Analysis of Brownfields Cleanup Alternatives and Remedial Action Plan

Former FPL Site
Laconia and York Street
Biddeford, Maine

Prepared for:
City of Biddeford
205 Main Street
Biddeford, Maine 04005

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1. INTRODUCTION

Credere Associates, LLC (Credere) has prepared this Analysis of Brownfields Cleanup Alternatives and Remedial Action Plan (ABCA/RAP) for the Former FPL Site located off Laconia and York Streets in the City of Biddeford, Maine (the Site). This document was prepared for the City of Biddeford (the City) using funding from their Environmental Protection Agency (EPA) funded Brownfields Cleanup grant (BF-96178601). The following report provides a technical evaluation of remedial alternatives for addressing the identified environmental conditions at the Site and presents a work plan for the selected remedial alternative.

1.1 PURPOSE AND SCOPE

The purpose of this report is to evaluate Brownfield cleanup alternatives to mitigate identified environmental conditions at the Site. Information on known Site conditions is based on the results of the following environmental investigations which were completed for the Site:

- October 31, 2011, Phase I Environmental Site Assessment (ESA) by Ransom Consultants, Incorporated, of Portland, Maine (Ransom)
- July 26, 2012, Sampling Letter Report by AMEC Environmental & Infrastructure, Incorporated, of Portland, Maine (AMEC)

Consistent with the findings of these environmental investigations, environmental conditions that need to be addressed at the Site include the following:

- Polycyclic aromatic hydrocarbons (PAHs) in soil exceeding applicable Maine Department of Environmental Protection (DEP) Remedial Action Guidelines (RAGs) and/or the Maine Urban Background Levels presented in the RAGs
- Arsenic concentrations in soil exceeding applicable Maine DEP RAGs but below the rural background levels presented in the Maine DEP RAGs.

1.2 SITE DESCRIPTION

The 0.35-acre Site is located between Laconia Street and the western bank of the Saco River in Biddeford, Maine. The Site slopes significantly toward the Saco River and is currently vacant and overgrown with vegetation. An area of rip rap drainage is located near the center of the Site that drains down along the concrete river wall, which runs along the northeastern edge of the Site along the river. The Site is currently owned by the City of Biddeford.

The Site is located within the Mill District in the City of Biddeford (High Density/Mixed Use Zone-MSRD3), on the western bank of the Saco River. Land use in the surrounding area is primarily commercial, industrial, and residential. Land located to the south of the Site is located within the City of Biddeford's Commercial Core Zone (MSRD1), and the northeast portion of the Site is considered to be zoned as General Development (GD).

Figure 1 locates the Site on the Biddeford, Maine, quadrangle prepared by the United States Geological Survey (USGS). A plan of the Site depicting pertinent features is presented as **Figure 2**.

1.3 SITE HISTORY

The Site was formerly utilized as part of the River Dam Mill and was improved with mill structures used for storage, production and/or the transportation of goods between the late 1800s and the mid/late 1900s. According to previous environmental reports, the Site was also used for the storage of electrical transformers in the late 1900s by the Central Maine Power Company (CMP). Since demolition of the previous Site buildings, this minimally accessed area has become overgrown with vegetation and provides little value to the surrounding mill complex that is actively being revitalized into a variety of uses including offices, workshops, restaurants, and residences.

1.4 PROPOSED REUSE

The focus of this project is the cleanup and redevelopment of the Site into a public park with a public amphitheater overlooking the falls of the Saco River in the heart of the Biddeford Mill Yard. At completion, the City of Biddeford intends to incorporate the Site into the larger RiverWalk Trail system. This urban trail will run through the mill yard complexes in Biddeford and the adjacent City of Saco, Maine, ending at a recreational park in Biddeford. The trail will pass by the Site and provide access to the amphitheater via the adjoining City owned property.

2. SUMMARY OF PREVIOUS INVESTIGATIONS

The following subsections are provided to summarize the previous environmental investigations completed at the Site.

Phase I ESA, Ransom, October 31, 2011

Ransom performed a Phase I ESA for the Site dated October 31, 2011, and identified the following recognized environmental conditions (RECs):

- Environmental investigations completed at adjacent properties and properties located in an upgradient position relative to the Site identified metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs,) diesel range organic compounds (DRO), and polycyclic aromatic hydrocarbons (PAHs) in surficial and subsurface soils at concentrations that exceeded applicable Maine DEP RAGs. Due to the proximity and upgradient position of these investigations, Ransom indicated similar contaminants were likely also present at the Site.
- The City and FPL personnel indicated CMP formerly stored electrical transformers on-site. FPL indicated an environmental report documenting potential environmental conditions as a result of this activity may exist; however, FPL representatives were unable to locate a copy of the report for review as part of Ransom's assessment. Ransom concluded that improperly stored transformers may represent a threat of release of polychlorinated biphenyls (PCBs) to the surface or into the subsurface of the Site.
- Stormwater discharge pipes were observed in the central portion of the property. City personnel indicated stormwater from the adjacent mill complex(s) was collected and discharged onto the Site through the subsurface collection system. Ransom indicated historical and existing spills, releases, and poor housekeeping practices at the adjacent mill facilities may have been discharged through the stormwater collection system and ultimately onto the Site.

Based on these RECs, Ransom recommended the following:

- A limited subsurface and/or surface soil investigation to assess impacts to the Site from historical industrial operations conducted on the Site, historical industrial operations conducted on adjacent and upgradient properties, the potential releases associated from historical electrical transformers stored on-site, and the potential for releases associated with the stormwater discharge points on-site.
- Development of a Soil Management Plan (SMP) to address necessary actions in the event contaminated soil is encountered during Site redevelopment.
- Filing of a deed restriction dependent upon the results of the recommended limited soil investigation. The deed restriction would require that certain Site use conditions/covenants be imposed on the property, such as prohibiting/managing the excavation of on-site soils and/or prohibiting groundwater extraction.

- Application to the Maine DEP Voluntary Response Action Program (VRAP) in order to receive associated liability protections.

Sampling Letter Report, AMEC, July 26, 2012

AMEC conducted a limited sampling program to assess the RECs identified in Ransom's Phase I ESA. The following is a brief summary of the July 26, 2012, AMEC Sampling Letter Report:

Investigation Scope

Soil samples were collected from 0 to 0.5 feet below ground surface (bgs) at eight (8) locations, and also from 1 foot bgs at locations SS-06 and SS-08. Samples were submitted to Absolute Resources Associates (ARA) of Portsmouth, New Hampshire, to be analyzed for lead, cadmium, and arsenic by EPA Method 6010B and PAHs by EPA Method 8270. In addition, samples collected from the 0 to 0.5-foot interval at locations SS-04 through SS-08, and samples collected from the 1-foot bgs interval at location SS-06 were submitted for analysis of PCBs by EPA Method 8082.

Soil Sampling, Laboratory Analysis, and Results

AMEC reported that concrete was encountered at 0.5 feet below grade at location SS-05 and fill containing brick, concrete, wood, and rebar was also encountered below the grass and topsoil at locations SS-06, SS-07 and SS-08. Visual and olfactory observations did not indicate the presence of gasoline or fuel oil, and photoionization detector (PID) screening results ranged from below the instrument limit of quantification to 0.6 parts per million by volume (ppm_v).

Laboratory analytical results indicated PAH concentrations exceeding the applicable May 2013 Maine DEP RAGs and/or the Maine urban background concentrations at sample locations SS-03 (0-0.5 feet bgs), SS-05 (0-0.5 feet bgs), SS-06 (0 to 0.5 feet bgs), SS-06 (1 foot bgs), SS-08 (0 to 0.5 feet bgs), and SS-08 (1 foot bgs). Arsenic was detected in all samples exceeding the applicable Maine DEP RAGs; however, all detected arsenic concentrations were below the rural background levels presented in the RAGs. Cadmium and lead were not detected at concentrations above the applicable Maine DEP RAGs and/or established background levels, and PCBs were not detected in any of the samples selected for analysis.

Conclusions and Recommendations

AMEC presented the following conclusions and recommendations:

- Based on the analytical results, the surface soil in the central and southern portion of the Site may not be suitable for park use. If a river walk trail is constructed in this area of the Site, the risk of contact with contaminated soil in unpaved areas could be addressed by covering this area with a demarcation layer and 8 to 10 inches of clean fill, or at least 2 feet of clean fill and no demarcation layer. Paving this area is another mitigation alternative. If a wooden walkway is constructed, a SMP is recommended to manage contaminated soil left in place.

- To provide the property owner (the City of Biddeford) protection from the future enforcement actions, the City of Biddeford should consider entering the Site into the Maine DEP VRAP program.

3. UPDATED CONCEPTUAL SITE MODEL

A conceptual site model (CSM) was developed using the findings of the previous investigations and will be updated in subsequent reports as new information becomes available. This CSM includes a description of the physical setting of the Site, contaminants of concern (COCs), extent of contamination, exposure pathways, and potential human and environmental receptors.

