

**ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES &
CONCEPTUAL REMEDIAL ACTION PLAN
FORMER APOLLO TANNERY
116 WASHINGTON STREET
CAMDEN, MAINE**

Prepared for:

Town of Camden
29 Elm Street
Camden, Maine

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1.0 INTRODUCTION AND BACKGROUND

Ransom Consulting, LLC (Ransom) prepared this Analysis of Brownfields Cleanup Alternatives (ABCA) to evaluate various remedial alternatives for the previously identified adverse environmental conditions at the Apollo Tannery, located at 116 Washington Street in the Town of Camden, Knox 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. This report was prepared on the behalf of the Town of Camden, using the United States Environmental Protection Agency (U.S. EPA) Brownfields Cleanup Funding.

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 conditions.
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) a Complete Soil Removal Alternative, and 3) a Soil Cover System with Targeted 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 identified by the Town’s Assessor’s Office as Lot 18 on Tax Map 114. The Site consists of an approximate 3.5-acre, irregularly-shaped parcel of land, located at 116 Washington Street, in the Town of Camden, Knox County, Maine. The Site is located within a residential area of Camden. The property is located along the southern side of Washington Street, approximately 0.5 miles northwest of the intersection of Washington Street and Mechanic Street in the Town of Camden (see Figure 1).

The Site is not currently improved with any structures; however, the Site was formerly improved with five buildings (the Site Buildings), herein referred to as the Manufacturing Building, the Maintenance Building, the Storage Building, the Pickle and Raw Stock Building, and the Wastewater Treatment Building. The Site Buildings were demolished in 2005. A gravel recreational walking path (Megunticook Riverwalk) runs along the western and southern edge of the Site. The Megunticook Riverwalk is improved by two wooden viewing platforms. The remaining portions of the property consist of paved parking areas (on the northern portion of the Site), heavily vegetated areas, and approximately 27,000 square feet of three-inch thick concrete slabs from the former building foundations (central and eastern portions of the Site). The Site is accessed by Washington Street to the north.

Based on available information, the Manufacturing Building was constructed in 1887, and operated as a woolen mill owned by the Camden Woolen Company. In 1953, the Site was acquired by Camden Tanning Company and began operation as a tannery, which included tanning and processing sheepskin. The property was leased to Apollo Tanning Ltd. (Apollo Tanning) in 1997 and continued its operation as a tanning facility. Apollo Tanning shut down operations in April 1999 and the property was put up for sale. Apollo Tanning filed for Chapter 7 bankruptcy in December 2000. The Site was acquired in 2003 by the Town of Camden for non-payment of taxes and in 2005 the Site Buildings were demolished. In 2008, the EPA funded the cleanup of the most heavily contaminated portion of the Site. The Site has been vacant since that time.

1.3 Potential Future Site Use

The Town of Camden's tentative vision for the Site includes future redevelopment that will be compatible with the public walking path along the riverfront and may include mixed-use commercial and/or residential redevelopment over the upland areas.

1.4 Site Geology and Hydrogeology

According to the *2010 Surficial Geologic Map of Maine*, surficial soils at the Site are identified as soils of the Presumpscot Formation (Pp). The Presumpscot Formation soils are massive to laminated silt and silty clay and may locally contain boulders, sand, and gravel. Soils of the Presumpscot Formation were deposited during late glacial marine submergence and occur as a blanket deposit over bedrock and older glacial sediments. Previous environmental investigations conducted at the Site and vicinity indicated that surficial soils at the Site consist of silts, sand, and gravel. These surficial soils overlay silt, clay, and till which extend at least 15 feet below ground surface (bgs), which was the maximum depth that soil borings were advanced during previous environmental investigations.

According to the *1985 Bedrock Geologic Map of Maine*, the Site is located at the Ordovician - Cambrian Mount Battie formation (OCAb), which consists of low rank amphibolite facies and medium rank amphibolite facies. Previous investigations indicate that overburden soils are underlain by dense gray silty glacial till; furthermore, little, if any, native materials were encountered at the Site, and may have been eroded from the valley by the Megunticook River.

The nearest named surface water body is the Megunticook River, directly adjacent to the South of the Site. Groundwater was calculated to flow in a generally southwesterly direction towards the Megunticook River. Groundwater was observed at depths ranging from approximately 1 to 8 feet bgs.

Based on the Camden Town/Knox County, Maine, Flood Insurance Rate Map (FIRM) (Community Panel Number 23013C0179D, preliminary map January 31, 2015), portions of the Site are in Special Flood



Hazard Area Zone AE (directly adjacent to the Megunticook River), Other Flood Area Zone X (small southern portion), and Other Area Zone X (central, northern, and eastern portions). Special Flood Hazard Area Zone AE designates areas in the 100-year flood. Other Flood Area Zone X areas between the limits of a 100-year flood and a 500 year flood; or certain areas subject to 100-year flooding with average depths less than one foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. Other Area Zone X encompasses areas determined to be outside of the 500-year flood.



2.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

The following historical reports/investigations have been prepared in connection with the Site:

1. “Environmental Site Assessment, Camden Tanning Corporation, Camden, Maine,” ABB Environmental Services, Inc., March 1977;
2. “Phase II Environmental Site Assessment, The Camden Tanning Corporation, Camden, Maine,” Woodard and Curran Inc., February 2, 1996;
3. “UST Site Assessment, Apollo Tanning Ltd., Camden, ME,” Fessenden Geo-Environmental Services,” December 1, 1997;
4. “Brownfields Site Assessment, Apollo Tanning, Camden, ME,” Maine Department of Environmental Protection, June 22, 2001;
5. “Phase II Environmental Site Assessment, Former Camden Tannery Site, Camden, Maine,” Summit Environmental Consultants, Inc., April 18, 2002;
6. “Phase II Environmental Site Assessment, Apollo Tannery (aka Camden Tannery), Camden, ME,” Summit Environmental Consultants, Inc., April 18, 2006; and
7. “Project Summary Report, Soil Remediation Project, Former Apollo Tannery, 116 Washington Street, Camden, ME,” Summit Environmental Consultants, Inc., October 7, 2008.
8. “ASTM Phase I Environmental Site Assessment, Apollo Tannery, 116 Washington Street, Camden, Maine,” Ransom, December 11, 2015;
9. “Phase II Environmental Site Assessment, Apollo Tannery, 116 Washington Street, Camden, Maine,” Ransom, January 29, 2016; and
10. “Riverbank Assessment, Apollo Tannery Targeted Brownfields Assessment, Camden, Maine,” KGSNE, LLC, March 10, 2020.

Copies of these reports have been previously filed with the Town of Camden’s Brownfields Program and/or the Maine Department of Environmental Protection (MEDEP) Voluntary Response Action Program (VRAP).

As part of these early historical assessments, the potential presence of residual petroleum- and metal-impacted soil and groundwater at the Site associated with the former Site operations was identified as a Recognized Environmental Condition (REC) and was subsequently assessed through a series of investigations that began during the end of tannery operations and continues until after the tannery ceased operating. Contaminated soils and groundwater associated with former Site operations were found to be present at areas of the Site and a cleanup plan was formulated. The area of the Site determined to be impacted was submitted to the MEDEP VRAP program (the VRAP area) and an EPA Brownfield Cleanup Grant was secured.

