. The outreach and meetings could delay the permit approval process longer than the original 2-years that it took in 2009.

GZA recommends UConn budget $50,000 for preparation, filing, and coordination of review of these permit applications.

7.0 ADDITIONAL STUDIES FOR FINAL DESIGN

As the project progresses from conceptual design to final design, additional studies will be required for permit, construction, and bidding documents. The list of anticipated additional studies is below.

In-Lake Soil Borings: The proposed lake-bottom elevations will require dredging the hard bottom material and an in-lake soil boring program should be conducted to characterize the physical properties of the soft sediments and hard bottom materials and depth to bedrock. The type, density, and depth of the materials of both the soft sediment and hard bottom material will be required to determine the dredging methodology and feasibility for removing these materials.

Environmental Sediment Sampling: The MMI sediment sampling performed in 2008 to 2009 is more than 11 years old. Since that time, additional sediment has accumulated into the lake, changing the environmental properties of the sediment. Therefore, additional soft sediment sampling during in-lake soil borings will be required to pre-characterize the proposed dredge sediments for off-site disposal or on-site reuse. In addition, the hard bottom material is being proposed to be removed and we recommend sampling the hard bottom material to evaluate soil management and re-use.

Sediment Dewatering Testing: In 2010, BEC subcontracted a firm that conducted bench-scale dewatering tests on actual samples of the Mirror Lake sediments. The testing determined likely dewatering rates and identified an appropriate polymer flocculent to remove suspended solids from the effluent that would be returned to the lake during the dredging process. In addition, laboratory testing was conducted on the filtrate to evaluate for chemical residuals that may require further treatment prior to discharging back to the lake. In the intervening years, new sediments have further accumulated in the lake, and new dewatering testing may be necessary.

8.0 CONCLUSIONS

GZA's 2021 bathymetric survey update indicates additional sediment deposition has occurred within Mirror Lake since the 2009 BEC survey. The estimated "soft" sediment in-situ volume is 19,250 cubic yards which is an increase of 2,150 cubic yards from the 17,100 cubic yards estimated in 2009. Sediment sampling and environmental laboratory analysis conducted by GZA in 2021 indicate that sediment environmental characteristics have not substantially changed since sampling and testing was conducted by Milone and MacBroom in 2009. The accumulated sediments within Mirror Lake are environmentally impacted and will require management during dredging, dewatering, and disposal.

Since 2009, the scope of the proposed dredging project has changed. Originally (2009), the dredging was intended to remove the "soft" sediment with hydraulic-dredging methods. To improve lake water quality and health, portions of the lake will require deeper dredging into the hard bottom material. Hydraulic dredging of the soft sediment is still feasible. However, it's likely that conventional dredging methods will be required to remove some or all of the hard bottom material. In addition, we understand UConn desires to couple the dredging project with repairs to the Mirror Lake Dam as one project.

For the hydraulic dredging portions of the project, the 2013 Mirror Lake Dredging construction plans, as designed, are generally bid- and construction-ready with relatively slight modifications (bathymetric survey and section updates). However, more robust modifications to the plans will be required for the following:

- Addition of conventional dredging for the hard bottom material removal; and
- Coordination with the Mirror Lake Dam improvement project so they are constructed efficiently as one project.

We anticipate the dredging contractor and the dam-repair contractor will be separate from one another. In our experience, the two contractors have separate skill sets relative to one of the scopes, and not both. Therefore, additional engineering and planning may be necessary to allow for the dam rehabilitation construction to be performed concurrently with the dredging and protection of the downstream watercourses.

In 2009 to 2013, the dredging impact to Roberts Brook and Fenton Brook was a major concern to regulators and the public and was a deciding factor to advance with hydraulic dredging. We anticipate that incorporating conventional dredging into the current dredging design will require additional public outreach and coordination with regulators. The dredging of Mirror Lake will require extensive permitting and, depending on the overall project approach to potentially include dam repairs and lake deepening, may require a greater permitting effort than dredging of the soft sediments alone.

TABLES

Table 1
Summary of Sediment Analytical Results
Mirror Lake, UCONN
Storrs, CT

Sample ID		Remediation Standard Regulations			SD-14	SD-37	SD-39	SD-57	SD-64	SD-67
Sample Date		R-DEC	I/C-DEC	GA-PMC	1/18/2021	1/18/2021	1/18/2021	1/18/2021	1/18/2021	1/18/2021
Extractable Total Petroleum Hydrocarbons (ETPH)										
Total Petroleum Hydrocarbons	mg/kg	500	2500	500	**320**	**870**	**240**	**260**	**70**	**240**
Volatile Organic Compounds (VOCs)										
Methyl Ethyl Keytone (MEK)	mg/kg	500	1,000	8	**0.18**	**0.074**	ND<0.038	ND<0.050	ND<0.034	ND<0.036
Metals										
Arsenic	mg/kg	10	10	NA	**10.7**	**4.6**	ND<1.0	**6.1**	ND<0.93	ND<0.95
Barium	mg/kg	4,700	140,000	NA	**177**	**119**	**27.2**	**148**	**22**	**31.7**
Cadmium	mg/kg	34	1,000	NA	**3.5**	**2.04**	ND<0.51	**3.1**	**0.47**	**2.73**
Chromium	mg/kg	3,900	51,000	NA	**67.8**	**47.1**	**10.1**	**60.3**	**13.3**	**9.97**
Lead	mg/kg	400	1,000	NA	**220**	**121**	**33**	**187**	**20.6**	**10.7**
Mercury	mg/kg	20	610	NA	ND<0.24	ND<0.15	ND<0.04	**0.13**	ND<0.03	ND<0.03
Selenium	mg/kg	340	10,000	NA	ND<5.2	NS<3.3	ND<2.0	ND<4.6	ND<1.9	ND<1.9
Silver	mg/kg	340	10,000	NA	ND<1.3	ND<0.82	ND<0.51	ND<1.2	ND<0.46	ND<0.48
Polychlorinated Biphenyls (PCBs)										
PCBs	mg/kg	1	10	NA	ND<0.62	ND<0.82	ND<0.500	ND<0.55	ND<0.44	ND<0.47
Polyaromatic Hydrocarbons (PAHs)										
2-Methylnaphthalene	mg/kg	*270*	*1,000*	*0.56*	**0.054**	**0.052**	**0.048**	**0.031**	**0.011**	**0.018**
Acenaphthene	mg/kg	*1,000*	*2,500*	*8.4*	**0.160**	**0.350**	**0.330**	**0.130**	**0.049**	**0.013**
Acenaphthylene	mg/kg	1,000	2,500	8.4	**0.320**	**0.200**	**0.087**	**0.200**	**0.051**	**0.047**
Anthracene	mg/kg	1,000	2,500	40	**0.630**	**0.930**	**0.770**	**0.300**	**0.100**	**0.074**
Benzo[a]anthracene	mg/kg	1	7.8	1	**2.200**	**4.100**	**4.200**	**2.200**	**0.480**	**0.430**
Benzo[a]pyrene	mg/kg	1	1	1	**2.300**	**4.700**	**4.800**	**2.000**	**0.460**	**0.440**
Benzo[b]fluoranthene	mg/kg	1	7.8	1	**1.900**	**4.400**	**4.600**	**1.700**	**0.360**	**0.380**
Benzo[g,h,i]perylene	mg/kg	*8.4*	*78*	*1*	**1.300**	**1.300**	**3.000**	**1.400**	**0.220**	**0.310**
Benzo(k)fluoranthene	mg/kg	8.4	78	1	**2.000**	**3.600**	**3.300**	**1.800**	**0.350**	**0.330**
Chrysene	mg/kg	*84*	*780*	*1*	**4.000**	**4.800**	**4.600**	**2.100**	**0.490**	**0.480**
Dibenzo[a,h]anthracene	mg/kg	*1*	*1*	*1*	**0.360**	**0.400**	**0.360**	**0.380**	**0.045**	**0.077**
Fluoranthene	mg/kg	1,000	2,500	5.6	**7.600**	**9.500**	**9.500**	**7.300**	**0.840**	**1.700**
Fluorene	mg/kg	1,000	2,500	5.6	**0.320**	**0.210**	**0.420**	**0.960**	**0.056**	**0.030**
Indeno[1,2,3-cd]pyrene	mg/kg	*1*	*7.8*	*1*	**1.900**	**3.200**	**3.300**	**1.900**	**0.370**	**0.450**
Napthalene	mg/kg	1,000	2,500	5.6	**0.077**	**0.073**	**0.160**	**0.450**	**0.0071**	**0.0051**
Phenanthrene	mg/kg	1,000	2,500	4	**2.400**	**4.200**	**5.900**	**0.980**	**0.310**	**0.270**
Pyrene	mg/kg	1,000	2,500	4	**6.600**	**7.900**	**8.500**	**5.900**	**0.760**	**0.900**
Pesticides										
4,4'-DDD	mg/kg	*1.8*	*17*	*0.003*	**0.021**	**0.0055**	ND<0.002	**0.0084**	ND<0.0018	**0.0067**
4,4'-DDE	mg/kg	*1.8*	*17*	*0.003*	**0.035**	**0.011**	ND<0.0027	**0.018**	ND<0.0018	ND<0.003
4,4'-DDT	mg/kg	*1.8*	*17*	*0.003*	**0.0092**	**0.0054**	ND<0.0028	**0.005**	ND<0.0018	ND<0.0022

Notes:

ND = indicates Non Detected above the method reporting limit (MRL)

Bold = detection above laboratory MRL

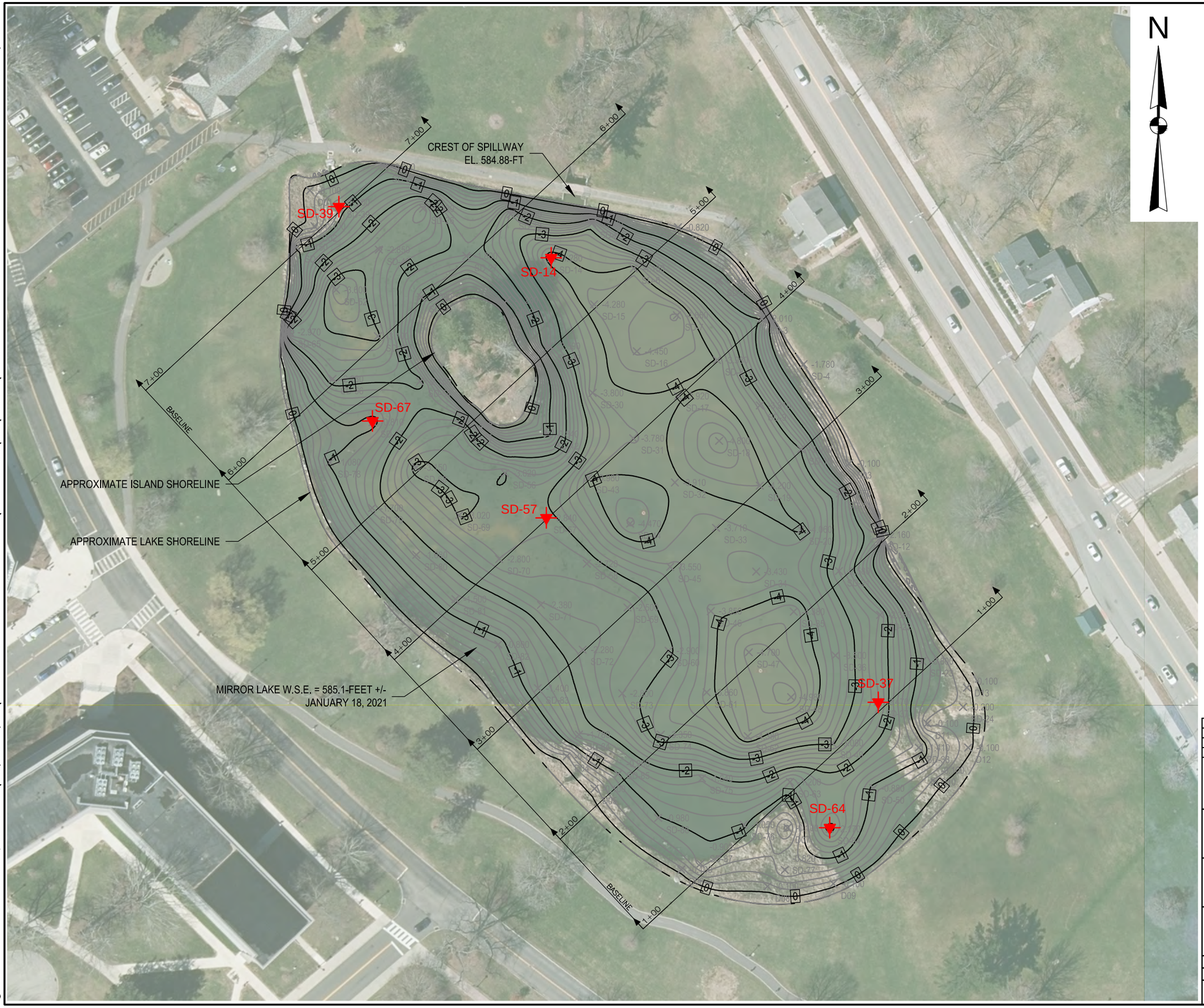
Bold and Shaded= indicates one or more of the reference standards exceeded

Italicized criteria from CTDEEP's Additional Polluting Substances (2018).

NA- Not applicable; an SPLP or TCLP result necessary to compare with this criterion

1. Only detected constituents are shown
2. CT RSRs = Connecticut Remediation Standard Regulations
3. R-DEC = Residential Direct Exposure Criteria
4. I/C-DEC = Industrial/Commercial Direct Exposure Criteria
5. GA-PMC = Class GA Pollutant Mobility Criteria
6. RSR Criteria not applicable to sediment samples. RSR Criteria shown for comparative purposes only.

FIGURES



N

LEGEND

-1 MAJOR CONTOUR- TOP OF SEDIMENT DEPTH

MINOR CONTOUR- TOP OF SEDIMENT DEPTH (0.2' INTERVAL)

1+00 CROSS SECTION LOCATION

SD-57 SEDIMENT SAMPLING LOCATION

× -4.2 SD-19 SURVEY LOCATION, IDENTIFICATION AND MEASURED DEPTH

NOTES:

1. 2019 AERIAL PHOTO OBTAINED FROM CT ECO ONLINE DATABASE.
2. BATHYMETRIC SURVEY OF MIRROR LAKE BOTTOM AND SEDIMENT SAMPLING CONDUCTED BY GZA ON JANUARY 18, 2021.
3. SPILLWAY CREST ELEVATION 584.88 FEET PROVIDED BY THE UNIVERSITY OF CONNECTICUT'S PLAN ENTITLED "DOWNSTREAM MIRROR LAKE.PDF", NOT DATED.
4. WATER SURFACE ELEVATION AT EL. 585.1 FEET AT TIME OF SURVEY AS MEASURED FROM THE SPILLWAY CREST, EL. 584.88 FEET.
5. EXISTING TOP OF SEDIMENT DEPTH CONTOURS APPROXIMATE THE DEPTH TO THE EXISTING LAKE BOTTOM RELATIVE TO THE SPILLWAY CREST.

0 40 80 160

SCALE IN FEET 1" = 80'

NO.	ISSUE/DESCRIPTION	BY	DATE

MIRROR LAKE BATHYMETRY UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

TOP OF SEDIMENT DEPTHS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
BVH INTEGRATED SERVICES, P.C.

PROJ MGR: JFD	REVIEWED BY: DMB	CHECKED BY: NA	FIGURE 1
DESIGNED BY: JFD	DRAWN BY: MJT	SCALE: AS SHOWN	
DATE: 4/22/21	PROJECT NO. 05.0046161.07	REVISION NO.	SHEET NO. 1 OF 6

N

LEGEND

-1 — MAJOR CONTOUR- TOP OF SEDIMENT DEPTH

MINOR CONTOUR- TOP OF SEDIMENT DEPTH (0.2' INTERVAL)

1+00 — CROSS SECTION LOCATION

SD-57 — SEDIMENT SAMPLING LOCATION

-4.2 SD-19 — SURVEY LOCATION, IDENTIFICATION AND MEASURED DEPTH

NOTES:

1. 2019 AERIAL PHOTO OBTAINED FROM CT ECO ONLINE DATABASE.
2. BATHYMETRIC SURVEY OF MIRROR LAKE BOTTOM AND SEDIMENT SAMPLING CONDUCTED BY GZA ON JANUARY 18, 2021.
3. SPILLWAY CREST ELEVATION 584.88 FEET PROVIDED BY THE UNIVERSITY OF CONNECTICUT'S PLAN ENTITLED "DOWNSTREAM MIRROR LAKE.PDF", NOT DATED.
4. WATER SURFACE ELEVATION AT EL. 585.1 FEET AT TIME OF SURVEY AS MEASURED FROM THE SPILLWAY CREST, EL. 584.88 FEET.

0 40 80 160

SCALE IN FEET 1" = 80'

NO.	ISSUE/DESCRIPTION	BY	DATE

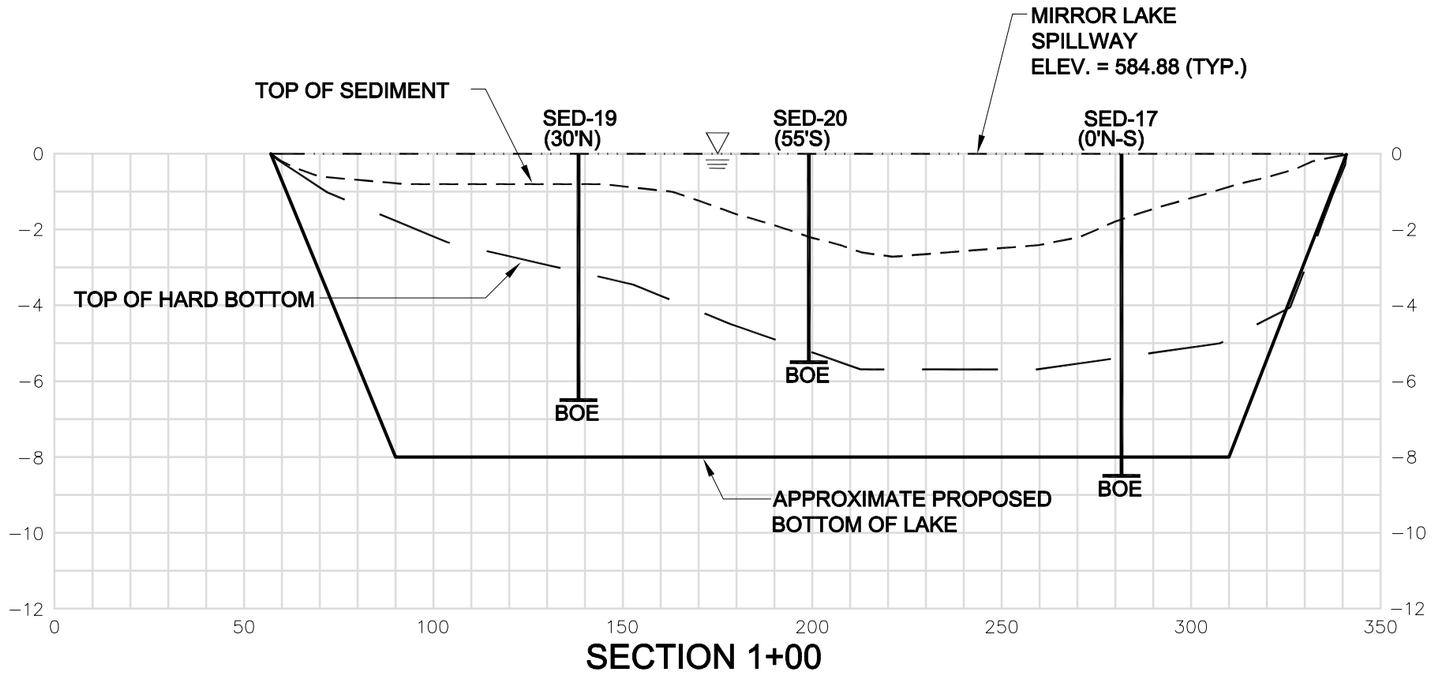
MIRROR LAKE BATHYMETRY UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

BATHYMETRY SURVEY PLAN

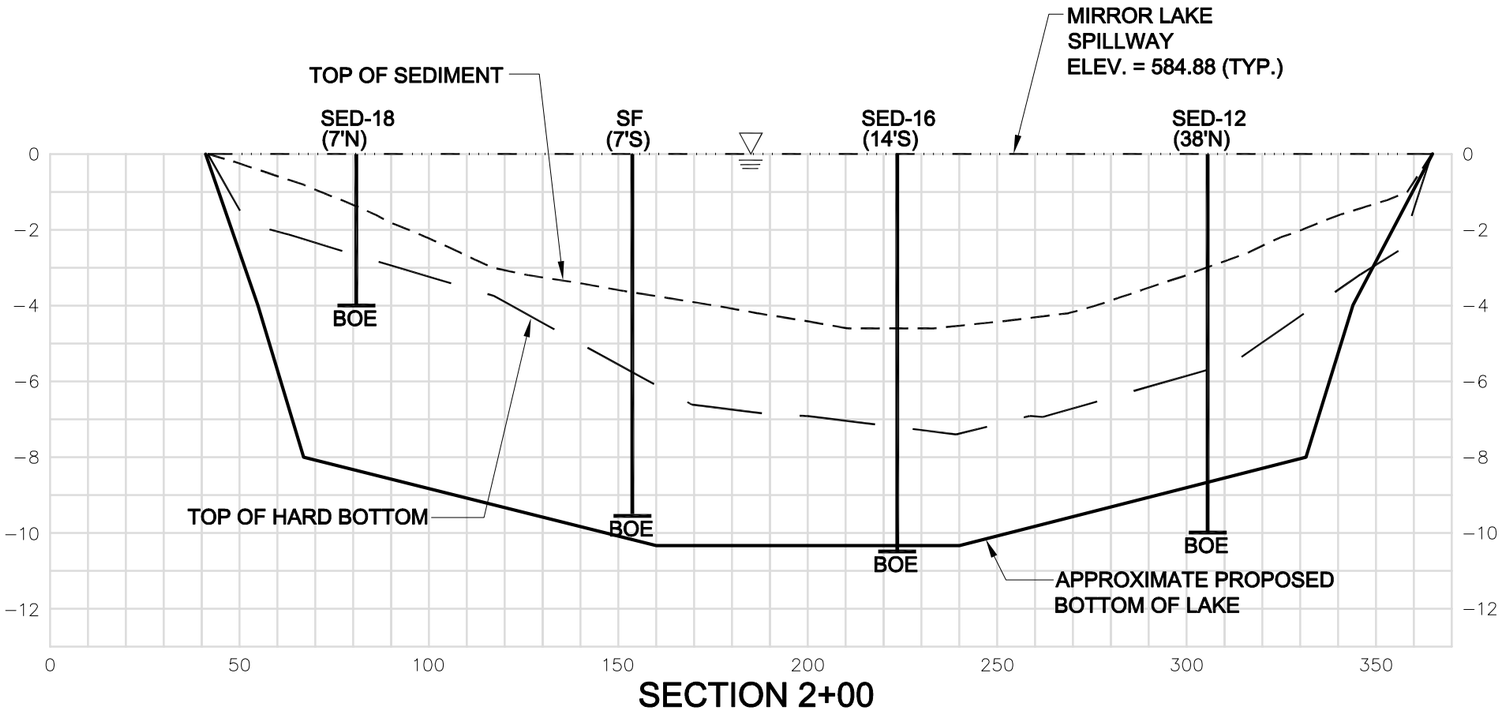
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
BVH INTEGRATED SERVICES, P.C.

PROJ MGR: JFD	REVIEWED BY: DMB	CHECKED BY: NA	FIGURE 2
DESIGNED BY: JFD	DRAWN BY: MJT	SCALE: AS SHOWN	
DATE: 4/22/21	PROJECT NO. 05.0046161.07	REVISION NO.	SHEET NO. 2 OF 6



SECTION 1+00



SECTION 2+00

LEGEND

TOP OF SEDIMENT (EXISTING LAKE BOTTOM)

APPROXIMATED TOP OF HARD BOTTOM (BOTTOM OF SEDIMENT)

APPROXIMATE PROPOSED BOTTOM OF LAKE

MILONE & MACBROOM EXPLORATION ID

OFFSET DISTANCE AND DIRECTION FROM SECTION

BOE - BOTTOM OF EXPLORATION

NOTES:

1. EXISTING LAKE BOTTOM BATHYMETRY PERFORMED BY GZA ON JANUARY 18, 2021. DEPTHS REFERENCE BELOW SPILLWAY CREST ELEVATION OF 584.88 FEET (NAVD88).
2. THE TOP OF HARD BOTTOM (BOTTOM OF SOFT SEDIMENT) BASED ON BATHYMETRIC SURVEY AND SEDIMENT PROBINGS BY BAYSTATE ENVIRONMENTAL CONSULTANTS, INC. (BEC), A *GZA COMPANY*, JULY 2009.

