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EXECUTIVE SUMMARY

Bioengineering Group, Inc (BioGroup), was contracted by the City of Peabody during the summer of 2008 to conduct a study aimed at determining potential dewatering locations and dewatering methods necessary for the dredging of ~90,000 CY of sediment to occur at Crystal Lake and Elginwood Pond. The primary objectives of this project were to:

1. Develop a base-map that identifies existing roads, waterbodies, open space (parks and forest), vegetation, and developed parcels in the vicinity of Crystal Lake and Elginwood Pond,

2. Evaluate select dewatering locations based on accessibility, safety, and security,

3. Evaluate dewatering methodologies and generate a cost estimate and construction and dewatering timeline,

4. Prepare a conceptual design for select dewatering sites including access, security, and other infrastructure components,

5. Determine necessary permits and timeline for permitting approval.

Based on analysis of potentially available dewatering locations, the BioGroup identified four (4) sites for further analysis and evaluation (see Appendix B):

1. A section of recreational fields behind the Covenant Christian School adjacent to Elginwood Pond

2. The parking lot and playing fields adjacent to the Kiley School

3. Along Crystal Drive and the bikeway that is currently under construction

4. Gravel pits located in the adjacent wooded area.

5. A parking area adjacent to the recreational fiends behind the Covenant Christian School.

The BioGroup also performed an analysis of potential dewatering technologies including:

1. Dewatering lagoons

2. Geotextile bags

3. Filter Belt Press Dewatering

4. Vacuum Dewatering

5. In-Place dewatering

Evaluations of these technologies are summarized in the table on the following page.

DEWATERING ALTERNATIVES

Alternatives	Area1 Requirements[1] (acres)	Cost[1,2] ($ mil)	Timeline[1] (months)	Operation Requirements	Positive Aspects	Negative Aspects
Passive Dewatering-Lagoon(s)	18 + 1 (Staging)	4	14	• Access road • Dike construction • Excavation of ~3.5 – 4' for lagoon construction	• No effluent treatment required[4] • Technologically simple	• Long Duration • Land Clearing • Large Footprint • Habitat Impact • Cost Setup High • Require excavation prior to reuse
Geotextile bags	11 + 1 (Staging)	3.3 + Filtrate Treatment	14	• Access road • Polymer addition • Capture Berm • Filtrate Treatment (TSS)	• Minimum rewetting by rainwater • Minimum Energy requirements	• Large Footprint • Long duration • Cost relatively high • Require excavation prior to reuse • Requires >32° F Temp
Filter Belt Press Dewatering (4 filter presses)	0.2 + 1 (Staging)	2.5 + Filtrate treatment + Transport	14	• Access road • Screening • Hydro-cyclone and Shakers • Filter belt press • Polymer addition • Floating silt curtain • Occasional dredge to remove residual solids • Truck traffic (10-12 trucks/day) • Filtrate Treatment (TSS)	• Small Footprint • Little site preparation required	• Duration • Energy requirements relatively high • Environmental Noise
Vacuum Dewatering	0.5 + 1 (Staging)	2 + Transport[3]	6	• Access road • Screening • Hydro-cyclone and Shakers • Polymer addition • Vacuum dewatering • Truck traffic (20 trucks/day)	• Small Footprint • Short duration • Cost • Little req. pre-dewatering construction • Relatively quiet • No additional filtrate treatment	• Relatively new technology • Energy requirements relatively high

[1] Area requirements, cost estimates and timelines are based on a total of 90,000 cy of dredge material (amount derived from previous study estimates – see Section 3.1.1).
[2] Costs estimates include dredging cost. Costs estimates do not include permitting, design, construction oversight, or monitoring (Source: Vetter, 2008).
[3] Assumes $600,000.00 for dredging
[4] Assumes all filtrate to be infiltrated or evaporated
*Note: Because of the severity of environmental impact associated with In-Place dewatering, it was not considered to be a viable dewatering alternative and does not appear on this table.

From this report, the vacuum dewatering method was determined to be the best method for dewatering dredge material from Crystal Lake and Elginwood Pond. Given the relatively small footprint, relatively short duration and relatively low cost when compared to other technologies, it appears to be the most appropriate technology for the City of Peabody. Additionally, the parking area adjacent to the recreation field is the most suitable dewatering location. The parking area is City owned, paved and close to Elginwood Pond making it the most cost effective for dewatering operations.

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to identify and evaluate dewatering methods and locations for the Crystal Lake and Elginwood Pond dredging project in the City of Peabody, Massachusetts. This report also serves to provide estimates for cost and feasibility using dredge and dewatering methods including both passive and mechanical technologies.

This is a conceptual design plan that represents an initial assessment of dewatering locations and methods. These preliminary designs must be verified during design development when detailed information regarding topography, groundwater, and jurisdictional resource areas are available.

1.2 Goals

The goals of this project include:

(1) Generation of conceptual design plans

(2) Identify potential dewatering locations and methods

(3) Provide cost estimates of dredging and dewatering operations

(4) Identify necessary permits

(5) Develop a timeline to implement dewatering strategies

1.3 Issues

(1) Current proposed dewatering method is cost-prohibitive for the City of Peabody

(2) Limited space available to perform dewatering operation due to land ownership, topography, land use, and regulatory restraints

2.0 BACKGROUND

Documented limnological and watershed assessments for Crystal Lake and Elginwood Pond were first conducted in 1995 when Fugro East, Inc. of Northborough, MA evaluated the water bodies' important limnological parameters, as well as their watersheds, for water and pollutant contribution (Fugro, 1995). In 1997, a Conservation Commission Ad Hoc Committee consisting of the Chairman (at the time) and 3 Commissioners submitted an executive summary for the dredging of the two water bodies to the Mayor, City Council, the Conservation Commission, the Parks and Recreation Department, Department of Public Services, and the Northeast Massachusetts Mosquito Control and Wetlands Management District (Bellavance, et al, 1997).

The primary objectives proposed by the Peabody Conservation Commission ad hoc committee dredging plan were to develop an approach to:

(1) Minimize environmental impacts within and adjacent to the ponds, both during and following dredging operations,

(2) Provide buffer zones to protect wildlife,

(3) Improve circulation within the water bodies,

(4) Improve recreational opportunities within and around the water bodies, and

(5) Prepare a realistic procedure for dredging and provisions for deeper dredging if additional backfill material is required

As a component to their dredging plan, the ad hoc committee developed an approximate proposed limit of dredging for the two water bodies that would result in a minimum 8' water depth. Proposed reuse options for dredge material included landfilling, transport for use as backfill at the Peabody Municipal Golf Course, or selling to potential buyers. The ad hoc committee also recognized opportunities for improving the publicly owned shoreline areas.

During September of 1997, ENSR on behalf of the City of Peabody submitted an ENF to the Executive Office of Environmental Affairs (now Executive of Energy and Environmental Affairs (EOEEA), two subsequent Notices of Project Changes (NOPC) were submitted during June of 1999 and again in November of 2001. During January of 2001, an NOPC was submitted to the EOEEA, which detailed project scope and provided a comprehensive review of pertinent impacts to the surrounding area (resource area, wildlife, traffic, etc.). The aim of these reports was to cumulatively assess the most feasible technologies for dredging and dewatering pond sediments with the ultimate objective of improving recreational opportunities, fisheries habitats, and the aesthetics of the two water bodies and adjacent natural resource areas. Feasibility was assessed based on project cost and duration, impacts to resource areas, as well as aesthetic impacts.

The 2001 NOPC, (the final report to EOEEA from ENSR on behalf of the City of Peabody) proposed to remove sediment from the two waterbodies using hydraulic dredging techniques and belt filter press technology to dewater sediment. The chosen proposed reuse alternative was as a topsoil/topsoil amendment at the GCR Landfill in Peabody. Dewatered sediment would be trucked directly from the dewatering operation to the reuse site. There, sediment would be stockpiled for use as topsoil or topsoil amendment over the landfill as part of the landfill closure capping process. The 2001 NOPC also provided a comprehensive watershed management plan including structural, procedural, educational, and regulatory controls to mitigate pollutant loading to the ponds following completion of the dredge/dewater operations.

3.0 SITE ASSESSMENT

3.1 Existing Conditions

Crystal Lake and Elginwood Pond are two small water bodies (each ~9.5 acres in surface area) located in West Peabody adjacent to Lowell Street. According to limnological investigation performed by Fugro East, Inc. in 1995, the mean depth of the Crystal Lake was 2.08 feet with the

maximum depth of 4 feet, while the mean depth of Elginwood Pond was 0.85 feet with the maximum depth of 4 feet (Fugro East, Inc. 1995).

