Capisic Pond Sustainability Plan - Phase 1

City of Portland
May 2012

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

TABLE OF CONTENTS

SECTION		PAGE NO.
EXECUTIVE SUMMARY		**ES-1**
1.	**INTRODUCTION**	**1-1**
1.1	Purpose	1-1
1.2	Capisic Pond	1-1
1.2.1	Pond and Park History	1-1
1.2.2	Previous Pond and Park Studies	1-2
1.2.3	Community Presence	1-9
1.2.4	Previous Recommendations	1-10
1.3	Summary	1-11
2.	**EXISTING CONDITIONS**	**2-1**
2.1	The Watershed	2-1
2.2	The Pond	2-2
2.2.1	Pond Sediments	2-2
2.2.2	Pond Chemistry	2-2
2.2.3	Pond Biology	2-3
2.2.4	Pond Hydrology	2-4
2.2.5	Pond Sedimentation	2-5
2.3	Pond and Park Resources	2-5
2.3.1	Natural Features	2-5
2.3.2	Man-Made Features and Infrastructure	2-8
2.4	Public Participation	2-14
3.	**RECOMMENDATIONS**	**3-1**
3.1	Wetland Analysis	3-1
3.2	Pond Morphology and Hydrology Evaluation	3-1
3.3	Management Opportunities Meetings	3-1
3.4	Open Water Habitat Enhancement Plan	3-1
4.	**REFERENCES**	**4-1**

LIST OF TABLES

TABLE		PAGE NO.
Table 2-1:	IWWH Rating System - Capisic Pond Category and Score	2-6
Table 2-2:	Rockland Avenue Outfall Management Alternatives	2-13

LIST OF FIGURES

FIGURE		PAGE NO.
Figure 1-1:	Waterlinks Concept Diagram	1-3
Figure 1-2:	Capisic Pond Master Plan Sketch	1-7
Figure 1-3:	Capisic Pond and MaineDEP Sampling Locations	1-9
Figure 1-4:	Current and Historical Pond Dimensions	1-11
Figure 2-1:	Watershed Map	2-1
Figure 2-2:	Capisic Brook Dam Weir Stage-Discharge Curves	2-4
Figure 2-3:	Future Open Water Habitat	2-7
Figure 2-4:	Rockland Avenue Outfall Drainage Area	2-9

APPENDICES

Appendix A: Capisic Pond Improvement Plan dated June 8, 1949 and Normandeau Associates Report – Results of Chemical Analysis of Sediments from Capisic Pond dated June 27, 1996

Appendix B: Capisic Pond Sediment Sampling Memorandum – December 2, 2011

Appendix C: Rockland Avenue Outfall Alternatives

Appendix D: Public Stakeholder Meeting Agenda and Notes – February 2, 2012

EXECUTIVE SUMMARY

This Capisic Pond Sustainability Plan – Phase 1 report (Report) was prepared by Woodard & Curran in association with Regina S. Leonard landscape architecture & design, herein referred to as the "Project Team". This Report provides recommendations for a Phase 2 effort for Capisic Pond's enhancement and long-term sustainable management.

Project Goals and Background

The Capisic Pond is the City of Portland's largest freshwater water body and the Park a favorite destination for area residents and bird watchers.

Over the past 15 years, the City of Portland has made significant investment in improving the Capisic Brook watershed through combined sewer overflow abatement and stormwater management and planning. With recent Capisic Pond Park habitat enhancements and planned improvements to watershed quality, the development of a sustainable management plan for Capisic Pond will allow the community to realize the full benefits of this resource.

This Report summarizes what has been accomplished to date within the watershed and Pond area, and provides recommendations for next phases of work. In an effort to inform future planning, the project team examined the chemical and physical characteristics of the pond sediments, explored opportunities for management of the Rockland Avenue stormwater discharge and explored permitting constraints and opportunities as a basis for next steps. Additionally, the project team conducted two public meetings to provide information to public stakeholders and to reach consensus on next steps in Capisic Pond management.

Pond History and Previous Studies

Capisic Pond is a manmade impoundment on the Capisic Brook in Portland, Maine. The Pond receives runoff from a highly urbanized watershed and has experienced significant sedimentation with current open water only a fraction of historical dimensions. The Pond has a colorful history and has been an integral part of the Portland area since the late 1600's and was the site of an early gristmill and sawmill. The Pond's current dam was constructed in the 1950's with modifications to the dam overflow weir made in the 1990's to manage upstream flooding. The Pond was last dredged in the 1950's. The Pond (and adjacent wetlands) is currently designated under state law as a "moderate-value" Inland Waterfowl and Wading Bird Habitat (IWWH) by Maine Department of Inland Fisheries and Wildlife, which requires special management. The adjacent Capisic Pond Park was established in 1948 and has been enjoyed by Portland area residents largely as a natural area with very few traditional park amenities.

Over the past twenty years, the Pond, the adjacent Park and the Capisic Brook watershed have been the subject of numerous studies and plans addressing ecology, flooding, infrastructure management, and pollution prevention. The studies have been largely focused on the Capisic Brook, combined sewer overflow abatement and habitat enhancement of the Park area and many of the plan and study recommendations have been implemented. The primary recommendations that are still to be implemented include Open Water Management and Education Station Development. More recently, concerns have been expressed regarding the discharges of stormwater runoff at Rockland Avenue. Currently, there is no specific Capisic Pond management plan in place for ongoing management of the Pond & Park for habitat, aesthetics or recreation.

Key Findings of this Report

- Since the 1950's open water in Capisic Pond has been reduced from approximately 7.7 acres to approximately 2.6 acres, approximately 34% of its 1956 dimensions.

- For sediment removal scenarios, pond sediments do not appear to preclude beneficial reuse under current Maine Department of Environmental Protection (MaineDEP) standards.
- Limited sampling conducted by MaineDEP indicate the Pond may be a nutrient enriched system and at times contains above average amounts of nutrients and dissolved organic carbon and below average levels of dissolved oxygen.
- Capisic Pond dam weir modifications were undertaken in 1996 and again in 2001 to reduce flooding above the dam. The modifications increased the overflow capacity, to pass far more water without raising the Pond's water level, which may influence the ability of cattails and other vegetation to colonize near-shore pond sediments.
- Capisic Pond is a moderate-value IWWH area with low scores for wetland diversity; sedimentation is compromising the *Percent of Open Water Habitat* value. The IF&W criteria should be carefully considered in the context of future habitat and open water enhancement activities.
- The Rockland Avenue stormwater outfall drains approximately 160 acres of highly developed residential and commercial area. Given the extensive size of the drainage area discharging runoff at the Rockland Avenue outfall there is potential for migration of pollution and sediments into the Pond; erosion of the channel below the outfall has also been observed.
- The following preferences were identified through the project's public meetings:
    - Open Water: Pursue open water habitat restoration to strategically remove accumulated sediments; provide enhanced open water to wetland ratios;, and enhance and manage wetlands for increased wetland diversity.
    - Rockland Avenue Outfall: Pursue retrofitting to enhance trash capture and stormwater quality treatment to the extent practicable.
    - Education Station: Pursue additional education stations, to be developed in a context sensitive way with neighborhood input and contingent upon neighborhood approval.
- The following questions were asked during the project's public meetings:
    - How much sediment enters the Pond? Will management actions be sustainable or have to happen frequently?
    - Will cattail vegetation simply return upon completion of any project? What is "life expectancy" for management actions?
    - What are the permitting and funding issues around preference for open water habitat enhancement?
    - What will be the wetland enhancements and will ecology and survivability be considered in the planning?

Recommendations

- Conduct Wetland Analysis
- Conduct Evaluation of Pond Morphology
- Conduct Evaluation of Pond Hydrology
- Engage and Consult with a "Project Partner Team"
- Develop a Pond Enhancement and Management Plan

1. INTRODUCTION

1.1 PURPOSE

The purpose of this report is to summarize the historical and current condition of Capisic Pond in Portland, ME. The report focuses primarily on the extensive studies regarding Capisic Pond and the Capisic Brook watershed, but also includes evaluation of current conditions. This summary will provide a basis for understanding where the Pond improvement actions stand now and will allow the identification of additional information or actions needed to move forward with community supported recommendations for Capisic Pond's enhancement.

This summary was developed using existing studies and plans, site visits, and historical and current information. Studies and plans reviewed included the following:

- Natural and Cultural Resources of Capisic Pond - Prepared by Woodlot Alternatives
- Capisic Brook Greenway Master Plan -Prepared by CRJA Landscape Architects
- Previous Capisic Pond Dredging Plans
- Maine DEP Wetland Biomonitoring
- Maine DEP Fluvial Geomorphology and Urban Streams Reports - Prepared by Field Geology Services
- West Side Interceptor Design Documents including NRPA permits and landscape design
- Capisic Brook Watershed Management Plan - Final Draft – Prepared by Woodard & Curran
- Pond historical documents including dam design, historical aerial photographs, etc.

1.2 CAPISIC POND

Capisic Pond (Pond) is Portland's largest freshwater body and was created in the 1600s with the construction of a dam on Capisic Brook, a small stream approximately 2.5 miles in length. The Capisic Brook Watershed is approximately 1,500 acres and is highly developed with a mix of residential and commercial development. The Pond receives natural runoff, stormwater runoff from developed areas and periodic combined sewer overflows during certain rain events. The City of Portland (City) is currently implementing combined sewer overflow abatement activities with the plan to eliminate combined sewer discharges into the Pond watershed within the next several years. Additionally, in 2011 the City developed the Capisic Brook Watershed Management Plan to address the impacts of urban area stormwater runoff on the brook and Pond. These efforts in the watershed now allow the City to consider a long-term management and enhancement plan for the Pond.

The watershed includes several tributary streams. The main branch of the Capisic Brook originates in a wooded area within Evergreen Cemetery and flows to the west and south along Warren Avenue. The North Tributary originates near Forest Avenue, and this branch flows through a residential and commercial-industrial area before joining the main branch northwest of Evergreen Cemetery. The stream then flows through a residential area and is joined by the West Tributary, which originates near I-95 and the Riverside Street commercial area. The West Tributary meets the main branch approximately 3,000 feet downstream of the confluence of the North Tributary and the main branch. The brook continues to flow through residential areas until it reaches Capisic Pond; the pond discharges back into the Brook which flows into the Fore River, a major tributary of Casco Bay.

1.2.1 Pond and Park History

Capisic Pond has been a central part of Portland's history for many years. The original falls near the current dam location powered a sawmill and a gristmill established in the late 1600's and was central to the economy in early Portland (then called Falmouth). During the cold months, the frozen water in the Pond provided ice to the City. The earliest references to pollution in the watershed was from 1886, when

then Secretary of the Maine Board of Health visited the "Capisic Pond in Deering for the purpose of inspecting the pond and its surroundings as regards alleged nuisances. For years a local nuisance had existed in the shape of a tripe factory and bone boiling establishment. The water which came from this and which crossed the public highway below the factory and flowed a considerable distance through meadows before it reached Capisic Pond, made the air very offensive the whole length of the little brook and had completely spoiled the little sheet of water which is known as Capisic Pond, and from which formerly there was gathered ice of a very excellent quality." In more recent history, the Pond has provided a fishing and skating area, as well as a recreational area with the creation of Capisic Pond Park in the 1940s (Gilbert, 1987; Graham, 2011).

The greater Capisic Pond area was first considered for the purposes of a park and playground in 1938 through a citizen petition, but the land was initially deemed unsuitable for park purposes by the City Council in 1939. In 1947, the City Council reconsidered a smaller parcel for the same purposes, and in 1948 Capisic Pond Park became an official City open space. Capisic Pond Park is now an 18-acre park consisting of a freshwater pond, wetlands and uplands. Residents frequent the park for recreation, particularly the half-mile Capisic Brook Trail walking path, and for bird watching. Several undeveloped side trails offer exploration of the pond and surrounding wetlands.

The current Capisic Pond dam was built by the City of Portland during the mid-1950s as part of the West Side Interceptor Sewer project, and as part of the overflow structure of the combined sewer system. This structure was a reconstruction of and is located below the placement of the original privately owned dam, the construction period of which is unknown, but knowledge of the pond reaches as far back as the mid- to late-1800s or further (Gilbert, 1987; Graham, 2011).

During the late 1940s, the City planned improvements to Capisic Pond in the form of dredging and included straightening of the Capisic Brook channel below Lucas Street. The plan indicates areas of cut and fill along the margin of the Pond and also shows a proposed roadway on the east side of the pond. Given that the road does not exist, it is not clear to what extent this plan was implemented. Appendix A shows the original Capisic Pond Improvement plan from June 8, 1949 that shows the extent of the dredging and proposed improvements.

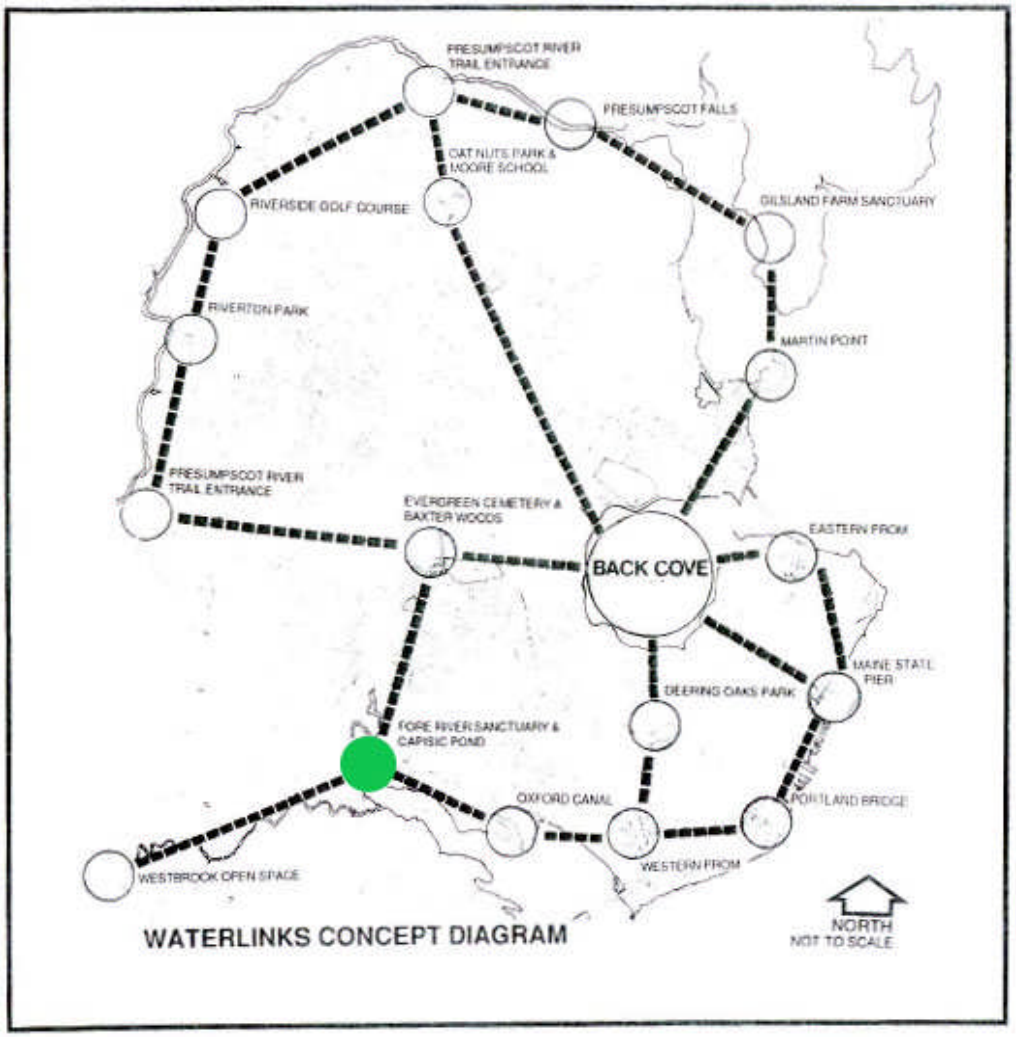
1.2.2 Previous Pond and Park Studies

Over the last three decades, the City of Portland and other agencies have undertaken a number of studies and plans relevant to Capisic Pond and the park area. With increasing public awareness and appreciation for urban natural spaces, the Capisic Pond Park has gained increasing importance both for its walking trails and as an environment in which to experience wildlife. While the 18-acre park, with its old field habitat, forested upland and large, freshwater pond, is unique in Portland, Capisic Pond Park's value as both a recreation and wildlife corridor is significantly defined by its connections with adjacent natural areas, such as Evergreen Cemetery and the Fore River Sanctuary. For this reason, some of the previous studies of this area are linked to larger, more comprehensive projects. Recommended improvements for the park, therefore, have historically been tied to these efforts. The following are brief descriptions of these previous studies.

Portland Shoreway Access Plan –Mitchell-Dewan, 1987

Similar to the 1905 *Plan for Portland's Park System* by the Olmsted Brothers, the Shoreway Access Plan analyzed the City's existing and potential open spaces and made comprehensive recommendations to develop, conserve and enhance public access to waterfront and natural areas. The plan, with its Waterlinks Concept Diagram (see Figure 1-1), envisioned an integrated system of recreation areas, trails and open spaces with destination points along a trail loop. The network included Capisic Pond Park in

Figure 1-1: Waterlinks Concept Diagram



"Loop Two," with a route connecting from the Fore River Sanctuary through the park to the Stroudwater River, Evergreen Cemetery and Baxter Woods.

While the Shoreway Access Plan focused on a comprehensive City-wide system, it also included recommendations specific to selected sites, including Capisic Pond Park. These recommendations were informed by general assessments of the existing conditions.

At the time of the study, Capisic Pond Park was an "unpublicized public park with a non-maintained but passable dirt road across open field." There was minimal development on site, with a central pathway and smaller footpaths, a primitive footbridge, and parking space for 1-2 cars. The natural features of the park included open field bordered to the west by the freshwater pond and to the east by what the plan described as "weeded, mixed evergreen and deciduous forest". There were six points of access to the park. The major path entered from Capisic Street with minor footpaths extending to adjacent neighborhoods at Machigonne, Eaton, Ridley and Lucas Streets. There was a small footbridge and path to the park from Presnell Street. At the time of the report, the park was experiencing pressure from several planned residential urban development projects proposed in the immediate neighborhoods.

Much of the plan's assessment focused upon the visual qualities of the park, noting that, "with better management of land and pond… the area could become an attractive addition to the neighborhood". The plan recommended selective thinning and some replanting to add to the "textural and spatial diversity". Water quality of the pond appeared to be an issue at the time of the report, which noted the presence of cattails and algae growth in the pond and the plan recommended protection from runoff from adjacent lawns and pathways. The plan also recommended an adjustment to the alignment of the trail to achieve a more naturalistic form that better complimented the pond.

While the Shoreway Access Plan recommended that the City prepare a master plan for park redevelopment, it did provide initial guidance. The recommendations included a new parking area off Lucas or Capisic Street for up to five vehicles, trail realignment and resurfacing, development of a small overlook with informal seating near the pond, creation of a new picnic area, and native plantings. The plan also focused upon the educational opportunities, suggesting the incorporation of interpretive signage with nature themes. While the plan did not make specific recommendations regarding trail surface materials for Capisic Pond Park, it did note that four feet should be the standard trail width and that trail surfaces should be appropriate to the area and expected level of use. The plan showed picnic areas in the meadow near the Capisic Street park entrance and atop the present day sledding hill. It noted that these designated areas should be level and accessible for daily maintenance. As well, the plan identified two overlooks: one at the top of the sledding hill and the other on the point of land near the Capisic Street Park entrance.

Inventory & Management of the Natural & Cultural Resources of Capisic Pond – Woodlot Alternatives, 1989

In 1989, the Friends of Capisic Pond Park commissioned a habitat assessment and management plan of the Pond and Park area. The resulting report called Capisic Pond Park a "high value natural area that provides residents the opportunity to learn about wetlands, wildlife, and the importance of natural resource protection". The inventory and assessment included a detailed listing of plants and wildlife found in the study area and also included limited analysis of Pond water chemistry. No unusual natural areas or rate plant communities were noted beyond the occurrence of the uncommon Tuberclad Orchid, which at one time was listed as a "special concern species" by the Maine Endangered Plant Technical Advisory Committee. The study noted a "typical assemblage" of large and small mammals within the park. Thirty-six species of birds were recorded, with up to twenty species actively breeding. While the report cited exceptionally high eutrophication rates within the pond due to pollution from a variety of non-point source pollutants, the analysis that provided this determination was limited and recommended further sampling.

The study provided a series of management recommendations, including both short-term and long-term steps and conservation-related measures for improving habitat and water quality as well as education. These short term measures included the conservation of the existing uplands to prevent future fragmentation of habitat and the acquisition of undeveloped adjacent land parcels. The recommendations also proposed future studies to better understand the hydrology of the Pond, including comprehensive water quality testing to better understand the contributing factors to the "accelerated eutrophication rate" of the pond. Conservation measures were aimed at improving the quality and function of the park as a natural area. The plan called for a detailed boundary survey as an important first step in addressing encroachment issues and the maintenance of a 100-foot vegetated buffer around the pond edge. Implementation of the *Shoreland Access Plan* was also deemed a priority, although the report did not provide specific details. At the time of the report, more extensive research was needed to understand how best to restore wetland systems within the park, although it was suggested that water level manipulation should be considered as a way to discourage the invasion of monoculture species, such as cattails.

The Capisic Brook Greenbelt / Stormwater Abatement Study – CH2M Hill, 1996

In 1996, the City of Portland commissioned CH2M Hill to evaluate and recommend water quality improvements "with net ecological and community benefits" within the Capisic and Fall Brook Watersheds. The study was initiated in response to the City's Combined Sewer Outflow Abatement Study Master Plan, which cited strong support for the implementation of a plan to improve water quality, manage storm water and enhance wildlife habitat and recreational opportunities. While the firm identified Capisic Pond Park for its high potential wildlife habitat, it noted that "the ecological value of the pond is diminished by the aggressive nature of two species: cattail and purple loosestrife". The report recommended an integrated approach to stormwater abatement, environmental enhancement and recreation enhancement in the Park and watershed area.

Environmental improvement recommendations included the diversification of existing vegetative species by planting a greater variety of herbaceous plants, wood shrubs and saplings to augment "vegetative stratification," or the canopy and sub-canopy. "These changes will work to maintain existing diversity of wildlife while providing habitat for additional species". Importance was given to nurturing the diversity and forestation of wetland habitats since they provide both natural flood control, and dense vegetative cover for wildlife. The environmental diversification goals also included the elimination of the large monocultures through pond dredging or other modifications, although this approach did not earn unanimous support from the regulatory agencies.

Additionally, in this study Capisic Pond dam weir modifications were identified as a principal flood control component. The recommended plan included lengthening the secondary weir by a total length of 25 feet while retaining the primary weir length of eight feet. It appears slightly different adjustments to the dam weir widths were implemented as a means to alleviate flooding. Deluca-Hoffman Associates, Inc. drawings 'issued for bid' October, 1996, depict the modifications and are discussed further in Section 2.2.4. The plans show widening the primary spillway from eight feet width to 18 feet. This weir widening was constructed shortly thereafter.

Recreational opportunities identified in the plan included passive and active components, such as walking paths, viewing areas and a bike path. Recommendations included the expansion of the existing trail networks within the watershed to provide access to wetlands and other natural features for educational and recreational opportunities. The report identified several recreational opportunities for Capisic Pond Park, including the addition of footbridges and the extension of the trail system around the west side of the pond and to the Fore River Sanctuary. The recommendations also included elements to enhance the educational benefits of the natural area and suggested new interpretive signs and plant identification markers. No plan was created to supplement these general recommendations.

Capisic Pond Sediment Sampling and Analysis – Normandeau Associates, 1996

In 1996, the Friends of Casco Bay obtained the services of Normandeau Associates (Normandeau) to perform a chemical analysis of Capisic Pond sediments in order to inform dredging considerations in the Pond. In April 1996, Normandeau and Friends of Casco Bay (FOCB) collected three sediment samples from the northern end of the pond south to Capisic Street and one additional sampling location south of Capisic Street. Although the sample location figure associated with the Normandeau final report has not been located, it is our understanding that location #1 was located in the upper pond, and each consecutive sample was taken further downstream. Results of this analysis indicated some detection of metals, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). Analytical results showed that only arsenic and PAHs exceeded the MDEP limits (at the time of the report) for those

compounds, with the highest detection of PAHs at sample location #1. A copy of this report is included in Appendix A.

During the same time frame, the FOCB conducted water depth evaluations within the Pond. Depths in Capisic Pond on the north side of Capisic Street ranged from 0.7 feet (0.2 meters) to no more than 2.3 feet deep (0.7 meters), while depths on the south side of Capisic Street ranged from 2 feet (0.6 meters) to 4.25 feet deep (1.3 meters).

Capisic Brook Watershed Flood Control Study Re-Evaluation (Draft) – DeLuca-Hoffman Associates, 1999

Following a significant storm event in October 1998, the City of Portland retained DeLuca-Hoffman Associates, Inc. to perform a Capisic Brook Flood Study Re-evaluation. Although this was a study of the entire Capisic Brook watershed, one deficiency identified in the report was the increased tailwater condition of Capisic Street culvert due to the configuration of Capisic Pond dam. According to the hydrology study, at storm flows the dam raised the water level at the culvert outlet, which in turn further raised the water level in the Pond. The Flood Study report recommended improvement to the dam's spillway and the addition of a second box culvert at Capisic Street.

In 2001, the dam underwent construction on its sewer diversion chamber and spillway. The spillway's primary weir opening was widened from 18 feet to 50 feet. Soon after the Capisic Street box culvert was replaced with a larger concrete arch culvert. The combination of a much wider spillway and the larger culvert substantially increased the outlet capacity at Capisic Pond compared to that available before 2001. The dam now has capacity to pass far more water without raising the Pond's water level nearly as much. The objective of reducing flooding on the properties surround Capisic Pond was accomplished.

Capisic Brook Greenway Master Plan – Carol R. Johnson Associates, 2001

In 2001, the City hired Carol R. Johnson Associates in association with CH2M Hill to develop master plans for a continuous trail system and greenway within the Fall Brook and Capisic Brook Watersheds, which were seen as important corridors for both stormwater management and wildlife movement. The project objectives fell under three main areas of focus: park and recreational improvements; natural plant, aquatic ecosystem and wildlife habit improvements; and engineering improvements.

Habitat restoration and planning recommendations included the reintroduction of native species and long-term management to minimize the spread of invasive plants; the protection and reinforcement of characteristic wetland types; provisions for environmental education with sites representative of watershed habitat types; and low impact pathways through less sensitive habitats. The plan considered the ecology and habitat within Capisic Pond Park as "the most diverse and valuable area of the watershed". The top of the pond near Lucas Street described as particularly diverse, with a mix of cattail marsh, wet meadow bordered by old field habitat and mature upland deciduous forest. The pond, the plan noted, "has substantial areas of open water surrounded by emergent vegetation [and] a wetland finger extends from the east side of the pond through old field habitat, which adds to the diversity". Despite these accolades, the report noted that the pond was eutrophic, with highly turbid water, algal growth, heavy silt accumulation and extensive debris and detritus around the pond edge. These conditions, the plan summarized, limit optimal aquatic habitat for fish while providing good habitat for warm water species and aquatic invertebrates. The assessment noted that the surrounding parkland provided optimal habitat for songbirds and semi-aquatic mammals because of abundant vegetative cover and food sources.

The Capisic Brook Greenway Master Plan sought to enhance the present uses of the park and to create new opportunities for public access. The plan recommended connections from Evergreen Cemetery down

to Capisic Pond Park; included two educational stations located along Capisic Brook, and highlighted specific improvements to the park itself. The Master Plan proposed better access to the park from the southern and northern ends with additional, but limited parking. It also proposed improved signage, seating, and viewing platforms or fishing decks above the pond edge. A new canoe launch near the turn-around at the southern end of the Park and near Capisic Street entrance was included in the recommendations.

Figure 1-2: Capisic Pond Master Plan Sketch

The plan also outlined a number of trail-related improvements, including paving the trail surface along the pond's eastern edge for universal accessibility, while leaving unpaved footpaths leading to more remote or private areas of the park. Small bridges and culverts were integrated to provide pedestrian routes across drainage areas. The plan proposed a new footpath along the western side of the pond, designed and located to maintain existing areas of ecologically sensitive habitat. It also suggested the use of elevated boardwalks and overlooks in wetlands and in steeper sections and to maintain separation between adjacent residences and the trail. The planned improvements also addressed the findings of prior stormwater studies and environmental assessments. The design incorporated a split rail fence to delineate the park boundary in order to resolve issues of encroachment by private landowners on the west side of the pond. The plan also recommended dredging the pond to reclaim open water and other upstream Capisic Brook channel modifications to improve stormwater conveyance and improve waterfowl habitat. Recommendations also included a comprehensive list of plant species selected to support and enhance the ecological habitat of the wetland corridor. Maintenance needs were also considered in the report. "Maintenance should allow for the natural maturation of land, vegetation, and stream morphology as well as safe use by visitors".

Inventory & Analysis, City of Portland Comprehensive Plan, 2002

Natural Environment - The City of Portland, in its 2002 Comprehensive Plan, included an inventory and analysis of the natural public spaces within the municipality. Of note, "Beginning with Habitat, An

Approach to Conserving Open Space," was introduced. The collaborative effort between the City, various environmental organizations, regulatory authorities and government agencies inventoried wildlife habitats within the City. The evaluation documented Capisic Pond and Brook as freshwater resources, but provided no other specific details relative to the park.

Recreation Resources **-** The Recreation Resources Inventory & Assessment reported a number of completed trails related to the recommendations of the Shoreway Access Plan of 1987, including the improvements to Capisic Pond Trail along the easterly side of the pond. Trails being planned at the time of assessment included those along Capisic and Fall Brooks. The report noted a general trend for increased public need for parks and open space "fueled by increased athletic field use, private funding and an increasingly diverse population". Master Planning, it noted, had created a change in the approach to the planning and management of parks from incremental project development to larger, comprehensive and long-range planning efforts, citing the recent Fall Brook and Capisic Brook Master Plans. The update also pointed to the importance of watershed improvements as part of City's strategy to comply with mandates by the EPA and the MDEP to reduce combined sewer outflows, allowing the brook corridors to naturally accommodate increased stormwater runoff while providing improved habitat and recreational opportunities through greenway development.

The Friends of Capisic Pond, which originally formed in 1989 to advocate against a proposed development adjacent to the pond, was inactive in 2002 despite the master planning efforts encompassing the Park. It is not known to what extent residents informed the recommendations for Capisic Pond Park contained in the Capisic Brook Greenway Master Plan.

Capisic Park Restoration Plan, West Side Interceptor Sewer Project, 2009

The period beginning in April 2009 saw renewed community activism on behalf of the Capisic Pond Park in response to a large-scale stormwater/sewer separation project proposed through the central park corridor. In response to citizen request, the City initiated the "Capisic Park Restoration Plan", a collaborative effort including input from residents, the Department of Inland Fisheries and Wildlife, the Maine Department of Environmental Protection, the Maine Audubon Society, local wildlife biologists, engineering and design consultants, and City staff and administrators.

The resulting plan established a project approach and defined limitations for construction to reduce impact on existing wildlife habitat, repair the park to its original natural condition and to the extent possible, improve the environmental and recreational values of the park consistent with previous park recommendations. The plan included an extensive replanting effort aimed at improving native plant diversity, reducing invasive species, supplementing the pond's vegetative buffer, and enhancing the existing wildlife habitat with the introduction of desirable food sources and increased vegetative cover.

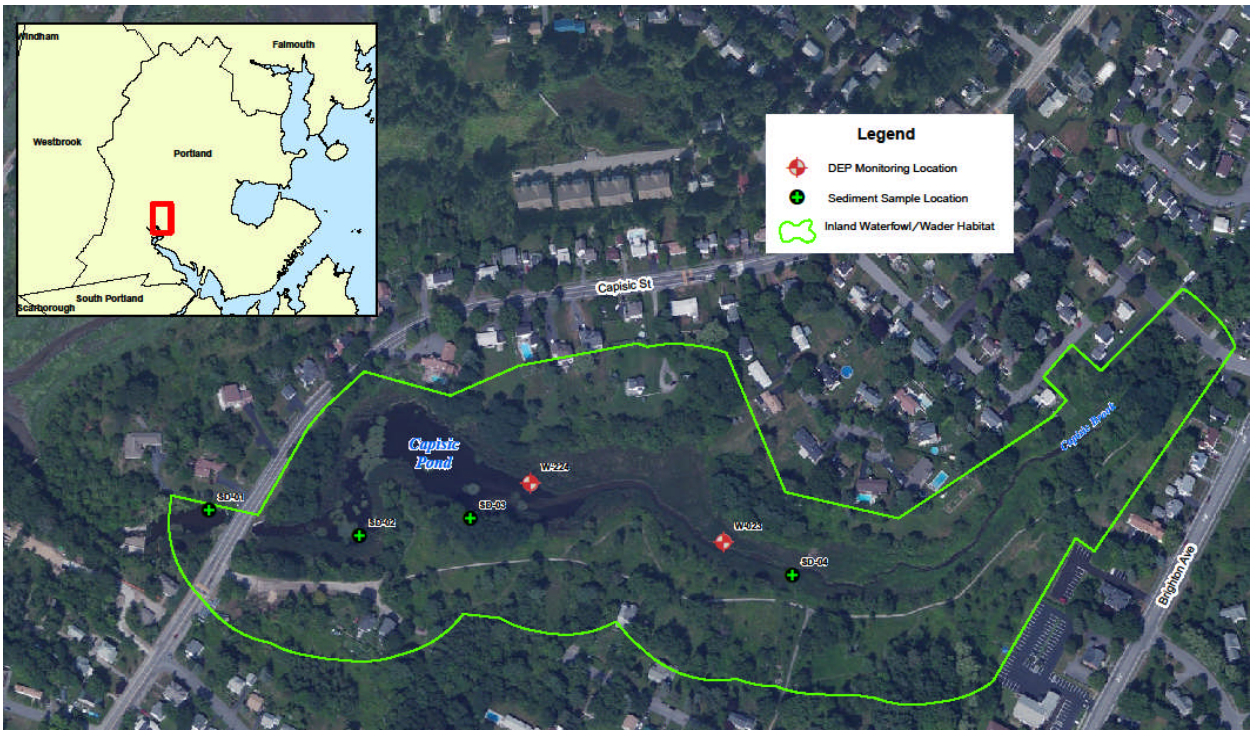
The Capisic Park Restoration Plan also included reconstruction and realignment of the existing trail, allowing it to provide seasonal access for sewer maintenance vehicles while remaining visually compatible with the natural character of the park. Where possible, the trail was pulled back from the pond edge to improve the buffer zone. Footpaths were left intact at the request of neighborhood residents, who collectively advocated for the "less is more" approach. A proposed footbridge across the Rockland Street drainage area was scaled back to reduce visual impact to the park. Entrance markers and signs, identifying the park and trail system, were also introduced at the three main entrances at Macy Street, Rockland Avenue and Lucas Street. Plans also included a new parking area adjacent to the Macy Street pedestrian entrance. The parking lot accommodates up to five vehicles.

Sewer and trail construction was completed in the fall of 2010, and the final plantings consistent with plan recommendations were installed in the fall of 2011. The plans incorporated a management strategy for maintenance of the park landscape, which greatly reduces mowing, maintains taller meadows and allows for the evolution of natural succession along woodland margins.

Maine Department of Environmental Protection Monitoring

MDEP has two on-going monitoring stations within the Capisic Brook watershed, including one at a location near Capisic Pond (Station W-023). Though the W-023 station is located in the northernmost part of the Pond, it represents the most proximate ongoing sampling location available in the area for indication of pond conditions. W-023 has been evaluated for both macroinvertebrates and water quality parameters and was assessed in 2000, 2003, and 2010. Figure 1-3 shows the Pond and locations of the MDEP monitoring stations

Figure 1-3: Capisic Pond and MaineDEP Sampling Locations



According to the 2003 results of the MDEP Monitoring Program, Station W-023 within Capisic Pond had impaired biota, poor water quality and degraded habitat. Runoff from the highly urban areas surrounding the Pond and Brook, as well as Combined Sewer Overflow (CSO) outfalls, may contribute to the impaired water quality at the station, particularly during wet weather (W&C, 2011). Further discussion of the results of analysis at this monitoring location is included in Section 2.0.

1.2.3 Community Presence

The Pond is of great importance to the surrounding community and there is currently an established presence of community interest through the Friends of Capisic Pond Park. Residents utilize the park for many activities including, but not limited to, walking and running, family recreation, dog walking, ice skating, wetland education and bird watching.

The water quality of Capisic Pond is of concern due to the potential for recreational use within the Park. Capisic Park is located along Capisic Pond, downstream of the majority of the watershed. The health of the brook and its watershed will determine the water quality, aquatic and terrestrial plant and wildlife presence and general aesthetics of Capisic Pond and Capisic Pond Park.

1.2.4 Previous Recommendations

As described above, several studies and projects have been performed regarding the ecological health and natural resources surrounding the Capisic Brook, Pond and watershed. These studies and plans provided recommendations for the Capisic Brook watershed, Brook and Park that range from structural management solutions to enhancement of natural areas. Although all work done within the watershed ultimately affects the Pond, this section summarizes those recommendations specifically pertinent to Capisic Pond.

- Continue separation of the City's CSO system to eliminate input of sanitary wastewater into the stream to significantly reduce nutrient and bacterial loads into the Pond;
- Implement structural improvements, including extension of the Capisic Pond Dam weir and installation of a 4' x 8' box culvert at Capisic Street, to control overbank flooding;
- Implement watershed-wide pollution prevention strategies to provide long-term improvements to Brook and Pond health. These recommendations include enhanced outreach and education to the public, watershed water quality monitoring, and policy and planning initiatives to reduce the likelihood for development and redevelopment to contribute to stream and Pond degradation;
- Develop Education Stations within the Park area to help inform the public of restoration efforts and their role in Pond health;
- Utilize a municipal road sweeping program to reduce road sand in stormwater runoff and therefore reduce sediment supply to Capisic Pond;
- Design and implement a greenway within the Capisic Brook watershed as described in the Greenway Master Plan; and
- Modify and dredge Capisic Pond to create an environment suitable for fish and other wildlife after upstream modifications have been carried out.

The following represent actions taken towards addressing the recommendations listed above.

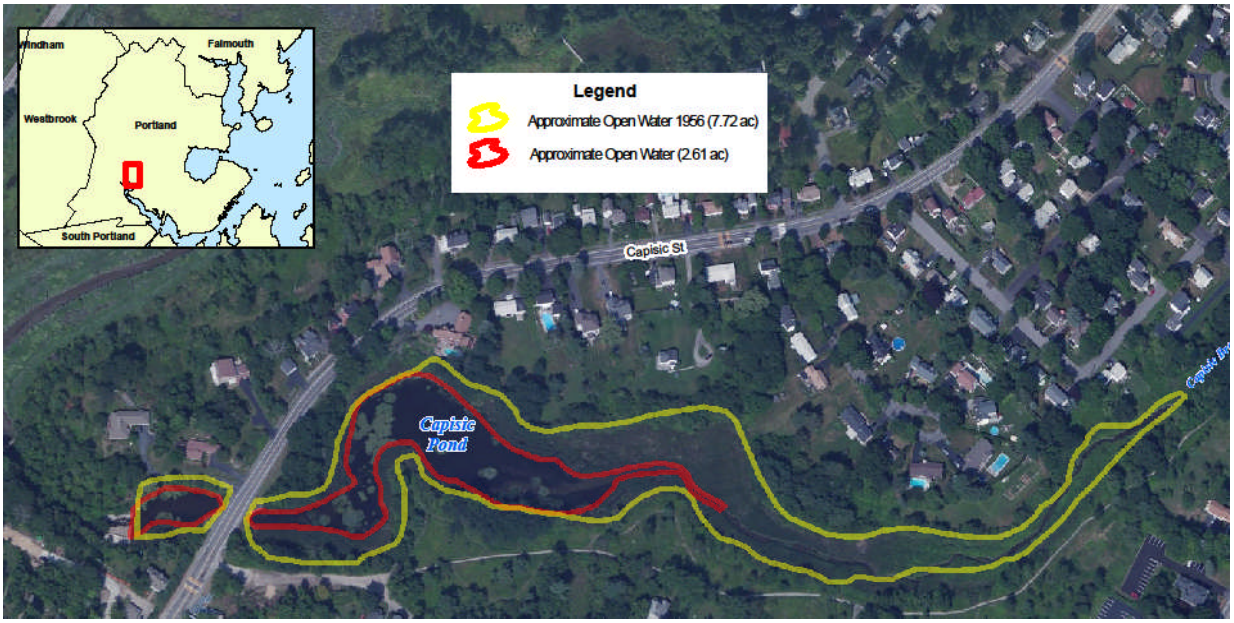
- The City continues to make progress towards separation of all combined sewers within the Capisic Brook watershed. As of fall 2011, several separation projects remain to be completed but will be completed over the next several years, significantly reducing or eliminating combined sewer overflows in the Capisic Brook watershed.
- The following conveyance structure modifications have been completed: extension of the Capisic Pond Dam weir, a 20' by 10'6" Con/Span open channel culvert at Capisic Street; and a 20' by 7' Con/Span open channel culvert at Lucas Street.
- The City has purchased a high-efficiency vacuum sweeper and currently implements a water quality sweeping program in the Capisic Brook watershed.
- The City has initiated a "Greener Neighborhoods, Cleaner Streams" program in the Capisic Brook watershed to help residents manage their properties in ways that can maintain and improve water quality.
- The City has installed four permanent flow monitoring locations within Capisic Brook in order to inform and support future water quality studies.

1.3 SUMMARY

Capisic Pond has been a central part of Portland's history for many years, and residents frequent the Capisic Pond Park for recreation and other outdoor activities. Studies have been performed on the Capisic Brook watershed, Pond, and Park, though most of the work in the watershed has focused on Capisic Brook. Results from studies generally indicate the Pond has poor water quality. Runoff from the highly urban areas surrounding the Pond and Brook, as well as Combined Sewer Overflow (CSO) discharges upstream of the Pond is likely to contribute to the impaired water quality. The Pond is of great importance to the surrounding community, and because of this, the poor water quality of the Pond is a concern due to the potential for recreational use and potential contact with the water.

Our review of the previous planning and research documents suggests that the physical landscape of Capisic Pond Park remains, in large part, unchanged since its inception as a public open space over fifty years ago. The area is still a relatively undeveloped natural area of old field habitat and deciduous upland surrounding a freshwater pond. While limited survey information is available regarding pond open water area and changes to open water over time, it is our understanding that open water habitat in Capisic Pond has been steadily declining since the last dredging effort in the 1950's. A comparison of approximate pond water dimensions based on our interpretation of aerial photographs in 1956 is included in Figure 1-4 below with yellow representing the 1956 approximation and red depicting the current dimensions.

Figure 1-4: Current and Historical Pond Dimensions



The trail system in the park, despite minor changes in alignment, still provides a central route traveling north to south across the narrow park corridor with smaller footpaths providing access to points to the east and west. While the formerly proposed overlooks, fishing decks and picnic areas have not been developed as recommended in the earlier plans, some features have been implemented, such as the parking area off Lucas Street, the entrance signs and markers. The new alignment and surface materials of the central trail is still being evaluated. Additionally, the City continues to evaluate the success of the current alignment, monitoring the formation of "desire lines" outside of the defined corridor, which have caused compaction and prevented grass establishment. The corridor was recently re-loamed and seeded.

Considering the greater context of the *Waterlinks* plan, there has been much progress toward the expansion of the trail network linking the park to the Fore River Sanctuary and Evergreen Cemetery. Portland Trails has played a key role in the implementation of the plan over the past three decades, and it is interesting to note that the Shoreway Access Plan provided the initial impetus behind the formation of Portland Trails in 1991. To date, the proposed trail along the west side of the pond has not been constructed. Considering the challenges of topography, sensitive habitats and residential abutters, further environmental assessment and planning would likely be necessary to determine the feasibility of this proposal.

The 2009-2011 park restoration effort greatly accomplished the environmental goals for the diversification of plant species, improvement of habitat, and the enhancement of the woodland edge as described in previous planning studies. The new plantings included over six hundred specimens: nine species of native trees, seventeen species of native shrubs and over 21 species of forbs, grasses and herbaceous plants. The palette expanded the overall range of wildlife food sources on site and expanded their seasonal availability. It is fully anticipated that, as the plant community matures, it will support an increased diversity and amount of wildlife in the park. Plantings located at the pond edge will help to expand the vegetated buffer, and will, in time, create added cover and habitat.

The largest remaining objective defined by previous park planning efforts is the water quality improvement of the pond. The "degradation" of the pond has been anecdotally linked to accelerated siltation and infill by a monoculture of cattails. Beyond the environmental ramifications, there are also consequences to the pond's recreational use and visual integrity.