0 20' 40' 80'

HOR. SCALE IN FEET 1" = 40'

0 2' 4' 8'

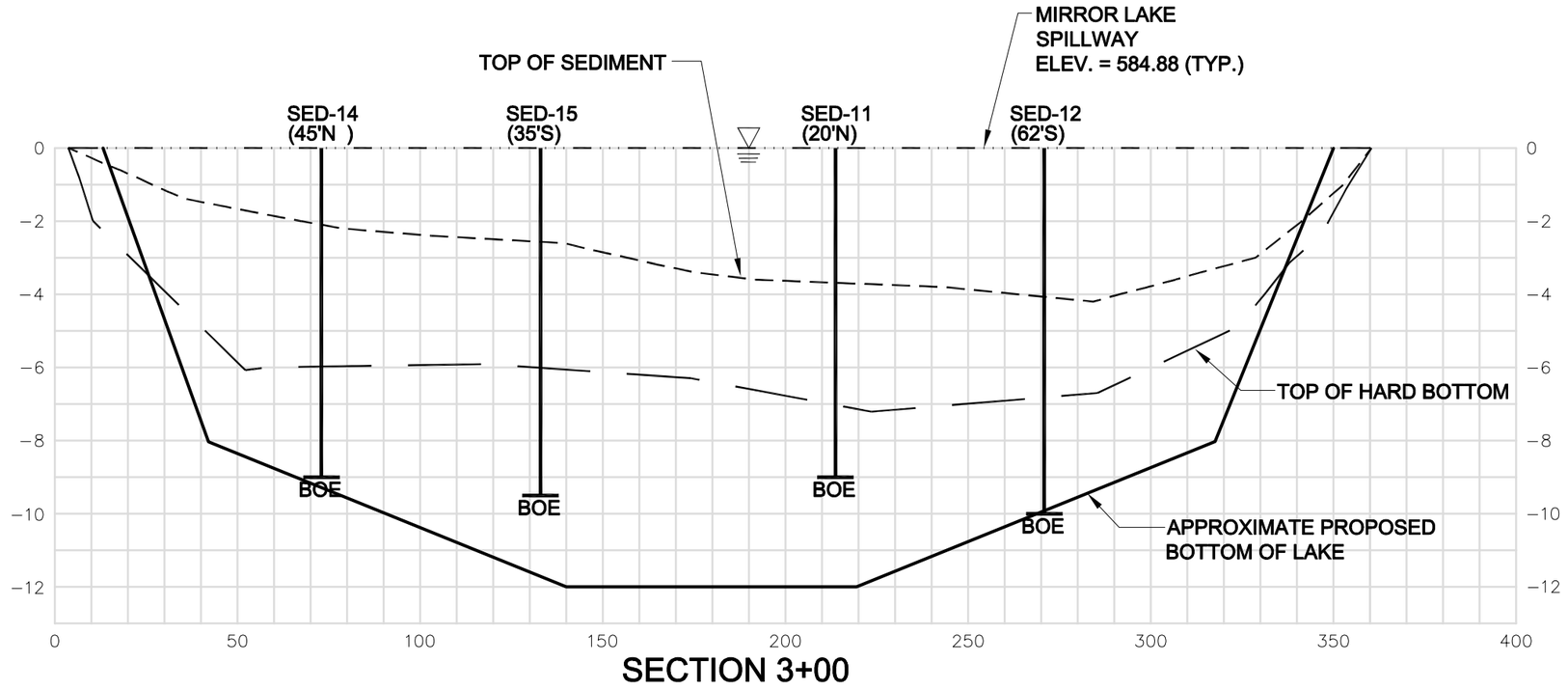
VERT. SCALE IN FEET 1" = 4'

NO.	ISSUE/DESCRIPTION	BY	DATE

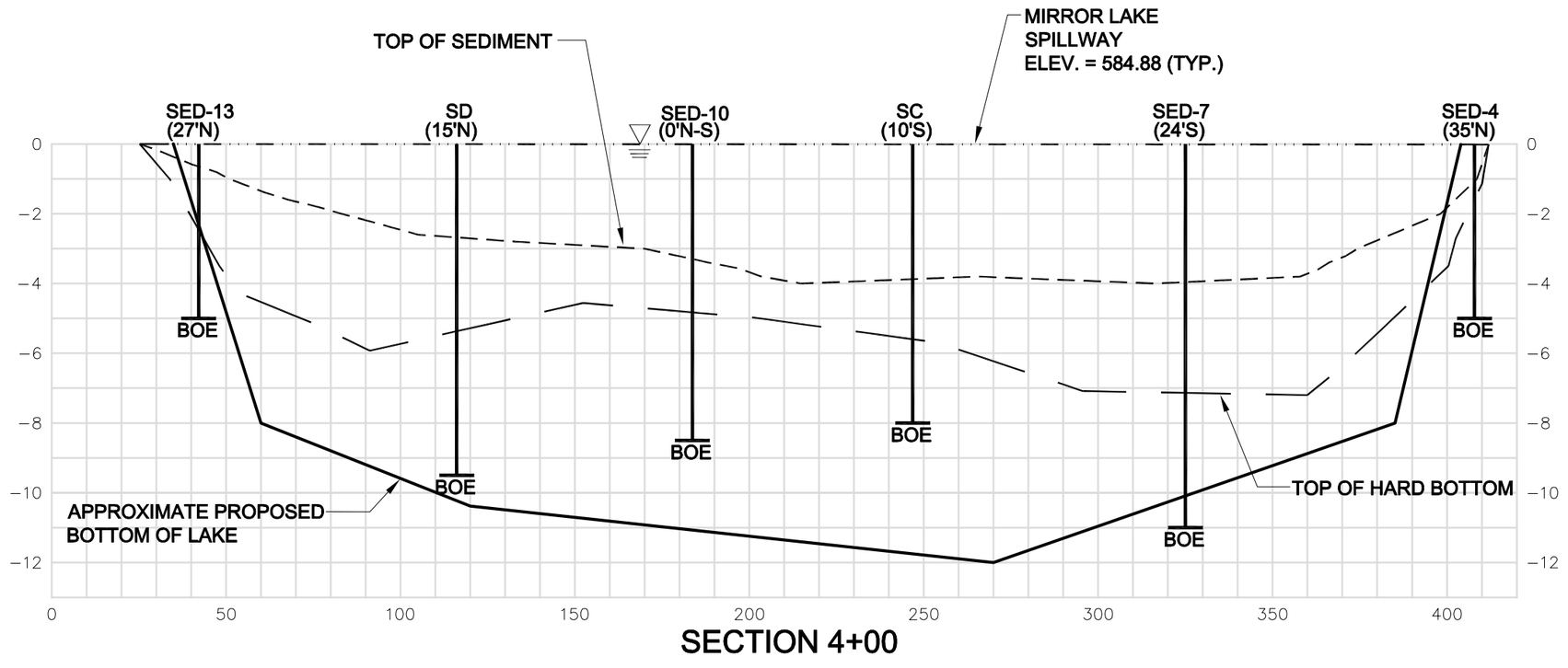
MIRROR LAKE BATHYMETRIC UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

SECTION 1+00 AND 2+00

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: BVH INTEGRATED SERVICES, P.C.	
PROJ MGR: JD	REVIEWED BY: DB	CHECKED BY: TEJ	FIG 3
DESIGNED BY: MH	DRAWN BY: MH	SCALE: AS NOTED	
DATE: 4/27/21	PROJECT NO. 05.0046161.07	REVISION NO. -	SHEET NO. 3 OF 6



SECTION 3+00



SECTION 4+00

LEGEND

- TOP OF SEDIMENT (EXISTING LAKE BOTTOM)
- APPROXIMATED TOP OF HARD BOTTOM (BOTTOM OF SEDIMENT)
- APPROXIMATE PROPOSED BOTTOM OF LAKE

SED-20 — MILONE & MACBROOM EXPLORATION ID
(55'S) — OFFSET DISTANCE AND DIRECTION FROM SECTION

BOE

BOE - BOTTOM OF EXPLORATION

NOTES:

1. EXISTING LAKE BOTTOM BATHYMETRY PERFORMED BY GZA ON JANUARY 18, 2021. DEPTHS REFERENCE BELOW SPILLWAY CREST ELEVATION OF 584.88 FEET (NAVD88).
2. THE TOP OF HARD BOTTOM (BOTTOM OF SOFT SEDIMENT) BASED ON BATHYMETRIC SURVEY AND SEDIMENT PROBINGS BY BAYSTATE ENVIRONMENTAL CONSULTANTS, INC. (BEC), A *GZA COMPANY*, JULY 2009.

0 20' 40' 80'
HOR. SCALE IN FEET 1" = 40'

0 2' 4' 8'
VERT. SCALE IN FEET 1" = 4'

NO.	ISSUE/DESCRIPTION	BY	DATE

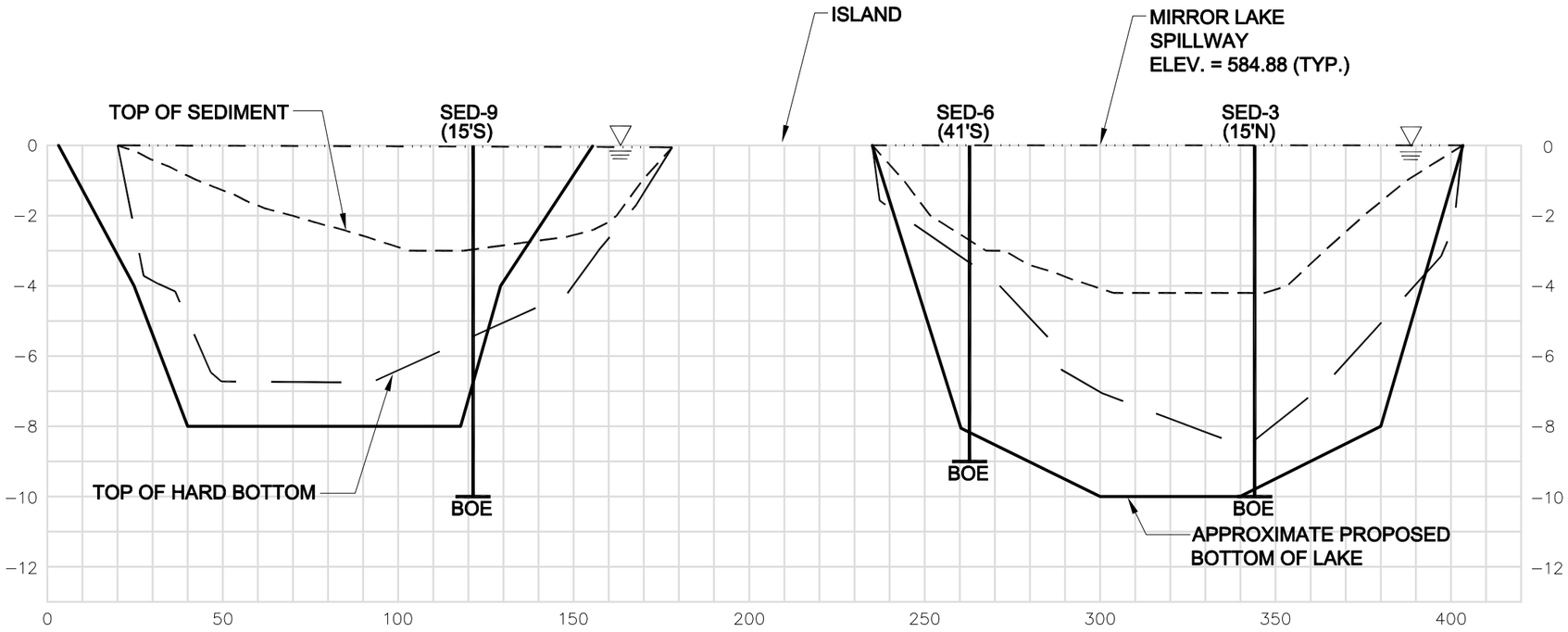
MIRROR LAKE BATHYMETRIC UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

SECTION 3+00 AND 4+00

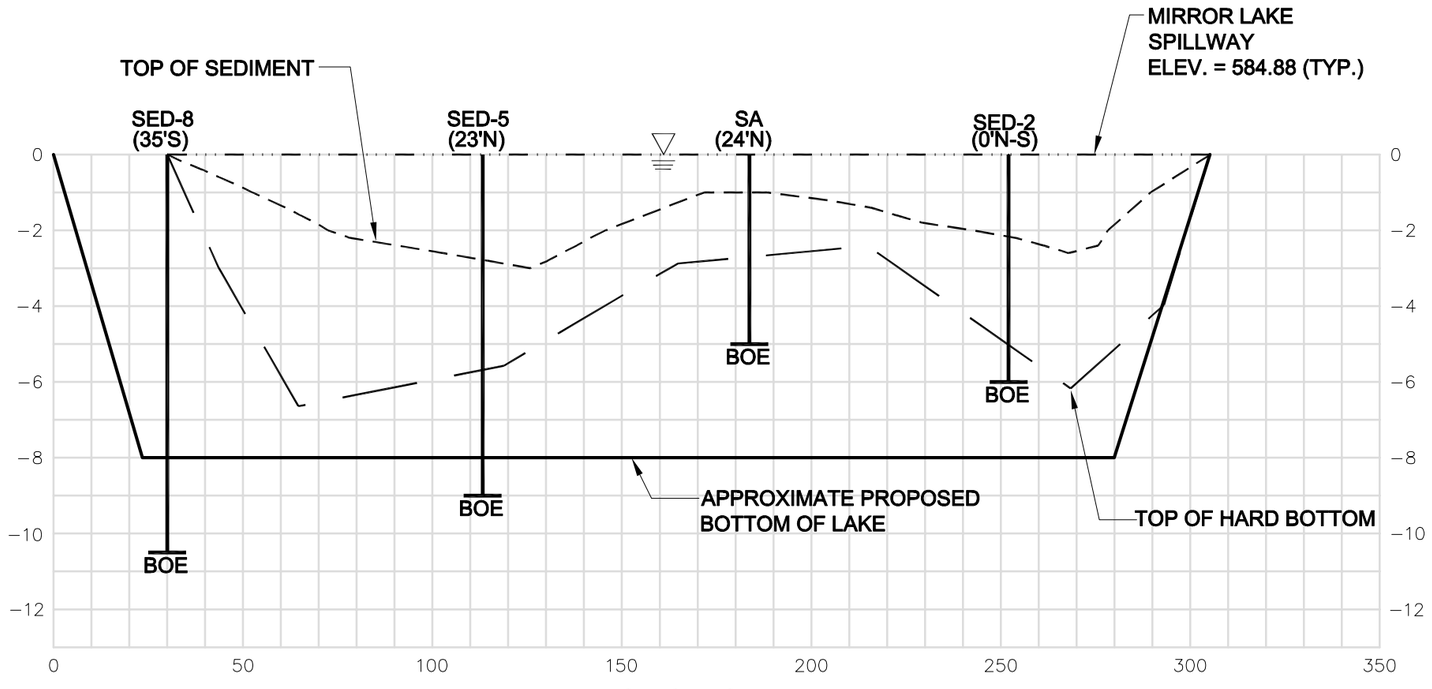
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
BVH INTEGRATED SERVICES, P.C.

PROJ MGR: JD	REVIEWED BY: DB	CHECKED BY: TEJ	FIG 4
DESIGNED BY: MH	DRAWN BY: MH	SCALE: AS NOTED	
DATE: 4/27/21	PROJECT NO. 05.0046161.07	REVISION NO. -	SHEET NO. 4 OF 6



SECTION 5+00



SECTION 6+00

LEGEND

- TOP OF SEDIMENT (EXISTING LAKE BOTTOM)
- APPROXIMATED TOP OF HARD BOTTOM (BOTTOM OF SEDIMENT)
- APPROXIMATE PROPOSED BOTTOM OF LAKE

SED-20 (55'S) — MILONE & MACBROOM EXPLORATION ID; OFFSET DISTANCE AND DIRECTION FROM SECTION

BOE — BOE - BOTTOM OF EXPLORATION

NOTES:

1. EXISTING LAKE BOTTOM BATHYMETRY PERFORMED BY GZA ON JANUARY 18, 2021. DEPTHS REFERENCE BELOW SPILLWAY CREST ELEVATION OF 584.88 FEET (NAVD88).
2. THE TOP OF HARD BOTTOM (BOTTOM OF SOFT SEDIMENT) BASED ON BATHYMETRIC SURVEY AND SEDIMENT PROBINGS BY BAYSTATE ENVIRONMENTAL CONSULTANTS, INC. (BEC), A *GZA COMPANY*, JULY 2009.

0 20' 40' 80'
HOR. SCALE IN FEET 1" = 40'

0 2' 4' 8'
VERT. SCALE IN FEET 1" = 4'

NO.	ISSUE/DESCRIPTION	BY	DATE

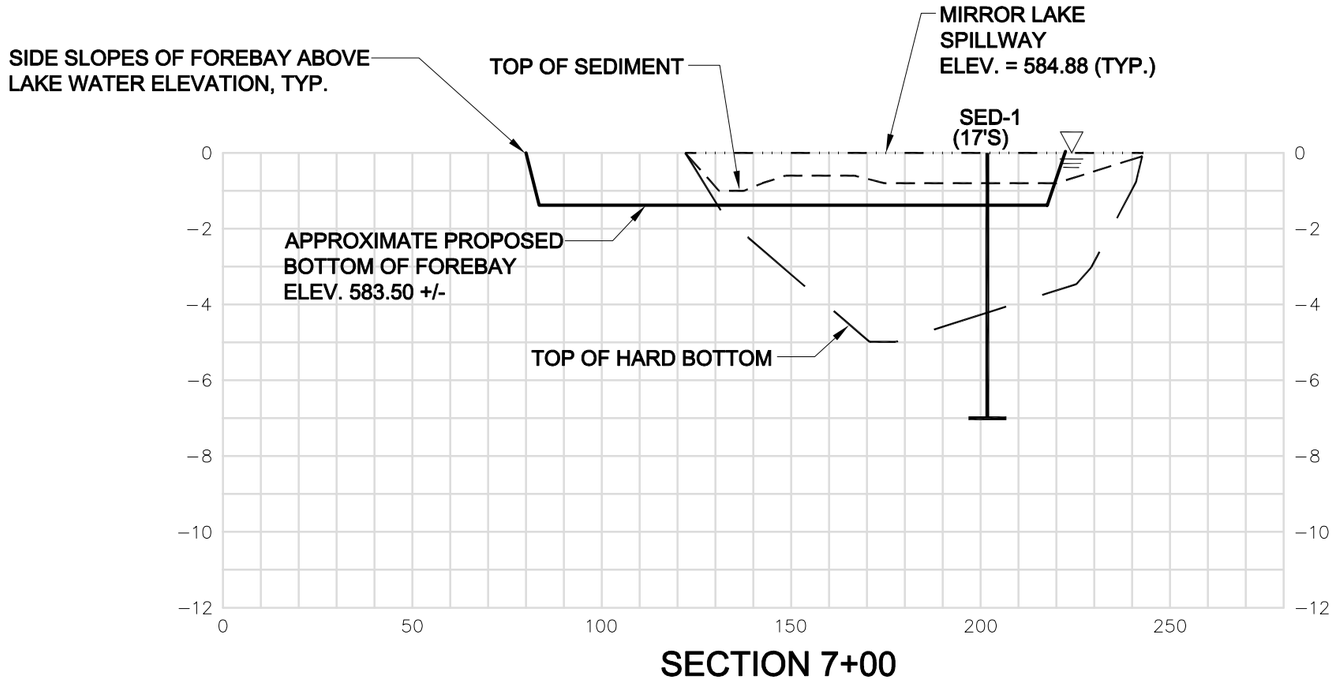
MIRROR LAKE BATHYMETRIC UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

SECTION 5+00 AND 6+00

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
BVH INTEGRATED SERVICES, P.C.

PROJ MGR: JD	REVIEWED BY: DB	CHECKED BY: TEJ	FIG 5
DESIGNED BY: MH	DRAWN BY: MH	SCALE: AS NOTED	
DATE: 4/27/21	PROJECT NO. 05.0046161.07	REVISION NO. -	SHEET NO. 5 OF 6



SECTION 7+00

LEGEND

TOP OF SEDIMENT (EXISTING LAKE BOTTOM)

APPROXIMATED TOP OF HARD BOTTOM (BOTTOM OF SEDIMENT)

APPROXIMATE PROPOSED BOTTOM OF FOREBAY

MILONE & MACBROOM EXPLORATION ID

OFFSET DISTANCE AND DIRECTION FROM SECTION

BOE - BOTTOM OF EXPLORATION

NOTES:

1. EXISTING LAKE BOTTOM BATHYMETRY PERFORMED BY GZA ON JANUARY 18, 2021. DEPTHS REFERENCE BELOW SPILLWAY CREST ELEVATION OF 584.88 FEET (NAVD88).
2. THE TOP OF HARD BOTTOM (BOTTOM OF SOFT SEDIMENT) BASED ON BATHYMETRIC SURVEY AND SEDIMENT PROBINGS BY BAYSTATE ENVIRONMENTAL CONSULTANTS, INC. (BEC), A *GZA COMPANY*, JULY 2009.

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VERT. SCALE IN FEET 1" = 4'

NO.	ISSUE/DESCRIPTION	BY	DATE

MIRROR LAKE BATHYMETRIC UPDATE
UNIVERSITY OF CONNECTICUT
STORRS, CONNECTICUT

SECTION 7+00

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: BVH INTEGRATED SERVICES, P.C.	
PROJ MGR: JD	REVIEWED BY: DB	CHECKED BY: TEJ	FIG 6
DESIGNED BY: MH	DRAWN BY: MH	SCALE: AS NOTED	
DATE: 4/27/21	PROJECT NO. 05.0046161.07	REVISION NO. -	SHEET NO. 6 OF 6

APPENDIX A – LIMITATIONS

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

SCREENING AND ANALYTICAL TESTING

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B – MMI 2009 SEDIMENT SAMPLING LOCATIONS AND TABLE

Engineering, Landscape Architecture and Environmental Science
MILONE & MACBROOM®
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax: (203) 272-9733
www.miloneandmacbroom.com

May 2009 Sediment Sampling Locations

LOCATION: Storrs, CT

MMI#: 1958-12-2
MXD: H:\2009sed-sam.mxd
SOURCE: CT DEP

N

Mirror Lake Dredging Feasibility Study

Map By: EPB
Date: MAY 2009
Scale: 1"=100'

SHEET: Figure 1

Table 1
Mirror Lake Sediment Sampling
May 2009

Field Observations

Boring Location ID	Depth of Water (ft)	2008 Interpolated Organic Sediment Thickness (ft)	2009 Confirmed Organic Sediment Thickness (ft)	Sampled Thickness of Till (ft)	Total Proposed Removal Thickness (ft)	Proposed Organic Removal (ft)	Proposed Till Removal (ft)	Blow Counts per Six Inches	PID (organic/till)
ML/0509/ Sed 1	2	5.5	2	3	3	3	0		0/0
ML/0509/ Sed 2	1	0.5	1	4	8	0.5	7.5	15-13-15-8-45-30-35-62	0/0
ML/0509/ Sed 3	5	3.5	2	3	4	3.5	0.5		0.1/0.1
ML/0509/ Sed 4	1	1	0.5	3.5	0	0	0		0/0
ML/0509/ Sed 5	3	1	2.5	3.5	2	1	1		10.3/3.4
ML/0509/ Sed 6	4	0.5	0.5	4.5	8	0.5	7.5		0/0
ML/0509/ Sed 7	5	3	2	4	5	3	2		0.1/0.2
ML/0509/ Sed 8	0.5	5.5	5.5	4.5	1	1	0		0.1/0
ML/0509/ Sed 9	4	2.5	2	4	7.5	2.5	5		0/0
ML/0509/ Sed 10	4	1	0.5	4	8	1	7	22-63-47-27-19-35-37-31-22(4")	0/0
ML/0509/ Sed 11	5	1.5	1	3	7	1.5	5.5		0.1/0.2
ML/0509/ Sed 12	5	2	2	3	3	2	1		0/0
ML/0509/ Sed 13	1	2	1	3	1	1	0		0.2/0.2
ML/0509/ Sed 14	3	3	2	4	6	3	3		0.2/0.2
ML/0509/ Sed 15	3	4	3	3.5	7	4	3		0.2/0.1
ML/0509/ Sed 16	5	3.5	2	3.5	5	3.5	1.5		0.1/0.1
ML/0509/ Sed 17	3	2.5	2	3.5	4	2.5	1.5		0/0
ML/0509/ Sed 18	1	0.5	1	2	4	0.5	3.5		0.1/0.1
ML/0509/ Sed 19	2	1	0.5	4	6	1	5		0.1/0.2
ML/0509/ Sed 20	2	1	1	2	4	1	3	15-31-35-25-53-40-35-16	0/0.1
ML/0509/ SA	1	0.5	2	2	9	0.5	8.5		
ML/0509/ SB	2	3	1	2.5	8	3	5		
ML/0509/ SC	4	1	1	3	8	1	7		
ML/0509/ SD	4	3	1.5	4	6	3	3		
ML/0509/ SE	4	5	1	3	5	5	0		
ML/0509/ SF	4	3.5	2	3.5	7	3.5	3.5	2-2-21-18-30-28-20-19-38	

APPENDIX C – LABORATORY TEST RESULTS

PHOENIX
Environmental Laboratories, Inc.

Tuesday, January 26, 2021

Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Project ID: UCONN-MIRROR LAKE
SDG ID: GCH47923
Sample ID#s: CH47923 - CH47930

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

January 26, 2021

SDG I.D.: GCH47923

Project ID: UCONN-MIRROR LAKE

Client Id	Lab Id	Matrix
SD-14	CH47923	SEDIMENT
SD-37	CH47924	SEDIMENT
SD-39	CH47925	SEDIMENT
SD-57	CH47926	SEDIMENT
SD-64	CH47927	SEDIMENT
SD-67	CH47928	SEDIMENT
TB011821 LL	CH47929	SEDIMENT
TB011821 HL	CH47930	SEDIMENT

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	12:50
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47923

Project ID: UCONN-MIRROR LAKE
Client ID: SD-14

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 1.3	1.3	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	10.7	2.6	mg/Kg	1	01/19/21	EK	SW6010D
Barium	177	1.3	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	3.5	1.3	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	67.8	1.3	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	< 0.24	0.24	mg/Kg	5	01/19/21	RS	SW7471B
Lead	220	1.3	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 5.2	5.2	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	26		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	320	190	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	58		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1221	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1232	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1242	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1248	ND	620	ug/Kg	10	01/19/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1260	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1262	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1268	ND	620	ug/Kg	10	01/19/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	109		%	10	01/19/21	SC	30 - 150 %
% DCBP (Confirmation)	90		%	10	01/19/21	SC	30 - 150 %
% TCMX	91		%	10	01/19/21	SC	30 - 150 %
% TCMX (Confirmation)	93		%	10	01/19/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	21	12	ug/Kg	1	01/20/21	CG	SW8081B
4,4' -DDE	35	12	ug/Kg	1	01/20/21	CG	SW8081B
4,4' -DDT	9.2	2.5	ug/Kg	1	01/20/21	CG	SW8081B
a-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Alachlor	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Aldrin	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
b-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Chlordane	ND	62	ug/Kg	1	01/20/21	CG	SW8081B
d-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Dieldrin	ND	6.2	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan I	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan II	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan sulfate	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Endrin	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Endrin aldehyde	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Endrin ketone	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
g-BHC	ND	2.5	ug/Kg	1	01/20/21	CG	SW8081B
Heptachlor	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Heptachlor epoxide	ND	12	ug/Kg	1	01/20/21	CG	SW8081B
Methoxychlor	ND	62	ug/Kg	1	01/20/21	CG	SW8081B
Toxaphene	ND	250	ug/Kg	1	01/20/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	60		%	1	01/20/21	CG	30 - 150 %
% DCBP (Confirmation)	61		%	1	01/20/21	CG	30 - 150 %
% TCMX	57		%	1	01/20/21	CG	30 - 150 %
% TCMX (Confirmation)	58		%	1	01/20/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-14

Phoenix I.D.: CH47923

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	7	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	140	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	140	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	1400	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	180	170	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	57	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	57	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Tetrachloroethene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	57	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	57	ug/Kg	1	01/19/21	JLI	SW8260C
Trichloroethene	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	57	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	96		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	97		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	88		%	1	01/19/21	JLI	70 - 130 %
% Toluene-d8	100		%	1	01/19/21	JLI	70 - 130 %
Polynuclear Aromatic HC (SIM)							
2-Methylnaphthalene	54	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthene	160	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthylene	320	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Anthracene	630	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benz(a)anthracene	2200	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(a)pyrene	2300	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(b)fluoranthene	1900	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(ghi)perylene	1300	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(k)fluoranthene	2000	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Chrysene	4000	13	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	360	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluoranthene	7600	13	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Fluorene	320	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	1900	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Naphthalene	77	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Phenanthrene	2400	13	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Pyrene	6600	13	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	64		%	1	01/20/21	WB	30 - 130 %
% Nitrobenzene-d5	49		%	1	01/20/21	WB	30 - 130 %
% Terphenyl-d14	82		%	1	01/20/21	WB	30 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

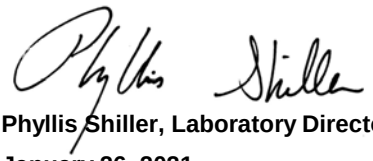
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C18 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

January 26, 2021

Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	13:10
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47924

Project ID: UCONN-MIRROR LAKE
Client ID: SD-37

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.82	0.82	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	4.6	1.6	mg/Kg	1	01/19/21	EK	SW6010D
Barium	119	0.82	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	2.04	0.82	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	47.1	0.82	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	< 0.15	0.15	mg/Kg	5	01/19/21	RS	SW7471B
Lead	121	0.82	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 3.3	3.3	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	40		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	870	120	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	77		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1221	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1232	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1242	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1248	ND	830	ug/Kg	10	01/19/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1260	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1262	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1268	ND	830	ug/Kg	10	01/19/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	103		%	10	01/19/21	SC	30 - 150 %
% DCBP (Confirmation)	84		%	10	01/19/21	SC	30 - 150 %
% TCMX	85		%	10	01/19/21	SC	30 - 150 %
% TCMX (Confirmation)	87		%	10	01/19/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	5.5	1.7	ug/Kg	1	01/22/21	CG	SW8081B
4,4' -DDE	11	8.3	ug/Kg	1	01/22/21	CG	SW8081B
4,4' -DDT	5.4	1.7	ug/Kg	1	01/22/21	CG	SW8081B
a-BHC	ND	1.7	ug/Kg	1	01/22/21	CG	SW8081B
Alachlor	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Aldrin	ND	1.7	ug/Kg	1	01/22/21	CG	SW8081B
b-BHC	ND	1.7	ug/Kg	1	01/22/21	CG	SW8081B
Chlordane	ND	41	ug/Kg	1	01/22/21	CG	SW8081B
d-BHC	ND	1.7	ug/Kg	1	01/22/21	CG	SW8081B
Dieldrin	ND	4.1	ug/Kg	1	01/22/21	CG	SW8081B
Endosulfan I	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Endosulfan II	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Endosulfan sulfate	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Endrin	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Endrin aldehyde	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Endrin ketone	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
g-BHC	ND	1.7	ug/Kg	1	01/22/21	CG	SW8081B
Heptachlor	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Heptachlor epoxide	ND	8.3	ug/Kg	1	01/22/21	CG	SW8081B
Methoxychlor	ND	41	ug/Kg	1	01/22/21	CG	SW8081B
Toxaphene	ND	170	ug/Kg	1	01/22/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	47		%	1	01/22/21	CG	30 - 150 %
% DCBP (Confirmation)	47		%	1	01/22/21	CG	30 - 150 %
% TCMX	46		%	1	01/22/21	CG	30 - 150 %
% TCMX (Confirmation)	45		%	1	01/22/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	9.9	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-37

Phoenix I.D.: CH47924

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	83	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	83	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	830	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	9.9	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	74	66	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	33	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	33	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Tetrachloroethene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	33	ug/Kg	1	01/19/21	JLI	SW8260C	
Toluene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
Total Xylenes	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	33	ug/Kg	1	01/19/21	JLI	SW8260C	
Trichloroethene	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
Trichlorofluoromethane	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
Trichlorotrifluoroethane	ND	33	ug/Kg	1	01/19/21	JLI	SW8260C	
Vinyl chloride	ND	17	ug/Kg	1	01/19/21	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	96		%	1	01/19/21	JLI	70 - 130 %	
% Bromofluorobenzene	96		%	1	01/19/21	JLI	70 - 130 %	
% Dibromofluoromethane	88		%	1	01/19/21	JLI	70 - 130 %	
% Toluene-d8	100		%	1	01/19/21	JLI	70 - 130 %	
Polynuclear Aromatic HC (SIM)								
2-Methylnaphthalene	52	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Acenaphthene	350	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Acenaphthylene	200	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Anthracene	930	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Benz(a)anthracene	4100	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Benzo(a)pyrene	4700	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Benzo(b)fluoranthene	4400	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Benzo(ghi)perylene	1300	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Benzo(k)fluoranthene	3600	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Chrysene	4800	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Dibenz(a,h)anthracene	400	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Fluoranthene	9500	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Fluorene	210	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Indeno(1,2,3-cd)pyrene	3200	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Naphthalene	73	8.3	ug/Kg	1	01/19/21	WB	SW8270D (SIM)	
Phenanthrene	4200	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
Pyrene	7900	8.3	ug/Kg	1	01/20/21	WB	SW8270D (SIM)	
QA/QC Surrogates								
% 2-Fluorobiphenyl	55		%	1	01/20/21	WB	30 - 130 %	
% Nitrobenzene-d5	25		%	1	01/20/21	WB	30 - 130 %	3
% Terphenyl-d14	72		%	1	01/20/21	WB	30 - 130 %	
Field Extraction	Completed				01/18/21		SW5035A	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