A recent study by Geosyntec Consultants (Geosyntec, 2008) yielded similar results where Crystal Lake was found to be generally shallow throughout (mean water depth of 2.7 feet), gradually sloping to an area near the pond center where maximum water depth ~4.5 feet. Elginwood Pond was found to have an average depth of 1.1 feet with the deepest section located near the Pond's outlet at Cobb Avenue with a depth of 4.3 feet. The entire southern half of Elginwood Pond is <1.5 feet deep with ~75% of the Pond <2 feet deep.

3.1.1 Crystal Lake and Elginwood Pond Sediment Profile and Characteristics

During the late summer and fall of 1995, Fugro East, Inc. (Fugro, 1995) performed physical and chemical analyses of the sediments from both water bodies. Analysis revealed acceptable concentrations of metal, hydrocarbon impact to sediments in both ponds as relates to the dredging and disposal (Per DEP criteria). These results were later qualified by ENSR (ENSR, 2000), who expanded analyses to include several other parameters. Particle size analysis indicated that sediments in both ponds are comprised by predominantly silt- and clay-sized with lesser amounts of sand. Analysis also characterizes the sediments with a high moisture content– 89% for Crystal Lake and 81% for Elginwood Pond. Furgo, 1995 estimated that the total approximate volume of soft sediment to be removed from Crystal Lake and Elginwood Pond if dredging were to occur to be ~67,121 CY from Crystal Lake and 38,757 CY from Elginwood Pond (total = 105,878 CY). A subsequent study by ENSR in 2000 determined that in-situ sediment volume in Crystal Lake to be ~61,000 CY and Elginwood Pond to be ~30,500 CY C (total = 91,500[‡]).

According to Geosyntec, 2008, average muck layer (sediment) thicknesses are ~2.85 feet in Crystal Lake and 2.05 feet in Elginwood Pond. Crystal Lake muck is predominantly underlain by peat while Elginwood Pond is predominantly underlain by sand and gravel. Total in-situ muck volumes were calculated to be ~ 65,118 yds^3, with 40,276 yds^3 in Crystal Lake and 24,842 yds^3 in Elginwood Pond.

The City has assumed that the estimated total volume of 91,500 CY (ENSR, 2000) to be the absolute maximum volume of in-situ sediment in the two waterbodies[§]. Hence, in order to maintain a conservative approach, this volume has been carried through in this report.

3.1.2 Crystal Lake and Elginwood Pond Watershed

Crystal Lake and Elginwood Pond are located in the Ipswich River watershed, and the sub-watershed of Norris Brook (MassGIS, 2008). Major land uses within the watershed were identified using Massachusetts Geographic Information Systems (MassGIS). Most of the sub-

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[‡] Assumes maximum dredging depth of 10' (ENSR, 2000)

[§] The volume of 90,000 CY of sediment to be removed includes the moisture content.

watershed land (~1,210 acres) is allocated to residential and commercial uses, whereas forested wetland and open water areas cover approximately 484 acres (Figure 2).

A majority of the watershed land area within the City boundaries (~1,479 acres) is comprised by privately owned land; just 151 acres of land is City-owned. MassGIS data indicate that the property adjacent to Crystal Lake on the southeastern side is privately owned, the rest of the lake shoreline is a property of Conservation Commission of City of Peabody. However, almost all of Elginwood Pond is bordered by homes and private property, with the exception of the most southern part of the Pond (Figure 3).

Several jurisdictional resources areas, including wetlands, lakes, and perennials streams, occur within the immediate vicinity of both ponds (Figure 4).

4.0 DREDGE METHODOLOGIES AND TECHNOLOGIES

Dredging projects generally involve three distinct processes:

- Dredging/Sediment Removal
- Sediment Dewatering
- Reuse/Disposal of Sediments

There are two main technologies available for dredging projects in lakes: mechanical dredging and hydraulic dredging. The following paragraphs summarize the processes involved in the application of these methods.

4.1 Mechanical Dredge

Mechanical dredging entails physically removing lake sediments with conventional excavation techniques and equipment. Common excavation equipment includes clamshells, draglines, excavators, and front-end loaders. A typical mechanical dredging process involves the excavation of the sediments, mobilization of the dredge material on a barge to shore, placement in temporary drying site, and trucking transportation to a definite disposal site or reuse facility.

Mechanical dredging may be performed in either wet (sediment under water) or dry (water removed from lake) conditions. The type of mechanical dredging applied is limited by the physical characteristic of the sediments. Sandy sediments with low organic contents are best suited for mechanical dredging in *wet conditions* because of their low in-situ water content and high dewatering rate. Fine materials (silt- and clay-rich sediments) are best suited for mechanical dredging in *dry conditions* because of their high in-situ water content and low dewatering rate.

4.2 Hydraulic Dredge

Hydraulic dredging is performed by removing water and sediment in a slurry from the lake bottom. The sediment and the water are then separated by one of several means and the water returned to the lake. A typical hydraulic dredging process involves the use of an 8-ft.-wide auger

lowered from a barge to the lake bottom, where it chops sediment and vegetation with water to create a slurry, and feeds it to a pump, which lifts the slurry and pushes it through a flexible, floating pipeline to shore where the a variety of dewatering operations can be implemented.

The self-propelled barge that carries the dredge typically pulls itself along on a cable stretched across the pond. As it moves forward, it can remove up to 4 ft. thick sediment from the bottom of the pond. An equal amount can be removed on the return pass. The cable then is typically moved about 6 ft. to one side, and the two-pass process is repeated. Hydraulic dredges typically operate at flows of approximately 2,000 gallons of slurry per minute with a solids concentration of approximately 10%.

Typical hydraulic dredging operations are often used in conjunction with mechanical dewatering operations because of the large amount of water generated during this process.

Given the high silt and fine-sand content of the sediments, hydraulic dredging is likely the best technology for sediment removal at Crystal Lake and Elginwood Pond.

5.0 DEWATERING METHODOLOGIES AND TECHNOLOGIES

Dewatering methods evaluated for this study include:

- Lagoon
- In-Place
- Geotextile bags
- Filter Belt Press
- Vacuum Dewatering

5.1 Lagoon Dewatering

Lagoon dewatering operations vary depending on the dredging method. Lagoon dewatering operations for hydraulically dredged sediments typically involves two steps:

- Primary settling in a relatively large basin (usually greater than 12 hours residence time)
- Secondary settling in a relatively small basin (usually 1 to 2 hour residence time) with the aid of chemical coagulants.

Mechanical Dredge Operation with Lagoon Dewatering :
Photograph source: US EPA Region 10

The majority of the sediments settle during the first step. The second step is aimed at removing colloidal particles. Sediments are left to dry in the basins via evaporation and percolation depending on their intended use.

Lagoon dewatering from mechanically dredged sediments consists of a single step. Because mechanically dredged sediment yields much lower water content than hydraulic methods, the main purpose of the lagoons is to provide space for the sediments to dry.

The primary restrictions of this lagoon dewatering are large area requirements and long desiccation periods.

5.1.1 Construction Cost Estimate & Timeline

This method assumes that sufficient area exists near the waterbody to construct a dredge spoils area using on-site borrow materials. The construction of a dike would be necessary to retain the slurry. This dewatering method assumes that the dewatered material would be transported off site by the municipality. The sediments are assumed to be relatively free of contamination (per the Massachusetts Oil and Hazardous Materials List); therefore the filtrate will be allowed to infiltrate at the dewatering site.

Estimated costs for implementing a lagoon dewatering operation, including dike construction and dredging, is approximately $44 per cubic yard of *in-situ*(in place) material.

Dredging and dewatering using this approach would likely require ~10—12 acres for every 50,000 cubic yards of *in-situ* material.

5.1.2 Operation & Maintenance Schedule

The ideal operation period is April to October when temperatures (>32° F) are least likely to affect dredging operation and dewatering performance. It is reommended that operations occur for 10 hours/day, during daylight hours. However, the dewatering process will occur continuously in a passive manner with no associated labor requirements. Maintenance may be necessary to prevent re-wetting of the sediments by major rain events. Regular maintenance is necessary to ensure that the dike surrounding the dewatering basins will hold any potential excess of water generated by rainfall.

