RAWP AND 50% DESIGN DRAWINGS
FORMER JAMESTOWN LANDFILL
JAMESTOWN, RHODE ISLAND

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Jamestown, Rhode Island

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December 2005
File No. 32220.11

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1.00 INTRODUCTION

On behalf of our client, the Town of Jamestown, GZA has prepared this *Remedial Action Work Plan* (RAWP) for the former Jamestown Landfill. The approximately 14-acre site is located on North Main Road within the northern portion of the Town of Jamestown, Rhode Island. The landfill is subject to two RIDEM regulatory programs; the Solid Waste Program (due to the former use of the property as a solid waste disposal facility) and the Site Remediation Program (due to the site's CERCLIS designation). The RAWP was prepared to address the applicable requirements of Section 9.00 of the RIDEM's Rules and Regulations for the Investigation and Remediation of Hazardous Materials Releases (DEM-DSR-01-93 Remediation Regulations) and complies with RIDEM's April 22, 2004 Remediation Decision Letter. The RAWP is based on our understanding of site conditions as presented in GZA's May 2002 *Site Investigation Report* and our experience on similar sites in Rhode Island. This RAWP is subject to the limitations presented in Section 10.00 and Appendix A.

2.00 BACKGROUND

Significant environmental assessment work has been completed at the Site, and as summarized below, which has led to an understanding of the primary contaminants of concern and areas/features of potential environmental concern

The following sections briefly describe the physical characteristics of the Site, its current and past usage and the nature of the surrounding area.

2.10 SITE DESCRIPTION

The approximately 14-acre site is located on North Main Road within the northern portion of the Town of Jamestown, Rhode Island. A Site *Locus Plan* is provided on the plan set cover sheet, Figure C-1. Figure C-2 *Existing Conditions Site Plan* depicts past and present key Site features. Two buildings and two open sheds are currently present on the property. A chain-link fence located along North Main Road restricts vehicular access to the Site. The landfill property currently serves as a transfer station, leaf composting and DPW materials storage facility for Jamestown's residents. There are no other commercial or industrial facilities currently located in the area.

2.20 ADJOINING PROPERTIES AND AREA LAND USE

The area surrounding the Site is characterized as lightly developed and generally residential in nature. The Site is bordered to the west by North Main Road and to the north, south, and east by proposed town right-of-way paper streets or vacant or developed residential properties.

2.30 SIR SUMMARY

The *Site Investigation* conducted at the Jamestown Landfill Site consisted of an investigation involving the collection, screening and/or laboratory testing of soil, sediment, groundwater, and surface water and landfill gas samples. Based on our evaluation of the project data and site conditions the following key conclusions were developed.

- Groundwater at the Site is present at depths of between 3.3 feet and 32.8 feet below grade. While interpretations of groundwater flow direction have varied, the surveyed elevations of the expanded monitoring well network indicate that groundwater flow is in a west/southwesterly direction.

- Soils at the Site are characterized as fine to coarse silty sand with a little gravel (classified as glacial till and reworked glacial till) overlaying Rhode Island Formation metamorphosed sedimentary bedrock that was encountered at depths ranging from 5 to 16 feet below ground surface. Borings and test pits conducted on-site describe cover material as sand and silt, sand some silt, and sand with trace silt. We believe that cover soils immediately over the waste generally consist of low permeability reworked native Glacial Till which is locally overlain by more uniform sands. In areas where municipal solid waste materials were present, cover material thickness (soil) were not uniform and ranged from 0.1 feet (at TP-15) to 5 feet (at TP-30). On average, the soil cover thickness throughout this area was $\pm$2.5-feet

- Laboratory testing of cover materials for metals, VOCs and SVOCs provided only limited Method 1 exceedances. That is, only arsenic (4 to 7 mg/kg in three samples) and beryllium (6.2 mg/kg in one sample) were detected above the Industrial/Commercial Direct Exposure Criteria. As noted above, the observed concentrations are within the range of typical New England soils and we believe are reflective of background conditions. RIDEM has since increased the arsenic direct exposure criteria to 7 mg/kg and no site samples exceeded this value.

- Four consecutive rounds of groundwater monitoring were completed at the Site, resulting in the collection and laboratory testing of 48 groundwater samples from as many as 13 existing and newly installed wells. The associated analytical testing program included metals, VOCs, and SVOCs. The resultant data, when compared to USEPA's MCL (i.e., GA Groundwater Objectives), indicate that groundwater exceedances were limited to the following.

Analyte	MCL (mg/L)	No. of Exceedances	Location of Exceedances	Range of Exceedances (mg/L)
1,2-dichloropropane	0.005	1	GZ-6	0.009
bis(2-ethylhexyl) phthalate	0.006	1	EA-2D	0.011
Arsenic	0.05	2	GZ-6	0.215
Beryllium	0.004	1	GZ-6	0.005
Chromium	0.1	3	GZ-1 & GZ-6	0.62 to 1.39
Lead	0.015	5	GZ-1& GZ-6	0.026 to 0.338

Note, all the MCL exceedances detected were in upgradient background wells except for minor exceedances of the bis (2-ethylhexyl) phthalate standard, reported on only one of four occasions in samples from well EA-2D.

As evidenced by the turbidity readings and dissolved metals testing, the inorganic exceedances are likely associated with the level of suspended sediment in the sample and represent naturally occurring inorganic compounds.

- Landfill Gas containing elevated levels of methane was observed in a limited area on-Site as demonstrated by soil gas readings in probe SG-5. We believe SG-5 is installed within waste and is therefore not an appropriate location for perimeter landfill gas compliance monitoring. An additional monitoring location (SG-15) was installed closer to the facility property boundary adjacent to SG-5. No methane has been detected in this new monitoring well or any of the 14 other perimeter monitoring wells which surround the property.

- Surface water samples were collected from four locations, one on-Site and three off site. Lead and zinc were detected at concentrations above RIDEM's chronic Ambient Water Quality Criteria (AWQC) for the protection of aquatic life in three of the four locations sampled. Surface water samples were collected once during the wet season (March) and once during the dry season (September); however, only one location (SW-4) was wet enough to be sampled in the dry season. Samples were analyzed for total metals, therefore the elevated concentrations could be due to suspended sediment is samples. Elevated fecal coliform was detected during one of the two sampling rounds in SW4.

3.00 PROPOSED LANDFILL CLOSURE AND SITE DEVELOPMENT COMPONENTS

Based on the findings of the SIR and the intended future use of the property we evaluated several closure alternatives. The following subsections provided a brief overview of landfill closure components followed by a description of future site development plans. Section 4 contains a detailed engineering analysis of the design elements.

3.10 LANDFILL CLOSURE OVERVIEW

The recommended and approved alternative for closure of the former solid waste landfill consists of the following actions which incorporate combination of remedial measures and address the requirements of the applicable regulatory programs.

- Increase the thickness of the soil cap so that all areas of the Site that received municipal solid wastes are provided with the equivalent of a soil cap thickness of not less than 2-feet. In unpaved areas, the soil cover will include a final layer of organic soil (loam) to support vegetative growth and control erosion and direct exposure risks. The cover material will be evaluated to demonstrate that it does not contain contaminants at concentrations above the Method 1 Industrial/Commercial Direct Criteria.

- Re-grade portions of the Site to meet minimum drainage slope (i.e., 3%) and maximum stable slope (i.e., 3:1) requirements to control erosion, reduce infiltration and manage stormwater drainage.

  Develop a revised post-closure groundwater monitoring program incorporating monitoring wells installed as part of, and subsequent to, the SIR. Existing wells that will not be included in the long-term monitoring program will be decommissioned in accordance with the well closure requirements of the Groundwater Regulations.

- Modify the Site's groundwater classification to GB consistent with Rule 11 of RIDEM's Rules and Regulations for Groundwater Quality.

- Design, permit and construct stormwater management systems to control erosion, reduce flooding and ponding and manage stormwater sheet flow and drainage.

- Protect the long-term effectiveness of the remedy by establishing an Environmental Land Usage Restriction for the property. The ELUR will serve to:

  - restrict the property's use from any residential activity;
  - require that the Site's cover material remain in good condition;
  - prohibit the use of groundwater at the Site for drinking water;
  - require RIDEM notification should soil excavation be planned;
  - provide for long-term maintenance, monitoring and other measures necessary to assure the integrity of the remedial action;
  - require prior notice to the RIDEM of the owner's intent to convey any interest in the property; and
  - grant RIDEM the right to enter the property for inspections and monitoring compliance with the remedial actions.

As part of the landfill closure and improvement, the Town of Jamestown has proposed to construct a Department of Public works (DPW) facility on the western portion of the landfill property, adjacent to North Main Road.

3.20 DPW FACILITY DESCRIPTION

The following sections present the primary components of the proposed Department of Public Woks (DPW) facility and required site design modifications to incorporate the grading and stormwater collection for the DPW facility into the landfill closure design. The attached 50% design drawings have been updated to show the facility location, facility entrance and parking, Individual Sewage Disposal System (ISDS), water supply source, and stormwater management systems associated with the facility. These site modifications and design components are described in further detail below.