3 = This parameter exceeds laboratory specified limits.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C20 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

Semi-Volatile Comment:
Poor surrogate recovery was observed for one acid and/or one base surrogate. The other surrogates associated with this sample were within QA/QC criteria. No significant bias suspected.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
January 26, 2021
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	13:30
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47925

Project ID: UCONN-MIRROR LAKE
Client ID: SD-39

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.51	0.51	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	< 1.0	1.0	mg/Kg	1	01/19/21	EK	SW6010D
Barium	27.2	0.51	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	< 0.51	0.51	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	10.1	0.51	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	< 0.04	0.04	mg/Kg	2	01/19/21	RS	SW7471B
Lead	33.0	0.51	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 2.0	2.0	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	66		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	240	74	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	74		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1221	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1232	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1242	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1248	ND	500	ug/Kg	10	01/19/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1260	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1262	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1268	ND	500	ug/Kg	10	01/19/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	98		%	10	01/19/21	SC	30 - 150 %
% DCBP (Confirmation)	87		%	10	01/19/21	SC	30 - 150 %
% TCMX	87		%	10	01/19/21	SC	30 - 150 %
% TCMX (Confirmation)	88		%	10	01/19/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
4,4' -DDE	ND	2.7	ug/Kg	2	01/19/21	CG	SW8081B
4,4' -DDT	ND	2.8	ug/Kg	2	01/19/21	CG	SW8081B
a-BHC	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
Alachlor	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Aldrin	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
b-BHC	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
Chlordane	ND	50	ug/Kg	2	01/19/21	CG	SW8081B
d-BHC	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
Dieldrin	ND	5.0	ug/Kg	2	01/19/21	CG	SW8081B
Endosulfan I	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Endosulfan II	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Endosulfan sulfate	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Endrin	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Endrin aldehyde	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Endrin ketone	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
g-BHC	ND	2.0	ug/Kg	2	01/19/21	CG	SW8081B
Heptachlor	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Heptachlor epoxide	ND	10	ug/Kg	2	01/19/21	CG	SW8081B
Methoxychlor	ND	50	ug/Kg	2	01/19/21	CG	SW8081B
Toxaphene	ND	200	ug/Kg	2	01/19/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	67		%	2	01/19/21	CG	30 - 150 %
% DCBP (Confirmation)	58		%	2	01/19/21	CG	30 - 150 %
% TCMX	68		%	2	01/19/21	CG	30 - 150 %
% TCMX (Confirmation)	60		%	2	01/19/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.8	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-39

Phoenix I.D.: CH47925

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	31	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	31	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	310	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	3.8	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	38	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	13	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	13	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Tetrachloroethene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	13	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	13	ug/Kg	1	01/19/21	JLI	SW8260C
Trichloroethene	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	13	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	6.3	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	95		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	92		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	97		%	1	01/19/21	JLI	70 - 130 %
% Toluene-d8	92		%	1	01/19/21	JLI	70 - 130 %

Polynuclear Aromatic HC (SIM)

2-Methylnaphthalene	48	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthene	330	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthylene	87	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Anthracene	770	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benz(a)anthracene	4200	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Benzo(a)pyrene	4800	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Benzo(b)fluoranthene	4600	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Benzo(ghi)perylene	3000	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Benzo(k)fluoranthene	3300	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Chrysene	4600	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	360	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluoranthene	9500	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Fluorene	420	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	3300	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Naphthalene	160	4.9	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Phenanthrene	5900	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Pyrene	8500	4.9	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	55		%	1	01/20/21	WB	30 - 130 %
% Nitrobenzene-d5	42		%	1	01/20/21	WB	30 - 130 %
% Terphenyl-d14	71		%	1	01/20/21	WB	30 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

Project ID: UCONN-MIRROR LAKE
Client ID: SD-39

Phoenix I.D.: CH47925

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

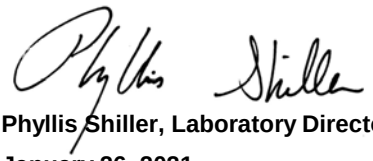
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C18 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
January 26, 2021
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	13:50
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47926

Project ID: UCONN-MIRROR LAKE
Client ID: SD-57

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 1.2	1.2	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	6.1	2.3	mg/Kg	1	01/19/21	EK	SW6010D
Barium	148	1.2	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	3.1	1.2	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	60.3	1.2	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	0.13	0.06	mg/Kg	5	01/19/21	RS	SW7471B
Lead	187	1.2	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 4.6	4.6	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	30		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	260	170	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	69		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1221	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1232	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1242	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1248	ND	550	ug/Kg	10	01/20/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1260	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1262	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
PCB-1268	ND	550	ug/Kg	10	01/20/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	86		%	10	01/20/21	SC	30 - 150 %
% DCBP (Confirmation)	82		%	10	01/20/21	SC	30 - 150 %
% TCMX	77		%	10	01/20/21	SC	30 - 150 %
% TCMX (Confirmation)	81		%	10	01/20/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	8.4	2.2	ug/Kg	1	01/20/21	CG	SW8081B
4,4' -DDE	18	11	ug/Kg	1	01/20/21	CG	SW8081B
4,4' -DDT	5.0	2.2	ug/Kg	1	01/20/21	CG	SW8081B
a-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Alachlor	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Aldrin	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
b-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Chlordane	ND	55	ug/Kg	1	01/20/21	CG	SW8081B
d-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Dieldrin	ND	5.5	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan I	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan II	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Endosulfan sulfate	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Endrin	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Endrin aldehyde	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Endrin ketone	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
g-BHC	ND	2.0	ug/Kg	1	01/20/21	CG	SW8081B
Heptachlor	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Heptachlor epoxide	ND	11	ug/Kg	1	01/20/21	CG	SW8081B
Methoxychlor	ND	55	ug/Kg	1	01/20/21	CG	SW8081B
Toxaphene	ND	220	ug/Kg	1	01/20/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	52		%	1	01/20/21	CG	30 - 150 %
% DCBP (Confirmation)	52		%	1	01/20/21	CG	30 - 150 %
% TCMX	45		%	1	01/20/21	CG	30 - 150 %
% TCMX (Confirmation)	46		%	1	01/20/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	1400	ug/Kg	50	01/20/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-57

Phoenix I.D.: CH47926

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	7	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
1,2-Dichloroethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
1,3-Dichloropropane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	1500	ug/Kg	50	01/20/21	JLI	SW8260C
2,2-Dichloropropane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
2-Hexanone	ND	130	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
4-Chlorotoluene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	130	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	1300	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
Bromochloromethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	20	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	500	ug/Kg	50	01/20/21	JLI	SW8260C
m&p-Xylene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	150	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	51	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	51	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
n-Butylbenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
n-Propylbenzene	ND	1000	ug/Kg	50	01/20/21	JLI	SW8260C
o-Xylene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C
Styrene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	1700	ug/Kg	50	01/20/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Tetrachloroethene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	51	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	3400	ug/Kg	50	01/20/21	JLI	SW8260C
Trichloroethene	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	51	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	26	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	93		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	80		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	108		%	1	01/19/21	JLI	70 - 130 %
% Toluene-d8	84		%	1	01/19/21	JLI	70 - 130 %
% 1,2-dichlorobenzene-d4 (50x)	98		%	50	01/20/21	JLI	70 - 130 %
% Bromofluorobenzene (50x)	101		%	50	01/20/21	JLI	70 - 130 %
% Dibromofluoromethane (50x)	96		%	50	01/20/21	JLI	70 - 130 %
% Toluene-d8 (50x)	96		%	50	01/20/21	JLI	70 - 130 %
Polynuclear Aromatic HC (SIM)							
2-Methylnaphthalene	31	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthene	130	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthylene	200	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Anthracene	300	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benz(a)anthracene	2200	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(a)pyrene	2000	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(b)fluoranthene	1700	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(ghi)perylene	1400	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(k)fluoranthene	1800	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Chrysene	2100	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	380	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluoranthene	7300	11	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Fluorene	96	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	1900	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Naphthalene	45	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Phenanthrene	980	11	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Pyrene	5900	11	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	56		%	1	01/20/21	WB	30 - 130 %
% Nitrobenzene-d5	47		%	1	01/20/21	WB	30 - 130 %
% Terphenyl-d14	75		%	1	01/20/21	WB	30 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

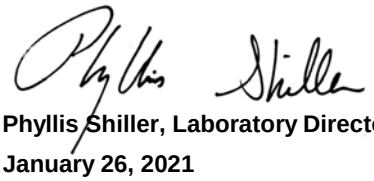
Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C18 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

Volatile Comment:
There was a suppression of the last internal standard in the low level analysis, all affected compounds are reported from the methanol preserved high level analysis which did not exhibit this interference.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
January 26, 2021
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	14:10
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47927

Project ID: UCONN-MIRROR LAKE
Client ID: SD-64

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.46	0.46	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	< 0.93	0.93	mg/Kg	1	01/19/21	EK	SW6010D
Barium	22.0	0.46	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	0.47	0.46	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	13.3	0.46	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	01/19/21	RS	SW7471B
Lead	20.6	0.46	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 1.9	1.9	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	75		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	70	67	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	64		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1221	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1232	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1242	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1248	ND	440	ug/Kg	10	01/19/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1260	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1262	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1268	ND	440	ug/Kg	10	01/19/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	98		%	10	01/19/21	SC	30 - 150 %
% DCBP (Confirmation)	88		%	10	01/19/21	SC	30 - 150 %
% TCMX	82		%	10	01/19/21	SC	30 - 150 %
% TCMX (Confirmation)	84		%	10	01/19/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
4,4' -DDE	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
4,4' -DDT	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
a-BHC	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
Alachlor	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Aldrin	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
b-BHC	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
Chlordane	ND	44	ug/Kg	2	01/20/21	CG	SW8081B
d-BHC	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
Dieldrin	ND	4.4	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan I	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan II	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan sulfate	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Endrin	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Endrin aldehyde	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Endrin ketone	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
g-BHC	ND	1.8	ug/Kg	2	01/20/21	CG	SW8081B
Heptachlor	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Heptachlor epoxide	ND	8.8	ug/Kg	2	01/20/21	CG	SW8081B
Methoxychlor	ND	44	ug/Kg	2	01/20/21	CG	SW8081B
Toxaphene	ND	180	ug/Kg	2	01/20/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	62		%	2	01/20/21	CG	30 - 150 %
% DCBP (Confirmation)	62		%	2	01/20/21	CG	30 - 150 %
% TCMX	60		%	2	01/20/21	CG	30 - 150 %
% TCMX (Confirmation)	61		%	2	01/20/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.4	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-64

Phoenix I.D.: CH47927

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	28	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	280	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	3.4	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	34	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	11	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Tetrachloroethene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	01/19/21	JLI	SW8260C
Trichloroethene	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	11	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	5.6	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	96		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	97		%	1	01/19/21	JLI	70 - 130 %
% Toluene-d8	94		%	1	01/19/21	JLI	70 - 130 %

Polynuclear Aromatic HC (SIM)

2-Methylnaphthalene	11	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthene	49	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthylene	51	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Anthracene	100	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benz(a)anthracene	480	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(a)pyrene	460	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(b)fluoranthene	360	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(ghi)perylene	220	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(k)fluoranthene	350	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Chrysene	490	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	45	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluoranthene	840	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluorene	56	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	370	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Naphthalene	7.1	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Phenanthrene	310	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Pyrene	760	4.4	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	55		%	1	01/19/21	WB	30 - 130 %
% Nitrobenzene-d5	53		%	1	01/19/21	WB	30 - 130 %
% Terphenyl-d14	74		%	1	01/19/21	WB	30 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

Project ID: UCONN-MIRROR LAKE
Client ID: SD-64

Phoenix I.D.: CH47927

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

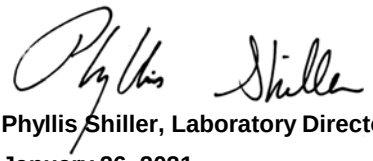
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C14 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

January 26, 2021

Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	14:30
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47928

Project ID: UCONN-MIRROR LAKE
Client ID: SD-67

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Silver	< 0.48	0.48	mg/Kg	1	01/19/21	EK	SW6010D
Arsenic	< 0.95	0.95	mg/Kg	1	01/19/21	EK	SW6010D
Barium	31.7	0.48	mg/Kg	1	01/19/21	EK	SW6010D
Cadmium	2.73	0.48	mg/Kg	1	01/19/21	EK	SW6010D
Chromium	9.97	0.48	mg/Kg	1	01/19/21	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	01/19/21	RS	SW7471B
Lead	10.7	0.48	mg/Kg	1	01/19/21	EK	SW6010D
Selenium	< 1.9	1.9	mg/Kg	1	01/19/21	EK	SW6010D
Percent Solid	71		%		01/18/21	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				01/18/21	L/E	SW3545A
Soil Extraction for Pesticide	Completed				01/18/21	L/E	SW3545A
Extraction for SVOA SIM	Completed				01/18/21	L/E	SW3545A
Extraction of CT ETPH	Completed				01/18/21	L/E	SW3546
Mercury Digestion	Completed				01/19/21		SW7471B
Total Metals Digest	Completed				01/18/21	J/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	240	69	mg/Kg	1	01/19/21	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	01/19/21	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	104		%	1	01/19/21	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1221	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1232	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1242	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1248	ND	470	ug/Kg	10	01/19/21	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
PCB-1254	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1260	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1262	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
PCB-1268	ND	470	ug/Kg	10	01/19/21	SC	SW8082A
QA/QC Surrogates							
% DCBP	90		%	10	01/19/21	SC	30 - 150 %
% DCBP (Confirmation)	81		%	10	01/19/21	SC	30 - 150 %
% TCMX	72		%	10	01/19/21	SC	30 - 150 %
% TCMX (Confirmation)	74		%	10	01/19/21	SC	30 - 150 %
Pesticides							
4,4' -DDD	6.7	1.9	ug/Kg	2	01/20/21	CG	SW8081B
4,4' -DDE	ND	3.0	ug/Kg	2	01/20/21	CG	SW8081B
4,4' -DDT	ND	2.2	ug/Kg	2	01/20/21	CG	SW8081B
a-BHC	ND	1.9	ug/Kg	2	01/20/21	CG	SW8081B
Alachlor	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Aldrin	ND	1.9	ug/Kg	2	01/20/21	CG	SW8081B
b-BHC	ND	1.9	ug/Kg	2	01/20/21	CG	SW8081B
Chlordane	ND	47	ug/Kg	2	01/20/21	CG	SW8081B
d-BHC	ND	1.9	ug/Kg	2	01/20/21	CG	SW8081B
Dieldrin	ND	4.7	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan I	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan II	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Endosulfan sulfate	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Endrin	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Endrin aldehyde	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Endrin ketone	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
g-BHC	ND	1.9	ug/Kg	2	01/20/21	CG	SW8081B
Heptachlor	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Heptachlor epoxide	ND	9.3	ug/Kg	2	01/20/21	CG	SW8081B
Methoxychlor	ND	47	ug/Kg	2	01/20/21	CG	SW8081B
Toxaphene	ND	190	ug/Kg	2	01/20/21	CG	SW8081B
QA/QC Surrogates							
% DCBP	80		%	2	01/20/21	CG	30 - 150 %
% DCBP (Confirmation)	54		%	2	01/20/21	CG	30 - 150 %
% TCMX	74		%	2	01/20/21	CG	30 - 150 %
% TCMX (Confirmation)	52		%	2	01/20/21	CG	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.6	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: SD-67

Phoenix I.D.: CH47928

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	30	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	30	ug/Kg	1	01/19/21	JLI	SW8260C
Acetone	ND	300	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	3.6	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	36	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	12	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Tetrachloroethene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	01/19/21	JLI	SW8260C
Trichloroethene	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	12	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	6.1	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	96		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	92		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	102		%	1	01/19/21	JLI	70 - 130 %
% Toluene-d8	92		%	1	01/19/21	JLI	70 - 130 %

Polynuclear Aromatic HC (SIM)

2-Methylnaphthalene	18	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthene	13	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Acenaphthylene	47	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Anthracene	74	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benz(a)anthracene	430	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(a)pyrene	440	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(b)fluoranthene	380	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(ghi)perylene	310	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Benzo(k)fluoranthene	330	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Chrysene	480	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	77	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Fluoranthene	1700	4.6	ug/Kg	1	01/20/21	WB	SW8270D (SIM)
Fluorene	30	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	450	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Naphthalene	5.1	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Phenanthrene	270	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
Pyrene	900	4.6	ug/Kg	1	01/19/21	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	76		%	1	01/20/21	WB	30 - 130 %
% Nitrobenzene-d5	65		%	1	01/20/21	WB	30 - 130 %
% Terphenyl-d14	92		%	1	01/20/21	WB	30 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

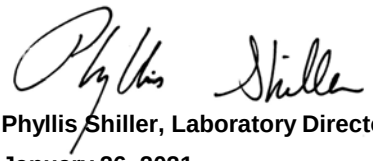
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C16 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

January 26, 2021

Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	12:30
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47929

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 LL

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
2-Hexanone	ND	25	ug/Kg	1	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	25	ug/Kg	1	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 LL

Phoenix I.D.: CH47929

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetone	ND	250	ug/Kg	1	01/19/21	JLI	SW8260C
Acrylonitrile	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Benzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Bromobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Bromochloromethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Bromoform	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Bromomethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Chlorobenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Chloroform	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Chloromethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	3.0	ug/Kg	1	01/19/21	JLI	SW8260C
Dibromomethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Ethylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
m&p-Xylene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	30	ug/Kg	1	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Methylene chloride	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Naphthalene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
o-Xylene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Styrene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrachloroethene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Toluene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Total Xylenes	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Trichloroethene	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	10	ug/Kg	1	01/19/21	JLI	SW8260C
Vinyl chloride	ND	5.0	ug/Kg	1	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene	99		%	1	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane	95		%	1	01/19/21	JLI	70 - 130 %

Ver 1

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 LL

Phoenix I.D.: CH47929

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
% Toluene-d8	94		%	1	01/19/21	JLI	70 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TRIP BLANK INCLUDED.

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
January 26, 2021
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

January 26, 2021

FOR: Attn: James Davis
GZA GeoEnvironmental, Inc.
95 Glastonbury Blvd 3rd Fl
Glastonbury, CT 06033

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		01/18/21	12:30
Location Code:	GZACTENG	Received by:	SW	01/18/21	15:37
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	05.0046161.07				

Laboratory Data

SDG ID: GCH47923
Phoenix ID: CH47930

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 HL

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Volatiles							
1,1,1,2-Tetrachloroethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,1,1-Trichloroethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,1,2-Trichloroethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,1-Dichloroethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,1-Dichloroethene	ND	140	ug/Kg	50	01/19/21	JLI	SW8260C
1,1-Dichloropropene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2,3-Trichloropropane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,2-Dibromoethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,2-Dichlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,2-Dichloroethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,2-Dichloropropane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,3-Dichlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,3-Dichloropropane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
1,4-Dichlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
2,2-Dichloropropane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
2-Chlorotoluene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
2-Hexanone	ND	700	ug/Kg	50	01/19/21	JLI	SW8260C
2-Isopropyltoluene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
4-Chlorotoluene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
4-Methyl-2-pentanone	ND	1300	ug/Kg	50	01/19/21	JLI	SW8260C

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 HL

Phoenix I.D.: CH47930

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Acetone	ND	5000	ug/Kg	50	01/19/21	JLI	SW8260C
Acrylonitrile	ND	25	ug/Kg	50	01/19/21	JLI	SW8260C
Benzene	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Bromobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Bromochloromethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Bromodichloromethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Bromoform	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Bromomethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Carbon Disulfide	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Carbon tetrachloride	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Chlorobenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Chloroethane	ND	150	ug/Kg	50	01/19/21	JLI	SW8260C
Chloroform	ND	120	ug/Kg	50	01/19/21	JLI	SW8260C
Chloromethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
cis-1,2-Dichloroethene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
cis-1,3-Dichloropropene	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Dibromochloromethane	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Dibromomethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Dichlorodifluoromethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Ethylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Hexachlorobutadiene	ND	200	ug/Kg	50	01/19/21	JLI	SW8260C
Isopropylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
m&p-Xylene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Methyl Ethyl Ketone	ND	3000	ug/Kg	50	01/19/21	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Methylene chloride	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Naphthalene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
n-Butylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
n-Propylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
o-Xylene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
p-Isopropyltoluene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
sec-Butylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Styrene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
tert-Butylbenzene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Tetrachloroethene	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Tetrahydrofuran (THF)	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Toluene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Total Xylenes	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
trans-1,2-Dichloroethene	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
trans-1,3-Dichloropropene	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	500	ug/Kg	50	01/19/21	JLI	SW8260C
Trichloroethene	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
Trichlorofluoromethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Trichlorotrifluoroethane	ND	250	ug/Kg	50	01/19/21	JLI	SW8260C
Vinyl chloride	ND	100	ug/Kg	50	01/19/21	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4 (50x)	98		%	50	01/19/21	JLI	70 - 130 %
% Bromofluorobenzene (50x)	101		%	50	01/19/21	JLI	70 - 130 %
% Dibromofluoromethane (50x)	96		%	50	01/19/21	JLI	70 - 130 %

Project ID: UCONN-MIRROR LAKE
Client ID: TB011821 HL

Phoenix I.D.: CH47930

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
% Toluene-d8 (50x)	95		%	50	01/19/21	JLI	70 - 130 %
Field Extraction	Completed				01/18/21		SW5035A

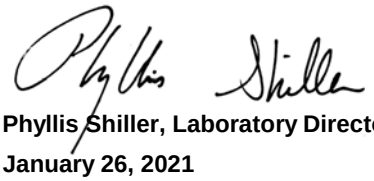
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
January 26, 2021
Reviewed and Released by: Phyllis Shiller, Laboratory Director

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

January 26, 2021

QA/QC Data

SDG I.D.: GCH47923

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 560545 (mg/kg), QC Sample No: CH48017 2X (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)													
Mercury - Soil	BRL	0.03	<0.03	<0.03	NC	106	103	2.9	90.9	90.5	0.4	70 - 130	30
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 560488 (mg/kg), QC Sample No: CH47890 (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)													
ICP Metals - Soil													
Arsenic	BRL	0.67	5.39	4.58	16.2	105	113	7.3	96.1			75 - 125	35
Barium	BRL	0.33	85.1	82.5	3.10	98.6	110	10.9	97.1			75 - 125	35
Cadmium	BRL	0.33	1.42	1.29	NC	99.9	114	13.2	91.8			75 - 125	35
Chromium	BRL	0.33	44.3	38.6	13.8	103	113	9.3	96.6			75 - 125	35
Lead	BRL	0.33	85.4	77.6	9.60	101	108	6.7	108			75 - 125	35
Selenium	BRL	1.3	<1.4	<1.5	NC	97.0	107	9.8	90.6			75 - 125	35
Silver	BRL	0.33	<0.36	<0.37	NC	95.2	101	5.9	92.1			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

January 26, 2021

QA/QC Data

SDG I.D.: GCH47923

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 560492 (mg/Kg), QC Sample No: CH48025 (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)											
TPH by GC (Extractable Products) - Sediment											
Ext. Petroleum H.C. (C9-C36)	ND	50	118	102	14.5	98	61	46.5	60 - 120	30	r
% n-Pentacosane	50	%	81	72	11.8	69	45	42.1	50 - 150	30	m,r
Comment:											
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.											
QA/QC Batch 560465 (ug/Kg), QC Sample No: CH48005 2X (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)											
Polychlorinated Biphenyls - Sediment											
PCB-1016	ND	33	75	68	9.8	88	90	2.2	40 - 140	30	
PCB-1221	ND	33							40 - 140	30	
PCB-1232	ND	33							40 - 140	30	
PCB-1242	ND	33							40 - 140	30	
PCB-1248	ND	33							40 - 140	30	
PCB-1254	ND	33							40 - 140	30	
PCB-1260	ND	33	87	76	13.5	93	87	6.7	40 - 140	30	
PCB-1262	ND	33							40 - 140	30	
PCB-1268	ND	33							40 - 140	30	
% DCBP (Surrogate Rec)	84	%	100	83	18.6	111	107	3.7	30 - 150	30	
% DCBP (Surrogate Rec) (Confirm	85	%	99	90	9.5	102	113	10.2	30 - 150	30	
% TCMX (Surrogate Rec)	69	%	77	71	8.1	84	84	0.0	30 - 150	30	
% TCMX (Surrogate Rec) (Confirm	70	%	81	74	9.0	85	85	0.0	30 - 150	30	
QA/QC Batch 560469 (ug/Kg), QC Sample No: CH48005 2X (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)											
Pesticides - Sediment											
4,4' -DDD	ND	1.7	56	64	13.3	89	140	44.5	40 - 140	30	r
4,4' -DDE	ND	1.7	57	65	13.1	120	113	6.0	40 - 140	30	
4,4' -DDT	ND	1.7	56	66	16.4	91	100	9.4	40 - 140	30	
a-BHC	ND	1.0	47	54	13.9	94	123	26.7	40 - 140	30	
Alachlor	ND	3.3	NA	NA	NC	NA	NA	NC	40 - 140	30	
Aldrin	ND	1.0	51	58	12.8	48	46	4.3	40 - 140	30	
b-BHC	ND	1.0	53	61	14.0	51	50	2.0	40 - 140	30	
Chlordane	ND	33	53	59	10.7	46	46	0.0	40 - 140	30	
d-BHC	ND	3.3	55	63	13.6	61	65	6.3	40 - 140	30	
Dieldrin	ND	1.0	52	59	12.6	86	70	20.5	40 - 140	30	
Endosulfan I	ND	3.3	53	60	12.4	47	52	10.1	40 - 140	30	
Endosulfan II	ND	3.3	53	61	14.0	63	60	4.9	40 - 140	30	
Endosulfan sulfate	ND	3.3	55	61	10.3	74	71	4.1	40 - 140	30	
Endrin	ND	3.3	53	61	14.0	60	76	23.5	40 - 140	30	
Endrin aldehyde	ND	3.3	41	53	25.5	62	59	5.0	40 - 140	30	
Endrin ketone	ND	3.3	58	67	14.4	69	78	12.2	40 - 140	30	
g-BHC	ND	1.0	46	52	12.2	49	59	18.5	40 - 140	30	
Heptachlor	ND	3.3	51	57	11.1	51	55	7.5	40 - 140	30	

