Remedial Action Work Plan and Analysis of Brownfield Cleanup Alternatives

0 & 58 Allen Street
Woonsocket, Rhode Island

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Prepared For:

Ms. Rachel Simpson, Senior Environmental Scientist
Office of Land Revitalization & Sustainable Materials Management
Rhode Island Department of Environmental Management
235 Promenade
Providence, Rhode Island 02908

BETA
6 Blackstone Valley Place
Suite 101
Lincoln, Rhode Island 02865
401.333.2382
www.BETA-Inc.com

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1.0 INTRODUCTION

BETA Group, Inc. (BETA) has developed this Remedial Action Work Plan (RAWP) and Analysis of Brownfield Cleanup Alternatives (ABCA) to provide details on the preferred remedial actions for the property at 0 & 58 Allen Street in Woonsocket, Rhode Island. The preferred remedies were identified in a Site Investigation Report (SIR) that was approved by RIDEM in a Remedial Decision Letter dated December 21, 2022. A copy of the letter is included in Appendix A. At this time, the City of Woonsocket is considered as the performing party; however, this could change if a developer purchases the Site prior to implementation of this RAWP/ABCA. At this time, the City of Woonsocket will be responsible for implementation of this RAWP/ABCA.

The Site consists of City of Woonsocket Assessor's Lot 177-017 (58 Allen Street) and Lots 176-016, 175-015, and 174-014 (0 Allen Street) on Map 14E in Woonsocket, Rhode Island (the Site). The 0.27-acre Site is currently improved by a paved parking lot.

This RAWP was prepared in accordance with Section 1.10 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Material Releases (Remediation Regulations), DEM-DSR-01-93, as amended in November 2011. The ABCA has been prepared in accordance with EPA requirements. It was required due to concentrations of total petroleum hydrocarbons, several polycyclic aromatic hydrocarbons (PAHs), and several metals that have been detected in soil above regulatory residential and industrial/commercial direct exposure thresholds. The goal of this RAWP/ABCA is to provide long-term protection of human health and the environment from site contaminants.

This RAWP/ABCA has been prepared on behalf of and for the exclusive use of City of Woonsocket. It is subject to the limitations presented in Section 13.

1.1 Site Location

The 0.27-acre Site is located between the west side of Allen Street and east side of Truman Drive in Woonsocket, Rhode Island. The site appears on the United States Geological Survey (USGS) Topographic Quadrangle – Blackstone, Massachusetts. Refer to Figure 1: USGS Topographic Quadrangle for details. According to the City of Woonsocket Assessor's Office, the Site is comprised of four parcels of land identified as Lots 14-174, 14-175, and 14-176 (0 Allen Street) and Lot 14-177 (58 Allen Street).

The approximate geographic coordinates of the Site are N 42º 0′ 3″ latitude and W 71º 30′ 51″ longitude. A portion of a United States Geologic Survey topographic map (Blackstone Quadrangle) showing the Site location is provided as Figure 1.

1.2 Site Description

The Site presently serves as an asphalt-paved, surface parking lot. BETA observed one catch basin in the northeastern area at the Site.

1.3 Environmental Setting

The Site is located at an elevation of approximately 136 feet above the 1929 National Geodetic Vertical Datum. The Site topography can be described as relatively flat with a slight slope to the southwest. The immediate Site vicinity slopes to the west away from the Blackstone River.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 250030 40008C dated March 2, 2009, the Site is located in Zone AE which has been determined to be an area with 1% annual chance floodplain and Zone X, which has been determined to be an area outside the 0.2% annual chance floodplain.

According to the RIDEM on-line Environmental Resource Map, the Site is located in the Groundwater Classification GB, meaning it is unsuitable for drinking water use without treatment. BETA infers groundwater to flow to the east towards the Blackstone River located approximately 250 feet east of the Site.

Potable water for Site and its vicinity is derived from the Scituate Reservoir and is supplied by the Woonsocket Water Supply Board through a piped distribution network.

According to the United States Department of Agriculture Soil Conservation Service (SCS) Soil Map, soil at the Site consists of the Urban land complex. Soil in these areas consists of sands and gravel.

Bedrock outcrops were not observed at or in the vicinity of the Site. According to RIDEM Environmental Resource Map, bedrock beneath the Site is metaclastic rock, undivided.

No surface water, wetlands or typical wetland vegetation was observed at the Site. The closest surface water body is the Blackstone River located approximately 250 feet east of the Site. BETA did not observe any wetland type vegetation at the Site. According to RIDEM's online Environmental Resource Map, no wetlands exist at the Site.

1.4 Climate Change and Site-Specific Risk Factors

Climate projections from the Massachusetts Climate and Hydrologic Risk Project for the Blackstone River Watershed based on the Representative Concentration Pathway (RCP) 8.5 warming scenario, a comparatively high greenhouse gas emissions scenario, indicate that the site will experience an annual average increase of 8.1 degrees F, up to 50 days per year above 90 degrees F, and up to 26 days per year above 95 degrees F by 2070. The same projections suggest that the site will experience an 21.7% increase in maximum precipitation, up to 2 more days per year with rainfall over 1", and one more day per year with rainfall over 2".[1]

These climate factors and related natural hazards will impact the Site's exposure and the vulnerability of remediation alternatives. Examples of potential site-specific risk factors for the site include high floodwater, unexpected changes in the water table, or increased interaction of contaminants with groundwater due to more frequent heavy rainfalls generating more discharge.

[1] Climate change projections developed for the Massachusetts Climate and Hydrologic Risk Project (Phase 1) by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) in partnership with Cornell University, U.S. Geological Survey and Tufts University.

Climate parameters influencing hydrologic processes and the performance of a containment system include precipitation, and ambient temperatures, among others. For example, a prolonged rainfall event could result in water seepage at the edges of a cover. Conversely, drought conditions could cause desiccation and cracking of the clay lining under a waste cell. Similarly, cracking or general deterioration of surface barriers could result from more frequent or extreme wet-dry or freeze-thaw cycles or heat stress.[2]

1.4 Site History

Historic records indicate that the northeastern portion of the Site was occupied by a portion of a machine shop for several years. The southern portion of the Site was comprised of various buildings mainly used for storage for several years, until 1950 which shows no buildings on Site. By 1963, several ASTs appeared on the Site at 50 Allen Street. According to the former Woonsocket City Planner, Mr. Kevin Proft, the eastern area of the site was previously a motor oil fueling station for trucks. This is consistent with the ASTs shown on the Sanborn Fire Insurance Maps. Mr. Proft stated that the ASTs were on Site until at least 1997. According to property cards provided by the Woonsocket Assessor's Department, the ASTs were removed by December 2008. The tank removal is reference in the property card for Lot 175-015. No other information was provided.

BETA's visual site inspection did not reveal any evidence of the previous ASTs nor any staining or leaking in the approximate area where the ASTs were located. Research efforts conducted at RIDEM and City Hall did not reveal any details or documentation regarding the ASTs.

An October 14, 1993 Phase I Environmental Site Assessment (ESA) by Garofalo Environmental Services, Inc. identified three underground storage tanks (USTs) located on-site. A 1,000-gallon gasoline UST and associated pump was located to the southwest of the former Site building. The gasoline UST was reportedly installed in 1967. Two additional USTs containing fuel oil and transmission oil were also located below the former Site building. The age and volume of these USTs is unknown. BETA's records inquiry at RIDEM and the Woonsocket Fire Department did not reveal documentation associated with the abovementioned USTs or their removal.

1.5 Previous Site Investigations

The RAWP/ABCA is based on the understanding of site conditions as presented in the following documents:

Phase I Environmental Site Assessment; dated May 2, 2022; BETA Group, Inc.

In April 2022, BETA Group, Inc. (BETA) completed a Phase I Environmental Site Assessment (ESA) for the property comprising City of Woonsocket Assessor's Map 14E Lot 177-017 (58 Allen Street) and Map 14E Lots 176-016, 175-015, and 174-014 (0 Allen Street) in Woonsocket, Rhode Island (the Site). The 0.27-acre Site is currently improved by a paved parking lot. The purpose of the Phase I ESA did not identify any Controlled Recognized Environmental Conditions (CRECs) and/or Historical Recognized Environmental Conditions (HRECs) in connection with the property but did identify the following Recognized Environmental Conditions (RECs):

[2] Climate Resilience Technical Fact Sheet: Contaminated Waste Containment Systems (epa.gov)

- Historical Presence of Aboveground Storage Tanks: According to Sanborn Fire Insurance Maps dating back to 1963, several aboveground storage tanks (ASTs) were historically located in the northeastern portion of the Site. Based on discussions with Mr. Kevin Proft, Woonsocket City Planner, a portion of the Site was utilized as a motor oil filling station for trucks and the ASTs were present on Site until at least 1997. BETA's visual site inspection did not reveal any evidence of the ASTs nor any staining or leaking in the approximate area where the ASTs were located. Research efforts conducted at the Rhode Island Department of Environmental Management (RIDEM) and City Hall did not reveal any details or documentation regarding the ASTs. Due to the lack of documentation or proper removal permits, BETA considered the historic presence of the ASTs to be a REC.
- Historic Use: According to Sanborn Fire Insurance Maps, a portion of the Site (the eastern area) was utilized as a machine shop from 1892 to approximately the 1950's. Additionally, historic City directories identify past occupants of the Site as Robert's Oil, Inc. and Kearns Frank Auto Supply. BETA considered these historic uses to be a REC due to potential historic on-site storage, use, and/or generation of oil and/or hazardous materials (OHMs).
- Spills Database Listing: According to information provided by EDR, the Site is listed in RIDEM's spills database with a release date of January 24, 1999. No other information was provided by EDR in reference to this listing with the exception of a note stating, "Investigate the former oil terminal." Records research at RIDEM, as well as city inquiries, did not reveal any information regarding this listing. Due to the lack of documentation or information regarding this listing, BETA considered the listing to be a REC.

Site Investigation Report; dated November 2022; BETA Group, Inc.

To assess soil and groundwater that may have been impacted by the RECs described above, BETA completed a Limited Subsurface Investigation at the Site in August and September 2022. Eight soil borings were advanced with three soil borings completed as a groundwater monitoring wells (MW-1 through MW-3). The remaining soil borings are referred to as B-4 through B-8. Laboratory analysis of samples collected during the Phase II ESA revealed the following:

- Concentrations of total petroleum hydrocarbons (TPH) exceeded RIDEM's Residential Direct Exposure Criteria (RDEC) in the 1-3 foot soil samples collected from borings B-5, B-6, and B-8;
- Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene and/or indeno(1,2,3-cd)pyrene exceeded their respective RDEC in the 1-3 foot samples collected from borings B-4, B-5, B-7, B-8, MW-1, and MW-3. The benzo(a)pyrene concentrations also exceeded RIDEM's Industrial/Commercial Direct Exposure Criteria (I/C DEC) in the 1-3 foot samples collected from borings B-4, B-5, B-7, B-8, MW-1, and MW-3;
- Concentrations of antimony in the 1-3 foot sample from B-6, arsenic in the 1-3 foot samples from B-4 and MW-2, manganese in the 1-3 foot sample from B-4, and lead in the 1-3 foot samples from B-4, B-6, B-7, B-8, and MW-1 exceeded their respective RDECs. The concentrations of arsenic in the 1-3 foot samples from B-4 and MW-2 and lead in the 1-3 foot samples from B-4 and B-7 also exceeded their respective I/CDECs; and
- Groundwater analytical results did not identify any concentrations of compounds above the RIDEM GB Groundwater Objectives.

After completion of the Phase I ESA, BETA was a provided with an October 14, 1993 Phase I Environmental Site Assessment (ESA) by Garofalo Environmental Services, Inc. which identified three underground storage tanks (USTs) located on-site. A 1,000-gallon gasoline UST and associated pump was located to the southwest of the former Site building. The gasoline UST was reportedly installed in 1967. Two additional USTs containing fuel oil and transmission oil were also located below the former Site building.

In order to determine if the USTs still existed at the Site, a ground penetrating radar (GPR) Survey was completed at the Site on September 16, 2022 by TPI Environmental, Inc. (TPI) to investigate potential abandoned USTs at the Site. The GPR Survey was focused on the central and northern portions of the Site in the reported location of the USTs. TPI did not identify any anomalies that would be indicative of a UST in the area surveyed.

Tables summarizing pollutant concentrations in soil and groundwater are provided in Appendix B.

2.0 RE-DEVELOPMENT PLANS

At this time, there are no plans to re-develop the Site. However, if a purchaser is identified the Site could be re-developed.

3.0 REMEDIAL OBJECTIVES

The overall remedial objective for this site is to protect human health and the environment from identified Site contaminants. The following sections specify the remedial objectives for impacted media at the Site (soil) based on the nature and extent of the identified impacts, and the planned continued use of the Site as a paved parking lot.

3.1 Soil Objectives

Based on analytical data provided in the Site Investigation Report soil has been classified as typical urban fill. As such, total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAH), and metals have been identified at the Site at concentrations exceeding the Method 1 Residential Direct Exposure Criteria (RDEC) and Industrial/Commercial Direct Exposure Criteria (IC/DEC) found in Table 1 of the Remediation Regulations.

