DRAFT
ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES &
CONCEPTUAL REMEDIAL ACTION PLAN
THE YARD SOUTH
149A FRONT STREET
SOUTH PORTLAND, MAINE

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1.0 INTRODUCTION AND BACKGROUND

Ransom Consulting, LLC (Ransom) has completed this Analysis of Brownfields Cleanup Alternatives (ABCA) on behalf of the South Portland Housing Department Corporation (SPHDC) to evaluate remedial alternatives for previously identified adverse environmental conditions at the Yard South Site, located at 149A Front Street in the City of South Portland, Cumberland County, Maine (the "Site"). This report summarizes the evaluation of remedial alternatives for the Site and includes a discussion of each remedial option, a cost estimate, the degree of effectiveness, ease of implementation for each remedial alternative, and the resilience of each option in light of reasonably foreseeable changing climate conditions. This report also contains a discussion of the recommended remedial alternative for the Site, as well as a conceptual Remedial Action Plan (RAP) for the selected alternative.

The SPHDC has obtained a $240,000 loan and a $160,000 grant (plus required 20% match) from the Maine Department of Economic and Community Development (DECD) Brownfield Revolving Loan Fund (RLF) Cleanup Program; as well as a $177,000 loan and a $500,000 grant from the Greater Portland Council of Governments (GPCOG) Brownfield RLF Cleanup Program.

1.1 Purpose and Scope

The purpose of this report is to screen potential remedial alternatives to mitigate previously identified adverse environmental conditions associated with the Site. Based on the information obtained during previous environmental investigations (summarized in Section 2.0), three remedial options were considered for the Site and evaluated. Key consideration was given to eliminating or reducing, to the extent possible, the risk of exposure for existing and future Site occupants and workers to the identified contamination at the Site.

The overall objectives of this ABCA include the following:

1. Evaluating the remedial alternatives against specific criteria, including overall protection of human health and the environment, technical practicality, ability to implement, reduction of toxicity, mobility, and volume, time required until remedial action objectives are attained, costs, and resiliency to climate change;

2. Selecting the remedial alternative that best meets the objectives and considerations of the project; and

3. Presenting a conceptual RAP for implementing the selected remedial alternative.

Remediation alternatives evaluated in this ABCA include 1) a No Action Alternative, 2) Shoreline Stabilization and Soil Cover System Alternative, and 3) Shoreline Stabilization and Soil Removal Alternative. The Evaluation of Remediation Alternatives (Section 5.0) discusses the requirements for each alternative. The alternatives were evaluated on the previously mentioned criteria, and one alternative was recommended for implementation at the Site. Furthermore, a conceptual RAP is presented in Section 6.0 for the recommended alternative.

1.2 Site Description and Surrounding Land Use

The Site is an approximately 3.16-acre parcel of land located at 149A Front Street in the City of South Portland, Cumberland County, Maine. The Site is located in an industrial area in the northeast corner of the City of South Portland, situated on the banks of the Fore River, between Bug Light Park to the east and a bulk oil storage facility to the west. The Site location is identified in **Figure 1**. The Yard South Site is part of a historic shipbuilding facility located on South Portland's Waterfront known as the Liberty Shipyard.

From circa 1940 to 1943, the U.S Government acquired the Liberty Shipyard property (which includes the Yard South Site) and brought fill to the Site in order to construct a shipyard manufacturing facility to meet the demand of World War II. From circa 1940 until 1945, the U.S Government contracted the Todd-Bath Shipyard, which later became the New England Shipbuilding Corporation (NESC), to operate the shipyard. In 1946, the Greater Portland Public Development Commission (GPPDC) purchased the Liberty Shipyard from the U.S Government. GPPDC subdivided and sold the Site parcels to various owners, which have utilized/occupied the Site for industrial and commercial businesses from circa 1946 until present date.

In 1995, Irving Oil purchased the 149 Front Street property and proposed to develop a bulk petroleum tank facility at the property, but the proposed bulk tank facility did not materialize, and the property remained vacant. From 1999 to 2016, HHH, LLC acquired all of the Liberty Shipyard Site parcels and proposed to redevelop them for mixed residential, commercial, and industrial uses, but those redevelopment plans did not materialize. The current Site owner (SPHDC) acquired the Site in 2020. The Liberty Shipyard Site is currently vacant and unimproved.

In December of 2017, the northern portion of the 149 Front Street property (which includes the Yard South Site) was entered into the Maine Department of Environmental Protection (MEDEP) Voluntary Response Action Program (VRAP) as the "Liberty Ship North Site" on behalf of the property owner at the time (HHH, LLC). In May 2018, the MEDEP VRAP issued a No Action Assurance (NAA) letter which outlined certain conditions that must be met as part of Site development in order to obtain a Certificate of Completion and liability protections from the MEDEP VRAP: 1) that a Declaration of Environmental Covenant (DEC) be prepared and recorded at the Cumberland County Registry of Deeds that documents the engineering and administrative controls implemented at the Site; and 2) that engineering controls and remedial tasks performed were completed in accordance with a MEDEP-approved Environmental Media Management Plan (EMMP). This EMMP was prepared in June 2018, and it outlined administrative and engineering controls necessary to limit exposure to contaminated media at the Site and described protocols for installing/maintaining MEDEP-approved cover systems (or other soil remediation systems) during future property redevelopment. The EMMP also required installation of vapor mitigation systems into future occupied buildings. A DEC has also been recorded; however, to date, no remedial actions outlined in the VRAP NAA or EMMP have been completed at the Site.

Over time, historic cribbing which formerly armoring the shoreline on the site has eroded, and the exposed material (presumed urban fill, as discussed above) has begun to erode into the Fore River due to river flow, tidal action, precipitation and storm events, and general wind/erosion. Erosion is most prominent between the Mean High Water (MHW) elevation and the top of bank. The portion of the shoreline between the former pier and the Northwest corner of the site currently exhibits the most erosion; however, the entire shoreline of the Site is unstable.

1.3 Future Site Use

The overall redevelopment plan for the Yard South site is to construct a resilient, sustainable, and vibrant mixed-use commercial and residential district that will serve as a model for future growth. Throughout this new district, a network of pedestrian-friendly streetscapes, trails, bus service, and water-based transit will connect the development to adjacent South Portland neighborhoods, Bug Light Park, the Greenbelt, and Portland. The Yard South waterfront will be a welcoming space with sweeping views of Fort Gorges, Casco Bay islands, the Portland skyline, and busy harbor. Housing, constructed over several phases, will be available for a range of income levels to address South Portland's housing goals.

1.4 Site Geology and Hydrogeology

Based on historic environmental investigations that have been conducted at the Site and the Liberty Shipyard properties, overburden soils in the area of the Site consist of up to 10 feet of urban fill underlain by a combination of silty sand, glaciomarine clay (i.e., Presumpscot Formation) and/or bedrock. The fill reportedly consists of a heterogeneous mix of silt, sand, gravel, cobbles and various anthropogenic constituents (bricks, concrete, wood, coal, ash, clinkers, etc.). Silty-sand deposits have been sporadically observed between the fill and the glaciomarine clays. The Presumpscot Formation consists of massive to laminated silt and silty clay with trace amounts of fine sand. Bedrock at the Site is identified as the Spring Point Formation, which consists of a varying assemblage of phyllite, amphibolite and gneiss. Generally, bedrock has been documented at approximate depths ranging from 5 to 14 feet below ground surface (bgs) at the Site.

Based on field observations and topography, the localized shallow groundwater flow is presumed to be generally north-northwest towards the Fore River. Shallow groundwater flow may be influenced by tides, underground utilities, heterogeneous subsurface soil strata, and/or other subsurface structures, which may act as preferred pathways of flow. Groundwater was encountered at the Site during historic environmental investigations at an approximate depth of 8-10 feet bgs, at the interface of native clay and overlying fill layers.

2.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

The following environmental assessments have been completed for the Liberty Shipyard Property (inclusive of The Yard South Site) through the City of South Portland's Brownfield Assessment Program:

1. Environmental Review and Data Gaps Evaluation, Former Liberty Shipyard Site, prepared by Ransom, May 6, 2020. It should be noted that this report summarizes and documents an extensive number of historic environmental investigations which have been performed on the Site at the entire Liberty Shipyard.

2. Phase II Environmental Site Assessment, Former Liberty Shipyard Site, prepared by Ransom, October 2020.

Copies of these reports have been previously provided to the MEDEP and filed with the City of South Portland's Brownfields Program and/or the MEDEP VRAP.

