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September 4, 2014

Massachusetts Department of Environmental Protection
Southeast Regional Office
Division of Solid Waste Management
20 Riverside Drive
Lakeville, MA 02347

Attention: Mark Dakers, Section Chief

Reference: BWP SW25 - Corrective Action Design
Boston Environmental Corporation, Transmittal #X254044
Old Fall River Road Landfill, Dartmouth

Dear Mr. Dakers:

We are in receipt of your August 25, 2014 Determination of Technical Incompleteness regarding the Corrective Action Design (CAD) for the Old Fall River Road Landfill in Dartmouth, and are herein responding to it. Responses are primarily revisions to portions of the CAD narrative sections and drawings. The revised sections along with added information are attached as either rplacement sections supplemental section to the original June 26, 2014 CAD submission. Specific responses to your comments are as follows.

1. The Existing Conditions Plan has been stamped by a Registered Land Surveyor and is included. This plan replaces the Existing Conditions Plan that was included in PART E - DRAWINGS.

2. A new plan titled *Final Closure Construction Plan - Fill Depth Grid Plan*, is included as an added plan to PART E - DRAWINGS. The plan shows cut and fill depths on a twenty foot (20') grid, to final closure grades, which includes the two feet, six inch (2' 6") final cap construction depth. As shown on the calculations included on the drawing, the volume of the final cap material is 91,035 cubic yards (cy). This volume is in addition to the proposed volume of grading and shaping material that is to be filled within the Landfill, which is 926,000 cy. Consequently the targeted volume of the final closure grades is 1,017,035 cy (926,000 cy + 91,035 cy). The grading has been revised from the plans included in the original CAD Application to optimize the shaping and grading material volume, holding the 926,000 cy capacity of grading and shaping material and the peak elevation of 134.5 feet. The other drawings in the original CAD submission that included all or portions of the final grading have been revised and are also included in the attached PART E - DRAWINGS as replacements to the original drawings.

3. Section 4.2 has been expanded by adding a new subsection titled *4.2.1 Soils Delivery Procedure*, to provide additional discussion regarding the methods and procedures for testing, reporting, acceptance and management of the shaping and grading material soils.

4. Subsection *4.2.3 C&D Fines and Residuals Handling Procedure* (formerly Subsection 4.2.2) has been modified to expand upon discussion of the applicability and measurement of sulfate content is the C&D residuals materials. Appendix B-9 has been added to provide backup information to that discussion.

5. The *Hazardous Materials Management Plan (HMMP)* contained in Appendix B-3 of the CAD, has been revised to add discussion on the notification and response protocols as well as field technician training requirements regarding the potential detection of Suspected Asbestos Containing Material (SACM). The revised *Appendix B-3, HMMP* is attached.

6. Specification *Section 02140 Passive Landfill Gas Vents* has been deleted from the CAD and replaced with the attached *Section 02130 Landfill Gas Extraction Wells*. The drawings have been revised by removing the shallow vent details and replacing them with extraction well details.

7. The Details Plan has been revised to show construction details of stormwater basins where they are within the limit of the geomembrane cap construction.

8. References to Emulsion Mix have been deleted and replaced with Asphalt Pavement Grindings as base material to hold rip rap in place. The let down channel rip rap has been extended within the Basins to eliminate scouring.

9. A detail of the stormwater collection area at the base of the access road has been added to the Details Plan. Additional plan views and details have been added to the stream crossing design. All road work and culvert work will be performed within Old Fall River Road property limits.

10. Proposed materials to be accepted at the Landfill have been revised to include only clean soil, contaminated soil as defined by COMM # 97-001, and C&D fines and residuals. As proposed by BEC in its Conceptual Closure Plan, C&D fines and residuals will constitute 11% of the total of the 926,000 cubic yards of grading and shaping material, or approximately 102,000 cubic yards.

11. As shown on the drawing titled Facility Access Road and Entrance Improvements, the scale house will also function as the office trailer for the site. There is an existing pole line that enters the site from Old Fall River Road, in the immediate vicinity of the scale house/office trailer that will be used for power and telephone. Bottled water will be provided for consumption and sanitary services will be provided by a portable toilet.

12. The grading and shaping materials will be accepted Monday through Saturday, from 7:00 AM to 5:00 PM. Equipment and site maintenance, such as erosion control work, may occur outside of those times. These times of operation have been added to *Section 4.3.5 Traffic Mitigation Plan.*

13. Proposed pipe sizes and valve locations for the contingency header and lateral HDPE gas collection system have been added to drawing G-1, *Landfill Gas Response Plan.*

14. Logs of the test pits are included in Appendix B-8. This is referenced in Section *1.3 Site Description* and *Section 3.2 Delineation of the Limit of Waste.* It was also noting that the locations of the test pits and limit of buried waste are shown on the *Site Preparation Grading Plan* which was included in PART E - DRAWINGS of the original CAD submission.

15. The existing on-site residence will be moved to an adjoining parcel of land to the south of the Landfill site, which is owned by Mary Robinson, the owner of the Landfill property. A parcel for the house relocation has been subdivided from a larger parcel. Filings have been prepared and will be submitted to the Town in the future. These filings include a septic system application and a Notice of Intent for work within the buffer zone. The existing domestic well will be decommissioned in accordance with *MassDEP Private Well Guidelines*, where the Dartmouth Board of Health will be notified of the abandonment of the well. The well will be decommissioned by a certified well driller by filling the entire depth of the well casing with approved grout and installing a surface seal below the existing ground surface.

16. The US EPA HELP Model Calculations that are included in Appendix B-2 demonstrated that under a peak storm condition, the maximum head on the geomembrane cap would be less than ten inches (10") on the 5% plateau, with less than half that depth (4.6") on the 3:1 sideslopes. With the sand drainage layer being twelve inches (12") deep and adequately drained, it will not be saturated and will have surplus drainage capacity. Consequently the final cover system will be stable under peak storm conditions. In addition, stability analysis calculations of the final cap construction have been made to confirm that there is an adequate factor of safety for the stability of the final cap and that the specified materials in the sand drainage layer and vegetative support layer soils provide adequate filtering from plugging the drainage layer, which could destabilize the final cap over time. These calculations have been added to Appendix B-2.

17. A discussion of temporary stockpiling has been added to *Section 4.2.2 Soils Handling Procedure* (formerly Section 4.2.1). Temporary stockpiling of incoming grading and shaping material may occur so as to allow adequate grading and compaction of materials to be conducted. Stockpiles will be located in the immediate area of the active face and within the areas subject to erosion and sediment controls.

18. LEC, a consultant acting on behalf of BEC, submitted a Habitat Assessment Report for the Landfill property to the Massachusetts Natural Heritage & Endangered Species Program (NHESP). The Habitat Assessment Report addressed the delineated habitat of the Eastern Box Turtle on the property, as identified on the Massachusetts Natural Heritage Atlas. The Assessment Report was intended to demonstrate that the closure of the Landfill would not adversely affect the actual habitat of the Eastern Box Turtle. In response to the Habitat Assessment Report, NHESP determined in a July 15, 2013 letter that the project, as proposed, would not result in a "take" of the state listed species, as long as the project complied with conditions presented in that determination. BEC will comply with all of the conditions presented in the NHESP determination, during the closure construction work. A

copy of the July 15, 2013 determination letter is attached.

If you have any questions on this matter, please do not hesitate to contact us.

Very truly yours,

SITEC Environmental, Inc.

A. Raymond Quinn, P.E., L.S.P.
Director of Engineering Services

cc: Andrew W. Daniels, Boston Environmental Corporation

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

July 15, 2013

Michael Toomey
Boston Environmental Corporation
338 Howard Street
Brockton, MA 02302

RE: Applicant: Michael Toomey
Project Location: 452 Old Fall River Road, Dartmouth (Book 4889, Page 329, Bristol County Registry of Deeds)
Project Description: Closure of the Former Cecil Smith Landfill
NHESP File No.: 13-32053
Documents Referenced:

- Eastern Box Turtle Protection Plan (dated May 14, 2013; prepared by LEC Environmental Consultants, Inc.)
- Operation and Maintenance Plan (dated May 16, 2013; prepared by LEC Environmental Consultants, Inc.)
- Habitat Cover Type Map (dated June 20, 2013; prepared by LEC Environmental Consultants, Inc.)

Dear Applicant:

The Massachusetts Division of Fisheries & Wildlife's Natural Heritage & Endangered Species Program (the "Division") received the MESA Project Review Checklist, site plans (dated August 28, 2012, revised March 7, 2013; prepared by SITEC Environmental, Inc.; the "Project Plan") and other required materials for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

Based on a review of the information provided and the information currently contained in our database, the proposed project occurs within the habitat of the Eastern Box Turtle (*Terrapene carolina*), a species state-listed as "Special Concern". This species and its habitats are protected pursuant to the MESA and its implementing regulations. A Fact Sheet for this species can be found on our website, www.mass.gov/nhesp.

As proposed, the project includes placement of fill material and the construction of a landfill cap, access roads, grading, and stormwater management structures totaling ±24.36 acres (the "Work") on a ±112.12-acre parcel (the "Property"), as shown on the Project Plan. The Division notes that the Applicant has also proposed to restore early-successional habitat conditions within a ±2.1-acre Proposed Restoration Area, as shown on the Habitat Cover Type Map referenced above, including the removal of surface debris and invasive species.

Division of Fisheries and Wildlife
Temporary Correspondence: 100 Hartwell Street, Suite 230, West Boylston, MA 01583
Permanent: Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890
An Agency of the Department of Fish and Game

Based on the information provided and the information contained in our database, the NHESP has determined that this project, as currently proposed, **must be conditioned in order to avoid a prohibited "take" of state-listed species (321 CMR 10.18(2)(a))**. The project must adhere to the following conditions:

1. Recorded Letter: Prior to the start of Work, the Applicant shall record this letter in the Bristol County Registry of Deeds or the Land Court for the district in which the property is located so as to become a record part of the chain of title for the property. The Applicant shall provide the Division with proof of said recordation within five (5) business days of recording.
2. Seed Mix: Prior to the start of Work the Applicant shall submit, for Division review and approval, a seed mix(s) for the re-vegetation of the capped landfill, its associated stormwater management basins, and any other areas within the limit of Work to be seeded and stabilized,. To the greatest extent possible, all seed shall be composed primarily of ecotype-forbs listed as native to Bristol County, Massachusetts, as provided in *The Vascular Plants of Massachusetts: A County Checklist, First Revision* (Dow Cullina, Connolly, Sorrie & Somers, 2011).
3. Restoration Plan: Prior to the start of Work the Applicant shall submit, for Division review and approval, a Restoration Plan for the Proposed Restoration Area, as shown on the Habitat Cover Type Map referenced above. Said Plan shall detail procedures for the proposed invasive species removal and reporting of completed restoration activities to the Division after completion.
4. Turtle Protection Plan: All construction activities shall be subject to the protective measures outlined within the Eastern Box Turtle Protection Plan referenced above, unless otherwise approved in writing by the Division.
5. Operation and Maintenance Plan: Any mechanized vegetation management of the capped landfill or its associated stormwater management areas, as shown on the Project Plan, shall be subject to the protective measures outlined within the Operation and Maintenance Plan.

Provided the above-noted conditions are implemented and there are no changes to the project plans, this project will not result in a "take" of state-listed species. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

The Division notes that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. Any proposed future projects or activities proposed on the property within mapped *Priority* and *Estimated* Habitat, as indicated in the Massachusetts Natural Heritage Atlas will require review by the Division pursuant to the MESA. **The Division, at its discretion, may take into account the cumulative impacts relevant to state-listed species, including but not limited to those associated with the current project, when or if future projects or activities are proposed.**

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Jesse E. Leddick, Endangered Species Review Biologist, at (508) 389-6386 or jesse.leddick@state.ma.us.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director
Massachusetts Division of Fisheries & Wildlife

On this 15th day of July, 2013, before me, the undersigned notary public, personally appeared Thomas W. French, PhD., Assistant Director, proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her knowledge and belief.

Amy Coman, Notary Public
My Commission expires: April 28, 2017

AMY SUE COMAN
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
April 28, 2017

cc: MA DEP Southeast Region
Town of Dartmouth Conservation Commission
Michael Quatromoni, SITEC Environmental, Inc.
Brian Madden, LEC Environmental Consultants, Inc.

Application For:

SUPPLEMENTAL SUBMISSION
CORRECTIVE ACTION DESIGN
BWP SW 25
TRANSMITTAL X254044

OLD FALL RIVER ROAD LANDFILL
FINAL CLOSURE

Applicant:

Boston Environmental Corporation
338 Howard Street
Brockton, Massachusetts

September 4, 2014

CORRECTIVE ACTION DESIGN

OLD FALL RIVER ROAD LANDFILL FINAL CLOSURE
452 OLD FALL RIVER ROAD
DARTMOUTH, MA

Prepared For:

Boston Environmental, Corp.
338 Howard Street
Brockton, MA 02302

Prepared By

SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050

June 26, 2014
Revised September 3, 2014

CORRECTIVE ACTION DESIGN

OLD FALL RIVER ROAD LANDFILL FINAL CLOSURE
452 OLD FALL RIVER ROAD
DARTMOUTH, MA

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PART A
PERMIT APPLICATION FORMS

Massachusetts Department of Environmental Protection

Supplemental Transmittal Form

(to accompany supplemental material or payment to previously submitted DEP permit applications)

1. Transmittal Number	Obtain from the upper right hand corner of the original application's Transmittal Form:	
	X254044	

2. Facility Information	(a) Facility Name:	(b) Facility Address:
	Old Fall River Road Landfill	452 Old Fall River Road
	(c) Facility Town/City	(d) Telephone Number:
	Dartmouth	508-897-8062

3. Permit Information	(a) Permit Name:		(b) Permit Code: (from original application)	
	Corrective Action Design		BWP SW 25	

4. Reason For Supplemental Submission	☒	(a) Response to Request for Additional information	☐	(b) Response to Statement of Deficiency
	☐	(c) Supplemental Fee Payment	☐	(d) Withdrawal of Application
	☐	(e) Other (please specify below):		

5. Form Prepared by	(a) Name of individual or firm preparing this submission:	(b) Affiliation with application, i.e. applicant, consultant to applicant:
	SITEC Environmental, Inc.	Consultant
	(c) Contact Name:	(d) Contact Telephone #:
	A. Raymond Quinn	781-319-0100

PART B
ENGINEERING REPORT

PART B
ENGINEERING REPORT

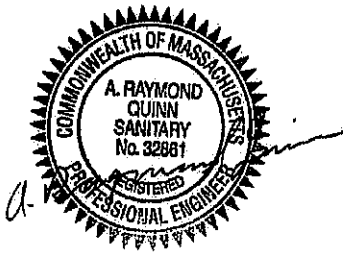
CORRECTIVE ACTION DESIGN
OLD FALL RIVER ROAD LANDFILL FINAL CLOSURE
452 OLD FALL RIVER ROAD
DARTMOUTH, MA

Prepared For:

Boston Environmental, Corp.
338 Howard Street
Brockton, MA 02302

Prepared By

SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050



June 26, 2014
Revised September 3, 2014

PART B
ENGINEERING REPORT

CORRECTIVE ACTION DESIGN
OLD FALL RIVER ROAD LANDFILL FINAL CLOSURE
452 OLD FALL RIVER ROAD, DARTMOUTH, MA

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1.0 INTRODUCTION

1.1 General

Mary Robinson is the owner of an inactive unlined landfill located at 452 Old Fall River Road in Dartmouth, Massachusetts (the "Landfill"). Mary Robinson has entered into an agreement with Boston Environmental Corporation (BEC) to cap and close the Landfill. On or about March 28, 2014, the Massachusetts Department of Environmental Protection issued an Administrative Consent Order (#ACO-SE-14-4001 ("ACO") to Mary Robinson and BEC. This Corrective Action Design ("CAD") is being submitted consistent with paragraph 54 of the ACO.

1.2 Application Documents

This document is included as a component of the CAD submission for the Final Closure Construction of the Old Fall River Road Landfill. Documents that comprise the entire application are listed below:

PART A: Permit Application Forms
PART B: Engineering Report
PART C: Construction Quality Assurance Plan
PART D: Technical Specifications
PART E: Drawings

1.3 Site Description

The Landfill is located at 452 Old Fall River Road in Dartmouth, Massachusetts. The Landfill was an active landfill from 1954 to 1974. The Landfill was privately operated and was used primarily for the disposal of construction and demolition waste during this period. The materials that were placed in the landfill generally consisted of demolition debris, brick, concrete and granite, along with scrap metal and tires.

The site is bisected by an active Algonquin Gas transmission line and a New England Electric electrical transmission line. The area of the property originally approved for landfill operations, according to the Site Assignment issued by the Town of Dartmouth in 1975, is 60 acres. BEC excavated 44 test pits at the Site, which determined that the extent of buried waste from the historic landfilling operation is approximately 25 acres in size. Logs of these test pits are included in Appendix B-8 and the locations of the test pits and limit of buried waste is included on the *Site Preparation Grading Plan* included in PART E - DRAWINGS.

The area which was used for landfilling is surrounded by the Algonquin Gas line on one side and wetlands on the other three sides. The Landfill is listed as an inactive, uncapped landfill according to the MassDEP Facility Master File listing. The land surrounding the Landfill is predominately wooded and undeveloped. Some residential homes and one commercial property, Gosselin & Sons Landscape Materials, are located to the north of the Site. Residential properties and undeveloped land abuts the Site to the south and undeveloped land along Old Fall River Road abuts the Site to

the east. The Site is bordered to the west by residential properties, wetlands and woodland and the Cole Brook Swamp. The Site is bordered by Old Fall River Road to the north and Hixville Road to the south.

The topography of the area surrounding the Site gently slopes from east to west. Stormwater runoff from the Site ultimately drains into the Cole Brook Swamp located to the north and west of the former Landfill and then into an unnamed stream that extends from the east side, across the north side and along the west side of the Landfill Site.

1.4 Site History

In 1954, a sand and gravel excavation operation began on Site and portions of the Site were used for disposal of solid waste, primarily demolition debris. The area of the sand and gravel excavation operation was subsequently used for waste disposal.

In the 1960s the Site was used for the disposal of demolition debris which generally consisted of brick, wood, steel granite, and general demolition debris from buildings. During this period the Site was also used to store salvageable materials principally scrap metals.

These practices continued until 1983 when the operations ceased due to a dispute with the Town of Dartmouth. Although a landfill site assignment was granted to the Site, the sanitary landfill that had been contemplated in the site assignment was never built or operated.

In July 2009, MassDEP performed a Site inspection in response to a compliant of alleged illegal activity occurring at the Site. During the inspection MassDEP observed that areas of the Landfill had been excavated to retrieve recyclable materials. The reclaimed recyclable materials were observed to have been culled and stockpiled adjacent to the excavation areas.

In August 2009, the MassDEP issued a Unilateral Administrative Order ("#UAO-SE-09-4001) which required the respondent (Mary Robinson) to prepare and submit to MassDEP a Remedial Action Plan. The respondent did not submit the Remedial Action Plan and consequently the MassDEP issued a Notice of Enforcement Conference. As a result of the Enforcement Conference conducted on June 22, 2011, MassDEP issued an Administrative Consent Decree that set forth the terms and conditions of achieving compliance. The Administrative Consent Order was not executed by the respondent and MassDEP.

In December 2012, MassDEP received a conceptual landfill closure proposal (the "Conceptual Closure Proposal") from BEC pursuant to the Department's "Inactive Landfill Closure Guidelines." As proposed, the existing footprint of the Landfill would be excavated/consolidated to a final size of 23-acres, and an estimated one-million cubic-yards of approved grading shaping materials would be used to achieve final landfill closure grades/configuration.

In mid-January 2013, MassDEP advised BEC that pursuant to the outlined procedures in the Department's "Inactive Landfill Closure Guidelines", MassDEP would conduct a public informational session within the community of Dartmouth regarding the "Conceptual Closure

Proposal". The purpose of the public informational sessions was to solicit input from the Town of Dartmouth officials and the community at large regarding the proposed landfill closure project.

In March 2013, BEC submitted a Notice of Intent ("NOI") to the Town of Dartmouth for the excavation/removal of solid waste from wetland resource areas surrounding the Landfill. The wetlands project was assigned Wetlands File Number #SE 15-2186.

In March 2013, BEC submitted a BRPWW10-Water Quality Certification application to MassDEP for proposed work within wetland resource areas surrounding the Landfill.

On March 28, 2013, the first public informational session on BEC's "Conceptual Closure Proposal" was conducted. As a result of public interest, two (2) additional public informational meetings were conducted on June 27, 2013 and on July 11, 2013.

In July 2013, BEC submitted their draft "Response to Public Comments" concerning issues that were raised during the three public informational sessions conducted on March 23, 2013, June 27, 2013 and on July 11, 2013.

In March 2014, BEC submitted its final/revised "Conceptual Closure Proposal" in accordance with the Department's Inactive Landfill Guidelines. As proposed in BEC's revised/final "Conceptual Closure Proposal", the project will include the following:

1. The existing foot-print of the Landfill will be reduced from approximately 25-acres to approximately 23-acres through the excavation of waste from surrounding wetland resource areas that abut the Landfill.
2. A four (4) year operational timeframe will be established, whereby approved landfill closure grading/shaping materials will be placed during the first three (3) years, in order to achieve proper Landfill closure grades/configuration, and during the fourth and final year of operation the Landfill's final capping system will be installed.
3. The total amount of approved landfill closure grading/shaping materials that will be used to close the Landfill will be approximately 926,000 cubic-yards ("yds^3").

On March 28, 2014, MassDEP issued an Administrative Consent Order ACO-SE-14-4001, which found that BEC's final/revised "Conceptual Closure Proposal" met the requirements of the "Inactive Landfill Closure Guidelines", and notified the Respondents that they could proceed with the preparation and submission of requisite permit applications pursuant to the applicable requirements set forth at 310 CMR 19.000, and as required by the Consent Order regarding the assessment and closure of the Landfill. A copy of ACO-SE-14-4001 in included in Appendix B-1.

2.0 FINAL CLOSURE PLAN

2.1 Site Preparation

Prior to the start-up of construction activities within buffer zones to adjacent bordering vegetated wetland ("BVW") areas, temporary erosion control devices will be installed adjacent to BVW and

proposed work areas. These devices will include staked haybales and silt fence along with staked silt socks where appropriate. These devices will be installed at locations along both sides of the entrance road to the site, at the existing crossing of the perennial stream and along the perimeter of the Landfill where initial work activities are to occur. These erosion control devices will be extended in advance of construction activities to ensure that there are no inadvertent disturbances to adjacent BVW. These devices will be maintained during the project and until vegetative cover is established to prevent erosion.

Entrance road improvements will be completed to establish suitable access/egress to the Landfill site. These improvements include a widening of the existing narrow access road to accommodate vehicular traffic and the placement of road surfacing materials that will prevent the tracking of dirt or mud to adjacent roadways. These surfacing materials include asphalt grindings from highway improvement projects and the construction of a crushed stone entrance apron at Old Fall River Road as one element to prevent tracking mud off-site.

The installation of project infrastructure facilities, including a truck scale, an office trailer and a wheel wash station, will occur along the entrance road from Old Fall River Road. The truck scale and office trailer will be installed along the westerly side of the entrance road just prior to the culvert crossing into the Landfill site. Installing the scale at this location will provide an adequate queuing area along the road for trucks delivering grading and shaping materials or final clover soils to the Landfill site. Trucks will not be allowed to queue up along Old Fall River Road. A wheel wash station will be installed and operated along the easterly side of the entrance road just north of the truck scale. Exiting trucks will be required to pass through the tire wash to ensure that there is no mud tracking off-site. The wheel wash station is to be a self-contained unit that does not discharge wash-water to adjacent areas.

An existing concrete culvert situated within the unnamed perennial stream located at the northerly Landfill entrance will be replaced in order to widen the entrance to accommodate truck traffic. The existing culvert has been determined to be a 46" diameter reinforced concrete culvert. As proposed this culvert will be removed and replaced with a new sixty (60) inch diameter reinforced concrete culvert embedded into the bottom of the stream a minimum of fifteen (15) inches in accordance with the Massachusetts River and Stream Crossing Standards. Concrete block retaining walls will be constructed on both sides of the access road at the stream crossing. Widening of the access road at the stream crossing will allow for the passage of two-way truck traffic with sufficient shoulder width and turning radius.

2.2 Final Closure Grading

This CAD includes the use of specific waste materials for grading and shaping the site to achieve final grades for the Landfill, under the MassDEP's July 6, 2001 *Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites* (Unlined Landfill Policy). Specifically the proposed final closure grades of the Landfill will be achieved by reusing soils or other materials, that are specifically approved by MassDEP for use as shaping and grading materials in unlined landfills. The materials that are to be accepted at the facility and the methods of accepting and screening the materials are described in *Section 4.0 Landfill Grading Materials Acceptance Plan* of this CAD.

The proposed shaping and grading will be conducted in a manner that will allow final cap construction to be completed in phases. As indicated on the plans included in PART E - DRAWINGS, the shaping and grading that is proposed by this CAD will begin with Phase 1 Closure, which will be located within the north/northwesterly portion of the main Landfill footprint and will proceed toward the south, proceeding along the northern and western sidelines, to finished elevations of approximately 134. This initial sequence will bring the 5.9 acre area indicated on the plan titled *Final Closure Construction Sequence Plan, Phase I Landfill Closure Construction* to final subgrade elevations. At the initiation of the Phase 1 grading period, the perimeter of this section of the Landfill will be prepared for closure. As shown on the attached drawing *Site Preparation Grading Plan*, this includes the relocation of waste from within ten feet of the adjacent bordering vegetated wetlands and around the perimeter. This will allow for the construction of the northern access road and sedimentation pond, denoted as Sedimentation Basin No. 2 on the Drawings, to take place outside the final capped limits of the Landfill. During the construction of the perimeter site preparation work, approved materials will be transported to the site and stockpiled within the inner portion of the Phase 1 Closure Area. As sections of the perimeter preparation are completed the stockpiled material will be relocated to the interior of the perimeter berms and incorporated into the Landfill. The capacity of Phase 1 is approximately 391,000 cubic yards of approved material.

The second phase (Phase 2), as indicated on the plan titled *Final Closure Construction Sequence Plan, Phase II Landfill Closure Construction* will shape and grade approximately 8.3 acres in the southwesterly portion of the main Landfill to final subgrade elevations. Shaping and grading in this section will be preceded by the site preparation work shown on the *Site Preparation Grading Plan*, which includes the removal of waste from within ten feet of the wetlands and the construction of a berm along the south perimeter that will form the outside containment of Sedimentation / Detention Basin No. 1. The capacity of the Phase 2 Closure Area is approximately 354,000 cubic yards of approved material.

The third phase (Phase 3) of this CAD, as indicated on the plan titled *Final Closure Construction Sequence Plan, Phase III Landfill Closure Construction* will be completed with the shaping and grading of two final areas. The first part of the Phase 3 Closure Area includes the shaping and grading of the easterly side of the main Landfill and will bring the remaining 5.9 acres to final subgrade elevations. The shaping and grading of this area will be preceded by the remaining Site Preparation work associated with the main Landfill Area, which includes the removal of waste and the completion of the southerly perimeter berm that will form the outside containment of Sedimentation / Detention Basin No. 1. Site preparation work that will precede Phase 3 landfilling will also include waste consolidation activities and landfill access road construction on the easterly side of the main Landfill area. The capacity for this part of the Phase 3 Closure is approximately 160,000 cubic yards of approved material.

The second part of the Phase 3 Closure will shape and grade the 2.5 acre isolated area located to the south of the Algonquin gas pipeline easement. The shaping and grading of the isolated landfill area will also be preceded by site preparation work which includes waste consolidation activities, the construction of a perimeter containment berm and the construction of Sedimentation / Detention Basin No. 3. The capacity for the isolated landfill area is approximately 23,000 cubic yards.