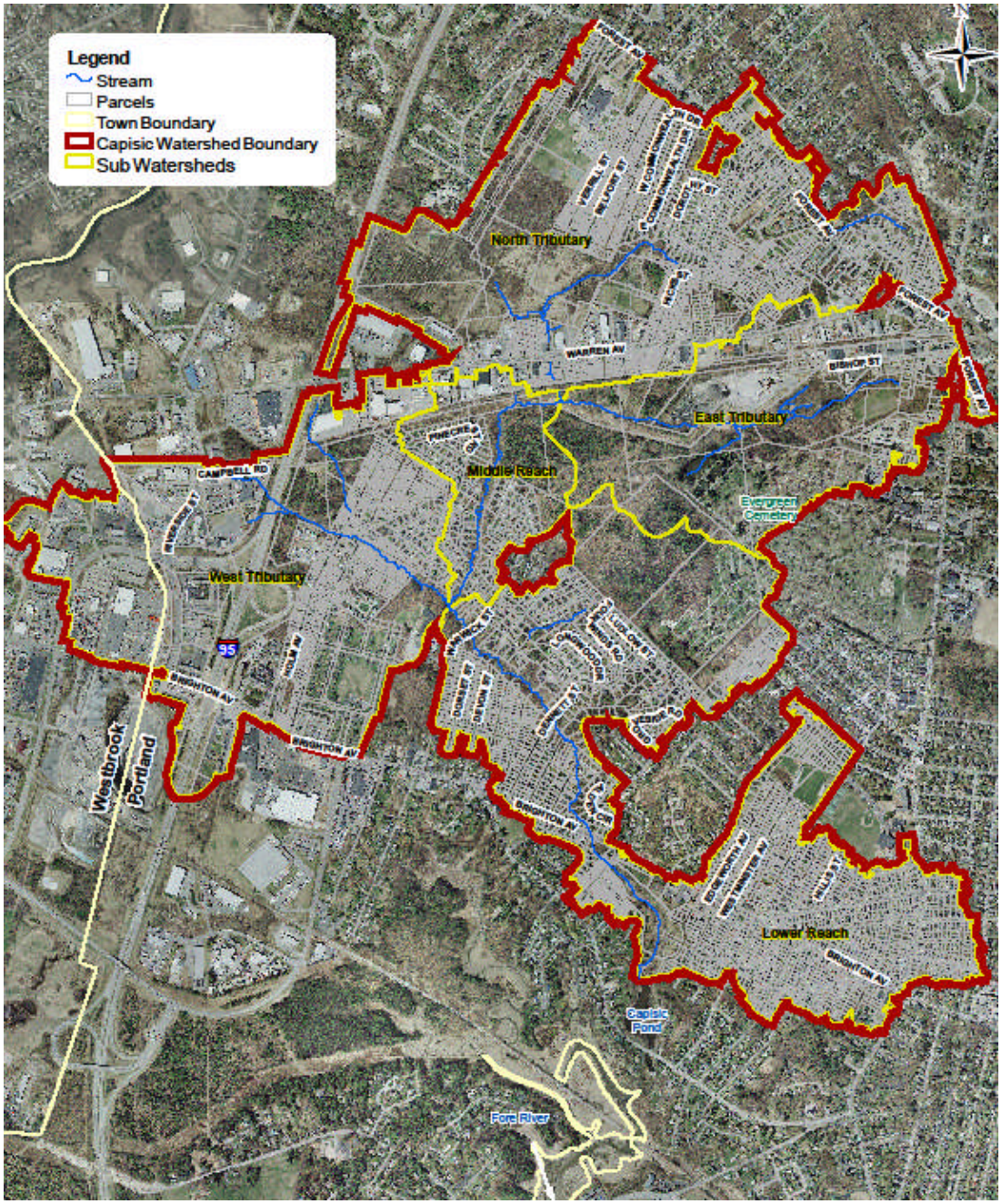
The Capisic Brook watershed has been identified by the City as a priority watershed that is currently in non-attainment of water quality standards. Recommendations for improving the watershed have been made and the City continues to make progress toward these improvements.

2. EXISTING CONDITIONS

2.1 THE WATERSHED

Capisic Pond is located within the Capisic Brook watershed, which is approximately 1,400 acres. The watershed was five subwatersheds: the North Tributary, East Tributary, West Tributary, Middle Reach, and Lower Reach, of which the northern portion of Capisic Pond is a part. Figure 2-1 shows the location of each subwatershed area, as well as Capisic Pond.

Figure 2-1: Watershed Map



In completing the draft Capisic Brook Watershed Management Plan, W&C performed analysis on land uses within the watershed. The amount of watershed area that is covered by impervious surfaces, such as roads, driveways and building footprints, influences Pond health. This analysis found that approximately 31% of the watershed is covered by impervious surfaces. When watersheds exceed approximately 10% of their land area in impervious surfaces, they begin to show signs of impairment. Impervious surfaces contribute to increased runoff and increased pollutant loads, while decreasing the infiltration of precipitation for recharge of local groundwater and maintenance of stream base flow.

2.2 THE POND

Capisic Pond, although currently experiencing the natural cycle from pond to wetland, still contains approximately 2.6 acres of open water habitat. The Pond's open water is surrounded by an emergent wetland, mostly dominated by cattails. Much of the adjacent land is old field habitat surrounding by mixed upland forest, with residential development along the western shores. The upper Pond, which extends north toward Lucas Street, contains more diverse wetland habitat including a cattail marsh near Lucas Street, with riparian vegetation environment present where the upper Pond broadens toward more open water (Johnson/CH2M Hill, 2001).

2.2.1 Pond Sediments

In September 2011, a site visit of the Pond and Park was performed. The site visit occurred during a period when the City had opened the dam to drain the Pond for planned erosion control management along the southwestern shoreline. This provided W&C an opportunity to view the Pond at low water conditions and visually characterize the bottom sediments that were visible. Additionally, a round of sediment core sampling was performed at four locations within the Pond.

The sediment characterization performed on September 14, 2011 found that the majority of sediments that were revealed during Pond drawdown were overlain by a layer of organic material ranging in thickness from approximately four to seven inches thick. The sediments themselves ranged from greenish-gray silty clay at the southern end of the Pond, near Capisic Street, to olive gray clay with very little to no fine sediment present in the open water area of the Pond. Sediment samples were analyzed at Katahdin Analytical Laboratories for chemical parameters including metals, dioxins, pesticides, PCBs, PAHs, extractable petroleum hydrocarbons (EPH), and phosphorous. Grain size analyses were conducted to determine physical characteristics of the sediments. The concentrations from the chemical analyses were compared against MaineDEP reduced procedure beneficial reuse standards where available. The concentrations of all parameters at all sampled locations were below these standards. Further discussion of sediment analysis and chemical analysis of the sediments is discussed in the memorandum in Appendix B.

2.2.2 Pond Chemistry

Very little data has been collected related directly to Capisic Pond, as opposed to the Capisic Brook and the upstream watershed. However, a wetland station (W-023) established by MDEP on Capisic Pond does exist on the northern boundary of the Pond area where the Capisic Brook and Pond meet. Data associated with this wetland station was collected in June 2000 and June 2003. Additionally, a new location was sampled in June 2010, W-224, which is located further downstream and more toward the center of the Pond than Site W-023.

With only two rounds of data from the wetland station and one data set from the pond location, there is not a full understanding of the chemistry of the pond. However, the data that is available is summarized below.

Total Phosphorus: Phosphorus is a major nutrient in all biological systems, as it is necessary for plant growth. Still, high amounts of phosphorus increases algae growth, particularly in freshwater ponds and lakes, which in turn can impede light penetrating the pond surface, inhibit other plant growth and can indirectly reduce Dissolved Oxygen levels. The flushing rate of a pond will influence the impact of Phosphorus on a pond's algal growth. At all three sampling events (both W-023 and W-224), total phosphorus levels were at or near 0.1 mg/L. This level of phosphorus typically indicates a eutrophic freshwater environment.

Dissolved Oxygen (DO): DO is the measure of the amount of oxygen that is dissolved in the water. DO levels that measure less than 5 ppm are considered stressful for aquatic life, as the amount of oxygen available is too low to sustain entire communities. The DO levels from the two sampling events at station W-023 measured 3.4 mg/L (June 2000) and 5.2 mg/L (June 2003), with W-224 (June, 2010) measuring at 7.4 mg/L. These levels indicate that summer DO levels may periodically be low enough to be stressful for pond organisms. It should be noted that DO levels fluctuate on a daily basis and should be monitored much more extensively before reaching conclusions of level of impact on Pond ecology.

Dissolved Organic Carbon (DOC): DOC is organic material that has been broken down to a size that can be dissolved into water; measured DOC indicates the amount of organic material found in lakes and ponds. The average DOC level in Maine lakes is 5.7 ppm; the levels at the three sampling events for Capisic Pond range between 5.9 ppm (W-023, June 2003) and 8.2 ppm (W-023, June 2000).

Chlorophyll a: Chlorophyll a is the measure of green pigment found in all plants, and the levels indicate the amount of algae found in a location; the higher the chlorophyll a level, the more algae is present. Chlorophyll a levels in Maine lakes average 4.7 ppb; the levels from the two sampling events at station W-023 measured 12.5 ppb (June 2000) and 8.0 ppb (June 2003), with location W-244 (June 2010) measuring 5.2 ppb. These levels indicate moderate amounts of algae present in the water system.

Overall, the available data is very limited and any assumptions derived from such a limited dataset would be premature. But the data "snapshot" indicates that this Pond may be a eutrophic system and at times contains above average amounts of nutrients and dissolved organic carbon. The process of eutrophication can increase in water bodies with highly developed watersheds, such as Capisic Brook, but it is also indicative of the natural progression of a pond to a wetland. To fully understand the chemistry of Capisic Pond, additional data should be collected.

2.2.3 Pond Biology

The primary references for conditions of Pond Biology were discussed in Section 1 but may be somewhat dated. As far as we know, very little assessment of pond aquatic fauna has been conducted.

During 2006, MDEP performed an Urban Streams Project with Partnership for Environmental Technology Education (PETE), producing a report, "Urban Streams Nonpoint Source Assessments in Maine", which includes a full discussion on Capisic Brook biological monitoring. According to data collected from the W-023 wetland station during 2000, macroinvertebrate biotas were impaired.

The 2010 sampling at location W-224 included a biological review. This data was similar, though indicated a slightly more impaired biological abundance, as compared to the data collected at station W-023. Again, as suggested by the PETE study, contaminants and/or dissolved oxygen may have negative long-term effects on sediment-dwelling organisms and will have an impact on both fish abundance and waterfowl that rely on these organisms for food sources.

During the September 2011 site visit, a biological monitoring review was not performed. However, during low water, snails, spiders, water bugs, and several other invertebrates were noted in the sediment and along the water margins.

2.2.4 Pond Hydrology

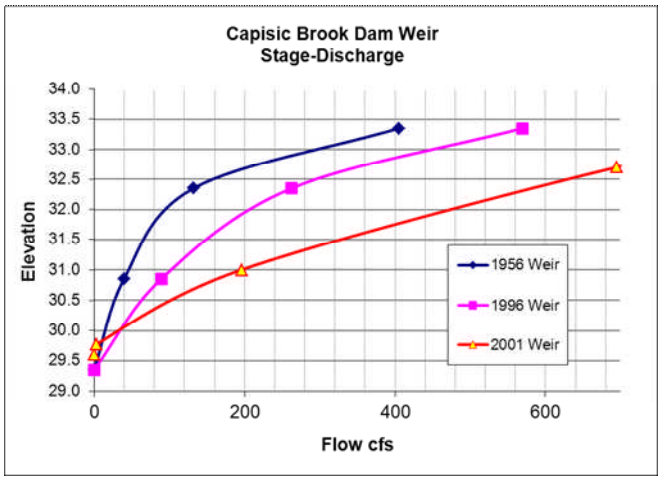
A hydrologic evaluation has not been performed on Capisic Pond itself, though information is available for the Capisic Brook watershed. A watershed's hydrology is a function of soil types and development patterns. The watershed consists of soils of glaciomarine origin, which are primarily of fine grain texture. Smaller areas within the watershed also exhibit soil conditions consisting of coarse grained glaciomarine soils. Predominant soil associations are the Suffield-Buxton-Hollis Association and the Hollis-Windsor-Au Gres Association. These soils generally exhibit slow to very slow permeability and in some cases have shallow water tables and/or bedrock. Additionally, a majority of watershed soils are classified by the Natural Resource Conservation Service as hydrologic soil type C or D, indicating high runoff and limited infiltration potential (W&C, 2011). These natural soil conditions, paired with the extensive development in the watershed, would indicate that the flow regime in the Pond is typified by short duration and "flashy" events with quick rises in water levels in the Brook and Pond and then equally quick descents to original water levels.

While there is no measured hydrologic data (flow events and durations) for Capisic Pond, flow data is collected within Capisic Brook upstream of the Pond. Streamflow data is now monitored at four locations in Capisic Brook. Preliminary monitoring data from 2009 indicates that Capisic Brook sees more frequent bankfull events than channels in undeveloped watersheds. This is attributed to extensive impervious area development in the watershed. More common bankfull events in Capisic Brook can cause in-stream scour which will result in higher sedimentation rates within Capisic Pond.

Additionally, as discussed in previous sections, the City conducted hydrology studies of the watershed and pond in the mid to late 1990's. This evaluation included a review at Capisic Pond Dam. Some flow restrictions were identified throughout the watershed and the recommendations from the study were addressed by the City, with a few exceptions. As previously discussed, the overflow weir at the Capisic Pond dam was modified in 1996 and again in 2001 to reduce flooding above the dam.

The weir modifications met design objectives, but the new flow regime may influence the Pond's wetland characteristics, including vegetation. The increase in weir width results in reduced frequency and magnitude of Pond water level fluctuations. An evaluation conducted by W&C as a part of this project analyzed probable flow depths under the old and new weir configurations. The changes to upstream (e.g. Pond water levels) as a result of the dam weir modifications are shown in Figure 2-2.

Figure 2-2: Capisic Brook Dam Weir Stage-Discharge Curves



For perspective, a typically monthly flow in Capisic Brook just upstream of the Pond would be around 100 cfs (based on 2009 flow evaluation), a significant flooding event such as the 1998 storm, results in flows close to 600 cfs (DHI, 1999).

The Pond's vegetated margins which once frequently flooded under feet of water are now less frequently inundated, and then only under a few inches of water. The less intense flooding may allow for establishment of different wetland vegetation. The reduction in flooding may also create visual changes. The Pond may tend to appear smaller because the water surface does not expand in size like it once did during precipitation events.

2.2.5 Pond Sedimentation

In 2003, a geomorphic assessment was completed by Field Geology Services for three streams in Portland, Maine, including Capisic Brook. This assessment included measurements and classification of stream reach, mapping of channel features, analysis of sediment transport dynamics, determination of energy gradients and channel characteristics.

A summary of this assessment for Capisic Brook found stream alteration by incision most likely due to increased peak discharge; however overall the Brook was found to be relatively stable, with approximately 86 percent of the total bank area considered to be under stable conditions, with only about nine percent considered to be eroding. Additionally, approximately 80 percent of the stream channel was considered to be unaltered. However, while the Capisic Brook channel was found to be relatively stable, the substrate was also found to be dominantly sand and finer particles (Field, 2003). This type of substrate is easily mobilized by bankfull flows and given the high level of urbanization in the watershed it is possible that new fine sediments consistently "replace" mobilized bed sediments. This would create what would appear to be a generally stable stream with the capabilities for high levels of sediment transport to downstream reaches and Capisic Pond.

Consequently, Capisic Brook is likely prone to periodic large sediment discharges due to predominantly sandy substrate and more frequent bankfull events, as discussed previously. Capisic Pond is the probable location for sedimentation and, therefore, the natural aging process of the Pond (evolution from pond to wetland to marsh) can increase under an urban scenario. However, with the City's planned improvements to the Brook watershed, including more aggressive sweeping of watershed roadways and catch basin cleaning, the rate of sediment input could drop in the future, but urban runoff peak flows without engineered management will continue to exacerbate in-stream erosion. Future evaluation of sedimentation rates will be necessary to develop an acceptable maintenance regime for continued sustainable management of the Pond's open water characteristics.

2.3 POND AND PARK RESOURCES

The natural resources surrounding Capisic Pond include not only the pond itself, but the adjacent wetland, and the field habitat surrounded by mixed upland forest. These areas are considered natural areas that help to maintain the overall health of the lower watershed, as well as ecological diversity.

2.3.1 Natural Features

Capisic Pond is surrounded by Capisic Pond Park, a valuable asset to the City. The Park not only provides walking trails for residents, but also habitat for many wildlife species, especially birds. In fact, the Maine Audubon has listed Capisic Pond Park as "[one] of the best places in southern Maine to see a wide variety of songbirds during spring migration" (Maine Audubon, 2008).

The 1989 study completed by Woodlot Alternatives indicated that the Park contains "moderate to high value waterfowl and wading bird habitat", observed 36 species of birds in the area, and concluded that

both small mammals, such as mice, shrew, rats and voles, and large mammals, including deer, raccoon, skunks and river otters, live in or utilized the pond, wetland or upland habitats (Woodlot, 1989).

Capisic Pond is mapped by the Maine Department of Inland Fisheries and Wildlife (IF&W), as a moderate-value Inland Waterfowl and Wading Bird Habitat area. The habitat is a "complex of freshwater wetland and open water areas plus a 250-foot wide area surrounding the complex itself where inland species of waterfowl and wading birds nest." Areas such as these, and including Capisic Pond, are protected as Significant Wildlife Habitats under the Natural Resources Protection Act (NRPA) (MDEP, 2010) with special management requirements and regulations.

The Inland Waterfowl and Wading Bird Habitats are rated by IF&W based on several key criteria. These include:

- Dominant Wetland Type
- Wetland Diversity
- Wetland Size
- Interspersion
- Percent of Open Water

Table 2-1: IWWH Rating System - Capisic Pond Category and Score

IWWH Characteristic	Description	Scoring Range		Capisic Pond Score
Dominant Wetland Type	Based on classification system published by IF&W. Score based on value of type to birds.	Inland Fresh Water Marsh	6	4
		Shallow Open Water	4	
		Shrub Swamp	2	
		Bog	2	
		Meadow	2	
		Wooded Swamp or Deep Open Water	0	
Wetland Diversity	Based on number of wetland types present in the wetland complex. Each individual type must be greater than 10% of total complex.	4+ Wetland Types	3	0
		3 Wetland Types	2	
		2 Wetland Types	1	
		1 Wetland Type	0	
Wetland Size	There are six size categories.	>300 acres	5	1
		200-300 acres	4	
		100-199 acres	3	
		10-99 acres	2	
		5-9 acres	1	
		<5 acres	0	
Interspersion	A measure of the level of "edge" between wetlands and adjacent upland habitats.	Category 3	3	2
		Category 2	2	
		Category 1	1	
		Negligible Interspersion	0	
Percent Open Water	There are four categories.	35-65% Open	3	3
		10-34% or 66-90%	2	
		1-10% or 90-99%	1	
		0% or 100%	0	
High 13-18, Moderate 10-12, Low 6-9, Not an IWWH 0-5		Total Score for Capisic Pond		10

Based on IWWH Rating Form, March 2008

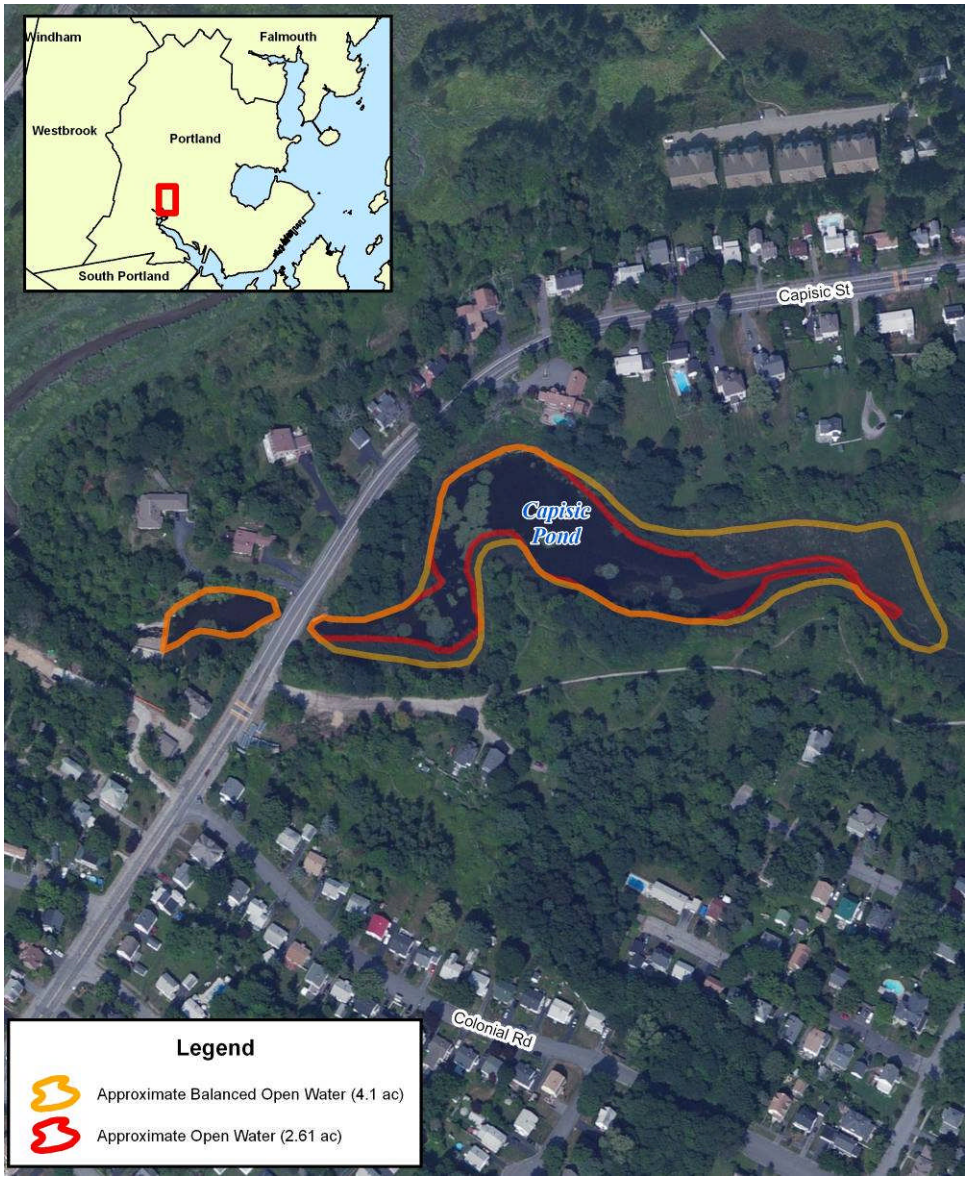
The IWWH habitat rating score provides an interesting opportunity for future discussion of enhancement options. In our judgment both wetland diversity and open water percentages are the most likely to be "adjustable" through active management actions. The other criteria are not as likely to be changed significantly due to type, size and geography constraints.

Open Water Percentage

IF&W lists the Capisic Pond IWWH habitat as 6.38 acres. Based on the current estimate of 2.61 acres of open water (shown previously in Figure 1-3) the current open water percentage is 41%. It is clear that under a future unmanaged scenario, the percent open water percent will continue to diminish along with the value of habitat based on the IWWH scoring criteria.

The maximum beneficial open water under the IWWH scoring criteria would be approximately 4 acres. A future open water habitat may look like Figure 2-3.

Figure 2-3: Future Open Water Habitat



Wetland Diversity

Capisic Pond's wetland diversity is currently rated as only one dominant species. While IF&W does not define what species it is assumed that this single species are cattails (Typha spp.) based on field observation. Typha are highly adaptable species of wetland plants and under the right conditions can grow and spread vigorously. They can easily become established in waters of 1 to 1.5 feet in depth, but once established can expand into deeper waters. A website on cattails (http://www.cattails.info) describes the growth of these plants in the following way:

Cattail is competitively superior under stable water conditions. Maintaining open areas in semi-permanent marshes is difficult once the plant is established. The plant can occur in a variety of natural communities and form extensive monocultures rapidly through vegetative reproduction, thereby reducing plant bio-diversity. Cattail can become a problem in irrigated agricultural lands and managed aquatic systems. The plant invades farm ponds, irrigation canals, and drainage ditches which can result in impeded water flow and increased siltation.

Future management enhancement will need to carefully consider cattail management, reestablishment and regrowth in order for wetland diversity to be successful.

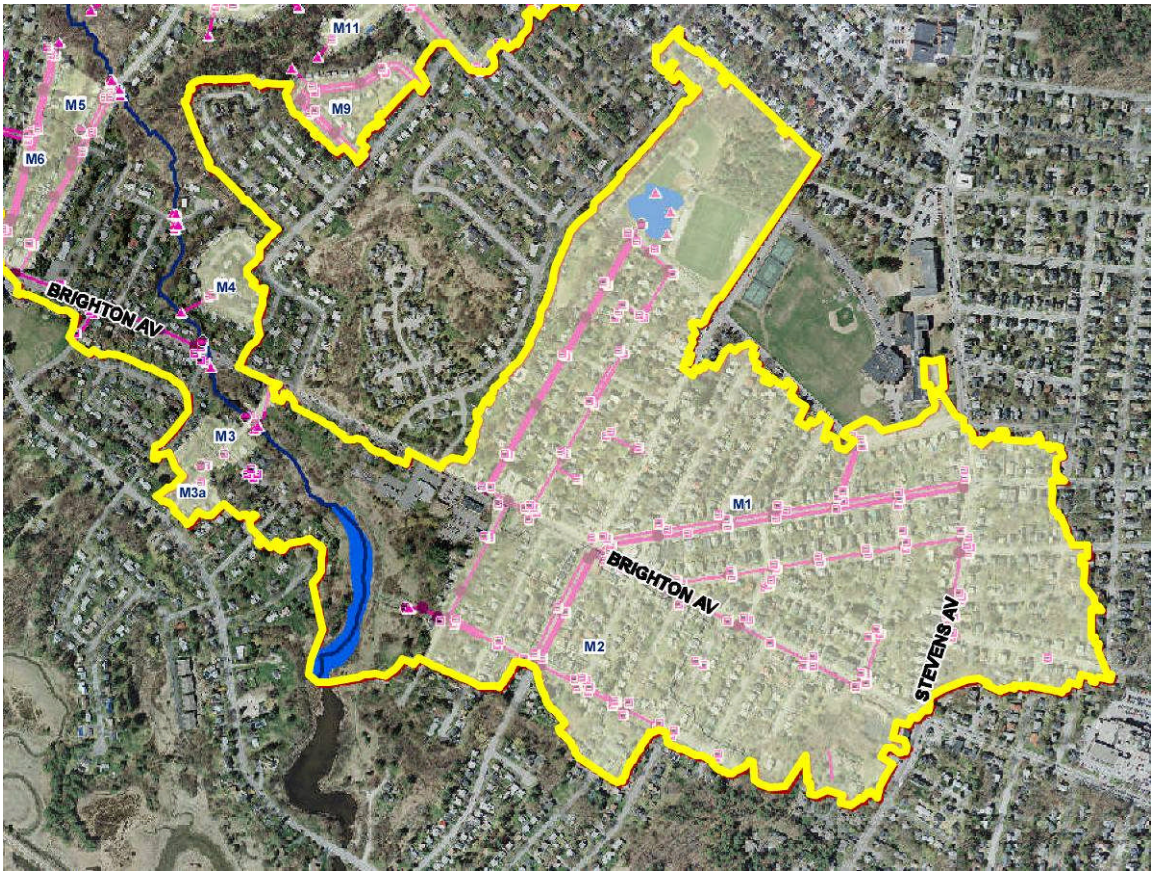
2.3.2 Man-Made Features and Infrastructure

Stormwater infrastructure in the Pond and Park area includes combined sewers, sanitary sewer and storm sewer infrastructure and several stream/drainage culverts and bridges. In 1997, the City implemented a plan to eliminate the majority of CSOs in this watershed. There are currently two active CSOs in the Capisic Brook watershed near Warren Avenue.

Rockland Avenue Outfall

As part of the City's ongoing efforts to remove stormwater from the combined sewer system, the City installed a separated storm sewer in the greater Brighton Avenue area with its outfall just west of Rockland Avenue in 2001. This stormwater outfall is arguably the most highly visible man-made structure within the Capisic Pond Park. The 60" reinforced concrete storm sewer outfall collects stormwater runoff from approximately 158 acres of primarily residential neighborhoods, with portions of mixed residential and commercial development along Brighton Ave and Woodford Street (see Figure 2-4). The areas labeled as M1 and M2 and shown in gray discharge at the Rockland Avenue outfall.

Figure 2-4: Rockland Avenue Outfall Drainage Area



Approximately 42% of the drainage area discharging at the Rockland Avenue outfall is covered by impervious surface (rooftops, streets, parking lots, sidewalks and other paved or hardened surfaces). The Rockland Avenue outfall discharges into a shallow channel that continues approximately 200' into Capisic Pond. The storm sewer outlet consists of a flared concrete pipe end with an aluminum bar rack and an angular rock (rip-rap) plunge pool for energy dissipation and erosion control.

The drainage area that contributes runoff to the outfall has minimal structural stormwater quality control. The primary structural management of sediments and other pollutants in this drainage area is through deep sump catch basins and Casco Traps on the outlets of many of the connected catch basins. Deep sump catch basins provide limited, non-floatable trash and sediment reduction. Casco Traps provide limited controls for floatable trash and oils and grease. Non-structural stormwater management in this watershed primarily consists of public education and outreach programs for residential homeowner pollution prevention, catch basin cleaning programs, and street sweeping. The primary sources of pollutants discharging at the Rockland Avenue outfall are from roadways, private property and parking lots that contribute runoff into the storm drain system. Pollutants in stormwater runoff are variable and seasonally dependent and can include heavy metals, sediments, excess nutrients, chloride, and toxics among others and also can contribute thermal pollution. However, the pollutants that are visibly present at the outfall and channel typically include floatable and non-floatable trash, and sediment.

As discussed in other sections of this report, the park area, including Capisic Pond, provides a recreational resource to many City residents. In addition, the park and pond provide habitat to many bird species, both

common and rare. Birds and other wildlife utilize the park as temporary habitat during periods of migration, or, for certain species, permanent year-round habitat.

Visitors to the park have expressed their concerns to the City over recent years about the visible impacts associated with the outfall, most notably the trash and sediment that resides in the channel; erosion that occurs along the banks of the channel during high flow, high velocity storm events; and the overall "look" of the outfall pipe and associated aluminum rack. Park visitors and concerned citizens have also expressed the question of what impact this outfall has on the overall water quality of the pond and the wildlife that relies on the habitat that the park offers.

While the stormwater runoff discharging at the Rockland Avenue outfall is highly visible within the Park, it is important to note that Capisic Brook itself is the primary surface discharge into the pond and conveys runoff from approximately 1500 acres of residential, commercial, and industrial land within Portland and Westbrook.

The following discussion provides several alternatives (to the current outlet configuration) for consideration in future management of Capisic Pond Park in regards to the Rockland Avenue outfall and has been included in this letter report at the request of citizens and City staff. Appendix C includes conceptual images of each of the alternatives and a series of concept level drawings for cost estimating purposes only.

Rockland Avenue Outfall Management Alternatives

When evaluating options for the Rockland Ave outfall, aesthetics, recreation access and wildlife habitat are important considerations; however, these cannot be the only considerations. We must consider the broader area of the Capisic Brook, including the receiving waters downstream of the Park, notably the Fore River estuary system.

Extend Rockland Avenue Storm Sewer into 120" Storm Sewer in Capisic Park (Figure 1-Appendix C)

The City of Portland installed a 120" elliptical concrete combined sewer through Capisic Park in 1955. This large combined sewer roughly parallels the pond edge, receiving flow from separated stormwater infrastructure upstream of Lucas Street, and collectively along its 2,800' length through the park to its outfall below Capisic Pond Dam. The recently completed West Side Interceptor Replacement Project, which involved installation of a 60" combined sewer through the park, eliminated any combined sewer inputs into the 120" pipe, effectively converting the large concrete pipe into a separated storm drain.

We evaluated extending the 60" storm sewer from the Rockland Avenue outfall underground, dropping below the recently installed 60" West Side Interceptor as a box culvert and connecting directly into the 120" storm sewer. This option appears to be technically feasible, and would eliminate the outfall and channel from Capisic Pond Park. Additional flow analyses would be needed to determine if the 120" pipe has the hydraulic conveyance capacity to handle runoff from the Rockland Avenue drainage areas. An opinion of cost and short list of advantages and disadvantages for this alternative is included in Table 2-2.

One disadvantage, which may not be readily apparent, to directly connecting the Rockland Avenue outfall to the existing 120" elliptical storm sewer is the resulting impact to water quality within the Fore River Estuary. The Capisic Pond dam impounds water, which enhances sedimentation, and therefore provides some measure of pollution control before the brook reaches the Fore River Estuary system. Although the Pond's primary purpose and function is not pollution control, this function cannot be overlooked, and a direct connection of the Rockland Avenue storm sewer to the 120" storm sewer will convey pollutants more directly into the Fore River estuary.

Construct a Stormwater Management System Downstream of the Outfall (Figure 2-Appendix C)

Some of the sediment discharged with runoff from the Rockland Avenue outfall deposits at the base of the existing conveyance channel, between the old bridge location (location prior to the recent sewer

project) and the open water of the pond. This is evident following a storm event, as this area typically has several inches of deposited silt and sand. The reason that sediment accumulates at this location relates to the slowing of runoff velocity as the discharge enters the calmer conditions in the pond, depositing sediments.

Sedimentation, the process of settling particles (and other pollutants) out of solution, has been a primary treatment strategy in the field of wastewater and stormwater management for many years. The sedimentation process that currently occurs at the pond edge is not an overly-effective form of treatment for pond water quality, as the sediment deposited in this area can be re-suspended in subsequent runoff events. An effective alternative would be to shift the sedimentation process upstream, and managed in an engineered system that is more effective at sediment removal and storage and can be maintained.

Appendix C depicts an engineered sedimentation "pond" that utilizes a portion of the existing park as a means to provide runoff management. The traditional "engineered" detention pond typically has uniform side slopes and a symmetrical layout that stands out as unnatural. We envision a more naturalized concept in this area, with boulders for energy dissipation, native vegetation species in and around the feature, and a layout that blends into the natural topography but that still allows for maintenance access. The schematic that is presented in Appendix C would be refined to accommodate these design principles.

Install a Hydrodynamic Separator Upstream of Outfall (Figure 3-Appendix C)

Hydrodynamic separation, the act of creating a hydraulic vortex to separate denser particles from flow, can be accomplished through several proprietary, manufactured stormwater management devices. These devices, housed in precast concrete vaults, are installed underground. The structure is mostly out of site with the exception of the top-side manhole covers that provide access to maintain and clean out the device. The hydraulic vortex that provides sediment settling is a function of the energy produced from flowing water, and therefore no power or mechanized equipment is needed within the structure. These structures can be installed in a configuration referred to as "off-line" from the storm sewer system. The term "off-line" refers to the adjacent, parallel configuration of the separator to the main line of the storm sewer. From preliminary evaluation, it appears that an adequate amount of City-owned right-of-way and park land exists upstream of the outfall to allow for the installation of an off-line hydrodynamic separator. The runoff from storm events below a certain size or rainfall intensity would be routed into the hydrodynamic separator. Flow entering the hydrodynamic separator would separate out some of the denser sediment particles from the runoff and reduce sediment from migrating into Capisic Pond. Various internal configurations including baffles, weirs or screens can provide additional removal of floatable trash and other pollutants. Flows in excess of the design storm would bypass the system and continue in the main line storm drain. This bypass would likely be required for this alternative given the extensive area draining to the Rockland Avenue outfall.

Hydrodynamic separation was a common practice for stormwater quality management under MaineDEP guidelines until the latest state stormwater regulations were adopted in 2005 which promoted passive filtration as a preferred treatment practice. More recent use of these systems is primarily for sediment removal as a "pre-treatment" device for filtration-based stormwater management systems. Documentation of field performance is made available through the University of New Hampshire Stormwater Center. The published testing reports indicate that these types of systems result in 27% removal efficiency of Total Suspended Solids (UNH Stormwater Center Biannual Report, 2009). The removal efficiency is enhanced by consistent sediment removal maintenance and the addition of more elaborate, and also costly, sedimentation chambers.

We believe that with proper maintenance and cleaning, an off-line hydrodynamic separator upstream of the existing outfall would provide benefit to the pond by reducing the sediment load and some of the floatable trash and oil. Even the published level of sediment reduction coupled with removals of floatable trash, oil and grease would be beneficial.

It should be noted that the upstream, off-line hydrodynamic separator option can be coupled with any of the above options to maximize water quality benefit.

Channel Stabilization (Figure 4-Appendix C)

The installation of any of the above options (with the exception of the pipe connection) does not resolve the velocity and scour issues associated with the outfall channel; therefore, we would recommend armoring the channel downstream of the outfall as a basic alternative. The traditional angular rip-rap stone may not be appropriate for channel lining in the park, as the constructed appearance of rip-rap channel lining deviates from park improvements and restoration efforts outlined in previous studies. Instead, we recommend selectively placing "natural" boulders and cobble mixed with an appropriate blend of vegetation along the length of the channel to the pond edge to soften the appearance of the channel stabilization efforts.

Table 2-2: Rockland Avenue Outfall Management Alternatives

Alternative	Opinion of Cost*	Advantage	Disadvantage
Extend Rockland Avenue Storm Sewer into 120" Storm Sewer in Capisic Park	$310,000	• Eliminates aesthetic concerns associated with outfall in Park • Eliminates polluted runoff effects of outfall on pond • Eliminates outfall channel and associated erosion issues	• Migrates runoff pollution to downstream waters (Fore River Estuary) • Highest cost of the evaluated alternatives • Invasive construction process with deep excavation near pond • Hydraulics analysis needed on 120" to confirm whether it has capacity to accept Rockland Ave drainage
Install a Hydrodynamic Separator Upstream of Outfall & Channel Stabilization	$170,000	• Lower cost versus other evaluated alternatives • Hidden from view • Minimizes construction impact on Park • Naturalized channel design stabilizes eroded channel • Provides wetland enhancement opportunity	• Outfall is still visible • Limited water quality benefit • Requires regular maintenance and clean-out to be effective • Hydrology evaluation necessary for diversion weir design
Construct a Stormwater Management System Downstream of Outfall	$280,000	• Benefits pond water quality versus other evaluated options • Provides a good opportunity for public education • Design could be part of overall habitat enhancement plan	• Outfall is still visible • Requires regular maintenance and clean-out • Impacts largest amount of park area of the evaluated alternatives • Impacts to existing wetland features
Channel Stabilization	$60,000	• Minimal cost, saves money over other alternatives • Design could be part of overall habitat enhancement plan	• Continued impact on pond water quality • Outfall remains in park and primarily visible during winter months

*All values include engineering, design, permitting and a contingency and have been rounded up to reflect conceptual opinion of cost.

2.4 PUBLIC PARTICIPATION

As a component of this project, W&C, with assistance from the City of Portland conducted a public meeting on February 1, 2012 to discuss findings as described above and to develop consensus around next steps in development of a management plan for Capisic Pond & Park. The specific decisions revolved around future open water enhancement, Rockland Avenue outfall considerations and education station development within the Park.

The meeting agenda, "dot" voting results, and presentation are included in Appendix D.

Over 20 residents attended the public meeting. Preferences were decided through "dot" voting by meeting attendees.

In summary the following preferences were established through the "dot" voting:

- Open Water: Pursue open water habitat restoration that would strategically remove accumulated sediments, provide enhanced open water to wetland ratios consistent with Inland Waterfowl and Wading Bird Habitat, and enhance and manage wetlands for increased wetland diversity.
- Rockland Avenue Outfall: Pursue retrofitting to enhance trash capture and stormwater quality treatment to extent practicable. Stormwater quality treatment to include manufactured pre-treatment device and outlet stormwater management system.
- Education Station: Pursue additional education stations, to be developed in context sensitive way with neighborhood input; neighborhood requested to maintain approve/veto on the type, location, and number of stations.
- "Parking Lot" items that could not be answered at the public meeting, included the following:
    - How much sediment enters the Pond? Will management actions be sustainable or have to happen frequently?
    - Will cattail vegetation simply return upon completion of any project? What is "life expectancy" for our actions?
    - What are the permitting and funding issues around preferences for open water habitat enhancement?
    - What will be the likely wetland enhancements and will ecology and survivability be considered in the planning?

3. RECOMMENDATIONS

The Capisic Brook watershed has been actively studied for more than a decade, however Capisic Pond, specifically, has not been included in many of the studies. While conditions can be implied from the Brook studies, the Pond has different natural processes. There are several data gaps that exist for the Pond, were identified in sections above and others were identified by the public during the February 1, 2012 public meeting.

It is our recommendation that the following be undertaken under a future phase of work in order to develop and implement a sustainable management plan for the Capisic Pond & Park.

3.1 WETLAND ANALYSIS

As discussed in Section 2.3.1, the desired future condition for Capisic Pond balances open water and diverse wetland habitat within the designated Inland Waterfowl and Wading Bird Habitats. Wetlands at Capisic Pond have been degraded over the years through sedimentation, excess nutrients and infestation with invasive species. Enhancing the Pond's wetland function could increase nutrient/pollutant attenuation, flood storage capacity, habitat value and aesthetic appeal.

This analysis should include an evaluation and mapping of existing wetlands and adjacent riparian habitat around the perimeter of the pond to determine the types of wetlands and natural features present, catalogue existing wetland biological and physical functions, and assess where restoration of wetlands and riparian areas is viable to increase diversity and minimize the potential for monoculture expansion. Additionally, this evaluation should engage an expert in wetland vegetative management to determine the likelihood of cattail regrowth dynamics under future management conditions.

3.2 POND MORPHOLOGY AND HYDROLOGY EVALUATION

To refine open water habitat enhancement alternatives and potential costs, an analysis of probable dredged volumes is necessary. This evaluation should include bathymetry analysis and further investigation of spatial variability of sediment depths. This evaluation will result in a series of figures exhibiting existing water column and sediment depths and may include additional sediments characterization based on further discussions with relevant project partners (i.e. MDEP, ACOE, etc).

Because sedimentation is a dynamic and continuous process, ongoing maintenance sediment removal will be required to maintain water column depth and open water habitat. This task also includes a volume estimation of annual sediment loading into the Pond based on watershed land use inputs.

Pond hydrology will influence the likelihood of future nuisance algal blooms under various management scenarios. This evaluation should include installation of a flow monitoring station at the dam weir and may include additional evaluation of pond sediment nutrient characteristics.

3.3 MANAGEMENT OPPORTUNITIES MEETINGS

Once bathymetry, sediment loading, and wetland functional assessment have been completed, a check in meeting(s) with potential project partners, including regulatory agencies, will be necessary to identify viable Pond enhancement opportunities. This meeting would be conducted to provide project partners with the latest research updates conducted in the previous two tasks and to reach consensus on enhancement opportunities moving forward. This meeting(s) should also begin to identify potential funding opportunities for enhancement activities.

3.4 OPEN WATER HABITAT ENHANCEMENT PLAN

A draft plan for Capisic Pond should be developed based on the previous three tasks.

This plan should include:

- Sediment removal alternatives analysis
- Beneficial reuse of dredged material and/or disposal alternatives analysis
- Logistics evaluation and constraints analysis for constructability
- Operations and Maintenance Plan
- Wetland enhancement plan
- Education Station and/or other Park amenity development
- Rockland Avenue outfall mitigation design
- Cost evaluation (including long-term operations)
- Financing strategy
- Timeline for implementation

4. REFERENCES

DHI, 1999. *Capisic Brook Watershed Flood Control Study Re-evaluation – Draft Final Report*. September.

Field Geology Services (FGS), 2003. *Fluvial Geomorphic Assessment of Four Urban Streams in Portland and Bangor, Maine*. December.

Gilbert, Donna M., 1987. *City of Portland, Maine Memorandum Subject: Capisic Pond & Dam History*. May.

Graham, Andy, 2011. *A Brief History of Capisic Pond.*

Johnson, Carol R. Associates, Inc. and CH2M Hill, 2001. The *Capisic Brook Greenway Master Plan*. May.

Maine Audubon, 2008. *Build Your Birding Skills.* http://www.maineaudubon.org/explore/event/bthon/calendar.shtml

Meidel, Suzanne, 2004. *Preliminary Summary of Existing Biological Monitoring Data from Capisic Brook in Portland, ME*. January.

Normandeau Associates, 1996. *Letter Report Summary of Results of Chemical Analysis of Sediments from Capisic Pond*. June.

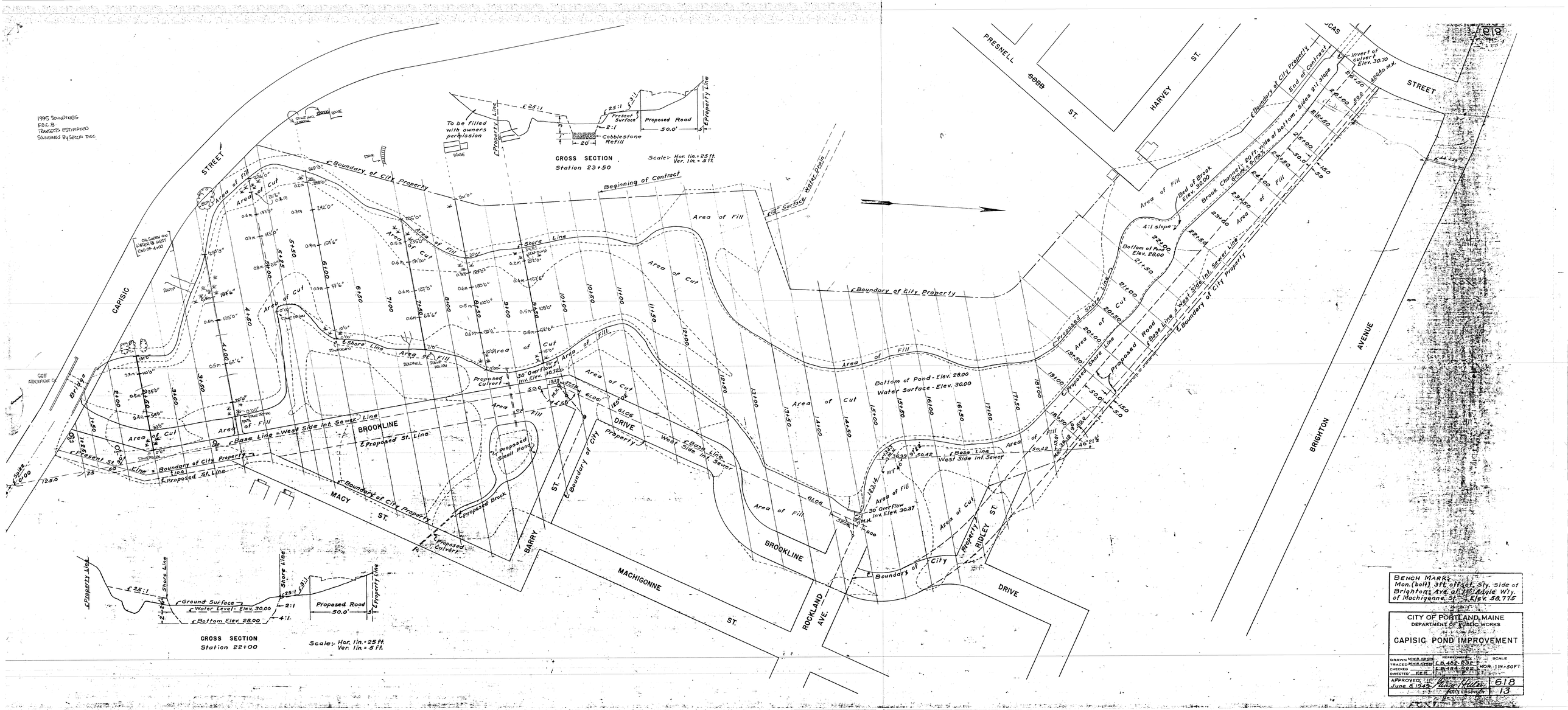
Partnership for Environmental Technology Education (PETE), 2006. *Urban Streams Project*. January.