Additionally, as part of the property transfer between L&R Northpoint Holdings (prior owner) and SPHDC (current owner), a Phase I ESA was completed by Ransom on October 16, 2020. The ESA did not identify any "Recognized Environmental Conditions" (RECs) in connection with the Site; however, the presence of previously-identified soil contamination and potential groundwater and soil vapor contamination was considered a Controlled Recognized Environmental Condition (CREC) because those contaminated media are being managed through a MEDEP VRAP NAA letter.

Ransom further concluded that because a Phase II Investigation has been performed at the Site (and surrounding Liberty Shipyard properties) through the City of South Portland Brownfield Assessment Program and because the Yard South Site redevelopment would be conducted in accordance with the MEDEP VRAP NAA Letter and EMMP, that no additional investigation was necessary. Ransom recommended the following actions be performed as part of future Site redevelopment and construction activities: 1) that the risk of exposure to contaminated media identified continue to be properly managed in accordance with the recorded DEC for the property, MEDEP' VRAP oversight/guidance, and the EMMP, dated June 2018; 2) Upon completion of proposed Brownfield cleanup activities at the Site, that a VRAP Closure Report (i.e. Remediation Closure Report) be prepared and submitted to the MEDEP for review and approval; and 3) Following MEDEP's review and approval of the VRAP Closure Report that the prospective Site owner and past owner should obtain a MEDEP VRAP "Certificate of Completion" for the Site under 38 M.R.S.S 343-E

3.0 SITE CHARACTERIZATION AND CLEANUP GOALS

Previous environmental investigations completed at the Site identified residual environmental contamination associated with historical Site operations. The identified contamination and appropriate cleanup goals are summarized below.

3.1 Regulatory Standards

Soil, groundwater, and soil vapor results from historic environmental investigations at the Site were compared to the MEDEP Bureau of Remediation and Waste Management's (BRWM's) "Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances," dated May 1, 2021.

Soil: Based on proposed redevelopment scenarios for the Site, the MEDEP RAGs for the Residential, Park User, Commercial Worker, and "Construction Worker exposure scenarios are the most applicable for surficial soils at the Subject Property. Because excavation/construction workers will also be in contact with potentially impacted soils at depth, subsurface soil sampling results will also be compared to the MEDEP RAGs for the "Construction Worker" exposure scenario.

Groundwater: Because public water is supplied to the Site and vicinity, the MEDEP RAGs for the Construction Worker exposure scenario is the most applicable to the Site.

3.2 Soils

As part of the City of South Portland Brownfield Assessment Program, Ransom conducted a Phase II ESA for the entire Liberty Shipyard property in the fall of 2020. A total of three test pits, three soil borings, and one soil vapor sample were performed on the Yard South Site. Ransom's Phase II ESA also included sampling five groundwater monitoring wells (LSMW202, LSMW203, LSMW204A, LSMW204B and LSMW205) which were installed at the Site as part of historic environmental investigations. Figure 2 identifies the locations of the samples taken as part of the Phase II ESA.

Surficial and subsurface soils encountered at the Yard South Site consisted of urban fill materials (wood, brick, concrete asphalt, and glass), sand and gravel to approximately 10 feet bgs. Native soils consisting of glaciomarine clay (Presumpscot Formation) were encountered at approximately 10 bgs. Minor petroleum staining was noted with one of the test pits in the central portion of the Site, and likely consisted of weathered fuel oil; however, elevated concentrations of organic vapors were not noted within any of the test pits or soil borings when screened with a photoionization detector (PID). Analytical results of the soil samples collected from the Site indicated concentrations of lead and arsenic within the surficial soil (i.e. 0-2 feet bgs) that exceed the corresponding MEDEP RAGs for the "Residential" exposure scenario.

The Yard South Site has approximately 500 feet of shoreline along the Fore River; this shoreline is constructed of urban fill materials, as well as large blocks from pre-war breakwater structure in the area. The shoreline at the Site is severely eroded, and is littered with exposed fill materials, brick, and metal remnants; these fill materials contain elevated concentrations of heavy metals, and urban fill is typically characterized by metals, petroleum constituents, and hydrocarbons. Historic aerial photos dating back to the 1950's show that the shoreline deteriorates each year, resulting in contaminated fill material being washed into the Fore River and Casco Bay.

The cleanup goals for the Site are to: reduce or eliminate the risk of human contact (current and future Site workers, future Site users, and/or residents) to impacted soils at the Site; to protect the adjacent Fore River and other environmental receptors; and to protect the environment and human receptors during proposed Site redevelopment activities.

3.3 Groundwater

Ransom collected groundwater samples from existing monitoring wells at the Site. Analytical results from the groundwater samples did not indicate contaminants of concern (COCs) to be present at concentrations exceeding either laboratory detection limits or their corresponding RAGs. As such, no groundwater remediation is anticipated.

3.4 Soil Vapors

Analytical results from the soil vapor sample collected indicated low concentrations of air petroleum hydrocarbons (APH) and VOCs. The detected concentrations and the laboratory's detection limits were all below their respective RAGs for the residential and commercial soil gas target values. These results suggest that no further soil vapor/indoor air remedial actions would be necessary; however, as stated previously, the NAA Letter for the "Liberty Ship North Site" (inclusive of the Site) has a requirement that new construction at the Site be equipped with vapor mitigation systems.

4.0 DESCRIPTION OF EVALUATION CRITERIA

The comparison of the remediation alternatives was conducted using the evaluation and threshold criteria described below.

4.1 Overall Protection of Human Health and the Environment

Alternatives must pass this threshold criterion to be considered for implementation as the recommended alternative. The goal of this criterion is to determine whether a remediation alternative provides adequate protection of human health and the environment. It also addresses how identified risks are eliminated, reduced, or controlled. Protection of human health is assessed by evaluating how site risks from each exposure route are eliminated, reduced, or controlled through the specific alternative.

4.2 Technical Practicality

The focus of this evaluation criterion is to determine technical practicality of instituting the specific alternative. This criterion evaluates the likelihood that the alternative will meet project specifications.

4.3 Ability to Implement

This criterion analyzes technical feasibility and the availability of services and materials. Technical feasibility assesses the ability to implement and monitor the effectiveness of the alternative. 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.

4.4 Reduction of Toxicity, Mobility, and Volume

This criterion evaluates the ability of the remediation alternative to significantly achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site. This analysis evaluates the quantity of hazardous substances and/or petroleum-impacted media to be removed, the degree of expected reduction in toxicity, the type and quantity of residuals to be reduced, and the manner in which the principle threat is addressed through the remediation alternative.

4.5 Short Term Effectiveness

This criterion addresses the period of time needed to complete the remediation, potential adverse impacts on human health and the environment that may exist until the cleanup goals are achieved, and the time frame for accomplishing the associated reduction in the identified environmental conditions.

4.6 Resiliency to Climate Change Conditions

This criterion evaluates the resilience of the remediation alternative to reasonably foreseeable changing climate conditions, such as: increasing/decreasing temperatures; increasing/decreasing precipitation; extreme weather events; rising sea level; changing flood zones; and higher/lower groundwater tables, among others.

4.7 Preliminary Cost

The preliminary cost criterion for the remediation alternatives evaluates the estimated capital, operation, and maintenance costs of each alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering, sampling contingencies, and licenses. Costs were developed as a balancing criterion for the remedial alternatives and should not be construed as bid costs or engineer's cost estimates. Cost may be used as a distinguishing factor in the selection of the remedial action. The preliminary costs developed should in no way be construed as a cost proposal, but rather a guide for selecting a remedial action.

5.0 EVALUATION OF REMEDIATION ALTERNATIVES

Based on the evaluation criteria outlined in the previous section and the potential exposure pathways identified for the Site, the remedial actions selected for the Site should accomplish the following objectives:

1. Minimize the potential for direct contact, incidental ingestion, or inhalation of contaminated soils located throughout the Site by current and/or future occupants, trespassers, future construction workers, and future residents at the Site;

2. Minimize the potential for impacts to the adjacent Fore River and other environmental receptors;

3. Protect construction workers and abutters during future Site redevelopment through control of dust and stormwater runoff; and

4. Reduce the toxicity, mobility, and/or volume of hazardous substances at the Site.

A secondary, but no less important objective is to facilitate sustainable and responsible development of the Site. To achieve these objectives, three soil remediation options were considered and are discussed in the following subsections. These remedial alternatives include the No Action Alternative, the Shoreline Stabilization and Soil Cover System Alternative, and the Shoreline Stabilization and Soil Removal Alternative. These alternatives were evaluated using the criteria described in Section 4.0 and are summarized below. The attached Table 1 includes a summary of the Evaluation and Comparison of the Remedial Alternatives.

