REMEDIAL ACTION CLOSURE REPORT

PARCEL C-1 PHASE I CAP
FORMER GORHAM MANUFACTURING FACILITY
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

Prepared for:
Textron, Inc.
40 Westminster Street
Providence, Rhode Island

Prepared by:

AMEC Environment & Infrastructure, Inc.
2 Robbins Road
Westford, Massachusetts 01886

Project No. 3650110213

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ACRONYMS

ABB-ES	ABB Environmental Services
AMEC	AMEC Environment & Infrastructure, Inc.
bgs	below ground surface
COPC	Constituents of Potential Concern
CY	cubic yard
1,2-DCE	1,2-dichloroethene
ELUR	Environmental Land Usage Restriction
ET&L	E.T.& L. Corporation
HASP	Health and Safety Plan
HLA	Harding Lawson Associates
LLDPE	linear low density polyethylene
LOW	Limit of Work
MACTEC	MACTEC Engineering and Consulting, Inc.
µg/kg	Micrograms per Kilogram
mg/m^3	Milligrams per Cubic Meter
NOI	Notice of Intent
NOT	Notice of Termination
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAH	Polynuclear Aromatic Hydrocarbons
PCE	Tetrachloroethene
PID	Photoionization Detector
RAWP	Remedial Action Work Plan
RDEC	Residential Direct Exposure Criteria
RIDEM	Rhode Island Department of Environmental Management
SI	Site Inspection
SIR	Site Investigation Report
SMP	Soil Management Plan
SPLP	Synthetic Precipitation Leaching Procedure
SSIR	Supplemental Site Investigation Report
SVOCs	Semi-volatile Organic Compounds

1,1,1-TCA	1,1,1-trichloroethane
TCE	Trichloroethene
Textron	Textron, Inc.
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

The Former Gorham Manufacturing Facility (the Site) is located at 333 Adelaide Avenue, Providence, Rhode Island (Figure 1). This Remedial Action Closure Report details the recently-completed Remedial Action and current Site status of the Parcel C-1 Phase I remediation (Figure 2), as proposed in the Remedial Action Work Plan (RAWP), dated August 10, 2012, by AMEC Environment & Infrastructure, Inc. (AMEC) (formerly known as MACTEC Engineering and Construction, Inc. [MACTEC]). This RAWP was approved August 10, 2012 by the State of Rhode Island Department of Environmental Management (RIDEM) (Appendix A). Phase I is identified as the area along Mashapaug Pond and Cove west and north of the Alvarez High School (Figure 3). Other areas of Parcel C-1, Mashapaug Cove (Phase II) and the northern portion of Parcel C-1 (Phase III), are currently in the site investigation and remedial design process and scheduled for remediation in the near future.

The remedial action discussed in this closure report focuses solely on surface soil in the Phase I area of Parcel C-1. The remedial objectives for the Phase I area work consisted of the following:

- contain/consolidate identified areas of solid waste;
- prevent direct-contact human exposure to contaminated soil and waste exceeding RIDEM Residential Direct Exposure Criteria (RDEC); and
- minimize the potential for leaching of metals from vadose zone soil to groundwater at the location of the former slag pile.

This Remedial Action Closure Report has been prepared pursuant to the Remedial Approval Letter (Appendix A) and the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, as amended November 9, 2011, (hereafter referred to as the Remediation Regulations) on behalf of Textron, Inc. (Textron).

1.1 Property and Site History

The Former Gorham Manufacturing Facility is a 37-acre parcel of land where Gorham Silver engaged in the manufacture of silverware, both sterling and plated, and bronze castings from approximately 1890 to 1985. Operations included casting, rolling, polishing, lacquering, forging, plating, annealing, soldering, degreasing, machining, and melting. Vapor degreasers reportedly used trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA).

More recent Site conditions are shown in the aerial photograph in Figure 2. In this figure, the Site is located immediately north of Adelaide Avenue and west of the Amtrak railroad tracks. The former manufacturing facility has been razed. A retail development has been completed on the southeastern portion (Parcel A). A public high school (Alvarez High School) has been constructed on a second parcel (Parcel B). A grassed lawn area/open space and parking lot is

proposed for Parcel C (a.k.a. the undeveloped lot west of Alvarez High School,) by the City of Providence under a draft RAWP dated August 2010..

1.2 Physical Setting

The 333 Adelaide Avenue property (Figure 2) is bordered to the east by Amtrak railroad tracks, and Adelaide Avenue and a residential neighborhood bound the 333 Adelaide Avenue property to the south. To the north and west, the Site is bounded by Mashapaug Pond. Parcel C-1 (a.k.a. Park Parcel; f.k.a. Parcel D) constitutes the northern portions of the 333 Adelaide Avenue property. On the opposite (northern) shore of Mashapaug Pond there is an industrially-zoned area.

The western portion of Parcel C-1 Phase I extends from the southwestern property boundary (Adelaide Avenue/Crescent Street) to the tip of the western peninsula that bends into Mashapaug Pond. This area is heavily wooded with moderate to steep slopes that descend to the Pond. The western peninsula has variable elevation and is a wooded environment. The peninsula is accessible via one or more paths. The tip of the peninsula is relatively open compared to the wooded areas adjacent to it. Limited areas along the western shoreline contain industrial fill material. There are structures present which, based on historic maps, were used for water extraction purposes associated with the former facility's fire suppression system and/or process water.

The central portion of Parcel C-1, Phase I, borders the southern shore of Mashapaug Cove and the Alvarez High School parking lot. This area consists of a steep wooded embankment that leads down to a wooded lowland adjacent to the Mashapaug Inner Cove. A slag pile previously located in the central portion of this area was removed from the property by Textron in July 2006 (Figures 2 and 3). Post-excavation confirmatory soil sampling was conducted, indicating isolated exceedances of RDEC. MACTEC submitted the *Slag Removal Action Summary Report* (September 2006) to the Consent Order parties summarizing analytical results and the excavation activities completed to date (MACTEC, 2006).

The embankments along the southern end of Mashapaug Cove are underlain by heterogeneous fill, consisting of granular reworked soils with varying amounts of casting sands and construction, demolition, and miscellaneous debris such as fire brick, old wood beams, and metal debris. The fill varies in thickness from one-foot at the northern edge of the former West Parking area (former facility area) to approximately 20-feet along the embankment north of the high school parking lot (Figure 3). Several historic groundwater well structures that were formerly used for industrial and/or fire suppression purposes are present near the southwestern shore and eastern shore of the Inner Cove.

The northeast portion of Parcel C-1 Phase 1 borders the Mashapaug Cove and Mashapaug Pond, and includes the eastern shore of Mashapaug Cove and a steep hill to the east. This area is generally more open and accessible than the areas immediately to the south of Mashapaug Cove. This area is adjacent to the flat upland area (Phase III) that formerly housed an employee recreational building (known as the Casino) and associated parking lots.

1.3 Regulatory Background and Previous Investigations

Environmental investigations have been carried out at the 333 Adelaide Avenue property beginning in 1986. RIDEM completed a United States Environmental Protection Agency (USEPA) Potential Hazardous Waste Site Identification Form in 1987. This occurred after the facility ceased operations in 1986. RIDEM completed a Preliminary Assessment (PA) of the 333 Adelaide Avenue property in 1989 which designated the property as a Medium Priority for a Site Inspection (SI). An SI Report was prepared by Camp Dresser & McKee in 1993 under contract to RIDEM. The SI recommended further investigation of the property. ABB Environmental Services (ABB-ES), subsequently, Harding Lawson Associates (HLA and Harding ESE), MACTEC (now AMEC) completed several environmental investigations on behalf of Textron since 1993.

In 1995, a Remedial Investigation Report (ABB-ES, 1995a) and a Supplemental Remedial Investigation Report (ABB-ES, 1995b) were prepared to assess site conditions, including portions of Parcel D (now known as Parcel C-1). The results of the earlier investigations (circa 1986 to 1995) were summarized in the Remedial Investigation Report.

A Supplemental Investigation Report (HLA, 1998) was prepared in 1998 for the Site. In 1999 a Site Investigation Summary Report and Risk Assessment (HLA, 1999) was prepared and submitted to RIDEM that addressed the entire 333 Adelaide Avenue property. This report was formally approved by RIDEM in a June 15, 2001 RIDEM Remedial Decision Letter. In April 2001, Harding ESE, prepared and submitted to RIDEM on Textron's behalf the *Remedial Action Work Plan, Former Gorham Manufacturing Facility, Providence, Rhode Island*.

In November 2002, MACTEC submitted a Method 3 Risk Assessment Work Plan (MACTEC, 2002) to RIDEM to assess the proposed redevelopment of the undeveloped portion of the 333 Adelaide Avenue property (Parcel C-1, formerly known as Parcel D) as a park with walking trails. Following review comments from RIDEM in September 2003, MACTEC submitted the *Method 3 Human Health Risk Assessment – Park Parcel* (MACTEC, 2004) to RIDEM in August 2004. No comments were received on this submittal.

Soil conditions at selected locations within the Site, material from the slag pile, and sediment conditions at selected locations in Mashapaug Cove were investigated in December 2005 on RIDEM's behalf and were documented in a Site Investigation Report submitted by Fuss & O'Neill, Inc. to RIDEM in April 2006. Surface soil sampling was also conducted by MACTEC in 1994, 1998, 2001, 2002, 2006 and 2007, including both surface soils and surface sediment found in erosion channels along the bank that leads into the Inner Cove. The 1998 surface soil analytical results for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and metals are presented in the *Supplemental Site Investigation Report, Proposed Park Subdivision, Former Gorham Manufacturing Facility, 333 Adelaide Avenue, Providence, Rhode Island* (HLA, 1998). Additional surface soil sampling was conducted along the bank of the Cove in 2001 and 2002 by MACTEC. This soil sampling program is summarized and results are presented in the *Method 3 Human Health Risk Assessment – Park Parcel* (MACTEC, 2004). Soil sampling for metals and dioxin along the

western side of Parcel C-1 is summarized and results are presented in the Supplemental Site Investigation Report (SSIR) Addendum (MACTEC, 2006 and 2007b).

The previous environmental investigations have demonstrated that soil at the 333 Adelaide Avenue Property, particularly the former manufacturing facility parcel, has been impacted by historical industrial operations at select locations. Constituents of potential concern (COPC) in soils at the Site include VOCs (principally the chlorinated hydrocarbons TCE, PCE, and 1,1,1-TCA and their degradation products 1,2-dichloroethene [1,2-DCE] and vinyl chloride), SVOCs (principally polynuclear aromatic hydrocarbons, PAHs), metals (primarily arsenic, copper, and lead), dioxin, and TPH.

The available information indicates that limited manufacturing activities (other than withdrawal of groundwater for use in manufacturing operations and the operation of Building V) were conducted within the Parcel C-1 Phase I area. A portion of Building V, the former smelting building, was within Parcel C-1 and the former slag pile was located adjacent to former Building V. The data suggest that impacted fill from the former manufacturing facility parcel impinges upon the westerly and southerly portions of Parcel C-1.

Constituents detected in sediments and surface soils adjacent to the Mashapaug Inner Cove include TPH, SVOCs, VOCs, metals, and dioxins. Sediment samples from drainage swales and erosion channels that serve as a pathway for the discharge into Mashapaug Inner Cove showed sporadic detections of SVOCs, TPH, and some metals. Surface soil samples from low lying areas adjacent to the Inner Cove also showed some detection of metals. The contaminated soil found within these drainage swales were removed for off-site disposal in July 2006. Confirmatory soil sampling results were included in the January 2007 summary report (MACTEC, 2007a).

Based on discussions with RIDEM and comments received on earlier reports and Work Plans, MACTEC prepared a Supplemental SI Work Plan in June 2006. On July 31, 2006 MACTEC submitted a *Supplemental Site Investigation Report* to RIDEM. Section 6.0 of the 2006 SSIR proposed three remedial alternatives to address soil contamination. On June 28, 2007 MACTEC submitted an addendum to the SSIR to RIDEM (MACTEC, 2007b). The SSIR Addendum detailed compliance sampling performed in February 2007 and the analytical results. These results, together with a site walk by RIDEM and MACTEC in August 2010, and other soil sampling outside the proposed Phase I cap supported the regulatory compliance of the preferred remedial alternative, the soil consolidation and installation of a soil and geomembrane cap on the Parcel C-1 Phase I Area.

1.4 Phased Approach

A phased remediation approach was developed for Parcel C-1 (Figure 3) which includes soil remediation/capping, groundwater remediation and dredging/capping of the Cove sediments:

- Phase I was completed in 2012, and it is the subject of this report. It included soil consolidation and capping of portions of Parcel C-1 along Mashapaug Pond and the

Cove west and north of the Alvarez High School (Parcel B) and the proposed open space/fields (Parcel C);

- Phase II is proposed to consist of sediment remediation within Mashapaug Inner Cove and wetland/shoreline capping and restoration of the Inner Cove;
- Phase III is proposed to consist of soil consolidation and capping within the open area north of the storm water detention basin;

Groundwater remediation consisting of a pump and treat system will be implemented on Parcel A in the spring of 2013.

2.0 CONTRACT

Textron contracted with E.T.&L. Corporation (ET&L) of Stow, MA, to perform the remedial construction at the Parcel C-1 Phase I Area. AMEC was contracted by Textron to perform construction management, air monitoring services, documentation, oversight, and quality assurance of the work.