Proposed redevelopment plans at this time will keep Site usage as a paved surface parking lot. Based on the nature of the contaminants in soil, direct contact with the soil with concentrations of contaminants above the RDEC and IC/DEC is the primary long-term exposure pathway of concern. Therefore, the remedial objective it to mitigate health and environmental risks associated with direct soil contact.

3.2 Groundwater Objectives

Groundwater in the vicinity of the subject property has been classified as GB (presumed to be degraded and not suitable for drinking water purposes without treatment). Therefore, the remedial objectives for groundwater are the GB Groundwater Objectives cited in Table 4 of the Remediation Regulations. Groundwater sampling and analytical data collected at the Site did not identify any contaminants above GB Groundwater Objectives. Therefore, no specific remedial actions are planned for groundwater.

3.3 Surface Water and Sediment

There are no surface water bodies or sediment on the Site. Therefore, there are no applicable remedial objectives.

Entrainment of impacted soil in stormwater runoff has the potential to impact nearby surface water/sediment. By maintaining the existing pavement or removing impacted soil, the potential for migration through entrainment will be eliminated. In addition, erosion runoff controls will be implemented during construction to prevent the off-site migration of sediments.

3.4 Air Objectives

Impacts to air quality are limited to potential volatilization of contaminants from groundwater into interior building spaces. However, since no buildings are currently planned and no VOCs were identified, risk associated with volatilization has not been identified. Therefore, no specific remedial objective for air has been identified.

Dust control measures will be required during earthwork activities to prevent the off-site migration of contaminants.

3.5 Stormwater Management

Under existing conditions, stormwater is collected in an on-site catch basin and discharge directly to the Blackstone River. It is expected that the existing catch basin will be maintained for either remedial option.

4.0 ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

As discussed in Section 1.0 of this report, both petroleum and hazardous materials contamination has been detected at the site. This ABCA is focused on the hazardous materials documented in soil. Petroleum contamination will be the addressed concurrently with the hazardous materials in soil.

4.1 REMEDIAL OBJECTIVES

Section 3.0 discussed the remedial objectives for the Site.

4.2 IDENTIFICATION AND INITIAL SCREENING OF REMEDIAL ALTERNATIVES

Screening of the alternatives was performed to identify if the alternatives are feasible based on these criteria:

1. The technologies to be employed would be reasonably likely to achieve compliance with RIDEM requirements; and
2. Individuals and the technologies are reasonably available.

The initial screening is summarized in the table below.

Table 1: Summary of Initial Remedial Alternatives

Remedial Alternative	Likely to Achieve compliance with Local, State or Federal Regulations (yes/no)	Individuals and Technologies Reasonably Available (yes/no)	Initial Screening
Soil			
1. No Action and ELUR	Yes	Yes	Feasible
2. Shallow Soil Removal	Yes	Yes	Feasible
3. Construction of an Engineered Cap and the Implementation of an ELUR	Yes	Yes	Feasible

Based on these criteria, none of the alternatives were judged to be unacceptable for the Site, and all were carried into the evaluation of remedial alternatives.

4.2.1 SOIL ALTERNATIVE 1 – NO ACTION AND THE IMPLEMENTATION OF AN ELUR

The Site is currently covered with an approximate 4-inch layer of asphalt. Although the current asphalt layer does not meet the requirements of a typical engineered cap, it currently restricts direct exposure to shallow soils below from Site occupants or trespassers. In order to maintain current Site use and conditions, an ELUR would be implemented at the Site restricting the following activities:

- Residential use of the Site;
- Disturbance or damage to the current asphalt layer;
- The excavation or disturbance of shallow soils from 0-5 feet below ground surface; and
- No groundwater at the property should be used for potable water.

The cost to implement this alternative is estimated to be $20,000 to $30,000 for a Class A-1 survey, preparation and filing of the ELUR, and preparation of a closure report.

4.2.2 SOIL ALTERNATIVE NO. 2 –SHALLOW SOIL REMOVAL

This alternative includes the excavation and off-site disposal of shallow soil from 0-5 feet below ground surface at the Site. Confirmatory samples would be collected throughout the bottom of the excavation to confirm all soils exceeding RDEC or I/C DEC have been removed. BETA estimates approximately 2,000-2,500 cubic yards of impacted soil would require removal. This alternative would also include backfilling the site back to the existing grade and repaving the parking lot.

The cost to implement this alternative is estimated to be $600,000 to $700,000 including the following:

- Removal and disposal of existing asphalt
- Excavation of soil across the site to a depth of 5 feet
- Disposal of contaminated soil
- Backfilling
- Paving to restore the site to parking lot
- Oversight and confirmatory sampling
- Closure report

Alternative 2 eliminates potential exposure to impacted shallow soil at the Site and allows unrestricted Site use. It is technically feasible and provides the most protection to potential receptors. However, the costs associated with soil removal, importing of clean fill and restoration would not be justifiable at this time due to the current Site use as parking lot. This alternative is likely more feasible if the Site is redeveloped in the future.

4.2.3 SOIL ALTERNATIVE NO. 3 – CONSTRUCTION OF AN ENGINEERED CAP AND IMPLEMENTATION OF AN ELUR

Alternative 3 involves the construction of an engineered cap across the Site. The engineered cap would likely consist of either 1) one foot of clean fill over a geotextile fabric, two feet of clean fill, and/or four inches of pavement over six inches of clean fill. This alternative would require an ELUR be implemented at the Site to protect and maintain the cap as well as limit disturbance/contact with impacted soils below.

The cost to implement this alternative is estimated to be $300,000 to $350,000 including the following:

- Removal and disposal of existing asphalt
- Excavation of soil across the site to a depth of 10 inches below existing grade
- Disposal of contaminated soil
- Backfilling with 6 inches of subgrade
- Asphalt paving to meet RIDEM's standard for a cap (4 inches of pavement)
- Oversight
- Class A-1 Survey
- Preparation and filing of an ELUR
- Closure report

Alternative 3 would eliminate all potential exposure to impacted shallow soils at the Site. It is technically feasible and would provide suitable protection for current Site receptors. Based on the current use of the Site, the costs associated with this alternative would not provide an increased protection to potential receptors compared to Alternative 1.

4.3 Evaluation and Selection of Remedial Action Alternatives

Based on the technical feasibility and cost efficiency evaluation, the most reasonable remediation strategy for the Site at this time would be Alternative 1, which calls for no action related to soil contamination and the implementation of an ELUR. The ELUR would require the current asphalt layer to be maintained, restrict access shallow soils below and prohibit the use of the Site for residential purposes. This option also allows for the greatest flexibility for future redevelopment of the Site.

Additionally, a second preferred alternative is Alternative 2. Although the cost for this alternative is the highest, it provides future users of the Site with a property that is not encumbered by a deed restriction. The selection of this alternative is contingent upon the City obtaining funding to implement this approach. This alternative will be furthered evaluated in the Remedial Action Work Plan.

4.4 Implementation Schedule

The proposed schedule for remediation is tied to redevelopment plans for the Site which is presently not known. Once redevelopment plans are developed for the Site, RIDEM will be provided with the plans and a project schedule for the Site.

Within 30 days of completion of this alternative, a Remedial Action Closure Report will be submitted to RIDEM for approval. The ELUR and SMP will be finalized within 30 days following the approval of the Closure Report by RIDEM and recorded with the City of Woonsocket. A recorded copy of the ELUR will be forwarded to RIDEM within 15 days of filing.

4.5 Green and Sustainable Remediation Considerations

The City will consider green and sustainable remediation options during the implementation of the selected remedial alternatives. The Best Management Practices (BMPs) issued under ASTM Standard E-2893: Standard Guide for Greener Cleanups will be used as a reference in this effort. In addition, the City intends to ask bidding cleanup contractors to propose additional green remediation techniques in their response to the Request for Proposals for the cleanup contract.

5.0 REMEDIAL ACTION – ALTERNATIVE 1

5.1 Description of the Proposed Remedy

This section describes the remedial actions that will be undertaken and how they address the remedial objectives discussed in Section 3. Surface soil (0 to 5 feet below grade) was determined to be impacted with various contaminants at concentrations exceeding their respective RDEC and, in some cases, IC/DEC. Therefore, the primary remedial action will consist of the encapsulation of soil over the entire Site with the current paved surface to prevent direct human exposure. Remedial actions shall consist of the following measures:

- To mitigate the potential for direct human contact with impacted soil, an engineered barrier will consist of the existing pavement at the Site;
- Prior to implementing the ELUR, cracks in the asphalt will be sealed and the pavement will be seal coated; and
- Maintenance and monitoring of the engineered barrier through the recording of an institutional control in the form of a RIDEM-approved Environmental Land Usage Restriction (ELUR) attached to the deed for the subject property. The ELUR shall restrict the future use of the Site to industrial/commercial use. The ELUR shall require the performance of annual inspections to document the condition of the engineered controls and include a Soil Management Plan (SMP), which will address any future activities that may disturb on-site soils and/or groundwater. The ELUR shall be recorded for the entirety of the Site in the Land Evidence Records for the City of Woonsocket and a recorded copy shall be forwarded to RIDEM within fifteen (15) days of recording.

5.2 Points of Compliance

The remedial objective for the Site is prevention of direct human exposure to soil with contaminant concentrations above the Method I RDEC and IC/DEC. The remedial objective will be accomplished through the maintenance of the current paved surface. Documented maintenance of the cap is the Point of Compliance.

Since the Site will subject to an ELUR, it shall be inspected on a yearly basis to ensure the long-term integrity of the cap. Repairs to the cap, if required, will be made on an expedited basis to comply with the remedial objectives.

5.3 Proposed Schedule for Remediation

The proposed schedule for remediation is tied to redevelopment plans for the Site which is presently not known. Once redevelopment plans are developed for the Site, RIDEM will be provided with the plans and a project schedule for the Site.

Within 30 days of completion of this alternative, a Remedial Action Closure Report will be submitted to RIDEM for approval. The ELUR and SMP will be finalized within 30 days following the approval of

the Closure Report by RIDEM and recorded with the City of Woonsocket. A recorded copy of the ELUR will be forwarded to RIDEM within 15 days of filing.

5.4 Contractors and/or Consultants

Once a crack sealing and seal coating contractor is selected, this information will be provided to RIDEM.

Joseph R. McLoughlin, LEP, LSP of BETA Group, Inc. will serve as the Qualified Environmental Professional documenting the implementation of remedial activities outlined in this Remedial Action Work Plan.

5.5 Site Plan

A site plan is provided as Figure 2. Redevelopment plans do not yet exist for the Site. RIDEM will be provided with redevelopment plans once they are developed.

5.6 Design Standards and Technical Specifications

Since Site work is not part of this alternative, no design standards or technical specifications are required.

5.7 Dust Control

Since Site work is not part of this alternative, no dust control is required.

5.8 Set-up Plans

5.8.1 Sedimentation and Erosion Control

Since Site work is not part of this alternative, no sedimentation or erosion controls are required.

5.8.2 Soil Stockpiles

Since Site work is not part of this alternative, no soil stockpiling is required.

5.8.3 Security

Since Site work is not part of this alternative, no security is required.

5.9 Soil/Effluent Disposal

5.9.1 Soil Disposal

No soil will be removed from the Site as part of this alternative.

5.9.2 Groundwater Dewatering

No groundwater dewatering will be required as part of this alternative.

5.10 Climate Adaptation Effectiveness

This alternative proposes encapsulation of soil over the entire Site with the current paved surface, spot-specific sealing of the asphalt, and seal coating of the pavement, as well as recording an ELUR for

the subject property, limiting future use of the site and requiring a SMP to limit disturbances on-site soils and/or groundwater. Repairing cracked surfaces will be effective at reducing human exposure to contaminants in the near term, however cracking or general deterioration of the paved surface will continue at a potentially increased rate than in the past due to more frequent or extreme wet-dry or freeze-thaw cycles or heat stress. Conducting annual inspections and keeping up with maintenance needs will be required to ensure effective adaptation capacity of this alternative.

While soil entrainment will be limited under this alternative given current conditions, it does not protect nearby water resources from soil migration that may occur because of rising groundwater and/or decreasing water levels in the nearby river. Annual inspections and repairs of the stormwater system onsite to ensure all catch basins and pipes are properly sealed will be critical to ensure that contaminated soils aren't transported off-site.

6.0 REMEDIAL ACTION – ALTERNATIVE 2

6.1 Description of the Proposed Remedy

This section describes the remedial actions that will be undertaken and how they address the remedial objectives discussed in Section 3. Surface soil (0 to 5 feet below grade) were determined to be impacted with various contaminants at concentrations exceeding their respective RDEC and, in some cases, IC/DEC. Therefore, the primary remedial action for this alternative will consist of the excavation and off-site disposal of soil over the entire Site to a depth of 5 feet below grade. Remedial actions, which will be implemented concurrently with future Site redevelopment activities, shall consist of the following measures:

- To mitigate the potential for direct human contact with impacted soil, soil will be excavated to a depth of at least 5 feet. Excavation extents and depths will proceed until soil contaminant concentrations are less than the Method 1 Residential Direct Exposure Criteria;
- Excavation will be directed in the field based on visual, olfactory, and field screening results. Confirmatory soil sampling will be conducted to confirm successful removal of impacted soil. Excavation and sampling will be conducted in accordance with RIDEM's "Guidelines for Expedited Excavation and Disposal Response Actions ("Dig and Haul" Policy), Policy Memo 2012-01;
- To meet RIDEM's RDEC, approximately 2,500 cubic yards of soil must be excavated. Excavated soil shall be characterized for off-site disposal at an appropriately licensed facility; and
- Imported clean granular fill will be used to backfill the excavated areas. Prior to import to the Site, a representative number of samples of clean fill will be analyzed for all constituents to ensure it is compliant with the Method 1 Residential Direct Exposure Criteria.