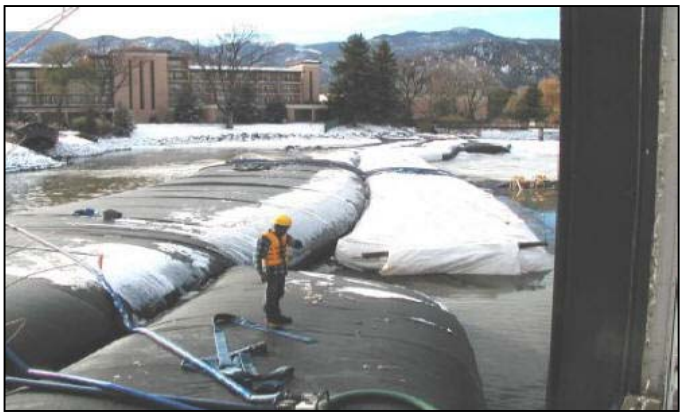
5.2 In-Place Dewatering

In-place dewatering is achieved by temporarily removing the water from the waterbody to allow the sediments to dry in-situ. After the water concentrations fall to within an acceptable range for the intended use of the sediments, they are removed by standard excavation practices. Several strategies are implemented to maintain the water levels at an elevation below the desired dredging depth including:

- Gravity drawdown
- Pumping
- Coffer-damming
- By-pass channels

Drying times are dependent of sediments composition. Highly organic materials could take months to achieve desirable water concentrations. The main disadvantage of in-situ dewatering operations is that a storm event will re-fill the lake and re-wet the sediments.

This dewatering alternative will not be further discussed since the environmental impacts involved in dewatering Crystal Lake and Elginwood Pond are not considered to be acceptable. Additioanlly, in-situ dewatering is not considered to be cost-effecitve given the additional major engineering components involved with dewatering the waterbody.



In place dewatering using cofferdams
Source: Water Structures Unlimited

5.3 Geotextile bags

Geotextile bags are constructed of high-strength, permeable, specially engineered textiles designed for containment and dewatering of high moisture content sludge and sediment. They are available in a variety of sizes, depending on volume and space requirements. For smaller dredging projects, geotextile bags can even be mounted in mobile roll-off containers that can be transported around the property as necessary.

This dewatering process consists of filling the geotextile bags by pumping the slurry from a dredging operation. Environmentally safe polymers (chemicals that increase flocculation and settling rate) can be added to the slurry, which make the solids bind together and the water will separate out more effectively and quickly (8 months) then without the addition of polymers (1+ year). The dewatering process occurs when clear effluent water simply drains from the geotextile bags. Clear filtrate is collected and returned to the water body over time. Over 80% of moisture is removed and the solids are consolidated and contained within the bags. When dry, the

geotextile bag and its solid contents can be disposed of at a landfill, or the sludge solids can be removed and reused as intended. This technology is affected by weather in two ways: (1) the mouth of the bags can freeze if filling occurs in very cold weather, and (2) it has also been reported from field use (Weymouth, MA) that the speed of dewatering is enhanced if the bags have a chance to freeze all the way through.

Geotube dewatering operation
Source: Wisconsin Department of Natural Resources

5.3.1 Construction Cost Estimate & Timeline

This method assumes that sufficient area exists near the water body, is available to spread out the geotextile bags, and to construct a barrier in order to capture the effluent. The cost estimate for this method assumes that the dewatered material would be transported off site by the municipality. The sediments are assumed to be relatively free of contamination (per the Massachusetts Oil and Hazardous Materials List); therefore the filtrate effluent will return to the pond but will be contained with a floating silt curtain within the pond.

A capture zone would be constructed first to collect filtrate prior to placement of the tubes. The capture zone is typically constructed of an impermeable membrane below a sand bed. The membrane would be constructed to collect water and direct it to a discharge point. The dewatered geotube sediments would remain on-site in the geotextile bags for later removal by the municipality. There is no money included for effluent treatment (TSS removal prior to discharging to the waterbody) equipment in the estimate. The project cost estimate for this dewatering approach is ~$36 per cubic yard of *in-situ* material.

Dredging and dewatering using this approach typically requires ~8 acres for every 50,000 cubic yards of *in-situ* material.

5.3.2 Operation & Maintenance Schedule

The ideal operation period is April to October when temperatures (>32° F) are least likely to affect dredging operation and dewatering performance. It is recommended that operations occur for 10 hours/day, during daylight hours. However, the dewatering process will occur continuously in a passive manner with no associated labor requirements.

Maintenance is required to assure that the pumping rates are adjusted according to dewatering performance. Monitoring of polymer injection is necessary to adjust concentrations and prevent excess residual polymer in the effluent.

5.4 Mechanical Dewatering

Mechanical dewatering involves the separation of sediments from water using machinery such as belt filter presses. The use of apolymer to enhance filtrate quality and produce a more consolidated filter cake is typical in this type of dewatering method.

Mechanical dewatering is typically implemented in conjunction with a hydraulic dredging operation. The main components of the process include:

- Hydraulic dredge
- "Knock out" tank for removal of cobbles and gravel, usually a sieve
- Batch tanks to even flows from hydraulic dredge to filter press
- Polymer addition and mixing system
- Two - four filter presses operating in parallel
- Conveyor belt system to mobilize filter cake to dump trucks
- Return line to the lake for filtrate
- Silt curtains to trap residual solids

After the coarse material has been removed from the dredged material, the tanks keep the slurry at a milkshake-like consistency until it is pumped into one of a four trailer-mounted, belt filter press. Just before the slurry is released into a filter press, it is mixed with a polymer that causes the solids to coalesce and separate from the water.

Hydraulic dredge operation using mechanical belt press dewatering operation.
Source: Eveready Marine Services

The filter presses quickly and progressively compresses the solids into a continuous "cake" of nearly dry material. As the material leaves the filter presses, it falls onto a conveyor belt that moves it up into the box of a waiting 10 to 30-yd. dump truck. The nearly clear water squeezed from the sediment is discharged into an area of the pond protected by silt curtains that is designed to capture any residual solids.

5.4.1 Construction Cost Estimate & Timeline

This dewatering method assumes that a small staging pad would be set-up for mechanical dewatering of the sediments at the site and the dewatered material would be transported off site by the municipality. The sediments are assumed to be relatively free of contamination (per the Massachusetts Oil and Hazardous Materials List); therefore the filtrate discharge area will be contained with a floating silt curtain within the pond. The filtrate area would be dredged occasionally to remove any residual sediment. The estimate for this method is approximately $32.00 per cubic yard of *in-situ* material.

5.4.2 Operation & Maintenance Schedule

The ideal operation period is April to October when temperatures (>32° F) are least likely to affect dredging and dewatering operation. It is recommended that operations occur for 10 hours/day, during daylight hours.

Maintenance will be required to assure that clogged screens do not prevent the removal of oversized material. This regular operation will ensure the integrity of the belt presses. Monitoring is required to adjust the polymer dosage and to prevent excessive polymer residual in the effluent return line.

5.5 Vacuum/Centrifugal Dewatering

This technology is best applied in conjunction with hydraulic dredging methods because it requires a constant feed of sludge. The dewatering process uses centrifugal or vacuum suction to pull water out of the dredged sediments leaving the fine solids behind The advantage to such a process is that the effluent can be immediately returned to the water body within an area containing with a floating filter with a TSS no greater then 30 ppm and oftentimes greatly reduced phosphorus and nitrogen concentrations. The resulting solids are deposited into a container and removed from site.

Vacuum dewatering operation
Source: Genesis Fluid Solutions (Genesis RDS)

The main components of the process include:

- Portable hydraulic dredge
- Screening 3/16” mesh
- Hydro-cyclones and Shakers for sands removal
- Automated Polymer addition

- Vacuum separation /Centrifuge
- Effluent return

5.5.1 Construction Cost Estimate & Timeline

This dewatering method assumes that a small staging pad (150'x150') would be set-up for mechanical dewatering of the sediments at the site. The effluent from the dewatering process can immediately be returned to the water body and the dewatered material would be transported off site by the municipality. The sediments are assumed to be relatively free of contamination (per the Massachusetts Oil and Hazardous Materials List); therefore the filtrate discharge area will be contained with a floating silt curtain within the pond. When the pumping is complete the project is complete. There is no additional time required for the solids to dry-out or additional space to be reserved for the project. The estimate for this method is approximately $15.00 per cubic yard of *in-situ* material plus the price of the hydraulic dredger (Hodges, M., 2008)

It is estimated that ~1,000 - ~1,500 yd^3 of sediment can be dredged and dewatered per day; or ~90 working days to dredge and dewater the ~90,000 yd^3 of sediment (which includes the moisture content of the sludge) to be removed from Crystal Lake and Elginwood Pond.