In addition to the soil remediation activities associated with the alternatives discussed below, the following additional remedial activities will be completed to address known environmental conditions at the Site, regardless of the selected soil remediation alternative:

1. A revised Site-Specific EMMP will be prepared and implemented during Site redevelopment activities (a soil management plan was previously prepared as part of historic VRAP documentation). This plan will outline procedures to reduce the risk of exposure of Site workers to the contaminated soil during construction activities; and will ensure proper characterization, handling, and management of contaminated soils which may be encountered and displaced during construction activities; and

2. Future occupied buildings at the Site will be equipped with a MEDEP-approved vapor mitigation system.

5.1 No Action Alternative

A No Action Alternative signifies that no further site remediation activities would be conducted. The No Action Alternative does not include a means for mitigating exposure to contaminated soils; therefore, the potential for human exposure continues to exist for current and future Site users, workers, and residents. As such, it may be necessary to install a fence and signage to control access to the Site. This alternative is not protective of the Fore River; without slope stabilization measures, the shoreline will continue to erode. This alternative does not facilitate Site redevelopment, nor does it protect Site workers and abutters

during redevelopment activity. The No Action Alternative would not achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site.

The No Action Alternative is not protective of human health and the environment and does not meet the project objectives. For these reasons, the No Action Alternative was not selected for implementation or further consideration.

5.2 Shoreline Stabilization and Soil Cover Systems Alternative

The second soil remediation alternative evaluated in this ABCA is the Shoreline Stabilization and Soil Cover Systems Alternative. This remedial alternative involves mitigating the potential for human exposure to impacted soils through construction of MEDEP-approved cover systems, performing shoreland stabilization, constructing clean corridors for future utility installations, and development of institutional controls/deed restrictions in the form of an EMMP (see previous section) and a Cover System Maintenance Plan.

MEDEP-approved cover systems would be installed over the impacted soils on the Site to prevent human contact with the impacted soils. Cover systems will be designed based on the proposed redevelopment features and existing Site conditions. For example, the conceptual redevelopment design includes the design of mixed-use building(s) over the majority of the Site. The proposed building footprint, paved parking areas, proposed concrete walkways and patios, and even landscaped areas will be constructed as engineered cover systems with marker layers and adequate cover material. Please see **Figure 3** for a proposed cover system layout, based on preliminary Site redevelopment plans, and **Figure 4** for construction details for several types of cover systems that may be used at this Site.

This alternative also includes temporary Shoreline Stabilization to prevent further erosion of potentially contaminated fill materials into the Fore River. Stabilization efforts will include placing toe stones along the base of the slope and armoring exposed soil with riprap to the top of the slope. The shoreline stabilization will occur from approximately the MHW elevation line to the top of slope, across the entirety of the shoreline. Areas below the MHW elevation will be stabilized through a separate, non-brownfields funded project.

Clean corridors will also be constructed in areas of proposed utilities (i.e. sewer and water services to the proposed building). These corridors will allow future construction workers to install infrastructure without coming into contact with contaminated soils. See Figure 4 for a construction detail of a typical clean corridor installation. If possible, excess soils will be relocated to different areas of the Site to be placed beneath MEDEP-approved cover systems; if this is not possible, those soils would be removed from Site and properly disposed.

If this alternative is selected, additional institutional controls/deed restrictions will be necessary to ensure that future construction, remediation, or landscaping at the property would not disturb the engineered cover systems or underlying residual contaminated soil without notification and consent from the MEDEP. A Post-Closure Cover System Maintenance Plan will need to be prepared and implemented to ensure the integrity of the cover systems over time.

The Soil Cover System Alternative meets the objectives of the project by minimizing the potential of human contact with contaminated soils, conducting slope stabilization to protect the adjacent Fore River, supporting proposed site redevelopment and protecting construction workers and abutters; and reducing

the mobility of hazardous substances at the Site. This alternative also fulfills the evaluation criteria as discussed below.

5.2.1 Overall Protection of Human Health and the Environment

This alternative provides adequate protection of human health by reducing the risk of human exposure to impacted soils via construction of engineered cover systems and the implementation of institutional controls which prohibit disturbance of the cover systems and require a Post-Closure Cover System Maintenance Plan. Additionally, the preparation and implementation of an Environmental Media Management Plan will provide guidance to redevelopment Site workers to minimize and manage future exposures to contaminated soils during Site redevelopment. The goal of reducing the risk of human exposure to impacted soils could be achieved through this alternative. Construction of clean corridors will further protect future construction workers at the Site since they will not have the potential of coming into contact with contaminated soils during future utility installations.

This alternative provides protection of the environment by shedding or redirecting stormwater run-on and minimizing infiltration within the impacted areas. Additionally, the preparation and implementation of an EMMP outlining proper stormwater, erosion, and dust management protocols will minimize potential impacts to the Fore River during remediation and future redevelopment activities. Conducting shoreline stabilization also provides additional protection of the environment by preventing contaminated soils and urban fill from eroding into the Fore River.

5.2.2 Technical Practicality

Constructing cover systems, performing shoreland stabilization, and constructing clean corridors are common and technically-practical remedial measures. The construction of these systems could be completed utilizing accepted construction techniques. Contractors with experience in similar projects are readily available in the region.

5.2.3 Ability to Implement

This remedial alternative is technically feasible and is an effective action for reducing the risk of human exposure to contaminated soils at the Site. Services and materials necessary to conduct this alternative are readily available.

Shoreland stabilization will require permitting as well as local, state, and federal approvals; however, the engineering and redevelopment team performing this Brownfield cleanup project have the expertise and experience to navigate these requirements.

5.2.4 Reduction of Toxicity, Mobility, and Volume

Engineered cover systems and shoreline stabilization can achieve reduction of the mobility of the impacted soils at the Site by reducing the amount that rainwater/stormwater, humans/animal transport methods, and wind/atmospheric transport methods can come into contact with the impacted soils; however, because no contaminated soils are being removed from Site as part of this alternative, there will be no reduction in the toxicity or volume of impacted soils at the Site.

5.2.5 Short Term Effectiveness

The remedial action objective could be attained when the impacted soils are covered, the shore is stabilized, and the clean corridors are in place. Potential adverse impacts to human health and the environmental from exposure to the contaminated soils may exist until the cleanup goals are achieved.

5.2.6 Resiliency to Climate Change Conditions

Due to the Site's proximity to the Fore River, climate change effects from rising sea level and changing flood zones may represent a threat to the Site. Additional climate change concerns would be associated with extreme weather, increased rainfall, and a rising groundwater table. This remedial alternative meets the objectives associated with this criterion by preventing impacted soils from coming into contact with rain/stormwater. The cover system will shed or redirect stormwater run-on and minimize infiltration within the impacted areas. Additionally, the redevelopment of this site will include temporary and permanent erosion control measures. Because impacted soils will remain onsite, a rising groundwater table may have the potential to come into contact with impacted soils; however, the contaminants of concern are not expected to be significantly leachable, thus reducing potential groundwater impacts.

Shoreland stabilization is a vital component of the Site's resiliency to climate change conditions. The reinforced and protected shoreline will prevent contaminated soils from washing into the Fore River due to rising water levels, high tide events, and extreme weather.

5.2.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 2 - Summary of Estimated Remediation Costs for Shoreline Stabilization and Soil Cover System Alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and sampling contingencies. The costs associated with this alternative are not prohibitive and are lower than Alternative 3 Shoreline Stabilization and Soil Removal Alternative.

5.3 Shoreline Stabilization and Soil Removal Alternative

The third soil remediation alternative evaluated in this ABCA is the Shoreline Stabilization and Soil Removal Alternative. This remedial alternative involves mitigating the potential for human exposure to impacted soils through removal and off-site disposal of surficial soils (depths up to 2 feet bgs), performing shoreland stabilization, constructing clean corridors for future utility installations, and development of institutional controls/deed restrictions in the form of an EMMP (see previous section).

In this alternative, approximately 13,500 cubic yards (approximately 15,000 tons) of surficial soil would be removed across the entire Site to a depth of two feet bgs to eliminate the exposure risk associated with the contaminated surficial soils. Excavated soil would be transported offsite and disposed at a landfill or other licensed receiving facility, based on the results of soil characterization sampling. The excavation would be backfilled with compacted clean fill and topsoil.

