Dredging Feasibility Assessment and Conceptual Engineering Design for Warner's Pond

Concord, Massachusetts

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1.0 INTRODUCTION

Warner's Pond

Warner's Pond is relatively shallow and occupies approximately 48 acres (54 acres, if islands are included) fully within the Town of Concord, Massachusetts. The pond is fed by an approximately 47-square-mile watershed that is located primarily outside of Concord and includes portions of the Towns of Acton, Boxborough, Carlisle, Littleton, Stow and Westford. Warner's Pond was created in the 1800s by damming Nashoba Brook just downstream of its confluence with Fort Pond Brook. Water discharges into the pond through a broad delta of emergent wetlands on the western shore. Given the size of the pond's watershed and the volume of water contained in the streams feeding the pond, water flushes through the pond relatively rapidly. Water leaves the pond via its outlet at the southeast corner.

A consequence of the large watershed to pond ratio, and the impounded nature of the pond, is that much of Warner's Pond has filled in with sediments that have made the pond shallower and more susceptible to excessive weed growth, particularly from highly invasive exotic plant species such as variable watermilfoil (*Myriophyllum heterophyllum*), fanwort (*Cabomba caroliniana*), and water chestnut (*Trapa natans*). Since at least the 1980s, the pond has undergone eutrophication (a process where waterbodies receiving excessive nutrients experience excessive plant growth) and sediment deposition. Sediment and excess nutrients are transported to the pond from its tributaries as well as from the nine stormwater outfalls that discharge directly to the pond or adjacent wetlands around its perimeter. The sediment accumulation, excess nutrients in the water column, and dense growths of exotic aquatic plants have led to a seriously degraded condition in the pond over time. These degraded conditions have diminished the ecological value of the pond with regard to its ability to support fish and wildlife populations typical of healthier open water habitats. The poor water quality and increased weed growth are also impairing the pond's ability to serve the community with regard to recreational opportunities. Sediments have increased so that some areas are impassable by kayakers and canoeists. The excessive growth of exotic and nuisance macrophyte species at the pond impairs recreational uses and both benefits from and contributes to the filling of the pond with sediment in the long term.

ESS Group, Inc. (ESS) prepared a Watershed Management Plan in 2012 to provide the Town with a framework to guide future management decisions for the pond (ESS Group 2012). The Plan recommended a range of options for improving the ecological and recreational value of the pond, including short-term options such as herbicides and biological controls as well as long-term options. The long-term options included (1) controlling nutrient and sediment loading through an educational program for watershed residents and low impact development techniques or (2) in-pond management (dredging). Dredging was recommended as the primary focus for management because the vast majority of the pond's watershed lies outside Concord's borders. While dredging is expensive, it addresses multiple in-pond problems and lasts for decades. The Plan recommended dredging of a portion of the pond, specifically the area between Scout Island, Pond Street, and the Commonwealth Avenue public access points, as a more realistic alternative to dredging the entire pond. The Town decided to pursue further study of limited dredging in this location as well as a small section in the northeastern corner of the pond adjacent to the recently-acquired

Gerow parcel where a swimming beach is under consideration. These areas are illustrated in Figure 1 and are referred to throughout the report as the South and North dredge areas, respectively.

Dredging is a reliable approach for restoring ecological and aesthetic characteristics of a waterbody since it removes the nutrient-rich sediments that have accumulated over time. These accumulations occur in every ponded system; however, impounded systems are inherently susceptible since the impoundment creates a natural settling point for material that would otherwise pass through. Since Warner's Pond is an impounded pond, the dredging program should be designed to not only remove the accumulated sediment, but also to deepen the pond to a depth that will preclude the growth of rooted plants from the areas of the pond that are envisioned to remain weed free. If dredging were only to remove the accumulated muck layer, the pond would soon accumulate a new layer of muck, although less thick, that would be sufficient to support the root systems for a number of aquatic weeds.

Ultimately, the goal of the restoration is to retain the pond's historic character as an open water amenity within the Town while also maintaining the site's value as an ecological resource. Therefore, in addition to developing a design and cost estimate for a dredging project to improve the deep-water habitat, areas in which the restoration could be configured to also improve the shallower wetland and wildlife habitat around the pond's perimeter have also been identified.

2.0 BATHYMETRY AND SEDIMENT QUALITY ANALYSIS

Sediment depth testing and sediment sampling was conducted at Warner's Pond on June 8 and August 21, 2017 in order to quantify the volume of soft sediment present within the dredge areas and to determine the physical and chemical properties of this soft sediment. Detailed methods are included in the Quality Assurance Project Plan (QAPP) and QAPP Amendment (ESS Group 2011, ESS Group 2017), and are summarized below.

2.1 Sediment Depth and Water Bathymetry

In addition to an initial assessment of sediment and water depths in 2012 to inform the Watershed Management Plan, targeted dredge areas were reassessed to confirm depth measurements. At each location, a tile probe was held to the pond bottom to determine water depth, and then pushed the probe into the soft sediment until refusal was achieved. The distance between the sediment-water interface and first refusal was recorded as the soft sediment depth. The surface sediment and the underlying hard sediment (e.g. sand, gravel, clay or bedrock) at each station was then characterized.

Based on these measurements, maps of the sediment and water depths within the pond were created (Figures 2 and 3), which served as the basis for the engineering design calculations presented in Section 4.0. Sediment depth in the dredge areas currently ranges from less than 1 foot along some of the pond's margins to around 3 feet. Based on these measurements, the total volume of the soft sediment contained within the dredge areas was calculated to be approximately 35,000 cubic yards.

Sediment Core Sample from Warner's Pond

2.2 Sediment Sampling

Sediment coring and sampling was conducted based on MassDEP requirements for the 401 Water Quality Certificate application. MassDEP requires one sediment core per 1,000 cubic yards to be dredged with up to three cores allowed to be combined for composite analysis. For projects dredging more than 10,000 cubic yards, MassDEP requires a sediment sampling plan to be submitted for approval prior to fieldwork being conducted. Therefore, a Sediment Sampling Plan for Warner's Pond was developed in February 2017 (Appendix A). The plan includes details on the sampling methods as well as 24 sampling locations in the South dredge area, and the cores that were planned to be composited together. After review of the Sediment Sampling Plan, MassDEP requested that four of the cores be analyzed as discrete samples rather than composited; therefore, the approach was modified to include four discrete samples. Sediment in the North dredge area was also sampled in accordance with the Sediment Sampling Plan, collecting five samples, one of which was discrete. The sampling locations are illustrated in Figure 4.

Sediment samples were delivered to a state certified laboratory (Phoenix Environmental Laboratories, Inc.) for analysis. Chemical analyses consisted of total organic carbon, total phosphorus, heavy metals (chromium, copper, zinc, lead, cadmium, arsenic, mercury, nickel), polychlorinated biphenyls (PCBs), extractable petroleum hydrocarbons with targeted polycyclic aromatic hydrocarbons, and percent moisture. TCLP analysis was conducted on samples with metal concentrations above theoretical TCLP levels. Volatile organic compounds (VOCs) were not included as there was no evidence of VOCs in the 2012 study. Samples were also assessed for grain size distribution.

2.3 Sediment Testing Results

Sediment chemistry results are provided in Table 1. Only one sample, SC4-ABC, was flagged for TCLP for lead. However, the analysis found the lead leachate levels to be below the detection limit. Sediment chemistry data were compared to the Massachusetts Contingency Plan (MCP) Method 1 Risk Characterization Soil Standards. These standards consider the potential risk of harm resulting from direct exposure to the hazardous constituent of the soil. The MCP defines different soil and groundwater types generally based on the exposure pathway. To be conservative, the lowest concentration level (S-1/GW-1) was used to evaluate the Warner's Pond sediment quality data. It should be noted that the MCP Method 1 standards apply to upland soils and thus are not directly applicable to the pond sediments. However, the MCP Method 1 standards would apply to any sediment dredged from the pond intended for upland reuse.

Sediment chemistry results were below MCP Method 1 standards for all samples and analytes evaluated except sample SC4-ABC which exceeded reportable concentrations for arsenic. Most heavy metals are relatively uncommon in the earth's crust, and elevated levels of these elements in aquatic sediments typically indicate human-induced contamination. However, elevated levels of some heavy metals, especially arsenic and lead, are not uncommon in New England aquatic sediments. Arsenic can enter aquatic systems through the natural process of weathering of rocks containing arsenic. It can also be

released into the environment due to human activities such as arsenic-based insecticides and the burning of fossil fuels.

As the sediment was found to be fairly clean, it is likely that there will not be any restrictions on its reuse. The implications of the one elevated arsenic sample will be determined through the 401 Water Quality Certification process. As part of the permitting process, the state may require additional sampling to help them better understand the extent of the contamination and this will determine where the sediment may be reused or disposed. Any material that is not suitable for beneficial upland reuse would need to either be trucked to a site for disposal (e.g. to a lined landfill) or could potentially be amended with clean material from within the basin to mitigate the concentrations to suitable levels prior to removal from the pond. It is also possible that the project could be designed to leave the contaminated material within the pond to avoid excessive costs for removing and disposing of contaminated material.

Laboratory reports are provided in Appendix B.

3.0 DREDGING FEASIBILITY

Dredging works as a plant control technique when either light limitation is imposed through increased water depth or when enough soft sediment is removed to reveal a less hospitable substrate for plant growth (e.g. hard bottom or other nutrient-poor substrate). Light limitation through increased depth is possible in Warner's Pond, particularly since water clarity is already relatively poor. It may not be necessary to dredge the entire pond to achieve a satisfactory level of plant control, but it would be necessary to do a thorough job in any area where control is to be achieved or greater depths are desired.

The biggest challenge for Warner's Pond is the size and extent of its watershed. Since it has such a large watershed, the amount of nutrients and sediment it receives each year far exceeds the pond's ability to assimilate these inputs and therefore, no watershed management action alone will improve conditions within the entire pond. Furthermore, a large sediment load would be expected to move into the pond with every storm or high-water flow and the streambed upstream of the pond is essentially a sandy-bottomed channel feeding the pond with new sediment each year. This presents a challenge for any dredging project at the pond since it would not be a sound management approach to expend effort and create environmental impact to remove sediment that would quickly re-fill.

The North and South dredge areas are suitable for dredging as they are not located within the main channel through the pond but are rather outside the path of the incoming sediments. Therefore, a dredging project targeting removal of sediment from these areas would be expected to last for many years while other areas within the pond continue to infill.

Dredging can be accomplished using a conventional "dry" dredge approach or through hydraulic dredging. Dry dredging requires drawing down the pond to allow dredging within the drained basin to occur using conventional excavation equipment. This approach would allow for sediment to be dewatered within the basin itself by pulling the sediment up to the margins of the pond to allow water to drain back into the main portion of the basin. However, given that Warner's Pond has a significant amount of water flowing through the system it may not be possible to entirely dewater the targeted work area without advanced water management techniques such as temporary cofferdams or the creation of channels to route the flow of water around the work area. For this reason, ESS does not recommend dry dredging as the preferred approach as these advanced dewatering techniques can quickly complicate and increase the cost of a project by three to four times at this site.

Hydraulic dredging would be a viable and feasible alternative to dry dredging. Hydraulic dredging is generally more expensive than dry dredging for limited projects but becomes increasingly cost-effective as the scale of a project increases. Hydraulic dredging requires significant planning for the dewatering of the sediment since the approach typically produces a sediment slurry that is nearly 80% water. Removing this volume of water from the sediment requires a more sophisticated containment area (compared with dry dredging). Alternatively, advanced dewatering techniques such as the use of Geotubes (geotextile fabric for dewatering) or a belt-filter press machine could be used, but these approaches would add additional costs over traditional dewatering containment. All of these external sediment dewatering options require land adjacent to or in close proximity to the pond to be made available for the dewatering process. The Town's public access lot at the Commonwealth Avenue access point would provide adequate space for the use of a belt-filter press machine, but a larger area would be required for either the use of the Geotubes (at least 2 acres) or a standard dewatering basin (at least 3 acres and preferably 4 acres). A 3 to 4 acre portion of agricultural land to the northwest of the pond, owned by the Commonwealth of Massachusetts, can be used for a standard dewatering basin. Dewatering sediment within standard dewatering basins would be roughly half the cost of using the Geotubes ($12/cubic yard vs. $24/cubic yard) to accomplish the same result. Given that land is available and suitable, ESS recommends the traditional dewatering approach over the more advanced dewatering methods based on the cost savings.

An additional consideration for the dredging approach is the location of the disposal site. A disposal location at the Northeast Correctional Center approximately 0.75 miles north of the pond is available and the feasibility of piping the sediment to this site following hydraulic dredging rather than dewatering the sediment on a site adjacent to the pond was assessed. There are culverts underneath routes 2 and 2A that could be used, but would require approval from MassDOT. This would also require using a booster pump to overcome the elevation differential and distance. Additionally, at least 3 acres at the disposal site would be required for a standard dewatering basin, and water would need to be pumped from the disposal site back to the pond (this could potentially be done at night with the same pipeline to reduce costs). The most feasible approach is to truck the material to this final disposal site following hydraulic dredging with on-site dewatering. The locations of the dewatering basin and disposal site are shown in Figure 5, with truck routes between the two sites.

The Warner's Pond Watershed Management Plan included a modeled nutrient budget developed from water quality sampling results (ESS Group 2012). The nutrient budget was used to determine the permissible load and critical load for Warner's Pond. Vollenweider (1968) established criteria for calculating the phosphorus load below which no productivity problems were expected (permissible load) and above which productivity problems were almost certain to persist (critical load). Once the nutrient load rises above the permissible load, water quality will begin to deteriorate until nutrient loading increases to a level above the critical load at which point the rate of deterioration will slow since the pond is saturated with nutrients – a state of advanced eutrophication. According to the nutrient budget, the permissible phosphorus load is 393 kg/year and the critical phosphorus load is 785 kg/year. In contrast, the model estimates that the average phosphorus load entering the pond is 4,930 kg/year.

Laboratory results indicate that the soft sediment at Warner's Pond contains an average of 147 mg/kg of total phosphorus. Assuming that the weight of sediment and water are roughly equal, this equates to the loss of approximately 3,935 kg of phosphorus from the removal of 35,000 cubic yards of sediment. Removal of phosphorus-laden sediment will help reduce eutrophication and move the pond closer towards the permissible load by limiting the release of phosphorus from sediments, particularly during periods of anoxia.

However, dredging will not ultimately be the final solution to water quality issues within the pond and continued work to reduce nutrient loading from the pond's watershed is still recommended.

To address nutrient loading, the Town should develop an educational program for watershed residents and work with the upstream municipalities to continue to improve stormwater infrastructure. Initial education and outreach should focus on items that individual residents could implement easily and at minimal to no cost. These actions include minimizing the impact of yard care (particularly fertilization), pet waste management, maintaining or planting buffers at the stream and pond margins, and other small behavioral changes that would improve water quality. Additional safeguards for protecting future water quality can be provided through improvements to the watershed's storm water infrastructure. The addition of storm water detention and infiltration facilities at key runoff locations could reduce the phosphorus reaching the pond and would help to reduce bacterial contamination. There are numerous storm water BMPs currently in the watershed, although most of these may not be adequately maintained or have only been designed to remove water from roadways quickly rather than encouraging infiltration. Going forward it should be encouraged that development and improvements to highway infrastructure be designed to incorporate infiltrating chambers to the outflows or other Low Impact Design (LID) features such as grassed swales, rain gardens, detention ponds, etc.

An additional management approach that could be considered is the use of bacterial additives and artificial aeration to improve water quality. However, these approaches do not have much scientific data supporting the promised results, particularly for larger systems such as Warner's Pond. The cost of these approach is likely to approach that of traditional dredging, and would not necessarily provide the same long-term results.

4.0 RECOMMENDED RESTORATION PLAN AND CONCEPT DESIGNS

4.1 Dredging

As discussed in Section 3.0, ESS recommends hydraulic dredging with a standard dewatering basin adjacent to the pond and trucking the material to the disposal site. Dredge design plans are provided in Appendix C. This would involve removing all soft sediment in the North and South dredge areas to a maximum depth of nine feet (Appendix C, Drawings D-1 and D-2). This depth would eliminate the potential for rooted plants since light would not be able to penetrate to the pond's bottom in water this deep. Additionally, this deepened section of the pond would enhance the pond's ability to provide suitable fish habitat by providing a cool water refuge in the summer and an enhanced deeper overwintering refuge for the winter. Improving the ecological health of Warner's Pond is a critical element to the overall dredge design program and will be essential toward receiving permitting approvals from the various agencies. There are many benefits to dredging a pond, but the benefits to dredging only a portion of a pond, such is the case here, is even more significant as the project will enhance the variability and complexity of the habitats contained within the pond system. This complexity generally improves fish, plant and wildlife diversity.

ESS also recommends re-using some of the dredged sediment by placing it along select areas adjacent to the island within the pond to create shallow wetland benches that will support a wide range of wildlife including wading birds, ducks, frogs, turtles, and juvenile fish. This approach would save costs of transporting all sediment offsite and would further enhance the natural ecology of the Warner's Pond system in areas outside of the dredged area. Conceptual engineering designs for this option are provided in Appendix C, Drawing D-3.

Estimated dredging costs are provided in Tables 2A and 2B. Table 2A includes costs for dredging the North and South dredge areas, or only the South dredge area, and Table 2B includes costs for dredging the North dredge area separately from the South dredge area. Assuming the estimated sediment accumulation rate of 43 to 64 cy/year derived in the Watershed Management Plan and a dredge volume of approximately 35,000 cubic yards in the North and South dredge areas, refill could be expected to take several hundred years. Using a conservative estimate of a 100-year project lifespan, the annualized dredging cost (for dredging both areas) would be $17,900 to $21,800 per year, not including permitting. This estimate is based entirely on measured TSS load and could be higher or lower depending on pond circulation patterns, in-pond algae and macrophyte production, and the occurrence of catastrophic weather events.

Table 2a. Project Budget Estimates for Warner's Pond Restoration

Town of Concord - Hydraulic Dredging of Warners Pond								
Project Budget Estimate								
10/23/18								
Description	***Unit***	***Unit Price (2018 $)***	***Quantity - South Dredge Area***	***Quantity - North Dredge Area***	***Subtotal - South Dredge Area***	***Subtotal - North Dredge Area***	***Project Total***	***South Dredge Area Only***
Site Preparation Warners Pond								
Mobilization/Demobilization	LS	$50,000.00	1		$50,000.00		$50,000.00	$50,000.00
Clearing and Grubbing	AC	$18,000.00	0.15	0.10	$2,700.00	$1,800.00	$4,500.00	$2,700.00
Crushed Stone for Access Road	T	$150.00	55		$8,250.00		$8,250.00	$8,250.00
Site Preperation Re-Use Site (Northeast Correctional Facility)								
Erosion Controls	FT	$12.00	1,300	0	$15,600.00	$0.00	$15,600.00	$15,600.00
Fine Grading and Compacting	SY	$2.50	12,300	0	$30,750.00	$0.00	$30,750.00	$30,750.00
Pond Dredging								
Hydraulic Dredging (8-Inch Dredge)	CY	$7.00	30,740	4,990	$215,180.00	$34,930.00	$250,110.00	$215,180.00
Dewatering								
Bales of Straw	EA	$13.50	500	60	$6,750.00	$810.00	$7,560.00	$6,750.00
Crushed Stone Marker Layer	T	$37.00	7,700	1,200	$284,900.00	$44,400.00	$329,300.00	$284,900.00
Crushed Stone Marker Layer Removal and Disposal	CY	$28.00	6,000	1,000	$168,000.00	$28,000.00	$196,000.00	$168,000.00
Dewatering Dredge Material	CY	$12.00	30,740	4,990	$368,880.00	$59,880.00	$428,760.00	$368,880.00
Wetland Creation								
Fine Grading and Compacting	SY	$2.29	5,600		$12,800.00		$12,800.00	$12,800.00
Wetland Plants	EA	$8.00	15,000		$120,000.00		$120,000.00	$120,000.00
Material Placement by Hydraulic Dredge	CY	$3.50	500		$1,800.00		$1,800.00	$1,800.00
Turbidity Curtain	FT	$32.00	1,400		$44,800.00		$44,800.00	$44,800.00
Hauling to Re-Use Site (Northeast Correctonal Center)								
Trucking	CY	$6.00	30,240	4,990	$181,440.00	$29,940.00	$211,400.00	$181,440.00
Site Resoration Warners Pond								
Seeding	SY	$1.00	700	500	$700.00	$500.00	$1,200.00	$700.00
Site Restoration Re-Use Site								

Pavement Restoration	LS	$5,000.00	1		$5,000.00		$5,000.00	$5,000.00
Seeding	SY	$1.00	12,300	0	$12,300.00	$0.00	$12,300.00	$12,300.00
15% CONTINGENCY							**$259,520.00**	**$229,478.00**
Estimated Construction Budget							**$1,989,650.00**	**$1,759,328.00**
Range of Estimated Budget (-10%/+10%)							**$1,790,000 - $2,190,000**	**$1,580,000 - $1,940,000**

Disclaimer: This Project Budget Estimate is made on the basis of ESS's judgement utilizing conceptual level drawings. The stated range of estimated budget are opinions only and not a formal construction estimate. ESS makes no warranty, expressed or implied, that proposals, bids, or actual construction cost will not vary from this budget estimate. If the Client wishes greater assurance as to probable construction costs, the Client shall employ an independent cost estimator or contractor.

Table 2b. Project Budget Estimates for Warner's Pond Restoration (North Dredge Area)

Town of Concord - Hydraulic Dredging of Warners Pond (North Dredge Area)							
Project Budget Estimate							
10/23/18							
Description	***Unit***	***Unit Price (2023 $)***	***Quantity - South Dredge Area***	***Quantity - North Dredge Area***	***Subtotal - South Dredge Area***	***Subtotal - North Dredge Area***	***Total***
Site Preperation Warners Pond							
Mobilization/Demobilization	LS	$ 58,000.00	0	1	$0.00	$58,000.00	$ 58,000.00
Clearing and Grubbing	AC	$ 20,880.00	0	0.10	$0.00	$2,090.00	$ 2,090.00
Crushed Stone for Access Road	T	$ 174.00	0	55	$0.00	$9,570.00	$ 9,570.00
Site Preperation Re-Use Site (Northeast Correctional Facility)							
Erosion Controls	FT	$ 14.00	0	800	$0.00	$11,200.00	$ 11,200.00
Fine Grading and Compacting	SY	$ 2.90	0	5,100	$0.00	$14,790.00	$ 14,790.00
Pond Dredging							
Hydraulic Dredging (8-Inch Dredge)	CY	$ 8.00	0	4,990	$0.00	$39,920.00	$ 39,920.00
Dewatering							
Bales of Straw	EA	$ 16.00	0	300	$0.00	$4,800.00	$ 4,800.00
Crushed Stone Marker Layer	T	$ 43.00	0	1,200	$0.00	$51,600.00	$ 51,600.00
Crushed Stone Marker Layer Removal and Disposal	CY	$ 39.00	0	1,000	$0.00	$39,000.00	$ 39,000.00
Dewatering Dredge Material	CY	$ 14.00	0	4,990	$0.00	$69,860.00	$ 69,860.00
Wetland Creation							
Fine Grading and Compacting	SY	$ 3.00	0	0	$0.00	$0.00	$ -
Wetland Plants	EA	$ 9.00	0	0	$0.00	$0.00	$ -
Material Placement by Hydraulic Dredge	CY	$ 4.00	0	0	$0.00	$0.00	$ -
Turbidity Curtain	FT	$ 37.00	0	0	$0.00	$0.00	$ -
Hauling to Re-Use Site (Northeast Correctonal Center)							
Trucking	CY	$ 7.00	0	4,990	$0.00	$34,930.00	$ 34,930.00
Site Resoration Warners Pond							
Seeding	SY	$ 1.00	0	500	$0.00	$500.00	$ 500.00
Site Restoration Re-Use Site							
Pavement Restoration	LS	$ 5,800.00	0	1	$0.00	$5,800.00	$ 5,800.00
Seeding	SY	$ 1.00	0	5,100	$0.00	$5,100.00	$ 5,100.00
15% CONTINGENCY			**$**				**52,074.00**
Estimated Construction Budget			**$**				**399,234.00**
Range of Estimated Budget (-10%/+10%)							**$360,000 - $440,000**

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1. 2023 dollars estimated using online inflation calculator (www.smartasset.com).
2. North Dredge Area estimate based on present conditions and segmenting project.
3. Assumes South Dredge Area constructed in 2018/2019 and North Dredge Area constructed in 2023.

4.2 Recreational Improvements

The Warner's Pond restoration project may help to alleviate recreational pressure on some of the other ponds in Town, which are already heavily utilized such as White Pond and Walden Pond. The area to be dredged should be swimmable, fishable and relatively weed free due to the water depths created by the dredge project. Along with these recreational improvements, the pond will also continue to afford a wide range of shallow water habitat including marsh, emergent wetland, and other vegetated areas that will maintain the pond's value for associated wildlife viewing. In addition to the recreational improvements associated with dredging, the Town has expressed interest in improving the current public access point off of Commonwealth Avenue and constructing a beach in the northeast section of the pond, adjacent to the North dredge area.

The Commonwealth Avenue access point includes an approximately 250-foot dirt road down to the pond that sits tightly between two houses (303-305 and 293 Commonwealth Avenue) and is only wide enough for one vehicle. There is a dirt parking area at the end of the road with boat access. ESS recommends converting the road to gravel, and either widening the road to 22 feet or adding passing pull-offs (Figures 6 and 7). ESS also recommends delineating seven parking spaces, using a portion of the existing parking area for stormwater management improvements, and improving the beach surface. The estimated cost for these improvements is $180,000 to $220,000, as detailed in Table 3.

Future North Beach Site

The Town recently acquired land to the northeast of the pond (the Gerow parcel), where there is interest in constructing a swimming beach, canoe/kayak access, fishing access, and picnic facilities. A concept plan for the "North Beach" that incorporates these features was developed (Figures 8 and 9). The Bruce Freeman Rail Trail is being constructed to the north of the site, as well as an associated parking area. Beach parking could be shared with the Rail Trail parking area, though additional parking is being considered, which is illustrated in the concept design. The estimated cost for constructing the North Beach is $1.60M to $1.96M, as detailed in Table 4. The Town has recently begun working with a landscape architecture firm to further explore options for development of the Gerow parcel.

Table 3. Project Budget Estimates for Commonwealth Avenue Access Improvements

Town of Concord - Commonwealth Avenue Access Road				
Project Budget Estimate				
05/18/18				
Description	***Unit***	***Unit Price***	***Quantity***	***Total***
Mobilization/Demobilization	LS	$ 10,000.00	1	$ 10,000.00
Erosion Controls	FT	$ 12.00	1,300	$ 15,000.00
Clearing and Grubbing	AC	$ 18,000.00	0.25	$ 4,500.00
Fine Grading and Compacting	SY	$ 8.00	1,000	$ 8,000.00
Crushed Stone for Gravel Access Road	T	$ 51.00	400	$ 25,000.00
Sand Borrow for Beach Surface Improvement	CY	$ 100.00	30	$ 3,000.00
Curb Stop	EA	$ 487.50	7	$ 3,400.00
Stormwater	LS	$ 100,000	1	$ 100,000.00
15% CONTINGENCY			**$**	**30,000.00**
Estimated Construction Budget			**$**	**200,000.00**
Range of Estimated Budget (-10%/+10%)				**$180,000 - $220,000**

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Table 4. Project Budget Estimates for North Beach Construction

Town of Concord - North Beach Recreational Improvements				
Project Budget Estimate				
05/18/18				
Description	***Unit***	***Unit Price***	***Quantity***	***Total***
Mobilization/Demobilization	LS	$ 25,000.00	1	$ 25,000.00
Erosion Controls	FT	$ 12.00	2,000	$ 24,000.00
Clearing and Grubbing	AC	$ 18,000.00	0.50	$ 9,000.00
Fine Grading and Compacting	SY	$ 8.00	4,300	$ 34,400.00
Crushed Stone for Trails and Parking	T	$ 51.00	300	$ 15,300.00
Sand Borrow for Beach Nourishment	CY	$ 30.00	4000	$ 120,000.00
Curb Stop	EA	$ 487.50	18	$ 8,800.00
Stormwater	LS	$ 65,000	1	$ 65,000.00
Floating Dock	SF	$ 40	400	$ 16,000.00
Existing Buildings Demolition	LS	$ 40,000	1	$ 40,000.00
Wooden Gaurdrail	FT	$ 70	200	$ 14,000.00
48-Inch Tall Chain Link Fence	FT	$ 25	400	$ 10,000.00
Playground	LS	$ 50,000	1	$ 50,000.00
2,700 Square Foot Bath House	LS	$ 1,120,000	1	$ 1,120,000.00
15% CONTINGENCY			**$**	**230,000.00**
Estimated Construction Budget			**$**	**1,780,000.00**
Range of Estimated Budget (-10%/+10%)				**$1,600,000 - $1,960,000**

Disclaimer: This Project Budget Estimate is made on the basis of ESS's judgement utilizing conceptual level drawings. The stated range of estimated budget are opinions only and not a formal construction estimate. ESS makes no warranty, expressed or implied, that proposals, bids, or actual construction cost will not vary from this budget estimate. If the Client wishes greater assurance as to probable construction costs, the Client shall employ an independent cost estimator or contractor.

4.3 Funding

There are not many available sources of funding specifically dedicated to dredging or pond restoration in general. ESS identified several potential sources of funding in addition to the Community Preservation Act funding currently being utilized for this project, listed in Table 5. In addition to these sources, some stormwater funding (e.g., the 319 Non-Point Source Grants) may also be applicable to aspects of the project if the effort can be tied to restoring the impacts from stormwater.

Table 5. Potential Sources of Funding

Program	Organization	Average Value	Maximum Value	Match	Notes	Link
Massachusetts Environmental Trust Grants	State of Massachusetts	$25,000	Generally $40,000	Preferred		http://www.mass.gov/eea/grants-and-tech-assistance/grants-and-loans/mass-enviro-trust/
Parkland Acquisitions and Renovations for Communities (PARC) Grant	State of Massachusetts	*Not available*	$400,000	No	Grant will cover 52-70% of total project cost	https://www.mass.gov/service-details/parkland-acquisitions-and-renovations-for-communities-parc-grant-program
Pulling Together Initiative	National Fish and Wildlife Foundation	$35,000	$100,000	Required (1:1)	Focus on invasive weed management	http://www.nfwf.org/pti
Land and Water Conservation Fund	National Park Service	$100,000	*Not available*	Required (1:1)	Focus on recreation	www.nps.gov/lwcf
Aquatic Ecosystem Restoration	U.S. Army Corps of Engineers	*Not available*	$10 M	50% for study after $100,000; 35% design and construction; 100% operation and maintenance	ACOE will conduct a feasibility study and formulate alternatives	http://www.nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program/Section-206/
FishAmerica Foundation		$10,000	*Not available*	*Not available*		http://www.fishamerica.org/grants/
Corporate Wetlands Restoration Partnership		*Not available*	*Not available*	No	Support aquatic restoration other than wetlands	
National Fish Passage Program	U.S. Fish and Wildlife Service	$70,000	None	Preferred	Requires reconnecting fish habitat	https://www.fws.gov/fisheries/whatwedo/nfpp/nfpp.html

5.0 REQUIRED PERMITS

Environmental permitting for dredging projects is moderately complex and will require up to a year before the project could receive all required approvals. Federal, state, and local permits are all required, and would necessitate considerable advance information and review time. Permits required for the project are detailed in the sections below, and a schedule is provided in Appendix D. Costs to prepare and file the required permits for the project envisioned at Warner's Pond are likely to be on the order of $75,000.