In 2008, the EPA Cleanup Grant was utilized to fund remediation activities at the southern portion of the Site with MEDEP VRAP oversight and guidance by Camden. The remediation activities included the installation of a slurry wall to isolate and prevent off-site migration of contamination, excavation and removal of contaminated soil, and encapsulation of remaining contaminated soil and groundwater at the southern portion of the Site with a low permeability cover layer. At the completion of these remedial activities in 2008, Summit Environmental Consultants, Inc. (Summit) concluded that contamination was likely present beyond the slurry wall (outside the limits of their excavation) but at concentrations below MEDEP's cleanup guidelines (circa 2007 standards). Summit concluded that the primary source of contamination was removed during the remedial activities and contained by the slurry wall and cover system, and that natural attenuation/breakdown of the residual contamination remaining at the Site would occur, and that the exposure risks were mitigated for the Site at that time.

Following remediation, this southern and central portion of the Site was issued a Certificate of Completion (COC) from MEDEP VRAP. This COC required a Declaration of Environmental Covenant (DEC), which included the following activity and use limitations: on-site groundwater extraction throughout the entire Site was prohibited without the written permission of the MEDEP; soil excavation at the southern portion of the Site (VRAP Area) was prohibited without the written permission of the MEDEP; and that proper maintenance of the installed cover system be conducted in the VRAP Area.

The Town of Camden attempted to sell and market the property for numerous years but received little interest despite a portion of the Site receiving a COC. In 2015 and 2016, the Town of Camden requested the Midcoast Economic Development District (MCEDD) Brownfield Assessment program to complete additional assessments on the property focused on the area outside of the COC boundary. In 2016, Ransom conducted a Phase II ESA to identify potential exposure risks and evaluate the suitability of the non-VRAP area for redevelopment and identify whether additional remediation or mitigation measures were necessary. Ransom's investigation identified the presence of low-level contaminants in surficial and subsurface soils outside of the VRAP area which were inferred to be associated with anthropogenic urban fill and/or hazardous material releases during the Site's former woolen mill and tannery use. Concentrations of benzo(a) pyrene and arsenic detected in surficial soil across the Site exceeded their applicable MEDEP RAGs at that time (2016). The results of these assessments were used by the Town to secure additional EPA Brownfield funding to cleanup these Site areas outside of the VRAP COC.

After receiving the current cleanup grant, the Town requested that the EPA complete further assessment within the VRAP COC area. The U.S. EPA conducted a Targeted Brownfields Assessment (TBA) at the Site in March 2020 which consisted of test pitting, surficial soil sampling, and porewater sampling within the COC area along the Megunticook River. In addition, the TBA included a series of Site wide soil samples to be analyzed for per- and polyfluoroalkyl substances (PFAS) which is an emerging contaminant. Analytical results identified low levels of VOCs and volatile petroleum hydrocarbons (VPH) compounds in several sample locations but below applicable RAGs. Low-level extractable petroleum hydrocarbons (EPH) compounds were detected in soil samples with two locations exceeding MEDEP RAGs for residential exposure scenarios. Various PAHs as part of the EPH analysis were detected in several samples collected near the Riverwalk and slurry wall at concentrations exceeding MEDEP RAGs for residential scenarios with one location also exceeding the applicable commercial MEDEP RAGs. Arsenic and lead were also detected above residential and/or commercial MEDEP RAGs in several locations. All of these exceedances were found within the VRAP COC area.

Hexavalent chromium results were rejected by the MEDEP due to a laboratory quality control issue. Limited per- and PFAS were detected at the Site at concentrations below the applicable MEDEP RAGs exposure but were also rejected by the MEDEP due to laboratory holding requirements. Porewater results



identified metals and PFAS in the collected samples at concentrations below the applicable U.S. EPA Ambient Water Quality criteria.



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.

As part of this ABCA soil, groundwater, and soil vapor results 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, and porewater sample results were compared to U.S. EPA Ambient Water Quality criteria. The proposed redevelopment plan for the Site includes a public recreational space along the Megunticook River (Riverwalk Area) and potential mixed-use commercial and/or residential use on the central portion of the Site (Upland Area). Based on the proposed redevelopment, the MEDEP RAGs for Park User, Outdoor Commercial Worker, and Construction Excavation Worker are applicable for soil in the Riverwalk Area and MEDEP RAGs for Residential, Outdoor Commercial Worker, and Construction/Excavation Worker exposure scenarios are applicable exposure scenarios for soil in the Upland Area. For air and groundwater, the MEDEP RAGs for Residential and/or Commercial exposures are applicable for the Upland Area of the Site.

3.1 Soils

3.1.1 Riverwalk Area

Surficial soils (0 to 2 feet bgs) across the Riverwalk Area contain arsenic and lead at concentrations which exceed the MEDEP RAGs for Park User exposure scenario, mercury was detected in surficial soils at concentrations exceeding the MEDEP RAGs for Residential, Park User, Outdoor Commercial Worker, and Excavation/Construction Worker exposure scenarios, and EPH and PAHs were detected in surficial soil at concentrations which exceed the applicable MEDEP RAGs for the Residential, Park User, Outdoor Commercial Worker, and/or Excavation/Construction worker exposure scenario. Arsenic concentrations detected in surficial soil at the Site were above the site-specific background concentration for arsenic. Remaining metals were not present at concentrations exceeding the MEDEP RAGs for the applicable exposure scenarios.

Subsurface soils (deeper than 2 feet bgs) across the Riverwalk Area contain lead, arsenic, EPH, and gasoline range organics (GRO) above applicable MEDEP RAGs for Excavation/Construction Worker exposure scenarios.

Volatile organic compounds (VOCs) were not detected in the soil samples collected from the Site at concentrations which exceeded their respective MEDEP RAGs for applicable exposure scenarios.

3.1.2 Upland Area

Surficial soils (0 to 2 feet bgs) across the Upland Area contain arsenic at concentrations which exceed the MEDEP RAGs for Residential and Park User exposure scenario, lead at concentrations which exceed the applicable MEDEP RAGs for Residential exposure scenarios, and GRO at a concentration which exceeds the applicable MEDEP RAGs for Residential, Park User, Outdoor Commercial Worker, and/or Excavation/Construction Worker exposure scenarios.

Subsurface soils (deeper than 2 feet bgs) across the Upland Area contain GRO above applicable MEDEP RAGs for Excavation/Construction Worker exposure scenarios.

The cleanup goals for the Site are to eliminate or reduce the risk of human contact to accessible and potentially accessible impacted soils for current and future Site workers, future park users, and/or residents and to provide protection to the environment during cleanup activities. Soil remediation measures such as soil removal activities or the installation of a barrier or engineered cover system over the accessible contaminated soils are feasible and would adequately reduce/eliminate the potential for human contact with the accessible impacted soil. In addition, Ransom recommends an Environmental Media Management Plan (EMMP) detailing proper erosion and dust control practices in an effort to prevent surficial soils from impacting the adjacent Megunticook River.