Woodard & Curran, 2011. *Capisic Brook Watershed Management Plan – Final Draft*. July.

Woodlot Alternatives, Inc., 1989. *Inventory and Management of the Natural and Cultural Resources of Capisic Pond*.

University of New Hampshire Stormwater Center, 2009. *Biannual Report*.

APPENDIX A: CAPISIC POND IMPROVEMENT PLAN DATED JUNE 8, 1949 AND NORMANDEAU ASSOCIATES REPORT – RESULTS OF CHEMICAL ANALYSIS OF SEDIMENTS FROM CAPISIC POND DATED JUNE 27, 1996


1995 SOUNDINGS
F.O.C.B
TRANSECTS ESTIMATED
SOUNDINGS BY SECOND DEC
CAPISIC STREET
PRESNELL ST.
HARVEY ST.
JCAS STREET
BRIGHTON AVENUE
MACY ST.
BARRY ST.
MACHIGONNE ST.
ROCKLAND AVE.
BIDLEY ST.
BROOKLINE DRIVE
Boundary of City Property
Beginning of Contract
End of Contract
Shore Line
Base Line - West Side Int. Sewer Line
Proposed St. Line
Present St. Line
Proposed Small Pond
Proposed Brook
Proposed Culvert
30" Overflow Inv. Elev. 30.72
30" Overflow Inv. Elev. 30.37
Bottom of Pond - Elev. 28.00
Water Surface - Elev. 30.00
Bed of Brook Elev. 30.00
Brook Channel 8 ft. wide at bottom - sides 2:1 slope
Bottom of Road Elev. 28.00
Proposed Road
Area of Fill
Area of Cut
Invert of Culvert Elev. 30.70
CROSS SECTION
Station 23+50
Scale:- Hor. 1in.=25ft.
Ver. 1in.=5ft.
To be filled with owners permission
Present Surface
Proposed Road
Cobblestone Refill
CROSS SECTION
Station 22+00
Ground Surface
Water Level - Elev. 30.00
Bottom Elev. 28.00
BENCH MARK:
Mon. (bolt) 3ft. offset Sly. side of Brighton Ave. at 1st Angle Wly. of Machigonne St. Elev. 58.775
CITY OF PORTLAND, MAINE
DEPARTMENT OF PUBLIC WORKS
CAPISIC POND IMPROVEMENT
DRAWN M.W.B. 12-1-43
TRACED M.W.B. 12-1-43
CHECKED
DIRECTED E.E.B.
REFERENCE
L.B. 450 P. 112
L.B. 484 P. 66
SCALE
HOR. 1IN.=50FT
APPROVED June 8 1945
CITY ENGINEER
618
13

Normandeau Associates
82 Main Street
Yarmouth, ME 04096
(207) 846-3598
(207) 846-6527 (Fax)

NORMANDEAU ASSOCIATES

June 27, 1996

Mr. Joe Payne
Friends of Casco Bay
2 Fort Road
South Portland ME 04106

RE: NAI Project #16262

Dear Joe:

This report summarizes the results of chemical analysis of sediments from Capisic Pond.

METHODS

Normandeau Associates and Friends of Casco Bay staff collected sediment samples from Capisic Pond on April 25, 1996. Three sampling stations were selected at more or less evenly spaced intervals from the northern end of the pond to Capisic St. A fourth station was selected south of Capisic Street in the center of the pond. Surface sediments were collected for analysis using a hand-held coring device and composited into a detergent-washed bucket. A second collection was made at Station 3 for sediments at the estimated project depth of 2-3 feet. The sediment coring device was inserted into the sediments until refusal (approximately 18") and withdrawn. Approximately 6" of the bottom sediments were extruded into the detergent washed bucket, and composited. Sediments collected for chemical analysis were placed on ice in a prewashed glass container, and delivered by overnight mail to Thermo Analytical Laboratory. Sediments collected for grain size analysis were stored on ice and delivered to the Normandeau Associates analytical lab.

Samples were analyzed for chemical constituents as specified in the draft Maine Department of Environmental Protection (MDEP) draft solid waste regulations (August 17,1995). Samples were analyzed in conformance with EPA-SW 846; methods for specific constituents included:

Percent solids	EPA SW-846 Method 1311 Section 7.1.1
Metals	EPA SW-846 Method 6010
PAHs	EPA SW-846 Method 8270
PCBs	EPA SW-846 Method 8080

Established quality control protocols were followed, including duplicate samples, spike samples, and blind samples.

Carcinogenic PAHs are defined by the MDEP as the following constituents:

ideno(1,2,3-cd) pyrene
benzo(a) anthracene
benzo(a) pyrene
benzo(a) fluoranthene
benzo(b) fluoranthene
benzo(k) fluoranthene
chrysene
dibenzo(a,h)anthracene

The concentrations of these parameters were added to obtain the level of carcinogenic PAHs.

RESULTS

A summary of analytical results is shown in Table 1, with complete results included in Appendix A. In general, results for all surface stations were similar. The percentage of sand ranged from 25% at Station 2 to 47% at Station 4. Silt and clay composed the remainder of the sediments. Median grain size ranged from 0.017 mm (medium silt) to 0.073 (coarse silt). Concentrations of all constituents were consistently lower at depth (Station 3 bottom) than at the surface, although the grain size was similar. Carcinogenic PAHs were an order of magnitude higher at Station 1 in comparison to Stations 2, 3, and 4. Carcinogenic PAHs at depth were approximately half the level of surface sediments at Stations 2, 3, and 4. Pyrene had the highest concentration of all of the PAHs that were measured, followed by fluoranthene. These constituents are derived from the combustion of fossil fuel.

CONCLUSIONS

Removal of sediments at Capisic Pond and disposal at an upland site would require conformance to the draft MDEP regulations for beneficial use of solid waste (Sections 6 and 7 of CMR 4XX.6(2)(A), August 17, 1995). In particular, concentrations of chemical contaminants need to be less than the MDEP limits for inert material in order to be used as construction fill. If concentrations exceed the limits by a factor of two, they may be utilized if mixed with inert borrow material and covered with concrete or asphalt. Levels of all constituents fell within MDEP limits with the exception of carcinogenic PAHs, which ranged from 1.68 at depth to 24.3 at Station 1. These levels are well above the 0.33 mg/kg established by MDEP.

According to Barbara Schwendtner, MDEP, sediments with concentrations falling outside of the inert limits would be handled on a case-by-case basis. The MDEP is just beginning to address the health risks of PAHs, as testing requirements have only recently been added. Material may be suitable for an exemption or permit by rule depending on the proposed disposal option. The proponent would need to demonstrate either thorough a risk assessment or risk management that the proposed use of the material would not pose a significant public health or environmental risk for any constituent that exceeds the solid waste screening criterion. In some or all areas tested in Capisic Pond, Benzo(a) anthracene, Chrysene, Benzo(a) pyrene, Benzo(b) fluoranthene, Benzo(k) fluoranthene, and Ideno(1,2,3-cd) pyrene concentrations exceeded this standard.

There are a number of options that may allow disposal of the sediments. Given that the underlying sediment appears to be clay (and thus likely has low contaminant levels), it may be feasible to dredge to a deeper depth and mix the sediments to achieve sufficient reduction in the contaminants of concern. Alternatively, the clay could be used as a liner material, thus protecting groundwater. We can provide assistance in developing these options. In addition, we have several risk assessment models that provide a rapid assessment of human and environmental risk based on the levels of parameters in question. It's important to note that removal of sediments from Capisic Pond would improve the aquatic habitat and reduce ecological risk.

RECOMMENDATIONS

I would like to develop some ideas for beneficial use of the material. I would recommend a meeting with Barbara Schwendtner of MDEP to review the results and discuss options for disposal.

Sincerely,

NORMANDEAU ASSOCIATES, INC.

Marcia Bowen

Marcia Bowen
Manager, Maine Office

MB/MISC.07

TABLE 1. Analytical Results (in mg/kg dry weight) of Sediment Sampling in Capisic Pond, Portland, ME

	STATION					
Constituent	**1 Surface**	**2 Surface**	**3 Surface**	**3 at Depth**	**4 Surface**	**DEP Limits**
Arsenic	16.2	12.2	12.8	8.45	13.1	<10
Barium	152	139	141	93.5	134	<10000
Cadmium	ND	ND	ND	ND	ND	<10
Chromium	72.5	72.9	64.5	43.6	54.5	<95
Copper	61.2	45.4	50.8	32.2	50.6	<600
Lead	162	115	125	66.6	135	<375
Mercury	0.59	ND	ND	ND	ND	<60
Molybdenum	ND	ND	ND	ND	ND	<950
Nickel	35.4	37.6	37.9	27.2	34.4	<3800
Selenium	ND	ND	ND	ND	ND	<950
Zinc	293	241	297	145	320	<1500
PCBs	0.290	0.250	0.210	0.046	0.290	<50
Carcinogenic PAHs	24.3	3.78	3.68	1.68	4.50	<0.33
% Solids	42	39	39	70	32	
% Gravel	0.0	0.0	0.6	0.1	2.6	
% Sand	34.7	25.1	32.1	21.4	47.3	
% Silt	44.3	45.3	45.0	50.4	46.9	
% Clay	21.0	29.6	22.3	28.1	3.2	
Median Grain Size	0.029	0.017	0.622	0.023	0.073	

/MISC.07

APPENDIX B: CAPISIC POND SEDIMENT SAMPLING MEMORANDUM – DECEMBER 2, 2011

COMMITMENT & INTEGRITY DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

MEMORANDUM

TO: Doug Roncarati, City of Portland
FROM: Zach Henderson and Dave Dinsmore
DATE: December 2, 2011
RE: Capisic Pond Sediment Sampling

Introduction

Capisic Pond (hereafter referred to as Pond) is Portland's largest freshwater body and formed by a manmade impoundment, the Capisic Pond Dam, on the Capisic Brook. The current Capisic Pond dam was built by the City of Portland during the mid-1950s as part of the West Side Interceptor Sewer project, and as part of the overflow structure of the combined sewer system. This structure was a reconstruction of and is located below the placement of the original privately owned dam, the construction period of which is unknown, but knowledge of the pond reaches as far back as the mid- to late-1800s or further. Capisic Pond has been a central part of Portland's history for many years. The original falls, near the current dam location, powered a sawmill and a gristmill established in the late 1600's and was central to the economy in early Portland (then called Falmouth). Capisic Brook, which feeds the pond, is a small stream approximately 2.5 miles in length. The Capisic Brook watershed is approximately 1,500 acres and is highly developed with a mix of residential and commercial development. The Pond receives runoff from undeveloped land, developed areas and roads and combined sewer overflows during certain rain events.

The City of Portland is currently implementing combined sewer overflow abatement activities with the goal of eliminating combined sewer discharges into the Capisic Brook within the next several years. Additionally, the City has drafted a watershed management plan to address urban area stormwater runoff impacts to both the Capisic Brook and Capisic Pond. These environmental remediation efforts in the watershed now allow the City to consider a long-term management and enhancement plan for the Pond.

Over the last three decades, the City of Portland and other entities have undertaken a number of studies and plans relevant to Capisic Pond and the adjacent park area. With the increasing public awareness and appreciation for urban natural spaces, the 18-acre Capisic Pond Park has gained increasing importance both for its walking trails and as an environment in which to experience wildlife in an otherwise urban setting. The City and project partners are now contemplating restoration and management activities consistent with previous plans, which may include removal of pond sediments under various restoration scenarios.

In order to inform the potential costs and benefits of various pond management alternatives, characterization of existing pond sediment is necessary. This memorandum is consistent with our proposal dated April 13, 2011 and includes a description of sediment sampling and analytical methods, the chemical parameters of sampled sediment, results and conclusions.

In addition, the following results were compared to previous pond sediment analysis conducted in 1996 by the Friends of Casco Bay. At that time, Normandeau Associates collected composite sediment samples at four locations (on April 25, 1996); samples were analyzed for percent solids, metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). There was no graphic available to enable Woodard & Curran to determine the locations from which those samples were collected.

Methods

On September 14, 2011 sediment samples were collected from four locations along the margin of the pond. The dam had been opened for four days prior to sample collection so water levels were lowered and areas of shoreline were exposed.

Sediment samples were collected from four locations, as depicted on the attached Figure 1. As indicated in the Figure, the locations cover the entire length of the pond and were selected to evaluate the distribution and variability of the chemical and physical characteristics described above. SD-01 is the furthest south of all samples locations, located on the western shore of the pond just south of Capisic Street and just north of a section of the shoreline where riprap has been recently installed. At the time of sample collection there was minimal water remaining in this part of the pond. SD-02 is situated on the eastern shoreline of the pond approximately 300 feet north of the Capisic Street crossing. SD-03 is also located on the eastern shoreline approximately 200 feet northwest of SD-02. The final sample location, SD-04, is just downstream from the Rockland Avenue stormwater discharge point at the northern end of the pond. Only one location, SD-4, was submerged during sample collection.

At each of the four locations, a 48" long by 1.5" diameter macro acetate liner tube was pushed into the sediments to maximum penetration to obtain a core sample. The liner is equipped with a core catcher on one end to retain the sediments and to prevent them from falling out of the liner upon retrieval. In order to collect representative samples and sufficient volume of material for analysis, several cores were obtained at each location. The sediment material in the liners was extracted from the liners into a glass mixing bowl. A stainless steel spoon was used to homogenize the material once all of the cores were placed into the bowl to create a composite sample. Once the material was homogenized into a composite it was transferred into labeled sample containers and put on ice in a cooler. The samples were submitted to an environmental laboratory for chemical analysis.

Sediment samples were analyzed at Katahdin Analytical Laboratories for chemical parameters including metals, dioxins, pesticides, PCBs, PAHs, extractable petroleum hydrocarbons (EPH), and phosphorous. Grain size analyses were conducted to determine physical characteristics of the sediments.

All of the sediment samples were analyzed for parameters in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods, SW-846, 2nd Edition, 1982" and compared against Maine Department of Environmental Protection (MaineDEP) limits defined for beneficial reuse and described in MaineDEP Chapter 418, Section A. The concentrations from analyses of the four samples collected during this project were compared against these specifications to evaluate the option of potential reuse of the sediment material.

The chemical and physical analytical methods that were used to characterize the sediment samples are summarized in **Table 1** below.

Table 1: Sediment Sample Analytical Summary

Parameter	Analytical Method
Pesticides	USEPA 8081
PCBs (polychlorinated biphenyls)	USEPA 8082
EPH (extractable petroleum hydrocarbons)	MA DEP EPH 04-1.1
PAHs (polycyclic aromatic hydrocarbons)	USEPA 8270C – SIMs
Metals (As, Cd, Cr, Pb, Hg)	USEPA 3050/6010, 7471 (Hg)
Hexavalent chromium	USEPA 3060
Total Phosphorous	USEPA 365.4
Dioxins	USEPA Method 1631
Grain Size Analysis	ASTM D422

Sample Results

The depth of penetration for each core and a visual physical characterization of the material were recorded and are summarized in Table 2 below.

Table 2: Core Penetration Depths and Visual Sediment Characterization Summary

Sample Location	Number of Cores	Depth of Penetration to Refusal (feet below pond bottom surface)	Physical Characteristics
SD-01	5	1.1 to 1.4	Poorly sorted medium to fine sands evenly distributed in greenish-gray clay.
SD-02	6	0.7 to 1.65	Stiff olive gray clay overlain by a loose unconsolidated layer of varying thickness (approximately 0.13 to 0.5 feet) of highly organic silt.
SD-03	9	0.5 to 0.8	Layer of organic silt (0.5) feet overlying clay.
SD-04	5	1.4 to 1.96	Hard dark brown clay containing small amounts of peat dispersed throughout and overlain by a thin layer of peat

Laboratory analyses of the sediment samples collected from Capisic Pond are summarized by chemical parameter in the following subsections. The raw data as received by the laboratory is included in Appendix A. The MaineDEP reduced procedure beneficial reuse standards are included in the following tables for comparison against the reported concentrations. For the EPH analysis, there is no current guidance from Chapter 418, so the total concentration was compared to the total petroleum hydrocarbon (TPH) standard in the Guidance on Disposal & Use of Assorted Solid Wastes Generated in Maine (rev. 4/16/2008). Sediment sample concentrations were also compared with results reported from the 1996 study conducted by Normandeau (where appropriate).

PAHs

For PAHs, results were obtained using two different methods; the selective ion monitoring (SIMs) Method 8270 and the EPH analysis. Although lower detection limits are reported with the USEPA 8270 SIMs analysis, concentrations obtained using both methods were compared against MaineDEP reuse limits and are summarized in Table 3.

As indicated in Table 3, the concentrations of all PAHs for both methods are below the beneficial reuse limits, when they are available. All PAH concentrations from the USEPA 8270 SIMs method are within the historical range of concentrations reported for the Normandeau 1996 study. For the EPH method, PAHs were not detected and are below the historical concentrations for samples collected at SD-02, SD-03, and SD-04. The highest concentrations of PAHs using both methods were detected in the sample collected from SD-01. Since the sample locations from the 1996 Normandeau study are unknown, the results cannot be compared directly with the locations selected for this study. Therefore, a range of historical concentrations are included in Table 3 for comparison.

Table 3: Summary of Analytical Results – PAHs

PAHs – USEPA 8270 and EPH Methods	1996 Study Historical Range- mg/kg	DEP Reuse mg/kg	2011 Sediment Sample Concentrations – mg/kg							
			SD-01		SD-02		SD-03		SD-04	
Compound			8270	EPH	8270	EPH	8270	EPH	8270	EPH
Naphthalene	-	-	0.20	0.37	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
2-methylnaphthalene	-	-	0.46	0.76	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
Acenaphthylene	-	-	<0.025	0.26	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
Acenaphthene	-	-	0.27	0.51	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
Fluorene	-	-	0.44	0.67	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
Phenanthrene	-	-	1.5	2.6	0.088	<0.27	0.15	<0.33	0.037	<0.25
Anthracene	-	-	0.28	0.52	<0.028	<0.27	<0.035	<0.33	<0.029	<0.25
Fluoranthene	-	-	0.76	1.7	0.21	<0.27	0.31	<0.33	0.075	<0.25
Pyrene	-	-	1.1	2.5	0.18	<0.27	0.28	<0.33	0.064	<0.25
Benzo(a)anthracene	-	2.0	0.36	0.62	0.092	<0.27	0.15	<0.33	0.034	<0.25
Chrysene	-	1.6	0.37	0.74	0.15	<0.27	0.24	<0.33	0.035	<0.25
Benzo(b)fluoranthene	-	5.0	0.34	0.48	0.24	<0.27	0.40	<0.33	0.062	<0.25
Benzo(k)fluoranthene	-	49	0.14	0.49	0.083	<0.27	0.14	<0.33	<0.029	<0.25
Benzo(a)pyrene	-	8.0	0.27	0.43	0.13	<0.27	0.20	<0.33	0.044	<0.25
Indeno(1,2,3-cd)pyrene	-	14	0.18	0.33	0.14	<0.27	0.20	<0.33	0.039	<0.25
Dibenzo(a,h)anthracene	-	2.0	0.041	<0.22	<0.028	<0.27	0.047	<0.33	<0.029	<0.25
Benzo(g,h,i)perylene	-	-	0.11	0.31	0.084	<0.27	0.13	<0.33	<0.029	<0.25
Total all PAHs	1.68 to 24.3		6.821	13.29	1.397	ND	2.247	ND	0.039	ND

ND = not detected
- = Not available
All concentrations in Table 3 are dry weight
Totals do not include non-detection values.

EPH

Although PAHs are considered to be target compounds, the primary constituents from the EPH analyses are petroleum hydrocarbons which are extracted from the sediment matrix using methylene chloride and hexane. As the name implies, the chemicals detected in this analysis are related to compounds found in petroleum products such as motor oil. The results are reported as different fractions based on the chemical structure and number of carbons contained in the extracted compounds. A summary of the petroleum hydrocarbon results are contained below in **Table 4**. Samples collected from the 1996 study were not analyzed for EPH, therefore there is no historical data against which to compare these results.

Table 4: Summary of Petroleum Hydrocarbon Results

Petroleum Hydrocarbon Fraction	DEP Standard – mg/kg	Sediment Sample Locations – mg/kg			
		SD-01	SD-02	SD-03	SD-04
Unadjusted C11-C22 Aromatics		160	<27	41	<25
C9-C18 Aliphatics		<22	<27	<33	<25
C19-C36		55	58	100	<25
C11-C22 Aromatics		150	<27	40	<25
Total TPH	500 (see description below)	365	58	181	ND

ND = not detected
- = Not available
All concentrations in Table 4 are dry weight
Totals do not include non-detection values.

As indicated from **Table 4**, petroleum hydrocarbons were not detected in the sample collected at SD-04. Concentrations were compared to the standard for TPH found in the Guidance on Disposal & Use of Assorted Solid Wastes Generated in Maine. This document, produced by the MaineDEP provides additional guidance on the disposal and characterization of solid wastes such as grit retrieved from storm sewers and car wash facilities. This document contains a maximum limit of 500 mg/kg TPH for disposal of these kinds of waste. For the sediment sample locations where TPH was detected, all total concentrations are below this limit.

PCBs

PCB analysis was performed to identify any of seven target Arochlors including Arochlor-1016, 1221, 1232, 1242, 1248, 1254, and 1260. None of these compounds were detected above detection limits in any of the four sediment samples and are therefore below DEP beneficial reuse standards. However, each of the five samples collected in the 1996 study had detections of PCBs, ranging from 0.046 to 0.29 mg/kg. The low end of the range of detections is only slightly above the detection limit of 0.031 mg/kg. The concentrations of PCBs detected in all samples from the 1996 study are below the current beneficial reuse limit of 0.74 mg/kg.

Pesticides

The pesticide analysis includes 21 target compounds that were used for pest control and their associated degradation products. Only two pesticides were detected and the results are summarized in Table 5 below.

None of these compounds were detected in the sediment sample collected at SD-04. 4,4'-DDD and 4,4'-DDE were detected in each of the other three samples at generally trace concentrations. SD-03 had the highest concentrations of these compounds. 4,4'-DDE and 4,4'-DDD are degradation products of the pesticide 4,4'-DDT. DDT was widely used in the 1950s and 1960s to control mosquitoes. As indicated in Table 5, the total concentrations of pesticides are below the DEP's reuse standard of 0.74 mg/kg.

Table 5: Summary of Pesticide Detections

Pesticide	DEP Standard – mg/kg	Sediment Sample Locations – mg/kg			
		SD-01	SD-02	SD-03	SD-04
4,4'-DDE	-	0.0076	0.0079	0.056	<0.0025
4,4'-DDD	-	0.019	0.0089	0.044	<0.0025
Total	0.74	0.0266	0.0168	0.1	ND

ND = not detected
- = Not available
All concentrations in Table 5 are dry weight
Totals do not include non-detection values.

Metals

Sediment samples from each of the four locations were also analyzed for the metals arsenic, cadmium, chromium, lead and mercury. In addition, all samples were analyzed for hexavalent chromium, a particularly toxic form of this heavy metal. The results for each of the locations are summarized in Table 6 below.

Table 6: Summary of Metals Results

Metals – Methods 6010, 7471, 3060	1996 Study Historical Range-mg/kg	DEP Reuse Standard mg/kg	Sediment Concentrations – mg/kg			
Element			SD-01	SD-02	SD-03	SD-04
Arsenic	8.45 – 16.2	29	6.6	8.5	8.4	5.8
Cadmium	Not detected	8.0	<1.0	<2.33	<1.75	<1.0
Chromium	43.6-72.9	100	33.5	60.4	37	40.7
Lead	66.6-162	800	19.7	18	51.9	26.1
Mercury	ND to 0.59	60	<0.048	<0.054	0.072	<0.052
Hexavalent Chromium	Not analyzed	38	<0.66	<0.66	<0.94	<0.72

ND = not detected
- = Not available
All concentrations in Table 6 are dry weight
Totals do not include non-detection values.

As indicated by the summarized results in Table 6, the concentrations of all elements are below the corresponding MaineDEP reuse standards. Cadmium was not detected in any of the four sediment

samples. Lead concentrations were below the historical concentrations detected in 1996 for all samples. Chromium concentrations ranged from 33.5 to 60.4 mg/kg. This is similar to the range of historical concentrations from the 1996 Normandeau study. Hexavalent chromium was not detected in any of the samples.

Phosphorus

Phosphorus is an essential nutrient for plant and animal growth in aquatic systems, however, elevated levels within pond sediments can cycle when conditions are conducive and can contribute to algae blooms. Each of the four sediment samples was analyzed for phosphorus using USEPA Method 365.1. Each of the four samples had concentrations below what is considered typical for the sediments within natural lakes and ponds (approximately 1000-2000 mg/kg). Lower concentrations indicated in these results may be explained by the integration of samples across a few feet of sediments which include both deeper "parent" sediment as well as the surficial sediments/silt that are likely to be higher in nutrients. Total phosphorus concentrations are summarized in Table 7 below.

Table 7: Total Phosphorus Results

Sample Location	Total Phosphorus – mg/kg
SD-01	530
SD-02	580
SD-03	720
SD-04	600

While concentrations of phosphorus are not regulated under beneficial reuse requirements it is important to understand the concentration of phosphorus in sediments for long-term lake management. The sampling for Total Phosphorus was included in this evaluation for use in future studies of nutrient dynamics within the Capisic Pond.

Dioxins

The four sediment samples were also analyzed for dioxins using USEPA Method 1631. Dioxin is a generic term that is applied to many individual dioxin or dioxin-like compounds that are persistent in the environment. Dioxins are produced by natural and man-made combustion processes as well as some industrial processes. Some of these compounds are considered to be non-toxic while others are considered to be toxic. The dioxin and dioxin-like compounds are currently evaluated by toxic equivalency (TEQ). The TEQ approach uses a toxic equivalency factor (TEF) to weight the individual dioxin congeners and the dioxin-like compounds. With the TEFs, the toxicity of a mixture of dioxins and dioxin-like compounds can be expressed in a single number - the toxic equivalent, TEQ. It is a single figure resulting from the product of the concentration and individual TEF values of each congener. The TEQ concept has been developed to facilitate risk assessment and regulatory control. The TEF uses 2,3,7,8-tetrachlorodibenxo-p-dioxin (TCDD) as the comparison and the other congeners and dioxin-like compounds are some fractional part of the TCDD toxicity. The individual weighted values are summed to generate a TEQ value for each sample. The beneficial reuse TEQ limit for dioxin and dioxin-like compounds is 16 pg/g. The TEQ determined from the analysis of each of the sediment samples was compared against this limit. A summary of the TEQ values are presented in **Table 8** below.

Table 8: Summary of TEQ from Dioxin Analyses

	Sediment Sample Location			
	SD-01	SD-02	SD-03	SD-04
TEQ (pg/g)	2.50	1.57	2.59	1.37

The TEQs reported use the detection limit for non-detects and are the estimated maximum possible concentrations.

As indicated from **Table 8** above, all of the sediment samples had TEQ values that were below the DEP's beneficial use standard of 16 pg/g. TCDD was not detected in any of the four samples.

Physical Characteristics

Sediment samples were analyzed for grain size. For this analysis, the sample is passed through sieves of various mesh sizes to characterize the physical composition of the sediment material. Visual observations from field personnel during sample collection were also noted and recorded. The visual observations are summarized previously in Table 1. In general the sediment material was characterized as clay overlain by a layer of highly organic silts of varying thickness with small amounts of fine and medium sand. The results from the sieve analysis results are summarized in **Table 9** below.

Table 9: Summary of Physical Characteristics

	Sediment Sample Location - % Composition			
Sediment	SD-01	SD-02	SD-03	SD-04
Gravel	0.4 %	0.0%	4.4%	0.0%
Total Sand	23.2 %	11.6%	14.7%	1.8%
Coarse Sand	1.2%	0.3%	0.7%	0.0%
Medium Sand	5.6%	2.5%	4.5%	0.1%
Fine Sand	16.4%	8.8%	9.5%	1.7%
Silt	36.6%	41.3%	44.9%	46.3%
Clay	39.8%	47.1%	36.0%	51.4%

As indicated from **Table 9**, the highest percentage of sand was found in the sample collected at SD-01. The sample location with the highest percentage of clay and silt was SD-04. The physical composition of the sediments will be taken into consideration when options are assessed for reuse of dredged material.

Conclusions

Sediment samples collected during the September 14, 2011 Capisic Pond study was analyzed for physical and chemical parameters in order to inform the potential reuse of this material under several future restoration scenarios. Sediments were also physically characterized for grain size to further define what purposes would be appropriate for the pond sediment material removed during restoration activities.

The concentrations from the chemical analyses were compared against MaineDEP reduced procedure beneficial reuse standards where available. The concentrations of all parameters at all sampled locations were below these standards. Concentrations of several chemical parameters were also compared against historical data from a 1996 study and while most concentrations were within the range of those from the 1996 study, a few parameters appeared to be higher in 1996 than in the sediment analysis conducted in 2011.

Although all samples had concentrations of all chemical parameters below MaineDEP reuse standards, other risk factors based on the removal methods or ultimate location selected for reuse of the sediment material will have to be considered and additional sampling and analysis may be required.

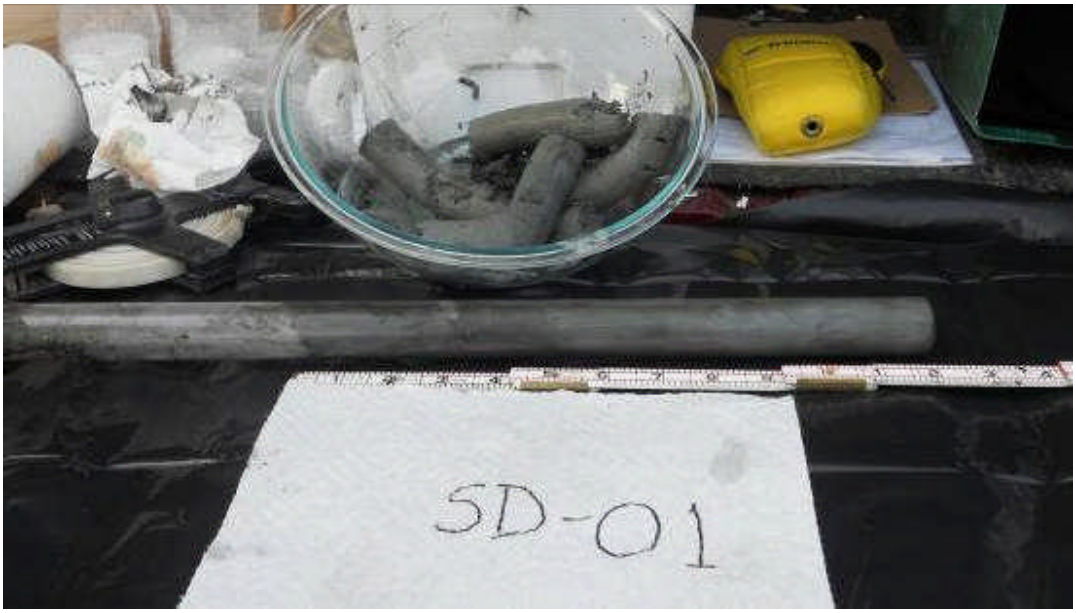
FIGURE

CAP
POR

2011
LOC

SITE PHOTOGRAPHS

Sampling Location SD-01



Sampling Location SD-02

Sampling Location SD-03

Sampling Location SD-04

APPENDIX A

Katahdin ANALYTICAL SERVICES

nelac Cert. No. E87604

October 17, 2011

Mr. Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland,ME 04102

RE: Katahdin Lab Number: SE5823
Project ID: Capisic Pond / 203939
Project Manager: Ms. Kelly Perkins
Sample Receipt Date(s): September 14, 2011

Dear Mr. Henderson:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. The original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert.html for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Deborah J Nadeau
Authorized Signature

10/17/2011
Date

TECHNICAL NARRATIVE

Organics Analysis

The samples of Work Order SE5823 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis.

8081 Analysis

The reported percent recovery acceptance limits for the Laboratory Control Samples (LCSs) are statistically derived for the full list of spiked compounds. The recoveries of the spiked analytes in the LCS, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are compared to these acceptance limits. Katahdin standard operating procedure is to take corrective action only if the number of spiked analytes in the LCS that are outside of the QC limits is greater than the DoD QSM allowable number of exceedances. If the associated MS/MSD has greater than the allowable number of exceedances, no corrective action is taken, as long as the LCS is acceptable.

There were no other protocol deviations or observations noted by the organics laboratory staff.

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* Compound recovery outside of quality control limits.

D Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J Used for Pesticide/Aroclor analyte when there is a greater than 40% difference for detected concentrations between the two GC columns.

B Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

N Presumptive evidence of a compound based on a mass spectral library search.

A Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS
(Refer to BOD Qualifiers Page for BOD footnotes)

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

MCL Maximum Contaminant Level

NL No limit

NFL No Free Liquid Present

FLP Free Liquid Present

NOD No Odor Detected

TON Threshold Odor Number

H1 Please note that the regulatory holding time for pH is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. pH for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H2 Please note that the regulatory holding time for DO is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. DO for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H3 Please note that the regulatory holding time for sulfite is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. Sulfite for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H4 Please note that the regulatory holding time for residual chlorine is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. Residual chlorine for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

KATAHDIN ANALYTICAL SERVICES
Combined Dilution Form 1

Client: Woodard & Curran
Project: Capisic Pond/203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/19/11
Analysis Date: 27-SEP-2011 16:24
Report Date: 10/06/2011
Matrix: SOIL
% Solids: 75.1

Lab ID: SE5823-1DL
Client ID: SD-01
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL
91-20-3	Naphthalene		200	1.0	20	25
91-57-6	2-Methylnaphthalene		460	5.0	20	120
208-96-8	Acenaphthylene	U	25	1.0	20	25
83-32-9	Acenaphthene		270	1.0	20	25
86-73-7	Fluorene		440	5.0	20	120
85-01-8	Phenanthrene		1500	5.0	20	120
120-12-7	Anthracene		280	1.0	20	25
206-44-0	Fluoranthene		760	5.0	20	120
129-00-0	Pyrene		1100	5.0	20	120
56-55-3	Benzo(a)anthracene		360	5.0	20	120
218-01-9	Chrysene		370	5.0	20	120
205-99-2	Benzo(b)fluoranthene		340	5.0	20	120
207-08-9	Benzo(k)fluoranthene		140	1.0	20	25
50-32-8	Benzo(a)pyrene		270	1.0	20	25
193-39-5	Indeno(1,2,3-cd)pyrene		180	1.0	20	25
53-70-3	Dibenzo(a,h)anthracene		41	1.0	20	25
191-24-2	Benzo(g,h,i)perylene		110	1.0	20	25
321-60-8	2-Methylnaphthalene-D10		46%			
118-79-6	Fluorene-D10		41%			
1718-51-0	Pyrene-D10		56%			

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/ 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 22-SEP-2011 00:15
Report Date: 10/04/2011
Matrix: SOIL
% Solids: 75.1

Lab ID: SE5823-1
Client ID: SD-01
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Aroclor-1016	U	22	1.0	17	22
Aroclor-1221	U	22	1.0	17	22
Aroclor-1232	U	22	1.0	17	22
Aroclor-1242	U	22	1.0	17	22
Aroclor-1248	U	22	1.0	17	22
Aroclor-1254	U	22	1.0	17	22
Aroclor-1260	U	22	1.0	17	22
Tetrachloro-m-xylene		60%			
Decachlorobiphenyl		73%			

Page 01 of 01 8EI00185.D

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond / 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 23-SEP-2011 14:48
Report Date: 10/12/2011
Matrix: SOIL
% Solids: 75.1

Lab ID: SE5823-1
Client ID: SD-01
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
alpha-BHC	U	2.2	1.0	1.7	2.2
gamma-BHC	U	2.2	1.0	1.7	2.2
Heptachlor	U	2.2	1.0	1.7	2.2
Aldrin	U	2.2	1.0	1.7	2.2
beta-BHC	U	2.2	1.0	1.7	2.2
delta-BHC	U	2.2	1.0	1.7	2.2
Heptachlor Epoxide	U	2.2	1.0	1.7	2.2
Endosulfan I	U	2.2	1.0	1.7	2.2
gamma-Chlordane	U	2.2	1.0	1.7	2.2
alpha-Chlordane	U	2.2	1.0	1.7	2.2
4,4'-DDE		7.6	1.0	3.3	4.2
Dieldrin	U	4.2	1.0	3.3	4.2
Endrin	U	4.2	1.0	3.3	4.2
4,4'-DDD		19	1.0	3.3	4.2
Endosulfan II	U	4.2	1.0	3.3	4.2
4,4'-DDT	U	4.2	1.0	3.3	4.2
Endrin Aldehyde	U	4.2	1.0	3.3	4.2
Endosulfan sulfate	U	4.2	1.0	3.3	4.2
Methoxychlor	U	22	1.0	17	22
Endrin Ketone	U	4.2	1.0	3.3	4.2
Toxaphene	U	42	1.0	33	42
Tetrachloro-m-Xylene		72%			
Decachlorobiphenyl		84%			

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Extractable Petroleum Hydrocarbon (EPH) Analysis

Client:	Woodard & Curran	**SDG:**	SE5823
Client Sample ID:	SD-01	**Date Collected:**	14-SEP-11
KAS Sample ID:	SE5823-1	**Date Received:**	14-SEP-11
Analytical Method:	MA DEP EPH 04-1.1	**Date Extracted:**	20-SEP-11
Prep Method:	SW846 3540	**Date Reported:**	04-OCT-11
Matrix:	SL	**Percent Solids:**	75.

EPH Range Results	Results	PQL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	160	22	mg/Kgdrywt	1	23-SEP-11	
C9-C18 Aliphatics	22	22	mg/Kgdrywt	1	23-SEP-11	U
C19-C36 Aliphatics	55	22	mg/Kgdrywt	1	23-SEP-11	
C11-C22 Aromatics	150	22	mg/Kgdrywt	1	23-SEP-11	

Targeted PAH Analytes	Results	PQL	Units	DF	Data Analyzed	Qual
Naphthalene	0.37	.22	mg/Kgdrywt	1	23-SEP-11	
2-Methylnaphthalene	0.76	.22	mg/Kgdrywt	1	23-SEP-11	
Phenanthrene	2.6	.22	mg/Kgdrywt	1	23-SEP-11	
Acenaphthylene	0.26	.22	mg/Kgdrywt	1	23-SEP-11	
Acenaphthene	0.51	.22	mg/Kgdrywt	1	23-SEP-11	
Anthracene	0.52	.22	mg/Kgdrywt	1	23-SEP-11	
Benzo(a)anthracene	0.62	.22	mg/Kgdrywt	1	23-SEP-11	
Benzo(a)pyrene	0.43	.22	mg/Kgdrywt	1	23-SEP-11	
Benzo(b)fluoranthene	0.48	.22	mg/Kgdrywt	1	23-SEP-11	
Benzo(g,h,i)perylene	0.31	.22	mg/Kgdrywt	1	23-SEP-11	
Benzo(k)fluoranthene	0.49	.22	mg/Kgdrywt	1	23-SEP-11	
Chrysene	0.74	.22	mg/Kgdrywt	1	23-SEP-11	
Dibenzo(a,h)anthracene	0.22	.22	mg/Kgdrywt	1	23-SEP-11	U
Fluoranthene	1.7	.22	mg/Kgdrywt	1	23-SEP-11	
Fluorene	0.67	.22	mg/Kgdrywt	1	23-SEP-11	
Indeno(1,2,3-cd)pyrene	0.33	.22	mg/Kgdrywt	1	23-SEP-11	
Pyrene	2.5	.22	mg/Kgdrywt	1	23-SEP-11	

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	93	40-140	23-SEP-11	
o-Terphenyl	84	40-140	23-SEP-11	
2-Fluorobiphenyl	70	40-140	23-SEP-11	
2-Bromonaphthalene	75	40-140	23-SEP-11	

* Fractionation Surrogates.

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.

3 Diesel PAH Analytes.

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Katahdin ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Lab Sample ID: SE5823-001
Report Date: 10/5/2011
PO No.:
Project: Capisic Pond / 203939

Sample Description	Matrix	Percent Solids(%)	Date Sampled	Date Received
SD-01	SL	75.1	09/14/2011	09/14/2011

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	6.6	mg/Kgdrywt	0.8	1	0.8	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CADMIUM	U 1.00	mg/Kgdrywt	1.00	1	1	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CHROMIUM	33.5	mg/Kgdrywt	1.50	1	1.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
LEAD	19.7	mg/Kgdrywt	0.5	1	0.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
MERCURY	U 0.048	ug/gdrywt	0.048	1	0.04	SW846 7471	9/28/11	NAT	SW846 7471	9/26/11	NAT	BI26HGS1	1

1 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects,sample volume, or quantity used for analysis.

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland,ME 04102

Lab Sample ID: SE5823-1
Report Date: 03-OCT-11
Client PO:
Project: Capisic Pond / 203939
SDG: SE5823

Sample Description	Matrix	Date Sampled	Date Received
SD-01	SL	14-SEP-11	14-SEP-11

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes
Chromium, Hexavalent	U0.66 mg/Kgdrywt	0.66	0.20	SW846 7196A	WG98085	22-SEP-11 10:45:00	SW846 3060A	21-SEP-11	CT	
Phosphorus, Total As P	530 mg/Kgdrywt	34.	8.8	EPA 365.4	WG97751	20-SEP-11 15:19:52	EPA 365.4	19-SEP-11	CT	
Total Solids	75. %	1		SM2540G	WG97657	21-SEP-11 09:15:00	ASTM D2216	20-SEP-11	RO	

Katahdin Analytical Services SE5823 page 0000010 of 0000108

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/19/11
Analysis Date: 25-SEP-2011 13:37
Report Date: 10/06/2011
Matrix: SOIL
% Solids: 68.1

Lab ID: SE5823-2
Client ID: SD-02
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Naphthalene	U	28	1.0	20	28
2-Methylnaphthalene	U	28	1.0	20	28
Acenaphthylene	U	28	1.0	20	28
Acenaphthene	U	28	1.0	20	28
Fluorene	U	28	1.0	20	28
Phenanthrene		88	1.0	20	28
Anthracene	U	28	1.0	20	28
Fluoranthene		210	1.0	20	28
Pyrene		180	1.0	20	28
Benzo(a)anthracene		92	1.0	20	28
Chrysene		150	1.0	20	28
Benzo(b)fluoranthene		240	1.0	20	28
Benzo(k)fluoranthene		83	1.0	20	28
Benzo(a)pyrene		130	1.0	20	28
Indeno(1,2,3-cd)pyrene		140	1.0	20	28
Dibenzo(a,h)anthracene	U	28	1.0	20	28
Benzo(g,h,i)perylene		84	1.0	20	28
2-Methylnaphthalene-D10		37%			
Fluorene-D10		36%			
Pyrene-D10		51%			

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/ 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 22-SEP-2011 00:36
Report Date: 10/04/2011
Matrix: SOIL
% Solids: 68.1

Lab ID: SE5823-2
Client ID: SD-02
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Aroclor-1016	U	23	1.0	17	23
Aroclor-1221	U	23	1.0	17	23
Aroclor-1232	U	23	1.0	17	23
Aroclor-1242	U	23	1.0	17	23
Aroclor-1248	U	23	1.0	17	23
Aroclor-1254	U	23	1.0	17	23
Aroclor-1260	U	23	1.0	17	23
Tetrachloro-m-xylene		92%			
Decachlorobiphenyl		83%			

Page 01 of 01 8EI00186.D

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond / 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 23-SEP-2011 15:08
Report Date: 10/11/2011
Matrix: SOIL
% Solids: 68.1

Lab ID: SE5823-2
Client ID: SD-02
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
alpha-BHC	U	2.3	1.0	1.7	2.3
gamma-BHC	U	2.3	1.0	1.7	2.3
Heptachlor	U	2.3	1.0	1.7	2.3
Aldrin	U	2.3	1.0	1.7	2.3
beta-BHC	U	2.3	1.0	1.7	2.3
delta-BHC	U	2.3	1.0	1.7	2.3
Heptachlor Epoxide	U	2.3	1.0	1.7	2.3
Endosulfan I	U	2.3	1.0	1.7	2.3
gamma-Chlordane	U	2.3	1.0	1.7	2.3
alpha-Chlordane	U	2.3	1.0	1.7	2.3
4,4'-DDE		7.9	1.0	3.3	4.4
Dieldrin	U	4.4	1.0	3.3	4.4
Endrin	U	4.4	1.0	3.3	4.4
4,4'-DDD		8.9	1.0	3.3	4.4
Endosulfan II	U	4.4	1.0	3.3	4.4
4,4'-DDT	U	4.4	1.0	3.3	4.4
Endrin Aldehyde	U	4.4	1.0	3.3	4.4
Endosulfan sulfate	U	4.4	1.0	3.3	4.4
Methoxychlor	U	23	1.0	17	23
Endrin Ketone	U	4.4	1.0	3.3	4.4
Toxaphene	U	44	1.0	33	44
Tetrachloro-m-Xylene		87%			
Decachlorobiphenyl		94%			

Page 01 of 01 1EI00452.D

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Extractable Petroleum Hydrocarbon (EPH) Analysis

Client:	Woodard & Curran	**SDG:**	SE5823
Client Sample ID:	SD-02	**Date Collected:**	14-SEP-11
KAS Sample ID:	SE5823-2	**Date Received:**	14-SEP-11
Analytical Method:	MA DEP EPH 04-1.1	**Date Extracted:**	20-SEP-11
Prep Method:	SW846 3540	**Date Reported:**	04-OCT-11
Matrix:	SL	**Percent Solids:**	68.

EPH Range Results	Results	PQL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	27	27	mg/Kgdrywt	1	23-SEP-11	U
C9-C18 Aliphatics	27	27	mg/Kgdrywt	1	23-SEP-11	U
C19-C36 Aliphatics	58	27	mg/Kgdrywt	1	23-SEP-11	
C11-C22 Aromatics	27.	27	mg/Kgdrywt	1	23-SEP-11	U

Targeted PAH Analytes	Results	PQL	Units	DF	Data Analyzed	Qual
Naphthalene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
2-Methylnaphthalene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Phenanthrene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthylene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Anthracene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)anthracene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)pyrene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Benzo(b)fluoranthene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Benzo(g,h,i)perylene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Benzo(k)fluoranthene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Chrysene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Dibenzo(a,h)anthracene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Fluoranthene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Fluorene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Indeno(1,2,3-cd)pyrene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U
Pyrene	0.27	.27	mg/Kgdrywt	1	23-SEP-11	U

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	101	40-140	23-SEP-11	
o-Terphenyl	75	40-140	23-SEP-11	
2-Fluorobiphenyl	72	40-140	23-SEP-11	
2-Bromonaphthalene	73	40-140	23-SEP-11	

* Fractionation Surrogates.

