

**DES Waste Management Division  
29 Hazen Drive; PO Box 95  
Concord, NH 03302-0095**

**Type I-A Modification to Solid Waste  
Management Facility and Waiver Applications  
North Country Environmental Services Landfill  
Response to NHDES Comments – 7/18/2014  
581 Trudeau Road  
Bethlehem, NH 03574  
NHDES Site #: 198704033  
Project Type: (SW-LNDFILL)  
Project Number: 0021939**

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Date of Report: August 1, 2014



August 1, 2014

Mr. Paul M. Gildersleeve, P.E.  
Solid Waste Management Bureau  
New Hampshire Department of Environmental Services  
29 Hazen Drive, P.O. Box 95  
Concord, New Hampshire 03302-0095

**RE: NCES – North Country Environmental Services, Trudeau Rd, Bethlehem, NH  
Type IA Permit Modification Application for Solid Waste Landfill Facility  
Stage V Expansion  
DES-SW-SP-03-002, WMD Doc Log # 13337, 13390, 13419, 13423, 13477 and 13833  
Response to NHDES Comments dated July 18, 2014  
CMA #833-A**

Dear Mr. Gildersleeve:

On behalf of North Country Environmental Services (NCES), CMA Engineers, Inc. has prepared this letter to provide information requested by the New Hampshire Department of Environmental Services (NHDES) in your correspondence dated July 18, 2014. Our responses to NHDES's comments are presented in roman type, following the corresponding NHDES comment in ***bold italic*** type. As your letter requested, we have enclosed one copy of the requested information and we are also uploading an electronic copy to the NHDES One Stop database. A revision date is provided on each revised page and sheet.

## **Operating Plan**

### ***1. No revised Appendix A, H, and I cover sheets were included. Please explain.***

Cover Sheets for all Operating Plan appendices are provided with the updated Operating Plan enclosed in Appendix A of this response to comments.

### ***2. In Section 2.1, under Certified Waste Derived Product (CWDP) Processed C&D, it states to refer to Appendix H. Appendix H of the Operating Plan is the Asbestos section, and no mention of C&D is listed. Please explain. Please also list the number for this CWDP.***

NHDES Certified Waste Derived Product (CWDP) documents have been removed from the operating plan as each is referenced by its NHDES CWDP number. A link to the NHDES web page that can be used to access the approved CWDP documents has been added to Section 2.1 of the Operating Plan for reference.

Appendix I of the Operating Plan had included the CWDP for Metal Shredder Residue ADC (CWDP #14). Appendix I has been removed from the Operating Plan and the C&D reference to Appendix H has also been removed.

Section 2.1 of the Operating Plan has been also been revised to separate NHDES CWDPs for alternative

daily cover (ADC), including their corresponding numbers, from ADC approved by NHDES under other mechanisms.

Section 2.1 has also been revised to modify language for other non-hazardous waste requiring special handling to read:

“Other non-hazardous solid waste that requires special handling prior to disposal or acceptance in accordance with Section 3.3.2”

A revised copy of the Operating Plan that incorporates these changes is included in the enclosed Appendix A.

***3. In Section 2.1, CWDP Merrimack Coal Fly Ash is listed. However, it is not one of the DES-approved CWDPs; it is a Certificate for Direct Reuse. Please explain why this Certificate of Direct Reuse is listed.***

Merrimack Coal Fly Ash has been removed from the NHDES Certified Waste Derived Product list in Section 2.1 of the revised Operating Plan contained in the enclosed Appendix A.

***4. In Section 7.0, a Level IV Operator is mentioned. The Solid Waste Operator rules have been revised and the Level IV designation is no longer used. Please update this section to incorporate the rules in <http://des.nh.gov/organization/commissioner/legal/rulemaking/documents/env-sw1600-adpt-pstd.pdf>***

Section 7.0 of the Operating Plan contained in the enclosed Appendix A has been revised to accord with the new Section Env-Sw 1600 that took effect on July 1, 2014, by referring to principal operator certification rather than Level IV operator certification.

## **Closure Plan**

***5. In Part V of the Application, in the Closure Cost Estimate, per Env-Sw 1403.02(g)(2), qualified professional oversight of all closure activities is required. Please explain if this cost is included. A link to the new Financial Assurance Requirements, as of July 1, 2014, is <http://des.nh.gov/organization/commissioner/legal/rulemaking/documents/env-sw1400-adpt-pstd.pdf>***

All resident engineering, engineering, senior-level oversight, construction contract administration, and other services required during closure construction, are included in Section XII – Engineering, under the line item “Resident Engineering, Project Manager, Project Engineer” which is a lump sum cost of \$250,000.