3.1 PHYSICAL SETTING

Topography

According to the United States Geological Survey (USGS) Topographic Map of the Biddeford Quadrangle, Maine, the Site is located at approximately 34 feet above mean sea level, and topography in the area is gently sloping to the northeast towards the Saco River. Topography at the Site slopes steeply to the east-northeast towards the Saco River. An excerpt from this map has been included as **Figure 1**.

Geology

Surficial Geology

According to the Maine Geological Survey (MGS) Surficial Geology of the Biddeford Quadrangle, Maine, map, the Site is underlain by artificial fill. Artificial fill can consists of any combination of material dependent on the source of the fill.

Based on the observations recorded during the performance of AMEC's Sampling Letter Report, surficial samples collected at the Site from depths ranging between 0 and 2 feet bgs generally consisted of topsoil in the grassy areas and fill material containing concrete, brick, wood, and rebar.

Bedrock Geology

According to the Maine Geological Survey (MGS) Bedrock Geology of Maine, map, the Site is underlain by Silurian to Precambrian gneiss, quartzite, and schist of the Berwick Formation. Bedrock outcrops were observed in the river bed adjacent to the Site (east); however, bedrock was not encountered during the performance of AMEC's sampling activities.

Hydrology

The Site is composed of vegetation and is void of any impervious surfaces. As such, stormwater primarily infiltrates to the subsurface and/or sheet flows to the northeast towards the Saco River.

According to the MGS Significant Sand and Gravel Aquifers, Biddeford Quadrangle, Maine, map, the Site is not located within a mapped significant sand and gravel aquifer.

Based on mapped topography and the location of the nearest surface water body, groundwater at the Site is presumed to flow east.

Changing Climate Concerns

It is locally known that it is not uncommon for the Saco River to splash over the river wall at the eastern boundary of the Site under current conditions; therefore, based on the National Oceanic and Atmospheric Administration (NOAA) interactive map of Sea Level Rise and Coastal Flooding Impacts (http:/coast.noaa.gov/slr/viewer/), sea level rise of up to 6 feet and increased flooding may result in the overtopping of the river walls at a greater frequency of flooding and increase potential erosion of the Site.

The Site is located along the banks of the Saco River. According to FEMA Flood Zone Map 23014500004B, the Site is located within a Zone C, where minimal flooding is expected. This is presumably due to the presence of the flood wall that extends along the eastern portion of the Site. Greater storm frequency and intensity in a changing climate may result in more frequent and more powerful flood waters within the Saco River, which may result in changes to the flood zone and increased flooding of the Site. Based on the steep grade of the Site and presence of the river wall, floodwaters would pool in the lower elevations of the Site and would require engineered drainage areas.

The Site receives stormwater discharge from the adjoining mill complex. Under current Site conditions, increased precipitation and extreme weather could result in additional stormwater runoff and potential erosion to the Site from the mostly impermeable mill complex. However, part of the design planning is to divert the stormwater drain through the Site to be discharged offsite to the southeast. Therefore, increased stormwater discharge due to greater storm intensity is not expected to impact the Site with proper engineering, which is planned despite the selected remedial alternative.

Based on the nature of the proposed reuse of the Site, changing temperature, wildfires, changing dates of ground thaw/freezing, changing ecological zone, saltwater intrusion and changing groundwater table are not likely to effect the Site.

3.2 CURRENT CONTAMINANTS OF CONCERN

Based on the results of the limited soil sampling conducted by AMEC at the Site, current COCs include the following:

- PAH compounds benzo(a)anthracene, benzo(a)pyrene, and dibenzo(a,h)anthracene were identified at concentrations that exceed applicable Maine DEP RAGs.
- Arsenic was identified at concentrations that exceed the applicable Maine DEP RAGs in all of the soil samples collected from the Site.

3.3 EXTENT OF CONTAMINATION

The horizontal extent of contamination was delineated to consist of the entire central and southern portion of the Site. The northern strip of the Site that extends along the river wall was not identified to contain COCs exceeding the Maine DEP RAGs. Based on this horizontal

delineation, a surface area of approximately 10,000 square feet is presumed to be impacted by the COCs.

Delineation sampling was not conducted to assess the vertical extent of the PAH and arsenic impacted soil. PAH and arsenic impacts are therefore presumed to be present throughout the entire thickness of the fill material present in the central and southern portions of the Site. The approximate extent of impacted soil is depicted on **Figure 2**.

3.4 EXPOSURE PATHWAYS AND POTENTIAL RECEPTORS

Exposure pathways describe how a human or environmental receptor comes into contact with contaminants that may be present at the Site. Exposure pathways presented in the CSM which are present at the Site include the following:

Dermal Absorption:	Exposure via dermal absorption occurs when receptors are exposed to chemical concentrations present in soil, groundwater, surface water, or hazardous building materials through direct contact with the skin.
Active Ingestion:	The active ingestion pathway represents exposure which may occur through the active ingestion of contaminant concentrations via a drinking water supply well, through agricultural products, or through direct consumption of soil (e.g., typically by children).
Incidental Uptake:	This pathway is applicable when receptors may incidentally inhale or ingest impacted media in the form of contaminated dust, chips, or airborne fibers.

Potential Receptors are categorized by duration of exposure and intensity of use at the Site. The receptor categories described in the CSM which are present at the Site include the following:

Commercial Worker:	Outdoor commercial receptors are those which are present at the Site for long durations but with low intensity exposure such as groundskeepers, parking lot attendants, and mechanics. This category is also conservatively applied for indoor office workers at the Site.
Excavation or Construction Worker:	Excavation or construction workers are present at the Site for short durations though intensity of use is high, such as during non-routine activities including construction or utility work. Examples include utility and construction contractors.
Recreational or Park User:	Park users are characterized by low duration, i.e. less than two hours per day, and low intensity usage such as that which would occur during activities such as walking, shopping, and bird watching.
Terrestrial and Aquatic Biota:	These receptors include flora and fauna which may be exposed to contaminants in their respective land-based or aquatic environments.

3.5 MIGRATION POTENTIAL & CSM SUMMARY

PAHs and arsenic are the COCs for the Site. Generally, these compounds are relatively stable given the low solubility of PAHs and vegetated nature of the slope at the Site preventing erosion; however, during remediation, these compounds have the potential to become mobilized and erode to the Saco River.

PAHs and arsenic in surface soil have the potential to impact excavation or construction workers during site remediation and subsequent construction of the trail and amphitheater, outdoor commercial workers (e.g. landscapers and maintenance personnel involved in disturbance of contaminated soil), and park users/visitors (e.g. users of the recreational trail and amphitheater) at the Site through direct contact, incidental uptake, and active ingestion (primarily by children). Additionally, considering the Site topography, inferred groundwater flow direction, surface water drainage pattern, and exposure of impacted soil during construction, PAHs and arsenic have the potential to migrate off-site and impact aquatic biota in the adjacent Saco River primarily through soil erosion.

4. CLEANUP GOALS AND APPLICABLE GUIDELINES

To determine the most appropriate cleanup method for the Site, the volume of impacted media must first be determined and then the cleanup goals for the Site must be analyzed considering the future reuse of the Site.

4.1 IMPACTED SOIL

The remediation goal for the PAH and arsenic impacted soil is to eliminate exposure to park users and future City maintenance workers. Remediation will be considered complete when the exposure pathways are reduced/eliminated such that exposure to PAHs and arsenic are below the Maine DEP park user RAGs, which are the lowest values of the applicable RAGs (i.e. park user, commercial workers, and construction workers). All soil disturbance shall be conducted in accordance with Maine's Erosion and Sedimentation Control Laws.

Based on the results of the AMEC Sampling Program, any excess fill at the Site would be considered special waste. If excess fill is generated under the selected alternative that cannot be reused onsite, it will be disposed offsite at an appropriately licensed landfill or recycling facility. Offsite disposal will be done in accordance with the Maine DEP Chapter 400 – Solid Waste Management.

5. DESCRIPTION OF REMEDIAL ALTERNATIVES

Based on the potential remaining exposure pathways to current and future receptors at the Site, the remedial actions selected for the Site should accomplish the following objective:

- Minimize the potential for human exposure to impacted soil in coordination with redevelopment of the Site

Multiple remedial alternatives are available to address the PAH and arsenic-impacted soil. However, based on our past experience at sites with similar contaminants and conditions, we have pre-screened general advantages and disadvantages of various options and have selected three (3) remedial alternatives for further evaluation and comparison:

Alternatives for Accessible Impacted Soil

1. Alternative #1 – No Action
2. Alternative #2 – Soil Removal
3. Alternative #3 – Soil Covering

These remedial alternatives were evaluated for implementation at the Site and are further discussed in the following sections.

"No Action" Alternative

A "No Action" alternative signifies that no soil treatment, removal, or remediation would be implemented at the Site. However, the "No Action" alternative does not include a means for mitigating or eliminating potential exposure to contaminated soil during remediation and following redevelopment. Therefore, the potential for human exposure through direct contact, active ingestion, and incidental uptake continues to exist. This alternative is presented and discussed throughout the subsequent portions of this report as a baseline comparison and represents the existing conditions at the Site.