5.5.2 Operation & Maintenance Schedule

The ideal operation period is April to October when temperatures (>32° F) are least likely to affect dredging and dewatering operation. It is recommended that operations occur for 10 hours/day, during daylight hours.

Maintenance will be required to assure that clogged screens do not prevent the removal of oversized material. Monitoring is required to adjust the polymer dosage and to prevent excessive polymer residual in the effluent return line.

6.0 POTENTIAL DEWATERING SITES (SEE APPENDIX B)

6.1 Site 1: Ball Field - Parcel ID 030-070

6.1.1 Methodology, Location & Design

Site 1 is approximately 4+ acres, located adjacent to Elginwood Pond, and is currently used as a recreational field for the City of Peabody. The field is mostly grass, relatively flat, and gently sloped toward Elginwood Pond and a wetland adjacent to Crystal Drive. There exists an approximate one-acre paved parking area adjacent to the field that is accessible via a short drive from Elginwood Road. A portion of the parking area could potentially be used for staging equipment during the dredge/dewatering project.

Depending on the dewatering method chosen, Site 1 would require some preparation for traffic, dewatering equipment platforms, and spill mitigation and seepage measures.

Site 1 is approximately 50 feet from the southernmost part of Elginwood Pond. Because of this close proximal location, effluent or filtrate from the dewatering operations could be piped to Elginwood Pond. Elginwood Pond and Crystal Lake are hydraulically connected. Currently Crystal Lake recharges Elginwood Pond, however the weir that separates the two waterbodies that controls the water height.

The filtrate could also be pumped directly to Crystal Lake through flexible hose.

6.1.2 Access, Safety & Security

The parking area (see Basemap) is approximately 100 feet from Site 1; therefore an access road would need to be constructed to connect the parking area to the Site. The access road would be located across the northern edge of the recreational field.

During the dewatering operations, Site 1 will likely require a protective barrier, such as a berm to protect the rest of the field from any potential spill. Site 1 will also require security fencing during the dewatering operations. For safety purposes, the site should be fenced, gated, and signed; it should be secured during all non-active use periods and visitors will require an escort or be required to sign-in as a minimum, with hard hat requirements.

6.1.3 Positive and Negative Site Aspects

The proximity of Site 1 to Elginwood Pond and Crystal Lake is a positive aspect for the dewatering options that require return of water removed from the sediments to the water bodies. It also facilitates the feeding of the dredge material into the dewatering process line.

Little or no impact on habitat would be expected. The closest residential unit is ~350 feet from the potential location of the dewatering operations. The potential staging area is ~200 feet away from the closest residential unit. There exists an access road to the potential staging area.

The effluent from the dewatering operations can be discharged by gravity into the water bodies.

Dewatering alternatives 4 (hydraulic dredging to filter press) and 5 (hydraulic dredging to vacuum dewatering) appear most suited to the conditions of Site one. The low area requirements of their process lines (< 2 acres) would fit within the existent available area. Minimum or none site conditioning (land clearing, grading, etc) would be required.

Dewatering alternatives 1 (Passive dewatering -Lagoon) and 3 (geotextile bags) for Site 1 would be ruled out due to large area requirements. However, geotextile bags containers could be stacked and therefore area requirements may be adjusted to fit within the available area. Long duration of the latter two alternatives (approximately 20 and 14 months, respectively) would interfere with recreational activities.

6.2 Site 2: Kiley School - Parcel ID 025-021

6.2.1 Methodology, Location & Design

Kiley School is located at the intersections of Johnson and Taylor Streets. It is currently used as the Peabody Public Schools Administration Building. It has paved parking area approximately 2-3 acres in size. Kiley School is topographically upgradient and approximately 750 feet from Crystal Lake. The parking lot is ideal for staging and there exists a small recreational field behind the school on Taylor Street that is approximately 4 acres in size. The school is surrounded to the north and east with residential homes.

6.2.2 Access, Safety & Security

Site 2 does not have direct access to Crystal Lake and an access way would be needed through undeveloped woods and around wetlands. The access way will likely be up to 1,000 feet in length. Any piping conduits from Site 2 to Crystal Lake would need to be constructed across Taylor Street.

A spill containment berm for any dewatering would be required similar to Site 1. All safety, access and security measures would also be similar to Site 1. If additional staging is necessary along Crystal Drive, construction for the bikeway may need to be curtailed during any dewatering operations.

6.2.3 Positive and Negative Site Aspects

There exists a relatively flat, grassed area that could potentially serve as the dewatering operations stage. The existing paved parking lot area could potentially be used for staging equipment. This site is located entirely on city-owned property. Accessibility to the staging and dewatering operations area is possible through Taylor Street. However, there is no direct access to either Crystal Lake or Elginwood Pond.

A network of project-associated piping would either need to run directly through the adjacent private property or strategically through the adjacent wooded area, thereby complicating conveyance of slurry and effluent. The required pipe network may potentially affect site ecology (resource area, habitat, etc.) in the adjacent wooded area. Moreover, the site is thickly settled with residences that may object to the siting of the dewatering operation.

The discharge effluent from dewatering operations can be returned to the water bodies by gravity. As with Site 1, the available area is the principal limiting factor for the implementation of passive dewatering alternatives (i.e., dewatering lagoons and geotextile bags). Filter belt press dewatering and vacuum dewatering appear most appropriate for the area limitations on this site.

6.3 Site 3: Crystal Drive

6.3.1 Methodology, Location & Design

Crystal Drive borders Crystal Lake to the east and Elginwood Pond to the west. It has limited right-of-way and is the egress for a few residences adjacent to Elginwood Pond. It has limited available area (<1 acres) and is bordered to the east and west by wetlands. Crystal Drive also abuts a former railway that is currently under construction for a new bike path.

6.3.2 Access, Safety & Security

Site 3 is easily accessible and is less than 50 feet from both Crystal Lake and Elginwood Pond with no obstructions. Similar to Site 1, a spill containment berm for any dewatering would be required.

6.3.3 Positive and Negative Site Aspects

The principal advantage of this site is the proximity to both Crystal Lake and Elginwood Pond. This positive site aspect will facilitate the transfer of dredge material into the dewatering process line. Among the three sites identified, this site exhibits the best accessibility. Nevertheless, the available area for this site is the most limited. Obstruction of vehicular and bikes traffic flow could be expected. Additionally, some clearing and earthwork in the wooded area adjacently to the north of Crystal Drive would likely be necessary to create a large enough footprint for staging and operations.

Due to the proximity to both Crystal Lake and Elginwood Pond, there is increased probability to of impact ecologically sensitive areas (vernal pools, wetlands, etc.). Due to this the proximity to resource areas, the project may receive increased scrutiny from environmental regulators. Strict controls would be required to prevent potential spillage of petroleum hydrocarbons and/or polymers. Moreover, because of the proximity of the dewatering operations to the waterbodies strict turbidity controls should be implemented.

Due to the limited available area, implementation of a passive dewatering method is not possible at this location. Belt filter press and vacuum dewatering are considered to be the only viable dewatering methodologies in this area.

6.4 Site 4: Adjacent Woods & Abandoned Gravel Pits – Parcel ID 034-006

6.4.1 Methodology, Location & Design

A wooded area containing abandoned gravel pits occurs adjacent to Crystal Lake and Elginwood Pond. This area contains thick vegetative cover, large mature trees, hilly topography, areas of bordering and isolated vegetated wetland, and several potential and certified vernal pools.

6.4.2 Access, Safety & Security

For work to occur within Site 4, significant clearing and earthwork would be required. Access to this location can be gained from Taylor Street to the northeast, but would also require access areas for running a network of conduit from the waterbodies.

6.4.3 Positive and Negative Site Aspects

An initial assessment of the wooded area and abandoned gravel pits adjacent to Crystal Lake and Elginwood Pond indicates that these are relatively poor locations to perform dewatering operations. Problems associated with using these locations include poor accessibility, topographic constraints, and impact to protected resource and habitat areas.

For work to occur within these locations, significant clearing and earthwork would be required that would negatively affect wetland and vernal pool habitat. Because of the presence of good, viable alternative dewatering sites (discussed in Section 7 of this report), it is highly likely that the regulatory authorities with jurisdiction over such work (Massachusetts Department of Environmental Protection (MassDEP), Massachusetts Environmental Policy Act (MEPA), Massachusetts Natural Heritage and Endangered Species Program (NHESP) and others) would deny such a project that would greatly affect the existing conditions. Beyond the pertinent regulatory issues, site development costs associated with clearing, grading, access road construction, and other pre-dredge construction activities necessary for developing a dewatering site would likely not be a cost effective alternative over those presented in the previous section of this report.