Note that the DPW facility is only at the conceptual design phase. As such, some design considerations may require modification to better address site conditions and the final design of the facility. RIDEM will be notified of any proposed modifications through the 90% Landfill Closure Design submittal.

3.21 Proposed DPW Facility Description

The facility will be constructed on the western portion of the site, adjacent to North Main Road. The approximate building footprint and proposed parking lot and access driveway areas are 12,600 ft^2 and 26,000 ft^2, respectively, as shown on Figure C-3, attached. The proposed facility will consist of office space, vehicle and equipment housing and maintenance facilities. The garage area will be constructed facing east for aesthetic purposes to conceal the garage face and parking area from North Road. The facility parking and entrance will be paved and extend from the existing transfer station driveway.

3.22 DPW Facility Subgrade Preparation

GZA performed a preliminary assessment of the waste thickness and subgrade conditions underlying the proposed facility footprint to evaluate the subgrade support options for the building foundation and parking areas. Approximately 4 to 8 feet of decomposed refuse was observed underlying the DPW facility and parking lot footprint. Due to the relatively small quantity and limited thickness of refuse, we propose to excavate the refuse from the building and parking area and replace this material with clean sand and gravel compacted in place.

The excavated material will: 1) relocated on-site for use as controlled fill in areas to be covered with pavement; 2) segregated by mechanical screening into solid waste and cover soils followed by beneficial reuse of the cover soils on-site or at an off-site landfill, and off-site disposal of the solid waste; and/or 3) transported off-site for disposal at an active landfill. Stockpiles will be completely covered with 10-mil polyethylene sheeting (or equivalent) secured in-place. The excavation (approximately 10,000 cubic yards) and reuse of this material on-site will provide the Town of Jamestown significant material purchase and disposal cost savings for the landfill closure program by reducing the volume of fill material required from off-site sources and limiting off-site disposal costs. If the material is disposed of off-site, the mechanical screening operation will decrease the amount of material requiring disposal as solid waste by removing the significant volume of cover soils observed in our test pit

explorations. The material that passes through the screen may be characterized as alternate daily cover material for use at the RIRRC's Johnston Landfill.

The excavation side walls in waste areas will be lined with a geosynthetic clay liner (GCL) or low permeability soils to prevent the migration of fluids into or out of the excavations. Some waste may remain in place under the parking lot areas and the proposed underground stormwater detention system depending on final facility grades and waste disposal considerations.

Soil and waste excavation activities will be conducted in accordance with the site-specific Waste Management Plan, attached as Appendix B. In general, excavated material will be visually assessed and screened with a photoionization detector for hazardous materials. Suspected hazardous materials will be segregated for further characterization and appropriate off-site disposal. Suitable soils will be relocated to the upper portions of the landfill and used for grading purposes. Waste that is relocated to the upper portion of the landfill will be compacted in lifts and covered daily to control odors.

3.23 DPW Facility Site Design And Utilities

The facility will be serviced by relocating the existing overhead electric poles and lines currently servicing the transfer station office, an individual sewage disposal system (ISDS), an underground storm water detention system, and a sub-slab ventilation system (to address the potential for methane intrusion). The following paragraphs briefly discuss the ISDS, stormwater collection, water supply and sub-slab ventilation system. The locations for the ISDS, stormwater collection system, electric service and water supply are shown on Figures C-3 and C-4.

3.23.1 Individual Sewage Disposal System (ISDS)

The proposed DPW facility will be serviced by a conventional ISDS with a primary septic tank, effluent pumping station, distribution system and Eljen In-drain type leach field. The system has been designed by a Class III ISDS Designer in accordance with RIDEM regulations. In addition, per the regulations, a soil evaluation was conducted by a Class IV Designer within the proposed leach field area to assess soil characteristics, dry season groundwater verification and infiltration rates. The leach field is located outside the limits of the waste. The system location is shown on sheet C-3 and details are provided on sheets C-6 and C-7.

3.23.2 DPW Facility Stormwater Collection System

The system has been designed in accordance with the State of Rhode Island's Stormwater Design and Installation Manual, as an underground detention system with water quality treatment. The locations are shown on Figures C-3, C-4 and the details on sheets C-9 and C-10. For pre- and post-development conditions and storm runoff design calculations, see the Site Hydrologic Analysis and Storm Water Design Package attached as Appendix C. In general, the system is designed to collect and maintain the peak stormwater discharge rates for the 2 and 25 year design storm events at predevelopment levels. The system will collect stormwater runoff from the facility's parking area and roof. The parking area will be sloped to divert stormwater to a series of catch basins which will be interconnected with RCP piping. The catch basins will be constructed with oversized sumps for sediment collection and removal, and outlet controls. To retain oils and additional sediment a Vortechs Model 7000 separator has been placed upstream of the underground detention area.

The detention system consists of 5-foot diameter fiberglass piping connected with concrete distribution chambers. The underground system is designed with an outlet control (orifice or weir) to maintain the facilities peak discharge rate at predevelopment levels for both 2 and 25 year storms. The outlet control will discharge to the proposed water quality basin at the transfer stations entrance, which ultimately discharges to the existing / rehabilitated steel culvert crossing North Main Street. This collection system will be designed and constructed as an integral part of the stormwater collection system servicing the landfill closure and has been sized to accept additional stormwater runoff from up-gradient areas of the property, primarily the compost area.

3.23.3 DPW Facility Water Supply

Water will be supplied to the facility from a supply well previously drilled on the adjacent Lot 47 to the east of the landfill property. Distribution piping will be installed from the wellhead to the facility. The piping will be located out side of the waste limits where feasible and will be constructed of 2-inch SDR 11 high density polyethylene piping with fused joint connections. Segments that will be located in waste will be encased in a 4-inch SCH 80 PVC piping with solvent fused joints. The piping will be constructed a minimum of 4-feet below the final ground surface grade. The location is shown on Figures C-3 and C-4 and the details are shown on Figure C-8.

3.23.4 Sub-Slab Ventilation System

A sub-slab ventilation system will be constructed under and around the perimeter of the proposed DPW facility's foundation slab to prevent landfill gas from migrating into the interior of the building. The system will vent mechanically through a series of stone venting layers equipped with perforated piping to collect and divert landfill gas away from the facility, for details see Figure C-10. The system will comply with EPA guidance document entitled *Radon Prevention in the Design and Construction of Schools and Other Large Buildings*, 1994. The mechanical components of this system will be explosion proof, as needed. Upon the ventilation trench installations, the radius of influence field test will be conducted to ensure the system is capable of applying a minimum vacuum of 0.01-inches of water across the building footprint. In addition, the building will be equipped with an internal continuous methane monitoring system with alarms.

3.30 ADDITIONAL SITE IMPROVMENTS

Other site improvements will take place in conjunction with the landfill closure construction phase. Below is a list and brief description of some additional site improvements.

3.31 Compost Area Expansion

The yard and leaf storage area has been expanded 50-ft to the south to address current and future composting needs. The additional area is necessary to stockpile the material in rows for composting. The compost area, both existing and new, will be constructed with a minimum of 2-feet of cover over the waste followed by an orange warning barrier. The warning barrier will be covered by a minimum of 12-inches of gravel.

3.32 Upper Paved Storage Area

An approximately 1 acre paved materials storage area has been proposed on top of the landfill. Presently this area is used for materials storage however is not paved. The surface runoff will drain to its own sediment forebay and stormwater control basin located on the northern end of the storage area. This basin will discharge to the eastern portion of the property. The storage area will be used by the DPW for storage of maintenance related materials, stone, gravel, piping, etc.

3.33 Metal Recycling Off-Load Deck Upgrades / Repairs

As part of the construction and upgrades to the site, the existing deck which is used to access the metal recycling dumpster will be removed and the wooden supports shall be replaced by concrete or concrete block. The old deck may be reused or completely replaced with a similar structure. As an option, the metal recycling area may be moved to an alternate location on the site in the future.

3.34 Transfer Station Water Collection System Tank Upgrade

The transfer station floor drain system and collection tank may receive upgrades during the construction phase of the remediation.

3.35 Roadway Surfaces and Entrance

All the roadway surfaces on the Site will be paved with the exception of the access road to the upper storage area. The access road will be constructed to have 2 feet of gravel fill over the waste followed by an orange warning barrier which will be covered by a minimum of 12-inches of gravel.

The entrance to the Site will be altered to better accommodate the tractor trailer trucks that are used to haul refuse from the existing Transfer Station. The turning radius on both the north and south sides of the existing entrance will be increased. The swale along the roadway will be restored and the culvert under the entrance will be replaced.

4.00 REMEDIAL ACTIONS

The following section describe the proposed Site improvements associated with the landfill closure in detail. The attached Figures C-1 through C-10 depict all features of interest.