As shown on the drawings, the proposed shaping and grading of the Landfill will bring the site to a maximum final elevation of about 134.5 feet. This represents a total volume of shaping and grading material of approximately 926,000 cubic yards. The shaping and grading operation is proposed to be conducted over a period of approximately three years. This corresponds to an average annual rate of about 310,000 cubic yards, which at an in place density of 3,000 pounds per cubic yard (approximately 110 pounds per cubic foot) represents about 465,000 tons per year. The facility will operate six days per week, excluding holidays (300 days per year), which will result in an average of about 1,030 cubic yards per day or 1,550 tons per day of soils being delivered to the site. The soils will be delivered in thirty cubic yard (30 cy) trucks. Typically a 30 cy truck will carry 32 tons of soils. Based on these assumptions, the estimated truck traffic generated by the proposed Landfill closure operation will be an average of 50 trucks per day.

2.3 Final Cover System

The purpose of Final Closure Construction is to control stormwater runoff so as to reduce erosion and sedimentation, to manage landfill gases and to isolate landfill materials from the environment and vectors. The final cover system will accomplish each of these objectives by incorporating a designed network of run-off/run-on controls, a passive gas venting system and a cover system comprised of geomembrane and earthen materials that will effectively isolate the underlying Landfill area.

The final cover system will be comprised of the components described below:

- Excavation and relocation of limited areas of existing waste, including the restoration of wetlands that may be disturbed by this work.
- The importation, placement and compaction of approved materials to bring the Landfill to design subgrade elevations.
- A suitably prepared landfill surface beneath the final cover system.
- A geomembrane subgrade/gas venting layer consisting of 6 inches of sand with a minimum saturated hydraulic conductivity of 1.0×10^{-3} centimeters per second (cm/sec).
- A low permeability layer consisting of a 40 mil HDPE textured geomembrane cap.
- A drainage layer consisting of 12 inches of sand with a minimum saturated hydraulic conductivity 1.0×10^{-2} cm/sec.
- Establish a vegetative support layer consisting of at least twelve inches (12") of soil with a minimum hydraulic conductivity of 1.2×10^{-4} cm/sec. and a minimum organic content of 5%. The vegetative and capable of supporting a healthy vegetative growth.

2.4 Stormwater Management System

In addition to the components listed above, the final cover system for the Closure Construction will have several stormwater run-off/run-on control features designed to maintain the integrity of the final cover and prevent ponding of water on the areas of the final cover. The stormwater control system will consist of the following components.

- Earthen diversion berms will be built into the final cover of the sideslopes to divert run-off to side slope let-down channels. These berms reduce the distance that overland run-off has to travel, thereby, reducing the volume of overland flow and erosion of the final cover.
- Side slope stone-lined let-down channels are used to convey slope run-off from the diversion berms to the stormwater basins at the toe of the slope.
- Stone-lined drainage channel is lined with a rip-rap surface and constructed along the inside edge of the Landfill access road on the easterly side of the Landfill. The channel will convey run-off from the easterly sideslope and access road to a stormwater collection area with a sediment sump where it will discharge from the Landfill through a culvert.
- Stormwater basins will capture sediment and control peak discharge rates, prior to discharge to surface waters.
- Sub-drains constructed of perforated pipe will be installed above the geomembrane cap at the toe of the sideslopes, as well as at intermediate slope locations associated with the earthen diversion berms. Sub-drains will divert drainage water that has percolated through the topsoil layer and into the drainage layer and discharge it to the perimeter swales. This will minimize the build-up of water within the drainage layer that could destabilize the sand drainage and vegetative support layer soils.

The locations of each of these stormwater management features, along with details and typical section views are presented in PART E - DRAWINGS of this submission.

The proposed final cover drainage layer was designed to provide sufficient capacity to manage all the water that enters the drainage layer and to ensure that it complies with regulatory design standards. The evaluation was performed using the USEPA HELP Model to determine hydraulic conductivity requirements for the drainage layer.

The following data was used in the design:

- The final cover drainage layer is to be 12 inches thick and comprised of permeable sand having a minimum hydraulic conductivity of 1.0×10^{-2} cm/sec.
- The vegetative support layer is to be comprised of a minimum of 12" of a soil with a minimum organic content of 5%, having a hydraulic conductivity of approximately 1.2×10^{-4} cm/sec.
- Sub-drains installed at the toe of the landfill sideslopes, as well as at intermediate locations, will be used to discharge infiltrated water and minimize pore pressure in the drainage layer. Sideslope subdrains will have a maximum separation distance of ninety (90) feet and the plateau area subdrains will have a maximum separation distance of ninety (90) feet.

The HELP Model analysis of the final cover indicates that the drainage layer has sufficient capacity to manage infiltration, without it impacting and destabilizing the vegetation support layer. (The depth of water on top of the geomembrane is not greater than the depth of the sand layer during peak day conditions.) Results of the HELP Model analysis are provided in Appendix B-2. In addition, stability analysis calculations of the final cap construction have been done to confirm that there is an adequate factor of safety for the stability of the final cap and that the specified materials in the sand drainage layer and vegetative support layer soils provide adequate filtering from plugging the

drainage layer, which could destabilize the final cap over time. These calculations have been added to Appendix B-2.

3.0 WASTE RELOCATION, WETLANDS RESTORATION & PERIMETER BERM

3.1 General

Certain limited areas of existing buried waste, along the perimeter of the Landfill area to be capped, or which may be identified during closure construction work, will be excavated and relocated into the interior portion of the Landfill as shown on the Drawings. These waste materials will be excavated to the natural ground surface and consolidated into the main portion of the Landfill so that they may be properly covered, initially with intermediate cover materials and subsequently incorporated into the site wide final closure construction work. The waste relocation work will remove waste from the delineated wetlands and within a minimum of ten feet from the wetlands boundary, in order to provide an adequate buffer space between the wetlands and landfilling work. Additionally waste will be removed for the perimeter access road and sedimentation pond areas. In areas where waste excavation will result in the need to backfill the areas, on-site, non-landfill related soils of adequate physical characteristics will be used. Where wetlands have been excavated, they will be remediated and replaced, as described below and shown on the drawings.

After waste excavation, relocation and wetlands restoration in any particular phase of landfill closure construction, an earthen perimeter containment berm will be constructed around the Landfill to establish the limit of grading and shaping materials associated with closure activities and to control stormwater runoff during intermediate stages of landfill closure.

3.2 Delineation of the Limit of Waste

BEC and its consultant SITEC Environmental, completed the delineation of wetlands throughout the entire property. The wetland delineation line has been surveyed and plotted on the drawings. BEC, on behalf of Mary Robinson, filed a Request for Determination of Applicability (RDA) with the Dartmouth Conservation Commission requesting approval to conduct the limit of waste test pit excavations and to obtain concurrence from the Commission on the accuracy of the wetland delineation. The Dartmouth Environmental Affairs Officer, Michael O'Reilly, visited the site on two occasions to view the wetlands flagging. The Commission issued a Negative Determination that allowed for the test pit investigations and also approved the limits of on-site wetlands and associated resource areas.

BEC completed an extensive topographic survey of the property and the area of the existing Landfill. There were several historical drawings that showed the reported extent of the Landfill which were prepared by the EPA as well as several consultants that worked on the Landfill property. These drawings were used to identify the general extent of the landfilling operations. To better define the Landfill and its boundaries, BEC and SITEC conducted an extensive test pitting program on the Landfill property to define the boundary of the waste. BEC excavated forty-four (44) test pits around the Site to determine the location of buried waste at the site and its limits. SITEC had a field engineer on site at all times to verify the test pit location as well as depth and materials identified

in the test pit. This test pit program and field survey has been used to prepare the drawings included in this Corrective Action Design (Closure Plan) submittal. Logs of these test pits are included in Appendix B-8 and the locations of the test pits and limit of buried waste is included on the *Site Preparation Grading Plan* included in PART E - DRAWINGS.

3.3 Waste Location, Excavation and Relocation

Prior to performing waste excavation activities, erosion controls will be installed on down-gradient sides of the work area as shown on the Erosion Control Plan enclosed in PART E – DRAWINGS. Erosion controls will consist of haybales and siltation fencing. It is anticipated that the waste excavation activities will be conducted using a track-mounted excavator that will load the waste into dump trucks. Excavation and waste removal will be performed until the natural ground surface is encountered. Waste relocation activities will be conducted under the supervision of a qualified environmental Field Technician experienced in solid waste management issues, health and safety protocols and hazardous materials identification and response actions. Removal of waste located in wetland resource areas or their buffer zones shall be conducted in compliance with federal, state, and local requirements.

Excavated waste materials will be loaded into dump trucks and transported to the Landfill's operations area, where grading and shaping materials are to be placed at locations described herein. The material will be placed to provide appropriate grading of this area. The excavated materials will be placed directly into the area of the Landfill that is to be graded, spread, and thoroughly compacted by the bulldozer or waste compactor performing the landfill grading activities. All waste materials consolidated into the Landfill will be covered with approved daily cover materials at the end of each day's operations. Similarly, there will be no waste material left exposed within the excavation area. This area will be made secure at the end of each day by grading to eliminate steep slopes or embankments and with the application of cover material to prevent unsafe conditions.

Waste excavation activities will be conducted under the supervision of an Environmental Field Technician experienced in the identification and handling of hazardous materials and DEP listed waste ban items. During the excavation process, the Environmental Field Technician will examine (visually and with instrumentation) the excavated materials for the presence of restricted materials. Should suspect hazardous materials be identified, excavation within its vicinity will be suspended until proper investigation can be performed in accordance with the Hazardous Materials Management Plan (HMMP) included as Appendix B-3. Refer to the HMMP for a listing of suspect hazardous materials as well as other site conditions requiring the implementation of the HMMP.

The nature of the materials encountered will be carefully examined and a determination will be made as to whether handling by on-site personnel (with Level D Personnel protective equipment) is feasible without risk to the environment or personal health and safety. This determination will be made by the Project Coordinator in consultation with the Environmental Consultant (if necessary – refer to HMMP in Appendix B-3). Should it be determined that the material can be managed by on-site personnel, the material will be placed within a secure area or roll-off container for collection by a licensed hazardous waste management company, for proper disposal. Should the materials require special handling, the area where the material was encountered will be secured and

appropriate notifications will be made. Refer to the HMMP for detailed descriptions of the notification and response actions to be implemented.

A complete listing of emergency response contacts with phone numbers has been developed and will be reviewed with all on-site workers prior to the start-up of this waste excavation project. Additionally, site workers will also receive training on the site-specific Health And Safety Plan (HASP) included as Appendix B-4 of this CAD. This HASP identifies the potential hazards that may be encountered during this project along with the measures to be implemented for protection. The copy of the HASP will be maintained at the office trailer at the site entrance. An Emergency Response Contact Sheet with phone numbers and directions to the nearest hospital will be posted within the trailer adjacent to the telephone. Heavy equipment operators will have two-way radios at all times during the work to respond to emergency situations.

3.4 Confirmatory Soil Sampling and Analysis Plan

Following the excavation and relocation of waste from the perimeter buffer area and prior to backfilling the excavation, BEC will conduct a confirmatory sampling and analysis of the residual soils that remain in the excavation area, in order to confirm that no unacceptable levels of contamination remain in the excavated areas.

Residual soils will be characterized by laboratory analysis of composite samples that are collected in a manner that provides a representative sample of the remaining soils materials. Each soil sample sent for analysis will represent no more than 500 cubic yards of excavated and relocated material. Sampling will be conducted in accordance with Section 3.1 of the *Massachusetts Department of Environmental Protection's Standard References for Monitoring Wells (Standard References)*. The method used will be selected in the field based upon conditions at that time and approved by the Project Coordinator in consultation with the Environmental Consultant (if necessary – refer to HMMP in Appendix B-3).

Each soil sample submitted for analysis will be a composite of at least five locations within the residuals soil area being characterized. The sampling locations will be selected and the surface of the remaining soils will be scraped to reveal material under the surface. A clean plastic or steel bucket will then be filled from each area using a hand trowel. A known volume of soil will be obtained from each bucket, emptied onto a mixing surface or into a separate clean bucket, and thoroughly mixed before being placed in sample jars. The exception will be volatile organic compounds (VOCs) or volatile petroleum hydrocarbons (VPH) samples which will be collected by a single grab sample and will not be agitated in a way that could cause volatilization. Saturated soils excavated below the groundwater table will be dewatered to the maximum extent practicable.

Each collected sample will have a completed sample label securely attached. In addition, the sample identification number will be marked on the container lid with a permanent marker so that the sample can be properly identified if the label is separated from the sample. The chain-of-custody program will be followed as outlined in Section 6.4-1 of the *Standard References*. Field data sheets, chain-of-custody forms and labels will be completed by field personnel at the time the samples are

collected. Forms must be signed by the sampler and each person the samples are transferred to. Chain-of-custody forms will be provided by the analytical laboratory.

The confirmatory Soil Sampling and Analysis Plan is to be conducted to ensure that residual soils will meet the criteria of the Massachusetts Contingency Plan (MCP) of the applicable Method 1 Soil Category pursuant to 310 CMR 40.0975.

In order to determine whether soils will meet the applicable Method 1 Soil Category criteria, the soils will be analyzed for the following analytes.

- Volatile Petroleum Hydrocarbons - MA-VPH Method
- Extractable Petroleum Hydrocarbons - MA-EPH Method
- Poly-chlorinated Biphynels (PCBs) by EPA Method 8082
- 8 RCRA Metals

Results of the Soil Sampling and Analysis Plan shall be periodically reported to MassDEP. At a minimum a report of the findings of the confirmatory soil sampling activities will be made to MassDEP at the completion of waste excavation and relocation for each phase of site preparation work.

3.5 Odor Monitoring Plan

BEC has established an Odor Monitoring Plan as part of the Landfill Gas Response Plan, which is included in Appendix B-5 of this Engineering Report. BEC will be responsible for the implementation of this Odor Monitoring Program, which is summarized below:

- Monitoring wind speed and direction throughout the day.
- Conducting odor surveillance along the down-wind property line and within the surrounding area at a minimum of two times daily or with changes in wind direction or wind speed. Surveillance locations shall include Old Fall River Road, Energy Road and Hixville Road.
- Recording all surveillance data and implementing measures necessary to abate odor episodes should they occur. These abatement measures may include neutralizing agent application, operational changes such as reducing the size of the active excavation area or the temporary suspension of waste excavation and consolidation activities until conditions are more conducive. The Project Coordinator will maintain a written log of all surveillance activities. These records will be readily available for reference and review to determine if trends have developed and to ensure that appropriate follow-up actions have been implemented.
- Work will be conducted in accordance with MassDEP odor policies.

3.6 Waste Excavation Area Restoration

Upon completing each day's excavation activities, approved daily cover materials will be placed over all exposed waste areas. The daily cover material will be placed, graded and compacted so as to form a stable surface, resistant to erosion. Excavation areas into natural soils will be stabilized to resist erosion. As indicated on the Drawings, the excavated areas will be brought to

grade/subgrade of the Landfill's perimeter facilities and will be located outside of the construction of the final cap. The area of remaining waste will be brought to design grades using approved materials and will be fully capped by the proposed design.

As shown on the Drawings, disturbed upland areas will be covered with the specified twelve inches (12") of vegetation support soils and will be seeded, consistent with the landfill sideslope cover. Wetland areas disturbed during the removal of solid waste and sediments will be restored to their approximate original grade so as to preserve the hydrological functions, including flood protection and groundwater recharge. As shown on *Drawing R-1, Wetlands Replication Areas Plan*, granular fill will be used as backfill up to six inches below the final grade if greater depths of sediment excavation are required. Final grades will be achieved using six inches of topsoil or peat with a minimum of 10% organic matter. Once the final grades are established, the disturbed areas will be planted with highbush blueberry and winterberry or other suitable wetland plant species listed in the Wetlands Protection Act. Also, the disturbed areas will receive an application of OBL Wetland Seed Mix ERNMX-151 or a similar mix. Utilization of this mix will result in a diverse plant community. The restored areas will be re-seeded as necessary to ensure that the area is fully stabilized and supporting vegetative growth. Disturbed wetland areas shall be restored according to MassDEP wetland restoration guidelines and the Superseding Order of Conditions that was issued by MassDEP on December 2, 2013, which is included in Appendix B-1

3.7 Perimeter Berm Construction

After waste excavation is completed in any particular construction phase, site preparation activities shall include the formation of an earthen perimeter containment berm to control stormwater runoff, the construction of a stormwater detention basin at the northwesterly corner of the landfill, and landfill surface grading and preparation activities. Construction sequence drawings that detail the phased construction of site preparation activities are enclosed in PART E – DRAWINGS.

The earthen containment berm is to be constructed of soils that may be excavated as part of landfill surface preparation activities or of soils that are transported to the site from off-site sources. The soils should be compactable to form a dense berm that will establish the actual limits of grading and shaping material placement and that will prevent the uncontrolled discharge of stormwater runoff from the disturbed landfill surface. The perimeter berm is to be formed at a minimum distance of ten feet (10') upgradient of the delineated and approved wetlands line and shall slope continuously to the northwesterly corner of the site where Stormwater Basin No. 2 is to be constructed.

4.0 LANDFILL GRADING MATERIALS ACCEPTANCE PLAN

4.1 Landfill Grading Material Types

MassDEP's *"Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites"* provides that a variety of materials can safely be used to (1) achieve proper grade for closure, (2) provide an adequate foundation layer for final cover materials, and (3) help defray the cost of landfill closure. The criteria established for the types of materials to be used for these closure activities are presented below:

1. Use of materials during closure shall not significantly add to the actual or potential public health, safety environmental concerns of the unlined inactive landfill site. Materials used during closure shall:
   a) be non-putrescible and not contain contaminants that are likely to leach in the landfill environment;
   b) not significantly increase the concentration of contaminants in leachate or quantities of leachate released at the site;
   c) not significantly increase the toxicity or quantities of landfill gas released; and,
   d) not significantly increase nuisance conditions, such as noise, dust or odor, at the site.

2. Closure materials shall have, but not be limited to, the following characteristics:
   a) be granular and composed predominately of inorganic (mineral) materials to minimize settlement due to decomposition, gas generation, etc.;
   b) be easy to spread, compact to high density and not readily decompose over time;
   c) be well graded;
   d) a maximum size where no more that 10% of the material, by weight, exceeds 6 inches (nominal) in size with a maximum size of 12 inches an any dimension.
   e) have a gradation where 90% of the material is 6 inches (nominal) or less in size.

3. To reduce settlement issues and gas and leachate generation concerns, the organic content (determined by a loss of ignition test) of materials brought to the site during closure shall either be:
   a) less than 35% (by weight) on a material specific basis; or
   b) less than 35% of the combined weight of all materials brought to the site during closure, excluding the weight of final cover materials used for the cap.

4. All materials greater than 35% organic content shall be mixed with other materials to meet 3.b above, either prior to or during the actual placement of that material. An appropriate method to verify the organic content of materials brought to the site shall be a requirement for use of those materials.

MassDEP Final Guidance provides:

1. The following types of materials shall be used for closure activities. All other materials shall require specific DEP approval.
   a) clean soil;
   b) contaminated soil as defined by DEP Policy 97-001;
   c) approved grading and shaping materials, such as C&D fines and residuals.

2. The type and/or source of all materials used for closure activities shall be approved by the Department prior to use at the Landfill. Testing of materials (chemical, physical, etc.) may be required to determine whether it is suitable for the proposed closure application.

3. Unprocessed MSW, C&D or any other unprocessed wastes are not suitable for use during inactive unlined landfill closures.

4.2 Material Acceptance, Screening, Tracking and Placement

All providers of grading material will be required to sign an agreement prior to utilizing the facility. In doing so, these providers will be certifying that the material they deliver to the facility are consistent with the acceptable shaping and grading material profile and they conform to the physical properties and/or chemical characteristics that may be reported on accompanying documentation or described when requesting approval to use the facility. In signing the agreement, the providers are also agreeing to comply with the regulations of the facility including the use of approved vehicle routes when going to and from the site. The facility will coordinate routes with trucking companies delivering materials to the Site.

4.2.1 Soils Delivery Procedure

Prior to any materials being shipped to the site, a profile must be submitted to BEC. The profile shall provide adequate characterization that demonstrates that the material meets the requirements of MassDEP's *Reuse and Disposal of Contaminated Soil at Massachusetts Landfills (Policy # COMM-97-001)*. The components of the profile that will be required for every source of materials are:

1.) An opinion letter by the LSP or other Qualified Environmental Professional managing the source site that certifies the material meets the criteria of MassDEP policy # COMM-97-001 for reuse at lined landfills
2.) Data summary table comparing laboratory results against the COMM-97-001, Table 1 - Maximum Contaminant Levels for Unlined Landfills.
3.) A site sketch showing all sampling locations, limits of the proposed material to be imported, and major structures.
4.) A Bill of Lading (BOL) or a Material Shipping Record (MSR) shall be completed for each source location. The BOL must be used for any in state site where there are reportable concentrations within the materials. An MSR may be used for out of state sources or where there are no exceedances of reportable concentrations.
5.) All laboratory reports, including the chain-of-custody(s).

The Opinion Letter shall include the general name to which the source site is commonly referred and provide additional or descriptive information that identifies the location and source of the material from within the source site. It shall also identify the person or organization legally responsible for submission, the company and contact of the Qualified Environmental Professional responsible for the characterization of the soil and provide estimated soil quantity to be transported to the landfill in cubic yards or tons. The Opinion letter shall identify the suspected source of contamination, such as a tank, either above ground or under ground, or from a motor vehicle or other container and also shall provide a description of the release including the substance released and, if known, quantity and date of release, as well as a physical description of the soils. The Opinion Letter shall provide the current and past site history including past incidents involving a release of OHM and/or past and present management practices of OHM, if applicable.

The Opinion Letter shall describe the sample type and collection methods and the name(s) of the Qualified Environmental Professional(s) who collected the samples. A description of whether the samples were taken from a stockpile or in-situ and whether the sample locations are from what may be considered "hot spots". At a minimum, for every 500 cubic yards of soil that is proposed to be transported for reuse at the Landfill, the following laboratory analysis shall be performed.

Total Volatile Organic Compounds (VOCs) - Total concentration of compounds listed in EPA Method 8260
Total Semi-Volatile Organic Compounds (SVOCs) - Total concentration of compounds listed in EPA Method 8270.
Total Poly-Chlorinated Biphynels (PCBs) - Total of concentrations of compounds listed in EPA Method 8080
Total Petroleum Hydrocarbons (TPH) - VPH and EPH total carbon chain groups may be substituted for TPH
Total Arsenic (As), Cadmium (Cd), Chromium (Cr), Lead (Pb), and Mercury (Hg)
Conductivity - Will be required where elevated concentrations of NaCl may be encountered. Any location within or adjacent to a marine environment or historically filled marine environment requires conductivity analysis. In addition, any site which was or may have been impacted by the storage or use of road salt requires conductivity testing.
TCLP (Listed or Characteristic Hazardous Waste) - Will be required for metals or organic compounds when total concentrations in the soil are above the theoretical levels at which TCLP criteria may be exceeded

The profile will be submitted to BEC so as to provide BEC an adequate opportunity to review the profile for completeness and for conformance to the requirements of COMM-97-001. After review of the profile BEC will contact the party proposing to deliver material for reuse that either all or a portion of the material is acceptable or that additional information will be required. Assuming the material is acceptable a tentative schedule for delivery will be developed, which can occur at a single time or may be occasional over a longer period of time. The profile and any responses will be filed at the Scale House for reference at the time of delivery.

4.2.2 Soils Handling Procedure

Upon arriving at the site all vehicles delivering preapproved material will be weighed on the truck scale at the site entrance. At that time, the scale attendant will record all pertinent information about the transporter and the materials delivered. This information will include the following:

- Date and Time of the delivery;
- Transporter information including company, phone number, driver's name, truck number or license plate and truck type;
- Gross vehicle weight; and tare weight when exiting the site;
- Material type and origin.
- Confirmation that the transporter is in possession of a Bill of Lading (BOL) or a Materials Shipping Record (MSR) documenting that materials have been tested and do not exceed contaminant limits set forth in DEP's Policy # COMM-97-001, *Reuse and Disposal of*

Contaminated Soil at Massachusetts Landfills. The driver will sign the BOL or MSR, as provided on those forms.

The scale attendant will visually check the contents of the load, if it is feasible to do so at that time, prior to directing the driver to proceed to the current working area on the Landfill. Should the attendant determine that unacceptable materials are observed or that the contents of the vehicle are not consistent with the declared material type, the vehicle will be rejected and not allowed to proceed. In the event of this occurrence, a discrepancy report will be prepared citing the nature of the problem and the action taken to prevent future occurrences. These actions include notifying the transportation company by phone or in writing of the discrepancy to facility policy and warning that a subsequent violation will result in suspension of facility privileges. These actions will also include the notification of appropriate authorities such as the Police Department, Fire Department and MassDEP, as appropriate.

Authorized vehicles will proceed to the active grading area following posted signs and directional arrows. Upon arriving at the active area, the driver will be directed by the spotter to the appropriate material placement area. The contents of the vehicle will be thoroughly inspected by the equipment operators as it is being discharged. Should unacceptable materials be observed during the unloading process, they will be reloaded onto the transporter's vehicle for subsequent removal from the facility. If it is not possible to segregate the prohibited materials from the rest of the load, the entire load will be rejected and placed back on the truck for removal. In either case, a Waste Load Discrepancy Report will be completed and the previously mentioned follow-up actions will be performed in order to prevent future occurrences. This acceptance protocol is applicable to all materials accepted at this facility for grading and shaping of the Landfill's surface.

Once the inspection of the material is complete, the load will be spread in shallow lifts and compacted. Bulldozers and/or compactors specifically designed for these operations will conduct this grading and compaction. Compaction will be conducted by multiple passes of the heavy equipment until the material is consolidated into a stable mass with minimal voids. As grading and shaping soils materials come in, there may be need to temporarily stockpile the material to allow time for adequate grading and compaction to occur. In this case the stockpiles will be created in the immediate vicinity of the active face and within the area that is subject to erosion and sediment controls, as described in this CAD. These operations will continue until the final grades presented on the Closure Plans are attained. These placement operations are intended to begin within the Final Closure Construction Area, as indicated on the Drawings in PART E - DRAWINGS of this CAD.

4.2.3 C&D Fines and Residuals Handling Procedure

BEC is proposing to conduct the grading and shaping operations of the Landfill by including fines and residuals from Construction & Demolition (C&D) processing operations. The use of this additional materials source stream will help BEC complete the Landfill closure process in a timely manner. The C&D fines and residuals will be blended with other approved materials, primarily soils. BEC is proposing to mix the materials at a ratio of two parts soil to one part C&D materials (2:1), by volume. This ratio does not include additional soils that will be used for cover material. The 2:1 ratio has proven, by field testing and assessment, to provide a conservative protocol for

mitigating the potential for producing odors. Odors can occur when the sulfates in gypsum, a component of wallboards, react in the environment so as to produce odorous hydrogen sulfide gas.

BEC is going to control the acceptance of C&D fines and residuals by establishing agreements with C&D processors who produce these materials and need to dispose them. These agreements will require the processors to demonstrate that they have established and that they conduct a Gypsum Removal Plan. The purpose of a Gypsum Removal Plan is to reduce, to the extent practicable, the amount of gypsum in the C&D materials, in order to reduce potential odor generation. In addition the agreements will require the processors to composite sample and analyze the fines and residuals for sulfate content, on a monthly basis. BEC will use the analytical results to comparatively track the general quantity of sulfates that are incorporated into the landfill.

During 2008 through 2010 SITEC Environmental conducted two independent evaluations of the effects of sulfate content in C&D fines and residual materials on the potential of generating odors from the production of hydrogen sulfide when mixed with soils in landfill closure projects. The first evaluation was an analysis of the closure practices of adding C&D fines and residuals as part of the Marion Landfill closure. The Marion study included the compilation of the application data of C&D materials and the monitoring of hydrogen sulfide within the Landfill. The conclusions of the Marion Study were that C&D materials containing an average of about 14,000 mg/kg of sulfate being mixed at a ratio of 2:1 soil to C&D materials, which converted to 4.2 pounds of sulfate per ton of soil, did not produce odors or high concentrations of hydrogen sulfide within the landfill.

