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Technical Memo

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Date:	September 12, 2012
To:	Thomas Kittredge, City of Belfast
From:	Kristin Gill, Erik Phenix, and Peter Sherr, Ransom Consulting, Inc.
cc:	Tracy Kelly and Molly King, MEDEP
	AmyJean McKeown, US EPA
Subject:	**Conceptual Remedial Action Plan and Cost Estimate**
	Belfast Boatyard, 38 Waterville Road, Belfast, Maine
Project No:	R111.06134

This memorandum has been prepared to summarize the preliminary Conceptual Remedial Action Plan (RAP) and associated estimated costs for the Belfast Boatyard located at 38 Waterville Road in Belfast, Maine (the "Site"). Phase I and II Environmental Site Assessments (ESAs) were completed for the Site through the City of Belfast's Brownfields Assessment Program. Refer to the attached Figure 1 for a layout of the Site, key Site features, and proposed remedial action areas. Contaminated surficial soils were identified in the following areas on the Site:

- Storage Structures: Elevated concentrations of copper and lead, which exceeded their Maine Department of Environmental Protection (MEDEP) Remedial Action Guidelines (RAGs) for "Outdoor Commercial Worker" and/or "Excavation/Construction Worker" exposure scenarios, were detected in the surficial soil samples collected from the dirt floors inside Storage Structures No. 3, No. 4, and No. 5 and are likely associated with marine paint removal activities conducted during boat maintenance/repair activities in these Storage Structures. Limited sampling was conducted within the remaining Storage Structures on the Site. Considering that similar activities are performed in Storage Structures No. 1, No. 2, and No. 6, it is possible that similar elevated concentrations of metals exist within portions of the surficial soils (dirt floors) of these buildings as well. For the purposes of this Conceptual RAP, we have proposed remediation activities within all of the Storage Structures onsite.

- South of Maintenance Shop: An elevated concentration of copper, which exceeded its MEDEP RAGs for "Outdoor Commercial Worker" and "Excavation/Construction Worker" exposure scenarios, was detected in a surficial soil sample collected from the ground surface south of the Maintenance Shop (in the vicinity of SS103 on Figure 1). This elevated concentration is likely the result of marine paint removal activities that generate dust, which is often discharged through ventilation fans to the exterior of the Maintenance Shop building and/or associated with marine paint releases to the former floor drains in the building, which historically discharged via a PVC pipe to the ground surface outside of the Maintenance Shop building.

- Burn Pile: An elevated concentration of arsenic was detected in the surficial soil sample collected from the burn pile (located in the vicinity of SS-115 on Figure 1), which exceeded its background concentrations and MEDEP RAGs for both "Outdoor Commercial Worker" and "Excavation/Construction Worker" exposure scenarios. The presence of this elevated arsenic concentration is likely associated with combustion of arsenic-containing wood at the burn pile portion of the Site. It should be noted that arsenic was detected at concentrations exceeding the corresponding "Outdoor Commercial Worker" and "Excavation/Construction Worker" RAGs in additional soil samples collected throughout the Site; however, with the exception of the sample collected from the burn pile area, these arsenic concentrations appear to represent background conditions for the fill material placed for site grading and are below the draft State-wide background arsenic concentration for rural areas, and therefore, do not appear to represent an exposure risk for future boatyard workers.

- Area of Oil Staining: An elevated concentration of one extractable petroleum hydrocarbon (EPH) fraction (C_{19}–C_{36} aliphatics) above its respective MEDEP Remediation Guideline was detected in a soil sample collected from an area of surficial petroleum staining (approximately 65 square feet) located south of Storage Structure No. 6 (in the vicinity of SS-114 on Figure 1), which appeared to be associated with motor oil/automotive lubricant spills from former vehicle storage activities in this area of the Site.

The proposed remedial actions to address these impacted soils include the following:

1. **Permitting & Erosion Control Measures**

   Appropriate local, State, and Federal permitting requirements should be conducted, prior to commencing with remediation activities. At this time, it is anticipated that a MEDEP Voluntary Response Action Program (VRAP) application (currently being completed), will be required for this remedial action project. If less than one acre is disturbed by the remedial actions, then a Main Construction General Permit (MCGP) may not be required. Nevertheless, erosion control measures are proposed to be implemented and maintained throughout the project in accordance with the Maine Erosion and Sediment Control Best Management Practices (BMPs).

2. **Reclaimed Asphalt Pavement Cover Systems**

   As shown on the attached Figure 1, cover systems are proposed to be installed over the dirt floors of Storage Structures No. 1 through No. 6. The cover systems will be designed to prevent direct contact exposure to contaminants of concern identified at the Site. The cover systems are proposed to be asphaltic pavement cover systems consisting of a minimum of 3 inches of reclaimed asphalt pavement (approximately ¾-inch crushed reclaimed asphalt) over a geotextile fabric marker layer. The marker layer will indicate the extent of clean materials above the contaminated materials.