4.10 PROPOSED REMEDY

Using the format established by Section 7.04 of the Remediation Regulations, GZA evaluated three remedial alternatives for the Site to address the observed regulatory exceedances and conditions of non-compliance as part of the SIR. The recommended, and RIDEM approved alternative, involves a combination of remedial measures and incorporates the requirements of all applicable regulatory programs. The RIDEM approved remediation alternative is as follows:

4.11 Landfill Cap

The thickness of the soil cap will be increased so that all areas of the Site that received municipal solid wastes are provided with an equivalent soil cap thickness of not less than 2-feet. Test pit explorations conducted as part of the site investigation identified two areas of the site that will require additional cover to meet the 2-foot minimum requirement. The primary area to receive cover was delineated on the western portion of the site adjacent to North Main Road. This area is the current location of the proposed DPW; therefore the majority of the waste in this area will be removed. Any waste remaining in this area will be densified and covered with a minimum of 2-feet of gravel, or impervious building structures or pavements, as part of the facility sub-grade preparation. The remaining areas to receive additional cover material are located on the upper portion of the landfill in the vicinity of test pits TP-17 and TP-19. These areas will be re-graded to meet the 2-foot cover requirement. The soil cover will include a final layer of organic soil (loam) to support vegetative growth. The source of the cover material will be evaluated to demonstrate that it does not contain contaminants at concentrations above the Method 1 I/CDEC.

Portions of the Site will be re-graded to meet the minimum drainage slope (i.e., 3%) and maximum stable slope (i.e., 3:1) requirements to control erosion, reduce infiltration and manage stormwater drainage.

As part of the upper landfill capping and regrading, the existing pavilion structures will be demolished and removed from their present location. The debris will either be placed under the cap of the paved upper storage area or disposed of off-site. The concrete collection tank that was used when municipal sludge was dewatered on-site will be pumped and filled in place with flowable concrete fill.

4.12 Ground Water

The ground water phase of the remediation plan consists of two major components: 1) development of the Environmental Monitoring Plan (EMP) and reclassification of groundwater at the Site.

The EMP for the closure and post-closure periods of the landfill operation was developed by GZA, submitted to RIDEM in October of 2004, and approved by the Office of Waste Management (OWM) in November of 2004. In response to RIDEM's comments on the 30% Landfill Closure Design Submission, GZA has prepared an addendum to the EMP that includes an additional monitoring location designated PWSW. A copy of the addendum is attached in Appendix D.

The groundwater designation of the Site was in keeping with Rule 9.01C(1)I of the Rules and Regulations for Groundwater Quality, which indicates that a GB designation is applicable to groundwater beneath "inactive landfills" and "inactive land disposal sites for solid wastes, hazardous waste and/or sewage sludge." Accordingly, as part of the remedy, a formal request for a modification of the Site's groundwater classification was made (per Rule 11 of the Rules and Regulations for Groundwater Quality). A copy of the letter of approval from RIDEM changing the Site's groundwater classification from GA to GB is attached in Appendix D.

4.13 Site Hydrologic Pre- and Post-Development Analysis

Rhode Island regulations require that proposed projects must control and maintain post development peak discharge rates from the 2-year and 25-year storm events at predevelopment conditions and that all stormwater basins be constructed to safely withstand or pass through the discharge from the 100-year storm event. In addition, appropriate water quality controls must be designed to reduce the average annual total suspended solids (TSS) loadings by 80 percent. This design standard can be met by containing the water quality volume (WQV), which is defined as the product of one-inch of rainfall over the impervious surface area within a contributing drainage area.

GZA has performed a site wide hydrologic study to delineate contributing drainage areas and evaluate peak stormwater runoff rates for pre- and post-development conditions. This analysis was performed in accordance with the State of Rhode Island Stormwater Design and Installation Standards Manual, September 1993, utilizing the Soil Conservation Services (1986) Technical Release 55 (TR-55) hydrologic model. The model was used to calculate peak runoff rates and develop site hydrographs under pre- and post-development conditions for the 24-hour duration, 2, 25, and 100-year frequency, Type III design storm events. Rainfall frequency values were obtained from the State of Rhode Island Hydrologic & Hydraulic Modeling Guidance document, titled "Rainfall Frequency Values for Rhode Island with 24-Hour Storm Duration." The table of results is provided in Appendix C.

A comparison of the TR-55 model output for pre- and post-development site conditions identified several areas where post-development peak flows were expected to exceed existing flows. These areas were evaluated further for the proper stormwater controls necessary to reduce the flows to desired levels. Selected stormwater controls included infiltration and detention. Pre- and post-development drainage area characteristics, storm hydrographs, and anticipated peak flows are provided in Appendix C. Pre- and post-development drainage areas have been delineated on Figures provided in Appendix C.

The following sections summarize the results of the hydrologic calculations and analysis.

4.13.1 Pre-Development Drainage Summary

The site was delineated into seven runoff drainage areas using site topography, infrastructure, and existing stormwater controls (swales, culverts, and berms), and are identified as drainage areas 1 through 7. Under current site conditions, stormwater is discharged off-site in all directions. Drainage areas 1, 2, 3 and 4 convey stormwater to North Main Road located west of the site. Drainage area 5 conveys stormwater onto Prospect Avenue to the east, drainage area 6 conveys stormwater on to Holly Street (a paper street) to the North, and drainage area 7 discharges to properties adjacent to the southern property boundary. The pre-development drainage areas are delineated and their runoff curve numbers, time of concentration, and surficial areas are identified on figures provided in Appendix C. Flow lengths, composite Manning's roughness coefficients, and composite runoff coefficients were calculated for each drainage area and used to calculate time of concentration and peak discharge rates for the 2, 25, and 100 year design storm events.

The following table summarizes the peak discharge rates for each drainage area and design storm frequency:

	Pre-Development Peak Runoff Rates (cfs)		
	Design Storm Frequency		
Drainage Area	*2 yr*	*25yr*	*100yr*
1	0.02	0.18	0.39
2	2.31	4.52	5.83
3	1.04	5.28	8.05
4	0.12	1.12	1.83
5	0.20	2.60	4.55
6	0.06	0.82	1.44
7	0.04	0.58	1.02

4.13.2 Post-Development Drainage Summary

The post-development drainage areas were delineated according to proposed site grading and improvements. The pre-development drainage area perimeters and characteristics were modified accordingly to represent post development stormwater runoff flow patterns and conditions. In general, the post-development drainage areas discharge stormwater in the same direction as during pre-development conditions. The primary differences between pre- and post-development is the addition of impervious surfaces associated with the proposed new structure, the Department of Public Works Facility, to drainage area 3, and the addition of a paved materials storage area to drainage area 5. Contributing surficial areas of drainage areas 2 and 6 have been reduced because of surface grading modifications at the top of the landfill and at the proposed paved materials storage area. The post development drainage areas are delineated with their associated runoff curve numbers, time of concentration, and surficial areas on figures provided in Appendix C. Post

development flow lengths, composite Manning's roughness coefficients, and composite runoff coefficients were calculated for each drainage area and utilized to calculate time of concentration and peak discharge rates for the 2, 25, and 100 year design storm events.

The following table summarizes the post development peak discharge rates for each drainage area and design storm frequency:

	Post-Development Peak Runoff Rates (cfs)		
	Design Storm Frequency		
Drainage Area	*2 yr*	*25yr*	*100yr*
1	0.01	0.15	0.31
2	2.30	4.42	3.36
3	3.48	7.37	9.9
4	0.12	1.12	1.83
5	0.20	2.60	4.55
6	0.06	0.79	1.44
7	0.04	0.58	1.02

4.13.3 Summary of Pre vs. Post Drainage Conditions

Runoff analysis indicates that proposed post development conditions will generate a net increase in the peak stormwater runoff rate from drainage areas 3 and 5, as shown in the following Table:

	Post Development Net Runoff Difference (cfs)	
	Design Storm Frequency	
Drainage Area	*2 yr*	*25yr*
1	0.00	-0.04
2	0.00	-0.10
3	2.44	2.09
4	0.00	0.00
5	1.67	3.29
6	0.00	-0.03
7	0.00	0.00

Attenuation of peak runoff will be required in drainage areas 3 and 5 to maintain stormwater runoff peak rates at or below predevelopment runoff conditions. The remaining drainage areas will not be affected by the proposed site improvements and landfill closure activities.

4.14 Proposed Stormwater Management and Collection

The site currently employs several small stormwater quality/quantity management systems. Since proposed site improvements associated and the landfill closure will primarily affect peak stormwater runoff rates generated by drainage areas 3 and 5, these areas will require water quality basins, detention basins, and storage basins equipped with outlet flow controls to reduce runoff to pre-development rates. In addition, drainage area 2 will require a water quality basin to contain sediment and temporary and permanent erosion controls will be required at the Site to reduce migration of sediment off-site. The water quality volume will be contained within each basin and infiltrated. Infiltration rates were evaluated by a Class IV soil evaluator at test pit locations TP05-1 and TP05-2.

The proposed stormwater management system will implement best management practices in accordance with the State of Rhode Island Stormwater Design and Installation Manual, September 1, 1993 and the State of Rhode Island Soil Erosion and Sediment Control Handbook, 1989.