Alternative #2 - Soil Removal

This alternative would involve the removal of contaminated soil that maybe accessible to future park-users and City maintenance workers. Characterization samples will need to be collected and analyzed according to the acceptance criteria for the selected disposal facility. Following removal, confirmatory samples would be collected from the excavation limits and submitted for laboratory analysis to ensure the cleanup goals were met and human and environmental risk is adequately managed. Removed soil would be replaced with clean compacted fill based on the geotechnical requirements of the redevelopment.

Alternative #3 - Soil Covering

This alternative would involve the covering of PAH and arsenic-impacted accessible soil with a demarcation layer and at least 1 foot of documented clean fill material and vegetation in landscaped areas at elevations higher than 1 foot above the river wall, and covering areas below this elevation with a paving/hardscape system. The height of 1 foot in elevation above the

retaining wall was selected based on the engineered height of the retaining wall relative to the anticipated flood stage of the river. The river wall currently only splashes over and has not been inundated in its recent history. In order for the landscaped areas at an elevation 1 foot above the river wall to be inundated, the flood stage must exceed the river wall and fill the basin portion of the Site. A soil cover schematic is included as **Figure 3**.

Most/all impacted soil will remain onsite with the exception of limited quantities of unsuitable material (i.e. building debris fill, other unknown fill components) that may be encountered during remediation and subsequent construction of the soil cover system. Soil may also be relocated to an adjoining City owned property to accommodate the need for fill at that property. Consistent with redevelopment designs, the cover system in the high traffic trail areas will be covered with a concrete/asphalt walkway to manage potential exposure to future users of the Site.

The lower elevations on the Site (i.e. below elevation 1 foot above the top of the river wall) are anticipated to be impacted by future climate change including more frequent flooding and extreme weather. Therefore, the surface area below the elevation 1 foot above the river wall will contain 100% hardscape to minimize erosion and the potential for exposure of contaminated soil during over topping of the river wall.

Following the completion of remediation and redevelopment activities, the potential risk posed by concentrations of hazardous substances that may remain in soil at the Site will be managed though the preparation and use of an SMP/Environmental Management Plan (EMP). The SMP/EMP will govern future excavation activities and describe the maintenance requirements for institutional controls located at the Site. The City of Biddeford will also prepare and record a Declaration of Environmental Covenant (DEC) consistent with the Maine "UECA", 38 M.R.S.A. § 3001 et seq. The DEC will minimize potential exposure to remaining contaminants through restrictions on usage, soil excavation, and/or groundwater extraction.

6. COMPARISON OF ALTERNATIVES

As discussed in the previous section, three remedial alternatives were developed to address the COCs at the Site. The comparison and evaluation of the remedial alternatives has been conducted using the five criteria listed below:

1. risk reduction and effectiveness
2. feasibility and ease of implementation
3. green remediation potential
4. cost effectiveness
5. estimated time to reach "No Further Action"

A brief summary of these five criteria and a discussion as to how they pertain to the three remedial alternatives is presented below and summarized on **Table 1** at the end of this Section.

6.1 DESCRIPTION OF EVALUATION CRITERIA

Risk Reduction and Effectiveness

Since the primary objective of any remedial action is to reduce or eliminate exposure of humans and the environment to COCs, risk reduction and effectiveness is considered the primary threshold criterion. Alternatives must pass this criterion to be considered for implementation as the recommended alternative. It addresses whether or not a remedy provides adequate protection and describes how the risks posed by the Site are eliminated, reduced, or controlled. Protection of human health is assessed by evaluating how risk from each exposure route is eliminated, reduced, or controlled through each specific alternative. This criterion also addresses the ability of the alternative to achieve the cleanup goal and applicable guidelines. This criterion evaluates the long term reliability of the alternative with respect to reasonable costs associated with upkeep, level of effort associated with upkeep, and the resilience of the alternative with respect to reasonably foreseeable changing climate conditions.

Feasibility and Ease of Implementation

This criterion analyzes technical feasibility and the availability of services and materials. Availability of services and materials evaluates the need for off-site treatment, storage, or disposal services and the availability of such services. Necessary equipment, specialists, and additional resources are also evaluated.

Green Remediation Potential

This criterion evaluates the extent of green remediation techniques that can be employed as part of the project and their associated benefits relative to other alternatives. This criterion will be evaluated based on its consistency with EPA's *Principle for Greener Cleanup* policy.

Cost Effectiveness

Cost information presented for the alternatives evaluates the estimated capital, operational and maintenance costs of each alternative. Capital costs include direct capital costs such as materials and equipment. Costs are presented as a balancing criterion such that if a number of remedial alternatives are comparable for the previously discussed criteria, cost may be used as a distinguishing factor in the selection of the remedial action. Estimated costs were developed based on prior project and contractor experience, and current estimates received from contractors. Remediation is scheduled to take place in 2015, and as such, costs presented are in year 2015 dollars.

Estimated Time to Reach "No Further Action"

This criterion is defined as the time it will take to achieve "No Further Action" in accordance with Maine 38 M.R.S.A. 343-E as well as to meet the requirements of the Maine DEP Voluntary Response Action Program (VRAP) and receive a Certificate of Completion from VRAP. Please note this criterion does not take into account redevelopment and other time for non-environmental tasks.

6.2 EVALUATION OF ALTERNATIVES

Alternative #1 - "No Action" Alternative

The "No Action" alternative involves no soil remediation, disposal, or covering, and would not include a means for mitigating or eliminating potential exposure to contaminated accessible soil both during and following redevelopment. Therefore, the potential for human exposure through direct contact and incidental uptake continues to exist for future park users, visitors, and area residents. As such, the "No Action" response is not wholly protective of human health and the environment. Additionally, without action, the toxicity, mobility, and volume of contaminants will not be reduced. Therefore, this alternative is ineffective as a permanent remedial solution. As a result, this alternative cannot be considered as a final alternative for the Site.

Alternative #2 – Soil Removal

Risk Reduction and Effectiveness

Once the identified contaminated soil is removed from the Site and confirmatory sample result are favorable, the remedial action objective will have been attained and determination of success is easy to demonstrate. Soil removal has been proven an effective means of remediating exposure risk. This alternative is highly effective for the Site because the contamination is removed and the risk of exposure by potential receptors is eliminated by complete removal of the source of exposure.

Since all contamination is proposed to be removed, this alternative is sustainable in a changing climate as the climate change concerns identified in **Section 3.1** (increased sea level, more frequent flooding, and increase stormwater discharge to the Site) will not affect long term efficacy. **Therefore, this alternative is highly effective.**

Feasibility and Ease of Implementation

This remedial alternative utilizes standard excavation and construction techniques for removal of the identified impacted accessible soil and replacement with clean fill. Since all contamination is to be removed, no continued management or restrictions are necessary. However, the impacted soil is located within an area of the mill complex with limited accessibility and limited areas for stockpiling large quantities of soil. Portions of the fill material that may require removal may be providing structural support to nearby structures. The complete extent of contamination is not currently known, and based on the long history of industrial operation at the Site and in the surrounding area, complete removal of impacted soil may be difficult and unknowns may be encountered at deeper interval where industrial debris and historical surfaces may be encountered. **Therefore, this alternative is feasible but not easily implementable.**

Green Remediation Potential

This alternative requires the most offsite disposal of impacted soil resulting in greater fuel consumption and greenhouse gas emissions during transport, and greater volumes of material to be disposed in a landfill. It is possible to reduce the transportation impacts by using local contractors, local disposal facilities, and a local source of clean fill. Additionally, subcontractors with green business practices (i.e. biofuel converted utility trucks, renewable/sustainable heating and electricity at their office/yard, etc.) can be given precedence in the bidding process. **Therefore, this alternative has lower potential for green remediation practices.**

Cost Effectiveness

Under this alternative, the removal of all impacted soil is required. Based on prior project and contractor experience and current estimates received from contractors, the estimated cost to properly excavate, stockpile, transport, and dispose of this material, as well as to backfill the excavation areas with clean structurally suitable material, and redevelop the Site, is estimated at approximately $341,000. The following is a breakdown of these costs:

Excavation Cost/Site preparation	$45,000
Stockpiling Cost	$2,000
Backfill Cost	$42,000
Transportation and Disposal Cost	$100,000
Site Restoration	$74,000
Engineering/Construction Oversight/Reporting	$47,000
10% Contingency	$31,000
Total	$341,000

Estimated Time to Reach "No Further Action"

Immediately following receipt of disposal certificates, the Site would meet the requirements for "No Further Action" and could attain a Certificate of Completion from the Maine DEP VRAP. **Using this alternative, "No Further Action" could be attained within four months of implementation.**

Alternative #3 - Soil Covering

Risk Reduction and Effectiveness

This alternative focuses on mitigating exposure to accessible impacted soil via dermal contact and incidental uptake. Once the impacted accessible soil is covered with the cover systems per the design specifications, the remedial action objectives will be attained and this alternative would be effective. Considering the known conditions and exposure scenarios present at the Site, a soil cover, landscaping, and concrete/paver walkway system is well-suited to eliminate the direct contact and incidental uptake exposure pathway and is a reliable method to manage risk. However, long-term maintenance and proper soil management practices are required for the covered areas.