This alternative also includes temporary Shoreline Stabilization to prevent further erosion of potentially contaminated fill materials into the Fore River. Stabilization efforts will include placing toe stones along the base of the slope and armoring exposed soil with riprap to the top of the slope. The shoreline stabilization will occur from approximately the MHW elevation line to the top of slope, across the entirety of the shoreline.

Clean corridors will also be constructed in areas of proposed utilities (i.e. sewer and water services to the proposed building). These corridors will allow future construction workers to install infrastructure without coming into contact with contaminated soils. See Figure 4 for a construction detail of a typical clean corridor installation. Excess soils from these clean corridors would be transported for offsite disposal.

If this alternative is selected, additional institutional controls/deed restrictions will be necessary to ensure that future construction, remediation, or landscaping at the property would not disturb residual contaminated soil (at depths greater than 2 feet bgs) without notification and consent from the MEDEP.

The Shoreland Stabilization and Soil Removal Alternative meets the objectives of the project by eliminating the potential of human contact with contaminated surficial soils, conducting slope stabilization to protect the adjacent Fore River, supporting proposed site redevelopment and protecting construction workers and abutters; and reducing the volume and mobility of hazardous substances at the Site. This alternative also fulfills the evaluation criteria as discussed below.

5.3.1 Overall Protection of Human Health and the Environment

This alternative protects human health by eliminating the risk of human exposure to impacted surficial soils at the Site via soil removal activities. Removal of the contaminated soils would eliminate the risk of direct contact by existing and future Site workers, occupants, and/or residents. The preparation and implementation of an EMMP will provide guidance to redevelopment Site workers to minimize and manage future exposures to contaminated soils remaining at depth (greater than 2 feet bgs) during Site redevelopment. Construction of clean corridors will further protect future construction workers at the Site since they will not have the potential of coming into contact with contaminated soils during future utility installations.

This alternative provides protection of the environment by minimizing the existing potential for impacts to stormwater runoff at the Site. Additionally, the preparation and implementation of an EMMP outlining proper stormwater, erosion, and dust management protocols will minimize potential impacts to the Fore River during remediation and future redevelopment. Conducting shoreline stabilization also provides additional protection of the environment by preventing contaminated soils and urban fill from eroding into the Fore River.

5.3.2 Technical Practicality

Performing soil removal activities, shoreland stabilization, and constructing clean corridors are common and technically practical remedial measures. These cleanup tasks could be completed utilizing accepted construction techniques. Contractors with experience in similar projects are readily available in the region.

5.3.3 Ability to Implement

This remedial alternative is technically feasible and is an effective action for eliminating the risk of human exposure to contaminated soils at the Site. Services and materials necessary to conduct this alternative are readily available.

Shoreland stabilization will require permitting as well as local, state and federal approvals; however, the engineering and redevelopment team performing this Brownfield cleanup project have the expertise and experience to navigate these requirements.

5.3.4 Reduction of Toxicity, Mobility and Volume

This remediation alternative can significantly achieve reduction of the mobility and volume of the impacted soils at the Site; as contaminated surficial soil would be removed from Site. Construction Worker exposure scenarios (through contact with deeper soils) would be mitigated through implementation of an EMMP.

In addition, erosion control and stabilization of the shoreline would prevent further potentially contaminated fill from entering the Fore River; thus reducing the mobility of impacted soils and urban fill materials at the Site.

5.3.5 Short Term Effectiveness

The remedial action objective would be attained when the impacted soils are removed from Site, the shoreline is stabilized, and the clean corridors are in place. Potential adverse impacts to human health and the environment from exposure to contaminated soils may exist until the cleanup goals are achieved.

5.3.6 Resiliency to Climate Change Conditions

Due to the Site's proximity to the Fore River, climate change effects from rising sea level and changing flood zones may represent a threat to the Site. Additional climate change concerns would be associated with extreme weather, increased rainfall, and rising groundwater tables. This remedial alternative meets the objectives associated with this criterion by removing impacted surficial soils from the Site which may have otherwise come into contact with flood waters, a rising groundwater table, and with rain/stormwater during extreme weather events.

Shoreland stabilization is a vital component of the Site's resiliency to climate change conditions. The reinforced and protected shoreline will prevent contaminated soils from washing into the Fore River due to rising water levels, high tide events, and extreme weather.

5.3.7 Preliminary Cost

The estimated costs associated with this remedial alternative are outlined in the attached Table 3 - Summary of Estimated Remediation Costs for Shoreline Stabilization and Soil Removal Alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and sampling contingencies. The costs associated with

this alternative are significantly higher than the costs associated with Alternative 2: Shoreline Stabilization and Soil Cover System.

5.4 Selection of Proposed Remediation Alternative

Based on the results of the initial screening of each alternative as shown on Table 1 and discussed above, Alternative 2: Shoreline Stabilization and Soil Cover System has been selected as the preferred remediation alternative. This alternative is protective of human health and the environment; is effective, technically feasible, and practical; and is the more cost-effective alternative.

6.0 CONCEPTUAL REMEDIAL ACTION PLAN

The Shoreline Stabilization with Soil Cover Systems Alternative protects human health and the environment and is effective, technically feasible, and practical. Because this alternative meets the evaluation criteria and is not cost-prohibitive, it has been selected for implementation at the Site. Remedial tasks proposed for completion at the Site are discussed below.

6.1 Shoreline Stabilization

The selected alternative includes stabilization of the existing Shoreline. Erosion control measures will be implemented during stabilization to prevent any further erosion of potentially contaminated fill materials into the Fore River. As a temporary measure to mitigate erosion along the shoreline and prevent further contamination of Fore River and Portland Harbor, stabilization methods will be implemented along the entirety of the shoreline at the site. The purpose of a cover system along the shoreline is to prevent further erosion of the site, and to prevent contaminants from entering the environment through erosion of the bank.

The slope should be graded to a slope of 2:1 (H:V) max, and overlayed with a layer of geotextile fabric. Two courses of 3-foot diameter toe stones shall be placed on the geotextile layer along the base of the eroding slope. The riprap slope will consist of a 4-inch-thick stone filter layer, and a 12-inch-thick layer of rip-rap. Above the slope, the 12” thick layer of riprap shall be tied into the landscaped cover system, described below.

6.2 Soil Cover Systems

Soil cover systems will be installed over the entire Site (approximately 13,500 square yards). Permanent cover systems at the Site will include a combination of landscape cover systems, pavement cover systems, structural gravel/building foundation cover systems, slope stabilization cover systems, and clean corridors installed as part of final Site development activities.

Impacted soils excavated from other areas of the Site during redevelopment activities (foundation and/or utility excavations) may be relocated on-Site underneath an approved cover system, noted above. **Figure 3** shows a conceptual site plan layout of where each of the cover systems will be implemented on the site. **Figure 4** presents a conceptual schematic of the various types of potential cover systems that may be used to accommodate future Site redevelopment plans.

6.3 Clean Corridors

Clean corridors will be provided at the Site in locations which will be used for the future placement of underground utilities (i.e. sewer and water infrastructure). These clean corridors will allow future earthwork contractors to install utilities without coming into contact with potentially contaminated soil and urban fil at the Site.

The location of the clean corridors will be based on design plans at the time of the construction. The width of each clean corridor will be specified on plans (and the type/configuration of the utility infrastructure proposed for installation), and the corridors will have a minimum depth of 6 feet. Corridors will have a marker layer installed along the base and sides of the trench and shall be backfilled with clean fill.

6.4 Institutional Controls

As part of this alternative, the following institutional controls will be necessary:

1. An EMMP will be prepared and implemented during Site redevelopment activities. This plan will outline procedures to protect Site workers from exposure risks to contaminated soil during construction activities; and will ensure proper characterization, handling, and management of contaminated soils which may be encountered and displaced during construction activities.

2. A Post-Closure Cover System Maintenance Plan will need to be prepared and implemented in order to ensure the integrity of the cover systems over time.

3. Deed restrictions and/or institutional controls in the form of a DEC shall be prepared for the rest of the Site which prohibits the extraction of groundwater without MEDEP notification and consent; ensures that future construction, remediation, or landscaping at the property would not disturb the engineered cover systems or underlying residual contaminated soil (without notification and consent from the MEDEP); and requires the installation of a vapor mitigation system in any future occupied building at the Site.