3.2 Soil Vapor

Low level VOCs and air petroleum hydrocarbons (APHs) were detected in the soil vapor samples collected from the Site at concentrations which did not exceed their respective calculated Soil Gas Targets for Residential or Commercial exposure scenarios. As such, future Site users are not anticipated to be at risk from soil vapors at the Site.

3.3 Porewater

Low level PFAS, VOCs, VPH, diesel range organics (DRO), and metals were detected in the porewater samples collected from the Site at concentrations which did not exceed their respective U.S. EPA Ambient Water Quality Criteria for aquatic life in acute or chronic exposure levels. As such, future Site users and the Megunticook River are not anticipated to be at risk from porewater at the Site.

3.4 Groundwater

VOCs and metals were detected in the groundwater collected by Summit at the Site in 2002. Because municipal water is available to the Site and vicinity and the current DEC mandated restriction on on-site groundwater extraction across the entire Site in 2008, ingestion of contaminated groundwater is not expected or assumed to represent an exposure risk. In addition, Ransom recommends an EMMP detailing proper groundwater management protocols be prepared and implemented during construction activities to protect workers from exposure to impacted groundwater at the Site. As such, no evaluation of remedial alternatives for impacted groundwater have been discussed in this ABCA.

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 principal 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 accessible contaminated onsite soils located throughout the Site by current and/or future occupants, trespassers, and future construction workers at the Site.
2. Minimize the potential for direct contact and incidental ingestion of contaminated groundwater during Site redevelopment/construction activities.
3. Minimize the potential for impacts to the adjacent Megunticook River during Site redevelopment/construction activities; and
4. Reduce the toxicity, mobility, and/or volume of hazardous substances at 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, Complete Soil Removal Alternative, and Soil Cover System with Targeted 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 at the Site to address impacted soil and groundwater regardless of the selected soil remediation alternative:

1. An EMMP will be prepared and implemented during Site redevelopment activities. This plan will outline procedures to reduce the risk of exposure of Site workers to the contaminated soil and groundwater during construction activities; and will ensure proper characterization, handling, and management of contaminated soils and groundwater which may be encountered and displaced during construction activities; and
2. A revised deed restriction in the form of a DEC shall be prepared which both prohibits the extraction of groundwater without MEDEP notification which was noted in the 2008 DEC and prohibits the excavation of soil without MEDEP notification which shall be revised to include the entire Site; similar to the DEC that was recorded for the southern portion of the Site (VRAP Area) in 2008.

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 identified adverse environmental conditions or unacceptable risks remaining from accessible contaminated soils; therefore, the potential for human exposure continues to exist for current trespassers and Site workers, and for future Site occupants, workers, and/or trespassers.

The No Action Alternative is not protective of human health and the environment and does not meet the project objectives. The No Action Alternative would not achieve reduction of the toxicity, mobility, and volume of the hazardous substances present at the Site. Additionally, the No Action Alternative would not be an effective remediation alternative, and potential impacts to human health would remain at the Site. The No Action Alternative was not selected for implementation or further consideration because the contaminated soils would continue to pose a health risk to current trespassers and Site workers, and to future Site occupants, workers, and/or trespassers.

5.2 Complete Soil Removal Alternative

The second soil alternative evaluated in this ABCA is the Complete Soil Removal Alternative. This alternative involves mitigating the potential for human exposure to impacted soils through soil removal activities.

In this alternative, approximately 2,400 cubic yards (approximately 3,000 tons) of surficial soil would be removed in the Upland Area of the Site and approximately 720 cubic yards (approximately 900 tons) in the Riverwalk area where lead and PAH impacted soils are located to a depth of two feet bgs to eliminate the exposure risk associated with the contaminated surficial soils. These values are based on single points of data and will require additional gap analysis in order to delineate more accurately. No soils would be excavated solely for arsenic exceedances of the MEDEP RAGs. Additional waste characterization of the soils will be necessary to determine the proper type of disposal facility and their proper handling. Excavation along the Megunticook River may require removal of existing trees and significant erosion control measures.

Excavated soil would be disposed of at an offsite state licensed landfill or other approved licensed disposal facility, based on the results of soil characterization sampling. The excavation would be backfilled with compacted clean fill and topsoil. This fill and topsoil would be sampled prior to installation to confirm suitability for clean cover system.

The evaluation of the Soil Removal Alternative is discussed below.

5.2.1 Overall Protection of Human Health and the Environment

This alternative provides protection of human health by mitigating the risk of human exposure of future Site residents to impacted soils via removal activities. Removal of the contaminated soils would eliminate the risk of direct contact by existing Site workers, and future site occupants, workers, and/or trespassers. 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 during Site redevelopment. The goal of reducing or eliminating the risk of human exposure to impacted soils could be achieved through this alternative.

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 Megunticook River during remediation and future redevelopment.

5.2.2 Technical Practicality

Soil removal activities are technically practical. Due to the presence of a fairly high water table at the Site (due to the Megunticook River), the removal of impacted soil may require additional measures (i.e., dewatering, treatment of the dewatered groundwater, etc.) but could be completed utilizing accepted construction techniques. Excavations along the bank of the Megunticook River will require removal of trees and underlying vegetation as well as temporary and permanent erosion control measures. Both contractors and disposal facilities with experience on similar projects are readily available in the region.

5.2.3 Ability to Implement

Removal and off-site disposal of impacted soils is technically feasible and is an effective action for reducing or eliminating the risk of human exposure. Services and materials necessary to conduct this alternative are readily available.

5.2.4 Reduction of Toxicity, Mobility and Volume

This remediation alternative can significantly achieve reduction of the toxicity, mobility, and volume of the impacted soils at the Site; as contaminated surficial soil which exceeds the applicable Residential, Park User, and/or Outdoor Commercial Worker MEDEP RAGs would be removed from Site. Excavation Construction Worker exposure scenarios would be mitigated through implementation of an EMMP.

5.2.5 Short Term Effectiveness

The remedial action objective would be attained when the impacted soils are removed from Site. Potential adverse impacts to human health from exposure to 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 Megunticook 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.

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 Complete Soil Removal Alternative. Capital costs include direct capital costs, such as materials and equipment, and indirect capital costs, such as engineering and sampling contingencies. For the purposes of this evaluation, Ransom assumed that removal of impacted soils would be conducted prior to Site redevelopment activities. Although not cost prohibitive, the costs associated with this alternative are significantly higher than the costs associated with Alternative 3: Soil Cover System with Targeted Soil Removal. The

preliminary cost provided were developed to compare alternatives and should not be considered engineering cost estimates.

5.3 Soil Cover System with Targeted Soil Removal Alternative

The third soil alternative evaluated in this ABCA is the Soil Cover System with Targeted Soil Removal Alternative. This alternative involves mitigating the potential for human exposure to impacted soils through the construction of engineered cover systems onsite and soil removal alternatives.