This alternative has the potential to be compromised by the climate change concerns identified in **Section 3.1** (increased sea level, more frequent flooding, and increase stormwater discharge to the Site) if proper engineering and stormwater control is not incorporated into the redevelopment plans. It is not uncommon for the river to splash over the river wall along the Site under current climate condition; increased flooding in a changing climate may impact the project by increasing the potential for erosion and flood damage. Increased stormwater runoff from the surrounding mostly impermeable mill complex may promote erosion of the landscaped and vegetated portions of the cover. These issues have been addressed by implementing Engineering controls such as stormwater discharge diversion to a holding basin southeast of the Site, hardscape below the elevation 1 foot above the river wall, and vegetation maintenance on landscaped areas to reduce future erosion potential. Erosion control best management practices (BMP) and emergency contingency plans will be in place to prevent erosion of the Site in the event of storms during construction. Additionally, the river wall along the eastern portion of the Site will prevent significant erosion directly to the river during a storm surge.

In addition to covering the contaminated soil with clean soil, landscaping, concrete, brick, or asphalt, institutional controls would be implemented at the Site. These controls will ensure longevity of the alternative through maintenance and ensure future owners, users, or utility workers do not disturb contaminated soils; or if disturbance is necessary, that the Maine DEP will be notified, and that the contaminated soil will be properly managed and disposed under the direction of an Environmental Professional in accordance with the applicable regulatory guidelines.

Following the completion of redevelopment activities, potential risk posed by concentrations of hazardous substances that may remain in soil at the Site will be managed though the preparation and use of an SMP/EMP. The SMP/EMP will govern future excavation activities and describe the maintenance requirements for institutional controls located at the Site. The City of Biddeford will also prepare and record a DEC consistent with the Maine "UECA", 38 M.R.S.A. § 3001 et seq. The DEC will minimize potential exposure to remaining contaminants through restrictions on usage, soil excavation, and/or groundwater extraction. **Therefore, the soil cover reduces risk and institutional controls make this alternative continually effective.**

Feasibility and Ease of Implementation

The soil covering alternative would utilize standard construction techniques for placement of the soil cover. The Site has limited accessibility for heavy equipment; however, less equipment staging and stockpiling is likely required for this alternative relative to Alternative #2. Minor reworking of the existing grades may be necessary prior to covering, and additional clean fill will have to be installed above the present material. Construction complication may be encountered due to the quantity and composition (i.e. concrete, bricks, wood and rebar) of fill material currently present in the confined area of the Site. This material may be unsuitable to meet required compactions and stability requirements of the proposed Site features. Therefore, this alternative allows for limited removal and offsite disposal or relocation to the adjoining City owned property of unsuitable material (i.e. building debris fill, other unknown fill components) or fill material in order to meet the desired final grades and accommodate the cover thicknesses. It also accounts for the lack of available stockpile staging space that is considered a limitation for Alternative #2 since limited soil quantities require less staging space or could be live loaded for offsite transport. **Therefore, this alternative is feasible and easily implementable.**

Green Remediation Potential

This alternative requires limited offsite disposal of impacted soil resulting in fuel consumption and greenhouse gas emissions during transport, and limited volumes of material to be disposed in a landfill; however, this quantities are far less than those required for Alternative #2. However, this alternative does require limited trucking of new cover materials to the Site. New materials can be selected from manufacturers that use recycled materials or use sustainable manufacturing processes. Materials can also be sourced locally to reduce shipping distances. Additionally local contractors with green businesses practices (i.e. biofuel converted utility trucks, renewable/sustainable heating and electricity at their office/yard, etc.) will be given precedence during the bidding process. **Therefore, this alternative has the greatest potential for green remediation practices relative to Alternative #2.**

Cost Effectiveness

The estimated costs presented below include the tasks necessary to install the soil cover over the PAH and arsenic-impacted soil. Costs for this alternative are estimated to be approximately $280,577. The following is a breakdown of these costs:

Site preparation	$79,750
Cover Install & Redevelopment	$138,320
Offsite disposal contingency	$6,000
Engineering/Construction Oversight/Reporting	$31,000
10% contingency	$25,507
Total	$280,577

Estimated Time to Reach "No Further Action"

Immediately following construction of the cover, landscaping, and rehabilitation, the Site would meet the requirements for a determination of "No Further Action" and would be eligible to

receive a Certificate of Completion from the Maine DEP VRAP. **Using this alternative, "No Further Action" could be attained within four months of implementing this alternative.**

6.3 JUSTIFICATION FOR THE SELECTED REMEDIAL ALTERNATIVE

Based on the evaluation of the remedial alternatives presented above, the recommended alternative is Alternative #3 – Soil Covering. This alternative most effectively meets each of the comparison criteria evaluated in this report, and is the best alternative considering the comparison of costs versus benefit for the Site.

With continued maintenance and compliance with the SMP/EMP, this alternative is highly effective even in a changing climate. Erosion potential has been considered in the design and abundant hardscape is planned. It is easily implementable as it uses proven techniques and requires fewer resources to complete. Although more susceptible to a changing climate (increased flooding and increased storm intensity), with appropriate cover design these effects can be minimized. This alternative is cheaper while achieving an acceptable permanent solution. This alternative is more sustainable in that it requires less trucking of soil and ultimately less greenhouse gas emissions, and also allows for implementation of green remediation practices.

7. PROPOSED REMEDIAL ACTION PLAN

As previously indicated, soil covering is the recommended alternative to address PAH and arsenic-impacted accessible soil at the Site. This section describes activities that will be completed as part of the Site remediation. Prior to initiating the project, the proposed remediation activities will be presented for review and approval by the Maine DEP VRAP; and prior to start of construction, a Health and Safety Plan must be prepared.

7.1 SOIL & ENVIRONMENTAL MANAGEMENT PLAN

In order to meet the regulatory requirements inherent in the handling of imported soil and the possible generation of Special Waste and to properly manage risk posed by the PAH and arsenic-impacted soil that will be encountered during redevelopment, a Soil Management Plan (SMP)/Environmental Management Plan (EMP) was developed for use at the Site. Included in this Soil Management Plan (SMP)/Environmental Management Plan (EMP) are:

- A description of soil conditions and associated regulatory applicability
- A listing of proper health and safety work practices and protective equipment for use during Site work activities
- A description of onsite soil management procedures including soil handling, stockpiling, and dust control for use during Site work activities
- A description of the onsite soil reuse procedures including the soil cover system
- A summary of the methods to be used for the proper transport and disposal of excess soil that may be generated during redevelopment
- A description of procedures for future excavation of soil below the marker layer
- A summary of long-term inspection and maintenance procedures

A copy of the SMP/EMP is included as **Appendix A**.

7.2 SOIL COVER AND INSTITUTIONAL CONTROLS

In order to manage risk posed by concentrations of PAHs and arsenic in accessible soil located at the Site, the following controls are proposed:

Soil Covering Procedure

A typical covering detail for a marker layer and clean fill, or an asphalt, concrete, or stone cap, to be placed over the identified contaminated soil is presented in the SMP/EMP. The following covering procedure will be implemented during the remedial action:

- If necessary to meet final grades, install Site features and subsurface infrastructure, and/or to provide structurally suitable sub-grade materials, impacted/unsuitable soil will be removed in accordance with the SMP/EMP.
- A demarcation layer consisting of a permeable geotextile fabric or similar material will be placed directly over the contaminated soil in landscaped areas to indicate the distinction between the clean cover and the underlying contaminated soil.
- A minimum of 12 inches of documented clean fill will be placed as cover material over contaminated soil in landscaped area. The source of fill will be documented to be a local native source or will be documented to be clean through analytical testing. Seed or vegetate the landscaped areas to prevent erosion of the clean cover.
- Areas planned for hardscape construction will be installed directly over the impacted soil and the hardscape will serve as the marker layer.
- Each covered area will be graded so that the stormwater runoff is directed to an appropriate area.
- Additional sub-base materials may be necessary beyond the minimum cover requirements discussed herein to maintain the structural integrity of the proposed site features.

Institutional Controls

Following the completion of redevelopment activities, potential risk posed by concentrations of hazardous substances that may remain in soil at the Site will be managed in accordance with the SMP/EMP. The SMP/EMP will govern future excavation activities and describe the maintenance requirements for institutional controls located at the Site. The City of Biddeford will also prepare and record a DEC consistent with the anticipated VRAP No Action Assurance Letter (NAAL) and the Maine UECA, 38 M.R.S.A. § 3001 et seq.

Green Remediation Optimization

To maximize the effectiveness of the selected alternative, the following green remediation practices are planned to be considered and implemented where possible during remediation:

- Use local contractors to reduce greenhouse gas emissions associated with equipment mobilization and daily personnel mobilization to the Site. Preference to contractors with green business practices (i.e. biofuel converted utility trucks, renewable/sustainable heating and electricity at their office/yard, etc.) can also be incorporated into the bidding process.
- Relocate and reuse the greatest amount of soil onsite to minimize the number of loads requiring offsite disposal. This will reduce greenhouse gas emission associated with trucking, reduce the amount of material that will require landfill space or processing for recycling, and reduce the use of resources associated with processing new material to replace unsuitable material.