4.14.1 Proposed Drainage Area 2 Stormwater Quality Control

A water quality basin (WQ Basin 1) will be constructed adjacent to the northern side of the site entrance. The basin will collect stormwater runoff generated from the transfer station area and up gradient gravel and paved access road ways and parking areas. Stormwater runoff will be conveyed to the proposed water quality basin through one 24-inch catch basin structure (CB-1) and a 24-inch asphalt swale located at the site's entrance. Entrance grading will be modified to retain and divert the runoff on the site to the proposed two catch basin structures. The paved portion of the site entrance is currently constructed with an asphalt berm to retain the runoff on the pavement surface. This berm will be reconstructed within the entrance modification area. The two catch basin structures will be equipped with outlet protection to trap oils and floating debris. The catch basins will outflow through an 18-inch diameter RCP piping and will discharge to the water quality basin. The catch basin outfall will be equipped with a flared outlet.

The water quality basin has been sized to detain the required water quality volume (1-inch of rainfall over all impervious surfaces) and infiltrate within the RIDEM maximum infiltration period of 72-hours. In addition the basin has been oversized to collect and store the 10-year accumulated sediment volume for the area. The basin will be grassed and discharge to the existing stormwater diversion swale servicing North Main Road though a rip rap overflow weir. The receiving swale adjacent to North Main Road will be re-established and maintained as part of the landfill closure activities.

Details of the water quality basin and conveyance system are presented on Figures C-8, C-9 and C-10 and design calculations are presented in Appendix C.

4.14.2 Proposed Drainage Area 3 Stormwater Collection System

As discussed, in the hydrologic analysis a detention system is required to maintain peak stormwater runoff rates at pre-development levels. The detention system will collect and detain all of the stormwater runoff generated from drainage area 3 prior to discharging off of the site. This area will include the proposed DPW facility and compost area expansion.

The detention system (Detention System 1) will be constructed underground with 480 feet of 5-foot diameter fiberglass piping with gasket bell ends and installed in two 240-foot legs. The pipe leg ends will be connected by a concrete inlet and outlet distribution box. The system will be equipped with two outlet flow control orifices to maintain the peak outflow at predevelopment levels. This outlet control will be equipped with a 4.5-inch diameter orifice at the base of the outlet structure to maintain the 2-year pre-development outflow and an 11.5-inch orifice installed 3-feet above the 4.5-inch orifice to maintain the 25-year pre-development outflows. The outlet structure will also be equipped with a 24-inch catch basin grate located on top of the out distribution box, exposed at the proposed ground surface to pass storm flows greater than the 25 year event. The system will outflow to a water quality basin, which will discharge to the existing stormwater diversion swale servicing North Main Road through twin 18-inch RCP pipes equipped with a flared end section.

Stormwater will be conveyed to the system through a series of four proposed catch basins (CB-2, CB-3 and CB-4) located within the proposed DPW parking lot area and one catch basin (CB-5) located within the grassed area adjacent to the proposed DPW. These basins will collect and divert stormwater runoff from the proposed DPW facility, the compost area and upgradient portions of the drainage area. The catch basins are interconnected with 18-inch RCP piping. Runoff quality will be mitigated with a Vortechnics Model 7000 to effectively remove sediment, floating oil, and other debris from the runoff.

The proposed water quality basin (WQ Basin 2) has been designed to collect and infiltrate the water quality volume within RIDEM's maximum infiltration time of 72-hours. In addition, the water quality basin and the up gradient catch basins have been oversized to collect and store the ten year accumulated sediment volume. The catch basins will be equipped with 6-foot diameter, 4-foot long sump extension for sediment removal.

Details of the water quality basin and conveyance system are presented on Figures C-8, C-9 and C-10 and design calculations are presented in Appendix C.

4.14.3 Proposed Drainage Area 5 Stormwater Collection System

The proposed stormwater collection system for drainage area 5 will consist of a detention basin (Detention System 2) to collect and redistribute the rate of runoff over a period of time by providing temporary live storage of runoff. Stormwater runoff will be regulated by strategically sized orifices to control discharge rates to pre-development conditions.

This system will retain and infiltrate the initial portion of the 25-year design storm to detain the system's outflow beyond Drainage Area 5's peak outflow rate. This will maintain the pre-development peak runoff rates at area 5's outfall.

The proposed paved storage area will be constructed with an asphalt berm to contain the runoff within the storage area perimeter. In addition, the access driveway will be graded to prevent the stormwater runoff from sheet flowing through the entrance away from the area. The storage area will be graded with a high ridge to divert runoff to two 6-foot openings in the asphalt berm located on the north end of the area. Stormwater will be diverted through these openings into a sediment forbay for sediment removal prior to discharging to the detention pond. The forbay will be constructed with two permanent rip rap check dams to contain the accumulated sediment and protect the forbay outlet. The forbay will discharge to the detention pond through an 18-inch diameter N-12 ADS pipe equipped with flare end sections on both the inlet and outlet.

The detention pond will collect and permanently detain approximately 10,600 ft^3 of stormwater prior to discharging through a 6-inch diameter orifice installed approximately 2.80-feet above the pond floor. This orifice will be installed with a concrete outlet structure equipped with a 24-inch catch basin grate located approximately 6-inches below the top pond bank elevation and will be utilized as a high flow overflow device. The orifice will maintain stormwater discharge rates at Area 5's outfall at pre-development conditions. The ponds outfall structure will discharge through an 18-inch diameter N-12 ADS pipe equipped with a device to retain oils and floating debris. The discharge piping will extend underground and discharge through a flared end section within Drainage Area 5. The pipe outfall will discharge onto a rip rap apron to control outlet erosion and dissipate the flow.

The proposed detention basin has been designed to collect and infiltrate the water quality volume within RIDEM's maximum infiltration time of 72-hours. In addition, the sediment forebay has been oversized to collect and store at a minimum the ten-year accumulated sediment volume generated by the storage area.

Details of the water quality basin and conveyance system are presented on Figures C-8, C-9 and C-10 and design calculations are presented in Appendix C.

4.13.3 Summary of Pre vs. Post Drainage Conditions with Detention

With the above referenced detention structures and outlet controls implemented in Drainage Areas 3 and 5, the pre-development stormwater runoff conditions are maintained with the site improvements and landfill closure activities. The following table compares the net differences between pre and post development stormwater runoff rates for each drainage area with detention implemented:

	Pre-Development Peak Runoff Rates (cfs)			Post-Development Peak Runoff Rates (cfs)			Post Development Net Runoff Difference (cfs)	
	Design Storm Frequency			*Design Storm Frequency*			*Design Storm Frequency*	
Drainage Area	*2 yr*	*25yr*	*100yr*	*2 yr*	*25yr*	*100yr*	*2 yr*	*25yr*
1	0.02	0.18	0.39	0.01	0.15	0.31	0.00	-0.04
2	2.31	4.52	5.83	2.30	4.42	3.36	0.00	-0.10
3	1.04	5.28	8.05	1.04	5.28	9.58	0.00	0.00
4	0.12	1.12	1.83	0.12	1.12	1.83	0.00	0.00
5	0.20	2.60	4.55	0.20	2.60	4.55	0.00	0.00
6	0.06	0.82	1.44	0.06	0.79	1.44	0.00	-0.03
7	0.04	0.58	1.02	0.04	0.58	1.02	0.00	0.00

4.14.4 Additional Site Drainage Improvements

A shallow diversion swale at the toe of the upper landfill area adjacent to the transfer station parking area and the compost area will be constructed to divert storm water from the grassed area on top of the landfill to the grassed and wooded side-slopes to the south of the compost area. The addition of this swale will improve the stormwater runoff conditions around the transfer station office and compost area. The swale outlet will be constructed as an open invert with a riprap apron for flow dispersion and outfall protection from erosion. Currently the western half of the site diverts stormwater to a swallow diversion swale located adjacent to North Main Road. This swale flows towards the south and crosses the site entrance through a 12-inch steel culvert and continues south to a second 12-inch steel culvert, which crosses North Main Road and discharges to the wetland area to the west. Both culverts have been filled with sediment and are either partially or fully clogged. This is causing some of the flooding along North Main Road in this area. To rehabilitate the drainage patterns in this area, these culverts will be replaced with 18-inch RCP piping as part of the landfill closure and site improvements. The site entrance culvert will be installed with a headwall inlet and flared outlet; the steel culvert crossing North Main Road will be replaced with two 18-inch diameter culverts. The culverts will be equipped with flared end sections at both the inlet and outlets.

Note these modifications along North Main Road will improve the drainage conditions in the area; however the road may ultimately need to be raised and re-crowned to fully alleviate the current drainage problems.

Details of these improvements are presented on Figures C-3 and C-4 with details on Figure C-8, C-9 and C-10 and design calculations are presented in Appendix C.

4.15 Sediment & Erosion Control

Preliminary erosion control details and layout are presented on Figure C-5. In general, where any disturbance to the existing vegetation occurs during construction, adequate erosion controls consisting of hay bales, silt fence, check dams and other standard slope and surface stabilization techniques will be implemented, as applicable. A separate

Stormwater Pollution Prevention Plan (SWPPP) will be generated to address the projects stormwater management through construction as well as permanent post-construction sediment and erosion controls. This document will be prepared and submitted to RIDEM for review and approval during the final design submittal.