6.5 Green Remediation Principals

To make the selected alternative greener, or more sustainable, several techniques are planned. The most recent Best Management Practices (BMPs) issued under ASTM Standard E-2893: Standard Guide for Greener Cleanups will be used as a reference in this effort. SPHDC will require the cleanup contractor to follow an idle-reduction policy and use heavy equipment with advanced emissions controls operated on ultra-low sulfur diesel. The number of mobilizations to the Site would be minimized and erosion control measures would be used to minimize runoff into environmentally sensitive areas. In addition, SPHDC plans to ask bidding cleanup contractors to propose additional green remediation techniques in their response to the Request for Proposals for the cleanup contract.

6.6 Site Redevelopment

SPHDC (the current owner of the Site), and their redevelopment partners are committed to designing and building a sustainable, mixed-use neighborhood on the current lot. This 3.16-acre Site will provide public waterfront amenities and necessary transportation linkages, such as water transit and a bus stop, that connect the overall Yard South development and greater South Portland to downtown Portland.

The overall redevelopment plan for the Yard South site is to construct a resilient, sustainable, and vibrant mixed-use district that will serve as a model for future growth. Throughout this new district, a network of pedestrian-friendly streetscapes, trails, bus service, and water-based transit will connect the development to adjacent South Portland neighborhoods, Bug Light Park, the Greenbelt, and Portland. The Yard South waterfront will be a welcoming space with sweeping views of Fort Gorges, Casco Bay islands, the Portland skyline, and busy harbor. Housing, constructed over several phases, will be available for a range of income levels to address South Portland's housing goals.

6.7 Project Oversight

The remedial actions proposed in this plan shall be coordinated with and conducted under the periodic oversight of a Qualified Environmental Professional (QEP). Additionally, as part of the Brownfield's programmatic requirements, this ABCA and Conceptual RAP will be submitted to the United States Environmental Protection Agency (U.S. EPA) and MEDEP for approval prior to implementation of the proposed remedial actions at the Site.

6.8 Site Closure and Reporting

A completion report summarizing the activities conducted as part of the Site remediation will be submitted to the MEDEP following the completion of the selected and approved remedial action. The final report will include a description of the remedial actions and field methods implemented at the Site. Upon submittal and approval of the completion report, the MEDEP VRAP will issue a Certificate of Completion.

7.0 SIGNATURE(S) OF ENVIRONMENTAL PROFESSIONAL(S)

The following Ransom personnel possess the sufficient training and experience necessary to conduct an Analysis of Brownfields Cleanup Alternatives, and from the information generated by such activities, have the ability to develop opinions and conclusions regarding remediation alternatives and a Conceptual Remedial Action Plan, as presented herein, for the Site.

_____
Scott Hayward, P.E.
Associate Project Manager

_____
Jaime Madore, P.E.
Senior Project Manager

_____
Nicholas Sabatine, P.G.
Principal & Vice President

TABLE 1 – SUMMARY OF EVALUATION AND COMPARISON OF REMEDIAL ALTERNATIVES
YARD SOUTH SITE, SOUTH PORTLAND, MAINE

Remedial Action Alternative (RAA)	Overall Protection of Human Health and the Environment	Technical Practicality	Ability to Implement	Reduction of Toxicity, Mobility and Volume	Short Term Effectiveness	Estimated Cost	Comments
1) No Action	• Long-term risks to human health by direct contact, inhalation, and ingestion of contaminated soils and urban fill will remain. • Contaminated soils will continue to erode and impact the Fore River.	• Not applicable.	• Not applicable.	• No reduction in toxicity, mobility or volume of the contaminated media.	• Not applicable.	• This alternative will involve ongoing security and maintenance measures, including fencing and signage. Cost estimates range from $20,000 to $50,000 for fence installation and approximately $5,000 per year for ongoing security and maintenance.	• This alternative does not address the documented adverse environmental conditions, human health risks, or contamination stigma at the property. • This is not considered a viable alternative.
2) Shoreline Stabilization with Soil Cover System	• Risks to human health by contact with contaminated soils and urban fill is significantly reduced by constructing soil cover systems and clean corridors. • Significant reduction of contamination risk of Fore River and Casco Bay, due to stabilization of shoreline, preventing contaminated soils from washing into the Fore River.	• The construction of soil cover systems, clean corridors, and shoreland stabilization utilizes standard excavation and construction techniques. Therefore, this alternative is technically practical.	• This alternative is technically feasible and is an effective action for reducing the risk of direct human contact to impacted soil, via approved cover system. • The necessary contractors, equipment, and materials to complete the remedial tasks are readily available.	• This alternative effectively reduces the mobility of contaminated soils and urban fills through the construction of cover systems and shoreland stabilization measures. The toxicity and volume of contaminated media are not affected under this alternative.	• Soil cover systems, shoreland stabilization, and clean corridors are effective methods of reducing pathways of human contact, and as such, are an effective method of short-term remediation.	• The estimated cost for this alternative is $1,132,350. This includes capital costs such as materials and equipment, and indirect capital costs such as engineering. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal or bid for services. • This Alternative is less expensive than the “Shoreline Stabilization with Soil Removal Alternative,” and still meets the objective of the cleanup project.	• This alternative was selected as the preferred remediation alternative because it is proven to protect human health and the environment; is effective, technically feasible, and practical; and is cost-effective.
3) Shoreline Stabilization with Soil Removal	• Risks to human health by contact with contaminated soils and urban fill is eliminated by excavation and offsite disposal of surficial soils and construction of clean corridors. • Significant reduction of contamination risk of Fore River and Casco Bay, due to stabilization of shoreline, preventing contaminated soils from washing into the Fore River.	• Excavation and offsite disposal of soil would utilize standard excavation and construction techniques. Shoreland stabilization and clean corridors also utilizes standard excavation and construction techniques. Therefore, this alternative is technically practical.	• This alternative is technically feasible and is an effective action for eliminating the risk of direct human contact to impacted soil, via excavation and offsite disposal. • The necessary contractors, equipment and materials to complete the remedial tasks are readily available.	• The mobility and volume of contaminated soil and urban fill would each be significant reduced under this alternative. Toxicity would not be affected.	• Excavation and offsite disposal, shoreland stabilization, and clean corridors are proven methods of reducing pathways of human contact, and as such, are an effective method of remediation.	• The estimated cost for this alternative is $3,019,050. This includes capital costs such as materials and equipment, and indirect capital costs such as engineering. • These cost estimates are for budgetary purposes only and in no way should be construed as a cost proposal or bid for services.	• This alternative was not selected because it is more costly than the “Shoreline Stabilization with Soil Removal Alternative,” alternative.

Table 2: Summary of Estimated Remediation Costs
South Portland Housing Development Corporation - Yard South Site, South Portland, Maine
Alternative #2 - Shoreline Stabilization (to Mean High Tide Elevation) and Soil Cover Systems

	Quantity	Units	Unit Cost	Total
Shoreline Stabilization				
Rip Rap	1200	Ton	$40	$48,000
Granular Borrow	100	CY	$50	$5,000
Geotextile Fabric	1,000	SY	$5.00	$5,000
Crushed Stone	150	CY	$45	$6,750
Site Control, and Water Management	1	Ea	$10,000	$10,000
Disposal of Excess Soils and Fill/Debris	200	ton	$130	$26,000
Waste Characterization Sampling of Excess Soils [1]	1	Ea	$1,100	$1,100
Construction of Cover Systems [2]				
Site Grading	1	LS	$20,000	$20,000
Covers System Construction	15,000	SY	$45	$675,000
Footing & Clean Corridor Contaminated Soil Removal	1,200	Ton	$130	$156,000
Waste Characterization Sampling of Excess Soils [1]	5	Ea	$1,100	$5,500
Erosion and Sedimentation Control	1	LS	$3,000	$3,000
Dust Control / Site H&S	1	LS	$5,000	$5,000
Permitting	1	LS	$5,000	$5,000
Engineering Design	1	LS	$25,000	$25,000
Construction Oversight and Bidding Phase Services	1	LS	$21,000	$21,000
VRAP Closure Reporting and Documentation [3]	1	LS	$12,000	$12,000
Subtotal				*$1,029,350*
Contingency 10% [4]				$103,000
TOTAL				**$1,132,350**

LS = Lump Sum, Gal = Gallon, EA = Each, SY = Square Yard

1 Assumes one waste characterization sample per every 250 tons of material disposed off-site (if less than 2,500 tons are disposed)

2 Assumes cover system installation on entirety of Site (approximatley 3.1 acres, or 135,000 square feet)
Cover system shall consist of a marker layer and 12 inches of compacted, structural sub-base gravel (approximately 66,000 square feet)

3
Cost includes VRAP Closure Report, Soil and Groundwater Management Plan, Cover System Maintenance Plan, and Declaration of Environmental Covenant.