- Dispose or recycle any excess or unsuitable material as locally as possible to reduce greenhouse gas emissions associated with trucking material offsite
- Source new fill and materials from local sources to reduce greenhouse gas emissions associated with transporting new materials to the Site. Recycled fill may also be considered; however, the supplier should provide documentation of concentrations of Site COCs to ensure the material is "clean."
- Recycle granite from the City's granite stock. The granite stock is made up of excess granite that is unsuitable for use as curbing and has no current application otherwise. Use of this material reduces the amount of new material processing and transport resources.

7.3 STATE AND FEDERAL PERMITS REQUIRED

A Natural Resource Protection Act (NRPA) permit will be obtained from the Maine DEP and approval will be obtained from the City prior to implementing the selected alternative. All soil disturbance shall be conducted in accordance with the Maine DEP Erosion and Sedimentation Control Laws.

No other permits are anticipated as a part of this remediation project; however, this ABCA/RAP will be submitted as a work plan to VRAP, and a NAAL will be obtained prior to initiating response actions.

7.4 REMEDIAL ACTION REPORTING

Following the initiation of remediation activities at the Site, Credere will submit status update reports to the Maine DEP and EPA on a quarterly basis or more frequently as needed. Once complete, Credere will prepare and submit a Final Remedial Action Completion Report to the Maine DEP and the EPA summarizing the field activities conducted as part of the remediation effort. This report will be prepared and submitted to the Maine DEP within 30 days following the recording of the final DEC.

8. CONCLUSIONS

Credere developed this ABCA/RAP for the Former FPL Site located along the western bank of the Saco River, off Laconia and York Streets in Biddeford, Maine. The purpose of this study is to evaluate potential remedial action alternatives to mitigate identified environmental conditions at the Site. Based on the findings of this study, a summary of our conclusions and recommendations are presented below:

- Remedial action is necessary to address the PAH and arsenic-impacted soils located in the southern portion of the Site. The selected remedial alternative to address the identified impacted media is soil covering.
- The soil cover should consist of a demarcation layer and covering of the contaminated accessible soil with at least one (1) foot of clean, compacted fill material and vegetation in landscaped areas or hardscape to include concrete walkways and tiered amphitheater seating to manage potential exposure to future users of the Site.
- Risk posed by environmental conditions remaining at the Site following the completion of the above-described remedy will be managed through the implementation of institutional controls. These controls will be executed through the preparation and recording of a DEC as well as the implementation of the SMP/EMP.

FIGURES

DRAWN BY: **MTG**	DATE: **1/29/2015**
CHECKED BY: **ASD**	PROJECT: **12001156**

Credere Associates, LLC
776 MAIN STREET
WESTBROOK, MAINE
Tel. 207.828.1272
Fax 207.887.1051
WWW.CREDERELLC.COM

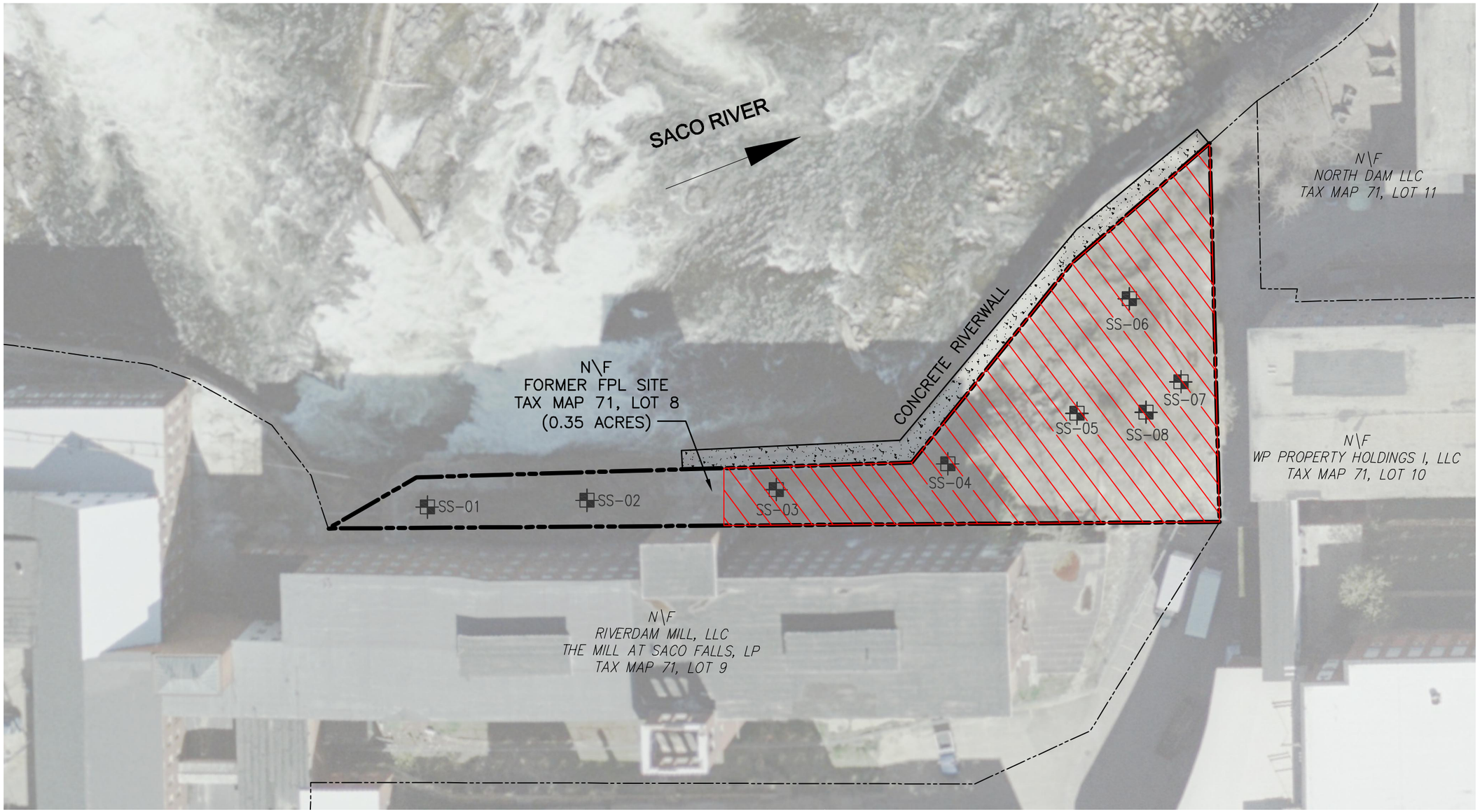
FIGURE 1
SITE LOCATION PLAN

FORMER FPL SITE
LACONIA AND YORK STREET
BIDDEFORD, MAINE 04019

1,000 0 2,000 Feet
1 inch = 2,000 feet.

BIDDEFORD

T:\Data\ME\Town\Biddeford\FLP Energy Maine Hydro



LEGEND

SYMBOL	DESCRIPTION
	SITE BOUNDARY
	ABUTTING PROPERTY BOUNDARY (APPROXIMATE)
	PREVIOUSLY COMPLETED SURFICIAL SOIL SAMPLE (AMEC – JULY 2012)
	APPROXIMATE AREA OF PAH AND ARSENIC-IMPACTED SOILS TO BE REMEDIATED

NOTES

1. BACKGROUND IMAGE SHOWN IS AN APRIL 24, 2006, AERIAL IMAGE OBTAINED FROM THE UNITED STATES GEOLOGICAL SURVEY (USGS) EARTH EXPLORER DATABASE.
2. SITE PROPERTY BOUNDARY LINES AND SURFACE SOIL SAMPLE LOCATION INFORMATION SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON AMEC'S JULY 26, 2012 PHASE II SAMPLING LETTER REPORT FIGURE, "SAMPLE LOCATIONS FIGURE 1".
3. ABUTTING PROPERTY LINES AND PROPERTY INFORMATION WERE OBTAINED FROM THE CITY OF BIDDEFORD'S ONLINE GEOGRAPHICAL INFORMATION SYSTEM. ABUTTING PROPERTY LINES ARE APPROXIMATE.

FIGURE 2
DETAILED SITE PLAN

GRAPHIC SCALE
40 0 20 40
1 inch = 40 ft.