3.0 SUMMARY OF REMEDIAL ACTIVITIES

3.1 Site Mobilization

Prior to Site mobilization, AMEC installed privacy screening on the existing perimeter chain link fence, and ET&L contacted DigSafe and City of Providence to receive the appropriate utility clearances. ET&L conducted mobilization activities during the week of September 4, 2012. During this week, ET&L performed survey layout, demolished the existing interior chain link fencing, and installed a stabilized construction entrance (approximately 200 ft long). The entrance was constructed of gravel and small rip rap over a geotextile fabric (as shown in Detail 3, Sheet C-501) and was located just inside the access gate to the Parcel C laydown area (adjacent to the Alvarez High School). All construction photographs (Appendix B) can be viewed for orientation and progress screening throughout the construction cycle. ET&L chose not to use the alternative laydown area located north of the detention basin and therefore did not install a second construction entrance at this location (Figure 4).

All necessary materials and equipment were delivered to the Site to begin operations during mobilization. Materials included hand tools, large earth moving equipment, and a portable toilet. An office trailer was not used at the Site. Instead, ET&L rented one of the small retail spaces at the Parcel A retail building. Warning signs were fastened to the entrance gate near the front of the Alvarez High School and at the gate behind the small retail spaces. In addition, ET&L constructed a laydown area in Parcel C for stockpiling imported soil. The laydown area was constructed of 4 inches of compacted sand and gravel material (imported) over geotextile, and it was approximately 100 ft x 75 ft. Parking for construction workers, construction equipment staging, and a Conex box were established near the laydown area in Parcel C.

AMEC fastened a public notice board to the perimeter fence, near the Parcel C access gate. The notice board was used to post information regarding the remedial action activities, project contact information, schedule, and a summary of weekly air monitoring results. A map of the Site was also posted on the notice board with outlines of the five major areas, as designated by ET&L. These areas were named Area #1 through Area #5 and are shown in Figure 4. AMEC and ET&L used this naming convention when describing the work in Progress Reports, Weekly Reports, and Dust Monitoring summaries.

All aspects of construction were documented in a field book and summarized on a weekly basis (Appendix C). Construction progress reports were also generated for use during construction progress meetings (Appendix C).

3.2 Clearing and Grubbing

Before disturbing the Site, ET&L installed haybales and silt fence for erosion control at the locations indicated on the contract drawings (C-102, C-103, and C-104). These locations were generally at the bottom of slopes, downgradient of proposed areas for excavation and/or capping. ET&L flagged groundwater monitoring wells and drainage structures and surveyed them with GPS technology. These features were subsequently protected.

ET&L subcontractor Wagner Wood (Amherst, MA) cleared the trees and brush within the limit of disturbance. No trees or vegetation remained within areas designated for capping. Wagner Wood chipped the cleared vegetation debris and disposed of it off-site as clean chipped material. Large trees were stacked and transported off-site for reuse.

ET&L excavated the larger stumps remaining from clearing activities and stockpiled them inside proposed capping limits. Wagner Wood sheared the stumps to separate visibly clean woody material from stump material impacted by soil. The visibly clean woody stump material was chipped and disposed off-site by Clean Harbors Environmental Services (Clean Harbors) as non-hazardous material. The soil-impacted stump material was broken down into small pieces by on-site heavy equipment and consolidated on-site within the proposed cap limits.

AMEC commenced perimeter air monitoring prior to grubbing operations. Air monitoring (Appendix D) is discussed in more detail in Section 3.6.

3.3 Western Shoreline Soil Excavation

Three isolated soil removal areas were identified within the western shoreline (RDEC exceedence of PAHs, lead, and risk based dioxin levels). The soil within these three locations was excavated and consolidated within the proposed cap as part of Phase I. These soil removal areas included the southwestern corner of Parcel C-1 within a storm water drainage ditch and two locations on the western peninsula, as shown on Drawing C-101.

Impacted soil was removed from these 10 feet x 10 feet areas, to a depth of 1 foot below ground surface (bgs). The excavated soil was placed in an off-road dump truck for immediate disposal within the proposed capping limits. Confirmatory grab soil samples were collected from the bottom and each sidewall of the excavation areas and submitted under chain of custody to ESS Laboratory (Cranston, RI). The confirmatory soil samples were compared to Rhode Island RDEC for PAHs (by USEPA Method 8270C) and lead (by USEPA Method 6010/7000) at the storm water drainage ditch and lead and risk-based derived dioxin concentration of 0.0043 micrograms per kilogram (µg/kg) (July 2006 SSIR and June 2007 SSIR Addendum) at the two locations on the western peninsula. The analytical method used for dioxin was USEPA Method 8290. A summary of analytical results for the confirmation soil samples are included in Table 1 and all laboratory data can be viewed within Appendix E.

Additional soil (18 cubic yards, CY) was removed from the excavation at the southwest drainage swale based on PAH exceedances of the RDEC at three confirmatory sample locations (bottom, north and south sidewalls). After removing approximately 2 ft of soil at the bottom of the excavation and 5 ft of soil on both the north and south sides, the new bottom and north and south sidewalls were subsequently re-sampled to confirm compliance with the RDEC. A summary of analytical results for the confirmation soil samples, after additional excavation, are included in Table 2 and Appendix E.

Once the cleanup criteria was met, the southwest drainage swale was covered with geotextile fabric and backfilled with rip rap material. The two isolated excavations on the western peninsula were backfilled with imported topsoil, seeded and mulched. This soil was tested to

meet RDEC prior to use as backfill material on site (Appendix F). Limited tree clearing was conducted to access these locations and support the removal of soil and backfill with clean material.

3.4 Former Slag Area Removal and Test Pitting

Soil was excavated at one location in the former slag pile area (10 feet x 10 feet x 2 feet deep, Figure 5 and Sheet C-104) by ET&L and loaded into a roll-off container in accordance with the approved RAWP. This soil was transported by Clean Harbors as hazardous waste and disposed at Clean Harbors' Corunna, Ontario Canada facility on March 11, 2013 (Appendix O). In addition, eleven test pits (TP01 – TP11) were conducted at the perimeter of the former slag pile removal area and at locations within the former slag pile to determine if additional slag material was present. A representative of RIDEM was on site during the test pit operations. Test pits were excavated to native soil or groundwater (3 -10 ft bgs). The test pit locations are shown on Figure 5 and were coordinated in the field with RIDEM.

During test pitting, there were no large pockets or veins of additional slag uncovered. Only a few small pieces of slag were observed. Confirmatory grab soil samples were conducted at each test pit for total lead (by USEPA Method 6010) and Synthetic Precipitation Leaching Procedure (SPLP) lead (by USEPA Method 1312). The sample depths were chosen based on the most likely location in the test pit to contain lead. These were typically within layers of industrial fill. Table 3 includes a summary of the analytical data for test pit samples. The analytical results of the test pit samples (Appendix E) indicated that total lead frequently exceeded the RDEC in the samples of industrial fill; however the highest result of SPLP lead was 0.358 mg/L. Thus, the leaching potential of the industrial fill within the test pits was limited. Even though the leaching potential of the industrial fill within the former slag area was confirmed to be limited, the area was capped as proposed with an impermeable liner, as described in subsection 3.5.1, further reducing the potential for leaching.

During test pitting activities, RIDEM requested additional test pits, outside of the proposed area to be capped with the impermeable liner, to determine the extent of a volcanic rock-like material, which was mixed with the industrial fill on-site. The volcanic rock-like material was widespread east of the proposed area to be capped with the impermeable liner (Area 5 on Figure 4). This material appeared to be produced from the same process that produced the slag, and RIDEM indicated that it should either be analyzed, consolidated within the impermeable cap limits or the impermeable cap extended to cover it. A sample of this material was collected and analyzed (Appendix E) for RCRA 8 metals (USEPA Method 6010B [and 7471A for mercury]). The results indicated that the volcanic rock-like material did not contain elevated concentrations of metals (Table 4) and did not exhibit slag-like material properties. Thus, with RIDEM's acknowledgement, the material was covered with the soil cap as originally proposed and did not require capping with the use of the impermeable cap.

3.5 Sub-Grade Preparation and Cap Installation

The Phase I proposed cap contained three distinct capping systems. These capping systems are shown as separate color-coded areas on Figure 3 and include an upland soil cap (Detail 5,

Sheet C-502), a wetland buffer cap (Detail 7, Sheet C-502), and a former slag area cap (Detail 6, Sheet C-502) shown in Appendix G.

The wetland buffer cap area consisted of the area within 50-feet of the delineated wetland along the Inner Cove shoreline approximated by keeping a common elevation for constructability and included a nonwoven geotextile overlain by 12-inches of topsoil. The upland soil cap consisted of the area outside the wetland buffer and former slag area capping systems and included a nonwoven geotextile fabric overlain by 18-inches of cover soil and 6-inches of topsoil. The former slag area cap area consisted of the location north of the high school, formerly known as the slag area. The former slag area cap consisted of a 6-inch buffer soil layer overlain by a 40-mil linear low density polyethylene (LLDPE) geomembrane, a geocomposite, 12-inches of protective soil and 6-inches of topsoil.

All soil components of the cap (imported soil) were sampled to meet RIDEM RDEC at a rate of 1 sample per 500 CY. The analytical results of cover/buffer soil, protective soil, topsoil (loam), and gravel are included in Appendix F (Imported Soil Analytical Results).

The two proposed capping areas on the western shoreline (Area #1 and Area #2 on Figure 4), adjacent to the Parcel C boundary (Sheet C-102), were excavated to achieve sub-grade elevation by using GPS technology, and the typical upland soil cap was installed (Appendix G). The detail of the typical upland soil cap is included as Detail 5, Sheet C-502. The cap included a nonwoven geotextile marker fabric with 18-inches of cover soil and 6-inches of topsoil.

ET&L prepared the sub-grade of the areas designated for capping north and northeast of the Alvarez High School, Sheets C-103 and C-104 (Area #3, Area #4, and Area #5 in Figure 4), with consolidated soil from Areas #1 and #2 on the western peninsula and re-grading activities within the adjacent areas to be capped (Areas #3, #4 and #5). Impacted soils within Area #5, the Former Slag Area Cap limits, was not used to re-grade areas outside this proposed Slag Area Cap limit.

During the construction of the Phase I soil cap, soil thickness was measured using GPS technology on the dozer performing grading. In addition, as part of quality control testing, AMEC directed ET&L to dig test holes (at a rate of one test per every 4,000 square feet) to measure the soil cap thickness. Ten test holes on the upland soil cap confirmed that the cap soil was equal to or greater than the specified soil thickness (confirmed by AMEC and recorded in the field log book). These locations were randomly chosen in the upland soil cap.

Compaction testing was performed by ET&L at the protective soil layer above the geomembrane and geocomposite at the former slag area cap. Test results (Appendix H) show that compaction was achieved at greater than 95% of the maximum Standard Proctor dry density at all locations. Compaction testing was not performed on the uniform sandy soil, utilized as the cover soil; however, ET&L placed and graded the cover soil in 9 inch lifts or less, tracked the soil multiple times during grading, and compacted it with the vibratory roller. The cover soil was determined by AMEC to be firm and unyielding before topsoil was placed. The

final grade of the upland soil cap matched the existing grade at the high school boundary and the existing grade at the boundary of the retail stores.

3.5.1 Former Slag Area Cap

In response to RIDEM questions regarding the potential leaching from the soil in contact with the former slag pile, the former slag area cap contains a drainage geocomposite layer over a 40-mil LLDPE geomembrane to limit infiltration and restrict contact with the underlying soils. The geomembrane was installed on October 23, 2012, by ET&L subcontractor, New England Liner Systems, Inc. (NE Liner Systems) Plantsville, CT. The geomembrane cover was composed of 10 panels. Double track hot fusion wedge welding was used for welding straight long seams of adjacent panels and one end seam, and extrusion welding was used for welding boots for monitoring wells and repairs. Rigorous quality control testing, including destructive and non-destructive testing, was performed by NE Liner Systems and observed by AMEC. Quality control data is included in Appendix I. The geomembrane was installed over 6-inches of imported buffer sand. The installed geomembrane specifications, from the manufacturer, interface friction testing and warranty are included in Appendix J.

NE Liner Systems installed the drainage geocomposite on October 26, 2012, on top of the geomembrane. The panels of geocomposite material were attached together with zip ties and the seams were sewed. 12-inches of protective soil and 6-inches of topsoil were installed over the drainage geocomposite (Appendix J).

The former slag area cap was terminated within 5 to 15 feet upgradient of the existing shoreline. A temporary stone wall was proposed to be constructed to support the required grade of the Phase I Cap as shown as Detail 12, Sheet C-502 and to support minimum grade requirements for the future liner extension proposed under Phase II of the Site remediation plan. However, the amount of impacted soil consolidation and re-grading required to reach the proposed subgrade was less than that proposed due to the heavy vegetative cover which existed during the original survey. Therefore the overall subgrade elevation within the northern cap area was lower than that anticipated and the actual elevation of the toe of the former slag area cap was lower than the design elevation, thus the stone retaining wall was not necessary to provide temporary structural support until the Phase II wetland cap is constructed. It was also determined prior to approval that the actual elevation of the toe of the former slag area cap was high enough to provide at least 5% slope to the proposed/restored shoreline under the Phase II reconstruction. The Phase II Cove remediation will restore the Cove waterline that existed prior to the July 2006 slag removal action and extend the former slag area cap down to that restored shoreline. The extents of the former slag area cap are shown on the as-built drawing (Appendix G) for the completed remediation.