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Heptachlor epoxide	ND	3.3	52	57	9.2	51	55	7.5	40 - 140	30	
Methoxychlor	ND	3.3	58	69	17.3	113	92	20.5	40 - 140	30	
Toxaphene	ND	130	NA	NA	NC	NA	NA	NC	40 - 140	30	
% DCBP	67	%	63	67	6.2	66	53	21.8	30 - 150	30	
% DCBP (Confirmation)	69	%	64	70	9.0	55	58	5.3	30 - 150	30	
% TCMX	60	%	55	60	8.7	65	70	7.4	30 - 150	30	
% TCMX (Confirmation)	63	%	57	63	10.0	57	54	5.4	30 - 150	30	
QA/QC Batch 560514 (ug/kg), QC Sample No: CH47927 (CH47923, CH47924, CH47925, CH47926, CH47927, CH47928)											
Semivolatiles (SIM) - Sediment											
2-Methylnaphthalene	ND	3.3	47	48	2.1	48	48	0.0	30 - 130	30	
Acenaphthene	ND	3.3	56	58	3.5	65	58	11.4	30 - 130	30	
Acenaphthylene	ND	3.3	51	53	3.8	50	50	0.0	30 - 130	30	
Anthracene	ND	3.3	62	62	0.0	74	62	17.6	30 - 130	30	
Benz(a)anthracene	ND	3.3	71	74	4.1	127	78	47.8	30 - 130	30	r
Benzo(a)pyrene	ND	3.3	67	70	4.4	80	54	38.8	30 - 130	30	r
Benzo(b)fluoranthene	ND	3.3	67	69	2.9	72	53	30.4	30 - 130	30	
Benzo(ghi)perylene	ND	3.3	69	71	2.9	65	47	32.1	30 - 130	30	r
Benzo(k)fluoranthene	ND	3.3	54	56	3.6	71	40	55.9	30 - 130	30	r
Chrysene	ND	3.3	61	64	4.8	108	63	52.6	30 - 130	30	r
Dibenz(a,h)anthracene	ND	3.3	69	70	1.4	64	58	9.8	30 - 130	30	
Fluoranthene	ND	3.3	64	69	7.5	171	73	80.3	30 - 130	30	m,r
Fluorene	ND	3.3	57	59	3.4	64	57	11.6	30 - 130	30	
Indeno(1,2,3-cd)pyrene	ND	3.3	69	73	5.6	77	61	23.2	30 - 130	30	
Naphthalene	ND	3.3	52	54	3.8	56	55	1.8	30 - 130	30	
Phenanthrene	ND	3.3	53	56	5.5	129	63	68.8	30 - 130	30	r
Pyrene	ND	3.3	66	71	7.3	163	75	73.9	30 - 130	30	m,r
% 2-Fluorobiphenyl	37	%	54	54	0.0	52	52	0.0	30 - 130	30	
% Nitrobenzene-d5	29	%	57	57	0.0	55	57	3.6	30 - 130	30	s
% Terphenyl-d14	49	%	79	76	3.9	76	72	5.4	30 - 130	30	
Comment:											
# FORMED PRECIPITATE DURING CONCENTRATION											
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)											
QA/QC Batch 560746 (ug/kg), QC Sample No: CH48015 (CH47925, CH47926, CH47927, CH47928, CH47929)											
Volatiles - Sediment (Low Level)											
1,1,1,2-Tetrachloroethane	ND	5.0	94	94	0.0	81	89	9.4	70 - 130	30	
1,1,1-Trichloroethane	ND	5.0	90	92	2.2	84	91	8.0	70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0	98	98	0.0	88	92	4.4	70 - 130	30	
1,1,2-Trichloroethane	ND	5.0	93	92	1.1	85	88	3.5	70 - 130	30	
1,1-Dichloroethane	ND	5.0	93	92	1.1	84	92	9.1	70 - 130	30	
1,1-Dichloroethene	ND	5.0	96	92	4.3	87	98	11.9	70 - 130	30	
1,1-Dichloropropene	ND	5.0	94	92	2.2	83	92	10.3	70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0	105	108	2.8	66	73	10.1	70 - 130	30	m
1,2,3-Trichloropropane	ND	5.0	87	89	2.3	81	85	4.8	70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0	107	109	1.9	66	73	10.1	70 - 130	30	m
1,2,4-Trimethylbenzene	ND	1.0	97	98	1.0	80	89	10.7	70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0	95	97	2.1	81	83	2.4	70 - 130	30	
1,2-Dibromoethane	ND	5.0	92	93	1.1	82	89	8.2	70 - 130	30	
1,2-Dichlorobenzene	ND	5.0	97	97	0.0	76	85	11.2	70 - 130	30	
1,2-Dichloroethane	ND	5.0	94	94	0.0	86	92	6.7	70 - 130	30	
1,2-Dichloropropane	ND	5.0	94	94	0.0	85	93	9.0	70 - 130	30	

QA/QC Data

SDG I.D.: GCH47923

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,3,5-Trimethylbenzene	ND	1.0	96	95	1.0	81	89	9.4	70 - 130	30	
1,3-Dichlorobenzene	ND	5.0	98	98	0.0	76	84	10.0	70 - 130	30	
1,3-Dichloropropane	ND	5.0	92	92	0.0	84	87	3.5	70 - 130	30	
1,4-Dichlorobenzene	ND	5.0	97	98	1.0	74	83	11.5	70 - 130	30	
2,2-Dichloropropane	ND	5.0	100	97	3.0	87	95	8.8	70 - 130	30	
2-Chlorotoluene	ND	5.0	98	98	0.0	82	91	10.4	70 - 130	30	
2-Hexanone	ND	25	94	97	3.1	83	86	3.6	70 - 130	30	
2-Isopropyltoluene	ND	5.0	96	96	0.0	82	90	9.3	70 - 130	30	
4-Chlorotoluene	ND	5.0	97	98	1.0	79	87	9.6	70 - 130	30	
4-Methyl-2-pentanone	ND	25	104	103	1.0	96	99	3.1	70 - 130	30	
Acetone	ND	10	84	125	39.2	84	86	2.4	70 - 130	30	r
Acrylonitrile	ND	5.0	88	88	0.0	80	85	6.1	70 - 130	30	
Benzene	ND	1.0	96	95	1.0	85	93	9.0	70 - 130	30	
Bromobenzene	ND	5.0	98	97	1.0	83	92	10.3	70 - 130	30	
Bromochloromethane	ND	5.0	91	92	1.1	85	91	6.8	70 - 130	30	
Bromodichloromethane	ND	5.0	96	96	0.0	85	92	7.9	70 - 130	30	
Bromoform	ND	5.0	87	90	3.4	75	81	7.7	70 - 130	30	
Bromomethane	ND	5.0	89	90	1.1	76	85	11.2	70 - 130	30	
Carbon Disulfide	ND	5.0	99	94	5.2	89	98	9.6	70 - 130	30	
Carbon tetrachloride	ND	5.0	93	92	1.1	82	92	11.5	70 - 130	30	
Chlorobenzene	ND	5.0	95	96	1.0	81	89	9.4	70 - 130	30	
Chloroethane	ND	5.0	81	80	1.2	72	82	13.0	70 - 130	30	
Chloroform	ND	5.0	90	90	0.0	82	90	9.3	70 - 130	30	
Chloromethane	ND	5.0	86	85	1.2	73	80	9.2	70 - 130	30	
cis-1,2-Dichloroethene	ND	5.0	87	87	0.0	78	85	8.6	70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0	97	97	0.0	83	90	8.1	70 - 130	30	
Dibromochloromethane	ND	3.0	96	97	1.0	84	91	8.0	70 - 130	30	
Dibromomethane	ND	5.0	94	94	0.0	86	91	5.6	70 - 130	30	
Dichlorodifluoromethane	ND	5.0	95	92	3.2	76	84	10.0	70 - 130	30	
Ethylbenzene	ND	1.0	96	97	1.0	83	93	11.4	70 - 130	30	
Hexachlorobutadiene	ND	5.0	103	106	2.9	71	81	13.2	70 - 130	30	
Isopropylbenzene	ND	1.0	98	97	1.0	86	94	8.9	70 - 130	30	
m&p-Xylene	ND	2.0	96	96	0.0	80	89	10.7	70 - 130	30	
Methyl ethyl ketone	ND	5.0	97	97	0.0	88	89	1.1	70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	1.0	98	97	1.0	89	96	7.6	70 - 130	30	
Methylene chloride	ND	5.0	91	92	1.1	78	82	5.0	70 - 130	30	
Naphthalene	ND	5.0	104	107	2.8	76	81	6.4	70 - 130	30	
n-Butylbenzene	ND	1.0	105	104	1.0	82	89	8.2	70 - 130	30	
n-Propylbenzene	ND	1.0	100	100	0.0	84	93	10.2	70 - 130	30	
o-Xylene	ND	2.0	98	97	1.0	83	91	9.2	70 - 130	30	
p-Isopropyltoluene	ND	1.0	100	100	0.0	80	89	10.7	70 - 130	30	
sec-Butylbenzene	ND	1.0	102	102	0.0	86	96	11.0	70 - 130	30	
Styrene	ND	5.0	96	96	0.0	79	88	10.8	70 - 130	30	
tert-Butylbenzene	ND	1.0	96	96	0.0	84	93	10.2	70 - 130	30	
Tetrachloroethene	ND	5.0	98	98	0.0	82	90	9.3	70 - 130	30	
Tetrahydrofuran (THF)	ND	5.0	86	88	2.3	81	83	2.4	70 - 130	30	
Toluene	ND	1.0	97	96	1.0	85	93	9.0	70 - 130	30	
trans-1,2-Dichloroethene	ND	5.0	84	116	32.0	74	83	11.5	70 - 130	30	r
trans-1,3-Dichloropropene	ND	5.0	94	96	2.1	81	87	7.1	70 - 130	30	
trans-1,4-dichloro-2-butene	ND	5.0	103	102	1.0	84	90	6.9	70 - 130	30	
Trichloroethene	ND	5.0	93	94	1.1	82	91	10.4	70 - 130	30	
Trichlorofluoromethane	ND	5.0	86	82	4.8	75	85	12.5	70 - 130	30	
Trichlorotrifluoroethane	ND	5.0	101	95	6.1	92	99	7.3	70 - 130	30	

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Vinyl chloride	ND	5.0	88	87	1.1	76	85	11.2	70 - 130	30	
% 1,2-dichlorobenzene-d4	95	%	101	101	0.0	101	100	1.0	70 - 130	30	
% Bromofluorobenzene	100	%	100	102	2.0	100	100	0.0	70 - 130	30	
% Dibromofluoromethane	99	%	100	98	2.0	98	97	1.0	70 - 130	30	
% Toluene-d8	95	%	101	102	1.0	101	101	0.0	70 - 130	30	

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 560746H (ug/kg), QC Sample No: CH48015 50X (CH47930 (50X))

Volatiles - Sediment (High Level)

1,1,1,2-Tetrachloroethane	ND	250	83	69	18.4	89	93	4.4	70 - 130	30	I
1,1,1-Trichloroethane	ND	250	78	62	22.9	89	94	5.5	70 - 130	30	I
1,1,2,2-Tetrachloroethane	ND	250	96	88	8.7	97	103	6.0	70 - 130	30	
1,1,2-Trichloroethane	ND	250	89	80	10.7	95	98	3.1	70 - 130	30	
1,1-Dichloroethane	ND	250	80	59	30.2	92	87	5.6	70 - 130	30	I
1,1-Dichloroethene	ND	250	74	58	24.2	89	88	1.1	70 - 130	30	I
1,1-Dichloropropene	ND	250	82	64	24.7	95	96	1.0	70 - 130	30	I
1,2,3-Trichlorobenzene	ND	250	118	103	13.6	111	112	0.9	70 - 130	30	
1,2,3-Trichloropropane	ND	250	89	82	8.2	91	94	3.2	70 - 130	30	
1,2,4-Trichlorobenzene	ND	250	120	103	15.2	111	110	0.9	70 - 130	30	
1,2,4-Trimethylbenzene	ND	250	91	77	16.7	98	101	3.0	70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	250	97	81	18.0	94	93	1.1	70 - 130	30	
1,2-Dibromoethane	ND	250	87	79	9.6	91	93	2.2	70 - 130	30	
1,2-Dichlorobenzene	ND	250	93	79	16.3	98	100	2.0	70 - 130	30	
1,2-Dichloroethane	ND	250	87	76	13.5	95	97	2.1	70 - 130	30	
1,2-Dichloropropane	ND	250	85	72	16.6	96	99	3.1	70 - 130	30	
1,3,5-Trimethylbenzene	ND	250	88	74	17.3	96	99	3.1	70 - 130	30	
1,3-Dichlorobenzene	ND	250	93	79	16.3	99	100	1.0	70 - 130	30	
1,3-Dichloropropane	ND	250	86	77	11.0	91	94	3.2	70 - 130	30	
1,4-Dichlorobenzene	ND	250	94	79	17.3	98	99	1.0	70 - 130	30	
2,2-Dichloropropane	ND	250	84	67	22.5	91	89	2.2	70 - 130	30	I
2-Chlorotoluene	ND	250	89	76	15.8	96	101	5.1	70 - 130	30	
2-Hexanone	ND	1300	95	86	9.9	96	97	1.0	70 - 130	30	
2-Isopropyltoluene	ND	250	89	75	17.1	98	101	3.0	70 - 130	30	
4-Chlorotoluene	ND	250	89	76	15.8	97	101	4.0	70 - 130	30	
4-Methyl-2-pentanone	ND	1300	104	94	10.1	107	111	3.7	70 - 130	30	
Acetone	ND	500	49	45	8.5	82	85	3.6	70 - 130	30	I
Acrylonitrile	ND	250	101	74	30.9	93	85	9.0	70 - 130	30	r
Benzene	ND	250	84	68	21.1	96	98	2.1	70 - 130	30	I
Bromobenzene	ND	250	90	78	14.3	97	101	4.0	70 - 130	30	
Bromochloromethane	ND	250	84	66	24.0	92	95	3.2	70 - 130	30	I
Bromodichloromethane	ND	250	84	72	15.4	91	96	5.3	70 - 130	30	
Bromoform	ND	250	79	67	16.4	80	83	3.7	70 - 130	30	I
Bromomethane	ND	250	51	39	26.7	54	55	1.8	70 - 130	30	I,m
Carbon Disulfide	ND	250	78	61	24.5	89	91	2.2	70 - 130	30	I
Carbon tetrachloride	ND	250	75	55	30.8	88	87	1.1	70 - 130	30	I,r
Chlorobenzene	ND	250	87	72	18.9	95	97	2.1	70 - 130	30	
Chloroethane	ND	250	23	17	30.0	30	29	3.4	70 - 130	30	I,m
Chloroform	ND	250	80	54	38.8	92	77	17.8	70 - 130	30	I,r
Chloromethane	ND	250	77	60	24.8	91	91	0.0	70 - 130	30	I
cis-1,2-Dichloroethene	ND	250	76	58	26.9	87	83	4.7	70 - 130	30	I
cis-1,3-Dichloropropene	ND	250	87	74	16.1	93	98	5.2	70 - 130	30	

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Dibromochloromethane	ND	150	86	73	16.4	88	94	6.6	70 - 130	30	
Dibromomethane	ND	250	89	79	11.9	96	98	2.1	70 - 130	30	
Dichlorodifluoromethane	ND	250	78	61	24.5	93	94	1.1	70 - 130	30	l
Ethylbenzene	ND	250	86	70	20.5	96	99	3.1	70 - 130	30	
Hexachlorobutadiene	ND	250	106	90	16.3	108	109	0.9	70 - 130	30	
Isopropylbenzene	ND	250	87	74	16.1	96	101	5.1	70 - 130	30	
m&p-Xylene	ND	250	88	71	21.4	96	98	2.1	70 - 130	30	
Methyl ethyl ketone	ND	250	99	96	3.1	99	107	7.8	70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	250	89	75	17.1	98	93	5.2	70 - 130	30	
Methylene chloride	ND	250	72	61	16.5	81	85	4.8	70 - 130	30	l
Naphthalene	ND	250	118	102	14.5	109	111	1.8	70 - 130	30	
n-Butylbenzene	ND	250	102	86	17.0	108	110	1.8	70 - 130	30	
n-Propylbenzene	ND	250	90	76	16.9	100	103	3.0	70 - 130	30	
o-Xylene	ND	250	88	73	18.6	97	99	2.0	70 - 130	30	
p-Isopropyltoluene	ND	250	94	78	18.6	100	104	3.9	70 - 130	30	
sec-Butylbenzene	ND	250	94	80	16.1	103	107	3.8	70 - 130	30	
Styrene	ND	250	89	74	18.4	97	98	1.0	70 - 130	30	
tert-Butylbenzene	ND	250	87	74	16.1	96	102	6.1	70 - 130	30	
Tetrachloroethene	ND	250	88	70	22.8	100	101	1.0	70 - 130	30	
Tetrahydrofuran (THF)	ND	250	88	89	1.1	89	97	8.6	70 - 130	30	
Toluene	ND	250	87	71	20.3	99	101	2.0	70 - 130	30	
trans-1,2-Dichloroethene	ND	250	75	50	40.0	118	113	4.3	70 - 130	30	l,r
trans-1,3-Dichloropropene	ND	250	88	76	14.6	91	95	4.3	70 - 130	30	
trans-1,4-dichloro-2-butene	ND	250	101	92	9.3	92	99	7.3	70 - 130	30	
Trichloroethene	ND	250	82	65	23.1	92	95	3.2	70 - 130	30	l
Trichlorofluoromethane	ND	250	24	18	28.6	31	29	6.7	70 - 130	30	l,m
Trichlorotrifluoroethane	ND	250	80	63	23.8	96	96	0.0	70 - 130	30	l
Vinyl chloride	ND	250	76	60	23.5	89	92	3.3	70 - 130	30	l
% 1,2-dichlorobenzene-d4	95	%	102	101	1.0	101	102	1.0	70 - 130	30	
% Bromofluorobenzene	99	%	100	98	2.0	101	101	0.0	70 - 130	30	
% Dibromofluoromethane	97	%	98	98	0.0	97	99	2.0	70 - 130	30	
% Toluene-d8	94	%	101	101	0.0	102	102	0.0	70 - 130	30	

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 560761 (ug/kg), QC Sample No: CH48017 (CH47923, CH47924)

Volatiles - Sediment (Low Level)

1,1,1,2-Tetrachloroethane	ND	5.0	97	92	5.3	93	91	2.2	70 - 130	30	
1,1,1-Trichloroethane	ND	5.0	97	93	4.2	86	86	0.0	70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0	94	91	3.2	94	90	4.3	70 - 130	30	
1,1,2-Trichloroethane	ND	5.0	89	85	4.6	88	84	4.7	70 - 130	30	
1,1-Dichloroethane	ND	5.0	92	89	3.3	85	83	2.4	70 - 130	30	
1,1-Dichloroethene	ND	5.0	93	91	2.2	84	83	1.2	70 - 130	30	
1,1-Dichloropropene	ND	5.0	92	89	3.3	89	90	1.1	70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0	104	95	9.0	103	100	3.0	70 - 130	30	
1,2,3-Trichloropropane	ND	5.0	90	88	2.2	90	88	2.2	70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0	103	97	6.0	98	96	2.1	70 - 130	30	
1,2,4-Trimethylbenzene	ND	1.0	97	92	5.3	91	89	2.2	70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0	104	99	4.9	98	95	3.1	70 - 130	30	
1,2-Dibromoethane	ND	5.0	95	89	6.5	92	89	3.3	70 - 130	30	
1,2-Dichlorobenzene	ND	5.0	93	90	3.3	88	85	3.5	70 - 130	30	
1,2-Dichloroethane	ND	5.0	87	85	2.3	87	84	3.5	70 - 130	30	

QA/QC Data

SDG I.D.: GCH47923

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,2-Dichloropropane	ND	5.0	90	87	3.4	90	88	2.2	70 - 130	30	
1,3,5-Trimethylbenzene	ND	1.0	95	91	4.3	91	89	2.2	70 - 130	30	
1,3-Dichlorobenzene	ND	5.0	96	92	4.3	88	86	2.3	70 - 130	30	
1,3-Dichloropropane	ND	5.0	90	86	4.5	91	87	4.5	70 - 130	30	
1,4-Dichlorobenzene	ND	5.0	93	89	4.4	85	83	2.4	70 - 130	30	
2,2-Dichloropropane	ND	5.0	111	105	5.6	89	90	1.1	70 - 130	30	
2-Chlorotoluene	ND	5.0	95	91	4.3	92	90	2.2	70 - 130	30	
2-Hexanone	ND	25	102	97	5.0	99	95	4.1	70 - 130	30	
2-Isopropyltoluene	ND	5.0	96	92	4.3	92	90	2.2	70 - 130	30	
4-Chlorotoluene	ND	5.0	95	90	5.4	89	88	1.1	70 - 130	30	
4-Methyl-2-pentanone	ND	25	102	99	3.0	100	97	3.0	70 - 130	30	
Acetone	ND	10	78	81	3.8	67	64	4.6	70 - 130	30	m
Acrylonitrile	ND	5.0	90	87	3.4	81	78	3.8	70 - 130	30	
Benzene	ND	1.0	94	90	4.3	91	90	1.1	70 - 130	30	
Bromobenzene	ND	5.0	92	88	4.4	90	86	4.5	70 - 130	30	
Bromochloromethane	ND	5.0	93	90	3.3	85	83	2.4	70 - 130	30	
Bromodichloromethane	ND	5.0	92	90	2.2	90	88	2.2	70 - 130	30	
Bromoform	ND	5.0	96	91	5.3	89	87	2.3	70 - 130	30	
Bromomethane	ND	5.0	82	80	2.5	74	74	0.0	70 - 130	30	
Carbon Disulfide	ND	5.0	95	93	2.1	84	85	1.2	70 - 130	30	
Carbon tetrachloride	ND	5.0	94	89	5.5	79	82	3.7	70 - 130	30	
Chlorobenzene	ND	5.0	94	90	4.3	91	90	1.1	70 - 130	30	
Chloroethane	ND	5.0	77	74	4.0	70	70	0.0	70 - 130	30	
Chloroform	ND	5.0	92	88	4.4	83	82	1.2	70 - 130	30	
Chloromethane	ND	5.0	90	84	6.9	72	72	0.0	70 - 130	30	
cis-1,2-Dichloroethene	ND	5.0	86	83	3.6	81	79	2.5	70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0	98	93	5.2	90	88	2.2	70 - 130	30	
Dibromochloromethane	ND	3.0	98	93	5.2	95	91	4.3	70 - 130	30	
Dibromomethane	ND	5.0	88	85	3.5	87	83	4.7	70 - 130	30	
Dichlorodifluoromethane	ND	5.0	91	87	4.5	80	79	1.3	70 - 130	30	
Ethylbenzene	ND	1.0	95	91	4.3	93	91	2.2	70 - 130	30	
Hexachlorobutadiene	ND	5.0	101	94	7.2	93	92	1.1	70 - 130	30	
Isopropylbenzene	ND	1.0	96	92	4.3	94	93	1.1	70 - 130	30	
m&p-Xylene	ND	2.0	98	93	5.2	94	92	2.2	70 - 130	30	
Methyl ethyl ketone	ND	5.0	95	97	2.1	89	86	3.4	70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	1.0	94	91	3.2	87	84	3.5	70 - 130	30	
Methylene chloride	ND	5.0	89	87	2.3	71	70	1.4	70 - 130	30	
Naphthalene	ND	5.0	110	100	9.5	110	106	3.7	70 - 130	30	
n-Butylbenzene	ND	1.0	101	95	6.1	92	92	0.0	70 - 130	30	
n-Propylbenzene	ND	1.0	97	93	4.2	92	91	1.1	70 - 130	30	
o-Xylene	ND	2.0	96	92	4.3	94	91	3.2	70 - 130	30	
p-Isopropyltoluene	ND	1.0	99	94	5.2	92	92	0.0	70 - 130	30	
sec-Butylbenzene	ND	1.0	103	98	5.0	98	97	1.0	70 - 130	30	
Styrene	ND	5.0	94	89	5.5	90	85	5.7	70 - 130	30	
tert-Butylbenzene	ND	1.0	96	92	4.3	93	91	2.2	70 - 130	30	
Tetrachloroethene	ND	5.0	94	90	4.3	90	90	0.0	70 - 130	30	
Tetrahydrofuran (THF)	ND	5.0	86	83	3.6	80	77	3.8	70 - 130	30	
Toluene	ND	1.0	95	90	5.4	90	89	1.1	70 - 130	30	
trans-1,2-Dichloroethene	ND	5.0	99	95	4.1	88	87	1.1	70 - 130	30	
trans-1,3-Dichloropropene	ND	5.0	101	97	4.0	93	91	2.2	70 - 130	30	
trans-1,4-dichloro-2-butene	ND	5.0	118	111	6.1	101	98	3.0	70 - 130	30	
Trichloroethene	ND	5.0	93	90	3.3	90	89	1.1	70 - 130	30	
Trichlorofluoromethane	ND	5.0	82	79	3.7	74	74	0.0	70 - 130	30	

QA/QC Data

SDG I.D.: GCH47923

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
Trichlorotrifluoroethane	ND	5.0	98	94	4.2	87	88	1.1	70 - 130	30
Vinyl chloride	ND	5.0	85	82	3.6	76	76	0.0	70 - 130	30
% 1,2-dichlorobenzene-d4	98	%	100	100	0.0	100	100	0.0	70 - 130	30
% Bromofluorobenzene	101	%	100	99	1.0	100	99	1.0	70 - 130	30
% Dibromofluoromethane	98	%	102	101	1.0	91	93	2.2	70 - 130	30
% Toluene-d8	102	%	100	100	0.0	98	98	0.0	70 - 130	30

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 560931H (ug/kg), QC Sample No: CH48072 (CH47926 (50X))

Volatiles - Sediment (High Level)

1,2,3-Trichlorobenzene	ND	5.0	102	112	9.3	101	110	8.5	70 - 130	30
1,2,3-Trichloropropane	ND	5.0	79	90	13.0	93	93	0.0	70 - 130	30
1,2,4-Trichlorobenzene	ND	5.0	102	112	9.3	101	108	6.7	70 - 130	30
1,2,4-Trimethylbenzene	ND	5.0	89	97	8.6	99	100	1.0	70 - 130	30
1,2-Dichlorobenzene	ND	5.0	86	96	11.0	96	99	3.1	70 - 130	30
1,3,5-Trimethylbenzene	ND	5.0	87	95	8.8	97	98	1.0	70 - 130	30
1,3-Dichlorobenzene	ND	5.0	88	97	9.7	97	99	2.0	70 - 130	30
1,4-Dichlorobenzene	ND	5.0	88	97	9.7	96	97	1.0	70 - 130	30
2-Chlorotoluene	ND	5.0	87	96	9.8	99	100	1.0	70 - 130	30
2-Isopropyltoluene	ND	5.0	86	96	11.0	99	100	1.0	70 - 130	30
4-Chlorotoluene	ND	5.0	87	96	9.8	96	99	3.1	70 - 130	30
Bromobenzene	ND	5.0	86	95	9.9	99	98	1.0	70 - 130	30
Isopropylbenzene	ND	5.0	86	95	9.9	99	99	0.0	70 - 130	30
Naphthalene	ND	5.0	95	107	11.9	100	106	5.8	70 - 130	30
n-Butylbenzene	ND	5.0	99	108	8.7	106	108	1.9	70 - 130	30
n-Propylbenzene	ND	5.0	90	97	7.5	100	101	1.0	70 - 130	30
sec-Butylbenzene	ND	5.0	93	102	9.2	104	105	1.0	70 - 130	30
tert-Butylbenzene	ND	5.0	87	94	7.7	98	99	1.0	70 - 130	30
trans-1,4-dichloro-2-butene	ND	5.0	91	99	8.4	97	97	0.0	70 - 130	30
% 1,2-dichlorobenzene-d4	96	%	99	101	2.0	101	102	1.0	70 - 130	30
% Bromofluorobenzene	100	%	101	102	1.0	102	102	0.0	70 - 130	30
% Dibromofluoromethane	97	%	90	99	9.5	91	98	7.4	70 - 130	30
% Toluene-d8	95	%	102	103	1.0	103	103	0.0	70 - 130	30

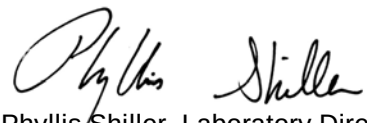
Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
m = This parameter is outside laboratory MS/MSD specified recovery limits.
r = This parameter is outside laboratory RPD specified recovery limits.
s = This parameter is outside laboratory Blank Surrogate specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference



Phyllis Shiller, Laboratory Director
January 26, 2021

Tuesday, January 26, 2021

Criteria: CT: GAM, RC

State: CT

Sample Criteria Exceedances Report

GCH47923 - GZACTENG

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CH47923	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR DEC RES (mg/kg) / APS Organics	1900	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benzo(a)pyrene	CT / RSR DEC RES (mg/kg) / Semivolatiles	2300	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR DEC RES (mg/kg) / Semivolatiles	1900	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benz(a)anthracene	CT / RSR DEC RES (mg/kg) / Semivolatiles	2200	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Chrysene	CT / RSR GA,GAA (mg/kg) / APS Organics	4000	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR GA,GAA (mg/kg) / APS Organics	1900	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benzo(ghi)perylene	CT / RSR GA,GAA (mg/kg) / APS Organics	1300	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	6600	13	4000	4000	ug/Kg
CH47923	$8100SEDSIM	Benzo(k)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	2000	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	1900	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benzo(a)pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	2300	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Benz(a)anthracene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	2200	13	1000	1000	ug/Kg
CH47923	$8100SEDSIM	Fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	7600	13	5600	5600	ug/Kg
CH47923	$PEST_SMR	4,4' -DDE	CT / RSR GA,GAA (mg/kg) / APS Organics	35	12	3	3	ug/Kg
CH47923	$PEST_SMR	4,4' -DDD	CT / RSR GA,GAA (mg/kg) / APS Organics	21	12	3	3	ug/Kg
CH47923	$PEST_SMR	4,4' -DDT	CT / RSR GA,GAA (mg/kg) / APS Organics	9.2	2.5	3	3	ug/Kg
CH47923	AS-SM	Arsenic	CT / RSR DEC RES (mg/kg) / Inorganics	10.7	2.6	10	10	mg/Kg
CH47924	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR DEC RES (mg/kg) / APS Organics	3200	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benzo(a)pyrene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4700	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benz(a)anthracene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4100	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4400	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benzo(ghi)perylene	CT / RSR GA,GAA (mg/kg) / APS Organics	1300	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR GA,GAA (mg/kg) / APS Organics	3200	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Chrysene	CT / RSR GA,GAA (mg/kg) / APS Organics	4800	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4400	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Benzo(a)pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4700	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	9500	8.3	5600	5600	ug/Kg
CH47924	$8100SEDSIM	Benz(a)anthracene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4100	8.3	1000	1000	ug/Kg
CH47924	$8100SEDSIM	Phenanthrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4200	8.3	4000	4000	ug/Kg
CH47924	$8100SEDSIM	Pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	7900	8.3	4000	4000	ug/Kg
CH47924	$8100SEDSIM	Benzo(k)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	3600	8.3	1000	1000	ug/Kg
CH47924	$ETPH_SMR	Ext. Petroleum H.C. (C9-C36)	CT / RSR DEC RES (mg/kg) / Pest/PCB/TPH	870	120	500	500	mg/Kg
CH47924	$ETPH_SMR	Ext. Petroleum H.C. (C9-C36)	CT / RSR GA,GAA (mg/kg) / Pesticides/TPH	870	120	500	500	mg/Kg
CH47924	$PEST_SMR	4,4' -DDE	CT / RSR GA,GAA (mg/kg) / APS Organics	11	8.3	3	3	ug/Kg
CH47924	$PEST_SMR	4,4' -DDD	CT / RSR GA,GAA (mg/kg) / APS Organics	5.5	1.7	3	3	ug/Kg
CH47924	$PEST_SMR	4,4' -DDT	CT / RSR GA,GAA (mg/kg) / APS Organics	5.4	1.7	3	3	ug/Kg
CH47925	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR DEC RES (mg/kg) / APS Organics	3300	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Benz(a)anthracene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4200	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Benzo(a)pyrene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4800	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR DEC RES (mg/kg) / Semivolatiles	4600	4.9	1000	1000	ug/Kg

Tuesday, January 26, 2021

Criteria: CT: GAM, RC

State: CT

Sample Criteria Exceedances Report

GCH47923 - GZACTENG

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CH47925	$8100SEDSIM	Benzo(ghi)perylene	CT / RSR GA,GAA (mg/kg) / APS Organics	3000	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR GA,GAA (mg/kg) / APS Organics	3300	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Chrysene	CT / RSR GA,GAA (mg/kg) / APS Organics	4600	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Phenanthrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	5900	4.9	4000	4000	ug/Kg
CH47925	$8100SEDSIM	Fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	9500	4.9	5600	5600	ug/Kg
CH47925	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4600	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	8500	4.9	4000	4000	ug/Kg
CH47925	$8100SEDSIM	Benzo(a)pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4800	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Benz(a)anthracene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	4200	4.9	1000	1000	ug/Kg
CH47925	$8100SEDSIM	Benzo(k)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	3300	4.9	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR DEC RES (mg/kg) / APS Organics	1900	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR DEC RES (mg/kg) / Semivolatiles	1700	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(a)pyrene	CT / RSR DEC RES (mg/kg) / Semivolatiles	2000	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benz(a)anthracene	CT / RSR DEC RES (mg/kg) / Semivolatiles	2200	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(ghi)perylene	CT / RSR GA,GAA (mg/kg) / APS Organics	1400	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Chrysene	CT / RSR GA,GAA (mg/kg) / APS Organics	2100	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Indeno(1,2,3-cd)pyrene	CT / RSR GA,GAA (mg/kg) / APS Organics	1900	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(a)pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	2000	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(b)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	1700	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Benzo(k)fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	1800	11	1000	1000	ug/Kg
CH47926	$8100SEDSIM	Fluoranthene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	7300	11	5600	5600	ug/Kg
CH47926	$8100SEDSIM	Pyrene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	5900	11	4000	4000	ug/Kg
CH47926	$8100SEDSIM	Benz(a)anthracene	CT / RSR GA,GAA (mg/kg) / Semivolatiles	2200	11	1000	1000	ug/Kg
CH47926	$PEST_SMR	4,4' -DDE	CT / RSR GA,GAA (mg/kg) / APS Organics	18	11	3	3	ug/Kg
CH47926	$PEST_SMR	4,4' -DDD	CT / RSR GA,GAA (mg/kg) / APS Organics	8.4	2.2	3	3	ug/Kg
CH47926	$PEST_SMR	4,4' -DDT	CT / RSR GA,GAA (mg/kg) / APS Organics	5.0	2.2	3	3	ug/Kg
CH47928	$PEST_SMR	4,4' -DDD	CT / RSR GA,GAA (mg/kg) / APS Organics	6.7	1.9	3	3	ug/Kg

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** GZA GeoEnvironmental, Inc.