FORMER FPL SITE
LACONIA AND YORK STREET
BIDDEFORD, MAINE 04019

DRAWN BY: WTE/MTG | DATE: 03/09/2015
CHECKED BY: ASD/RIP | PROJECT: 14001258

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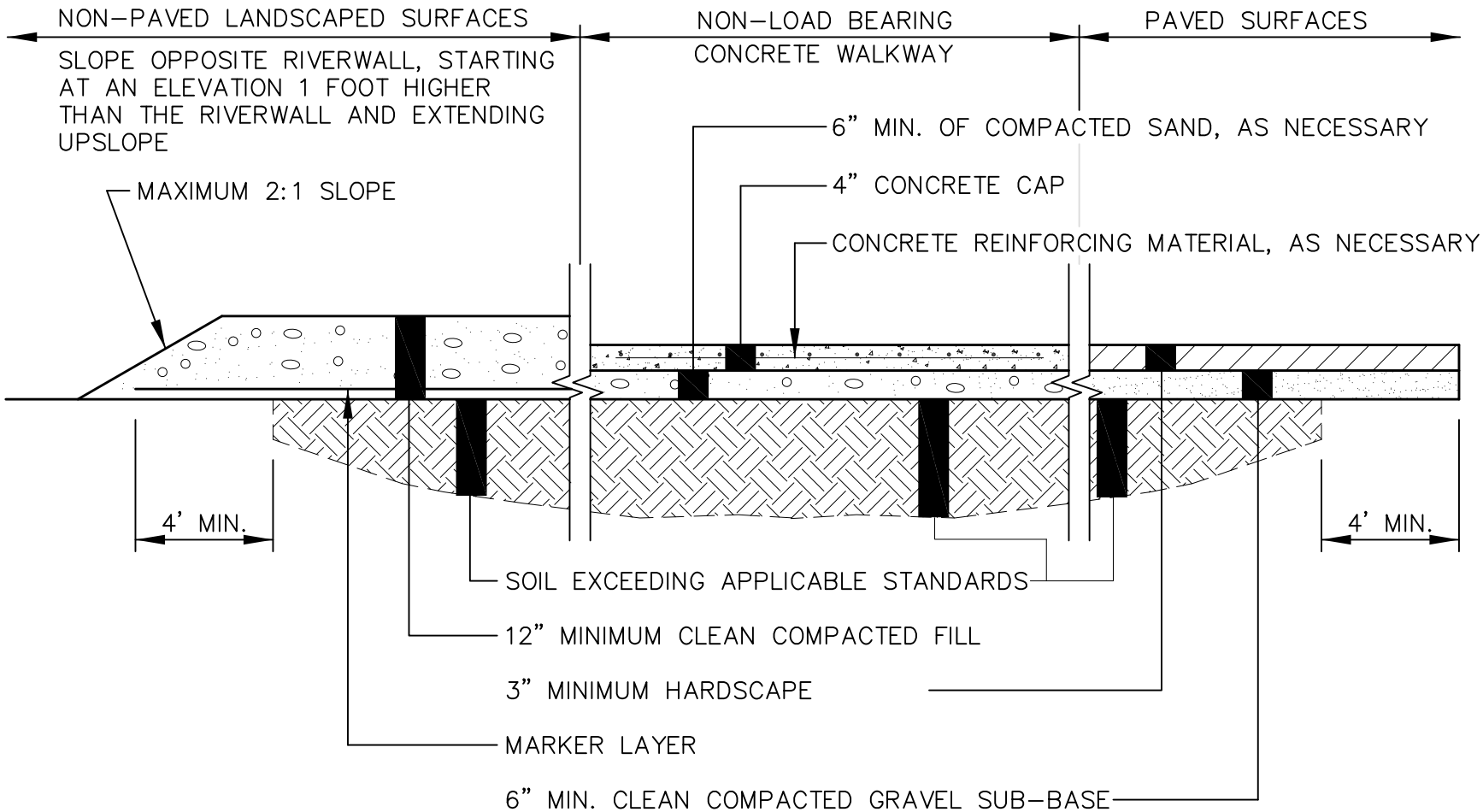
DRAWN BY: MTG | DATE: 1/26/2015
CHECKED BY:RIP/ASD | PROJECT: 1200156

SOIL COVERING SCHEMATIC

ABCA/RAP
FORMER FPL SITE
LACONIA AND YORK STREET
BIDDEFORD, MAINE

SKETCH NO: FIGURE 3

SCALE: N.T.S.



NOTE

THE QUANTITIES IDENTIFIED ARE MINIMUM REQUIREMENTS FOR COVERING OF THE IDENTIFIED CONTAMINATED SOILS. ADDITIONAL SUB–BASE MATERIALS MAY BE REQUIRED IN AREAS PROPOSED FOR ASPHALT PAVING AND/OR CONCRETE SIDEWALKS AS NECESSARY AND IF APPLICABLE, TO MAINTAIN STRUCTURAL INTEGRITY OF THESE MATERIALS.

APPENDIX A

Soil Management Plan/Environmental Management Plan

CREDERE ASSOCIATES, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

March 10, 2015

Brian Phinney
City of Biddeford
205 Main Street
Biddeford, Maine 04005

RE: **Soil Management Plan/Environmental Management Plan**
Former FPL Site
Laconia and York Streets, Biddeford, Maine

Dear Mr. Phinney:

The following document describes methods and procedures to be used during remediation activities and specifies long-term site management requirements at the Former FPL Site located off Laconia and York Streets in Biddeford, Maine (the Site). The activities and practices described below are necessary to fulfill the applicable regulatory requirements and to manage potential risk to human and environmental receptors associated with contaminated soil. Included in this Soil Management Plan (SMP)/Environmental Management Plan (EMP) are:

- A description of soil conditions and associated regulatory applicability
- A listing of proper health and safety work practices and protective equipment for use during Site work activities
- A description of onsite soil management procedures including soil handling, stockpiling, and dust control for use during Site work activities
- A description of the onsite soil reuse procedures including the soil cover system
- A summary of the methods to be used for the proper transport and disposal of excess soil that may be generated during redevelopment
- A description of procedures for future excavation of soil below the marker layer
- A summary of long-term inspection and maintenance procedures

1. INTRODUCTION AND APPLICABILITY

Based on available information, the Site was formerly utilized as part of the River Dam Mill and was improved with mill structures used for storage, production and/or the transportation of goods between the late 1800s and the mid/late 1900s. According to previous environmental reports, the Site was also used for the storage of electrical transformers in the late 1900s by the Central Maine Power Company (CMP).

According to previously completed environmental investigations, soil at the Site consists primarily of fill material that contains concentrations of polycyclic aromatic hydrocarbons

(PAHs) and arsenic at concentrations exceeding the Maine Department of Environmental Protection (DEP) park user remedial action guidelines (RAGs). A limited Soil Sampling Report was prepared in July 2012 to assess surface soil at the Site. In accordance with this site-specific data, maximum expected contaminant concentrations are summarized below and constitute impacted soil at the Site:

Table 1 - Estimated Maximum Soil Contaminant Concentrations for Compounds Exceeding Maine DEP RAGs*

Analytical Group	Analyte	Maximum Concentration (mg/kg except as noted)
PAHs	Benzo(a)anthracene	5.5
	Benzo(a)pyrene	3.9
	Benzo(b)fluoranthene	3.4
	Dibenzo(a,h)anthracene	0.9
Metals	Arsenic	12

* Maximum estimated Site concentrations are based on environmental data collected from the Site during the July 26, 2012, Soil Sampling Report. **Additional currently unknown contaminants may exist at the Site.**

2. GENERAL HEALTH AND SAFETY PLAN DURING SOIL EXCAVATION AND HANDLING

The following serves as guidelines for health and safety procedures to be employed during general construction and/or Site maintenance activities at the Site involving exposure to contaminated soil.

Based on previous environmental assessments completed at the Site, the expected contaminants of concern include PAHs and arsenic in soil. The primary route for contact with impacted materials at the Site is dermal absorption, incidental uptake, and active ingestion. As such, the utilization of basic personal protective equipment (PPE) will minimize the potential for human exposure while conducting remediation activities at the Site.

Training

All personnel who will be directly handling or otherwise may be exposed to impacted media shall have 40 hour Occupational Safety & Health Administration (OSHA) CFR 1910.120 training, 3 days of supervised field experience, and current 8-hour OSHA refresher training.

Personal Protective Equipment

Based on the hazard evaluation, Level D PPE has been initially designated for all personnel who will be directly handling or otherwise may be exposed to impacted media at the Site. The contractor's Health and Safety Officer may upgrade PPE to Level C or higher if additional hazards are identified during Site work.

Specific Level D PPE to be used at the Site includes the following:

- Steel toe work boots with latex over boots as required
- Safety glasses with side shields
- Work gloves
- Nitrile inner gloves
- Hard hat
- Coveralls (optional)

Work Zone Monitoring

The property boundaries should be monitored for ambient dust levels to ensure fugitive dust is not migrating from the Site onto adjoining or nearby properties. As a general rule of thumb, visible ambient dust should be controlled using wet suppressant methods and any stockpiles should be covered during down time. Access should be limited to applicable personnel during periods where contaminated soil is exposed at the surface.

General Operating Procedures

In addition to the above basic health and safety guidelines, the following procedures should be followed during activities conducted at the Site which create the potential for exposure to impacted soil:

- Work conducted at the Site shall be directed by a qualified environmental professional.
- The Site shall be surveyed and cleared by DigSafe.
- All equipment used during excavation activities shall be properly cleaned and decontaminated.
- Any indication of conditions more hazardous than those anticipated, or the observation of circumstances that would render the above basic health and safety procedures inappropriate, shall result in the evacuation of the work area and a reassessment of health and safety procedures by a qualified environmental professional.