MEDEP-approved cover systems would be installed over the lead and GRO impacted soils in the Upland Area of the Site to prevent human contact with the impacted soils. These soils have been pinpointed at B101 on Figure two and the cover system has been proposed to cover the area surrounding the boring delineated by borings with laboratory confirmed COC concentrations below applicable MEDEP RAGs. Minimal disturbance would occur for the soils with elevated arsenic, but no cover system would be installed over soils solely with arsenic exceedances. Cover systems will be designed based on the proposed redevelopment features and existing Site conditions. Any new proposed building, paved parking area, proposed concrete walkways and patios, and landscaped areas will be constructed as an engineered cover systems with marker layers and adequate cover material. If the redevelopment has not been determined at the time of the cleanup, a gravel or loam cover system would be constructed. In this Alternative targeted soil removal would occur on the impacted soil near the Riverwalk approaching the bank of the Megunitcook River. Temporary and permanent erosion control measures would be implemented, which would further increase the resiliency of the riverbank in the event of future flooding events. Excavation extents will be planned to minimize removal of existing trees where possible. Please see Figure 2 for the proposed location of this cover system as well as the targeted soil removal area.

In this alternative, approximately 720 cubic yards (approximately 900 tons) of surficial soil would be removed in the Riverwalk Area of the Site to a depth of two feet bgs to eliminate the exposure risk associated with the contaminated surficial soils. These values are based on single points of data and will require additional data gap analysis in order to delineate more accurately. Additional waste characterization of these soils will be necessary to determine the proper type of disposal facility and their proper handling. Excavation along the Megunticook River may require removal of existing trees and significant erosion control measures.

If this alternative is selected, additional institutional controls/deed restrictions beyond those outlined in the introduction to Section 5 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. Additionally, a Post-Closure Cover System Maintenance Plan will need to be prepared and implemented to detail the integrity of the cover systems over time.

The Soil Cover System with Targeted Soil Removal Alternative fulfills the evaluation criteria, as discussed below.

5.3.1 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.

This alternative provides protection of the environment by shedding or redirecting stormwater run-on and minimizing infiltration within the impacted areas and by minimizing potential impacts to stormwater runoff by soil not underneath the cover system. Additionally, the preparation and implementation of an EMMP outlining proper stormwater, erosion, and dust management protocols will minimize potential impacts to the Megunticook River during remediation and future redevelopment activities.

5.3.2 Technical Practicality

Constructing cover systems over impacted soils and soil removal are both technically practical remedial measures. The construction of these systems could be completed utilizing accepted construction techniques. Due to the presence of a fairly high-water table at the Site (due to the Megunticook River), the removal of impacted soil may require additional measures (i.e. dewatering, treatment of the dewatered groundwater, ect.) but could be completed utilizing accepted constructed techniques. Excavations along the bank of the Megunticook River will require removal of trees and underlying vegetation as well as temporary and permanent erosion controls measures. Both contractors and disposal facilities with experience with similar projects are readily available in the region.

5.3.3 Ability to Implement

Construction of engineered cover systems over impacted soils and targeted soil removal at the Site is technically feasible and is an effective action for reducing the risk of human exposure. Services and materials necessary to conduct this alternative are readily available.

5.3.4 Reduction of Toxicity, Mobility, and Volume

Engineered cover systems 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 the Upland Area Site as part of this alternative, there will be no reduction in the toxicity or volume of impacted soils in the Upland Area of the Site. Additionally, this remediation alternative can significantly achieve reduction of the toxicity, mobility, and volume of the impacted soil on the Riverwalk portion of the Site; as contaminated surficial soil which exceeds the applicable Residential, Park User, and/or Outdoor Commercial Worker MEDEP RAGs would be removed from Site. Excavation Construction Worker exposure scenarios would be mitigated through the implementation of an EMMP.

5.3.5 Short Term Effectiveness

The remedial action objective could be attained when the Upland impacted soils are covered and impacted Riverwalk soils are removed from Site. Potential adverse impacts to human health from exposure to the accessible 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 Megunticook 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 as well as 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. 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 as part of the cover systems. 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.

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 Soil Cover System with Targeted 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 not prohibitive and are lower than Alternative 2 Complete Soil Removal.

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 3: Soil Cover System with Targeted Soil Removal alternative has been selected as the preferred remediation alternative. This alternative is proven to protect human health and the environment; is effective, technically feasible, and practical.

6.0 CONCEPTUAL REMEDIAL ACTION PLAN

The Soil Cover System with Targeted Soil Removal 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, this alternative has been selected for implementation at the Site for remediation of accessible onsite contaminated soils. Remedial tasks proposed for completion at the Site are discussed below.

6.1 Targeted Soil Removal

Soil removal will occur in the Riverwalk area of the Site. The amount of soil exceeding the MEDEP RAGs is unclear based on the TBA data collected. Ransom proposes to conduct additional sampling to refine the vertical and horizontal extents of the contamination and to determine the waste characterization of the material to be disposed offsite. These volumes will be re-calculated after this data gap sampling has been completed. Conceptually, approximately 720 cubic yards (900 tons) of impacted soil are anticipated to be removed. Contaminated surficial soil which exceeds the applicable Residential, Park User, and/or Outdoor Commercial Worker MEDEP RAGs for GRO, Lead, Mercury, EPH, and PAH's will be removed from Site and disposed of at an offsite state licensed landfill or other approved licensed disposal facility, based on the results of soil characterization sampling. A percentage of the targeted soil could be required to be disposed of as hazardous waste pending the waste characterization sampling. The excavation would be backfilled with compacted clean fill and topsoil. This fill and topsoil would be sampled prior to installation to confirm suitability for clean over system. Additional remedial actions completed in the Riverwalk area will include implementation of temporary and permanent erosion control and/or slope stabilization measures.

6.2 Soil Cover Systems

Soil cover systems will be installed over the select sections of the Upland Area of the Site (approximately 3,600 Square Yards). This Soil Cover System will be implemented over impacted surficial soil that exceeds the applicable Residential, Park User, and/or Outdoor Commercial Worker MEDEP RAGs for Lead and PAH. This conceptual remedial action plan outlines a permanent cover system including a combination of landscaped areas, paved parking areas, and/or building foundations being installed as part of final Site development activities. These options are shown in figure 3 and further discussed below:

Landscaped Cover Systems: Landscaped cover systems include lawn areas, flower/landscaping beds, rip rap/stone, and other pervious ground surfaces. In these areas, a marker layer (US65HVO Demarcation Fabric, or approved equal) will be placed over the native/impacted soil. A minimum of 12 inches of compacted material will be placed over the marker layer, depending on redevelopment plans (i.e., in areas where grass or other plantings are proposed, 8 inches of compacted fill and 4 inches of compacted loam may be placed; in areas where riprap is proposed, 12 inches of stone may be placed). No less than 12-inches of total compacted cover material shall be permitted in these areas.

Asphalt/Concrete Cover Systems: Asphalt/concrete cover systems include roads, parking areas, driveways, sidewalks, patios, and other impervious ground surfaces. Cover systems in these areas shall include: a marker layer (US65HVO Demarcation Fabric or approved equal) placed over the native/impacted soil; a minimum of 6 inches of clean compacted structural soils (gravel sub-base materials) to ensure the structural integrity of the

asphalt/concrete surface; and a minimum of 4 inches of concrete/asphalt (design by others). No less than 10-inches of total cover material shall be permitted in these areas.