Project Location: UCONN-MIRROR LAKE ***Project Number:***

Laboratory Sample ID(s): CH47923-CH47930 ***Sampling Date(s):*** 1/18/2021

List RCP Methods Used (e.g., 8260, 8270, et cetera) 6010, 7470/7471, 8081, 8082, 8260, 8270, ETPH

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☑ Yes ☐ No ☐ NA
4	**Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents acheived? See Sections: SVOASIM Narration, VOA Narration.**	☐ Yes ☑ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?** **b) Were these reporting limits met?**	☑ Yes ☐ No ☑ Yes ☐ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☑ Yes ☐ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Tuesday, January 26, 2021

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

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SDG Comments

Metals Analysis:
The client requested a shorter list of elements than the 6010 RCP list. Only the RCRA 8 Metals are reported as requested on the chain of custody.

8270 Semi-volatile Organics:
The client requested a short list for 8270 RCP Semivolatile. Only the PAH constituents are reported as requested on the chain-of-custody.

ETPH Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-FID22 01/19/21-1 Jeff Bucko, Chemist 01/19/21

CH47923 (1X), CH47924 (1X), CH47925 (1X), CH47926 (1X), CH47927 (1X), CH47928 (1X)

The initial calibration (ETPHD14I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (119A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:
Samples: CH47923, CH47924, CH47925, CH47926, CH47927, CH47928
Preceding CC 119A016 - None.
Succeeding CC 119A029 - ETPH (C9-C36) 70%H (30%)

QC (Batch Specific):

Batch 560492 (CH48025)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 60 - 120 with the following exceptions: None.
All LCSD recoveries were within 60 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Mercury Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

MERLIN 01/19/21 07:34 Rick Schweitzer, Chemist 01/19/21

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

The method preparation blank, ICB, and CCBs contain all of the acids and reagents as the samples.
The initial calibration met all criteria including a standard run at or below the reporting level.
All calibration verification standards (ICV, CCV) met criteria.
All calibration blank verification standards (ICB, CCB) met criteria.
The matrix spike sample is used to identify spectral interference for each batch of samples, if within 85-115%, no interference is observed and no further action is taken.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.

QC (Batch Specific):

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Mercury Narration

Batch 560545 (CH48017)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

ARCOS-2 01/18/21 10:43 Emily Kolominskaya, Chemist 01/18/21

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 560488 (CH47890)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

PCB Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-ECD29 01/19/21-1 Saadia Chudary, Chemist 01/19/21

CH47923 (10X), CH47924 (10X), CH47925 (10X), CH47926 (10X), CH47927 (10X), CH47928 (10X)

The initial calibration (PC1218AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PC1218BI) RSD for the compound list was less than 20% except for the following compounds: None.
The continuing calibration %D for the compound list was less than 15% except for the following compounds:None.

QC (Batch Specific):

Batch 560465 (CH48005)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.

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SDG I.D.: GCH47923

PCB Narration

PEST Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-ECD35 01/19/21-1 Adam Werner, Chemist 01/19/21

CH47925 (2X)

The initial calibration (PS0119AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PS0119BI) RSD for the compound list was less than 20% except for the following compounds: None.
The Endrin and DDT breakdown does not exceed 15% except for the following compounds:None.
The Endrin and DDT breakdown does not exceed the maximum of 20% except for the following compounds:None.
The continuing calibration %D for the compound list was less than 20% except for the following compounds:None.

AU-ECD35 01/20/21-1 Chelsey Guerette, Chemist 01/20/21

CH47923 (1X), CH47926 (1X)

The initial calibration (PS0120AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PS0120BI) RSD for the compound list was less than 20% except for the following compounds: None.
The Endrin and DDT breakdown does not exceed 15% except for the following compounds:None.
The Endrin and DDT breakdown does not exceed the maximum of 20% except for the following compounds:None.
The continuing calibration %D for the compound list was less than 20% except for the following compounds:None.

AU-ECD35 01/22/21-1 Chelsey Guerette, Chemist 01/22/21

CH47924 (1X)

The initial calibration (PS0120AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PS0120BI) RSD for the compound list was less than 20% except for the following compounds: None.
The Endrin and DDT breakdown does not exceed 15% except for the following compounds:None.
The Endrin and DDT breakdown does not exceed the maximum of 20% except for the following compounds:None.
The continuing calibration %D for the compound list was less than 20% except for the following compounds:None.

AU-ECD7 01/19/21-1 Chelsey Guerette, Chemist 01/19/21

CH47927 (2X), CH47928 (2X)

The initial calibration (PS0113AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PS0113BI) RSD for the compound list was less than 20% except for the following compounds: None.
The Endrin and DDT breakdown does not exceed 15% except for the following compounds:None.
The Endrin and DDT breakdown does not exceed the maximum of 20% except for the following compounds:None.
The continuing calibration %D for the compound list was less than 20% except for the following compounds:
Samples: CH47927, CH47928
Preceding CC 119A047 - Endrin -25%L (20%)
Succeeding CC 119A060 - Aldrin -22%L (20%), Endrin -23%L (20%)
A low "1A" standard was run after the samples to demonstrate capability to detect any compounds outside of the CC acceptance criteria. All reported samples were ND for the affected compounds.

QC (Batch Specific):

Batch 560469 (CH48005)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.

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PEST Narration

All LCS/LCSD RPDs were less than 30% with the following exceptions: None.

SVOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

CHEM07 01/20/21-1 Wes Bryon, Chemist 01/20/21

CH47923 (1X), CH47924 (1X), CH47925 (1X), CH47926 (1X), CH47928 (1X)

For 8270 full list, the DDT breakdown and pentachlorophenol & benzidine peak tailing were evaluated in the DFTPP tune and were found to be in control.
For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM07/7_BN_0111):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM07/0120_03-7_BN_0111):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Site Specific):

Batch 560514 (CH47927)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 30 - 130 with the following exceptions: None.
All LCSD recoveries were within 30 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 30 - 130 with the following exceptions: Fluoranthene(171%), Pyrene(163%)
All MSD recoveries were within 30 - 130 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: Benz(a)anthracene(47.8%), Benzo(a)pyrene(38.8%), Benzo(ghi)perylene(32.1%), Benzo(k)fluoranthene(55.9%), Chrysene(52.6%), Fluoranthene(80.3%), Phenanthrene(68.8%), Pyrene(73.9%)
A matrix effect is suspected when a MS/MSD recovery is outside of criteria. No further action is required if LCS/LCSD compounds are within criteria.
FORMED PRECIPITATE DURING CONCENTRATION
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)
Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

SVOASIM Narration

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SVOASIM Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 560514 (Samples: CH47923, CH47924, CH47925, CH47926, CH47927, CH47928): -----

The blank surrogate was below criteria. (% Nitrobenzene-d5(CH47927))

The MS and/or the MSD recovery is above the upper range, therefore a slight high bias is possible. (Fluoranthene, Pyrene)

The MS/MSD RPD exceeds the method criteria for one or more analytes, therefore there may be variability in the reported result. (Benz(a)anthracene, Benzo(a)pyrene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Fluoranthene, Phenanthrene, Pyrene)

Instrument:

CHEM25 01/19/21-1 Wes Bryon, Chemist 01/19/21

CH47923 (1X), CH47924 (1X), CH47925 (1X), CH47926 (1X), CH47927 (1X), CH47928 (1X)

For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM25/25_SIM18_0115):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM25/0119_03-25_SIM18_0115):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Site Specific):

Batch 560514 (CH47927)

CH47923, CH47924, CH47925, CH47926, CH47927, CH47928

All LCS recoveries were within 30 - 130 with the following exceptions: None.
All LCSD recoveries were within 30 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 30 - 130 with the following exceptions: Fluoranthene(171%), Pyrene(163%)
All MSD recoveries were within 30 - 130 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: Benz(a)anthracene(47.8%), Benzo(a)pyrene(38.8%), Benzo(ghi)perylene(32.1%), Benzo(k)fluoranthene(55.9%), Chrysene(52.6%), Fluoranthene(80.3%), Phenanthrene(68.8%), Pyrene(73.9%)
A matrix effect is suspected when a MS/MSD recovery is outside of criteria. No further action is required if LCS/LCSD compounds are within criteria.
FORMED PRECIPITATE DURING CONCENTRATION
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

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SVOASIM Narration

VOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 560746 (Samples: CH47925, CH47926, CH47927, CH47928, CH47929): -----

The LCS/LCSD RPD exceeds the method criteria for one or more analytes, but these analytes were not reported in the sample(s) so no variability is suspected. (Acetone, trans-1,2-Dichloroethene)

QC Batch 560746H: -----

One or more analytes is below the method criteria. A low bias for these analytes is possible. (Acetone)

The LCS and/or the LCSD recovery is below the method criteria. All of the other QC is acceptable, therefore no significant bias is suspected. (1,1,1,2-Tetrachloroethane, 1,1,1-Trichloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, 1,1-Dichloropropene, 2,2-Dichloropropane, Benzene, Bromochloromethane, Bromoform, Carbon Disulfide, Carbon tetrachloride, Chloroform, Chloromethane, cis-1,2-Dichloroethene, Dichlorodifluoromethane, Methylene chloride, trans-1,2-Dichloroethene, Trichloroethene, Trichlorotrifluoroethane, Vinyl chloride)

The LCS/LCSD RPD exceeds the method criteria for one or more analytes, but these analytes were not reported in the sample(s) so no variability is suspected. (Acrylonitrile, Carbon tetrachloride, Chloroform, trans-1,2-Dichloroethene)

The QC recoveries for one or more analytes is below the method criteria. A slight low bias is likely. (Bromomethane, Chloroethane, Trichlorofluoromethane)

Instrument:

CHEM03 01/19/21-2 Jane Li, Chemist 01/19/21

CH47923 (1X), CH47924 (1X)

Initial Calibration Evaluation (CHEM03/VT-L011921):
94% of target compounds met criteria.
The following compounds had %RSDs >20%: 2,2-Dichloropropane 29% (20%), Acetone 26% (20%), Chloroethane 22% (20%), trans-1,3-Dichloropropene 26% (20%), trans-1,4-dichloro-2-butene 39% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Acetone 0.082 (0.1), Tetrachloroethene 0.164 (0.2)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM03/0119_08-VT-L011921):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

CHEM14 01/19/21-1 Jane Li, Chemist 01/19/21

CH47925 (1X), CH47926 (1X), CH47927 (1X), CH47928 (1X), CH47929 (1X), CH47930 (50X)

Initial Calibration Evaluation (CHEM14/VT011821):
96% of target compounds met criteria.
The following compounds had %RSDs >20%: 1,2-Dibromo-3-chloropropane 21% (20%), Acetone 23% (20%), Methylene chloride

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VOA Narration

21% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Acetone 0.066 (0.1), Bromoform 0.096 (0.1), Tetrachloroethene 0.179 (0.2)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM14/0119_01-VT011821):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
99% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

CHEM14 01/20/21-1 Jane Li, Chemist 01/20/21

CH47926 (50X)

Initial Calibration Evaluation (CHEM14/VT011821):
96% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM14/0120_02-VT011821):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

QC (Batch Specific):

Batch 560746 (CH48015) CHEM14 1/19/2021-1

CH47925(1X), CH47926(1X), CH47927(1X), CH47928(1X), CH47929(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: Acetone(39.2%), trans-1,2-Dichloroethene(32.0%)
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Batch 560746H (CH48015) CHEM14 1/19/2021-1

CH47930(50X)

All LCS recoveries were within 70 - 130 with the following exceptions: Acetone(49%), Bromomethane(51%), Chloroethane(23%), Trichlorofluoromethane(24%)
All LCSD recoveries were within 70 - 130 with the following exceptions: 1,1,1,2-Tetrachloroethane(69%), 1,1,1-Trichloroethane(62%), 1,1-Dichloroethane(59%), 1,1-Dichloroethene(58%), 1,1-Dichloropropene(64%), 2,2-Dichloropropane(67%), Acetone(45%), Benzene(68%), Bromochloromethane(66%), Bromoform(67%), Bromomethane(39%), Carbon Disulfide(61%), Carbon tetrachloride(55%), Chloroethane(17%), Chloroform(54%), Chloromethane(60%), cis-1,2-Dichloroethene(58%), Dichlorodifluoromethane(61%), Methylene chloride(61%), trans-1,2-Dichloroethene(50%), Trichloroethene(65%), Trichlorofluoromethane(18%), Trichlorotrifluoroethane(63%), Vinyl chloride(60%)
All LCS/LCSD RPDs were less than 30% with the following exceptions: Acrylonitrile(30.9%), Carbon tetrachloride(30.8%), Chloroform(38.8%), trans-1,2-Dichloroethene(40.0%)

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

RCP Certification Report

January 26, 2021

SDG I.D.: GCH47923

VOA Narration

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Batch 560761 (CH48017) CHEM03 1/19/2021-2

CH47923(1X), CH47924(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Batch 560931H (CH48072) CHEM14 1/20/2021-1

CH47926(50X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Temperature Narration

The samples were received at 1.4C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes ☐ No ☐
Coolant: IPK ☐ ICE ☐ No ☐

CHAIN OF CUSTODY RECORD

Temp 14 °C Pg 1 of 1

PHOENIX Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Data Delivery/Contact Options:
☐ Fax:
☐ Phone:
☒ Email: james.davis@gza.com

Customer: GZA
Address: 95 GLASTONBURY BLVD, 3rd FLOOR GLASTONBURY, CT

Project: UCONN - MANSFIELD CAMPUS
Report to: JAMES DAVIS
Invoice to: ↓
QUOTE #

Project P.O: GS.0046161.07

This section MUST be completed with Bottle Quantities.

Sampler's Signature: [signature] Date: 1/18/2021

Matrix Code:
DW=Drinking Water GW=Ground Water SW=Surface Water WW=Waste Water
RW=Raw Water SE=Sediment SL=Sludge S=Soil SD=Solid W=Wipe OIL=Oil
B=Bulk L=Liquid X = _____(Other)

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	VOC (8260)	RCRA-8 Metals	ETPH	PAH	PCB	Pesticide	MS/MSD*	GL Amber 8 oz. w/H3PO4	Soil VOA Vials [1] methanol [2] H2O	GL Soil container (8) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCL	GL Amber 1000ml [ ] As is [ ] HCL	PL As is [ ] 250ml [ ] 500ml [ ] H2SO4	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
47923	SD-14	SE	1/18/21	1250	X	X	X	X	X	X				3	1								
47924	SD-37	↓	↓	1310	↓	↓	↓	↓	↓	↓				3	1								
47925	SD-39			1330										3	1								
47926	SD-57			1350										3	1								
47927	SD-64			1410										3	1								
47928	SD-67	↓	↓	1430	↓	↓	↓	↓	↓	↓				3	1								
47929	TB011821 LL	↓	↓	1230	↓									3									
47930	TB HL																						

Relinquished by:	Accepted by:	Date:	Time:
[signature]	[signature]	1/18/2021	15:37

Comments, Special Requirements or Regulations:
* TAX EXEMPT *

*MS/MSD are considered site samples and will be billed as such in accordance with the prices quoted.

Turnaround Time:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other
* SURCHARGE APPLIES

RI
☐ (Residential) Direct Exposure
☐ (Comm/Industrial) Direct Exposure
☐ GA Leachability
☐ GB Leachability
☐ GA-GW Objectives
☐ GB-GW Objectives

CT
☒ RCP Cert
☐ GW Protection
☐ SW Protection
☒ GA Mobility
☐ GB Mobility
☒ Residential DEC
☐ I/C DEC
☐ Other

MA
☐ MCP Certification
☐ GW-1 ☐ MWRA eSMART
☐ GW-2 ☐ S-1 10% CALC
☐ GW-3
☐ S-1 GW-1 ☐ S-1 GW-2 ☐ S-1 GW-3
☐ S-2 GW-1 ☐ S-2 GW-2 ☐ S-2 GW-3
☐ S-3 GW-1 ☐ S-3 GW-2 ☐ S-3 GW-3
☐ SW Protection

State where samples were collected: CT

Data Format
☒ Excel
☒ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ Tier II Checklist
☐ Full Data Package*
☒ Phoenix Std Report
☐ Other
* SURCHARGE APPLIES

PEL-126 REV. 06/20

APPENDIX D – HRGS SEISMIC REFRACTION REPORT

HAGER-RICHTER
GEOSCIENCE, INC.

SEISMIC REFRACTION SURVEY
MIRROR LAKE
CONNECTICUT, NEW YORK

Prepared for:

GZA GeoEnvironmental, Inc.
95 Glastonbury Boulevard, 3rd Floor
Glastonbury, Connecticut 06033

Prepared by:

Hager-Richter Geoscience, Inc.
846 Main Street
Fords, New Jersey 08863

File 20JCC87
February 2021

HAGER-RICHTER
GEOSCIENCE, INC.

GEOPHYSICS FOR THE ENGINEERING COMMUNITY
SALEM, NEW HAMPSHIRE
Tel: 603.893.9944
FORDS, NEW JERSEY
Tel: 732.661.0555

February 2, 2021
File 20JCC87

James Davis, P.E.
Sr. Project Manager
GZA GeoEnvironmental, Inc.
95 Glastonbury Boulevard, 3rd Floor
Glastonbury, Connecticut 06033

Tel: 860.858.3157
Cell: 860.462.3016
Email: James.Davis@gza.com

RE: Seismic Refraction Survey
Mirror Lake
Storrs, Connecticut

Dear Mr. Davis:

In this report, we summarize the results of a seismic refraction survey conducted by Hager-Richter Geoscience, Inc., (HRGS) in December 2020 in support of a geotechnical investigation of the above referenced site by GZA GeoEnvironmental, Inc. (GZA). The scope of work and area of interest were specified by GZA.

INTRODUCTION

The site is located at Mirror Lake, within the UConn Campus, in Storrs, Connecticut. Figure 1 shows the general location of the site. GZA was interested in determining the depth and configuration of the bedrock along five proposed transects around the perimeter of the lake. The area of interest was relatively flat and currently surfaced by grass and soil. Based on several borings installed at the site by GZA near the spillway to the north of the lake, overburden stratigraphy was described as 10 ft of fill over 10 ft of hard till. Gneiss bedrock was encountered between 20 and 28 feet below grade. The seismic refraction lines and approximate boring locations are shown in Figure 2.

OBJECTIVE

The objective of the seismic refraction survey was to determine the depth and configuration of the bedrock surface in the accessible portions of the Site.

THE SURVEY

HRGS personnel conducted the geophysical survey on December 10-11, 2020. Amanda Fabian, Alexis Martinez, and Justin Covert of HRGS conducted the seismic refraction survey. The project was coordinated with Mr. Davis of GZA. Original data and field notes reside in the HRGS files and will be retained for a minimum of three years.

The geophysical survey was conducted using the seismic refraction method. Seismic refraction data were acquired along five transects identified as Seismic Lines 1, 2, 3, 4 and 5, totaling 1,890 feet. The locations of the seismic lines are shown in Figure 2.

The positions of the start and end points of the seismic transects were surveyed with a Trimble Geo 7X CM GPS system. Surface elevations were estimated from site plans provided by GZA and varied between approximately 576 and 591 feet for an apparent surface relief of 15 feet.

EQUIPMENT AND PROCEDURES

The seismic refraction survey was conducted using our 48-channel seismograph (two 24-channel Geometrics Geodes) coupled to 48 14-Hz geophones. Geophone spacings of 5, 6, and 7 feet were used for the seismic lines. A 12-pound sledgehammer was used as the energy source. The seismograph is connected to, and controlled by, a notebook PC computer. The software provides for the acquisition, display, plotting, filtering and storage of seismic data.

The seismic refraction data were interpreted with the Generalized Reciprocal Method (GRM). For the GRM interpretation, we used IXRefraX, commercially licensed software from Interpex Limited. GRM allows the depth to bedrock to be determined for *each* geophone location, rather than only at the shot points as for most other methods, and it is less sensitive to the presence of dipping interfaces and hidden layers. The GRM method requires at least seven "shots" per cable spread -- one shot off each end of the cable, one shot at each end of the cable, and three shots interior to the cable. This configuration provides reversed profiles.

LIMITATIONS OF THE METHOD

> IN GENERAL, THE ACCURACY (STANDARD DEVIATION) OF THE APPARENT DEPTHS OF RELATIVELY COMPETENT BEDROCK DETERMINED BY THE SEISMIC REFRACTION METHOD IS ABOUT ± 10% OF THE APPARENT DEPTH OF BEDROCK, OR ± 2 FEET, WHICHEVER IS GREATER. **BEDROCK MODELS SHOWN AS PROFILES OR LISTED AS TABULAR DATA SHOULD NOT BE RELIED ON SOLELY FOR CONTRACT BEDROCK REMOVAL QUANTITIES.**

As with all geophysical methods, the seismic refraction method assumes that the local geology is relatively uncomplicated. In particular, the seismic refraction method assumes that interfaces between geologic materials correlate with sharp increases in seismic velocity and that the interfaces between geologic units are relatively flat lying. The method is not very sensitive to lateral variations within layers, and relatively subtle features such as fracture zones within bedrock generally cannot be detected unless there is a topographic expression of the feature and/or a significant drop in bedrock velocity. The accuracy of the method is degraded in areas with strong topographic relief and/or where the interfaces have apparent dips greater than about 20°. ***In general, the accuracy of depths determined is estimated to be about 10% or 2 feet, whichever is greater. The results of this survey should not be relied upon for contract bedrock removal quantities.***

Where two materials do not exhibit contrasting velocities, or where velocities gradually increase with depth, a clear refracted signal is not generated, and the seismic refraction method cannot be used to distinguish the two materials. In some cases, the "geophysical contact" between materials with contrasting velocities does not correlate exactly with the "geologic contact." For example, where a highly weathered bedrock is overlain by a dense material such as till, the velocity range of the weathered bedrock might overlap or approach the velocity range of the till, and the two materials cannot be distinguished seismically. In such cases, the depth determined by seismic refraction is the depth of *competent* bedrock, which might be located at some depth below the geologic contact.

The depth relations of the water table and bedrock may constitute a significant problem for the seismic refraction technique. This problem is that of a "blind layer." A blind layer occurs where the thickness of the saturated overburden is less than about half the depth of bedrock. In such cases, the water-saturated material immediately above bedrock is "blind" in the sense that no refracted seismic energy from it will be received as a first arrival of seismic energy, and all methods used to reduce the seismic data to determine the depth of bedrock, the objective of this survey, use *only* first arrivals. Thus, the saturated layer will not be detected where it is close to bedrock, and most methods of seismic data reduction will indicate that bedrock is considerably shallower than it is. Although GRM, the method used by HRGS to reduce the seismic refraction data, does not use first arrivals through the water saturated zone (because there is none to use) in such cases, GRM determines the depth of bedrock correctly by using the *average* velocity of the saturated and unsaturated zones.

A "hidden layer" occurs where a lower velocity material underlies a higher velocity material, a common situation in stratified sediments. An example is where sands are present under layers of clay or till. As in the case of a "blind layer," most methods of seismic refraction data reduction will indicate that bedrock is deeper than it is if a hidden layer is present but not detected. Internal tests in the seismic refraction data reduction software that we use (IXRefraX by Interpex) indicate that such layers might be present, and an average velocity of the two layers is used to determine the depth of bedrock

RESULTS

General. The seismic refraction survey consisted of five seismic lines, identified as Seismic Lines 1 through 5. The locations of the seismic lines are shown in Figure 2. The integrated results of the survey are shown in profile form in Figures 3 thru 7 for Seismic Lines 1, 2, 3, 4 and 5, respectively, and are listed in Table 1.

Data Quality. The quality of the seismic refraction data ranges from good to excellent. A measure of the accuracy of the data can be obtained by comparing the results at seismic line intersections or by comparing the seismically determined depths with depths in borings that intersect bedrock. The seismic lines were arranged as an approximate ring around the lake, so

they did not intersect. The distance between adjacent line ends is generally greater than about 20 feet, thus the seismically determined depths at adjacent line ends are not directly comparable.

The locations and bedrock depths based on the information from test borings were provided by GZA. Only one borehole was installed near Seismic Line 5, approximately 20 feet south of the seismic line and the difference between bedrock depth at the borehole location and the depth determined seismically near the borehole are not comparable due to the relatively far distance between them.

Based on the results for similar projects, we estimate the accuracy (standard deviation) of the depths of competent bedrock determined by the seismic refraction survey to be about ± 10% of the depth of bedrock, or ± 2 feet), whichever is greater.

As noted above, the depth determined by seismic refraction is the depth of competent bedrock, which might be located at a depth somewhat below the depth of refusal, or within the area designated as weathered bedrock in the boring logs.

Interpretation of Velocities. The results of the seismic refraction survey are shown as profiles in Figures 3-7 and in tabular form in Table 1. Based on the interpretation obtained with the GRM method, materials with three distinct velocity ranges were detected. The upper material (Layer 1) exhibits compressional wave velocities ranging between about 1,080 feet per second (fps) to 1,470 fps and is interpreted to consist of fill/unsaturated soils. The middle layer exhibits compressional wave velocities ranging between 2,420 and 6,400 ft/s and is interpreted to consist of partially saturated soils/hard till. The lower material exhibits compressional wave velocities ranging between 12,000 and 18,220 fps and is interpreted as competent gneiss bedrock.