6.2 Points of Compliance

The remedial objective for the Site is prevention of direct human exposure to soil with contaminant concentrations above the Method I RDEC and IC/DEC. The remedial objective will be accomplished through the excavation and off-site disposal of soil with contaminants greater than the RDEC. Post-excavation confirmatory sampling will be the Point of Compliance. During construction, the construction superintendent and a qualified environmental professional will document that excavation

and sampling are conducted in accordance with the RAWP/ABCA. Clean fill transported to the Site to construct the cap will be tested to confirm compliance with RIDEM requirements. Operation logs will be maintained and submitted upon the completion of the project.

6.3 Proposed Schedule for Remediation

The proposed schedule for remediation is tied to redevelopment plans for the Site which is presently not known. Once redevelopment plans are developed for the Site, RIDEM will be provided with the plans and a project schedule for the Site.

Within 30 days of completion of this alternative, a Remedial Action Closure Report will be submitted to RIDEM for approval.

6.4 Contractors and/or Consultants

The remedial contractor has not been determined at the time of this submission. The firm's name and qualifications will be provided to RIDEM as soon as the company is selected through a competitive bidding process.

Joseph R. McLoughlin, LEP, LSP of BETA Group, Inc. will serve as the Qualified Environmental Professional documenting the implementation of remedial activities outlined in this Remedial Action Work Plan.

6.5 Site Plan

A site plan is provided as Figure 2. Redevelopment plans do not yet exist for the Site. RIDEM will be provided with redevelopment plans once they are developed.

6.6 Design Standards and Technical Specifications

Proposed remedial elements that will meet the stated remedial objectives are described in this section. In addition, Best Management Practices that will be implemented to prevent the off-site migration of impacted Site materials during construction are also discussed.

Since the redevelopment plans have not yet been developed for the Site, design standards and technical specifications cannot be developed at this time. Once the redevelopment plans are known, RIDEM will be provided with design standards and technical specifications for this alternative.

Soil used to backfill the excavated areas shall be determined to be "clean" before it is imported to the Site. The definition of "clean" shall be compliance with the Rhode Island's Residential Direct Exposure Criteria. For this project, loam and any other fill material brought to the site shall be sampled by the contractor at a rate of 1 sample per 500 yd^3 and analyzed for Volatile Organic Compounds (EPA method 8260), TPH (EPA Method 8100M), Semi Volatile Organic Compounds (EPA Method 8270), polychlorinated biphenyls (PCBs) (EPA Method 8082) and priority 13 metals.

In addition, prior to the import of aggregate materials (stone, rip-rap, etc.) to the Site, the contractor performing the work will be required to provide certification from the supplier that the aggregate is from a clean virgin source.

6.7 Dust Control

Work at the site must comply with applicable federal, state, and local regulations, including the RIDEM Air Pollution Control Regulation No. 5 regarding control of fugitive dust. Dust is not only considered a general nuisance to neighboring properties, but it could allow contaminants of concern to migrate from the Site. Reasonable precautions will be taken to prevent the excessive generation of dust during soil excavation, stockpiling, loading, and other soil handling activities. Dust control measures, including wetting and the application of calcium chloride, shall be implemented if there is visual evidence of airborne dust being generated.

6.8 Set-up Plans

6.8.1 Sedimentation and Erosion Control

Prior to the start of excavation activities, sediment and erosion controls consisting of filter socks, staked silt fencing, straw wattles or other equivalent methods will be installed to prevent the migration of sediments. The Sedimentation and Erosion Control Plan will be subject to RIDEM approval under the RIPDES General Permit fort Stormwater Discharges Associated with Construction Activity.

6.8.2 Soil Stockpiles

Soil excavated from the site for either re-use or disposal may be temporarily stockpiled in a designated area on the Site, only. No off-site stockpiling will be allowed unless specifically approved by RIDEM.

Stockpiled soil shall be placed on one layer of 6-mil polyethylene sheeting in a volume that shall not exceed 500 cubic yards per stockpile. Stockpiles shall be securely covered with 6-mil polyethylene sheets whenever there is no active excavation being conducted.

6.8.3 Security

To prevent public access during construction, the entirety of the Site will be secured with temporary fencing.

6.9 Soil/Effluent Disposal

6.9.1 Soil Disposal

To meet RIDEM's RDEC, approximately 2,500 cubic yards of soil must be excavated. Excavated soil shall be characterized for off-site disposal at an appropriately licensed facility. Based on the sampling data obtained to date, it appears that Site soil will meet the criteria established by Rhode Island Resource Recovery Corporation's (RIRRC) Alternative Cover Policy (Central Landfill in Johnston).

A significant number of soil samples have been collected at the Site. If this data is acceptable to RIRRC, it may be possible to live load and haul soil to the disposal facility without stockpiling and testing. If

the material must be stockpiled, composite soil samples from the stockpile shall be collected and laboratory analyzed for contaminants at a frequency of one sample per 1,000 tons. Based on an urban fill soil classification, samples will be analyzed for VOCs, SVOCs, PCBs, total metals TPH, pH and particle size.

Shipping manifests for vehicles transporting soil and receipts from the disposal facility shall be logged and maintained on file.

6.9.2 Groundwater Dewatering

No groundwater dewatering will be required as part of this alternative.

6.10 Climate Adaptation Effectiveness

Because a portion of the site is located within a FEMA mapped 1% annual chance floodplain, the Site is at risk of increasingly frequent flooding from future climate change-induced natural hazards. Therefore, disposal of contaminated soil offsite in an area not subject to flood hazards will increase the alternative's adaptive capacity to known climate risks.

This alternative will require erosion runoff controls to be implemented during construction to prevent the off-site migration of sediments. Evaluation of stormwater runoff volumes and pollutant loadings for the design of construction stormwater controls should consider a wide range of rain conditions rather than only large storms in order to ensure the design can withstand higher intensity rainfall events. Furthermore, construction should be scheduled to occur outside of the seasons where high intensity rainfall is most likely to occur to reduce the risk of stormwater control failures due to localized flooding.

7.0 CONTINGENCY PLAN

Prior to the commencement of work for Alternative 2, contractors involved in implementing the RAWP will be required to prepare a Contingency Plan or Health and Safety Plan (HASP) for their site personnel. The HASP shall summarize potential constituents of concern at the Site and describe appropriate protective measures to be followed during work. A copy of the working HASP must be available on-site during all remediation activities.

The following items shall be located and discussed with all field personnel prior to their initial entry onto the site and before work begins.

- Health & Safety Plan
- Personal protection equipment
- Owner and Owner's Representative contact information
- Location of nearest telephone

In the event that contamination of an undetermined nature is encountered during the course of the work, the contractor shall stop work immediately and notify the owner, the owner's representative and the Site Health and Safety Officer at the telephone numbers provided in this section. The owner

or his representative shall notify the RIDEM and take the necessary actions to characterize the nature and extent of the contamination.

Should an emergency arise, or hazardous site conditions develop, communication will be established as soon as is practicable with the Site Health and Safety Officer, the Owner and the Owner's representative. Several emergency response procedures are provided below for guidance, as follows:

1. Worker Injury
   a. Apply site first aid as appropriate and applicable. The contractor shall have a first aid kit on-site at all times.
   b. Call for ambulance service.
   c. Call police and fire departments as necessary.

2. Volatile Organic Compounds
   The Owner's Qualified Environmental Professional shall be on-site during all remedial activities. Although significant concentrations of volatile organic compounds (VOCs) are not expected to be encountered during the course of the work, the owner's representative shall monitor the concentration VOCs in site soil and in the ambient air with a portable photoionization detector or similar device. If significant concentrations are detected (greater than 10 ppm above background for this project), the work shall be stopped and the soils and health concerns characterized further. Proper notification will be given to the RIDEM.

3. Fire
   a. Evacuate area surrounding fire.
   b. Call Fire Department
   c. Call Emergency Coordinator and/or Contacts.

7.1 Emergency Service Contacts

Agency	Telephone
Woonsocket Police	(401) 766-1212 or 911
Woonsocket Fire	(401) 765-2500 or 911
Woonsocket Public Works Dept.	(401) 597-0857
DigSafe	1-888-344-7233
RIDEM Hotline	(401) 222-1360 (401) 222-3070
Owner's Representative	Telephone
Michael Debroisse Director of Planning & Development	(401) 767-9231
Remedial Contractor	Telephone
To be determined	To be determined
Qualified Environmental Professional	Telephone
Joseph R. McLoughlin II, LEP, LSP BETA Group, Inc.	(401) 333-2382 (office) (508) 212-8717 (cell)
RIDEM Project Contact	Telephone
Ms. Rachel Simpson Office of Land Revitalization and Sustainable Materials Management	(401) 222-2797 ext. 27777105
RIDEM Emergency Contact	Telephone
Mr. James Ball Emergency Response Program	(401) 222-4700 ext. 27777129 Anytime, Any Emergency: (401) 222-3070

7.2 Nearest Medical Facility

The Landmark Medical Center is the nearest (1.42 miles) medical facility to the Site. It is located at:

115 Cass Avenue
Woonsocket, RI 02895
Telephone: (401) 769-4100

Driving directions from the Site are as follows:

- Head southeast on Allen St toward Bernon Street
- Turn left onto Bernon Street
- Turn left onto Front Street
- Turn right onto Hamlet Avenue
- Use the middle lane to turn left onto Cumberland Street
- Turn right onto Cass Avenue

7.3 Contaminants of Concern

As previously stated, TPH, PAHs, and metals are the primary contaminants of concern on the Site.

Petroleum hydrocarbons are harmful if inhaled, ingested, or consumed. They can cause headaches, dizziness, nausea, chemical pneumonitis, and dry cracked skin. The OSHA Permissible Exposure Limit is 2000 mg/m3.

PAHs are broadly classified as Coal Tar Pitch Volatiles. The National Institute of Occupational Safety and Health (NIOSH) considers coal tar products (i.e., coal tar, coal tar pitch, or creosote) to be potential occupational carcinogens; the NIOSH REL (10-hour TWA) for coal tar products is 0.1 mg/m3 (cyclohexane-extractable fraction).

The OSHA Permissible Exposure Limit (8-hour TWA) for coal tar pitch volatiles is 0.2 mg/m3 (benzene-soluble fraction). OSHA defines "coal tar pitch volatiles" in 29 CFR 1910.1002 as the fused polycyclic hydrocarbons that volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter and includes substances such as anthracene, benzo(a)pyrene, phenanthrene, acridine, chrysene, pyrene, etc.

Petroleum hydrocarbons are harmful if inhaled, ingested, or consumed. They can cause headaches, dizziness, nausea, chemical pneumonitis, and dry cracked skin. The OSHA Permissible Exposure Limit is 2000 mg/m3.

Metals are harmful if inhaled, ingested, or consumed. They can cause weakness, exhaustion, partial paralysis, and kidney disease. Different metals have different OSHA Permissible Exposure Limit.

Fact sheets for the various contaminants of concern are provided in Appendix E.

8.0 OPERATING LOG

An operating log will not be required for Alternative 1.

For Alternative 2, the Qualified Environmental Professional will clearly and completely record all activities on-site in an Operating Log. Key parameters that will be recorded in the Operating Log include the thickness of the cap, construction details and the locations of each capping method. It will also document subcontractors and equipment used on-site, hours worked, summary of work performed, waste disposal information (e.g., volume of waste taken offsite, disposal location, and a description of problems identified and response actions taken. A sample Operating Log template is included as Appendix F. The Operating Log will be readily available at the Site during construction and shall be kept by the Owner for three years following completion of work.

9.0 SHUT-DOWN, CLOSURE AND POST-CLOSURE REQUIREMENTS

For Alternative 1, the final ELUR and Post Construction Soil Management Plan, which will outline specific procedures for conducting activities that may involve disturbance of the engineered cap, will be recorded with the City of Woonsocket. Compliance inspections of the cap will be conducted by the Owner or a qualified environmental professional on an annual basis. An evaluation report detailing the findings of the inspections noting any compliance violations will be submitted to RIDEM. The report will be prepared on forms provided by RIDEM.

For Alternative 2, in the event that the remedial work is suspended for an extended period of time, RIDEM will be notified. Daily shut-down procedures will include covering and securing of all soil stockpiles. At the completion of the remedial work, a RAWP Closure Report that outlines all remedial activities that were completed will be submitted to RIDEM. Alternative 2 will not require an Post-Closure activities.