3.5.2 Revegetation

The capping systems (and all disturbed areas) were seeded with two different seed mixes, a wetland seed mix and an upland seed mix. The extents of these two seed mixes are shown on

Sheets C-108, C-109, and C-110 (Appendix G). Both seed mixes were applied by ET&L subcontractor HydroGrass (Oxford, MA) with fertilizer, mulch, and a bonded fiber mat to stabilize soils and provide structural integrity. Most of the hydroseeding occurred on two days: October 25, 2012 and November 6, 2012. Certificates for the seed mixes, as provided by HydroGrass, are included in Appendix K. The extents of the two seed mixes are shown on the as-built drawing (Appendix G) for the completed remediation. Follow-up seeding will occur as necessary in the spring of 2013.

3.6 Air Monitoring

Dust monitoring was performed by AMEC during grubbing, excavating, filling, grading, and other activities that disturbed the soil at the Site. AMEC conducted dust monitoring in the work zone and at the work area perimeter using a combination of fixed and hand held real-time continuous air monitoring instruments.

Continuous visual monitoring and monitoring with a handheld Data-RAM (approximately every 2 hours) for dust levels were conducted at the work area and recorded in the Site field logbook. Perimeter dust monitoring was performed using fixed MIE DR4000 monitors placed in weatherproof cases. These instruments measured aerosol dust and were set to automatically store data (data logging) for subsequent retrieval. Perimeter dust monitors were placed at four points outside of the soil capping activities. The four points were located based on the earthwork activities and prevailing wind direction (which was northeast) accordingly and as shown on Figure 4: Station 1 (Serial Number 08838) - near the access gate and immediately west of the high school; Station 2 (Serial Number 04597) - at the northwest fence corner of the high school; Station 3 (Serial Number 6337) - at the edge of the woods between Areas #2 and #3; and Station 4 (Serial Number 11321) - near the gate behind the retail spaces. These fixed perimeter monitoring locations were established to confirm that areas outside of the work zone were not impacted by the capping activities. Data logging (every minute) for each of the four perimeter air monitoring locations (Figure 4) is included in Appendix D.

The real time monitoring of air quality was summarized on a log sheet each day, including the daily average and daily maximum dust concentrations from the perimeter dust monitoring stations. Daily dust monitoring summaries were compiled each week in weekly monitoring logs. The weekly monitoring logs were emailed to RIDEM at the end of each week, for uploading to the project website. In addition, the weekly monitoring logs were posted at the notice board at the Site access gate. The weekly monitoring logs are included in Appendix D.

Real-time dust monitoring continued throughout the remedial action, unless a significant precipitation event occurred, at which time dust monitoring was suspended per manufacturer specifications and standard industrial hygiene practices. The fixed monitoring points were set to trigger the alarm when the dust level reached 0.20 milligrams per cubic meter (mg/m^3) as a warning that the action level (0.29 mg/m^3 in air) was being approached.

ET&L mobilized a 5,800 gallon water truck to the Site for dust control, and potable water was obtained from a hydrant near the Site, as approved by the City of Providence. Water was

applied as needed, approximately hourly, in advance of visible dust. Due to the aggressive application of water for dust control, the action level was not exceeded at the perimeter stations. Action levels were exceeded briefly based on the hand held real time instruments (less than one minute in duration) within the work zone on occasion, and water was applied immediately. There were no exceedances of the action level at the Site perimeter monitoring stations throughout the entire construction process.

A photoionization detector (PID) was also used at the Site to monitor the breathing zone for VOCs during excavation and grading, and a multi-gas meter was used to monitor for methane and oxygen. This information was maintained in the field logbook and included in the weekly air monitoring logs. Threshold values listed in Table 4-1 of the health and safety plan (HASP) (Table 4-1 Appendix L) were not exceeded.

3.7 Monitoring Wells

On October 5, 2012, ET&L subcontractor Geosearch, Inc. (Geosearch) Fitchburg, MA, installed the new monitoring well (MW-234S) on the east side of the former slag area cap. The bottom of the well was installed at 17 ft bgs, and it was screened from 7 ft bgs to 17 ft bgs. The well is 2" PVC with a steel protective casing. The well completion report is included in Appendix M. The new well has not been developed. The GZA-5 replacement well will be installed as part of the Phase II remedial action The location of MW-234S is shown on the as-built drawing (Appendix G) for the completed remediation.

ET&L attempted to maintain all existing monitoring wells within the Phase I Cap during construction; however, some wells were damaged by heavy equipment and subsequently fixed to support groundwater monitoring efforts, as necessary. Other wells required elevation modification due to the proposed landfill grades. The following paragraphs summarize activities at the existing monitoring wells on-site:

- MW-GZA3 was accidently hit during construction and the PVC riser broke. The well was repaired with a piece of rigid hose, with hose clamps, connecting the intact PVC riser and a new PVC riser (1 ½"). MW-GZA3 and MW-109D were fitted with boots, and the geomembrane was installed with penetrations and boots for these two wells (Detail 14, Sheet C-503, Appendix G).
- MW-233 and the adjacent probe were accidently hit during construction and the steel wells were bent. ET&L cut the well and probe below the bend and added 1" PVC risers. The new PVC risers extended above the new surface, and new protective steel casings were installed.
- MW-GZA6 was also accidently hit during construction and the protective steel casing, PVC riser, and the top of the screen were damaged. ET&L repaired the well with a piece of rigid hose, with hose clamps, connecting the top of the PVC screen to a new PVC riser (1 ½"). Then, a second PVC riser (2") was connected to the 1 ½" riser and extended to the surface. A new protective steel casing was installed.

- The flush mount well vaults for MW-230S and MW-230D were re-set in concrete. The elevations of the wells were not modified. Also, the PVC risers and protective casing for wells MW-FS/B-6S and MW-FD/B-6D were re-set.
- ET&L raised the elevation of MW-231S/D with a piece of rigid hose, with hose clamps, and added a new PVC riser (1 ½").

Only one well was abandoned - a former process water supply well that was most likely associated with the fire suppression system at the former manufacturing facility. The well was located in a concrete structure (foundation for a well housing) on the western shoreline of the Inner Cove and within the wetland cap area (Sheet C-103, Appendix G). It was abandoned by Geosearch on October 5, 2012, in accordance with Specification 02526 (AMEC, 2012), by tremie grouting. The bottom of the well was approximately 102 ft bgs. The concrete debris from the well housing was broken up to six-inch minus pieces and placed under the former slag area cap. The well abandonment report is included in Appendix M.

3.8 Fencing

The existing chain link fence was removed, and a new fence was installed along the boundary between Parcels C and C-1, extending from Adelaide Avenue to the existing chain link fence in the northwest corner of the high school parking lot (Sheets C-102 and C-103, Appendix G). The chain link fence and access gate in the northwest corner of the retail property (intersection of Parcels A and B) was proposed to be replaced or reset; however, it was recently repaired by Amtrak and did not need to be repaired. The existing fence still extends east to the storm water detention basin fencing.

This fence will remain in place until all three phases of remediation on Parcel C-1 have been completed or when the City of Providence has completed the installation of the planned walking path and fence/plantings along the water side of the path to restrict access to the steep slope down to the shoreline.

3.9 Stormwater Management

Storm water from Parcels A and B is currently directed to the detention basin for infiltration and discharge into the Inner Cove through existing piping. Surface water runoff from Parcel C currently infiltrates on property. In addition, a soil berm was installed at the northern limit of Parcel C to limit storm water run-on to the cap during construction. This berm was left in place post-construction as a Site benefit. Cap run-on is also limited north of the high school and north of the retail spaces because the soil cap extends to the top of the slope.

A Notice of Intent (NOI) was submitted to RIDEM on July 5, 2012 for the Phase I Cap construction. This NOI references a storm water pollution prevention plan that was prepared to support the construction activities. This plan was maintained on site during the construction of the Phase I cap. Storm water and erosion control measures were used during the construction of the Phase I Cap and are shown on Sheet C-501 (Appendix G) and within Specification 02370 (AMEC, 2012). These measures included the installation and maintenance of hay bales and silt

fence, a stabilized construction entrance, and bonded fiber mat installed on the final grade as part of hydroseeding. A Notice of Termination (NOT) will be filed with the RIDEM Office of Water Resources upon determination that final stabilization of the Phase I area has been achieved and temporary erosion control measures have been removed.

3.10 Community Participation

Textron distributed a community notice, dated August 17, 2012, to the residents in the Reservoir Triangle Neighborhood and other interested parties as coordinated with the Environmental Justice League of Rhode Island. The notice was printed in English and in Spanish and included a brief description of the work to be performed and the precautions to be taken to protect the community, the proposed schedule for remedial construction, and contact information. This community notice was posted on the public notice board retained at the construction access gate. The community notice is included in Appendix N.

4.0 CONCLUSION

The Phase I remedial objectives for the former Gorham Manufacturing Facility, Parcel C-1 Phase I were met as proposed in the RAWP (AMEC, 2012) and approved in the Remedial Approval Letter (RIDEM, 2012). This is based on the successful removal of soil from the three isolated locations along the western side of Parcel C-1 and confirmatory soil sampling, installation of a recreational soil cap and impermeable liner, meeting RDEC, over the impacted soil and slag, respectively. The Phase I Area soil surface was seeded and is currently being monitored for slope stabilization. In addition, a very limited amount of waste was generated from the Site, as one load (8 CY) of soil (from the former slag area) was transported and disposed off-site and 400 CY of chipped material was transported and reused off-site (Appendix O).

5.0 INSTITUTIONAL CONTROLS AND NOTICES

A draft Environmental Land Usage Restriction (ELUR) was prepared in accordance with Rule 8.09 of the Remediation Regulations, by Textron and the City of Providence (AMEC, 2012). This draft ELUR is currently under review by RIDEM. Once the remediation of all three Phases of Parcel C-1 is completed this ELUR will be formerly recorded with the property deed. This ELUR will address all three phases of Parcel C-1 remediation (upland and Mashapaug Cove).

A draft Soil Management Plan (SMP) which outlines the procedures for managing the soils on site should disturbances below the cap is also being reviewed by RIDEM (AMEC, 2012) and will be recorded with the ELUR.

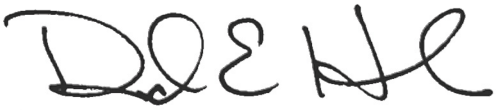
A draft ELUR and SMP has been included in Appendix P of this closure report. Textron will maintain and monitor the completed remedial action at Parcel C-1 until the responsibility is taken over by the City of Providence at the time the ELUR is recorded.

6.0 CERTIFICATION REQUIREMENTS

The following certifications are provided pursuant to Rule 9.19 of the Remediation Regulations.

The undersigned hereby certifies that to the best of their knowledge the information contained in this report is complete and accurate based on the information available at the time of its preparation. Furthermore, the undersigned certifies that to the best of their knowledge the report is as complete and accurate of a representation of the Site and the release based on the available information, and contains the known facts surrounding the release.

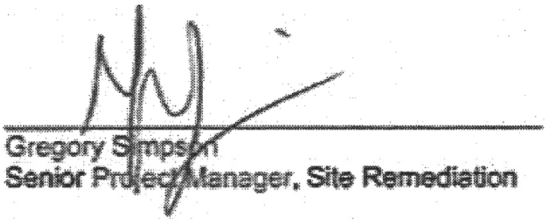
AMEC Environment & Infrastructure, Inc.



David E. Heislein
Principal Project Manager

April 11, 2013
Date

Textron, Inc.



April 11, 2013
Date

7.0 REFERENCES

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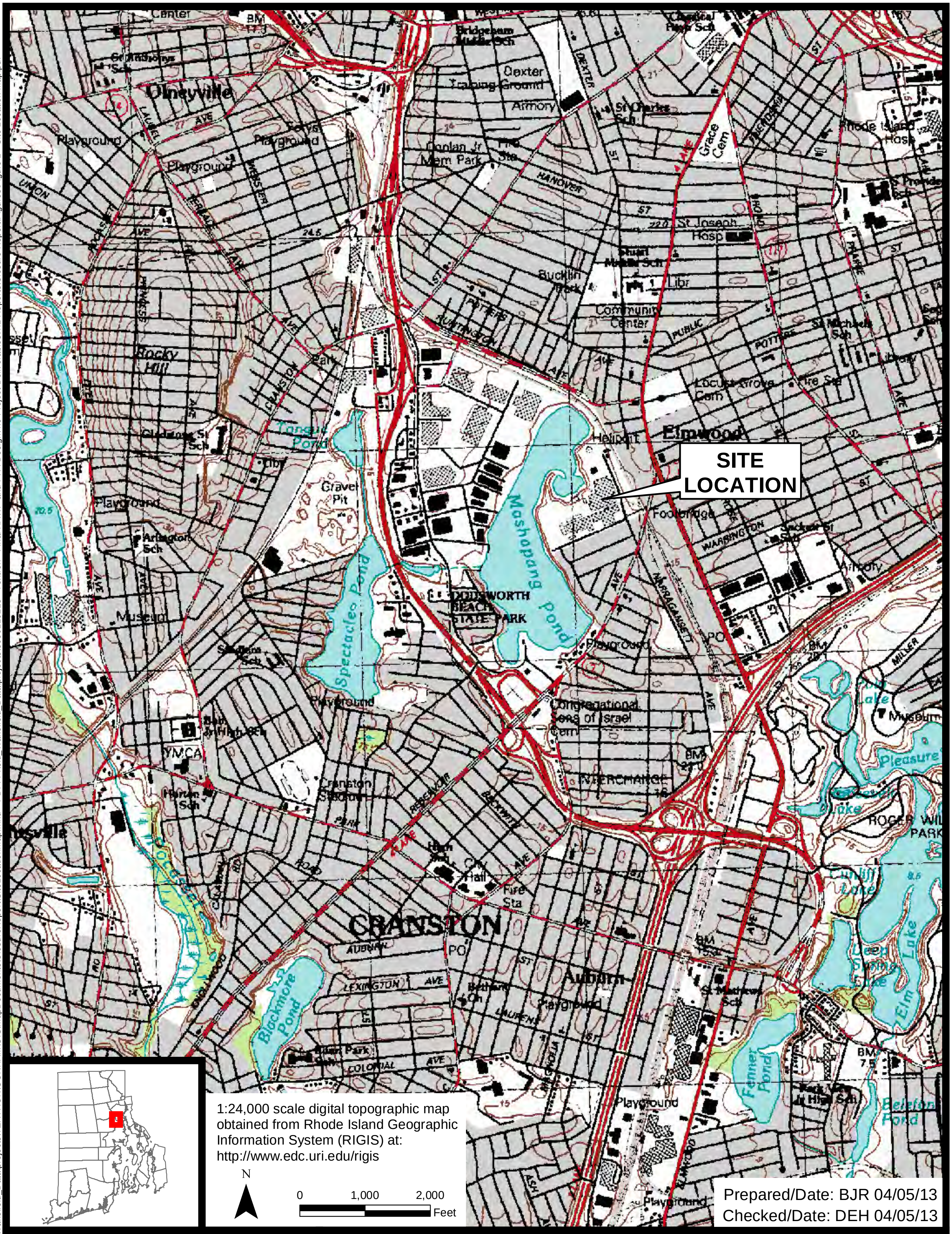
FIGURES