Notice of Intent

Several wetland resource areas that fall under the jurisdiction of the Wetlands Protection Act (WPA) and the Town of Concord Wetlands Protection Bylaw occur within and adjacent to Warner's Pond. Dredging will impact Land Under Water and other resource areas. The area of impact to wetland resource areas will need to be determined by a wetland scientist through wetland delineation and other methods. In order to obtain an Order of Conditions under the WPA, a Notice of Intent application must be submitted to the Concord Natural Resources Commission and MassDEP.

Environmental Notification Form

The Massachusetts Environmental Policy Act (MEPA) and its implementing regulations establish procedures for the evaluation of environmental impacts associated with actions taken by state agencies, including issuance of permits and granting of financial assistance. Projects that exceed one or more MEPA review thresholds are required to undergo review by the MEPA office. The proposed project exceeds MEPA review thresholds 301 CMR 11.03(3)(b)(1)(f), 301 CMR 11.03(3)(b)(3), and 301 CMR 11.03(3)(b)(4): alternation of one half or more acres of any other wetlands and dredging and disposal of 10,000 cubic yards of material. MEPA review will require submittal of an Environmental Notification Form.

401 Water Quality Certificate

A 401 Water Quality Certification is required for projects that involve the fill or excavation of 100 cubic yards of sediment or more from a pond or disturbance of 5,000 square feet or more of Land Under Water. An application for a 401 Water Quality Certification must be prepared and submitted to the MassDEP Division of Wetlands and Waterways. Sediment samples must be taken within the proposed sediment removal limits to evaluate the bulk physical and chemical characteristics. The MassDEP standard for this assessment is one core per 1,000 cubic yards to be dredged, with a minimum of two required samples. Up to three cores can be combined into a single composite sample for laboratory analysis. As described in Section 2.2, ESS conducted sediment sampling based on these requirements and in coordination with MassDEP. However, as noted in Section 2.3, there may be additional sampling required to better understand the extent of the contamination in the area of the elevated arsenic sample.

Chapter 91

The Massachusetts Public Waterfront Act (Chapter 91) and its implementing regulations seek to protect and promote the public use of tidelands, Great Ponds, and non-tidal rivers and streams in accordance with the public trust doctrine. Warner's Pond is an impounded non-tidal river; therefore, the project will require a Chapter 91 permit issued by MassDEP. The Chapter 91 application can be submitted jointly with the 401 Water Quality Certificate application.

Section 404 of the Clean Water Act

The project will require approval under Section 404 of the Clean Water Act (CWA) from the USACE New England District. Section 404 regulates the discharge of dredged, excavated, or fill material in wetlands,

streams, rivers, and other waters of the U.S. Removal of 100 cubic yards of sediment or an impact area greater than one acre will require an individual permit.

National Pollutant Discharge Elimination System

National Pollutant Discharge Elimination System (NPDES) permits regulate the discharge of point source pollutants through the CWA. NPDES permits include discharge limits and requirements for monitoring and reporting. The project will require a NPDES Construction General Permit issued by the state of Massachusetts for stormwater and dewatering discharge if the project's final reuse area and dewatering area disturb more than one acre of land.

Massachusetts Endangered Species Act

The Massachusetts Endangered Species Act (MESA) and its implementing regulations provide for the protection of endangered, threatened, and special concern species and their habitats in Massachusetts. According to MassGIS OLIVER, Warner's Pond, the dewatering site, and disposal site are not located in Natural Heritage and Endangered Species Program (NHESP) designated priority habitat of rare species or estimated habitats of rare wildlife. Therefore, NHESP review is not required for the project.

6.0 SUMMARY

Warner's Pond is an artificially created system that is no longer meeting its goal as an ecological and recreational amenity. Although a range of options could be considered that would alleviate some of the symptoms resulting from the accumulated sediment, these approaches would only further delay the need to dredge.

Dredging provides a more reasonable, cost-effective and long-lasting solution, but may also prove to be the most costly alternative in the near term since it must be funded in its entirety despite the benefits lasting for 100 years or more. Instead of simply removing the plants, dredging removes accumulated sediments and restores water depth. Dredging "resets" the pond and is the only alternative that achieves the restoration goal of increasing pond depth.

The recommended approach, focused on the portions of the pond that are accessible to recreation, would cost on the order of $1.8M to $2.2M, plus permitting and additional design costs of $75,000. Recreational improvements at the Commonwealth Avenue access point and Gerow parcel would cost approximately $180,000 to $220,000 and $1.60M to $1.96M, respectively. The Town has recently begun working with a landscape architecture firm to further explore options for development of the Gerow parcel.

Grant funding for this type of project is extremely limited and difficult to secure. Fortunately, a dredge project such as the one envisioned would be expected to last at least 100 years before additional dredging might be required. The lifespan of the preferred dredge project option could be extended even further by implementing a storm water improvement program within the watershed that would target the reduction of sediment sources from the Warner's Pond watershed.

7.0 REFERENCES

ESS Group. 2011. DRAFT Quality Assurance Project Plan for Warner's Pond Watershed Management Plan.

ESS Group. 2012. Warner's Pond Watershed Management Plan.

ESS Group. 2017. Amendment to Warner's Pond Quality Assurance Project Plan.

Vollenweider, R. A. (1968). The scientific basis of lake and stream eutrophication, with particular reference to phosphorus and nitrogen as eutrophication factors. Organisation for Economic Cooperation and Development, Paris, 159.

Tables

Table 1. Sediment Testing Results

					South Dredge Area																			
				CLIENT ID	SC1-A		SC1-BC		SC2-ABC		SC3-AC		SC3-B		SC4-ABC		SC5-ABC		SC6-ABC		SC7-AC		SC7-B	
				SAMPLING DATE	6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017		6/8/2017	
				Lab SAMPLE ID	BY37422		BY37423		BY37424		BY37425		BY37426		BY37427		BY37428		BY37429		BY37430		BY37431	
				Sample Type	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment		Sediment	
	20x Rule Screening Threshold	TCLP Threshold (mg/L)	S-1/GW-1	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Miscellaneous/Inorganics																								
Percent Moisture				%	**67**		**74**		**76**		**85**		**69**		**80**		**76**		**80**		**84**		**85**	
Percent Solid				%	**33**		**26**		**24**		**15**		**31**		**20**		**24**		**20**		**16**		**15**	
Tot.Org.Carbon				mg/kg	**87,000**		**81,000**		**63,000**		**100,000**		**98,000**		**54,000**		**65,000**		**98,000**		**90,000**		**85,000**	
Phosphorus, Total as P				mg/Kg	**183**		**70.1**		**85.5**		**166**		**59.5**		**83.8**		**78**		**124**		**225**		**141**	
Metals, Total																								
Arsenic	100		20	mg/Kg	**6.9**		**6.4**		**6.5**		**17.3**		**14.2**		**26.7**		**12**		**9.9**		**14.5**		**5.2**	
Cadmium	20		70	mg/Kg	< 1.0	U	< 1.2	U	< 1.3	U	< 2.1	U	< 1.0	U	**11.8**		**1.5**		< 1.5	U	< 2.2	U	< 2.4	U
Chromium	100		100	mg/Kg	**30**		**33.1**		**23.3**		**51.4**		**49.5**		**81.1**		**39.9**		**32.1**		**54.4**		**18**	
Copper				mg/kg	**6.8**		**14.6**		**9.1**		**22.7**		**24.8**		**57.1**		**22.9**		**19**		**34.2**		**17.6**	
Lead	100		200	mg/Kg	**21.3**		**33.7**		**15.6**		**47.5**		**53.8**		**104**		**67.9**		**43.4**		**77**		**21.6**	
Mercury	4		20	mg/Kg	**0.09**		**0.1**		< 0.11	U	< 0.18	U	**0.28**		**0.39**		**0.23**		**0.24**		**0.29**		< 0.17	U
Nickel			600	mg/Kg	**10.6**		**12.2**		**10.7**		**18.1**		**13.2**		**29.7**		**14.1**		**10.2**		**15.8**		**7.5**	
Zinc			1,000	mg/Kg	**37.3**		**56.1**		**41.4**		**91.9**		**114**		**228**		**119**		**68.9**		**169**		**40.5**	
Metals, TCLP																								
Lead		5		mg/L											< 0.10	U								
PCBs By SW8082A																								
PCB-1016				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1221				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1232				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1242				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1248				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1254				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1260				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1262				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
PCB-1268				mg/Kg	< 0.2	U	< 0.25	U	< 0.28	U	< 0.43	U	< 0.21	U	< 0.32	U	< 0.27	U	< 0.32	U	< 0.41	U	< 0.44	U
Total PCBs			1	mg/Kg	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
MA EPH Aliphatic/Aromatic Ranges By MA EPH 5/2004																								
C11-C22 Aromatic Hydrocarbons 1,2*			1,000	mg/Kg	< 10	U	< 13	U	**30**		< 22	U	< 11	U	< 16	U	**21**		< 17	U	**28**		**33**	
C19-C36 Aliphatic Hydrocarbons 1*			1,000	mg/Kg	< 10	U	< 13	U	< 14	U	< 22	U	< 11	U	< 16	U	**15**		< 17	U	< 21	U	< 22	U
C9-C18 Aliphatic Hydrocarbons 1*			3,000	mg/Kg	< 10	U	< 13	U	< 14	U	< 22	U	< 11	U	< 16	U	< 14	U	< 17	U	< 21	U	< 22	U
Total TPH 1,2*				mg/Kg	< 10	U	< 13	U	**30**		< 22	U	< 11	U	< 16	U	**36**		< 17	U	**28**		**33**	
EPH Other PAH Target Analytes By MA EPH 5/2004																								
Acenaphthylene			1	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.0	U	< 0.74	U	< 1.0	U	< 1.0	U	< 1.0	U	< 1.0	U	< 1.3	U
Anthracene			1,000	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Benz(a)anthracene			7	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Benzo(a)pyrene			2	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 2.0	U
Benzo(b)fluoranthene			7	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Benzo(ghi)perylene			1,000	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Benzo(k)fluoranthene			70	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Chrysene			70	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Dibenz(a,h)anthracene			0.7	mg/Kg	< 0.69	U	< 0.7	U	< 0.7	U	< 0.71	U	< 0.7	U	< 0.8	U	< 0.7	U	< 0.7	U	< 0.7	U	< 1.5	U
Fluoranthene			1,000	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Fluorene			1,000	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Indeno(1,2,3-cd)pyrene			7	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Pyrene			1,000	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
EPH Diesel PAH Target Analytes By MA EPH 5/2004																								
2-Methylnaphthalene			0.7	mg/Kg	< 0.69	U	< 0.7	U	< 0.7	U	< 0.7	U	< 0.7	U	< 0.74	U	< 0.7	U	< 0.7	U	< 0.7	U	< 1.4	U
Acenaphthene			4	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Naphthalene			4	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U
Phenanthrene			10	mg/Kg	< 0.69	U	< 0.89	U	< 0.96	U	< 1.5	U	< 0.74	U	< 1.7	U	< 1.4	U	< 1.1	U	< 1.4	U	< 3.2	U

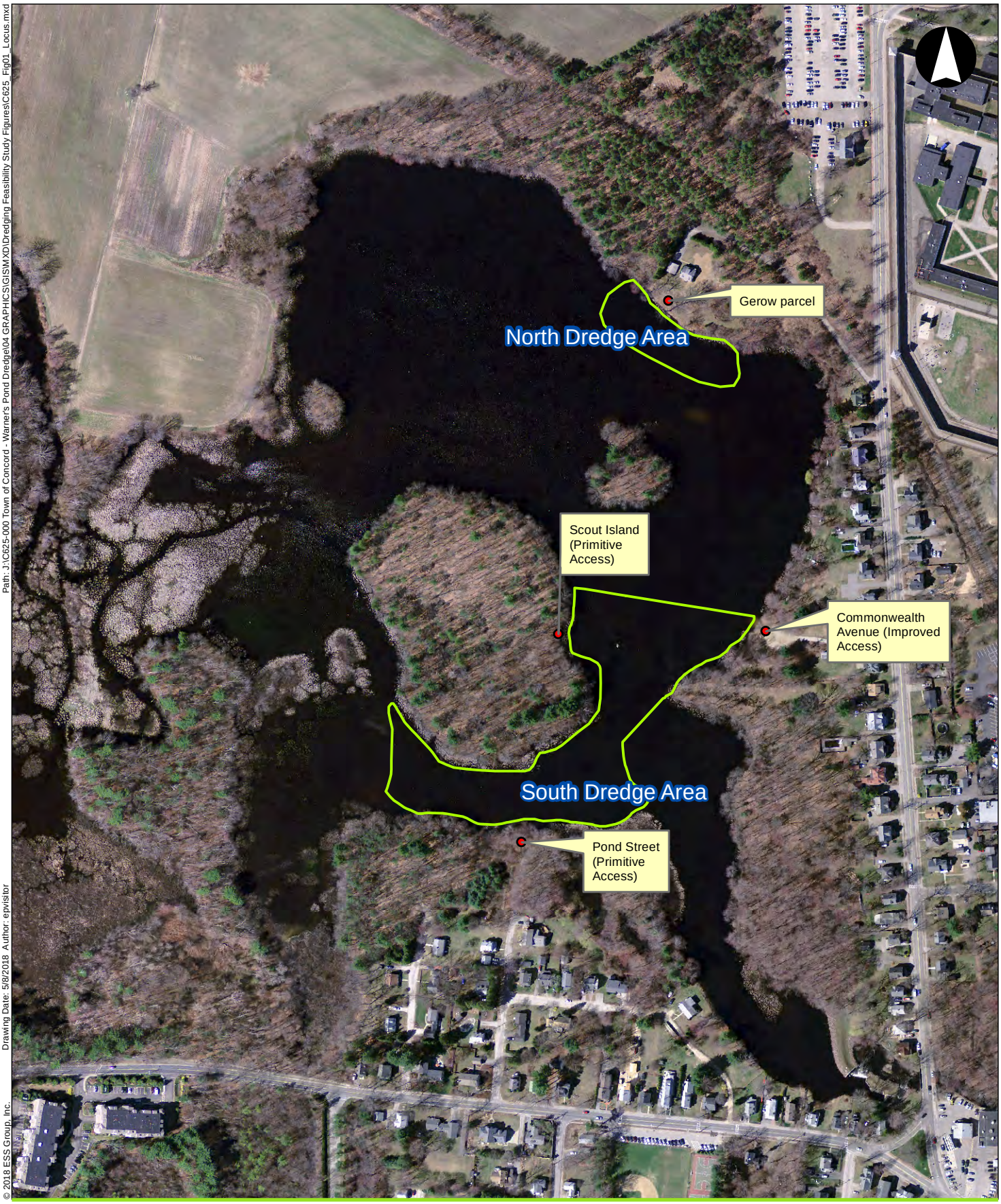
S-1/GW-1 Method 1 Risk Values found in Table 2 of the Massachusetts Contingency Plan (MCP; 2015) in Section 40.0975.
* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range
* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
Bold numbers indicates result detected above method detection limit (MDL)
RED values denote method reporting limits (MRL) that exceed one or more standards or screening thresholds
Dark orange-shaded results indicate an exceedance of one or more standards
Values with an "U" denote a result below the method detection limit presented

Table 1. Sediment Testing Results

									North Dredge Area					
				CLIENT ID	SC8-A		SC8-BC		SC9		SC10		SC11	
				SAMPLING DATE	6/8/2017		6/8/2017		8/21/2017		8/21/2017		8/21/2017	
				Lab SAMPLE ID	BY37432		BY37433		BY88127		BY88128		BY88129	
				Sample Type	Sediment		Sediment		Sediment		Sediment		Sediment	
	20x Rule Screening Threshold	TCLP Threshold (mg/L)	S-1/GW-1	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Miscellaneous/Inorganics														
Percent Moisture				%	**84**		**74**		**52.2**		**63.7**		**76.8**	
Percent Solid				%	**16**		**26**		**47.8**		**36.3**		**23.2**	
Tot.Org.Carbon				mg/kg	**82,000**		**63,000**		**32,000**		**27,000**		**62,000**	
Phosphorus, Total as P				mg/Kg	**84.3**		**81.4**		**201**		**347**		**276**	
Metals, Total														
Arsenic	100		20	mg/Kg	**7.2**		**6.9**		**4.7**		**12**		**8**	
Cadmium	20		70	mg/Kg	< 2.2	U	< 1.2	U	< 0.75	U	**1.07**		< 1.3	U
Chromium	100		100	mg/Kg	**24.8**		**22.3**		**22.4**		**50**		**30.2**	
Copper				mg/kg	**17.1**		**14.6**		**12.1**		**28.4**		**17**	
Lead	100		200	mg/Kg	**27.3**		**33.4**		**16.7**		**64.2**		**38.6**	
Mercury	4		20	mg/Kg	< 0.17	U	< 0.09	U	< 0.06	U	**0.08**		< 0.11	U
Nickel			600	mg/Kg	**8.4**		**8.5**		**9.22**		**17.1**		**12.5**	
Zinc			1,000	mg/Kg	**67**		**77.7**		**43.2**		**146**		**86.9**	
Metals, TCLP														
Lead		5		mg/L										
PCBs By SW8082A														
PCB-1016				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1221				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1232				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1242				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1248				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1254				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1260				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1262				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
PCB-1268				mg/Kg	< 0.41	U	< 0.26	U	< 0.14	U	< 0.18	U	< 0.28	U
Total PCBs			1	mg/Kg	ND		ND		ND		ND		ND	
MA EPH Aliphatic/Aromatic Ranges By MA EPH 5/2004														
C11-C22 Aromatic Hydrocarbons 1,2*			1,000	mg/Kg	< 20	U	< 13	U	< 6.9	U	< 9.1	U	< 14	U
C19-C36 Aliphatic Hydrocarbons 1*			1,000	mg/Kg	< 20	U	< 13	U	< 6.9	U	< 9.1	U	< 14	U
C9-C18 Aliphatic Hydrocarbons 1*			3,000	mg/Kg	< 20	U	< 13	U	< 6.9	U	< 9.1	U	< 14	U
Total TPH 1,2*				mg/Kg	< 20	U	< 13	U	< 6.9	U	< 9.1	U	< 14	U
EPH Other PAH Target Analytes By MA EPH 5/2004														
Acenaphthylene			1	mg/Kg	< 1.0	U	< 1.0	U	< 0.48	U	< 0.63	U	< 1.00	U
Anthracene			1,000	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Benz(a)anthracene			7	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Benzo(a)pyrene			2	mg/Kg	< 2.0	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Benzo(b)fluoranthene			7	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Benzo(ghi)perylene			1,000	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Benzo(k)fluoranthene			70	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Chrysene			70	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Dibenz(a,h)anthracene			0.7	mg/Kg	< 1.0	U	< 0.7	U	< 0.48	U	< 0.63	U	< 1.00	U
Fluoranthene			1,000	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Fluorene			1,000	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Indeno(1,2,3-cd)pyrene			7	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Pyrene			1,000	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
EPH Diesel PAH Target Analytes By MA EPH 5/2004														
2-Methylnaphthalene			0.7	mg/Kg	< 0.92	U	< 0.7	U	< 0.48	U	< 0.63	U	< 1.00	U
Acenaphthene			4	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Naphthalene			4	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U
Phenanthrene			10	mg/Kg	< 2.2	U	< 1.3	U	< 0.48	U	< 0.63	U	< 1.00	U

S-1/GW-1 Method 1 Risk Values found in Table 2 of the Massachusetts Contingency Plan (MCP; 2015) i
* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that rang
* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in
Bold numbers indicates result detected above method detection limit (MDL)
RED values denote method reporting limits (MRL) that exceed one or more standards or screening thres
Dark orange-shaded results indicate an exceedance of one or more standards
Values with an "U" denote a result below the method detection limit presented

Figures



Warner's Pond Dredging Feasibility Assessment
Concord, Massachusetts

1 inch = 350 feet

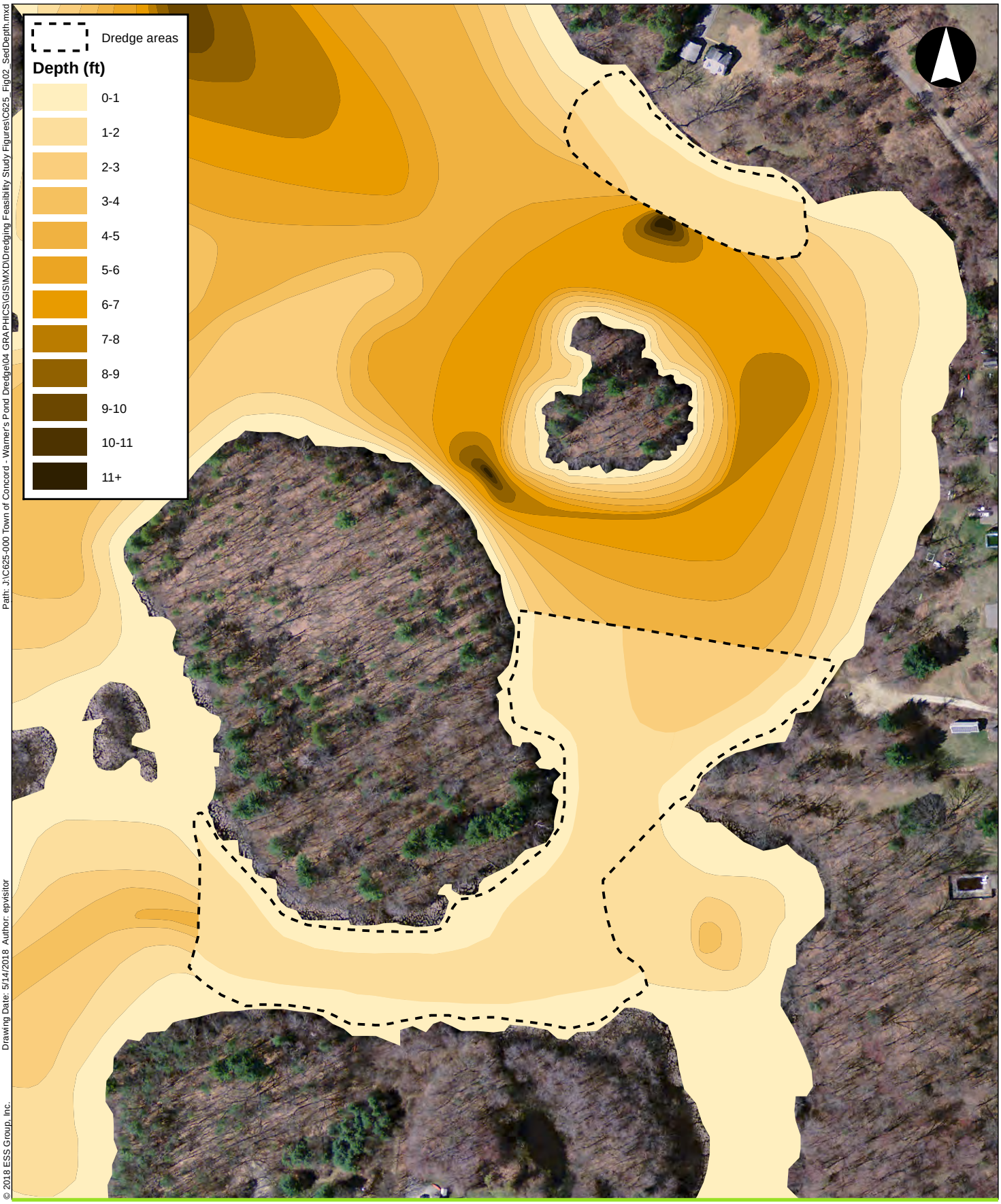
Source: 1) MassGIS, Ortho Imagery, 2013

0 175 350
Feet

Dredge areas

Warner's Pond
Project Locus and Dredge Areas

Figure 1



Warner's Pond Dredging Feasibility Assessment
Concord, Massachusetts

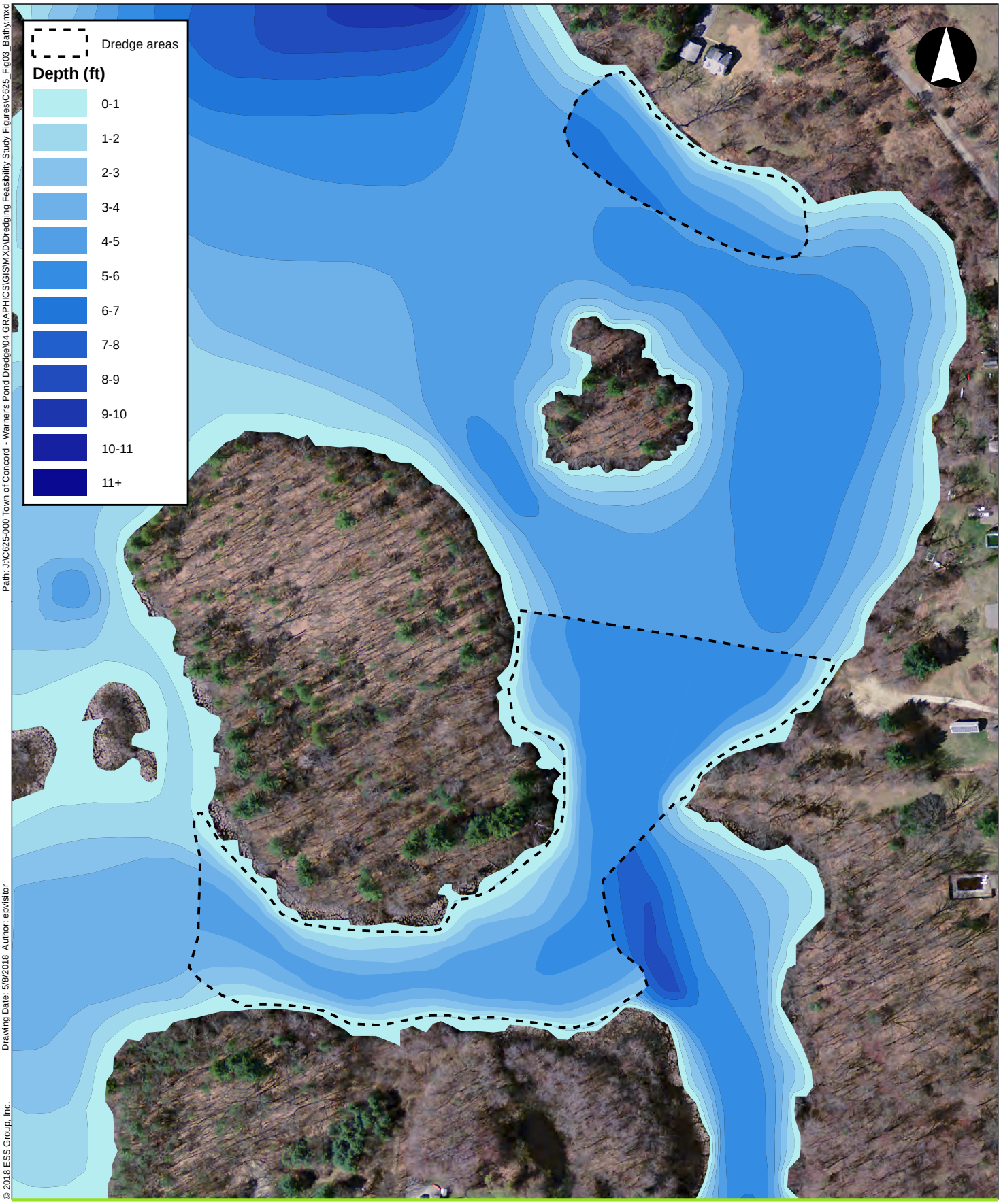
Warner's Pond Sediment Depths

1 inch = 200 feet

Source: 1) MassGIS, Ortho Imagery, 2013
2) ESS Group, Sediment Depths, 2011
3) ESS Group, Sediment Depths, 2017

0 100 200
Feet

Figure 2



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Drawing Date: 5/8/2018 Author: epvisitor

environmental consulting & engineering services

0 100 200 Feet

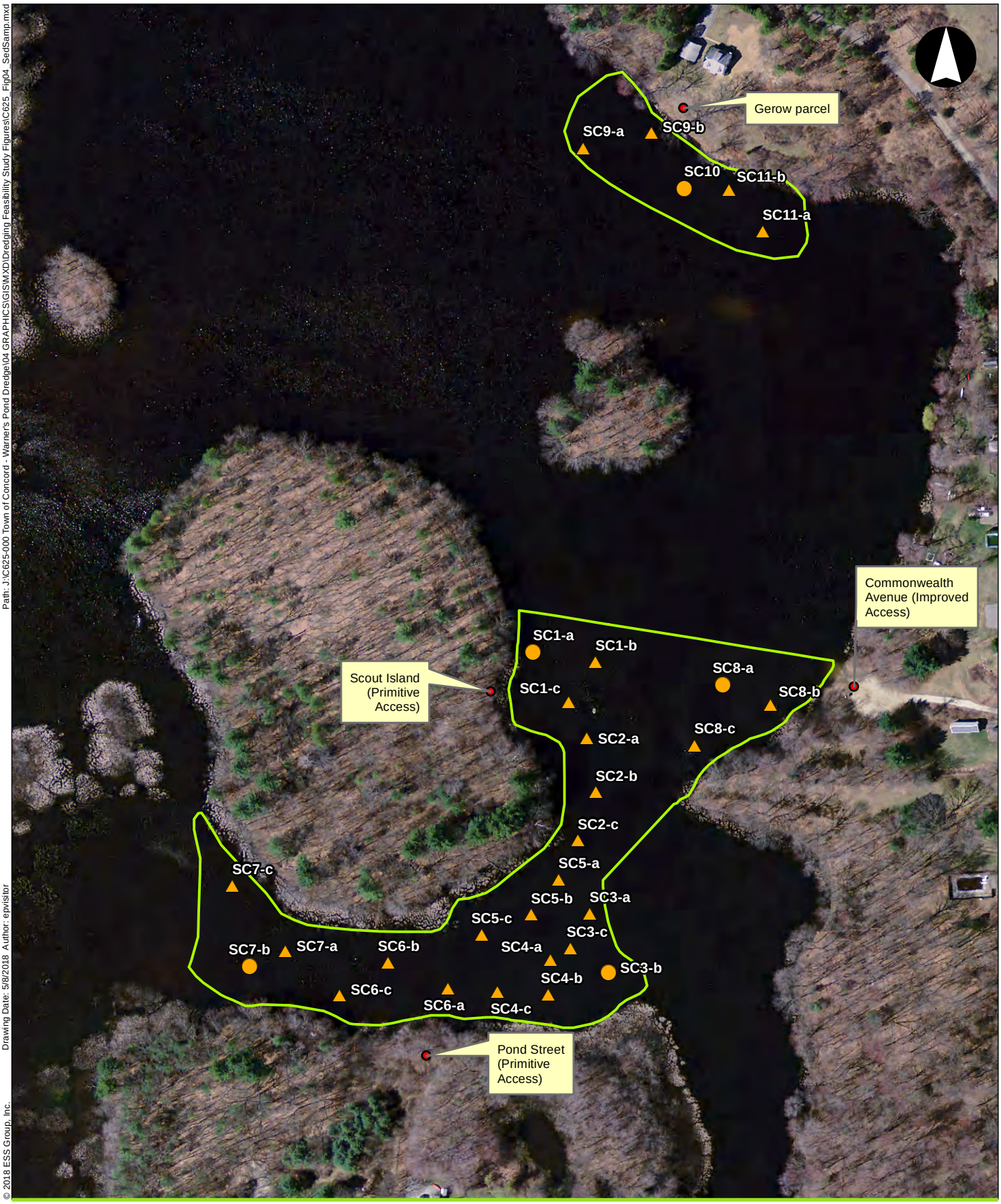
Warner's Pond Dredging Feasibility Assessment
Concord, Massachusetts