10.0 INSTITUTIONAL CONTROLS AND NOTICES

As discussed previously, for Alternative 1, an ELUR and a Post Closure Soil Management Plan (SMP) will be placed on the entire property as part of the proposed remedial action. The ELUR and SMP will be recorded on the title to the property in the City of Woonsocket's Land Evidence Records and shall be binding to all owners, successors and or assigns. The ELUR will require that the capped portions of the property remain in place and any soil disturbed post-remediation be managed in accordance with an approved SMP. In addition, ELUR compliance inspections will be conducted annually starting one year after the filing date and continue in perpetuity. A copy of the draft ELUR for the Site is included in Appendix G.

The ELUR and SMP will be finalized and recorded with the City within 30 days after the remedial action has been completed and approved by RIDEM. A recorded copy of the ELUR shall be forwarded to RIDEM within 15 days of filing.

The Soil Management Plan will outline proper notification requirements and procedures that will govern any future soil excavation activity on the site. Direct exposure to soil is the primary concern at the site. Individuals engaged in activities at the site may be exposed through incidental ingestion, dermal contact, or inhalation of vapors or entrained soil particles if proper precautions are not taken. Therefore, the following procedures will be followed to minimize the potential of exposure.

1. During site work, the appropriate precautions will be taken to restrict unauthorized access to the property.

2. During site/earth work, dust suppression (i.e. watering, etc.) techniques must be employed at all times in accordance with all applicable federal, state, and local regulations, including the DEM Air Pollution Control Regulations, and specifically Regulation No. 5 regarding control of Fugitive Dust.

3. In the event that an unexpected observation or situation arises during site work, such activities will immediately stop. Workers will not attempt to handle the situation themselves but will contact the appropriate authority for further direction.

4. In the event that certain soils on-site were not previously characterized, these soils are presumed to be regulated until such time that it is demonstrated to the RIDEM through sampling and laboratory analysis that they are not regulated.

5. If excess soil is generated from the Site, the soil is to remain on-site for analytical testing, to be performed by a Qualified Environmental Professional, in order to determine the appropriate disposal and/or management options. The soil must be placed in roll-off containers or on and covered by polyethylene/plastic sheeting during the entire duration of its staging and secured with appropriate controls to limit the loss of cover and protect against storm-water and / or wind erosion (i.e. hay bales, silt fencing, rocks, etc.).

6. Excavated soil will be staged and temporarily stored in a designated area of the property. Within reason, the storage location will be selected to limit the unauthorized access to the materials (i.e., away from public roadways/walkways). No regulated soil will be stockpiled on-site for greater than 60 days without prior RIDEM approval.

7. Excess soils generated which are to be disposed of off-site, must be disposed of at a licensed disposal facility in accordance with all local, state, and federal laws. Copies of the material shipping records associated with the disposal of the material shall be maintained by the site owner and included in the annual inspection report for the site.

8. Non-disposable equipment used during the soil disturbance activities will be properly decontaminated as appropriate prior to removal from the site. All disposable equipment used during the soil disturbance activities will be properly containerized and disposed of following completion of the work. Vehicles utilized during the work shall be properly decontaminated as appropriate prior to leaving the site.

9. At the completion of site work, site surfaces must be restored to their condition(s) prior to the work that took place.

Alternative 2 will not require an ELUR.

11.0 COMPLIANCE DETERMINATION

For Alternative 1, compliance with the RAWP will be demonstrated by the filing of the ELUR.

For Alternative 2, compliance with the RAWP will be demonstrated by the successful completion of the removal of impacted soil, which will serve to achieve the Remedial Objectives established for this program.

The RAWP Closure Report, which will include Operating Logs (for Alternative 2), data confirming the use of fill/loam compliant with the Residential Direct Exposure Criteria, and photographic documentation of the construction activities, will be used to demonstrate compliance. Acceptance and approval of the remedial action by RIDEM will be through the issuance of a Letter of Compliance.

For Alternative 1, to evaluate and record long-term compliance with the provisions of the ELUR, a qualified environmental professional will evaluate the condition of the Site on an annual basis. Upon completion of the evaluation, a report will be submitted to RIDEM discussing findings and noting any compliance violations at the Site. If the Site is determined to be out of compliance with the term s of the ELUR, the responsible party will submit a corrective action plan in writing to RIDEM within ten days of receipt of the evaluation report.

12.0 CERTIFICATION STATEMENT

BETA Group, Inc. certifies that the information contained in this Remedial Action Work Plan is complete and accurate to the best of its knowledge.

Joseph R. McLoughlin II, LEP, LSP
Vice President
BETA Group, Inc.

The City of Woonsocket certifies to the best of its knowledge that this Remedial Action Work Plan is a complete and accurate representation of the Site and the release and contains all pertinent known facts thereto.

2/17/23

Michael Debroisse
Director of Planning and Development
City of Woonsocket

13.0 LIMITATIONS

This document has been prepared on behalf of and for the exclusive use of the City of Woonsocket. It shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party in whole or in part, without the prior written consent of BETA and the City of Woonsocket.

In preparation of this RAWP/ABCA, BETA has obtained and relied upon information from multiple sources to develop certain conclusions regarding environmental issues at and in the vicinity of the subject property. While BETA has no reason to question this information, we did not attempt to independently verify its accuracy or completeness. Note that the validity of our findings and conclusions are contingent upon the accuracy of that information.

BETA's findings and conclusions must be considered professional opinion concerning the significance of the data provided and not as scientific certainties. No other warranty, express or implied, is made. Specifically, BETA does not and cannot represent that the Site does not contain hazardous material, oil or other latent condition beyond that made known to BETA.

BETA's work was performed in accordance with generally accepted industry practices and the degree of care and skill generally exercised by other consultants under similar circumstances and conditions were observed.

FIGURES

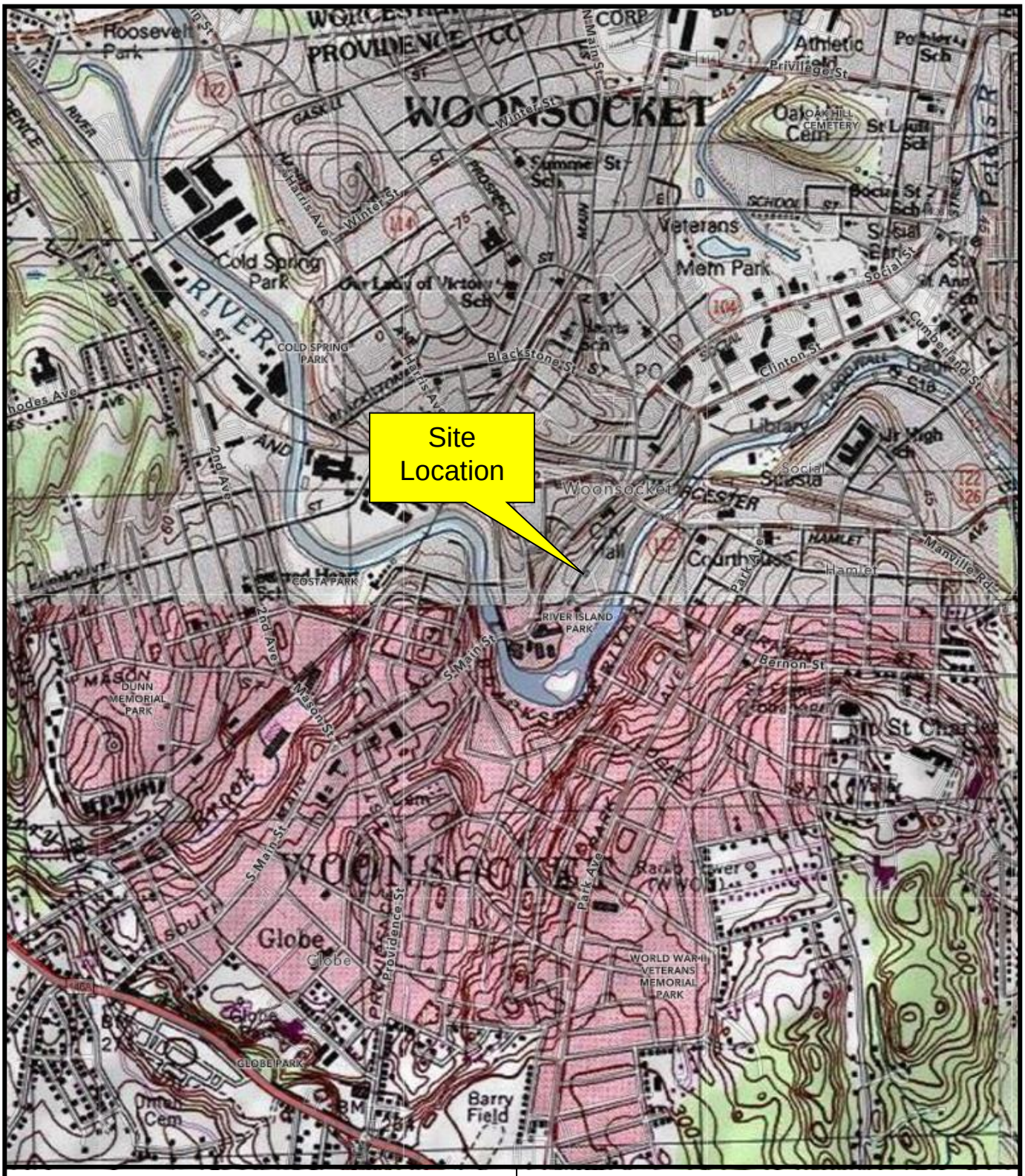
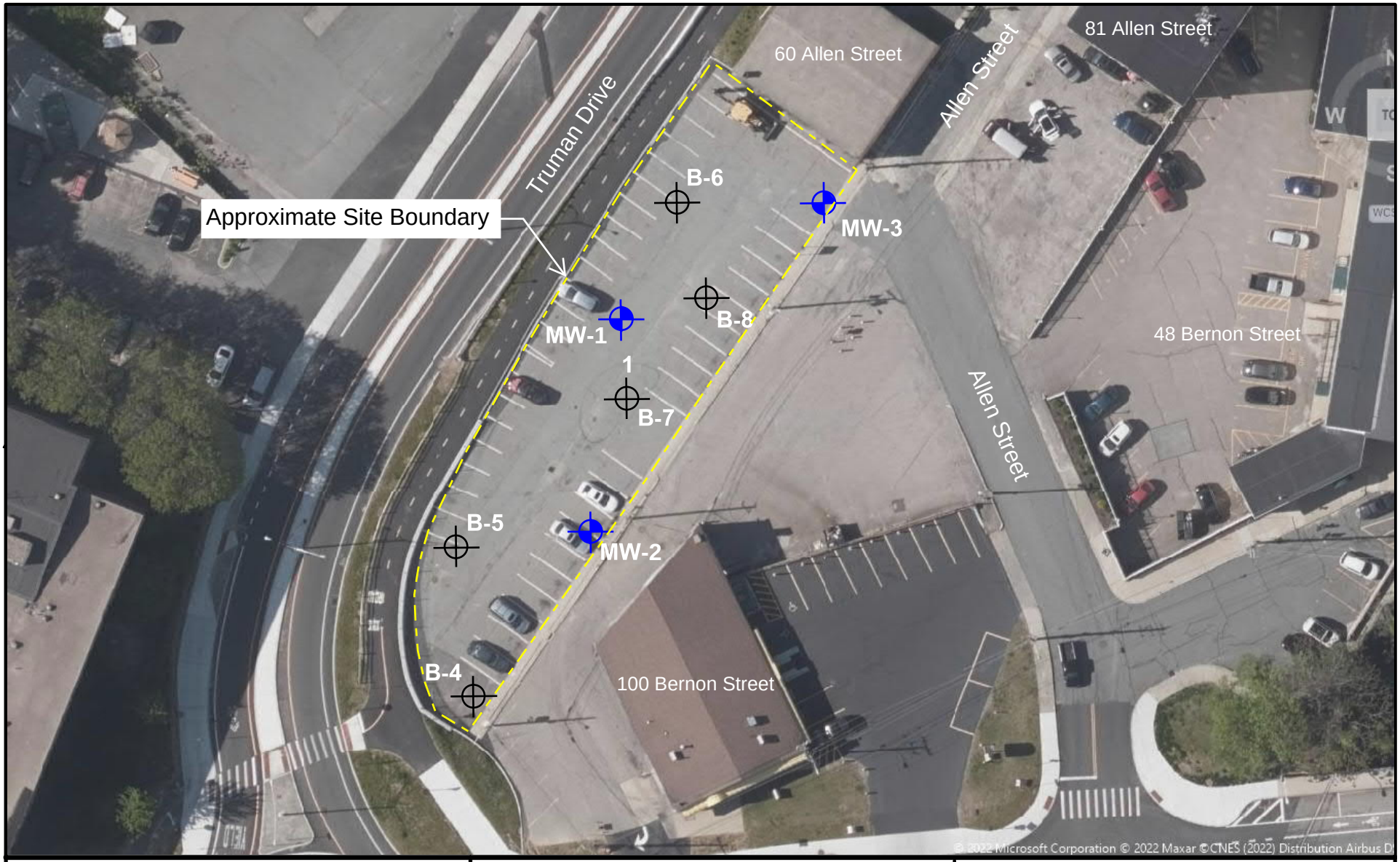


Figure 1: Site Locus

0 and 58 Allen Street
Woonsocket Rhode Island

BETA



IMPROVING COMMUNITIES TOGETHER

Figure 2 - Site Plan
0 & 58 Allen Street
Woonsocket, Rhode Island

LEGEND

Location of Monitoring Well

Location of Soil Boring

Scale = 1"=50'

APPENDICES

APPENDIX A: Remedial Decision Letter

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF LAND REVITALIZATION & SUSTAINABLE MATERIALS MANAGEMENT
235 Promenade Street, Providence, Rhode Island 02908

REMEDIAL DECISION LETTER December 21, 2022
File No. SR-39-2118

Michael Debroisse, Director of Planning & Development
City of Woonsocket
169 Main Street
Woonsocket, RI 02895

RE: Allen Street Parking Lot
0 & 58 Allen Street
Woonsocket, Rhode Island
Plat Map 14 / Lots 174, 175, 176, and 177

Dear Mr. Debroisse:

On April 22, 2020, the Rhode Island Department of Environmental Management's (the Department) Office of Land Revitalization and Sustainable Materials Management (LRSMM) enacted the codified 250-RICR-140-30-1, Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (the Remediation Regulations). The purpose of these regulations is to create an integrated program requiring reporting, investigation, and remediation of contaminated sites in order to eliminate and/or control threats to human health and the environment. A Remedial Decision Letter (RDL) is a formal, written communication from the Department that approves a site investigation, identifies the preferred remedial alternative and authorizes the development of a Remedial Action Work Plan (RAWP) in order to achieve the objectives of the environmental clean-up.