Remedial Action Closure Report Phase I Parcel C-1 333 Adelaide Avenue Providence, RI	amec	Site Location Map Former Gorham Manufacturing Site Project 3650-11-0213 Figure 1

Legend

Former Slag Area

Approximate Site Boundary

Note: 2011 Ortho photo obtained from Rhode Island Geographic Information System (RIGIS)

Prepared/Date: BJR 04/05/13

Checked/Date: DEH 04/05/13

Remedial Action Closure Report
Parcel C-1
333 Adelaide Avenue
Providence, RI

amec

Site Plan
Former Gorham Manufacturing Site

Project 3650-11-0213

Figure 2

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Mashapaug Pond

Mashapaug Outer Cove

Mashapaug Inner Cove

Railroad Tracks

Phase III

Phase II

Phase I

Phase I

Parcel C-1

Parcel A
Retail

Parking Lot

Parcel B
High School

Parcel C
Planned Parking Lot
and Fields

Adelaide Avenue

Crescent Street

N

0 75 150 Feet

Legend

- Approximate Fill Area
- Division of Phase I and III for access road to cove
- Area to be Excavated
- Wetland Buffer 12" Soil with Geofabric, Limited Clearing of Brush
- 24" Soil Cap with Geofabric
- Former Slag Area 18" Soil Cap with Liner
- 12" Soil Cap with Geofabric
- Approximate Parcel Boundary
- Elevation

Prepared/Date: BJR 04/05/13
Checked/Date: DEH 04/05/13

Remedial Action Closure Report
Parcel C-1
333 Adelaide Avenue
Providence, RI

amec

Parcel C-1 Three Phased Remediation
Former Gorham Manufacturing Site
Project 3650-11-0213 Figure 3

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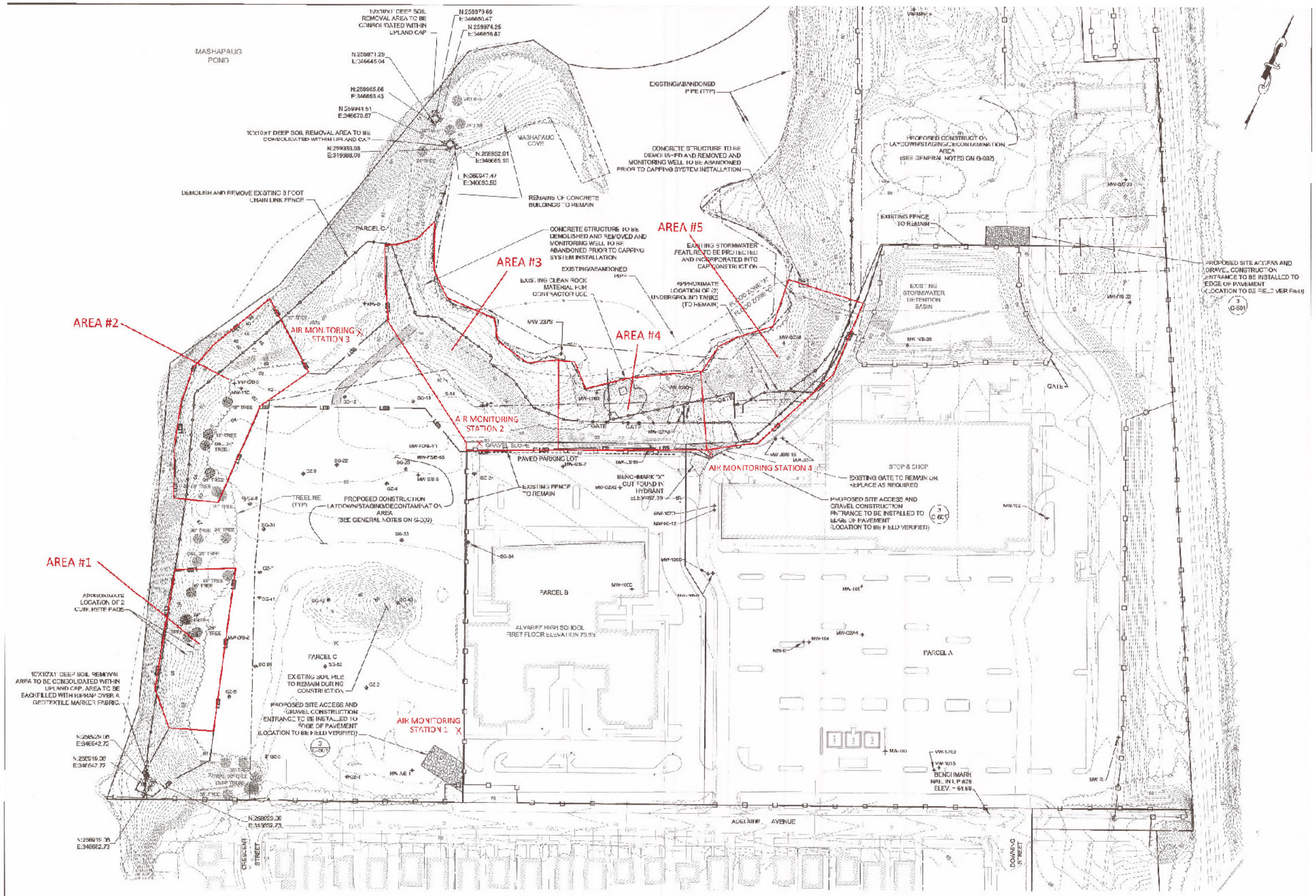
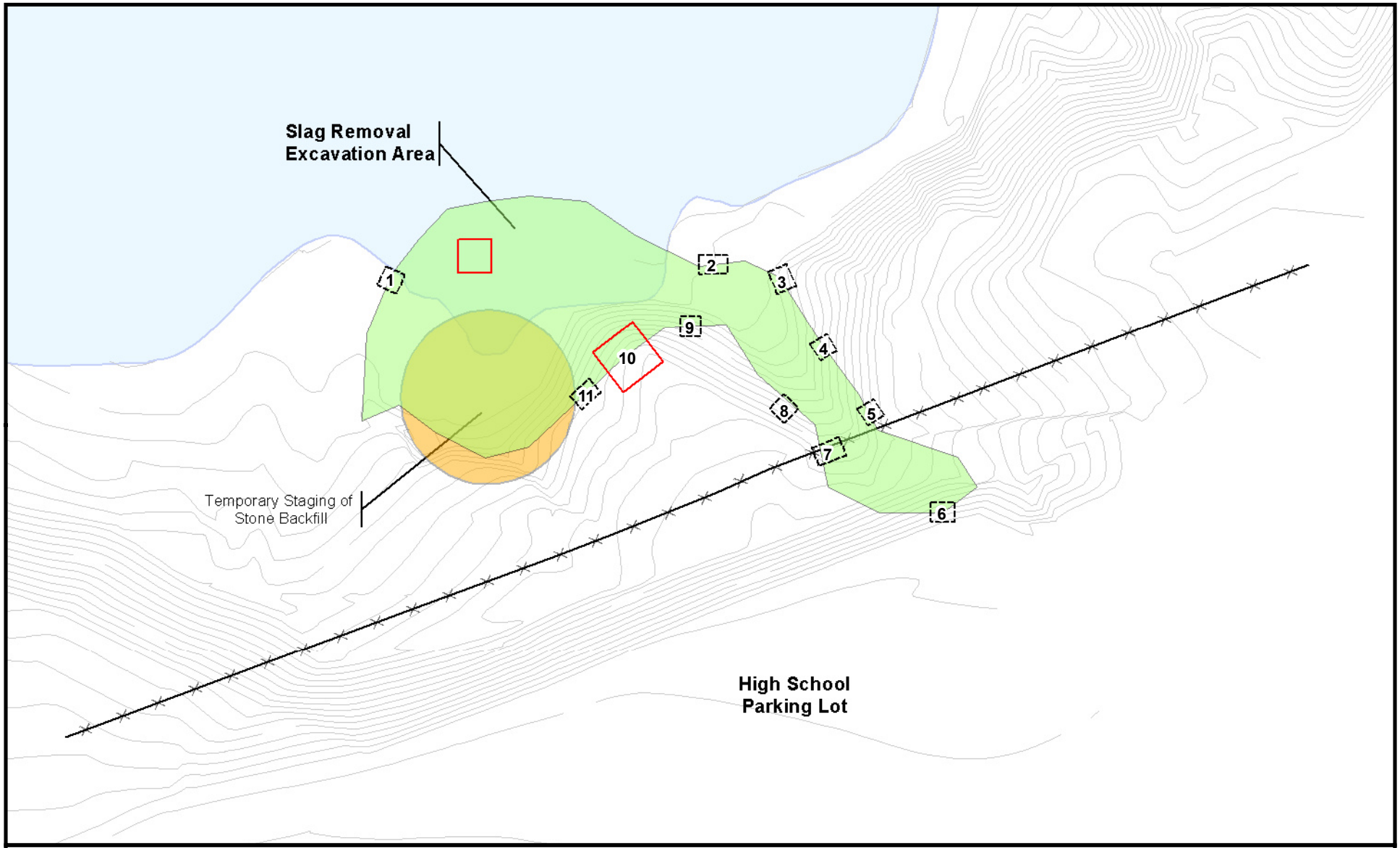
Document: P:\P\old_Wakefield_Data\projects\TEXTRON\GORHAM\GIS\MapDocuments\ClosureReport\Figure 4_11x17_LS.mxd Figure: P:\old_Wakefield_Data\projects\3650110213 - Textron - Final RAWP and PH I Design\4.0 Project Deliverables\4.1 Reports\Closure Report\Figures\Figure 4 - Work Area Designation and Perimeter Monitoring Locations.pdf



Prepared/Date: BJR 04/05/13
Checked/Date: DEH 04/05/13

	Remedial Action Closure Report Parcel C-1 333 Adelaide Avenue Providence, RI	amec	Work Area Designations and Perimeter Air Monitoring Stations Project 3650-11-0213 Figure 4



Legend

- Additional Removal Areas
- Test Pit (Final Locations To Be Determined In Field)
- Initially Excavated Area
- Fence
- Mashapaug Cove
- Elevation

amec

N

0 15 30 Feet

Prepared/Date: BJR 04/05/13

Checked/Date: DEH 04/05/13

Figure 5
Former Slag Pile Area
Former Gorham Manufacturing Site
Remedial Action Closure Report
Phase I Parcel C-1
333 Adelaide Avenue
Providence, RI