3. ONSITE SOIL MANAGEMENT DURING REMEDIATION

The following section provides procedures for the excavation, re-use, storage, and disposal of excess soil generated during remediation activities at the Site.

All impacted soil that will remain at the Site, including materials planned for reuse and undisturbed *in situ* impacted soil if identified in the future, will be covered to minimize the direct contact hazard for future Site users.

Onsite Reuse of Soil

All areas of the Site should be covered according to the below specifications:

- All features and subsurface infrastructure will be installed and the grading of impacted soil shall be completed consistent with the design requirements for the Site.
- Any excess or unsuitable material (i.e. structurally unsuitable, building debris, etc) that cannot be re-used at the Site will be relocated to the adjoining City owned property for use as fill under proper cover or removed in accordance with **Section 4** of this SMP/EMP.
- A permeable geotextile fabric will be placed directly over the impacted soil in landscaped areas to indicate the distinction between the cover and the underlying impacted soil to remain at the Site. A separate marker layer will not be necessary below impermeable surfaces such as concrete walkways, asphalt pavement, hardscape, or concrete foundations, since these materials will serve as the marker layer. The geotextile marker layer will extend from landscaped areas to the exterior limit of these impermeable areas.
- A minimum of 12 inches of documented clean fill shall be placed as cover material over the marker layer in landscaped areas. The source of fill will be documented to be a local native source or will be documented to be clean through analytical testing. The covered areas will be loamed, seeded, mulched, vegetated, or otherwise permanently stabilized to prevent erosion and damage to the soil cover. If the marker layer must be compromised to facilitate landscape installation, a replacement marker layer shall be installed prior to the placement of any new non-impacted material.
- Areas planned for hardscape construction will be installed directly over the impacted soil and the hardscape will serve as the marker layer.
- Each covered area will be graded so that the stormwater runoff is directed to an appropriate area.
- Additional sub-base materials may be necessary beyond the minimum cover requirements discussed herein to maintain the structural integrity of the proposed site features.

Soil Stockpiling and Storage

In the event removal of soil is required for future maintenance, construction, or utility work at the Site. Soil excavated from the Site may be temporarily stored or removed following waste disposal characterization and acceptance at an appropriate receiving facility. Soil removed from the Site should be placed atop 20-mil polyethylene sheeting to prevent contamination of surrounding cover materials, and securely covered by 10-mil or 20-mil polyethylene sheeting. Berms shall be constructed around the edges of the stockpiles, the base shall be sloped to create leachate collection points, and storm water runoff will be diverted away from any soil stockpile or storage area when feasible.

Soil may be more conveniently live loaded into trucks for offsite disposal at an appropriate facility or temporarily stored within secure, water resistant, DOT-approved bulk containers. All stockpiled or containerized soil will be stored within a secure area of the Site and properly

labeled to minimize potential contact. In addition, all soil stockpiled or otherwise stored at the Site will be inspected daily for tears, holes, or other failures in the polyethylene sheeting or storage container.

Erosion Control

To prevent exposure of terrestrial and aquatic biota to COCs at the Site during construction, erosion control best management practices (BMP) will be employed in accordance with Maine's Erosion and Sedimentation Control Laws. Generally, sediment migration into the Saco River is limited by the river wall; however, the seeps at the base of the wall will be protected with filtration fabric during construction.

Dust Control

Dust control requirements will be a contractual responsibility of the environmental contractor for the Site and will be documented by the owner's Environmental Professional during remediation activities. Dust control measures shall be employed during excavation and grading, and to control dust around stockpiles, haul roads, and any other exposed soils.

- At a minimum, wet suppression shall be used to provide temporary control of dust. Wet suppression will be applied on a routine basis and/or as directed by the owner's Environmental Professional to adequately control dust. Depending upon weather conditions and work activity, several wet suppression applications per day, and/or the use of granular calcium chloride or similar commercially manufactured dust control agents, may be necessary to adequately control dust. Aside from routine wet suppression, alternate dust control measures are subject to approval by the owner's Environmental Professional.
- Water runoff generated by dust control will be retained and disposed in accordance with the requirements of the appropriate regulatory agencies.
- Vehicles leaving the Site shall have no mud or dirt on the vehicle body or wheels. Any foreign matter on the vehicle body or wheels will be physically removed prior to vehicles entering a public roadway. Vehicles will not be permitted to leave the Site with exterior mud or dirt that has the potential to be deposited on public roadways.

4. OFFSITE SOIL DISPOSAL

If need arises, all excess impacted soil or unsuitable material that cannot be relocated or is unsuitable for use at the adjoining City owned property will be transported and disposed offsite in accordance with all applicable federal and state regulations. The following subsections provide appropriate procedures for the characterization and offsite disposal of special waste soil.

Waste Characterization Sampling

Waste characterization sampling will be required in order to meet facility acceptance requirements. As such, the owner's Environmental Professional will collect representative samples from the special waste soil for analysis by an independent, Maine-certified laboratory.

At a minimum, and in accordance with disposal facility requirements, laboratory criteria will include, but may not be limited to, the following analyses:

- Total petroleum hydrocarbons (TPH)
- Volatile organic compounds (VOC)
- Semi-volatile organic compounds (SVOC)
- Polychlorinated biphenyls (PCB)
- RCRA 8 Metals
- pH
- Ignitibility, conductivity, and reactivity (sulfide and cyanide)
- Additional toxicity characteristics leaching procedure (TCLP) analysis, where necessary

Following the results of the above analyses, an appropriate disposal or recycling method will be selected and a soil disposal acceptance package should be prepared and submitted to the facility.

Soil Transport and Recycling/Disposal

Prior to shipment, an appropriate recycling or disposal application will be submitted to the selected facility to obtain acceptance approval. Following facility acceptance, impacted soil will be removed from the Site for proper recycling or disposal. The loading of impacted soil will be conducted in accordance with the requirements of this SMP/EMP. All impacted soil loading and transport activities will be overseen by the owner's Environmental Professional. All equipment used for the transport of impacted soil will be properly licensed in accordance with applicable state and federal regulations. Haul truck cargo areas shall be securely and completely covered during material transport on public roadways.

Each shipment of impacted soil will be accompanied by appropriate transport documentation, such as a hazardous waste manifest or bill of lading. An official record of each shipment of impacted soil from the Site, including tonnage, will be presented to the owner's Environmental Professional following delivery to the receiving facility.

5. PROCEDURES FOR EXCAVATION THROUGH THE COVER SYSTEM

The following are the procedures required when disturbing the soil cover system. See **Figure 1** for limits of the cover system. It is assumed for the purposes of this Soil Management Plan that impacted soil will be encountered beneath the cover system.

DEP Notification

Prior to excavation, the Maine DEP must be notified in writing. This notification should include a description of the work to be completed and how the excavated material will be handled and managed. Applicable Natural Resource Protection Permits similar to those required for the initial work may be required depending on the nature of the required cover disturbance.

Personnel Training

All excavated material beneath the cover system is assumed to be impacted soil and should be handled by personnel properly trained in handling hazardous materials in accordance with OSHA 1910.120.

Disposal of Unsuitable Excavated Material

Unsuitable excavated material (i.e. improper utility backfill, building debris, etc.) must be disposed of in one of the following manners:

1. Excavation is backfilled with excavated material, followed by a marker layer and then covered with a minimum of 12 inches of documented clean material; or

2. Excavated material is disposed off-site in accordance with applicable State and Federal rules, regulations and law.

6. EMERGENCY UTILITY REPAIR NOTIFICATION EXCEPTION

Emergency repair of subsurface utilities (e.g., a water line break) below the marker layer may be performed without prior Maine DEP notification. However, the Maine DEP must be notified within 72 hours of the start of repair activities. **Sections 2 through 5** of this plan still apply, to the extent practicable, during any emergency excavation and repair.

7. GROUNDWATER USE RESTRICTIONS

The use of groundwater at the Site as a potable water source is prohibited. All potable water must be provided to the Site via a public water source.

8. INSPECTION AND MAINTENANCE PLAN

This section outlines the inspection and maintenance plan for the soil cover. A copy of the SMP/EMP will be maintained by the City and should be filed in appropriate City files and provided to applicable City departments for ease of access when additional work is required.

Rationale

The cover system installed at the Site currently adequately addresses risk of exposure to contamination to Site occupants; however, due to the continued use of the Site, the cover system may degrade over time. Periodic and annual inspections and as needed maintenance will maintain the cover system and ensure continued risk reduction at the Site.

Inspection Checklist

The cover system at the Site should be inspected at a minimum on an annual basis. The purpose of the inspection is to ensure the performance of the soil cover system is maintained, as well as to provide a means of documenting the need to perform (or documenting completed) maintenance on the soil cover system.

The inspection checklist to be filled out on an annual basis is included in **Table 1**.