1 inch = 200 feet

Source: 1) MassGIS, Ortho Imagery, 2013
2) ESS Group, Bathymetry, 2011
3) ESS Group, Bathymetry, 2017

Warner's Pond Bathymetry

Figure 3



Warner's Pond Dredging Feasibility Assessment
Concord, Massachusetts

1 inch = 200 feet

Source: 1) MassGIS, Ortho Imagery, 2013
2) ESS Group, Sediment Sampling, 06/08/2017 and 08/21/2017

0 100 200 Feet

Dredge areas

Sample type

Discrete

Composite

Warner's Pond
Sediment Coring Locations

Figure 4

Drawing Date: 5/14/2018 Author: epvisitor
Path: J:\C625-000 Town of Concord - Warner's Pond Dredge\04 GRAPHICS\GIS\MXD\Dredging Feasibility Study Figures\C625_Fig05_DewateringDisposalSites.mxd

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0 500 1,000
Feet

Warner's Pond Dredging Feasibility Assessment
Concord, Massachusetts

1 inch = 1,000 feet

Source: 1) MassGIS, Ortho Imagery, 2013

Stock pile site
Dewatering Site
Truck Route
Dewatering Discharge Line

Warner's Pond
Dewatering and Stock Pile Sites

Figure 5

DATE: Jan 03, 2018 - 12:07PM
FILENAME: C:\Users\GRogowski\appdata\local\temp\AcPublish_10104\C625-000 Warners Pond CONCEPT.dwg

PROPOSED IMPROVED BEACH SURFACE

PROPOSED VAN ACCESSIBLE SIGN

PROPOSED 22 FOOT GRAVEL ACCESS ROAD

DRY SWALE

REMAINING EXISTING PARKING LOT FOOTPRINT TO BE USED FOR STORMWATER MANAGEMENT IMPROVEMENTS

COMMONWEALTH AVENUE

317-319

137

311-313

303-305

316-320

308

302

294

293

287

282

277

127

39A

N

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TOWN OF CONCORD

WARNERS POND

1"=50'

0 50 FEET

1) MASSGIS, 2010 FEMA LIDAR & 2013/2014 ORTHOIMAGERY

LEGEND

PROPOSED ACCESS ROAD

PROPOSED PARKING SPACE

PROPOSED ACCESS ROAD CENTERLINE

EXISTING TAX PARCELS

EXISTING TOPOGRAPHY (10 FOOT)

ACCESS ROAD CONCEPT

Figure 6

PROPOSED IMPROVED BEACH SURFACE

PROPOSED VAN ACCESSIBLE SIGN

REMAINING EXISTING PARKING LOT FOOTPRINT TO BE USED FOR STORMWATER MANAGEMENT IMPROVEMENTS

DRY SWALE

PROPOSED 12 FOOT GRAVEL ACCESS ROAD WITH PASSING PULLOFFS (IMPROVE EXISTING ROAD FOOTPRINT)

COMMONWEALTH AVENUE

317-319
137
311-313
127
303-305
39A
293
287
277
316-320
308
302
294
282
127

N

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TOWN OF CONCORD

WARNERS POND

1"=50'

0 50 FEET

1) MASSGIS, 2010 FEMA LIDAR & 2013/2014 ORTHOIMAGERY

LEGEND

PROPOSED ACCESS ROAD

PROPOSED PARKING SPACE

PROPOSED ACCESS ROAD CENTERLINE

EXISTING TAX PARCELS

EXISTING TOPOGRAPHY (10 FOOT)

ACCESS ROAD CONCEPT

Figure 7

DATE: Apr 17, 2018 - 4:14PM
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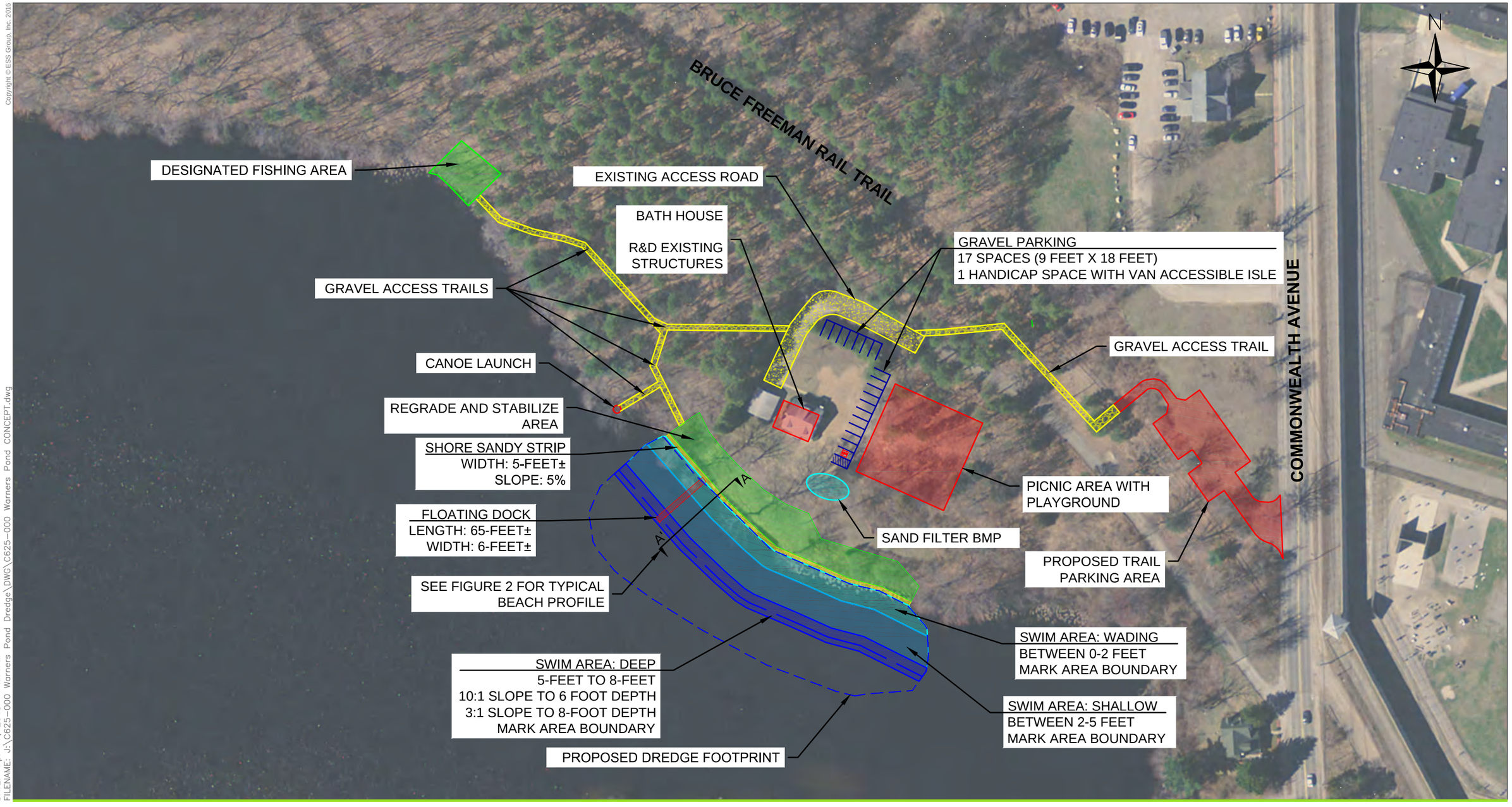

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TOWN OF CONCORD

WARNERS POND

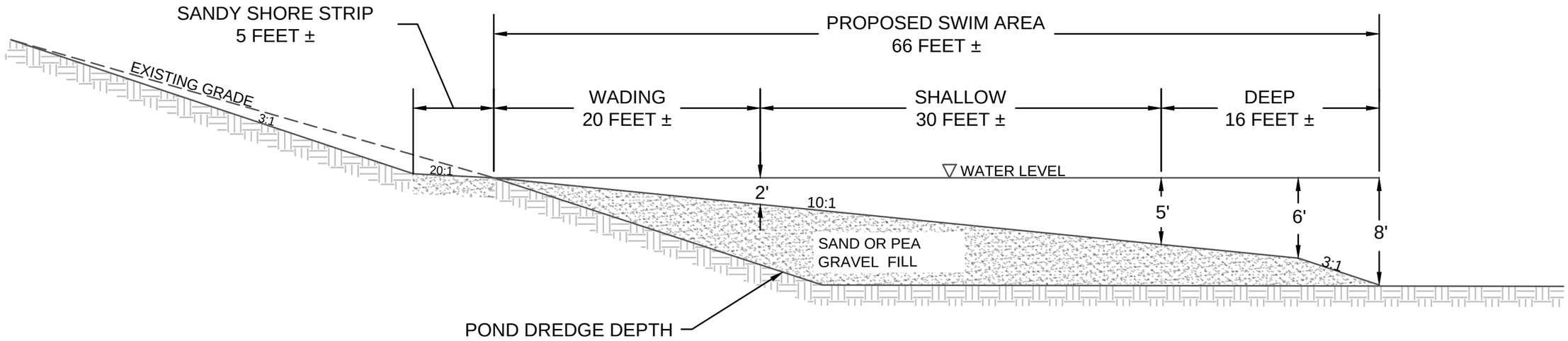
1"=100'

0 100 FEET

1) 2013/2014 ORTHOIMAGERY

NORTH BEACH CONCEPT

Figure 8



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TOWN OF CONCORD

WARNERS POND

NTS

0 NTS

NORTH BEACH CONCEPT
A- A' TYPICAL BEACH PROFILE

Figure 9

Appendix A

Sediment Sampling Plan

Warner's Pond Sediment Sampling Plan

Warner's Pond
Concord, Massachusetts

PREPARED FOR:
Delia R. J. Kaye
Natural Resources Director
Division of Natural Resources
141 Keyes Road
Concord, Massachusetts 01742

PREPARED BY:
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor
East Providence, Rhode Island 02915

ESS Project No. C625-000

February 17, 2017

Warner's Pond Sediment Sampling Plan

Warner's Pond
Concord, Massachusetts

Prepared for:

Delia R. J. Kaye
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February 17, 2017

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1.0 INTRODUCTION

The purpose of this proposed sediment sampling plan (Sampling Plan) is to evaluate the physical and chemical attributes of the sediments to be dredged in support of the submission, on behalf of the Town of Concord for a 401 Water Quality Certification to the Massachusetts Department of Environmental Protection (MassDEP). The Water Quality Certification will address the applicable requirements of 314 CMR 9.07 necessary for dredging and sediment placement, which may include upland placement.

The approach discussed in this Sampling Plan is informed by the chemical analysis of screening sampling performed from February 2011 to September 2011 as provided here in Table 1. These results have been used to refine the locations proposed for sampling in Warner's Pond. Sampling work going forward will consist of advancing a peat flag-sampler suited for soft sediments at pre-determined locations for laboratory analysis. This field investigation and laboratory analysis will be used to determine the suitability of the dredged sediments for upland placement. Sampling locations have been selected based upon sediment depth obtained from ESS field data collection in 2011 (Figure 1).

A minimum of two samples are required by MassDEP for all dredging projects. For dredging projects up to 10,000 cubic yards, the standard for sample collection is one core per 1,000 cubic yards of dredged material with up to three cores being combined into a single sample for analysis.

Based on the sediment thicknesses measured in 2011, the project may generate up to 30,000 cubic yards of dredged sediment; therefore ESS anticipates that these sampling criteria can be met with up to 10 additional composite sets of samples being analyzed. The sampling locations are depicted in Figure 2.

Based on the due diligence performed, there are no known, current or historical sources of releases or discharges of hazardous materials to the pond. Historically, there have been a number of industrial uses that operated on the banks of the pond or nearby; however, the results from the 2011 sediment sampling did not indicate any significant contamination (Table 1). The proposed sediment sample locations in the proposed dredging area are spaced evenly to provide a representative characterization of the sediment from each basin.

1.1 Site Description

Warner's Pond was created in the 1800s by damming Nashoba Brook approximately a mile downstream of its confluence with Fort Pond Brook to operate a saw mill, then a pail factory. In 1895, a fire destroyed the factory and Ralph Warner sold it to the West End Land Company. Since then the dam has been rebuilt several times and expanded for various purposes, including operation of David Loring's Lead Pipe Works from 1819 to 1854. In 2008, the dam was reconstructed due to safety concerns about aging and failing structural components.

Since the late 1890s, Warner's Pond has been a significant Town natural resource and popular recreation area. Its ecosystem provides habitat for numerous species of aquatic plants and animals. Since then, the pond has begun to eutrophicate (a process where waterbodies receiving excessive nutrients experience excessive plant growth) and sediment deposition, leading to a decreased use by canoeists, kayakers, and fishermen as well as diminished ecological value. Open water areas are dwindling. Sediments have increased so that some areas are impassable by kayakers and canoeists.

Warner's Pond is relatively shallow and occupies approximately 48 acres (discounting approximately six acres of islands) fully within the Town of Concord, Massachusetts. The pond is fed by an approximately 47-square-mile watershed that is located primarily outside of Concord and includes portions of the towns

of Acton, Boxborough, Carlisle, Littleton, Stow and Westford. The two tributaries that flow into the pond—Nashoba Brook and Fort Pond Brook—merge just upstream of the pond inlet on the western shore. Water discharges into the pond through a broad delta of emergent wetlands on the western shore. Given the size of the pond's watershed and the volume of water contained in the streams feeding the pond, the water entering the pond flushes through the pond relatively rapidly. Water leaves the pond via its outlet at the southeast corner of the pond.

2.0 METHODS

Section 2 discusses proposed methods for sample collection, analysis and handling of data.

2.1 Sample Collection

Samples will be collected using an extendable Russian peat corer or flag-corer with a 1.65-feet (0.5-meter) long coring segment to characterize the vertical profile of soft sediments at each location. To prevent cross-contamination of the samples, the peat corer will be decontaminated in the field just prior to sampling using an Alconox solution, followed by a rinse with isopropyl alcohol and then distilled water (see Section 2.4 for further details about decontamination procedures). At each location, the peat corer will be hand-driven to a depth sufficient to collect the first 1.65 feet of sediment and retrieved for logging and photographing. Material in the core barrel will be removed with a decontaminated stainless steel spoon and placed in a decontaminated stainless steel bowl after each portion of the core is retrieved. Sampling at each station will continue in 1.65 feet increments until first refusal. Therefore, the anticipated samples will represent the entire depth of soft sediments that are proposed to be removed by dredging activities. In the event that shallow refusal is encountered at a particular location, ESS will reposition and retry to ensure that a hard object was not the cause of refusal. Accurate sample depth representation will be ensured by following pre-measured increments inscribed on the extension rods of the sampler.

Field notes to be taken during sampling will include the following:

- Date/Time
- Descriptions of weather conditions
- Personnel involved in sampling
- Sample location via DGPS for each sample
- Water depth at each sample location
- Penetration length at each sample location
- Recovery length at each sample location
- Detailed visual description of the sample material recovered (i.e., sand, silt, organics, etc.) at each sample location
- Core section photographs
- Sample identification number
- Problems encountered, if any, during sampling at each location

Collection of up to 30 cores will be collected from representative locations in each basin (Figure 2) with up to 10 composited samples submitted for laboratory analysis, in accordance with 314 CMR 9.07(2)(b) of the Water Quality Certification Regulations.

2.2 Sample Logging

Upon recovery, ESS will carefully open the sediment sampler to examine each sample. Sediment within the samples is not assumed to be affected by contamination; however, dedicated disposable gloves will be worn at all times when handling samples to avoid any potential cross-contamination between samples. Based upon the results of previous field investigations, the sediments are expected to be relatively

uniform in the uppermost layer, transitioning to coarser grains at refusal; however, if the samples reveal significant stratification, sub-sampling of large strata (>1 foot) will be performed accordingly.

Careful field book records will be kept in order to reference samples to the photographs. Each sample core will be photographed as follows:

- Once the sample has been exposed, a tape measure will be placed next to the sample;
- Each photo will include sample location, date, and project number for identification.

The samples will also be logged on a core log field sheet or field book. The core logs will include the following information:

- ESS project number, site, and client
- Sample date (date of field sampling)
- Time of sample
- Sample location
- ESS personnel on-site during sampling
- Sediment sample range (0-2 feet, 2-4 feet, etc., depending on strata identified)
- Water depth
- Description of sample material in each core, as follows:
    - Color, grain size, and moisture content
    - Changes in stratigraphy
    - The presence and size of coarse clasts (e.g., gravel), and foreign material such as metal, brick, etc.
    - Signs of contamination, including odors.

2.3 Sample Sub-Sampling and Composition

Compositing will include sample material from up to three cores with visually similar material. If significant stratification is observed, additional composite samples will be formed for each group of cores demonstrating the stratification. Sediments to be composited will be mixed thoroughly with decontaminated stainless steel spoons to ensure a homogenous sample. Any water that has separated from the sediment will be mixed back into the sample. Sample material for bulk chemical analysis will be placed into appropriately labeled sample containers provided by the laboratory. Sample material for bulk physical analysis will be placed in appropriately labeled in resealable gallon-size plastic storage bags.

All materials will be placed in the sample container unless the quantity of material exceeds the volume of the sample container, the quantity of material is too large for insertion into the sample container, or the material misrepresents the sample. Coarse clasts or organic matter (e.g., twigs) that are excluded will be documented in the field book and the core log. If the sediment is estimated to contain more than ten percent fines, the sample will be labeled for combined grain-size analysis that includes wet sieve analysis. The selection criteria for determining when sediment needs to be submitted for bulk physical analysis are as follows:

- If no stratification is observed throughout the sample, one composite sample will be selected for bulk chemical and physical analysis.
- If sediment stratification is observed in the sample, each distinct stratum will be sampled in a composite fashion for subsequent laboratory analysis.
- At a minimum, one composite sediment sample will be submitted from each set of three cores for laboratory analysis.

Decontamination procedures, described below, shall be followed between each individual sample collection.

2.4 Decontamination Procedures

Reasonable efforts will be made to avoid potential cross-contamination of samples. All containers and equipment used for mixing and filling sample jars will be decontaminated prior to sampling at each location using the following steps:

1. Tap Water and Alconox Rinse/Scrub – Alconox detergent will be added to tap water and mixed in spray bottles per manufacturer's recommendations. The tap water/Alconox solution will be sprayed onto equipment in quantities sufficient to promote formation of bubbles/foam when scrubbed with a scrub brush. Scrubbing shall continue until the absence of soil, sediment and foreign material on the equipment is confirmed visually.

2. Tap Water Rinse – Tap water will be either poured or sprayed over the equipment following the tap water/Alconox rinse/scrub. The tap water rinse shall continue until the bubbles/foam generated from the water/Alconox rinse/scrub has been purged from the equipment.

3. Isopropyl Alcohol Rinse – Following the tap water rinse, isopropyl alcohol will be sprayed onto the equipment in sufficient quantities to coat the entire surface area of the equipment.

4. De-ionized Water Rinse – Following the isopropyl alcohol rinse, de-ionized water will be sprayed onto the equipment in sufficient quantities to coat the entire surface of the equipment.

5. Fresh Water Rinse – Following the de-ionized water rinse, fresh water will be sprayed onto the equipment in sufficient quantities to coat the entire surface area of the equipment.

2.5 Sample Labeling

After filling the sample containers, samples will be labeled with a sample identification code corresponding to the sample location and resulting composite samples. The following data will be included on all labels:

- ESS project number
- Sample identification code
- Preservation/storage method
- Date/time of sample
- Initials of person/s collecting the sample

If stratification is observed in the sample cores, each corresponding composite bulk physical and chemical sample will be labeled by adding a capitalized letter following the core identification code at the end of each sample code (e.g.,S1-A, S1-B, etc.); the letters will be assigned so that "A" represents the stratified layer nearest to the sediment-water interface, "B" represents the layer below, etc.

2.6 Sample Storage and Documentation

After filling and labeling the sample containers, each container will be placed upright within an ice-packed cooler. Bulk chemical samples will be maintained and transferred to laboratory at a temperature of 6°C. Bulk physical samples do not require refrigeration. All samples will be transferred to the laboratory for analysis within the method holding time and accompanied by completed chains-of-custody.

2.7 Sample Analysis

As the dredged material may be managed or reused in the upland environment, the lab will conduct the following bulk physical and chemical analyses:

- Bulk Physical: Grain size distribution (ASTM D422) and percent moisture.

Bulk Chemical: Total organic carbon, metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), polychlorinated biphenyls (PCBs) aroclor analysis, and extractable petroleum hydrocarbons (EPHs) with target polycyclic aromatic hydrocarbons (PAHs). Because there was no evidence of VOCs in the 2011 data, VOCs will not be included in the analysis. Based on results from prior sampling in 2011, metals concentrations are expected to be below theoretical TCLP levels. If metals exceed these concentrations, TCLP analysis will be conducted on the affected samples.

2.8 Quality Assurance/Quality Control

The MassDEP QA/QC Requirements and Performance Standards for EPH Analysis (MADEP-EPH-98-1), Metals Analysis, and PCBs provide the in-laboratory QA/QC requirements to be adhered to in the project QA/QC program.

Tables

Attachment A. Sediment Quality at Warner's Pond, Concord, MA

Analyte	CAS Number	SC3		SC4		MCP[1]	BUD[2]	Lined Landfill[3]
		Result	RL	Result	RL			
Metals - mg/kg-dry								
Arsenic	7440-38-2	6.45	4.71	ND	5.1	20	11	40
Cadmium	7440-43-9	ND	0.358	ND	0.387	70	0.8	30
Chromium (total)	7440-47-3	23.6	0.799	23.4	0.864	100	11	1000
Copper (analyzed wet)	7440-50-8	ND	21	ND	23	NL	NL	NL
Lead	7439-92-1	34.5	21	34.0	23	200	19	2000
Mercury	7439-97-6	ND	0.355	ND	0.389	20	8.7	10
Nickel	7440-02-0	7.85	0.429	9.4	0.464	600	7.2	NL
Zinc	7440-66-6	70.1	21	44.3	23	1000	280	NL
EPH Ranges - mg/kg-dry								
Adjusted C11-C22 Aromatics	NA	ND	65	ND	71	1000	48	NL
C09-C18 Aliphatics	NA	ND	65	ND	71	1000	780	NL
C19-C36 Aliphatics	NA	ND	65	ND	71	3000	3000	NL
Unadjusted C11-C22 Aromatics	NA	ND	65	ND	71	1000	48	NL
EPH Target Analytes - mg/kg-dry								
Acenaphthene	83-32-9	ND	0.435	ND	0.476	4	3.9	NL
Acenaphthylene	208-96-8	ND	0.435	ND	0.476	1	1.1	NL
Anthracene	120-12-7	ND	0.435	ND	0.476	1000	1000	NL
Benzo(a)anthracene	56-55-3	ND	0.435	ND	0.476	7	3.7	NL
Benzo(a)pyrene	50-32-8	ND	0.435	ND	0.476	2	0.66	NL
Benzo(b)fluoranthene	205-99-2	ND	0.435	ND	0.476	7	3.7	NL
Benzo(g,h,i)perylene	191-24-2	ND	0.435	ND	0.476	1000	1000	NL
Benzo(k)fluoranthene	207-08-9	ND	0.435	ND	0.476	70	37	NL
Chrysene	218-01-9	ND	0.435	ND	0.476	70	370	NL
Dibenz(a,h)anthracene	53-70-3	ND	0.435	ND	0.476	0.7	0.66	NL
Fluoranthene	206-44-0	ND	0.435	ND	0.476	1000	1000	NL
Fluorene	86-73-7	ND	0.435	ND	0.476	1000	1000	NL
Indeno(1,2,3-cd)pyrene	193-39-5	ND	0.435	ND	0.476	7	3.7	NL
Methylnaphthalene, 2-	91-57-6	ND	0.435	ND	0.476	0.7	0.66	NL
Naphthalene	91-20-3	ND	0.435	ND	0.476	4	0.66	NL
Phenanthrene	85-01-8	ND	0.435	ND	0.476	10	10	NL
Pyrene	129-00-0	ND	0.435	ND	0.476	1000	1000	NL
Total PAH Target Concentration	NA	ND	0.435	ND	0.476	NL	NL	100
Other - %								
Ash	NA	74.7	1	65.1	1	NL	NL	NL
Total Volatile Solids	NA	25.3	0.500	34.9	0.500	NL	NL	NL
Polychlorinated Biphenyls - µg/kg - dry*								
Aroclor 1016	12674-11-2	ND	217	ND	238	1000	44	NL
Aroclor 1221	11104-28-2	ND	217	ND	238	1000	44	NL
Aroclor 1232	11141-16-5	ND	217	ND	238	1000	44	NL
Aroclor 1242	53469-21-9	ND	217	ND	238	1000	44	NL
Aroclor 1248	12672-29-6	ND	217	ND	238	1000	44	NL
Aroclor 1254	11097-69-1	ND	217	ND	238	1000	44	NL
Aroclor 1260	11096-82-5	ND	217	ND	238	1000	44	NL
VOCs - µg/kg-dry								
1,1-Dichloropropene	563-58-6	ND	217	ND	398	NL	NL	NL
1,2,3-Trichlorobenzene	87-61-6	ND	217	ND	398	NL	NL	NL
1,2,4-Trimethylbenzene	95-63-6	ND	217	ND	398	NL	NL	NL
1,3,5-Trimethylbenzene	108-67-8	ND	217	ND	398	NL	NL	NL
1,3-Dichloropropane	142-28-9	ND	217	ND	398	NL	NL	NL
2,2-Dichloropropane	590-20-7	ND	543	ND	994	NL	NL	NL
2-Chlorotoluene	95-49-8	ND	543	ND	994	NL	NL	NL
2-Methoxy-2-Methylbutane	994-05-8	ND	217	ND	398	NL	NL	NL
4-Chlorotoluene	106-43-4	ND	543	ND	994	NL	NL	NL
4-Isopropyltoluene	99-87-6	ND	217	ND	398	NL	NL	NL
Bromobenzene	108-86-1	ND	217	ND	398	NL	NL	NL
Bromochloromethane	74-97-5	ND	543	ND	994	NL	NL	NL
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	ND	217	ND	398	9000	660	NL
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	ND	217	ND	398	3000	660	NL
Dichloroethane, 1,1'-	75-34-3	ND	543	ND	994	400	200	NL
Dichloroethane, 1,2-	107-06-2	ND	217	ND	398	100	5	NL
Dichloropropane, 1,2-	78-87-5	ND	217	ND	398	100	5	NL
Dichloropropene, 1,3-	542-75-6	ND	217	ND	398	10	19	NL
Diethyl Ether	60-29-7	ND	217	ND	398	NL	NL	NL
Diisopropyl Ether	108-20-3	ND	217	ND	398	NL	NL	NL
Ethyl-t-Butyl Ether	637-92-3	ND	217	ND	398	NL	NL	NL
Isopropylbenzene	98-82-8	ND	217	ND	398	NL	NL	NL
n-Butylbenzene	104-51-8	ND	217	ND	398	NL	NL	NL
n-Propylbenzene	103-65-1	ND	217	ND	398	NL	NL	NL
sec-Butylbenzene	135-98-8	ND	217	ND	398	NL	NL	NL
tert-Butylbenzene	98-06-6	ND	217	ND	398	NL	NL	NL
Tetrahydrofuran	109-99-9	ND	543	ND	994	NL	NL	NL

Analyte	CAS Number	SC3		SC4		MCP[1]	BUD[2]	Lined Landfill[3]
		Result	RL	Result	RL			
trans-1,2-Dichloroethylene	156-60-5	ND	217	ND	398	100	92	NL
1,2,4-Trichlorobenzene	120-82-1	ND	217	ND	398	2000	660	NL
1,4-Dichlorobenzene	106-46-7	ND	217	ND	398	700	660	NL
Hexachlorobutadiene	87-68-3	ND	217	ND	398	6000	300	NL
Naphthalene	91-20-3	ND	543	ND	994	4000	660	NL
1,1,1,2-Tetrachloroethane	630-20-6	ND	217	ND	398	100	25	NL
1,1,1-Trichloroethane	71-55-6	ND	217	ND	398	30000	19000	NL
1,1,2,2-Tetrachloroethane	79-34-5	ND	217	ND	398	5	5	NL
1,1,2-Trichloroethane	79-00-5	ND	217	ND	398	100	5	NL
1,1-Dichloroethylene	75-35-4	ND	217	ND	398	3000	NL	NL
1,2-Dibromo-3-chloropropane	96-12-8	ND	217	ND	398	NL	NL	NL
1,4-Dioxane	123-91-1	ND	43500	ND	79500	200	14	NL
2-Chloroethyl vinyl ether	110-75-8	ND	217	ND	398	NL	NL	NL
2-Hexanone	591-78-6	ND	543	ND	994	NL	NL	NL
4-Methyl-2-pentanone	108-10-1	ND	217	ND	398	NL	NL	NL
Acetone	67-64-1	ND	543	ND	994	6000	330	NL
Acrylonitrile	107-13-1	ND	217	ND	398	NL	NL	NL
Benzene	71-43-2	ND	217	ND	398	2000	150	NL
Bromodichloromethane	75-27-4	ND	217	ND	398	100	5	NL
Bromoform	75-25-2	ND	217	ND	398	100	7	NL
Bromomethane	74-83-9	ND	217	ND	398	500	10	NL
Carbon disulfide	75-15-0	ND	217	ND	398	NL	NL	NL
Carbon tetrachloride	56-23-5	ND	217	ND	398	10000	390	NL
Chlorobenzene	108-90-7	ND	217	ND	398	1000	28	NL
Chloroethane	75-00-3	ND	217	ND	398	NL	NL	NL
Chloroform	67-66-3	ND	217	ND	398	400	5	NL
Chloromethane	74-87-3	ND	217	ND	398	NL	NL	NL
cis-1,2-Dichloroethylene	156-59-2	ND	217	ND	398	300	13	NL
Dibromochloromethane	124-48-1	ND	217	ND	398	5	5	NL
Dibromomethane	74-95-3	ND	217	ND	398	NL	NL	NL
Dichlorodifluoromethane	75-71-8	ND	217	ND	398	NL	NL	NL
Ethylbenzene	100-41-4	ND	217	ND	398	40000	190	NL
Ethylene dibromide	106-93-4	ND	217	ND	398	100	5	NL
Methyl ethyl ketone	78-93-3	ND	543	ND	994	400	350	NL
Methyl Tert-Butyl Ether	1634-04-4	ND	217	ND	398	100	140	NL
Methylene chloride	75-09-2	ND	217	ND	398	100	NL	NL
Styrene	100-42-5	ND	543	ND	994	3000	NL	NL
Tetrachloroethylene	127-18-4	ND	217	ND	398	1000	NL	NL
Toluene	108-88-3	ND	217	ND	398	30000	1300	NL
trans-1,3-Dichloropropene	10061-02-6	ND	217	ND	398	NL	NL	NL
Trichloroethylene	79-01-6	ND	217	ND	398	300	NL	NL
Trichlorofluoromethane	75-69-4	ND	543	ND	994	NL	NL	NL
Vinyl Chloride	75-01-4	ND	217	ND	398	900	280	NL
Xylenes, Total	1330-20-7	ND	543	ND	994	400000	420	NL
PAH - µg/kg								
Acenaphthene	83-32-9	ND	435	ND	476	4000	3900	NL
Acenaphthylene	208-96-8	ND	435	ND	476	1000	1100	NL
Anthracene	120-12-7	ND	435	ND	476	1000000	1000000	NL
Benz(a)anthracene	56-55-3	ND	43	ND	48	7000	3700	NL
Benzo(a)pyrene	50-32-8	ND	43	ND	48	2000	660	NL
Benzo(b)fluoranthene	205-99-2	ND	435	ND	476	70000	3700	NL
Benzo(g,h,i)perylene	191-24-2	ND	435	ND	476	1000000	1000000	NL
Benzo(k)fluoranthene	207-08-9	ND	435	ND	476	70000	37000	NL
Chrysene	218-01-9	ND	435	ND	476	70000	370000	NL
Dibenz(a,h)anthracene	53-70-3	ND	43	ND	48	700	660	NL
Fluoranthene	206-44-0	ND	435	ND	476	1000000	1000000	NL
Fluorene	86-73-7	ND	435	ND	476	1000000	1000000	NL
Indeno(1,2,3-cd)pyrene	193-39-5	ND	43	ND	48	7000	3700	NL
Methylnaphthalene, 2-	91-57-6	ND	435	ND	476	700	660	NL
Naphthalene	91-20-3	ND	435	ND	476	4000	660	NL
Phenanthrene	85-01-8	ND	435	ND	476	10000	10000	NL
Pyrene	129-00-0	ND	435	ND	476	1000000	1000000	NL