Building Foundation Cover Systems: Any new building foundations would act as a cover system and consist of a marker layer (US65HVO Demarcation Fabric or approved equal) placed over the native/impacted soil; sub-slab structural crushed stone bedding (design by others); and the building foundation (design by others).

In addition, 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 presents a conceptual schematic of the various types of potential cover systems that may be used to accommodate future Site redevelopment plans.

6.3 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 and neighboring properties from exposure risks to the contaminated soil and groundwater during construction activities; and will detail the 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 be prepared and implemented in order to detail 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; and that future construction, remediation, or landscaping at the property will not disturb the engineered cover systems or underlying residual contaminated soil (without notification and consent from the MEDEP).
4. Future Site residents shall be prohibited from excavating soils onsite for any purpose (i.e., gardens, installation of mailboxes, etc.).

6.4 Green Remediation Principals

The soil cover systems which will be installed over contaminated soils at the Site will be implemented in accordance with the EPA's Clean and Greener Policy for Contaminated Sites, revised February 2012 (Green Remediation Principals). As much as feasible, the cleanup contractor will use well maintained, appropriate-sized machinery, which may reduce fuel consumption and emissions. Additionally, recycled cover materials may be incorporated into the final design, which would conserve resources. Any area of the cover system, which is specified to be seeded, will be done with a seed mixture which is appropriately zoned for the southern Maine climate, and if feasible, one which requires less water than a typical seed mixture. The cleanup will be conducted in a manner which is ultimately protective of the air (via dust control and minimizing equipment emissions), adjacent water bodies (through stringent erosion and sedimentation control measures), and human receptors (via physical barriers and restrictions to prevent human contact with the impacted areas).

6.5 Development Proposals

Currently one development proposal is being negotiated with the Town. Ransom has reviewed the initial proposal and determined that it is in general alignment with the selected remedial alternative and upon final development, Ransom will review the final proposed design to ensure the implementation of necessary remedial actions.

6.6 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 U.S. EPA and MEDEP for approval prior to implementation of the proposed remedial actions at the Site.

7.0 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.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Previous environmental investigations conducted at the Site identified contamination associated with onsite soils and groundwater.

Three remediation alternatives were evaluated to address exposure risks related to impacted soil at the Site, including a No Action Alternative, Soil Removal Alternative and the Soil Cover System with Targeted Soil Removal Slab Removal Alternative. The No Action Alternative was determined to be unacceptable because it did not meet threshold criteria of the overall protection of human health and the environment. The Complete Soil Removal Alternative was not selected due to the fact that it was the most expensive alternative which was evaluated. The Soil Cover System with Targeted Soil Removal 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 was selected as the preferred remedial alternative.

Previously, to address impacted soil and groundwater at the Site, the 2008 MEDEP VRAP Certificate of Closure conditions prohibit excavation of soil within the VRAP Area and extraction of groundwater across the entire Site. The selected alternative includes revisions to the existing institutional controls in the form of updated deed restrictions which protect the engineered cover system by prohibiting excavation across the entire Site without notification to MEDEP and which protect future Site occupants from exposure to impacted groundwater by prohibiting the extraction of groundwater at the Site without notification of MEDEP.

In addition to these remedial measures, the following remedial activities will be completed at the Site: implementation of an EMMP during remedial activities at the Site to manage impacted soil and groundwater and protect Site workers; and implementation of a Post-Closure Cover System Maintenance Plan detailing inspection, notification, and maintenance requirements for the cover systems at the Site. As part of the proposed remedial measures, additional TCLP sampling of identified lead impacted soils is recommended to identify, delineate, and address any potentially “hot spots” of soils impacted by potentially leachable concentrations of lead from remaining at the Site beneath the cover systems.

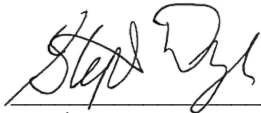
Upon completion of the remedial activities at the Site, the remedial actions will be documented, and the results of the actions presented in a completion report submitted to the MEDEP VRAP to obtain a final VRAP Certificate of Completion.

9.0 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.