The second evaluation took place as part of the closure of the Stoughton Landfill, which included the controlled reuse of soils and C&D materials at applied loading rates of pounds of sulfate per ton of soils. The evaluation included the sampling and analysis of C&D fines and residual materials for sulfate content and density, their controlled mixing with soils at specified volume ratios and the monitoring of hydrogen sulfide within cells established for the evaluation. As reported to MassDEP, measured sulfate concentrations averaged 27,000 mg/kg for residuals and 37,000 mg/kg for fines. The targeted application rate was about 8.0 pounds of sulfate per ton of soil, which equated to a volumetric ratio of 2:1 soil to C&D materials. Portions of the Application to MassDEP to conduct the Stoughton Assessment and status reports prepared during its conduct are attached in Appendix B-9.

The fines and residual materials produced by processing operations will be delivered to the site in covered roll off or other closed containers, unmixed with other materials. The roll-off containers will cross the scales and their weights will be recorded. A separate log for these materials will be maintained for record and reporting purposes. These volume records, along with the sulfate analysis reporting will provide a mechanism to track the volume of sulfates that are deposited into the Landfill. These materials will then be delivered to the Landfill in an area specifically designated for the handling and filling of C&D materials. This area is limited to portions of the Landfill that are at least 1,000 feet from any residence.

The blending of the soils with fines/residuals will occur as the materials are placed into the Landfill. The blending will be performed by using heavy equipment. Either of two methods may be used to measure the materials to the established ratio. The first method will be to create a mixing pile from

separate stockpiles of fines/residuals and soils. The ratio will be achieved by creating the mixing pile by taking the established ratio of front end loader bucket loads from each of the piles. (e.g. one bucket full of fines/residuals to two bucket full of soil to achieve a 2:1 ratio.) BEC may initially try to blend the mix pile materials by feeding them through a trommel device that does not have a screen, but rather a solid body. This will provide a thorough blending of the materials with a single step that will allow a near continuous operation, without having to work in batches. As an alternative to the trommel, a batch mixing process can be used that will initially consist of turning the pile with the front end loader, spreading the pile out and then harrowing the pile to achieve a blend of materials.

Another method of proportioning the materials will be to spread measured layers of the materials at the established ratio. (e.g. a two foot thick layer of soil covered by a one foot layer of fines/residuals, to achieve a 2:1 ratio.) The layered soils and fines/residuals will again be blended by either feeding the measured materials through a trommel or by turning the pile with the front end loader, spreading the pile out and then harrowing the pile to achieve a blend of materials. The blended materials will then be placed into the Landfill and thoroughly compacted. BEC will maintain a stockpile of soil on the Landfill's footprint to ensure enough soil is available for daily use in the blending process.

4.3 Construction Period Impact Controls

4.3.1 Dust Control

The Facility will implement measures necessary to prevent impacts associated with wind blown dust generated from the placement of grading and shaping materials as well as landfill capping materials. The Facility will conduct routine evaluations of dust control program by performing inspections within the adjacent areas along Old Fall River Road, Hixville Road and Energy Road.

The dust control measures to be implemented during grading and shaping and closure construction include:

- Maintaining all internal access roads in good condition with stable surface materials that resist the propagation of dust,
- The application of calcium chloride to access roads to prevent dust conditions;
- The use of a water truck on the project so that access roads can be sprinkled to prevent dust conditions; the water truck will also be equipped with a hose attachment so that grading and shaping materials can be sprinkled as they are being unloaded, spread and compacted;
- Dispatching of a street sweeper to the paved areas within the site and along the adjacent streets to prevent off-site dust;
- Coordinating the locations at which grading and shaping material placement occurs so that more remote areas can be worked during periods of higher wind.

4.3.2 Litter Control

Due to the nature of the materials to be accepted at this site for grading and shaping, wind blown litter is not anticipated to be a significant issue. The Facility will, however, dispatch personnel as needed to patrol adjacent streets and properties for fugitive litter. The Project Coordinator will be responsible for determining if cleanup actions are needed and for assigning personnel.

4.3.3 Noise Control

The Facility will implement measures to minimize noise impacts during the project. The measures include:

- Maintaining internal access roads in good condition to reduce truck body noise;
- Minimizing truck and heavy equipment idling in proximity to the adjacent property areas;
- Maintaining strict adherence to the approved hours of operation;
- Communicating frequently with all site employees reminding them to be aware of noise issues at the facility and their possible detrimental impacts to the adjacent areas.

4.3.4 Odor Control

The Facility will implement measures necessary for the control of odors during the placement of grading and shaping materials, during the waste excavation and consolidation activities and during final cap construction. These measures include, but are not necessarily limited to the following:

- The temporary suspension of waste excavation activities during periods of excessively hot weather or other weather conditions when odor episodes are identified to be occurring;
- The liberal application of odor neutralizing agents during the waste excavation activities and during the unloading of grading and shaping materials;
- The rapid covering of particularly odiferous loads of materials either excavated from on-site or delivered to the facility for grading and shaping. These materials will be covered with non-odorous materials.

4.3.5 Traffic Mitigation Plan

The Facility will implement a Traffic Mitigation Plan that will reduce impacts to the vicinity, resulting from truck traffic generated by the closure activities of the Landfill. The grading and shaping materials will be accepted at the Landfill, Monday through Saturday from 7:00 AM to 5:00 PM. Equipment and site maintenance, such as erosion control work, may occur outside of those times. Because there should be no peak demands on the facility, the average and peak hour trip rate for the facility will be about 14 truck trips per hour for an average eight hour day. Even if unmitigated, this increase is not significant, especially when taken into context that this is a temporary traffic generation source, which will cease upon final closure of the Landfill.

The Facility will coordinate routes and schedules with trucking companies delivering materials to the site, particularly on large soil jobs, to balance truck route trip rates. Traffic delivering closure

materials to the Landfill can be controlled by prior notice to the entities that are shipping the materials to the Facility. Each source of materials that are shipped to the Facility requires prior approval by BEC. In that approval the operators will be assign the traffic route to the Facility. A majority of the trucks delivering materials to the Facility will be directly controlled by BEC. Others will be contracted or will be independent users of the site who will be directed by BEC, under penalty of suspension or termination of the privilege to use the site, on the routing, the speed, noise generation and other driving practices that may impact neighborhood traffic and abutters on the travel route.

BEC will post signs at the site entrance and other locations, directing the truck drivers to obey all posted speed limits, not to use "Jake Brakes", always use the wheel wash station when leaving the site and to keep to the assigned travel route. Drivers will be advised that BEC has a zero tolerance policy toward violations of its posted rules. BEC will investigate any valid complaints from residents and, if they are justified, will suspend or terminate the offender's privilege to use the Facility.

The Figure titled Truck Traffic Routing, included in PART E Drawings, indicates the primary truck route for accessing the site. Trucks will be directed to use Massachusetts Route 140 (Rt. 140). The trucks will exit Rt. 140 at Exit 4 in New Bedford. North bound trucks will take a right at the bottom of the exit ramp onto Kings Highway and then take a right onto Mount Pleasant Street. South bound trucks on Rt. 140 will take a right directly onto Mount Pleasant Street. The trucks will then merge and travel west on New Plainville Road for approximately two miles where New Plainville Road intersects with Old Plainville Road. Trucks will then travel west on Old Plainville Road for approximately 0.25 miles where Old Plainville Road becomes Old Fall River Road at the Dartmouth Town Line. Trucks will then travel west on Old Fall River Road for approximately two miles, crossing Faunce Corner Road, and will then turn left onto the Site. While the above described route will be the primary haul route to the Facility, emergency alternative routes with very good access exist, notably Exit 11 (Reed Road) and Exit 12 (Faunce Corner Road) off of Interstate 195. These emergency alternative routes will only be allowed for use if the primary route is detoured or otherwise obstructed. Trucks using these emergency alternative routes, without BEC approval, will be treated as having violated the Facility's Traffic Mitigation Plan and the privilege to use the Facility will be suspended or terminated.

5.0 LANDFILL GAS MANAGEMENT SYSTEM

The management of gas generated within the Old Fall River Road Landfill will be provided by the installation of passive landfill gas extraction wells. The layout of the Landfill's gas system and installation details are presented on the drawings included in PART E - DRAWINGS of this submission. The components of the gas system are described below.

The proposed system is a passive type of gas extraction well system, by which removal of the gas from the Landfill is caused by the internal pressure of the gases within the Landfill. If an active collection and treatment system is ever determined to be required, the proposed gas extraction well system could be manifolded to a vacuum blower and treated at a single location. The determination of the need for an active gas collection and treatment system will be determined by the

Comprehensive Site Assessment, and if needed the Corrective Action Alternative Analysis, requirements of the regulations.

Gas Extraction Wells

The radius of influence exerted by a vertical gas vent well is the lateral distance from which the gas generated will be drawn into the well as a result of pressure exerted by the gas within the Landfill. To efficiently and effectively collect gases generated within the Landfill several extraction wells, appropriately located, shall be installed. An estimated radius of influence of 100 horizontal feet was utilized for the design of the gas collection system. The radii of influence for the gas extraction wells overlap to provide adequate venting capability over the Landfill's area.

The gas venting wells have been designed to have a constructed well diameter of two feet. To construct each venting well, a two-foot diameter boring will be drilled to the bottom of waste or to the groundwater table, which ever is the shallower, by using a bucket auger drilling rig. Once the well boring has been completed, the gas extraction well will be installed. Each extraction well will consist of the following:

- An eight-inch diameter perforated SDR-17 HDPE well screen, provided with a bottom end cap, joined to a six-inch solid SDR-17 HDPE riser pipe via a slip coupling connection.
- One to one and one half-inch washed stone placed around the well screen to a minimum of one-foot above the top of the well screen.
- A well washer to provide a separation between the washed stone gravel pack and the next layer.
- A two-foot thick bentonite plug consisting of medium bentonite chips or pellets placed above the stone and hydrated with water.
- Well-graded soil backfill placed above the bentonite plug to the surface.

All of the vertical wells will be drilled to a depth of the approximate bottom of waste deposition in the Landfill, or to the groundwater table. The top of the six-inch diameter solid SDR-17 HDPE riser will extend approximately three feet above the final cover of the Landfill's surface and will terminate in a "candycane" outlet, with an insect screen.

Landfill Gas Response Plan

BEC's consultant, SITEC has prepared a *Landfill Gas Response Plan* as part of this CAD application as required by MassDEP for approval of the final closure construction of the Landfill. The *Landfill Gas Response Plan* is being submitted by BEC as part of the CAD in order to allow the reuse of processed C&D fines and residual material (fines/residuals) for a portion of the grading and shaping fill, as part of the Old Fall River Road Landfill Closure project. This Plan has been developed in accordance with MassDEP's September 2007, *Control of Odorous Gas at Massachusetts Landfills* policy and is attached as Appendix B-5.

6.0 STORMWATER MANAGEMENT PLAN

Existing Conditions

As shown on the enclosed drawings, the limit of existing waste associated with the former Old Fall River Road Landfill as determined through a test pit plan conducted in September 2012, consists of two separate areas. The larger of the two areas is located on the northerly side of the Algonquin Gas pipeline easement and is approximately 22.5 acres in area. The second area is an isolated landfilled area on the southerly side of the Algonquin Gas pipeline easement and is approximately 2.5 acres in area. Both landfill areas are uncapped and significant portions of these areas are situated within the 100-foot buffer zone associated with adjacent Bordering Vegetated Wetland (BVW).

Under existing conditions, stormwater runoff from both landfilled areas generally flows, untreated, in a westerly direction toward the surrounding BVW. The existing landfill surface consists of a pasture / grassland with a fair stand of vegetation.

Proposed Conditions

BEC has prepared a Stormwater Management Plan (Plan) that is intended to provide a comprehensive means to properly control stormwater runoff generated across the site. The Plan is intended to provide a stormwater system that will control both the quantity and quality of runoff that is discharged from the site to the environment to mitigate potential impacts from that discharge. An analysis has been performed for three (3) scenarios during the operational closure period in order to evaluate the ability of the earthen perimeter berm to contain the runoff from the 100-year rainfall event. As demonstrated by the drainage calculations enclosed in *PART B, Appendix B-6 – Stormwater Management System and Drainage Report*, the earthen berm has the capability of fully containing stormwater runoff from the Landfill for all major rainfall events. Minor grading will be required within the landfill to create storage capacity. The proposed grading and perimeter berm locations are shown on the enclosed *Site Preparation Plan* and *Final Closure Construction Sequence Plan* in PART E – DRAWINGS.

In addition, drainage calculations have been prepared to analyze stormwater runoff generated from all storm events for the final Landfill post-closure conditions. The proposed post-closure conditions, as presented in this CAD are represented by the anticipated build out of the site by landfilling approved materials to attain proposed final elevations. This will be achieved by filling the area of the consolidated Landfill to a maximum slope of 3:1 and a minimum slope of five percent (5%) on the upper plateau area, to reach a maximum elevation of 134.5 feet. The filled area will be capped and be constructed with plateau and sideslope drainage controls for diverting run off to the control facilities constructed under the CAD. These conditions are generally presented on the drawing titled *Final Design Grading Plan* included in PART E- DRAWINGS of this CAD. A report enclosed in *PART B, Appendix B-6 – Stormwater Management System and Drainage Report*, summarizes the proposed stormwater management system proposed for the final closure of the Old Fall River Road Landfill and the system's applicability to the MassDEP stormwater management standards, including required water quality volume to be treated by the facilities and the mitigation of peak runoff flows from existing conditions to proposed post-closure conditions. In addition, drainage

calculations for existing conditions and post-closure conditions are enclosed in PART B, Appendix B-6.

7.0 THE SUBGRADE LAYER AND SUBGRADE PREPARATIONS

After the Landfill has reached its approved subgrade elevations, it will require minor grading and shaping prior to placing the cap. Grading will be established across the Landfill area that will be capped, based on the approved plans and existing survey baseline information. Where appropriate, organic soils and other unsuitable materials will be removed and stockpiled for use as vegetative support soils. Upon completion of grading activities, the Landfill surface and the subgrade soils will be thoroughly compacted as required in Section 02200 - Earthwork included in PART D – TECHNICAL SPECIFICATIONS of this CAD. Should there be insufficient quantities of soil to establish a uniform subgrade layer, additional soils materials will be brought in and applied to deficient areas. These subgrade materials may be soils conforming to *DEP's Policy # COMM-97-001, Reuse and Disposal of Contaminated Soil at Massachusetts Landfills*. These soils shall comply with the requirements of reuse levels for unlined landfills, as stated in that Policy. The passive landfill gas vents shown on the PART E - DRAWINGS will be installed prior to the completion of subgrade preparation.

8.0 THE LANDFILL GAS VENTING LAYER

The Landfill gas venting layer will consist of a sand material with a minimum permeability of 1 x 10^{-3} cm/sec. This layer will be placed to a uniform 6" thickness over the entire area to be capped for the purpose of providing a medium within which landfill gas will migrate to the passive ventilation system. This layer should prevent isolation or pockets of gas from building up and damaging the geomembrane cap. Frequency testing requirements for both permeability and grain-size are specified in the CQA Plan which is attached as PART C of this CAD. The gas venting layer will be "connected" so the accumulating gases flow to the gas vents for emission of built up gases to the atmosphere.

9.0 LOW PERMEABILITY LAYER

The final cap design includes the installation of a 40 mil textured High Density Polyethylene (HDPE) geomembrane as the low permeability layer. Technical Specifications for the geomembrane material and its installation are included in PART D of this CAD. The geomembrane shall be installed over the prepared landfill surface to the limits shown on the Drawings that are included in PART E. The geomembrane shall be firmly secured into an anchor trench that will be excavated around the perimeter of the Landfill closure area. The anchor trenches shall be backfilled and compacted with suitable soil material to fully secure the geomembrane sheets and the extrusion welds will be fully tested in accordance with the specifications.

The geomembrane material will be subject to extensive source testing by a third party testing laboratory as well as in-the-field destructive and non-destructive seam testing as detailed within the PART C - CONSTRUCTION QUALITY ASSURANCE PLAN and PART D - TECHNICAL

SPECIFICATIONS of this CAD. Geomembrane installation and testing will be supervised and coordinated by the Certifying Engineer.

10.0 DRAINAGE LAYER

10.1 Drainage Layer Description

The final cover drainage layer will be comprised of a permeable layer of sand installed directly on the surface of the low permeability layer geomembrane. The purpose of the drainage layer is to:

- prevent excessive accumulation of water above the low permeability layer;
- provide a high permeability pathway through which drainage water which infiltrates through the vegetative support layer may flow; and
- function, in association with the vegetative layer, as a protective layer over the low permeability layer.

Accordingly, the materials used within the drainage layer will be high permeability sands.

10.2 Design Criteria for Drainage Layer

The drainage layer has been designed to comply with applicable regulatory design standards (310 CMR 19.112). The general regulatory design standards for the final cover drainage layer are:

- The layer must have sufficient thickness and hydraulic conductivity to drain the immediate and up-gradient areas of the final cover system.
- To protect the geomebrane from damage, the maximum grain size of the sand layer will be less than 3/8 inches.
- The layer must be composed of a soil material that is at least twelve (12) inches thick and has a designed minimum saturated hydraulic conductivity of 1.0×10^{-2} centimeters per second (cm/sec).

10.3 Analysis of Drainage Layer

The proposed final cover drainage layer was evaluated to assure it would provide sufficient capacity to manage water infiltrating through the overlying vegetation support layer. The evaluation included an estimation of the infiltration into the drainage layer. This estimate was made by SITEC using the HELP (Hydrologic Evaluation for Landfill Performance) model, based on weather data for Providence, Rhode Island. Results of the calculations are presented in Appendix B-2. In addition, analysis of the final cover system's stability and the filtering capacity of the sand drainage layer have been included in Appendix B-2.

- The evaluation shows that the drainage layer has sufficient capacity to manage all infiltration provided the following conditions are satisfied:
- The drainage layer is approximately twelve (12) inches thick and its design minimum saturated hydraulic conductivity of 1.0×10^{-2} cm/sec.

- The vegetative support layer is a minimum of 12 inches thick on the side slopes and its saturated hydraulic conductivity is approximately 1.2×10^{-4} cm/sec.

11.0 VEGETATIVE SUPPORT LAYER

11.1 Vegetative Support Layer Description

Areas of the final cap that will not be part of surface access roads will be covered with vegetative support soils and will be seeded to establish a stable grass cover over these areas. The vegetative support layer will be comprised of a loamy soil capable of supporting native vegetation, free of large rocks, debris, stumps and any other unsuitable matter. The purpose of the vegetative support layer is to:

- provide an environment that will sustain a vegetative cover; and
- protect underlying layers of the final cover from the adverse effects of desiccation, extremes of temperature, including frost effects, and erosion.

11.2 Design Criteria for Vegetative Support Layer

The vegetative support layer has been designed to comply with applicable regulatory design standards (310 CMR 19.112). The general regulatory design standard for the vegetative support layer is that it must have a sufficient thickness and composition to support vegetation and to protect underlying layers from desiccation, extreme temperatures and erosion.

11.3 Analysis of Vegetative Support Layer

The vegetative support layer will be twelve (12) inches thick and when placed over the drainage layer will provide a layer of earthen materials 24" thick, above the low-permeability layer. Thus, the potential effects of temperature variations and the potential for erosion to expose the low-permeability layer are minimized.

The soils used to construct the vegetative support layer will be obtained from local sources and will have a minimum organic content of five percent (5%). Lime and/or fertilizers will be added to encourage the growth of vegetation. Since the design of the underlying drainage layer is based on soil hydraulic conductivity, the vegetative support layer will have a saturated hydraulic conductivity of approximately 1.2×10^{-4} centimeters per second.

The Landfill slopes shall be seeded upon completing the placement of the vegetative soil layer using the seed species and application rates stipulated in the specifications. Seeding will be done by either broadcast or hydroseed application methods between April 1 and May 31 or August 15 to October 15 unless otherwise approved.

12.0 CONSTRUCTION PLAN

12.1 General

The Landfill closure project will be phased. Final capping construction activities will be completed as portions of the Landfill areas achieve final closure elevations. This CAD submission details the phased final closure of the entire site. This work will proceed in accordance with the provisions of this plan and MassDEP approvals. MassDEP will be notified in writing prior to commencing closure construction activities. The following section describes the general conduct of the closure construction work and provides measures to be employed to mitigate any possible nuisance conditions that may arise due to site construction activities.

12.2 Sub-grade Preparation

The Final Closure Construction project includes preparing a subgrade for the final cover system and to construct the Landfill's gas venting system. A description of construction control measures which will be implemented during the subgrade preparation, gas system installation and final cover construction are provided below.

Dust Suppression
While preparing the subgrade for the final cover system, dry materials have the potential to become airborne creating dust. This potential will be controlled by applying water to dry and dusty work areas on an as needed basis. If dust control by the application of water is unsuccessful, the excavation or movement of material will stop so the dust can be controlled, or may be delayed until weather or site conditions are conducive to resuming the work.

Odor Control
The subgrade preparation and gas system work has the potential to generate odors. A sufficient supply of lime or other odor control agents will be maintained at the project site to manage odors, should they occur. If odors develop, the odor control agents will be applied, as necessary, to neutralize odors at the active excavation area. In addition, soil may be used to cover odorous waste. At the end of each work day, exposed waste will be covered to control potential odors.

Erosion Controls
The intermediate cover soils will be maintained prior to the placement of the sub-grade/gas venting layer to minimize erosion. Erosion control methods, including silt fencing and hay bales, have been installed around the entire perimeter of the Landfill. These measures will be maintained throughout the operating and closure construction activities at the site.

Run-off Controls
Run-off control structures will be constructed as part of the subgrade preparation. Swales will direct run-off away from the construction area to the stormwater sedimentation basins. Any sediment captured in the these basins will be removed on an as-needed basis.

12.3 Final Cover Construction

Once the subgrade is prepared, as shown on the design drawings, the construction of the final cover system will begin. This work will include the following elements:

1. Gas wells and vent trenches will be drilled or dug into the Landfill, as specified.

2. A six (6) inch thick sub-grade/gas venting layer, comprised of permeable sands, will be placed over the entire area where the final cover system will be placed.

3. An HDPE geomembrane will be placed on the prepared surface of the subgrade/gas-venting layer. The geomembrane will be deployed from the top of slopes and will be appropriately ballasted with sand bags. The geomembrane will be oriented parallel to the line of the slope. The geomembrane will be secured in an anchor trench at the top of the Landfill and along its perimeter.

4. A drainage layer, at least twelve (12) inch thick, will be placed over the surface of the geomembrane. This material will, typically, be spread from the bottom of the slope, up-hill toward the top of the slope. In limited areas, it may be necessary to work from the top towards the bottom.

5. A vegetation-support layer, at least twelve (12) inch thick of at least 5% organic content soils, will be placed above the drainage layer. This material will, typically, be spread from the bottom of the slope, up-hill toward the top of the slope. Final seeding of the completed slopes will be performed prior to October 15th each year to ensure adequate time for seed germination and establishment of vegetative cover.

6. Earthen diversion berms and stone-lined run-off channels will be constructed on the final cover system. The diversion berms will be constructed of compacted earthen soils used in the vegetation-support layer. The stone-lined channels will be constructed on a channel subgrade above the geomembrane.

The above summary of work is intended to provide a general description of the final cover construction. PART C - CONSTRUCTION QUALITY ASSURANCE PLAN and PART D - TECHNICAL SPECIFICATIONS, which provide more detailed requirements for the construction work, are included as components of this Corrective Action Design submission.

13.0 CLOSURE/POST-CLOSURE ENVIRONMENTAL MONITORING

13.1 Site Monitoring

During the closure and subsequent initial post-closure period, bi-monthly, or every other month, inspections are proposed to be conducted to determine the adequacy and status of erosion controls, settlement of critical areas, site drainage, gas venting, groundwater monitoring wells and vector control. Reports will be forwarded to MassDEP and the Dartmouth Board of Health during the

closure and post-closure periods describing any maintenance activity at the Landfill. A copy of an inspection form is included in Appendix B-7. This form will be utilized for the closure period and modified for the post-closure period inspections and any additional comments will be attached to the forms. At some future point in time, presumably by the fifth year after final closure, approval will be requested from MassDEP to conduct inspections on a semi-annual basis.

13.2 Groundwater and Surface Water Monitoring

An Initial Site Assessment and a Comprehensive Site Assessment Scope of Work (ISA/CSA-SOW) has been prepared in accordance with MassDEP Guidance and submitted to MassDEP for approval.

Following MassDEP's approval of the ISA/CSA-SOW Report, the site assessment work will be conducted. Groundwater and surface water will be sampled for four quarters, by techniques consistent with the approved ISA/CSA-SOW and DEP's *Standard References for Monitoring Wells*. Samples will be field screened for pH, temperature, dissolved oxygen and conductivity. In accordance with the Solid Waste Management Regulations at 310 CMR 19.132(1)(h)1-3, samples will be sent to a laboratory certified by the Commonwealth of Massachusetts for the analysis of the parameters required by the regulations. Soil gas monitoring wells will be field screened in accordance with the approved CSA-SOW.

Initial results from two sampling events of the CSA will be presented in a Draft CSA Report. Comments received from MassDEP and results of the final two rounds of sampling will be incorporated into the Final CSA Report. The Final CSA Report will include a risk characterization of the site and recommendations for the need of any further assessment.

As monitoring continues during the post-closure period, the data may indicate that changes to the monitoring program, either a reduction or an increase, is warranted for either; 1) the number of groundwater wells or surface water locations sampled; 2) the number of parameters analyzed; or 3) the frequency of sampling. Any change in the monitoring program will require the approval of MassDEP. It is anticipated that the Environmental Monitoring Program will be reevaluated after the fifth year of final closure.

During sampling and monitoring activities, groundwater monitoring wells and gas monitoring wells will be inspected to ensure that the seal around the well and the well itself is secure. Wells will be repaired or replaced, as required to conform to the MassDEP's *Standard References for Monitoring Wells* and to provide proper monitoring facilities. Static groundwater elevations and total well depth from each well will be recorded prior to collecting groundwater samples. Groundwater and gas monitoring wells will be maintained as required in accordance with 310 CMR 19.118(2) and 310 CMR 19.133. All sampling and analysis protocols will be consistent with MassDEP requirements.

13.3 Landfill Gas Monitoring

In accordance with MassDEP's approval of the ISA/CSA-SOW, the installation and screening of a soil gas monitoring well system will be conducted, as part of the CSA program. Depending on the

results of the soil gas monitoring work, additional gas wells may be installed, if it appears that landfill gas is migrating off site.

Following completion of the CSA work soil gas will continue to be monitored on a quarterly schedule. Design modification of the passive gas venting system may be warranted if the concentration of explosive gases is consistently measured to be greater than 25% of the Lower Explosive Limit (LEL) or methane exceeds 1.25% (equivalent to 25% LEL) at the property line. In addition, an oxygen meter, hydrogen sulfide meter and a photoionization detector will be used to determine the possible presence of other landfill gases or volatile organic compounds (VOCs). The landfill gas venting system and gas monitoring wells will be monitored and maintained during post-closure to determine the gas control system's effectiveness in preventing concentration levels of explosive and malodorous gases and other pollutants which may exceed air quality standards, and in turn cause nuisance conditions or explosive conditions, as outlined in 310 CMR 19.117, 310 CMR 19.118(4) and 310 CMR 19.133.

14.0 CONCEPTUAL POST-CLOSURE USE PLAN

14.1 Alternative Post-Closure Uses

A number of post-closure uses have been considered for the Old Fall River Road Landfill. Categorical uses have included passive recreation, active recreation, solid waste composting and solar power generation. The following is a summary of the potential post-closure uses that have been considered.

Passive Recreational Uses
This use typically includes the establishment of walking trails and park areas for unorganized recreation such as dog walking or frisbee playing. Capital and maintenance costs for this alternative are relatively low. Parking areas would have to be established and mitigation of odors from the gas vents may have to be conducted.