In the matter of the above-referenced property (the Site), the Department's Office of LRSMM is in receipt of the following documentation submitted pursuant to the Remediation Regulations in response to the reported release at the Site:

1. Phase I Environmental Site Assessment (ESA), received by the Department on May 5, 2022, and prepared by BETA Group, Inc. (BETA);

2. Site-Specific Quality Assurance Project Plan, received by the Department on July 12, 2022, and prepared by BETA;

3. Public Notice Package, received by the Department on July 19, 2022, and prepared by BETA;

4. Site Investigation Report / Phase II ESA, received by the Department on November 11, 2022, and prepared by BETA; and

5. Post-Site Investigation Public Notice, received by the Department on December 6, 2022, and

prepared by BETA.

Collectively, these documents define "Existing contamination" at the Site and fulfill the requirements of a Site Investigation Report (SIR) as described in Section 1.8.8 of the Remediation Regulations. In addition, according to our records, public notice was conducted to all abutting property owners, tenants, easement holders, the municipality, and Environmental Justice Focus Area, regarding the substantive findings of the completed investigation in accordance with Sections 1.8.7(A)(2) and 1.8.9 of the Remediation Regulations. The Department has received documentation demonstrating that the requirements of Rhode Island General Laws (R.I.G.L.), Title 23, Health and Safety, Chapter 23-19.14, Industrial Property Remediation and Reuse Act, 23-19.14-5, Environmental Equity and Public Participation, have been fulfilled. The opportunity for public review and comment on the technical feasibility of the proposed remedial alternatives commenced on December 6, 2022 and the period closed on December 20, 2022. No comments were received.

The preferred remedial alternative, as stated in the SIR, consists of the following conceptual measures:

- Alternative 1: No action and Implementation of an Environmental Land Usage Restriction (ELUR). The existing asphalt at the Site shall remain in place to act as an engineered barrier. An ELUR shall be recorded on the deed for the entire property (Plat Map 14 / Lots 174, 175, 176, and 177). The ELUR shall require the performance of annual inspections to document the status of the ELUR and the condition of the engineered controls. Furthermore, the ELUR shall include a Department-approved post-remediation Soil Management Plan (SMP) which will address any future activities that may disturb on-Site soils. The ELUR shall be recorded for the entire property in the Land Evidence Records for the City of Woonsocket, and a recorded copy forwarded back to the Department within fifteen (15) days of recording.

- Alternative 2: Shallow soil removal. All soils from 0-5 feet below ground surface shall be excavated and disposed of at an off-site licensed facility. Confirmatory samples shall be collected to confirm all soils exceeding the applicable Direct Exposure Criteria have been removed.

The Department hereby approves the SIR, with the above identified preferred remedial alternative, and requires a RAWP be submitted for review and approval, and implemented, to achieve the objectives of the environmental clean-up, in accordance with the following conditions:

1. In accordance with Sections 1.9 and 1.10 of the Remediation Regulations, a RAWP, and ELUR and SMP, if applicable, shall be submitted for Department review and approval within sixty (60) days from the date of this letter. The RAWP shall describe all of the technical details, engineer design elements, and schedules associated with the implementation of the proposed remedy. All of the subsections outlined in Section 1.10 of the Remediation Regulations must be included in order to facilitate the review and approval of the RAWP. If an item is not applicable to this Site, simply state that it is not applicable and provide an explanation in the RAWP.

2. Pursuant to Section 1.11.2 of the Remediation Regulations, an application fee for Remedial Action Approvals in the amount of one thousand ($1,000.00) dollars shall be made payable to the State of Rhode Island General Treasurer and remitted to the Office of Management Services with the attached Remedial Action Approval Application Fee Form. Receipt of this Remedial Action Approval Application Fee is required prior to the Department's RAWP review.

3. Once the Department reviews the RAWP for consistency with Sections 1.9 and 1.10 of the Remediation Regulations, any written comments generated and forwarded as a result of the review(s) shall be incorporated forthwith into a RAWP Addendum, to be submitted for final approval.

4. Upon finalization of the RAWP, the Department will issue a Remedial Approval Letter (RAL), signifying Department approval. All remedial measures required by the Department shall be implemented, in accordance with the approved schedule, to ensure all applicable exposure pathways at the site are appropriately addressed.

Please be advised that the Department reserves the right to require additional actions under the aforementioned Remediation Regulations at the Property should any of the following occur:

- Conditions at the Site previously unknown to the Department are discovered;
- Information previously unknown to the Department becomes available;
- Policy and/or regulatory requirements change; and/or
- Failure by the City of Woonsocket or any future holder of any interest in the Property to adhere to the terms and conditions of the Department approved RAWP, schedule, RAL / ELUR, and/or SMP for the Property.

If you have any questions regarding this letter or would like the opportunity to meet with Department personnel, please contact me by telephone at (401) 222-2797, ext. 277-7105, or by E-mail at Rachel.simpson@dem.ri.gov.

Sincerely,

Rachel T. Simpson
Senior Environmental Scientist
Office of Land Revitalization &
Sustainable Materials Management

cc: Kelly J. Owens, RIDEM/LRSMM
Ashley L. Blauvelt, RIDEM/LRSMM

Joseph McLoughlin, BETA Group, Inc.
Jessica Dominguez, EPA Region 1

Attachment: Remedial Action Approval Application Fee Form

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF LAND REVITALIZATION & SUSTAINABLE MATERIALS MANAGEMENT
235 Promenade Street, Providence, Rhode Island 02908

REMEDIAL ACTION APPROVAL APPLICATION FEE FORM

Rule 1.11.2 of the Department's Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, requires an application fee for Remedial Action Approvals in the amount of one thousand ($1,000) dollars. Please submit this form and check, made payable to the State of Rhode Island General Treasurer, directly to:

R.I. Department of Environmental Management
Office of Management Services - Rm 340
235 Promenade Street
Providence, RI 02908

Please complete this page and attach it to the check or money order. This information must be provided to coordinate your fee with the application submitted.

Site Name: Allen Street Parking Lot

Address: 0 & 58 Allen Street

Town/City: Woonsocket

File Number: SR-39-2118

Contact Person:_____

Phone No:_____

RIDEM Project Manager: Rachel Simpson

FOR RIDEM OFFICE USE ONLY:

Fee Amount Received: _____
Date Received: _____
Check#:_____

Receipt Account:
10.074.3765103.03.461043
cc:74:3481 Leg.17-18-841

APPENDIX B: Site Contaminants (Soil and Groundwater)

Table 1 – Soil Sampling – Field and Headspace Screening Results
0 & 58 Allen Street
Woonsocket, Rhode Island

Sample ID	Sample Depth	Headspace TOV[1] Concentration via OVM[2] (ppmv)[3]	Observations & Comments
MW-1	0-2.5'	0.4	Evidence of urban fill. Sample submitted for laboratory analysis.
MW-1	2.5-5'	0.7	None
MW-1	5-7.5'	1.2	None
MW-1	7.5-10'	0.8	Submitted for laboratory analysis.
MW-1	10-12.5'	1.3	None
MW-1	12.5-15'	1.6	None
MW-2	0-2.5	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
MW-2	2.5-5'	See Note 4.	None
MW-2	5-7.5'	See Note 4.	None
MW-2	7.5-10'	See Note 4.	Submitted for laboratory analysis.
MW-2	10-12.5'	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
MW-2	12.5-15'	See Note 4.	None
MW-3	0-2.5	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
MW-3	2.5-5'	See Note 4.	None
MW-3	5-7.5'	See Note 4.	None
MW-3	7.5-10'	See Note 4.	None
MW-3	10-12.5'	See Note 4.	Slight petroleum odor and staining. Sample submitted for laboratory analysis
MW-3	12.5-15'	See Note 4.	Slight petroleum odor and staining. Sample submitted for laboratory analysis.
B-4	0-2.5	0.6	Evidence of urban fill. Sample submitted for laboratory analysis.
B-4	2.5-5'	0.9	None
B-4	5-7.5'	1.2	None
B-4	7.5-10'	0.0	None
B-4	10-12.5'	0.0	None
B-4	12.5-15'	0.0	Submitted for laboratory analysis
B-5	0-2.5'	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
B-5	2.5-5'	See Note 4.	None
B-5	5-7.5'	See Note 4.	None
B-5	7.5-10'	See Note 4.	Sample submitted for laboratory analysis.
B-5	10-12.5'	See Note 4.	Evidence of urban fill. Submitted for laboratory analysis
B-5	12.5-15'	See Note 4.	Evidence of urban fill.
B-6	0-2.5'	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
B-6	2.5-5'	See Note 4.	None
B-6	5-7.5	See Note 4.	None
B-6	7.5-10'	See Note 4.	Sample submitted for laboratory analysis.

B-6	10-12.5’	See Note 4.	Slight petroleum odor. Sample submitted for laboratory analysis (12-13’).
B-6	12.5-15’	See Note 4.	Slight petroleum odor. Sample submitted for laboratory analysis (12-13’).
B-7	0-2.5’	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
B-7	2.5-5’	See Note 4.	None
B-7	5-7.5	See Note 4.	None
B-7	7.5-10’	See Note 4.	Sample submitted for laboratory analysis
B-7	10-12.5’	See Note 4.	None
B-7	12.5-15’	See Note 4.	None
B-8	0-2.5	See Note 4.	Evidence of urban fill. Sample submitted for laboratory analysis.
B-8	2.5-5’	See Note 4.	None
B-8	5-7.5	See Note 4.	Slight petroleum odor. Sample submitted for laboratory analysis.
B-8	7.5-10’	See Note 4.	None
B-8	10-12.5’	See Note 4.	None
B-8	12.5-15’	See Note 4.	None

Notes:

1. TOV – total organic vapors as measured with OVM equipped with a 10.6 eV lamp.
2. OVM – organic vapor meter
3. Ppmv – parts per million by volume
4. No TOV headspace readings collected due to lamp failure.