Sarah Mazerolle
Project Engineer



Stephen J. Dyer, P.E.
Senior Project Manager

SPM/SJD:mes

**TABLE 1 – SUMMARY OF THE EVALUATION AND COMPARISON OF SOIL REMEDIAL ALTERNATIVES
FORMER APOLLO TANNERY
116 WASHINGTON STREET, CAMDEN, 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	Resiliency to Climate Change Conditions	Estimated Cost	Comments
1) No Action	<ul style="list-style-type: none"> Long-term risks to human health by direct contact, incidental ingestion, or inhalation of contaminated onsite soils will remain. Long-term risks to the environment by stormwater runoff impacting the Megunticook River and/or leaching to groundwater will remain. Cleanup objectives will not be met. 	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> No reduction in toxicity, mobility or volume of the contaminated soil. 	<ul style="list-style-type: none"> This is not considered an effective remedial alternative. 	<ul style="list-style-type: none"> Impacted soils will remain in contact with stormwater/rainfall and potentially rising groundwater table. 	<ul style="list-style-type: none"> This alternative will involve ongoing security measures and maintenance and will cost approximately \$1,000 per year. 	<ul style="list-style-type: none"> This alternative does not address the recognized environmental conditions and contamination stigma at the property. Because contaminated soil will remain onsite, this alternative will require a deed restriction to limit future site use and restrict access to the Site.
2) Complete Soil Removal	<ul style="list-style-type: none"> Exposure risks to human health by direct contact, inhalation and incidental ingestion of contaminated surficial soil is eliminated by removing the contaminated soil from the site. The implementation of an Environmental Media Management Plan (EMMP) will provide guidance to Site workers to minimize exposure to contaminated soils during Site redevelopment. Exposure risks to the environmental by stormwater runoff and/or leaching to groundwater will be eliminated by removing the contaminated soil from the site. 	<ul style="list-style-type: none"> Soil removal techniques utilize standard excavation and construction techniques; therefore, this alternative is technically practical. 	<ul style="list-style-type: none"> The necessary services and materials, including construction equipment and contractors, needed to complete the soil removal activity are readily available in the coastal Maine region. 	<ul style="list-style-type: none"> Removal of contaminated surficial soil completely reduces the toxicity, mobility and volume of the onsite soil contamination. The goal of reducing or eliminating the exposure risk of future site occupants, workers, and trespassers to the impacted soil is achieved. 	<ul style="list-style-type: none"> The remedial action objective would be attained when the impacted soils are removed from Site. Potential adverse impacts to human health from exposure to contaminated soils may exist until the cleanup objectives are achieved. 	<ul style="list-style-type: none"> Impacted surficial soils are removed from Site, eliminating the risk of direct contact with rising groundwater table and/or stormwater/rainfall. 	<ul style="list-style-type: none"> The estimated cost for the Soil Removal Alternative is approximately \$643,900. (These cost estimates are for budgetary purposes and should not be construed as a cost proposal.) The costs associated with this alternative are higher than those associated with the Soil Cover System with Targeted Soil Removal Alternative. 	<ul style="list-style-type: none"> The following additional remedial actions will be necessary at the Site: <ol style="list-style-type: none"> Implementation of an EMMP; and Deed restriction and/or institutional controls which prohibit the extraction of groundwater onsite
3) Soil Cover System with Targeted Soil Removal	<ul style="list-style-type: none"> Exposure risks to human health by direct contact, inhalation and incidental ingestion of contaminated soil is significantly reduced by covering remaining contaminated Upland Area soil in-place and by removing contaminated soil in the Riverwalk Area from the Site. The implementation of an EMMP will provide guidance to Site workers to minimize exposure to contaminated soils during Site redevelopment. Exposure risks to the environment by stormwater runoff are reduced by placing clean fill and maintaining vegetation over the impacted material. Risks to the environment by groundwater leaching are not reduced in the Upland Area of the Site, due to the fact that contaminated soils remain onsite, however they are reduced in the Riverwalk Area of the Site. The proposed alternative will not reduce concentrations below regulatory exposure guidelines in the Upland Area of the Site, but the physical barrier and institutional controls will protect human health and the environment from direct exposure. 	<ul style="list-style-type: none"> Construction activities associated with soil cover systems and soil removal will utilize standard construction techniques; therefore, this alternative is technically practical. Institutional controls are becoming a more common and viable alternative; therefore, this remedial alternative is technically practical. 	<ul style="list-style-type: none"> The necessary services and materials, including construction equipment and contractors, needed to complete the soil cover systems and the soil removal activity are readily available in the coastal Maine region. Institutional controls and long-term maintenance may be difficult to maintain if the property ownership is transferred and future owners of the site are unwilling to abide by the restrictive covenant. 	<ul style="list-style-type: none"> Cover systems reduce the mobility of contaminated soil by preventing stormwater runoff from coming in contact with the soil. No reduction of toxicity or volume of contaminated soil or sediment in the Upland Area of the Site, due to the fact that no soil is being removed from Site. Impacted soils will remain in the Upland Area of the site; however, they will be covered. This achieves the goal of reducing the risk of direct contact by potential future site occupants, workers, and trespassers to contaminated soils. Removal of contaminated surficial soil completely reduces the toxicity, mobility and volume of the Riverwalk soil contamination. The goal of reducing or eliminating the exposure risk of future site occupants, workers, and trespassers to the impacted soil is achieved in the Riverwalk Area of the Site. 	<ul style="list-style-type: none"> The remedial action objective could be attained when the impacted soils are covered, and targeted impacted soils are removed. Potential adverse impacts to human health from exposure to the accessible contaminated soils may exist until the cleanup goals are achieved. 	<ul style="list-style-type: none"> Impacted soils in the Upland Area of the Site are covered, reducing the risk of direct contact with stormwater/rainfall. Impacted soils in the Upland Area of the Site may still come into contact with a rising groundwater table; however, the contaminants of concern are not anticipated to be significantly leachable, thus reducing the impacts to groundwater. Impacted surficial soils in the Riverwalk portion of the Site are removed from Site, eliminating the risk of direct contact with rising groundwater table and/or stormwater/rainfall. 	<ul style="list-style-type: none"> The estimated cost for the Soil Cover System without Concrete Slab Removal Alternative is approximately \$316,200 (These cost estimates are for budgetary purposes only and should not be construed as a cost proposal.) The costs associated with this alternative are not prohibitive and are lower than those associated with the Soil Removal Alternative. 	<ul style="list-style-type: none"> The following additional remedial actions will be necessary at the Site: <ol style="list-style-type: none"> Implementation of a Post-Closure Cover System Maintenance Plan; Implementation of an EMMP; Deed restrictions and/or institutional controls which prohibits the extraction of groundwater and ensures that future onsite construction would not disturb the cover systems; A Declaration of Environmental Covenant which requires that a vapor mitigation system be incorporated into the design of any new proposed Site building; and Requirements that future residents be prohibited from soil excavation onsite.

Table 2: Summary of Estimated Remediation Costs for Complete Soil Removal Alternative
Former Apollo Tannery Site
116 Washington Avenue
Camden, Maine

	Number	Units	Unit Cost	Total
Engineering Support and Project Reporting				
Environmental Media Management Plan	1	LS	\$2,500	\$2,500
Site-Specific Quality Assurance Project Plan ⁽¹⁾	1	LS	\$3,000	\$3,000
Data Gap Sampling	1	LS	\$20,000	\$20,000
Engineering Design	1	LS	\$12,000	\$12,000
Construction Oversight and Bidding Phase Services ⁽²⁾	1	LS	\$24,000	\$24,000
VRAP Closure Reporting and Documentation ⁽³⁾	1	LS	\$8,000	\$8,000
<i>Engineering Support and Project Reporting Subtotal:</i>				\$69,500
Targeted Riverwalk Hot Spot Remediation ⁽⁵⁾				
Impacted Soil Excavation ⁽⁵⁾	720	CY	\$15	\$10,800
Transportation & Disposal (T&D) - Non- Hazardous ⁽⁴⁾	880	Tons	\$80	\$70,400
Transportation & Disposal (T&D) - Hazardous ⁽⁴⁾	20	Tons	\$590	\$11,800
Waste Characterization Sampling & Analysis for Disposal ⁽⁶⁾	2	EA	\$1,500	\$3,000
Stormwater and Erosion Controls	1	LS	\$10,000	\$10,000
Clean Backfill	720	CY	\$20	\$14,400
Site Restoration, Grading, Seeding	1	LS	\$8,000	\$8,000
<i>Targeted Soil Removal Subtotal:</i>				\$128,400
Targeted Upland Hot Spot Remediation ⁽⁷⁾				
Impacted Soil Excavation ⁽⁷⁾	3,000	Tons	\$10	\$30,000
Transportation & Disposal (T&D) - Non- Hazardous ⁽⁵⁾	3,000	Tons	\$75	\$225,000
Transportation & Disposal (T&D) - Hazardous ⁽⁵⁾	0	Tons	\$590	\$0
Waste Characterization Sampling & Analysis for Disposal ⁽⁶⁾	6	EA	\$1,500	\$9,000
Stormwater and Erosion Controls	1	LS	\$10,000	\$10,000
Clean Backfill	2,400	CY	\$30	\$72,000
Site Restoration, Grading, Seeding	1	LS	\$16,000	\$16,000
<i>Targeted Soil Removal Subtotal:</i>				\$362,000
SUBTOTAL				\$559,900
Contingency 15% ⁽⁶⁾				\$84,000
COMPLETE SOIL REMOVAL ALTERNATIVE TOTAL				\$643,900

1 Site-Specific Quality Assurance Project Plan must be prepared for collection of required waste characterization samples.

2 Cost includes bidding documents, contractor selection, and periodic oversight during remediation.

3 Cost includes VRAP Closure Report and Declaration of Environmental Covenants.

4 Demolition and disposal costs based on recent projects and costs for similar type materials.

5 Assumes volume of impacted soil = 720 cy based on proposed excavation depth of 2 feet across the 3240 Sq. Ft section of Impacted Soil in the Riverwalk area of the Site. Assume soil density of 1.25 tons per CY for fill soil.