4 Covers previously unidentified issues that could come up during cleanup activities on Site.

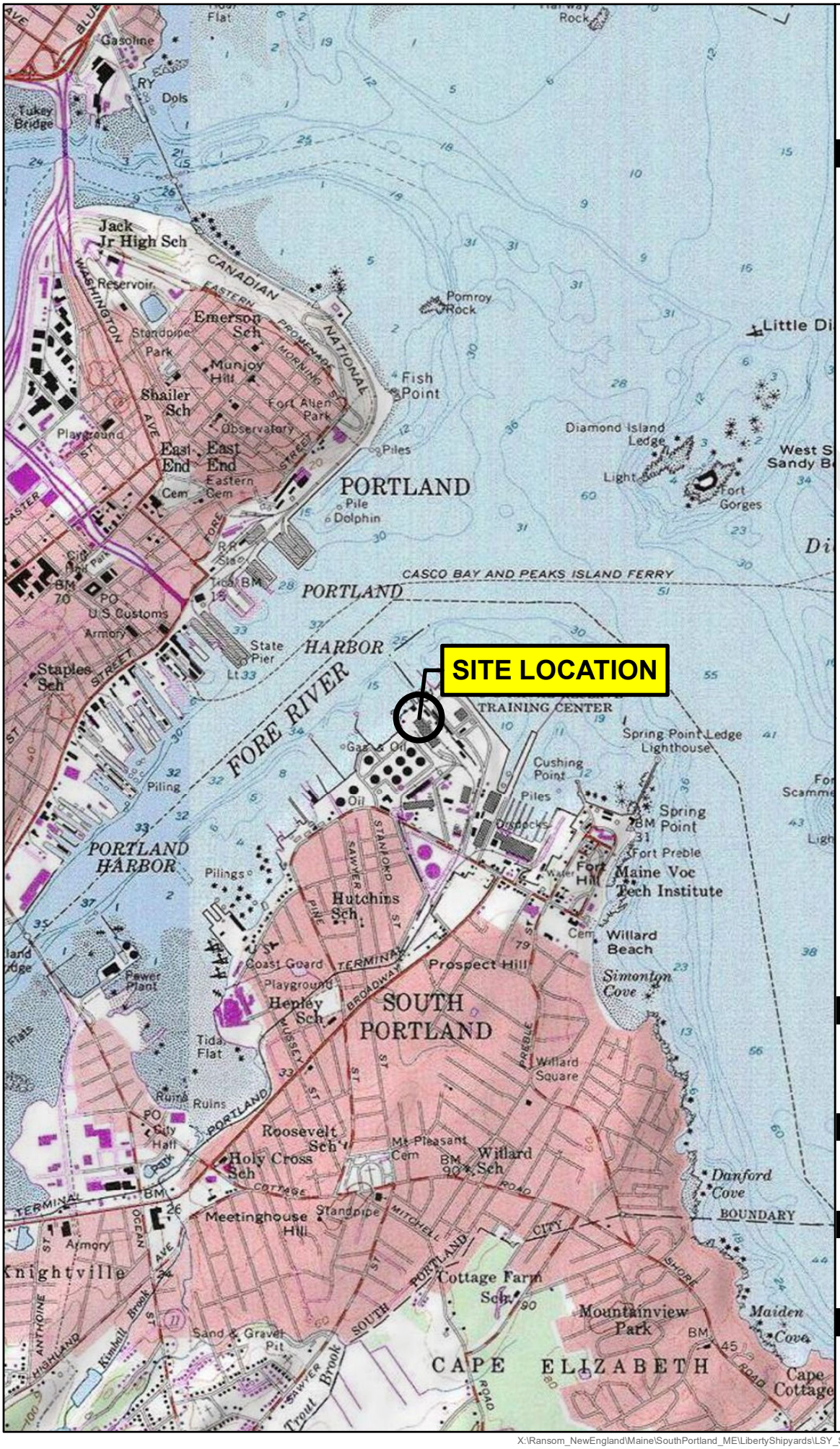
Table 3: Summary of Estimated Remediation Costs
South Portland Housing Development Corporation - Yard South Site, South Portland, Maine
Alternative #3 - Shoreline Stabilization (to Mean High Tide Elevation) and Soil Removal

	Quantity	Units	Unit Cost	Total
Shoreline Stabilization				
Rip Rap	1200	Ton	$40	$48,000
Granular Borrow	100	CY	$50	$5,000
Geotextile Fabric	1,000	SY	$5.00	$5,000
Crushed Stone	150	CY	$45	$6,750
Site Control, and Water Management	1	Ea	$10,000	$10,000
Disposal of Excess Soils and Fill/Debris	200	ton	$130	$26,000
Waste Characterization Sampling of Excess Soils [(1)]	1	Ea	$1,100	$1,100
Soil Removal and Offsite Disposal				
Excavation, Transportation and Disposal of Surficial Soil [(2)]	15000	Ton	$130	$1,950,000
Footing & Clean Corridor Contaminated Soil Removal	800	Ton	$130	$104,000
Disposal Waste Characterization Samples [(1)]	32	Ea	$1,100	$35,200
Clean Backfill	10500	CY	$45	$472,500
Site Restoration, Grading, Seeding	1	LS	$8,000	$8,000
Erosion and Sedimentation Control	1	LS	$5,000	$5,000
Dust Control / Site H&S	1	LS	$5,000	$5,000
Permitting	1	LS	$5,000	$5,000
Engineering Design	1	LS	$25,000	$25,000
Construction Oversight and Bidding Phase Services	1	LS	$21,000	$21,000
VRAP Closure Reporting and Documentation [(3)]	1	LS	$12,000	$12,000
Subtotal				$2,744,550
Contingency 10% [(4)]				$274,500
TOTAL				**$3,019,050**

LS = Lump Sum, Gal = Gallon, Ea = Each, CY = Cubic Yards

1 Assumes one waste characterization sample per every 500 tons of material disposed off-site (if greater than 2,500 tons are disposed, i.e. 5 sample minimum)
2 Assumes surficial soils (0-2 feet bgs) are removed across the entirety of the Site (135,000 square feet)
3 Cost includes VRAP Closure Report, Soil and Groundwater Management Plan, and Declaration of Environmental Covenant.
4 Covers previously unidentified issues that could come up during cleanup activities on Site.

NOTE: These costs do not include eligible Brownfield programmatic costs which include, but are not limited to: Finaling ABCA/RAP, Site-Specific Quality Assurance Project Plan, and Community Outreach.



RANSOM Consulting, LLC

Regional Locator Map

Notes

1. Data Source: Copyright: © 2013 National Geographic Society, i-cubed
2. USGS Quad Names: Portland East and Portland West, Maine
3. Latitude: 43°39'13.0"N
   Longitude: 70°14'12.7"W