*Standard applies to ***total*** PCBs

ND: Not Detected

NL: Not Listed

1: MADEP, 2014. Massachusetts Contingency Plan 310 CMR 40.0000

2: MADEP, 2004. Draft Interim Guidance Document for Beneficial Use Determination Regulations 310 CMR 19.060

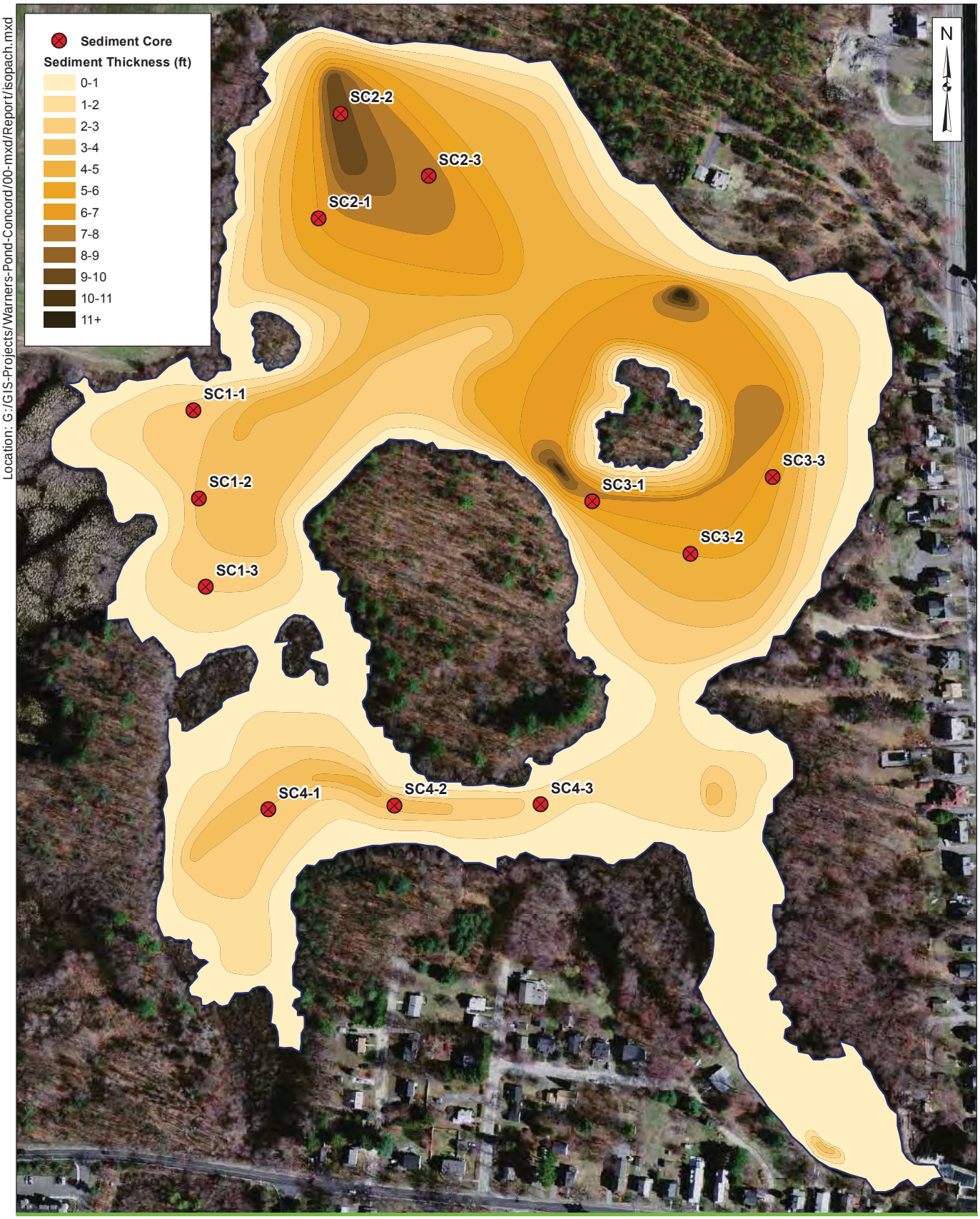
3: MADEP, 1997. Reuse and Disposal of Contaminated Soil at Massachusetts Landfills Department of Environmental Protection Policy # COMM-97-001

Analyte (or Reporting Limit) Exceeds MCP S-1/GW-1 Standard

Analyte (or Reporting Limit) Exceeds BUD Standard

Analyte (or Reporting Limit) Exceeds MCP S-1/GW-1 Standard and BUD Standard

Figures



Warner's Pond Isopach Map and 2011 Sediment Sampling Locations

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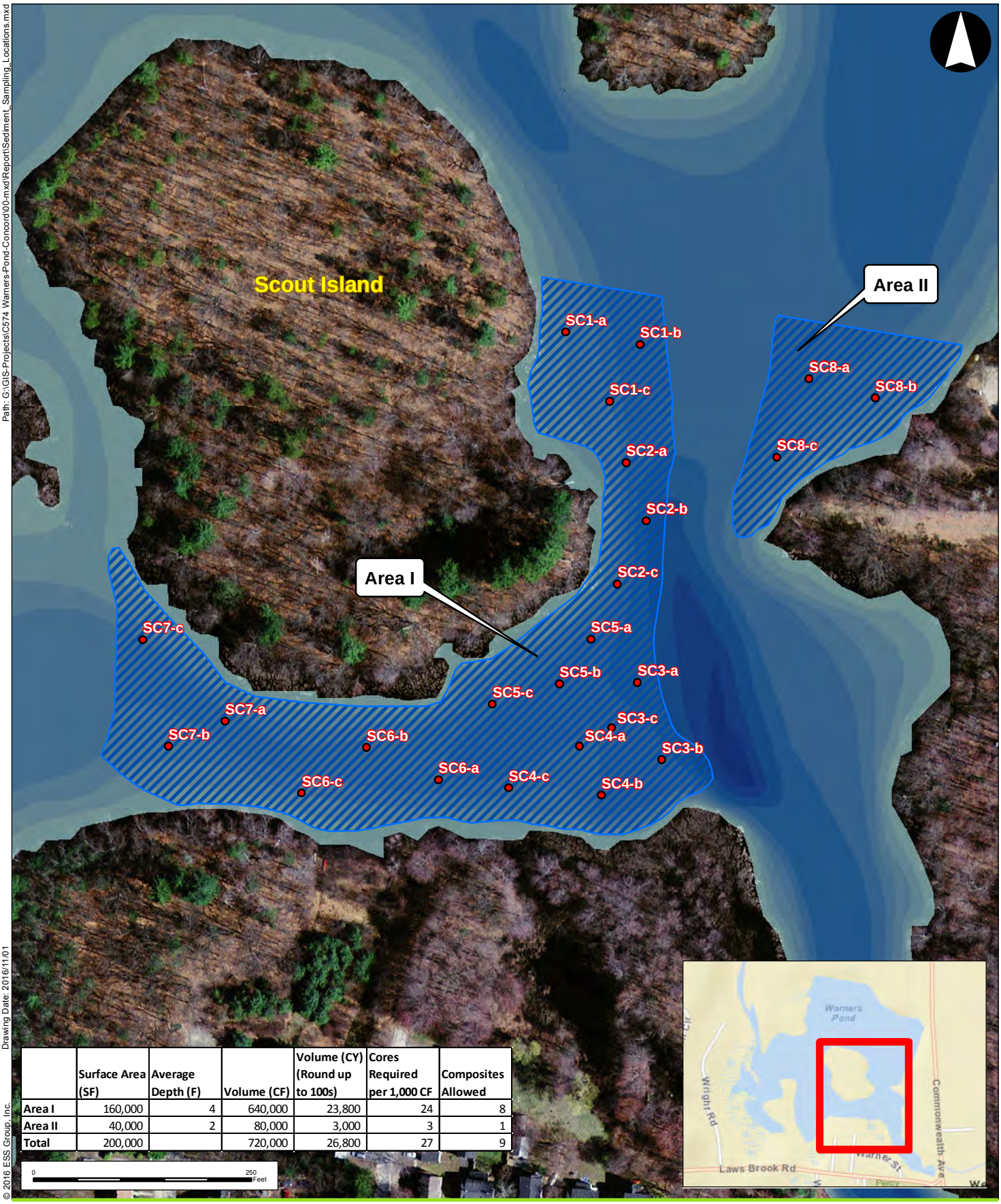
Scale: 1" = 300'

0 300 Feet

Source: 1) MassGIS, Color Orthophotos, 2008

Figure 1



	Surface Area (SF)	Average Depth (F)	Volume (CF)	Volume (CY) (Round up to 100s)	Cores Required per 1,000 CF	Composites Allowed
Area I	160,000	4	640,000	23,800	24	8
Area II	40,000	2	80,000	3,000	3	1
Total	200,000		720,000	26,800	27	9

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1 inch = 150 feet

Source: 1) MassGIS, Half-Meter Resolution, 2008

Notes

a. Area sizes were visually estimated for planning purposes only.
b. Approximate depth of dredge is based on the findings of Warner's Pond Watershed Management Plan (ESS, 2012). Actual depth of dredge will be confirmed by field analysis.

Warner's Pond
Proposed Sediment Sampling Locations

Figure 2

Appendix B

Laboratory Reports

PHOENIX
Environmental Laboratories, Inc.

Tuesday, July 11, 2017

Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Project ID: WARNER'S POND
Sample ID#s: BY37422 - BY37433

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.

Enclosed are revised Analysis Report pages. Please replace and discard the original pages. If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #MA-CT-007
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
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

NY # 11301

SDG Comments

July 11, 2017

SDG I.D.: GBY37422

Version 2: Added TCLP Lead.

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	13:55
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37422

Project ID: WARNER'S POND
Client ID: SC1-A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	6.9	2.0	mg/Kg	1	06/13/17	LK	SW6010C	
Cadmium	< 1.0	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Chromium	30.0	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Copper	6.8	1.0	mg/kg	1	06/13/17	LK	SW6010C	
Mercury	0.09	0.07	mg/Kg	1	06/13/17	RS	SW7471B	
Nickel	10.6	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Lead	21.3	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Zinc	37.3	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Percent Moisture	67	0.1	%		06/12/17	MA	PEL	
Percent Solid	33		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	87000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	183	1.5	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/13/17	W/W	SW7471B	
EPH Extraction	Completed				06/12/17	HC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/12/17	L/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Project ID: WARNER'S POND
Client ID: SC1-A

Phoenix I.D.: BY37422

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1221	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1232	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1242	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1248	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1254	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1260	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1262	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
PCB-1268	ND	200	ug/Kg	2	06/13/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	65		%	2	06/13/17	AW	30 - 150 %
% TCMX	72		%	2	06/13/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Anthracene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Chrysene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluoranthene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluorene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Pyrene	ND	690	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	43		%	1	06/13/17	DD	30 - 130 %
% Nitrobenzene-d5	56		%	1	06/13/17	DD	30 - 130 %
% Terphenyl-d14	70		%	1	06/13/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	10	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	10	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	10	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	10	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	49		%	1	06/14/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	100		%	1	06/14/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	105		%	1	06/14/17	AW	40 - 140 %
% o-terphenyl (aromatic)	49		%	1	06/14/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

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

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	13:40
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37423

Project ID: WARNER'S POND
Client ID: SC1-BC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	6.4	2.4	mg/Kg	1	06/13/17	LK	SW6010C	
Cadmium	< 1.2	1.2	mg/Kg	1	06/13/17	LK	SW6010C	
Chromium	33.1	1.2	mg/Kg	1	06/13/17	LK	SW6010C	
Copper	14.6	1.2	mg/kg	1	06/13/17	LK	SW6010C	
Mercury	0.10	0.10	mg/Kg	1	06/13/17	RS	SW7471B	
Nickel	12.2	1.2	mg/Kg	1	06/13/17	LK	SW6010C	
Lead	33.7	1.2	mg/Kg	1	06/13/17	LK	SW6010C	
Zinc	56.1	1.2	mg/Kg	1	06/13/17	LK	SW6010C	
Percent Moisture	74	0.1	%		06/12/17	MA	PEL	
Percent Solid	26		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	81000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	70.1	1.9	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/13/17	W/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/12/17	L/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Project ID: WARNER'S POND
Client ID: SC1-BC

Phoenix I.D.: BY37423

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1221	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1232	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1242	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1248	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1254	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1260	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1262	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
PCB-1268	ND	250	ug/Kg	2	06/13/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	61		%	2	06/13/17	AW	30 - 150 %	
% TCMX	74		%	2	06/13/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Anthracene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Chrysene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluoranthene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluorene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Pyrene	ND	890	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	47		%	1	06/13/17	DD	30 - 130 %	
% Nitrobenzene-d5	57		%	1	06/13/17	DD	30 - 130 %	
% Terphenyl-d14	69		%	1	06/13/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	ND	13	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	13	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	13	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
Total TPH 1,2*	ND	13	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	38		%	1	06/15/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	124		%	1	06/15/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	127		%	1	06/15/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	48		%	1	06/15/17	AW	40 - 140 %	

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	13:25
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37424

Project ID: WARNER'S POND
Client ID: SC2-ABC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	6.5	2.6	mg/Kg	1	06/13/17	LK	SW6010C	
Cadmium	< 1.3	1.3	mg/Kg	1	06/13/17	LK	SW6010C	
Chromium	23.3	1.3	mg/Kg	1	06/13/17	LK	SW6010C	
Copper	9.1	1.3	mg/kg	1	06/13/17	LK	SW6010C	
Mercury	< 0.11	0.11	mg/Kg	1	06/13/17	RS	SW7471B	
Nickel	10.7	1.3	mg/Kg	1	06/13/17	LK	SW6010C	
Lead	15.6	1.3	mg/Kg	1	06/13/17	LK	SW6010C	
Zinc	41.4	1.3	mg/Kg	1	06/13/17	LK	SW6010C	
Percent Moisture	76	0.1	%		06/12/17	MA	PEL	
Percent Solid	24		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	63000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	85.5	2.1	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/13/17	W/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/12/17	L/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC2-ABC

Phoenix I.D.: BY37424

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1221	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1232	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1242	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1248	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1254	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1260	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1262	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
PCB-1268	ND	280	ug/Kg	2	06/16/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	80		%	2	06/16/17	AW	30 - 150 %	
% TCMX	73		%	2	06/16/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Anthracene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Chrysene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluoranthene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluorene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Pyrene	ND	960	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	48		%	1	06/13/17	DD	30 - 130 %	
% Nitrobenzene-d5	57		%	1	06/13/17	DD	30 - 130 %	
% Terphenyl-d14	60		%	1	06/13/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	30	14	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	14	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	14	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
Total TPH 1,2*	30	14	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	39		%	1	06/15/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	105		%	1	06/15/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	127		%	1	06/15/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	41		%	1	06/15/17	AW	40 - 140 %	

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	12:40
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37425

Project ID: WARNER'S POND
Client ID: SC3-AC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	17.3	4.1	mg/Kg	1	06/13/17	LK	SW6010C	
Cadmium	< 2.1	2.1	mg/Kg	1	06/13/17	LK	SW6010C	
Chromium	51.4	2.1	mg/Kg	1	06/13/17	LK	SW6010C	
Copper	22.7	2.1	mg/kg	1	06/13/17	LK	SW6010C	
Mercury	< 0.18	0.18	mg/Kg	1	06/13/17	RS	SW7471B	
Nickel	18.1	2.1	mg/Kg	1	06/13/17	LK	SW6010C	
Lead	47.5	2.1	mg/Kg	1	06/13/17	LK	SW6010C	
Zinc	91.9	2.1	mg/Kg	1	06/13/17	LK	SW6010C	
Percent Moisture	85	0.1	%		06/12/17	MA	PEL	
Percent Solid	15		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	100000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	166	3.3	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/13/17	W/W	SW7471B	
EPH Extraction	Completed				06/12/17	HC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/12/17	L/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Project ID: WARNER'S POND
Client ID: SC3-AC

Phoenix I.D.: BY37425

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1221	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1232	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1242	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1248	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1254	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1260	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1262	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1268	ND	430	ug/Kg	2	06/14/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	53		%	2	06/14/17	AW	30 - 150 %
% TCMX	71		%	2	06/14/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	1000	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Anthracene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Chrysene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	710	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluoranthene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluorene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Pyrene	ND	1500	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	31		%	1	06/13/17	DD	30 - 130 %
% Nitrobenzene-d5	38		%	1	06/13/17	DD	30 - 130 %
% Terphenyl-d14	34		%	1	06/13/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	22	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	22	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	22	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	22	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	76		%	1	06/14/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	103		%	1	06/14/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	105		%	1	06/14/17	AW	40 - 140 %
% o-terphenyl (aromatic)	76		%	1	06/14/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

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

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

Phyllis Shiller, Laboratory Director

July 11, 2017

Reviewed and Released by: Bobbi Aloisa, Vice President

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	12:30
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37426

Project ID: WARNER'S POND
Client ID: SC3-B

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	14.2	2.0	mg/Kg	1	06/13/17	LK	SW6010C	
Cadmium	< 1.0	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Chromium	49.5	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Copper	24.8	1.0	mg/kg	1	06/13/17	LK	SW6010C	
Mercury	0.28	0.08	mg/Kg	1	06/13/17	RS	SW7471B	
Nickel	13.2	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Lead	53.8	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Zinc	114	1.0	mg/Kg	1	06/13/17	LK	SW6010C	
Percent Moisture	69	0.1	%		06/12/17	MA	PEL	
Percent Solid	31		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	98000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	59.5	1.6	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/13/17	W/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/12/17	L/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Project ID: WARNER'S POND
Client ID: SC3-B

Phoenix I.D.: BY37426

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1221	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1232	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1242	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1248	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1254	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1260	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1262	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1268	ND	210	ug/Kg	2	06/14/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	55		%	2	06/14/17	AW	30 - 150 %	
% TCMX	62		%	2	06/14/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Anthracene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Chrysene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluoranthene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Fluorene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Pyrene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	45		%	1	06/13/17	DD	30 - 130 %	
% Nitrobenzene-d5	59		%	1	06/13/17	DD	30 - 130 %	
% Terphenyl-d14	60		%	1	06/13/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	ND	11	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	11	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	11	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
Total TPH 1,2*	ND	11	mg/Kg	1	06/15/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	29		%	1	06/15/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	128		%	1	06/15/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	133		%	1	06/15/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	29		%	1	06/15/17	AW	40 - 140 %	3

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	12:02
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37427

Project ID: WARNER'S POND
Client ID: SC4-ABC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	26.7	3.1	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	11.8	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	81.1	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	57.1	1.5	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	0.39	0.12	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	29.7	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	104	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
TCLP Lead	< 0.10	0.10	mg/L	1	07/10/17	LK	SW6010C	
TCLP Metals Digestion	Completed				07/10/17	WQ/Q	SW3005A	
Zinc	228	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	80	0.1	%		06/12/17	MA	PEL	
Percent Solid	20		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	54000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	83.8	2.5	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/12/17	HC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
TCLP Extraction for Metals	Completed				07/07/17	W	SW1311	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	740	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Naphthalene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004	

Project ID: WARNER'S POND
Client ID: SC4-ABC

Phoenix I.D.: BY37427

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Sieve Test	Completed				06/23/17	*	ASTM 7
Polychlorinated Biphenyls							
PCB-1016	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1221	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1232	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1242	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1248	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1254	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1260	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1262	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1268	ND	320	ug/Kg	2	06/14/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	57		%	2	06/14/17	AW	30 - 150 %
% TCMX	65		%	2	06/14/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	1000	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Anthracene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Chrysene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	800	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluoranthene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Fluorene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
Pyrene	ND	1700	ug/Kg	1	06/13/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	69		%	1	06/13/17	DD	30 - 130 %
% Nitrobenzene-d5	67		%	1	06/13/17	DD	30 - 130 %
% Terphenyl-d14	73		%	1	06/13/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	16	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	16	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	16	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	16	mg/Kg	1	06/14/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	53		%	1	06/14/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	114		%	1	06/14/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	120		%	1	06/14/17	AW	40 - 140 %
% o-terphenyl (aromatic)	47		%	1	06/14/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

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

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	13:00
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37428

Project ID: WARNER'S POND
Client ID: SC5-ABC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	12.0	2.5	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	1.5	1.3	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	39.9	1.3	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	22.9	1.3	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	0.23	0.11	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	14.1	1.3	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	67.9	1.3	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	119	1.3	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	76	0.1	%		06/12/17	MA	PEL	
Percent Solid	24		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	65000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	78.0	2.1	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Naphthalene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC5-ABC

Phoenix I.D.: BY37428

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1221	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1232	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1242	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1248	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1254	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1260	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1262	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1268	ND	270	ug/Kg	2	06/14/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	58		%	2	06/14/17	AW	30 - 150 %	
% TCMX	65		%	2	06/14/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Anthracene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Chrysene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluorene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	70		%	1	06/14/17	DD	30 - 130 %	
% Nitrobenzene-d5	68		%	1	06/14/17	DD	30 - 130 %	
% Terphenyl-d14	73		%	1	06/14/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	21	14	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	15	14	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	14	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
Total TPH 1,2*	36	14	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	38		%	1	06/19/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	110		%	1	06/19/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	107		%	1	06/19/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	40		%	1	06/19/17	AW	40 - 140 %	

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

If there are any questions regarding this data, please call Phoenix Client Services.
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Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	11:40
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37429

Project ID: WARNER'S POND
Client ID: SC6-ABC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	9.9	2.9	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	< 1.5	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	32.1	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	19.0	1.5	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	0.24	0.13	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	10.2	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	43.4	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	68.9	1.5	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	80	0.1	%		06/12/17	MA	PEL	
Percent Solid	20		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	98000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	124	2.5	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Naphthalene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Project ID: WARNER'S POND
Client ID: SC6-ABC

Phoenix I.D.: BY37429

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1221	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1232	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1242	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1248	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1254	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1260	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1262	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1268	ND	320	ug/Kg	2	06/14/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	63		%	2	06/14/17	AW	30 - 150 %	
% TCMX	67		%	2	06/14/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Anthracene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Chrysene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluoranthene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluorene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Pyrene	ND	1100	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	45		%	1	06/14/17	DD	30 - 130 %	
% Nitrobenzene-d5	45		%	1	06/14/17	DD	30 - 130 %	
% Terphenyl-d14	55		%	1	06/14/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	ND	17	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	17	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	17	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
Total TPH 1,2*	ND	17	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	35		%	1	06/19/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	116		%	1	06/19/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	116		%	1	06/19/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	37		%	1	06/19/17	AW	40 - 140 %	3

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

If there are any questions regarding this data, please call Phoenix Client Services.
This report must not be reproduced except in full as defined by the attached chain of custody.

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	11:20
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37430

Project ID: WARNER'S POND
Client ID: SC7-AC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	14.5	4.3	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	< 2.2	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	54.4	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	34.2	2.2	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	0.29	0.15	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	15.8	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	77.0	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	169	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	84	0.1	%		06/12/17	MA	PEL	
Percent Solid	16		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	90000	100	mg/kg	1	06/13/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	225	3.1	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	UU/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Naphthalene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC7-AC

Phoenix I.D.: BY37430

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1221	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1232	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1242	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1248	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1254	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1260	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1262	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1268	ND	410	ug/Kg	2	06/14/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	59		%	2	06/14/17	AW	30 - 150 %
% TCMX	62		%	2	06/14/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Anthracene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Chrysene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Fluoranthene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Fluorene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
Pyrene	ND	1400	ug/Kg	1	06/14/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	39		%	1	06/14/17	DD	30 - 130 %
% Nitrobenzene-d5	40		%	1	06/14/17	DD	30 - 130 %
% Terphenyl-d14	52		%	1	06/14/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	28	21	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	21	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	21	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
Total TPH 1,2*	28	21	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	46		%	1	06/19/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	116		%	1	06/19/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	117		%	1	06/19/17	AW	40 - 140 %
% o-terphenyl (aromatic)	39		%	1	06/19/17	AW	40 - 140 % 3

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	11:30
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37431

Project ID: WARNER'S POND
Client ID: SC7-B

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	5.2	4.8	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	< 2.4	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	18.0	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	17.6	2.4	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	< 0.17	0.17	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	7.5	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	21.6	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	40.5	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	85	0.1	%		06/12/17	MA	PEL	
Percent Solid	15		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	85000	100	mg/kg	1	06/14/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	141	3.3	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/14/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	1400	ug/Kg	1	06/15/17	DD	MA EPH 5/2004	
Acenaphthene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004	
Naphthalene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004	
Phenanthrene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC7-B

Phoenix I.D.: BY37431

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1221	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1232	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1242	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1248	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1254	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1260	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1262	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
PCB-1268	ND	440	ug/Kg	2	06/14/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	51		%	2	06/14/17	AW	30 - 150 %
% TCMX	55		%	2	06/14/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	1300	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Anthracene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	2000	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Chrysene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	1500	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Fluoranthene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Fluorene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
Pyrene	ND	3200	ug/Kg	1	06/15/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	60		%	1	06/15/17	DD	30 - 130 %
% Nitrobenzene-d5	62		%	1	06/15/17	DD	30 - 130 %
% Terphenyl-d14	78		%	1	06/15/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	33	22	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	22	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	22	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
Total TPH 1,2*	33	22	mg/Kg	1	06/19/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	47		%	1	06/19/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	114		%	1	06/19/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	112		%	1	06/19/17	AW	40 - 140 %
% o-terphenyl (aromatic)	37		%	1	06/19/17	AW	40 - 140 % 3

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

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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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
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Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	14:05
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37432

Project ID: WARNER'S POND
Client ID: SC8-A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	7.2	4.4	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	< 2.2	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	24.8	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	17.1	2.2	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	< 0.17	0.17	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	8.4	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	27.3	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	67.0	2.2	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	84	0.1	%		06/12/17	MA	PEL	
Percent Solid	16		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	82000	100	mg/kg	1	06/14/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	84.3	3.1	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	920	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Acenaphthene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Naphthalene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Phenanthrene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC8-A

Phoenix I.D.: BY37432

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1221	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1232	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1242	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1248	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1254	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1260	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1262	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1268	ND	410	ug/Kg	2	06/14/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	49		%	2	06/14/17	AW	30 - 150 %	
% TCMX	57		%	2	06/14/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Anthracene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	2000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Chrysene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluoranthene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluorene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Pyrene	ND	2200	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	64		%	1	06/14/17	DD	30 - 130 %	
% Nitrobenzene-d5	63		%	1	06/14/17	DD	30 - 130 %	
% Terphenyl-d14	69		%	1	06/14/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	ND	20	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	20	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	20	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
Total TPH 1,2*	ND	20	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	37		%	1	06/19/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	116		%	1	06/19/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	113		%	1	06/19/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	27		%	1	06/19/17	AW	40 - 140 %	3

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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

Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

July 11, 2017

FOR: Attn: Mr Matt Ladewig
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	SM	06/08/17	14:20
Location Code:	ESSGRPRI	Received by:	B	06/12/17	15:48
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY37422
Phoenix ID: BY37433

Project ID: WARNER'S POND
Client ID: SC8-BC

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	6.9	2.4	mg/Kg	1	06/14/17	LK	SW6010C	
Cadmium	< 1.2	1.2	mg/Kg	1	06/14/17	LK	SW6010C	
Chromium	22.3	1.2	mg/Kg	1	06/14/17	LK	SW6010C	
Copper	14.6	1.2	mg/kg	1	06/14/17	LK	SW6010C	
Mercury	< 0.09	0.09	mg/Kg	1	06/14/17	RS	SW7471B	
Nickel	8.5	1.2	mg/Kg	1	06/14/17	LK	SW6010C	
Lead	33.4	1.2	mg/Kg	1	06/14/17	LK	SW6010C	
Zinc	77.7	1.2	mg/Kg	1	06/14/17	LK	SW6010C	
Percent Moisture	74	0.1	%		06/12/17	MA	PEL	
Percent Solid	26		%		06/12/17	Q	SW846-%Solid	
Tot.Org.Carbon	63000	100	mg/kg	1	06/14/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total as P	81.4	1.9	mg/Kg	1	06/14/17	MI	SM4500PE-99	7
Soil Extraction for PCB	Completed				06/12/17	HC/V	SW3545A	
Soil Extraction SVOA PAH	Completed				06/13/17	JJ/CKV	SW3545A	
Mercury Digestion	Completed				06/14/17	QW/W	SW7471B	
EPH Extraction	Completed				06/14/17	JC/Q	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				06/12/17		MADEP EPH-04	
Total Metals Digest	Completed				06/13/17	X/AG/BF	SW3050B	
Tot.Org.Carbon Preparation	Completed				06/12/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Naphthalene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Sieve Test	Completed				06/23/17	*	ASTM	7

Ver 2

Project ID: WARNER'S POND
Client ID: SC8-BC

Phoenix I.D.: BY37433

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Polychlorinated Biphenyls								
PCB-1016	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1221	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1232	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1242	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1248	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1254	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1260	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1262	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
PCB-1268	ND	260	ug/Kg	2	06/14/17	AW	SW8082A	
QA/QC Surrogates								
% DCBP	61		%	2	06/14/17	AW	30 - 150 %	
% TCMX	64		%	2	06/14/17	AW	30 - 150 %	
EPH Other PAH Target Analytes								
Acenaphthylene	ND	1000	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Anthracene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benz(a)anthracene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(a)pyrene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(b)fluoranthene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(ghi)perylene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Benzo(k)fluoranthene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Chrysene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Dibenz(a,h)anthracene	ND	700	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluoranthene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Fluorene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Indeno(1,2,3-cd)pyrene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
Pyrene	ND	1300	ug/Kg	1	06/14/17	DD	MA EPH 5/2004	
QA/QC Surrogates								
% 2-Fluorobiphenyl	56		%	1	06/14/17	DD	30 - 130 %	
% Nitrobenzene-d5	49		%	1	06/14/17	DD	30 - 130 %	
% Terphenyl-d14	50		%	1	06/14/17	DD	30 - 130 %	
MA EPH Aliphatic/Aromatic Ranges								
C11-C22 Aromatic Hydrocarbons 1,2*	ND	13	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C19-C36 Aliphatic Hydrocarbons 1*	ND	13	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
C9-C18 Aliphatic Hydrocarbons 1*	ND	13	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
Total TPH 1,2*	ND	13	mg/Kg	1	06/19/17	AW	MA EPH 5/2004	
QA/QC Surrogates								
% 1-chlorooctadecane (aliphatic)	38		%	1	06/19/17	AW	40 - 140 %	3
% 2-Bromonaphthalene (Fractionation)	117		%	1	06/19/17	AW	40 - 140 %	
% 2-Fluorobiphenyl (Fractionation)	117		%	1	06/19/17	AW	40 - 140 %	
% o-terphenyl (aromatic)	40		%	1	06/19/17	AW	40 - 140 %	

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

3 = This parameter exceeds laboratory specified limits.
7 = This parameter is not certified by MA for this matrix.