Active Recreational Uses
This use typically includes the development of some organized athletic facility, such as baseball, soccer or football fields or a mountain bicycle (BMX) recreation, training and competition facility. Capital and maintenance costs will be greater than for passive recreational uses. Additional measures will have to be taken to protect the Landfill's cap because of the more intensive use of the site, relative to passive recreational uses. Also more parking will be required than for passive recreational uses and mitigation of odors from the gas vents may still have to be conducted.

Solid Waste Composting Uses
This use would be to develop a leaf composting operation to the top plateau of the Landfill. Capital and maintenance costs for this alternative are relatively low. The area where these activities are conducted would be supplemented with a thicker cap and a wearing surface of processed asphalt, brick or concrete would have to be installed. An access road would also be required to handle potentially more intense traffic use on the landfill than with the recreational use alternatives.

Depending on actual conditions at the locations of user and employee exposure, mitigation of odors from the gas vents may have to be conducted.

Solar Panel Power Generation
This use would be the construction of an electric generating solar power panel array, on top of the Landfill. This alternative will be the most expensive because of the potential high cost of site development for the array and capital costs for the array and electrical transmission equipment. However, this alternative offers the potential benefit of renewable electricity generation. With the potential for selling the power to individual off site users or to the local power grid system, this alternative offers the potential means of generating revenue along with reducing power demand from non-renewable sources.

14.2 Proposed Post-Closure Use

The proposed post-closure use for the site is to be determined at a later time. When an appropriate post-closure use has been selected a BWP SW36 Major Post-Closure Use or a BWP SW37 Minor Post-Closure Use will be submitted to MassDEP, for approval.

15.0 CLOSURE/POST-CLOSURE COST ESTIMATES

15.1 Cost Estimates

Old Fall River Road Landfill closure and post-closure cost estimates were developed and included in the approved Conceptual Closure Proposal at Attachment 6. Attachment 6 provides a summary of the costs associated with all closure construction requirements and post-closure maintenance of the Landfill site as well as environmental monitoring and reporting for the 30 year Post-Closure Period.

The funding of these closure/post-closure costs is underwritten by the revenue generated by the acceptance of approved materials, for shaping and grading the Landfill, in accordance with MassDEP's Unlined Landfill Policy.

15.2 Financial Assurance Mechanism

In accordance with 310 CMR 19.051 and paragraphs 55 and 56 of the ACO, BEC will provide MassDEP with documentation that a Financial Assurance Mechanism (FAM) is established for the implementation and completion of the Landfill's closure plan and post-closure maintenance and monitoring in the amount of approximately $5,600,000. The Financial Assurance Mechanism for the post-closure maintenance and monitoring portion will, per paragraph 56 of the ACO, consist of an account to be funded in the amount of $816,450 through a portion of the proceeds from the delivery and use of the approved shaping and grading material.

APPENDIX B-1

PROJECT APPROVALS & REGULATORY CORRESPONDENCE

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

DEVAL L. PATRICK
Governor

MAEVE VALLELY BARTLETT
Secretary

DAVID W. CASH
Commissioner

CF

COPY

July 21, 2014

Mr. Michael Toomey
Boston Environmental Corporation
338 Howard Street
Brockton, Massachusetts 02302

RE: Determination of Administrative Completeness
Application for: BWP SW 25
Corrective Action Design (CAD)
Transmittal Number: X254044

AT: Old Fall River Road Landfill
452 Old Fall River Road
Dartmouth, MA 02747
Facility #39200
Regulated Object #172451

Dear Mr. Toomey:

The Massachusetts Department of Environmental Protection ("MassDEP") has completed its administrative review of the Corrective Action Design permit application (the "Application") listed above regarding final landfill grading and construction of a final cover system on the Old Fall River Road Landfill (the "Landfill") and determined that the application is administratively complete. Accordingly, MassDEP has commenced its Technical Review.

The Application was prepared on behalf of Boston Environmental Corporation (the "Applicant") by SITEC Environmental, Inc. of Marshfield, Massachusetts and submitted to MassDEP on June 26, 2014. The permit application fee is recorded as being paid on July 1, 2014.

APPLICATION SUMMARY:
The following submittal represents the complete Application reviewed by MassDEP under 310 CMR 19.000 *Solid Waste Management Regulations* and MassDEP's *Landfill Technical Guidance Manual*, May 1997 ("Manual").

The Application consisted of transmittal form assigned number X254044, application form: BWP SW 25: Corrective Action Design, an Engineering Report, a Construction Quality Assurance Plan, Technical Specifications, and a set of Project Design Drawings, contained within a bound document entitled:

Corrective Action Design
Old Fall River Road Landfill
452 Old Fall River Road
Dartmouth, MA
June 26, 2014

The Application indicates that the closure/capping of the landfill will be performed in accordance with MassDEP's "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills Policy #COMM-97-001" dated August 15, 1997, as well as in accordance with an Administrative Consent Order (#ACO-SE-14-4001), dated March 28, 2014.

Review of the submitted information indicates that approximately 926,000 cubic yards of mildly contaminated soil and construction and demolition ("C&D") debris fines will be used for grading and shaping materials in preparation for capping the landfill. As proposed, the closure/capping process will be performed and completed within a 4 year period.

According to 310 CMR 4.10, MassDEP has 96 days from July 1, 2014, to complete its review and issue a decision. Provided your application is technically adequate, and none of the contingencies outlined in 310 CMR 4.04 occur, MassDEP will issue a Provisional Decision (pursuant to 310 CMR 19.033(4)), within the 96 day timeframe, to grant or deny the permit and establish a 21 day public comment period.

You will be entitled to a refund of the Application fee, should MassDEP fail to complete its review of the Application and make a Provisional Decision within this timeframe.

Please contact me at (508) 946-2847 or Dan Connick at (508) 946-2884 if you have any questions. In all written responses please reference Transmittal # X254044.

Very Truly Yours,

Mark Dakers, Chief
Solid Waste Management Section

D/DC/rr
P:\C-D\DARTMOUTH\Cecil Smith LF\CAD\Amin Complete CAD 1.doc

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Dartmouth Board of Health
whenderson@town.dartmouth.ma.us

Dartmouth Conservation Commission
moreilly@town.dartmouth.ma.us

SITEC
rquinn@sitec-engineering.com

DEP - Boston
ATTN: P. Emond

DEP-Lakeville
M. Pinaud
L. Black

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

DEVAL L. PATRICK
Governor

MAEVE VALLELY BARTLETT
Secretary

DAVID W. CASH
Commissioner

August 25, 2014

Mr. Michael Toomey
Boston Environmental Corporation
338 Howard Street
Brockton, MA 02302

RE: Determination of Technical Incompleteness
Application for: BWP SW 25
Corrective Action Design (CAD)
Transmittal Number: X254044

AT: Old Fall River Road Landfill
452 Old Fall River Road
Dartmouth, MA 02747
Facility #39200
Regulated Object #172451

Dear Mr. Toomey:

The Massachusetts Department of Environmental Protection ("MassDEP") has completed its technical review of the Corrective Action Design permit application (the "Application") listed above regarding final landfill grading and construction of a final cover system on the Old Fall River Road Landfill (the "Landfill") and determined that the application is Technically Incomplete.

The Application was prepared on behalf of Boston Environmental Corporation (the "Applicant") by SITEC Environmental, Inc. of Marshfield, Massachusetts and submitted to MassDEP on June 26, 2014. The permit application fee is recorded as being paid on July 1, 2014. On July 21, 2014, MassDEP issued a determination that the Application was Administratively Complete. On August 13, 2014, the Applicant met with MassDEP to discuss the status of MassDEP's review of the Application.

APPLICATION SUMMARY:

The following submittal represents the complete Application reviewed by MassDEP under 310 CMR 19.000 *Solid Waste Management Regulations* and MassDEP's *Landfill Technical Guidance Manual*, May 1997 ("Manual").

The Application consisted of transmittal form assigned number X254044, application form: BWP SW 25: Corrective Action Design, an Engineering Report, a Construction Quality Assurance Plan, Technical Specifications, and a set of Project Design Drawings, contained within a bound document entitled:

Corrective Action Design
Old Fall River Road Landfill
452 Old Fall River Road
Dartmouth, MA
June 26, 2014

The Application indicates that the closure/capping of the Landfill will be performed in accordance with MassDEP's "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills Policy #COMM-97-001" dated August 15, 1997, and in accordance with an Administrative Consent Order: ACO-SE-14-4001 ("ACO"), dated March 28, 2014.

Based on its Technical Review of the Application, MassDEP has determined that the following information is required:

1. Pursuant to 310 CMR 19.011(2) all mapping and surveying shall be completed by a registered surveyor. Accordingly, the site plans indicating property lines must be stamped by a registered land surveyor.

2. Pursuant to Paragraph 54 A of the ACO and Section 2.2, page B-6 of the Application 926,000 cubic yards of materials will be utilized to achieve the grades shown on the submitted plans. A plan indicating cut and fill volumes shall be submitted.

3. Section 4.2, page B-14 of the Application provides a Material Acceptance, Screening, Tracking and Placement narrative and a Soils Handling Procedure. Pursuant to Paragraph 54 B of the ACO, the methods and procedures for testing and management of the soils must be discussed. Please provide more detail regarding soil pre-testing and evaluation and coordination between the personnel performing the pre-evaluation and the scale operator accepting the material on site.

4. Section 4.2.2, page B-15 of the Application states that processors who produce construction and demolition ("C&D") fines and residuals for this project must enter into agreements with the Applicant that require the processor to demonstrate that they have established a Gypsum Removal Plan and to "composite and analyze the fines and residuals " for sulfate content. Pursuant to Paragraph 54 B of the ACO, the CAD must include a discussion on the methods and procedures for testing the C&D fines and residuals for their sulfate content and the methods and procedures for the mixing of the

C&D fines and residuals with soil as predicated on the sulfate content of the C&D fines and residuals. Please provide additional detail.

5. Appendix B-3 of the Application is a Hazardous Waste Materials Management Plan. Reporting obligations under the Massachusetts Contingency Plan are included in section 4.0. Section 2.0 part 8 states that Suspect Asbestos Containing Materials ("SACM") may be encountered during existing waste relocation. Discuss the proposed notification protocol related to handling of SACM. State the level of proposed asbestos training for the Field Technician performing the ongoing inspection during waste relocation.

6. Specification 02140 regards Passive Gas Vents. Revise the text and drawing details to indicate that passive gas vents will extend to approximately the full depth of waste.

7. Drawing DET-1 provides details for stormwater basin construction. Provide additional details for the basin located above the Landfill final cover system.

8. Drawing DET-1 provides a Let-Down Channel Detail that proposes the use of Emulsion Mix. Provide a description of the Emulsion Mix. Indicate on this detail or on SP-4 the extent of rip-rap to be placed at outlet of the Basin No. 1 and No. 2 let-down channels to prevent scouring.

9. Drawing SP-4 indicates a stormwater collection area and outlet pipe at the base of the Landfill access road. Provide details for this outlet similar to the details on drawing DET-1 for basins 1 and 2. Also supplement the Stream Crossing Replacement Culvert Detail on drawing DET-1 to indicate the extent of the headwall and the extent of rip rap, if any, at the inlet and outlet. State that all road work and culvert work will be performed within the Old Fall River Road Landfill property limits.

10. Revise the discussion on materials proposed to be accepted in Section 4 to include only contaminated soils and C&D fines and residuals and state the maximum percentage by volume of C&D fines and residuals will be accepted.

11. Indicate the approximate location of the construction office trailer and utilities servicing the trailer and scale house.

12. State the proposed days and hours of operation based on various operational activities: waste acceptance, grading, capping activities etc.

13. Indicate the proposed pipe sizes for potential active gas system header pipes and indicate shut off valve locations on Drawing G-1.

14. Resubmit the data for the 44 test pits as a supplement to the Application.

15. Discuss activities related to the house relocation and water well decommissioning.

16. Provide a calculation demonstrating the stability of the final cover system under peak

storm conditions.

17. Discuss temporarily stockpiling grading and shaping materials.

18. Discuss status of review by the Division of Fisheries and Wildlife based on their July 15, 2013, correspondence regarding the MESA project review and the box turtle habitat.

Please contact me at (508) 946-2847 or Dan Connick at (508) 946-2884 if you have any questions. In all written responses please reference Transmittal # X254044.

Very Truly Yours,

Mark Dakers, Chief
Solid Waste Management Section

D/DC

P:\C-D\DARTMOUTH\Cecil Smith LF\CAD\Tech Incomplete CAD 2.doc

ec: Dartmouth Town Manager
cressmandg@town.dartmouth.ma.us

Dartmouth Board of Health
whenderson@town.dartmouth.ma.us

Dartmouth Conservation Commission
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ATTN: P. Emond

DEP-Lakeville
M. Pinaud
L. Black

APPENDIX B-2

HELP MODEL CALCULATIONS

FINAL CAP DESIGN STABILITY CALCULATIONS

FINAL COVER STABILITY ANALYSIS
Old Fall River Road Landfill
Final Cover Design

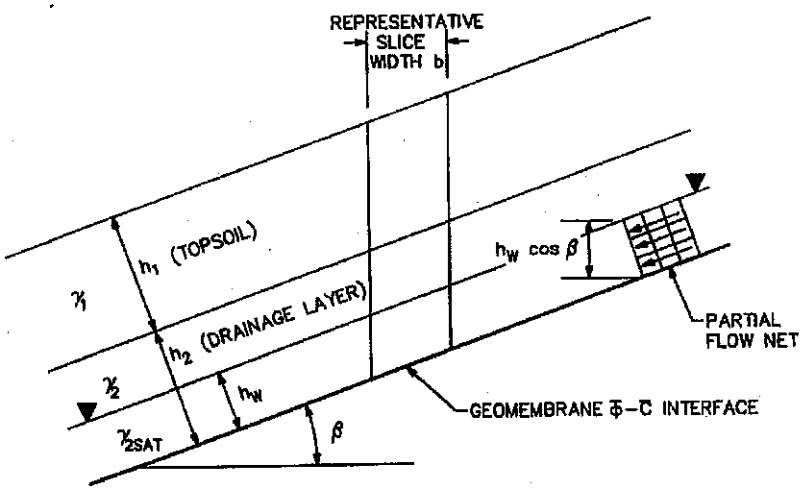
1. Objective

Evaluate the stability of the final cover system for both the average water depth of 2.4" and the maximum water depth of 4.6" in the 12" thick, 3:1 sideslope, sand drainage layer (from HELP Model), a 12" vegetative support material with a permeability of 1.2 x 10^{-4} cm/sec, and a geomembrane/sand interface friction angle of 27°. Determine the factor of safety against sliding under static conditions.

2. Method Of Analysis

Stability is analyzed using the "infinite slope analysis" method by summing force vectors parallel to the slope. The method used is described in "*Geosynthetic Landfill Cover Design Methodology and Construction Experience in the Pacific Northwest*" by Thiel & Stewart published in the Proceedings of Geosynthetics 1993 Conference, Vancouver, 1993. In their discussion Thiel and Stewart suggest, from US EPA studies, that a factor of safety between 1.25 and 1.50 is acceptable. They also state that the use of the average saturated water depth (h_w) is acceptable. In this example the maximum water depth is also calculated, for comparative purposes.

3. Schematic Of Problem



b) FORCES

$W = [h_1 \gamma_1 + (h_2 - h_w)\gamma_2 + h_w \gamma_{2SAT}]\, b/\cos\beta$

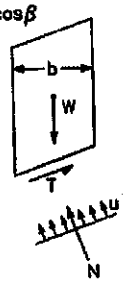
$u = \gamma_w h_w \cos\beta$

$U = ub/\cos\beta = \gamma_w h_w b$

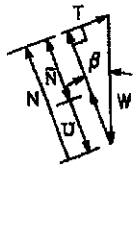
$N = W\cos\beta$

$T = W\sin\beta$

$\bar{N} = N - U$



FREE BODY DIAGRAM



FORCE POLYGON

Geometric Parameters:

β = slope angle;
h_1 = thickness of vegetation layer;
h_2 = thickness of drainage layer;
h_w = height of water in drainage layer normal to slope;

Material Parameters:

γ_1 = saturated unit weight of vegetation layer;
γ_2 = moist unit weight of drainage layer;
γ_{2SAT} = saturated unit weight of drainage layer;
γ_w = unit weight of water;
Φ = effective friction parameter for shear strength at base of drainage layer;
c = effective cohesion parameter for shear strength at base of drainage layer.

4. Problem Parameters

1. Unit weight of vegetative support/ protection layer, γ_1 = 120 pcf
2. Unit weight of sand drainage layer, γ_2 = 115 pcf
3. Unit weight of saturated sand drainage layer, γ_{2SAT} = 120 pcf
4. Unit weight of water, γ_w = 62.4 P pcf
5. Thickness of vegetative support/ protection layer, h_1 = 1.0 ft.
6. Thickness of sand drainage layer, h_2 = 1.0 ft.
7. Height of water in drainage layer, Average h_w = 2.4 in. = 0.2 ft; Maximum h_w = 4.6 in. = 0.383 ft (from HELP Model for 3:1 Slopes)
8. Slope angle, β = 18.4° (3H:1V)
9. Geomembrane/Sand Drainage Layer interface friction angle, Φ = 27°
10. Geomembrane/Sand Drainage Layer interface cohesion, c = 0 psf

5. Governing Equation

$$\text{Factor of Safety, FS} = \frac{\text{Resisting Shear}}{\text{Driving Shear}} = \frac{c + [\, h_1 \gamma_1 + (h_2 - h_w)\gamma_2 + h_w \gamma_{2SAT} - h_w \gamma_w] \tan \Phi}{[\, h_1 \gamma_1 + (h_2 - h_w)\gamma_2 + h_w \gamma_{2SAT}] \tan \beta} =$$

6. Results and Conclusions

$$\text{(Average } h_w\text{)} \quad \frac{0 + [(1.0\text{x}120) + (1.0\text{-}0.2)\text{x}115 + (0.2\text{x}120) - (0.2\text{x}62.4)] \text{ x } \tan 27°}{[(1.0\text{x}120) + (1.0\text{-}0.2)\text{x}115 + (0.2\text{x}120)] \text{ x } \tan 18.4°} = 1.451$$

$$\text{(Maximum } h_w\text{)} \quad \frac{0 + [(1.0\text{x}120) + (1.0\text{-}0.383)\text{x}115 + (0.383\text{x}120) - (0.383\text{x}62.4)] \text{ x } \tan 27°}{[(1.0\text{x}120) + (1.0\text{-}0.383)\text{x}115 + (0.383\text{x}120)] \text{ x } \tan 18.4°} = 1.377$$

The results of the calculations are that for both average and maximum heights of water in the drainage layer, there is an adequate factor of safety for the stability of the final cover system.

FINAL COVER STABILITY ANALYSIS - FILTERING CAPACITY
Old Fall River Road Landfill
Final Cover Design

1. Objective

Evaluate the the applicability of the filtering capacity of the sand drainage layer relative to the stability of the final cover system, using typical sieve analysis of sand drainage layer and top soil materials that are consistent with the specified materials for those components of the Landfill's final cap construction.

2. Method Of Analysis

The stability of earth structures can require filtering to prevent movement of soil particles from one structural soil component to another. If adequate filtering is not provided movement of soil particles from one component to another can cause erosion and stability problems. This movement of soil particles is prevented by filtering soil layers. The design of proper filtering capacity consists of choosing the physical dimensions of the filtering media so that no significant mobility of soil into the filtering media occurs. In a landfill final cap construction this filtering capacity is provided by the sand drainage layer (filter) and the media to be filtered is the topsoil, vegetative support soils (soils). The method used in determining filtering capacity is described in "Soil Mechanics" by Lamb and Whitman.

3. Problem Parameters

The selection of the filter media depends on the flow pattern in the structure under consideration. In a landfill cap construction, flow is vertical from the soils to the filter media and then flows along the impermeable cap to an outlet location. The requirements of a filter to keep soil particles from infiltrating the filter significantly are based on the particle size of the two media. The particle size requirements were first developed by Terzaghi and later expounded upon by the Army Corp of Engineers. The resulting filter/soil specifications relate to the proportional grading of the filter media to the filtered soils. That research developed the following relationships.

$$\frac{D_{15}\ \text{Filter}}{D_{85}\ \text{Soil}} < 5$$

$$\frac{D_{15}\ \text{Filter}}{D_{15}\ \text{Soil}} < 20$$

$$\frac{D_{50}\ \text{Filter}}{D_{50}\ \text{Soil}} < 25$$

These expressions limit particle movement from soils into the filter to a small zone at their interface and keeps the permeability of the filter media considerably greater than the soil's.

4. Calculated Filtering Capacity

Using sieve analysis of sand drainage layer (filter) and vegetative support soils (soils) materials that are attached, the following calculations and conclusions can be made.

Soils: D_{85} = 3.0 mm; D_{50} = 0.55 mm; D_{15} = 0.10 mm

Filter: D_{50} = 0.50 mm; D_{15} = 0.20 mm

$$\frac{D_{15}\text{ Filter}}{D_{85}\text{ Soil}} \quad \frac{0.20\text{ mm}}{3.0\text{ mm}} = 0.07 < 5 \quad \textbf{OK}$$

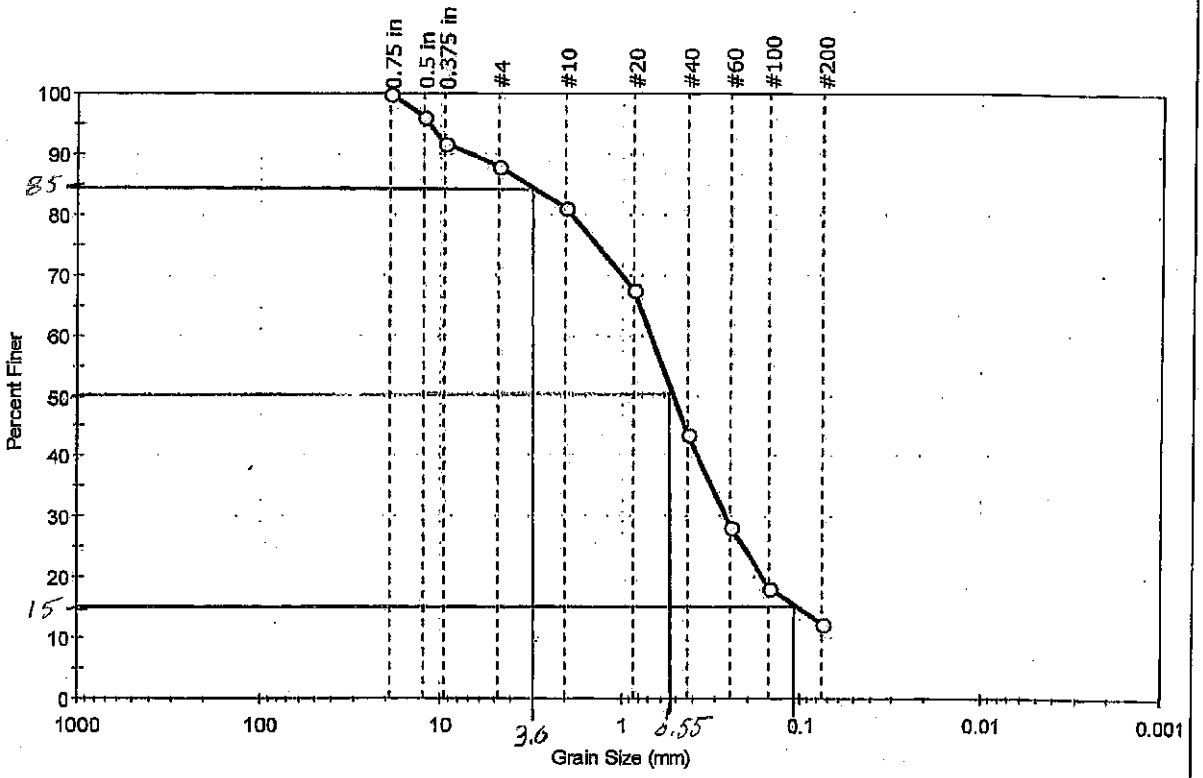
$$\frac{D_{15}\text{ Filter}}{D_{15}\text{ Soil}} \quad \frac{0.20\text{ mm}}{0.10\text{ mm}} = 2.00 < 20 \quad \textbf{OK}$$

$$\frac{D_{50}\text{ Filter}}{D_{50}\text{ Soil}} \quad \frac{0.50\text{ mm}}{0.55\text{ mm}} = 0.91 < 25 \quad \textbf{OK}$$

TOPSOIL

Test Comment:	---
Sample Description:	Moist, very dark brown silty sand with organics
Sample Comment:	---

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
--	12.1	75.5	12.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	92		
#4	4.75	88		
#10	2.00	81		
#20	0.85	67		
#40	0.42	44		
#60	0.25	28		
#100	0.15	18		
#200	0.075	12		

Coefficients

D_{85} =3.2973 mm	D_{30} =0.2647 mm
D_{60} =0.6842 mm	D_{15} =0.1010 mm
D_{50} =0.5113 mm	D_{10} =0.0565 mm
C_u =12.110	C_c =1.812

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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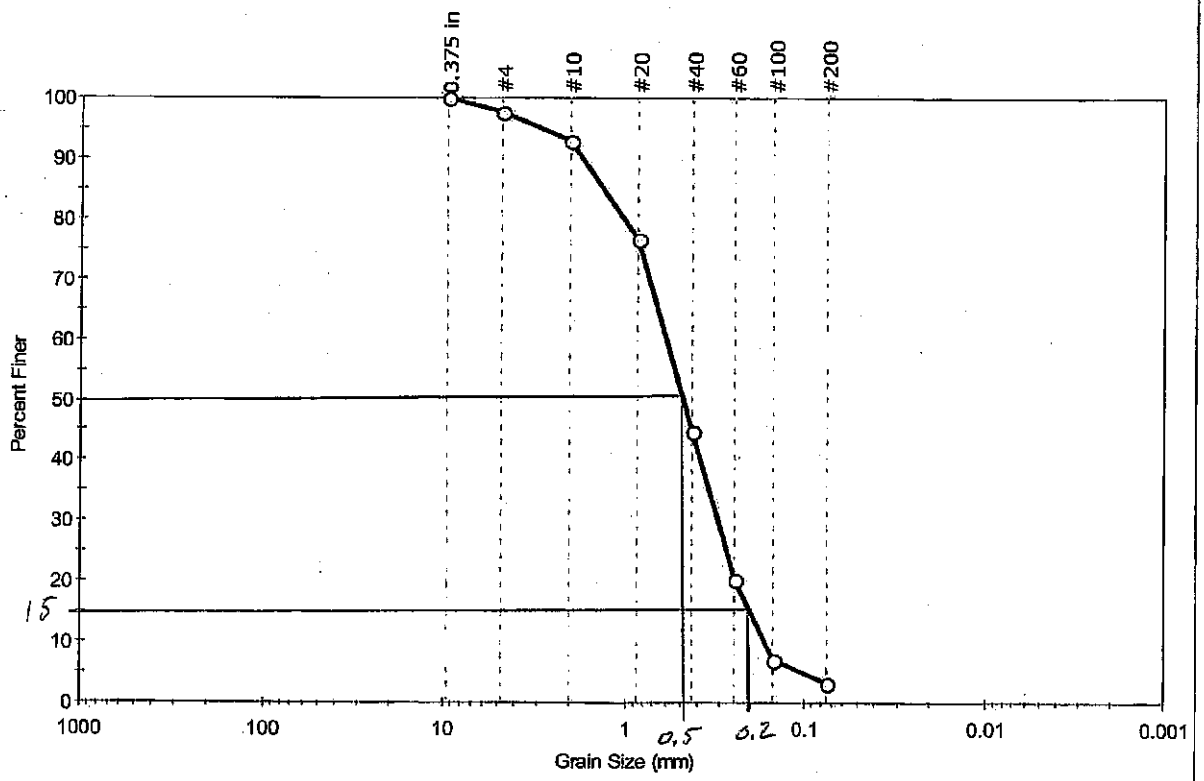
DRAINAGE LAYER SAND

Test Comment:	---
Sample Description:	Moist, yellowish brown sand
Sample Comment:	---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.3	94.5	3.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	93		
#20	0.85	77		
#40	0.42	45		
#60	0.25	20		
#100	0.15	7		
#200	0.075	3		

Coefficients

D_{85} =1.3185 mm	D_{30} =0.3075 mm
D_{60} =0.5908 mm	D_{15} =0.2030 mm
D_{50} =0.4747 mm	D_{10} =0.1676 mm
C_u =3.525	C_c =0.955

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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APPENDIX B-3

HAZARDOUS MATERIALS MANAGEMENT PLAN

(HMMP)

HAZARDOUS MATERIALS MANAGEMENT PLAN

For the

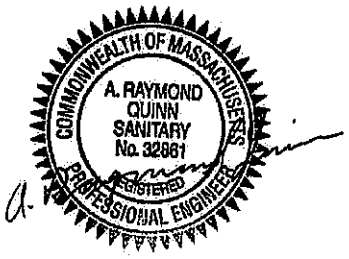
CORRECTIVE ACTIONS DESIGN
ADMINISTRATIVE CONSENT ORDER #ACO-SE-14-4001
OLD FALL RIVER ROAD LANDFILL, DARTMOUTH, MA

Prepared For:

Boston Environmental, Corp.
338 Howard Street
Brockton, MA 02302

Prepared By

SITEC Environmental, Inc.
769 Plain Street, Unit C
Marshfield, MA 02050



June 26, 2014
Revised September 3, 2014

HAZARDOUS MATERIALS MANAGEMENT PLAN

For the

CORRECTIVE ACTIONS DESIGN
ADMINISTRATIVE CONSENT ORDER #ACO-SE-14-4001
OLD FALL RIVER ROAD LANDFILL, DARTMOUTH, MA

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6.0	DISPOSAL OF DISCOVERED HAZARDOUS MATERIALS	7

1.0 GENERAL

The waste relocation activities to be conducted as part of the Old Fall River Road Landfill (the Landfill) closure project will involve the excavation, inspection, loading and transporting of the buried solid waste from the excavation site to the main portion of the Landfill where it will be incorporated in the slopes for capping. Although, the Landfill was not known as a hazardous waste disposal facility, it is possible for older landfills, such as the Old Fall River Road Landfill, to contain hazardous materials due their years of operation, the industrialized nature of the area and the myriad of "household wastes" they may have accepted. Although "household waste" is "exempt" from the hazardous waste regulations, it does often contain hazardous materials, hazardous substances and other contaminants. Therefore, it is possible that hazardous materials may be found during the excavation of the buried waste beyond the main portion of the Landfill. While this "Hazardous Materials Management Plan" (HMMP) is intended to address the full spectrum of potential contaminants that may be encountered, it may require amendment to account for other conditions that may be identified, either prior to or during this aspect of the Landfill Closure Project.