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.

3 Diesel PAH Analytes.

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Katahdin ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Lab Sample ID: SE5823-002
Report Date: 10/5/2011
PO No.:
Project: Capisic Pond / 203939

Sample Description	Matrix	Percent Solids(%)	Date Sampled	Date Received
SD-02	SL	68.1	09/14/2011	09/14/2011

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	8.6	mg/Kgdrywt	2.	2	0.8	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CADMIUM	U 2.33	mg/Kgdrywt	2.33	2	1	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	1
CHROMIUM	60.4	mg/Kgdrywt	3.50	2	1.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
LEAD	18.	mg/Kgdrywt	1.	2	0.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
MERCURY	U 0.054	ug/gdrywt	0.054	1	0.04	SW846 7471	9/28/11	NAT	SW846 7471	9/26/11	NAT	BI26HGS1	1

1 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects,sample volume, or quantity used for analysis.

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland,ME 04102

Lab Sample ID: SE5823-2
Report Date: 03-OCT-11
Client PO:
Project: Capisic Pond / 203939
SDG: SE5823

Sample Description	Matrix	Date Sampled	Date Received
SD-02	SL	14-SEP-11	14-SEP-11

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes
Chromium, Hexavalent	U0.66 mg/Kgdrywt	0.66	0.20	SW846 7196A	WG98085	22-SEP-11 10:51:00	SW846 3060A	21-SEP-11	CT	
Phosphorus, Total As P	580 mg/Kgdrywt	35.	9.1	EPA 365.4	WG97751	20-SEP-11 15:20:49	EPA 365.4	19-SEP-11	CT	
Total Solids	68. %	1		SM2540G	WG97657	21-SEP-11 09:16:00	ASTM D2216	20-SEP-11	RO	

600 Technology Way
P.O. Box 540, Scarborough, ME 04070

http://katahdinlab.com
sales@katahdinlab.com

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/19/11
Analysis Date: 25-SEP-2011 14:19
Report Date: 10/06/2011
Matrix: SOIL
% Solids: 52.8

Lab ID: SE5823-3
Client ID: SD-03
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Naphthalene	U	35	1.0	20	35
2-Methylnaphthalene	U	35	1.0	20	35
Acenaphthylene	U	35	1.0	20	35
Acenaphthene	U	35	1.0	20	35
Fluorene	U	35	1.0	20	35
Phenanthrene		150	1.0	20	35
Anthracene	U	35	1.0	20	35
Fluoranthene		310	1.0	20	35
Pyrene		280	1.0	20	35
Benzo(a)anthracene		150	1.0	20	35
Chrysene		240	1.0	20	35
Benzo(b)fluoranthene		400	1.0	20	35
Benzo(k)fluoranthene		140	1.0	20	35
Benzo(a)pyrene		200	1.0	20	35
Indeno(1,2,3-cd)pyrene		200	1.0	20	35
Dibenzo(a,h)anthracene		47	1.0	20	35
Benzo(g,h,i)perylene		130	1.0	20	35
2-Methylnaphthalene-D10		55%			
Fluorene-D10		43%			
Pyrene-D10		60%			

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/ 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 22-SEP-2011 00:58
Report Date: 10/04/2011
Matrix: SOIL
% Solids: 52.8

Lab ID: SE5823-3
Client ID: SD-03
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Aroclor-1016	U	31	1.0	17	31
Aroclor-1221	U	31	1.0	17	31
Aroclor-1232	U	31	1.0	17	31
Aroclor-1242	U	31	1.0	17	31
Aroclor-1248	U	31	1.0	17	31
Aroclor-1254	U	31	1.0	17	31
Aroclor-1260	U	31	1.0	17	31
Tetrachloro-m-xylene		88%			
Decachlorobiphenyl		82%			

Page 01 of 01 8EI00187.D

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond / 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 23-SEP-2011 15:27
Report Date: 10/12/2011
Matrix: SOIL
% Solids: 52.8

Lab ID: SE5823-3
Client ID: SD-03
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
alpha-BHC	U	3.1	1.0	1.7	3.1
gamma-BHC	U	3.1	1.0	1.7	3.1
Heptachlor	U	3.1	1.0	1.7	3.1
Aldrin	U	3.1	1.0	1.7	3.1
beta-BHC	U	3.1	1.0	1.7	3.1
delta-BHC	U	3.1	1.0	1.7	3.1
Heptachlor Epoxide	U	3.1	1.0	1.7	3.1
Endosulfan I	U	3.1	1.0	1.7	3.1
gamma-Chlordane	U	3.1	1.0	1.7	3.1
alpha-Chlordane	U	3.1	1.0	1.7	3.1
4,4'-DDE		44	1.0	3.3	6.1
Dieldrin	U	6.1	1.0	3.3	6.1
Endrin	U	6.1	1.0	3.3	6.1
4,4'-DDD		56	1.0	3.3	6.1
Endosulfan II	U	6.1	1.0	3.3	6.1
4,4'-DDT	U	6.1	1.0	3.3	6.1
Endrin Aldehyde	U	6.1	1.0	3.3	6.1
Endosulfan sulfate	U	6.1	1.0	3.3	6.1
Methoxychlor	U	31	1.0	17	31
Endrin Ketone	U	6.1	1.0	3.3	6.1
Toxaphene	U	61	1.0	33	61
Tetrachloro-m-Xylene		75%			
Decachlorobiphenyl		89%			

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Extractable Petroleum Hydrocarbon (EPH) Analysis

Client:	Woodard & Curran	**SDG:**	SE5823
Client Sample ID:	SD-03	**Date Collected:**	14-SEP-11
KAS Sample ID:	SE5823-3	**Date Received:**	14-SEP-11
Analytical Method:	MA DEP EPH 04-1.1	**Date Extracted:**	20-SEP-11
Prep Method:	SW846 3540	**Date Reported:**	04-OCT-11
Matrix:	SL	**Percent Solids:**	53.

EPH Range Results	Results	PQL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	41	33	mg/Kgdrywt	1	23-SEP-11	
C9-C18 Aliphatics	33	33	mg/Kgdrywt	1	23-SEP-11	U
C19-C36 Aliphatics	100	33	mg/Kgdrywt	1	23-SEP-11	
C11-C22 Aromatics	40.	33	mg/Kgdrywt	1	23-SEP-11	

Targeted PAH Analytes	Results	PQL	Units	DF	Data Analyzed	Qual
Naphthalene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
2-Methylnaphthalene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Phenanthrene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthylene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Anthracene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)anthracene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)pyrene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Benzo(b)fluoranthene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Benzo(g,h,i)perylene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Benzo(k)fluoranthene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Chrysene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Dibenzo(a,h)anthracene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Fluoranthene	0.38	.33	mg/Kgdrywt	1	23-SEP-11	
Fluorene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Indeno(1,2,3-cd)pyrene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U
Pyrene	0.33	.33	mg/Kgdrywt	1	23-SEP-11	U

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	100	40-140	23-SEP-11	
o-Terphenyl	77	40-140	23-SEP-11	
2-Fluorobiphenyl	69	40-140	23-SEP-11	
2-Bromonaphthalene	71	40-140	23-SEP-11	

* Fractionation Surrogates.

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.

3 Diesel PAH Analytes.

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Katahdin ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Lab Sample ID: SE5823-003
Report Date: 10/5/2011
PO No.:
Project: Capisic Pond / 203939

Sample Description	Matrix	Percent Solids(%)	Date Sampled	Date Received
SD-03	SL	52.8	09/14/2011	09/14/2011

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	8.4	mg/Kgdrywt	1.	1	0.8	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CADMIUM	U 1.75	mg/Kgdrywt	1.75	1	1	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	1
CHROMIUM	37.0	mg/Kgdrywt	2.63	1	1.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
LEAD	51.9	mg/Kgdrywt	0.9	1	0.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
MERCURY	0.072	ug/gdrywt	0.069	1	0.04	SW846 7471	9/28/11	NAT	SW846 7471	9/26/11	NAT	BI26HGS1	

1 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects,sample volume, or quantity used for analysis.

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland,ME 04102

Lab Sample ID: SE5823-3
Report Date: 03-OCT-11
Client PO:
Project: Capisic Pond / 203939
SDG: SE5823

Sample Description	Matrix	Date Sampled	Date Received
SD-03	SL	14-SEP-11	14-SEP-11

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes
Chromium, Hexavalent	U0.94 mg/Kgdrywt	0.94	0.29	SW846 7196A	WG98085	22-SEP-11 10:52:00	SW846 3060A	21-SEP-11	CT	
Phosphorus, Total As P	720 mg/Kgdrywt	62.	16.	EPA 365.4	WG97751	20-SEP-11 15:21:46	EPA 365.4	19-SEP-11	CT	
Total Solids	53. %	1		SM2540G	WG97657	21-SEP-11 09:17:00	ASTM D2216	20-SEP-11	RO	

Katahdin Analytical Services SE5823 page 0000022 of 0000108

60 Technology Way
P.O. Box 540, Scarborough, ME 04070

http://katahdinlab.com
sales@katahdinlab.com

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/19/11
Analysis Date: 25-SEP-2011 15:01
Report Date: 10/06/2011
Matrix: SOIL
% Solids: 67.4

Lab ID: SE5823-4
Client ID: SD-04
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Naphthalene	U	29	1.0	20	29
2-Methylnaphthalene	U	29	1.0	20	29
Acenaphthylene	U	29	1.0	20	29
Acenaphthene	U	29	1.0	20	29
Fluorene	U	29	1.0	20	29
Phenanthrene		37	1.0	20	29
Anthracene	U	29	1.0	20	29
Fluoranthene		75	1.0	20	29
Pyrene		64	1.0	20	29
Benzo(a)anthracene		34	1.0	20	29
Chrysene		35	1.0	20	29
Benzo(b)fluoranthene		62	1.0	20	29
Benzo(k)fluoranthene	U	29	1.0	20	29
Benzo(a)pyrene		44	1.0	20	29
Indeno(1,2,3-cd)pyrene		39	1.0	20	29
Dibenzo(a,h)anthracene	U	29	1.0	20	29
Benzo(g,h,i)perylene	U	29	1.0	20	29
2-Methylnaphthalene-D10		52%			
Fluorene-D10		44%			
Pyrene-D10		64%			

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond/ 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 22-SEP-2011 01:19
Report Date: 10/04/2011
Matrix: SOIL
% Solids: 67.4

Lab ID: SE5823-4
Client ID: SD-04
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Aroclor-1016	U	25	1.0	17	25
Aroclor-1221	U	25	1.0	17	25
Aroclor-1232	U	25	1.0	17	25
Aroclor-1242	U	25	1.0	17	25
Aroclor-1248	U	25	1.0	17	25
Aroclor-1254	U	25	1.0	17	25
Aroclor-1260	U	25	1.0	17	25
Tetrachloro-m-xylene		88%			
Decachlorobiphenyl		72%			

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Woodard & Curran
Project: Capisic Pond / 203939
PO No:
Sample Date: 09/14/11
Received Date: 09/14/11
Extraction Date: 09/15/11
Analysis Date: 23-SEP-2011 15:47
Report Date: 10/11/2011
Matrix: SOIL
% Solids: 67.4

Lab ID: SE5823-4
Client ID: SD-04
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
alpha-BHC	U	2.5	1.0	1.7	2.5
gamma-BHC	U	2.5	1.0	1.7	2.5
Heptachlor	U	2.5	1.0	1.7	2.5
Aldrin	U	2.5	1.0	1.7	2.5
beta-BHC	U	2.5	1.0	1.7	2.5
delta-BHC	U	2.5	1.0	1.7	2.5
Heptachlor Epoxide	U	2.5	1.0	1.7	2.5
Endosulfan I	U	2.5	1.0	1.7	2.5
gamma-Chlordane	U	2.5	1.0	1.7	2.5
alpha-Chlordane	U	2.5	1.0	1.7	2.5
4,4'-DDE	U	4.8	1.0	3.3	4.8
Dieldrin	U	4.8	1.0	3.3	4.8
Endrin	U	4.8	1.0	3.3	4.8
4,4'-DDD	U	4.8	1.0	3.3	4.8
Endosulfan II	U	4.8	1.0	3.3	4.8
4,4'-DDT	U	4.8	1.0	3.3	4.8
Endrin Aldehyde	U	4.8	1.0	3.3	4.8
Endosulfan sulfate	U	4.8	1.0	3.3	4.8
Methoxychlor	U	25	1.0	17	25
Endrin Ketone	U	4.8	1.0	3.3	4.8
Toxaphene	U	48	1.0	33	48
Tetrachloro-m-Xylene		74%			
Decachlorobiphenyl		86%			

Page 01 of 01 1EI00454.D

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Extractable Petroleum Hydrocarbon (EPH) Analysis

Client:	Woodard & Curran	**SDG:**	SE5823
Client Sample ID:	SD-04	**Date Collected:**	14-SEP-11
KAS Sample ID:	SE5823-4	**Date Received:**	14-SEP-11
Analytical Method:	MA DEP EPH 04-1.1	**Date Extracted:**	20-SEP-11
Prep Method:	SW846 3540	**Date Reported:**	04-OCT-11
Matrix:	SL	**Percent Solids:**	67.

EPH Range Results	Results	PQL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	25	25	mg/Kgdrywt	1	23-SEP-11	U
C9-C18 Aliphatics	25	25	mg/Kgdrywt	1	23-SEP-11	U
C19-C36 Aliphatics	25	25	mg/Kgdrywt	1	23-SEP-11	U
C11-C22 Aromatics	25.	25	mg/Kgdrywt	1	23-SEP-11	U

Targeted PAH Analytes	Results	PQL	Units	DF	Data Analyzed	Qual
Naphthalene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
2-Methylnaphthalene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Phenanthrene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthylene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Acenaphthene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Anthracene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)anthracene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Benzo(a)pyrene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Benzo(b)fluoranthene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Benzo(g,h,i)perylene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Benzo(k)fluoranthene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Chrysene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Dibenzo(a,h)anthracene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Fluoranthene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Fluorene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Indeno(1,2,3-cd)pyrene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U
Pyrene	0.25	.25	mg/Kgdrywt	1	23-SEP-11	U

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	97	40-140	23-SEP-11	
o-Terphenyl	80	40-140	23-SEP-11	
2-Fluorobiphenyl	79	40-140	23-SEP-11	
2-Bromonaphthalene	80	40-140	23-SEP-11	

* Fractionation Surrogates.

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.

3 Diesel PAH Analytes.

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Katahdin ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Lab Sample ID: SE5823-004
Report Date: 10/5/2011
PO No.:
Project: Capisic Pond / 203939

Sample Description	Matrix	Percent Solids(%)	Date Sampled	Date Received
SD-04	SL	67.4	09/14/2011	09/14/2011

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	5.8	mg/Kgdrywt	0.8	1	0.8	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CADMIUM	U 1.00	mg/Kgdrywt	1.00	1	1	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
CHROMIUM	40.7	mg/Kgdrywt	1.50	1	1.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
LEAD	26.1	mg/Kgdrywt	0.5	1	0.5	SW846 6010	9/22/11	EAM	SW846 3050	9/21/11	NAT	BI21ICS1	
MERCURY	U 0.052	ug/gdrywt	0.052	1	0.04	SW846 7471	9/28/11	NAT	SW846 7471	9/26/11	NAT	BI26HGS1	1

1 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects,sample volume, or quantity used for analysis.

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Zach Henderson
Woodard & Curran
41 Hutchins Drive
Portland,ME 04102

Lab Sample ID: SE5823-4
Report Date: 03-OCT-11
Client PO:
Project: Capisic Pond / 203939
SDG: SE5823

Sample Description	Matrix	Date Sampled	Date Received
SD-04	SL	14-SEP-11	14-SEP-11

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes
Chromium, Hexavalent	U0.72 mg/Kgdrywt	0.72	0.22	SW846 7196A	WG98085	22-SEP-11 10:53:00	SW846 3060A	21-SEP-11	CT	
Phosphorus, Total As P	600 mg/Kgdrywt	48.	12.	EPA 365.4	WG97751	20-SEP-11 15:22:43	EPA 365.4	19-SEP-11	CT	
Total Solids	67. %	1		SM2540G	WG97657	21-SEP-11 09:18:00	ASTM D2216	20-SEP-11	RO	

Katahdin Analytical Services SE5823 page 0000028 of 0000108

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97583-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND/203939 SDG No.: SE5823

Lab File ID: N1683 Lab Sample ID: WG97583-1

Instrument ID: GCMS-N Date Extracted: 09/19/11

Matrix: (soil/water) SOIL Date Analyzed: 09/25/11

Level:(low/med) LOW Time Analyzed: 1047

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG97583-LCS	WG97583-2	N1684	09/25/11	1129
02	WG97583-LCSD	WG97583-3	N1685	09/25/11	1212
03	SD-01	SE5823-1	N1686	09/25/11	1254
04	SD-02	SE5823-2	N1687	09/25/11	1337
05	SD-03	SE5823-3	N1688	09/25/11	1419
06	SD-04	SE5823-4	N1689	09/25/11	1501
07	SD-01	SE5823-1DL	N1722	09/27/11	1624
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IVSV

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: Capisic Pond/203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/19/11
Analysis Date: 25-SEP-2011 10:47
Report Date: 10/06/2011
Matrix: SOIL
% Solids: 100

Lab ID: WG97583-1
Client ID: WG97583-Blank
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Naphthalene	U	20	1.0	20	20
2-Methylnaphthalene	U	20	1.0	20	20
Acenaphthylene	U	20	1.0	20	20
Acenaphthene	U	20	1.0	20	20
Fluorene	U	20	1.0	20	20
Phenanthrene	U	20	1.0	20	20
Anthracene	U	20	1.0	20	20
Fluoranthene	U	20	1.0	20	20
Pyrene	U	20	1.0	20	20
Benzo(a)anthracene	U	20	1.0	20	20
Chrysene	U	20	1.0	20	20
Benzo(b)fluoranthene	U	20	1.0	20	20
Benzo(k)fluoranthene	U	20	1.0	20	20
Benzo(a)pyrene	U	20	1.0	20	20
Indeno(1,2,3-cd)pyrene	U	20	1.0	20	20
Dibenzo(a,h)anthracene	U	20	1.0	20	20
Benzo(g,h,i)perylene	U	20	1.0	20	20
2-Methylnaphthalene-D10		52%			
Fluorene-D10		47%			
Pyrene-D10		60%			

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond/203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/19/11
Analysis Date: 09/25/11
Report Date: 10/06/2011
Matrix: SOIL

Lab ID: WG97583-2 & WG97583-3
Client ID: WG97583-LCS & WG97583-LCSD
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3550
Analyst: WAS
Analysis Method: SW846 M8270C SIM
Lab Prep Batch: WG97583
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
Naphthalene	67	67	NA	41	49	62	73	16	50	10-129
2-Methylnaphthalene	67	67	NA	45	52	67	78	15	50	10-152
Acenaphthylene	67	67	NA	41	48	62	71	14	50	25- 94
Acenaphthene	67	67	NA	40	46	60	68	13	50	33- 98
Fluorene	67	67	NA	40	45	60	67	10	50	40- 92
Phenanthrene	67	67	NA	46	49	69	74	7	50	46- 96
Anthracene	67	67	NA	43	46	65	68	5	50	34- 96
Fluoranthene	67	67	NA	56	56	84	84	0.7	50	38-116
Pyrene	67	67	NA	38	43	58	65	12	50	35-111
Benzo(a)anthracene	67	67	NA	48	49	72	74	2	50	48-100
Chrysene	67	67	NA	48	50	72	75	4	30	46-101
Benzo(b)fluoranthene	67	67	NA	58	56	86	84	3	50	53-100
Benzo(k)fluoranthene	67	67	NA	46	46	68	68	0.2	50	49- 96
Benzo(a)pyrene	67	67	NA	58	49	87	73	17	50	61-101
Indeno(1,2,3-cd)pyrene	67	67	NA	51	53	76	80	5	50	50-105
Dibenzo(a,h)anthracene	67	67	NA	55	58	82	87	6	50	55-105
Benzo(g,h,i)perylene	67	67	NA	43	45	64	68	6	50	53-103

FORM III SV-2

N1684.D & N1685.D

FORM 4
PESTICIDE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97401-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND/ 203939 SDG No.: SE5823

Lab Sample ID: WG97401-1 Lab File ID: 8EI00169

Matrix (soil/water) SOIL Extraction:(SepF/Cont/Sonc) SW846 3540

Sulfur Cleanup: (Y/N) N Date Extracted: 09/15/11

Date Analyzed (1): 09/21/11 Date Analyzed (2): 09/21/11

Time Analyzed (1): 1836 Time Analyzed (2): 1836

Instrument ID (1): GC08 Instrument ID (2): GC08

GC Column (1): ZB-MULTIRESIDUE1 ID: 0.53(mm) GC Column (2): ZB-MULTIRESIDUE2 ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	WG97401-LCS	WG97401-2	8EI00170	09/21/11	09/21/11
02	WG97401-LCSD	WG97401-3	8EI00171	09/21/11	09/21/11
03	SD-01	SE5823-1	8EI00185	09/22/11	09/22/11
04	SD-02	SE5823-2	8EI00186	09/22/11	09/22/11
05	SD-03	SE5823-3	8EI00187	09/22/11	09/22/11
06	SD-04	SE5823-4	8EI00188	09/22/11	09/22/11
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

COMMENTS:

FORM IVPCB

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: Capisic Pond/ 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/15/11
Analysis Date: 21-SEP-2011 18:36
Report Date: 10/04/2011
Matrix: SOIL
% Solids: 100

Lab ID: WG97401-1
Client ID: WG97401-Blank
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
Aroclor-1016	U	3.4	1.0	17	3.4
Aroclor-1221	U	3.4	1.0	17	3.4
Aroclor-1232	U	3.4	1.0	17	3.4
Aroclor-1242	U	3.4	1.0	17	3.4
Aroclor-1248	U	3.4	1.0	17	3.4
Aroclor-1254	U	3.4	1.0	17	3.4
Aroclor-1260	U	3.4	1.0	17	3.4
Tetrachloro-m-xylene		85%			
Decachlorobiphenyl		97%			

Page 01 of 01 8EI00169.D

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/15/11
Analysis Date: 09/21/11
Report Date: 10/08/2011
Matrix: SOIL

Lab ID: WG97401-2 & WG97401-3
Client ID: WG97401-LCS & WG97401-LCSD
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: CB
Analysis Method: SW846 8082
Lab Prep Batch: WG97401
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
Aroclor-1016	33	33	NA	32	37	94	111	16	50	53-123
Aroclor-1260	33	33	NA	37	38	111	115	3	50	58-120

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97628-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND / 203939 SDG No.: SE5823

Lab File ID: CEI1184 Lab Sample ID: WG97628-1

Instrument ID: GC12 Date Extracted: 09/20/11

Matrix: (soil/water) SOIL Date Analyzed: 09/22/11

Level:(low/med) LOW Time Analyzed: 1545

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG97628-LCSD	WG97628-3	CEI1182	09/22/11	1218
02	WG97628-LCS	WG97628-2	CEI1186	09/22/11	1752
03	SD-01	SE5823-1	CEI1195	09/23/11	0319
04	SD-02	SE5823-2	CEI1196	09/23/11	0422
05	SD-03	SE5823-3	CEI1197	09/23/11	0524
06	SD-04	SE5823-4	CEI1198	09/23/11	0627
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97628-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND / 203939 SDG No.: SE5823

Lab File ID: CEI1184A Lab Sample ID: WG97628-1

Instrument ID: GC12 Date Extracted: 09/20/11

Matrix: (soil/water) SOIL Date Analyzed: 09/22/11

Level:(low/med) LOW Time Analyzed: 1545

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG97628-LCSD	WG97628-3	CEI1182A	09/22/11	1218
02	WG97628-LCS	WG97628-2	CEI1186A	09/22/11	1752
03	SD-01	SE5823-1	CEI1195A	09/23/11	0319
04	SD-02	SE5823-2	CEI1196A	09/23/11	0422
05	SD-03	SE5823-3	CEI1197A	09/23/11	0524
06	SD-04	SE5823-4	CEI1198A	09/23/11	0627
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IVDRO

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97628-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND / 203939 SDG No.: SE5823

Lab File ID: CEI2184 Lab Sample ID: WG97628-1

Instrument ID: GC12 Date Extracted: 09/20/11

Matrix: (soil/water) SOIL Date Analyzed: 09/22/11

Level:(low/med) LOW Time Analyzed: 1545

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	WG97628-LCSD	WG97628-3	CEI2182	09/22/11	1218
02	WG97628-LCS	WG97628-2	CEI2186	09/22/11	1752
03	SD-01	SE5823-1	CEI2195	09/23/11	0319
04	SD-02	SE5823-2	CEI2196	09/23/11	0422
05	SD-03	SE5823-3	CEI2197	09/23/11	0524
06	SD-04	SE5823-4	CEI2198	09/23/11	0627
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IVDRO

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Blank Analysis

Client:	Katahdin Analytical Services	**SDG:**	SE5823
Client Sample ID:	Method Blank Sample	**Date Collected:**	
KAS Sample ID:	WG97628-1	**Date Received:**	
Analytical Method:	MA DEP EPH 04-1.1	**Date Extracted:**	20-SEP-11
Prep Method:	SW846 3540	**Date Reported:**	04-OCT-11
Matrix:	SL	**Percent Solids:**	NA

EPH Range Results	Results	PQL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	20	20	mg/Kgdrywt	1	22-SEP-11 15:45	U
C9-C18 Aliphatics	20	20	mg/Kgdrywt	1	22-SEP-11 15:45	U
C19-C36 Aliphatics	20	20	mg/Kgdrywt	1	22-SEP-11 15:45	U
C11-C22 Aromatics	20.	20	mg/Kgdrywt	1	22-SEP-11 15:45	U

Targeted PAH Analytes	Results	PQL	Units	DF	Data Analyzed	Qual
Naphthalene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
2-Methylnaphthalene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Phenanthrene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Acenaphthylene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Acenaphthene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Anthracene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Benzo(a)anthracene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Benzo(a)pyrene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Benzo(b)fluoranthene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Benzo(g,h,i)perylene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Benzo(k)fluoranthene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Chrysene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Dibenzo(a,h)anthracene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Fluoranthene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Fluorene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Indeno(1,2,3-cd)pyrene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U
Pyrene	0.20	.2	mg/Kgdrywt	1	22-SEP-11 15:45	U

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	81	40-140	22-SEP-11 15:45	
o-Terphenyl	61	40-140	22-SEP-11 15:45	
2-Fluorobiphenyl	73	40-140	22-SEP-11 15:45	
2-Bromonaphthalene	72	40-140	22-SEP-11 15:45	

* Fractionation Surrogates.

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.

3 Diesel PAH Analytes.

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/20/11
Analysis Date: 09/22/11
Report Date: 10/04/2011
Matrix: SOIL

Lab ID: WG97628-2 & WG97628-3
Client ID: WG97628-LCS & WG97628-LCSD
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3540
Analyst: AC
Analysis Method: MA DEP EPH 04-1.1
Lab Prep Batch: WG97628
Units: mg/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
Unadjusted C11-C22 Aromatics	153	153	NA	114	116	74	76	2	25	40-140

FORM III DRO-2

CEI1186.d & CEI1182.d

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/20/11
Analysis Date: 09/22/11
Report Date: 10/04/2011
Matrix: SOIL

Lab ID: WG97628-2 & WG97628-3
Client ID: WG97628-LCS & WG97628-LCSD
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3540
Analyst: AC
Analysis Method: MA DEP EPH 04-1.1
Lab Prep Batch: WG97628
Units: mg/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
Naphthalene	9.0	9.0	NA	4.6	4.7	52	52	0.6	25	40-140
2-Methylnaphthalene	9.0	9.0	NA	4.8	4.8	53	53	1	25	40-140
Acenaphthylene	9.0	9.0	NA	4.8	4.9	53	54	1	25	40-140
Acenaphthene	9.0	9.0	NA	4.9	4.9	54	54	0.6	25	40-140
Fluorene	9.0	9.0	NA	5.2	5.5	58	61	4	25	40-140
Phenanthrene	9.0	9.0	NA	6.2	6.5	69	72	5	25	40-140
Anthracene	9.0	9.0	NA	6.7	7.0	74	77	4	25	40-140
Fluoranthene	9.0	9.0	NA	7.1	7.3	78	81	3	25	40-140
Pyrene	9.0	9.0	NA	7.0	7.2	77	80	3	25	40-140
Benzo(a)Anthracene	9.0	9.0	NA	8.4	8.6	93	95	2	25	40-140
Chrysene	9.0	9.0	NA	7.4	7.5	82	84	1	25	40-140
Benzo(b)Fluoranthene	9.0	9.0	NA	8.0	8.1	89	90	0.7	25	40-140
Benzo(k)Fluoranthene	9.0	9.0	NA	7.5	7.6	83	85	2	25	40-140
Benzo(a)Pyrene	9.0	9.0	NA	7.1	7.4	79	82	4	25	40-140
Indeno(1,2,3-cd)Pyrene	9.0	9.0	NA	7.6	7.8	85	87	2	25	40-140
Dibenzo(a,h)Anthracene	9.0	9.0	NA	7.5	7.7	84	85	2	25	40-140
Benzo(g,h,i)Perylene	9.0	9.0	NA	7.6	7.7	84	85	0.9	25	40-140

FORM III DRO-2

CEI1186a.d & CEI1182a.d

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/20/11
Analysis Date: 09/22/11
Report Date: 10/04/2011
Matrix: SOIL

Lab ID: WG97628-2 & WG97628-3
Client ID: WG97628-LCS & WG97628-LCSD
SDG: SE5823
Extracted by: JMS
Extraction Method: SW846 3540
Analyst: AC
Analysis Method: MA DEP EPH 04-1.1
Lab Prep Batch: WG97628
Units: mg/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
C9-C18 Aliphatics	54	54	NA	41	46	75	84	12	25	40-140
C19-C36 Aliphatics	72	72	NA	55	60	76	83	9	25	40-140

FORM 4
PESTICIDE METHOD BLANK SUMMARY

CLIENT SAMPLE ID

WG97400-BLANK

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CAPISIC POND / 203939 SDG No.: SE5823

Lab Sample ID: WG97400-1 Lab File ID: 1EI00445

Matrix (soil/water) SOIL Extraction:(SepF/Cont/Sonc) SW846 3540

Sulfur Cleanup: (Y/N) N Date Extracted: 09/15/11

Date Analyzed (1): 09/23/11 Date Analyzed (2): 09/23/11

Time Analyzed (1): 1251 Time Analyzed (2): 1251

Instrument ID (1): GC01 Instrument ID (2): GC01

GC Column (1): ZB-MULTIRESIDUE-2 ID: 0.53(mm) GC Column (2): ZB-MULTIRESIDUE-1 ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	WG97400-LCS	WG97400-2	1EI00446	09/23/11	09/23/11
02	WG97400-LCSD	WG97400-3	1EI00447	09/23/11	09/23/11
03	SD-01	SE5823-1	1EI00451	09/23/11	09/23/11
04	SD-02	SE5823-2	1EI00452	09/23/11	09/23/11
05	SD-03	SE5823-3	1EI00453	09/23/11	09/23/11
06	SD-04	SE5823-4	1EI00454	09/23/11	09/23/11
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

COMMENTS:

FORM IVPESTICIDE

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/15/11
Analysis Date: 23-SEP-2011 12:51
Report Date: 10/11/2011
Matrix: SOIL
% Solids: 100

Lab ID: WG97400-1
Client ID: WG97400-Blank
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

Compound	Flags	Results	DF	PQL	Adj.PQL
alpha-BHC	U	0.34	1.0	1.7	0.34
gamma-BHC	U	0.34	1.0	1.7	0.34
Heptachlor	U	0.34	1.0	1.7	0.34
Aldrin	U	0.34	1.0	1.7	0.34
beta-BHC	U	0.34	1.0	1.7	0.34
delta-BHC	U	0.34	1.0	1.7	0.34
Heptachlor Epoxide	U	0.34	1.0	1.7	0.34
Endosulfan I	U	0.34	1.0	1.7	0.34
gamma-Chlordane	U	0.34	1.0	1.7	0.34
alpha-Chlordane	U	0.34	1.0	1.7	0.34
4,4'-DDE	U	0.66	1.0	3.3	0.66
Dieldrin	U	0.66	1.0	3.3	0.66
Endrin	U	0.66	1.0	3.3	0.66
4,4'-DDD	U	0.66	1.0	3.3	0.66
Endosulfan II	U	0.66	1.0	3.3	0.66
4,4'-DDT	U	0.66	1.0	3.3	0.66
Endrin Aldehyde	U	0.66	1.0	3.3	0.66
Endosulfan sulfate	U	0.66	1.0	3.3	0.66
Methoxychlor	U	3.4	1.0	17	3.4
Endrin Ketone	U	0.66	1.0	3.3	0.66
Toxaphene	U	6.6	1.0	33	6.6
Tetrachloro-m-Xylene		71%			
Decachlorobiphenyl		78%			

KATAHDIN ANALYTICAL SERVICES
LAB CONTROL SAMPLE

Client:
Project: Capisic Pond / 203939
PO No:
Sample Date:
Received Date:
Extraction Date: 09/15/11
Analysis Date: 09/23/11
Report Date: 10/11/2011
Matrix: SOIL

Lab ID: WG97400-2 & WG97400-3
Client ID: WG97400-LCS & WG97400-LCSD
SDG: SE5823
Extracted by: KD
Extraction Method: SW846 3540
Analyst: EKC
Analysis Method: SW846 8081A
Lab Prep Batch: WG97400
Units: ug/Kgdrywt

COMPOUND	LCS SPIKE	LCSD SPIKE	SAMPLE CONC.	LCS CONC.	LCSD CONC.	LCS %REC.	LCSD %REC.		%RPD	%RPD LIMIT	QC. LIMITS
alpha-BHC	3.3	3.3	NA	2.2	2.5	68	75		10	50	31-128
gamma-BHC	3.3	3.3	NA	2.2	2.5	66	74		11	30	47- 98
beta-BHC	3.3	3.3	NA	2.3	2.6	69	79		13	50	53-106
delta-BHC	3.3	3.3	NA	2.5	2.8	74	82		11	50	34-123
Heptachlor	3.3	3.3	NA	2.2	2.0	66	60		10	50	47-101
Aldrin	3.3	3.3	NA	2.2	2.6	66	78		16	50	46- 91
Heptachlor Epoxide	3.3	3.3	NA	2.3	2.6	69	78		13	50	50- 96
gamma-Chlordane	3.3	3.3	NA	2.4	2.8	73	85		16	50	54- 96
alpha-Chlordane	3.3	3.3	NA	2.5	2.9	74	88		17	50	32-131
4,4'-DDE	3.3	3.3	NA	2.4	2.9	73	87		17	50	52-103
Endosulfan I	3.3	3.3	NA	2.2	2.2	67	67		0.4	50	23- 80
Dieldrin	3.3	3.3	NA	2.3	2.7	68	80		16	50	39-115
Endrin	3.3	3.3	NA	2.0	0.78	61	24	*	88	50	19-148
4,4'-DDD	3.3	3.3	NA	2.5	2.7	74	81		9	50	48-111
Endosulfan II	3.3	3.3	NA	2.3	2.7	70	80		13	50	33- 87
4,4'-DDT	3.3	3.3	NA	2.4	2.4	73	70		3	50	39-112
Endrin Aldehyde	3.3	3.3	NA	3.9	2.5	* 118	76		43	50	34- 91
Methoxychlor	3.3	3.3	NA	2.5	2.6	74	76		4	50	28-142
Endosulfan sulfate	3.3	3.3	NA	2.5	2.4	74	71		4	50	11-143
Endrin Ketone	3.3	3.3	NA	2.7	3.5	82	104		24	50	52-120

FORM III PESTICIDE-2

1EI00446.D & 1EI00447.D

Katahdin ANALYTICAL SERVICES

PREPARATION BLANK REPORT

Sample ID: PBSBI21ICS1 **Batch ID:** BI21ICS1

Element Name	Result	Units	Flag	PQL	File
ALUMINUM	1.	mg/kgdrywt	U	30.0	IBI21B
ANTIMONY	0.2	mg/kgdrywt	U	0.800	IBI21B
ARSENIC	0.2	mg/kgdrywt	U	0.800	IBI21B
BARIUM	0.06	mg/kgdrywt	J	0.500	IBI21B
BERYLLIUM	0.003	mg/kgdrywt	U	0.500	IBI21B
BORON	0.3	mg/kgdrywt	J	10.0	IBI21B
CADMIUM	0.09	mg/kgdrywt	U	1.00	IBI21B
CALCIUM	14.	mg/kgdrywt	H	10.0	IBI21B
CHROMIUM	0.07	mg/kgdrywt	J	1.50	IBI21B
COBALT	0.03	mg/kgdrywt	U	3.00	IBI21B
COPPER	0.08	mg/kgdrywt	J	2.50	IBI21B
IRON	2.2	mg/kgdrywt	J	10.0	IBI21B
LEAD	0.1	mg/kgdrywt	U	0.500	IBI21B
LITHIUM	0.2	mg/kgdrywt	U	10.0	IBI21B
MAGNESIUM	4.0	mg/kgdrywt	J	10.0	IBI21B
MANGANESE	0.09	mg/kgdrywt	J	0.500	IBI21B
MOLYBDENUM	0.2	mg/kgdrywt	U	1.00	IBI21B
NICKEL	0.08	mg/kgdrywt	J	4.00	IBI21B
PALLADIUM	0.2	mg/kgdrywt	U	10.0	IBI21B
POTASSIUM	10.	mg/kgdrywt	U	100.	IBI21B
SELENIUM	0.2	mg/kgdrywt	U	1.00	IBI21B
SILICON	2.	mg/kgdrywt	J	20.0	IBI21B
SILVER	0.05	mg/kgdrywt	U	1.50	IBI21B
SODIUM	10.	mg/kgdrywt	U	100.	IBI21B
STRONTIUM	0.05	mg/kgdrywt	J	10.0	IBI21B
THALLIUM	0.2	mg/kgdrywt	U	1.50	IBI21B
TIN	3.0	mg/kgdrywt	J	10.0	IBI21B
TITANIUM	0.04	mg/kgdrywt	U	1.50	IBI21B
VANADIUM	0.04	mg/kgdrywt	U	2.50	IBI21B
ZINC	0.14	mg/kgdrywt	J	2.50	IBI21B

U The analyte was not detected in the sample at a level greater than the instrument detection limit.

J The analyte was detected in the sample at a concentration greater than the instrument detection limit, but less than the laboratory's Practical Quantitation Level.

H The analyte was detected in the sample at a concentration greater than the laboratory's acceptance limit.

Katahdin ANALYTICAL SERVICES

LABORATORY CONTROL SAMPLE REPORT

Sample ID: LCSOBI21ICS1 **Batch ID:** BI21ICS1

Element Name	True Value	Result	Units	Recovery(%)	Flag	Limits (mg/kgdrywt)		File
ALUMINUM	200.	198.	mg/kgdrywt	99.0%		159	241	IBI21B
ANTIMONY	10.0	8.9	mg/kgdrywt	89.0%		7.95	12.0	IBI21B
ARSENIC	10.0	9.2	mg/kgdrywt	92.0%		7.95	12.0	IBI21B
BARIUM	200.	199.	mg/kgdrywt	99.5%		159	241	IBI21B
BERYLLIUM	5.00	4.97	mg/kgdrywt	99.4%		3.98	6.02	IBI21B
BORON	50.0	47.7	mg/kgdrywt	95.4%		39.8	60.2	IBI21B
CADMIUM	25.0	24.8	mg/kgdrywt	99.2%		19.9	30.1	IBI21B
CALCIUM	250.	261.	mg/kgdrywt	104.4%		199	301	IBI21B
CHROMIUM	20.0	20.1	mg/kgdrywt	100.5%		15.9	24.1	IBI21B
COBALT	50.0	50.6	mg/kgdrywt	101.2%		39.8	60.2	IBI21B
COPPER	25.0	24.7	mg/kgdrywt	98.8%		19.9	30.1	IBI21B
IRON	100.	101.	mg/kgdrywt	101.0%		79.5	120	IBI21B
LEAD	10.0	9.8	mg/kgdrywt	98.0%		7.95	12.0	IBI21B
LITHIUM	50.0	47.8	mg/kgdrywt	95.6%		39.8	60.2	IBI21B
MAGNESIUM	500.	494.	mg/kgdrywt	98.8%		398	602	IBI21B
MANGANESE	50.0	48.4	mg/kgdrywt	96.8%		39.8	60.2	IBI21B
MOLYBDENUM	30.0	29.1	mg/kgdrywt	97.0%		23.8	36.1	IBI21B
NICKEL	50.0	49.8	mg/kgdrywt	99.6%		39.8	60.2	IBI21B
PALLADIUM	50.0	47.7	mg/kgdrywt	95.4%		39.5	60	IBI21B
POTASSIUM	1000.	960.	mg/kgdrywt	96.0%		795	1200	IBI21B
SELENIUM	10.0	9.3	mg/kgdrywt	93.0%		7.95	12.0	IBI21B
SILICON	500.	423.	mg/kgdrywt	84.6%		398	602	IBI21B
SILVER	5.00	4.75	mg/kgdrywt	95.0%		3.98	6.02	IBI21B
SODIUM	750.	780.	mg/kgdrywt	104.0%		596	904	IBI21B
STRONTIUM	50.0	48.6	mg/kgdrywt	97.2%		39.8	60.2	IBI21B
THALLIUM	10.0	0.07	mg/kgdrywt	0.7%	L	7.95	12.0	IBI21B
TIN	50.0	52.7	mg/kgdrywt	105.4%		39.8	60.2	IBI21B
TITANIUM	50.0	57.0	mg/kgdrywt	114.0%		39.8	60	IBI21B
VANADIUM	50.0	48.4	mg/kgdrywt	96.8%		39.8	60.2	IBI21B
ZINC	50.0	50.5	mg/kgdrywt	101.0%		39.8	60.2	IBI21B

H Laboratory control sample recovery is greater than the laboratory's acceptance limit.

L Laboratory control sample recovery is less than the laboratory's acceptance limit.

Katahdin ANALYTICAL SERVICES

PREPARATION BLANK REPORT

Sample ID: PBSBI26HGS1 **Batch ID:** BI26HGS1

Element Name	Result	Units	Flag	PQL	File
MERCURY	0.005	ug/gdrywt	U	0.04	HBI28A

U The analyte was not detected in the sample at a level greater than the instrument detection limit.

J The analyte was detected in the sample at a concentration greater than the instrument detection limit, but less than the laboratory's Practical Quantitation Level.

H The analyte was detected in the sample at a concentration greater than the laboratory's acceptance limit.

Katahdin ANALYTICAL SERVICES

LABORATORY CONTROL SAMPLE REPORT

Sample ID: LCSOBI26HGS1 **Batch ID:** BI26HGS1

Element Name	True Value	Result	Units	Recovery(%)	Flag	Limits (ug/gdrywt)		File
MERCURY	0.83	0.863	ug/gdrywt	104.0%		0.663	1.00	HBI28A

H Laboratory control sample recovery is greater than the laboratory's acceptance limit.

L Laboratory control sample recovery is less than the laboratory's acceptance limit.

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Blank Sample Summary Report

Chromium, Hexavalent

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG98085	SW846 7196A	22-SEP-11	21-SEP-11	U 0.36 mg/Kgdrywt	0.48 mg/Kgdr

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG97751	EPA 365.4	20-SEP-11	19-SEP-11	U 0.080 mg/L	0.10 mg/L

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG97657	ASTM D2216	21-SEP-11	20-SEP-11	U 1 %	1 %

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Laboratory Control Sample Summary Report

Chromium, Hexavalent

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG98085-2	LCS	WG98085	22-SEP-11	21-SEP-11	mg/Kgdrywt	40	40.	101	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG97751-2	LCS	WG97751	20-SEP-11	19-SEP-11	mg/L	.5	0.53	106	80-120	

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG97657-2	LCS	WG97657	21-SEP-11	20-SEP-11	%	90	91.	101	80-120	
WG97657-3	LCSD	WG97657	21-SEP-11	20-SEP-11	%	90	91.	101	80-120	0

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 200-7019-1

SDG Number: SE5823

Job Description: Katahdin General Project

For:
Katahdin Analytical Services
PO BOX 540
600 Technology Way
Scarborough, ME 04074

Attention: Kelly Perkins

Approved for release.
Kathryn A Kelly
Project Manager I
9/27/2011 4:23 PM

Kathryn A Kelly
Project Manager I
kathryn.kelly@testamericainc.com
09/27/2011

The test results in this report relate only to sample(s) as received by the laboratory. These test results were derived under a quality system that adheres to the requirements of NELAC. Pursuant to NELAC, this report may not be produced in full without written approval from the laboratory

TestAmerica Laboratories, Inc.
TestAmerica Burlington 30 Community Drive, Suite 11, South Burlington, VT 05403
Tel (802) 660-1990 Fax (802) 660-1919 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

CASE NARRATIVE

Client: Katahdin Analytical Services

Project: Katahdin General Project

Report Number: 200-7019-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 09/16/2011; the samples arrived in good condition. The temperature of the coolers at receipt was 17.2 C.

GRAIN SIZE
Samples SE5823-1, SE5823-2, SE5823-3 and SE5823-4 were analyzed for grain size in accordance with D422 grain size. The samples were analyzed on 09/22/2011.

No difficulties were encountered during the grain size analyses.

All quality control parameters were within the acceptance limits.