Table 2
Soil Analytical Data
0 58 Allen Street, Woonsocket, Rhode Island

Sample Designation	B-4 1-3ft	B-4 12-15ft	MW-1 1-3ft	MW-1 8-10ft	B-7 1-3ft	B-7 7-9ft	B-8 1-3ft	B-8 5-7ft	B-6 1-3ft	B-6 8-10ft	B-6 12-13ft	B-5 1-3ft	B-5 7-9ft	MW-2 1-3ft	MW-2 10-15ft	MW-3 1-3ft	MW-3 10-15ft	RIDEM ResDEC	RIDEM I/CDEC	RIDEM GB Leachability
Sample Date	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022	08/22/2022			
Volatile Organic Compounds, milligrams per kilogram (mg/Kg)																				
Total VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	--	--	--
Semi-Volatile Organic Compounds, mg/Kg																				
1,1-Biphenyl	**0.03**	0.026 U	**0.037**	0.031 U	**0.041**	0.026 U	**0.05**	0.031 U	0.051 U	0.03 U	---	0.052 U	0.03 U	0.026 U	0.028 U	**0.033**	0.028 U	0.8	NE	NE
1,2,4-Trichlorobenzene	0.286 U	0.263 U	0.271 U	0.308 U	**0.376**	0.265 U	0.286 U	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	0.277 U	0.284 U	96	NE	NE
1,2-Dichlorobenzene	0.286 U	0.263 U	0.271 U	0.308 U	**0.313**	0.265 U	0.286 U	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	0.277 U	0.284 U	510	10,000	NE
1,3-Dichlorobenzene	0.286 U	0.263 U	0.271 U	0.308 U	**0.311**	0.265 U	0.286 U	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	0.277 U	0.284 U	430	10,000	NE
2-Methylnaphthalene	0.286 U	0.263 U	0.271 U	0.308 U	0.284 U	**0.385**	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	0.277 U	0.284 U	123	10,000	NE
Acenaphthylene	0.286 U	0.263 U	**0.438**	0.308 U	**0.314**	0.265 U	**0.461**	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	**0.463**	0.284 U	23	10,000	NE
Anthracene	**0.452**	0.263 U	**0.787**	0.308 U	**0.706**	0.265 U	**0.947**	0.313 U	0.515 U	0.299 U	---	**0.615**	0.304 U	0.261 U	0.279 U	**0.682**	0.284 U	35	10,000	NE
Benzo(a)anthracene	**1.42**	0.263 U	**1.98**	0.308 U	**2.09**	0.265 U	**1.97**	0.313 U	0.515 U	0.299 U	---	**1.59**	0.304 U	0.261 U	0.279 U	**3.32**	0.284 U	0.9	7.8	NE
Benzo(a)pyrene	**1.52**	0.131 U	**2.34**	0.154 U	**2.01**	0.132 U	**1.94**	**0.222**	**0.323**	0.15 U	---	**1.55**	0.152 U	0.13 U	0.139 U	**3.74**	0.142 U	0.4	0.8	NE
Benzo(b)fluoranthene	**1.66**	0.263 U	**2.72**	0.308 U	**2.22**	0.265 U	**2.26**	0.313 U	0.515 U	0.299 U	---	**1.18**	0.304 U	0.261 U	0.279 U	**4.54**	0.284 U	0.9	7.8	NE
Benzo(g,h,i)perylene	**0.861**	0.263 U	**1.74**	0.308 U	**1.07**	0.265 U	**1.11**	0.313 U	0.515 U	0.299 U	---	**0.894**	0.304 U	0.261 U	0.279 U	**2.29**	0.284 U	0.8	10,000	NE
Benzo(k)fluoranthene	**0.633**	0.263 U	**0.974**	0.308 U	**0.827**	0.265 U	**0.84**	0.313 U	0.515 U	0.299 U	---	**1.21**	0.304 U	0.261 U	0.279 U	**1.71**	0.284 U	0.9	78	NE
Carbazole	0.286 U	0.263 U	**0.467**	0.308 U	0.284 U	0.265 U	**0.322**	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	**0.327**	0.284 U	NE	NE	NE
Chrysene	**1.61**	0.131 U	**2.04**	0.154 U	**2.2**	0.132 U	**1.93**	**0.277**	**0.309**	0.15 U	---	**1.5**	0.152 U	0.13 U	0.139 U	**3.56**	0.142 U	0.4	780	NE
Dibenzo(a,h)Anthracene	**0.228**	0.131 U	**0.366**	0.154 U	**0.307**	0.132 U	**0.276**	0.156 U	0.257 U	0.15 U	---	0.262 U	0.152 U	0.13 U	0.139 U	**0.56**	0.142 U	0.4	0.8	NE
Fluoranthene	**3.12**	0.263 U	**4.58**	0.308 U	**4.04**	0.265 U	**4.67**	**0.713**	**0.558**	0.299 U	---	**3.12**	0.304 U	0.261 U	0.279 U	**6.75**	0.284 U	20	10,000	NE
Fluorene	0.286 U	0.263 U	0.271 U	0.308 U	0.284 U	0.265 U	**0.295**	0.313 U	0.515 U	0.299 U	---	0.524 U	0.304 U	0.261 U	0.279 U	0.277 U	0.284 U	28	10,000	NE
Indeno(1,2,3-cd)Pyrene	**0.985**	0.263 U	**1.83**	0.308 U	**1.2**	0.265 U	**1.32**	0.313 U	0.515 U	0.299 U	---	**0.94**	0.304 U	0.261 U	0.279 U	**2.65**	0.284 U	0.9	7.8	NE
Phenanthrene	**1.68**	0.263 U	**3.29**	0.308 U	**2.9**	0.265 U	**3.26**	**0.618**	0.515 U	0.299 U	---	**2.12**	0.304 U	0.261 U	0.279 U	**2.46**	0.284 U	40	10,000	NE
Pyrene	**2.71**	0.263 U	**3.9**	0.308 U	**3.98**	0.265 U	**3.76**	**0.563**	0.515 U	0.299 U	---	**2.66**	0.304 U	0.261 U	0.279 U	**6.13**	0.284 U	13	10,000	NE
Total Petroleum Hydrocarbons, mg/Kg																				
Total Petroleum Hydrocarbons	**154**	38.8 U	**410**	46.6 U	**221**	38.4 U	**820**	**202**	**1,300**	45.1 U	40.8 U	**1,640**	45.9 U	**46.6**	39.4 U	**448**	41.3 U	500	2,500	2,500
Total Metals, mg/Kg																				
Antimony	5.13 U	4.91 U	4.83 U	5.46 U	**9.97**	4.95 U	5.16 U	5.86 U	**17.9**	5.56 U	---	4.57 U	5.74 U	5.19 U	5.15 U	5.2 U	5.2 U	10	820	NE
Arsenic	**22.1**	**4.64**	**5.38**	**4.07**	**5.81**	2.47 U	2.58 U	**4.72**	2.49 U	2.78 U	---	2.29 U	**3.08**	**9.39**	2.58 U	2.6 U	2.6 U	7	7	NE
Barium	**655**	**21.4**	**97.8**	**14**	**87.9**	**20.6**	**94.8**	**12.6**	**57**	**17.1**	---	**37.5**	**16.3**	**53**	**17.4**	**80.1**	**37.5**	5,500	10,000	NE
Beryllium	**1.19**	**0.23**	**0.28**	**0.27**	**0.31**	**0.16**	**0.19**	**0.25**	**0.25**	**0.19**	---	**0.17**	**0.27**	**0.28**	**0.12**	**0.2**	**0.17**	1.5	1.5	NE
Cadmium	**2.29**	0.49 U	**0.62**	0.55 U	0.51 U	0.49 U	**0.61**	0.59 U	0.5 U	0.56 U	---	0.46 U	0.57 U	0.52 U	0.52 U	0.52 U	0.52 U	39	1000	NE
Chromium	**34.5**	**7.06**	**16.2**	**10**	**17.1**	**46.9**	**17.4**	**7.88**	**11.9**	**4.29**	---	**7.43**	**6.37**	**5.76**	**30.6**	**16.7**	**9.11**	1,400	10,000	NE
Copper	**347**	**9.03**	**406**	**5.55**	**152**	**18**	**67.4**	**9.75**	**163**	2.78 U	---	**16.8**	**12.6**	**42.1**	**6.34**	**143**	**8.3**	3,100	10,000	NE
Lead	**1,180**	**5.06**	**277**	5.46 U	**726**	4.95 U	**216**	**9.5**	**440**	5.56 U	---	**58.1**	**15.2**	**76.1**	5.15 U	**143**	5.2 U	150	500	NE
Manganese	**451**	**145**	**277**	**78.4**	**166**	**102**	**145**	**58**	**190**	**27.2**	---	**207**	**44.1**	**167**	**98.6**	**162**	**205**	390	10,000	NE
Mercury	**0.59**	0.031 U	**0.194**	0.039 U	**1.65**	0.032 U	**0.163**	0.042 U	**0.062**	0.037 U	---	**0.063**	**0.043**	**0.087**	0.031 U	**0.098**	0.034 U	23	610	NE
Nickel	**50.4**	**3.82**	**13.3**	**6.45**	**12.1**	**6.7**	**8.24**	**6.27**	**11.6**	**3.06**	---	**14.3**	**4.88**	**6.92**	**24**	**8.48**	**6.14**	1,000	10,000	NE
Selenium	**0.68**	4.91 U	4.83 U	5.46 U	5.11 U	4.95 U	5.16 U	5.86 U	4.97 U	5.56 U	---	4.57 U	5.74 U	5.19 U	5.15 U	5.2 U	5.2 U	390	10,000	NE
Silver	2.56 U	0.49 U	0.48 U	0.55 U	1.02 U	0.49 U	0.52 U	0.59 U	0.5 U	0.56 U	---	0.91 U	0.57 U	0.52 U	1.03 U	1.04 U	1.04 U	200	10,000	NE
Thallium	5.13 U	4.91 U	4.83 U	5.46 U	5.11 U	4.95 U	5.16 U	0.59 U	4.97 U	0.56 U	---	4.57 U	0.57 U	5.19 U	5.15 U	5.2 U	5.2 U	5.5	140	NE
Vanadium	**29.7**	**11.1**	**20**	**12.8**	**15.9**	**15.1**	**10.5**	**10.3**	**26.5**	**5.78**	---	**30.8**	**9.6**	**9.17**	**12.4**	**20.8**	**14**	550	10,000	NE
Zinc	**762**	**28.1**	**175**	**15.1**	**152**	**16**	**207**	**299**	**133**	**62.6**	---	**101**	**20.3**	**22**	**22**	**147**	**27.8**	6,000	10,000	NE
Polychlorinated Biphenyls, mg/Kg																				
Aroclor 1260	0.06 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	---	0.05 U	0.06 U	0.05 U	0.06 U	**0.2**	0.06 U	10	10	10

Notes
BOLD - compound detected
BOLD and Shaded - compound detected above RIDEM RDEC
BOLD and Shaded - compound detected above both RIDEM RDEC and I/CDEC
U - Not detected above listed detection limit.
NE - Standard not established

Table 3
Groundwater Analytical Data
0 58 Allen Street, Woonsocket, Rhode Island

Sample Designation	MW-3	MW-2	MW-1	RIDEM GB Criteria
Sample Date	**09/08/2022**	**09/08/2022**	**09/08/2022**	
Volatile Organic Compounds, milligrams per liter (mg/L)				
Acetone	**0.0452**	**0.0302**	**0.0265**	NE
Chloromethane	**0.0078**	**0.0048**	**0.0041**	NE
Semi-Volatile Organic Compounds, mg/L				
Benzo(a)anthracene	**0.00033**	**0.00106**	**0.00032**	NE
Benzo(a)pyrene	**0.00032**	**0.00104**	**0.00031**	NE
Benzo(b)fluoranthene	**0.0004**	**0.00138**	**0.00036**	NE
Benzo(g,h,i)perylene	0.00078 U	**0.00084**	0.00075 U	NE
Benzo(k)fluoranthene	0.00019 U	**0.0005**	0.00019 U	NE
Chrysene	**0.00028**	**0.00095**	**0.00027**	NE
Fluoranthene	0.00078 U	**0.00208**	0.00075 U	NE
Indeno(1,2,3-cd)Pyrene	**0.00025**	**0.00073**	**0.00022**	NE
Phenanthrene	0.00078 U	**0.00116**	0.00075 U	NE
Pyrene	0.00078 U	**0.00195**	0.00075 U	NE
Total Petroleum Hydrocarbons, mg/L				
Total Petroleum Hydrocarbons	**0.31**	**0.77**	**0.28**	NE
Total Metals, micrograms per liter (µg/L)				
Antimony	2.5 U	**6**	2.5 U	NE
Arsenic	**8.3**	**8.2**	**2.8**	NE
Barium	**192**	**161**	**119**	NE
Beryllium	**0.6**	**0.6**	0.5 U	NE
Cadmium	2.5 U	2.5 U	2.5 U	NE
Chromium	**32.9**	**28.7**	**19.4**	NE
Copper	**242**	**166**	**19.1**	NE
Lead	**95.6**	**259**	**100**	NE
Manganese	**0.689**	**0.669**	**0.438**	NE
Mercury	0.2 U	0.2 U	0.2 U	NE
Nickel	25 U	25 U	25 U	NE
Selenium	25 U	25 U	25 U	NE
Silver	5 U	5 U	5 U	NE
Thallium	**0.5**	0.5 U	0.5 U	NE
Vanadium	**16.3**	**16.9**	10 U	NE
Zinc	**230**	**176**	**86.8**	NE
Polychlorinated Biphenyls, µg/L				
Total PCBs	ND	ND	ND	NE

Notes
BOLD - compound detected
BOLD and Shaded - compound detected above RIDEM GB Criteria
U - Not detected above listed detection limit.
NE - Standard not established

APPENDIX C: Hazardous Materials Fact Sheets

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Lead

Synonyms & Trade Names Lead metal, Plumbum

CAS No. 7439-92-1	RTECS No. OF7525000 (/niosh-rtecs/OF72D288.html)	DOT ID & Guide
Formula Pb	Conversion	IDLH 100 mg/m3 (as Pb) See: 7439921 (/niosh/idlh/7439921.html)

Exposure Limits NIOSH REL *: TWA (8-hour) 0.050 mg/m3 See Appendix C (nengapdxc.html) [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.] OSHA PEL *: [1910.1025] TWA 0.050 mg/m3 See Appendix C (nengapdxc.html) [*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]

Measurement Methods
NIOSH 7082 (/niosh/docs/2003-154/pdfs/7082.pdf), 7105 (/niosh/docs/2003-154/pdfs/7105.pdf), 7300 (/niosh/docs/2003-154/pdfs/7300.pdf), 7301 (/niosh/docs/2003-154/pdfs/7301.pdf), 7303 (/niosh/docs/2003-154/pdfs/7303.pdf), 7700 (/niosh/docs/2003-154/pdfs/7700.pdf), 7701 (/niosh/docs/2003-154/pdfs/7701.pdf), 7702 (/niosh/docs/2003-154/pdfs/7702.pdf), 9100 (/niosh/docs/2003-154/pdfs/9100.pdf), 9102 (/niosh/docs/2003-154/pdfs/9102.pdf), 9105 (/niosh/docs/2003-154/pdfs/9105.pdf);
OSHA ID121 (http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html) (http://www.cdc.gov/Other/disclaimer.html), ID125G (http://www.osha.gov/dts/sltc/methods/inorganic/id125g/id125g.html) (http://www.cdc.gov/Other/disclaimer.html), ID206 (http://www.osha.gov/dts/sltc/methods/inorganic/id206/id206.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description A heavy, ductile, soft, gray solid.