The terms hazardous material, hazardous waste, hazardous substance, hazardous chemical, etc. are often incorrectly interchanged, when they in fact have very specific definitions in state and federal regulations. Therefore, for the purposes of this HMMP, hazardous material is defined to include the entire spectrum of contaminated media and wastes which may be encountered during the waste excavation process. Should a suspect "hazardous material" be encountered, it will be segregated and properly categorized as either a hazardous waste, hazardous material, hazardous substance, hazardous chemical, etc. Procedures for analysis and characterization are discussed in this HMMP.

The steps to be implemented when any type or amount of suspect hazardous material is discovered during the project are outlined within this plan. The procedures for identifying, separating, handling, and storing large and small quantities of hazardous materials as well as general procedures for complying with reporting obligations to state and federal authorities are also defined herein. Procedures outlined in the Health and Safety Plan (HASP) will be implemented.

Requirements for notification, reporting and emergency response are specific to the type and amount of contaminant detected. They are also specific to the media (water, soil, air) that the contaminant is released into. Therefore, it is important that the provisions of this HMMP be understood so that proper consideration can be given in evaluating the reporting obligations. The final determination of what must be reported, and to whom, will depend on the actual conditions encountered.

The primary obligation for heavy equipment operators, site workers and the supervising Field Technician under this HMMP is to suspend work upon discovery of hazardous materials or suspecting that hazardous materials are present (i.e. based on monitoring, observations, etc.) and to notify the Project Coordinator. The Project Coordinator, in conjunction with the Environmental Consultant, will be responsible for determining the appropriate reporting and response actions needed.

Field Technician:	**SITEC Environmental, Inc.** **TBD** **Phone: (781) 319-0100**
Project Coordinator:	**Boston Environmental, Corp.** **Michael Toomey, Executive Vice President** **Phone: (508) 897-8062**
Environmental Consultant:	**SITEC Environmental, Inc.** **Michael Quatromoni** **Phone: (781) 319-0100**

2.0 IDENTIFICATION OF HAZARDOUS MATERIALS

All excavation at the Landfill will proceed with caution. These operations will be closely monitored (visually and with instrumentation) for the presence of hazardous materials or obviously impacted soil or groundwater. Materials suspected as being hazardous will be fully investigated. These materials include, but are not limited to: containers such as drums and paint cans; household chemicals; batteries; air conditioners; paints; electrical equipment and demolition debris. The Project Coordinator will assign a qualified Field Technician to visually monitor the excavation for the presence of suspect hazardous materials or conditions. Additionally, the Field Technician will utilize the monitoring equipment described in the Health and Safety Plan (HASP) to further evaluate the materials and/or the excavation area. Suspect materials and conditions to which actions should be taken include, but are not limited to:

1. Visual observation of drums, canisters, or other containers which may contain hazardous materials (e.g paint cans, gasoline containers, compressed gas tanks or canisters, household chemicals, etc.);

2. Visual observation of stained or discolored soils or refuse;

3. Observation of vapors or gases originating from the excavation;

4. Unusual odors emanating from the excavation;

5. Site personnel showing signs of chemical exposure;

6. Analytical testing to indicate a discovered material is hazardous; and/or

7. Direct monitoring results on the PID, LEL, oxygen or H_2S monitor, to suggest a hazardous material or hazardous condition has been encountered (i.e., erratic measurements, decreasing/increasing measurements, etc.).

8. Visual observation of demolition debris for the presence of Asbestos Containing Materials (ACM). Suspect ACM includes, but is not limited to, thermal insulation, pipe wrapping material, flooring tiles, cement shingles, plaster, cement pipes, cement sheets, ceiling tiles, spray-on fire proofing, cement drywall or other suspect debris.

3.0 DISCOVERY OF HAZARDOUS MATERIALS

Upon discovery of a release of suspected hazardous material, excavation in that area will be suspended. The Project Coordinator will be contacted by either the equipment operator or the Field Technician to evaluate the condition and provide clarification and direction. If necessary, the Project Coordinator will contact SITEC to assist in the decision making process. If hazardous materials or contamination are discovered, then the Project Coordinator will implement a plan to properly handle and dispose of the hazardous material. The need for notification or additional investigation will be made at that time. Notification and reporting obligations are discussed in general in Section 4.0 of this HMMP.

If a release of hazardous materials is suspected, the Project Coordinator will order the excavation area evacuated if, in his opinion:

1. the hazardous materials are an unknown substance and remaining within the area may result in worker exposure to the material; or
2. the concentration of the material in air is above the action levels presented within the HASP,

Site evacuation will include securing an Exclusion Zone to all personnel, identifying current wind direction and ordering operational personnel to remain at an up-wind location beyond the Exclusion Zone boundary pending further instructions. The Exclusion Zone will be demarcated with orange plastic fencing that is secured with wooden stakes or steel rebar. The Project Coordinator may also make a determination that temporarily suspending the placement of grading and shaping materials and the construction of the Landfill capping system is necessary and appropriate pending the further evaluation of site conditions.

The Project Coordinator, in consultation with SITEC, may also decide that notifications to the MassDEP, the Town of Dartmouth Fire Department, Police Department and Board of Health are required so that other emergency response actions can be implemented by the Town. These actions may include the notification of abutters as determined appropriate by the MassDEP and Town of Dartmouth officials.

The designated Exclusion Zone will not be reentered until a determination is made by the Project Coordinator that it is safe to do so. The Project Coordinator may, at his discretion, retain the services of a licensed private hazardous waste site contractor to enter the effected portion of the Site to conduct a re-characterization of conditions. Boston Environmental, Corp. (BEC) will utilize the following private hazardous waste site contractor to respond to such emergency situations:

- **Clean Harbors Environmental Services**
  Phone: (781) 585-5112

Personnel performing the evaluation of materials or conditions will monitor for the presence of an IDLH (Immediately Dangerous to Life and Health) condition, for concentrations of contaminants exceeding the Action Levels within the HASP and other potentially hazardous conditions with monitoring equipment and procedures described in the HASP.

After the site has been re-characterized, appropriate PPE and engineering controls, as described in this HMMP, will be used to protect workers, and the appropriate separation and handling of the material will be conducted. This work will be conducted by either operational personnel or the private hazardous waste contractor as determined appropriate be the Project Coordinator. Prior to proceeding, obligations such as reporting and permitting under other state or federal laws (i.e. the Massachusetts Contingency Plan (MCP)) will be identified and incorporated into the continued site activities.

Soil that are suspected to be contaminated will be segregated, protected, and placed on and covered with polyethylene sheeting for temporary storage prior to disposal. Debris that is suspected as being Asbestos Containing Materials (ACM) will also be segregated and covered with poly sheeting and/or placed within specially marked bags. Suspect ACM will be wetted down with clean water prior to segregating and covering in order to prevent the potential release of fibers to the environment. The segregation of these materials will be conducted mainly using the excavator/grapple or other heavy equipment such as a front end loader to the extent possible. This equipment will be used to consolidate suspect materials into a small stockpile within the Exclusion Zone. The wetting and covering of these materials will be performed only when it is determined by the Health and Safety Coordinator that it can be performed safely and that the personnel assigned to conduct these activities are wearing appropriate personnel protective equipment (PPE). BEC has employees that are certified by the Massachusetts Department of Labor and Standards (MDLS) as Asbestos Inspector. A certified Asbestos Inspector will be on-site daily, during the waste relocation work, to assist in identifying materials that are determined as being suspect ACM.

4.0 REPORTING OBLIGATIONS

Upon discovering hazardous material or other contamination in the Landfill, the Project Coordinator, in consultation with the Environmental Consultant, will determine if notification and plan approval is required by state or federal agencies before removal of the contaminated media/hazardous material. General information is presented here. Additional agencies may require notification, and more detailed information may need to be obtained, depending on the exact nature of the conditions that are encountered. A comprehensive review of all potentially applicable regulations will be conducted prior to proceeding.

4.1 MassDEP Requirements Under the Massachusetts Contingency Plan (MCP)

Depending on the specific nature of the hazardous material or contamination, notification in accordance with the MCP may be required. Under the MCP, at 310 CMR 40.0110 through 40.0114

certain exclusions from the MCP are described for "Adequately Regulated Sites". Included under these exclusions are Solid Waste Management Facilities (310 CMR 40.0114). These exclusions do not lessen the scope of response actions, but rather put the response actions under the control of MassDEP's Solid Waste Section. If notification under the MCP is required (310 CMR 40.0300), response actions will comply with the necessary standards. The obligation to report under the MCP is triggered if a Reportable Quantity (RQ) is released to the environment, or a Reportable Concentration (RC) is measured in subsurface soil or ground water. The RQs and RCs are tabulated in the MCP for regulated hazardous materials. In general, if they are exceeded, then reporting obligations exist.

The MassDEP Office with jurisdiction for the Town of Dartmouth is Lakeville. The address, phone number and fax number are provided below:

Massachusetts Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 02347
Phone: (508) 946-2700
Fax: (508) 947-6557

Subsequent discoveries of hazardous materials or oil which have been previously reported for the site will still be reported as required in 310 CMR 40.0300. Further actions taken for subsequent discoveries will be handled on a case by case basis with the MA DEP and/or under consultation with a Massachusetts Licensed Site Professional (LSP).

The separation of hazardous materials or oil from the solid waste and recyclable materials in the landfill may require prior consent from the MassDEP as these actions could be considered Preliminary Response Actions as outlined in 310 CMR 40.0400.

Releases or threats of release requiring two-hour or 72-hour notification to the MassDEP or any other situation where the MassDEP determines that accelerated response actions are necessary to prevent, eliminate, or minimize damage to the environment or public health will require that an Immediate Response Action (IRA) be performed to address hazards associated with the release or threat of release. Except as provided in 310 CMR 40.0421, IRAs will be approved with the MassDEP prior to implementation.

For 120-day reporting conditions the MCP requirements do not typically apply, per the 310 CMR 40.0114 section for MCP's Adequately Regulated Sites. Site assessment and remediation would be regulated under the Solid Waste Management Facilities regulations.

Certain actions related to the implementation of the MCP may require the input of an LSP. The need for an LSP is limited under the Adequately Regulated Sites section of the MCP. If it appears that there is a likely MCP reporting situation or if MassDEP suggests that an LSP should be involved, the Project LSP will be contacted for advice.

Project LSP: **A. Raymond Quinn, P.E., LSP**
SITEC Environmental, Inc.
Phone: (781) 319-0100

4.2 Asbestos Containing Material (ACM)

If any friable asbestos containing material (ACM) is identified during the waste relocation work, MassDEP and the Town of Dartmouth Board of Health will be notified. To expedite the prompt removal of ACM from the site, BEC or its designated contractor, shall contact the MassDEP regional asbestos program to request an emergency waiver number (508-792-7650). A copy of the *Massachusetts MassDEP Asbestos Notification Form (ANF-001, Asbestos Notification Form)* will be submitted and the original submitted to the MassDEP electronically within 24 hours of receiving the waiver number along with the applicable fee. A copy of each notification will be filled electronically to the appropriate MassDEP asbestos program upon receipt of the emergency waiver number.

5.0 HANDLING and STORAGE of DISCOVERED HAZARDOUS MATERIALS

Discovered or suspected hazardous material or soil contaminated by such material will be segregated from other excavated materials after a review has been conducted by the Project Coordinator.

The Project Coordinator will be responsible for the management, safe handling, consolidation and off-site disposal of these materials. The Project Coordinator will establish specific handling methodologies based on the conditions and materials encountered. In general, the materials may be sampled and analyzed, as appropriate, to properly classify them for off-site disposal and/or temporary on-site storage. This sampling will be conducted by the environmental Field Technician or other environmental professional experienced in various media sampling protocols and trained in appropriate health and safety procedures.

While on site, containers confirmed or suspected as containing hazardous materials, will be temporarily stored in a protected manner. Any leaking containers will be placed within over pack drums to avoid potential releases to the environment. Care will be taken to ensure that no incompatible materials (e.g. acids and bases, cyanides and acids) will be stored near one another. Spill containment and cleanup equipment such as absorbent booms, pads, shovels, speedy-dry, DOT approved 55-gallon drums, polyethylene sheeting and additional personnel protective equipment will also be stored on site and will be readily available for use, if necessary.

The packaging of suspect materials will be conducted by operational personnel after a determination by the Project Coordinator that it can be handled safely. Should it be determined that the material requires special handling, the third party Hazardous Waste contractor will be contacted to properly manage the material.

On site soils that are suspected to be contaminated will be segregated, protected, and placed on and covered with polyethylene sheeting for temporary storage prior to characterization. Any soils that are delivered to the Site, that are suspected to contain hazardous waste, will be returned to the

generating site for retesting or disposal at an appropriate disposal facility. Debris that is suspected as being ACM will also be segregated and covered with poly sheeting. Suspect ACM will be wetted down with clean water or wetting agent using a hand pump sprayer or hose prior to segregating and covering in order to prevent the potential release of fibers to the environment.

Should a large volume of materials be identified as being hazardous, special provisions may be required for the management of these materials. These provisions will be specifically developed on the basis of the characteristic and quantity of the waste material. Contingency plans may include the on-site in-situ or ex-situ or off-site treatment of waste, in-situ isolation or excavation and on-site or off-site storage of the waste. Until the nature and extent of the existence of hazardous materials is known, specific plans can not be developed. It will be the responsibility of the Project Coordinator to assure that proper steps are taken and adequate support is contracted to deal with the situation.

The following rules will be enforced when storing hazardous materials/hazardous wastes removed and segregated from the Landfill:

- If determined to be hazardous waste, the segregated waste will be disposed of within 90 days of classification in accordance with applicable hazardous waste regulations. All hazardous wastes will be managed in accordance with 310 CMR 30.000;

- The hazardous material storage will be conducted in a secured area that can be locked and controlled by the Project Coordinator.

- Spill control equipment including absorbent materials, non-sparking tools, personal protective equipment polyethylene sheeting stored within the hazardous materials trailer are to be used in the event of the discovery of hazardous wastes.

- The storage area is to be secured against unauthorized entry and a posted sign will specify "Hazardous Waste Storage Area";

- The hazardous material(s) will be removed from the site in as timely a manner as possible. Remediation waste subject to the MCP Bill of Lading requirements will be removed within 120 days;

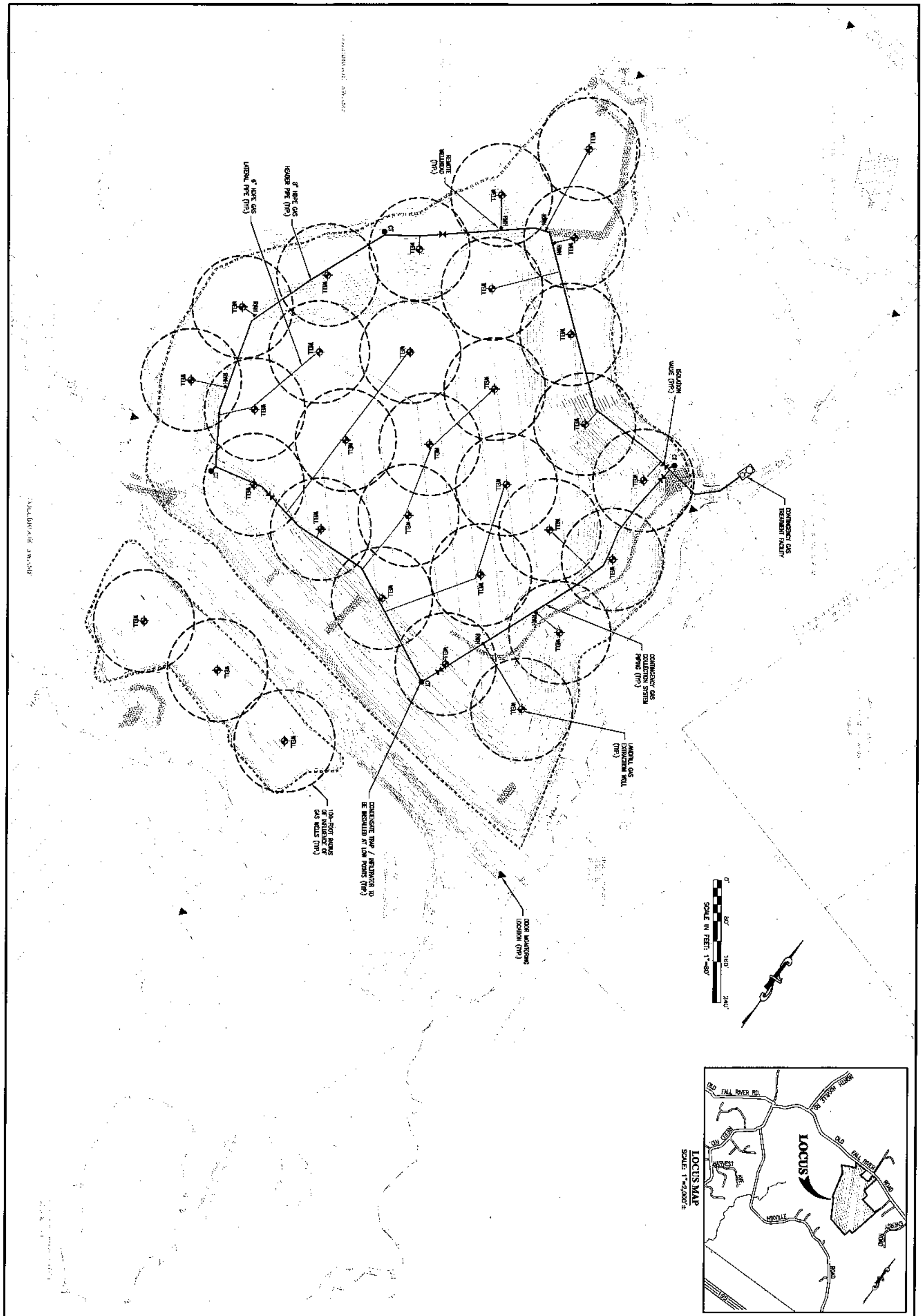
- After material classification, a review of applicable state and federal regulations will be conducted and any other requirements for the material will be complied with.

6.0 DISPOSAL OF DISCOVERED HAZARDOUS MATERIALS

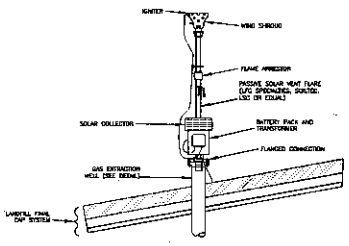
Discovered hazardous materials will be characterized through laboratory analysis prior to disposal. Laboratory analytical results will dictate the disposal methods. Hazardous materials will be shipped off site with appropriate documentation including hazardous waste manifests and land ban paperwork if the materials are determined to be hazardous waste. Bills of Lading will be used in the shipment of hazardous materials off site. Written documentation of the disposal of hazardous materials or waste will be kept for a minimum of five years, or as required by other regulation.

APPENDIX B-5

LANDFILL GAS RESPONSE PLAN

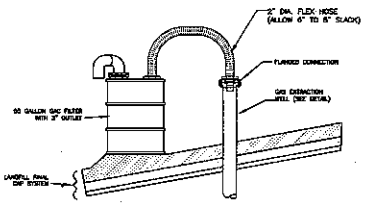


File No. SE11-820	**SITEC ENVIRONMENTAL** Civil and Environmental Engineering, Land Use Planning and Surveying, Hazardous and Solid Waste Consultants. 759 Plain Street, Unit C, Marshfield, MA 02050, Phone (781) 319-0100, Fax (781) 834-4783	project: OLD FALL RIVER ROAD LANDFILL – FINAL CLOSURE, 452 OLD FALL RIVER ROAD, DARTMOUTH, MASSACHUSETTS	scale: 1"=80'	No. 1	Date 08/29/14 — Revision Description: REVISED FINAL GRADING AND NOTATIONS
		client: BOSTON ENVIRONMENTAL CORPORATION, 338 HOWARD STREET, BROCKTON, MASSACHUSETTS	date: MAY 16, 2014; drawn: JAC; checked: MQ; approved: ARQ		
		drawing title: LANDFILL GAS RESPONSE PLAN	drawing number: C-1		



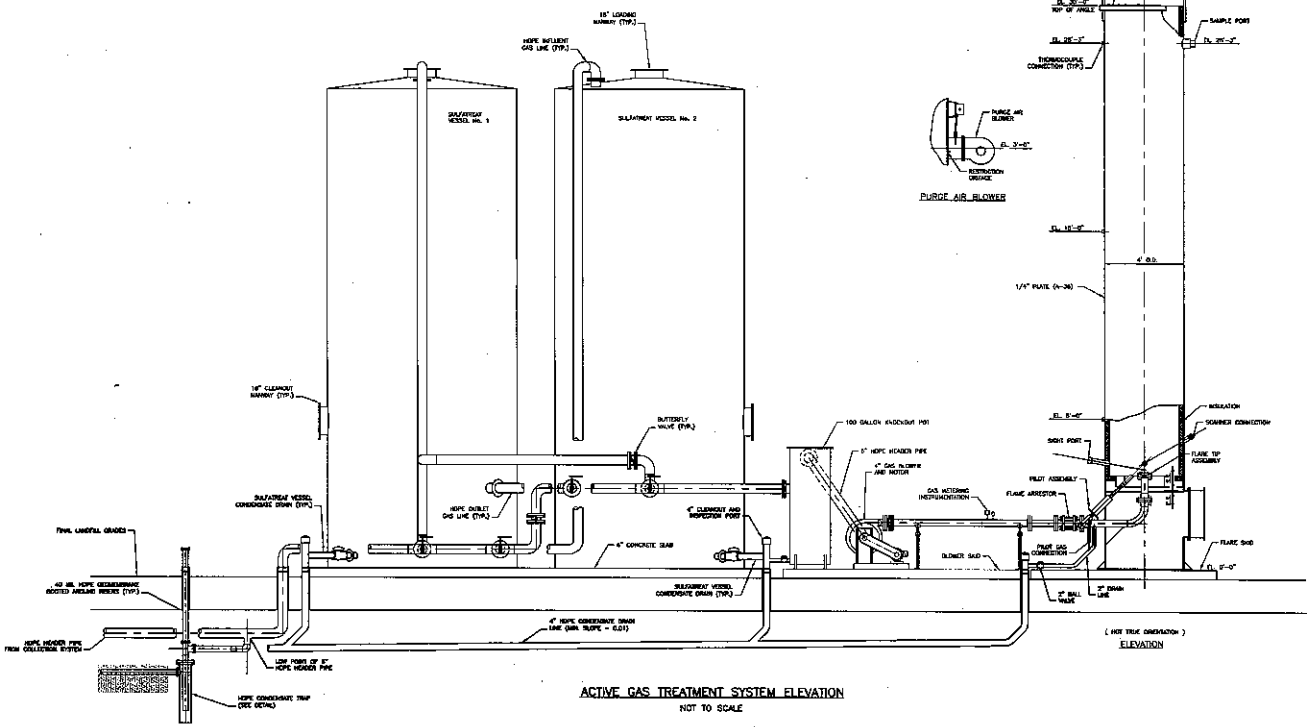
PASSIVE SOLAR GAS FLARE DETAIL

NOT TO SCALE



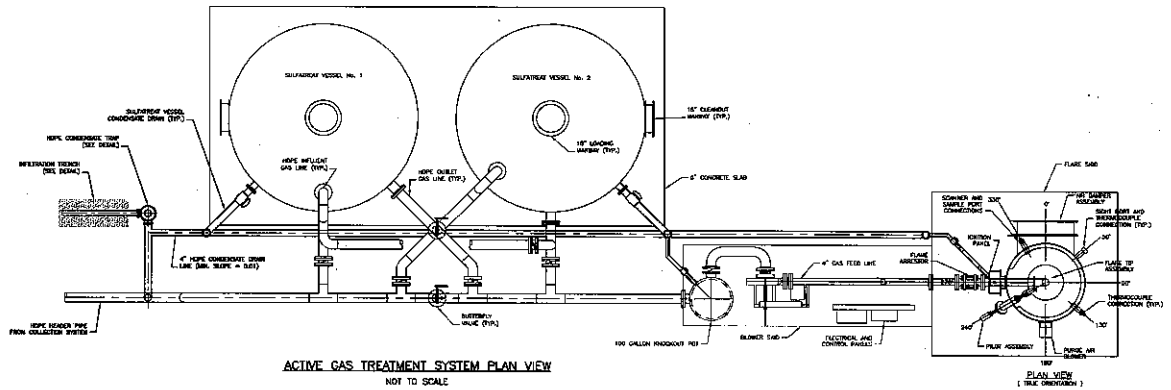
GRANNULAR ACTIVATED CARBON (GAC) FILTER DETAIL

NOT TO SCALE



ACTIVE GAS TREATMENT SYSTEM ELEVATION

NOT TO SCALE



ACTIVE GAS TREATMENT SYSTEM PLAN VIEW

NOT TO SCALE

No.	Date	Revision Description	Chkd. by	Appvd.
1	08/29/14	ORIENTED EXCAVATED GAS VENT DETAIL		

project: OLD FALL RIVER ROAD LANDFILL – FINAL CLOSURE
452 OLD FALL RIVER ROAD
DARTMOUTH, MASSACHUSETTS

client: BOSTON ENVIRONMENTAL CORPORATION
53 MAIN STREET
BROCKTON, MASSACHUSETTS

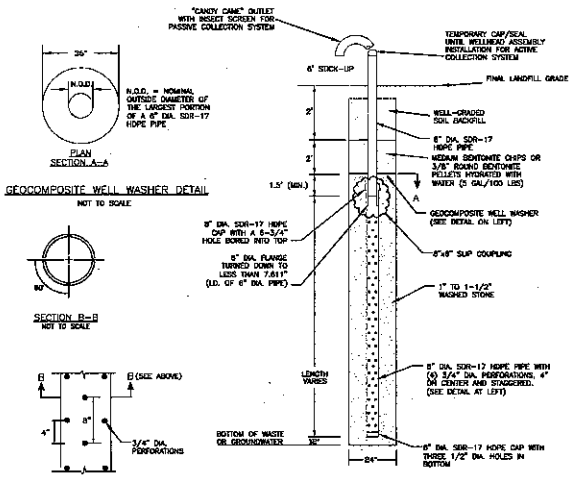
drawing title: CONTINGENCY ACTIVE GAS TREATMENT SYSTEM DETAILS

scale: AS SHOWN
date: MAY 16, 2014
drawn: JAC
checked: MQ
approved: ARQ

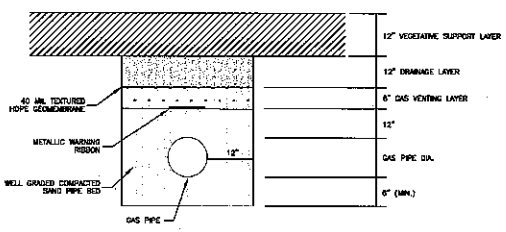
drawing number: DET-1

SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Permitting and Surveying
Hazardous and Solid Waste Consultants
159 Plain Street, Unit C
Stoughton, MA 02072
PHONE (781) 344-1010
FAX (781) 344-4100