EXECUTIVE SUMMARY - Detections

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
200-7019-1	SE5823-1					
Sieve Size 3 inch - Percent Finer		100.0			% Passing	D422
Gravel		0.4			%	D422
Sieve Size 2 inch - Percent Finer		100.0			% Passing	D422
Sand		23.2			%	D422
Sieve Size 1.5 inch - Percent Finer		100.0			% Passing	D422
Coarse Sand		1.2			%	D422
Sieve Size 1 inch - Percent Finer		100.0			% Passing	D422
Medium Sand		5.6			%	D422
Sieve Size 0.75 inch - Percent Finer		100.0			% Passing	D422
Fine Sand		16.4			%	D422
Sieve Size 0.375 inch - Percent Finer		100.0			% Passing	D422
Silt		36.6			%	D422
Sieve Size #4 - Percent Finer		99.6			% Passing	D422
Clay		39.8			%	D422
Sieve Size #10 - Percent Finer		98.4			% Passing	D422
Sieve Size #20 - Percent Finer		96.2			% Passing	D422
Sieve Size #40 - Percent Finer		92.8			% Passing	D422
Sieve Size #60 - Percent Finer		90.6			% Passing	D422
Sieve Size #80 - Percent Finer		86.4			% Passing	D422
Sieve Size #100 - Percent Finer		84.1			% Passing	D422
Sieve Size #200 - Percent Finer		76.4			% Passing	D422
Hydrometer Reading 1 - Percent Finer		62.2			% Passing	D422
Hydrometer Reading 2 - Percent Finer		56.2			% Passing	D422
Hydrometer Reading 3 - Percent Finer		50.3			% Passing	D422
Hydrometer Reading 4 - Percent Finer		45.8			% Passing	D422
Hydrometer Reading 5 - Percent Finer		39.8			% Passing	D422
Hydrometer Reading 6 - Percent Finer		30.7			% Passing	D422
Hydrometer Reading 7 - Percent Finer		26.2			% Passing	D422

EXECUTIVE SUMMARY - Detections

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
200-7019-2	SE5823-2					
Sieve Size 3 inch - Percent Finer		100.0			% Passing	D422
Gravel		0.0			%	D422
Sieve Size 2 inch - Percent Finer		100.0			% Passing	D422
Sand		11.6			%	D422
Sieve Size 1.5 inch - Percent Finer		100.0			% Passing	D422
Coarse Sand		0.3			%	D422
Sieve Size 1 inch - Percent Finer		100.0			% Passing	D422
Medium Sand		2.5			%	D422
Sieve Size 0.75 inch - Percent Finer		100.0			% Passing	D422
Fine Sand		8.8			%	D422
Sieve Size 0.375 inch - Percent Finer		100.0			% Passing	D422
Silt		41.3			%	D422
Sieve Size #4 - Percent Finer		100.0			% Passing	D422
Clay		47.1			%	D422
Sieve Size #10 - Percent Finer		99.7			% Passing	D422
Sieve Size #20 - Percent Finer		98.5			% Passing	D422
Sieve Size #40 - Percent Finer		97.2			% Passing	D422
Sieve Size #60 - Percent Finer		95.6			% Passing	D422
Sieve Size #80 - Percent Finer		94.4			% Passing	D422
Sieve Size #100 - Percent Finer		93.4			% Passing	D422
Sieve Size #200 - Percent Finer		88.4			% Passing	D422
Hydrometer Reading 1 - Percent Finer		67.9			% Passing	D422
Hydrometer Reading 2 - Percent Finer		63.4			% Passing	D422
Hydrometer Reading 3 - Percent Finer		57.5			% Passing	D422
Hydrometer Reading 4 - Percent Finer		53.0			% Passing	D422
Hydrometer Reading 5 - Percent Finer		47.1			% Passing	D422
Hydrometer Reading 6 - Percent Finer		36.6			% Passing	D422
Hydrometer Reading 7 - Percent Finer		35.1			% Passing	D422

EXECUTIVE SUMMARY - Detections

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
200-7019-3	SE5823-3					
Sieve Size 3 inch - Percent Finer		100.0			% Passing	D422
Gravel		4.4			%	D422
Sieve Size 2 inch - Percent Finer		100.0			% Passing	D422
Sand		14.7			%	D422
Sieve Size 1.5 inch - Percent Finer		100.0			% Passing	D422
Coarse Sand		0.7			%	D422
Sieve Size 1 inch - Percent Finer		100.0			% Passing	D422
Medium Sand		4.5			%	D422
Sieve Size 0.75 inch - Percent Finer		100.0			% Passing	D422
Fine Sand		9.5			%	D422
Sieve Size 0.375 inch - Percent Finer		97.7			% Passing	D422
Silt		44.9			%	D422
Sieve Size #4 - Percent Finer		95.6			% Passing	D422
Clay		36.0			%	D422
Sieve Size #10 - Percent Finer		94.9			% Passing	D422
Sieve Size #20 - Percent Finer		93.3			% Passing	D422
Sieve Size #40 - Percent Finer		90.4			% Passing	D422
Sieve Size #60 - Percent Finer		89.0			% Passing	D422
Sieve Size #80 - Percent Finer		86.2			% Passing	D422
Sieve Size #100 - Percent Finer		85.3			% Passing	D422
Sieve Size #200 - Percent Finer		80.9			% Passing	D422
Hydrometer Reading 1 - Percent Finer		65.2			% Passing	D422
Hydrometer Reading 2 - Percent Finer		57.9			% Passing	D422
Hydrometer Reading 3 - Percent Finer		50.6			% Passing	D422
Hydrometer Reading 4 - Percent Finer		43.3			% Passing	D422
Hydrometer Reading 5 - Percent Finer		36.0			% Passing	D422
Hydrometer Reading 6 - Percent Finer		25.0			% Passing	D422
Hydrometer Reading 7 - Percent Finer		15.9			% Passing	D422

EXECUTIVE SUMMARY - Detections

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
200-7019-4	SE5823-4					
Sieve Size 3 inch - Percent Finer		100.0			% Passing	D422
Gravel		0.0			%	D422
Sieve Size 2 inch - Percent Finer		100.0			% Passing	D422
Sand		1.8			%	D422
Sieve Size 1.5 inch - Percent Finer		100.0			% Passing	D422
Coarse Sand		0.0			%	D422
Sieve Size 1 inch - Percent Finer		100.0			% Passing	D422
Medium Sand		0.1			%	D422
Sieve Size 0.75 inch - Percent Finer		100.0			% Passing	D422
Fine Sand		1.7			%	D422
Sieve Size 0.375 inch - Percent Finer		100.0			% Passing	D422
Silt		46.3			%	D422
Sieve Size #4 - Percent Finer		100.0			% Passing	D422
Clay		51.9			%	D422
Sieve Size #10 - Percent Finer		100.0			% Passing	D422
Sieve Size #20 - Percent Finer		99.9			% Passing	D422
Sieve Size #40 - Percent Finer		99.9			% Passing	D422
Sieve Size #60 - Percent Finer		99.9			% Passing	D422
Sieve Size #80 - Percent Finer		99.9			% Passing	D422
Sieve Size #100 - Percent Finer		99.8			% Passing	D422
Sieve Size #200 - Percent Finer		98.2			% Passing	D422
Hydrometer Reading 1 - Percent Finer		83.4			% Passing	D422
Hydrometer Reading 2 - Percent Finer		76.4			% Passing	D422
Hydrometer Reading 3 - Percent Finer		65.9			% Passing	D422
Hydrometer Reading 4 - Percent Finer		58.9			% Passing	D422
Hydrometer Reading 5 - Percent Finer		51.9			% Passing	D422
Hydrometer Reading 6 - Percent Finer		36.2			% Passing	D422
Hydrometer Reading 7 - Percent Finer		30.9			% Passing	D422

METHOD SUMMARY

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Grain Size	TAL BUR	ASTM D422	

Lab References:

TAL BUR = TestAmerica Burlington

Method References:

ASTM = ASTM International

METHOD / ANALYST SUMMARY

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Method	Analyst	Analyst ID
ASTM D422	Bourdeau, Timothy P	TPB

SAMPLE SUMMARY

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
200-7019-1	SE5823-1	Solid	09/14/2011 0820	09/16/2011 0922
200-7019-2	SE5823-2	Solid	09/14/2011 0905	09/16/2011 0922
200-7019-3	SE5823-3	Solid	09/14/2011 1140	09/16/2011 0922
200-7019-4	SE5823-4	Solid	09/14/2011 1020	09/16/2011 0922

SAMPLE RESULTS

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-1

Lab Sample ID: 200-7019-1
Client Matrix: Solid

Date Sampled: 09/14/2011 0820
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-1.txt
Dilution:	1.0			Initial Weight/Volume:	69.6 g
Analysis Date:	09/22/2011 0002			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (% Passing)	Qualifier	NONE	NONE
Sieve Size 3 inch - Percent Finer		100.0			
Sieve Size 2 inch - Percent Finer		100.0			
Sieve Size 1.5 inch - Percent Finer		100.0			
Sieve Size 1 inch - Percent Finer		100.0			
Sieve Size 0.75 inch - Percent Finer		100.0			
Sieve Size 0.375 inch - Percent Finer		100.0			
Sieve Size #4 - Percent Finer		99.6			
Sieve Size #10 - Percent Finer		98.4			
Sieve Size #20 - Percent Finer		96.2			
Sieve Size #40 - Percent Finer		92.8			
Sieve Size #60 - Percent Finer		90.6			
Sieve Size #80 - Percent Finer		86.4			
Sieve Size #100 - Percent Finer		84.1			
Sieve Size #200 - Percent Finer		76.4			
Hydrometer Reading 1 - Percent Finer		62.2			
Hydrometer Reading 2 - Percent Finer		56.2			
Hydrometer Reading 3 - Percent Finer		50.3			
Hydrometer Reading 4 - Percent Finer		45.8			
Hydrometer Reading 5 - Percent Finer		39.8			
Hydrometer Reading 6 - Percent Finer		30.7			
Hydrometer Reading 7 - Percent Finer		26.2			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: **SE5823-1**

Lab Sample ID: 200-7019-1
Client Matrix: Solid

Date Sampled: 09/14/2011 0820
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-1.txt
Dilution:	1.0			Initial Weight/Volume:	69.6 g
Analysis Date:	09/22/2011 0002			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (%)	Qualifier	NONE	NONE
Gravel		0.4			
Sand		23.2			
Coarse Sand		1.2			
Medium Sand		5.6			
Fine Sand		16.4			
Silt		36.6			
Clay		39.8			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-2

Lab Sample ID: 200-7019-2
Client Matrix: Solid

Date Sampled: 09/14/2011 0905
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-2.txt
Dilution:	1.0			Initial Weight/Volume:	84.61 g
Analysis Date:	09/22/2011 0003			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (% Passing)	Qualifier	NONE	NONE
Sieve Size 3 inch - Percent Finer		100.0			
Sieve Size 2 inch - Percent Finer		100.0			
Sieve Size 1.5 inch - Percent Finer		100.0			
Sieve Size 1 inch - Percent Finer		100.0			
Sieve Size 0.75 inch - Percent Finer		100.0			
Sieve Size 0.375 inch - Percent Finer		100.0			
Sieve Size #4 - Percent Finer		100.0			
Sieve Size #10 - Percent Finer		99.7			
Sieve Size #20 - Percent Finer		98.5			
Sieve Size #40 - Percent Finer		97.2			
Sieve Size #60 - Percent Finer		95.6			
Sieve Size #80 - Percent Finer		94.4			
Sieve Size #100 - Percent Finer		93.4			
Sieve Size #200 - Percent Finer		88.4			
Hydrometer Reading 1 - Percent Finer		67.9			
Hydrometer Reading 2 - Percent Finer		63.4			
Hydrometer Reading 3 - Percent Finer		57.5			
Hydrometer Reading 4 - Percent Finer		53.0			
Hydrometer Reading 5 - Percent Finer		47.1			
Hydrometer Reading 6 - Percent Finer		36.6			
Hydrometer Reading 7 - Percent Finer		35.1			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-2

Lab Sample ID: 200-7019-2
Client Matrix: Solid

Date Sampled: 09/14/2011 0905
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-2.txt
Dilution:	1.0			Initial Weight/Volume:	84.61 g
Analysis Date:	09/22/2011 0003			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (%)	Qualifier	NONE	NONE
Gravel		0.0			
Sand		11.6			
Coarse Sand		0.3			
Medium Sand		2.5			
Fine Sand		8.8			
Silt		41.3			
Clay		47.1			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-3

Lab Sample ID: 200-7019-3
Client Matrix: Solid

Date Sampled: 09/14/2011 1140
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-3.txt
Dilution:	1.0			Initial Weight/Volume:	79.11 g
Analysis Date:	09/22/2011 0004			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (% Passing)	Qualifier	NONE	NONE
Sieve Size 3 inch - Percent Finer		100.0			
Sieve Size 2 inch - Percent Finer		100.0			
Sieve Size 1.5 inch - Percent Finer		100.0			
Sieve Size 1 inch - Percent Finer		100.0			
Sieve Size 0.75 inch - Percent Finer		100.0			
Sieve Size 0.375 inch - Percent Finer		97.7			
Sieve Size #4 - Percent Finer		95.6			
Sieve Size #10 - Percent Finer		94.9			
Sieve Size #20 - Percent Finer		93.3			
Sieve Size #40 - Percent Finer		90.4			
Sieve Size #60 - Percent Finer		89.0			
Sieve Size #80 - Percent Finer		86.2			
Sieve Size #100 - Percent Finer		85.3			
Sieve Size #200 - Percent Finer		80.9			
Hydrometer Reading 1 - Percent Finer		65.2			
Hydrometer Reading 2 - Percent Finer		57.9			
Hydrometer Reading 3 - Percent Finer		50.6			
Hydrometer Reading 4 - Percent Finer		43.3			
Hydrometer Reading 5 - Percent Finer		36.0			
Hydrometer Reading 6 - Percent Finer		25.0			
Hydrometer Reading 7 - Percent Finer		15.9			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: **SE5823-3**

Lab Sample ID: 200-7019-3
Client Matrix: Solid

Date Sampled: 09/14/2011 1140
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-3.txt
Dilution:	1.0			Initial Weight/Volume:	79.11 g
Analysis Date:	09/22/2011 0004			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (%)	Qualifier	NONE	NONE
Gravel		4.4			
Sand		14.7			
Coarse Sand		0.7			
Medium Sand		4.5			
Fine Sand		9.5			
Silt		44.9			
Clay		36.0			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-4

Lab Sample ID: 200-7019-4
Client Matrix: Solid

Date Sampled: 09/14/2011 1020
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-4.txt
Dilution:	1.0			Initial Weight/Volume:	67.41 g
Analysis Date:	09/22/2011 0005			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (% Passing)	Qualifier	NONE	NONE
Sieve Size 3 inch - Percent Finer		100.0			
Sieve Size 2 inch - Percent Finer		100.0			
Sieve Size 1.5 inch - Percent Finer		100.0			
Sieve Size 1 inch - Percent Finer		100.0			
Sieve Size 0.75 inch - Percent Finer		100.0			
Sieve Size 0.375 inch - Percent Finer		100.0			
Sieve Size #4 - Percent Finer		100.0			
Sieve Size #10 - Percent Finer		100.0			
Sieve Size #20 - Percent Finer		99.9			
Sieve Size #40 - Percent Finer		99.9			
Sieve Size #60 - Percent Finer		99.9			
Sieve Size #80 - Percent Finer		99.9			
Sieve Size #100 - Percent Finer		99.8			
Sieve Size #200 - Percent Finer		98.2			
Hydrometer Reading 1 - Percent Finer		83.4			
Hydrometer Reading 2 - Percent Finer		76.4			
Hydrometer Reading 3 - Percent Finer		65.9			
Hydrometer Reading 4 - Percent Finer		58.9			
Hydrometer Reading 5 - Percent Finer		51.9			
Hydrometer Reading 6 - Percent Finer		36.2			
Hydrometer Reading 7 - Percent Finer		30.9			

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

Client Sample ID: SE5823-4

Lab Sample ID: 200-7019-4
Client Matrix: Solid

Date Sampled: 09/14/2011 1020
Date Received: 09/16/2011 0922

D422 Grain Size

Analysis Method:	D422	Analysis Batch:	200-25733	Instrument ID:	D422_import
	N/A	Prep Batch:	N/A	Lab File ID:	200-7019-A-4.txt
Dilution:	1.0			Initial Weight/Volume:	67.41 g
Analysis Date:	09/22/2011 0005			Final Weight/Volume:	
Prep Date:	N/A				

Analyte	DryWt Corrected: N	Result (%)	Qualifier	NONE	NONE
Gravel		0.0			
Sand		1.8			
Coarse Sand		0.0			
Medium Sand		0.1			
Fine Sand		1.7			
Silt		46.3			
Clay		51.9			

Particle Size of Soils by ASTM D422

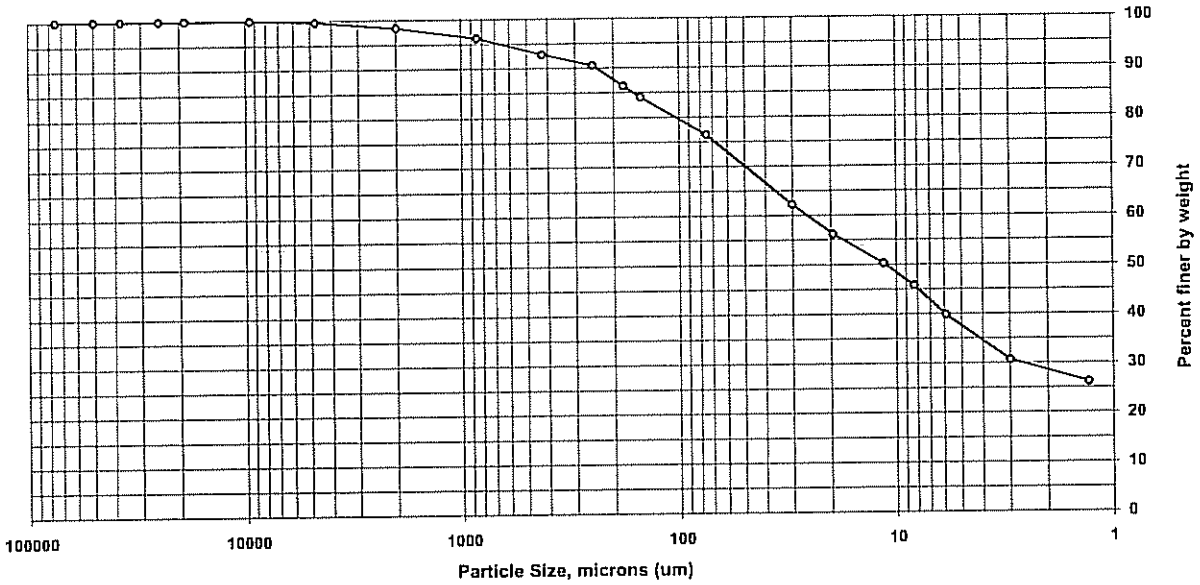
Sample ID: SE5823-1
Lab ID: 200-7019-A-1

Percent Solids: 77.3%
Specific Gravity: 2.650

Date Received: 9/16/2011
Start Date: 9/22/2011
End Date: 9/24/2011

Shape (> #10): subangular

Non-soil material: plant
Hardness (> #10): hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	98.4	1.2
#20	850	96.2	2.2
#40	425	92.8	3.4
#60	250	90.6	2.2
#80	180	86.4	4.2
#100	150	84.1	2.3
#200	75	76.4	7.7
Hyd1	30.1	62.2	14.2
Hyd2	19.5	56.2	6.0
Hyd3	11.5	50.3	5.9
Hyd4	8.3	45.8	4.5
Hyd5	5.9	39.8	6.0
Hyd6	3	30.7	9.1
Hyd7	1.3	26.2	4.5

Soil Classification	Percent of sample
Gravel	0.4
Sand	23.2
Coarse Sand	1.2
Medium Sand	5.6
Fine Sand	16.4
Silt	36.6
Clay	39.8

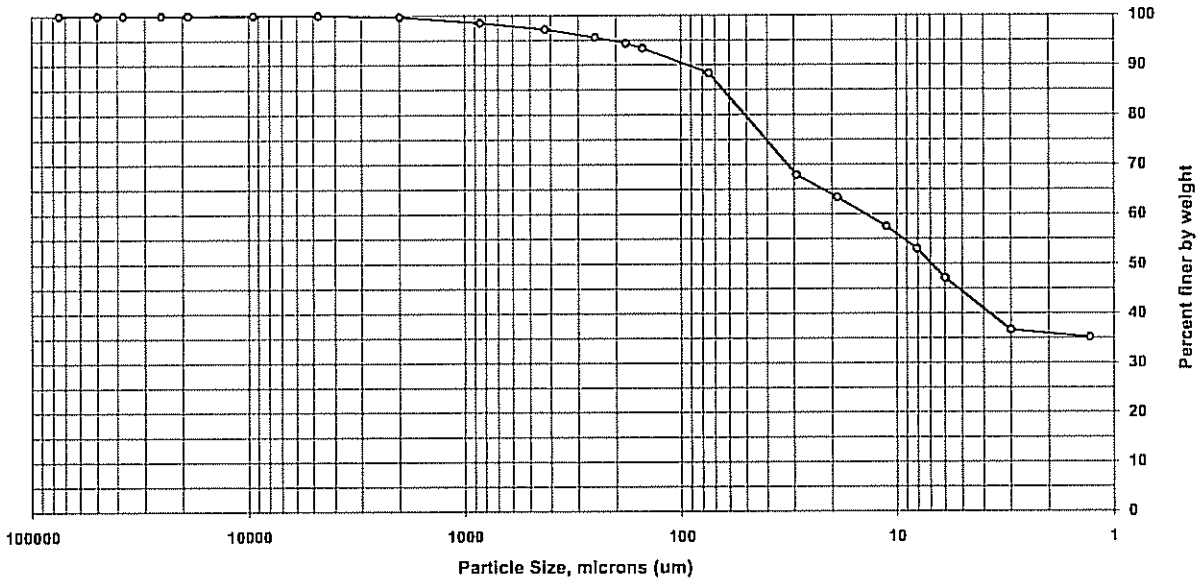
Particle Size of Soils by ASTM D422

Sample ID:	SE5823-2	Percent Solids:	63.9%	Date Received:	9/16/2011
Lab ID:	200-7019-A-2	Specific Gravity:	2.650	Start Date:	9/22/2011
				End Date:	9/24/2011

Shape (> #10): subangular

Non-soil material: N/A

Hardness (> #10): hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	98.5	1.2
#40	425	97.2	1.3
#60	250	95.6	1.6
#80	180	94.4	1.2
#100	150	93.4	1.0
#200	75	88.4	5.0
Hyd1	29.3	67.9	20.5
Hyd2	18.9	63.4	4.5
Hyd3	11.2	57.5	5.9
Hyd4	8.1	53.0	4.5
Hyd5	6	47.1	5.9
Hyd6	3	36.6	10.5
Hyd7	1.3	35.1	1.5

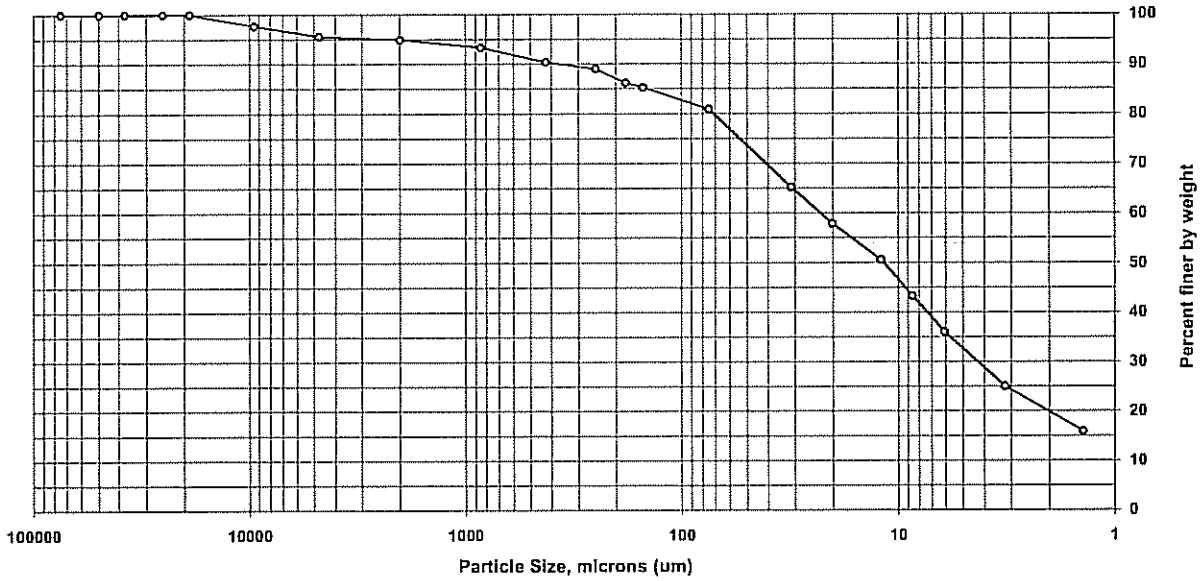
Soil Classification	Percent of sample
Gravel	0.0
Sand	11.6
Coarse Sand	0.3
Medium Sand	2.5
Fine Sand	8.8
Silt	41.3
Clay	47.1

Particle Size of Soils by ASTM D422

				Date Received:	9/16/2011
Sample ID:	SE5823-3	Percent Solids:	55.5%	Start Date:	9/22/2011
Lab ID:	200-7019-A-3	Specific Gravity:	2.650	End Date:	9/24/2011

Shape (> #10): subangular

Non-soil material: plant,shell
Hardness (> #10): hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.7	2.3
#4	4750	95.6	2.1
#10	2000	94.9	0.7
#20	850	93.3	1.6
#40	425	90.4	2.9
#60	250	89.0	1.4
#80	180	86.2	2.8
#100	150	85.3	0.9
#200	75	80.9	4.4
Hyd1	31.2	65.2	15.7
Hyd2	20.2	57.9	7.3
Hyd3	12	50.6	7.3
Hyd4	8.6	43.3	7.3
Hyd5	6.1	36.0	7.3
Hyd6	3.2	25.0	11.0
Hyd7	1.4	15.9	9.1

Soil Classification	Percent of sample
Gravel	4.4
Sand	14.7
Coarse Sand	0.7
Medium Sand	4.5
Fine Sand	9.5
Silt	44.9
Clay	36.0

Particle Size of Soils by ASTM D422

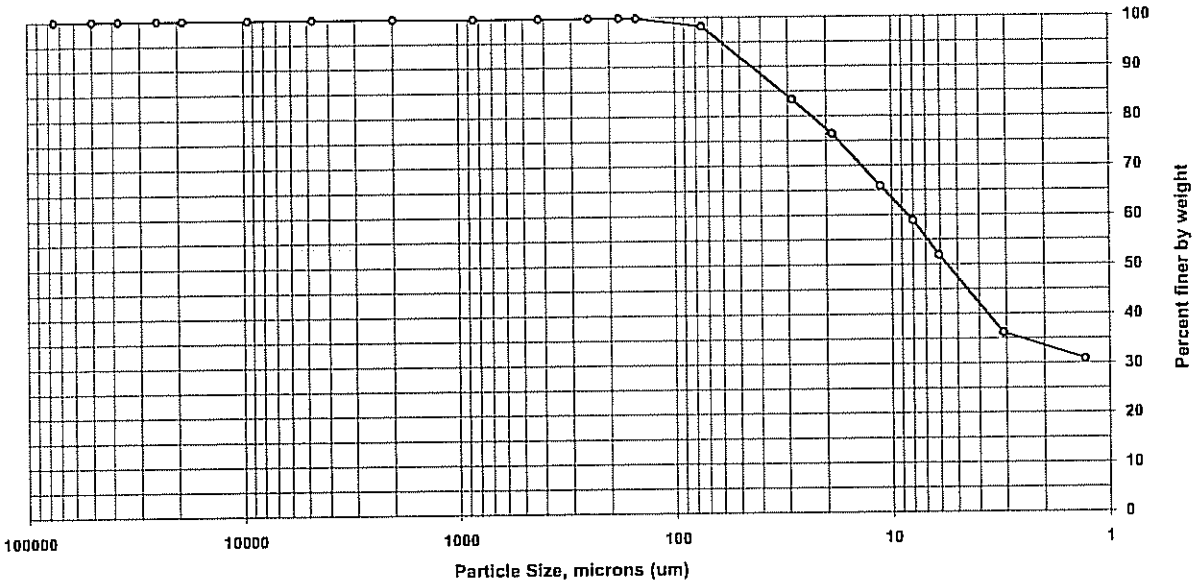
Sample ID: SE5823-4
Lab ID: 200-7019-A-4

Percent Solids: 68.1%
Specific Gravity: 2.650

Date Received: 9/16/2011
Start Date: 9/22/2011
End Date: 9/24/2011

Shape (> #10): N/A

Non-soil material: N/A
Hardness (> #10): N/A



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.9	0.1
#40	425	99.9	0.0
#60	250	99.9	0.0
#80	180	99.9	0.0
#100	150	99.8	0.1
#200	75	98.2	1.6
Hyd1	28.8	83.4	14.8
Hyd2	18.8	76.4	7.0
Hyd3	11.3	65.9	10.5
Hyd4	8	58.9	7.0
Hyd5	6.1	51.9	7.0
Hyd6	3.1	36.2	15.7
Hyd7	1.3	30.9	5.3

Soil Classification	Percent of sample
Gravel	0.0
Sand	1.8
Coarse Sand	0.0
Medium Sand	0.1
Fine Sand	1.7
Silt	46.3
Clay	51.9

TestAmerica Burlington

Sediment Grain Size - D422

Client		Date Received	9/16/2011
Client Sample ID	SE5823-1	Start Date	09/22/2011 0:02
Lab Sample ID	200-7019-A-1	End Date	09/24/2011 0:17

Dry Weight Determination

Tin Weight	0.99 g
Wet Sample + Tin	31.98 g
Dry Sample + Tin	24.94 g
% Moisture	22.72 %

Non-soil material:	plant
Shape (> #10):	subangular
Hardness (> #10):	hard
Date/Time in oven	09/22/2011 0:03
Date/Time out of oven	09/22/2011 17:43

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)		69.60	69.6
Sample Weight (Oven Dried)			53.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.88
Sample <#10			52.9
% Passing #10			76

Hydrometer Data

Serial Number	741402
Calib. Date (mm/dd/yyyy)	12/21/2010
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0030
Hydrometer Cal Slope	-8.33333E-05
Hydrometer Cal Intercept	1.004916667
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750	488.23	488.45	0.22 g	99.6	Gravel	
#10	2000	462.94	463.60	0.66 g	98.4	Sand	Coarse
#20	850	390.53	391.71	1.18 g	96.2	Sand	Medium
#40	425	355.31	357.14	1.83 g	92.8	Sand	Medium
#60	250	335.53	336.71	1.18 g	90.6	Sand	Fine
#80	180	312.89	315.17	2.28 g	86.4	Sand	Fine
#100	150	331.37	332.60	1.23 g	84.1	Sand	Fine
#200	75	320.78	324.92	4.14 g	76.4	Sand	Fine
				0.00 g	76.4		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g) 53.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual		Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
	2	2	1.0240	21.0	30.1	62.2	Silt	
	5	5	1.0220	21.0	19.5	56.2	Silt	
	15	15	1.0200	21.0	11.5	50.3	Silt	
	30	30	1.0185	21.0	8.3	45.8	Silt	
	60	63	1.0165	21.0	5.9	39.8	Silt	
	250	253	1.0135	20.5	3	30.7	Clay	
	1440	1400	1.0120	20.5	1.3	26.2	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client		Date Received	9/16/2011
Client Sample ID	SE5823-2	Start Date	09/22/2011 0:03
Lab Sample ID	200-7019-A-2	End Date	09/24/2011 0:28

Dry Weight Determination

Tin Weight	1.01 g
Wet Sample + Tin	45.36 g
Dry Sample + Tin	29.33 g
% Moisture	36.14 %

Non-soil material:	N/A
Shape (> #10):	subangular
Hardness (> #10):	hard
Date/Time in oven	09/22/2011 0:04
Date/Time out of oven	09/22/2011 17:43

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)		84.61	84.61
Sample Weight (Oven Dried)			54

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.18
Sample <#10			53.8
% Passing #10			63.6

Hydrometer Data	
Serial Number	741402
Calib. Date (mm/dd/yyyy)	12/21/2010
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0030
Hydrometer Cal Slope	-8.33333E-05
Hydrometer Cal Intercept	1.004916667
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.94	463.12	0.18 g	99.7	Sand	Coarse
#20	850	384.04	384.69	0.65 g	98.5	Sand	Medium
#40	425	353.79	354.50	0.71 g	97.2	Sand	Medium
#60	250	341.77	342.65	0.88 g	95.6	Sand	Fine
#80	180	330.82	331.48	0.66 g	94.4	Sand	Fine
#100	150	327.03	327.57	0.54 g	93.4	Sand	Fine
#200	75	312.66	315.35	2.69 g	88.4	Sand	Fine
				0.00 g	88.4		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g) 54

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual		Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
	2	2	1.0260	21.0	29.3	67.9	Silt	
	5	5	1.0245	21.0	18.9	63.4	Silt	
	15	15	1.0225	21.0	11.2	57.5	Silt	
	30	30	1.0210	21.0	8.1	53	Silt	
	60	57	1.0190	21.0	6	47.1	Silt	
	250	247	1.0155	20.5	3	36.6	Clay	
	1440	1394	1.0150	20.5	1.3	35.1	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client		Date Received	9/16/2011
Client Sample ID	SE5823-3	Start Date	09/22/2011 0:04
Lab Sample ID	200-7019-A-3	End Date	09/24/2011 0:31

Dry Weight Determination

Tin Weight	0.99 g
Wet Sample + Tin	35.54 g
Dry Sample + Tin	20.18 g
% Moisture	44.46 %

Non-soil material:	plant,shell
Shape (> #10):	subangular
Hardness (> #10):	hard
Date/Time in oven	09/22/2011 0:05
Date/Time out of oven	09/22/2011 17:43

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)		79.11	79.11
Sample Weight (Oven Dried)			43.9

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			2.23
Sample <#10			41.7
% Passing #10			52.7

Hydrometer Data

Serial Number	741402
Calib. Date (mm/dd/yyyy)	12/21/2010
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0030
Hydrometer Cal Slope	-8.33333E-05
Hydrometer Cal Intercept	1.004916667
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500	447.50	448.53	1.03 g	97.7	Gravel	
#4	4750	488.23	489.14	0.91 g	95.6	Gravel	
#10	2000	462.94	463.23	0.29 g	94.9	Sand	Coarse
#20	850	390.53	391.22	0.69 g	93.3	Sand	Medium
#40	425	355.31	356.57	1.26 g	90.4	Sand	Medium
#60	250	335.53	336.13	0.60 g	89.0	Sand	Fine
#80	180	312.89	314.11	1.22 g	86.2	Sand	Fine
#100	150	331.37	331.77	0.40 g	85.3	Sand	Fine
#200	75	320.78	322.72	1.94 g	80.9	Sand	Fine
				0.00 g	80.9		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g) 43.9

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0210	21.0	31.2	65.2	Silt	
5	5	1.0190	21.0	20.2	57.9	Silt	
15	15	1.0170	21.0	12	50.6	Silt	
30	30	1.0150	21.0	8.6	43.3	Silt	
60	63	1.0130	21.0	6.1	36	Silt	
250	241	1.0100	21.0	3.2	25	Clay	
1440	1388	1.0075	21.0	1.4	15.9	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client		Date Received	9/16/2011
Client Sample ID	SE5823-4	Start Date	09/22/2011 0:05
Lab Sample ID	200-7019-A-4	End Date	09/24/2011 0:43

Dry Weight Determination

Tin Weight	1.00 g	Non-soil material:	N/A
Wet Sample + Tin	30.86 g	Shape (> #10):	N/A
Dry Sample + Tin	21.32 g	Hardness (> #10):	N/A
% Moisture	31.95 %		
		Date/Time in oven	09/22/2011 0:06
		Date/Time out of oven	09/22/2011 17:43

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)		67.41	67.41
Sample Weight (Oven Dried)			45.9

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			45.9
% Passing #10			68.1

Hydrometer Data

Serial Number	741402
Calib. Date (mm/dd/yyyy)	12/21/2010
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0030
Hydrometer Cal Slope	-8.33333E-05
Hydrometer Cal Intercept	1.004916667
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	384.04	384.10	0.06 g	99.9	Sand	Medium
#40	425	353.79	353.80	0.01 g	99.9	Sand	Medium
#60	250	341.77	341.78	0.01 g	99.9	Sand	Fine
#80	180	330.76	330.76	0.00 g	99.9	Sand	Fine
#100	150	327.03	327.07	0.04 g	99.8	Sand	Fine
#200	75	312.66	313.38	0.72 g	98.2	Sand	Fine
				0.00 g	98.2		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g) 45.9

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual		Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
	2	2	1.0270	21.0	28.8	83.4	Silt	
	5	5	1.0250	21.0	18.8	76.4	Silt	
	15	15	1.0220	21.0	11.3	65.9	Silt	
	30	31	1.0200	21.0	8	58.9	Silt	
	60	57	1.0180	21.0	6.1	51.9	Silt	
	250	235	1.0135	21.0	3.1	36.2	Clay	
	1440	1382	1.0120	21.0	1.3	30.9	Clay	

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

QUALITY CONTROL RESULTS

Client: Katahdin Analytical Services

Job Number: 200-7019-1
Sdg Number: SE5823

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Geotechnical					
Analysis Batch:200-25733					
200-7019-1	SE5823-1	T	Solid	D422	
200-7019-2	SE5823-2	T	Solid	D422	
200-7019-3	SE5823-3	T	Solid	D422	
200-7019-4	SE5823-4	T	Solid	D422	

Report Basis
T = Total

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Katahdin Analytical | Contact: Kelly Perkins | Phone # ( ) | Fax # ( )

Address | City | State | Zip Code

Purchase Order # | Proj. Name / No.: Capisic Pond / 203939 | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) | Copies To:

LAB USE ONLY | WORK ORDER #: SE5823

KATAHDIN PROJECT NUMBER

REMARKS: To: Test America, VT

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Grain Size (Filt. ☐Y ☐N)	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	SE5823-1	9-14-11/8:20	SL	1	✓									
	SE5823-2	/09:05	↓	↓	↓									
	SE5823-3	/11:40												
	SE5823-4	/10:20												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												

COMMENTS

QC II Results by 10/3/11 please!

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Dr Medlin	9/15/11 0930	09/16/11 0922			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN

ORIGINAL

Login Sample Receipt Checklist

Client: Katahdin Analytical Services

Job Number: 200-7019-1
SDG Number: SE5823

List Source: TestAmerica Burlington

Login Number: 7019
List Number: 1
Creator: Marion, Greg T

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	NO SEAL NUMBERS
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	17.5°C IR GUN ID 96/CF=0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Not requested on COC.
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

From:
WILLARD WARREN
KATAHDIN ANALYTICAL SERVICES
600 TECHNOLOGY WAY

SCARBOROUGH, ME 04074
(207) 874-2400

Ship Date: 15SEP11
ActWgt: 6.3 LB
CAD: 683287/CAFE2472

TO SAMPLE RECEIPT
TEST AMERICA
30 COMMUNITY DR STE 11

SOUTH BURLINGTON, VT 05403 (US)

FedEx Ground

Ref:
INV:
PO: Dept:

1 of 1

(9612019) 8146969 60043208

GND
Prepaid

THIS PACKA
APPROVAL

49 CFR

SGS

Laboratory Report of Analysis

To: Kelly Perkins
Katahdin Analytical Services
600 Technology Way
Scarborough, ME 04074

Report Number: **31102529**

Client Project: **Capisic Pond/203939**

Dear Kelly Perkins,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Amy J. Boehm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Digitally signed by: Amy Boehm
Date: 2011.10.03 14:32:22 - 05'00'

Amy J. Boehm
Project Manager
amy.boehm@sgs.com

Date

Laboratory Qualifiers

Report Definitions

DL	Method, Instrument, or Estimated Detection Limit per Analytical Method
CL	Control Limits for the recovery result of a parameter
LOQ	Reporting Limit
DF	Dilution Factor
RPD	Relative Percent Difference
LCS(D)	Laboratory Control Spike (Duplicate)
MS(D)	Matrix Spike (Duplicate)
MB	Method Blank

Qualifier Definitions

*	Recovery or RPD outside of control limits
B	Analyte was detected in the Lab Method Blank at a level above the LOQ
U	Undetected (Reported as ND or < LOD)
V	Recovery is below quality control limit. The data has been validated based on a favorable signal-to-noise and detection limit
A	Amount detected is less than the Lower Method Calibration Limit
J	Amount detected is between the Method Detection Limit and the Lower Calibration Limit
O	The recovery of this analyte in the OPR is above the Method QC Limits and the reported concentration in the sample may be biased high
E	Amount detected is greater than the Upper Calibration Limit
S	The amount of analyte present has saturated the detector. This situation results in an underestimation of the affected analyte(s)
Q	Indicates the presence of a quantitative interference. This situation may result in an underestimation of the affected analyte(s)
I	Indicates the presence of a qualitative interference that could cause a false positive or an overestimation of the affected analyte(s)
DPE	Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s)
TIC	Tentatively Identified Compound
EMPC	Estimated Maximum possible Concentration due to ion ratio failure
ND	Not Detected
K	Result is estimated due to ion ratio failure in High Resolution PCB Analysis
P	RPD > 40% between results of dual columns
D	Spike or surrogate was diluted out in order to achieve a parameter result within instrument calibration range

Samples requiring manual integrations for various congeners and/or standards are marked and dated by the analyst. A code definition is provided below:

M1	Mis-identified peak
M2	Software did not integrate peak
M3	Incorrect baseline construction (i.e. not all of peak included; two peaks integrated as one)
M4	Pattern integration required (i.e. DRO, GRO, PCB, Toxaphene and Technical Chlordane)
M5	Other - Explained in case narrative

Note Results pages that include a value for "Solids (%)" have been adjusted for moisture content.