4.16 Environmental Land Use Restriction

To protect the long-term effectiveness of the remedy, an Environmental Land Usage Restriction has been developed for the property. The ELUR will serve to:

- restrict the property's use from any residential activity;
- require that the Site's cover material remain in good condition;
- prohibit the use of groundwater at the Site for drinking water;
- require RIDEM notification should soil excavation be planned;
- provide for long-term maintenance, monitoring and other measures necessary to assure the integrity of the remedial action;
- require prior notice to the RIDEM of the owner's intent to convey any interest in the property; and
- grant RIDEM the right to enter the property for inspections and monitoring compliance with the remedial actions.

A copy of the draft ELUR has been attached as Appendix E.

5.00 SOILS MANAGEMENT AND WASTE HANDLING CONTINGENCY PLAN

The Soils Management and Waste Handling Contingency Plan (SMP) has been prepared to establish procedures that will be followed during the landfill closure construction and subsequent landfill cap maintenance activities at the Site. A copy of the SMP is attached as Appendix B.

The procedures in this plan are also intended to address excavation activities associated with the construction of a new Department of Public Works maintenance, storage and office facility on the landfill property. The SMP also establishes procedures that will be followed should future construction/maintenance activities at the restricted portion (identified as the "Site" in the Environmental Land Use Restriction and shown on Exhibit B) of the North Main Road Property; require the need to manage soils excavated from the subsurface. As such, this plan will be implemented when existing site surfaces are disturbed. The plan serves to supplement, and will be initiated by, the RIDEM notification requirement established by the Environmental Land Usage Restriction for the property.

6.00 COMPLIANCE DETERMINATION

At the completion of construction GZA will prepare a ***Remedial Action Completion Report*** for the Town's documentation and submission to RIDEM. This report will summarize construction activities, document any necessary quality assurance/quality control testing, identify any deviations from the planned design and contain as-built drawings of the final closure components (e.g., cap grades, detention basins, monitoring wells). This report will include a request, on behalf of the Town, for a *Certificate of Landfill Closure* and *Letter of Compliance* from RIDEM and can also be used by the Town in support of their request to the EPA to archive the site off of the *CERCLIS* list.

7.00 PROJECT MANAGEMENT AND OVERSIGHT

As Engineer-of-Record, GZA will take a lead role in the administration of the construction project by serving as the lead on-site representative for the Town during construction. Our work will include:

- Conducting a pre-construction meeting at the site to establish communications between GZA, the contractor, and the Client;
- Providing construction observation and field testing services;
- Reviewing and commenting on the contractor's submittals and shop drawings;
- Addressing and resolving technical issues as they arise during construction and resolving administrative issues with the Client;
- Maintaining liaison with the Client, Contractor and RIDEM; and
- Preparing written documentation of construction activities via field reports and memoranda including progress reports to RIDEM as required by Section 11.05 of the Remediation Regulations.

GZA will provide field engineering services by an experienced GZA field engineer on a full-time or part-time basis as deemed appropriate in consultation with the Town. Our field engineer will be responsible for:

- Observing the contractor's work and identifying deviations from the design intent and contract specifications, and providing recommended actions, as appropriate, to the Client;
- Screening soil and waste as they are excavated to assess the presence of hazardous materials;
- Performing quality control/quality assurance testing during fill placement to check compliance with the specifications; and

- Documenting the foregoing in field reports, to be submitted on a weekly basis.

GZA will provide interpretations and clarifications of the contract documents, prepare associated correspondence, and will render technical opinions concerning acceptability of work with respect to the contract requirements.

The contact person for the Town of Jamestown will be:

Steve Goslee
Public Works Director
44 Southeast Avenue
Jamestown, Rhode Island 02835
(401) 423-1313

8.00 PROJECT SCHEDULE

The Town is prepared to implement the remedial action plan upon receiving approval from RIDEM and upon receiving the necessary permits. The permits may include and are not limited to the Construction Phase Rhode Island Pollution Discharge Elimination System (RIPDES) permit, an industrial activities (Landfill and Transfer Station) RIPDES, a Freshwater Wetlands Preliminary Determination Permit and any local permits associated with street construction. At this time, it is anticipated that the necessary permits will be obtained by September 2006.

Task	Estimated Completion (after receiving RIDEM approval and necessary permits)
Submit 50% Design & RAWP	January 2006
Receive Public Comment	February 2006
Incorporate Comments Into 90% Design & RAWP & Submit for Review	May 2006
Prepare Final Design & Bid Documents	July 2006
Public Funding Approval	December 2006
Select Construction Contractor	January 2007
Start Cap Construction	April 2007
Construction Complete	November 2007
Prepare Construction Completion Cert.	January 2008

9.00 LIMITATIONS

GZA's work was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and GZA observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. This work plan is also subject to the following specific limitations and those contained in Appendix A.

This work plan was designed to provide an appropriate level of remediation given our current understanding of site conditions and proposed development objectives for the property. If development plans or property use changes significantly, or if additional data is obtained during the course of development, GZA reserves the right to modify any or all of the criteria specified in this plan.

10.00 CERTIFICATION

GZA certifies that to the best of its knowledge the Remedial Action Work Plan for the former Jamestown Landfill site contains accurate information.

GZA GEOENVIRONMENTAL, INC.

Edward A. Summerly, P.G.
Associate Principal
GZA GeoEnvironmental, Inc

Mr. Goslee, representative for the Town of Jamestown, certifies to the best of his knowledge that this Remedial Action Work Plan is a complete and accurate representation of the landfill site, and contains all known facts concerning the release of hazardous substances at the site.

THE TOWN OF JAMESTOWN

Steve Goslee
Director of Public Works
Town of Jamestown

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APPENDIX A

LIMITATIONS

GEOHYDROLOGICAL LIMITATIONS

1. The conclusions and recommendations submitted in this report are based in part upon the data obtained from a limited number of soil samples from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further investigation. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the boring logs.

3. Water level readings have been made in the test pits, borings and/or observation wells at times and under conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time measurements were made.

4. The conclusions and recommendations contained in this report are based in part upon various types of chemical data and are contingent upon their validity. These data have been reviewed and interpretations made in the report. As indicated within the report, some of these data are preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by GZA, and the conclusions and recommendations presented therein modified accordingly.

5. Chemical analyses have been performed for specific parameters during the course of this study, as detailed in the text. It must be noted that additional constituents not searched for during the current study may be present in soil and groundwater at the site.

6. It is recommended that this firm be retained to provide further engineering services during design, implementation, and/or construction of any remedial measures, if necessary. This is to observe compliance with the concepts and recommendations contained herein and to allow design changes in the event that subsurface conditions differ from those anticipated.

APPENDIX B

SOIL MANAGEMENT PLAN AND WASTE HANDLING PLAN

APPENDIX B

SOILS MANAGEMENT PLAN AND WASTE HANDLNG CONTINGENCY PLAN

Former Jamestown Municipal Landfill
Jamestown, Rhode Island
Plat 2 Lots 49, 50, 51
(RIDEM Case No. LCP 2003-01)

This ***Soils Management Plan*** (SMP) has been prepared to establish procedures that will be followed during the landfill closure construction and subsequent landfill cap maintenance activities at the former Jamestown Municipal Landfill site on North Main Road in Jamestown Rhode Island. The procedures in this plan are also intended to address excavation activities associated with the proposed construction of a new Department of Public Works maintenance, storage and office facility on the landfill property.

Additionally, this SMP establishes procedures that will be followed should future construction/maintenance activities at the restricted portion (defined as the "Contaminated Site" in the Environmental Land Use Restriction and shown on Exhibit B) of the Landfill property; require the need to manage soils excavated from the subsurface. As such, this plan will be implemented when final site controls are disturbed. The plan serves to supplement, and will be initiated by, the RIDEM notification requirement established by the Environmental Land Usage Restriction for the property. Note, that the entire 14 acre parcel (identified as Plat 2 Lots 49, 50, and 51) is subject to the ELUR, while approximately 10 acres has been show to contain buried solid waste, identified below as the "Waste Footprint Area".

Due to the presence of buried solid waste the ELUR limits future site development to industrial/commercial activities. Engineering controls are required for the entire area continuing solid waste. Some controls extend beyond the limits of waste (e.g., drainage structures). Soil handling and construction activities, outside of the areas of concern noted below, will not require RIDEM notification.

Identification of Areas of Concern:

- **Landfill Area Refuse:** As described in GZA's May 13, 2002, *Site Investigation Report*; an approximately 10 acre area of the property was used for disposal of municipal solid waste. Testing for 15 target inorganic analytes from six samples submitted to the laboratory for analysis at the former landfill facilities indicated three arsenic concentrations between 2 and 7 mg/kg. None being above RIDEM's revised 7 mg/kg I/CDEC. The metal beryllium was detected at a concentration of 6.2 mg/kg, above the 1.3 mg/kg I/CDEC for this element, at TP-19, in the middle of the north side of the site. To address the presence of solid waste, a minimum two (2') foot thick soil cap will be placed over these areas to prevent future direct exposure and limit precipitation infiltration. An industrial/commercial ELUR is

being place on the property to address the one beryllium exceedance; however, as noted in the SI Report we believe the observed concentration represents naturally occurring background conditions.