For the reasons stated above, the wooded area and abandoned gravel pits adjacent to Crystal Lake and Elginwood Pond are not considered to be good potential dewatering sites.

6.5 Site 5: Parking Area Adjacent to Recreational Fields – Parcel ID 033-067

6.5.1 Methodology, Location & Design

The Site 5 is a parking area approximately 1 acre in size located adjacent to the Site 1 recreational fields. The site is accessible via a short drive from Elginwood Road and is currently used as a parking area for the athletic fields. The site is entirely covered with impermeable asphalt.

Site 5 is approximately 150 feet from the southernmost reach of Elginwood Pond. Because of its close proximity to Elginwood, dredge slurry or filtrate from the dewatering operations could be piped to Elginwood Pond. Elginwood Pond and Crystal Lake are hydraulically connected. Currently Crystal Lake recharges Elginwood Pond, however the weir that separates the two waterbodies controls the water height.

Filtrate resulting from dewatering could be pumped to Elginwood Pond with Crystal Lake water levels simultaneously controlled by the weir. During dredging operations, the drawdown of Crystal Lake would need to be carefully monitored in order to avoid large changes in water level

surface elevation. Filtrate could also be pumped directly to Crystal Lake through flexible hose, thereby reducing the potential of water level draw down during dredging operations.

Depending on the chosen dewatering method, Site 5 would require some preparation for truck and equipment traffic, dewatering equipment platforms, and spill mitigation. Major cracks, potholes, etc. in the pavement surface should be repaired prior to commencing dewatering operations.

6.5.2 Access, Safety & Security

The parking area (see Basemap) can be directly accessed from Elginwood Road, therefore no new infrastructure will be required for site access.

During the dewatering operations, Site 5 will likely require a protective barrier, such as a berm, to protect adjacent areas from a potential spill. Site 5 will also require security fencing during the dewatering operations. For safety purposes, the site should be fenced, gated, and signed; it should be secured during all non-active use periods and visitors will require an escort or be required to sign-in as a minimum, with hard hat requirements.

6.5.3 Positive and Negative Site Aspects

The proximity of Site 5 to Elginwood Pond and Crystal Lake (~200') is a positive aspect for the dewatering options that require return of filtrate to the water bodies. This close proximity allows for the running of a pipe network without crossing roadways. Additionally, the site is located entirely on city-owned property and is easily accessible from Elginwood Road.

Though use of this site will require closure of the parking area during dewatering operations, ample parking exists adjacent to the southern end of the athletic fields adjacent to the Covenant Christian School.

Site 5 is relatively flat and covered with impermeable pavement, therefore minimal site work will be required to prepare the site surface for dewatering operations, however the existing asphalt surface condition should be inspected carefully. Because of its distance from the Pond edge and adjacent resource areas, it is relatively unlikely that dewatering operations will negatively affect the local ecology beyond that inherent with dredging a waterbody.

Dewatering operations are unlikely to disrupt roadway traffic or residents, however trucks hauling dredge material from the site may be periodically disruptive to residences or users of Elginwood Road and Lake Street.

Dewatering alternatives 4 (hydraulic dredging to filter press) and 5 (hydraulic dredging to vacuum dewatering) appear most suited to the conditions of Site five. The low area requirements of their process lines (< 2 acres) would fit within the existing available area. Minimal or no site conditioning (land clearing, grading, etc) would be required.

Dewatering alternatives 1 (Passive dewatering -Lagoon) and 3 (geotextile bags) for Site 5 would be ruled out due to large area requirements. However, geotextile bags containers could be stacked and therefore area requirements may be adjusted to fit within the available area. Long duration of the latter two alternatives (approximately 20 and 14 months, respectively) may potentially interfere with recreational activities due to parking area closure.

If Site 5 is selected for dewatering operations, consideration will need to be given to returning water to Crystal Lake. Because Site 5 is located at the southern-most edge of Elginwood Pond, and at the most hydraulically down-gradient dredge location, up-gradient drawdown would need to be carefully monitored (especially during the dredging of Crystal Lake) in order to avoid potentially draining the waterbodies during dredging. Careful consideration should be given to this potential issue.

7.0 DREDGE SEDIMENT BENEFICIAL REUSE OPPORTUNITIES

The City of Peabody has expressed a desire to reuse dredged sediment by either marketing it to potentially interested parties or using it within the City boundaries. A variety of sediment reuse options have been explored, however the most current proposed in-City reuse for the sediments is as cover for the GCR Landfill in Peabody. Given the characteristics of the sediment, it is well suited for reuse in a variety of applications beyond those explored in the most recent NOPC submittal to the EOEEA (the EOEA) in 2001.

The physical properties of the pond sediments (silt-rich, high organic content) are ideal for lining constructed wetlands and can be amended for use in bioretention basins, and other similar types of Low-Impact Development (LID) Stormwater Best Management Practices (BMP) (MassDEP, 2008). The MassDEP looks highly upon these reuse strategies. Currently, the City is exploring opportunities for developing constructed wetlands as LID stormwater BMPs in the Strongwater Brook Watershed adjacent to the Welch School. Reuse of the dredge material for these purposes is a cost-effective method for disposing of the dredged sediment and lining the constructed wetlands. Execution of these designs is contingent upon funding and permitting.

Aggregate Industries on Russell Street is developing a closure plan and this material may prove to be useful during this closure plan

8.0 PERMITTING REQUIREMENTS

The following sections detail select regulatory and permitting requirements for the dredging, dewatering, and beneficial reuse of sediment at Crystal Lake and Elginwood Pond. Many permits have already been investigated and/or secured by the City during the Massachusetts Environmental Policy Act (MEPA) permitting process, however revisions to methodologies may require revised and/or additional permits. This section aims to provide a comprehensive list of environmental permits and associated requirements, however modifications to the project scope may affect regulatory agency jurisdiction and/or applicable laws, regulations or permitting requirements (e.g., if the sediment is found to contain Reportable Quantities (RQs) and/or Reportable Concentrations (RCs) per the Massachusetts Oil and Hazardous Materials List ("MOHML") (310 CMR 40.1600), the project site may become jurisdictional to the

Massachusetts Oil and Hazardous Material Release Prevention and Response Act (M.G.L. c. 21E)).

The City has already gone through the MEPA review process, secured an Order of Conditions (OOC) from the Peabody Conservation Commission, a 401 Water Quality Certification (WQC) Permit from the MassDEP, and a letter from the USACE stating the project is not jurisdictional to the 404 WQC process.

Because of Peabody's municipal status, the City is exempt from Massachusetts permitting fees.

8.1 Dredging

The following section discusses the permitting requirements and applicable laws and regulations necessary in order to commence dredging at Crystal Lake and Elginwood Pond.

8.1.1 Clean Water Act & Water Quality Certification

Dredging activities at Crystal Lake and Elginwood Pond will be required to comply with Section 27 of the Massachusetts Clean Waters Act (MCWA) (M.G.L. c. 21, ss 26 through 53) and the associated regulations (314 CMR 9.00) that establish procedures and criteria for the administration of Section 401 of the federal Clean Waters Act (CWA) (33 U.S.C. 1251). Per Section 401 of the Federal Clean Waters Act, dredging activities will require a Water Quality Certificate (WQC). MassDEP administers the 401 WQC.

Based on the proposed methodology for dredging (traditional mechanical or hydraulic methods), discharge of dredged material during sediment removal will be limited to "incidental fallback" and therefore falls outside the definition of "discharge of dredged material" pursuant to 33 CFR Part 323. Hence, this project is not jurisdictional to the United States Army Corp of Engineers (ACOE), even though Crystal Lake and Elginwood Pond do meet the definition of a navigable waterway pursuant to 33 CFR Part 328 and the U.S. Supreme Court decision in Rapanos vs. United States.

8.1.1.1 Permitting Timeline

Within 24 days of receiving the application and fee payment, MassDEP will complete an administrative completeness review. Within 96 days of making a determination of administrative completeness, MassDEP will complete a technical review, which includes a public comment review and comment period.

8.2 Dewatering: Discharge of effluent

8.2.1 Groundwater Discharge

If dewatering activities result in the discharge to "groundwaters of the Commonwealth", activities will be subject to the jurisdiction MassDEP Groundwater Discharge Permit Program pursuant to M.G.L. c. 21, s 43. In addition to regulating discharges, MassDEP regulates the

outlets and treatment works associated with these discharges pursuant to M.G.L. c. 21, ss 26 through 53. Through 314 CMR 5.00, the MassDEP controls discharge of effluent to ground water.