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:

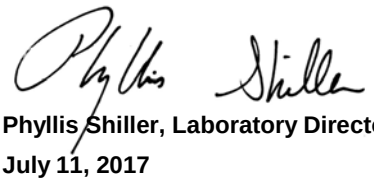
* See Attached

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

Semi-Volatile Comment:
Where the LOD justifies lowering the RL/PQL, the RL/PQL of some compounds are evaluated below the lowest calibration standard in order to meet criteria.

EPH Comment
Poor surrogate recovery due to sample matrix. Sample was re-extracted with similar results.

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



Phyllis Shiller, Laboratory Director
July 11, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

July 11, 2017

QA/QC Data

SDG I.D.: GBY37422

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 389691 (mg/kg), QC Sample No: BY37054 (BY37422, BY37423, BY37424, BY37425, BY37426)													
Mercury - Soil	BRL	0.02	<0.03	<0.03	NC	98.6	95.1	3.6	101			75 - 125	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 75-125%													
QA/QC Batch 389649 (mg/kg), QC Sample No: BY37112 (BY37422, BY37423, BY37424, BY37425, BY37426)													
ICP Metals - Soil													
Arsenic	BRL	0.66	0.70	0.78	NC	99.3			94.0			75 - 125	30
Cadmium	BRL	0.33	<0.32	<0.31	NC	103			99.8			75 - 125	30
Chromium	BRL	0.33	5.58	5.37	3.80	107			103			75 - 125	30
Copper	BRL	0.33	22.9	21.3	7.20	105			104			75 - 125	30
Lead	BRL	0.33	10.3	11.7	12.7	103			102			75 - 125	30
Nickel	BRL	0.33	5.41	4.27	23.6	106			101			75 - 125	30
Zinc	BRL	0.33	23.9	21.4	11.0	98.4			95.1			75 - 125	30
QA/QC Batch 389768 (mg/kg), QC Sample No: BY37902 (BY37427, BY37428, BY37429, BY37430, BY37431, BY37432, BY37433)													
ICP Metals - Soil													
Arsenic	BRL	0.67	2.26 *	2.20	NC	95.5			89.0			75 - 125	30
Cadmium	BRL	0.33	1.17	0.90	NC	97.3			90.9			75 - 125	30
Chromium	BRL	0.33	14.2 *	16.0	11.9	103			99.0			75 - 125	30
Copper	BRL	0.33	23.9	27.7	14.7	109			114			75 - 125	30
Lead	BRL	0.33	126	128	1.60	99.6			89.8			75 - 125	30
Nickel	BRL	0.33	15.9 *	15.7	1.30	101			96.0			75 - 125	30
Zinc	BRL	0.33	62.1	64.1	3.20	96.3			102			75 - 125	30
QA/QC Batch 389842 (mg/kg), QC Sample No: BY38155 (BY37429, BY37430, BY37431, BY37432, BY37433)													
Mercury - Soil	BRL	0.03	64.7	55.8	14.8	88.0	91.5	3.9	NC			75 - 125	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 75-125%													
QA/QC Batch 389841 (mg/kg), QC Sample No: BY38821 (BY37427, BY37428)													
Mercury - Soil	BRL	0.03	<0.03	<0.03	NC	90.6	90.9	0.3	88.9			75 - 125	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 75-125%													
QA/QC Batch 392992 (mg/L), QC Sample No: BY50255 (BY37427)													
ICP Metals - TCLP Extraction													
Lead	BRL	0.010	0.57	0.52	9.20	98.3			99.5			75 - 125	20

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QA/QC Report

July 11, 2017

QA/QC Data

SDG I.D.: GBY37422

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 389813 (mg/kg), QC Sample No: BY37219 (BY37422, BY37423, BY37424, BY37425, BY37426, BY37427, BY37428, BY37429, BY37430)													
Tot.Org.Carbon	BRL	100	41000	41000	NC	103						75 - 125	30
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 389940 (mg/Kg), QC Sample No: BY37422 (BY37422, BY37423, BY37424, BY37425, BY37426, BY37427, BY37428, BY37429, BY37430, BY37431, BY37432, BY37433)													
Phosphorus, Total as P	BRL	0.50	183	137	28.8	107						75 - 125	30
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 389948 (mg/kg), QC Sample No: BY37431 (BY37431, BY37432, BY37433)													
Tot.Org.Carbon	BRL	100	85000	98000	NC	84.3						75 - 125	30
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													

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QA/QC Report

July 11, 2017

QA/QC Data

SDG I.D.: GBY37422

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 389635 (ug/Kg), QC Sample No: BY32761 2X (BY37422, BY37423, BY37424, BY37425, BY37426, BY37427, BY37428, BY37429, BY37430, BY37431, BY37432, BY37433)											
Polychlorinated Biphenyls - Soil											
PCB-1016	ND	33	79	71	10.7	65	77	16.9	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	86	76	12.3	66	77	15.4	40 - 140	30	
PCB-1262	ND	33							40 - 140	30	
PCB-1268	ND	33							40 - 140	30	
% DCBP (Surrogate Rec)	82	%	104	90	14.4	75	81	7.7	30 - 150	30	
% TCMX (Surrogate Rec)	79	%	95	83	13.5	73	84	14.0	30 - 150	30	
QA/QC Batch 389717 (ug/kg), QC Sample No: BY37422 (BY37422, BY37423, BY37424, BY37425, BY37426, BY37427, BY37428, BY37429, BY37430, BY37432, BY37433)											
Polynuclear Aromatic HC - Soil											
2-Methylnaphthalene	ND	230	65	59	9.7	58	37	44.2	30 - 130	30	r
Acenaphthene	ND	230	77	74	4.0	72	58	21.5	30 - 130	30	
Acenaphthylene	ND	230	70	67	4.4	81	49	49.2	30 - 130	30	r
Anthracene	ND	230	79	77	2.6	73	60	19.5	30 - 130	30	
Benz(a)anthracene	ND	230	73	69	5.6	65	54	18.5	30 - 130	30	
Benzo(a)pyrene	ND	230	74	70	5.6	65	52	22.2	30 - 130	30	
Benzo(b)fluoranthene	ND	230	77	75	2.6	70	57	20.5	30 - 130	30	
Benzo(ghi)perylene	ND	230	69	68	1.5	64	52	20.7	30 - 130	30	
Benzo(k)fluoranthene	ND	230	77	74	4.0	71	58	20.2	30 - 130	30	
Chrysene	ND	230	79	78	1.3	73	60	19.5	30 - 130	30	
Dibenz(a,h)anthracene	ND	230	75	75	0.0	72	59	19.8	30 - 130	30	
Fluoranthene	ND	230	79	78	1.3	72	59	19.8	30 - 130	30	
Fluorene	ND	230	79	77	2.6	74	60	20.9	30 - 130	30	
Indeno(1,2,3-cd)pyrene	ND	230	70	69	1.4	64	53	18.8	30 - 130	30	
Naphthalene	ND	230	68	62	9.2	61	50	19.8	30 - 130	30	
Phenanthrene	ND	230	78	78	0.0	74	60	20.9	30 - 130	30	
Pyrene	ND	230	82	81	1.2	76	62	20.3	30 - 130	30	
% 2-Fluorobiphenyl	84	%	65	62	4.7	76	48	45.2	30 - 130	30	r
% Nitrobenzene-d5	63	%	62	39	45.5	51	45	12.5	30 - 130	30	r
% Terphenyl-d14	74	%	80	79	1.3	73	61	17.9	30 - 130	30	
Comment:											
Additional 8270 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 10-110%, for soils 30-130%)											
QA/QC Batch 389637 (mg/kg), QC Sample No: BY37423 (BY37422, BY37425, BY37427)											
Extractable Petroleum Hydrocarbons - Soil											
C11-C22 Aromatic Hydrocarbons 1	ND	3.3	69	73	5.6	45			40 - 140	25	

QA/QC Data

SDG I.D.: GBY37422

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
C19-C36 Aliphatic Hydrocarbons 1*	ND	3.3	58	57	1.7	50			40 - 140	25
C9-C18 Aliphatic Hydrocarbons 1*	ND	3.3	51	50	2.0	40			40 - 140	25
Total TPH 1,2*	ND	3.3	63	65	3.1	45			40 - 140	25
% 1-chlorooctadecane (aliphatic)	54	%	61	62	1.6	49			40 - 140	25
% 2-Bromonaphthalene (Fractionati	100	%	103	114	10.1	104			40 - 140	25
% 2-Fluorobiphenyl (Fractionation)	107	%	110	123	11.2	113			40 - 140	25
% o-terphenyl (aromatic)	76	%	82	88	7.1	60			40 - 140	25

Comment:

Additional EPH fractionation criteria: Breakthrough criteria (BT) is 0 to 5%

QA/QC Batch 389944 (mg/kg), QC Sample No: BY37423 (BY37423, BY37424, BY37426, BY37428, BY37429, BY37430, BY37431, BY37432, BY37433)

Extractable Petroleum Hydrocarbons - Soil

C11-C22 Aromatic Hydrocarbons 1	ND	3.3	69	73	5.6	45			40 - 140	25
C19-C36 Aliphatic Hydrocarbons 1*	ND	3.3	58	57	1.7	50			40 - 140	25
C9-C18 Aliphatic Hydrocarbons 1*	ND	3.3	51	50	2.0	40			40 - 140	25
Total TPH 1,2*	ND	3.3	63	65	3.1	45			40 - 140	25
% 1-chlorooctadecane (aliphatic)	54	%	61	62	1.6	49			40 - 140	25
% 2-Bromonaphthalene (Fractionati	100	%	103	114	10.1	104			40 - 140	25
% 2-Fluorobiphenyl (Fractionation)	107	%	110	123	11.2	113			40 - 140	25
% o-terphenyl (aromatic)	76	%	82	88	7.1	60			40 - 140	25

Comment:

MSD could note be reported.

Additional EPH fractionation criteria: Breakthrough criteria (BT) is 0 to 5%

QA/QC Batch 389934 (ug/kg), QC Sample No: BY39829 (BY37431)

Polynuclear Aromatic HC - Soil

2-Methylnaphthalene	ND	230	54			61			30 - 130	30
Acenaphthene	ND	230	64			68			30 - 130	30
Acenaphthylene	ND	230	60			62			30 - 130	30
Anthracene	ND	230	69			73			30 - 130	30
Benz(a)anthracene	ND	230	65			69			30 - 130	30
Benzo(a)pyrene	ND	230	62			64			30 - 130	30
Benzo(b)fluoranthene	ND	230	66			69			30 - 130	30
Benzo(ghi)perylene	ND	230	61			64			30 - 130	30
Benzo(k)fluoranthene	ND	230	69			70			30 - 130	30
Chrysene	ND	230	69			74			30 - 130	30
Dibenz(a,h)anthracene	ND	230	65			67			30 - 130	30
Fluoranthene	ND	230	68			66			30 - 130	30
Fluorene	ND	230	60			66			30 - 130	30
Indeno(1,2,3-cd)pyrene	ND	230	62			63			30 - 130	30
Naphthalene	ND	230	57			63			30 - 130	30
Phenanthrene	ND	230	63			62			30 - 130	30
Pyrene	ND	230	71			71			30 - 130	30
% 2-Fluorobiphenyl	49	%	56			60			30 - 130	30
% Nitrobenzene-d5	50	%	58			65			30 - 130	30
% Terphenyl-d14	68	%	72			71			30 - 130	30

Comment:

LCSD/MSD Not reported for this batch.

Additional 8270 criteria: 10% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 10-110%, for soils 30-130%)

r = This parameter is outside laboratory RPD specified recovery limits.

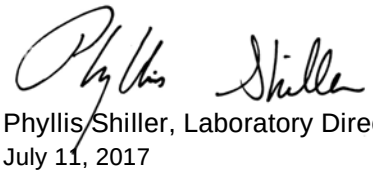
QA/QC Data

SDG I.D.: GBY37422

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD 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
July 11, 2017

Tuesday, July 11, 2017

Criteria: MA: S1, S2

State: MA

Sample Criteria Exceedances Report

GBY37422 - ESSGRPRI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
BY37425	$EPH_TARGET	Dibenz(a,h)anthracene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	710	700	700	ug/Kg
BY37425	$EPH_TARGET	Dibenz(a,h)anthracene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	710	700	700	ug/Kg
BY37427	$EPH_TARGET	Dibenz(a,h)anthracene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	800	700	700	ug/Kg
BY37427	$EPH_TARGET	Dibenz(a,h)anthracene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	800	700	700	ug/Kg
BY37427	$EPHD_TARG	2-Methylnaphthalene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	740	700	700	ug/Kg
BY37427	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	740	700	700	ug/Kg
BY37427	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	740	700	700	ug/Kg
BY37427	AS-SM	Arsenic	MA / CMR 310.40.1600 / S1 (mg/kg)	26.7	3.1	20	20	mg/Kg
BY37427	AS-SM	Arsenic	MA / CMR 310.40.1600 / S2 (mg/kg)	26.7	3.1	20	20	mg/Kg
BY37427	AS-SM	Arsenic	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	26.7	3.1	20	20	mg/Kg
BY37427	AS-SM	Arsenic	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	26.7	3.1	20	20	mg/Kg
BY37431	$EPH_TARGET	Acenaphthylene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	1300	1000	1000	ug/Kg
BY37431	$EPH_TARGET	Dibenz(a,h)anthracene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	1500	700	700	ug/Kg
BY37431	$EPH_TARGET	Dibenz(a,h)anthracene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	1500	700	700	ug/Kg
BY37431	$EPH_TARGET	Acenaphthylene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	1300	1000	1000	ug/Kg
BY37431	$EPH_TARGET	Acenaphthylene	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	1300	1000	1000	ug/Kg
BY37431	$EPHD_TARG	2-Methylnaphthalene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	1400	700	700	ug/Kg
BY37431	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	1400	700	700	ug/Kg
BY37431	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	1400	700	700	ug/Kg
BY37432	$EPH_TARGET	Dibenz(a,h)anthracene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	1000	700	700	ug/Kg
BY37432	$EPH_TARGET	Dibenz(a,h)anthracene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	1000	700	700	ug/Kg
BY37432	$EPHD_TARG	2-Methylnaphthalene	MA / CMR 310.40.1600 / S1 (mg/kg)	ND	920	700	700	ug/Kg
BY37432	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-1 STANDARDS / S-1 Soil & GW-1	ND	920	700	700	ug/Kg
BY37432	$EPHD_TARG	2-Methylnaphthalene	MA / SOIL S-2 STANDARDS / S-2 Soil & GW-1	ND	920	700	700	ug/Kg

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

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

July 11, 2017 SDG I.D.: GBY37422

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

EPH Fractionation Standard

SDG I.D.: GBY37422

Effective Date(s): 01/20/17 - 01/01/18 **Analyst:** aw

AS #	TV	20mL	21mL	22mL	23mL	% Rec1	% Rec2	% Rec3	% Rec4	Rec Limits
2-Methylnapthalene bt	0	0.00	0.00	0.00	0.00					
Napthalene bt	0	0.00	0.00	0.00	0.00					
C9 - Nonane	40	14.16	13.44	14.60	13.58	35.4	33.6	36.5	34.0	30-140
C-10 Decane	40	18.58	17.78	19.05	18.21	46.4	44.4	47.6	45.5	40-140
Napthalene	40	25.00	25.87	25.43	23.37	62.5	64.7	63.6	58.4	40-140
2-Methylnaphthalene	40	26.18	27.21	26.46	24.31	65.5	68.0	66.2	60.8	40-140
C12 - Dodecane	40	21.43	21.27	22.65	21.97	53.6	53.2	56.6	54.9	40-140
C9-C18 Aliphatic Group	240	133.52	131.41	135.35	133.85	55.6	54.8	56.4	55.8	40-140
2-Flourobiphenyl (surr)	20	15.59	16.75	15.98	14.87	78.0	83.7	79.9	74.3	40-140
Breakthrough	0	0.00	0.00	0.00	0.00					
Acenaphthalene	40	26.99	28.33	27.19	25.25	67.5	70.8	68.0	63.1	40-140
2-Bromonaphthalene (Surr)	20	15.51	17.08	16.16	15.13	77.6	85.4	80.8	75.7	40-140
Acenaphthene	40	27.34	28.74	27.36	25.19	68.3	71.9	68.4	63.0	40-140
C14 - Tetradecane	40	25.33	25.23	25.97	25.89	63.3	63.1	64.9	64.7	40-140
Fluorene	40	29.58	30.79	29.05	26.90	73.9	77.0	72.6	67.2	40-140
Spike Compounds Group 1		2.75	2.71	2.80	2.77					
C16 - Hexadecane	40	28.53	28.40	28.59	28.94	71.3	71.0	71.5	72.4	40-140
Aliphatic Targets		6.31	6.24	6.22	6.28					
Anthracene	40	30.03	30.93	28.67	26.54	75.1	77.3	71.7	66.4	40-140
Phenanthrene	40	29.81	30.51	28.45	26.26	74.5	76.3	71.1	65.7	40-140
o-Terphenyl (surr)	40	30.30	30.45	28.44	26.38	75.8	76.1	71.1	65.9	40-140
C18 - Octadecane	40	29.31	29.07	28.72	29.44	73.3	72.7	71.8	73.6	40-140
Fluoranthene	40	29.51	29.40	27.35	25.33	73.8	73.5	68.4	63.3	40-140
C19 - Nonadecane	40	28.35	28.26	27.75	28.57	70.9	70.6	69.4	71.4	40-140
Spike Compounds Group 2		3.55	3.53	3.42	3.51					
Pyrene	40	35.00	34.99	31.43	27.52	87.5	87.5	78.6	68.8	40-140
C11-C22 Aromatic Hydrocar	680	576.30	579.98	540.89	491.06	84.8	85.3	79.5	72.2	40-140
C20 - Eicosane	40	28.79	28.34	27.75	28.58	72.0	70.9	69.4	71.5	40-140
o-COD (surr)	40	26.22	24.31	25.01	27.50	65.6	60.8	62.5	68.8	40-140
C22 - Docosane	40	28.69	28.28	27.49	28.29	71.7	70.7	68.7	70.7	40-140
Benzo(a)anthracene	40	31.36	31.63	27.93	25.35	78.4	79.1	69.8	63.4	40-140
Chyrsene	40	28.76	27.61	27.17	25.12	71.9	69.0	67.9	62.8	40-140

EPH Fractionation Standard

SDG I.D.: GBY37422

Effective Date(s): 01/20/17 - 01/01/18 **Analyst:** aw

AS #	TV	20mL	21mL	22mL	23mL	% Rec1	% Rec2	% Rec3	% Rec4	Rec Limits
C24 - Tetracosane	40	28.24	27.89	26.87	27.59	70.6	69.7	67.2	69.0	40-140
Benzo(b/k)fluoranthene (c	80	59.97	59.71	55.02	50.90	75.0	74.6	68.8	63.6	40-140
Benzo(a)pyrene	40	30.21	29.62	27.67	25.89	75.5	74.1	69.2	64.7	40-140
C26 - Hexacosane	40	27.79	27.46	26.48	27.15	69.5	68.7	66.2	67.9	40-140
C28 - Octacosane	40	28.29	28.00	27.03	27.67	70.7	70.0	67.6	69.2	40-140
C19-C36 Aliphatic Group	320	253.33	245.48	237.44	244.19	79.2	76.7	74.2	76.3	40-140
Indeno/Dibenz(copk)	80	59.66	58.60	54.83	50.67	74.6	73.3	68.5	63.3	40-140
Benzo(ghi)perylene	40	29.70	29.23	27.40	25.33	74.3	73.1	68.5	63.3	40-140
C30 - Tricotane	40	27.67	27.52	26.51	27.13	69.2	68.8	66.3	67.8	40-140
C36 - Hexatriacontane	40	27.90	28.85	27.67	28.15	69.7	72.1	69.2	70.4	40-140

Notes: 40ppb (LCS) MAEPH fractionation test. 1-20ml hex, 2-21ml hex, 3-22ml hex, 4-23ml hex. 40-140% rec for all compounds except C-9 which is 30-140% Lot #:110916-990086

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

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

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

Temp 0.2 C Pg 1 of 1

Data Delivery:
☐ Fax #:
☒ Email: mladewig@essgroup.com

Customer: STEPHANIE L. MARTIN
Address: 10 HEMINGWAY DRIVE
EAST PROVIDENCE, RI 02915

Project: WARNER'S POND
Report to:
Invoice to:
Phone #:
Fax #:

Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature: Stephanie Martin Date: 6.8.17

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

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Grain Size Analysis	% Moisture, TOC, Metals, PCB	EPH w/ Target PAH	Soil VOA Vials [ ] methanol [ ] H2O	GL Soil container (8) oz [ ] As is [ ] HCl	40 ml VOA Vial [ ] oz ( ) oz	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria (as is)	Bacteria (w/thio)	1 gal bag
37422	SC1-a	Soil	6.8.17	1355	X	X	X		1		1							1
37423	SC1-bc	Soil	6.8.17	1340	X	X	X		1		1							1
37424	SC2-abc	Soil	6.8.17	1325	X	X	X		1		1							1
37425	SC3-ac	Soil	6.8.17	1240	X	X	X		1		1							1
37426	SC3-b	Soil	6.8.17	1230	X	X	X		1		1							1
37427	SC4-abc	Soil	6.8.17	1202	X	X	X		1		1							1
37428	SC5-abc	Soil	6.8.17	1300	X	X	X		1		1							1
37429	SC6-abc	Soil	6.8.17	1140	X	X	X		1		1							1
37430	SC7-ac	Soil	6.8.17	1120	X	X	X		1		1							1
37431	SC7-b	Soil	6.8.17	1130	X	X	X		1		1							1
37432	SC8-a	Soil	6.8.17	1405	X	X	X		1		1							1
37433	SC8-bc	Soil	6.8.17	1420	X	X	X		1		1							1

Relinquished by:	Accepted by:	Date:	Time:
6-12-17 0934		6-12-17	9:40
	TROWM	6/12/17	15:48

Comments, Special Requirements or Regulations:
1

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

RI
☐ Direct Exposure (Residential)
☐ GW
☐ Other

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

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☒ S-1
☒ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: MA

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

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

GBY 37422

Tara Banning

From: Matt Ladewig <mladewig@essgroup.com>
Sent: Monday, June 12, 2017 4:40 PM
To: Tara Banning
Cc: Shannon Wilhelm; Jonathan Alvarez; Stephanie Martin; Carl Nielsen
Subject: RE: Warner's Pond

Hi Tara –

We are looking for the following metals:

Arsenic
Cadmium
Chromium
Copper
Lead
Nickel
Zinc

Mercury

Thanks,
Matt

Matt Ladewig, CLM | Project Scientist
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor, East Providence, RI 02915 | p 401.330.1204

E-news | LinkedIn | Twitter | www.essgroup.com

From: Tara Banning [mailto:tara@phoenixlabs.com]
Sent: Monday, June 12, 2017 4:02 PM
To: Matt Ladewig <mladewig@essgroup.com>
Cc: Shannon Wilhelm <shannon@phoenixlabs.com>
Subject: Warner's Pond

Hello,
We are receiving samples at the lab today for the above mentioned project. You listed metals on the chain, which metals would you like run? Please let me know if you have any questions.

Thank you

Tara Banning
Phoenix Environmental Labs

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

CHAIN OF CUSTODY RECORD

Temp 0.2 °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:
☐ Fax #:
☒ Email: mladewig@essgroup.com

Customer: STEPHANIE L. MARTIN
Address: 10 HEMINGWAY DRIVE
EAST PROVIDENCE, RI 02915

Project: WARNER'S POND
Report to:
Invoice to:
Phone #:
Fax #:
Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature: Stephanie Martin Date: 6.8.17

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

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Grain Size Analysis	% Moisture	EPH w/ Target PAH	Total phosphorus	Soil VOA Vials [ ] methanol [ ] H2O	Gl. Soil container (8) oz ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria (as is)	Bacteria (w/thio)	1 gal bag
37422	SC1-a	Soil	6.8.17	1355	X	X	X	X		1		1							1
37423	SC1-bc	Soil	6.8.17	1340	X	X	X			1		1							1
37424	SC2-abc	Soil	6.8.17	1325	X	X	X			1		1							1
37425	SC3-ac	Soil	6.8.17	1240	X	X	X			1		1							1
37426	SC3-b	Soil	6.8.17	1230	X	X	X			1		1							1
37427	SC4-abc	Soil	6.8.17	1202	X	X	X			1		1							1
37428	SC5-abc	Soil	6.8.17	1300	X	X	X			1		1							1
37429	SC6-abc	Soil	6.8.17	1140	X	X	X			1		1							1
37430	SC7-ac	Soil	6.8.17	1120	X	X	X			1		1							1
37431	SC7-b	Soil	6.8.17	1130	X	X	X			1		1							1
37432	SC8-a	Soil	6.8.17	1405	X	X	X			1		1							1
37433	SC8-bc	Soil	6.8.17	1420	X	X	X			1		1							1

Relinquished by:	Accepted by:	Date:	Time:
6.12.17 0934		6-12-17	9:40
	TROWM	6/13/17	15:48

Comments, Special Requirements or Regulations:
Add total phos per Stephanie Martin @ ESS @ 6/13/17

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

RI
☐ Direct Exposure (Residential)
☐ GW
☐ Other

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

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☒ S-1
☒ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: MA

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

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

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

CHAIN OF CUSTODY RECORD

Temp 2.2 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:
☐ Fax #:
☒ Email: mladewig@essgroup.com

Customer: Stephanie L. Martin
Address: 10 Hemingway Drive
East Providence, RI 02915

Project: Warners Pond
Report to: Wanders Pond, MA (C625-000)
Invoice to:
Phone #:
Fax #:
Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature: Stephanie Martin Date: 6-8-17

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

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Grain Size Analysis *	% Moisture	EPH w/ Target PAH	Total PCBs (Aroclors 5/7/4)	Soil VOA Vials [ ] methanol	GL Soil container [ ] H2O	40 ml VOA Vial [ ] oz [ ] As is [ ] HCl	GL Amber [ ] oz [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria (as is)	Bacteria (within)	1 gal bag
37422	SC1-a	Soil	6-8-17	1355	X	X	X	X		1		1							1
37423	SC1-bc	Soil	6-8-17	1340	X	X	X	X		1		1							1
37424	SC2-abc	Soil	6-8-17	1325	X	X	X	X		1		1							1
37425	SC3-ac	Soil	6-8-17	1240	X	X	X	X		1		1							1
37426	SC3-b	Soil	6-8-17	1230	X	X	X	X		1		1							1
37427	SC4-abc	Soil	6-8-17	1202	X	X	X	X		1		1							1
37428	SC5-abc	Soil	6-8-17	1300	X	X	X	X		1		1							1
37429	SC6-abc	Soil	6-8-17	1140	X	X	X	X		1		1							1
37430	SC7-ac	Soil	6-8-17	1120	X	X	X	X		1		1							1
37431	SC7-b	Soil	6-8-17	1130	X	X	X	X		1		1							1
37432	SC8-a	Soil	6-8-17	1405	X	X	X	X		1		1							1
37433	SC8-bc	Soil	6-8-17	1420	X	X	X	X		1		1							1

Relinquished by:	Accepted by:	Date:	Time:
6-12-17 0934	TROWN	6-12-17	9:40
		6/12/17	15:48

Comments, Special Requirements or Regulations:
* ASTM D422
** Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, & Zinc.
Revised COC

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

RI
☐ Direct Exposure (Residential)
☐ GW
☐ Other

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

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☒ S-1
☒ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: MA

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

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

GBY 37422

Christine Paradise

From: Stephanie Martin <smartin@essgroup.com>
Sent: Wednesday, June 14, 2017 10:42 AM
To: Christine Paradise
Subject: FW: Warner's Pond (Quoted as "Wanders Pond, MA (C625-000)")
Attachments: Warners Pond Revised COC.pdf

From: Stephanie Martin
Sent: Tuesday, June 13, 2017 11:09 AM
To: 'Christine@phoenixlabs.com' <Christine@phoenixlabs.com>
Cc: Matt Ladewig <mladewig@essgroup.com>; Jonathan Alvarez <jalvarez@essgroup.com>
Subject: Warner's Pond (Quoted as "Wanders Pond, MA (C625-000)")

Hi Christine,

Here is the revised Chain of Custody for Warner's Pond. As discussed, please include Total Phosphorus to the analysis request for all samples.

In addition, please note that the sample matrix is sediment, not soil.

Thank you for your assistance. Please let me know if you have any questions or concerns.

Kind regards,
Stephanie

Stephanie L. Martin ¦ Environmental Scientist
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor, East Providence, RI 02915 | p 401.330.1246

E-news | LinkedIn | Twitter | www.essgroup.com

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1244

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37422

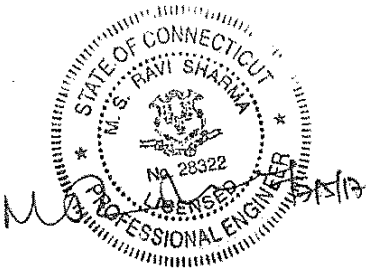
Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
⅜" (9.5mm)	100
¼" (6.3mm)	90
#10 (2.0mm)	76
#20 (850µm)	64
#40 (425µm)	50
#100 (150µm)	39
#200 (75µm)	20.8

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy



File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1245

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37423

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	85
#20 (850µm)	72
#40 (425µm)	61
#100 (150µm)	45
#200 (75µm)	28.8

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER
6/15/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1246

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37424

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	83
#20 (850µm)	70
#40 (425µm)	46
#100 (150µm)	26
#200 (75µm)	13.2

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1247

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37425

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	94
#20 (850µm)	82
#40 (425µm)	63
#100 (150µm)	39
#200 (75µm)	17.2

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER
6/25/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1248

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37426

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	73
#20 (850µm)	60
#40 (425µm)	36
#100 (150µm)	29
#200 (75µm)	14.9

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED
PROFESSIONAL ENGINEER
6/23/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1249

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: **WASHED SIEVE ANALYSIS (ASTM C-136, D1140)**

Material: Fine Silty Soil

Source: Client's Sample # BY37427

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	90
#20 (850µm)	63
#40 (425µm)	46
#100 (150µm)	28
#200 (75µm)	17.7

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED
PROFESSIONAL ENGINEER
6/23/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1250

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: **WASHED SIEVE ANALYSIS (ASTM C-136, D1140)**

Material: Fine Silty Soil

Source: Client's Sample # BY37428

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	57
#20 (850µm)	47
#40 (425µm)	41
#100 (150µm)	30
#200 (75µm)	16.2

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 26322
LICENSED PROFESSIONAL ENGINEER
6/23/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1251

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37429

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	80
#20 (850µm)	71
#40 (425µm)	64
#100 (150µm)	44
#200 (75µm)	34.9

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER
6/15/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1252

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37430

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	61
#20 (850µm)	45
#40 (425µm)	38
#100 (150µm)	28
#200 (75µm)	21.4

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED
PROFESSIONAL ENGINEER

6/15/17

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1253

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: **WASHED SIEVE ANALYSIS (ASTM C-136, D1140)**

Material: Fine Silty Soil

Source: Client's Sample # BY37431

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
⅜" (9.5mm)	100
¼" (6.3mm)	88
#10 (2.0mm)	40
#20 (850µm)	28
#40 (425µm)	21
#100 (150µm)	14
#200 (75µm)	11.1

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

STATE OF CONNECTICUT
M. S. RAVI SHARMA
No. 28322
LICENSED
PROFESSIONAL ENGINEER
6/23/17

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1254

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37432

Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	83
#20 (850µm)	69
#40 (425µm)	59
#100 (150µm)	47
#200 (75µm)	32.7

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy

STATE OF CONNECTICUT
M.S. RAVI SHARMA
No. 28322
LICENSED PROFESSIONAL ENGINEER

File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

MATERIALS TESTING, INC.