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TABLES

Table 1. Confirmation Soil Sample Results Summary
Parcel C-1 Phase I Cap
Former Gorham Manufacturing Facility
Providence, RI

parameter_name	RDEC (ppm)	SSNW1B01 10/3/2012 0-1 ft		SSNW1E01 10/3/2012 0-1 ft		SSNW1N01 10/3/2012 0-1 ft		SSNW1S01 10/3/2012 0-1 ft		SSNW1W01 10/3/2012 0-1 ft		SSNW2B01 10/3/2012 0-1 ft		SSNW2E01 10/3/2012 0-1 ft		SSNW2N01 10/3/2012 0-1 ft		SSNW2S01 10/3/2012 0-1 ft		SSNW2W01 10/3/2012 0-1 ft	
Semivolatile Organics (mg/Kg)																					
2-Methylnaphthalene	123																				
Acenaphthene	43																				
Acenaphthylene	23																				
Anthracene	35																				
Benzo(a)anthracene	0.9																				
Benzo(a)pyrene	0.4																				
Benzo(b)fluoranthene	0.9																				
Benzo(g,h,i)perylene	0.8																				
Benzo(k)fluoranthene	0.9																				
Chrysene	0.4																				
Dibenzo(a,h)anthracene	0.4																				
Fluoranthene	20																				
Fluorene	28																				
Indeno(1,2,3-cd)pyrene	0.9																				
Naphthalene	54																				
Phenanthrene	40																				
Pyrene	13																				
Dioxins/Furans (mg/Kg)																					
1,2,3,4,6,7,8-HpCDD		0.000000232	J	0.00000402		0.0000308		0.00000273	U	0.00000293	U	0.000102		0.000000836	J	0.0000031	U	0.00000057	J	0.0000011	J
1,2,3,4,6,7,8-HpCDF		0.00000262	U	0.00000414		0.00000201	J	0.00000273	U	0.00000293	U	0.00000833		0.000000555	J	0.0000031	U	0.000000405	J	0.000000825	J
1,2,3,4,7,8,9-HpCDF		0.00000262	U	0.000000439	J	0.000000341	J	0.00000273	U	0.00000293	U	0.00000111	J	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,4,7,8-HxCDD		0.00000262	U	0.000000221	J	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,4,7,8-HxCDF		0.00000262	U	0.00000209	J	0.000000156	JK	0.00000273	U	0.00000293	U	0.000000486	J	0.00000028	J	0.0000031	U	0.00000016	JK	0.000000396	J
1,2,3,6,7,8-HxCDD		0.00000262	U	0.000000458	J	0.00000271	U	0.00000273	U	0.00000293	U	0.00000156	J	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,6,7,8-HxCDF		0.00000262	U	0.00000115	J	0.00000271	U	0.00000273	U	0.00000293	U	0.000000182	JK	0.000000115	JK	0.0000031	U	0.000000115	JK	0.000000119	JK
1,2,3,7,8,9-HxCDD		0.00000262	U	0.000000536	J	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.000000195	J	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,7,8,9-HxCDF		0.00000262	U	0.00000275	U	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,7,8-PeCDD		0.00000262	U	0.000000243	JK	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
1,2,3,7,8-PeCDF		0.00000262	U	0.000000536	J	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
2,3,4,6,7,8-HxCDF		0.00000262	U	0.00000227	J	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.000000215	J	0.0000031	U	0.00000279	U	0.000000186	JK
2,3,4,7,8-PeCDF		0.00000262	U	0.00000126	J	0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.00000263	U
2,3,7,8-TCDD		0.000000525	U	0.000000203	J	0.000000541	U	0.000000545	U	0.000000586	U	0.000000539	U	0.000000536	U	0.00000062	U	0.000000558	U	0.000000526	U
2,3,7,8-TCDF		0.000000525	U	0.000000697		0.000000541	U	0.000000545	U	0.000000586	U	0.000000539	U	0.000000536	U	0.00000062	U	0.000000558	U	0.000000526	U
OCDD		0.00000216	BJ	0.0000234	B	0.000694	B	0.00000125	BJ	0.00000168	BJ	0.00109	B	0.00000457	BJ	0.00000223	BJ	0.00000287	BJ	0.00000723	B
OCDF		0.00000525	U	0.00000511	J	0.0000288		0.00000545	U	0.00000586	U	0.0000757		0.00000072	JK	0.0000062	U	0.000000528	JK	0.00000118	J
Total HpCDD		0.000000232	J	0.00000823		0.0000479		0.00000273	U	0.00000293	U	0.000154		0.0000018	J	0.0000031	U	0.0000011	J	0.00000242	J
Total HpCDF		0.00000262	U	0.00000713		0.0000103		0.00000273	U	0.00000293	U	0.0000523		0.000000555	J	0.0000031	U	0.000000405	J	0.00000118	J
Total HxCDD		0.00000262	U	0.00000324		0.00000271	U	0.00000273	U	0.00000293	U	0.00000323		0.000000451	J	0.0000031	U	0.00000279	U	0.00000057	J
Total HxCDF		0.00000262	U	0.0000259		0.000000444	J	0.00000273	U	0.00000293	U	0.00000673		0.00000149	J	0.0000031	U	0.000000868	J	0.00000186	J
Total PeCDD		0.00000262	U	0.00000277		0.00000271	U	0.00000273	U	0.00000293	U	0.0000027	U	0.00000268	U	0.0000031	U	0.00000279	U	0.000000217	J
Total PeCDF		0.00000262	U	0.0000373		0.00000271	U	0.00000273	U	0.00000293	U	0.00000152	J	0.00000159	J	0.0000031	U	0.000000504	J	0.00000181	J
Total TCDD		0.000000525	U	0.00000162		0.000000541	U	0.000000545	U	0.000000586	U	0.000000539	U	0.000000536	U	0.00000062	U	0.000000558	U	0.000000526	U
Total TCDF		0.000000525	U	0.0000176		0.000000541	U	0.000000545	U	0.000000586	U	0.000000809		0.000000606		0.00000062	U	0.000000558	U	0.000000662	
Total TCDD TEQ - 2005 WHO (0)		2.97E-09		0.00000168		0.000000564		3.75E-10		5.04E-10		0.00000169		0.000000096		6.69E-10		3.83E-08		9.19E-08	
Inorganics (mg/Kg)																					
Lead	150	5.4	U	26.8		6.3		4.9	U	5.1	U	8		5.4	U	5		8.5		4.6	U

Table 1. Confirmation Soil Sample Results Summary
Parcel C-1 Phase I Cap
Former Gorham Manufacturing Facility
Providence, RI

parameter_name	RDEC (ppm)	SSSWB01 10/3/2012 0-1 ft		SSSWE01 10/3/2012 0-1 ft		SSSWN01 10/3/2012 0-1 ft		SSSWS01 10/3/2012 0-1 ft		SSSWW01 10/3/2012 0-1 ft	
Semivolatile Organics (mg/Kg)											
2-Methylnaphthalene	123	0.347	U	0.344	U	0.347	U	0.364	U	0.366	U
Acenaphthene	43	0.347	U	0.344	U	0.347	U	0.364	U	0.366	U
Acenaphthylene	23	0.371		0.344	U	0.347	U	0.364	U	0.366	U
Anthracene	35	0.347	U	0.344	U	0.347	U	0.364	U	0.366	U
Benzo(a)anthracene	0.9	0.626		0.344	U	0.434		0.853		0.366	U
Benzo(a)pyrene	0.4	***0.621***		0.295		***0.442***		***0.836***		0.255	
Benzo(b)fluoranthene	0.9	***1.06***		0.417		0.661		***1.31***		0.366	U
Benzo(g,h,i)perylene	0.8	0.616		0.344	U	0.401		***0.81***		0.366	U
Benzo(k)fluoranthene	0.9	0.404		0.344	U	0.347	U	0.422		0.366	U
Chrysene	0.4	***0.78***		0.365		***0.515***		***1.03***		0.303	
Dibenzo(a,h)anthracene	0.4	0.256		0.172	U	0.174	U	0.326		0.184	U
Fluoranthene	20	1.6		0.703		1.01		1.88		0.563	
Fluorene	28	0.347	U	0.344	U	0.347	U	0.364	U	0.366	U
Indeno(1,2,3-cd)pyrene	0.9	0.541		0.344	U	0.347	U	0.661		0.366	U
Naphthalene	54	0.347	U	0.344	U	0.347	U	0.364	U	0.366	U
Phenanthrene	40	0.726		0.363		0.601		0.896		0.366	U
Pyrene	13	1.19		0.547		0.807		1.54		0.45	
Dioxins/Furans (mg/Kg)											
1,2,3,4,6,7,8-HpCDD											
1,2,3,4,6,7,8-HpCDF											
1,2,3,4,7,8,9-HpCDF											
1,2,3,4,7,8-HxCDD											
1,2,3,4,7,8-HxCDF											
1,2,3,6,7,8-HxCDD											
1,2,3,6,7,8-HxCDF											
1,2,3,7,8,9-HxCDD											
1,2,3,7,8,9-HxCDF											
1,2,3,7,8-PeCDD											
1,2,3,7,8-PeCDF											
2,3,4,6,7,8-HxCDF											
2,3,4,7,8-PeCDF											
2,3,7,8-TCDD											
2,3,7,8-TCDF											
OCDD											
OCDF											
Total HpCDD											
Total HpCDF											
Total HxCDD											
Total HxCDF											
Total PeCDD											
Total PeCDF											
Total TCDD											
Total TCDF											
Total TCDD TEQ - 2005 WHO (0)											
Inorganics (mg/Kg)											
Lead	150	13.2		25.9		64.3		110		32.9	

Notes:
ft = feet
mg/kg = milligrams/kilogram
RDEC = residential direct exposure criteria
ppm = parts per million
U = not detected, value is reporting limit
B = associated analyte was found in the method blank, as well as in the sample
J = estimated value
K = estimated maximum possible concentration
Highlighted, bolded, and italicized results exceed criteria

prepared by: KJC 2/11/13
checked by: PJM 4/5/13

Table 2. Confirmation Soil Sample Results Summary (Resampling)
Parcel C-1 Phase I Cap
Former Gorham Manufacturing Facility
Providence, RI

parameter_name	RDEC (ppm)	SSSWB04 10/23/2012 4-4 ft	SSSWN02 10/23/2012 2-2 ft	SSSWS02 10/23/2012 2-2 ft
Semivolatile Organics (mg/Kg)				
2-Methylnaphthalene	123	0.359 U	0.354 U	0.348 U
Acenaphthene	43	0.359 U	0.354 U	0.348 U
Acenaphthylene	23	0.359 U	0.354 U	0.348 U
Anthracene	35	0.359 U	0.354 U	0.348 U
Benzo(a)anthracene	0.9	0.359 U	0.354 U	0.348 U
Benzo(a)pyrene	0.4	0.18 U	0.178 U	0.175 U
Benzo(b)fluoranthene	0.9	0.359 U	0.354 U	0.348 U
Benzo(g,h,i)perylene	0.8	0.359 U	0.354 U	0.348 U
Benzo(k)fluoranthene	0.9	0.359 U	0.354 U	0.348 U
Chrysene	0.4	0.18 U	0.178 U	0.175 U
Dibenzo(a,h)anthracene	0.4	0.18 U	0.178 U	0.175 U
Fluoranthene	20	0.359 U	0.354 U	0.348 U
Fluorene	28	0.359 U	0.354 U	0.348 U
Indeno(1,2,3-cd)pyrene	0.9	0.359 U	0.354 U	0.348 U
Naphthalene	54	0.359 U	0.354 U	0.348 U
Perylene-d12		40	40	40
Phenanthrene	40	0.359 U	0.354 U	0.348 U
Pyrene	13	0.359 U	0.354 U	0.348 U

Notes:
ft = feet
mg/kg = milligrams/kilogram
RDEC = residential direct exposure criteria
ppm = parts per million
U = not detected, value is reporting limit

prepared by: KJC 2/11/13
checked by: PJM 4/5/13

Table 3. Test Pit Sample Results Summary
Former Slag Area
Parcel C-1 Phase I
Former Gorham Manufacturing Facility
Providence, RI

parameter_name	RDEC (ppm)	TP0104-RA100212 10/2/2012 4-4 ft	TP0205-RA100312 10/3/2012 5-5 ft	TP0305-RA100312 10/3/2012 5-5 ft	TP0410-RA100212 10/2/2012 10-10 ft	TP0505-RA100212 10/2/2012 5-5 ft	TP0608-RA100212 10/2/2012 8-8 ft	TP0706-RA100212 10/2/2012 6-6 ft	TP0810-RA100212 10/2/2012 10-10 ft	TP0903-RA100212 10/2/2012 3-3 ft	TP0904-RA100212 10/2/2012 4-4 ft	TP1002-RA100412 10/4/2012 2-2 ft	TP1107-RA100212 10/2/2012 7-7 ft
Lead (mg/Kg)													
Lead	150	3.9 U	719	350	284	2510 D	3820 D	434	91.6	4510 D	440	3580 D	17.7
SPLP Lead (mg/L)													
Lead		0.01 U	0.109	0.09	0.048	0.254	0.169	0.01 U	0.019	0.146	0.031	0.358	0.01 U

Notes:
ft = feet
mg/kg = milligrams/kilogram
mg/L = milligrams/liter
RDEC = residential direct exposure criteria
ppm = parts per million
U = not detected, value is reporting limit
D = value was obtained from a diluted analysis
SPLP = Synthetic Precipitation Leaching Procedure

prepared by: KJC 2/11/13
checked by: PJM 4/5/13
revised by: DEH 4/11/13

Table 4. RCRA 8 Soil Sample Results Summary
Parcel C-1 Phase I
Former Gorham Manufacturing Facility
Providence, RI

parameter_name	RDEC (ppm)	Fill Solid 100412 10/4/2012
Inorganics (mg/Kg)		
Arsenic	7	3.5
Barium	5500	45.1
Cadmium	39	0.47 U
Chromium	390	4.2
Lead	150	4.7 U
Mercury	23	0.03 U
Selenium	390	4.7 U
Silver	200	0.49

Notes:
mg/kg = milligrams/kilogram
RDEC = residential direct exposure criteria
ppm = parts per million
U = not detected, value is reporting limit

prepared by: KJC 2/11/13
checked by: PJM 4/5/13

APPENDIX A

Remedial Action Approval Letter

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

August 10, 2012

REMEDIAL APPROVAL LETTER
Case No. 2005-059 (Associated with Case No. 97-030)

Mr. Gregory L. Simpson
Project Manager
Textron, Inc.
40 Westminster Street
Providence, RI 02903

RE: Former Gorham Manufacturing Facility
Park Parcel (a.k.a. Parcel C-1; f.k.a. Parcel D) – Phase I
333 Adelaide Ave., Providence, RI

Dear Mr. Simpson:

On November 9, 2011, the Rhode Island Department of Environmental Management (the Department) amended the 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 in an efficient manner. A **Remedial Approval Letter** (RAL) is a document used by the Department to approve remedial actions at contaminated sites that do not involve the use of complex engineered systems or techniques (e.g., groundwater pump and treat systems, soil vapor extraction systems, etc.).