The type of ground water discharge permit will be contingent upon the volume of effluent produced daily, sediment and/or water chemistry, potential affects to groundwater, and the discretion of the MassDEP. However, it is likely that *BRPWP10*, which pertains to (among other activities) discharges from construction dewatering, will be the most appropriate permit for this project (if necessary at all). Once the dewatering methodology and design is established, the maximum daily discharge volume calculated, and the potential affects to groundwater qualified, the City should consult with MassDEP regulators to determine the most appropriate permit for the dredge dewatering operation. If a GeoTube® or mechanical dewatering technique is implemented, it is unlikely that significant discharge to groundwater will occur, and hence the requirement of a discharge permit is not likely.

Discharge will also be subject to the MassDEP Surface Water Quality Standards pursuant to 314 CMR 4.00.

8.2.1.1 Permitting Timeline

The applications for a groundwater discharge permit must be submitted at least 180 days before the date on which the discharge will begin, unless permission is granted by the MassDEP. For this reason, it is suggested that if the City decides to discharge to groundwater, the application is submitted well in advance of the 180 day requirement.

The following information pertains to the MassDEP BRP WP10 permit. If it is found that a different discharge permit is required, the permitting timeline may be affect.

Within 30 days of the receipt of the application and permit application fee for a BRPWP10 permit, the MassDEP will complete an administrative completeness review. Within 90 days of making a determination of administrative completeness, the MassDEP will complete a technical review.

If the technical review identifies any deficiencies, the City would have 180 days to correct the problems and resubmit the application. Within 90 days of the receipt of resubmitted application, MassDEP would complete a supplemental technical review.

If the City requests a public hearing, or if MassDEP determines a public hearing to necessary, the City will be required to post notice of the public hearing within at least 30 days prior to the hearing (pursuant to and in accordance with 310 CMR 2.06). Within 90 days of the close of the period for public comment, including any public hearing, the MassDEP will complete a public comment review and make a determination on the permit. The permit remains/becomes effective following the 30-day statute of limitations period.

8.2.2 Surface Water Discharge

Discharge of effluent derived from the dewatering operation will be covered under the 401 WQC, on stipulation being that it must be returned to the same waterbody(ies) from which it was derived. Thus, discharge must be returned to either Crystal Lake or Elginwood Pond (Chin, K., 2008). It is important to note that dewatered effluent from material derived from Elginwood Pond can be returned to Crystal Lake and vice versa.

8.3 Resource Area Permitting Requirements

8.3.1 Wetlands Protection

Dewatering and dredge operations are jurisdictional to the Massachusetts Wetlands Protection Act (WPA) (M.G.L. c. 131 s. 40) and the City of Peabody, MA wetlands bylaw (Chapter 32 Peabody Wetlands and Rivers Protection Regulations). The City will require an Order of Conditions (OOC) from the issuing authority (Peabody Conservation Commission or MassDEP) per the WPA regulations (310 CMR 10.00) and City of Peabody Bylaw Regulations.

Jurisdictional areas that occur within the Crystal Lake and Elginwood Pond project area include:

(1) bordering vegetated wetland (BVW), bank, and their 100' buffer zone,

(2) bordering land subject to flooding (BLSF – 100'year floodplain),

(3) land under water (LUW) (lakes, ponds, etc.),

(4) riverfront area (200' perennial streams, creeks, etc.

The precise type and quantity of jurisdictional resource area will ultimately be dependent on the selected dewatering location.

Work in any of these resource areas will also require evaluation of impacts to wildlife and wildlife habitat. These requirements are discussed in detail in Section 9.3.2.

8.3.1.1 <u>Permitting Timeline</u>

Within 21 days of the close of the public hearing, the Peabody Conservation Commission shall issue a decision either denying the project or issuing OOC imposing conditions as necessary to meet the performance standards pertinent to the site and the WPA regulations. Depending on the outcome from the hearing, action by the MassDEP can be requested per 310 CMR 10.05. At this point, the MassDEP Wetlands Program will perform a thorough review of the project and issue a decision in the form of a denial or a Superseding Order of Conditions within 70 days from the "Request for Departmental Action."

8.3.2 Wildlife Habitat

The proposed dredge project is subject to the authority of the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and jurisdictional to the associated regulations (321 CMR 10.00). Per the *MassDEP Wildlife Habitat Protection Guidance*, a detailed wildlife habitat evaluation (Appendix B) will be required as a component to the NOI submittal regardless of whether the site is known to contain state-listed endangered species. All Land Under Water (LUW) is presumed significant for wildlife habitat and alteration to >10% of the land area triggers the threshold for a detailed evaluation. Such an evaluation is required to be performed by an "individual with at least a masters degree in wildlife biology or ecological science from an accredited college or university, or any other competent professional at least two years experience in wildlife habitat evaluation." (310 CMR 10.60(1)(b)). Per 310 CMR 10.60(1)(c) and Appendix D of the MassDEP Wildlife Habitat Protection Guidance, the wildlife habitat evaluation and associated NOI package will require review by the Massachusetts Division of Fisheries and Wildlife (DFW) Natural Heritage and Endangered Species Program (NHESP).

8.3.2.1 Permitting Timeline

The NHESP will typically make a determination on submittals within 90 days from the receipt of the project proposal. Within 30 days of receiving a filing the NHESP will provide a response letter indicating whether or not the submission is complete. If the submission is found to be complete, the NHESP will provide a determination letter within 60 days of the date of posting of the first letter. A comments letter will be sent to the City (applicant), the MassDEP Wetlands and Waterways Program, and the Peabody Conservation Commission. The NOI application package will not be considered complete until NHESP issues their response to the proposed project. Upon receipt of the NHESP comments, the MassDEP wetlands and waterways program will begin review of the NOI.

8.3.3 Massachusetts Environmental Policy Act (MEPA)

As discussed previously (see Section 3.0), the City of Peabody has already been granted a permit from the MEPA Office. However, any modifications to the project scope will require the filing of a NOPC, as was done in 2001 (ENSR, 2001).

8.4 Other Permitting Requirements

8.4.1 Beneficial Reuse of Dredged Sediments

Reuse of the dredge spoils may require the issuance of a Beneficial Use Determination (BUD) permit by the MassDEP in accordance with the Beneficial Use Regulations (310 CMR 19.060). In general, for material such as the dredge sediment to be beneficially reused, it must have chemical and physical properties similar to the raw material that it is replacing or, when incorporated into another product (e.g., soil amendment), its use must contribute to the effectiveness of the final product (MassDEP, 2004).

In August 1999 and again in April 2000, responses letters to ENSR from the MassDEP determined that the water body sediments exceed the Massachusetts Soil Background concentrations by a few parts per million in the case of several metals and was not suitable for unrestricted upland reuse. In the case of Mercury, detection limits exceeded published Soil Concentration backgrounds and an official determination could not be made for reuse.

Based on issues with previous sediment sampling events, it is clear that more of samples are required from both water bodies in greater numbers. Because there were only slight exceedences for several parameters, increased numbers of samples could:

(1) Result in average concentrations below Soil Background (i.e., more samples = more data points to use in averaging)

(2) Provide better sediment spatial distribution

(3) Reveal trends in impact to sediments (e.g., impacted sediments may be limited to select locations – adjacent to outfalls, stream inlets, roadways, etc.)

If the City chooses to pursue this option beyond which has already been completed, a pre-application meeting should be scheduled with MassDEP in order to receive specific guidance on submitting a comprehensive evaluation. For a pre-application meeting with the MassDEP, the City will be required to submit:

(1) a detailed physical and chemical characterization of the sediment,

(2) a general description of the sediment,

(3) the quantities of (final) material to be used,

(4) the specifications for the use,

(5) a description of re-use of the material,

(6) a description of the risk management techniques and BMPs to be implemented during sediment reuse, and

(7) a description of the proposed location(s) and type(s) of locations for reuse

A pre-application meeting will provide an informal opportunity for the City to; (1) *describe the proposed beneficial use activity and obtain guidance on the application process and content from the department* (310 CMR 19.060(11)), (2) receive guidance on the application process, and (3) anticipate issues that may pertain to the proposed reuse.

If the pond sediment is determined to require a BUD, it will be categorized according to its end-use. Preliminary conversations with MassDEP indicate that sediment reuse could be permitted as a Category 3 material (Use of Secondary Materials in restricted Applications) (Emund, P, 2008). However, because of the nature of the sediment and its potential use in the development

of constructed wetlands, bioretention basins, etc., it does not easily fall into a single category[**]. This further emphasizes the need for a pre-application meeting where the MassDEP can assist in categorizing the material and issue further guidance for the successful permitting of the BUD.