- **Sludge Disposal Area:** – GZA's May 13, 2002, *Site Investigation Report*, described a one-acre area in the southeast corner of the property that was historically used for sewage sludge disposal. Eleven of 15 target metals were detected in surficial soil samples collected from this area. All observed concentrations fall within the range of naturally occurring values for Rhode Island soils and do not exceed Industrial/Commercial Direct Exposure Criterion. The ELUR has also been place over this portion of the Site.

A Class I survey, attached to the ELUR as Exhibit A, depicts the boundaries of the Site subject to the ELUR.

DESCRIPTION AND MAINTENANCE OF ENGINEERED CONTROL

The engineered controls are an integral part of the ELUR and must be maintained to ensure potential human exposure to solid waste and soils impacted by the disposal of waste is minimized. The engineered control at the Site consists of three components:

- The chain-link fence and gate located along North Main Road restricts vehicular access to the Site.

- Landfill Cap: The thickness of the soil cap will be increased, as needed, so that all areas of the Site that received municipal solid wastes are provided with a soil cap thickness of not less than 2 feet. The soil cover will include a final layer of organic soil (loam) to support vegetative growth and control erosion and direct exposure risks. The source of the cover material will be evaluated to demonstrate that it does not contain contaminants at concentrations above the Method 1 Criteria. Warning barriers will be placed 18-inches under active areas that are not receiving asphalt pavement (e.g., compost and yard waste area, access road extending from the transfer station area to the top of the landfill).

- Portions of the Site will be re-graded to meet the minimum drainage slope (i.e., 2%) and maximum stable slope (i.e., 3:1) requirements to control erosion, reduce infiltration and manage stormwater drainage.

If excavation, disturbance of the structural integrity of the engineered controls, or any other activity inconsistent with the requirements of the ELUR is required at the Site (e.g., utility maintenance and/or repair, emergencies, etc.), the RIDEM will be notified in writing prior to scheduled maintenance or repair, or in the case of an emergency, as soon as possible but no more than three (3) business days after having learned of the emergency. As stated in Paragraph C of the ELUR, in the case of an emergency, the restrictions detailed in Paragraphs A and B of the ELUR may be temporarily suspended without first notifying RIDEM. In the case of scheduled excavation and/or maintenance or repair of subsurface

utilities, the restrictions detailed in Paragraphs A and B of the ELUR may be temporarily suspended; however, RIDEM will be notified in writing, and a construction plan will be provided, prior to the proposed work. The basic health and safety procedures outlines in this SMP will be followed for excavation work conducted within the ELUR area.

SOIL AND WASTE MANAGEMENT PLAN

The following procedures will be implemented to govern soil and waste stockpiling, management, and disposal procedures. The stockpiling and disposal procedures detailed in this plan apply only to excess soil and waste which cannot be used as backfill in the original excavation or elsewhere on site in an approved manner. Soil/waste generated from an excavation conducted within the ELUR area may be placed back into its original excavation for backfill upon completion of the excavation. The original stratigraphy of soil and waste materials will be maintained, to the extent practicable, upon backfilling excavations (i.e., minimum of 2 foot thick soil cover over waste with 6 inches of organic loam at surface) so that the corresponding depth and location of the backfilled materials resembles the depth and location at which the soil originally existed. Alternatively, soil generated from an excavation in the ELUR can be disposed of at an appropriate off-site disposal/treatment facility.

Soil generated from an excavation within the ELUR area will not be used as backfill at a location outside of the ELUR area without prior analytical testing to confirm that the concentrations of chemical constituents in the soil are below RIDEM's Residential Direct Exposure Criteria.

Excavation in any portion of the ELUR that involves the disturbance of the soil landfill cap or asphalt cover will immediately be replaced and restored to its original condition upon completion.

Solid Waste Excavation Practices

During solid waste excavation, a GZA engineer or environmental scientist will visually evaluate and field screen the waste. Existing cover soils will be removed from the excavation areas and stockpiled separately for on-site reuse. Waste and cover soil samples will be periodically obtained from the excavation and field screened for VOCs using a PID employing a 10.6 eV lamp. Based on visual / olfactory observations and field screening data, the waste shall be separated between clean waste and potentially contaminated waste.

To minimize the potential for off-site odors, the area of waste excavation will be kept as small as possible at all times. At no time shall the face of the waste excavation exceed 12-feet in height and no more than 150-feet in length. If more than 150-feet of waste will be exposed in any work day, then portions of the face must be covered throughout the day such that no more than 150 linear feet of waste is exposed at any given time.

All exposed waste surfaces shall be covered with at least 6-inches of soil cover material at the end of each work day. Alternative cover, such as Posi-Shell or 10-mil polyethylene sheeting secured in-place is also acceptable.

Waste Excavation Contingency Plan

Spill containment and control equipment consisting of two overpack drums, two 6-inch by 15 foot spill containment booms, two bundles of 100 absorbent pads, three bags of Speedi-dry absorbent, drum plugs, a fire extinguisher, and 6-mil poly bags will be maintained at the site during all waste excavation activities. In the event that an intact drum is encountered, its potential contents will be evaluated in-place, when deemed safe it will be gently removed from the excavation, placed in an over-pack drum and staged on 10-mil polyethylene sheeting while awaiting analytical characterization for off-site disposal.

An emergency response contractor (e.g., Marshall Environmental) will be on call during waste excavation activities to assist in the response to any unforeseen conditions. In the event of an environmental emergency the following agencies/individuals will be notified, as appropriate:

Response Agency	**Phone Number**
Town Manager	(401) 423-7220
Police	911 or (401) 423-1212
Fire	911 or (401) 423-1313
RIDEM/Office of Compliance & Inspection/Emergency response Program	(401)222-1360 or (401) 222-3070 (non-business hours)
USEPA/hazardous Materials Spills	(800) 424-8802
GZA's Health and Safety Officer	(781) 760-6421
Emergency Response Contractor	(401) 639-3714

Solid Waste Odor Control Practices

Based on 60 plus test pit excavations conducted at the site, we do not believe that odors will be a significant issue. However, if objectionable odors are encountered during excavation then, measure will be taken to keep the odors to a minimum. Primary measures include minimizing the amount of exposed waste in the excavation, covering the exposed working faces of waste at the end of each day with 6-inches of sand and gravel (or equivalent), and minimizing the amount of waste stockpiled on the Site. If this is not sufficient to control objectionable odors at the property boundary the primary measures will be supplement by the use Posi-Shell applied during the course of excavation and at the end of each day to all working faces and stockpiles. Waste stockpiles will be covered as they are generated.

Soil and Solid Waste Stockpiling/Storage Practices

Soil and clean waste generated from the excavation performed in the waste footprint area that requires temporary storage will be stockpiled on 10-mil polyethylene sheeting (or equivalent). Soils may be reused on-site anywhere within the ELUR area.

Waste materials may be: 1) relocated on-site for use as controlled fill in areas to be covered with pavement; 2) segregated by mechanical screening into solid waste and cover soils followed by beneficial reuse of the cover soils on-site or at an off-site landfill, and off-site disposal of the solid waste; and/or 3) transported off-site for disposal at an active landfill. Stockpiles will be completely covered with 10-mil polyethylene sheeting (or equivalent) secured in-place. All excavated soil and waste will be stockpiled on-site.

Potentially contaminated soils and solid waste excavated from the waste footprint area will be temporarily stockpiled on 10-mil polyethylene sheeting (or equivalent) until analytical testing results confirm the concentrations of chemical constituents in the material. The stockpile will also be completely covered with 10-mil polyethylene sheeting (or equivalent) secured in-place. Once analytical testing is complete, the material will be reused or disposed of, as appropriate. If disposal is required materials will be transported to an appropriate off-site disposal/treatment facility.

Soil and Solid Waste Stockpile Maintenance

Solid waste stockpiles will be inspected daily. If tears or punctures are observed in the polyethylene sheeting either covering or underlying the piles, repairs will be made immediately. The inspection shall also confirm that, to the extent possible, storm water runoff is diverted away from the piles.

Analysis for Potentially Contaminated Soils and Waste

In order to select the appropriate method of reuse or disposal for soils and solid waste, one sample will be collected from the stockpiles for every 500 cubic yards of material generated. The samples will be analyzed by a Rhode Island-certified laboratory for one or more of the following waste characterization parameters as appropriate for the proposed use or disposal facility:

Analyte/Parameter	**Test Method**
Petroleum hydrocarbons	EPA Method 8100M
Volatile organic compounds	EPA Method 8260
Semi-volatile organic compounds	EPA Method 8270
Polychlorinated Biphenyls	EPA Method 8081
Total RCRA Metals	EPA Method 6010 & 7471A
Flashpoint	EPA Method 1010M
Corrosivity (pH)	EPA Method 9045C
Reactivity	EPA Methods SW-846 7.3.3.2/9014 and SW-846 7.3.4.2/376.2

Upon evaluation of the results of laboratory analysis, an appropriate method of reuse or disposal will be selected. If necessary, the soil or solid waste will be transported off-site for disposal under a Uniform Hazardous Waste Manifest, Material Shipping Record & Log, or other appropriate documentation. All excess contaminated solid waste will be removed from the Site within 60 days of its date of generation.