The Department's Office of Waste Management (OWM) has the following documents on file in the matter of the above referenced "Site" (as defined in the Industrial Property Remediation and Reuse Act), submitted on behalf of Textron, Inc. (Textron):

1. Draft Remedial Action Work Plan, Phase I Soil Capping: Parcel D, Former Gorham Manufacturing Facility, 333 Adelaide Avenue, Providence, Rhode Island (Draft RAWP), prepared by AMEC Environment & Infrastructure (AMEC), and dated February 27, 2012;

2. Draft Environmental Land Usage Restriction (ELUR) and Soil Management Plan (SMP), submitted via e-mail by Textron, Inc., on April 5, 2012;

3. Department Comment Letter, Re: Draft Remedial Action Work Plan, Former Gorham Manufacturing Facility – Park Parcel (a.k.a. Parcel D), 333 Adelaide Ave., Providence, RI, Case No. 2005-059 (Associated with Case No. 97-030), and dated May 10, 2012;

4. Remedial Action Work Plan, Phase I Soil Capping: Parcel C-1, Former Gorham Manufacturing Facility, 333 Adelaide Avenue, Providence, Rhode Island, prepared by AMEC, dated June 13, 2012, and received June 20, 2012;

5. Response to May 10, 2012 Comments, Rhode Island Department of Environmental Management, Draft Remedial Action Work Plan, Former Gorham Manufacturing Facility - Park Parcel (a.k.a. Parcel C-1), 333 Adelaide Ave., Providence, RI, Case No. 2005-059 (Associated with Case No. 97-030), prepared by AMEC, dated June 14, 2012, and received June 20, 2012;

6. Revised Response to May 10, 2012 Comments, Rhode Island Department of Environmental Management, Draft Remedial Action Work Plan, Former Gorham Manufacturing Facility - Park Parcel (a.k.a. Parcel C-1), 333 Adelaide Ave., Providence, RI, Case No. 2005-059 (Associated with Case No. 97-030), prepared by AMEC, and dated August 1, 2012; and

7. Remedial Action Work Plan, Phase I Soil Capping: Parcel C-1, Former Gorham Manufacturing Facility, 333 Adelaide Avenue, Providence, Rhode Island (RAWP), prepared by AMEC, dated and received August 10, 2012.

Subject to the conditions herein, these documents fulfill the requirements of Section 8.00 (Risk Management) and Section 9.00 (Remedial Action Work Plan) of the Remediation Regulations, and describe a plan to remediate existing contamination pursuant to 23-19.14-1 et seq., and the Department's Remediation Regulations, as amended November 9, 2011, in accordance therewith.

This RAL places primary responsibility for the construction, operation, maintenance and monitoring of the approved Remedial Action Work Plan (RAWP) and its associated remedy on Textron. As the responsible party and performing party, Textron is expected to implement the RAWP in an expeditious and professional manner that prevents non-compliance with the RAL and RAWP, and protects human health and the environment.

The selected remedial alternative involves a three phased approach to the remediation of the Park Parcel and Mashapaug Cove. **The RAWP and associated documents for Phase I, describe a plan to remediate the existing soil contamination at the property through the limited removal of surface soil with post-removal confirmation sampling at three locations in the western shoreline area, additional soil removal at two locations within the former slag pile area, and encapsulation of any soil exceeding a residential direct exposure criteria within the Park Parcel Phase I area, in order to contain historic fill material, prevent direct exposure, limit infiltration in the former slag pile area, and restrict wind erosion or surface run-off. Upon completion of the remedial activities, an Environmental Land Usage Restriction (ELUR)**

will be recorded on the deed for the Park Parcel (designated Parcel C-1). The ELUR shall include a post-construction Soil Management Plan (SMP), which will outline the procedures for managing the soils on site should disturbances below the cap be required. As part of the ELUR, it shall be the responsibility of the property owner to provide for annual inspections of the property by a qualified environmental professional, and to submit a report, subject to review by the Department, which shall certify that the property is in compliance with the Department approved remedy and the terms of the ELUR. The Department will also perform random audits of the remedy. Textron shall maintain and monitor the completed engineered cap in the Phase I area until the responsibility is taken over by the City of Providence, Providence Redevelopment Authority (PRA), or a future successor.

The proposed Phase I soil cap consists of three distinct components including a fill area cap, a wetland buffer cap, and a former slag area cap. The fill area extends along the top of the western slope and extends along the shoreline of Mashapaug Pond's inner cove. The fill area will be capped with a marker fabric and minimum of two feet of clean soil consisting of 18 inches of cover soil covered by six inches of top soil, then seeded or stabilized with erosion control matting. The portions of the fill area cap along the area of the Gorham site known as Parcel B (a.k.a. Alvarez High School) and Parcel C (a.k.a. the undeveloped lot to the west of Alvarez High School, formerly proposed for a YMCA), will match the existing grade at the High School boundary and the proposed future grade at the Parcel C boundary. The wetland buffer area consists of the area within the 50 foot wetland boundary (delineated approximately five to ten feet upland from the Mashapaug cove shoreline). The limit of work will be approximately 10 feet above the waterline; therefore no Phase I work will be conducted within the delineated wetland. An effort will be made to save as many large trees within the buffer zone as possible, however clearing and grubbing of the wetland buffer zone scrub material will be conducted to support the installation of the soil cap. One foot of soil at the toe of the wetland buffer zone will be removed to allow the soil cap to key into the existing grade above the wetland boundary. A marker fabric will be installed over the fill material surface. Twelve inches of clean soil will then be spread throughout the buffer zone to provide the soil cap. The finished surface for the wetland buffer cap will be stabilized with erosion control matting and Department approved wetland grasses as part of the wetland buffer area restoration.

All of the Phase I work will be conducted outside of the wetland boundary, with all of the remediation work within the freshwater wetlands to be conducted in the future as part of the Phase II cove sediment remediation. The cap design for the former slag area includes a geotextile membrane to limit infiltration and restrict contact with the underlying soils. The existing soil will be graded and capped with six inches of clean sand, followed by a 40-mil geotextile membrane, a drainage composite layer, twelve inches of clean cover soil, and an additional six inches of clean top soil, which will be seeded or stabilized with erosion control matting. The existing chain link fence will be relocated along the boundary between Parcels C and C-1, until the cove sediments (Phase II) and remaining Parcel C-1 surface

soils (Phase III) have been remediated. All existing groundwater monitoring wells within the Phase I cap will be secured during construction activities and maintained for future groundwater monitoring purposes. Former groundwater monitoring well GZA-5 will be restored to its location within the former slag pile area, and one additional monitoring well will be installed downgradient of the former slag pile area for future groundwater monitoring purposes. The implementation and completion of the Phase I work shall in no way interfere with the eventual implementation and completion of Phase II, Phase III, or an eventual groundwater remedy for the overall Gorham site. Upon Textron's completion of remedial activities on the Park Parcel and stable establishment of the cap, responsibility for maintaining the remedy in the future and any future development of the Park Parcel shall be assumed by the owner of the property, currently the City of Providence through the PRA.

Based upon review and consideration of the above referenced documents, the Department approves the proposed RAWP through this RAL provided that all activities, procedures, operations, and schedules detailed in the RAWP, and the conditions listed below, are strictly adhered to:

1) All work, operations, activities and schedules shall be performed in accordance with the terms and conditions of this RAL, the Department approved RAWP, and all other applicable federal, state and local laws and regulations.

2) Textron shall prepare and distribute a community notice to the residents in the reservoir triangle neighborhood and to other interested parties (e.g. community groups and local elected officials). The notice shall be printed in English and Spanish and shall include an estimated schedule for remedial activities and construction, a brief description of the work to be performed and the precautions to be taken to protect the community, and relevant contact information for Textron, Amec and its on-site contractors as applicable (i.e. name, phone, e-mail … etc.) for questions and complaints.

3) Work shall be initiated at the Site within thirty (30) days of receipt of this RAL.

4) No hazardous waste shall be accepted from any off-site sources for treatment or disposal at the Site.

5) Sampling and analysis of all media involved in the Remedial Action shall be conducted in accordance with the requirements of the RAWP and this RAL.

6) The Department shall be notified as soon as possible, in accordance with Section 9.08 of the Remediation Regulations, of any consultant or contractor that has not yet been determined at the time that this approval was granted. This requirement also includes the name and contact information for the receiving licensed disposal facility(s) to be utilized in the event that

proper off-Site disposal of any excess excavated regulated material or collected water from dewatering activities is required.

7) Any significant changes to the RAWP shall be pre-approved by the OWM, and any minor changes shall be reported to the OWM by telephone within one (1) working day and in writing within five (5) working days.

8) Appropriate procedures shall be implemented to manage, control and monitor regulated soil and dust in a manner consistent with the RAWP and the RAL, including but not limited to the following:

   a) Air monitoring will be completed during all remedial activities at the Site that have the potential to disturb fill/soil. Strict operational controls shall be in place to reduce the potential for dust emissions during the remediation activities and air quality within and surrounding the work area shall be monitored (including exposure monitoring for on-site workers in the work area and ambient air monitoring within the work area and at the work area perimeter).

   b) The air monitoring program shall include visual monitoring and a handheld mini-RAM to measure dust levels immediately downwind of the construction activities. Readings will be logged every two hours of the work day and shall include notations regarding ongoing construction activities being monitored, engineering controls being implemented, the monitoring results and any required corrective actions. At the end of each week the logs shall be scanned and PDF files provided to the OWM via email the following Monday for upload to the project website. The perimeter monitors shall run the length of time that activity is conducted at the Site.

   c) If visible dust conditions are sustained for more than one minute within the work zone, dust suppression methods (i.e., water spray) will be implemented immediately to reduce airborne dust levels. Dust suppression will be performed throughout the capping activities and will include spraying of fine mist of water over exposed soils to suppress dust as needed.

   d) If dust concentrations reach the action level (0.29 mg/m^3) within the work area (sustained for more than 1 minute), soil disturbing operations will be suspended and dust control measures implemented to prevent recurrence. The source of the elevated dust will be identified and immediate steps will be taken to reduce dust levels and correct the problem. For the perimeter dust monitors, the alarm level will be set to trigger at 0.2 mg/m^3. If an alarm is triggered, the source of the elevated dust reading will be investigated and identified if possible, and immediate steps will be taken to reduce dust levels

9) Any temporarily stockpiled soils shall be placed upon and covered with polyethylene of thickness at least 6-mil or greater to prevent tearing, and segregated from clean fill material to prevent cross contamination.

10) All excess fill material generated on site shall have all solid waste and debris removed prior to reuse as closure cap subgrade beneath the marker fabric layer.

11) Any material discovered during excavation activities that qualifies as "Solid Waste," as defined by the Department's Solid Waste Regulations, must be disposed of at a licensed Solid Waste Facility.

12) Any portion of the RAWP conducted on the Site which falls under the jurisdiction of the Department's Freshwater Wetlands Program, and is not considered an exempt activity under Rule 6.08 (Site Remediation) of the Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (the Wetlands Regulations), must be done in accordance with the Wetlands Regulations, including but not limited to the timely acquisition of a Wetlands Permit.

13) Any portion of the RAWP conducted on the Site which falls under the jurisdiction of the Department's Office of Water Resources (OWR), Rhode Island Pollution Discharge Elimination System (RIPDES) Program, must be performed in compliance with all appropriate OWR/RIPDES Rules and Regulations, including but not limited to the timely acquisition of a RIPDES Permit or a General Permit for Storm Water Discharge Associated with Construction Activity as appropriate and/or applicable.

14) All waste derived from implementation of the RAWP shall be managed in accordance with the Department's Remediation Regulations, Rules and Regulations for Hazardous Waste Management, and Solid Waste Regulations, as appropriate. In accordance with Rule 11.07 (Initiator) of the Remediation Regulations, Textron must comply with the requirements of the Solid Waste Regulations, as amended, for all solid waste shipments that they initiate, and documentation of disposal shall be provided to the OWM.

15) Within sixty (60) days of completion of the Remedial Action described in the RAWP, a Remedial Action Closure Report, detailing the Remedial Action and current site status, shall be submitted to the OWM for review and approval. The Remedial Action Closure Report shall include at a minimum the following items:

    a) A post remediation survey of the entire Phase I Park Parcel Site with as-built plans demarcating the exact location (e.g. vertical and horizontal extent and type) of the installed engineered controls, including: geotextile marker fabric, clean fill, and as applicable any utilities, structures, basins, swales, storm water management features, and current groundwater monitoring locations.

b) Analytical results and summary of all air and dust monitoring and/or sampling performed throughout the project.

c) All original laboratory analytical data results from the remedial activities, compliance and confirmation sampling, as applicable.

d) Documentation that all excess regulated soil, solid waste, remediation waste, etc. was properly disposed of off site at an appropriately licensed facility in accordance with all applicable laws.

16) Textron, its representatives, employees, agents and contractors shall adhere to the following timelines in its management, operation and maintenance of the Site.

a) Textron shall immediately notify the OWM of any Site or operating condition that results in non-compliance with this RAL.

b) The OWM shall be notified in writing immediately if Textron suspects or has reason to believe that any of the remedial objectives will not be met.

c) The OWM will be notified a minimum of five (5) working days in advance of any changes in contractors and/or consultants for the remedial activities in this RAWP, and will be promptly supplied with complete contact information for each new contractor or consultant (including but not limited to company name and address, contact name and address, contact telephone number and e-mail address).

d) Any RAWP interruptions shall be reported to the OWM by telephone within one (1) working day and in writing within seven (7) days.

Please be advised that the latest version of the draft ELUR is currently under review by the Department's Office of Legal Services (OLS) and any comments resulting from that review will be promptly forwarded to Textron and the City of Providence. Once the language of the ELUR is finalized, and the Department has approved the Remedial Action Closure Report, Textron shall direct the City of Providence to have the final Department approved ELUR recorded in the Providence land evidence records, and submit a recorded (stamped) copy to the OWM within fifteen (15) days of the date that it is recorded in accordance with Rule 8.09 of the Remediation Regulations.