General Maintenance

To ensure the proper performance of the cover system, it is critical that the cover system be properly maintained. If during the annual inspection or during normal site operations, it is observed that the cover is eroded or damaged, then immediate action to repair the damage should be undertaken. This should include the placement of an additional marker layer and a minimum of 12 inches of suitable soil, and/or re-grading of area to reduce erosion.

Maintenance required and performed should also be summarized on the inspection checklist in **Table 1**.

Record Keeping

An annual inspection report, documenting the general condition of the covered areas and any maintenance required or performed by the property owner, must be prepared and kept on file. The inspections will be conducted and recorded by the City of Biddeford Environmental Code Enforcement Office. The annual inspection documentation should also be made available for inspection by the Maine DEP upon request.

9. ANTICIPATED QUESTIONS

The following are examples of anticipated questions and answers, and are provided as guidance to the grounds and maintenance staff and other potential users of the Site.

Why are there restrictions on excavating at the Site?

The Site is located in the area of historical industrial operations and these operations have resulted in soil that is contaminated. To minimize potential human exposure to the contaminated soil, there is a restriction on excavating soil.

How do I know where on the grounds I am allowed to dig and where it is restricted?

The areas of the Site depicted on **Figure 1** should be considered a restricted area and notification to the DEP is required prior to any excavation through the cover system.

Will a subcontractor hired to work at the Site need to comply with this Plan?

Yes. Most contractors will be unaware that there is a restriction on digging on the Site. Anyone who is planning on digging at the Site will need to comply with this Plan and Maine DEP requirements.

The property owner is responsible for notifying subcontractors of this Plan and its requirements.

Why is there a groundwater restriction at the site?

Groundwater at the Site has not been assessed for impacts associated with the impacted soil. To minimize potential human exposure to the potentially contaminated groundwater, there is a restriction on groundwater use.

What is a groundwater use restriction?

A groundwater use restriction means that no new groundwater extraction wells can be installed on the Site for potable water uses. If there ever becomes a need to lift this restriction a hydrogeologic study must be completed to confirm that the groundwater is acceptable to be utilized for potable uses.

What is a hydrogeologic study?

A hydrogeologic study is an investigation done by a qualified environmental consulting firm and approved by the Maine DEP to study the groundwater in an area. The investigation can involve such things as installing and sampling monitoring wells and computer modeling.

If I have a question, who should I call?

Depending on the complexity of the issue, the following people will be able to answer your questions or refer you to the right person.

Former FPL Site– Contact Information Site Soil/Environmental Management Plan		
Organization	**Person**	**Phone Number**
Property Owner	City of Biddeford Brian Phinney	(207) 571-0032
Credere Associates, LLC	Rip Patten	(207) 828-1272 x35
Maine DEP	Nick Hodgkins	(207) 287-4854

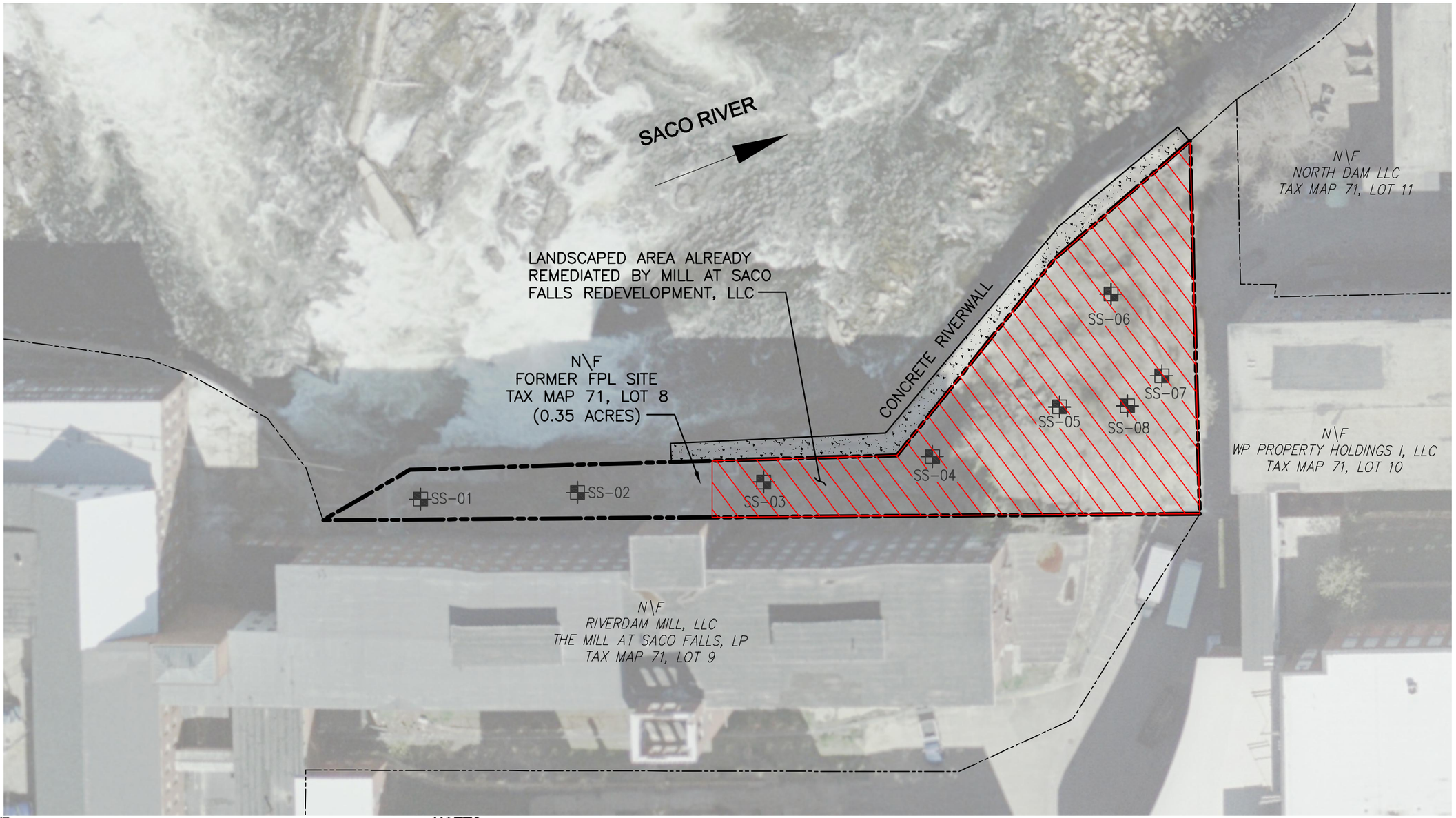
If there are any questions, please contact the undersigned.

Sincerely,
Credere Associates, LLC

Allison Drouin.
Geologist

Rip Patten, PE, LSP, LEED-AP
Vice President

Attachments: Figure 1 – Extent of Soil Cover
Table 1 – Annual Soil Cover Inspection Checklist



LEGEND

SYMBOL	DESCRIPTION
	SITE BOUNDARY
	ABUTTING PROPERTY BOUNDARY (APPROXIMATE)
	PREVIOUSLY COMPLETED SURFICIAL SOIL SAMPLE (AMEC – JULY 2012)
	APPROXIMATE EXTENT OF SOIL COVER

NOTES

1. BACKGROUND IMAGE SHOWN IS AN APRIL 24, 2006, AERIAL IMAGE OBTAINED FROM THE UNITED STATES GEOLOGICAL SURVEY (USGS) EARTH EXPLORER DATABASE.
2. SITE PROPERTY BOUNDARY LINES AND SURFACE SOIL SAMPLE LOCATION INFORMATION SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON AMEC'S JULY 26, 2012 PHASE II SAMPLING LETTER REPORT FIGURE, "SAMPLE LOCATIONS FIGURE 1".
3. ABUTTING PROPERTY LINES AND PROPERTY INFORMATION WERE OBTAINED FROM THE CITY OF BIDDEFORD'S ONLINE GEOGRAPHICAL INFORMATION SYSTEM. ABUTTING PROPERTY LINES ARE APPROXIMATE.

FIGURE 1
EXTENT OF SOIL COVER

GRAPHIC SCALE
40 20 0 40
1 inch = 40 ft.

FORMER FPL SITE
LACONIA AND YORK STREET
BIDDEFORD, MAINE

DRAWN BY: WTE/MTG
CHECKED BY: ADS/RIP
DATE: 03/09/2015
PROJECT: 14001258

CREDERE ASSOCIATES, LLC
776 MAIN STREET
WESTBROOK, MAINE 04092
TEL: 207.828.1272
FAX: 207.887.1051
WWW.CREDERELLC.COM

Economy Community Environment

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TABLE 1
Former FPL Site
ANNUAL SOIL COVER INSPECTION CHECKLIST

Date: _____

By: _____

Weather: _____

Erosion of soil cover observed in area?	**Y / N**	**Observations:**
Marker layer exposed in any area?	**Y / N**	**Observations:**
Significant settling observed?	**Y / N**	**Observations:**
Unusual seeps or breakouts of liquids observed?	**Y / N**	**Observations:**
Comments:		
Maintenance Required:		
Maintenance Completed:		
Date Maintenance Completed:		