BASIC HEALTH AND SAFETY PROCEDURES

The basic health and safety procedures outlined below will be implemented while performing excavation work within the waste footprint area of the Site. The procedures are intended as a general guideline for basic, short-term excavation activity conducted in the ELUR area. The contractor conducting the DPW facility construction will be required to develop a site-specific health and safety plan in accordance with the OSHA requirements contained in 29 CFR Part 1910.120.

Based on the documented Site conditions, the potential routes of exposure to on-site excavation or utility repair workers include dermal contact (absorption) or accidental ingestion of impacted soil and solid waste, and the possible injection of contaminants through broken skin. As contaminants present at the Site are not generally volatile in nature, inhalation hazards are not anticipated. Utilization of the appropriate personal protective equipment (PPE) and the general safety guidelines provided below will minimize the potential for worker exposure while performing work within the ELUR area.

Personal Protective Equipment (PPE)

In general, the level of protection that will be used by workers will be determined by the task that the person is performing; however, at a minimum Level D PPE will be worn at all times while performing excavation activities within the ELUR area. Level D PPE will, at a minimum, consist of the following PPE:

1. Steel-toe work boots with over-boots as needed;
2. Eye protection (safety glasses or chemical splash goggles);
3. Nitrile gloves/inner latex or PVC gloves;
4. Hard hat; and
5. Work coveralls.

If Level C or higher level of PPE is determined to be necessary to complete a specific task, a site-specific health and safety plan will be developed for the work to be performed.

All contractors and and/or workers involved with the soils or waste excavated from within the waste footprint area must be trained in accordance with OSHA standards due to the Sites CERCLIS site designation. For full details on training requirements refer the following federal regulations:

29 CFR 1910.120
29 CRF 1926.65

Site Operating Procedures/Safety Guidelines

Regardless of the level of PPE necessary to complete work in the ELUR area, the following general health and safety guidelines will be followed during the performance of any excavation activities conducted within the ELUR area. Adherence to these guidelines will reduce the potential worker exposure to impacted media.

1. All work conducted on-site shall be coordinated through a designated Town employee responsible for the implementation of the requirements of this SMP (including all health and safety procedures);
2. The location of all utilities in the vicinity of the excavation will be established prior to beginning work;
3. All spectators will remain outside the designate Exclusion Zone (established as a 50 foot perimeter beyond the area of excavation);
4. A pre-work meeting will be conducted at the beginning of each day to discuss the health and safety procedures;
5. Practice contamination avoidance: never sit down or kneel in an excavation; never lay equipment on the ground; avoid obvious sources of contamination such as puddles; and avoid unnecessary contact with objects in an excavation;
6. Be alert to any unusual changes in your physical condition; never ignore warning signs. Notify the responsible Town employee as to suspected exposures;
7. All equipment used in an excavation shall be properly cleaned and maintained in good working order. Equipment shall be inspected for signs of defect and/or contamination before use;
8. Eating, drinking, chewing gum, and smoking shall be prohibited in active excavation areas; and
9. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the excavation of site personnel form the excavation and the re-evaluation of the hazard and the level of protection.

In Case of Serious Exposure of Injury

In the event of serious chemical exposure or worker injury, the responsible Town employee will immediately be alerted. This person will follow the steps indicated below:

1. Summon appropriate emergency response agency by using the emergency phone numbers provided as Attachment A. Convey the following information:

    a. Nature of emergency,
    b. Location of victim,
    c. Specific information about exposure or accident (gases, chemical, asphyxiation, etc.),
    d. Length of exposure, and
    e. Hazards which may be involved in rescue or treatment;

2. If taken to a hospital, notify the hospital of the background of the problem:

    a. Potential for hospital contamination,
    b. Any contaminated items and the nature of the contamination, and
    c. Estimated arrival time.

3. Follow additional documented Town procedures for reporting injuries or accidents.

Emergency Phone Numbers

Emergency telephone numbers and the directions to the nearest hospital are included below.

Response Agency	Phone Number
Ambulance	911 or (401) 423-1313
Police	911 or (401) 423-1212
Fire	911 or (401) 423-1313
RIDEM/Office of Compliance & Inspection/Emergency response Program	(401)222-1360 or (401) 222-3070 (non-business hours)
USEPA/hazardous Materials Spills	(800) 424-8802
Poison Control Center	(800) 562-8236
Dig Safe (Utility Clearance)	1-888-DIGSAFE
Hospital	
Newport Hospital 11 Friendship St Newport, RI 02840 (401) 846-6400	(401) 846-6400

Route to Hospital

Total Distance:	8.1 miles
Estimated Time:	17 minutes

Directions	Distance
1: Depart on N Main Rd (East)	0.1 miles
2: Bear RIGHT (South) onto E Shore Rd	3.9 miles
3: Keep RIGHT onto Local road(s)	0.0 miles
4: Bear RIGHT (North-West) onto Conanicus Ave	0.3 miles
5: Take Ramp (RIGHT) onto SR-138	2.8 miles
6: Turn RIGHT onto Ramp	0.1 miles
7: Turn RIGHT (South) onto SR-138A [SR-238], then immediately turn LEFT (East) onto Van Zandt Ave	0.5 miles
8: Turn RIGHT (South) onto Malbone Rd	0.1 miles
9: Turn RIGHT (South) onto Broadway	0.0 miles
10: Turn LEFT (East) onto Friendship St	0.0 miles
11: Arrive	0.0 miles

APPENDIX D

GROUNDWATER RECLASSIFICATION AND EMP ADDENDUM

November 29, 2005
File No. 32220.11

Mr. Chris Walusiak
Rhode Island Department of Environmental Management
Office of Waste Management
235 Promenade Street
Providence, Rhode Island 02908

Re: Addendum to
The Post-Closure Environmental Monitoring Plan
Former Jamestown Landfill
Jamestown, Rhode Island

Dear Mr. Walusiak:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide you with this addendum to the approved *Post-Closure Environmental Monitoring Plan* (EMP) for the former Jamestown Landfill. This addendum contains our recommendations/addition to the ongoing post-closure sampling and analysis conducted at the former Jamestown Landfill (the Site) located on North Main Road in Jamestown, Rhode Island. An additional sample location consisting of the water supply well located to the northeast of the former landfill on Plat 2/Lot 47 is being added to the routine quarterly monitoring program. This location shown on the attached figure will be designated PWSW in future monitoring reports.

Groundwater samples will be collected from location PWSW following the schedule set forth in the EMP. Samples will be collected employing low stress/low flow techniques described in the EMP until such time as the well is put into service as the potable supply for a proposed new DPW facility. At that time, sample will be collected from a supply tap in the facility. The aeration will be removed and the spigot decontaminated with a 10% bleach in water solution and the tap will be run for a minimum of 60 minutes to obtain a fresh sample from the well. Samples will be collected laboratory clean pre-preserved containers specific to the method of analysis. Sample containers will be provided by the laboratory prior to the sampling round. Preserved samples will be delivered the laboratory under chain of custody for analysis.

Sample analysis will consist of six field screening parameters (temperature, pH, oxidation reduction potential, specific conductivity, turbidity, and dissolved oxygen), 47 volatile organic compounds (via EPA Method 524.2) and 15 metals (via EPA Method 200.7) as indicated in Appendix A of the RIDEM Solid Waste Regulation #2. In addition nitrate, nitrite and total coliform will be analyzed as indicators of groundwater quality. Because PWSW will be used as a drinking water source; the laboratory will employ the use of EPA drinking water analytical methods 524.2 (VOCs) and 200.7 (metals).

Analytical result comparison, statistical evaluations and reporting will follow the procedures presented in the EMP.

We trust this addendum addresses your request and look forward to your approval. Please feel free to call us at (401) 421-4140 if you have any questions or comments.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Anthony L. Gomez
Assistant Project Manager

Edward A. Summerly, P.G.
Associate Principal

ALG/EAS:clz

Attachments: Figure 1

cc: Thomas Thighe, Town of Jamestown
Steve Goslee, Town of Jamestown
Michael Gray, Town of Jamestown
Laurie Grandchamp, RIDEM/OWM
Mark Dennen, RIDEM/OWM

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32220.00-C

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

June 13, 2005

In Re: Groundwater Reclassification at the Jamestown and Little Compton Landfills

Amendments to the DEM "Rules and Regulations for Groundwater Quality" that reclassify the groundwater at the Jamestown and Little Compton Landfills from GA to GB were filed with the RI Secretary of State's Office on June 10, 2005. These changes to the groundwater classification map will become effective June 30, 2005. The map changes were the only changes to the regulations.