Bedrock Depths and Configuration. The results of the seismic refraction survey are shown in profile form in Figures 3-7 and are listed in Table 1. The depth of competent bedrock along the Seismic Lines varies between about 7 and about 28 feet below ground surface. The elevation of competent bedrock in the locations surveyed varies between approximately 553 feet and 581 feet, an apparent relief of 28 feet.

CONCLUSIONS

Based on the seismic refraction survey conducted by Hager-Richter Geoscience, Inc. at Mirror Lake, within the UConn Campus, in Storrs, Connecticut, we conclude the following:

- The depth of competent bedrock varies between approximately 7 and 28 feet below ground surface.

- Bedrock elevation in the area surveyed varies between approximately 553 feet and 581 feet, an apparent relief of 28 feet.

LIMITATIONS ON USE OF THE REPORT

This Report was prepared for the exclusive use of GZA Geoenvironmental, Inc. (Client). No other party shall be entitled to rely on this Report or any information, documents, records, data, interpretations, advice or opinions given to Client by Hager-Richter Geoscience, Inc. (HRGS) in the performance of its work. The Report relates solely to the specific project for which HRGS has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of HRGS. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to HRGS.

HRGS has used reasonable care, skill, competence, and judgment in the preparation of this Report consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by HRGS should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, HRGS makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this report, please contact us at your convenience. It has been a pleasure to work with you on this project.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.
dba HR Geological Services in New York

José Carlos Cambero Calzada, P.G. (NY 000899)
Senior Geophysicist

Attachments: Figures 1 – 7

Table 1 - Seismic Refraction Results

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
1	1136791.5	855106.6	0	13640	15.1	589	573.9
1	1136791.4	855113.6	7	13640	14.1	588.8	574.7
1	1136791.2	855120.6	14	14495	13.9	588.6	574.7
1	1136791.1	855127.6	21	15946	11.8	588.5	576.6
1	1136791	855134.6	28	15946	8.6	588.3	579.7
1	1136790.9	855141.6	35	15946	8.2	588.1	579.9
1	1136790.6	855148.6	42	15946	10.7	587.9	577.2
1	1136790.5	855155.6	49	15946	18.4	587.8	569.4
1	1136790.4	855162.6	56	15946	20.4	587.7	567.3
1	1136790.2	855169.6	63	15621	19.9	587.6	567.8
1	1136790	855176.6	70	15621	19.1	587.5	568.5
1	1136789.9	855183.6	77	15621	17	587.4	570.5
1	1136789.8	855190.6	84	15621	17.8	587.3	569.6
1	1136789.6	855197.6	91	15621	18.8	587.2	568.4
1	1136789.4	855204.6	98	15621	20.2	587.1	566.9
1	1136789.2	855211.6	105	15621	19.8	587	567.2
1	1136789.1	855218.6	112	15621	18.9	587	568.1
1	1136789	855225.6	119	15621	20.6	587	566.4
1	1136788.8	855232.6	126	15621	22.9	587	564.1
1	1136788.6	855239.6	133	16034	25.1	587	561.9
1	1136788.5	855246.6	140	16034	25.6	587	561.4
1	1136788.4	855253.6	147	16034	25	587	562
1	1136788.1	855260.6	154	16034	22.8	587	564.2
1	1136788	855267.6	161	16034	21	587	566
1	1136787.9	855274.6	168	16034	19.3	587	567.7
1	1136787.8	855281.6	175	16034	16.7	587	570.3
1	1136787.5	855288.6	182	16034	13.3	587	573.7
1	1136787.4	855295.6	189	16034	13.7	587	573.3
1	1136787.2	855302.6	196	16034	12.6	587	574.4
1	1136787	855309.6	203	16034	14.3	587	572.7
1	1136786.9	855316.6	210	16034	17	587	570
1	1136786.8	855323.6	217	16034	16.6	587	570.4
1	1136786.6	855330.6	224	15942	18.2	587	568.8
1	1136786.4	855337.6	231	15942	19.7	587	567.3
1	1136786.2	855344.6	238	15942	20.6	587	566.4
1	1136786.1	855351.6	245	15942	20.6	587	566.4

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
1	1136786	855358.6	252	15942	19.4	587	567.6
1	1136785.8	855365.6	259	15942	18.9	587	568.1
1	1136785.6	855372.6	266	15942	14.3	587	572.7
1	1136785.5	855379.6	273	15942	12.7	587	574.3
1	1136785.4	855386.6	280	15942	14.5	587	572.5
1	1136785.1	855393.6	287	15942	14.1	587	572.9
1	1136785	855400.6	294	15646	13.9	587	573.1
1	1136784.9	855407.6	301	15646	14.9	587	572.1
1	1136784.8	855414.5	308	15646	15.1	587.1	572
1	1136784.6	855421.3	315	14526	15.7	587.4	571.7
1	1136784.5	855428.2	322	14526	15.3	587.7	572.4
1	1136784.4	855435	329	14803	15.1	588	572.9
2	1137163.6	854807	0	15403	10.2	590.5	580.3
2	1137159.9	854810.3	5	15926	9.8	590.3	580.5
2	1137156.1	854813.6	10	15926	9.8	590	580.3
2	1137152.5	854816.9	15	15926	9.2	589.8	580.6
2	1137148.8	854820.2	20	15926	9	589.5	580.5
2	1137145	854823.6	25	15830	9.2	589.3	580.1
2	1137141.2	854826.9	30	15830	8.8	589.1	580.3
2	1137137.5	854830.2	35	15830	8	588.8	580.9
2	1137133.8	854833.5	40	15849	8.2	588.6	580.3
2	1137130.1	854836.8	45	15849	8.4	588.3	579.9
2	1137126.4	854840.2	50	15849	7.9	588.1	580.2
2	1137122.6	854843.5	55	15849	7	587.8	580.9
2	1137118.9	854846.8	60	15849	7.1	587.6	580.5
2	1137115.1	854850.1	65	15849	8	587.4	579.3
2	1137111.4	854853.4	70	15849	8.8	587.1	578.4
2	1137107.6	854856.8	75	15849	10.1	587	576.9
2	1137103.9	854860.1	80	15849	13.7	586.9	573.3
2	1137100.1	854863.4	85	15849	16.6	586.9	570.3
2	1137096.4	854866.7	90	15916	17.3	586.9	569.5
2	1137092.6	854870	95	15989	16.4	586.8	570.4
2	1137089	854873.3	100	15989	14.4	586.8	572.3
2	1137085.2	854876.6	105	15989	14	586.7	572.8
2	1137081.5	854879.9	110	15989	13.7	586.7	572.9
2	1137077.8	854883.2	115	15989	14	586.6	572.6
2	1137074	854886.6	120	15989	14.4	586.6	572.2
2	1137070.2	854889.9	125	15989	15.2	586.6	571.4
2	1137066.5	854893.2	130	15989	15.5	586.5	571

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
2	1137062.8	854896.6	135	15989	14.3	586.5	572.2
2	1137059	854899.9	140	15498	11.6	586.4	574.9
2	1137055.2	854903.2	145	15498	12	586.4	574.4
2	1137051.5	854906.5	150	15498	14.2	586.3	572.1
2	1137047.8	854909.8	155	15588	14.8	586.3	571.5
2	1137044	854913.1	160	15603	16.7	586.3	569.5
2	1137040.2	854916.4	165	15603	18	586.2	568.3
2	1137036.5	854919.8	170	15603	21.5	586.2	564.7
2	1137032.8	854923.1	175	15603	21.9	586.1	564.2
2	1137029	854926.4	180	15603	21.9	586.1	564.2
2	1137025.2	854929.7	185	15603	22.2	586	563.9
2	1137021.5	854933.1	190	15538	22.4	586	563.6
2	1137017.8	854936.4	195	15790	22.4	586.1	563.7
2	1137014.1	854939.8	200	15790	21.9	586.3	564.4
2	1137010.4	854943.1	205	15790	22.7	586.4	563.7
2	1137006.8	854946.5	210	15790	22.3	586.6	564.3
2	1137003.1	854949.9	215	15790	22.6	586.8	564.2
2	1136999.4	854953.2	220	15790	22.9	586.9	564
2	1136995.8	854956.6	225	16536	22.7	587	564.3
2	1136992	854959.9	230	13956	22.3	587	564.7
2	1136988.2	854963.2	235	13956	20.7	587.1	566.4
2	1136984.5	854966.5	240	13242	19.2	587.1	567.9
2	1136980.8	854969.8	245	15133	17.2	587.1	570
2	1136977	854973.1	250	15133	15.9	587.2	571.2
2	1136973.2	854976.4	255	15133	15.6	587.2	571.6
2	1136969.5	854979.7	260	15133	15.5	587.2	571.7
2	1136965.8	854982.9	265	15133	15.7	587.3	571.6
2	1136962	854986.2	270	15133	15.1	587.3	572.2
2	1136958.2	854989.6	275	15133	14.7	587.3	572.6
2	1136954.6	854992.9	280	15133	15.7	587.4	571.7
2	1136950.9	854996.1	285	15133	16.9	587.4	570.5
2	1136947.1	854999.4	290	15133	17.7	587.4	569.8
2	1136943.4	855002.8	295	15617	17.9	587.4	569.5
2	1136939.6	855006.1	300	15617	19.6	587.5	567.9
2	1136935.9	855009.3	305	15617	20.7	587.5	566.8
2	1136932.1	855012.6	310	15682	21.9	587.5	565.6
2	1136928.4	855015.9	315	15682	22.4	587.6	565.2
2	1136924.6	855019.2	320	15682	21.1	587.6	566.5
2	1136920.9	855022.6	325	15682	21.8	587.6	565.8

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
2	1136917.1	855025.8	330	15682	21.6	587.7	566
2	1136913.4	855029.1	335	15682	22.1	587.7	565.6
2	1136909.6	855032.4	340	15682	23.9	587.7	563.9
2	1136906	855035.8	345	15203	24.5	587.8	563.3
2	1136902.2	855039	350	15203	24.6	587.8	563.2
2	1136898.5	855042.3	355	15203	24.4	587.8	563.4
2	1136894.8	855045.6	360	15203	24	587.8	563.9
2	1136891	855048.9	365	15203	23.4	587.9	564.5
2	1136887.2	855052.2	370	15203	22.8	587.9	565.1
2	1136883.5	855055.5	375	15203	22.8	587.9	565.1
2	1136879.8	855058.8	380	15203	24.1	588	563.8
2	1136876	855062.1	385	15203	24.5	588	563.5
2	1136872.2	855065.5	390	14707	24.8	588	563.2
2	1136868.4	855068.9	395	14707	23.8	588	564.2
2	1136864.6	855072.3	400	14707	22.9	588	565.1
2	1136860.8	855075.8	405	14707	23.4	588	564.6
2	1136857	855079.1	410	14707	24.4	588	563.6
2	1136853.1	855082.6	415	14707	24.9	588	563.1
2	1136849.4	855085.9	420	14707	23.9	588	564.1
2	1136845.5	855089.4	425	14707	23.2	588	564.8
2	1136841.8	855092.8	430	14707	23	588	565
2	1136837.9	855096.2	435	14707	22.3	588	565.7
2	1136834.1	855099.6	440	14707	21.7	588	566.3
2	1136830.2	855103	445	14707	21.4	588	566.6
2	1136826.5	855106.4	450	14954	21.6	588	566.4
2	1136822.6	855109.9	455	14954	21.2	588	566.8
2	1136818.9	855113.2	460	14954	20.5	588	567.5
2	1136815	855116.7	465	14954	17.2	588	570.8
2	1136811.2	855120.1	470	12003	13.9	588	574.1
2	1136807.4	855123.5	475	12003	9.8	588	578.2
3	1137209.6	854784.5	0	18190	10.8	590.7	579.9
3	1137214.4	854788.4	6	18190	10.8	590.4	579.5
3	1137219.1	854792.2	12	16434	10.9	590	579.1
3	1137223.9	854796	18	16434	10.5	589.9	579.4
3	1137228.5	854799.8	24	16434	10	589.7	579.7
3	1137233.1	854803.5	30	16434	11.7	589.6	577.9
3	1137237.9	854807.3	36	16434	12.7	589.5	576.8
3	1137242.5	854811.1	42	17495	12.1	589.3	577.2
3	1137247.1	854814.8	48	17495	11.7	589.2	577.6

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
3	1137251.8	854818.6	54	17495	12.5	589.1	576.6
3	1137256.5	854822.3	60	17495	12.7	589	576.3
3	1137261.1	854825.9	66	17495	13.6	589	575.4
3	1137265.8	854829.6	72	17495	14.9	589	574.1
3	1137270.4	854833.3	78	17495	14.1	589	574.9
3	1137275	854836.9	84	17495	13.2	589	575.8
3	1137279.6	854840.6	90	17495	10.5	589	578.5
3	1137284.2	854844.4	96	17495	10.6	588.9	578.3
3	1137289	854848.2	102	17495	10.3	588.7	578.5
3	1137293.8	854851.9	108	17756	9.6	588.6	578.9
3	1137298.4	854855.8	114	17978	10.3	588.4	578.1
3	1137303.1	854859.6	120	17978	10.7	588.3	577.6
3	1137307.9	854863.4	126	17978	11.1	588.1	577
3	1137312.5	854867.1	132	17978	11.1	588	576.9
3	1137317.1	854870.9	138	17978	10.6	587.9	577.2
3	1137321.9	854874.7	144	17978	10.1	587.8	577.7
3	1137326.5	854878.4	150	17978	10.2	587.7	577.5
3	1137331.1	854882.2	156	17978	10.2	587.6	577.4
3	1137335.8	854886	162	17978	10	587.5	577.5
3	1137340.4	854889.8	168	17978	10.5	587.4	577
3	1137345.1	854893.6	174	17978	11.1	587.3	576.2
3	1137349.8	854897.3	180	18224	11.5	587.2	575.7
3	1137354.4	854901.1	186	18224	14.1	587.1	573.1
3	1137359	854904.9	192	18224	16.3	587	570.8
3	1137363.8	854908.6	198	18224	15.3	587.1	571.7
3	1137368.4	854912.4	204	18224	16.3	587.2	570.9
3	1137373	854916.1	210	18224	15.4	587.3	572
3	1137377.6	854919.8	216	18224	15.1	587.5	572.4
3	1137382.2	854923.5	222	18224	13.7	587.6	573.9
3	1137386.9	854927.2	228	18224	14.8	587.8	572.9
3	1137391.6	854930.9	234	18224	14.7	587.9	573.2
3	1137396.2	854934.7	240	18224	13	588	575
3	1137400.9	854938.4	246	18224	12.1	588.2	576.1
3	1137405.5	854942.1	252	17764	10.9	588.3	577.4
3	1137410.1	854945.8	258	17764	11.4	588.4	577
3	1137414.8	854949.6	264	17764	11	588.6	577.5
3	1137419.5	854953.2	270	17074	12.1	588.7	576.7
3	1137424.1	854957	276	17074	12.7	588.9	576.2
3	1137428.8	854960.7	282	16049	12.3	589	576.7

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
4	1137423.4	854972.7	0	14271	10	589.5	579.5
4	1137420.8	854976.9	5	14966	10	589.4	579.4
4	1137418	854981.1	10	14966	11.6	589.3	577.8
4	1137415.4	854985.4	15	14966	12.5	589.2	576.8
4	1137412.6	854989.6	20	14966	11.5	589.1	577.6
4	1137410	854993.8	25	14966	10.7	589	578.4
4	1137407.2	854998	30	14520	10.6	588.9	578.4
4	1137404.6	855002.2	35	14520	11.8	588.9	577
4	1137401.9	855006.4	40	14520	14	588.8	574.7
4	1137399.2	855010.7	45	14520	15.1	588.7	573.5
4	1137396.5	855014.9	50	14520	15.4	588.6	573.2
4	1137393.9	855019.1	55	14520	13	588.5	575.5
4	1137391.1	855023.3	60	14520	11.1	588.4	577.3
4	1137388.5	855027.6	65	14520	10.7	588.3	577.6
4	1137385.8	855031.8	70	14520	11	588.2	577.2
4	1137383.1	855036	75	14520	12.7	588.1	575.4
4	1137380.4	855040.2	80	14520	14.6	588	573.5
4	1137377.8	855044.4	85	14520	17.3	588	570.7
4	1137375	855048.6	90	14520	18	588	570
4	1137372.4	855052.9	95	14709	18	587.9	569.9
4	1137369.6	855057.1	100	14709	17.8	587.9	570.2
4	1137367	855061.3	105	14709	17	587.9	570.8
4	1137364.4	855065.5	110	14709	17	587.9	570.8
4	1137361.6	855069.8	115	14709	15.7	587.8	572.1
4	1137359	855074	120	14709	14.1	587.8	573.7
4	1137356.2	855078.2	125	14709	14.4	587.8	573.4
4	1137353.6	855082.4	130	14709	13.6	587.8	574.2
4	1137351	855086.6	135	14709	10.5	587.7	577.2
4	1137348.2	855090.9	140	14709	9.8	587.7	577.9
4	1137345.6	855095.1	145	14746	9.2	587.7	578.5
4	1137342.9	855099.3	150	15265	8.9	587.7	578.8
4	1137340.2	855103.5	155	15265	9.7	587.6	577.9
4	1137337.6	855107.8	160	15265	10.6	587.6	577.1
4	1137334.9	855112	165	15265	10.5	587.6	577.1
4	1137332.2	855116.2	170	15265	9.6	587.6	578
4	1137329.5	855120.4	175	15265	9.3	587.5	578.3
4	1137326.9	855124.6	180	15265	8.9	587.5	578.6
4	1137324.2	855128.9	185	15265	9.3	587.5	578.2
4	1137321.5	855133.1	190	15265	10.5	587.5	576.9

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
4	1137318.9	855137.3	195	15265	10.1	587.4	577.3
4	1137316.1	855141.6	200	15018	10.9	587.4	576.5
4	1137313.5	855145.8	205	15018	12.1	587.4	575.3
4	1137310.8	855150	210	15018	12	587.4	575.4
4	1137308.1	855154.2	215	15018	12.4	587.3	574.9
4	1137305.5	855158.4	220	15018	13	587.3	574.3
4	1137302.8	855162.6	225	15018	12.3	587.3	575
4	1137300.1	855166.9	230	15196	12.3	587.3	574.9
4	1137297.4	855171.1	235	15196	12.4	587.2	574.8
4	1137294.8	855175.3	240	18011	11.2	587.2	576
4	1137292.1	855179.6	245	16827	10.3	587.2	576.9
4	1137289.4	855183.8	250	16827	10.7	587.2	576.4
4	1137286.8	855188	255	16827	10.9	587.1	576.2
4	1137284	855192.2	260	16827	10.7	587.1	576.4
4	1137281.4	855196.4	265	16827	12.1	587.1	575
4	1137278.8	855200.6	270	17283	12.4	587.1	574.6
4	1137276	855204.9	275	17283	11.7	587	575.3
4	1137273.4	855209.1	280	17283	12.4	587	574.6
4	1137270.6	855213.3	285	17283	13.8	587	573.2
4	1137268	855217.6	290	17283	14.6	587.1	572.5
4	1137265.2	855221.8	295	17283	15.6	587.1	571.5
4	1137262.6	855226	300	17283	16.1	587.2	571
4	1137260	855230.2	305	17283	16.2	587.2	571
4	1137257.2	855234.4	310	17283	17.2	587.2	570.1
4	1137254.6	855238.6	315	17283	16.6	587.3	570.7
4	1137251.9	855242.9	320	17283	16.6	587.3	570.7
4	1137249.2	855247.1	325	16723	15.5	587.3	571.8
4	1137246.5	855251.3	330	16521	14.9	587.4	572.4
4	1137243.9	855255.5	335	16521	14.5	587.4	572.9
4	1137241.2	855259.8	340	16521	14.2	587.5	573.3
4	1137238.5	855263.9	345	16521	13.7	587.5	573.8
4	1137235.9	855268.2	350	16521	14.3	587.5	573.2
4	1137233.1	855272.4	355	16521	15.1	587.6	572.5
4	1137230.5	855276.6	360	16521	15.3	587.6	572.3
4	1137227.8	855280.8	365	16521	15.4	587.7	572.2
4	1137225.1	855285.1	370	16521	16	587.7	571.6
4	1137222.5	855289.2	375	16521	15.7	587.7	572
4	1137219.8	855293.5	380	16895	16	587.8	571.8
4	1137217.1	855297.7	385	17785	16.5	587.8	571.3

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
4	1137214.4	855301.9	390	17785	16.8	587.8	571
4	1137211.8	855306.1	395	17785	16.5	587.9	571.4
4	1137209	855310.4	400	17785	13.7	587.9	574.2
4	1137206.4	855314.6	405	17785	12.7	588	575.2
4	1137203.8	855318.8	410	17785	13.6	588	574.4
4	1137201	855323	415	17785	14.3	588	573.7
4	1137198.4	855327.2	420	17785	16.9	588.1	571.1
4	1137195.6	855331.4	425	17785	16.9	588.1	571.2
4	1137193	855335.7	430	17785	17.5	588.2	570.7
4	1137190.2	855339.9	435	17785	17.6	588.2	570.6
4	1137187.6	855344.1	440	17785	19.2	588.2	569
4	1137185	855348.3	445	17432	19.1	588.3	569.1
4	1137182.2	855352.6	450	17432	19.2	588.3	569.1
4	1137179.6	855356.8	455	17432	19.3	588.3	569
4	1137176.9	855361	460	17432	18.7	588.4	569.7
4	1137174.2	855365.2	465	17432	19	588.4	569.4
4	1137171.5	855369.4	470	13572	19	588.5	569.4
4	1137168.9	855373.6	475	13572	18.5	588.5	570
5	1137188.6	855453.1	0	17212	24.8	584	559.2
5	1137181.8	855454.2	7	16960	26.2	583.4	557.2
5	1137175	855455.4	14	17367	26.4	582.8	556.5
5	1137168.1	855456.5	21	17367	28.4	582.2	553.8
5	1137161.2	855457.7	28	17367	28.4	581.7	553.3
5	1137154.4	855458.9	35	17367	26	581.3	555.2
5	1137147.4	855460.1	42	17539	25.7	580.8	555.2
5	1137140.5	855461.3	49	17539	23.3	580.4	557.1
5	1137133.6	855462.5	56	17539	19.4	579.9	560.5
5	1137126.8	855463.7	63	17539	17.2	579.5	562.3
5	1137119.8	855464.9	70	17539	15.4	579	563.7
5	1137112.8	855466.1	77	17539	16.7	578.9	562.3
5	1137105.6	855467.4	84	17539	17.7	578.8	561.1
5	1137098.5	855468.6	91	17539	20.5	578.7	558.2
5	1137091.5	855469.8	98	17539	22.9	578.6	555.7
5	1137084.4	855471	105	16750	21.2	578.5	557.3
5	1137077.2	855472.2	112	16750	22.1	578.4	556.3
5	1137070.1	855473.4	119	16750	16.9	578.3	561.4
5	1137063.1	855474.7	126	16750	15.4	578.2	562.8
5	1137056	855475.9	133	16750	12.2	578.1	565.9
5	1137048.9	855477.1	140	17146	9.2	578	568.8

Line ID	Easting (ft)	Northing (ft)	Station (ft)	Bedrock Velocity (ft/s)	Bedrock Depth (ft)	Surface Elevation (ft)	Bedrock Elevation (ft)
5	1137043.9	855477.9	147	17146	8	576	568
5	1137037.1	855479.1	154	17146	8.4	576.1	567.7
5	1137030.1	855480.3	161	17146	11.3	578.6	567.3
5	1137023.2	855481.5	168	17146	14	579.3	565.4
5	1137016.2	855482.7	175	17146	13.9	579.7	565.8
5	1137009.4	855483.8	182	17146	16.1	580.1	564.1
5	1137002.5	855485	189	17146	18.3	580.5	562.2
5	1136995.6	855486.2	196	17146	19.7	580.9	561.3
5	1136988.8	855487.3	203	17146	21.7	581.3	559.6
5	1136981.8	855488.5	210	17238	21.9	581.7	559.9
5	1136974.9	855489.7	217	17238	21.7	582.2	560.5
5	1136968	855490.9	224	17720	22.3	582.6	560.3
5	1136961.1	855492.1	231	17720	21.2	583	561.8
5	1136954.2	855493.3	238	17720	21.2	583.5	562.3
5	1136947.4	855494.6	245	17720	21.2	583.9	562.7
5	1136940.5	855495.8	252	17720	21.1	584.2	563.1
5	1136933.6	855496.9	259	17720	20.3	584.4	564
5	1136926.9	855498.1	266	17720	20.9	584.6	563.7
5	1136920	855499.2	273	17720	20.7	584.8	564.1
5	1136913.1	855500.4	280	17720	21.3	585	563.7
5	1136906.2	855501.6	287	17720	21.2	585.2	564.1
5	1136899.5	855502.8	294	17720	21.9	585.4	563.6
5	1136892.6	855503.9	301	17720	21.1	585.7	564.5
5	1136885.8	855505.1	308	17698	20.2	585.9	565.7
5	1136878.9	855506.2	315	16386	17.3	586.1	568.7
5	1136872.1	855507.4	322	16189	16.4	586.3	569.9
5	1136865.2	855508.6	329	15880	16.5	586.5	570

Estimated standard deviation of depth of interfaces for seismic lines is normally taken as 10% or 2 feet, whichever is greater. Depths and elevations of bedrock determined here are for competent bedrock. Heavily weathered or highly fractured bedrock may occur at shallower depths. The easting and northing coordinates are relative to CT State Plane NAD83 (CORS96) in US survey feet. Elevations along the seismic lines were determined from plans provided by GZA and are relative to mean sea level (NAVD88).

N

H-R

APPROXIMATE SCALE (feet)

0 1000 2000

CONN

LOCATION

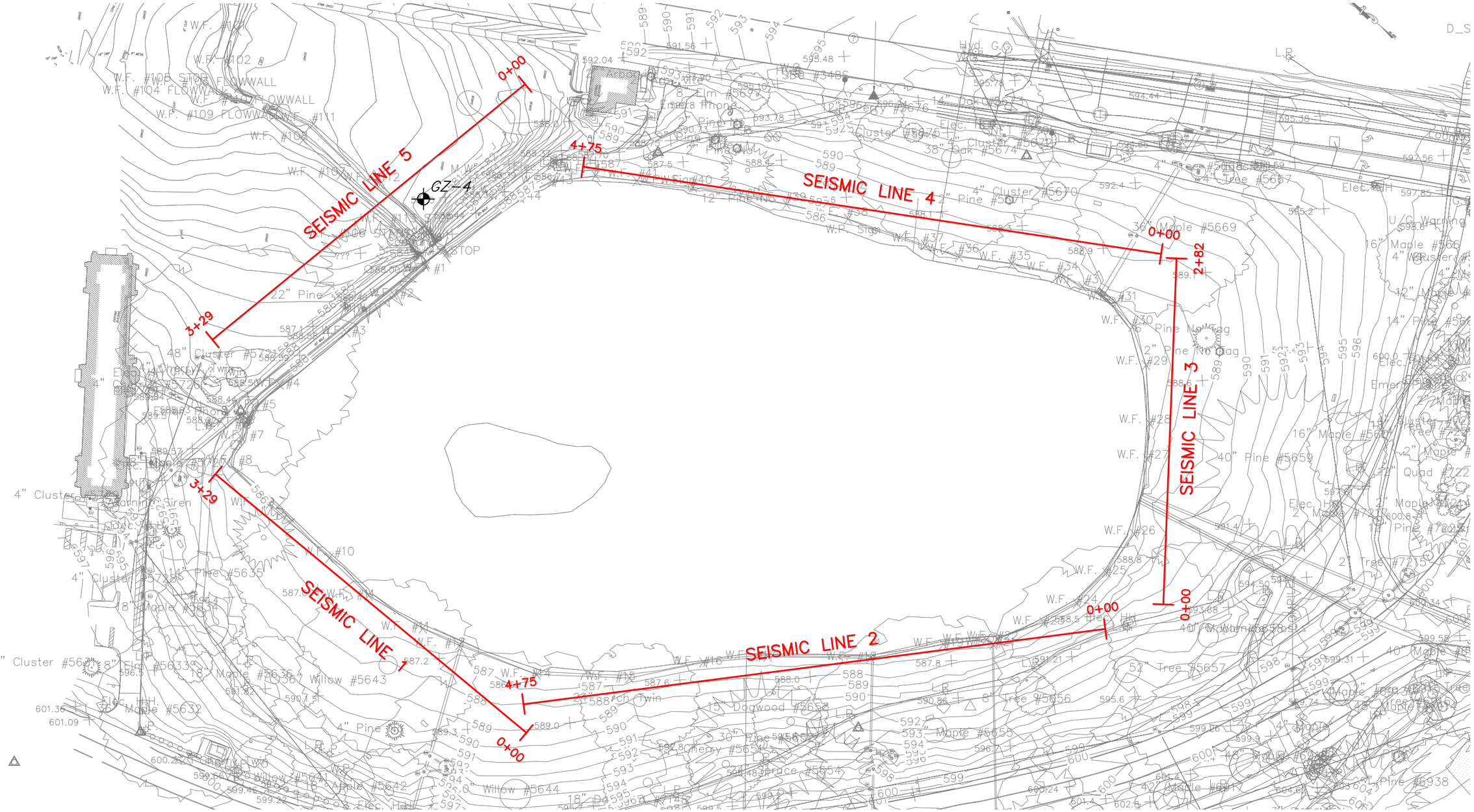
NOTE:

Modified from Google Earth Pro aerial photograph.