MW: 207.2	BP: 3164° F	MLT: 621°F	Sol: Insoluble	VP: 0 mmHg (approx)	IP: NA
Sp.Gr: 11.34	Fl.P: NA	UEL: NA	LEL: NA		

Noncombustible Solid in bulk form.

Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

Personal Protection/Sanitation (See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
(See Appendix E) (nengapdxe.html)
NIOSH/OSHA

Up to 0.5 mg/m3:
(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 2.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Up to 100 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0052 (/niosh/ipcsneng/neng0052.html) See MEDICAL TESTS: 0127 (/niosh/docs/2005-110/nmed0127.html)

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Coal tar pitch volatiles

Synonyms & Trade Names Synonyms vary depending upon the specific compound (e.g., pyrene, phenanthrene, acridine, chrysene, anthracene & benzo(a)pyrene). [Note: NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products.]

CAS No.	RTECS No.	DOT ID & Guide
65996-93-2	GF8655000 (/niosh-rtecs/GF841098.html)	2713 153 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx/guide153/) (http://www.cdc.gov/Other/disclaimer.html) (acridine)
	Conversion	IDLH Ca [80 mg/m3] See: 65996932 (/niosh/idlh/65996932.html)

Exposure Limits NIOSH REL : Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction) See Appendix A (nengapdxa.html) See Appendix C (nengapdxc.html)
OSHA PEL : TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002] See Appendix C (nengapdxc.html)

Measurement Methods
OSHA 58 (http://www.osha.gov/dts/sltc/methods/organic/org058/org058.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description Black or dark-brown amorphous residue.

Properties vary depending upon the specific compound.					

Combustible Solids

Incompatibilities & Reactivities Strong oxidizers

Exposure Routes inhalation, skin and/or eye contact

Symptoms dermatitis, bronchitis, [potential occupational carcinogen]

Target Organs respiratory system, skin, bladder, kidneys

Cancer Site [lung, kidney & skin cancer]

Personal Protection/Sanitation (See protection codes (protect.html))	First Aid (See procedures (firstaid.html))
	Eye: Irrigate immediately

Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** Daily **Remove:** No recommendation **Change:** Daily	**Skin:** Soap wash immediately **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 1415 (/niosh/ipcsneng/neng1415.html) See MEDICAL TESTS: 0054 (/niosh/docs/2005-110/nmed0054.html)

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NIOSH

NIOSH HomeInternational Chemical Safety Cards(ICSC)

ICSC: 0825

ANTHRACENE

Anthracin Paranaphthalene $C_{14}H_{10}$ / $(C_6H_4CH)_2$ Molecular mass: 178.2 ICSC # 0825	CAS # 120-12-7 RTECS # CA9350000 March 24, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•**INHALATION**	Cough. Sore throat.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•**SKIN**	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•**EYES**	Redness. Pain.	Safety spectacles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•**INGESTION**	Abdominal pain.	Do not eat, drink, or smoke during work.	

			Rinse mouth. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from strong oxidants. Well closed.	

ICSC: 0825	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

ANTHRACENE

ICSC: 0825

I M P O R T A N T D

PHYSICAL STATE; APPEARANCE:
WHITE CRYSTALS OR FLAKES.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
The substance decomposes on heating, under influence of strong oxidants producing acrid, toxic fume , causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance slightly irritates the skin and the respiratory tract.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis under the influence of UV light.

A T A	

PHYSICAL PROPERTIES	Boiling point: 342°C Melting point: 218°C Density: 1.25-1.28 g/cm3 Solubility in water, g/100 ml at 20 °C: 0.00013 Vapour pressure, Pa at 25°C: 0.08	Relative vapour density (air = 1): 6.15 Flash point: 121°C Auto-ignition temperature: 538°C Explosive limits, vol% in air: 0.6-? Octanol/water partition coefficient as log Pow: 4.5 (calculated)

ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. 

NOTES

Green oil, Tetra-olive N2G are trade names.

NFPA Code: H0; F1; R;

ADDITIONAL INFORMATION

ICSC: 0825 **ANTHRACENE**

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ICSC: 0385

BENZ(a)ANTHRACENE

1,2-Benzoanthracene Benzo(a)anthracene 2,3-Benzphenanthrene Naphthanthracene $C_{18}H_{12}$ Molecular mass: 228.3 ICSC # 0385	CAS # 56-55-3 RTECS # CV9275000 EC # 601-033-00-9 October 23, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles , face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

•**INGESTION**		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

ICSC: 0385	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

BENZ(a)ANTHRACENE

ICSC: 0385

IMPORTANT

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO YELLOW - BROWN FLUORESCENT FLAKES OR POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK:
Carcinogen category: 2 (as pyrolysis product of organic materials)

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is probably carcinogenic to humans.

D A T A	(DFG 2005).
PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood. 

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

ICSC: 0385 **BENZ(a)ANTHRACENE**

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ICSC: 0720

BENZO(b)FLUORANTHENE

Benz(e)acephenanthrylene 2,3-Benzofluoroanthene Benzo(e)fluoranthene 3,4-Benzofluoranthene $C_{20}H_{12}$ Molecular mass: 252.3 ICSC # 0720	CAS # 205-99-2 RTECS # CU1400000 EC # 601-034-00-4 March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

ICSC: 0720	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

BENZO(b)FLUORANTHENE

ICSC: 0720

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK:
Carcinogen category: 2;
(DFG 2004).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.12
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. 	

NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 0720 **BENZO(b)FLUORANTHENE**

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ICSC: 0721

BENZO(k)FLUORANTHENE

Dibenzo(b,jk)fluorene 8,9-Benzofluoranthene 11,12-Benzofluoranthene $C_{20}H_{12}$ Molecular mass: 252.3 ICSC # 0721	CAS # 207-08-9 RTECS # DF6350000 EC # 601-036-00-5 March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

ICSC: 0721	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

BENZO(k)FLUORANTHENE

ICSC: 0721

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK:
Carcinogen category: 2;
(DFG 2004).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 217°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish. 

NOTES

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 0721 **BENZO(k)FLUORANTHENE**

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ICSC: 0104

BENZO(a)PYRENE

Benz(a)pyrene 3,4-Benzopyrene Benzo(d,e,f)chrysene $C_{20}H_{12}$ Molecular mass: 252.3 ICSC # 0104	CAS # 50-32-8 RTECS # DJ3675000 EC # 601-032-00-3 October 17, 2005 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

STORAGE

SPILLAGE DISPOSAL		PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

ICSC: 0104	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

BENZO(a)PYRENE

ICSC: 0104

IMPORTANT

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK:
Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ

D A T A		cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm3	Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment. 	

NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

ICSC: 0104 **BENZO(a)PYRENE**

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ICSC: 1672

CHRYSENE

Benzoaphenanthrene 1,2-Benzophenanthrene 1,2,5,6-Dibenzonaphthalene $C_{18}H_{12}$ Molecular mass: 228.3 ICSC # 1672	CAS # 218-01-9 RTECS # GC0700000 UN # 3077 EC # 601-048-00-0 October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily

			possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Health haz-Enviro Suspected of causing cancer Very toxic to aquatic life Toxic to aquatic life with long lasting effects

ICSC: 1672	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

CHRYSENE

ICSC: 1672

I M P O R T A N

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO BEIGE CRYSTALS OR POWDER

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
The substance decomposes on burning producing toxic fumes . Reacts violently with strong oxidants.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A3 (confirmed animal

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed .

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

T D A T A	carcinogen with unknown relevance to humans); (ACGIH 2006). MAK: skin absorption (H); Carcinogen category: 2 (DFG 2007).	This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm3	Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment. 	

NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

Card has been partially updated in January 2008: see Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 1672 **CHRYSENE**

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NIOSH

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ICSC: 1474

PYRENE

Benzo (d,e,f) phenanthrene beta-Pyrene $C_{16}H_{10}$ Molecular mass: 202.26 ICSC # 1474	CAS # 129-00-0 RTECS # UR2450000 November 27, 2003 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, or polymer foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust .	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder . Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs.

ICSC: 1474	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

PYRENE

ICSC: 1474

I M P O R T A N T D A T

PHYSICAL STATE; APPEARANCE:
PALE YELLOW OR COLOURLESS SOLID IN VARIOUS FORMS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating producing irritating fumes .

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation , through the skin and by ingestion .

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

A	
PHYSICAL PROPERTIES	Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm3 Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in crustacea,in fish,in milk,in algae andin molluscs. It is strongly advised that this substance does not enter the environment. 

NOTES

Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.

ADDITIONAL INFORMATION

ICSC: 1474 **PYRENE**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

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Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA 30329-4027, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO

Centers for Disease Control and Prevention
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NIOSH

NIOSH HomeInternational Chemical Safety Cards(ICSC)

ICSC: 0104

BENZO(a)PYRENE

Benz(a)pyrene 3,4-Benzopyrene Benzo(d,e,f)chrysene $C_{20}H_{12}$ Molecular mass: 252.3 ICSC # 0104	CAS # 50-32-8 RTECS # DJ3675000 EC # 601-032-00-3 October 17, 2005 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

STORAGE

SPILLAGE DISPOSAL		PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

ICSC: 0104	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

BENZO(a)PYRENE

ICSC: 0104

IMPORTANT

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK:
Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ

D A T A		cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm3	Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment. 	

NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

ICSC: 0104 **BENZO(a)PYRENE**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

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APPENDIX D: Operating Log

REMEDIAL ACTION WORK PLAN - OPERATING LOG

PROJECT: Allen Street Parking Lot 0 & 58 Allen Street Woonsocket, Rhode Island	DATE: _____ PAGE: 1 of _____
CONTRACTOR: _____	WEATHER: _____ WIND:
CONTRACTOR'S HOURS OF WORK: _____ to _____	INSPECTOR: _____ HOURS ON-SITE: to

SUBCONTRACTORS WORKING ON-SITE:	
(1)	
(2)	
(3)	

VISITORS TO JOB SITE:	Arrival	Departure

LIST OF EQUIPMENT ON-SITE _____

DESCRIPTION OF WORK PERFORMED: _____

MATERIALS AND QUANTITIES BROUGHT TO SITE: _____

SOIL DISPOSAL (Number of Trucks, Volume, Disposal Location): _____

DUST MONITORING: _____

NEW ISSUES: _____

CONTINGENCY PLAN IMPLEMENTED? Yes ☐ No ☐

Actions Undertaken: _____

PHOTOGRAPHIC LOG: (Attach Photos) _____

INSPECTOTR'S SIGNATURE:

APPENDIX E: Draft Environmental Land Usage Restriction and Post Closure Soil Management Plan

ENVIRONMENTAL LAND USAGE RESTRICTION

This Declaration of Environmental Land Usage Restriction ("Restriction") is made on this _____ day of _____, 20___ by **[property owner]**, and its successors and/or assigns (hereinafter, the "Grantor").

WITNESSETH:

WHEREAS, the Grantor _____ (name) is the Owner in fee simple of certain real property identified as Lots 174-014, 175-015, 176-016, and 177-017 on Map 14E, 0 and 58 Allen Street, Woonsocket, Rhode Island (the "Property"), more particularly described in Exhibit A (Legal Description) which is attached hereto and made a part hereof;

WHEREAS, the Property has been determined to contain soil which is contaminated with certain Hazardous Materials and/or petroleum in excess of applicable residential and industrial/commercial Direct Exposure Criteria criteria pursuant to the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases ("Remediation Regulations");

WHEREAS, the Grantor and the Rhode Island Department of Environmental Management ("Department") have determined that the environmental land use restrictions set forth below are consistent with the regulations adopted by the Department pursuant to R.I.G.L. § 23-19.14-1 and that this restriction shall be a Conservation Restriction pursuant to R.I.G.L. § 34-39-1 et. seq. and shall not be subject to the 30-year limitation provided in R.I.G.L. § 34-4-21;

WHEREAS, the Department's written approval of this Restriction is contained in the document entitled: Remedial Approval Letter issued pursuant to the Remediation Regulations;

WHEREAS, to prevent exposure to or migration of Hazardous Substances and to abate hazards to human health and/or the environment, and in accordance with the Remedial Decision Letter, the Grantor desires to impose certain restrictions upon the use, occupancy, and activities of and at the Property;

WHEREAS, the Grantor believes that this Restriction will effectively protect public health and the environment from such contamination; and

WHEREAS, the Grantor intends that such restrictions shall run with the land and be binding upon and enforceable against the Grantor and the Grantor's successors and assigns.