8.4.1.1 Permitting Timeline

For most BUD permitting projects, an administrative completeness review process occurs within 24 days of the receipt of a permit application. The permitting timeline is somewhat variable and depending on the classification of the dredge material, however within 48 days of completing the administrative review, MassDEP will complete a technical review. Should deficiencies exist with the initial permit application, the applicant has 90 days to respond to the deficiencies and MassDEP has another 48 days to complete a supplemental permit review. Clearly, application deficiencies might extend the permitting time.

Assuming that the reused dredge material is considered to meet the requirements of Category 4 – Use of Secondary Material in Unrestricted Applications, the project would be designated as an Individual Rule Project (IRP). Projects designated as IRPs are unique and as such, a unique timeline and fee is developed specifically for them (Brown, M.E., 2008). Generally, a fee and timeline are developed based on the complexity of the project (i.e., the amount of time it will take a MassDEP analyst to review the project), however because of the City's status as a municipality, the project would be fee-exempt.

8.4.2 Construction Activities

Construction activities (including other land-disturbing activities) that disturb one or more acres are regulated under the EPA National Pollutant Discharge Elimination System (NPDES) stormwater program. Because construction activities are likely to exceed the one acre limit, all construction activities will be required to comply with the 2008 General Permit for Stormwater Discharges from Construction Activities.

Applicable construction activities are jurisdiction MassDEP Surface Water Discharge Program pursuant to the Massachusetts Clean Water Act M.G.L. c. 21, ss 26 through 53 and the Federal Clean Water Act, 33 U.S.C. 1251 *et seq*., and the NPDES Regulations at 40 CFR Part 122. Through 314 CMR 3.00, the MassDEP Division of Water Pollution Control assumes the authority to issue general permits for surface water discharges on behalf of the US EPA. Construction activities will also be subject to the MassDEP Surface Water Quality Standards pursuant to 314 CMR 4.00.

[**] MassDEP classifies material reuse according to 4 general categories based on the intended reuse of the materials (see 310 CMR 19.060(14) – (17)) based on risk to public health and environmental impact.

8.4.2.1 Permitting Timeline

Within 24 days of the receipt of the application (BRPWM09 Form) and permit application fee for a NPDES Stormwater Pollution Prevention Plan, the MassDEP will complete a technical review[††].

If the technical review identifies any deficiencies, the City would have 60 days to correct the problems and resubmit the application. Within 24 days of the receipt of the resubmitted application, MassDEP would complete a supplemental technical review.

Within 24 days of the close of the period for public comment, including any public hearing MassDEP will complete the public comment review. The permit remains/becomes effective following the 30-day statute of limitations period.

[††] A SWPPP is generally specified as the responsibility of the contractor, so the City would likely not be responsible for generating this or the NPDES permit application.

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Appendix A

Figures

Figure 1 – Locus Map

Figure 2 – Land Use

Figure 3 – Land Ownership

Figure 4 – Resource Area

CRYSTAL LAKE AND ELGINWOOD POND
LOCUS MAP

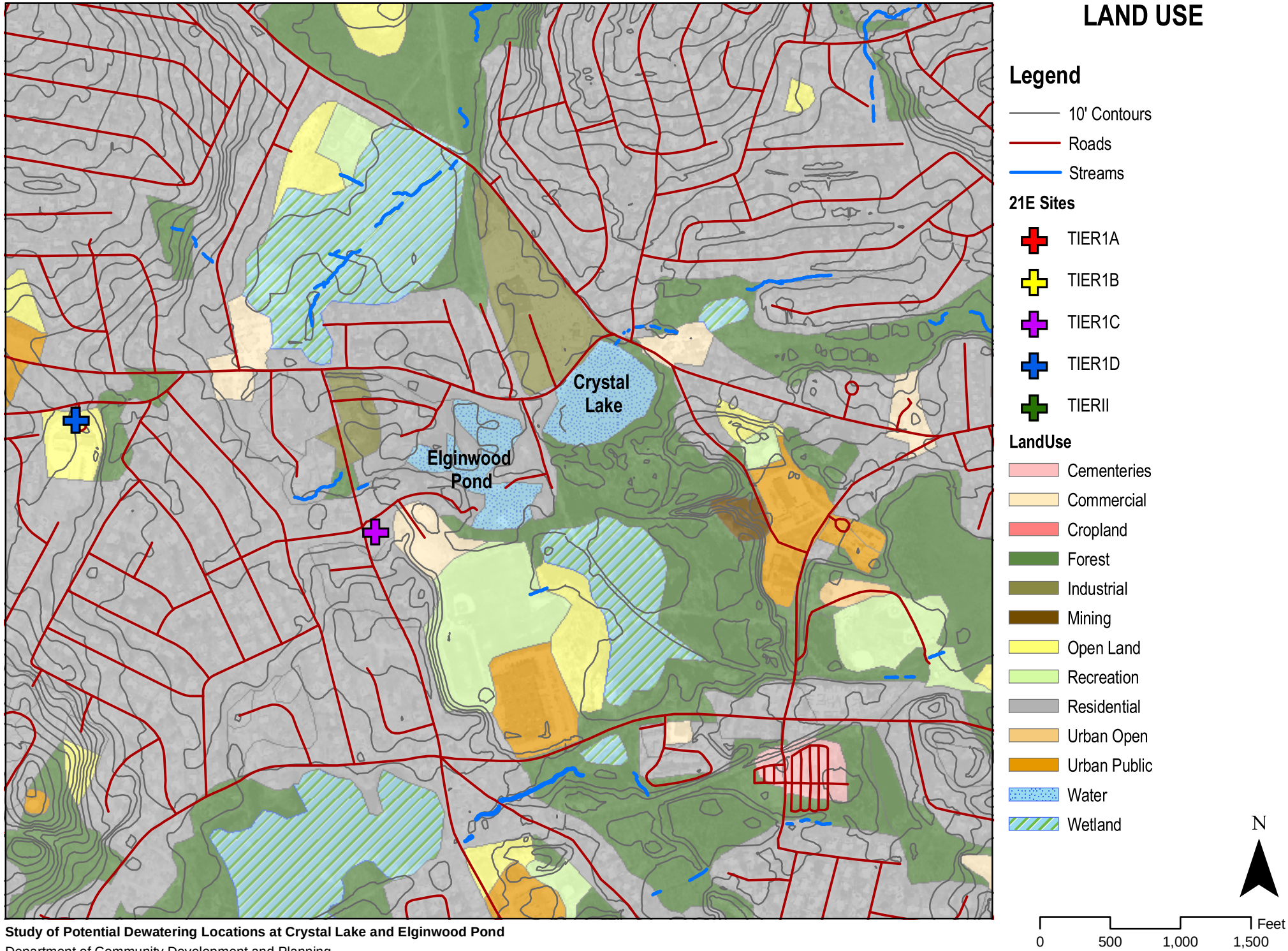
Study of Potential Dewatering Locations at Crystal Lake and Elginwood Pond

Department of Community Development and Planning
Peabody, Massachusetts

FIGURE 1

0 4,000 8,000 12,000 Feet

N



Study of Potential Dewatering Locations at Crystal Lake and Elginwood Pond

Department of Community Development and Planning
Peabody, Massachusetts

FIGURE 2

LAND OWNERSHIP

Legend

- 10' Contours
- Roads
- State-Mapped Streams
- Wetlands
- State-Mapped Lakes and Ponds
- Buildings