SGS North America Inc. 5500 Business Drive, Wilmington, NC 28405
t 910.350.1903 f 910.350.1557 www.us.sgs.com

Member of SGS Group

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
SE5823-1	31102529001	09/14/2011 08:20	09/16/2011 09:45	Soil-Solid as dry weight
SE5823-2	31102529002	09/14/2011 09:05	09/16/2011 09:45	Soil-Solid as dry weight
SE5823-3	31102529003	09/14/2011 11:40	09/16/2011 09:45	Soil-Solid as dry weight
SE5823-4	31102529004	09/14/2011 10:20	09/16/2011 09:45	Soil-Solid as dry weight

	A	B	C	D	E	F
1	TEQ Calculations using tables in Chapter 405 of the ME Solid Waste Rules					
2						
3	Compound Name	Reporting TEF Table 405.1	Compliance TEF Table 405.2	Lab Result	Calculated TEQ for Reporting	Calculated TEQ for Compliance
4	2,3,7,8 TCDF	0.1	0.1	0.000	0.000	0.000
5	Other TCDF**	0	0.001	1.08	0.000	0.00108
6	2,3,7,8 TCDD	1	1	0.000	0.000	0.000
7	Other TCDD**	0	0.01	0.000	0.000	0.000
8	1,2,3,7,8 PeCDF	0.05	0.1	0.000	0.000	0.000
9	2,3,4,7,8 PeCDF	0.5	0.1	0.688	0.344	0.0688
10	Other PeCDF***	0	0.001	6.09	0.000	0.00540
11	1,2,3,7,8 PeCDD	0.5	0.5	0.000	0.000	0.000
12	Other PeCDD***	0	0.005	0.707	0.000	0.00354
13	1,2,3,4,7,8 HxCDF	0.1	0.01	0.000	0.000	0.000
14	1,2,3,7,8,9-HxCDF	0.1	0.01	0.000	0.000	0.000
15	2,3,4,6,7,8 HxCDF	0.1	0.01	0.605	0.0605	0.00605
16	1,2,3,6,7,8-HxCDF	0.1	0.01	0.333	0.0333	0.00333
17	Other HxCDF***	0	0.0001	5.84	0.000	0.000490
18	1,2,3,4,7,8 HxCDD	0.1	0.04	0.496	0.0496	0.0198
19	1,2,3,6,7,8 HxCDD	0.1	0.04	1.14	0.114	0.0456
20	1,2,3,7,8,9 HxCDD	0.1	0.04	1.22	0.122	0.0488
21	Other HxCDD***	0	0.0004	11.8	0.000	0.00358
22	1,2,3,4,6,7,8 HpCDF	0.01	0.001	2.86	0.0286	0.00286
23	1,2,3,4,7,8,9 HpCDF	0.01	0.001	0.000	0.000	0.000
24	Other HpCDF***	0	0.00001	7.70	0.000	0.0000484
25	1,2,3,4,6,7,8 HpCDD	0.01	0.001	79.0	0.790	0.0790
26	Other HpCDD***	0	0.00001	191	0.000	0.00112
27	1,2,3,4,6,7,8,9 OCDF	0.001	0.001	6.16	0.00616	0.00616
28	1,2,3,4,6,7,8,9 OCDD	0.001	0	2170	2.170	0.000
29	Totals:				3.72	0.296
30		EPA 89				
31	*** Use lab result for "total" and the spreadsheet will calculate "other"					

Results of **SE5823-1**

Client Sample ID: **SE5823-1**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529001-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 08:20
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 76.40

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
2,3,7,8-TCDD	ND		U	0.177	0.463	pg/g		
1,2,3,7,8-PeCDD	ND		U	0.185	2.31	pg/g		
1,2,3,4,7,8-HxCDD	**0.496**		J	0.219	2.31	pg/g	34.44	1.15
1,2,3,6,7,8-HxCDD	**1.14**		J	0.276	2.31	pg/g	34.56	1.42
1,2,3,7,8,9-HxCDD	**1.22**		J	0.251	2.31	pg/g	34.82	1.14
1,2,3,4,6,7,8-HpCDD	**79.0**			0.734	2.31	pg/g	38.47	1.03
OCDD	**2170**			1.52	4.63	pg/g	43.67	0.91
2,3,7,8-TCDF	ND		U	0.426	0.463	pg/g		
1,2,3,7,8-PeCDF	ND		U	0.0737	2.31	pg/g		
2,3,4,7,8-PeCDF	**0.688**		J	0.0594	2.31	pg/g	31.30	1.59
1,2,3,4,7,8-HxCDF	ND		U	0.124	2.31	pg/g		
1,2,3,6,7,8-HxCDF		0.333	J	0.153	2.31	pg/g	33.71	1.97
2,3,4,6,7,8-HxCDF	**0.605**		J	0.160	2.31	pg/g	34.39	1.28
1,2,3,7,8,9-HxCDF	ND		U	0.199	2.31	pg/g		
1,2,3,4,6,7,8-HpCDF	**2.86**			0.213	2.31	pg/g	36.95	0.95
1,2,3,4,7,8,9-HpCDF	ND		U	0.271	2.31	pg/g		
OCDF	**6.16**			0.473	4.63	pg/g	44.00	0.94
Total TCDD	ND		U	0.177	0.463	pg/g		
Total TCDF	ND	1.08		0.426	0.463	pg/g		
Total PeCDD	**0.707**		J	0.213	2.31	pg/g		
Total PeCDF	**6.09**			3.46	3.46	pg/g		
Total HxCDD	**9.94**	11.8		0.276	2.31	pg/g		
Total HxCDF	**4.95**	5.84		0.199	2.31	pg/g		
Total HpCDD	**191**			0.939	2.31	pg/g		
Total HpCDF	**7.70**			0.318	2.31	pg/g		

World Health Organization Summary

	Units	ND=0	ND=½	ND=DL
WHO-2005 TEQ	pg/g	2.02	2.25	2.48
WHO-2005 TEQ w/EMPC	pg/g	2.06	2.28	2.50

Results of **SE5823-1**

Client Sample ID: **SE5823-1**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529001-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 08:20
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 76.40

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
Labeled Standards								
13C-2378-TCDD	92.0				25.0-164	%		
13C-12378-PeCDD	90.0				25.0-181	%		
13C-123478-HxCDD	107				32.0-141	%		
13C-123678-HxCDD	97.0				28.0-130	%		
13C-1234678-HpCDD	90.0				23.0-140	%		
13C-OCDD	97.0				17.0-157	%		
13C-2378-TCDF	87.0				24.0-169	%		
13C-12378-PeCDF	79.0				24.0-185	%		
13C-23478-PeCDF	97.0				21.0-178	%		
13C-123478-HxCDF	99.0				26.0-152	%		
13C-123678-HxCDF	84.0				26.0-123	%		
13C-234678-HxCDF	86.0				29.0-147	%		
13C-123789-HxCDF	87.0				28.0-136	%		
13C-1234678-HpCDF	81.0				28.0-143	%		
13C-1234789-HpCDF	101				26.0-138	%		
37Cl-2378-TCDD	94.0				35.0-197	%		

Batch Information

Analytical Batch: HRD1307
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL
Analytical Date/Time: 09/29/2011 07:42
Dilution: 1

Prep Batch: HXA1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/20/2011 17:00
Prep Initial Wt./Vol.: 14.14 g
Prep Extract Vol.: 20 uL

	A	B	C	D	E	F
1	TEQ Calculations using tables in Chapter 405 of the ME Solid Waste Rules					
2						
3	Compound Name	Reporting TEF Table 405.1	Compliance TEF Table 405.2	Lab Result	Calculated TEQ for Reporting	Calculated TEQ for Compliance
4	2,3,7,8 TCDF	0.1	0.1	0.391	0.0391	0.0391
5	Other TCDF**	0	0.001	2.70	0.000	0.00231
6	2,3,7,8 TCDD	1	1	0.000	0.000	0.000
7	Other TCDD**	0	0.01	0.000	0.000	0.000
8	1,2,3,7,8 PeCDF	0.05	0.1	0.000	0.000	0.000
9	2,3,4,7,8 PeCDF	0.5	0.1	0.800	0.400	0.0800
10	Other PeCDF***	0	0.001	7.21	0.000	0.00641
11	1,2,3,7,8 PeCDD	0.5	0.5	0.000	0.000	0.000
12	Other PeCDD***	0	0.005	0.547	0.000	0.00274
13	1,2,3,4,7,8 HxCDF	0.1	0.01	0.000	0.000	0.000
14	1,2,3,7,8,9-HxCDF	0.1	0.01	0.000	0.000	0.000
15	2,3,4,6,7,8 HxCDF	0.1	0.01	0.860	0.0860	0.00860
16	1,2,3,6,7,8-HxCDF	0.1	0.01	0.558	0.0558	0.00558
17	Other HxCDF***	0	0.0001	9.16	0.000	0.000774
18	1,2,3,4,7,8 HxCDD	0.1	0.04	0.499	0.0499	0.0200
19	1,2,3,6,7,8 HxCDD	0.1	0.04	1.44	0.144	0.0576
20	1,2,3,7,8,9 HxCDD	0.1	0.04	1.07	0.107	0.0428
21	Other HxCDD***	0	0.0004	9.10	0.000	0.00244
22	1,2,3,4,6,7,8 HpCDF	0.01	0.001	6.56	0.0656	0.00656
23	1,2,3,4,7,8,9 HpCDF	0.01	0.001	0.473	0.00473	0.000
24	Other HpCDF***	0	0.00001	18.2	0.000	0.000112
25	1,2,3,4,6,7,8 HpCDD	0.01	0.001	25.7	0.257	0.0257
26	Other HpCDD***	0	0.00001	55.6	0.000	0.000299
27	1,2,3,4,6,7,8,9 OCDF	0.001	0.001	14.5	0.0145	0.01450
28	1,2,3,4,6,7,8,9 OCDD	0.001	0	225	0.225	0.000
29	Totals:				1.45	0.316
30		EPA 89				
31	*** Use lab result for "total" and the spreadsheet will calculate "other"					

Results of **SE5823-2**

Client Sample ID: **SE5823-2**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529002-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 09:05
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 62.50

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
2,3,7,8-TCDD	ND		U	0.186	0.465	pg/g		
1,2,3,7,8-PeCDD	ND		U	0.229	2.33	pg/g		
1,2,3,4,7,8-HxCDD	**0.499**		J	0.168	2.33	pg/g	34.44	1.20
1,2,3,6,7,8-HxCDD	**1.44**		J	0.219	2.33	pg/g	34.53	1.20
1,2,3,7,8,9-HxCDD		1.07	J	0.195	2.33	pg/g	34.81	1.01*
1,2,3,4,6,7,8-HpCDD	**25.7**			0.455	2.33	pg/g	38.46	1.05
OCDD	**225**			0.943	4.65	pg/g	43.66	0.87
2,3,7,8-TCDF		0.391	J	0.240	0.465	pg/g	27.09	1.01*
1,2,3,7,8-PeCDF	ND		U	0.106	2.33	pg/g		
2,3,4,7,8-PeCDF	**0.800**		J	0.0925	2.33	pg/g	31.27	1.52
1,2,3,4,7,8-HxCDF	ND		U	0.101	2.33	pg/g		
1,2,3,6,7,8-HxCDF	**0.558**		J	0.119	2.33	pg/g	33.72	1.08
2,3,4,6,7,8-HxCDF	**0.860**		J	0.134	2.33	pg/g	34.29	1.14
1,2,3,7,8,9-HxCDF	ND		U	0.160	2.33	pg/g		
1,2,3,4,6,7,8-HpCDF	**6.56**			0.203	2.33	pg/g	36.94	1.01
1,2,3,4,7,8,9-HpCDF		0.473	J	0.246	2.33	pg/g	39.24	0.80*
OCDF	**14.5**			0.458	4.65	pg/g	43.99	0.90
Total TCDD	ND		U	0.186	0.465	pg/g		
Total TCDF	**1.51**	2.70		0.240	0.465	pg/g		
Total PeCDD	**0.547**		J	0.263	2.33	pg/g		
Total PeCDF	**6.96**	7.21		3.87	3.87	pg/g		
Total HxCDD	**5.44**	9.10		0.219	2.33	pg/g		
Total HxCDF	**9.16**			0.160	2.33	pg/g		
Total HpCDD	**55.6**			0.581	2.33	pg/g		
Total HpCDF	**17.7**	18.2		0.296	2.33	pg/g		

World Health Organization Summary

	Units	ND=0	ND=½	ND=DL
WHO-2005 TEQ	pg/g	0.970	1.22	1.46
WHO-2005 TEQ w/EMPC	pg/g	1.12	1.34	1.57

Results of **SE5823-2**

Client Sample ID: **SE5823-2**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529002-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 09:05
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 62.50

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
Labeled Standards								
13C-2378-TCDD	88.0				25.0-164	%		
13C-12378-PeCDD	88.0				25.0-181	%		
13C-123478-HxCDD	109				32.0-141	%		
13C-123678-HxCDD	93.0				28.0-130	%		
13C-1234678-HpCDD	90.0				23.0-140	%		
13C-OCDD	81.0				17.0-157	%		
13C-2378-TCDF	80.0				24.0-169	%		
13C-12378-PeCDF	81.0				24.0-185	%		
13C-23478-PeCDF	96.0				21.0-178	%		
13C-123478-HxCDF	100				26.0-152	%		
13C-123678-HxCDF	85.0				26.0-123	%		
13C-234678-HxCDF	85.0				29.0-147	%		
13C-123789-HxCDF	87.0				28.0-136	%		
13C-1234678-HpCDF	79.0				28.0-143	%		
13C-1234789-HpCDF	96.0				26.0-138	%		
37Cl-2378-TCDD	85.0				35.0-197	%		

Batch Information

Analytical Batch: HRD1397
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL
Analytical Date/Time: 09/29/2011 08:30
Dilution: 1

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Prep Initial Wt./Vol.: 17.19 g
Prep Extract Vol: 20 uL

	A	B	C	D	E	F
1	TEQ Calculations using tables in Chapter 405 of the ME Solid Waste Rules					
2						
3	Compound Name	Reporting TEF Table 405.1	Compliance TEF Table 405.2	Lab Result	Calculated TEQ for Reporting	Calculated TEQ for Compliance
4	2,3,7,8 TCDF	0.1	0.1	0.619	0.0619	0.0619
5	Other TCDF**	0	0.001	8.54	0.000	0.00792
6	2,3,7,8 TCDD	1	1	0.000	0.000	0.000
7	Other TCDD**	0	0.01	0.000	0.000	0.000
8	1,2,3,7,8 PeCDF	0.05	0.1	0.258	0.0129	0.0258
9	2,3,4,7,8 PeCDF	0.5	0.1	2.18	1.09	0.218
10	Other PeCDF***	0	0.001	18.3	0.000	0.0159
11	1,2,3,7,8 PeCDD	0.5	0.5	0.350	0.175	0.175
12	Other PeCDD***	0	0.005	3.35	0.000	0.0150
13	1,2,3,4,7,8 HxCDF	0.1	0.01	0.595	0.0595	0.00595
14	1,2,3,7,8,9-HxCDF	0.1	0.01	0.000	0.000	0.000
15	2,3,4,6,7,8 HxCDF	0.1	0.01	1.34	0.134	0.0134
16	1,2,3,6,7,8-HxCDF	0.1	0.01	0.961	0.0961	0.00961
17	Other HxCDF***	0	0.0001	16.7	0.000	0.00138
18	1,2,3,4,7,8 HxCDD	0.1	0.04	0.552	0.0552	0.0221
19	1,2,3,6,7,8 HxCDD	0.1	0.04	2.19	0.219	0.0876
20	1,2,3,7,8,9 HxCDD	0.1	0.04	1.38	0.138	0.0552
21	Other HxCDD***	0	0.0004	14.7	0.000	0.0042
22	1,2,3,4,6,7,8 HpCDF	0.01	0.001	5.48	0.0548	0.00548
23	1,2,3,4,7,8,9 HpCDF	0.01	0.001	0.372	0.00372	0.000
24	Other HpCDF***	0	0.00001	15.0	0.000	0.0000915
25	1,2,3,4,6,7,8 HpCDD	0.01	0.001	35.7	0.357	0.0357
26	Other HpCDD***	0	0.00001	79.3	0.000	0.000436
27	1,2,3,4,6,7,8,9 OCDF	0.001	0.001	11.5	0.0115	0.0115
28	1,2,3,4,6,7,8,9 OCDD	0.001	0	447	0.447	0.000
29	Totals:				2.92	0.773
30		EPA 89				
31	*** Use lab result for "total" and the spreadsheet will calculate "other"					

Results of **SE5823-3**

Client Sample ID: **SE5823-3**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529003-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 11:40
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 51.80

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
2,3,7,8-TCDD	ND		U	0.236	0.489	pg/g		
1,2,3,7,8-PeCDD	**0.350**		J	0.180	2.45	pg/g	31.48	1.37
1,2,3,4,7,8-HxCDD		0.552	J	0.280	2.45	pg/g	34.44	0.83*
1,2,3,6,7,8-HxCDD	**2.19**		J	0.341	2.45	pg/g	34.54	1.22
1,2,3,7,8,9-HxCDD	**1.38**		J	0.314	2.45	pg/g	34.81	1.26
1,2,3,4,6,7,8-HpCDD	**35.7**			0.502	2.45	pg/g	38.47	1.01
OCDD	**447**			0.811	4.89	pg/g	43.66	0.90
2,3,7,8-TCDF	0.666			0.359	0.489	pg/g	27.05	0.88
2,3,7,8-TCDF [confirm]		0.619		0.218	0.489	pg/g	11.92	1.00*
1,2,3,7,8-PeCDF		0.258	J	0.123	2.45	pg/g	30.59	2.18*
2,3,4,7,8-PeCDF		2.18	J	0.0975	2.45	pg/g	31.30	1.89*
1,2,3,4,7,8-HxCDF		0.595	J	0.175	2.45	pg/g	33.61	1.05*
1,2,3,6,7,8-HxCDF		0.961	J	0.219	2.45	pg/g	33.72	1.99*
2,3,4,6,7,8-HxCDF		1.34	J	0.221	2.45	pg/g	34.28	1.00*
1,2,3,7,8,9-HxCDF	ND		U	0.286	2.45	pg/g		
1,2,3,4,6,7,8-HpCDF	**5.48**			0.271	2.45	pg/g	36.94	1.06
1,2,3,4,7,8,9-HpCDF	**0.372**		J	0.315	2.45	pg/g	39.24	0.92
OCDF	**11.5**			0.462	4.89	pg/g	43.99	0.89
Total TCDD	ND		U	0.236	0.489	pg/g		
Total TCDF	**5.46**	8.54		0.389	0.489	pg/g		
Total PeCDD	**1.75**	3.35	J	0.207	2.45	pg/g		
Total PeCDF	**15.1**	18.3		9.66	9.66	pg/g		
Total HxCDD	**13.7**	14.7		0.341	2.45	pg/g		
Total HxCDF	**13.8**	16.7		0.286	2.45	pg/g		
Total HpCDD	**79.3**			0.642	2.45	pg/g		
Total HpCDF	**15.0**			0.386	2.45	pg/g		

World Health Organization Summary

	Units	ND=0	ND=½	ND=DL
WHO-2005 TEQ	pg/g	1.26	1.46	1.67
WHO-2005 TEQ w/EMPC	pg/g	2.33	2.46	2.59

Results of **SE5823-3**

Client Sample ID: **SE5823-3**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529003-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 11:40
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 51.80

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
Labeled Standards								
13C-2378-TCDD	76.0				25.0-164	%		
13C-12378-PeCDD	87.0				25.0-181	%		
13C-123478-HxCDD	104				32.0-141	%		
13C-123678-HxCDD	92.0				28.0-130	%		
13C-1234678-HpCDD	90.0				23.0-140	%		
13C-OCDD	87.0				17.0-157	%		
13C-2378-TCDF	56.0				24.0-169	%		
13C-12378-PeCDF	80.0				24.0-185	%		
13C-23478-PeCDF	96.0				21.0-178	%		
13C-123478-HxCDF	99.0				26.0-152	%		
13C-123678-HxCDF	82.0				26.0-123	%		
13C-234678-HxCDF	84.0				29.0-147	%		
13C-123789-HxCDF	86.0				28.0-136	%		
13C-1234678-HpCDF	78.0				28.0-143	%		
13C-1234789-HpCDF	98.0				26.0-138	%		
37Cl-2378-TCDD	81.0				35.0-197	%		

Batch Information

Analytical Batch: HRD1397
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL
Analytical Date/Time: 09/29/2011 09:16
Dilution: 1

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Prep Initial Wt./Vol.: 19.73 g
Prep Extract Vol: 20 uL

Analytical Batch: HRD1401
Analytical Method: EPA 1613B
Instrument: HRMS3
Analyst: JHL
Analytical Date/Time: 09/29/2011 12:52
Dilution: 1

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Prep Initial Wt./Vol.: 19.73 g
Prep Extract Vol: 20 uL

	A	B	C	D	E	F
1	TEQ Calculations using tables in Chapter 405 of the ME Solid Waste Rules					
2						
3	Compound Name	Reporting TEF Table 405.1	Compliance TEF Table 405.2	Lab Result	Calculated TEQ for Reporting	Calculated TEQ for Compliance
4	2,3,7,8 TCDF	0.1	0.1	0.000	0.000	0.000
5	Other TCDF**	0	0.001	1.67	0.000	0.00167
6	2,3,7,8 TCDD	1	1	0.000	0.000	0.000
7	Other TCDD**	0	0.01	0.000	0.000	0.000
8	1,2,3,7,8 PeCDF	0.05	0.1	0.000	0.000	0.000
9	2,3,4,7,8 PeCDF	0.5	0.1	0.435	0.218	0.0435
10	Other PeCDF***	0	0.001	3.65	0.000	0.00322
11	1,2,3,7,8 PeCDD	0.5	0.5	0.000	0.000	0.000
12	Other PeCDD***	0	0.005	0.000	0.000	0.000
13	1,2,3,4,7,8 HxCDF	0.1	0.01	0.000	0.000	0.000
14	1,2,3,7,8,9-HxCDF	0.1	0.01	0.000	0.000	0.000
15	2,3,4,6,7,8 HxCDF	0.1	0.01	0.000	0.000	0.000
16	1,2,3,6,7,8-HxCDF	0.1	0.01	0.200	0.0200	0.00200
17	Other HxCDF***	0	0.0001	2.72	0.000	0.000252
18	1,2,3,4,7,8 HxCDD	0.1	0.04	0.000	0.000	0.000
19	1,2,3,6,7,8 HxCDD	0.1	0.04	0.451	0.0451	0.0180
20	1,2,3,7,8,9 HxCDD	0.1	0.04	0.453	0.0453	0.0181
21	Other HxCDD***	0	0.0004	4.74	0.000	0.00153
22	1,2,3,4,6,7,8 HpCDF	0.01	0.001	0.665	0.00665	0.000665
23	1,2,3,4,7,8,9 HpCDF	0.01	0.001	0.000	0.000	0.000
24	Other HpCDF***	0	0.00001	2.18	0.000	0.0000152
25	1,2,3,4,6,7,8 HpCDD	0.01	0.001	32.7	0.327	0.0327
26	Other HpCDD***	0	0.00001	84.8	0.000	0.000521
27	1,2,3,4,6,7,8,9 OCDF	0.001	0.001	1.19	0.00119	0.00119
28	1,2,3,4,6,7,8,9 OCDD	0.001	0	1210	1.21	0.000
29	Totals:				1.87	0.123
30		EPA 89				
31	*** Use lab result for "total" and the spreadsheet will calculate "other"					

Results of **SE5823-4**

Client Sample ID: **SE5823-4**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529004-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 10:20
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 68.40

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	IS	Ratio
2,3,7,8-TCDD	ND		U	0.174	0.495	pg/g		
1,2,3,7,8-PeCDD	ND		U	0.157	2.47	pg/g		
1,2,3,4,7,8-HxCDD	ND		U	0.221	2.47	pg/g		
1,2,3,6,7,8-HxCDD	**0.451**		J	0.276	2.47	pg/g	34.53	1.40
1,2,3,7,8,9-HxCDD	**0.453**		J	0.252	2.47	pg/g	34.81	1.31
1,2,3,4,6,7,8-HpCDD	**32.7**			0.549	2.47	pg/g	38.40	1.07
OCDD	**1210**			1.17	4.95	pg/g	43.65	0.89
2,3,7,8-TCDF	ND		U	0.180	0.495	pg/g		
1,2,3,7,8-PeCDF	ND		U	0.0837	2.47	pg/g		
2,3,4,7,8-PeCDF	**0.435**		J	0.0730	2.47	pg/g	31.28	1.54
1,2,3,4,7,8-HxCDF	ND		U	0.134	2.47	pg/g		
1,2,3,6,7,8-HxCDF	**0.200**		J	0.166	2.47	pg/g	33.71	1.11
2,3,4,6,7,8-HxCDF	ND		U	0.173	2.47	pg/g		
1,2,3,7,8,9-HxCDF	ND		U	0.213	2.47	pg/g		
1,2,3,4,6,7,8-HpCDF		0.665	J	0.209	2.47	pg/g	36.93	1.26*
1,2,3,4,7,8,9-HpCDF	ND		U	0.261	2.47	pg/g		
OCDF		1.19	J	0.413	4.95	pg/g	44.00	1.95*
Total TCDD	ND		U	0.174	0.495	pg/g		
Total TCDF	**0.869**	1.67		0.180	0.495	pg/g		
Total PeCDD	ND		U	0.157	2.47	pg/g		
Total PeCDF	**2.55**	3.65		2.11	2.47	pg/g		
Total HxCDD	**4.34**	4.74		0.276	2.47	pg/g		
Total HxCDF	**2.41**	2.72	J	0.213	2.47	pg/g		
Total HpCDD	**84.8**			0.703	2.47	pg/g		
Total HpCDF	**1.52**	2.18	J	0.308	2.47	pg/g		

World Health Organization Summary

	Units	ND=0	ND=½	ND=DL
WHO-2005 TEQ	pg/g	0.931	1.15	1.36
WHO-2005 TEQ w/EMPC	pg/g	0.938	1.15	1.37

Results of **SE5823-4**

Client Sample ID: **SE5823-4**
Client Project ID: **Capisic Pond/203939**
Lab Sample ID: 31102529004-A
Lab Project ID: 31102529

Collection Date: 09/14/2011 10:20
Received Date: 09/16/2011 09:45
Matrix: Soil-Solid as dry weight
Solids (%): 68.40

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
Labeled Standards								
13C-2378-TCDD	88.0				25.0-164	%		
13C-12378-PeCDD	88.0				25.0-181	%		
13C-123478-HxCDD	109				32.0-141	%		
13C-123678-HxCDD	95.0				28.0-130	%		
13C-1234678-HpCDD	92.0				23.0-140	%		
13C-OCDD	98.0				17.0-157	%		
13C-2378-TCDF	84.0				24.0-169	%		
13C-12378-PeCDF	83.0				24.0-185	%		
13C-23478-PeCDF	99.0				21.0-178	%		
13C-123478-HxCDF	101				26.0-152	%		
13C-123678-HxCDF	85.0				26.0-123	%		
13C-234678-HxCDF	86.0				29.0-147	%		
13C-123789-HxCDF	90.0				28.0-136	%		
13C-1234678-HpCDF	84.0				28.0-143	%		
13C-1234789-HpCDF	101				26.0-138	%		
37Cl-2378-TCDD	88.0				35.0-197	%		

Batch Information

Analytical Batch: HRD1397
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL
Analytical Date/Time: 09/29/2011 10:05
Dilution: 1

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Prep Initial Wt./Vol.: 14.79 g
Prep Extract Vol.: 20 uL

Print Date: 10/03/2011

N.C. Certification # 461

Batch Summary

Analytical Method: EPA 1613B

Prep Method: EPA 1613 PREP S/D/T
Prep Batch: HXX1279
Prep Date: 09/26/2011 17:00

Client Sample ID	Lab Sample ID	Analysis Date	Analytical Batch	Instrument	Analyst
OPR for HBN 12239 [HXX/1279]	41227	09/29/2011 02:02	HRD1397	HRMS2	JHL
OPRD for HBN 12239 [HXX/1279]	41228	09/29/2011 02:49	HRD1397	HRMS2	JHL
LMB for HBN 12239 [HXX/1279]	41226	09/29/2011 03:37	HRD1397	HRMS2	JHL
SE5823-1	31102529001	09/29/2011 07:42	HRD1397	HRMS2	JHL
SE5823-2	31102529002	09/29/2011 08:30	HRD1397	HRMS2	JHL
SE5823-3	31102529003	09/29/2011 09:18	HRD1397	HRMS2	JHL
SE5823-4	31102529004	09/29/2011 10:05	HRD1397	HRMS2	JHL
SE5823-3	31102529003	09/29/2011 12:52	HRD1401	HRMS3	JHL

Method Blank Summary

Blank ID: LMB for HBN 12239 [HXX/1279]
Blank Lab ID: 41226
QC for Samples:
31102529001, 31102529002, 31102529003, 31102529004

Matrix: Soil-Solid as dry weight

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Ratio
2,3,7,8-TCDD	ND		U	0.134	0.500	pg/g		
1,2,3,7,8-PeCDD	ND		U	0.119	2.50	pg/g		
1,2,3,4,7,8-HxCDD	ND		U	0.127	2.50	pg/g		
1,2,3,6,7,8-HxCDD	ND		U	0.160	2.50	pg/g		
1,2,3,7,8,9-HxCDD	ND		U	0.145	2.50	pg/g		
1,2,3,4,6,7,8-HpCDD	ND		U	0.210	2.50	pg/g		
OCDD	ND		U	0.556	5.00	pg/g		
2,3,7,8-TCDF	ND		U	0.110	0.500	pg/g		
1,2,3,7,8-PeCDF	ND		U	0.0652	2.50	pg/g		
2,3,4,7,8-PeCDF	ND		U	0.0554	2.50	pg/g		
1,2,3,4,7,8-HxCDF	ND		U	0.0698	2.50	pg/g		
1,2,3,6,7,8-HxCDF	ND		U	0.0842	2.50	pg/g		
2,3,4,6,7,8-HxCDF	ND		U	0.0900	2.50	pg/g		
1,2,3,7,8,9-HxCDF	ND		U	0.116	2.50	pg/g		
1,2,3,4,6,7,8-HpCDF	ND		U	0.137	2.50	pg/g		
1,2,3,4,7,8,9-HpCDF	ND		U	0.178	2.50	pg/g		
OCDF	ND		U	0.386	5.00	pg/g		
Total TCDD	ND		U	0.134	0.500	pg/g		
Total TCDF	ND		U	0.110	0.500	pg/g		
Total PeCDD	ND		U	0.119	2.50	pg/g		
Total PeCDF	ND		U	0.0652	2.50	pg/g		
Total HxCDD	ND		U	0.160	2.50	pg/g		
Total HxCDF	ND		U	0.116	2.50	pg/g		
Total HpCDD	ND		U	0.210	2.50	pg/g		
Total HpCDF	ND		U	0.178	2.50	pg/g		
Labeled Standards								
13C-2378-TCDD	84.0				25.0-164	%		
13C-12378-PeCDD	85.0				25.0-181	%		
13C-123478-HxCDD	100				32.0-141	%		
13C-123678-HxCDD	87.0				28.0-130	%		
13C-1234678-HpCDD	86.0				23.0-140	%		
13C-OCDD	79.0				17.0-157	%		
13C-2378-TCDF	79.0				24.0-169	%		
13C-12378-PeCDF	78.0				24.0-185	%		
13C-23478-PeCDF	91.0				21.0-178	%		
13C-123478-HxCDF	91.0				26.0-152	%		
13C-123678-HxCDF	78.0				26.0-123	%		
13C-234678-HxCDF	78.0				29.0-147	%		
13C-123789-HxCDF	79.0				28.0-136	%		
13C-1234678-HpCDF	75.0				28.0-143	%		
13C-1234789-HpCDF	88.0				26.0-138	%		

Method Blank Summary

Blank ID: LMB for HBN 12239 [HXX/1279]
Blank Lab ID: 41226
QC for Samples:
31102529001, 31102529002, 31102529003, 31102529004

Matrix: Soil-Solid as dry weight

Results by **EPA 1613B**

Parameter	Result	EMPC	Qual	DL	LOQ/CL	Units	RT	Rato
37Cl-2378-TCDD	85.0				35.0-197	%		

Batch Information

Analytical Batch: HRD1397
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL
Analytical Date/Time: 09/29/2011 00:37
Dilution: 1

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Prep Initial Wt./Vol.: 10 g
Prep Extract Vol: 20 ul

Print Date: 10/03/2011

N.C. Certification # 481

Blank Spike Summary

Blank Spike ID: OPR for HBN 12239 [HXX/1279]
Blank Spike Lab ID: 41227
Date Analyzed: 09/29/2011 02:02

Spike Duplicate ID: OPRD for HBN 12239 [HXX/1279]
Spike Duplicate Lab ID: 41228
Date Analyzed: 09/29/2011 02:49
Matrix: Soil-Solid as dry weight

QC for Samples: 31102529001, 31102529002, 31102529003, 31102529004

Results by **EPA 1613B**

	Blank Spike (pg/g)			Spike Duplicate (pg/g)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	QL	RPD (%)	RPD QL
2,3,7,8-TCDD	20.0	19.3	96	20.0	19.0	95	67.0-158	1.6	20.00
1,2,3,7,8-PeCDD	100	99.0	99	100	95.5	95	70.0-142	3.6	20.00
1,2,3,4,7,8-HxCDD	100	78.1	79	100	78.4	78	70.0-164	0.89	20.00
1,2,3,6,7,8-HxCDD	100	102	102	100	96.7	97	76.0-134	5.3	20.00
1,2,3,7,8,9-HxCDD	100	90.9	91	100	87.9	88	64.0-162	3.4	20.00
1,2,3,4,6,7,8-HpCDD	100	94.5	94	100	90.7	91	70.0-140	4.1	20.00
OCDD	200	191	96	200	186	93	78.0-144	2.7	20.00
2,3,7,8-TCDF	20.0	20.5	103	20.0	19.6	98	75.0-158	4.5	20.00
1,2,3,7,8-PeCDF	100	92.5	92	100	87.3	87	80.0-134	5.8	20.00
2,3,4,7,8-PeCDF	100	75.4	75	100	74.1	75	68.0-160	0.40	20.00
1,2,3,4,7,8-HxCDF	100	79.9	80	100	77.5	77	72.0-134	3.0	20.00
1,2,3,6,7,8-HxCDF	100	99.0	99	100	93.2	93	84.0-130	6.0	20.00
2,3,4,6,7,8-HxCDF	100	97.3	97	100	95.0	95	70.0-156	2.4	20.00
1,2,3,7,8,9-HxCDF	100	94.5	95	100	94.6	95	78.0-138	0.11	20.00
1,2,3,4,6,7,8-HpCDF	100	99.2	99	100	99.1	99	82.0-122	0.10	20.00
1,2,3,4,7,8,9-HpCDF	100	83.8	84	100	78.4	78	78.0-138	6.7	20.00
OCDF	200	181	90	200	180	90	63.0-170	0.55	20.00
Labeled Standards									
13C-2378-TCDD			82			82	25.0-164		
13C-12378-PeCDD			84			88	25.0-181		
13C-123478-HxCDD			103			103	32.0-141		
13C-123678-HxCDD			88			89	28.0-130		
13C-1234678-HpCDD			84			85	23.0-140		
13C-OCDD			73			86	17.0-157		
13C-2378-TCDF			69			78	24.0-169		
13C-12378-PeCDF			76			81	24.0-185		
13C-23478-PeCDF			89			94	21.0-178		
13C-123478-HxCDF			90			92	26.0-152		
13C-123678-HxCDF			77			77	26.0-123		
13C-234678-HxCDF			79			79	29.0-147		
13C-123789-HxCDF			79			78	26.0-136		
13C-1234678-HpCDF			72			74	28.0-143		
13C-1234789-HpCDF			87			94	26.0-138		
37Cl-2378-TCDD			86			82	35.0-197		

Print Date: 10/03/2011

N.C. Certification # 481

Blank Spike Summary

Blank Spike ID: OPR for HBN 12239 [HXX/1279]
Blank Spike Lab ID: 41227
Date Analyzed: 09/29/2011 02:02

Spike Duplicate ID: OPRD for HBN 12239 [HXX/1279]
Spike Duplicate Lab ID: 41228
Date Analyzed: 09/29/2011 02:49
Matrix: Soil-Solid as dry weight

QC for Samples: 31102529001, 31102529002, 31102529003, 31102529004

Results by **EPA 1613B**

Parameter	Blank Spike (%) Conc	Result	Rec (%)	Spike Duplicate (%) Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: HRD1397
Analytical Method: EPA 1613B
Instrument: HRMS2
Analyst: JHL

Prep Batch: HXX1279
Prep Method: EPA 1613 PREP S/D/T
Prep Date/Time: 09/26/2011 17:00
Spike Init Wt./Vol.: 10 g Extract Vol: 20 uL
Dupe Init Wt./Vol.: 10 g Extract Vol: 20 uL

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

31102529

Page ____ of ____

Client: Katahdin Analytical | Contact: Kelly Perkins | Phone #: ( ) | Fax #: ( )

Address | City | State | Zip Code

Purchase Order # | Proj. Name / No.: Capisic Pond/203939 | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) | Copies To:

LAB USE ONLY | WORK ORDER #: SE5823
KATAHDIN PROJECT NUMBER ____

REMARKS: ____

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: ____

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. ☐Y ☐N: Dioxin method 1613	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	SE5823-1	9-14-11/0820	SL	1	✓									
	SE5823-2	/0905			✓									
	SE5823-3	/1140			✓									
	SE5823-4	/1020			✓									
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												

w/ confirmation - US TEF
Equivalent Maine 1987
Reg + II TEF
1989 Maine Factors

COMMENTS

1.4°C - seal intact

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Don Medlin	9/14/11 1530			9/16/11 9:45	
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

ORIGINAL

KAS-COC1

SGS North America Inc.

Sample Receipt Checklist (SRC)

Client: Katahdin

Work Order No.: 31102529

Notes:

1. x Shipped
   ___ Hand Delivered

2. x COC Present on Receipt
   ___ No COC
   ___ Additional Transmittal Forms

3. x Custody Tape on Container
   ___ No Custody Tape

4. x Samples Intact
   ___ Samples Broken / Leaking

5. x Chilled on Receipt Actual Temp.(s) in °C: 1.4
   ___ Ambient on Receipt
   ___ Walk-in on Ice; Coming down to temp.
   ___ Received Outside of Temperature Specifications

6. x Sufficient Sample Submitted
   ___ Insufficient Sample Submitted

7. ___ Chlorine absent NA
   ___ HNO3 < 2
   ___ HCL < 2
   ___ Additional Preservatives verified (see notes)

8. x Received Within Holding Time
   ___ Not Received Within Holding Time

9. x No Discrepancies Noted
   ___ Discrepancies Noted

10. ___ No Headspace present in VOC vials
    ___ Headspace present in VOC vials >6mm

Comments:

Inspected and Logged in by: TP

Date: Mon-9/19/11 00:00

Katahdin Analytical Services, Inc. Sample Receipt Condition Report

Client:	Woodard + Curran	KAS PM:	KAP	Sampled By:	Client
Project:		KIMS Entry By:	DM	Delivered By:	Client
KAS Work Order#:	SE5823	KIMS Review By:	MAP	Received By:	DM
SDG #:	Cooler: 1 of 1			Date/Time Rec.:	9/14/11 1250

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 3.3
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) may not meet certain regulatory requirements and may invalidate certain data.
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles free of headspace: **Aqueous:** No bubble larger than a pea				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
WOODARD & CURRAN	ZACH HENDERSON	(207) 774-2112	( )

Address	City	State	Zip Code
41 HUTCHINS Dr.	PORTLAND	ME	04102

Purchase Order #: Proj. Name / No.: CAPISIC POND / 203939 Katahdin Quote #:

Bill (if different than above): Address:

Sampler (Print / Sign): David Dinsmore / David Dinsmore Copies To: Dave Dinsmore

LAB USE ONLY WORK ORDER #: SE5823
KATAHDIN PROJECT NUMBER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. ☐Y ☒N DIOXIN	Filt. ☐Y ☒N Metals, Total P	Filt. ☐Y ☒N PAH, Pest, PCB	Filt. ☐Y ☒N EPH	Filt. ☐Y ☒N Grain Size	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	SD-01	9/14/11 / 0820	SED	5	1	1	1	1	1					
	SD-02	9/14/11 / 0905	↓	5	1	1	1	1	1					
	SD-03	9/14/11 / 1140	↓	5	1	1	1	1	1					
	SD-04	9/14/11 / 1020	↓	5	1	1	1	1	1					

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
David Dinsmore	9/14/11 1245	Dan Medlin			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF COVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

ORIGINAL

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Sep. 15, 2011
11:55 AM

Quote/Incoming:

Login Number: SE5823

Account: WOODAR001 Web
Woodard & Curran

Project:

Primary Report Address:
Zach Henderson
Woodard & Curran
41 Hutchins Drive

Portland,ME 04102
zhenderson@woodardcurran.com

Primary Invoice Address:
Accounts Payable
Woodard & Curran
41 Hutchins Drive

Portland,ME 04102

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	merge results for EDD
CHECK NO.	:	
CLIENT PO#	:	
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	3.3
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS027-XLS and KAS064-XLS
LOGIN INITIALS	:	GN
PM	:	KAP
PROJECT NAME	:	Capisic Pond / 203939
QC LEVEL	:	II
REGULATORY LIST	:	
REPORT INSTRUCTIONS	:	email pdf and EDD to Zach and Dave Dinsmore. No HC
SDG ID	:	
SDG STATUS	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SE5823-1	SD-01	14-SEP-11 08:20	14-SEP-11			04-OCT-11	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	ASTM-D422-SUB		50g Glass		
Solid	S	E365.4-TOTAL-PHOS	12-OCT-11	100g Glass		
Solid	S	MA-EPH	28-SEP-11	100g Glass		
Solid	P	RCRA-METALS				
SW3050-PREP		SW6010-ARSENIC		SW6010-CADMIUM		
SW6010-CHROMIUM		SW6010-LEAD		SW7471-MERCURY		
Solid	S	SW7196A-CRVI	12-OCT-11	50g Glass		
Solid	S	SW8081	28-SEP-11	100g Glass		
Solid	S	SW8082	28-SEP-11	100g Glass		
Solid	S	SW8270SIM	28-SEP-11	100g Glass		
Solid	S	SW8290-DIOXIN-SUB		50g Glass		
Solid	S	TS	14-OCT-11			

SE5823-2	SD-02	14-SEP-11 09:05	14-SEP-11			04-OCT-11	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	ASTM-D422-SUB		50g Glass		
Solid	S	E365.4-TOTAL-PHOS	12-OCT-11	100g Glass		
Solid	S	MA-EPH	28-SEP-11	100g Glass		
Solid	P	RCRA-METALS				
SW3050-PREP		SW6010-ARSENIC		SW6010-CADMIUM		
SW6010-CHROMIUM		SW6010-LEAD		SW7471-MERCURY		
Solid	S	SW7196A-CRVI	12-OCT-11	50g Glass		
Solid	S	SW8081	28-SEP-11	100g Glass		
Solid	S	SW8082	28-SEP-11	100g Glass		
Solid	S	SW8270SIM	28-SEP-11	100g Glass		
Solid	S	SW8290-DIOXIN-SUB		50g Glass		
Solid	S	TS	14-OCT-11			

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Sep. 15, 2011
11:55 AM

Login Number: SE5823

Account: WOODAR001 Web
Woodard & Curran

Quote/Incoming:

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SE5823-3	SD-03	14-SEP-11 11:40	14-SEP-11			04-OCT-11	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Solid	S	ASTM-D422-SUB		50g Glass		
Solid	S	E365.4-TOTAL-PHOS	12-OCT-11	100g Glass		
Solid	S	MA-EPH	28-SEP-11	100g Glass		
Solid	P	RCRA-METALS				
SW3050-PREP		SW6010-ARSENIC		SW6010-CADMIUM		
SW6010-CHROMIUM		SW6010-LEAD		SW7471-MERCURY		
Solid	S	SW7196A-CRVI	12-OCT-11	50g Glass		
Solid	S	SW8081	28-SEP-11	100g Glass		
Solid	S	SW8082	28-SEP-11	100g Glass		
Solid	S	SW8270SIM	28-SEP-11	100g Glass		
Solid	S	SW8290-DIOXIN-SUB		50g Glass		
Solid	S	TS	14-OCT-11			

SE5823-4	SD-04	14-SEP-11 10:20	14-SEP-11			04-OCT-11	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Solid	S	ASTM-D422-SUB		50g Glass		
Solid	S	E365.4-TOTAL-PHOS	12-OCT-11	100g Glass		
Solid	S	MA-EPH	28-SEP-11	100g Glass		
Solid	P	RCRA-METALS				
SW3050-PREP		SW6010-ARSENIC		SW6010-CADMIUM		
SW6010-CHROMIUM		SW6010-LEAD		SW7471-MERCURY		
Solid	S	SW7196A-CRVI	12-OCT-11	50g Glass		
Solid	S	SW8081	28-SEP-11	100g Glass		
Solid	S	SW8082	28-SEP-11	100g Glass		
Solid	S	SW8270SIM	28-SEP-11	100g Glass		
Solid	S	SW8290-DIOXIN-SUB		50g Glass		
Solid	S	TS	14-OCT-11			

Total Samples: *4* ***Total Analyses:*** *40*

APPENDIX C: ROCKLAND AVENUE OUTFALL ALTERNATIVES

COMMITMENT & INTEGRITY
DRIVE RESULTS

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
Tel. 207-774-2112

CLIENT	City of Portland		
PROJECT	Capisic Pond Evaluation		
DESIGNED BY	DAS	DATE	11/28/2011
COST BY	DAS	DATE	11/28/2011
CHECKED BY	ZH	DATE	1/20/2012
PROJECT NO.	203939.74		

Rockland Ave Outfall, Hard Pipe Connection to 120" SD - Opinion of Probable Cost

Assumptions: Unit costs provided for this estimate were based on averaged MaineDOT unit bid prices from recent projects bid and constructed in Portland, Maine. The ENR Construction Cost Index for this estimate is 9176 as of January 2012.

Hard Pipe Connection of 60" Rockland Ave SD to 120" West Side Interceptor SD	Quantity	Unit	Unit Cost	Price	Total	Notes
Mobilization & Administration	1	LS	5% of Cost	$ 9,700.00		*Assume 5% of total construction cost*
Remove & Dispose of Existing Outfall End	1	LS	$ 1,000.00	$ 1,000.00		*Remove aluminum bar rack, flared end & rip rap*
8' Dia Manhole	1	EA	$ 12,000.00	$ 12,000.00		
6' x 12' Vault	1	EA	$ 20,000.00	$ 20,000.00		
Connection and Riser on 120" SD	1	EA	$ 30,000.00	$ 30,000.00		*Includes structural modifications to 120" SD at connection Point*
60" RCP Storm Drain	162	LF	$ 500.00	$ 81,000.00		
3'x8' Box Culvert	31	LF	$ 600.00	$ 18,600.00		
Common Borrow	400	CY	$ 15.00	$ 6,000.00		*Fill over top of pipe*
Loam & Seed	1,400	SY	$ 10.00	$ 14,000.00		
Landscaping & Restoration	1	LS	$ 10,000.00	$ 10,000.00		*Plantings, detailed grading, trail work*
				Construction Cost:	***$ 202,300.00***	
				Engineering & Permitting (15%):	***$ 30,400.00***	
				Wetland & Habitat Compensation ILF:	***$ 10,600.00***	*Assumes wetland impacts will be considered cumulative to WSIS project, total direct wetland impacts 1,058 SF (IWWH Compensation)*
				Contingency (25%):	***$ 58,200.00***	
				Total Cost per System:	***$ 301,500.00***	

COMMITMENT & INTEGRITY
DRIVE RESULTS

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
Tel. 207-774-2112

CLIENT	City of Portland		
PROJECT	Capisic Pond Evaluation		
DESIGNED BY	DAS	DATE	11/28/2011
COST BY	DAS	DATE	11/28/2011
CHECKED BY	ZH	DATE	1/20/2012
PROJECT NO.	203939.74		

Rockland Ave Outfall, Hydrodynamic Separator with Channel Stabilization - Opinion of Probable Cost

Assumptions: Unit costs provided for this estimate were based on averaged MaineDOT unit bid prices from recent projects bid and constructed in Portland, Maine. The ENR Construction Cost Index for this estimate is 9176 as of January 2012.

Hydrodynamic Separator with Channel Lining	Quantity	Unit	Unit Cost	Price	Total	Notes
Mobilization & Administration	1	LS	5% of Cost	$ 5,500.00		*Assume 5% of total construction cost*
Channel Armoring	300	CY	$ 100.00	$ 30,000.00		*Rounded, Selectively Placed Boulders, 2-4' Dia*
Hydrodynamic Separator	1	EA	$ 50,000.00	$ 50,000.00		*Includes excavation, bedding & backfill; assumes Vortechs 16,000*
Modify Existing Manhole	1	EA	$ 5,000.00	$ 5,000.00		*Coring & Adding Internal Weir*
5' Dia Manhole	2	EA	$ 4,500.00	$ 9,000.00		
24" Storm Drain	20	LF	$ 125.00	$ 2,500.00		
Loam & Seed	800	SY	$ 10.00	$ 8,000.00		
Landscaping & Restoration	1	LS	$ 5,000.00	$ 5,000.00		*Plantings, detailed grading, trail work around separator & channel*
				Construction Cost:	***$ 115,000.00***	
				Engineering & Permitting (15%):	***$ 17,300.00***	
				Wetland & Habitat Compensation ILF:	***$ -***	*Assumes channel lining will be considered maintenance, no impact fee*
				Contingency (25%):	***$ 33,100.00***	
				Total Cost per System:	***$ 165,400.00***	

COMMITMENT & INTEGRITY
DRIVE RESULTS

WOODARD &CURRAN

41 Hutchins Drive
Portland, Maine 04102
Tel. 207-774-2112

CLIENT	City of Portland		
PROJECT	Capisic Pond Evaluation		
DESIGNED BY	DAS	DATE	11/28/2011
COST BY	DAS	DATE	11/28/2011
CHECKED BY	ZH	DATE	1/20/2012
PROJECT NO.	203939.74		

Rockland Ave Outfall, Stormwater Management System - Opinion of Probable Cost

Assumptions: Unit costs provided for this estimate were based on averaged MaineDOT unit bid prices from recent projects bid and constructed in Portland, Maine. The ENR Construction Cost Index for this estimate is 9176 as of January 2012.