This RAL does not remove Textron's obligation to obtain any other necessary permits from other local, state, and/or federal agencies (including the Department) that may be necessary to comply with this RAL. Textron is reminded of its obligation for securing any required permits and other approvals prior to commencing any Site activities. **Please notify the OWM at least forty-eight (48) hours in advance of any remedial work.**

As the performing party, Textron shall be responsible for properly conducting the above-listed activities. Please review the stipulations of this RAL thoroughly to ensure your compliance with the requirements.

All correspondences should be sent to my attention. If you have any questions regarding this letter or if you would like the opportunity to meet again with Department personnel, please contact me by telephone at (401) 222-2797 x7109 or by e-mail at joseph.martella@dem.ri.gov.

Sincerely,

Joseph T. Martella II
Senior Engineer
Rhode Island DEM
Office of Waste Management

Authorized by,

Kelly J. Owens
Supervising Engineer
Rhode Island DEM
Office of Waste Management

cc: Terrence D. Gray, P.E., Assistant Director, RIDEM/AW&C
Leo Hellested, P.E., RIDEM/OWM
Susan Forcier, Esq., RIDEM/OLS
Elizabeth Scott, RIDEM/OWR
Ron Gagnon, RIDEM/OC&TA
Jenna McIntyre, RIDEM/OC&TA
Ann Battersby, RIDEM/OC&TA
Christopher Walusiak, RIDEM/OC&TA
Barbara Morin, RIDEM/OAR
Robert Vanderslice, PhD, RIDOH
Hon. Angel Taveras, Mayor, City of Providence
Senator Juan M. Pichardo, District 2
Representative Scott A. Slater
Councilman Wilbur W. Jennings Jr., Ward 8
Robert E. Azar, Providence Planning Department
April H. Wolf, Providence Planning Department
Robert F. McMahon, Providence Parks Department
David Heislein, AMEC
Amelia Rose, EJLRI
Knight Memorial Library – Project Repository

APPENDIX B

PHOTOGRAPHS

Date	Photo ID	Description
09/19/12	0885	Clearing on the eastern side of the site, looking northeast from the former slag area

Date	Photo ID	Description
09/19/12	0886	Skidding trees (by Wagner Wood) from the area to be capped

Date	Photo ID	Description
09/20/12	0887	Front gate with construction signs

Date	Photo ID	Description
09/20/12	0889	Notice board with project postings

Date	Photo ID	Description
09/21/12	0895	Looking southwest at the cleared slopes north of the HS

Date	Photo ID	Description
09/21/12	0896	Loading out cleared material from the area to be capped, looking southwest

Date	Photo ID	Description
09/21/12	0898	Looking east at the cleared area to be capped. Two culvert (storm drain) outlets are visible. One is at the right center of the photo and one is at the right side of the photo. Both are marked with fluorescent paint. These are not shown on the plans, but they will be plugged and abandoned in place

Date	Photo ID	Description
09/21/12	0900	Looking east at the detention basin outlet. Also, there is a manhole that appears to be in line with the culvert from the detention basin. The manhole will need to be raised to accommodate the cap.

Date	Photo ID	Description
09/21/12	0901	Concrete and brick structure to be removed at the northeast of the site

Date	Photo ID	Description
09/21/12	0904	Looking west at the concrete and brick structure to be removed. The well to be abandoned may be located to the right of the structure.

Date	Photo ID	Description
09/21/12	0910	Western shoreline area to be graded and capped

Date	Photo ID	Description
09/24/12	0916	Excavator loading out brick and concrete from the pump house (to be broken up and placed under the cap), looking northeast

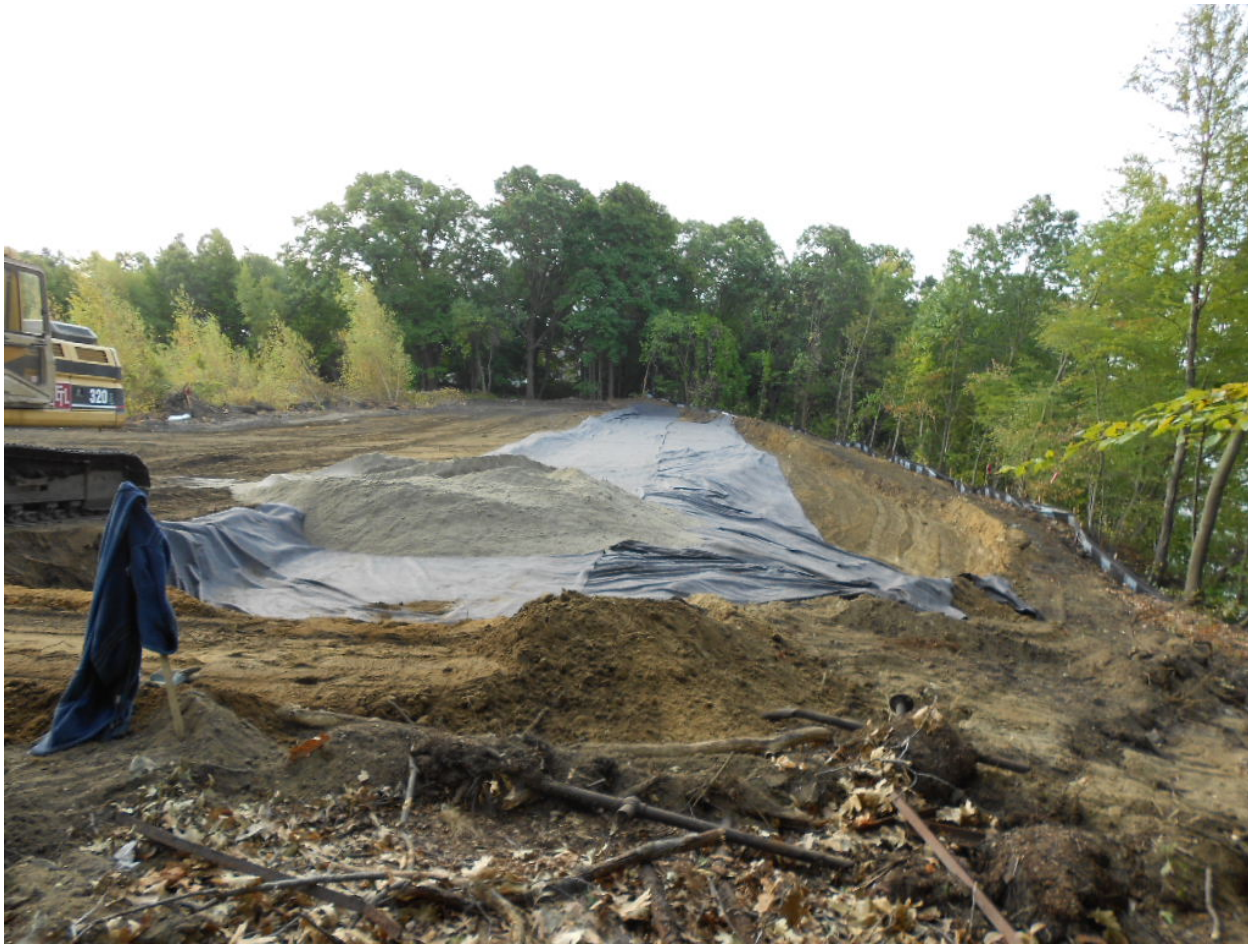
Date	Photo ID	Description
09/24/12	0918	Concrete vault containing well at the beginning of the peninsula

Date	Photo ID	Description
09/24/12	0921	Looking southeast at the lay down area

Date	Photo ID	Description
09/24/12	0931	Concrete vault containing well at the beginning of the peninsula, looking southwest. MW-235S and MW-235D located in front of the vault. Feature to the right of the concrete vault was not identified.

Date	Photo ID	Description
09/24/12	0932	Air monitoring station no. 2 set-up outside the northwest corner of the high school fence, looking east. MW-238S and MW-238D in the background

Date	Photo ID	Description
09/25/12	0940	Water truck applying dust control at Areas 3 and 4, looking south



Date	Photo ID	Description
09/26/12	0947	Cover soil and geotextile installed at Area 1, looking south

Date	Photo ID	Description
09/27/12	0957	Wagner Wood chipper set up to dispose chipped stumps into Clean Harbors-provided trailer truck, looking southwest

Date	Photo ID	Description
09/27/12	0958	Looking southwest from Area 5 at the cleared slopes on-site

Date	Photo ID	Description
09/27/12	0962	Lay down area extended, looking south

Date	Photo ID	Description
09/28/12	0963	Wagner Wood shearing stumps for chipping, looking west

Date	Photo ID	Description
09/28/12	0965	Placing cover soil at Area 2, looking west

Date	Photo ID	Description
09/28/12	0966	Dozer grading sub-grade at Area 5, looking northeast

Date	Photo ID	Description
10/01/12	0970	Excavated soil from Area 2 stockpiled at Area 5, looking southwest

Date	Photo ID	Description
10/01/12	0976	Backfilling Area 2 with cover soil, looking northwest

Date	Photo ID	Description
10/01/12	0977	Area 1backilled with cover soil, looking southeast

Date	Photo ID	Description
10/02/12	0978	Hotspot excavation at the southwest of the site in the drainage channel

Date	Photo ID	Description
10/02/12	0979	Looking at the drainage channel from the hot spot excavation. Note: the drainage channel was widened slightly for access.

Date	Photo ID	Description
10/02/12	1509	TP 11, excavated 8 ft bgs

Date	Photo ID	Description
10/02/12	1526	TP 5, excavated 5 ft bgs

Date	Photo ID	Description
10/02/12	1529	TP 8, excavated 10 ft bgs

Date	Photo ID	Description
10/03/12	0991	Hot spot excavation at former slag area

Date	Photo ID	Description
10/03/12	0993	Excavated material from the former slag area placed inside roll-off for T&D

Date	Photo ID	Description
10/03/12	1001	Storm drain to be plugged at the top of the bank in Area 5, looking east

Date	Photo ID	Description
10/04/12	1007	Test pits in industrial fill area with volcanic rock looking material

Date	Photo ID	Description
10/04/12	1009	Close-up of volcanic rock looking material in the industrial fill area (Area 5), sent for analysis (RCRA 8 metals)

Date	Photo ID	Description
10/04/12	1010	Construction entrance extended with rip rap material from former slag area, looking east

Date	Photo ID	Description
10/05/12	1011	Pump exposed at the former pump house, looking northwest. Supply pipe is from the cove.

Date	Photo ID	Description
10/05/12	1013	Pump removed at the former pump house, looking northwest. Supply pipe is from the cove. Discharge pipe presumed to go to buried tanks.

Date	Photo ID	Description
10/05/12	1018	Subcontractor Geosearch set-up to install new well MW-243S, looking east

Date	Photo ID	Description
10/09/12	1024	Re-grading industrial fill at Area 5 with excavator and off-road dump and compacting Area 5 sub-grade with roller, looking northeast

Date	Photo ID	Description
10/09/12	1027	Presumed water lines from the abandoned water tanks at the top of slope at Area 5, looking east. Water lines were plugged and abandoned in place.

Date	Photo ID	Description
10/09/12	1029	Roller compacting sub-grade at Area 5, looking northeast

Date	Photo ID	Description
10/09/12	1031	Re-grading industrial fill at Area 5 with dozer, looking northeast

Date	Photo ID	Description
10/10/12	1033	Jersey Barrier retaining wall installed at the toe of slope at Area 4, looking southwest

Date	Photo ID	Description
10/11/12	1040	Looking southwest at sub-grading at Areas 3 and 4

Date	Photo ID	Description
10/12/12	1044	Grading industrial debris with the excavator at Area 3, looking east

Date	Photo ID	Description
10/15/12	1052	MW-233 and adjacent probe raised (using hose and hose clamps) to accommodate cap

Date	Photo ID	Description
10/16/12	1555	Rip rap placed at the storm drain (from the detention basin) outlet

Date	Photo ID	Description
10/17/12	1562	Installing geotextile at the wetland buffer cap at Area 5, looking northeast

Date	Photo ID	Description
10/19/12	1566	Sub-grading at Area 3, looking west

Date	Photo ID	Description
10/19/12	1567	Looking east from Area 3 at the finished grade at Area 5 and buffer sand at Area 4

Date	Photo ID	Description
10/22/12	1574	Looking north at repaired topsoil on Area 5

Date	Photo ID	Description
10/23/12	1577	Looking southwest at installed anchor trench at the top of slope at Area 4. Dozer is fine grading buffer sand.