Ownership

- Private
- City of Peabody
- Essex County

N

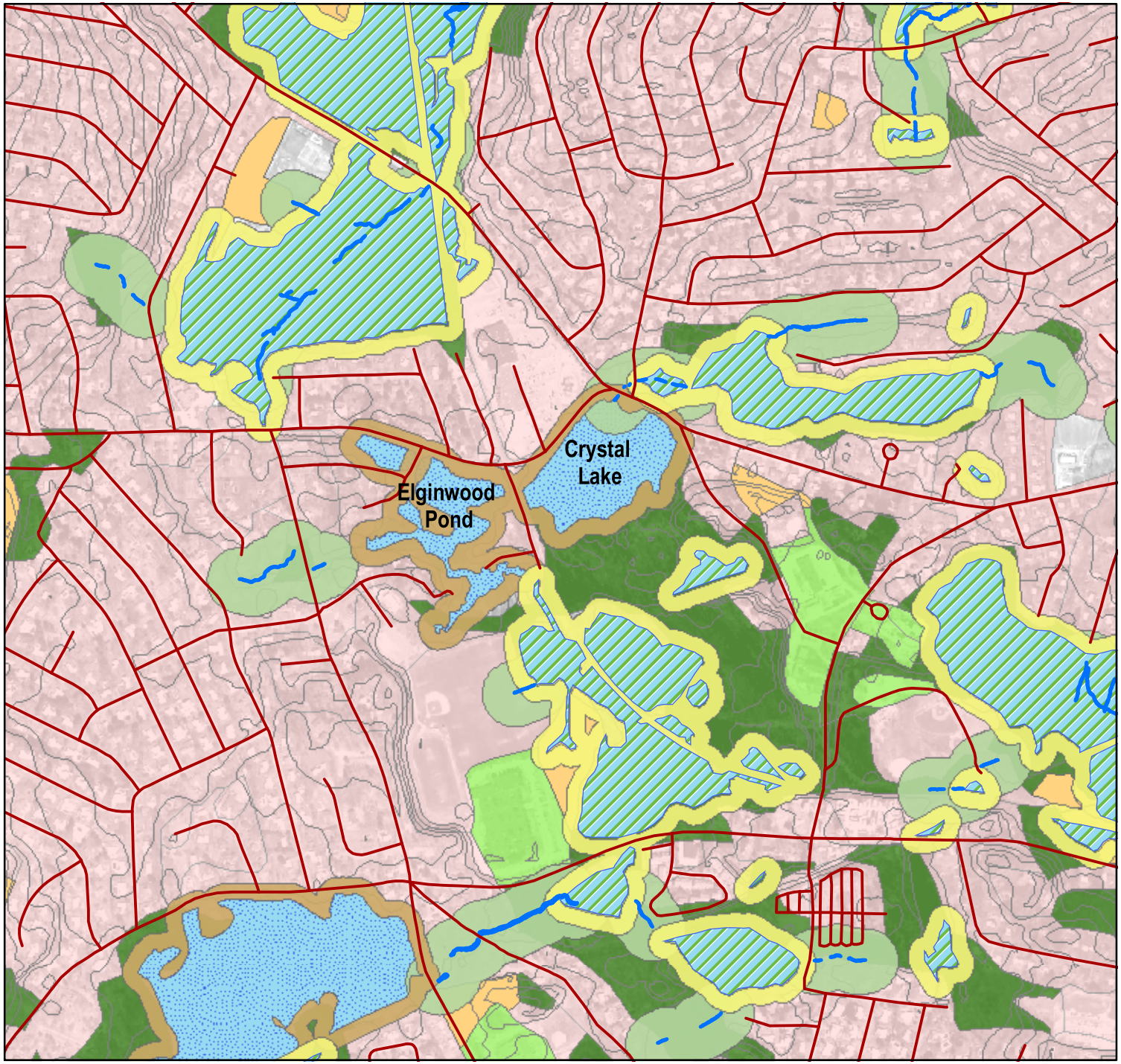
0 500 1,000 1,500 Feet

Study of Potential Dewatering Locations at Crystal Lake and Elginwood Pond

Department of Community Development and Planning

Peabody, Massachusetts

FIGURE 3



JURISDICTIONAL RESOURCE AREAS

Legend

- 10' Contours
- Roads
- State-Mapped Streams
- State-Mapped Wetlands
- 100' Wetland Buffer
- 100' Top of Bank Buffer
- 200' Riverfront
- State-Mapped Lakes and Ponds
- Open Land
- Forest
- Urban Open and Public
- Developed Land

NOTES:

- 200' Riverfront applies only to perennial streams. Ground truthing will be necessary to determine if they are jurisdictional.
- Jurisdictional areas may be present that do not occur on the map.

N

0 500 1,000 1,500 Feet

Study of Potential Dewatering Locations at Crystal Lake and Elginwood Pond

Department of Community Development and Planning

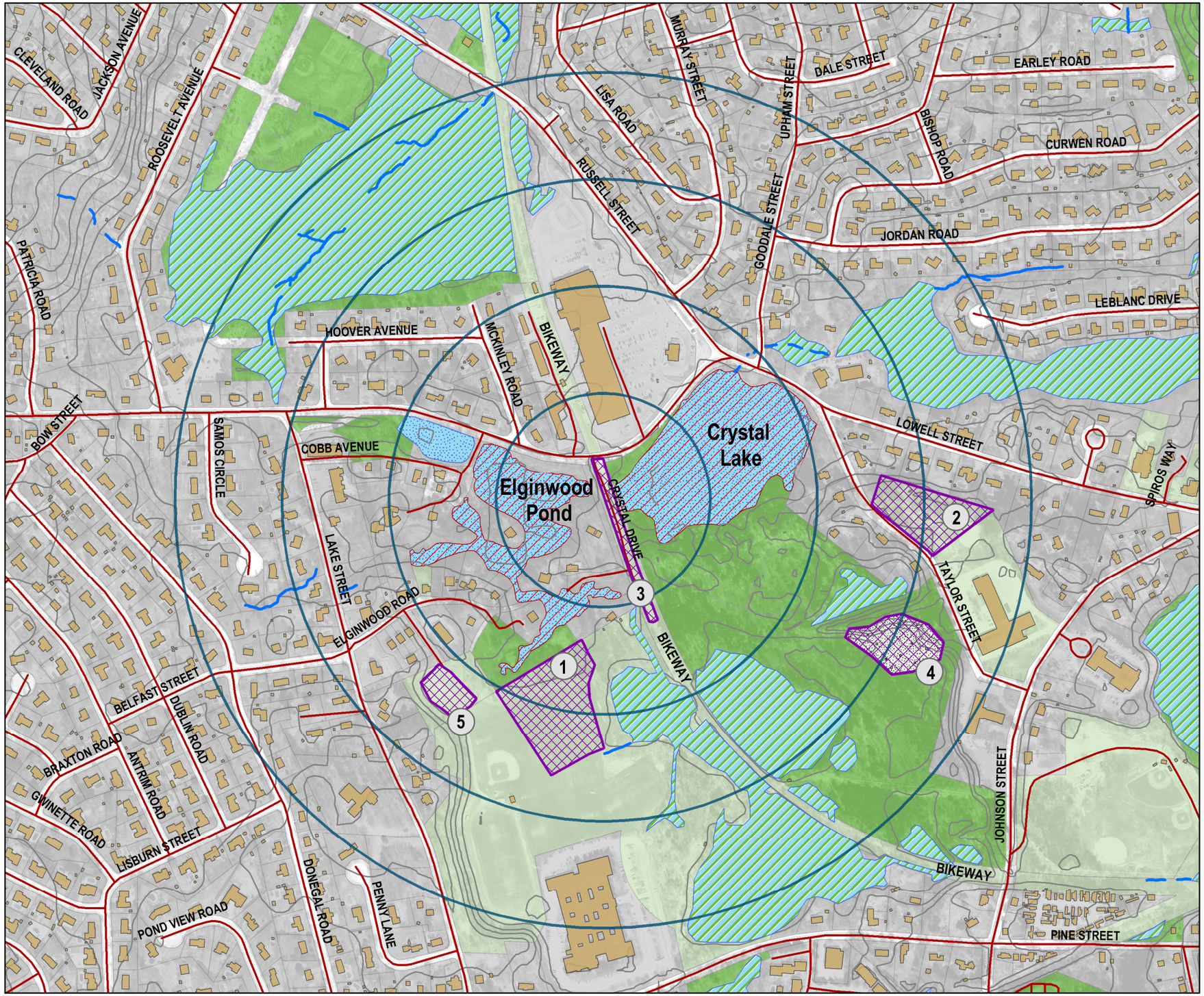
Peabody, Massachusetts

FIGURE 4

Appendix B

Basemap

PROJECT SITE BASEMAP



LEGEND

EXISTING

- 10' Contours
- Roads
- State-Mapped Streams
- Wetlands*
- State-Mapped Lakes and Ponds
- Buildings
- Gravel Pits

Ownership

- Private
- City of Peabody - Civic/Recreation**
- City of Peabody - Open Space

PROPOSED

- Lateral Distance from Locus Center (500' intervals)
- Dredge Area
- Potential Dewatering Locations

*Wetlands layer data source - Massachusetts Geographic Information Systems

**Includes schools, library, ballfields, and other City buildings

***Sites 1-5 correlate with potential dewatering locations. Refer to the report for more information.

N

0 500 1,000 1,500 Feet

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Bioengineering GROUP