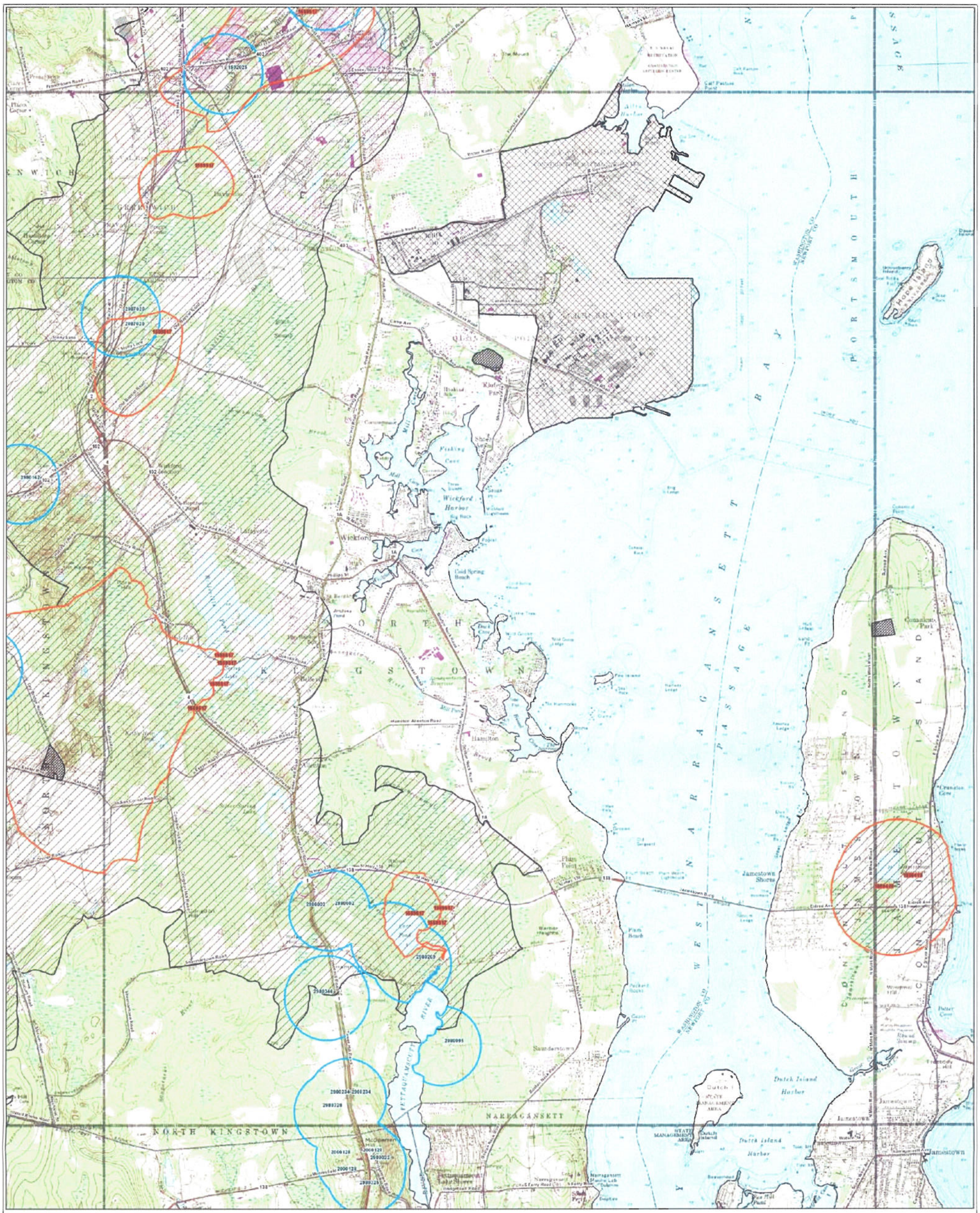
Links to the groundwater classification maps and the regulations can be found at the following page on the DEM website: http://www.dem.ri.gov/programs/benviron/water/quality/prot/index.htm.

If you have any questions, please contact me at 222-4700, ext. 7603.

Sincerely,

E. P. Panciera

Ernest C. Panciera
Principal Environmental Scientist


Wickford
Wickford Harbor
Hamilton
Allenton
Belleville
Quonset Point
Davisville
Wickford Junction
Saunderstown
Jamestown Shores
Plum Point
Plum Beach
Dutch Island Harbor
Hope Island
Conanicut Park
Cold Spring Beach
Fishing Cove
Mill Cove
Mill Pond
Pettaquamscutt River
Narragansett Pier
NORTH KINGSTOWN
NARRAGANSETT
JAMESTOWN
NARRAGANSETT BAY
WEST PASSAGE
EAST PASSAGE
PORTSMOUTH
Groundwater Classification
&
Well Head Protection Area
WICKFORD
1:24,000
1 inch equals 2,000 feet
0 0.5 1 2 Miles
Groundwater Class Definitions
GAA - Groundwater resources known or presumed to be suitable for drinking without treatment.
GA - Groundwater resources known or presumed to be of drinking water quality but are not assigned GAA
GB - Groundwater resources known or presumed unsuitable for drinking water use without treatment.
GC - Groundwater resources underlying waste disposal and surrounding areas.
Well Head Protection Area Definition
The critical portion of a three-dimensional zone surrounding a public well or wellfield through which water will move toward and reach such well or wellfield.
USGS Topographic Map Background is for Reference Only
Revision Date and Source Scale Varies
Projection: Transverse Mercator
Datum: NAD 83
RI State Plane Coordinate System (Feet)
Community WHPA
Non-Community WHPA
Community Water Supply ID
Non-Community Water Supply ID
Groundwater Classification
GA
All areas are assumed GA unless otherwise indicated by the shade patterns shown below
GAA
GC
GB > 25 Acres
GB < or = 25 Acres
Quadrangle Boundary

APPENDIX E

ENVIRONMENTAL LAND USE RESTRICTION

ENVIRONMENTAL LAND USAGE RESTRICTION

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

WITNESSETH:

WHEREAS, the Grantor Town of Jamestown is the owner in fee simple of certain real property identified as Plat 2 Lots 49, 50, and 51 on North Main Road in Jamestown, Newport County, 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 solid waste, soil and groundwater which is contaminated with certain hazardous materials and in excess of applicable residential direct exposure criteria, and GA groundwater objective criteria pursuant to the Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases ("Remediation Regulations");

WHEREAS, the Grantor has determined that the environmental land use restrictions set forth below are consistent with the regulations adopted by the Rhode Island Department of Environmental Management ("Department") pursuant to R.I.G.L. § 23-19.14-1;

WHEREAS, the Department's written approval of this Restriction is contained in the document entitled: Remedial Decision 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 Decision 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 groundwater at the Property shall be used as potable water;

iii No soil at the Property shall be disturbed in any manner without written permission of the Department's Office of Waste Management, except as permitted in the Remedial Action Work Plan (RAWP) and Soil Management Plan (SMP). The SMP is Exhibit B and attached hereto;

iv 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;

v No subsurface structures shall be constructed on the Property over groundwater containing hazardous materials and/or petroleum in concentrations exceeding the applicable Department approved GB Groundwater Objectives set forth in the Remediation Regulations;

vi 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 activity from being exposed to soils containing hazardous materials and/or petroleum in concentrations exceeding the applicable Department-approved residential direct exposure criteria in accordance with the Remediation Regulations; and

vii The engineered controls at the Property described in the Soil Management Plan (SMP) contained in Exhibit B attached hereto shall not be disturbed and shall be properly maintained so that water does not infiltrate soils containing hazardous materials and/or petroleum in concentrations exceeding the applicable Department-approved leachability criteria set forth in the Remediation Regulations.

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 Waste 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 3 (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.

The Town of Jamestown

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: _____

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Metes and Bounds Description
For
Landfill Remediation
Jamestown, RI

October 19, 2004

A certain lot or parcel of land situated on the easterly side of North Main Road, in the Town of Jamestown, County of Newport, State of Rhode Island, more particularly bounded and described as follows:

Beginning at a point being a granite bound on the easterly side of said North Main Road, said point being the most northwesterly corner of land owned by Ernest R. Viera and being the most southwesterly corner of the parcel hereby described:

Thence: N10°32'20"E, along said easterly side of North Main Road, a distance of five hundred seventy four and seventy three hundredths (574.73) feet to a spike at the southwesterly corner of Holly Street;-

Thence: N88°26'56"E, bounding on said Holly Street, a distance of eight hundred eighty and forty six hundredths (880.46) feet to the westerly line of Summit Street;-

Thence: S01°33'04"E, bounding on said westerly side of Summit Street, a distance of seven hundred twenty three and fifty four hundredths (723.54) feet to a stone wall at land of Cajacet Farms, LLC;-

Thence N82°22'52"W, along said stone wall bounding on said Cajacet Farms, LLC and land of said Viera, a distance of one thousand thirteen and eighty hundredths (1013.80) feet to the point of beginning.

Containing 609,478 Square feet or 13.992 Acres.