6 One waste characterization sample is required per 500 tons of soil disposal.

7 Assumes volume of impacted soil = 2,400 cy based on proposed excavation depth of 2 feet across the 32,000 Sq. Ft the section of Impacted Soil in the Upland area.

NOTE: Costs presented in table above do not include programmatic and environmental design costs in Brownfields Cleanup Funds are to be used for Site redevelopment and remediation. These costs would include, but are not limited to, the following: Final Remedial Action Plan, Community Relations Plan & 30-day Public Comment, and Public LS = Lump Sum, CY = Cubic Yard, EA = Each

Table 3: Summary of Estimated Remediation Costs for Soil Cover System With Targeted Soil Removal Alternative
Former Apollo Tannery Site
116 Washington Avenue
Camden, Maine

	Number	Units	Unit Cost	Total
Engineering Support and Project Reporting				
Environmental Media Management Plan	1	LS	\$2,500	\$2,500
Site-Specific Quality Assurance Project Plan ⁽¹⁾	1	LS	\$3,000	\$3,000
Data Gap Sampling	1	LS	\$20,000	\$20,000
Engineering Design	1	LS	\$12,000	\$12,000
Construction Oversight and Bidding Phase Services ⁽²⁾	1	LS	\$24,000	\$24,000
VRAP Closure Reporting and Documentation ⁽³⁾	1	LS	\$8,000	\$8,000
<i>Engineering Support and Project Reporting Subtotal:</i>				\$69,500
Targeted Riverwalk Hot Spot Remediation ⁽⁵⁾				
Impacted Soil Excavation ⁽⁵⁾	720	CY	\$15	\$10,800
Transportation & Disposal (T&D) - Non- Hazardous ⁽⁴⁾	880	Tons	\$80	\$70,400
Transportation & Disposal (T&D) - Hazardous ⁽⁴⁾	20	Tons	\$590	\$11,800
Waste Characterization Sampling & Analysis for Disposal ⁽⁶⁾	2	EA	\$1,500	\$3,000
Stormwater and Erosion Controls	1	LS	\$10,000	\$10,000
Clean Backfill	720	CY	\$20	\$14,400
Site Restoration, Grading, Seeding	1	LS	\$8,000	\$8,000
<i>Targeted Soil Removal Subtotal:</i>				\$128,400
Cover System Installation				
Cover System ⁽⁷⁾	3,600	SY	\$20	\$72,000
Stormwater and Erosion Controls ⁽⁸⁾	1	LS	\$5,000	\$5,000
<i>Cover System Subtotal:</i>				\$77,000
SUBTOTAL				\$274,900
Contingency 15% ⁽⁶⁾				\$41,300
SOIL COVER SYSTEM AND TARGET SOIL REMOVAL ALTERNATIVE TOTAL				\$316,200

1 Site-Specific Quality Assurance Project Plan must be prepared for collection of required waste characterization samples.

2 Cost includes bidding documents, contractor selection, and periodic oversight during remediation.

3 Cost includes VRAP Closure Report and Declaration of Environmental Covenants.

4 Demolition and disposal costs based on recent projects and costs for similar type materials.

5 Assumes volume of impacted soil = 720 cy based on proposed excavation depth of 2 feet across the 3,240 Sq. Ft section of Impacted Soil in the Riverwalk area of the Site. Assume soil density of 1.25 tons per cy for fill soil.

6 One waste characterization sample is required per 500 tons of soil disposal.

7 Cover systems shall be either: 12" gravel over marker layer; or 12" of fill/loam combination over marker layer

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

NOTE: Costs presented in table above do not include programmatic and environmental design costs in Brownfields Cleanup Funds are to be used for Site redevelopment and remediation. These costs would include, but are not limited to, the following: Final Remedial Action Plan, Community Relations Plan & 30-day Public Comment, and Public Meetings.

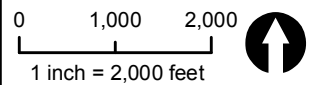
LS = Lump Sum, SY = Square Yard, CY=Cubic Yard, EA= Each



Notes

1. Data Source: USGS National Map Seamless Server, 24K DRG, 1/3" NED
2. USGS Quad Name: Camden
3. Latitude: 44° 12' 53" N
 Longitude: 69° 4' 36" W
 UTM Northing: 4895730 mN
 UTM Easting: 493853 mE