Date	Photo ID	Description
10/23/12	1578	Begin installing geomembrane at Area 4, looking east

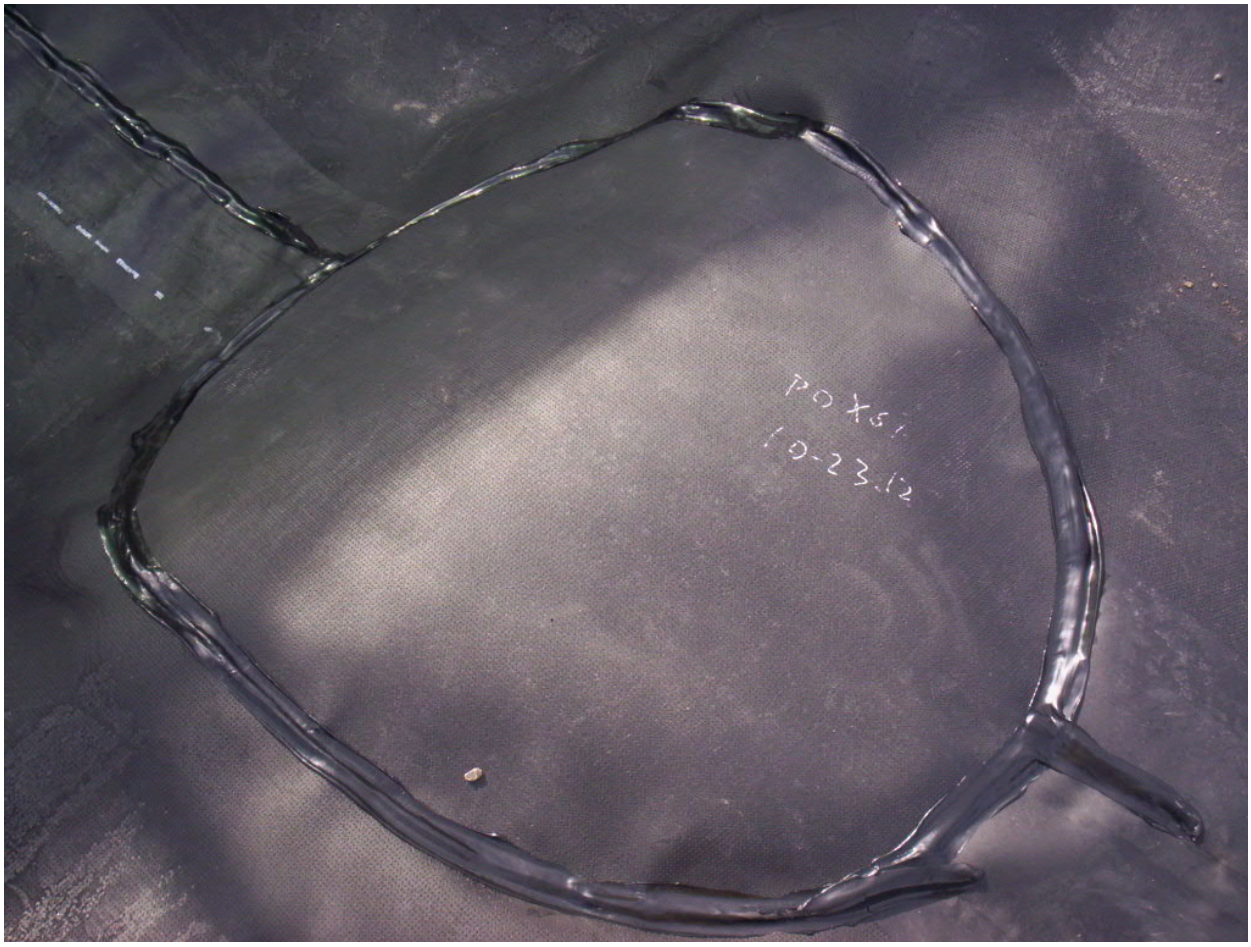
Date	Photo ID	Description
10/23/12	1583	Fusion welding end seams during geomembrane installation at Area 4, looking north

Date	Photo ID	Description
10/23/12	1586	Extrusion welding boot for monitoring well

Date	Photo ID	Description
10/23/12	1589	Cutting pieces from geomembrane seams removed for destructive testing

Date	Photo ID	Description
10/23/12	1590	On-site testing equipment for peel and shear tests

Date	Photo ID	Description
10/23/12	1591	Location of destructive test (DS-2)



Date	Photo ID	Description
10/23/12	1592	Extrusion weld repair at DS-2

Date	Photo ID	Description
10/23/12	1593	Vacuum test for extrusion weld for boot at monitoring well

Date	Photo ID	Description
10/23/12	1596	Additional excavation at the southwest drainage swale at the sidewalls (north and south) and bottom

Date	Photo ID	Description
10/23/12	1597	Looking southwest at the installed geomembrane at Area 4

Date	Photo ID	Description
10/26/12	1606	Drainage geocomposite installation at Area 4, looking southwest

Date	Photo ID	Description
10/26/12	1610	Geotextile fabric sewn at the seams of the drainage geocomposite

Date	Photo ID	Description
10/29/12	1614	Protective soil placed at the edges of the drainage geocomposite at Area 4 during the hurricane, looking southwest

Date	Photo ID	Description
10/30/12	1622	Topsoil and hydroseeding remained in good condition after the hurricane at Area 2, looking west

Date	Photo ID	Description
10/30/12	1623	Topsoil and hydroseeding remained in good condition after the hurricane at Area 2, looking northwest

Date	Photo ID	Description
10/31/12	1630	Compaction testing on the protective soil at the top of the slope at Area 4

Date	Photo ID	Description
10/31/12	1631	Rip rap placed at the hot spot excavation at the southwest swale, looking south

Date	Photo ID	Description
11/02/12	1649	Looking north at Area 5. Protective steel casings installed at MW-233 and adjacent probe and GZA-6.

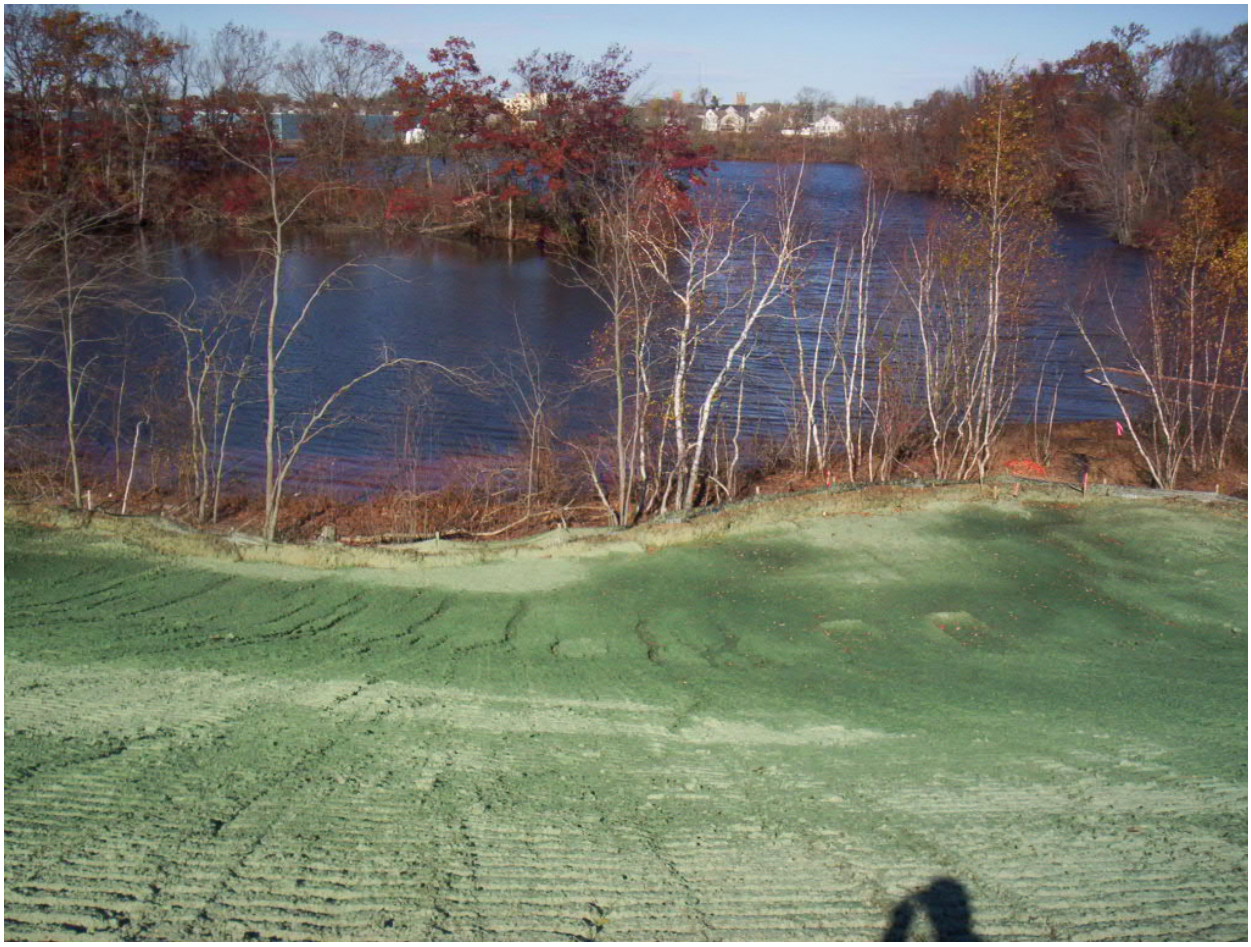
Date	Photo ID	Description
11/02/12	1653	Area between the gate and Area 5 upland soil cap graded, looking southeast

Date	Photo ID	Description
11/02/12	1654	Looking west along the outside of the High School fence at the grading between Area 4 and the fence

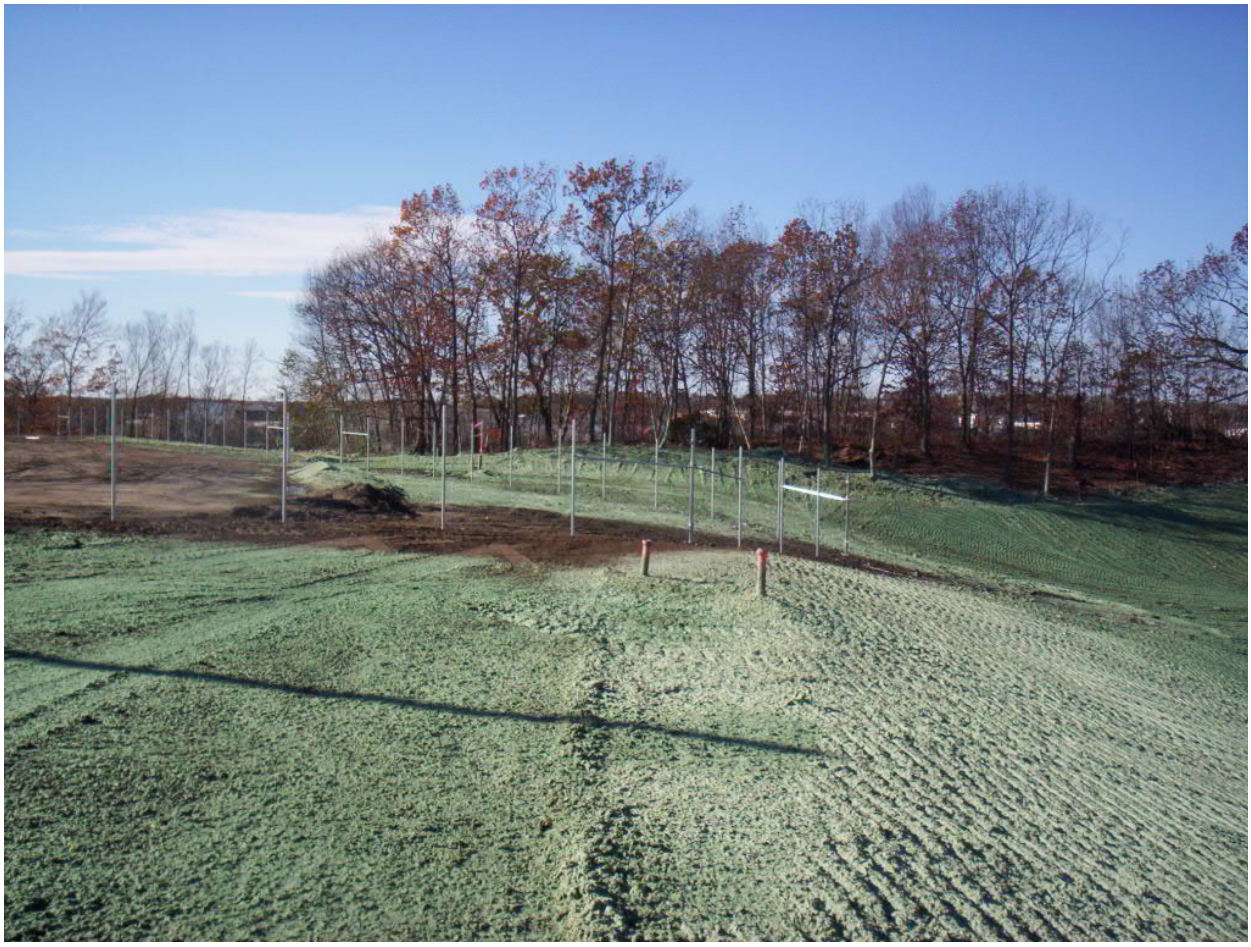
Date	Photo ID	Description
11/02/12	1656	Looking southwest at Areas 3 and 4. Final grading achieved.

Date	Photo ID	Description
11/02/12	1659	Opening in berm created for gate, looking west. Roller compacted laydown area.

Date	Photo ID	Description
11/06/12	1662	Hydrograss hydroseeding Area 4, looking northeast



Date	Photo ID	Description
11/09/12	1671	Looking north at slope of Area 3 after Nor'easter



Date	Photo ID	Description
11/09/12	1674	Looking southwest at slope of Area 3 after Nor'easter. Also, some areas outside the cap were hydroseeded. Fence posts installed upgradient of Area 3.

Date	Photo ID	Description
11/09/12	1677	Looking west at slope of Area 2 after Nor'easter

Date	Photo ID	Description
11/09/12	1678	Looking west at slope of Area 4 after Nor'easter

Date	Photo ID	Description
11/09/12	1682	Toe of slope at Area 5 after Nor'easter, looking southwest

Date	Photo ID	Description
11/09/12	1684	Area hydroseeded near the fence at Area 5, looking east