Figure 1
General Site Location
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER
Salem, NH | Fords, NJ



LEGEND

SEISMIC LINE

BORING

SCALE (feet)

0 80 160

NOTE:

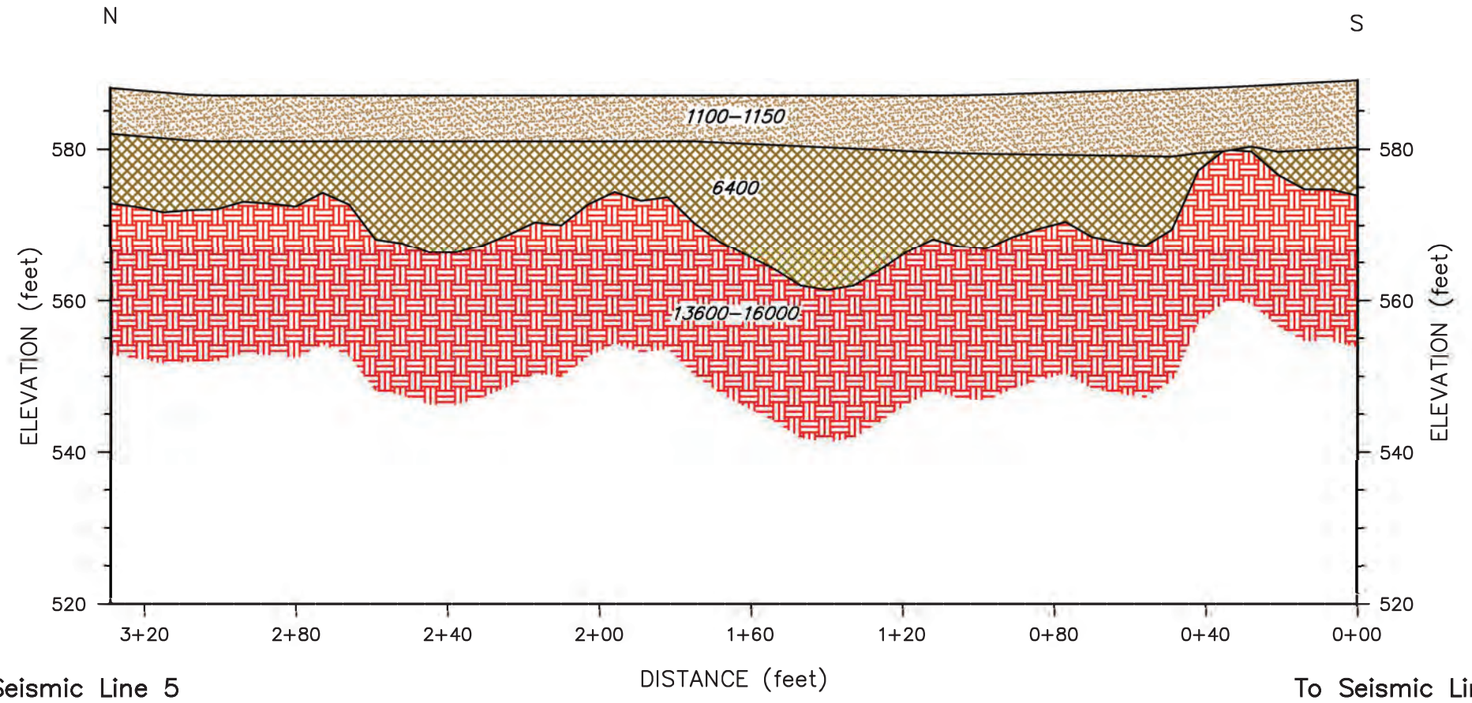
Modified from site plan provided by GZA GeoEnvironmental, Inc., identified as 70223 Bas.dwg.

Figure 2
Site Plan
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER

Salem, NH | Fords, NJ



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations estimated from plans provided by GZA GeoEnvironmental, Inc.
4. Data were analyzed using the Generalized Reciprocal Method.

LEGEND

- Unsaturated soils
- Partially saturated soils/ Till
- Bedrock
- *13600–16000* Velocity (fps)
- Interface determined from seismic refraction data
- GZ–4 20'S — Boring with identification, distance and direction from traverse, and depth of bedrock based on logs provided by GZA GeoEnvironmental, Inc.

HORIZONTAL SCALE (feet)

0 40 80

Vertical Exaggeration = 2X

Figure 3
Seismic Line 1
Mirror Lake
Storrs, Connecticut

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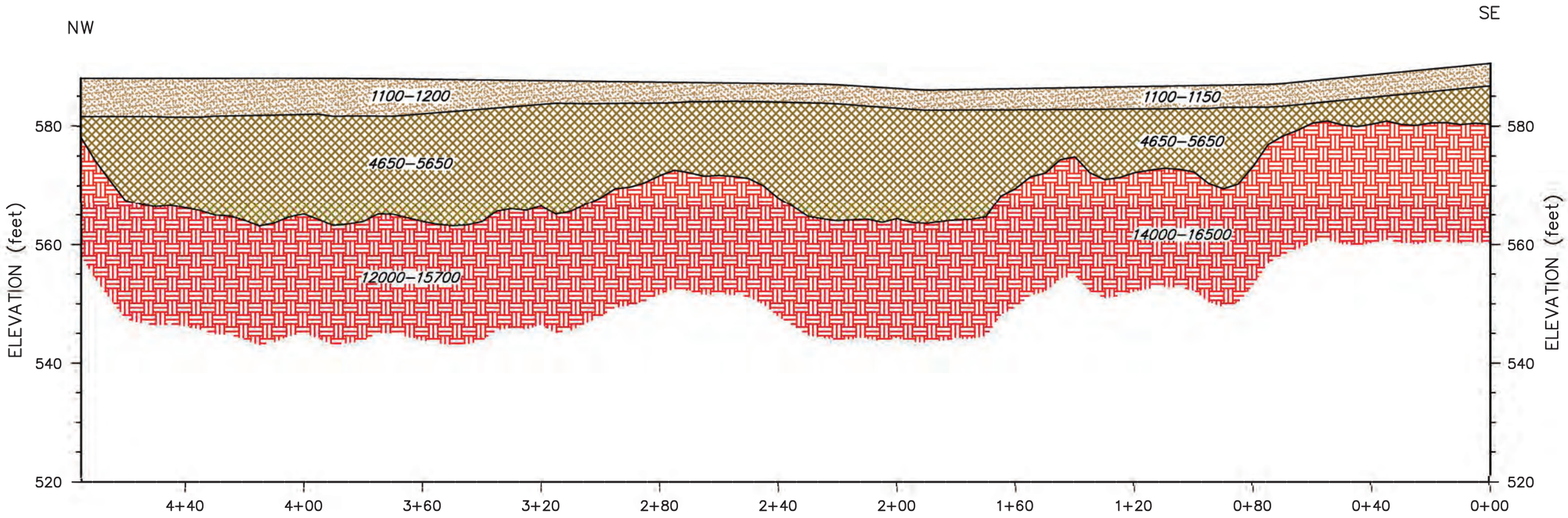
HAGER–RICHTER
Salem, NH | Fords, NJ



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations estimated from plans provided by GZA GeoEnvironmental, Inc.
4. Data were analyzed using the Generalized Reciprocal Method.

LEGEND

- Unsaturated soils
- Partially saturated soils/ Till
- Bedrock
- *13600–16000* Velocity (fps)
- Interface determined from seismic refraction data
- GZ–4 20'S — Boring with identification, distance and direction from traverse, and depth of bedrock based on logs provided by GZA GeoEnvironmental, Inc.

HORIZONTAL SCALE (feet)

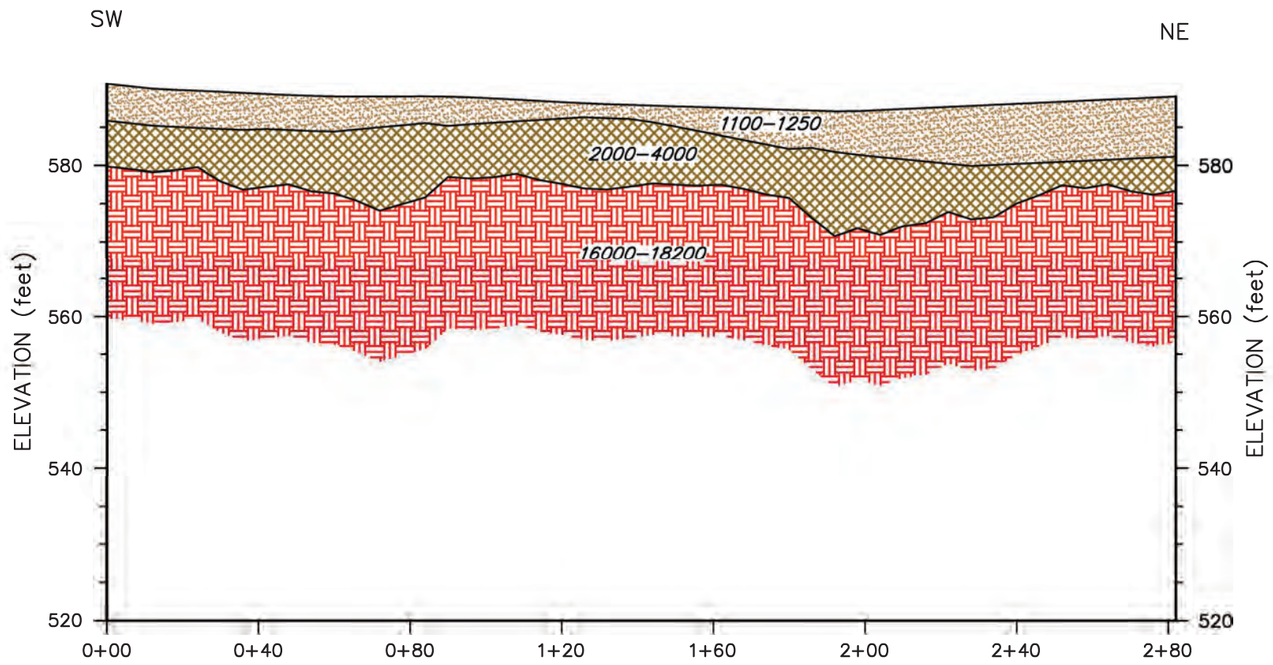
0 40 80

Vertical Exaggeration = 2X

Figure 4
Seismic Line 2
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER
Salem, NH | Fords, NJ



To Seismic Line 2

To Seismic Line 4

NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations estimated from plans provided by GZA GeoEnvironmental, Inc.
4. Data were analyzed using the Generalized Reciprocal Method.

LEGEND

- Unsaturated soils
- Partially saturated soils/ Till
- Bedrock
- *13600–16000* Velocity (fps)
- Interface determined from seismic refraction data
- GZ–4 20'S — Boring with identification, distance and direction from traverse, and depth of bedrock based on logs provided by GZA GeoEnvironmental, Inc.

HORIZONTAL SCALE (feet)

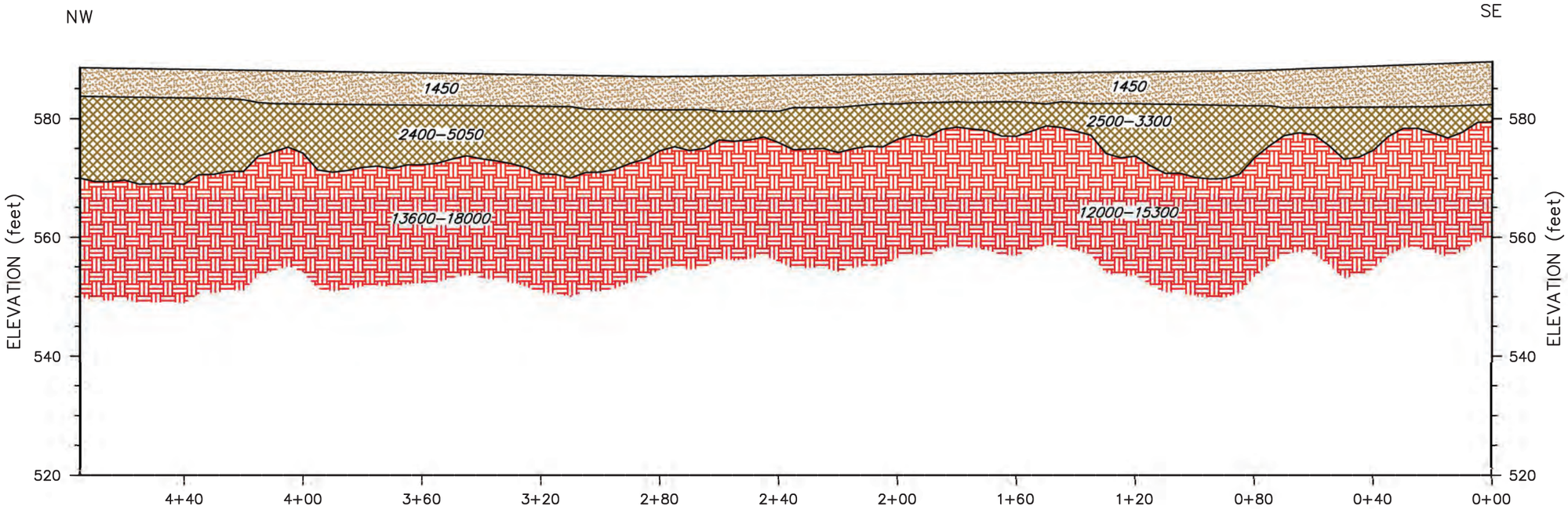
0 40 80

Vertical Exaggeration = 2X

Figure 5
Seismic Line 3
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER
Salem, NH | Fords, NJ



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations estimated from plans provided by GZA GeoEnvironmental, Inc.
4. Data were analyzed using the Generalized Reciprocal Method.

LEGEND

- Unsaturated soils
- Partially saturated soils/ Till
- Bedrock
- *13600–16000* Velocity (fps)
- Interface determined from seismic refraction data
- GZ–4 20'S — Boring with identification, distance and direction from traverse, and depth of bedrock based on logs provided by GZA GeoEnvironmental, Inc.

HORIZONTAL SCALE (feet)

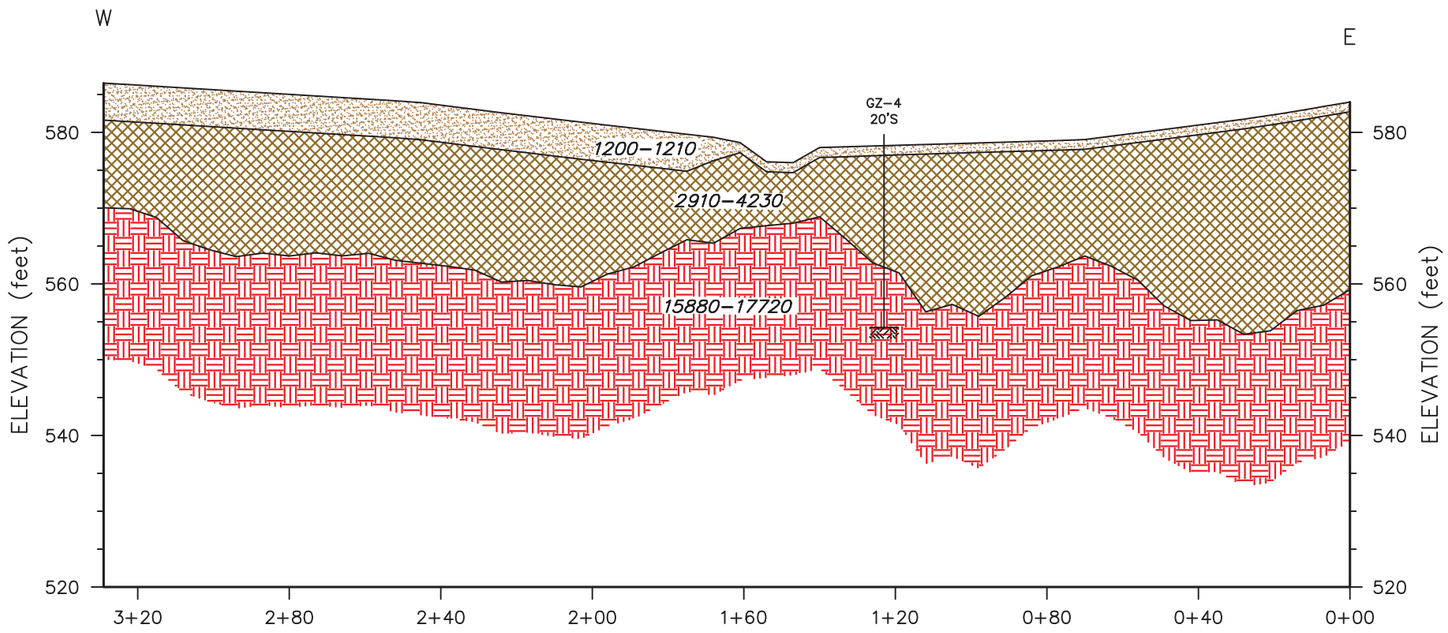
0 40 80

Vertical Exaggeration = 2X

Figure 6
Seismic Line 4
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER
Salem, NH | Fords, NJ



NOTES:

1. Estimated accuracy (standard deviation) of depth of bedrock is ±10% or 2 feet, whichever is greater.
2. The depths determined for bedrock are depths of competent rock; weathered and/or fractured bedrock might occur at shallower depths.
3. Surface elevations estimated from plans provided by GZA GeoEnvironmental, Inc.
4. Data were analyzed using the Generalized Reciprocal Method.

LEGEND

- Unsaturated soils
- Partially saturated soils/ Till
- Bedrock
- *13600–16000* Velocity (fps)
- Interface determined from seismic refraction data
- GZ–4 20'S — Boring with identification, distance and direction from traverse, and depth of bedrock based on logs provided by GZA GeoEnvironmental, Inc.

HORIZONTAL SCALE (feet)

0 40 80

Vertical Exaggeration = 2X

Figure 7
Seismic Line 5
Mirror Lake
Storrs, Connecticut

File 20JCC87 | February, 2021

HAGER–RICHTER
Salem, NH | Fords, NJ

GZA GeoEnvironmental, Inc.

GZA GeoEnvironmental, Inc.

BVH integrated services

APPENDIX F

Feasibility Estimate

Univ. of Conn.- Mirror Lake

Dam Improvements

Storrs CT

PM&C LLC
20 Downer Ave, Suite 5
Hingham, MA 02043
(T) 781-740-8007
(F) 781-740-1012

Prepared for:

BVH Integrated Services

May 12, 2021

PM&C

Univ. of Conn.- Mirror Lake
Dam Improvements
Storrs CT

12-May-21

Feasibility Estimate

MAIN CONSTRUCTION COST SUMMARY

	Anticipated Bid date	Gross Floor Area	$/sf	Estimated Construction Cost
SITEWORK	Apr-23			$11,934,915
SUB-TOTAL				$11,934,915
GENERAL CONDITIONS	6%			$716,095
GENERAL REQUIREMENTS	8%			$954,793
PRECONSTRUCTION FEE				NIC
SUBCONTRACTOR DEFAULT INSURANCE				In Rates
DREDGING PERMIT				$50,000
ESTIMATING AND DESIGN CONTINGENCY	15%			$1,790,237
CM CONTINGENCY	3%			$358,047
ESCALATION to bid date (4-23)	8.00%			$954,793
INSURANCE	1.25%			$149,186
OVERHEAD AND FEE	4.25%			$718,593
PHASING PREMIUM; Mobilization/Start Up Costs/ Additional General Conditions				NIC
SUBTOTAL OF ALL CONSTRUCTION				$17,626,659
P&P BONDS	0.36%			$63,456
TOTAL OF ALL CONSTRUCTION				**$17,626,659**

ALTERNATES - including all mark-ups		
ALTERNATE #1- Shelter	ADD	**$970,420**
ALTERNATE #2- South Promenade	ADD	**$1,624,235**
ALTERNATE #3 Downstream Improvements	ADD	**$757,476**
ALTERNATE #4- Bridge to Island	ADD	**$1,515,433**

Univ. of Conn.- Mirror Lake
Dam Improvements 12-May-21
Storrs CT

Feasibility Estimate

This Feasibility cost estimate was produced from drawings, outline specifications and other documentation prepared by BVH Integrated Services and their design team dated August 20, 2021. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, general contractor's overhead and profit and design contingency. Cost escalation assumes start dates indicated.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- All professional fees and insurance
- Building Permit costs
- Land acquisition, feasibility, and financing costs
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items (e.g. draperies, furniture and equipment)
- Rock excavation; special foundations (unless indicated by design engineers)
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Costs Associated with SITES certification or pre-certification

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	03 - SITE CONCRETE						
33000	**CONCRETE**						
	New Spillway						
	Spillway concrete	**200**	cy	2,000.00	400,000		
	12" concrete apron at outfall - stepped	**556**	sf	25.00	13,900		
	Concrete Training Wall and Abutment						
	Concrete walls 18" thick x 17' high	**197**	cy				
	Formwork	**6,460**	sf	22.00	142,120		
	Rebar	**16,150**	lbs	2.00	32,300		
	Concrete including placing	**197**	cy	300.00	59,100		
	Footing 2'-0" x 12" for overlook foundations for campus connect						
	Concrete footing 2'-0" wide x 12" thick	**9**	cy				
	Formwork	**624**	sf	17.00	10,608		
	Rebar	**864**	lbs	2.00	1,728		
	Concrete including placing	**9**	cy	300.00	2,700		
	Overlook Retaining Wall for campus connect						
	Concrete to walls	**29**	cy				
	Formwork	**1,440**	sf	22.00	31,680		
	Rebar	**7,800**	lbs	2.00	15,600		
	Premium for epoxy rebar at cap	**1**	ls	500.00	500		
	Concrete including placing	**29**	cy	320.00	9,280		
	Premium for radius	**1**	ls	2,500.00	2,500		
	Concrete mud mat at temp spillway	**24**	cy	300.00	7,200		
	Concrete including placing at foot bridge	**4**	cy	300.00	1,200		
	SUBTOTAL					730,416	
	TOTAL - CONCRETE						**$730,416**
	05 - METALS						
055000	**METAL FABRICATIONS**						
	Metal grate foot-bridge at spillway per Bridge Brother quote (10' x 20)	**1**	ls	28,408.00	28,408		
	Metal rails at new foot bridge	**40**	lf	300.00	Included		
	SUBTOTAL					28,408	
	TOTAL - METALS						**$28,408**
31	**EARTHWORK**						
311000	**SITE PREPARATION**						
	Site Demolitions and Relocations						
	Temp site construction fence around entire site	**4,245**	lf	18.00	76,410		
	Temp site construction fence gate	**3**	loc	1,000.00	3,000		
	Allowance for temp jersey barriers and relocation of vehicular and pedestrian ways	**1**	ls	10,000.00	10,000		
	Allowance for temp way finding signage	**1**	ls	2,500.00	2,500		
	Tree protection						
	Allowance for an arborist for tree/root pruning/	**5**	days	1,000.00	5,000		
	Tree protection fencing	**1,825**	lf	15.00	27,375		
	Area; allow for soil care/fertilizer/root protection	**20,200**	sf	3.00	60,600		
	Lift access tree crown for pruning	**1**	ls	7,000.00	7,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	Remove tree allowance at new dewatering and drainage work area	**18**	loc	1,500.00	27,000		
	Remove tree and shrubs/ landscaping at island allowance; assumes completed when pond is empty	**6,000**	sf	2.00	12,000		
	Remove tree and shrubs/ landscaped allowance at campus connect area	**1**	ls	5,000.00	5,000		
	Remove existing walks at campus connect area	**5,475**	sf	2.00	10,950		
	Remove asphalt paving for new drainage work	**4,234**	sf	2.00	8,468		
	Remove granite curb and salvage for re-installation	**467**	lf	15.00	7,005		
	Remove asphalt paving for new curb	**734**	sf	3.00	2,202		
	Police detail allowance	**1**	ls	35,000.00	35,000		
	Remove existing spillway	**1**	ls	20,000.00	20,000		
	Remove temp spillway	**1**	ls	10,000.00	10,000		
	Allowance to protect exiting gas line at dewatering	**475**	lf	5.00	2,375		
	Allowance to protect sewer line at dewatering	**800**	lf	5.00	4,000		
	Allowance to protect storm line at dewatering	**900**	lf	5.00	4,500		
	Allowance to protect water line at dewatering	**1,229**	lf	5.00	6,145		
	Allowance to protect storm structures at dewatering	**4**	loc	500.00	2,000		
	Remove 15" RCP	**53**	lf	20.00	1,060		
	Remove 24" RCP	**405**	lf	25.00	10,125		
	Remove 30" RCP	**10**	lf	50.00	500		
	Remove 42" RCP	**45**	lf	90.00	4,050		
	Remove storm treatment structure	**1**	loc	1,500.00	1,500		
	Allowance to protect existing site and building finishes	**1**	ls	5,000.00	5,000		
	Miscellaneous site demolition/prep	**1**	ls	40,000.00	40,000		
	SUBTOTAL					410,765	
312000	**EARTH WORK**						
	Site Clearing						
	Strip topsoil, store onsite; at geo tube locations	**2,222**	cy	16.00	35,552		
	Strip topsoil, store onsite; at temp spillway locations	**185**	cy	16.00	2,960		
	Strip topsoil, store onsite; at new drainage work	**2,507**	cy	16.00	40,112		
	Strip topsoil, store onsite at campus connect	**370**	cy	16.00	5,920		
	Clear and grub island	**6,000**	sf	3.00	18,000		
	Allowance to prep area for water treatment tanks	**1**	ls	10,000.00	10,000		
	Misc. Site Earthwork						
	Install, maintain and remove stabilized construction entrance	**96**	cy	75.00	7,200		
	Fine grading	**37,217**	sy	2.25	83,738		
	De-watering/dust control/street sweeping allowance	**1**	ls	25,000.00	25,000		
	Allowance for temp SOE at new site drainage work	**1**	ls	10,000.00	10,000		
	Premium for grading at perimeter of pond after dredging	**71,990**	sf	0.50	35,995		
	Allowance for grading at forebays	**21,500**	sf	2.00	43,000		
	Bring levels up at island	**1,367**	cy	30.00	41,010		
	Hydraulic Dredging						
	Level gravel pads for dewatering	**120,000**	sf	0.75	90,000		
	Create berm at geo tube holding area	**2,000**	lf	50.00	100,000		
	Mobilize hydro dredging equipment: Per pricing from Infrastructure Alternatives	**1**	ls	689,600.00	689,600		
	Remove sediment through hydro dredging operations into geo tubes w/ water treatment in modular tanks- disposal carried below; Per pricing from Infrastructure Alternatives	**1**	ls	933,500.00	933,500		
	Demobilization; Per pricing from Infrastructure Alternatives	**1**	ls	355,900.00	355,900		
	Allowance to load sediment into trucks after dry period; assume continuous operation	**18,000**	cy	3.50	63,000		
	Mechanically Dry Dredge						
	Allowance for pond draining/ pumps/pipes etc.	**1**	ls	50,000.00	50,000		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SITEWORK							
109		Allowance for temp drainage swales for 6 months, includes removal and patch	**1,700**	lf	75.00	127,500		
110		Allowance to create temp road and working area to remove till	**1**	ls	30,000.00	30,000		
111		Allowance to mechanically dredge near spillway; out of sequence	**1**	ls	15,000.00	15,000		
112		Mechanically dredge pond	**24,200**	cy	15.00	363,000		
113		Stockpile till materials, assuming former eastern dewatering area available	**24,200**	cy	5.00	121,000		
114		Allowance to load glacial till; assume continuous operation	**24,200**	cy	3.50	84,700		
115								
116		**Soil Disposal Premiums**						
117		Truck and dispose non-hazardous sediment at licensed waste facility; <RCS-1 - 1.4x	**25,200**	tn	80.00	2,016,000		
118		Truck and dispose of non-hazardous glacial till at licensed waste facility; >RCS-1 - 1.65x	**39,930**	tn	30.00	1,197,900		
119		Additional premium to dispose of glacial till at licensed waste facility; <RCS-1 - contingency	**39,930**	tn	50.00	1,996,500		
120		Allowance to dispose of geotextile tubes; assumes contaminated	**4**	ea	5,000.00	20,000		
121								
122		**Earthwork at roadways and walkway; Patching**						
123		Bituminous and concrete paving	*4,234*			-		
124		gravel base; avg 12" thick	**157**	cy	45.00	7,065		
125		Allowance for rip rap at storm outlet at promenade location; see alt #2 for promenade	**3**	loc	1,200.00	3,600		
126		Allowance for Riverstone platform at large forebay (one location)	**400**	sf	30.00	12,000		
127		New concrete walks at campus connect	*4,400*					
128		Grading allowance at new walks and related areas	**489**	sy	1.50	734		
129		gravel base; 8" thick	**108**	cy	45.00	4,860		
130		New Light pole base	**23**	ea	800.00	18,400		
131		De-watering/dust control allowance	**1**	ls	1,000.00	1,000		
132								
133		**Earthwork for Spillway**						
134		Mobilize crane to west site of downstream channel	**1**	ls	5,000.00	5,000		
135		Temp rip rap to cross channel	**200**	sf	15.00	3,000		
136		Phased sheet pile cofferdam at existing spillway	**2,558**	sf	125.00	319,750		
137		Allowance to proof compact existing grades at side of new spillway	**1**	ls	2,500.00	2,500		
138		Excavate and prep grade for new spillway (demo taken above)	**1**	ls	5,000.00	5,000		
139		Excavate and backfill for new temp spillway	**240**	cy	50.00	12,000		
140		Backfill inside cofferdam to elevation	**278**	cy	40.00	11,120		
141		Allowance for misc. temp rip rap, sandbags and stabilization/protection at temp spillway	**1**	ls	10,000.00	10,000		
142		Allowance for rip rap at toe drain	**60**	cy	55.00	3,300		
143		Allowance for rip rap at slope protection near spillway	**1,300**	cy	55.00	71,500		
144		Allowance for embankment fill	**356**	cy	50.00	17,800		
145		Allowance to repair the banks near the Culvert at Rt 195; 20-30 feet of rip rap on either side.	**1**	loc	20,000.00	20,000		
146		SUBTOTAL					9,140,716	
147								
148	**312500**	**EROSION AND SEDIMENTATION CONTROLS**						
149		Silt fence/ silt sock as shown	**1,100**	lf	16.00	17,600		
150		Silt fence/ silt sock at island	**272**	lf	17.00	4,624		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	Turbidity curtain type #1	**133**	lf	18.00	2,394		
	Inlet protection allowance	**10**	ea	250.00	2,500		
	Allowance for additional erosion control not shown; new drainage	**1**	ls	5,000.00	5,000		
	Silt fence maintenance and monitoring	**1**	ls	2,000.00	2,000		
	Allowance for additional erosion control not shown for dry dredging and storm water run off	**1**	ls	10,000.00	10,000		
	Silt control at campus connect						
	Added Silt fence/ silt sock allowance	**500**	lf	15.00	7,500		
	Inlet protection allowance	**4**	ea	250.00	1,000		
	Silt fence maintenance and monitoring	**1**	ls	2,000.00	2,000		
	SUBTOTAL					54,618	
	TOTAL, DIVISION 31 - EARTHWORK and SITE PREPARATION						**$9,606,099**
32	**EXTERIOR IMPROVEMENTS**						
320000	**PAVING AND CURBING**						
	Roadways Patching						
	Bituminous concrete paving	*1,234*					
	bituminous concrete; 4" thick	**137**	sy	35.00	4,795		
	Allowance to reinstall curb	**100**	lf	30.00	3,000		
	New concrete walks	*3,000*					
	Concrete; 6" thick	**3,000**	sf	12.00	36,000		
	Tie new walks into existing	**1**	ls	800.00	800		
	New concrete walks at campus connect	*4,400*					
	Concrete; 6" thick	**4,400**	sf	12.00	52,800		
	New precast curb	**467**	lf	30.00	14,010		
	Allowance for curb cuts	**3**	loc	800.00	2,400		
	Tie new walks into existing	**1**	ls	2,500.00	2,500		
	SUBTOTAL					116,305	
323000	**SITE IMPROVEMENTS**						
	Stone headwall with Riverstone splash structure at Promenade location; avg 2.5' high	**50**	lf	550.00	27,500		
	Forebay spill wall at future promenade location	**3**	ea	3,500.00	10,500		
	Allowance to remove and reinstall way-finding signage as needed	**1**	ls	2,500.00	2,500		
	Allowance for 12" dia wood piles for high water mark	**5**	ea	2,000.00	10,000		
	Allowance for some stone facing at spillway	**1**	ls	20,000.00	20,000		
	Allowance for boulders at spillway	**6**	ea	1,500.00	9,000		
	Allowance for site furnishings; trash receptacle, bollards, bench, signage etc. @ campus connect	**1**	ls	10,000.00	10,000		
	SUBTOTAL					89,500	
329200	**LANDSCAPING**						
328400	*PLANTINGS*						
	Allowance for new plantings at island	**12,300**	sf	7.00	86,100		
	Allowance for new shoreline plantings	**1,900**	sf	5.00	9,500		
	Allowance for new water plantings	**29,250**	sf	3.50	102,375		
	Allowance for new forebay plantings 70% perennial and 30% shrub	**21,600**	sf	6.00	129,600		
	Allowance to restore planting at temp spillway; see alternate #3 for downstream improvements	**10,000**	sf	1.00	10,000		
	Allowance to restore downstream plantings	**1**	ls	10,000.00	10,000		
	Allowance to restore plantings at drainage work	**1**	ls	5,000.00	5,000		
	Allowance to restore plantings at water treatment tanks	**1**	ls	15,000.00	15,000		