File No. SE11-920

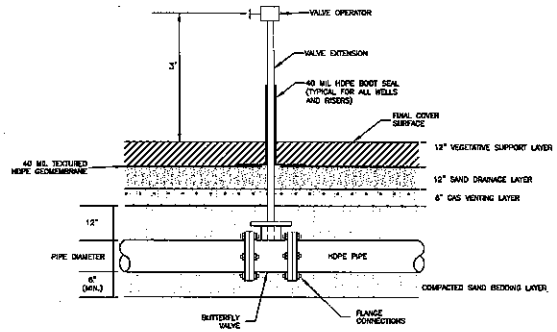


GAS EXTRACTION WELL DETAIL
NOT TO SCALE

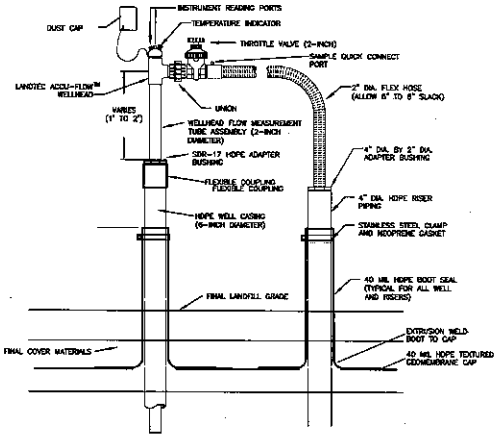


NOTES:
1. STATE AND FEDERAL REGULATIONS REQUIRE HEALTH AND SAFETY PLANS FOR WORK IN CONFINED SPACES SUCH AS THOSE WHICH WILL BE ENCOUNTERED DURING GAS MANAGEMENT STRUCTURE INSTALLATIONS.
2. ALL UNDERGROUND FLANGES TO BE COVERED AND SEALED IN 5 MIL POLYETHYLENE WRAP OR COATED WITH AUTOMOTIVE UNDERCOATING MATERIAL.
3. ALL BOLTS & NUTS TO BE 316 STAINLESS STEEL OR CARBON STEEL COATED WITH COLD TAR EPOXY EMULSION OR EQUAL, LUBRICATED WITH NEVERSEEZ OR APPROVED EQUIVALENT.
4. METALLIC WARNING RIBBON TO BE PLACED ON TOP OF SAND BEDDING.

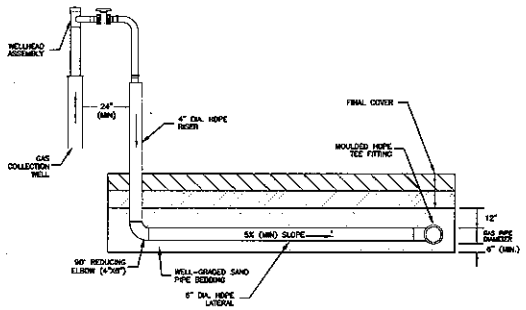
GAS COLLECTION PIPELINE TRENCH DETAIL
NOT TO SCALE



TYPICAL LANDFILL GAS BUTTERFLY VALVE
NOT TO SCALE



LANDFILL WELLHEAD ASSEMBLY & GAS SYSTEM BOOT DETAIL
NOT TO SCALE



WELL LATERAL DETAIL
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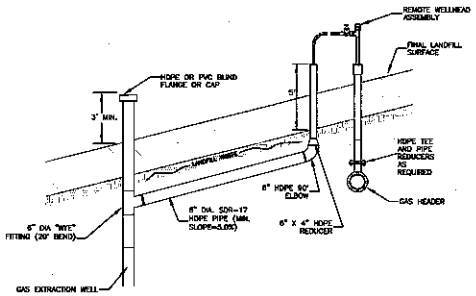
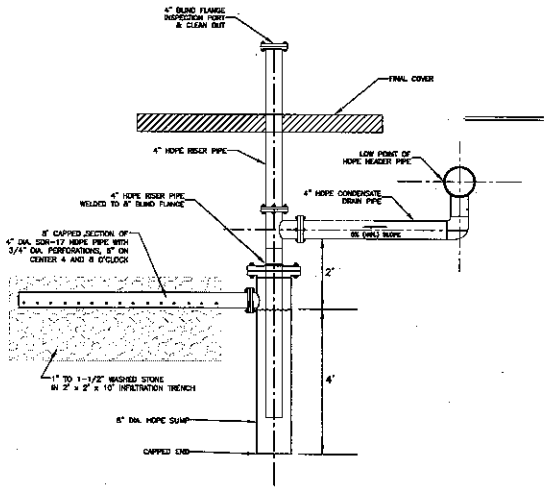


DOWN SLOPE WELL/REMOTE WELLHEAD DETAIL
NOT TO SCALE



CONDENSATE TRAP DETAIL
NOT TO SCALE

No	Date	Revision Description	Chkd. by	Appvd.
1	06/26/14	ADD PASSIVE WELL NOTE		

scale:	AS SHOWN
date:	MAY 16, 2014
drawn:	JAC
checked:	MQ
approved:	ARQ
drawing number:	DET-2

project: OLD FALL RIVER ROAD LANDFILL – FINAL CLOSURE
452 OLD FALL RIVER ROAD
DARTMOUTH, MASSACHUSETTS

client: BOSTON ENVIRONMENTAL CORPORATION
BROCKTON, MASSACHUSETTS

drawing title: CONTINGENCY ACTIVE GAS COLLECTION SYSTEM DETAILS

SITEC ENVIRONMENTAL
Civil and Environmental Engineering
Land Use Planning and Surveying
Hazardous and Solid Waste Consultants
765 Plain Street, Unit C
Marshfield, MA 02050
PHONE (781) 837-0700
FAX (781) 834-4785

File No. SE11-920

APPENDIX B-8

EXPLORATORY TEST PIT EXCAVATION LOGS

Cecil Smith Landfill
Old Fall River Road
Dartmouth, MA 02747

Exploratory Test Pit Excavation Logs
Performed On: September 24, 2012
September 25, 2012

TP-1
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-2
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-3
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-4
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-5
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-6
0"-12 Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-7
0"-12" Buried Demolition Debris
24"+ Hydric Soils

TP-8
0"-12" Buried Demolition Debris
24"+ Hydric Soils

TP-9
0"-12" Fill
12"24" Buried Demolition Debris

TP-10
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-11
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-12
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-13
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-14
0"-12" Fill
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-15
0"-12" Fill
12"-24" Buried Demolition Debris
24"+ Hydric Soils

TP-16
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-17
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-18
0"-12" Fill
12"-24" Buried Demolition Debris
24"- 60" Buried Demolition Debris

TP-19
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-20
0"-12" Fill
12"-24" Buried Demolition Debris
24"- 60" Buried Demolition Debris

TP-21
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-22
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-23
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-24
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-25
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-26
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-27
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-28
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-29
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-30
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-31
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-32
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-33
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"60" Buried Demolition Debris

TP-34
0"-12" Topsoil
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-35
0"-12" Loamy Sand
12"-24" Hydric Soils

TP-36
0"-12" Loamy Sand
12"-24" Hydric Soils

TP-37
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-38
Surface Dumping
0"-12" Gravel/ Till
12"-24" Coarse Gravel

TP-39
Surface Dumping
0"-12" Gravel/Till
12"-24" Coarse Gravel

TP-40
Surface Dumping
0"-12" Gravely Sand
12"-24" Coarse Gravel

TP-41
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-42
0"-12" Fill
12"-24" Buried Demolition Debris

TP-43
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

TP-44
0"-12" Fill
12"-24" Buried Demolition Debris
24"-60" Buried Demolition Debris

APPENDIX B-9

EXCERPTS FROM C&D FINES & RESIDUALS ASSESSMENT PROGRAM - STOUGHTON LANDFILL

MODIFICATION TO THE PROVISIONAL APPROVAL
CORRECTIVE ACTION PLAN - PHASE III

STOUGHTON RECYCLING TECHNOLOGIES, LLC
100 PAGE STREET
STOUGHTON, MASSACHUSETTS

INTRODUCTION

The Town of Stoughton and Stoughton Recycling Technologies, LLC (SRT), formerly known as TW Conroy 5, LLC, are seeking approval to modify the Department of Environmental Protection's (DEP) March 28, 2007, *Provisional Approval, Corrective Action Plan - Phase III*, (Phase III CAP) for the Stoughton Page Street Landfill (the Landfill), and the subsequent *Permit Clarification & Errata Notice*, dated May 22, 2007. This modification and the original Phase III CAP were authorized under the *Administrative Consent Order with Penalty (ACOP) #ACOP-SE-06-4006* that was signed by the Town of Stoughton, SRT (formerly known as TW Conroy 5, LLC) and DEP, dated May 25, 2006 and its *Amendment No. 1*, dated April 9, 2007.

The Phase III CAP was prepared by SRT for DEP approval of the final closure construction of a portion of the Landfill. Specifically, the Phase III CAP provided the detailed final closure design for a section of the Landfill that had not been included in the previous Phase I and Phase II CAPs. Also, the Phase III CAP sought approval for the re-use of waste materials for grading and shaping of the Landfill that are specifically identified in the DEP's July 6, 2001 *Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites* (Unlined Landfill Policy).

The Phase III CAP submission was specifically intended to achieve compliance with certain conditions stipulated under section *VII Order* of the ACOP. Also, the Phase III CAP addressed conditions stipulated in DEP's Provisional Approvals of the *Phase I Final Closure Construction* CAP, dated September 26, 2006 and the *Phase II Final Closure Construction* CAP, dated December 29, 2006. The Phase I CAP approved a final closure construction of the northern portion of the site referred to as the Waste Consolidation Area (WCA). The Phase II CAP provided corrective actions for the area around the C&D Processing Facility and established a site wide stormwater management plan. Specifically, the Phase III CAP provided corrective actions for the closure of the remaining area of the Landfill under the Unlined Landfill Policy and for site wide conditions.

This proposed modification to the Phase III CAP is intended to allow SRT to accept processed construction and demolition (C&D) fines and residual material (fines/residuals) for re-use as grading and shaping material, which is necessary for the approved closure of the Stoughton Landfill. SRT seeks this modification in order to have an additional source of materials that it can use to complete the Phase III CAP, as timely as possible. This modification will also reduce traffic associated with the current off site shipping of fines/residuals for disposal and the import of soils and other approved materials that are currently being used in the landfill closure work. DEP previously approved a list of materials that SRT can use as grading and shaping material for closure, which are listed in the Department's March 28, 2007, *Provisional Approval, Corrective Action Plan - Phase III* (page 5), and as modified in the Department's *Permit Clarification & Errata Notice* (revised page 5), dated May 22, 2007. SRT seeks a modification of this list of materials to include use of C&D

fines/residuals as grading and shaping materials, by mixing those materials with soils and other approved materials. The approved design and operation of the Phase III CAP is not proposed to be modified, except as stated in this application.

The following are the components of this proposed Phase III CAP modification:

- **Soils to Fines/Residuals Ratio:** SRT will conduct its grading and shaping operations such that ratios of soils to fines/residuals shall be optimized according to DEP's specifications.

- **Implementation of Gypsum Removal Plans:** SRT shall enhance its Gypsum Removal Action Plan, so as to reduce its gypsum content and consequently its sulfate concentration in its fines/residuals. SRT will initially conduct weekly and eventually monthly sampling and analysis of the fines/residuals for sulfate content in order to maintain the appropriate ratio of soils to fines/residuals approved for the facility.

- **Landfill Gas Response Plan:** SRT will implement a Landfill Gas Response Plan, in accordance with DEP's June 2006 landfill gas policy.

- **Financial Assurance Mechanism:** SRT will maintain its existing Financial Assurance Mechanism (FAM) for the Page Street Landfill Closure to include the contingency costs identified in the Landfill Gas Response Plan.

- **Second Phase Fines/Residuals Assessment:** SRT will conduct a continuation of studying Best Management Practices (BMPs) that will insure that inappropriate levels of hydrogen sulfide will not be generated. Additionally, SRT is supporting an expanded bench scale test on the effectiveness of an innovative and alternative technology to pre-treat fines/residuals to maximize re-use as grading and shaping materials.

SOILS TO FINES/RESIDUALS RATIO

SRT, through its ownership partners, has participated in and supported the conduct of a case study at the Marion Landfill. The purpose of the project was to determine the efficiency of re-use of C&D fines/residuals as a component of grading and shaping materials. A copy of the Case Study Report text and tabulated data are included as Attachment A. Two of the primary conclusions developed as a result of the demonstration project are the following:

- Limit the volume of gypsum containing material from the fines/residuals waste stream.

- Use proper landfill closure Best Management Practices (BMP's) such as: mixing a controlled ratio of fines/residuals to other grading and shaping materials; maintaining a small active area with optimum compaction; and maintaining proper storm water controls, in order to yield optimal results.

SRT will comply with DEP-mandated specifications, based upon the procedures outlined in the Fines/Residuals Handling Protocol, as set forth in Attachment B.

LANDFILL GAS RESPONSE PLAN

SRT will implement a Landfill Gas Response Plan. The proposed Landfill Gas Response Plan is included in Attachment C. Components of this Plan include: a plan identifying potential receptors; procedures and protocols; procedures to respond to complaints; a landfill gas monitoring plan; and a conceptual response and communication plan.

FINANCIAL ASSURANCE MECHANISM

In accordance with the proposed SRT Landfill Gas Response Plan presented in Attachment C, SRT will maintain its approved Financial Assurance Mechanism (FAM) so as to provide sufficient funds to conduct the work described in the proposed Landfill Gas Response Plan. The FAM will be maintained at its current value of $5,000,000 and will be adjusted by deducting the approved value of work that has already been completed and adding the value of contingency work included in the proposed Landfill Gas Response Plan. The proposed, amended FAM costs are presented on Table 1, titled *Closure/Post-Closure Cost Estimate Summary*. Backup cost estimates for the Landfill Gas Response Plan gas treatment contingency are included on Table 2, titled *Cost Estimates for Pre-Treatment and Treatment of Landfill Gas.*

As presented on Tables 1 and 2, the estimated costs for constructing and operating the Landfill Gas Response Plan contingencies is $1,855,318. These costs include the installation of gas collection system piping to the proposed Phase III CAP gas extraction wells, a hydrogen sulfide pretreatment system and an enclosed flare. The general layout of these facilities is included on the drawing titled *Landfill Gas Response Plan*, included in Attachment C. The estimated costs include construction as well as five year post-closure costs for the operation and maintenance of the Landfill Gas Response Plan contingencies. These costs compare to the value of $1,856,705, which represents the portion of the FAM that is available for tasks that have been completed to date, as indicated on the *Closure/Post-Closure Cost Estimate Summary* table. Since the value of completed work that is held in the FAM exceeds the estimated costs for the Landfill Gas Response Plan, there is no need to increase the $5,000,000 value of the existing FAM.

SECOND PHASE FINES/RESIDUALS ASSESSMENT

SRT is proposing to conduct a second phase assessment into optimizing the use of fines/residuals as grading and shaping materials in landfill closure projects. This assessment is intended to supplement the information gained by the Marion Study by developing at least two more data points of the ratio of mixing soils with fines/residuals, to the potential to generate hydrogen sulfide. The assessment project is described in Attachment D.

ATTACHMENT B

FINES/RESIDUALS HANDLING PROTOCOL

SRT will comply with DEP-mandated specifications by limiting the loading rate of sulfates to a unit weight of soils, consistent with the Marion Case Study report. Specifically, SRT proposes to limit the content of sulfates in the fines/residuals materials to an initial maximum of 4.2 pounds of sulfate per ton of soil. This sulfate loading rate was derived from the reported volume of materials incorporated into the Marion Landfill, as determined by the Study. In order to determine the volumetric mixing ratios of the materials to achieve the specified sulfate loading rate of 4.2 pounds of sulfate per ton of grading and shaping materials, SRT must know the concentration of sulfates in those materials, as well as the densities of the soils and the fines/residuals materials. A conversion of the weight ratio of 4.2 pounds of sulfate per ton of soil to a volumetric ratio, must be made for field implementation purposes. Volumetric ratios will be measured in the field by such basic methods as proportioning by front end loader bucket loads.

In accordance with their approved Authorization to Operate permits, SRT and other processors test their fines/residuals at least once a month for sulfate content. SRT has begun sampling its fines/residuals on a weekly basis. In addition, all materials that will be placed in the Landfill will be weighed at the C&D Processing Facility scale house. The fines and residual materials produced by processing operations will be loaded into separate roll-off containers inside the processing facility building. The roll-off containers, loaded on roll-off trucks, will cross the scales and their weights will be recorded. A separate log of each material will be maintained for record and reporting purposes. During the initial fines/residuals reuse, as proposed in the *Attachment D - Second Phase Fines/Residuals Assessment*, the volume of materials carried in roll-offs and soil trucks will be estimated. From this data, density information of the various materials will be developed. Using this information, SRT will develop its specific soils to fines/residuals mixing volume ratio, based upon the example calculation included on the attached Table B-1.

SRT proposes to conduct the grading and shaping operations consistent with the approved Phase III CAP. The C&D fines and residuals will be blended with other approved materials, such as soils. The actual ratio will be determined by prorating to the measured sulfate concentrations and the determination of average material densities. This ratio does not include additional soils that will be used for cover material.

During the first nine months of operation, sulfate analysis results for SRT's fines/residuals have averaged about 32,900 mg/Kg, with a range between 31,000 mg/Kg and 37,000 mg/Kg. Applied sulfate concentrations will be based upon a "rolling average" of sulfate analysis results in both fines and residuals. The "rolling average" will be the average of sulfate concentrations reported during the most recent three month period. As an example, using Table B-1 and assuming a "rolling average" sulfate concentration of 35,000 mg/Kg, an average density of fines/residuals of 1,000 pounds per cubic yard and an average density of soil of 3,000 pounds per cubic yard, a mixing ratio of 5.6:1 is derived. As described below, it is SRT's goal to enhance the execution of its Gypsum

Removal Action Plan, so as to reduce its gypsum content and consequently its sulfate concentration in its fines/residuals by up to 25%. Based upon results of the Second Phase Fines/Residuals Assessment project described in Attachment D and/or operational experience, SRT may propose at a later time to increase the sulfate application rate to greater than the 4.2 pounds per ton of soil.

The blending of the soils with fines/residuals will occur as the materials are placed into the Landfill. The blending will be performed by using heavy equipment. Either of two methods may be used to measure the materials to the established ratio. The first method will be to create a mixing pile from separate stockpiles of fines/residuals and soils. The ratio will be achieved by creating the mixing pile by taking the established ratio of front end loader bucket loads from each of the piles. (e.g. one bucket full of fines/residuals to four bucket fulls of soil to achieve a 4:1 ratio.) SRT is going to initially try to blend the mix pile materials by feeding them through a trommel device that does not have a screen, but rather a solid body. This will provide a thorough blending of the materials with a single step that will allow a near continuous operation, without having to work in batches. As a back up to the trommel, a batch mixing process can be used that will initially consist of turning the pile with the front end loader, spreading the pile out and then harrowing the pile to achieve a blend of materials.

Another method of measuring the materials will be to spread measured layers of the materials at the established ratios. (e.g. a two foot thick layer of soil covered by a one foot layer of fines/residuals, covered by another two foot layer of soil to achieve a 4:1 ratio.) The layered soils and fines/residuals will again be blended by either feeding the measured materials through a trommel or by turning the pile with the front end loader, spreading the pile out and then harrowing the pile to achieve a blend of materials. The blended materials will then be placed into the landfill and thoroughly compacted. SRT will maintain a stockpile of soil on the Landfill's footprint to ensure enough soil is available for daily use.

IMPLEMENTATION OF GYPSUM REMOVAL PLANS

As indicated in the above discussion of *Soils to Fines/Residuals Ratio*, the higher the concentration of sulfate in fines/residuals, the higher the ratio, or volume, of soils must be applied to a unit volume of fines/residuals. Therefore, it is in SRT's best interest to use fines/residuals that have a reduced sulfate content, so as to reduce the volume of soil and optimize the volume of fines/residuals that can be utilized.

As described in the Marion Case Study (Attachment A) sulfate content is directly related to gypsum content, which is attributed to the presence of wallboard in the waste stream. In accordance with DEP requirements, SRT included a *Gypsum Removal Action Plan* in its Application for Authorization to Operate (ATO) its C&D Processing Facility. In its September 11, 2007 ATO, DEP approved the SRT *Gypsum Removal Action Plan*, as follows.

> **"Gypsum Removal**: The Owner/Operator shall implement the "Gypsum Removal Plan" that was included in the application, in that the facility shall, to the maximum extent possible, extract and properly dispose of gypsum wall-board, from the waste stream prior to

processing the waste stream for the production of C&D fines and the ensuing use of the material as an alternative daily landfill cover material pursuant to the Beneficial Use Determination ("BUD") approval dated January 29, 2007 (Transmittal Number #W095314)."

The approved SRT *Gypsum Removal Action Plan* is included as Attachment E and the referenced January 29, 2007 BUD is included as Attachment F.

In order to enhance the removal of gypsum from the fines/residual materials, SRT has modified its *Gypsum Removal Action Plan*, in order to better define its procedures for the separation and removal of gypsum from the fines/residuals waste stream. The revised plan is included in Attachment G *Gypsum Removal & Sampling Plan*. The revised plan identifies a more aggressive approach to separation and specifies procedures for sampling, sample preparation and analysis for sulfate content. With the implementation of the *Gypsum Removal & Sampling Plan* SRT's goal is to consistently reduce the sulfate concentration in its fines/residuals that is about 25% below its current average concentrations.

TABLE No. B-1

CALCULATION OF THE RATIO OF CUBIC YARDS OF SOIL TO CUBIC YARDS OF C&D FINES/RESIDUALS

EXAMPLE CALCULATION

POUNDS OF SULFATE PER CUBIC YARD OF SOIL

(1)	4.2	Pounds of sulfate per ton of soils
(2)	3,000	Pounds per cubic yard of soil
(3)	1.5	Tons per cubic yard of soil [(2) / 2,000 pounds per ton]
(4)	6.3	Pounds of sulfate per cubic yard of soil [(1) x (3)]

POUNDS OF FINES/RESIDUALS PER POUNDS OF SULFATES PER CUBIC YARD OF SOIL

(5)	6.3	Pounds of sulfate per cubic yard of soil [(4)]
(6)	35,000	Concentration of sulfates in fines/residuals [mg/kg ≃ ppm]
(7)	0.035	Pounds of sulfates per pound of fines/residuals [(6) / 1,000,000]
(8)	180	Pounds of fines/residuals per pounds of sulfates per cubic yard of soil [(5) / (7)]

CUBIC YARDS OF FINES/RESIDUALS PER POUNDS OF SULFATES PER CUBIC YARD OF SOIL

(9)	180	Pounds of fines/residuals per pounds of sulfates per cubic yard of soil [(8)]
(10)	1,000	Pounds per cubic yard of fines/residuals
(11)	0.5	Tons per cubic yard of fines/residuals [(10) / 2,000 pounds per ton]
(12)	0.18	Cubic yards of fines/residuals per pounds of sulfates per cubic yard of soil [(9) / (10)]

RATIO OF CUBIC YARDS OF SOIL TO CUBIC YARDS OF FINES/RESIDUALS

(13)	1	Cubic yards of soil
(14)	0.18	Cubic yards of fines/residuals per pounds of sulfides per cubic yard of soil [(12)]
(15)	5.6	Parts soil to one part fines/residuals, by volume [(13) / (14)]

RATIO OF CUBIC YARDS SOIL TO CUBIC YARDS OF FINES/RESIDUALS

POUNDS OF SULFATE PER TON OF SOIL = 4.2

CONCENTRATION OF SULFATE IN FINES/RESIDUALS (PPM)	DENSITY OF FINES/RESIDUALS (LBS/CY)						
	600	700	800	900	1000	1100	1200
10,000	1.0	1.1	1.3	1.4	1.6	1.7	1.9
15,000	1.4	1.7	1.9	2.1	2.4	2.6	2.9
20,000	1.9	2.2	2.5	2.9	3.2	3.5	3.8
25,000	2.4	2.8	3.2	3.6	4.0	4.4	4.8
30,000	2.9	3.3	3.8	4.3	4.8	5.2	5.7
35,000	3.3	3.9	4.4	5.0	5.6	6.1	6.7
40,000	3.8	4.4	5.1	5.7	6.3	7.0	7.6
45,000	4.3	5.0	5.7	6.4	7.1	7.9	8.6

* Mixing ratios are to be rounded up to the nearest half (0.5) portion.

ATTACHMENT D

SECOND PHASE FINES/RESIDUALS ASSESSMENT

The assessment project will be to accept fines and residual materials produced by the SRT C&D Processing Facility into the Stoughton Landfill; to mix those materials at approved proportions with soil and other approved materials; and to assess the production of hydrogen sulfide in the Landfill as a result of the placement of these materials. As shown on the attached drawing *Second Phase Fines/Residuals Assessment*, there are three proposed operations areas for this project. The first is the Section 1 Final Closure Grades (Section 1) area, as identified in the approved Phase III CAP. This area has been reduced in size from a volume of about 190,000 cubic yards to 150,000 cubic yards, in order to provide for the other two areas of this project, which are Cell 1 and Cell 2. These cells have respective volumes of about 35,000 and 30,000 cubic yards, as shown.

SRT proposes to use Section 1 during the period of this assessment for the reuse of residuals, only, at a sulfate concentration consistent with the 4.2 pounds of sulfate per ton of soils and other materials, consistent with the measured loading rate in Marion. (The basis for the 4.2 pounds of sulfate per ton of approved materials is the measured average concentration of 14,000 ppm of sulfate in the fines, and the 2:1 soils to fines volume ratio which was based on reported tonnages of materials and assumed densities.) SRT proposes to use Cell 1 and Cell 2 as areas where fines, only, will be incorporated at sulfate loading rates of eight (8 lbs.) and twelve pounds (12 lbs.) of sulfate per ton of soils and other materials. These loading rates represent multiples of two and three times the sulfate loading rate that has been assessed in the Marion Landfill.