   Storage Structures No. 1 through No. 5 encompass footprints of approximately 3,200 square feet each, and Storage Structure No. 6 encompasses a footprint of approximately 6,030 square feet.

   Periodic inspections and long-term maintenance of the asphalt pavement cover systems will be required.

3. Limited Soil Removal

As shown on the attached Figure 1, limited soil removal activities are proposed to be conducted within the burn pile area (approximately 900 square feet), the area of oil staining (approximately 65 square feet), and south of the Maintenance Shop (approximately 120 square feet) on the Site. Soils are proposed to be excavated to a depth of approximately two feet below the ground surface. A total of approximately 80 cubic yards of impacted soils are proposed to be excavated from these three areas and disposed off-site as special waste (i.e., non-hazardous).

Two confirmatory samples are proposed to be collected from each of these three areas to confirm that the extent of impacted soils has been addressed. The confirmatory samples will be analyzed for EPH, arsenic, or copper, depending on the contaminant of concern for each area. Results of the confirmatory soil samples will be provided to the MEDEP upon receipt.

4. Deed Restriction

A deed restriction in the form of a Declaration of Environmental Covenant (DEC) is proposed to be established and filed for the Site, which will:

(a) Notify future Site owners and occupants of the existence and location of soil contamination at the Site;

(b) Prohibit excavation activities within the footprint of the cover systems, without prior MEDEP notification and approval; and

(c) Require development of a MEDEP-approved Soil Management Plan, which will describe appropriate soil handling and disposal procedures for any contaminated soils which may be disturbed at the Site. The Soil Management Plan will also describe long-term maintenance activities associated with the cover systems.

(d) Prohibit extraction of groundwater, or installation of a drinking water well without prior MEDEP notification and approval.

The estimated costs associated with the proposed remedial actions summarized above are outlined in the attached Table 1. The cost estimates provided in Table 1 are engineering estimates for budgetary purposes only and do not include final engineering design or bidding contract documents; actual costs will be based on contractor bids and/or quotes, received prior to initiating the proposed remedial actions. Costs associated with long-term inspections and maintenance of the asphalt cover systems are not included in the estimated costs. Long-term monitoring and maintenance activities can likely be performed by the owner or their designated representative.

Table 1: Summary of Estimated Remediation Costs

Asphalt Cover & Limited Soil Removal Alternative [1]	Number	Units	Unit Cost	Total
Asphalt Cover Construction				
Reclaimed Asphalt Pavement for Cover Systems [2]	204	CY	$25	$5,100
Geotextile Fabric	2,450	SY	$2.40	$5,880
Limited Soil Removal				
Contaminated Soil [3]	80	CY	$100	$8,000
Disposal Soil Characterization Samples	1	Each	$1,500	$1,500
Replacement Clean Fill [4]	80	CY	$25	$2,000
Engineering Oversight/Closure Report [5]				
Permitting [6]	8	Hrs	$85	$680
Part-time Oversight	24	Hrs	$85	$2,040
Confirmatory Sampling [7]	1	LS	$450	$450
Closure Report	1	LS	$3,500	$3,500
Deed Restriction/VRAP Assistance [8, 9]	1	LS	$5,000	$5,000
Subtotal				*$34,200*
Contingency 20%				$6,800
TOTAL				**$41,000**

1 - Cost estimates are for budgetary purposes only.

2 - Includes labor and materials for the placement of 3 inches of reclaim asphalt pavement within Storage Structures No. 1 through No. 6 (approx. 22,030 SF total).

3 - Includes excavation, disposal, and transport; assumes removal can be done in 1 day and that soils are disposed as special waste (i.e., non-hazardous waste).

4 - Includes material, backfill, and compaction.