Scale and Orientation



Prepared For

Town of Camden
 29 Elm Street
 Camden, Maine

Site Address

Former Apollo Tannery
 116 Washington Street
 Camden, Maine

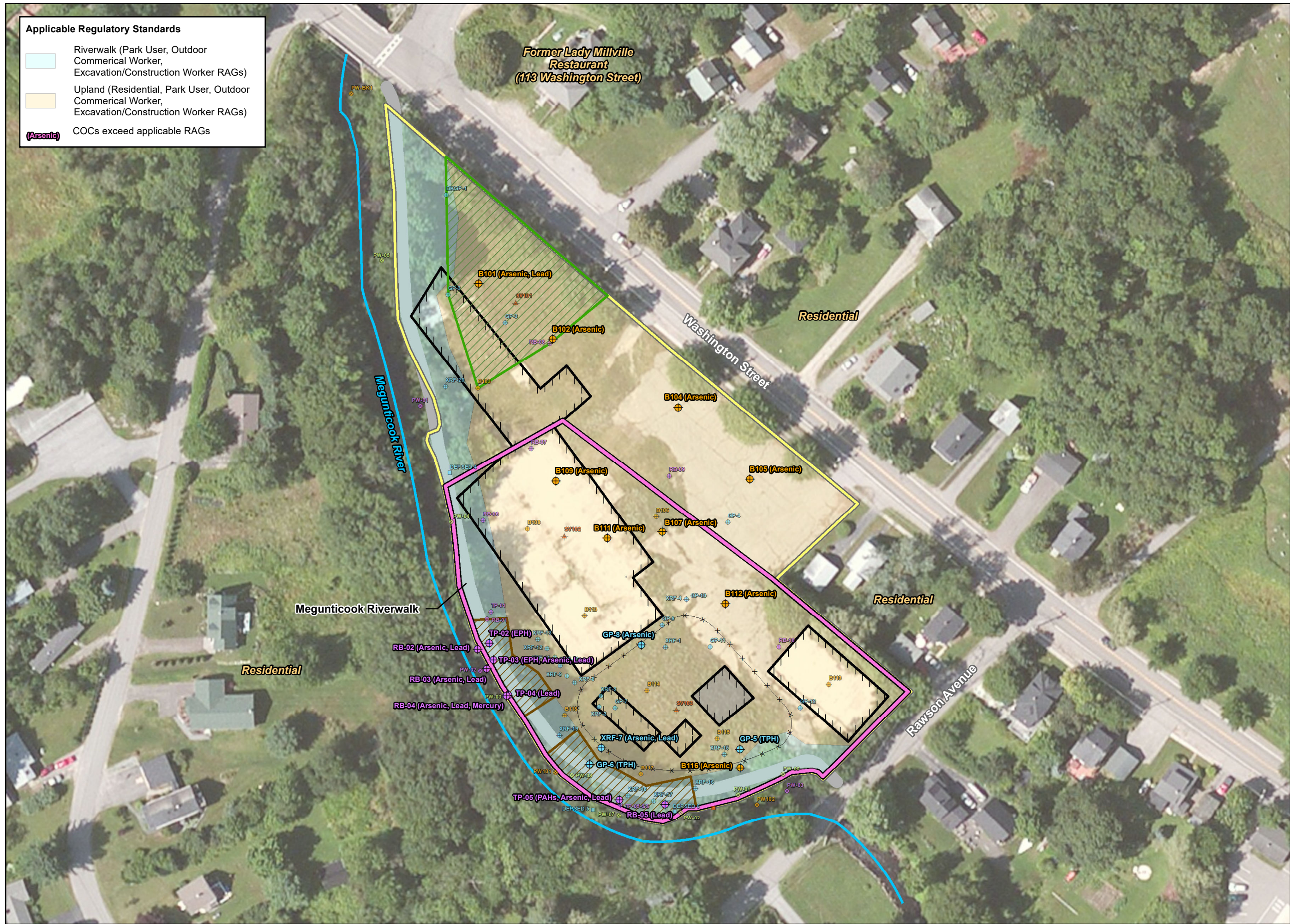
181.06095 | Feb 2019

Figure 1
 Site Location

Applicable Regulatory Standards

- Riverwalk (Park User, Outdoor Commercial Worker, Excavation/Construction Worker RAGs)
- Upland (Residential, Park User, Outdoor Commercial Worker, Excavation/Construction Worker RAGs)
- (Arsenic) COCs exceed applicable RAGs

**Former Lady Millville Restaurant
(113 Washington Street)**

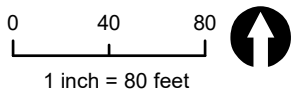


Legend & Notes

- Site Boundary
- Riverwalk Area
- Upland Area
- Area of Potential Riverwalk Impacted Soil
- Proposed Cover System
- Slurry Wall (VRAP, 2008)
- VRAP COC Boundary (2008)
- Soil Vapor Point
- Soil Boring (EPA TBA, 2019)
- Soil Boring (Ransom, 2016)
- Soil Boring (MEDEP, 2001)
- Pore Water Sample (EPA TBA, 2019)
- Pore Water Sample (Ransom, 2016)
- Pore Water Sample (Summit, 2006)
- Sediment Sample (MEDEP, 2001)
- Sediment Sample (Summit, 2001)

Notes
 1. Site Plan based on ESRI World Imagery.
 2. Some features are approximate in location and scale.
 3. This plan has been prepared for the Town of Camden. All other uses are not authorized unless written permission is obtained from Ransom Consulting, LLC.

Scale & Orientation



Prepared For

Town of Camden
29 Elm Street
Camden, Maine

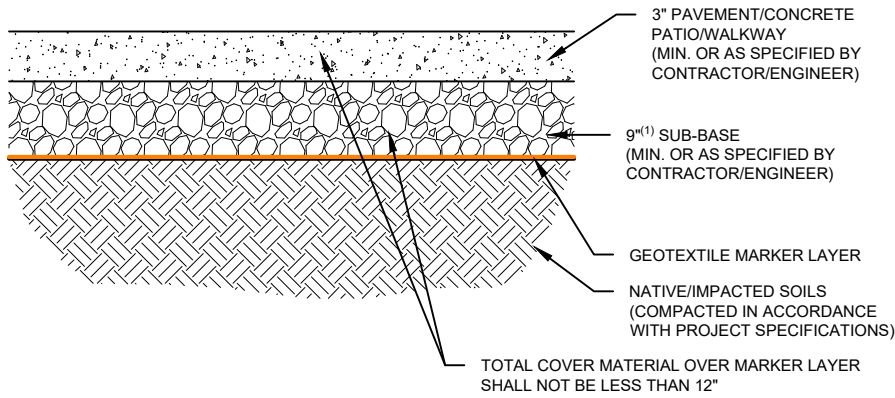
Site Address

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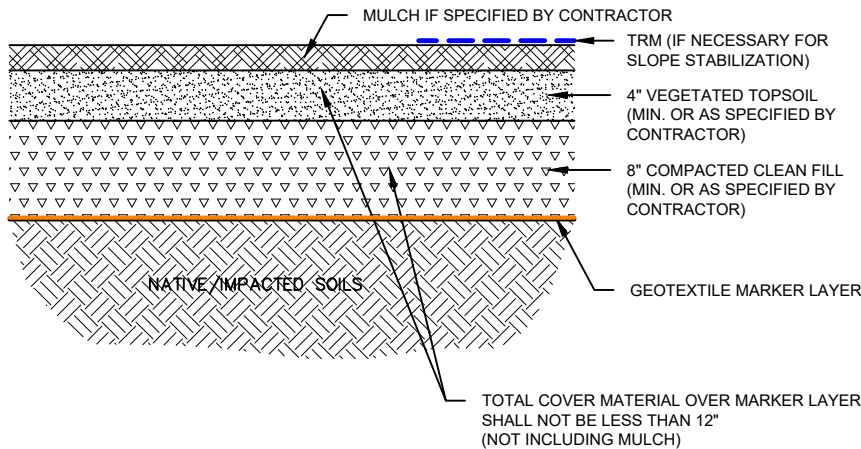
181.06095 | Mar 2022

Figure 2
Site Plan

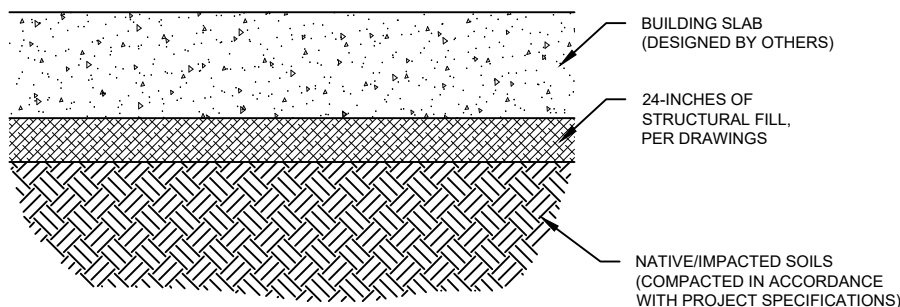
Legend & Notes



NEW ASPHALT/CONCRETE COVER
NOT TO SCALE



LANDSCAPE COVER
NOT TO SCALE



STRUCTURE/BUILDING FOUNDATION COVER
NOT TO SCALE

Notes:

1. 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, 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. Cover systems shall have a maximum slope 2:1.
4. Cover systems shall extend a minimum of 4' beyond limits of contaminated soils.

Prepared For

Town of Camden
29 Elm Street
Camden, Maine

Site Address

Former Apollo Tannery
116 Washington Street
Camden, Maine

181.06095 March 2022

Figure 3
Typical Cover System
Details