55 LAURA STREET • NEW HAVEN, CONNECTICUT 06512 • (203) 468-5216
42 BOSTON POST ROAD • WILLIMANTIC, CONNECTICUT 06226 • (860) 423-1972

DATE: 06-23-17

REPORT: M-1255

CLIENT: Phoenix Environmental Laboratories, Inc.
PO Box 370
Manchester, CT 06040
Attn: Bobbi Aloisa

PROJECT: Client's Information

SUBJECT: WASHED SIEVE ANALYSIS (ASTM C-136, D1140)

Material: Fine Silty Soil

Source: Client's Sample # BY37433

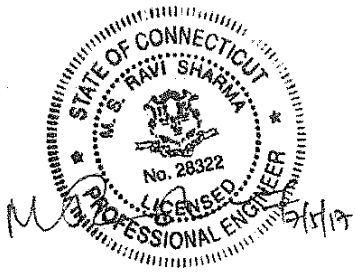
Sampled: by client and delivered to MTI on 6/14/17

Sieve Size	Percent Passing
¼" (6.3mm)	100
#10 (2.0mm)	74
#20 (850µm)	54
#40 (425µm)	37
#100 (150µm)	21
#200 (75µm)	12.4

A material specification was not provided at this time.

Materials Testing, Inc.
Richard C. Kearns

William J. Soucy



File: Original
1cc: Client
Attachment: (1) Chain of Custody

wlb

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

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

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

Temp °C Pg of

Contact Options:
☐ Fax:
☐ Phone:
☐ Email:

~~Customer~~: Materials Testing Inc
Address:

Project:
Report to: Bobbi Aloisa
Invoice to:

Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature _____ Date: _____

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

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Analysis Request: Sieve	Soil VOA Vials [ ] methanol [ ] H2O	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle
BY37422		S	6-8-17	13:55	X										
BY37423				13:40	X										
BY37424				13:25	X										
BY37425				12:40	X										
BY37426				12:30	X										
BY37427				12:02	X										
BY37428				13:00	X										
BY37429				11:40	X										
BY37430				11:20	X										
BY37431				11:30	X										
BY37432				14:05	X										
BY37433				14:20	X										

Relinquished by:	Accepted by:	Date:	Time:
		6-14-17	8:00
		6/14	

Comments, Special Requirements or Regulations:

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

RI
☐ Direct Exposure (Residential)
☐ GW
☐ Other

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

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: MA

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

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

* SURCHARGE APPLIES

Sarah Bell

From: Matt Ladewig <mladewig@essgroup.com>
Sent: Friday, July 07, 2017 2:56 PM
To: Sarah Bell
Subject: RE: GBY37422 Warner's Pond status update

Hi Sarah –

Received the final results today. Based on those, we'd like to add a TCLP for one sample:

SC4-ABC (Lead)

Let me know if you have any questions.

Thanks,
Matt

Matt Ladewig, CLM | Project Scientist
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor, East Providence, RI 02915 | p 401.330.1204

E-news | LinkedIn | Twitter | www.essgroup.com

From: Sarah Bell [mailto:sarah@phoenixlabs.com]
Sent: Thursday, July 06, 2017 11:26 AM
To: Matt Ladewig <mladewig@essgroup.com>
Subject: RE: GBY37422 Warner's Pond status update

Matt! Happy Independence month…
I have everything on this except the Sieve. I can send you what I have since you need to possibly add on.
I will check to see who we sent the Sieve to as well and contact them.

Sarah Bell
Client Services - Project Manager
Accounts Receivable
Phoenix Environmental Laboratories
587 East Middle Turnpike
Manchester, CT 06040
Ph: 1-860-645-1102

From: Matt Ladewig [mailto:mladewig@essgroup.com]
Sent: Thursday, July 06, 2017 11:20 AM
To: Sarah Bell
Subject: GBY37422 Warner's Pond status update

Hi Sarah –

Hope you had a good Fourth! Just wanted to check on the status of one our recent submissions, when you have a chance. Here's the info:

GBY37422 Warner's Pond submitted on 6/12

Depending on metals results, we may need to run some TCLPs. So, if the initial metals results are ready, it would be useful for us to at least see those.

Thanks,
Matt

Matt Ladewig, CLM | Project Scientist
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor, East Providence, RI 02915 | p 401.330.1204

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PHOENIX
Environmental Laboratories, Inc.

Wednesday, August 30, 2017

Attn: Mr Carl Nielsen
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Project ID: WARNERS POND C625-000
Sample ID#s: BY88127 - BY88129

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 have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

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
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

Analysis Report

August 30, 2017

FOR: Attn: Mr Carl Nielsen
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		08/21/17	10:55
Location Code:	ESSGRPRI	Received by:	SW	08/22/17	14:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY88127
Phoenix ID: BY88127

Project ID: WARNERS POND C625-000
Client ID: SC9

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	4.7	1.5	mg/Kg	1	08/25/17	MA	SW6010C	
Cadmium	< 0.75	0.75	mg/Kg	1	08/25/17	MA	SW6010C	
Chromium	22.4	0.75	mg/Kg	1	08/25/17	MA	SW6010C	
Copper	12.1	0.75	mg/Kg	1	08/25/17	MA	SW6010C	
Mercury	< 0.06	0.06	mg/kg	1	08/23/17	RS	SW7471B	
Nickel	9.22	0.75	mg/Kg	1	08/25/17	MA	SW6010C	
Lead	16.7	0.75	mg/Kg	1	08/25/17	MA	SW6010C	B
Zinc	43.2	0.75	mg/Kg	1	08/25/17	MA	SW6010C	
Percent Moisture	52.2	0.1	%		08/23/17	MA	PEL	
Percent Solid	47.8	1	%		08/23/17		SW846-%Solid	
Total Solids @ 104C	47.8	0.1	%	1	08/23/17	KH	SM2540B-97	
Tot.Org.Carbon	32000	100	mg/kg	1	08/25/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total	201	1.0	mg/Kg	1	08/25/17	JR	SM4500PE-99	
Soil Extraction for PCB	Completed				08/23/17	JC/CK	SW3545A	
Soil Extraction SVOA PAH	Completed				08/22/17	BJ/JCK	SW3545A	
Mercury Digestion	Completed				08/23/17	RW/W	SW7471B	
EPH Extraction	Completed				08/24/17	JC/R	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				08/22/17		MADEP EPH-04	
Total Metals Digest	Completed				08/22/17	L/AG	SW3050B	
Tot.Org.Carbon Preparation	Completed				08/22/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Acenaphthene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Naphthalene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Phenanthrene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	

Project ID: WARNERS POND C625-000
Client ID: SC9

Phoenix I.D.: BY88127

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1221	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1232	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1242	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1248	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1254	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1260	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1262	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
PCB-1268	ND	140	ug/Kg	2	08/25/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	67		%	2	08/25/17	AW	30 - 150 %
% TCMX	59		%	2	08/25/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Anthracene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Chrysene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluoranthene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluorene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Pyrene	ND	480	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	60		%	1	08/23/17	DD	30 - 130 %
% Nitrobenzene-d5	67		%	1	08/23/17	DD	30 - 130 %
% Terphenyl-d14	65		%	1	08/23/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	6.9	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	6.9	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	6.9	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	6.9	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	50		%	1	08/25/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	124		%	1	08/25/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	123		%	1	08/25/17	AW	40 - 140 %
% o-terphenyl (aromatic)	66		%	1	08/25/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.
B = Present in blank, no bias suspected.

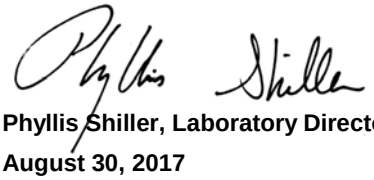
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

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

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



Phyllis Shiller, Laboratory Director
August 30, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

August 30, 2017

FOR: Attn: Mr Carl Nielsen
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		08/21/17	11:20
Location Code:	ESSGRPRI	Received by:	SW	08/22/17	14:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY88127
Phoenix ID: BY88128

Project ID: WARNERS POND C625-000
Client ID: SC10

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	12.0	1.8	mg/Kg	1	08/25/17	MA	SW6010C	
Cadmium	1.07	0.92	mg/Kg	1	08/25/17	MA	SW6010C	
Chromium	50.0	0.92	mg/Kg	1	08/25/17	MA	SW6010C	
Copper	28.4	0.92	mg/Kg	1	08/25/17	MA	SW6010C	
Mercury	0.08	0.07	mg/kg	1	08/23/17	RS	SW7471B	
Nickel	17.1	0.92	mg/Kg	1	08/25/17	MA	SW6010C	
Lead	64.2	0.92	mg/Kg	1	08/25/17	MA	SW6010C	B
Zinc	146	0.92	mg/Kg	1	08/25/17	MA	SW6010C	
Percent Moisture	63.7	0.1	%		08/23/17	MA	PEL	
Percent Solid	36.3	1	%		08/23/17		SW846-%Solid	
Total Solids @ 104C	36.3	0.1	%	1	08/23/17	KH	SM2540B-97	
Tot.Org.Carbon	27000	100	mg/kg	1	08/25/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total	347	6.9	mg/Kg	5	08/25/17	JR	SM4500PE-99	
Soil Extraction for PCB	Completed				08/23/17	JC/CK	SW3545A	
Soil Extraction SVOA PAH	Completed				08/22/17	BJ/JCK	SW3545A	
Mercury Digestion	Completed				08/23/17	RW/W	SW7471B	
EPH Extraction	Completed				08/24/17	JC/R	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				08/22/17		MADEP EPH-04	
Total Metals Digest	Completed				08/22/17	L/AG	SW3050B	
Tot.Org.Carbon Preparation	Completed				08/22/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Acenaphthene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Naphthalene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Phenanthrene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	

Project ID: WARNERS POND C625-000
Client ID: SC10

Phoenix I.D.: BY88128

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1221	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1232	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1242	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1248	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1254	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1260	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1262	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1268	ND	180	ug/Kg	2	08/24/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	70		%	2	08/24/17	AW	30 - 150 %
% TCMX	70		%	2	08/24/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Anthracene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Chrysene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluoranthene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluorene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Pyrene	ND	630	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	70		%	1	08/23/17	DD	30 - 130 %
% Nitrobenzene-d5	75		%	1	08/23/17	DD	30 - 130 %
% Terphenyl-d14	76		%	1	08/23/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	9.1	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	9.1	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	9.1	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	9.1	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	76		%	1	08/25/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	117		%	1	08/25/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	116		%	1	08/25/17	AW	40 - 140 %
% o-terphenyl (aromatic)	86		%	1	08/25/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.
B = Present in blank, no bias suspected.

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:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

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

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

Phyllis Shiller, Laboratory Director
August 30, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

Analysis Report

August 30, 2017

FOR: Attn: Mr Carl Nielsen
ESS Group Inc.
10 Hemingway Drive 2nd Floor
Riverside, RI 02915-2224

Sample Information		Custody Information		Date	Time
Matrix:	SEDIMENT	Collected by:		08/21/17	11:55
Location Code:	ESSGRPRI	Received by:	SW	08/22/17	14:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GBY88127
Phoenix ID: BY88129

Project ID: WARNERS POND C625-000
Client ID: SC11

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference	
Arsenic	8.0	2.7	mg/Kg	1	08/25/17	MA	SW6010C	
Cadmium	< 1.3	1.3	mg/Kg	1	08/25/17	MA	SW6010C	
Chromium	30.2	1.3	mg/Kg	1	08/25/17	MA	SW6010C	
Copper	17.0	1.3	mg/Kg	1	08/25/17	MA	SW6010C	
Mercury	< 0.11	0.11	mg/kg	1	08/23/17	RS	SW7471B	
Nickel	12.5	1.3	mg/Kg	1	08/25/17	MA	SW6010C	
Lead	38.6	1.3	mg/Kg	1	08/25/17	MA	SW6010C	B
Zinc	86.9	1.3	mg/Kg	1	08/25/17	MA	SW6010C	
Percent Moisture	76.8	0.1	%		08/23/17	MA	PEL	
Percent Solid	23.2	1	%		08/23/17		SW846-%Solid	
Total Solids @ 104C	23.2	0.1	%	1	08/23/17	KH	SM2540B-97	
Tot.Org.Carbon	62000	100	mg/kg	1	08/25/17	MA	SW9060A/L. Kahn	7
Phosphorus, Total	276	2.2	mg/Kg	1	08/25/17	JR	SM4500PE-99	
Soil Extraction for PCB	Completed				08/23/17	JC/CK	SW3545A	
Soil Extraction SVOA PAH	Completed				08/22/17	BJ/JCK	SW3545A	
Mercury Digestion	Completed				08/23/17	RW/W	SW7471B	
EPH Extraction	Completed				08/24/17	JC/R	SW3545A	
Ext. Petroleum Hydrocarbons	Completed				08/22/17		MADEP EPH-04	
Total Metals Digest	Completed				08/22/17	L/AG	SW3050B	
Tot.Org.Carbon Preparation	Completed				08/22/17	MA		
EPH Diesel PAH Target Analytes								
2-Methylnaphthalene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Acenaphthene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Naphthalene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	
Phenanthrene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004	

Project ID: WARNERS POND C625-000
Client ID: SC11

Phoenix I.D.: BY88129

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Polychlorinated Biphenyls							
PCB-1016	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1221	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1232	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1242	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1248	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1254	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1260	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1262	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
PCB-1268	ND	280	ug/Kg	2	08/24/17	AW	SW8082A
QA/QC Surrogates							
% DCBP	74		%	2	08/24/17	AW	30 - 150 %
% TCMX	73		%	2	08/24/17	AW	30 - 150 %
EPH Other PAH Target Analytes							
Acenaphthylene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Anthracene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benz(a)anthracene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(a)pyrene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(b)fluoranthene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(ghi)perylene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Benzo(k)fluoranthene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Chrysene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Dibenz(a,h)anthracene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluoranthene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Fluorene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Indeno(1,2,3-cd)pyrene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
Pyrene	ND	1000	ug/Kg	1	08/23/17	DD	MA EPH 5/2004
QA/QC Surrogates							
% 2-Fluorobiphenyl	43		%	1	08/23/17	DD	30 - 130 %
% Nitrobenzene-d5	58		%	1	08/23/17	DD	30 - 130 %
% Terphenyl-d14	53		%	1	08/23/17	DD	30 - 130 %
MA EPH Aliphatic/Aromatic Ranges							
C11-C22 Aromatic Hydrocarbons 1,2*	ND	14	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C19-C36 Aliphatic Hydrocarbons 1*	ND	14	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
C9-C18 Aliphatic Hydrocarbons 1*	ND	14	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
Total TPH 1,2*	ND	14	mg/Kg	1	08/25/17	AW	MA EPH 5/2004
QA/QC Surrogates							
% 1-chlorooctadecane (aliphatic)	42		%	1	08/25/17	AW	40 - 140 %
% 2-Bromonaphthalene (Fractionation)	122		%	1	08/25/17	AW	40 - 140 %
% 2-Fluorobiphenyl (Fractionation)	122		%	1	08/25/17	AW	40 - 140 %
% o-terphenyl (aromatic)	41		%	1	08/25/17	AW	40 - 140 %

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

7 = This parameter is not certified by MA for this matrix.
B = Present in blank, no bias suspected.

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:

MAEPH:
1* Hydrocarbon range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.
2* C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH analytes eluting in that range.

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

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

Phyllis Shiller, Laboratory Director
August 30, 2017
Reviewed and Released by: Bobbi Aloisa, Vice President

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

August 30, 2017

QA/QC Data

SDG I.D.: GBY88127

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 398884 (mg/kg), QC Sample No: BY86133 (BY88127, BY88128, BY88129)														
Mercury - Soil	BRL	0.03	0.12	0.12	NC	82.6	87.9	6.2	85.2			75 - 125	20	
Comment:														
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 75-125%														
QA/QC Batch 398826 (mg/kg), QC Sample No: BY88092 (BY88127, BY88128, BY88129)														
ICP Metals - Soil														
Arsenic	BRL	0.61	2.11	4.04	NC	92.9			93.6			75 - 125	30	
Cadmium	BRL	0.30	0.84	1.26	NC	105			101			75 - 125	30	
Chromium	BRL	0.30	20.1	20.4	1.50	106			99.2			75 - 125	30	
Copper	BRL	0.30	37.0	43.6	16.4	111			117			75 - 125	30	
Lead	0.62	0.30	19.0	29.5	43.3	99.5			108			75 - 125	30	r
Nickel	BRL	0.30	14.5	12.5	14.8	106			101			75 - 125	30	
Zinc	BRL	0.30	82.4	104	23.2	102			118			75 - 125	30	

r = This parameter is outside laboratory RPD specified recovery limits.

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

August 30, 2017

QA/QC Data

SDG I.D.: GBY88127

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 399221 (mg/Kg), QC Sample No: BY88127 (BY88127, BY88128, BY88129)													
Phosphorus, Total as P	BRL	0.50	201	166	19.1	90.0						75 - 125	30
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 399288 (mg/kg), QC Sample No: BY88127 (BY88127, BY88128, BY88129)													
Tot.Org.Carbon	BRL	100	32000	30000	NC	96.7						75 - 125	30
Comment:													
MS is not reported for this batch due to high sample concentration.													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 398893 (), QC Sample No: BY88127 (BY88127, BY88128, BY88129)													
Total Solids	BRL	0.1	47.8	46.8	2.10	100						75 - 125	30
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													

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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

August 30, 2017

QA/QC Data

SDG I.D.: GBY88127

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 399141 (mg/kg), QC Sample No: BY88129 (BY88127, BY88128, BY88129)											
Extractable Petroleum Hydrocarbons - Sediment											
C11-C22 Aromatic Hydrocarbons 1	ND	3.3	80	62	25.4	72	61	16.5	40 - 140	25	
C19-C36 Aliphatic Hydrocarbons 1*	ND	3.3	85	65	26.7	70	74	5.6	40 - 140	25	r
C9-C18 Aliphatic Hydrocarbons 1*	ND	3.3	73	57	24.6	62	66	6.3	40 - 140	25	
Total TPH 1,2*	ND	3.3	80	62	25.4	70	65	7.4	40 - 140	25	
% 1-chlorooctadecane (aliphatic)	80	%	90	67	29.3	73	68	7.1	40 - 140	25	r
% 2-Bromonaphthalene (Fractionati	113	%	137	126	8.4	126	127	0.8	40 - 140	25	
% 2-Fluorobiphenyl (Fractionation)	114	%	141	122	14.4	126	130	3.1	40 - 140	25	l
% 2-Methylnaphthalene BT			0	0	NC				0 - 5		
% Naphthalene BT			0	0	NC				0 - 5		
% o-terphenyl (aromatic)	85	%	93	73	24.1	82	68	18.7	40 - 140	25	
Comment:											
Additional EPH fractionation criteria: Breakthrough criteria (BT) is 0 to 5%											
QA/QC Batch 398720 (ug/kg), QC Sample No: BY88550 (BY88127, BY88128, BY88129)											
Polynuclear Aromatic HC - Sediment											
2-Methylnaphthalene	ND	230	62	70	12.1	71	78	9.4	40 - 140	30	
Acenaphthene	ND	230	75	86	13.7	79	83	4.9	40 - 140	20	
Acenaphthylene	ND	230	68	77	12.4	74	75	1.3	40 - 140	30	
Anthracene	ND	230	79	85	7.3	83	86	3.6	40 - 140	30	
Benz(a)anthracene	ND	230	73	79	7.9	77	79	2.6	40 - 140	30	
Benzo(a)pyrene	ND	230	72	77	6.7	75	77	2.6	40 - 140	30	
Benzo(b)fluoranthene	ND	230	74	81	9.0	80	82	2.5	40 - 140	30	
Benzo(ghi)perylene	ND	230	74	79	6.5	72	78	8.0	40 - 140	30	
Benzo(k)fluoranthene	ND	230	75	79	5.2	79	84	6.1	40 - 140	30	
Chrysene	ND	230	80	87	8.4	83	85	2.4	40 - 140	30	
Dibenz(a,h)anthracene	ND	230	78	83	6.2	76	81	6.4	40 - 140	30	
Fluoranthene	ND	230	76	83	8.8	77	79	2.6	40 - 140	30	
Fluorene	ND	230	68	77	12.4	70	79	12.1	40 - 140	30	
Indeno(1,2,3-cd)pyrene	ND	230	77	82	6.3	77	82	6.3	40 - 140	30	
Naphthalene	ND	230	62	71	13.5	74	77	4.0	40 - 140	30	
Phenanthrene	ND	230	75	81	7.7	78	80	2.5	40 - 140	30	
Pyrene	ND	230	77	85	9.9	80	81	1.2	40 - 140	20	
% 2-Fluorobiphenyl	70	%	65	77	16.9	74	72	2.7	30 - 130	20	
% Nitrobenzene-d5	59	%	63	70	10.5	74	90	19.5	30 - 130	20	
% Terphenyl-d14	81	%	74	81	9.0	73	76	4.0	30 - 130	20	
QA/QC Batch 398933 (ug/Kg), QC Sample No: BY89110 2X (BY88127, BY88128, BY88129)											
Polychlorinated Biphenyls - Sediment											
PCB-1016	ND	33	82	73	11.6	74	87	16.1	40 - 140	30	
PCB-1221	ND	33							40 - 140	30	
PCB-1232	ND	33							40 - 140	30	
PCB-1242	ND	33							40 - 140	30	

QA/QC Data

SDG I.D.: GBY88127

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	88	79	10.8	84	93	10.2	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	106	%	103	91	12.4	95	105	10.0	30 - 150	30
% TCMX (Surrogate Rec)	97	%	91	82	10.4	81	95	15.9	30 - 150	30

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
r = This parameter is outside laboratory RPD 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
August 30, 2017

Wednesday, August 30, 2017

Criteria: None

State: MA

Sample Criteria Exceedances Report

GBY88127 - ESSGRPRI

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

August 30, 2017 SDG I.D.: GBY88127

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

EPH Fractionation Standard

SDG I.D.: GBY88127

Effective Date(s): 01/20/17 - 01/01/18 **Analyst:** aw

AS #	TV	20mL	21mL	22mL	23mL	% Rec1	% Rec2	% Rec3	% Rec4	Rec Limits
2-Methylnapthalene bt	0	0.00	0.00	0.00	0.00					
Napthalene bt	0	0.00	0.00	0.00	0.00					
C9 - Nonane	40	14.16	13.44	14.60	13.58	35.4	33.6	36.5	34.0	30-140
C-10 Decane	40	18.58	17.78	19.05	18.21	46.4	44.4	47.6	45.5	40-140
Napthalene	40	25.00	25.87	25.43	23.37	62.5	64.7	63.6	58.4	40-140
2-Methylnaphthalene	40	26.18	27.21	26.46	24.31	65.5	68.0	66.2	60.8	40-140
C12 - Dodecane	40	21.43	21.27	22.65	21.97	53.6	53.2	56.6	54.9	40-140
C9-C18 Aliphatic Group	240	133.52	131.41	135.35	133.85	55.6	54.8	56.4	55.8	40-140
2-Flourobiphenyl (surr)	20	15.59	16.75	15.98	14.87	78.0	83.7	79.9	74.3	40-140
Breakthrough	0	0.00	0.00	0.00	0.00					
Acenaphthalene	40	26.99	28.33	27.19	25.25	67.5	70.8	68.0	63.1	40-140
2-Bromonaphthalene (Surr)	20	15.51	17.08	16.16	15.13	77.6	85.4	80.8	75.7	40-140
Acenaphthene	40	27.34	28.74	27.36	25.19	68.3	71.9	68.4	63.0	40-140
C14 - Tetradecane	40	25.33	25.23	25.97	25.89	63.3	63.1	64.9	64.7	40-140
Fluorene	40	29.58	30.79	29.05	26.90	73.9	77.0	72.6	67.2	40-140
Spike Compounds Group 1		2.75	2.71	2.80	2.77					
C16 - Hexadecane	40	28.53	28.40	28.59	28.94	71.3	71.0	71.5	72.4	40-140
Aliphatic Targets		6.31	6.24	6.22	6.28					
Anthracene	40	30.03	30.93	28.67	26.54	75.1	77.3	71.7	66.4	40-140
Phenanthrene	40	29.81	30.51	28.45	26.26	74.5	76.3	71.1	65.7	40-140
o-Terphenyl (surr)	40	30.30	30.45	28.44	26.38	75.8	76.1	71.1	65.9	40-140
C18 - Octadecane	40	29.31	29.07	28.72	29.44	73.3	72.7	71.8	73.6	40-140
Fluoranthene	40	29.51	29.40	27.35	25.33	73.8	73.5	68.4	63.3	40-140
C19 - Nonadecane	40	28.35	28.26	27.75	28.57	70.9	70.6	69.4	71.4	40-140
Spike Compounds Group 2		3.55	3.53	3.42	3.51					
Pyrene	40	35.00	34.99	31.43	27.52	87.5	87.5	78.6	68.8	40-140
C11-C22 Aromatic Hydrocar	680	576.30	579.98	540.89	491.06	84.8	85.3	79.5	72.2	40-140
C20 - Eicosane	40	28.79	28.34	27.75	28.58	72.0	70.9	69.4	71.5	40-140
o-COD (surr)	40	26.22	24.31	25.01	27.50	65.6	60.8	62.5	68.8	40-140
C22 - Docosane	40	28.69	28.28	27.49	28.29	71.7	70.7	68.7	70.7	40-140
Benzo(a)anthracene	40	31.36	31.63	27.93	25.35	78.4	79.1	69.8	63.4	40-140
Chyrsene	40	28.76	27.61	27.17	25.12	71.9	69.0	67.9	62.8	40-140

EPH Fractionation Standard

SDG I.D.: GBY88127

Effective Date(s): 01/20/17 - 01/01/18 **Analyst:** aw

AS #	TV	20mL	21mL	22mL	23mL	% Rec1	% Rec2	% Rec3	% Rec4	Rec Limits
C24 - Tetracosane	40	28.24	27.89	26.87	27.59	70.6	69.7	67.2	69.0	40-140
Benzo(b/k)fluoranthene (c	80	59.97	59.71	55.02	50.90	75.0	74.6	68.8	63.6	40-140
Benzo(a)pyrene	40	30.21	29.62	27.67	25.89	75.5	74.1	69.2	64.7	40-140
C26 - Hexacosane	40	27.79	27.46	26.48	27.15	69.5	68.7	66.2	67.9	40-140
C28 - Octacosane	40	28.29	28.00	27.03	27.67	70.7	70.0	67.6	69.2	40-140
C19-C36 Aliphatic Group	320	253.33	245.48	237.44	244.19	79.2	76.7	74.2	76.3	40-140
Indeno/Dibenz(copk)	80	59.66	58.60	54.83	50.67	74.6	73.3	68.5	63.3	40-140
Benzo(ghi)perylene	40	29.70	29.23	27.40	25.33	74.3	73.1	68.5	63.3	40-140
C30 - Tricotane	40	27.67	27.52	26.51	27.13	69.2	68.8	66.3	67.8	40-140
C36 - Hexatriacontane	40	27.90	28.85	27.67	28.15	69.7	72.1	69.2	70.4	40-140

Notes: 40ppb (LCS) MAEPH fractionation test. 1-20ml hex, 2-21ml hex, 3-22ml hex, 4-23ml hex. 40-140% rec for all compounds except C-9 which is 30-140% Lot #:110916-990086

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

Temp: 2.3 °C Pg of

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

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:
☐ Fax #:
☑ Email: CNielsen@essgroup.com

Customer: ESS Group
Address: 16 Hemingway Drive
2nd Floor
East Providence, RI 02915

Project: WARNER'S Pond (C625-006)
Report to: Carl Nielsen
Invoice to: Barbara Cabral
Phone #: (401) 330-1244
Fax #:

Project P.O:

This section MUST be completed with Bottle Quantities.

Client Sample Information - Identification

Sampler's Signature: Date: 8-21-17

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

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	% Moisture	TOC	Metals (Pb, As, Cd, Cr, Cu, Ni, Hg, Zn)	PCB's	EPH with Target PAH	Total Phosphorus	Soil VOA Vials [ ] methanol [ ] H2O	GL Soil container (8) oz [ ] As is [ ] HCl ( ) oz	40 ml VOA Vial [ ] As is [ ] H2SO4	GL Amber 1000ml (8 oz) [ ] As is [ ] HCl	PL As is [1250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 1250ml [ ] 500ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria (as is)	Bacteria (w/thio)	1 gal bag
88127	SC9	SE	8-21-17	1055	X	X	X	X	X	X		1		1							1
88128	SC10	SE	8-21-17	1120	X	X	X	X	X	X		1		1							1
88129	SC11	SE	8-21-17	1155	X	X	X	X	X	X		1		1							1

Relinquished by:	Accepted by:	Date:	Time:
		8-22-17	10:00
		8/22/17	1420

Comments, Special Requirements or Regulations:
*Retain samples in case TCLP analysis is required based upon results. (Metals) Please provide interim report for metals to assist with determinations.

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

RI
☐ Direct Exposure (Residential)
☐ GW
☐ Other

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

MA
☐ MCP Certification
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: MA

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

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

* SURCHARGE APPLIES

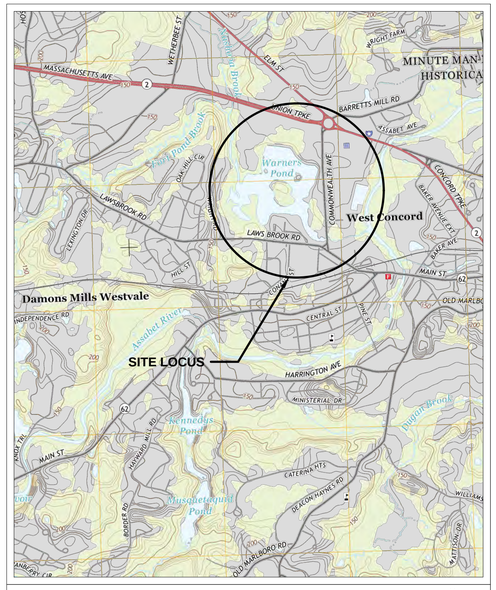
Appendix C

Dredging Plans

DREDGING PLANS FOR

WARNER'S POND
CONCORD, MASSACHUSETTS

MAY 2018



LOCATION MAP

NOT TO SCALE
SOURCE: USGS 2015

N

PREPARED FOR:

Town of Concord
22 Monument Square
Concord, Massachusetts 01742

PREPARED BY:

ess group
environmental consulting
& engineering services

100 Fifth Avenue, 5th Floor
Waltham, Massachusetts 02451
p 781.419.7696
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INDEX OF DRAWINGS

FOR DREDGING FEASIBILITY STUDY

GENERAL NOTES:

1. THE HORIZONTAL DATUM SHOWN HEREON IS THE NORTH AMERICAN DATUM OF 1983 (NAD-83) MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, FEET.
2. THE VERTICAL DATUM FOR TOPOGRAPHY SURROUNDING THE POND AND BATHYMETRY IN THE POND REFERENCES NAVD88. LiDAR WAS OBTAINED FROM MASSGIS, DATED 2013-2014.
3. POND BOTTOM CONTOURS ARE IN FEET AND WERE GENERATED USING AUTOCAD CIVIL 3D. DATA TO CREATE CONTOURS FROM WATER DEPTH MEASUREMENTS IN THE FIELD BY ESS GROUP, INC. ON AUGUST 10, 2017 AND IN 2011 AND CAN ONLY BE CONSIDERED TO REPRESENT CONDITIONS EXISTING AT THAT TIME. THE WATER SURFACE ELEVATION AT THE TIME OF FIELD MEASUREMENTS WAS 116.5 FEET AND ALL WATER DEPTHS ARE REFERENCED TO THIS ELEVATION.
4. PROPOSED DREDGE AND EXCAVATION CONTOURS SHOWN ARE APPROXIMATE. PROJECT OBJECTIVE IS TO DREDGE AND EXCAVATE ACCUMULATED SOFT SEDIMENT WITHIN PROJECT LIMITS AND CREATE A BASIN WITH A MAXIMUM DEPTH OF 9 FEET BELOW WATER SURFACE. CONTOURS SHOWN RESULT IN A DREDGE VOLUME OF APPROXIMATELY 35,735 CY.
5. FEMA FLOOD HAZARD ZONES FROM FEMA FIRM NO. 25017C0359F, EFFECTIVE DATE JULY 7, 2014.
6. TAX PARCEL DATA OBTAINED FROM MASSGIS, DATED 2017. PARCEL LINES ARE APPROXIMATE.
7. SEDIMENT DEWATERING TO OCCUR ON AGRICULTURAL FIELD (NORTHEAST CORRECTIONAL CENTER LAND) TO NORTHWEST OF POND AS SHOWN ON PLANS.