Sediment Collection Pond at Outfall							Notes
	Quantity	*Unit*	*Unit Cost*		*Price*	*Total*	
Mobilization & Administration	1	LS	5% of Cost	$	6,900.00		*Assume 5% of total construction cost*
Spillway and Channel Armoring	500	CY	$ 100.00	$	50,000.00		*Rounded, Selectively Placed Boulders, 2-4' Dia*
Common Excavation	800	CY	$ 15.00	$	12,000.00		
Grading & Embankments	1,000	CY	$ 15.00	$	15,000.00		
Loam & Seed	3,600	SY	$ 10.00	$	36,000.00		
Landscaping & Restoration	1	LS	$ 25,000.00	$	25,000.00		*Plantings, detailed grading, trail work; including pond and pond perimeter*
				Construction Cost:	***$***	***144,900.00***	
				Engineering & Permitting (15%):	***$***	***21,800.00***	
				Wetland & Habitat Compensation ILF:	***$***	***67,500.00***	*Assumes wetland impacts will be considered cumulative to WSIS project, total direct wetland impacts 7,345 SF (IWWH Compensation)*
				Contingency (25%):	***$***	***41,700.00***	
				Total Cost per System:	***$***	***275,900.00***	

COMMITMENT & INTEGRITY
DRIVE RESULTS

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
Tel. 207-774-2112

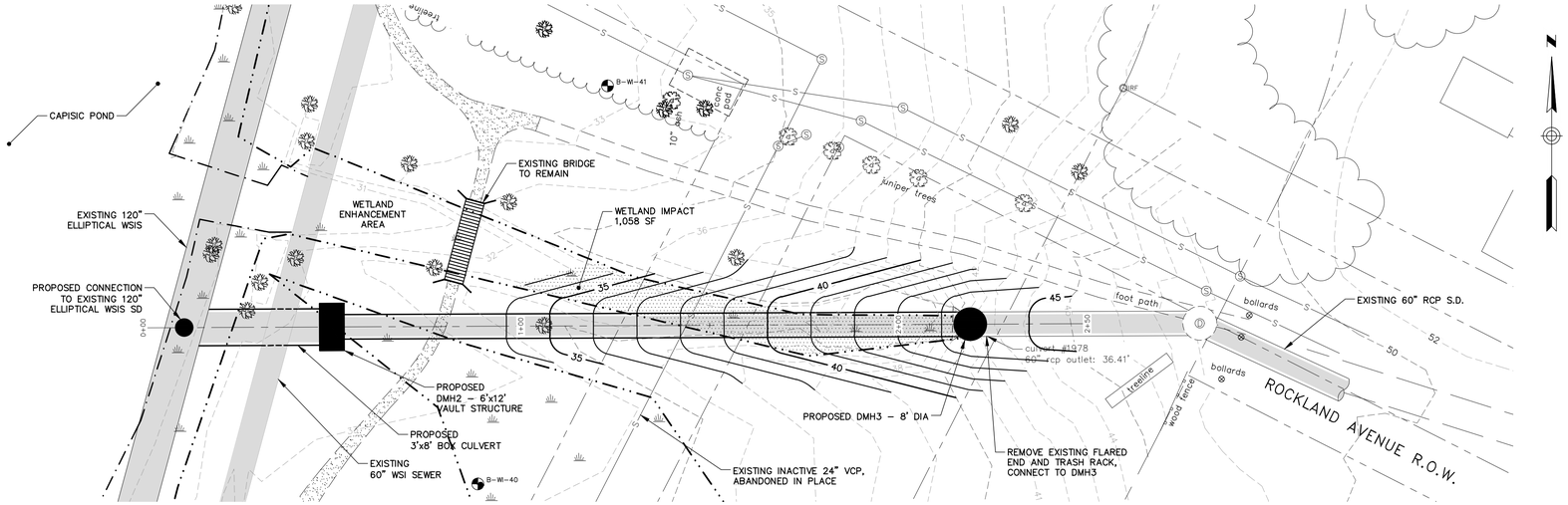
CLIENT	City of Portland		
PROJECT	Capisic Pond Evaluation		
DESIGNED BY	DAS	DATE	11/28/2011
COST BY	AEA	DATE	1/20/2012
CHECKED BY	ZH	DATE	
PROJECT NO.	203939.74		

Rockland Ave Outfall, Channel Stabilization - Opinion of Probable Cost

Assumptions: Unit costs provided for this estimate were based on averaged MaineDOT unit bid prices from recent projects bid and constructed in Portland, Maine. The ENR Construction Cost Index for this estimate is 9176 as of January 2012.

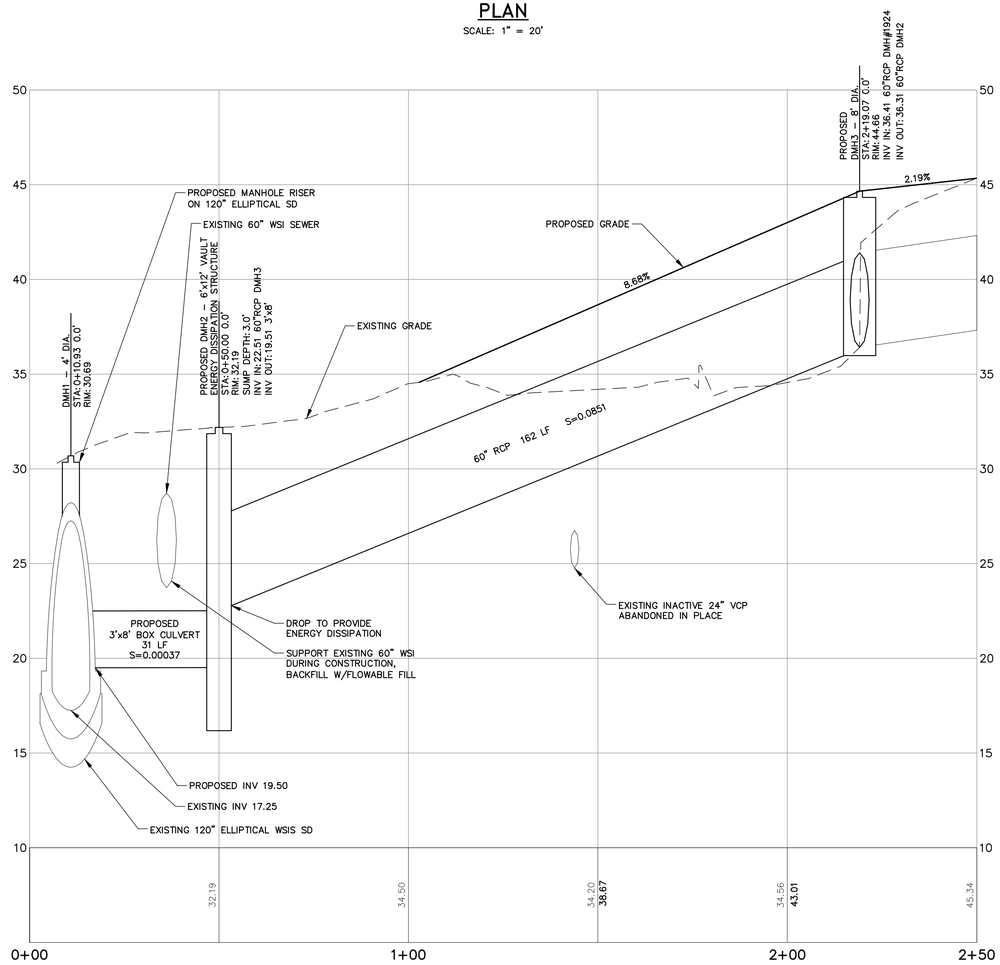
Channel Lining	Quantity	Unit	Unit Cost	Price	Total	Notes
Mobilization & Administration	1	LS	5% of Cost	$ 2,000.00		*Assume 5% of total construction cost*
Channel Armoring	300	CY	$ 100.00	$ 30,000.00		*Rounded, Selectively Placed Boulders, 2-4' Dia*
Loam & Seed	415	SY	$ 10.00	$ 4,150.00		*Assumes 10 feet of disturbance on either side of armoring*
Landscaping & Restoration	1	LS	$ 5,000.00	$ 5,000.00		*Plantings, detailed grading, trail work around channel*
				Construction Cost:	***$ 41,150.00***	
				Engineering & Permitting (15%):	***$ 6,200.00***	
				Wetland & Habitat Compensation ILF:	***$ -***	*Assumes channel lining will be considered maintenance, no impact fee*
				Contingency (25%):	***$ 11,900.00***	
				Total Cost per System:	***$ 59,250.00***	

22x34 SHEET
1:1



PLAN

SCALE: 1" = 20'



PROFILE STA. 0+00 TO STA. 2+50

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'

NOTE:

RESTORE LANDSCAPING AND PLANTINGS DISTURBED BY CONSTRUCTION.

NOTE: PLAN DEPICTS A SCHEMATIC ALTERNATIVE TO THE ROCKLAND AVE OUTFALL. ADDITIONAL ENGINEERING AND EVALUATION IS REQUIRED PRIOR TO IMPLEMENTING ANY OF THE PRESENTED ALTERNATIVES. NOT FOR CONSTRUCTION.

20' 0 20' 40'

BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

THIS DOCUMENT IS THE PROPERTY OF WOODARD & CURRAN INC. AND ITS CLIENT. THIS DOCUMENT OR ANY PART THEREOF MAY NOT BE REPRODUCED OR DISTRIBUTED WITHOUT WRITTEN PERMISSION.

REV	DESCRIPTION	DATE

DESIGNED BY: DAS
DRAWN BY: JBC
CHECKED BY: DAS
203939.74-U00A.DWG

CONNECTION TO 120" SD PLAN AND PROFILE

CITY OF PORTLAND
PORTLAND, MAINE

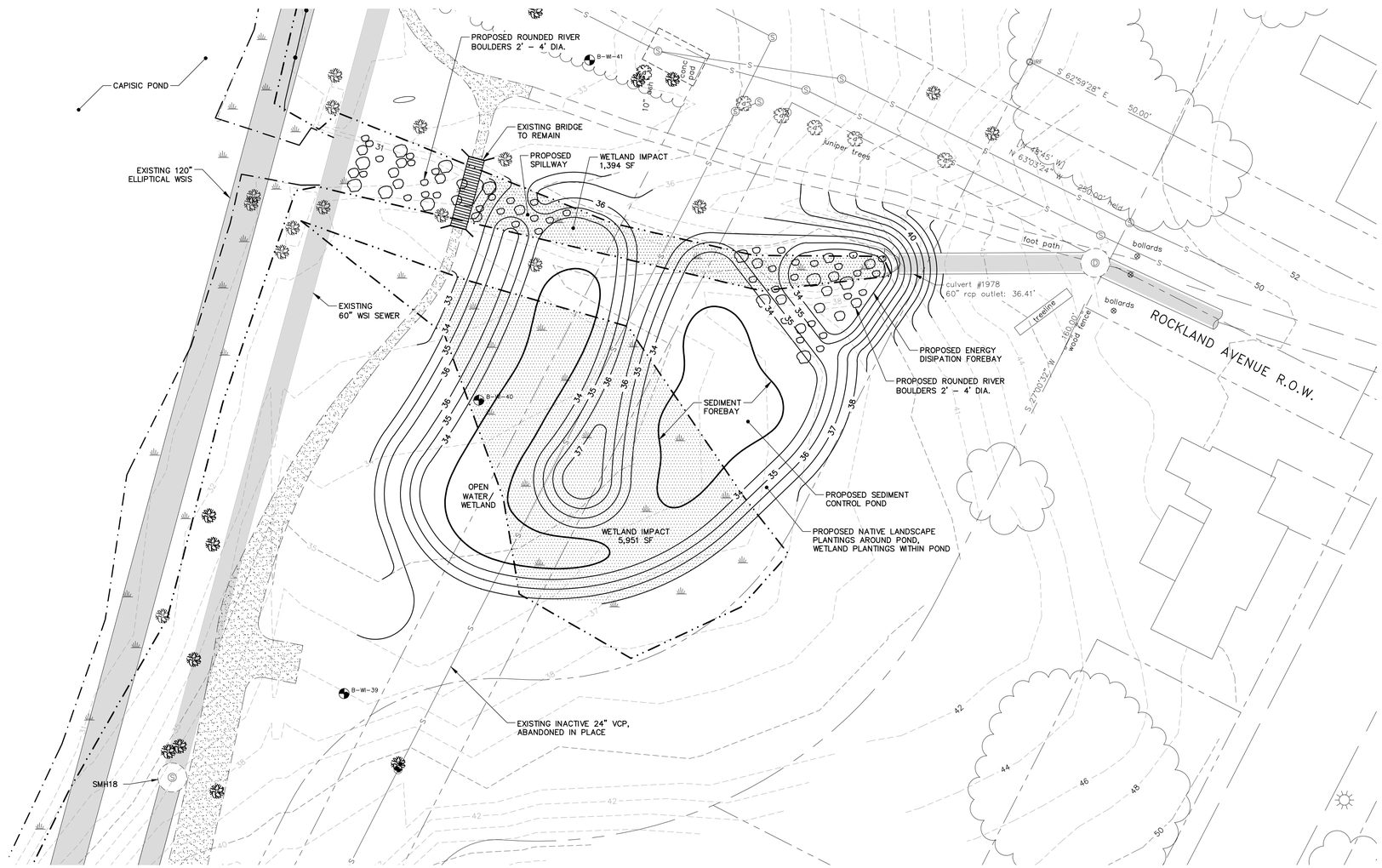
CAPISIC POND
SUSTAINABILITY ANALYSIS

JOB NO.: 203939.74
DATE: JANUARY 2012
SCALE: AS NOTED
SHEET: 1 OF 4

Figure 1

\\Portland\Projects\203939 City of Portland-General Engineering Services\wip\74 Capisic Pond Sustainability Plan\Drawings\203939.74-U00A.dwg, Feb 22, 2012 – 11:28am

22x34 SHEET
1:1



NOTE: PLAN DEPICTS A SCHEMATIC ALTERNATIVE TO THE ROCKLAND AVE OUTFALL. ADDITIONAL ENGINEERING AND EVALUATION IS REQUIRED PRIOR TO IMPLEMENTING ANY OF THE PRESENTED ALTERNATIVES. NOT FOR CONSTRUCTION.

20' 0 20' 40'

BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

THIS DOCUMENT IS THE PROPERTY OF WOODARD & CURRAN INC. AND ITS CLIENT. THIS DOCUMENT MAY NOT BE REPRODUCED OR TRANSMITTED, IN WHOLE OR IN PART, WITHOUT THE WRITTEN PERMISSION OF WOODARD & CURRAN INC.

REV	DESCRIPTION	DATE

DESIGNED BY: DAS
DRAWN BY: JBC
CHECKED BY: DAS
203939.74-U00A.DWG

STORMWATER MANAGEMENT SYSTEM

CITY OF PORTLAND
PORTLAND, MAINE

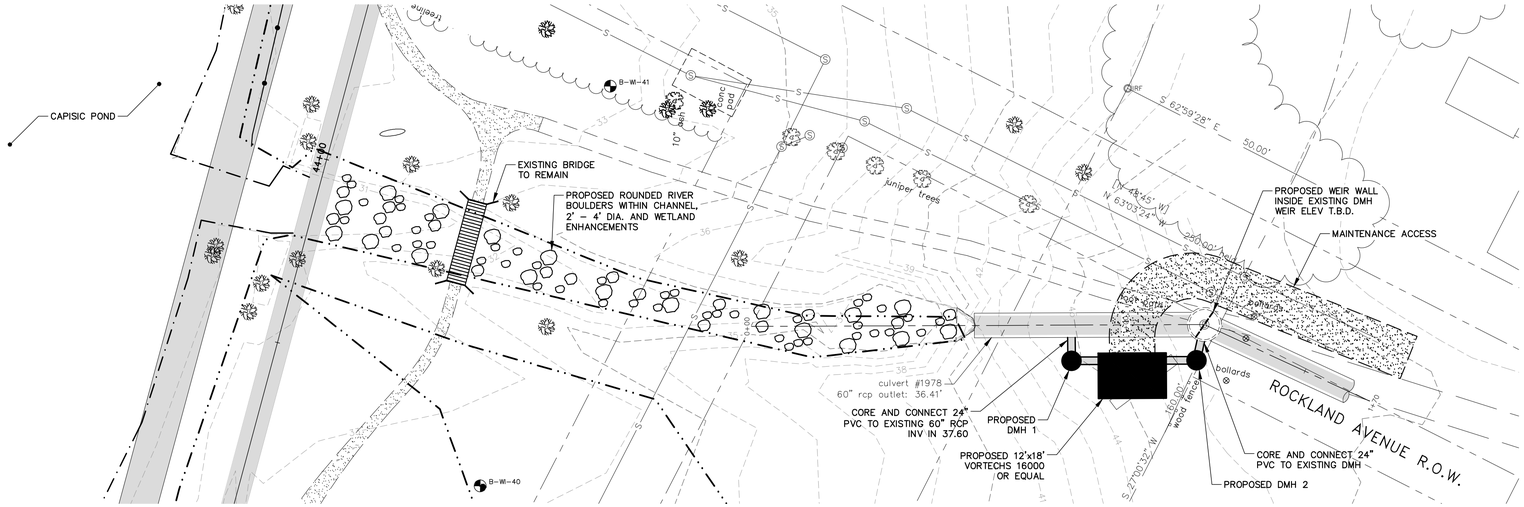
CAPISIC POND
SUSTAINABILITY ANALYSIS

JOB NO.: 203939.74
DATE: JANUARY 2012
SCALE: 1" = 20'
SHEET: 2 OF 4

Figure 2

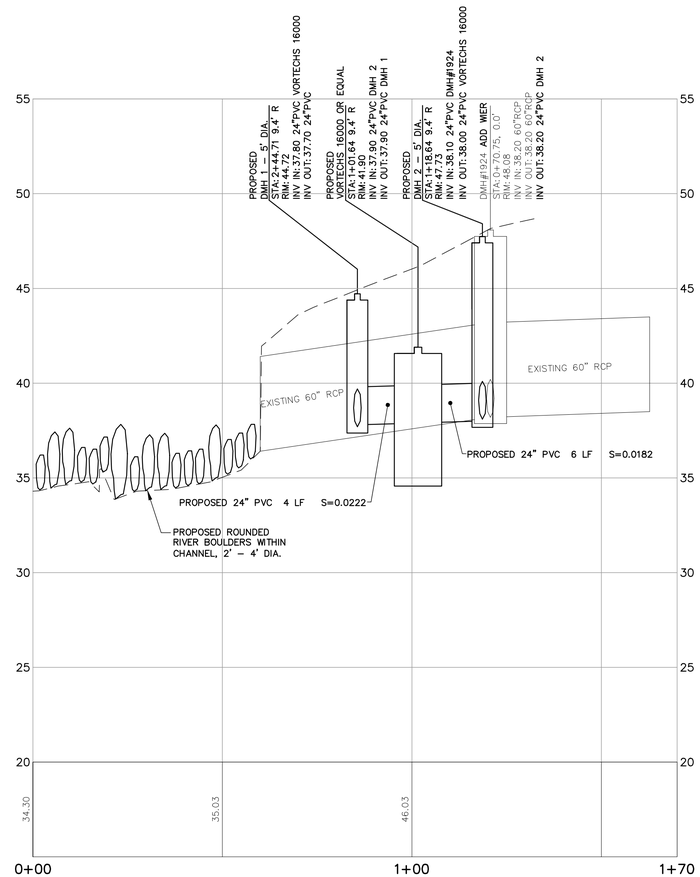
\\Portland\Projects\203939 City of Portland-General Engineering Services\wip\74 Capisic Pond Sustainability Plan\Drawings\203939.74-U00A.dwg, Feb 22, 2012 – 11:28am

22x34 SHEET
1:1



PLAN

SCALE: 1" = 20'



PROFILE STA. 0+00 TO STA. 1+70

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'

NOTE:

RESTORE LANDSCAPING AND PLANTINGS DISTURBED BY CONSTRUCTION.

NOTE: PLAN DEPICTS A SCHEMATIC ALTERNATIVE TO THE ROCKLAND AVE OUTFALL. ADDITIONAL ENGINEERING AND EVALUATION IS REQUIRED PRIOR TO IMPLEMENTING ANY OF THE PRESENTED ALTERNATIVES. NOT FOR CONSTRUCTION.

20' 0 20' 40'

BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

THIS DOCUMENT IS THE PROPERTY OF WOODARD & CURRAN INC. AND ITS CLIENT. THIS DOCUMENT OR ANY PART THEREOF MAY NOT BE REPRODUCED OR DISTRIBUTED WITHOUT WRITTEN PERMISSION.

REV	DESCRIPTION	DATE

DESIGNED BY: DAS
CHECKED BY: DAS
DRAWN BY: JBC
203939.74-U00A.DWG

PLAN AND PROFILE HYDRODYNAMIC SEPARATOR

CITY OF PORTLAND
PORTLAND, MAINE

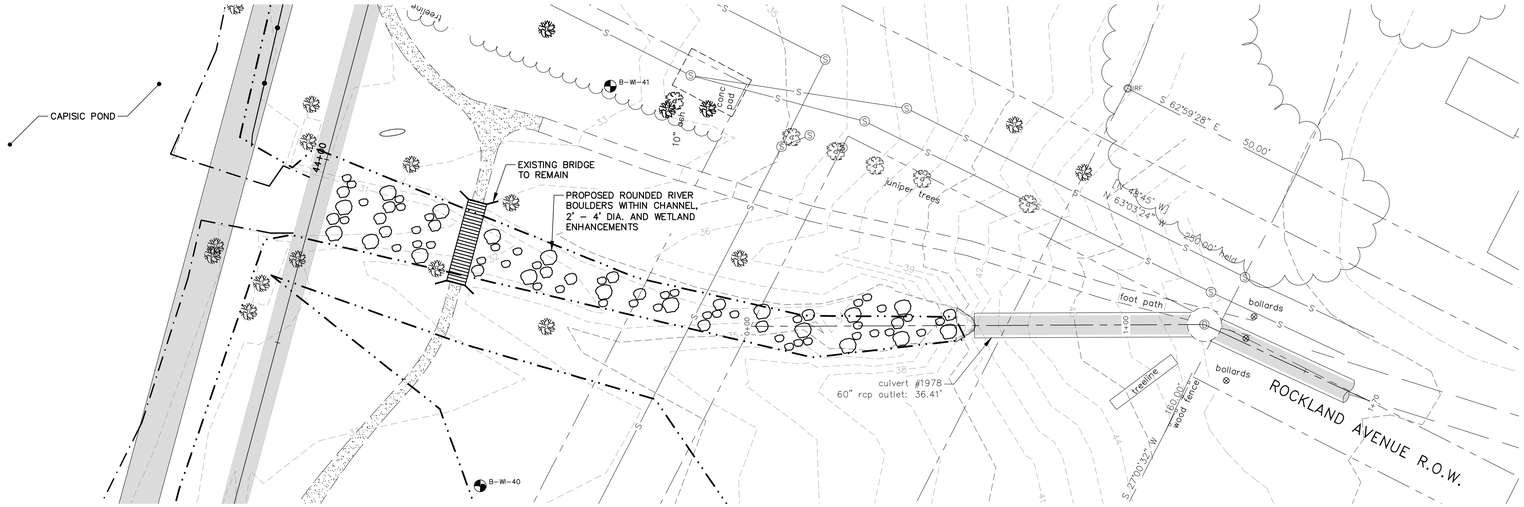
CAPISIC POND
SUSTAINABILITY ANALYSIS

JOB NO.: 203939.74
DATE: JANUARY 2012
SCALE: 1" = 20'
SHEET: 3 OF 4

Figure 3

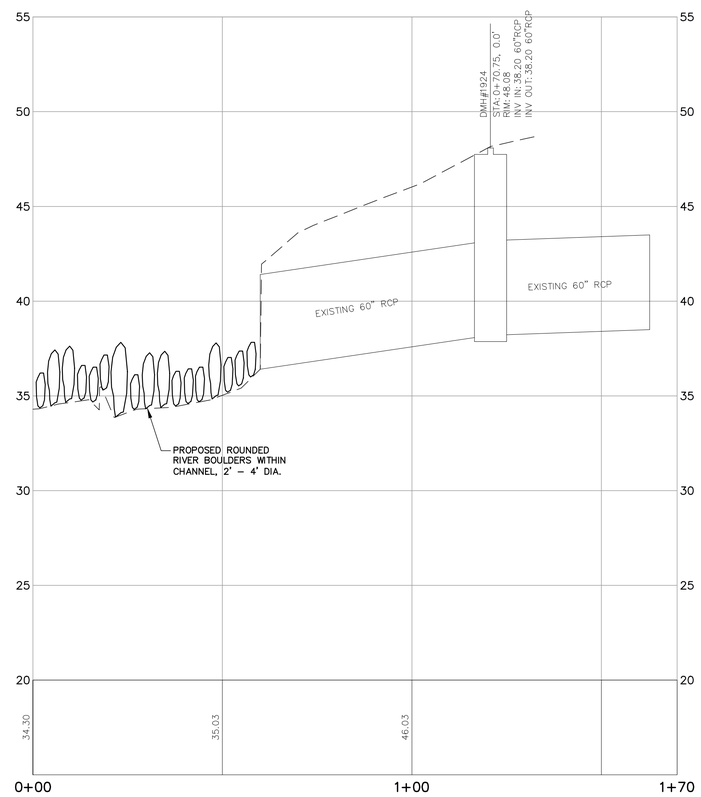
\\Portland\Projects\203939 City of Portland-General Engineering Services\wip\74 Capisic Pond Sustainability Plan\Drawings\203939.74-U00A.dwg, Feb 22, 2012 – 11:28am

22x34 SHEET
1:1



PLAN

SCALE: 1" = 20'



PROFILE STA. 0+00 TO STA. 1+70

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'

NOTE:

RESTORE LANDSCAPING AND PLANTINGS DISTURBED BY CONSTRUCTION.

NOTE: PLAN DEPICTS A SCHEMATIC ALTERNATIVE TO THE ROCKLAND AVE OUTFALL. ADDITIONAL ENGINEERING AND EVALUATION IS REQUIRED PRIOR TO IMPLEMENTING ANY OF THE PRESENTED ALTERNATIVES. NOT FOR CONSTRUCTION.

20' 0 20' 40'

BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

WOODARD & CURRAN

COMMITMENT & INTEGRITY DRIVE RESULTS

THIS DOCUMENT IS THE PROPERTY OF WOODARD & CURRAN INC. AND ITS CLIENT. THIS DOCUMENT OR ANY PART THEREOF MAY NOT BE REPRODUCED OR DISTRIBUTED WITHOUT WRITTEN PERMISSION.

REV.	DESCRIPTION	DATE

DESIGNED BY: DAS
DRAWN BY: JBC
CHECKED BY: DAS
203939.74-U00A.DWG

PLAN AND PROFILE CHANNEL STABILIZATION

CITY OF PORTLAND
PORTLAND, MAINE

CAPISIC POND
SUSTAINABILITY ANALYSIS

JOB NO.: 203939.74
DATE: JANUARY 2012
SCALE: 1" = 20'
SHEET: 4 OF 4

Figure 4

\\Portland\Projects\203939 City of Portland-General Engineering Services\wip\74 Capisic Pond Sustainability Plan\Drawings\203939.74-U00A.dwg, Feb 22, 2012 11:29am

APPENDIX D: PUBLIC STAKEHOLDER MEETING AGENDA AND NOTES – FEBRUARY 2, 2012

MEETING AGENDA

This Meeting:	Exploring the Needs for Capisic Pond & Park: Preparing for a Sustainable Management Plan
Date/Time:	7-9PM – February 1, 2012
Location:	Deering High School

Meeting Objectives

Understand project scope and objectives

Understand previous pond and park recommendations

Understand findings from Phase I study

Understand pros and cons of various management actions

Determine preferences for various management actions

Agenda

- Introductions/Greeting/Agenda Overview (7-7:15PM)
- Phase I Summary Presentation (7:15-7:45PM)
- Questions and Answers on Phase I Results (7:45-8PM)
- Facilitated Discussion and Preferences for Management Actions (8-8:40PM)
- Items for Future Phases of Study/Planning (8:40-8:50PM)
- Next Steps

Exploring the Needs for Capisic Pond & Park

PREPARING FOR A SUSTAINABLE MANAGEMENT PLAN

WOODARD & CURRAN

RESURGAM · CITY OF PORTLAND, MAINE

SUSTAINABLE PORTLAND · MAINE ·

Introductions

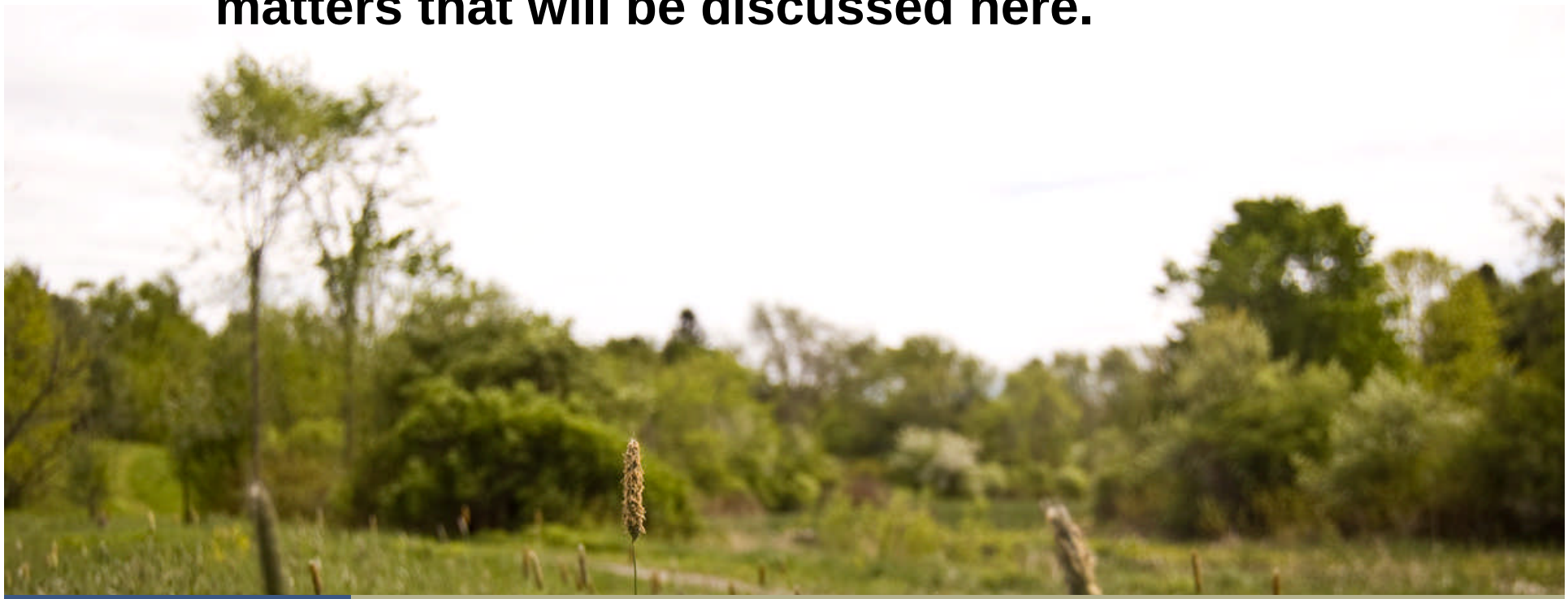
Ed Suslovic, City Council
Mike Bobinsky – Director of Public Services, Portland

Zach Henderson, Woodard & Curran
Barry Sheff, Woodard & Curran

Meeting Goals

To provide input and strategic direction to City staff and City Council on preferred actions for management of Capisic Pond & Park.

City officials have made no final decisions on any matters that will be discussed here.

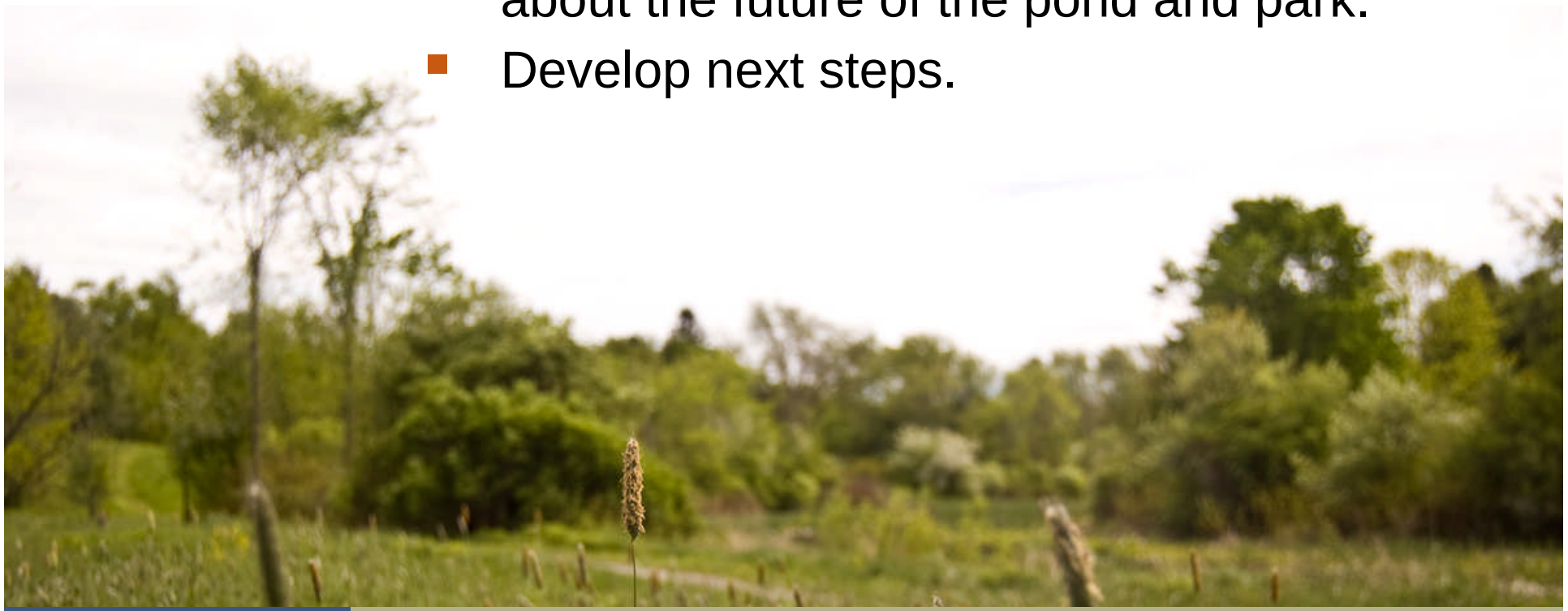


Project – Phase I Goals

- Review existing plans, studies, and prior visioning work.
- Summarize current condition and opportunities for further exploration.
- Assess Rockland Avenue stormwater drainage outfall.

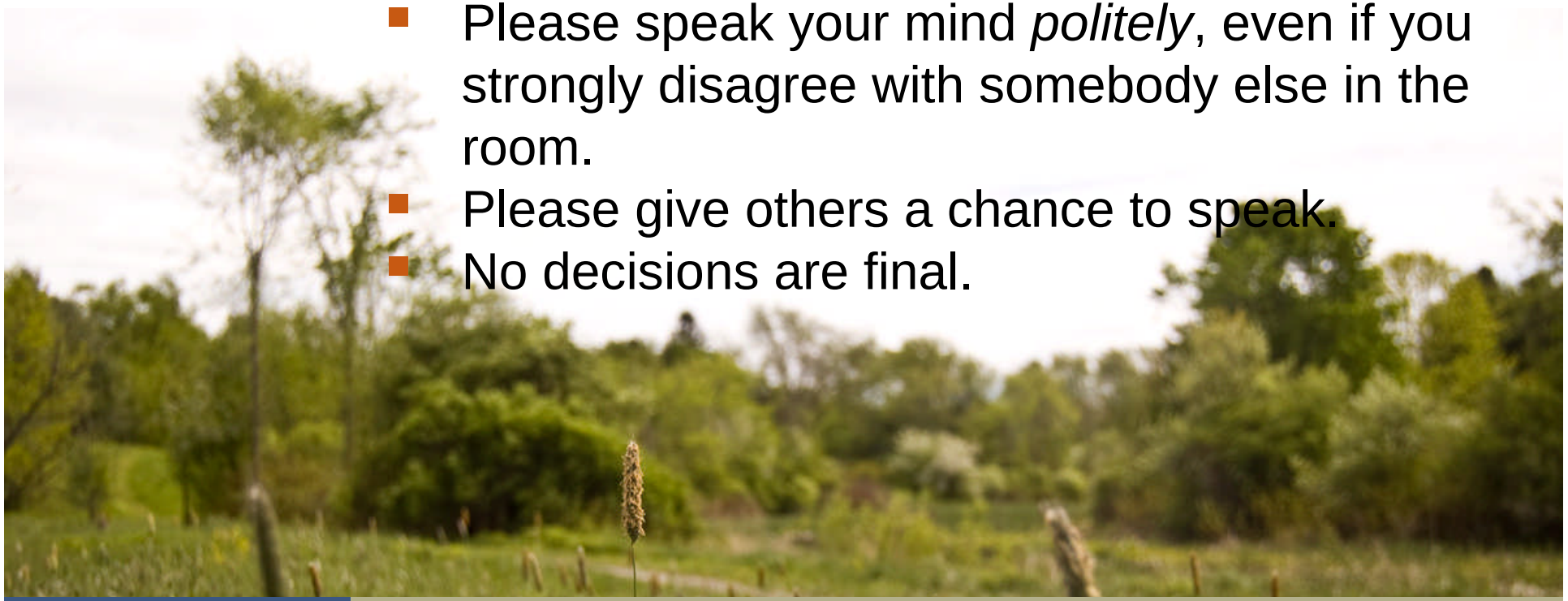
Project – Phase I Goals

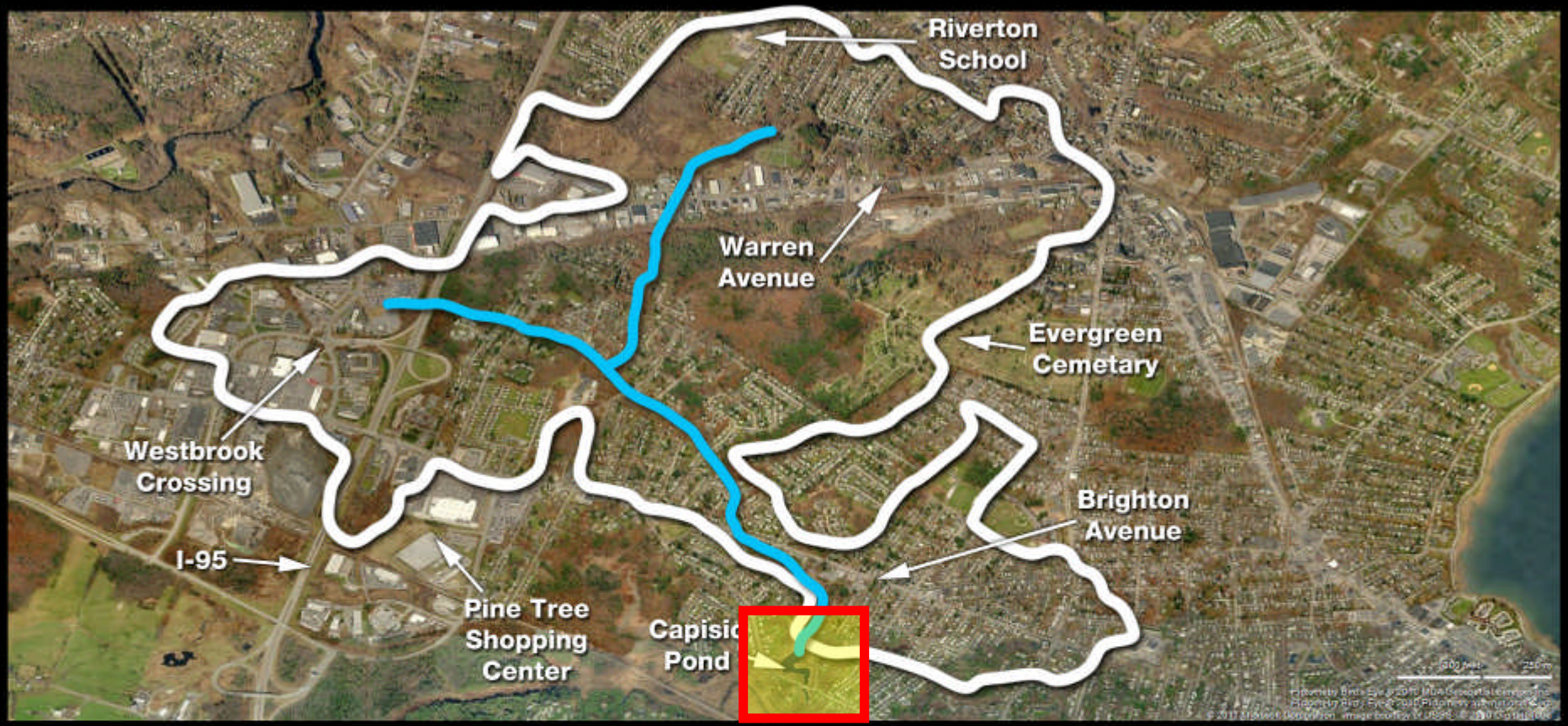
- Characterize pond sediments.
- Explore permitting constraints and opportunities.
- Workshop with residents and stakeholders about the future of the pond and park.
- Develop next steps.



Ground Rules

- We have identified specific opportunities to answer questions…please hold them.
- We want to hear everybody's opinion today.
- Please speak your mind, especially if you *disagree* with somebody else in the room.
- Please speak your mind *politely*, even if you strongly disagree with somebody else in the room.
- Please give others a chance to speak.
- No decisions are final.





Capisic Brook Watershed Boundary

Capisic Brook

Harvey St
Halet St
Presnell St
Capisic St
Sandy Terrace
Little Rd
Starbird Rd
Capisic St
Capisic
Pond
Macy St
Machigonne St
Machigonne St
Hastings St
Colonial Rd
Colonial
Wolcott
Portland
Capisic St

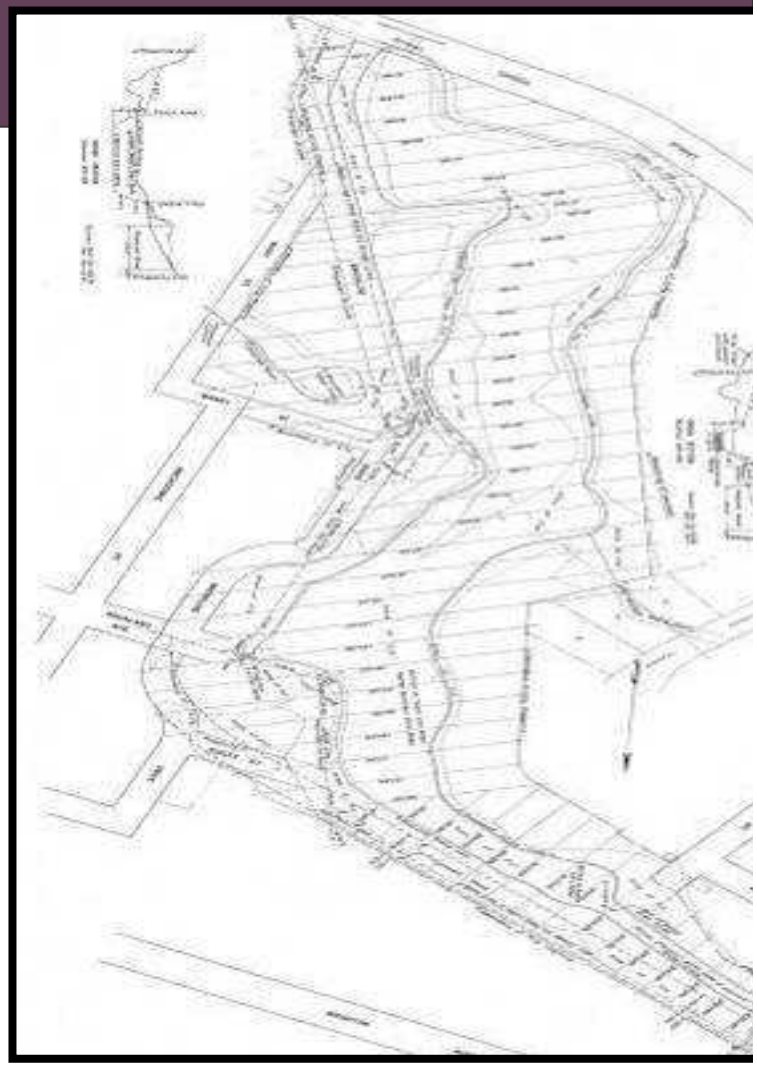
Capisic Pond History

- Portland's largest freshwater body created by a manmade impoundment
- Sawmill and gristmill at original Capisic Brook Falls established late 1600s
- Capisic Pond referenced in 1886 report by Maine Board of Health
- Areas adjacent to Pond considered for park purposes in 1930-50's
- Pond dredging and channel straightening in late 1940s
- Current dam constructed in mid-1950's as part of Westside Interceptor
- Dam overflow weir modifications made in 1996 and 2001 to reduce upstream flooding

Capisic Pond 1954

Previous Studies and Plans

- 1987 - Portland Shoreway Access Plan
- 1989 - Inventory and Management of Natural and Cultural Resources of Capisic Pond
- 1996 - Capisic Brook Greenbelt /Stormwater Abatement Study
- 1996 - Capisic Pond Sediment Sampling and Analysis (conducted by FOCB)
- 1999 - Capisic Brook Watershed Flood Control Study Reevaluation
- 2001 - Capisic Brook Greenway Master Plan
- 2009 - Restoration Plan, Westside Interceptor Sewer Project
- 2011 - Capisic Brook Watershed Management Plan (Final Draft)
- Maine DEP Water Quality Monitoring and Urban Streams Report - Ongoing



Capisic Pond Improvement Plan - 1949

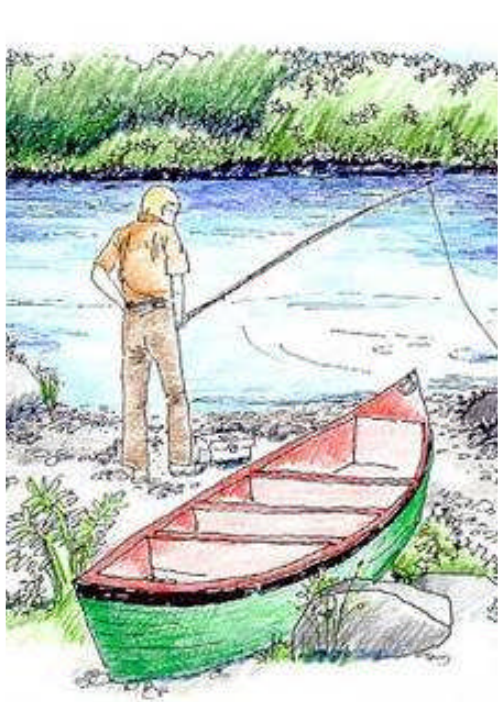
Previous Recommendations

- Eliminate Combined Sewer Overflows into Capisic Pond
- Implement structural improvements
  - Capisic Pond Dam weir widening
  - 4' x 8' box culvert at Capisic Street
- Increase native plant diversity, reduce invasive species, and improve the existing wildlife habitat
- Implement watershed pollution prevention strategies
  - Enhanced outreach and education to the public, watershed water quality monitoring, and policy and planning initiatives

Capisic Park Habitat Restoration - 2010

- Ongoing or Not Yet Completed
- Complete or Largely Complete

Previous Recommendations



- Enhance the present uses of the park and to create new opportunities for public access
- Develop Education Stations within the Park
- Implement an effective street sweeping program
- Enhance connectivity between Capisic Pond and greater Portland trail network
- Modify and dredge Capisic Pond to create an environment suitable for fish and other wildlife

- Ongoing or Not Yet Completed

- Complete or Largely Complete

Ongoing Recommendations

- Combined Sewer Overflow Abatement
- Stormwater Management
- **Open Water Habitat Maintenance**
- **Rockland Avenue Outfall**
- Safe and Stable Public Access
- **Education Stations**

Greener Neighborhoods
Cleaner Streams

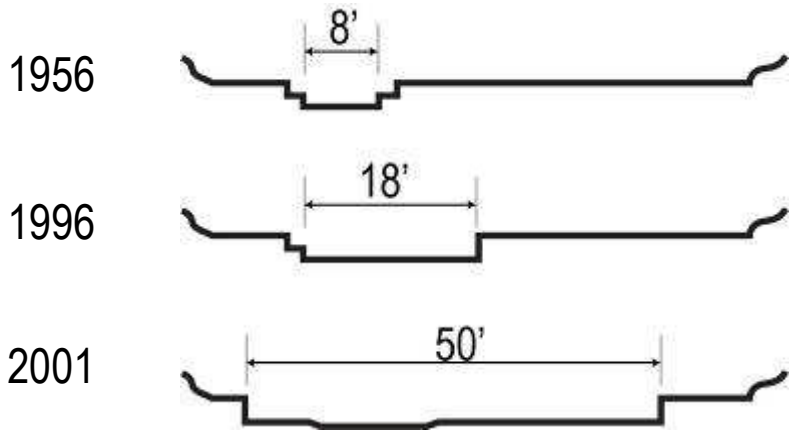
Informing Future Actions

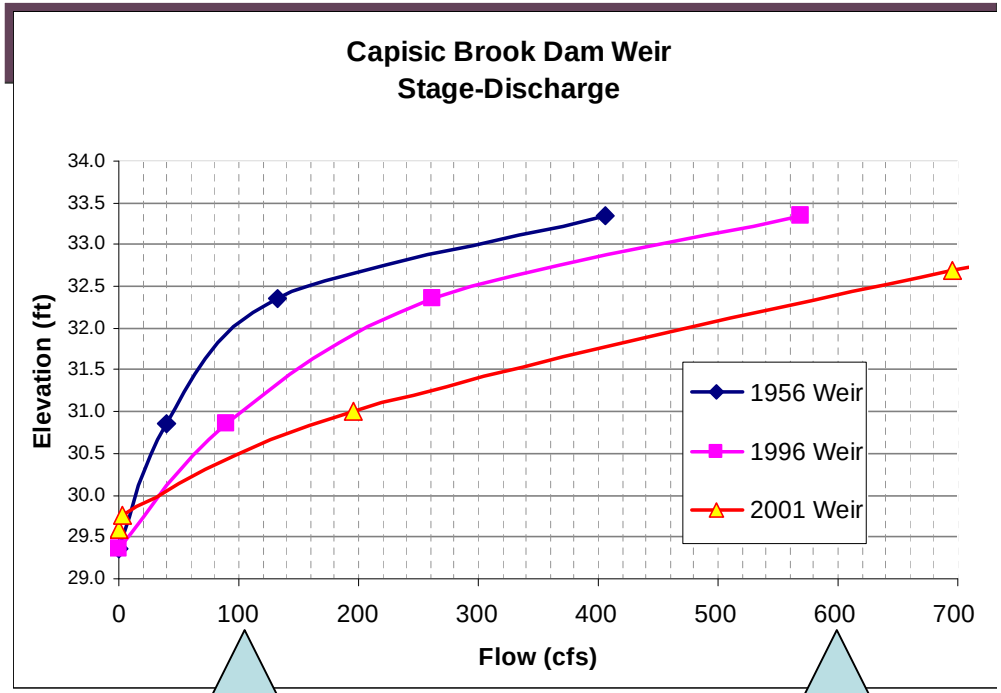
- **Pond Sediment Analysis**
  - Identify potential contamination in pond sediments for reuse or removal
  - Sampling conducted during drawdown in four locations
  - Samples analyzed for Pesticides, PCBs, Petroleum, Metals, Dioxins, Grain Size

- Results: No constituent exceeds state guidance for beneficial reuse from sample locations.
- Remaining Questions: How and where would this material be used? Who would handle it?