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	Allowance to restore some planting areas at campus connect scope	**1**	ls	10,000.00	10,000		
	TURF AND GRASSES						
	Soils						
	Screen stockpiled topsoil	**4,914**	cy	5.00	24,570		
	Export tailings from screening process - assume clean rock	**1,474**	cy	8.50	12,529		
	Spread new topsoil @ lake edge sodded areas	**167**	cy	55.00	9,185		
	Spread new topsoil @ repaired grass areas	**4,730**	cy	55.00	260,150		
	Spread new topsoil @ campus connect	**206**	cy	55.00	11,330		
	Premium for new topsoil @ embankment grass areas	**275**	cy	55.00	15,125		
	Premium for new drainage soils @ forebays; assumes 12" thick	**799**	cy	55.00	43,945		
	Lawn						
	New sod - at lake edge	**4,500**	sf	2.00	9,000		
	Allowance to seed at geotextile tube locations	**120,000**	sf	0.35	42,000		
	Allowance to seed at new drainage work locations	**135,400**	sf	0.35	47,390		
	New sod - at walk edge at campus connect scope	**5,574**	sf	2.00	11,148		
	Restore misc. landscape areas	**1**	ls	5,000.00	5,000		
	SUBTOTAL					868,947	
	TOTAL, DIVISION 32 - EXTERIOR IMPROVEMENTS						**$1,074,752**
	33 **UTILITIES**						
330000	**STORM DRAINAGE**						
	Storm water distribution- includes E&B						
	Allowance for temp storm piping to Forebays and temp pumping while pond is drained; assumes 6 month duration	**1**	ls	75,000.00	75,000		
	Drain-- New 12" RCP	**20**	lf	110.00	2,200		
	Drain-- New 15" RCP	**324**	lf	115.00	37,260		
	Drain-- New 18" RCP	**19**	lf	135.00	2,565		
	Drain-- New 24" RCP	**317**	lf	155.00	49,135		
	Drain-- New 30" RCP	**17**	lf	160.00	2,720		
	Drain-- New 42" RCP	**17**	lf	225.00	3,825		
	Drain- Hydro dynamic separator	**2**	ea	10,000.00	20,000		
	Drain- New bypass junction box 4x6	**2**	ea	2,500.00	5,000		
	Drain- New Storm Diversion structure 12x7	**1**	ea	12,000.00	12,000		
	Drain- New Storm DMH	**7**	ea	5,500.00	38,500		
	Connect to existing storm pipe	**5**	ea	2,000.00	10,000		
	Misc. drainage work at forebays	**3**	loc	2,000.00	6,000		
	SUBTOTAL					264,205	
331000	**WATER SERVICE AND FIRE MAINS**						
	No new work assumed						
	SUBTOTAL					-	
333000	**SANITARY SEWERAGE**						
	No work assumed						
	SUBTOTAL					-	
336000	**GAS SERVICES**						
	No new work assumed						
	SUBTOTAL					-	
	TOTAL, DIVISION 33 - UTILITIES						**$264,205**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	26 ELECTRICAL UTILITIES						
	Power						
	Add new circuit breaker and make connections at existing panel	**1**	ls	3,500.00	3,500		
	Allow for feeder from existing panelboard to new NEMA 3R enclosure	**80**	lf	18.00	1,440		
	Coring	**1**	ls	1,500.00	1,500		
	New NEMA 3R enclosure w/ disconnect switches	**1**	ls	2,500.00	2,500		
	Allow for 1.25" PVC conduit with 20A circuit to edge of lake	**260**	lf	35.00	9,100		
	NEMA 3R device box with receptacle	**4**	ea	300.00	1,200		
	NEMA 3R junction box for future use	**1**	ea	225.00	225		
	SOOW type cable - 20A rated	**1,000**	lf	8.00	8,000		
	Allow for connections at fountains	**3**	loc	500.00	1,500		
	Aerator timeclock	**3**	ea	650.00	1,950		
	Allow for misc. electrical scope not yet defined	**1**	ls	3,500.00	3,500		
	Site Lighting						
	Site Lighting at campus connect scope						
	Install 2-1" PVC conduits for site lighting and blue phone at campus connect scope	**930**	lf	0.00	-		
	Install half new and half exiting salvage pole light	**23**	ea	5,000.00	115,000		
	Pole base	**23**	ea	0.00	See Civil		
	Pole grounding	**23**	ea	150.00	3,450		
	Connect to existing power	**1**	ls	5,000.00	5,000		
	Site lighting circuitry	**2,790**	lf	3.00	8,370		
	Trenching and backfilling	**930**	lf	10.00	9,300		
	Misc.						
	Blue phone				Assumes by owner		
	Coordination, BIM, shop drawings	**1**	ls	2,000.00	2,000		
	Site demolition work/salvage allowance	**1**	ls	10,000.00	10,000		
	Fees & permits	**1**	ls	0.00	-		
	Site Lighting at spillway scope						
	Allowance to remove and reinstall existing pole light	**5**	loc	4,500.00	22,500		
	Pole base	**5**	ea		ETR		
	Pole grounding	**5**	ea		ETR		
	Site lighting circuitry				ETR		
	Misc.						
	Temp power for pumps	**1**	ls	5,000.00	5,000		
	Coordination, BIM, shop drawings	**1**	ls	5,000.00	5,000		
	Site demolition/make safe work	**1**	ls	10,000.00	10,000		
	Fees & permits	**1**	ls	1,000.00	1,000		
	SUBTOTAL					231,035	
	TOTAL, DIVISION 26 - ELECTRICAL UTILITIES						**$231,035**
	TOTAL - SITE DEVELOPMENT						**$11,934,915**

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATE #1- Shelter							
	03 - CONCRETE						
33000	**CONCRETE**						
	Shelter platform						
	12" Concrete pier 15' tall; assumes poured in place when lake is dry	**13**	loc	6,000.00	78,000		
	Formed Concrete deck; assumes 0'-8" thick	*99*	*cy*				
	Formwork	**2,300**	sf	18.00	41,400		
	Rebar	**16,100**	lbs	2.00	32,200		
	Concrete including placing and finishes	**99**	cy	350.00	34,650		
	SUBTOTAL					186,250	
	TOTAL - CONCRETE						**$186,250**
31	**EARTHWORK**						
311000	**SITE PREPARATION**						
	Tree protection				See base estimate		
	Remove concrete walks				NIC		
	Miscellaneous demolition	**1**	ls	5,000.00	5,000		
	SUBTOTAL					5,000	
312000	**EARTH WORK**						
	Site Clearing						
	Strip topsoil, store onsite	**370**	cy	16.00	5,920		
	Earthwork at roadways and walkway						
	Concrete paving	*5,000*			-		
	gravel base; avg 12" thick	**185**	cy	45.00	8,325		
	Site Earthwork						
	No cofferdam required	**3,000**	lf	125.00	NIC		
	Excavate/backfill for poured in place piers	**13**	loc	800.00	10,400		
	Allowance for additional grading at shelter platform	**1**	ls	5,000.00	5,000		
	De-watering/dust control allowance	**1**	ls	2,000.00	2,000		
	Light pole base	**11**	ea	800.00	8,800		
	SUBTOTAL					40,445	
312500	**EROSION AND SEDIMENTATION CONTROLS**						
	Allowance for additional erosion control/silt protection	**1**	ls	1,000.00	1,000		
	SUBTOTAL					1,000	
	TOTAL, DIVISION 31 - EARTHWORK and SITE PREPARATION						**$46,445**
32	**EXTERIOR IMPROVEMENTS**						
320000	**PAVING AND CURBING**						
	New concrete walks	*5,000*					
	Concrete; 6" thick	**5,000**	sf	12.00	60,000		
	Tie new walks into existing	**1**	ls	800.00	800		
	SUBTOTAL					60,800	

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATE #1- Shelter							
323000	**SITE IMPROVEMENTS**						
	New wood post shelter- stick built w/ metal roof and exposed wood timbers	**800**	sf	180.00	144,000		
	New wood post rail w. 2x6 top and bottom rails w/ metal picket panel	**138**	lf	250.00	34,500		
	Allowance for site furnishings; trash receptacle, bollards, signage bench etc.	**1**	ls	10,000.00	10,000		
	SUBTOTAL					188,500	
329200	**LANDSCAPING**						
328400	*PLANTINGS*						
	Allowance for new plantings - trees and/or shrubs	**47**	ea	700.00	32,900		
	Allowance for existing and new plantings soils at trees and shrubs	**131**	cy	80.00	10,480		
	Allowance for mulch at tree/shrub area	**23,547**	sf	0.30	7,064		
	SUBTOTAL					50,444	
TOTAL, DIVISION 32 - EXTERIOR IMPROVEMENTS							**$299,744**
26	**ELECTRICAL UTILITIES**						
	Install 2-1" PVC conduits for site lighting and blue phone	**500**	lf	15.00	7,500		
	Site Lighting						
	Install new pole light	**11**	ea	8,500.00	93,500		
	Pole base	**11**	ea		See Civil		
	Pole grounding	**11**	ea	150.00	1,650		
	Connect to existing power	**1**	ls	5,000.00	5,000		
	Site lighting circuitry	**1,500**	lf	3.00	4,500		
	Trenching and backfilling	**500**	lf	10.00	5,000		
	Misc.						
	Blue phone				Assumes by owner		
	Coordination, BIM, shop drawings	**1**	ls	2,000.00	2,000		
	Site demolition work	**1**	ls	2,500.00	2,500		
	Fees & permits	**1**	ls	1,600.00	1,600		
	SUBTOTAL					123,250	
TOTAL, DIVISION 26 - ELECTRICAL UTILITIES							**$123,250**
TOTAL ALTERNATE #1							**$655,689**

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	ALTERNATE #2- South Promenade						
	03 - CONCRETE						
33000	**CONCRETE**						
	Cantilevered Footing 5'-6" x 0'-12"						
	Concrete footing 12'-8" wide x 2'-8" thick	**96**	cy				
	Formwork	**2,454**	sf	17.00	41,718		
	Rebar	**9,216**	lbs	2.00	18,432		
	Concrete including placing	**96**	cy	300.00	28,800		
	Promenade Retaining Wall 12" thick						
	Concrete to walls	**231**	cy				
	Formwork	**12,272**	sf	22.00	269,984		
	Rebar	**42,952**	lbs	2.00	85,904		
	Premium for epoxy rebar at cap	**1**	ls	3,000.00	3,000		
	Concrete including placing	**231**	cy	320.00	73,920		
	Premium for radius at lookout	**1**	ls	5,000.00	5,000		
	Concrete to slab on grade/sidewalk above promenade; 0'-8" thick-partially cantilevered	**146**	cy				
	12" crushed stone wrapped in filter fabric	**219**	cy	75.00	16,425		
	Rebar	**11,800**	lbs	2.00	23,600		
	Concrete including placing	**146**	cy	300.00	43,800		
	Premium for formed cantilever at walks	**472**	lf	25.00	11,800		
	SUBTOTAL					622,383	
	TOTAL - CONCRETE						**$622,383**
31	**EARTHWORK**						
311000	**SITE PREPARATION**						
	Site Demolitions and Relocations						
	Tree protection				See base estimate		
	Remove concrete walks				See base estimate		
	Miscellaneous demolition	**1**	ls	8,000.00	8,000		
	SUBTOTAL					8,000	
312000	**EARTH WORK**						
	Site Clearing						
	Strip topsoil, store onsite				See base estimate		
	Site Earthwork						
	No cofferdam required	**6,750**	lf	125.00	NIC		
	Premium to excavate/backfill for retaining wall	**3,881**	cy	25.00	97,025		
	Allowance for additional grading at forebay	**300**	lf	10.00	3,000		
	De-watering/dust control allowance	**1**	ls	5,000.00	5,000		
	Light pole base	**12**	ea	800.00	9,600		
	SUBTOTAL					114,625	
312500	**EROSION AND SEDIMENTATION CONTROLS**						
	Allowance for additional erosion control/silt protection	**1**	ls	2,500.00	2,500		
	SUBTOTAL					2,500	
	TOTAL, DIVISION 31 - EARTHWORK and SITE PREPARATION						**$125,125**

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATE #2- South Promenade							
32	**EXTERIOR IMPROVEMENTS**						
320000	**PAVING AND CURBING**						
	See Site Concrete						
	SUBTOTAL					-	
323000	**SITE IMPROVEMENTS**						
	New wood post rail w. 2x6 top and bottom rails w/ metal picket panel	**772**	lf	250.00	193,000		
	Allowance for site furnishings; trash receptacle, bollards, signage b	**1**	ls	15,000.00	15,000		
	SUBTOTAL					208,000	
329200	**LANDSCAPING**						
328400	*PLANTINGS*						
	Allowance for misc. plantings; forebays in base	**1**	ls	5,000.00	5,000		
	SUBTOTAL					5,000	
TOTAL, DIVISION 32 - EXTERIOR IMPROVEMENTS							**$213,000**
33	**UTILITIES**						
330000	**STORM DRAINAGE**						
	Storm water distribution						
	Allowance for 6' wide spillway built into promenade from forebay	**3**	loc	2,000.00	6,000		
	SUBTOTAL					6,000	
TOTAL, DIVISION 33 - UTILITIES							**$6,000**
26	**ELECTRICAL UTILITIES**						
	Install 2-1" PVC conduits for site lighting and blue phone	**472**	lf	15.00	7,080		
	Site Lighting						
	Install new pole light	**12**	ea	8,500.00	102,000		
	Pole base	**12**	ea		See Civil		
	Pole grounding	**12**	ea	150.00	1,800		
	Connect to existing power	**1**	ls	5,000.00	5,000		
	Site lighting circuitry	**1,416**	lf	3.00	4,248		
	Trenching and backfilling	**472**	lf	10.00	4,720		
	Misc.						
	Blue phone				Assumes by owner		
	Coordination, BIM, shop drawings	**1**	ls	2,000.00	2,000		
	Site demolition work	**1**	ls	2,500.00	2,500		
	Fees & permits	**1**	ls	1,600.00	1,600		
	SUBTOTAL					130,948	
TOTAL, DIVISION 26 - ELECTRICAL UTILITIES							**$130,948**
	TOTAL ALTERNATE #2						**$1,097,456**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	ALTERNATE #3 Downstream Improvements						
	03 - CONCRETE						
	33000 CONCRETE						
	New abutments at foot bridge						
	Allowance for concrete abutments/bridge support- complete;	**49**	cy	2,200.00	Included in bid		
	Concrete including placing at foot bridge	**4**	cy	300.00	1,200		
	SUBTOTAL					1,200	
	TOTAL - CONCRETE						**$1,200**
	05 - METALS						
	055000 METAL FABRICATIONS						
	Metal grate foot-bridge at spillway per Bridge Brother quote (10' x 20)	**1**	ls	64,390.00	64,390		
	Metal rails at new foot bridge	**40**	lf	300.00	Included		
	SUBTOTAL					64,390	
	TOTAL - METALS						**$64,390**
31	**EARTHWORK**						
	311000 SITE PREPARATION						
	Site Demolitions and Relocations						
	Temp site construction fence; includes an allowance to move	**500**	lf	20.00	10,000		
	Remove tree and shrubs/ landscaped allowance	**1**	ls	5,000.00	5,000		
	Tree protection						
	Allowance for an arborist for tree/root pruning/ monitoring	**2**	days	1,000.00	2,000		
	Tree protection fencing allowance	**200**	lf	15.00	3,000		
	Area; allow for soil care/fertilizer/root protection	**5,000**	sf	3.00	15,000		
	Remove tree allowance	**6**	loc	1,500.00	9,000		
	Lift access tree crown for pruning	**1**	ls	4,000.00	4,000		
	Road Detail allowance	**1**	ls	10,000.00	10,000		
	Miscellaneous demolition	**1**	ls	5,000.00	5,000		
	SUBTOTAL					63,000	
	312000 EARTH WORK						
	Site Clearing						
	Strip topsoil, store onsite at downstream	**424**	cy	16.00	6,784		
	Site Earthwork						
	Allowance to widen/ renew stream bed; assume work completed when no flow is occurring	**5,600**	sf	6.00	33,600		
	Grading allowance at new planting	**2,689**	sy	1.50	4,034		
	De-watering/dust control allowance	**1**	ls	5,000.00	5,000		

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	ALTERNATE #3 Downstream Improvements						
	Excavate and back fill for new bridge abutments	**2**	loc	5,000.00	Included in bid		
	New concrete walks	*4,100*					
	gravel base; 8" thick	**100**	cy	45.00	4,500		
	Light pole base	**10**	ea	800.00	8,000		
	Hazardous Waste Remediation Premiums						
	No work assumed						
	SUBTOTAL					61,918	
312500	**EROSION AND SEDIMENTATION CONTROLS**						
	Silt fence/ silt sock	**500**	lf	15.00	7,500		
	Inlet protection allowance	**2**	ea	250.00	500		
	Silt fence maintenance and monitoring	**1**	ls	2,000.00	2,000		
	SUBTOTAL					10,000	
	TOTAL, DIVISION 31 - EARTHWORK and SITE PREPARATION						**$134,918**
	32 EXTERIOR IMPROVEMENTS						
320000	**PAVING AND CURBING**						
	New concrete walks	*4,100*					
	Concrete; 6" thick	**4,100**	sf	12.00	49,200		
	Tie new walks into existing	**1**	ls	1,000.00	1,000		
	SUBTOTAL					50,200	
323000	**SITE IMPROVEMENTS**						
	Allowance for site furnishings; trash receptacle, bollards, bench, signage etc.	**1**	ls	20,000.00	20,000		
	SUBTOTAL					20,000	
329200	**LANDSCAPING**						
328400	*PLANTINGS*						
	Allowance for new plantings	**12,000**	sf	6.00	72,000		
	TURF AND GRASSES						
	Soils						
	Spread new topsoil @ lake edge sodded areas	**300**	cy	55.00	16,500		
	Premium for new soils at plantings	**356**	cy	55.00	19,580		
	Lawn						
	New sod - at stream edge	**8,105**	sf	2.00	16,210		
	SUBTOTAL					124,290	
	TOTAL, DIVISION 32 - EXTERIOR IMPROVEMENTS						**$194,490**
	26 ELECTRICAL UTILITIES						
	Install 2-1" PVC conduits for site lighting and blue phone	**565**	lf	15.00	8,475		
	Site Lighting						

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	ALTERNATE #3 Downstream Improvements						
	Install new pole light	**10**	ea	8,500.00	85,000		
	Pole base	**10**	ea		See Civil		
	Pole grounding	**10**	ea	150.00	1,500		
	Connect to existing power	**1**	ls	5,000.00	5,000		
	Site lighting circuitry	**1,695**	lf	3.00	5,085		
	Trenching and backfilling	**565**	lf	10.00	5,650		
	Misc.						
	Blue phone				Assumes by owner		
	Coordination, BIM, shop drawings	**1**	ls	2,000.00	2,000		
	Site demolition work	**1**	ls	2,500.00	2,500		
	Fees & permits	**1**	ls	1,600.00	1,600		
	SUBTOTAL					116,810	
	TOTAL, DIVISION 26 - ELECTRICAL UTILITIES						**$116,810**
	TOTAL ALTERNATE #3						**$511,808**

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	ALTERNATE #4- Bridge to Island						
	03 - CONCRETE						
33000	**CONCRETE**						
	New abutments at foot bridge						
	Allowance for concrete abutments/bridge support- complete; at island and shore	**49**	cy	2,500.00	Included in bid price		
	New concrete piles at foot bridge						
	24" Concrete piles, 15' exposed with cap to support bridge allowance	**2**	loc	15,000.00	30,000		
	Concrete including placing at foot bridge	**33**	cy	300.00	9,900		
	SUBTOTAL					39,900	
	TOTAL - CONCRETE						**$39,900**
	05 - METALS						
055000	**METAL FABRICATIONS**						
	Metal grate foot-bridge 10' x 180 per Bridge Brothers quote	**1**	ls	825,794.00	825,794		
	Metal rails at new foot bridge	**200**	lf	300.00	Included above		
	SUBTOTAL					825,794	
	TOTAL - METALS						**$825,794**
31	**EARTHWORK**						
311000	**SITE PREPARATION**						
	Site Demolitions and Relocations						
	Allowance for added temp site construction fence; includes an allowance to move	**1**	ls	2,500.00	2,500		
	Remove tree and shrubs/ landscaped allowance				See base estimate		
	Remove existing walks				See base estimate		
	Miscellaneous demolition	**1**	ls	5,000.00	5,000		
	SUBTOTAL					7,500	
312000	**EARTH WORK**						
	Site Clearing						
	Strip topsoil, store onsite at downstream	**11**	cy	16.00	176		
	Site Earthwork						
	Grading allowance at new walks and related areas	**67**	sy	1.50	101		
	De-watering/dust control allowance	**1**	ls	1,000.00	1,000		
	Excavate and back fill for new bridge abutments	**2**	loc	8,000.00	16,000		
	New concrete walks	*300*					
	gravel base; 8" thick	**7**	cy	45.00	315		
	New Light pole base	**3**	ea	800.00	2,400		
	Hazardous Waste Remediation Premiums						
	No work assumed						
	SUBTOTAL					19,992	
312500	**EROSION AND SEDIMENTATION CONTROLS**						
	Added Silt fence/ silt sock allowance	**500**	lf	15.00	7,500		
	Inlet protection allowance	**2**	ea	250.00	500		

Feasibility Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATE #4- Bridge to Island							
	Silt fence maintenance and monitoring	**1**	ls	2,000.00	2,000		
	SUBTOTAL					10,000	
	TOTAL, DIVISION 31 - EARTHWORK and SITE PREPARATION						**$37,492**
	***32* EXTERIOR IMPROVEMENTS**						
320000	**PAVING AND CURBING**						
	New concrete walks	*300*					
	Concrete; 6" thick	**300**	sf	12.00	3,600		
	Tie new walks into existing	**1**	ls	2,500.00	2,500		
	New stone dust area	*300*					
	Stabilized stone dust 4" thick	**300**	sf	15.00	4,500		
	Metal edging	**200**	lf	18.00	3,600		
	SUBTOTAL					14,200	
323000	**SITE IMPROVEMENTS**						
	New wood post rail w. 2x6 top and bottom rails w/ metal picket panel at granite steps	**12**	lf	250.00	3,000		
	New granite steps on concrete foundation	**72**	lfr	350.00	25,200		
	Allowance for site furnishings; trash receptacle, bollards, bench, signage etc.	**1**	ls	10,000.00	10,000		
	SUBTOTAL					38,200	
329200	**LANDSCAPING**						
328400	*PLANTINGS*						
	Allowance for plantings at island				See base estimate		
	TURF AND GRASSES						
	Soils						
	Spread new topsoil @ lake edge sodded areas	**11**	cy	55.00	605		
	Lawn						
	New sod - at stream edge	**300**	sf	2.00	600		
	SUBTOTAL					1,205	
	TOTAL, DIVISION 32 - EXTERIOR IMPROVEMENTS						**$53,605**
	***26* ELECTRICAL UTILITIES**						
	Install 2-1" PVC conduits for site lighting and blue phone	**200**	lf	15.00	3,000		
	Site Lighting						
	Install new light	**5**	ea	8,500.00	42,500		
	Pole base	**5**	ea		See Civil		
	Pole grounding	**5**	ea	150.00	750		
	Connect to existing power	**1**	ls	5,000.00	5,000		
	Site lighting circuitry	**600**	lf	3.00	1,800		
	Trenching and backfilling	**200**	lf	10.00	2,000		
	Misc.						
	Blue phone				Assumes by owner		
	Coordination, BIM, shop drawings	**1**	ls	8,000.00	8,000		
	Site demolition work/salvage allowance	**1**	ls	2,500.00	2,500		
	Fees & permits	**1**	ls	1,600.00	1,600		
	SUBTOTAL					67,150	

PM&C

Univ. of Conn.- Mirror Lake
Dam Improvements
Storrs CT

12-May-21

Feasibility Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST

ALTERNATE #4- Bridge to Island

TOTAL, DIVISION 26 - ELECTRICAL UTILITIES	**$67,150**

TOTAL ALTERNATE #4	**$1,023,941**