SRT has begun and will continue to collect regular, and sometimes weekly, samples of fines and residuals for sulfate analysis. To date, results indicate that fines have an average sulfate concentration of about 35,000 mg/Kg and that residuals have a sulfate concentration of about 15,000 mg/Kg. Table No. D-1 has been developed to calculate the volumetric ratio of fines and residuals to soils, at the proposed sulfate loading rates given above.

Calculations of mixing ratios will be based on the "rolling average" of analytical results, as described in Attachment B. Fines, residuals and soils will be tracked by weight and the area that they are placed in for reuse. Weight to volume measurements will be made to develop more certain information on material density. This will be done by measuring the volume of materials in truck trailer and roll-off container beds and applying the measured weights of the materials, as determined by the on-site truck scales, to calculate the material densities. A series of these density measurements will be conducted over the life of the Assessment Project.

The cells will be constructed in a manner consistent with normal closure activities associated with the use of fines/residuals and soils as grading and shaping materials. The development of the cells will not be accelerated or impeded so as to hasten or delay the closure of these areas. They will be developed at the going rate of fines/residuals production and availability of soils and other approved materials. If fines/residuals production is outpacing the available soils volume for the approved ratios, the fines/residuals will be sent to off-site reuse-disposal facilities. The cells will be provided

with adequate opportunity to be exposed to precipitation and infiltration of moisture. Upon filling the cells to the approved grades, they will receive a one foot (1') layer of intermediate cover, consistent with DEP's Solid Waste Management Regulations. Topographical surveys will be conducted to determine the in-place volume of the materials.

The effectiveness of the second phase assessment program will be monitored by a series of temporary gas monitoring probes and permanent gas vent wells. The installation of the permanent gas vent wells were approved in the Phase III CAP, and for this assessment will be installed in the Section 1 area. The probes will consist of 1" diameter PVC pipe, screened at a depth of between ten and twenty feet (10' to 20') below the finished cell area landfill surfaces. The permanent gas vent wells will be installed in the general locations and in the manner described in the approved Phase III CAP.

Temporary gas probes and permanent gas vent wells will be field screened for % Lower Explosive Limit (LEL), % oxygen, % methane and hydrogen sulfide using a multi-gas meter. The field screening events will be conducted every two weeks, or as otherwise may be necessary. The results of each soil gas survey sample analysis will be recorded, along with weather conditions. Results of the landfill gas monitoring will be tabulated, evaluated and reported to DEP. Using this data, recommendations will be developed regarding fines/residuals mixtures with soils and other approved materials. Recommendations are intended to optimize soils to fines/residuals ratios.

SRT is also proposing to work with Hydros, Inc. of Bourne, Massachusetts to conduct an expanded bench scale feasibility study to determine the potential of pretreating fines/residuals with sulfur fixing bacteria, in order to further mitigate the production of hydrogen sulfide gas through, what is in effect, an in-situ biofiltration process. The objective of this study will be to define the effects of varying soils to fines/residuals ratio and the resulting gas characteristics, when applying sulfur oxidizing bacteria and nutrients. These nutrients have in the past been successfully used to remove inorganic and organic sulfur compounds from contaminated surfaces. The study will measure the gas levels as a determinant of the appropriate selection of mixed bacterial cultures by testing in a controlled environment where conditions such as pH, temperature, moisture content, organic content and oxygen concentrations can be monitored. From the results of the expanded bench scale work, SRT and Hydros may identify a larger scale demonstration project of this application, for DEP approval.

TABLE No. D-1
SECOND PHASE FINES/RESIDUALS ASSESSMENT
STOUGHTON RECYCLING TECHNOLOGIES, PAGE STREET LANDFILL

SECTION 1 - RESIDUALS REUSE AREA

Sulfate Application Rate	4.2	lbs. of sulfates per ton of soil/other materials
Soils Density	1.5	tons per cubic yard
	3,000	pounds per cubic yard
Residuals Density	0.4	tons per cubic yard
	800	pounds per cubic yard
Sulfate Concentration in Residuals	15,000	mg/Kg
	0.015	ratio - lbs. sulfate per lbs. of residuals
Pounds of Residuals per Ton of Soils at Sulfate Application Rate	280	lbs. of residuals per ton of soil/other materials
Cubic Yards of Residuals per Ton of Soils at Sulfate Application Rate	0.35	C.Y. of residuals per ton of soil/other materials
Tons of Soils per Cubic Yard of Residuals at Sulfate Application Rate	2.86	tons of soil per cubic yard of residuals
Cubic Yards of Soil per Cubic Yard of Residuals at Sulfate Application Rat	1.90	cubic yards of soil per cubic yard of residuals

USE RATIO OF 2 :1 SOILS TO RESIDUALS, BY VOLUME

Available Volume		150,000 C.Y.
C.Y. of Soils at	1.90 :1	98,361 C.Y.
Tons of Soil		147,541 Tons
C.Y. of Residuals at	1.90 :1	51,639 C.Y.
Tons of Residuals		20,656 Tons

CELL 1 - FINES REUSE AREA

Sulfate Application Rate	8	lbs. of sulfates per ton of soil/other materials
Soils Density	1.5	tons per cubic yard
	3,000	pounds per cubic yard
Fines density	0.5	tons per cubic yard
	1000	pounds per cubic yard
Sulfate Concentration in Fines	35,000	mg/Kg
	0.035	ratio - lbs. sulfate per lbs. of fines
Pounds of Fines per Ton of Soils at Sulfate Application Rate	229	lbs. of fines per ton of soil/other materials
Cubic Yards of Fines per Ton of Soils at Sulfate Application Rate	0.23	C.Y. of fines per ton of soil/other materials
Tons of Soils per Cubic Yard of Fines at Sulfate Application Rate	4.38	tons of soil per cubic yard of fines
Cubic Yards of Soil per Cubic Yard of Fines at Sulfate Application Rate	2.92	cubic yards of soil per cubic yard of fines

USE RATIO OF 3 :1 SOILS TO FINES, BY VOLUME

Available Volume		35,000 C.Y.
C.Y. of Soils at	2.92 :1	26064 C.Y.
Tons of Soil		39096 Tons
C.Y. of Fines at	2.92 :1	8936 C.Y.
Tons of Fines		4468 Tons

CELL 2 - FINES REUSE AREA

Sulfate Application Rate	12	lbs. of sulfates per ton of soil/other materials
Soils Density	1.5	tons per cubic yard
	3,000	pounds per cubic yard
Fines density	0.5	tons per cubic yard
	1000	pounds per cubic yard
Sulfate Concentration in Fines	35,000	mg/Kg
	0.035	ratio - lbs. sulfate per lbs. of fines
Pounds of Fines per Ton of Soils at Sulfate Application Rate	343	lbs. of fines per ton of soil/other materials
Cubic Yards of Fines per Ton of Soils at Sulfate Application Rate	0.34	C.Y. of fines per ton of soil/other materials
Tons of Soils per Cubic Yard of Fines at Sulfate Application Rate	2.92	tons of soil per cubic yard of fines
Cubic Yards of Soil per Cubic Yard of Fines at Sulfate Application Rate	1.94	cubic yards of soil per cubic yard of fines

USE RATIO OF 2 :1 SOILS TO FINES, BY VOLUME

Available Volume		30,000 C.Y.
C.Y. of Soils at	1.94 :1	19811 C.Y.
Tons of Soil		29717 Tons
C.Y. of Fines at	1.94 :1	10189 C.Y.
Tons of Fines		5094 Tons

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September 14, 2009

Mr. David Ellis, Section Chief
Commonwealth of Massachusetts
Department of Environmental Protection
20 Riverside Drive
Lakeville, MA 02347

Reference: Page Street Landfill - Bi-Monthly Status Report
Stoughton , Massachusetts

Dear Mr. Ellis:

In accordance with Provision Number 9 of the Department's March 28, 2007 **Provisional Approval, Corrective Action Plan - Phase III** (CAP) and Provision Number 11 of the Department's November 14, 2008 **Provisional Approval, Modification of Phase III Corrective Action Plan, Use of C&D Fines & Residuals as Grading/Shaping Materials for Landfill Closure**, we are submitting this Status Report regarding the closure of the Page Street Landfill. This Status Report covers the period of July and August 2009.

General Landfill Operations and Monitoring

The western side of the Phase III area had previously been prepared for the placement of grading and shaping materials. Stormwater controls, including haybales and silt fence, have been established and maintained along the perimeter and brush and trees have been removed from the fill area. Also a drainage swale has been constructed and maintained along the western toe of slope that carries runoff from the western sideslope to the north and the existing sedimentation pond. Stockpiles of leaf and yard waste, including compost and clean soils have been screened and segregated. Top soils for vegetative cover have been produced by the screening. Leaf composting is being conducted in the south central portion of the Phase III area.

Haul roads have been established within the landfill area for trucks delivering soils from off-site sources and C&D materials from the processing facility. The haul roads have been built up and surfaced with crushed asphalt, brick and concrete (ABC) material. The established internal access roads are being maintained. The wheel cleaning grate is maintained by removing accumulated soils and the paved area is swept, as needed, to eliminate off site tracking of soils and spayed with water to reduce the generation of dust.

Stone lined drainage swales have been constructed along the eastern and southern boundaries of the Phase III Landfill area. The swales collect runoff from the majority of the operations area and diverts it to the upstream end of the constructed sedimentation pond that runs parallel to Mack Drive and the Avon town line. The remainder of the operations area runoff is collected by the swale along the western side line, which flows to the northern sedimentation pond. The swales appear to be effectively collecting runoff from the contributory operations area and reducing sediment loadings to the sedimentation basin.

SRT notified DEP in a February 19, 2009 letter, that it was moving the approved asphalt, brick and concrete (ABC) processing operation from the southeastern section of the Phase III landfill closure area to the southwestern section. This relocation was required because the area originally approved for ABC processing was subsequently approved for the demonstration cells of the fines/soils mixing. ABC material is now being stockpiled and processed in the relocated area.

During the period that is covered by this Status Report (July and August) a total of 20,199 tons of approved materials (contaminated soils, not including fines and residual materials) were received and placed to grade and shape the Landfill. To date, a total of 252,580 tons of these approved materials have been received, in accordance with the approved Phase III CAP.

As required by MassDEP, a quarterly screening of gas monitoring wells and the surface gas screening of the recycling drop off center and leaf and yard waste collection area was conducted on August 28, 2009 and was reported to the Department. During the past few months a total of seven additional gas monitoring wells were installed to the west of the Landfill, along Reebok Drive in the area of BJ's parking lot, as suggested by MassDEP. These wells have been installed to monitor potential gas migration in this area of the Landfill and bring the total number of gas monitoring probes to 31. Results of the May 2009 environmental sampling event were submitted to the Department in a report dated August 5, 2009.

Unilateral Administrative Order

As previously reported, SRT has, to date, fully complied with the requirements of a Unilateral Administrative Order (UAO) issued by DEP during 2008. The UAO required actions regarding the off site presence of solid waste on property formerly owned by Reebok. A Remedial Action Capping Plan for this site was prepared and submitted to DEP on October 24, 2008, in accordance with the UAO. MassDEP issued a Provisional Approval for the Remedial Action Capping Plan on April 29, 2009. SRT has initiated access approval negotiations with the property owner and easement holders, with the intent of capping this area during 2009.

Use of C&D Fines & Residuals as Grading/Shaping Materials for Landfill Closure

A proposed modification to the Phase III CAP that allows the use of fines and residuals produced at the C&D processing facility for grading and shaping material was finalized and submitted on September 15, 2008 to DEP for approval. On November 14, 2008, DEP issued its **Provisional Approval, Modification of Phase III Corrective Action Plan, Use of C&D Fines & Residuals**

as Grading/Shaping Materials for Landfill Closure. In accordance with Provision 11 of that approval, Status Reports are now submitted to DEP on a bi-monthly schedule and will include information on the quantities of materials that are managed under that approval.

DEP's approval of the use of fines and residuals (C&D materials) for grading and shaping required SRT to conduct separate mixing and placement operations within designated sections of the Landfill. The fines are to be placed in two cells (initially Cell 2, then Cell 1) that will be used to evaluate the proposed mixing ratios of fines to soil and monitor changes in hydrogen sulfide concentrations within the cell. The residuals are to be placed in a separate section (Section 1) of the Landfill that is part of the previously approved closure process. The residuals in Section 1 and the fines in Cell 2 are mixed with soils at a volumetric ratio of two parts soil to one part C&D materials (2:1). Based upon the assumptions given in the September 12, 2008 Application to accept C&D materials for grading and shaping (see Attachment D, Table D-1 of the Application) the 2:1 mixing ratio was anticipated to result in loading rates of twelve pounds of sulfate in fines per ton of soil (12 lbs./ton) and four pounds of sulfate in residuals per ton of soil (4 lbs./ton). Following completion of the filling of Cell 2 it will be covered with intermediate cover material and operations will be moved to Cell 1. In accordance with DEP's approval, soil gas monitoring probes have been installed in Cell 2, soil gas characteristics are being monitored using the probes and a "first interim report" was prepared, which summarized the results of the work. The most recent Status Report for the months of May and June 2009 was intended to function as the "first interim report", required by Provision No. 12 of the Department's November 14, 2008 approval. This Status Report is to function as an update to that "first interim report". The same is to be done following the completion of Cell 1. Based upon the results of the study work, a long term sulfate loading rate and soil to C&D material mixing ratios will be recommended.

As part of this demonstration project, SITEC Environmental is working closely with SRT to evaluate and document any changes in conditions, that may give rise to the generation of hydrogen sulfide. As discussed in the application that was the subject of the Department's November 14, 2008 Provisional Approval (the Application), there are three variables that must be determined in order to calculate the amount of sulfates that have been placed in the Landfill, relative to the volumetric ratio of soils to C&D materials. These variables are 1) the density of the soils, 2) the density of the C&D materials, and 3) the concentration of sulfates in the C&D materials. The densities of soils and C&D fines materials are being determined by weighing a know volume of the materials. Density measurements for each material are made on a daily basis and are recorded. This information is then applied to the daily operations to determine the volume (cubic yards) of the C&D materials and the weight of soils incorporated into the shaping and grading operations, as described below. To date the average measured loose (not compacted) density of fines is 774 pounds per cubic yard (lbs/cy) or 0.387 tons per cubic yard (ton/cy); residuals is 345 lbs/cy or 0.172 ton/cy and soils is 2,715 lbs/cy or 1.358 ton/cy. These measurements will continue to be taken throughout this assessment process.

Fines and residuals are sampled and analyzed for sulfate concentration. The sampling and analysis is conducted in accordance with the protocols presented in **Attachment G - Stoughton Recycling Technologies Gypsum Removal & Sampling Plan (March 7, 2008)**, of the approved Application. Basically, grab samples of the C&D materials are collected and composited for each day. The daily

composites are again composited to a single weekly sample that is analyzed for sulfate concentrations. Results of the sulfate analysis are tabulated on the attached **Table No. 1, Stoughton Recycling Technologies - C&D Materials-Soil Processing, Fines and Residuals Sulfate Analysis**. While sulfate analysis has been conducted on SRT's C&D materials since the start up of the processing facility in June of 2007, the attached table uses the more recent data, starting in July 2008 and going forward. The table provides an average value of all data shown and an average for the results of the most recent 30 day sampling events. As can be noted on Table 1 the current 30 day average for the sulfate concentration in fines is 43,667 mg/kg and for residuals is 36,333 mg/kg.

Week ending summaries of the fines and residual materials placed in the Landfill are presented, respectively on the attached **Table No. 2, Stoughton Recycling Technologies - C&D Fines Materials-Soil Processing, Weekly Record of Materials for Cell No. 2** and **Table No. 3, Stoughton Recycling Technologies - C&D Residuals Materials-Soil Processing, Weekly Record of Materials for Section 1**. These weekly summary tables are based on daily records that are kept by SRT. Data that is directly input to the tables are the C&D materials "Weight (Tons)" based on scale readings taken of every load of C&D material that is brought to the Landfill from the C&D Processing Facility and the "Sulfate Concentration (mg/kg)" that is obtained by the sampling and analysis program described above. Using the daily C&D material weights and density data, as described above, their "Volume (Cubic Yards)" is determined for each day. Using the calculated "Volume (Cubic Yards)" of C&D materials and the approved mixing ratio, which is 2:1, the "Volume (Cubic Yards)" of soil is calculated for each day's operation of mixing the C&D materials that are delivered to the Landfill. The "Weight (Tons)" of soil that is represented by the calculated "Volume (Cubic Yards)" of soil is determined using each days measured soil density value. Density values presented on the attached tables are calculated from the sum of each week's daily weight and volume values. These tables also include the reported "Sulfate Concentrations (mg/kg)" for each week's samples. Using the "Sulfate Concentration" and the "Weight (Tons)" values for the C&D materials, the mass loading, or "Sulfate Weight (lbs.)" is calculated for each week. The "Cumulative Pounds of Sulfates per Ton of Soils" is then calculated by dividing the total to date of "Sulfate Weight (lbs.)", by the total to date of the "Weight (Tons)" of soil. As can be noted on Table 2, the actual sulfate loading rate for fines (11.27 pounds of sulfate per ton of soil) is less than the design loading rate of twelve pounds of sulfate per ton of soil, and on Table 3, the actual sulfate loading rate for residuals (3.91 pounds of sulfate per ton of soil) is less than the design loading rate of four pounds of sulfate per ton of soil.

The measuring, mixing and placement of the blended C&D materials and soils has been conducted in accordance with the Application and DEP's Provisional Approval. Mixing of the C&D materials and soil at the approved 2:1 ratio is being conducted by creating a mix pile of the materials with measured proportions of two parts of soil to one part of C&D materials. The proportioning and mixing of fines materials is done with the use of heavy equipment. The fines are proportioned by placing a full, equally measured, front end loader bucket of fines and two full, equally measured, buckets of soil into a mix pile within Cell No. 2. Subsequent blending or mixing is done by turning the mix pile several times with the heavy equipment, until a homogenous blend is achieved, as determined by the equipment operator's visual observations.

The proportioning and mixing of the residual materials is also done with heavy equipment. The residual and soils materials are proportioned by spreading an even layer of residuals, approximately one foot thick, and then covering it with a layer of soil that is twice as thick as the residuals. Mixing or blending is then accomplished with heavy equipment, using a harrow attachment to turn and mix the material. Mixing continues until a homogeneous blend is achieved, as determined by the equipment operator's visual observation. As requested by MassDEP, SITEC Environmental has been conducting twice weekly operational oversight inspections. The purpose of the inspections is to observe and document, through inspection reports, SRT's measuring, mixing and blending operations of the soils and C&D materials. SITEC Environmental has prepared reports of each of the operational oversight inspections. Copies of these reports, through August 31, 2009, are attached.

The mixed materials are then placed into their designated areas of the Landfill and are then compacted. The footprint of Cell 2 was laid out by field survey in accordance with the approved Application and was formed by creating a perimeter berm from the interior, intermediate cover soils. On May 28, 2009, MassDEP issued an approval to extend the operations within Cell No. 2, by enlarging its footprint and to allow filling the swale between Cell No. 2 and Section No. 1. On August 18, 2009, SRT submitted a second request to extend the footprint of Cell No. 2, this time to the east. The purpose of the extensions is to allow continued operation within Cell No. 2, while the potential for hydrogen sulfide generation is being monitored in the Cell. The filling of Section 1 is proceeding in accordance with the approved final grades.

Monitoring the Impacts of the Cells

As required by MassDEP's November 14, 2008 **Provisional Approval,** SRT has installed and monitored soil gas probes in Cell No. 2. Initially, four probes were installed on April 23, 2009, within the Cell. Three additional gas probes were installed in Cell No. 2 on June 22, 2009. The probes were installed using direct push, geoprobe methods. The probes were pushed to the approximate original bottom elevation of the Cell and a screen with sand pack was placed to approximately two feet below the existing surface of the Cell. Attached is a figure titled ***Demonstration Cell No.2, Fines/Residuals Assessment*** which shows the relative locations of the probes

Each probe has been screened at least once, and usually twice, per week for percent oxygen (%O), percent lower explosive limit (%LEL), percent methane (%CH_4) and hydrogen sulfide (H_2S) in parts per million. Results of the screening done to date are reported on **Table No. 4, Stoughton Recycling Technologies - C&D Fines Materials-Soil Processing, Demonstration Cell Gas Probes.** As can be noted on Table No. 4, minimal hydrogen sulfide had been detected up to the first week in July. Since then three gas probes (C2-4, C2-5 and C2-7) have shown the presence of H_2S at moderate concentrations. Included with Table No. 4 is a graph plotting the hydrogen sulfide concentrations for those three probes (C2-4, C2-5 and C2-7). It should be noted that in Marion, measured H_2S concentrations reached a maximum of 16,000 ppm, without creating any nuisance conditions. No H_2S odors have been detected in the immediate vicinity of Cell No. 2. SRT continues to conduct the Odor Survey Plan, as approved by MassDEP, to monitor for off-site odors.

Recommended Fines Mixing Ratio for Cell No. 1

As has been reported in these Status Reports, the C&D Fines Materials mixing and placement operation in Cell No. 2, began in December of 2008 and has been continuous. Consequently, some of the material has been in place for nearly nine months, which, based upon experiences at other facilities, is adequate time for hydrogen sulfide to be produced at quantities that can create off site nuisance conditions. During the period ending August 31, 2009, a measured 17,481 tons of fines and an estimated 120,446 tons of soil have been incorporated into the Cell. The in-place, compacted volume (cubic yards) of materials placed in Cell No. 2 will be confirmed by field survey.

Weather conditions over the past two months have been conducive to the production of hydrogen sulfide, with nearly seven inches (6.90") of rain being recorded at Logan Airport in July, which is more than double the average (3.06") for the month, providing moisture and slightly warmer than average temperature for the month of August (1.3 degrees above the average of 72.3 degrees). The combination of moisture and warmth promote the biological reactions that produce hydrogen sulfide.

As reported on Table No. 4, there have been moderate levels of hydrogen sulfide measured within the Cell. Conditions of adequate time, moisture and temperature have provided sufficient opportunity, based on experiences from other facilities, to generate nuisance odors. During SITEC Environmental's bi-weekly field inspections, there has been no detection of hydrogen sulfide odors. Based upon these results, SRT is requesting approval to begin operations in Cell No. 1, whereby C&D fines are to be mixed with soils and other approved materials at a ratio of 1:1 (equal amounts). The gas probes in Cell No. 2 will continue to be monitored. If concentrations of hydrogen sulfide significantly increase or if nuisance odor conditions are detected, MassDEP will be notified and the 1:1 mixing operation of Cell No. 1 may be modified.

Should you have any questions regarding these issues, please do not hesitate to contact me.

Sincerely,
SITEC Environmental, Inc.

A. Raymond Quinn, PE, LSP
Director of Engineering Services

cc: Lawrence Barrett, Town of Stoughton Department of Public Works
Sandra Gabriel, Town of Stoughton Board of Health
Deborah Sovinee, Stoughton Redevelopment Authority
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Nick Mucci, Stoughton Recycling Technologies, LLC
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C&D MATERIAL/SOILS MIXING TABLES

Table No. 1
Stoughton Recycling Technologies - C&D Materials-Soil Processing
Fines and Residuals Sulfate Analysis

Date Sampled	FINES			RESIDUALS		
	Sulfate Analysis (mg/kg)	Average (mg/kg)	Average-30 Days (mg/kg)	Sulfate Analysis (mg/kg)	Average (mg/kg)	Average-30 Days (mg/kg)
7/1/2008	35,000					
8/1/2008	31,000	33,000				
8/29/2008				14,000		
8/29/2008				11,000	12,500	
8/29/2008				11,000	12,000	
8/29/2008				11,000	11,750	
8/29/2008				24,000	14,200	
8/29/2008				6,500	12,917	
8/29/2008				11,000	12,643	
8/29/2008				14,000	12,813	
8/29/2008				13,000	12,833	
8/29/2008				17,000	13,250	
9/12/2008	29,000	31,667	31,667			
10/21/2008	32,000	31,750	31,750			
11/5/2008	34,000	32,200	33,000			
11/21/2008	35,000	32,667	33,667			
11/28/2008	40,000	33,714	36,333			
12/3/2008	35,000	33,875	36,000			
12/5/2008	32,000	33,667	35,200	22,000	14,045	
12/9/2008				1,800	13,025	11,900
12/10/2008				1,300	12,123	8,367
12/11/2008				12,000	12,114	9,275
12/12/2008	32,000	33,500	34,800	7,300	11,793	8,880
12/19/2008	31,000	33,273	34,167	33,000	13,119	12,900
12/27/2008	33,000	33,250	33,300			
1/2/2009	37,000	33,538	33,333			
1/9/2009	36,000	33,714	33,800	34,000	14,347	14,900
1/16/2009	37,000	33,933	34,800	32,000	15,328	33,000
1/23/2009	43,000	34,500	37,200	27,000	15,942	31,000
1/30/2009	44,000	35,059	39,400	36,000	16,945	32,250
2/4/2009	38,000	35,222	39,167			
2/6/2009	50,000	36,000	41,333	38,000	17,948	33,400
2/13/2009	38,000	36,100	41,667	33,000	18,632	33,200
2/20/2009	31,000	35,857	40,667	12,000	18,343	29,200
2/27/2009	45,000	36,273	41,000	25,000	18,621	28,800
3/4/2009	32,000	36,087	39,000			
3/6/2009	42,000	36,333	39,667	22,000	18,756	26,000
3/13/2009	32,000	36,160	36,667	18,000	18,727	22,000
3/20/2009	34,000	36,077	36,000	34,000	19,293	22,200
3/27/2009	31,000	35,889	36,000	36,000	19,889	27,000
4/1/2009	24,000	35,464	32,600			
4/3/2009	34,000	35,414	32,833	18,000	19,824	25,600
4/10/2009	36,000	35,433	31,833	29,000	20,130	27,000
4/17/2009	41,000	35,613	33,333	30,000	20,448	29,400
4/24/2009	34,000	35,563	33,333	36,000	20,934	29,800
5/1/2009	33,000	35,485	33,667	35,000	21,361	29,600
5/8/2009	39,000	35,588	36,167	34,000	21,732	30,333
5/15/2009	54,000	36,114	39,500	58,000	22,769	37,000
5/22/2009	32,000	36,000	38,833	36,000	23,136	38,167
5/29/2009	28,000	35,784	36,667	15,000	22,916	35,667
6/5/2009	40,000	35,895	37,667	30,000	23,103	34,667
6/12/2009	39,000	35,974	38,667	17,000	22,946	31,667
6/19/2009	38,000	36,025	38,500	28,000	23,073	30,667
6/26/2009	30,000	35,878	34,500	37,000	23,412	27,167
7/3/2009	39,000	35,952	35,667	39,000	23,783	27,667
7/10/2009	40,000	36,047	37,667	31,000	23,951	30,333

Table No. 1
Stoughton Recycling Technologies - C&D Materials-Soil Processing
Fines and Residuals Sulfate Analysis