Informing Future Actions

- **Changes to Pond Hydrology**
  - Evaluated dam weir modifications to determine influence on pond water levels





Typical Monthly Storm Event Flow

1998 Flood Event

Informing Future Actions

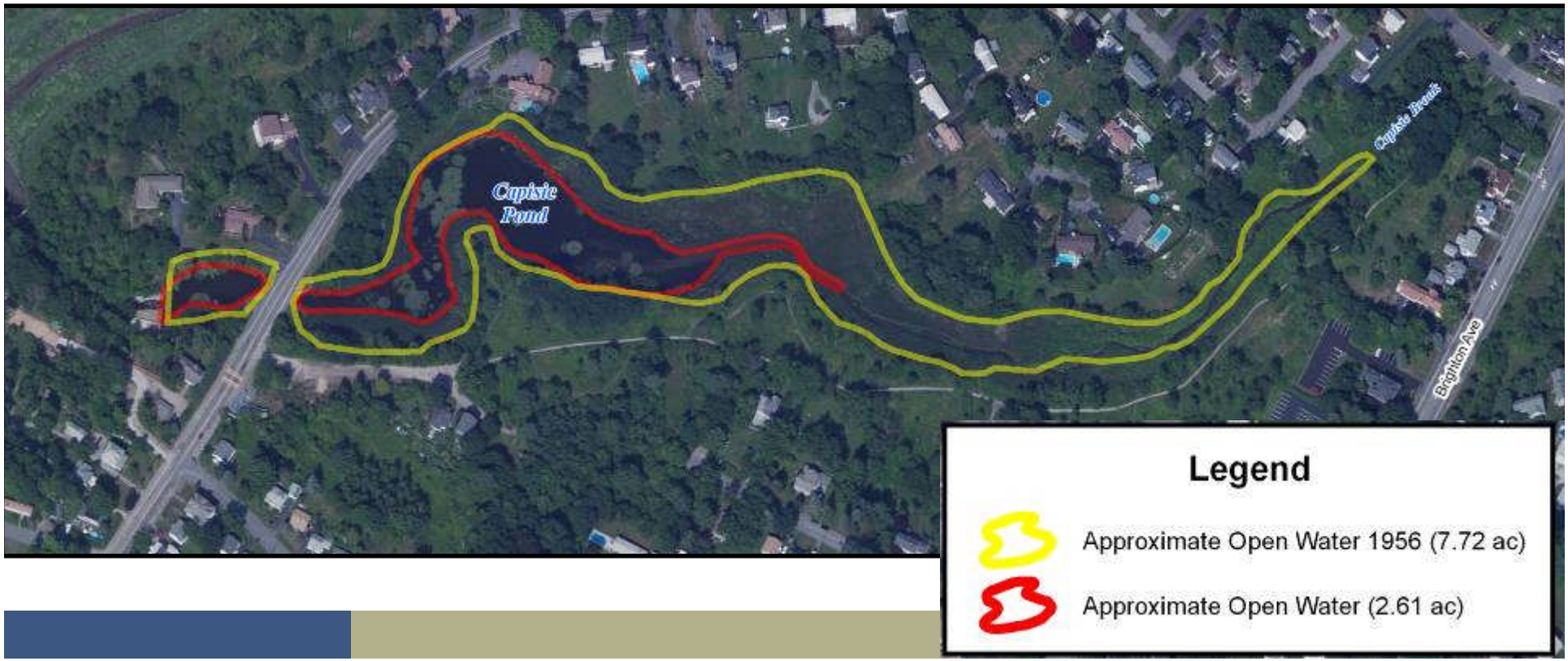
- **Rockland Avenue Stormwater Outfall**
  - Rockland outfall is the discharge point for 160 acres
  - The “drainage area” includes portions of Brighton Ave., Woodford St., Columbia St. up to Ludlow St.
  - Evaluated cost-benefit of several options to address outfall

Informing Future Actions

- **Rockland Avenue Stormwater Outfall**
  - Evaluated options include:
    - Stabilized outlet
    - Stabilized outlet with trash collection device
    - Stabilized outlet with water quality wetland
    - Hard pipe to drainage system

Informing Future Actions

- **Capisic Pond Open Water**
  - Historic (1960) and today

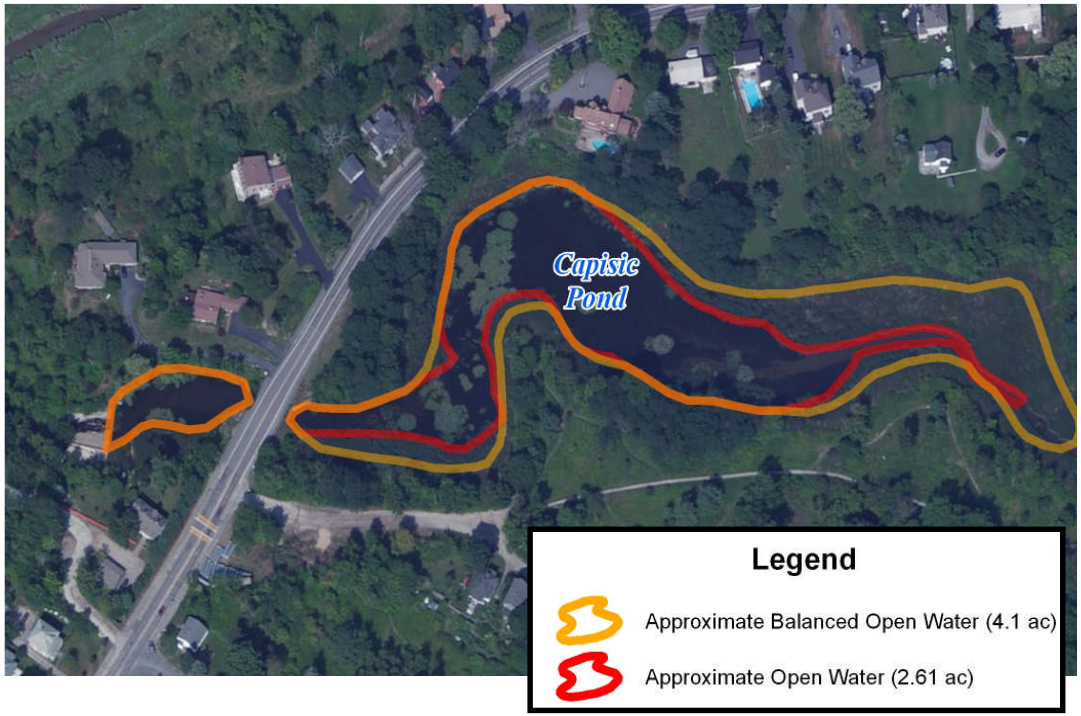


Informing Future Actions

- **Inland Waterfowl and Wading Bird Habitat**
  - Capisic Pond and Park designated as IWWH by ME Dept. of Inland Fisheries and Wildlife
  - IWWH is a “significant wildlife habitat” under state law requiring special management
  - Capisic Pond is ranked as “moderate value” habitat with score of 10
  - Low value habitat score = 6-9

Informing Future Actions

- **Inland Waterfowl and Wading Bird Habitat**
  - Capisic Pond has low wetland diversity, Score = 0
  - Open Water critical component of IWWH, 35-65% of area Score = 3 points
  - Capisic Pond current open water approximately 39% of area
  - Maximum beneficial open water would be 4 acres versus current 2.6 acres, 6” to 3’ deep



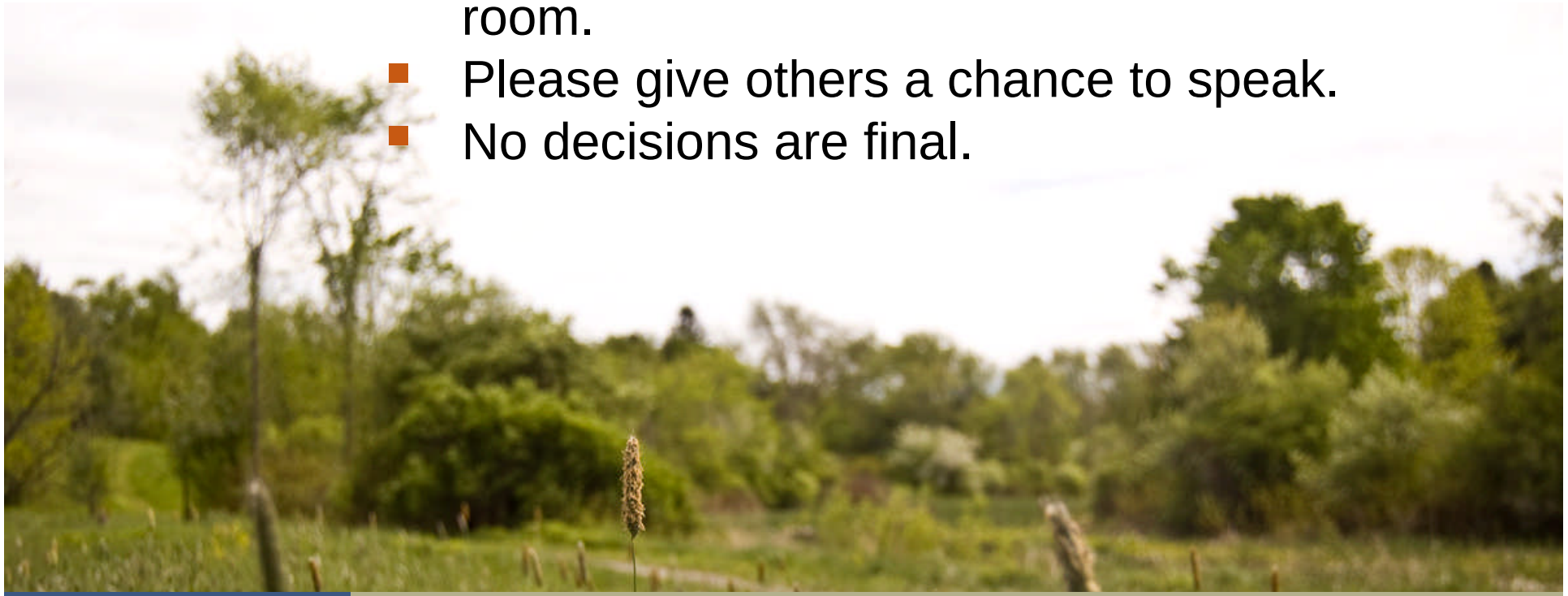
Key Question: Is the enhancement and maintenance of wetland diversity and open water appropriate for IWWH?

Your Input!!

- Open Water Habitat Maintenance
- Rockland Avenue Outfall
- Education Stations (as time allows)

Ground Rules

- We want to hear everybody's opinion today.
- Please speak your mind, especially if you *disagree* with somebody else in the room.
- Please speak your mind *politely*, even if you strongly disagree with somebody else in the room.
- Please give others a chance to speak.
- No decisions are final.



Open Water Question

Do Nothing

Pros

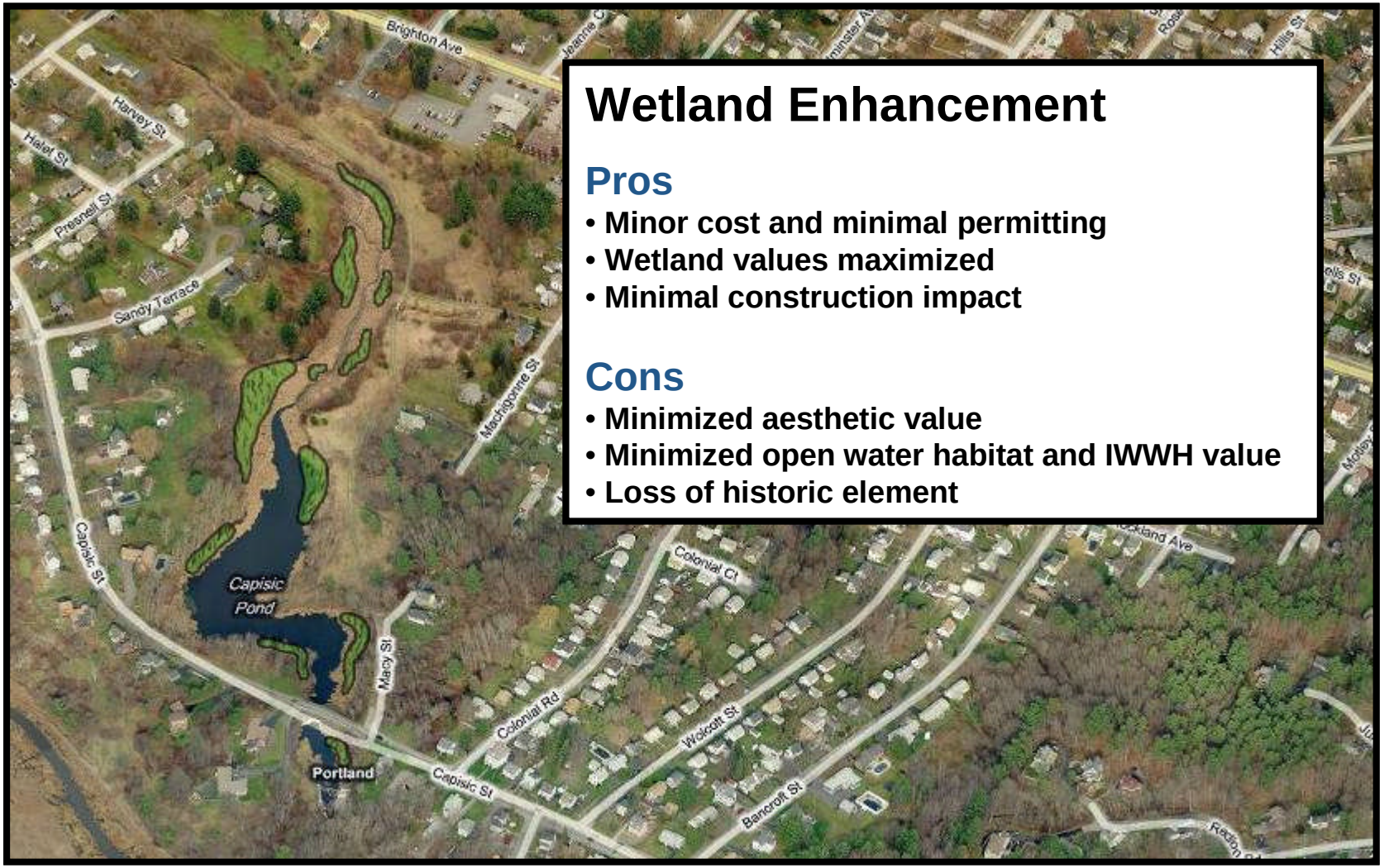
- No cost or permitting
- Pond area maintains some wetland values
- No construction impact

Cons

- Minimized aesthetic value
- Minimized IWWH habitat value
- Loss of historic element

Images are only conceptual.

Open Water Question



Wetland Enhancement

Pros

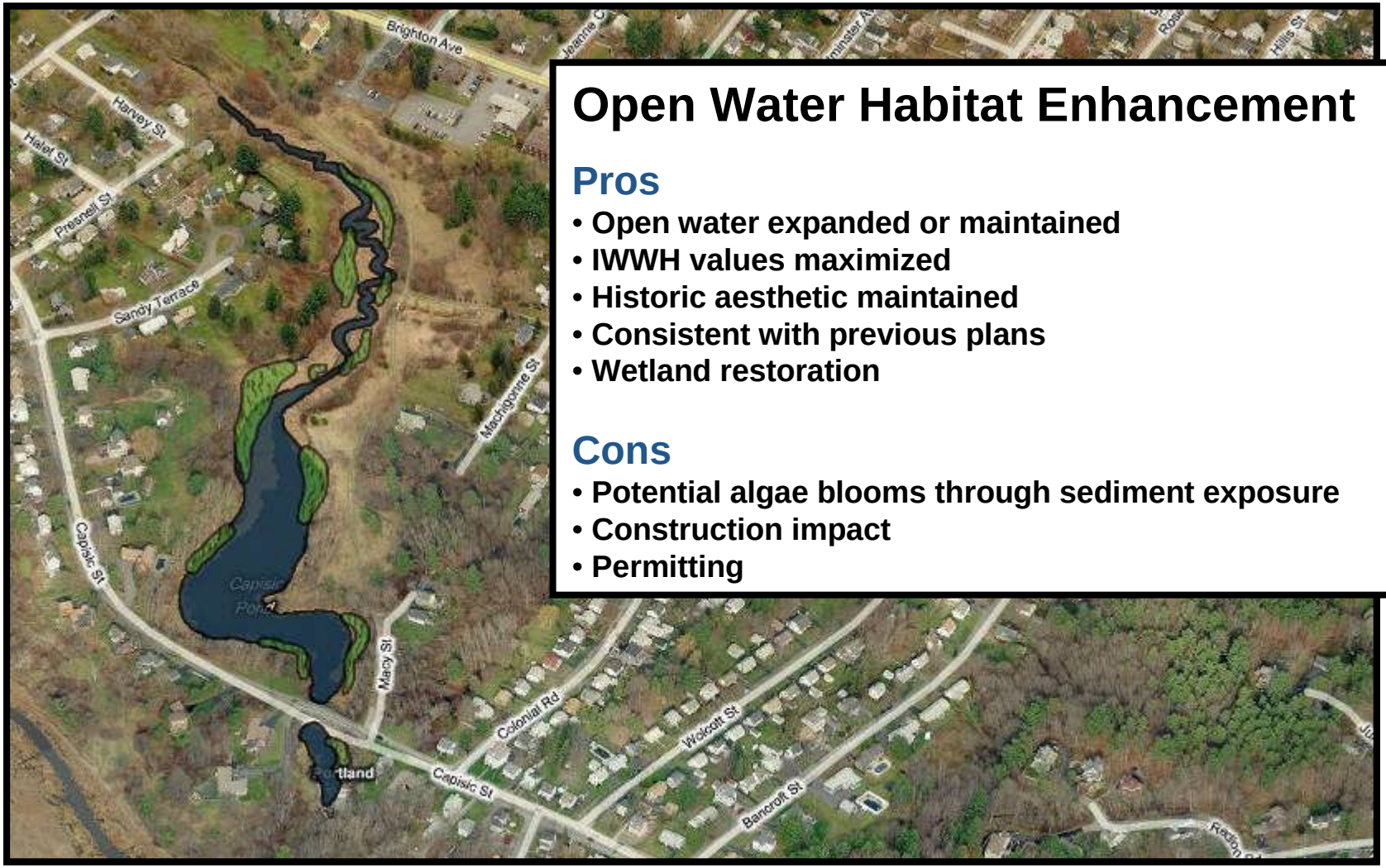
- Minor cost and minimal permitting
- Wetland values maximized
- Minimal construction impact

Cons

- Minimized aesthetic value
- Minimized open water habitat and IWWH value
- Loss of historic element

Images are only conceptual.

Open Water Question



Open Water Habitat Enhancement

Pros

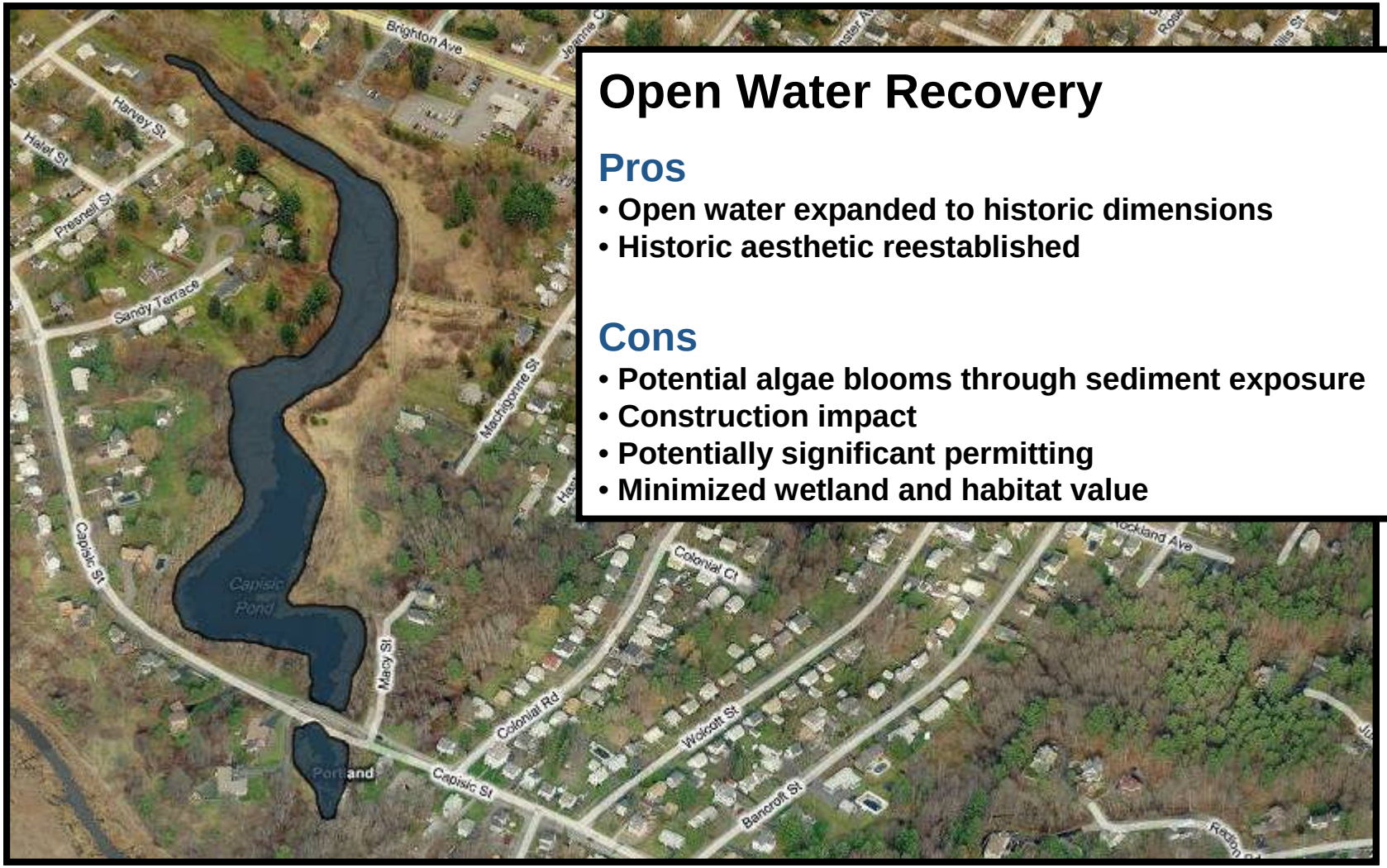
- Open water expanded or maintained
- IWWH values maximized
- Historic aesthetic maintained
- Consistent with previous plans
- Wetland restoration

Cons

- Potential algae blooms through sediment exposure
- Construction impact
- Permitting

Images are only conceptual.

Open Water Question



Open Water Recovery

Pros

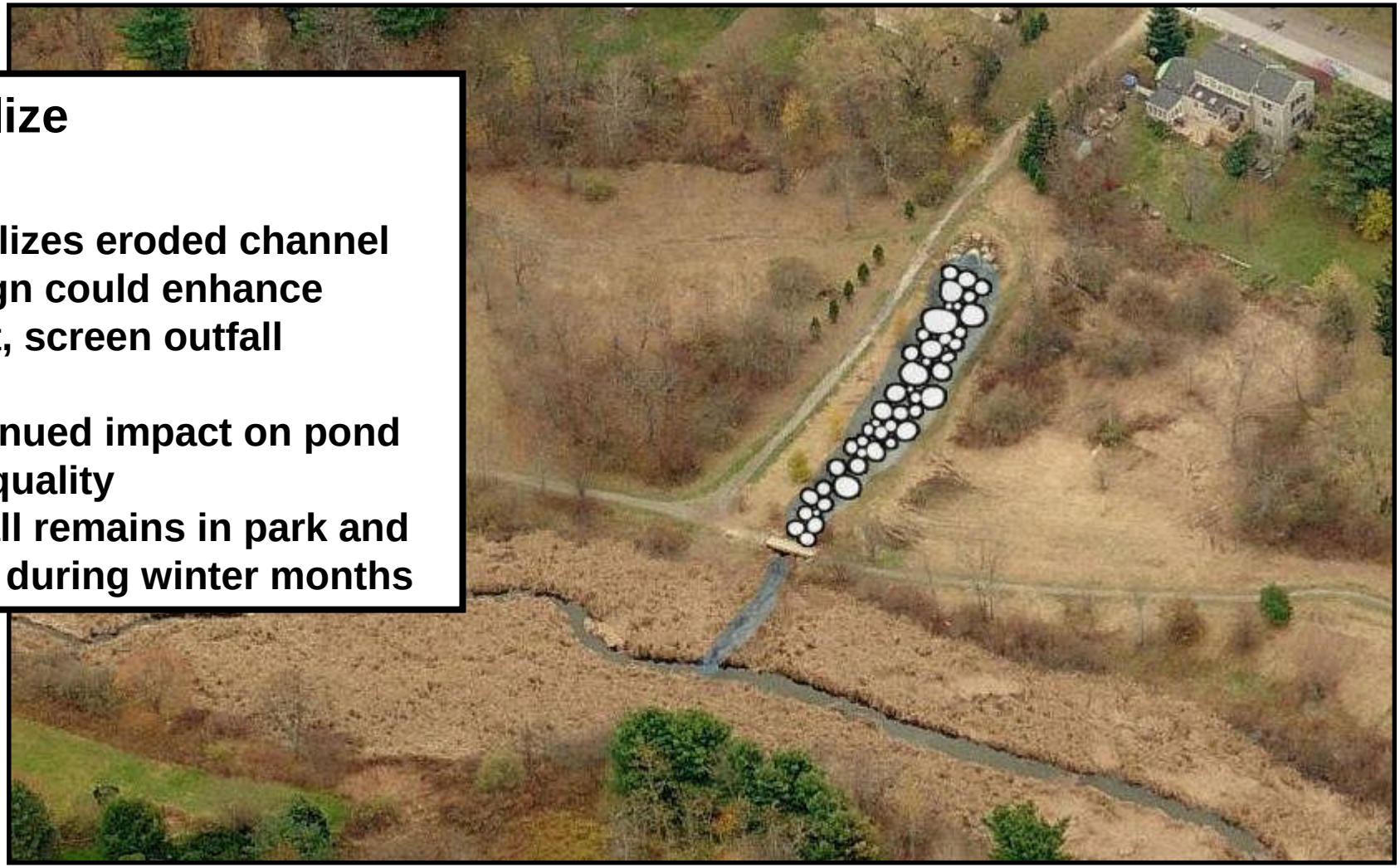
- Open water expanded to historic dimensions
- Historic aesthetic reestablished

Cons

- Potential algae blooms through sediment exposure
- Construction impact
- Potentially significant permitting
- Minimized wetland and habitat value

Images are only conceptual.

Rockland Outfall Question



Stabilize

Pros

- Stabilizes eroded channel
- Design could enhance habitat, screen outfall

Cons

- Continued impact on pond water quality
- Outfall remains in park and visible during winter months

All images are only conceptual.

Rockland Outfall Question

Water Quality Unit

Pros

- Less cost versus other water quality alternatives
- Hidden from view
- Minimizes construction impact on Park
- Stabilizes eroded channel

Cons

- Outfall is still visible
- Limited water quality benefit
- Requires regular maintenance and clean-out to be effective
- Hydraulic evaluation necessary

All images are only conceptual.

Rockland Outfall Question

Wetland Treatment

Pros

- Most beneficial for pond water quality
- Provides an opportunity for public education
- Design could be part of overall habitat enhancement

Cons

- Outfall is still visible in winter
- Requires regular maintenance and clean-out
- Construction impacts largest amount of park area of the evaluated alternatives
- Impacts to existing wetlands

All images are only conceptual.

Rockland Outfall Question

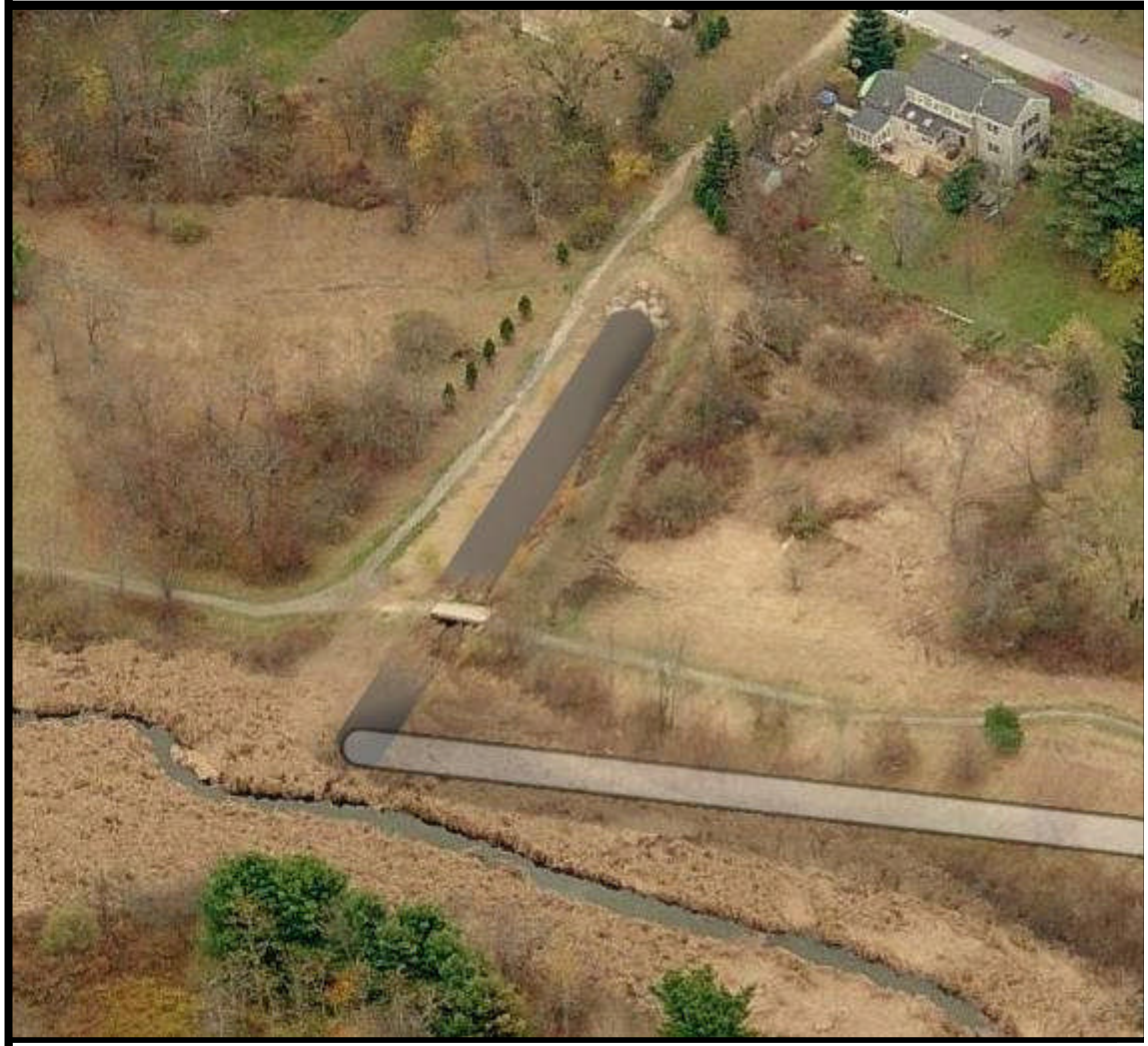
Hard Pipe

Pros

- Eliminates aesthetic concerns associated with outfall in Park
- Eliminates polluted runoff effects on pond
- Eliminates outfall channel and associated erosion issues

Cons

- Migrates runoff pollution to downstream waters (Fore River Estuary)
- Highest cost of the evaluated alternatives
- Invasive construction process with deep excavation near pond
- Hydraulics analysis needed



All images are only conceptual.

Education Station Question

Next Steps

- Finalize summary report with consideration for your preferences, with recommendations for additional evaluation.

PREFERENCE

OPEN WATER

"DO NOTHING"	WETLAND ENHANCEMENT
0	0

PREFERENCE

OPEN WATER

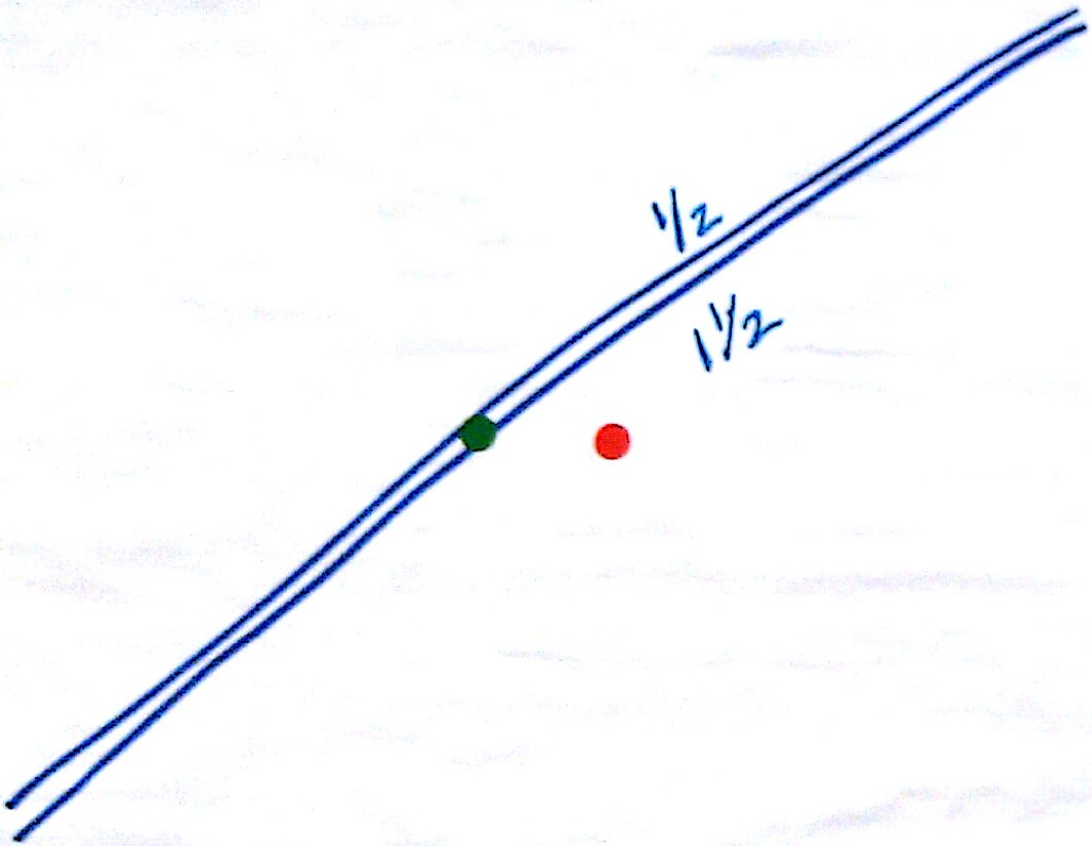
OPEN WATER HABITAT ENHANCEMENT	OPEN WATER RECOVERY
15	3

Generated by CamScanner from intsig.com

PREFERENCE

ROCKLAND AVE OUTFALL

STABILIZE

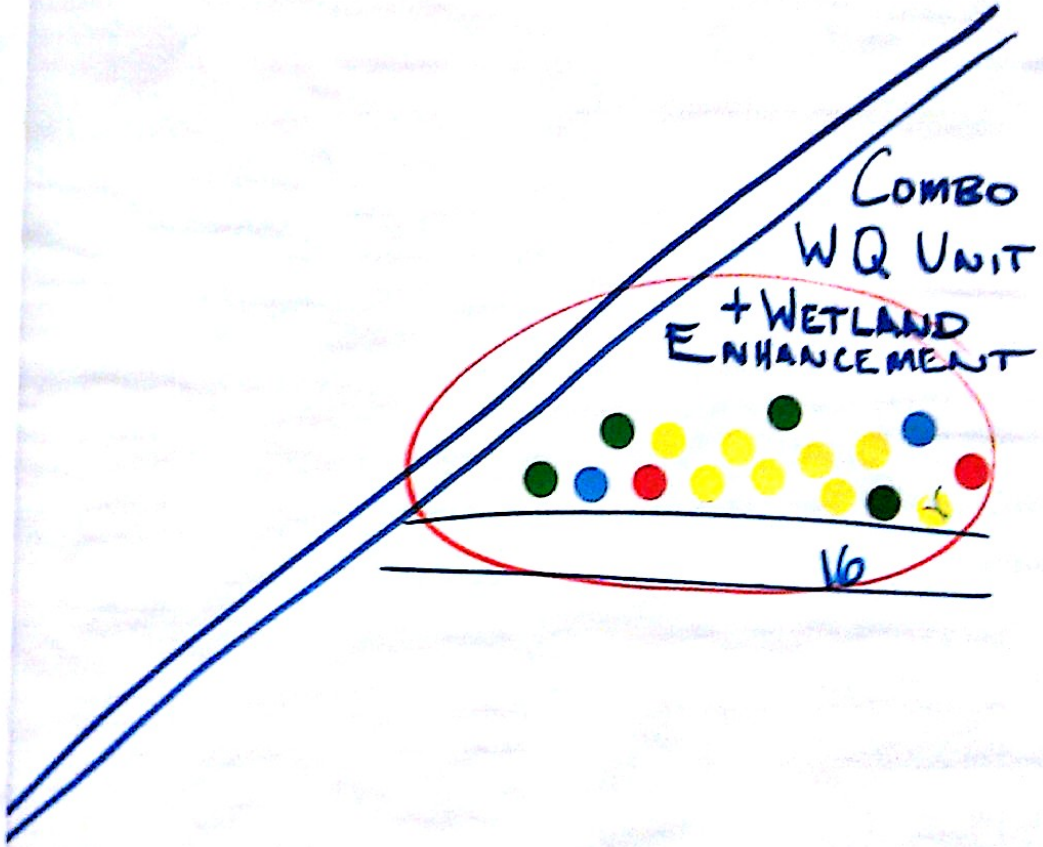


WATER QUALITY UNIT

PREFERENCE

ROCKLAND AVE OUTFALL

HARD PIPE

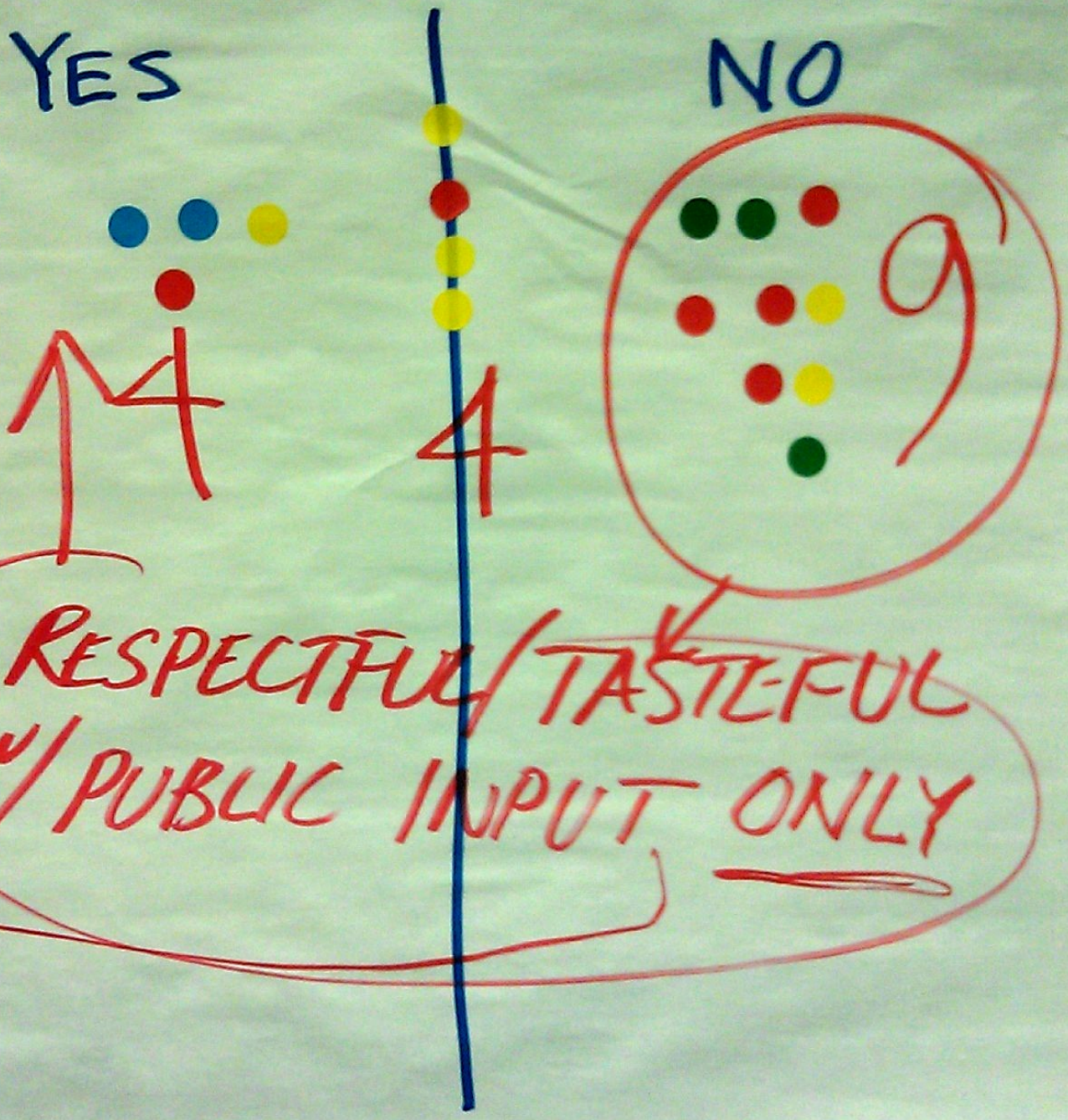


WETLAND TREATMENT

Generated by CamScanner from intsig.com

PREFERENCE

EDUCATION STATION(S)



RESPECTFUL/TASTEFUL w/ PUBLIC INPUT ONLY

Generated by CamScanner from intsig.com

PARKING LOT

VOLUME OF SEDIMENT ??

"EASE OF READ" OF SED. ANAL. MEMO

CAT TAIL MAINTENANCE

WHY CAT TAIL GROWTH

PERMITTING & FUNDING

PLANT ECOLOGY & SURVIVABILITY

Generated by CamScanner from intsig.com

WOODARD
&CURRAN