SEDIMENTATION & EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES, AS SPECIFIED ON THE DRAWINGS AS NECESSARY, AND AS REQUIRED BY THE PERMITS.
2. PERIMETER SOIL AND EROSION CONTROLS SHALL BE PLACED PRIOR TO ANY CONSTRUCTION ACTIVITIES. CONTRACTOR TO NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITIES. ALL SOIL AND EROSION CONTROLS SHALL BE CHECKED AND REPAIRED AS NECESSARY BY THE CONTRACTOR.
3. THE CONTRACTOR SHALL PROVIDE SUPPLEMENTAL EROSION CONTROL MEASURES TO PREVENT OFF-SITE TRANSPORT OF EARTH, SEDIMENT AND DEBRIS AS NECESSARY.
4. AREAS TO REMAIN UNSTABILIZED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED.
5. PERMANENT SEEDING SHALL OCCUR BETWEEN MARCH 1 AND JUNE 15, OR BETWEEN AUGUST 15 AND OCTOBER 15.
6. ALL STOCKPILE AREAS SHALL BE SURROUNDED BY EROSION CONTROL BARRIERS UNTIL SUCH TIME AS THE MATERIAL IS RESPREAD AND STABILIZED OR TRANSPORTED OFF-SITE.
7. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE SURROUNDED BY EROSION CONTROLS, TEMPORARILY SEEDED AND MULCHED.
8. TEMPORARY STOCKPILES OF DREDGED/EXCAVATED MATERIAL SHALL BE LOCATED ON-SITE, WITHIN THE DESIGNATED AREA(S). ANY MATERIAL NOT RE-USED ON-SITE SHALL BE TRUCKED TO AN ACCEPTABLE OFF-SITE DISPOSAL LOCATION IN ACCORDANCE WITH THE PROJECT'S PERMITS.
9. EROSION CONTROL MEASURES SHALL BE INSPECTED DAILY AND DURING AND AFTER EVERY RAIN EVENT. ANY NECESSARY REPLACEMENT OR REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR.
10. DUST SHALL BE CONTROLLED IN ACCORDANCE WITH THE SPECIFICATIONS AND APPLICABLE REGULATIONS.
11. THE CONTRACTOR SHALL PHASE DREDGING OPERATIONS TO MINIMIZE THE AREA DISTURBED OR OPEN TO THE ELEMENTS AT ANY GIVEN TIME.
12. BEST MANAGEMENT PRACTICES SHALL BE DEPLOYED TO MINIMIZE TURBIDITY. AT A MINIMUM, A SILT CURTAIN SHALL BE USED DOWNCURRENT OF THE CONSTRUCTION AREA.
13. THE SITE SHALL BE LEFT IN A STABLE CONDITION AT THE CLOSE OF EACH DAY.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO EXCAVATION IN ACCORDANCE WITH COMMONWEALTH OF MASSACHUSETTS, GENERAL LAWS C39-1.2.
2. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES AND UTILITY COMPANIES, IN WRITING, 48 HOURS PRIOR TO ANY WORK WITHIN 15 FEET OF A UTILITY LINE.
3. THE CONTRACTOR SHALL, UNDER THE DIRECTION OF THE ENGINEER, ESTABLISH "CONSTRUCTION LIMITS" ON THE SITE BY ACCEPTABLE VISIBLE MARKERS. ALL WORK AND EQUIPMENT SHALL BE CONFINED TO WITHIN THESE LIMITS, UNLESS OTHERWISE SPECIFICALLY AUTHORIZED.
4. NO CHANGES ARE TO BE MADE UNLESS AUTHORIZED BY ENGINEER AND/OR APPLICANT/OWNER.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC.
6. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, STREETS, PAVEMENTS, HIGHWAY GUARDS, CURBING, EDGING, TREES, PLANTINGS, STRUCTURES, PIPES, ETC. ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AT HIS/HER OWN EXPENSE AS REQUIRED BY THE ENGINEER OR OWNER ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
7. THE CONTRACTOR SHALL DISPOSE OF ALL STUMPS, RUBBISH AND DEBRIS IN ACCORDANCE WITH THE SPECIFICATIONS AND ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACTOR SHALL LEAVE THE PROJECT SITE IN SAFE AND CLEAN CONDITION UPON COMPLETION OF DREDGING OPERATIONS.
8. THE CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
9. ALL SURFACES DISTURBED BY THIS WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AS DETAILED OR AS SPECIFIED BY THE ENGINEER.
10. DREDGING SEQUENCE SHALL BE COORDINATED TO MINIMIZE DISTURBANCE OF EXISTING CONDITIONS AND OPERATIONS.
11. DREDGING SHALL TAKE PLACE WITHIN APPROVED WORK WINDOWS.
12. ALL EXISTING PIPING AND STRUCTURES EXPOSED DURING EXCAVATION SHALL BE ADEQUATELY SUPPORTED, BRACED, OR OTHERWISE PROTECTED DURING DREDGING ACTIVITIES.
13. ALL NECESSARY FEES AND PERMITS SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
14. WORK SHALL COMPLY WITH APPLICABLE MUNICIPAL, STATE, AND FEDERAL PERMITS AND REQUIREMENTS.
15. THE CONTRACTOR SHALL OBTAIN AND COMPLY WITH ALL AUTHORIZATIONS NECESSARY FOR CONSTRUCTION AND DREDGE MATERIAL TRANSPORT VEHICLE ENTRY/EXIT/TRAVEL ON STATE AND LOCAL ROADS.
16. NO DREDGED MATERIAL CONTAINING FREE DRAINING LIQUIDS (AS DETERMINED BY THE EPA PAINT FILTER TEST) SHALL BE TRANSPORTED OVER STATE OR LOCAL ROADS.

UTILITIES NOTES:

1. BEFORE COMMENCEMENT OF DREDGING, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAKING ALL NECESSARY ARRANGEMENTS AND FOR PERFORMING ANY NECESSARY WORK INVOLVED IN CONNECTION WITH THE DISCONTINUANCE OR JURISDICTION OF THE UTILITY COMPANIES, SUCH AS ELECTRICITY, TELEPHONE, WATER, GAS AND ANY SYSTEM OR SYSTEMS WHICH WILL BE AFFECTED BY THE WORK TO BE PERFORMED UNDER THIS CONTRACT.
2. UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER OR OWNER, THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES.
3. IF REQUIRED, OVERHEAD LINES SHALL BE RELOCATED BY THE UTILITY COMPANY AT THE CONTRACTOR'S EXPENSE.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER AND OWNER FOR RESOLUTION OF THE CONFLICT.

FOR DREDGING FEASIBILITY STUDY

ESS group
environmental consulting & engineering services

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No.	REVISION	DATE	APP BY
DRAWN BY: SJC		CHECKED BY: PRW	
DESIGNED BY: SJC		APPROVED BY: PRW	

TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

WARNER'S POND
DREDGING
GENERAL NOTES

PROJECT No.: C625-000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	N-1
SHEET No.: 1 OF 9	
SCALE:	

FOR DREDGING FEASIBILITY STUDY

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No.	REVISION	DATE	APP BY

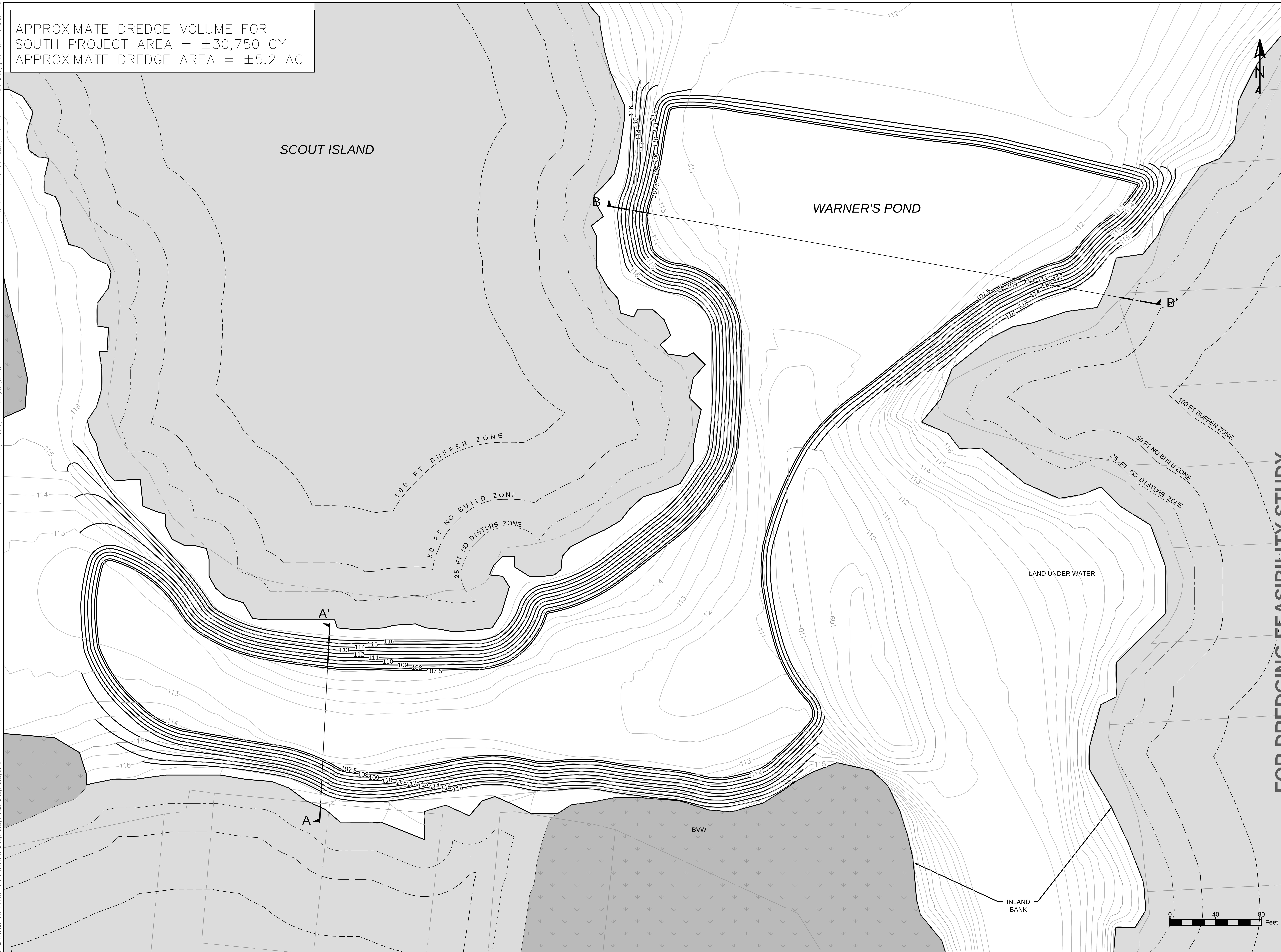
DRAWN BY: SJC	CHECKED BY: PRW
DESIGNED BY: SJC	APPROVED BY: PRW

TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

WARNER'S POND
DREDGING
SITE PLAN

PROJECT No.: C625-000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	**S-1**
SHEET No.: 2 OF 9	
SCALE: 1" = 100'	

APPROXIMATE DREDGE VOLUME FOR
SOUTH PROJECT AREA = ±30,750 CY
APPROXIMATE DREDGE AREA = ±5.2 AC



FOR DREDGING FEASIBILITY STUDY

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Waltham, Massachusetts 02451
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No.	REVISION	DATE	APP BY

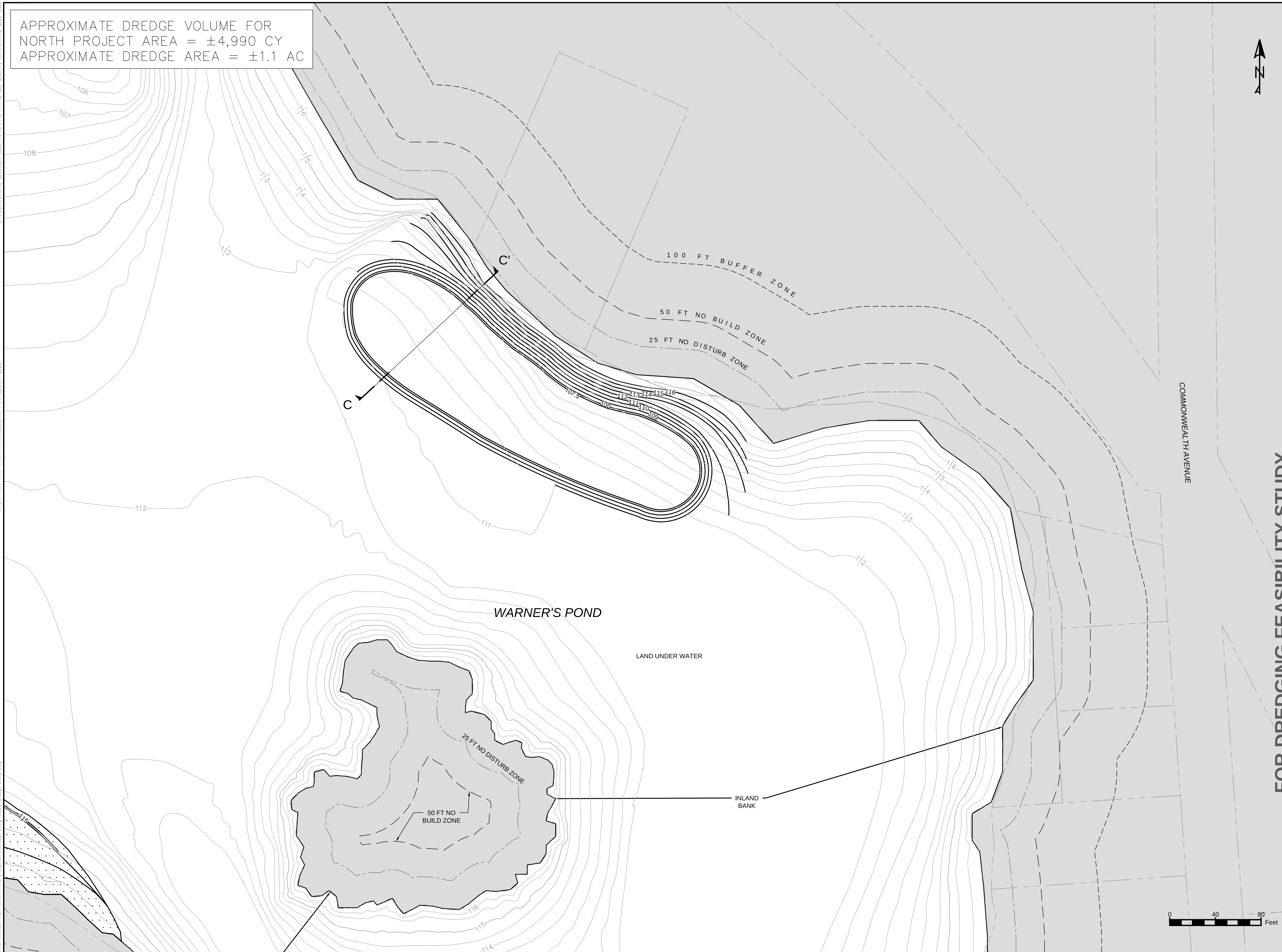
DRAWN BY: SJC	CHECKED BY: PRW
DESIGNED BY: SJC	APPROVED BY: PRW

TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

WARNER'S POND
SOUTH PROJECT AREA
PROPOSED DREDGING

PROJECT No.: C625–000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	D-1
SHEET No.: 3 OF 9	
SCALE: 1" = 40'	

APPROXIMATE DREDGE VOLUME FOR
NORTH PROJECT AREA = ±4,990 CY
APPROXIMATE DREDGE AREA = ±1.1 AC



FOR DREDGING FEASIBILITY STUDY

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p 781.419.7696
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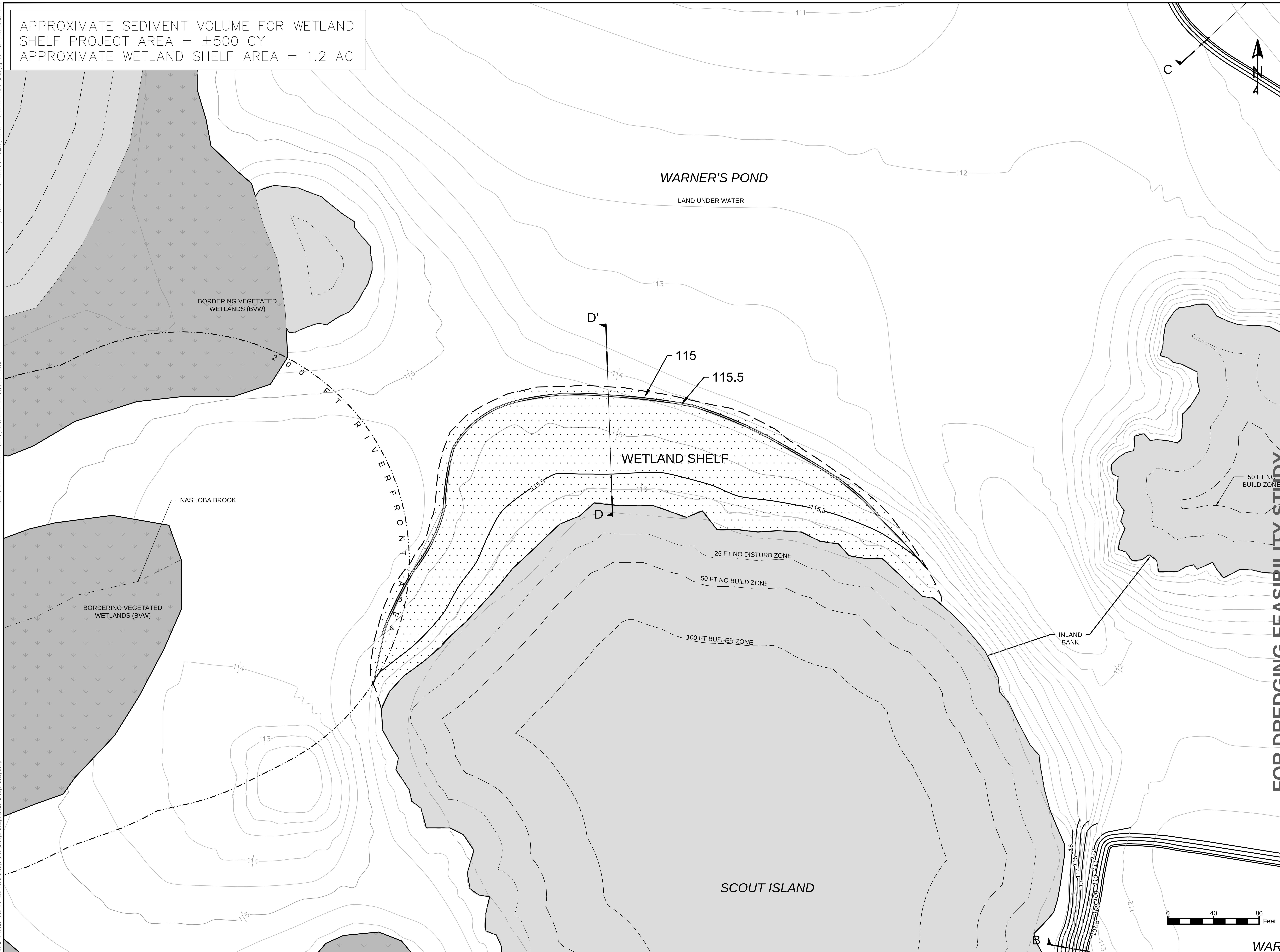
No.	REVISION	DATE	APP BY
DRAWN BY: SJC		CHECKED BY: PRW	
DESIGNED BY: SJC		APPROVED BY: PRW	

TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

WARNER'S POND
NORTH PROJECT AREA
PROPOSED DREDGING

PROJECT No.: C625-000.05
DATE OF ISSUE: MAY 2018
SHEET No.: 4 OF 9
SCALE: 1" = 40'

DRAWING No.
D-2



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WARNER'S POND
PROPOSED
WETLAND SHELF

PROJECT No.: C625-000.05
DATE OF ISSUE: MAY 2018
SHEET No.: 5 OF 9
SCALE: 1" = 40'

DRAWING No.
D-3

FOR DREDGING FEASIBILITY STUDY

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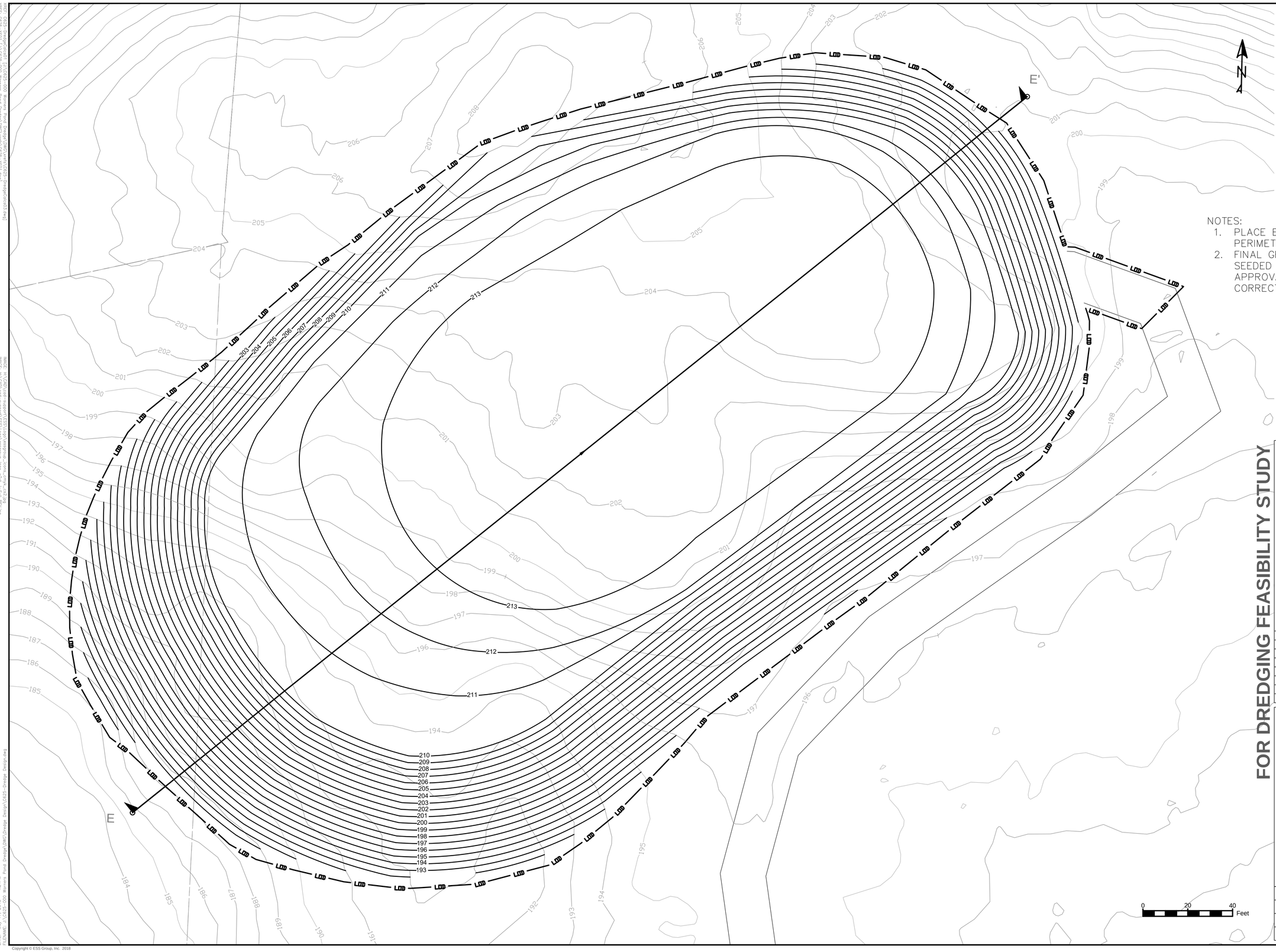
WARNER'S POND
DREDGE MATERIAL
MANAGEMENT PLAN

PROJECT No.: C625–000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	**D-4**
SHEET No.: 6 OF 9	
SCALE: 1" = 300'	



NOTES:
1. PLACE EROSION CONTROLS ALONG LOD PERIMETER.
2. FINAL GRADED DISPOSAL AREA TO BE SEEDED WITH SEED MIX MEETING APPROVAL OF NORTHEASTERN CORRECTIONAL CENTER.

FOR DREDGING FEASIBILITY STUDY

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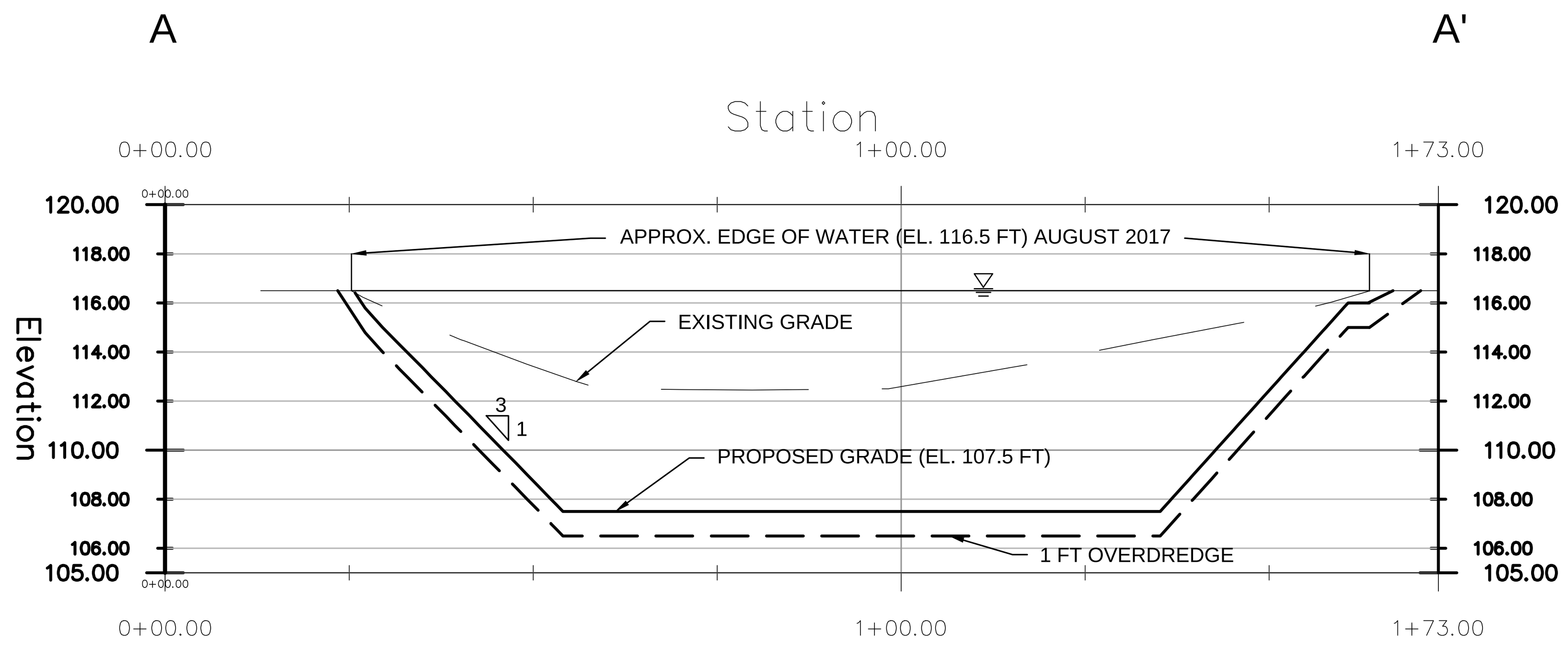
TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

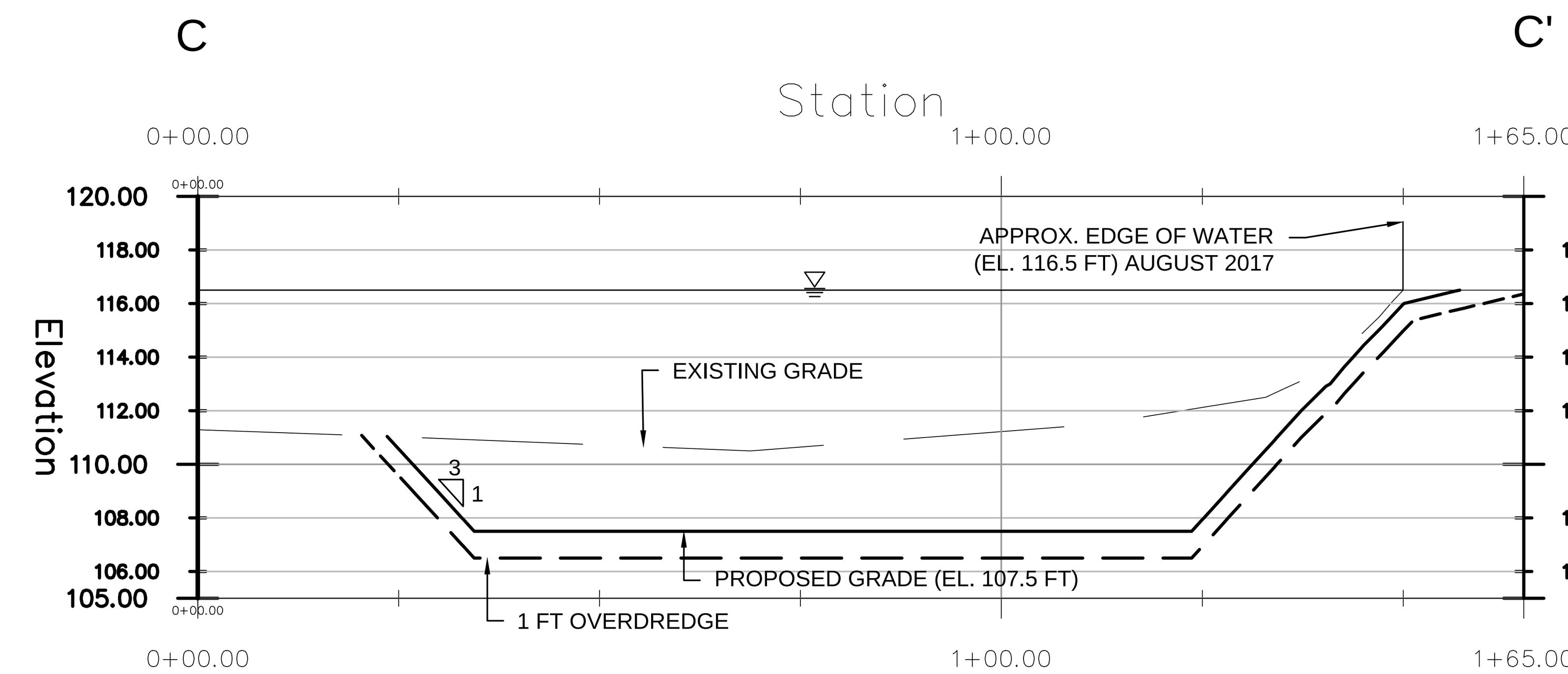
WARNER'S POND
DREDGE MATERIAL
DISPOSAL SITE

PROJECT No.: C625-000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	**D-5**
SHEET No.: 7 OF 9	
SCALE: 1" = 20'	