Date Sampled	FINES			RESIDUALS		
	Sulfate Analysis (mg/kg)	Average (mg/kg)	Average-30 Days (mg/kg)	Sulfate Analysis (mg/kg)	Average (mg/kg)	Average-30 Days (mg/kg)
7/17/2009	43,000	36,205	38,167	33,000	24,157	30,833
7/24/2009	39,000	36,267	38,167	35,000	24,398	33,833
7/31/2009	40,000	36,348	38,500	30,000	24,520	34,167
8/7/2009	51,000	36,660	42,000	38,000	24,806	34,333
8/14/2009	42,000	36,771	42,500	38,000	25,081	34,167
8/21/2009	48,000	37,000	43,833	44,000	25,467	36,333
8/28/2009	42,000	37,100	43,667	33,000	25,618	36,333
9/4/2009	35,000	37,059	43,000	41,000	25,920	37,333
9/11/2009	41,000	37,135	43,167	40,000	26,190	39,000
9/18/2009	37,000	37,132	40,833	31,000	26,281	37,833
9/25/2009	38,000	37,148	40,167	38,000	26,498	37,833
10/2/2009	35,000	37,109	38,000	27,000	26,507	35,000
10/9/2009	36,000	37,089	37,000	32,000	26,605	34,833
10/16/2009	32,000	37,000	36,500	31,000	26,682	33,167
10/23/2009	35,000	36,966	35,500	25,000	26,653	30,667
10/30/2009	35,000	36,932	35,167	36,000	26,812	31,500
11/5/2009	40,000	36,983	35,500	28,000	26,832	29,833
11/12/2009	40,000	37,033	36,333	24,000	26,785	29,333
11/20/2009	30,000	36,919	35,333	29,000	26,821	28,833
11/25/2009	36,000	36,905	36,000	33,000	26,919	29,167
12/4/2009	25,000	36,719	34,333	39,000	27,108	31,500
12/10/2009	39,000	36,754	35,000	37,000	27,260	31,667
12/17/2009	36,000	36,742	34,333	19,000	27,135	30,167
12/24/2009	48,000	36,910	35,667	32,000	27,207	31,500
12/31/2009	43,000	37,000	37,833	34,000	27,307	32,333
1/8/2010	34,000	36,957	37,500	34,000	27,404	32,500
1/15/2010	44,300	37,061	40,717	32,000	27,470	31,333
1/22/2010	40,000	37,103	40,883	38,000	27,618	31,500
1/29/2010	40,400	37,149	41,617	33,000	27,693	33,833
2/5/2010	49,000	37,311	41,783	29,000	27,711	33,333

Table No. 2
Stoughton Recycling Technologies - C&D Fines Materials-Soil Processing
Weekly Record of Materials for Cell No. 2

WEEK ENDING	SOIL			C&D FINES MATERIAL					Cumulative Pounds of Sulfates per Ton of Soils
	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Sulfate Concentration (mg/Kg)	Sulfate Weight (lbs.)	
11/29/2008	293	1.465	200	37.00	0.37	100	40,000	2,960	10.10
12/6/2008	1,932	1.33	1,454	267.96	0.37	727	32,000	17,149	9.04
12/13/2008	419	1.23	340	55.67	0.33	170	32,000	3,563	8.95
12/20/2008	933	1.41	664	126.70	0.39	332	31,000	7,979	8.85
12/27/2008	394	1.42	278	48.58	0.35	139	33,000	3,206	8.78
1/2/2009	1,738	1.47	1,186	225.22	0.38	593	37,000	16,666	9.03
1/9/2009	2,346	1.39	1,684	347.16	0.41	842	36,000	24,996	9.50
1/16/2009	2,301	1.47	1,570	330.91	0.42	785	37,000	24,487	9.75
1/23/2009	2,846	1.37	2,074	373.41	0.36	1,037	43,000	32,113	10.08
1/30/2009	3,534	1.34	2,636	506.68	0.38	1,318	44,000	44,588	10.62
2/6/2009	2,927	1.34	2,184	411.92	0.38	1,092	50,000	41,192	11.13
2/13/2009	2,666	1.46	1,830	362.63	0.40	915	38,000	27,560	11.04
2/20/2009	3,562	1.45	2,458	456.50	0.37	1,229	31,000	28,303	10.61
2/27/2009	4,728	1.48	3,202	627.30	0.39	1,601	45,000	56,457	10.82
3/6/2009	4,846	1.40	3,460	663.36	0.38	1,730	42,000	55,722	10.91
3/13/2009	3,713	1.40	2,646	496.73	0.38	1,323	32,000	31,791	10.69
3/20/2009	4,956	1.39	3,562	663.02	0.37	1,781	34,000	45,085	10.51
3/27/2009	4,481	1.31	3,420	634.63	0.37	1,710	31,000	39,347	10.35
4/3/2009	3,251	1.29	2,528	443.07	0.35	1,264	34,000	30,129	10.28
4/10/2009	5,650	1.31	4,318	783.83	0.36	2,159	36,000	56,436	10.25
4/17/2009	3,757	1.37	2,748	522.68	0.38	1,374	41,000	42,860	10.32
4/24/2009	5,038	1.40	3,598	685.74	0.38	1,799	34,000	46,630	10.24
5/1/2009	3,325	1.39	2,396	452.13	0.38	1,198	33,000	29,841	10.18
5/8/2009	3,257	1.39	2,336	420.48	0.36	1,168	39,000	32,797	10.18

(1) Daily density measurements are used to determine the volume of C&D materials and weight of soils used each day. The Average Density is calculated from the weekly totals OF C&D materials and soils that are incorporated into the Landfill.

Table No. 2 (Continued)
Stoughton Recycling Technologies - C&D Fines Materials-Soil Processing
Weekly Record of Materials for Cell No. 2

WEEK ENDING	SOIL			C&D FINES MATERIAL					Cumulative Pounds of Sulfates per Ton of Soils
	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Sulfate Concentration (mg/Kg)	Sulfate Weight (lbs.)	
5/15/2009	4,673	1.40	3,336	621.06	0.37	1,668	54,000	67,074	10.43
5/22/2009	2,744	1.34	2,050	410.01	0.40	1,025	32,000	26,241	10.40
5/29/2009	2,997	1.40	2,136	452.33	0.42	1,068	26,000	25,330	10.33
6/5/2009	3,980	1.40	2,838	563.10	0.40	1,419	40,000	45,048	10.37
6/12/2009	4,079	1.32	3,082	610.05	0.40	1,541	39,000	47,584	10.43
6/19/2009	3,885	1.38	2,814	511.29	0.36	1,407	38,000	38,858	10.41
6/26/2009	2,901	1.35	2,154	428.75	0.40	1,077	30,000	25,725	10.37
7/3/2009	976	1.27	770	166.90	0.43	385	39,000	13,018	10.40
7/10/2009	3,611	1.33	2,706	541.06	0.40	1,353	40,000	43,285	10.45
7/17/2009	2,920	1.34	2,174	453.09	0.42	1,087	43,000	38,966	10.53
7/24/2009	2,234	1.31	1,704	391.20	0.46	852	39,000	30,514	10.60
7/31/2009	1,959	1.24	1,576	276.66	0.35	788	40,000	22,133	10.61
8/7/2009	2,204	1.23	1,790	442.45	0.49	895	51,000	45,130	10.81
8/14/2009	2,870	0.98	2,926	655.20	0.45	1,463	42,000	55,037	11.01
8/21/2009	3,473	1.02	3,416	567.10	0.33	1,708	48,000	54,442	11.15
8/28/2009	2,048	1.00	2,050	445.29	0.43	1,025	42,000	37,404	11.27
9/4/2009	1,944	1.14	1,700	365.71	0.43	850	35,000	25,600	11.30
9/11/2009	1,427	1.05	1,356	254.33	0.38	678	41,000	20,855	11.34
9/18/2009	1,868	1.25	1,494	325.89	0.44	747	37,000	24,116	11.36
9/25/2009	2,718	1.50	1,810	353.26	0.39	905	38,000	26,848	11.33
10/2/2009	2,232	1.23	1,812	366.31	0.40	906	35,000	25,642	11.33
10/9/2009	2,387	1.37	1,746	375.26	0.43	873	36,000	27,019	11.33
10/16/2009	1,761	1.27	1,388	260.91	0.40	694	32,000	17,978	11.32
10/23/2009	2,235	1.23	1,814	384.78	0.42	907	35,000	26,935	11.33
10/30/2009	1,725	1.48	1,162	299.47	0.52	581	35,000	20,963	11.34
TO DATE	138,743		104,576	20,487		52,288		1,573,601	11.34

(1) Daily density measurements are used to determine the volume of C&D materials and weight of soils used each day. The Average Density is calculated from the weekly totals OF C&D materials and soils that are incorporated into the Landfill.

Table No. 2

STOUGHTON RECYCLING TECHNOLOGIES - C&D MATERIALS-SOIL PROCESSING

SUMMARY OF MATERIALS PLACED IN CELL No. 2 AND SECTION No. 1 THROUGH OCTOBER 2009

	SOIL			C&D MATERIAL					Cumulative Pounds of Sulfates per Ton of Soils
	Weight (Tons)	Average Density (Tons/Cubic Yard)	Volume (Cubic Yards)	Weight (Tons)	Average Density (Tons/Cubic Yard)	Volume (Cubic Yards)	Sulfate Concentration (mg/Kg)	Sulfate Weight (lbs.)	
FINES - CELL 2	138,743	1.33	104,576	20,487	0.39	52,288	38,405	1,573,601	11.34
RESIDUALS - SECTION 1	195,655	1.36	144,094	12,204	0.17	72,047	31,789	775,902	3.97
TOTAL	334,398	1.34	248,670	32,691	0.26	124,335	35,935	2,349,503	7.03

ESTIMATED SULFATE LOADING RATE FOR CELL No.1 USING MIXED FINES AND RESIDUALS AT A 1:1 RATIO WITH SOILS

TOTAL LOOSE VOLUME OF C&D MATERIALS (FINES AND RESIDUALS) =	124,335	CY C&D MATERIALS
TOTAL LOOSE VOLUME OF SOILS AT AN EQUAL VOLUME TO C& D MATERIALS (1:1 MIXTURE) =	124,335	CY SOILS
TOTAL WEIGHT OF SOILS AT AVERAGE DENSITY (1.34 TONS/CY) =	166,609	TONS SOIL
TOTAL WEIGHT OF SULFATES IN TOTAL VOLUME OF C&D MATERIALS =	2,349,503	POUNDS SULFATE
TOTAL POUNDS OF SULFATES PER TON OF SOIL =	14.10	POUNDS SULFATE PER TON OF SOIL

ESTIMATED SULFATE LOADING RATE FOR CELL No.1 USING FINES ONLY AT A 1:1 RATIO WITH SOILS

TOTAL LOOSE VOLUME OF FINES ONLY MATERIALS =	52,288	CY C&D MATERIALS
TOTAL LOOSE VOLUME OF SOILS AT AN EQUAL VOLUME TO FINES (1:1 MIXTURE) =	52,288	CY SOILS
TOTAL WEIGHT OF SOILS AT AVERAGE DENSITY (1.34 TONS/CY) =	70,066	TONS SOIL
TOTAL WEIGHT OF SULFATES IN TOTAL VOLUME OF FINES =	1,573,601	POUNDS SULFATE
TOTAL POUNDS OF SULFATES PER TON OF SOIL =	22.46	POUNDS SULFATE PER TON OF SOIL

Table No. 3
Stoughton Recycling Technologies - C&D Residuals Materials-Soil Processing
Weekly Record of Materials for Section 1

WEEK ENDING	SOIL			C&D RESIDUALS MATERIAL					Cumulative Pounds of Sulfates per Ton of Soils
	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Sulfate Concentration (mg/Kg)	Sulfate Weight (lbs.)	
12/6/2008	4,263	1.35	3,160	241.73	0.15	1,580	22,000	10,636	2.49
12/13/2008	4,465	1.36	3,280	257.52	0.16	1,640	7,300	3,760	1.65
12/20/2008	3,477	1.45	2,390	217.31	0.18	1,195	33,000	14,342	2.35
12/27/2008	1,117	1.46	766	72.48	0.19	383	12,900 (2)	1,870	2.30
1/2/2009	0	0	0	0	0	0			
1/9/2009	4,441	1.45	3,070	270.93	0.18	1,535	34,000	18,423	2.76
1/16/2009	3,905	1.41	2,766	264.17	0.19	1,383	32,000	16,907	3.04
1/23/2009	5,137	1.47	3,504	304.89	0.17	1,752	27,000	16,464	3.07
1/30/2009	7,169	1.49	4,806	420.06	0.17	2,403	36,000	30,244	3.32
2/6/2009	3,954	1.47	2,698	304.91	0.23	1,349	38,000	23,173	3.58
2/13/2009	5,472	1.42	3,862	310.94	0.16	1,931	33,000	20,522	3.60
2/20/2009	6,041	1.38	4,384	404.47	0.18	2,192	12,000	9,707	3.36
2/27/2009	4,956	1.39	3,574	269.73	0.16	1,787	25,000	14,467	3.32
3/6/2009	1,662	1.41	1,182	111.54	0.19	591	22,000	4,908	3.31
3/13/2009	4,828	1.47	3,286	281.99	0.17	1,643	18,000	10,152	3.21
3/20/2009	2,174	1.41	1,540	119.89	0.16	770	34,000	8,153	3.23
3/27/2009	1,373	1.44	954	84.65	0.18	477	36,000	6,095	3.26
4/3/2009	2,547	1.43	1,784	156.16	0.18	892	18,000	5,622	3.22
4/10/2009	3,130	1.45	2,166	178.6	0.16	1,083	29,000	10,359	3.22
4/17/2009	868	1.45	598	45.16	0.15	299	30,000	2,710	3.22
4/24/2009	5,394	1.46	3,702	287.1	0.16	1,851	36,000	20,671	3.26
5/1/2009	5,517	1.41	3,926	319.98	0.16	1,963	35,000	22,399	3.32
5/8/2009	1,516	1.37	1,108	84.55	0.15	554	34,000	5,749	3.33

(1) Daily density measurements are used to determine the volume of C&D materials and weight of soils used each day. The Average Density is calculated from the weekly totals OF C&D materials and soils that are incorporated into the Landfill.
(2) No sampling and analysis conducted this week. Use 30 day average.

Table No. 3 (Continued)
Stoughton Recycling Technologies - C&D Residuals Materials-Soil Processing
Weekly Record of Materials for Section 1

WEEK ENDING	SOIL			C&D RESIDUALS MATERIAL					Cumulative Pounds of Sulfates per Ton of Soils
	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Weight (Tons)	Average Density(1) (Tons/Cubic Yard)	Volume (Cubic Yards)	Sulfate Concentration (mg/Kg)	Sulfate Weight (lbs.)	
5/15/2009	10,561	1.37	7,726	570.11	0.15	3,863	58,000	66,133	3.66
5/22/2009	7,105	1.40	5,088	416.2	0.16	2,544	36,000	29,966	3.69
5/29/2009	4,973	1.32	3,762	336.83	0.18	1,881	15,000	10,105	3.62
6/5/2009	5,579	1.37	4,064	345.93	0.17	2,032	30,000	20,756	3.62
6/12/2009	7,679	1.39	5,516	439.48	0.16	2,758	17,000	14,942	3.51
6/19/2009	6,567	1.41	4,658	416.37	0.18	2,329	28,000	23,317	3.52
6/26/2009	5,867	1.38	4,242	360.16	0.17	2,121	37,000	26,652	3.56
7/3/2009	1,621	1.39	1,164	99.44	0.17	582	39,000	7,756	3.58
7/10/2009	7,387	1.42	5,218	430.04	0.16	2,609	31,000	26,662	3.58
7/17/2009	5,900	1.44	4,096	360.54	0.18	2,048	33,000	23,796	3.60
7/24/2009	796	1.41	564	57.76	0.20	282	35,000	4,043	3.60
7/31/2009	3,098	1.31	2,362	289.63	0.25	1,181	30,000	17,378	3.65
8/7/2009	5,139	1.37	3,760	440.97	0.23	1,880	38,000	33,514	3.74
8/14/2009	5,338	1.02	5,250	446.36	0.17	2,625	38,000	33,923	3.83
8/21/2009	5,943	1.20	4,964	384.34	0.15	2,482	44,000	33,822	3.89
8/28/2009	3,284	1.14	2,872	240.84	0.17	1,436	33,000	15,895	3.91
9/4/2009	5,212	1.11	4,708	387.05	0.16	2,354	41,000	31,738	3.98
9/11/2009	3,631	1.09	3,334	280.45	0.14	1,667	40,000	18,436	4.00
9/18/2009	2,772	1.38	2,002	153.12	0.15	1,001	31,000	9,493	3.99
9/25/2009	0		0	0		0	38,000	0	3.99
10/2/2009	1,871	1.32	1,414	110.81	0.16	707	27,000	5,964	3.98
10/9/2009	3,594	1.32	2,722	187.4	0.14	1,361	32,000	11,994	3.97
10/16/2009	4,166	1.32	3,152	213.25	0.14	1,576	34,000	14,501	3.96
10/23/2009	642	1.32	486	39.89	0.16	243	25,000	1,995	3.96
10/30/2009	3,524	1.43	2,464	218.74	0.18	1,232	36,000	15,749	3.97
TO DATE	195,655		144,094	12,204		72,047		775,902	3.97

(1) Daily density measurements are used to determine the volume of C&D materials and weight of soils used each day. The Average Density is calculated from the weekly totals OF C&D materials and soils that are incorporated into the Landfill.
(2) No sampling and analysis conducted this week. Use 30 day average.

SITEC
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February 4, 2010

Mr. David Ellis, Section Chief
Commonwealth of Massachusetts
Department of Environmental Protection
20 Riverside Drive
Lakeville, Massachusetts 02347

Reference: Page Street Landfill
Stoughton, Massachusetts

Dear Mr. Ellis:

As you are aware, Stoughton Recycling Technologies, LLC (SRT) has been conducting the **Section III "Fines" Area - Continued C&D Materials Assessment** in accordance with MassDEP's November 14, 2008 Provisional Approval. The controlled proportioning, mixing and placement of C&D fines and soil began in the first cell (Cell No. 2) in early December 2008. At about that same time the controlled mixing and placement of C&D residuals and soil began in Section No. 1 of the Phase III closure area. As you are also aware, SRT has installed seven gas probes in Cell No. 2 and has been monitoring hydrogen sulfide gas production in this area since April 2009. Documentation of the C&D material and soil mixing operations and results of hydrogen sulfide gas monitoring were most recently reported to MassDEP in our November 24, 2009 Bi-Monthly Status Report.

As reported in the November 24, 2009 Bi-Monthly Status Report, results of the gas monitoring have indicated that hydrogen sulfide generation within Cell No. 2 had peaked during the summer and early fall of 2009 (maximum concentration of 2,800 ppm in probe C2-5) and have subsequently diminished by an order of magnitude. Tabulated (Table No. 1) and graphed hydrogen sulfide concentration data was included in the November 24, 2009 Bi-Monthly Status Report and is attached for reference.

Based upon the positive results that have been produced by the monitored mixing of C&D materials and soils, SRT requested approval in the November 24, 2009 Bi-Monthly Status Report to begin mixing C&D materials with soil at a 1:1 ratio in Cell No. 1. This change of mixing ratios in Cell No. 1 was contemplated in SRT's original September 12, 2008 application and MassDEP's November 14, 2008 Provisional Approval. Specifically, SRT proposes to mix fines alone, or preferably blended with residual materials, together with soils or other approved materials at a ratio of 1:1. If the fines and residuals mixture is approved, they will be mixed at the proportion that they are produced by SRT's processing facility.

Sulfate loading rates for the proposed Cell No. 1 parameters have been calculated on the attached Table No. 2, using the mass loading rate data that has been developed for Cell No. 2 and Section No. 1. Based on this data, the sulfate loading rate in Cell No. 2 has been 11.34 pounds of sulfate per ton of soil. Projected loading rates in Cell No. 1, at a 1:1 mix ratio with soils for the fines and residuals mix will be 14.10 pounds of sulfate per ton of soil or for the fines alone mix, 22.46 pounds of sulfate per ton of soil.

The C&D materials and soils that are to be placed in Cell No. 1 will continue to be tracked, as they have been throughout the assessment process for Cell No. 2. To date, fines have been analyzed for a number of parameters, including sulfate and organic content, while residuals have only been analyzed for sulfates. In accordance with our discussions, analysis will be conducted on residuals for organic content, as well. The sampling and analysis protocol will be established with the intent that non-reactive organic content materials, such as plastics that do not contribute to the production of hydrogen sulfide, are to be excluded from the reported results. The potential generation of hydrogen sulfide will be monitored by installing gas probes into Cell No. 1, as it is filled, consistent with what was done in Cell No. 2.

SRT will appreciate your expeditious consideration of this proposed modification to the Provisional Approval. Should you have any questions or require additional information regarding this issue, please do not hesitate to contact me.

Sincerely,
SITEC Environmental, Inc.

A. Raymond Quinn, PE, LSP
Director of Engineering Services

cc: Lawrence Barrett, Town of Stoughton Department of Public Works
Sandra Gabriel, Town of Stoughton Board of Health
Deborah Sovinee, Stoughton Redevelopment Authority
Terry Conroy, TW Conroy 5 LLC
Jeff Leech, Stoughton Recycling Technologies, LLC
Nick Mucci, Stoughton Recycling Technologies, LLC
Donald P. Nagle, Esq.

PART D

TECHNICAL SPECIFICATIONS

SECTION 02130

LANDFILL GAS EXTRACTION WELLS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for installation of landfill gas extraction wells (EW) as specified herein and as shown on the Drawings.

1.02 RELATED SECTIONS

A. Section 02200 - Earthwork

B. Section 02714 - HDPE Pipe and Fittings

1.03 CONTRACTOR QUALIFICATIONS

A. Contractor shall have completed at least five successful operating landfill gas collection system installations with similar wells, and condensate traps within the last five years.

B. All extraction wells (EW) shall be installed under the direction of a qualified construction superintendent with direct experience of conducting landfill gas extraction well boring and construction work. All final EW collection well drilling logs and construction diagrams shall be signed by the construction superintendent.

1.04 SUBMITTALS

A. The Contractor is responsible for implementing a Health and Safety Plan for the protection of its employees working at the site. The plan shall be approved by the Owner prior to construction start-up. Refer to Section 01036 – Health and Safety.

B. Prior to construction, Contractor shall meet with the appropriate representatives of the Bourne Police Department and Fire Department to discuss public safety, site access, traffic safety and emergency response requirements.

C. Prior to construction, the Contractor shall submit to the Owner a detailed Odor Control Plan describing procedures to control odors from the waste excavation and Contractor's procedures for responding to odor complaints.

D. Prior to construction, the Contractor shall submit to the Owner a detailed Spoils Management Plan for the handling of spoils removed from the borehole and trenches during gas collection system construction.

E. Prior to construction, the Contractor shall submit to the Owner shop drawings detailing the dimensioning and technical specifications for all the gas collection

pipe and fittings. Also, submit certified test reports that the pipe was manufactured and tested in accordance with the ASTM standards specified herein.

F. The Contractor shall submit testing results of pre-construction quality control tests conducted on representative samples of the Contractor's source of the washed stone. Such test results must document compliance with these specifications.

G. The Contractor shall submit to the Owner representative samples of washed stone prior to delivery of the washed stone to the project site. Owner may elect to conduct the tests of said sample.

H. Submit one copy of the following Landfill Gas Extraction Well (EW) Data upon completion of drilling:

1. Daily driller's report. During the drilling of the well, maintain daily driller's report that includes at a minimum, but not limited to:

   a. Date, Location, Boring identification number, Weather conditions, Daily activities, Equipment used, Drilling crew, Time (rig time, down time, stand-by, etc.), Footage, Materials used, Well construction (materials used, type, quantity, etc.), Relevant notations and Verification of activities.

2. Well Log. During the drilling of the well the Contractor will complete a well log report that includes at a minimum, but not limited to:

   a. Logger's Name, Date Begun, Date Completed, Location, Boring identification number, Weather conditions, Equipment used, Drilling crew, Time (time to depth, down time, stand-by, etc.), Footage (Total Depth, Well depth), General descriptions of strata encountered, Depth and thickness of intermediate covers/soil layers, General soils descriptions, Estimates of moisture content, Notation of wet or saturated zones, Ambient air monitoring results, Materials used, Well construction (materials used, type, quantity, etc.), Relevant notations and Verification of activities.

3. Well Installation Log. Upon completion of the well the Contractor will complete a well instillation report that includes at a minimum, but not limited to:

   a. Installer's Name, Date Begun, Date Completed, Location, Boring identification number, Equipment used, Installation crew, Time (time to depth, down time, stand-by, etc.), Footage (Total Depth, Well depth), Materials used, Size and depth of pipe, Length of perforated and solid casing, Depth and type of gravel pack, Depth and thickness of bentonite seal(s), Depth and thickness of backfill materials(s), Type and thickness of surface seal, Casing elevation, Relevant notations and Verification of activities.

4. Contractor will provide copies of Driller's Reports, Well Logs and Well Installation Logs for review and approval by the Owner prior to requesting payment for that work.

5. Contractor will provide copies of proposed EW Installation procedures for review and approval by the Owner prior to initiation of well construction.

PART 2 - PRODUCTS

2.01 GAS EXTRACTION WELLS (EW)

A. All pipe and fittings are to be high density polyethylene (HDPE) per Specification Section 02714, HDPE Pipe and Fittings and as shown on the Drawings.

2.02 WASHED STONE

A. Washed stone shall be non-calcareous gravel, 1-inch to 1½-inch for gas collection gas wells. Washed stone shall be free of debris, organic matter, vegetation, frozen earth and any other materials considered unsuitable by the Owner. Washed stone shall be clean with no more than 5 percent of the material being finer than a #200 sieve as determined by ASTM D422.

2.03 SOIL BACKFILL

A. Soil: backfill shall be of a fine material that has good compaction characteristics and shall conform with cover materials on-site or as designated in Section 02200, Earthwork and as approved by the Owner.

2.04 BENTONITE SEALS

A. Bentonite shall be medium bentonite chips or 3/8-inch round bentonite pellets.

PART 3 - EXECUTION

3.01 GAS EXTRACTION WELLS (EW)

A. The Contractor shall install landfill gas extraction wells, piping, headers, valves etc. at the locations and as shown on the Drawings.

B. The EW well boring will be a minimum 24-inch diameter hole drilled to the bore hole depth which is through the full depth of waste, and into natural soils. Wells shall be constructed in accordance with the details shown on the Drawings and as noted in the Specifications.

C. Contractor shall fabricate the well casings in accordance with Drawings and Specifications. The well casing shall be perforated in accordance with the Drawings and Specifications. All perforations and casing assembly shall be as stipulated in the Drawings and Specifications. The bottom of the casing shall be capped with a fused polyethylene cap of appropriate size and schedule. Slip couplings shall allow for landfill settling, while providing a seal between changing pipe sizes, as shown on the Drawings.

D. No pressure check is necessary for the extraction wells.

E. Contractor shall drill the gas extraction well bores using an appropriate truck

mounted or Caisson (crane-mounted bucket auger) type drilling unit capable of boring to the depths indicated in the Drawings and Specifications.

F. Contractor shall preform no boring unless the Owner is present to approve the well location and to witness operations.

G. Well casings shall be set and the annular space backfilled in accordance with contract Drawings and Specifications. Well casings shall be installed immediately after completion of the holes by lifting the casing with the drill rig cable hoist, in sections if required, and lower the casing into the hole. The casing shall be installed above the bottom of the boring, as shown on the Drawings. The flanged surface connection, or the cap, shall terminate 6 feet above the existing landfill surface. The casing shall be suspended at the surface and centered in the boring at all times during backfilling. Suspension and centering equipment shall allow for safe manipulation of the well casing in and over the open boring and provide a stable working surface for personnel completing section couplings and/or final removal of well supporting equipment. Initial washed stone backfilling operations shall be completed while the well casing is suspended at the depth shown on the Drawings above the bottom of the boring hole. When the pipe is "supported" by the washed stone in the hole, and the drill rig can be moved to the next location. Wells shall then be completely backfilled with the designated amounts and levels of materials as shown on the Drawings. Washed stone backfill shall be placed to the depths shown on the Drawings. A minimum two feet thick seal of hydrated bentonite chips shall be installed above the gravel pack and well washer, as shown on the Drawings. This seal will be allowed to hydrate thoroughly prior to addition of clean backfill. Clean backfill shall be installed, as shown on the Drawings.

I. The drilling schedule must be reviewed daily to insure that all wells started can be completed and sealed by the end of each work day. No wells are to be left incomplete overnight.

J. At no time are open well borings to be left uncovered and/or unattended during the course of the workday.

K. Contractor shall be responsible for any grading, leveling, towing and/or restoration which may be necessary for movement of the drill rig on the landfill property. No extraction well drilling shall occur on slopes that cannot safely support the drilling operations.

L. Any settlement shall be backfilled within 3 weeks after placement of backfill from the level of the subsidence to 6 inches above existing grade with the appropriate cover materials.

END OF SECTION