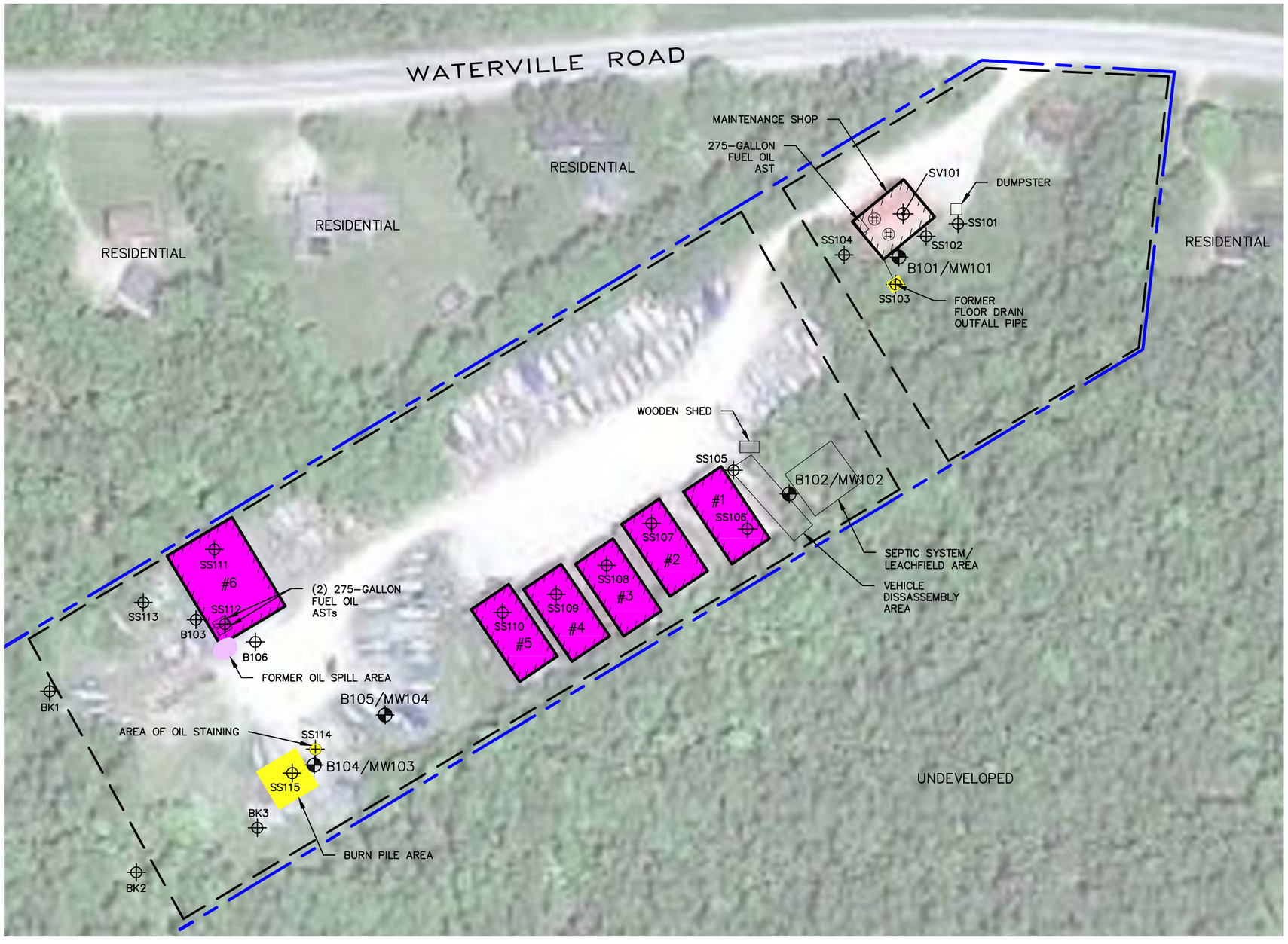
5 - Cost estimates are for remediation only and do not include final design enginnering or preparation of bidding documents.

6 - Assumes a Maine Construction General Permit will be required for soil removal activities.

7 - Assumes 2 EPH, 2 arsenic, and 2 copper confirmatory samples, depending on area of soil removal.

8 - Cost estimate includes a $500 application fee to MEDEP VRAP.

9 - Cost estimates do not include required ongoing inspections and maintenance of asphalt cover system.



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LEGEND:

- B101/MW101 — SOIL BORING/MONITORING WELL
- SS111 — SURFICIAL SOIL SAMPLE LOCATION
- PW101 — PORE WATER SAMPLE LOCATION
- SV101 — SOIL VAPOR SAMPLE LOCATION
- FLOOR DRAIN
- #5 — STORAGE STRUCTURE
- AREA OF PROPOSED ASPHALT CAP
- LIMITED SOIL REMOVAL AREA
- AOC1 — APPROXIMATE LIMIT OF AREAS OF CONCERN
- APPROXIMATE SITE BOUNDARY (BOUNDARY TAKEN FROM CITY OF BELFAST TAX MAP)

NOTES:

1. SITE PLAN BASED ON OBSERVATIONS MADE BY RANSOM CONSULTING, INC. ON MAY 23, 2012. AERIAL IMAGE PROVIDED BY GOOGLE EARTH.
2. SOME FEATURES ARE APPROXIMATE IN LOCATION AND SCALE.
3. THIS PLAN HAS BEEN PREPARED FOR THE CITY OF BELFAST. ALL OTHER USES ARE NOT AUTHORIZED, UNLESS WRITTEN PERMISSION IS OBTAINED FROM RANSOM CONSULTING, INC.

0 50 100 200

SCALE in FEET
1"=100'

RANSOM Consulting, Inc.

PREPARED FOR:
CITY OF BELFAST
131 CHURCH STREET
BELFAST, MAINE

SITE:
BELFAST BOATYARD
38 WATERVILLE ROAD
BELFAST, MAINE

PROPOSED REMEDIAL ACTION AREAS

DATE: SEPTEMBER 2012
PROJECT: 111.06134
FIGURE: 1

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