NOW, THEREFORE, Grantor agrees as follows:

A. Restrictions Applicable to the Property: In accordance with the Remedial Approval Letter, the use, occupancy and activity of and at the Property is restricted as follows:

i. No residential use of the Property shall be permitted that is contrary to Department approvals and restrictions contained herein;

ii. No soil at the Property shall be disturbed in any manner without written permission of the Department's Office of Land Revitalization & Sustainable Materials Management, except as permitted in the Soil Management Plan (SMP), Exhibit B and attached hereto, approved by the Department in a written approval letter dated _____(date);

[iii. Humans engaged in activities at the Property shall not be exposed to soils containing Hazardous Materials and/or petroleum in concentrations exceeding the applicable Department approved Direct Exposure Criteria set forth in the Remediation Regulations;

[iv. The engineered controls at the Property described in the SMP contained in Exhibit B attached hereto shall not be disturbed and shall be properly maintained to prevent humans engaged in residential or industrial/commercial activity from being exposed to soils containing Hazardous Materials and/or petroleum in concentrations exceeding the applicable Department-approved residential or industrial/commercial Direct Exposure Criteria in accordance with the Remediation Regulations; and

B. No action shall be taken, allowed, suffered, or omitted at the **Property if such action or omission is reasonably likely to:**

i. Create a risk of migration of Hazardous Materials and/or petroleum;
ii. Create a potential hazard to human health or the environment; or
iii. Result in the disturbance of any engineering controls utilized at the Property, except as permitted in the Department-approved SMP contained in Exhibit B.

C. Emergencies: In the event of any emergency which presents a significant risk to human health or to the environment, including but not limited to, maintenance and repair of utility lines or a response to emergencies such as fire or flood, the application of Paragraphs A (iii.-viii.) and B above may be suspended, provided such risk cannot be abated without suspending such Paragraphs and the Grantor complies with the following:

i. Grantor shall notify the Department's Office of Land Revitalization & Sustainable Materials Management in writing of the emergency as soon as possible but no more than three (3) business days after Grantor's having learned of the emergency. (This does not remove Grantor's obligation to notify any other necessary state, local or federal agencies.);

ii. Grantor shall limit both the extent and duration of the suspension to the minimum period reasonable and necessary to adequately respond to the emergency;

iii. Grantor shall implement reasonable measures necessary to prevent actual, potential, present and future risk to human health and the environment resulting from such suspension;

iv. Grantor shall communicate at the time of written notification to the Department its intention to conduct the Emergency Response Actions and provide a schedule to complete the Emergency Response Actions;

v. Grantor shall continue to implement the Emergency Response Actions, on the schedule submitted to the Department, to ensure that the Property is remediated in accordance with the Remediation Regulations (or applicable variance) or restored to its condition prior to such emergency. Based upon information submitted to the Department at the time the ELUR was recorded pertaining to known environmental conditions at the Property, emergency maintenance and repair of utility lines shall only require restoration of the Property to its condition prior to the maintenance and repair of the utility lines; and

vi. Grantor shall submit to the Department, within ten (10) days after the completion of the Emergency Response Action, a status report describing the emergency activities that have been completed.

D. Release of Restriction; Alterations of Subject Area: The Grantor shall not make, or allow or suffer to be made, any alteration of any kind in, to, or about any portion of the Property inconsistent with this Restriction unless the Grantor has received the Department's prior written approval for such alteration. If the Department determines that the proposed alteration is significant, the Department may require the amendment of this Restriction. Alterations deemed insignificant by the Department will be approved via a letter from the Department. The Department shall not approve any such alteration and shall not release the Property from the provisions of this Restriction unless the Grantor demonstrates to the Department's satisfaction that Grantor has managed the Property in accordance with applicable regulations.

E. Notice of Lessees and Other Holders of Interests in the Property: The Grantor, or any future holder of any interest in the Property, shall cause any lease, grant, or other transfer of any interest in the Property to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Restriction. The failure to include such provision shall not affect the validity or applicability of this Restriction to the Property.

F. Enforceability: If any court of competent jurisdiction determines that any provision of this Restriction is invalid or unenforceable, the Grantor shall notify the Department in writing within fourteen (14) days of such determination.

G. Binding Effect: All of the terms, covenants, and conditions of this Restriction shall run with the land and shall be binding on the Grantor, its successors and assigns, and each Owner and any other party entitled to control, possession or use of the Property during such period of Ownership or possession.

H. Inspection & Non-Compliance: It shall be the obligation of the Grantor, or any future holder of any interest in the Property, to provide for annual inspections of the Property for compliance with the ELUR in accordance with Department requirements.

A qualified environmental professional will, on behalf of the Grantor or future holder of any interest in the Property, evaluate the compliance status of the Property on an annual basis. Upon completion of the evaluation, the environmental professional will prepare and simultaneously submit to the Department and to the Grantor or future holder of any interest in the Property an evaluation report detailing the findings of the inspection , and noting any compliance violations at the Property. If the Property is determined to be out of compliance with the terms of the ELUR, the Grantor or future holder of any interest in the Property shall submit a corrective action plan in writing to the Department within ten (10) days of receipt of the evaluation report, indicating the plans to bring the Property into compliance with the ELUR, including, at a minimum, a schedule for implementation of the plan.

In the event of any violation of the terms of this Restriction, which remains uncured more than ninety (90) days after written notice of violation, all Department approvals and agreements relating to the Property may be voided at the sole discretion of the Department.

I. Terms Used Herein: The definitions of terms used herein shall be the same as the definitions contained in Section 1.4 (DEFINITIONS) of the Remediation Regulations.

IN WITNESS WHEREOF, the Grantor has hereunto set (his/her) hand and seal on the day and year set forth above.

[**Name of Person(s), company, LLC or LLP**]

By: _____ _____
Grantor (signature)_____ _____Grantor (typed name)

STATE OF RHODE ISLAND
COUNTY OF _____

In (CITY/TOWN), in said County and State, on the _____ day of _____, 20___, before me Personally appeared _____, to me known and known by me to be the party executing the foregoing instrument and (he/she) acknowledged said instrument by (him/her) executed to be (his/her) free act and deed.

Notary Public: _____
My Comm. Expires: _____

Post Remediation Soil Management Plan
Lots 174-014, 175-015, 176-016, and 177-017 on Map 14E
0 & 58 Allen Street, Woonsocket, Rhode Island

This Soil Management Plan (SMP) has been prepared to establish procedures that will be followed should future construction/maintenance activities at the 0 & 58 Allen Street property require the need to manage soils excavated from the subsurface or when existing site surfaces / Department approved engineered controls (asphalt, concrete, landscaping and/or foundations) are disturbed. The plan serves to supplement, and will be initiated by, the RIDEM notification requirement established by the Environmental Land Use Restriction (ELUR) for the property.

Background

The Property, located at 0 & 58 Allen Street in Woonsocket, Rhode Island, was formerly a motor oil fueling station for trucks, an auto parts supply facility, and a portion of a machine shop. The property was found to contain total petroleum hydrocarbons, several polycyclic aromatic hydrocarbons, and several metals in soil during a site investigation performed at the property. The Site is currently developed with a paved parking lot. The Department approved remedy included maintaining the existing parking lot to prevent direct exposure to soil. The regulated site soils are covered with Department approved engineered controls, consisting of asphalt pavement in order to prevent direct exposure to regulated soils.

Applicable Area

This SMP and affiliated ELUR, which restricts the property to Industrial/Commercial use, pertains to the entire Property. See attached site figure.

Soil Management

The direct exposure pathway is the primary concern at the site. Individuals engaged in activities at the site may be exposed through incidental ingestion, dermal contact, or inhalation of vapors or entrained soil particles if proper precautions are not taken. Therefore, the following procedures will be followed to minimize the potential of exposure.

During site work, the appropriate precautions will be taken to restrict unauthorized access to the property.

During all site/earth work, dust suppression (e.g. watering, etc) techniques must be employed at all times. If it is anticipated due to the nature of the contaminants of concern that odors may be generated during site activities, air monitoring and means to control odors will be utilized, as appropriate (e.g. odor-suppressing foam, etc).

In the event that an unexpected observation or situation arises during site work, such activities will immediately stop. Workers will not attempt to handle the situation themselves but will contact the appropriate authority for further direction.

In the event that certain soils on site were not previously characterized, these soils are presumed to be regulated until such time that it is demonstrated to the Department, through sampling and laboratory analysis that they are not regulated. (For example, presumptive remedies or locations of previously inaccessible soil.)

If excess soil is generated / excavated from the Property, the soil is to remain on-site for analytical testing, to be performed by an environmental professional, in order to determine the appropriate disposal and/or management options. The soil must be placed on and covered with polyethylene/plastic sheeting during the entire duration of its staging and secured with appropriate controls to limit the loss of the cover and protect against storm-water and / or wind erosion (e.g. hay bales, silt fencing, rocks, etc).

Excavated soils will be staged and temporarily stored in a designated area of the property. Within reason, the storage location will be selected to limit the unauthorized access to the materials (e.g., away from public roadways/walkways). No regulated soil will be stockpiled on-site for greater than 60 days without prior Department approval.

In the event that stockpiled soils pose a risk or threat of leaching hazardous materials, a proper leak-proof container (e.g. drum or lined roll-off) or secondary containment will be utilized.

Soils excavated from the site may not be re-used as fill on residential property. Excavated fill material shall not be re-used as fill on commercial or industrial properties unless it meets the Department's Method 1 Residential Direct Exposure Criteria for all constituents listed in Table 1 of the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations). Copies of the laboratory analysis results shall be maintained by the site owner and included in the annual inspection report for the site, or the closure report if applicable. In the event that the soil does not meet any of these criteria, the material must be properly managed and disposed of off site at a licensed facility.

Site soils, which are to be disposed of off-site, must be done so at a licensed facility in accordance with all local, state, and federal laws. Copies of the material shipping records associated with the disposal of the material shall be maintained by the site owner and included in the annual inspection report for the site.

Best soil management practices should be employed at all times and regulated soils should be segregated into separate piles (or cells or containers) as appropriate based upon the results of analytical testing, when multiple reuse options are planned (e.g. reuse on-site, reuse at a Department approved Industrial/Commercial property, or disposal at a Department approved licensed facility).

All non-disposable equipment used during the soil disturbance activities will be properly decontaminated as appropriate prior to removal from the site. All disposable equipment used during the soil disturbance activities will be properly containerized and disposed of following completion of the work. All vehicles utilized during the work shall be properly decontaminated as appropriate prior to leaving the site.

At the completion of site work, all exposed soils are required to be recapped with Department approved engineered controls (2 ft of clean fill or equivalent: building foundations, 4 inches of pavement/concrete underlain with 6 inches of clean fill, and/or 1 foot of clean fill underlain with a geotextile liner) consistent or better than the site surface conditions prior to the work that took place. These measures must also be consistent with the Department approved ELUR recorded on the property. Any clean fill material brought on site is required to meet the Department's Method 1 Residential Direct Exposure Criteria or be designated by an Environmental Professional as Non-Jurisdictional under the Remediation Regulations. The Annual Inspection Report for the site, or Closure Report if applicable, should include either analytical sampling results from the fill demonstrating compliance or alternatively include written certification by an Environmental Professional that the fill is not jurisdictional.

Worker Health and Safety

To ensure the health and safety of on-site workers, persons involved in the excavation and handling of the material on site are required to wear a minimum of Level D personal protection equipment, including gloves, work boots and eye protection. Workers are also required to wash their hands with soap and water prior to eating, drinking, smoking, or leaving the site.

Department Approval

In accordance with Section A iii of the ELUR, no soil at the property is to be disturbed in any manner without prior written permission of the Department's Office of Land Revitalization & Sustainable Materials Management, except for minor inspections, maintenance, and landscaping activities that do not disturb the contaminated soil at the Site. As part of the notification process, the site owner shall provide a brief written description of the anticipated site activity involving soil excavation. The notification should be submitted to the Department no later than 60 days prior to the proposed initiation of the start of site activities. The description shall include an estimate of the volume of soil to be excavated, a list of the known and anticipated contaminants of concern, a site figure clearly identifying the proposed areas to be excavated/disturbed, the duration of the project and the proposed disposal location of the soil.

Following written Notification, the Department will determine the post closure reporting requirements. Significant disturbances of regulated soil will require submission of a Closure Report for Department review and approval documenting that the activities were performed in accordance with this SMP and the Department approved ELUR. Minor disturbances of regulated soil may be documented through the annual certification

submitted in accordance with Section H (Inspection & Non-Compliance) of the Department approved ELUR. The Department will also make a determination regarding the necessity of performing Public Notice to abutting property owners/tenants concerning the proposed activities. Work associated with the Notification will not commence until written Department approval has been issued. Once Department approval has been issued, the Department will be notified a minimum of two (2) days prior to the start of activities at the site. Shall any significant alterations to the Department approved plan be necessary, a written description of the proposed deviation, will be submitted to the Department for review and approval prior to initiating such changes.