Scale and Orientation

0 1,000 2,000

1 inch = 2,000 feet

Prepared For

South Portland Housing Development Corporation
South Portland, Maine

Site Address

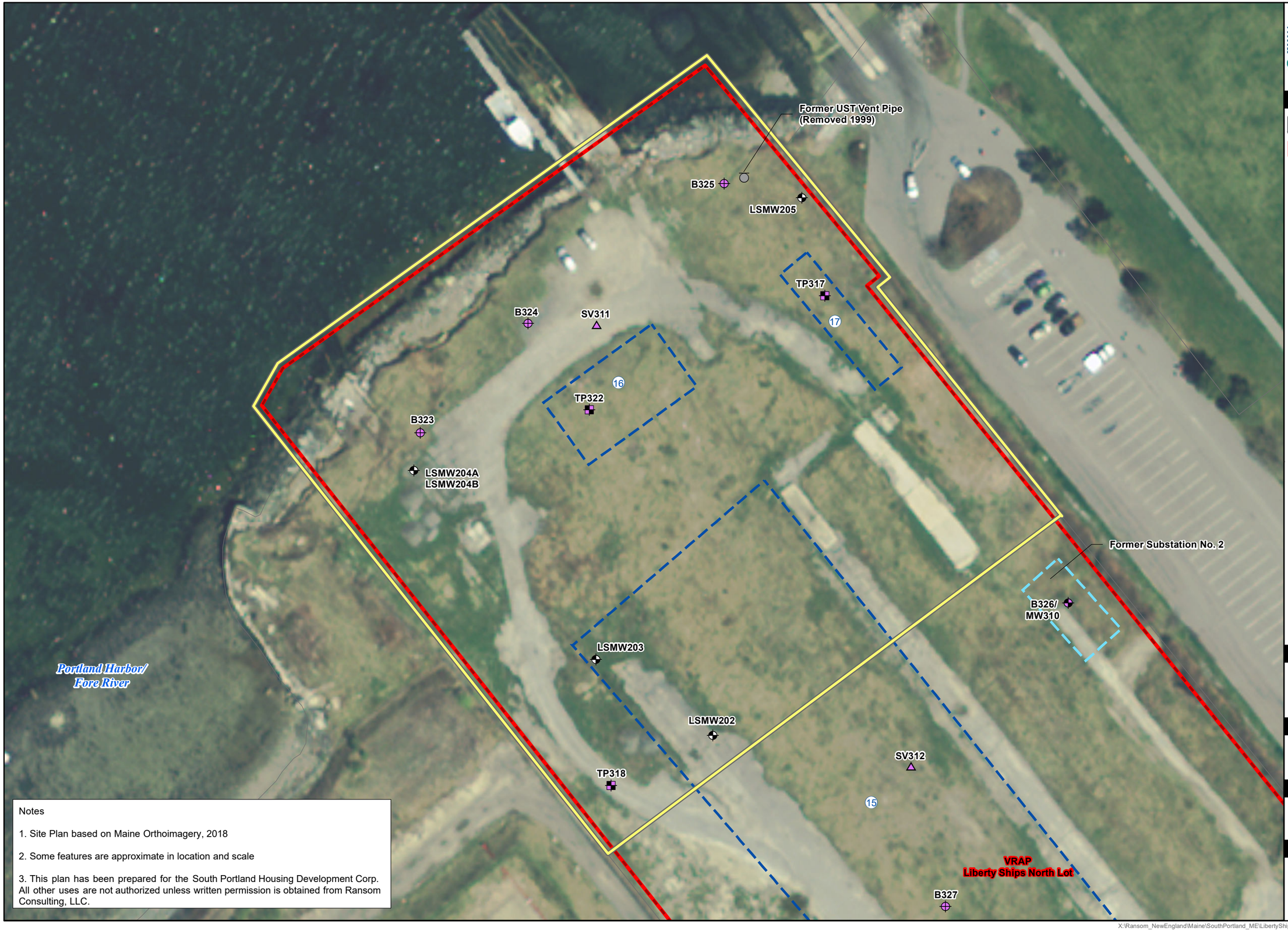
Yard South
149A Front Street
South Portland, Maine

201.06067 | Mar 2023

Figure 1

Site Location Map

X:\Ransom_NewEngland\Maine\SouthPortland_ME\LibertyShipyards\LSY_SouthPortlandME-F1_YardSouthSLM.mxd



Notes

1. Site Plan based on Maine Orthoimagery, 2018

2. Some features are approximate in location and scale

3. This plan has been prepared for the South Portland Housing Development Corp. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

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Consulting, LLC

Legend & Notes

- Site Boundary
- Liberty Ship North Lot VRAP Boundary
- Former Building Footprint
- Former Building Number
- Removed UST
- Existing Monitoring Well
- Soil Boring
- Soil Boring/ Monitoring Well
- Sub-Slab/ Soil Vapor Sample
- Test Pit

Scale & Orientation

0 30 60

1 inch = 60 feet

Prepared For

South Portland Housing Development Corporation
South Portland, Maine

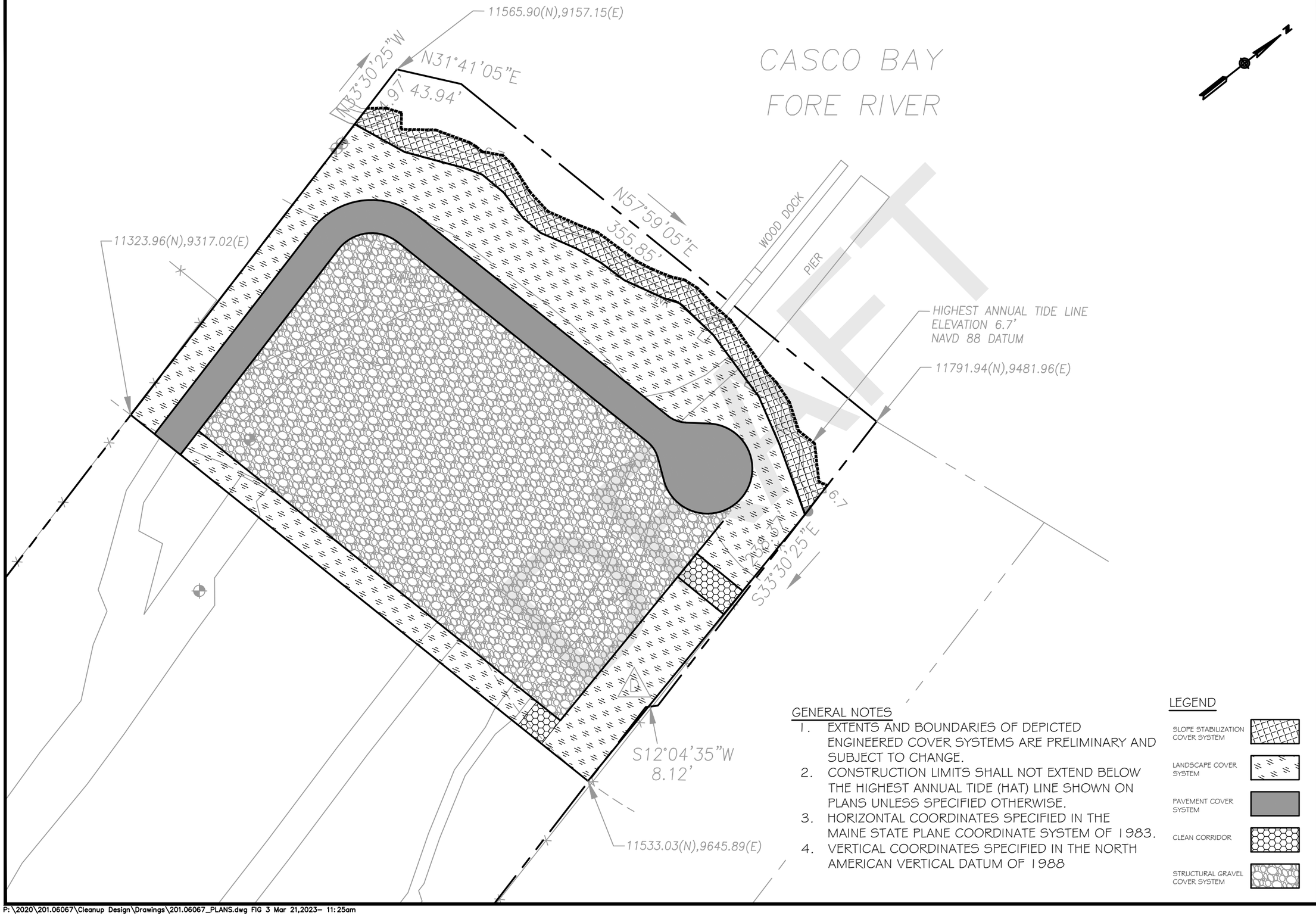
Site Address

Yard South
149A Front Street
South Portland, Maine

201.06067 | Mar 2023

Figure 2
Site Plan

X:\Ransom_NewEngland\Maine\SouthPortland_ME\LibertyShipyards\LSY_SouthPortlandME-F2_YardSouthSP.mxd



GENERAL NOTES

1. EXTENTS AND BOUNDARIES OF DEPICTED ENGINEERED COVER SYSTEMS ARE PRELIMINARY AND SUBJECT TO CHANGE.
2. CONSTRUCTION LIMITS SHALL NOT EXTEND BELOW THE HIGHEST ANNUAL TIDE (HAT) LINE SHOWN ON PLANS UNLESS SPECIFIED OTHERWISE.
3. HORIZONTAL COORDINATES SPECIFIED IN THE MAINE STATE PLANE COORDINATE SYSTEM OF 1983.
4. VERTICAL COORDINATES SPECIFIED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988

LEGEND

- SLOPE STABILIZATION COVER SYSTEM
- LANDSCAPE COVER SYSTEM
- PAVEMENT COVER SYSTEM
- CLEAN CORRIDOR
- STRUCTURAL GRAVEL COVER SYSTEM

Site:

YARD SOUTH
149A FRONT STREET
SOUTH PORTLAND, ME

Prepared for:

SOUTH PORTLAND
HOUSING DEVELOPMENT
CORPORATION

100 WATERMAN DRIVE SUITE 101
SOUTH PORTLAND, ME 04106

0 30 60 120
SCALE in FEET
1"=60'

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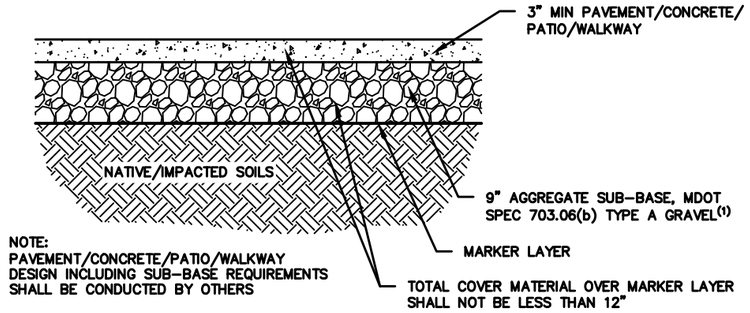
No.	Revision/Issue	Date
D		
C		
B		
A		

Project: 201.06067

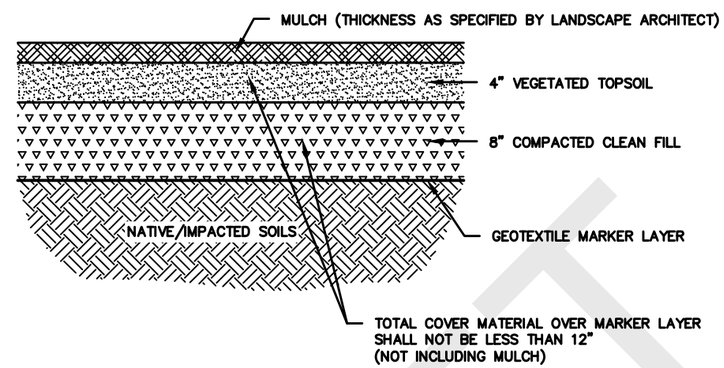
Sheet No: FIG 3

P:\2020\201.06067\Cleanup Design\Drawings\201.06067_PLANS.dwg FIG 3 Mar 21,2023– 11:25am

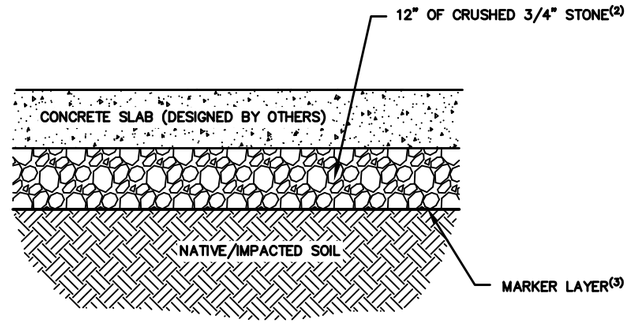


(1) MAY BE REDUCED TO 6" TO MAXIMIZE ONSITE SOIL RETENTION WITH MEDEP APPROVAL

PAVEMENT COVER SYSTEM
NOT TO SCALE



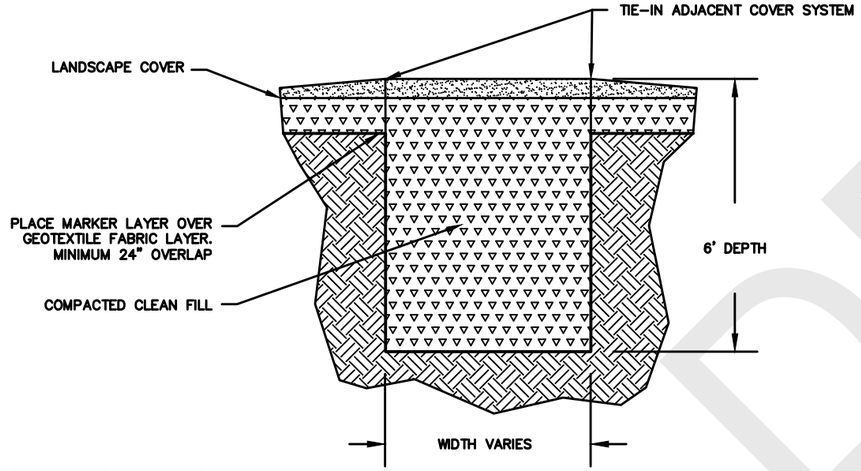
LANDSCAPE COVER
NOT TO SCALE



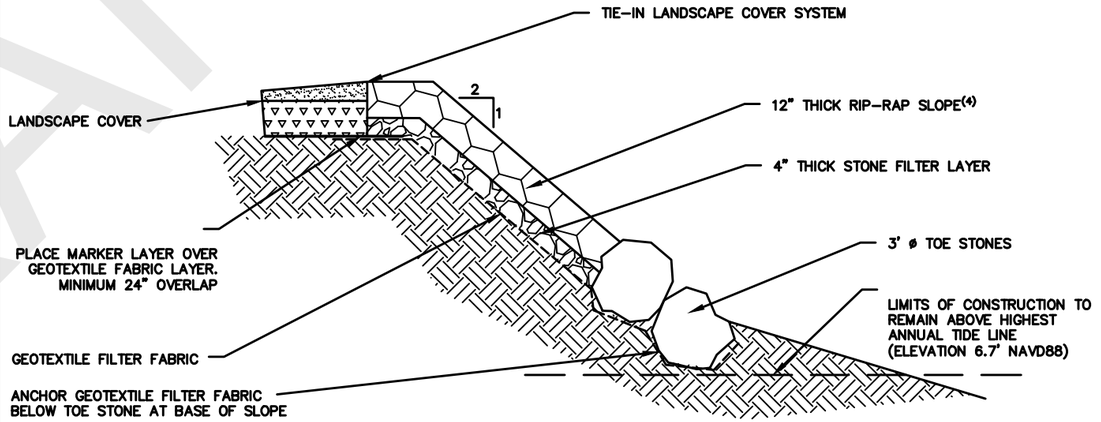
(2) MAY BE MODIFIED BASED ON STRUTURAL BUILDING DESIGN WITH MEDEP APPROVAL

(3) MAY BE OMITTED IF NECESSARY, BASED ON STRUCTURAL BUILDING DESIGN, WITH MEDEP APPROVAL.

STRUCTURAL GRAVEL COVER SYSTEM
NOT TO SCALE



CLEAN CORRIDOR DETAIL
NOT TO SCALE



(4) RIPRAP SIZING AND FINAL CONFIGURATION TO BE COORDINATED WITH GEOTECHNICAL ENGINEERS AS PART OF FINAL DESIGN.

SHORELINE RESTORATION/STABILIZATION
NOT TO SCALE

NOTES:

1. THE QUANTITIES IDENTIFIED ARE MINIMUM REQUIREMENTS FOR COVERING CONTAMINATED SOILS. ADDITIONAL SUB-BASE MATERIALS MAY BE REQUIRED IN AREAS PROPOSED FOR ASPHALT PAVING, BUILDINGS AND/OR CONCRETE SIDEWALKS/PATIOS, AS NECESSARY, TO MAINTAIN STRUCTURAL INTEGRITY OF THESE MATERIALS. THE SITE DESIGN ENGINEER IS REQUIRED TO MAKE THE DETERMINATION OF STRUCTURAL SUITABILITY.
2. GEOTEXTILE MARKER LAYER SHALL BE ORANGE US65HVO DEMARCATION FABRIC OR APPROVED EQUAL, UNLESS NOTED.
3. IMPACTED SOILS EXCAVATED FROM THE SITE MAY BE RELOCATED ONSITE BENEATH ANY MEDEP APPROVED COVER SYSTEMS. IF SOILS ARE RELOCATED BENEATH ROADWAYS OR BUILDING FOOTPRINTS, THEY MUST MEET STRUCTURAL DESIGN SPECIFICATIONS.

RANSOM Consulting, LLC.

PREPARED FOR:
SOUTH PORTLAND HOUSING
DEVELOPMENT CORPORATION
100 WATERMAN DRIVE STE 101
SOUTH PORTLAND, ME 04106

SITE:
YARD SOUTH
149A FRONT STREET
SOUTH PORTLAND, MAINE

TYPICAL COVER SYSTEM DETAILS

DATE: MARCH 2023
PROJECT: 201.06067
FIGURE: 4

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