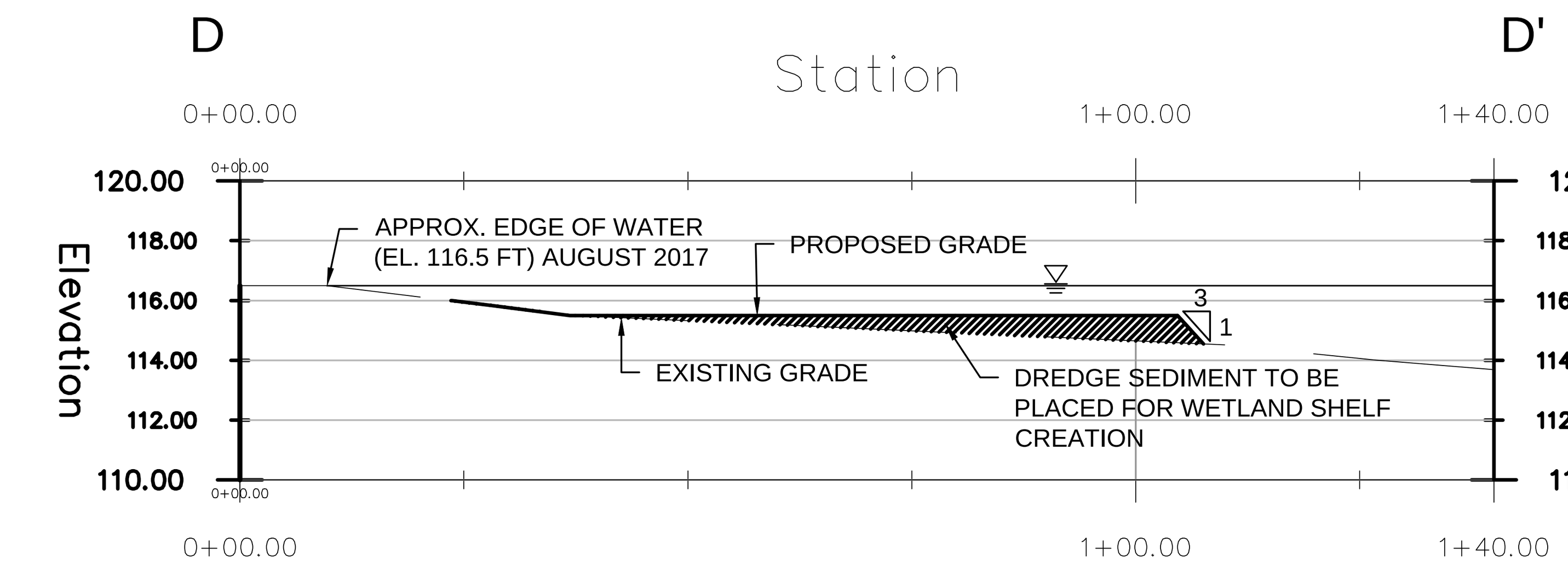
SECTION A-A'

0 20 40 HORIZONTAL
0 6 12 VERTICAL
SCALE IN FEET



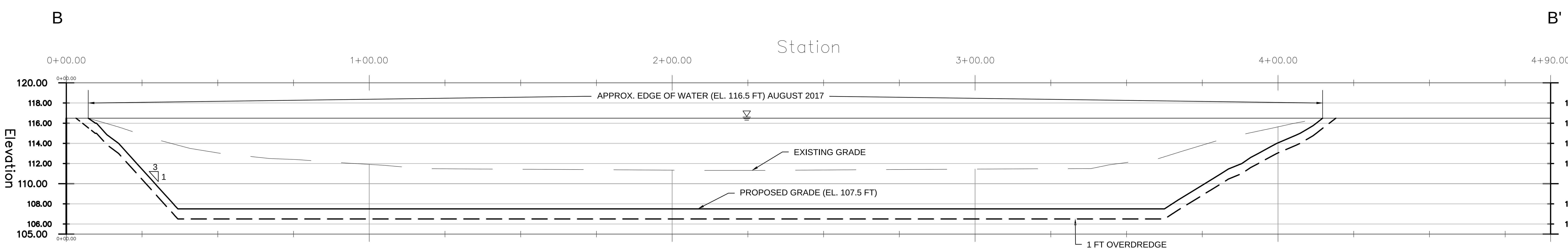
SECTION C-C'

0 20 40 HORIZONTAL
0 6 12 VERTICAL
SCALE IN FEET



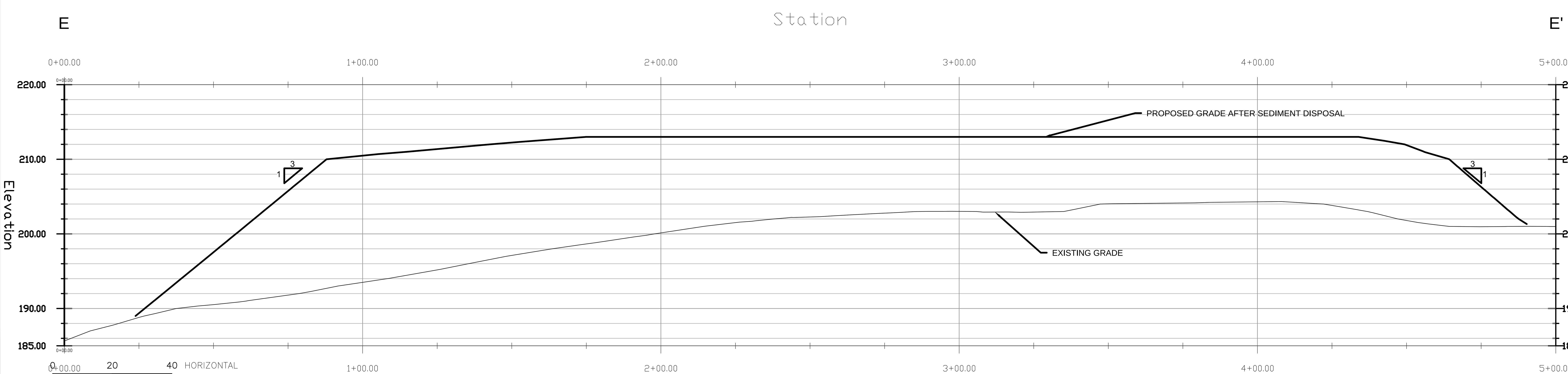
0 20 40 HORIZONTAL
0 6 12 VERTICAL
SCALE IN FEET

SECTION D-D'



0 20 40 HORIZONTAL
0 6 12 VERTICAL
SCALE IN FEET

SECTION B-B'



0 20 40 HORIZONTAL
0 8 16 VERTICAL
SCALE IN FEET

SECTION E-E'

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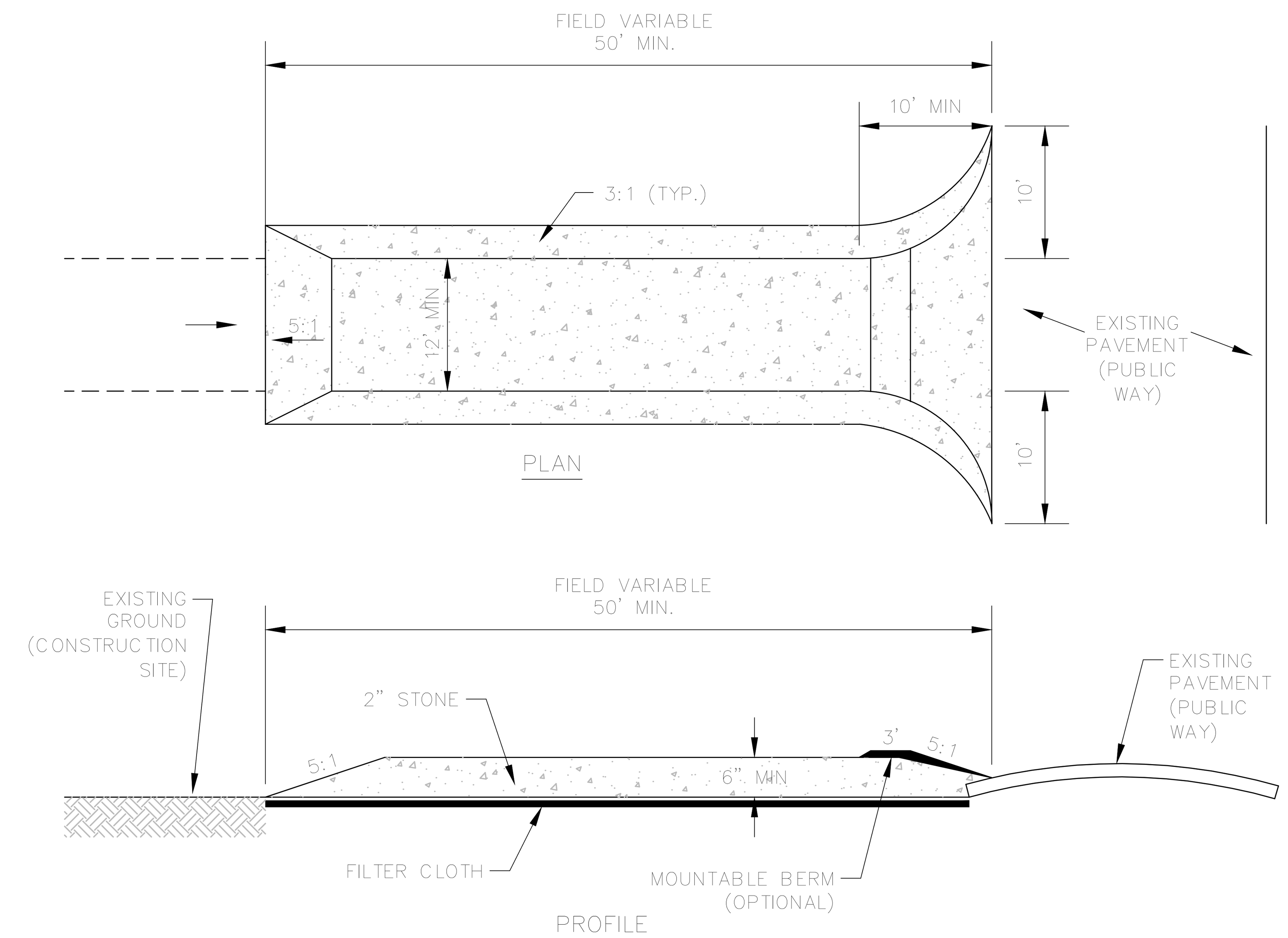
TOWN OF CONCORD
WARNER'S POND
CONCORD, MA

WARNER'S POND
PROJECT COMPONENT
SECTIONS

PROJECT No.: C625-000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	D-6
SHEET No.: 8 OF 9	
SCALE: AS SHOWN	

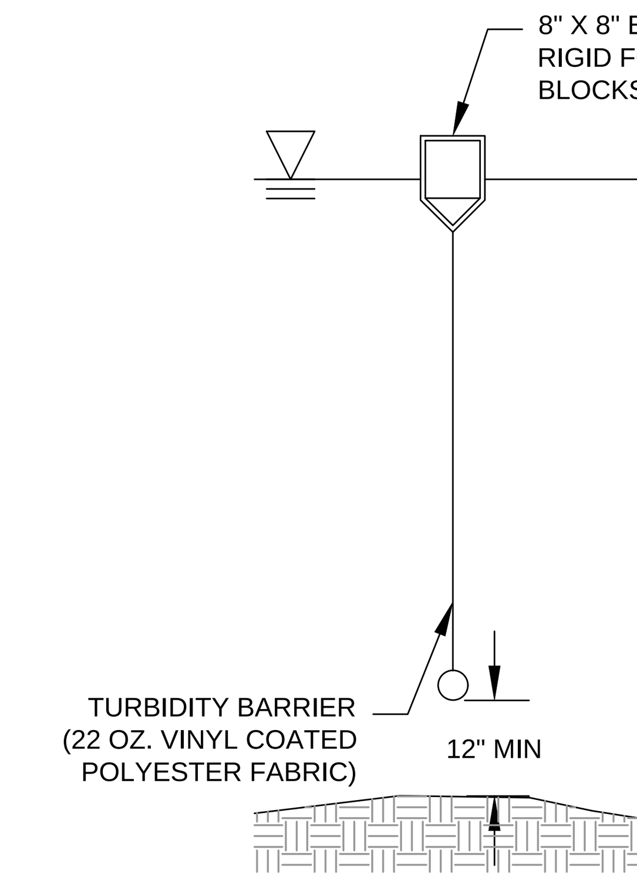


CONSTRUCTION SPECIFICATIONS:

1. USE 2" DIAMETER STONE OR RECLAIMED/RECYCLED CONCRETE EQUIVALENT.
2. RECOMMENDED LENGTH GREATER THAN 50 FEET WHERE PRACTICAL.
3. THICKNESS NOT LESS THAN 6 INCHES.
4. 12-FOOT MINIMUM WIDTH, BUT NOT LESS THAN FULL WIDTH AT POINTS WHERE INGRESS AND EGRESS OCCUR.
5. FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION EGRESS SHALL BE PIPED ACROSS THE EGRESS. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WILL BE PERMITTED.
7. EGRESS SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED BY THE CONTRACTOR.
9. REMOVE STABILIZED CONSTRUCTION EGRESS PRIOR TO PLACEMENT OF HOT MIX ASPHALT PAVEMENT.

STABILIZED CONSTRUCTION EGRESS

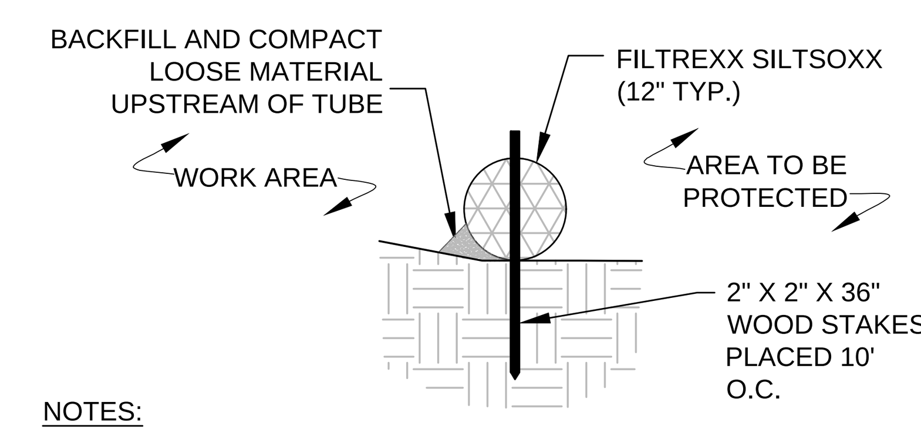
NOT TO SCALE



NOTES:
1. TURBIDITY BARRIER AND ANCHORING SYSTEM TO BE DESIGNED FOR PROJECT SITE.

TURBIDITY BARRIER

NOT TO SCALE

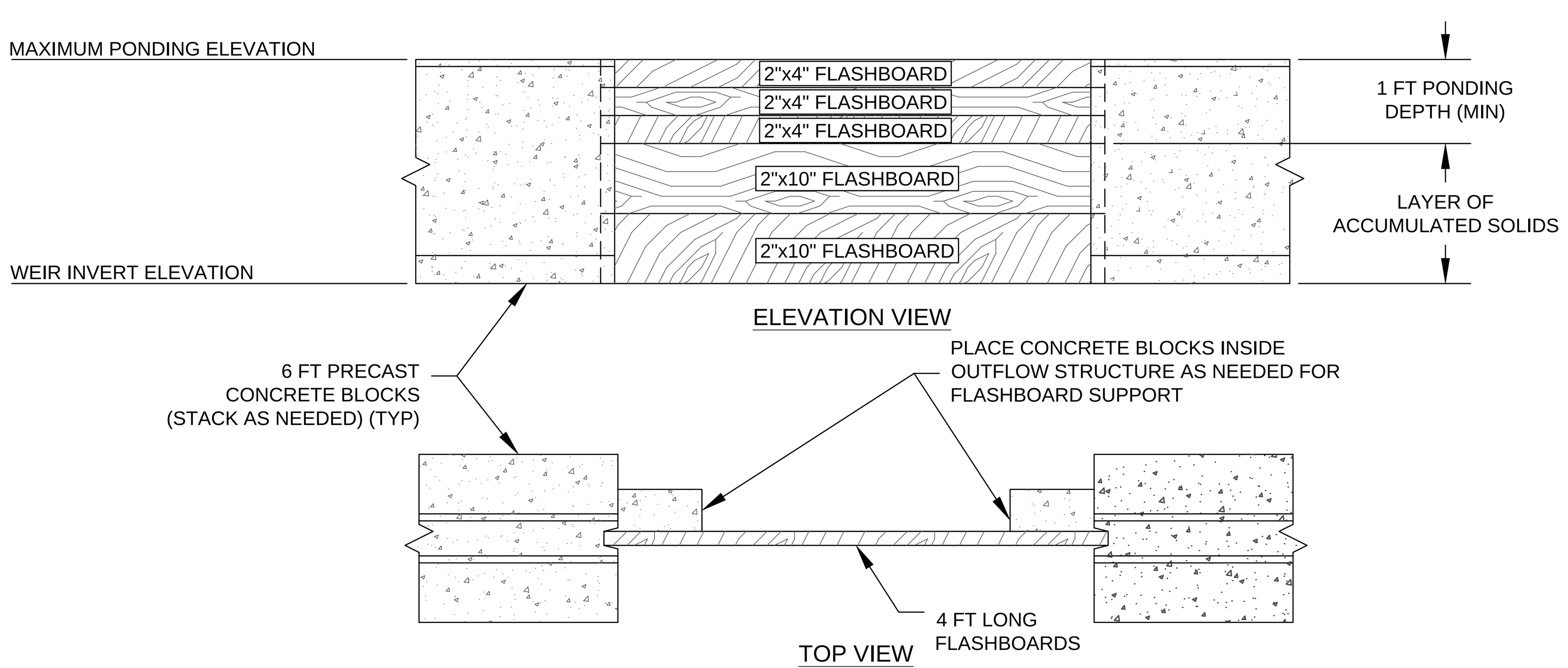


NOTES:

1. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
2. SILTSOXX TO BE LEFT IN PLACE ONCE CONSTRUCTION IS COMPLETE.

FILTREXX SILTSOXX ™ DETAIL

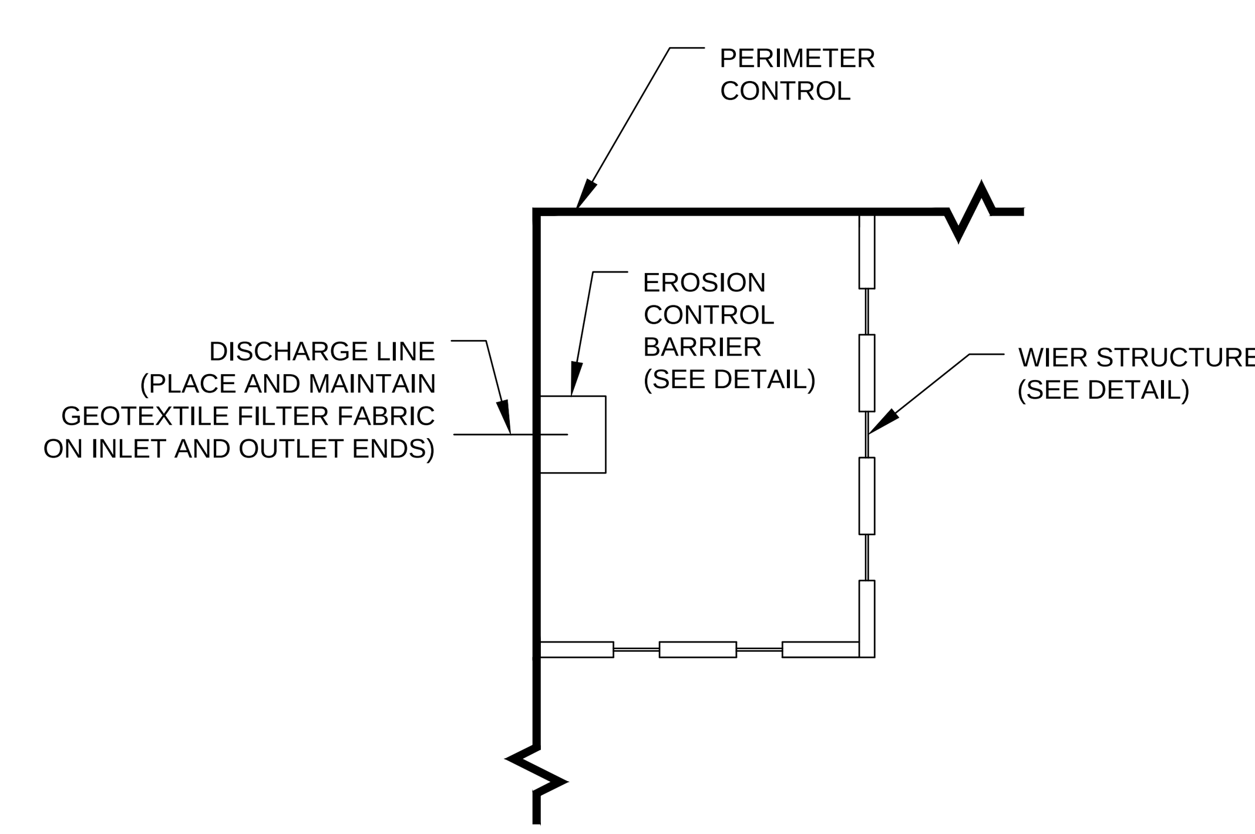
NOT TO SCALE



NOTE: FLASHBOARD SIZES ARE NOMINAL DIMENSIONS.

DEWATERING AREA WEIR STRUCTURE

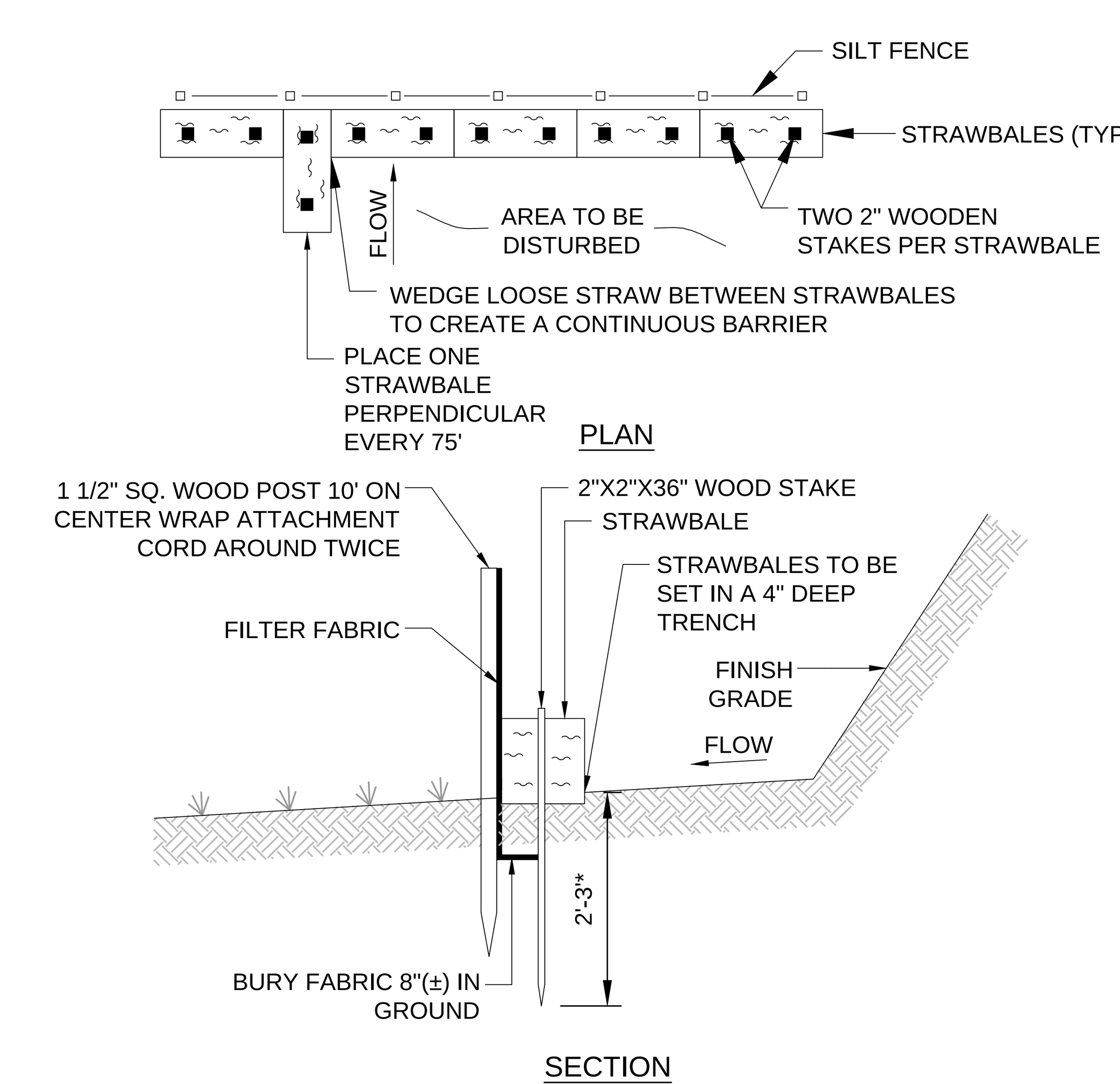
NOT TO SCALE



NOTE: PROVIDE MINIMUM WIER EFFECTIVE LENGTH OF 30 FT.

DEWATERING AREA OUTFLOW STRUCTURE

NOT TO SCALE

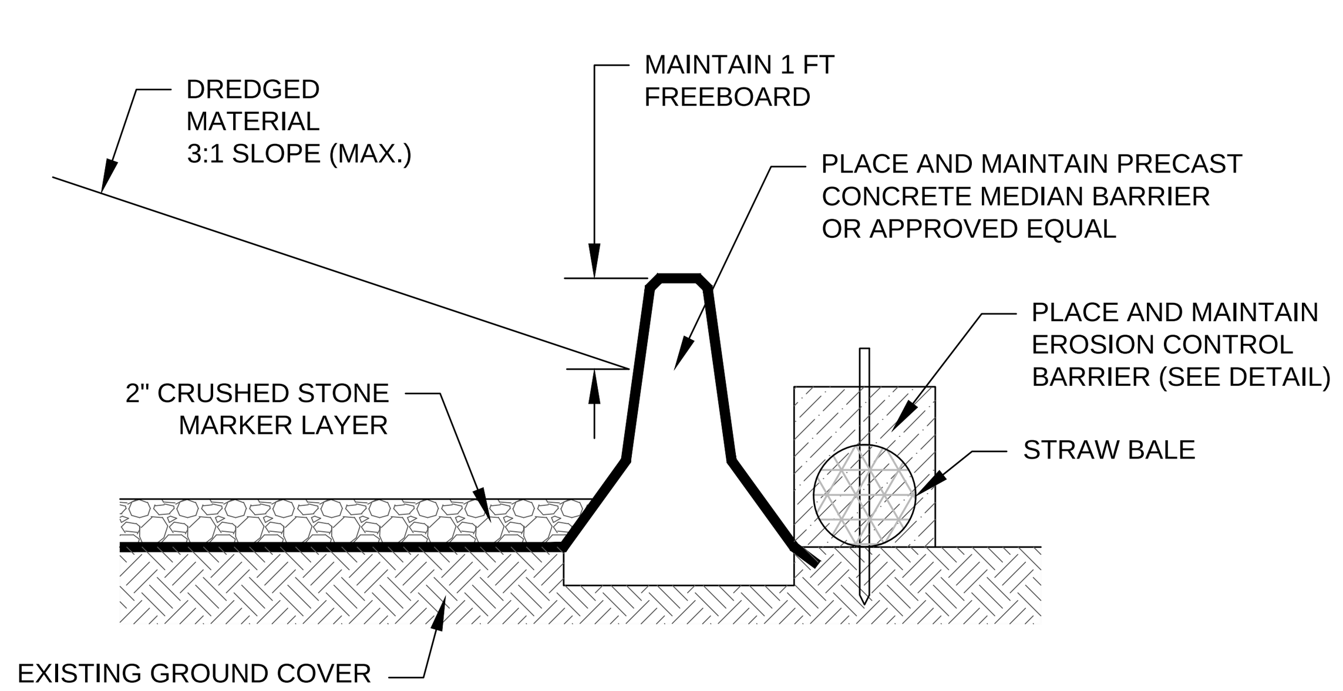


NOTE:

* = DEPTH TO BE 2' UNLESS POST IS TO BE SET IN PEAT; IN PEAT DRIVE BEYOND 2' DEPTH BY HAND TO REFUSAL OR 3' MAX.

STRAWBALES AND SILT FENCE (EROSION CONTROL BARRIER)

NOT TO SCALE



DEWATERING AREA PERIMETER CONTROL

NOT TO SCALE

FOR DREDGING FEASIBILITY STUDY

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CONCORD, MA

WARNER'S POND
DREDGING
DETAILS

PROJECT No.: C625-000.05	DRAWING No.
DATE OF ISSUE: MAY 2018	D-7
SHEET No.: 9 OF 9	
SCALE: AS SHOWN	

Appendix D

Permit Schedule

Permitting Timeline for Warner's Pond in Concord, MA

Permit	Milestone	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019
Project narrative	Prepare master project narrative	■													
	Provide project narrative for client review	•													
	Client review of project narrative	■													
	Prepare final master project narrative	■													
MEPA ENF	Prepare MEPA ENF	■													
	File MEPA ENF	•													
	Review period (estimated)		■	■											
	MEPA site visit		•												
	Secretary's certificate issued			•											
Notice of Intent	Prepare NOI	■													
	File NOI		•												
	Review period (estimated)		■	■	■										
	Conservation Commission hearing (first)			•											
	Conservation Commission hearing (second)				•										
	Order of Conditions issued				•										
Section 401 Water Quality Certification	Prepare 401 WQC	■													
	File 401 WQC		•												
	Review period (estimated)		■	■	■	■	■	■	■	■	■				
	401 Water Quality Certification issued										•				
Chapter 91, Massachusetts Public Waterfront Act	Prepare Ch. 91	■													
	File Ch. 91		•												
	Review period (estimated)		■	■	■	■	■	■	■	■	■				
	Ch. 91 Certification issued										•				
US Army Corps of Engineers	Prepare USACE application	■													
	File USACE application		•												
	Review period (estimated)		■	■	■	■	■								
	Permit issued						•								
NPDES Permitting	Prepare NPDES permit application	■													
	File NPDES permit application		•												
	Review period (estimated)		■	■	■	■	■	■	■	■	■	■	■	■	■
	Permit issued														•