In the Post Closure Cost Estimate, we have added a line item for “Qualified Professional Oversight” under Section VIII – Other. This line item includes third party costs for coordination of post closure operation, maintenance, and oversight required during the post closure monitoring period as required by the rule referenced above. We have included this line item in the Post Closure cost estimate as it is an annual operating cost. Please find attached a revised Post Closure Cost Estimate and supporting documentation in Appendix B.1.

***6. In the Closure Cost Estimate, per Env-Sw 1403.02(g)(7), the cost of replacing 20% of the active gas collection system is required. Please explain if this is included.***

The Stage V closure construction cost estimate originally submitted included line items under Section V.B – Gas Vents & Devices for replacing a portion of the existing gas collection system, both inside and outside the landfill footprint, at the time of closure. We have revised line items and quantities in this section to reflect the replacement of 20% of the existing active gas collection system inside the entire landfill footprint at the time of closure. In addition, we have provided a supplemental cost estimate for the basis of replacing 20% of the existing collection system at time of closure that includes a breakdown of gas system components currently in place, and separately, a breakdown of gas system components that will be installed during Stage V filling. Please find attached a revised Closure Construction Cost Estimate, including backup calculations, in Appendix B.1.

### **Closure Plan Drawings**

#### ***7. The callouts on Sheet C2 do not leader to specific features. Please explain.***

Sheet C2 of the Closure Plan Drawing set was missing layers that were included in the original application. The layers have been added back into the drawing and a revised full size plan (24" x 36") and a reduced size plan (8.5" x 11) have been provided in Appendix B.2.

Detail 9 on Sheet C4 has also been revised to remove a reference to a 12" header. HDPE gas header pipe currently being installed at the landfill is 14". A revised Sheet C4 is provided in Appendix B.2.

If you have any questions, please do not hesitate to contact me at (207) 541-4223.

Very truly yours,  
CMA ENGINEERS, INC.



Robert J. Grillo, P.E.  
Project Manager



Adam J. Sandahl, P.E.  
Project Engineer

RJG/ams

Enclosures

*Appendix A – Revised Operating Plan*

*Appendix B – Closure Plan Revisions*

*Appendix B.1 – Revised Closure and Post Closure Cost Estimates and Supporting Documentation*

*Appendix B.2 – Revised Sheets C-2 and C-4 of Closure Plan Drawing Set*

cc: John Gay, NCES  
Kevin Roy, NCES  
Bryan Gould, Cleveland, Waters and Bass, P.A.  
April Hibberd, Town of Bethlehem – Administrative Assistant  
Sandy Laleme, Town of Bethlehem - Selectboard Chairwoman (w/o full size plans)  
NHDES Onestop

## *List of Appendices*

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*Appendix A – Revised Operating Plan*

*Appendix B – Closure Plan Revisions*

*Appendix B.1 – Revised Closure and Post Closure Cost Estimates and  
Supporting Documentation*

*Appendix B.2 – Revised Sheets C-2 and C-4 of Closure Plan Drawing Set*

## *Appendix A – Revised Operating Plan*

# FACILITY OPERATING PLAN

North Country Environmental Services, Inc.  
Bethlehem, New Hampshire

*Prepared by:*

**CMA Engineers, Inc.**

~~July 10, 2012~~ ~~February 2014~~ June 2014

# FACILITY OPERATING PLAN

North Country Environmental Services, Inc.

Bethlehem, New Hampshire

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| <del>Appendix I:</del>   | <del>Metal Shredder Residue Alternative Daily Cover Specifications and Restrictions</del>                                                                                                                                              |

## FACILITY OPERATING PLAN

This Facility Operating Plan (Plan) is for the North Country Environmental Services, Inc. (NCES) landfill facility located on Trudeau Road in Bethlehem, New Hampshire. The purpose of this Plan is to describe the operating requirements for the facility in accordance with the New Hampshire Solid Waste Rules. A copy of this Plan is to be maintained at the facility.

### 1.0 FACILITY IDENTIFICATION

The facility is owned and operated by NCES. The current mailing address and telephone number for the facility are:

North Country Environmental Services, Inc.  
581 Trudeau Road, PO Box 9  
Bethlehem, NH 03574  
Telephone (603) 869-3366  
Facsimile (603) 869-2152

The facility is a lined landfill comprised of four Stages. Stages I, II ~~and~~ III and IV were permitted by the New Hampshire Department of Environmental Services (NHDES) in 1987, 1989 ~~and~~ 2000 and 2003 (Permit Nos. DES-SW-87-022, DES-SW-89-009, ~~and~~ DES-SW-SP-00-003 and DES-SW-SP-03-002), respectively. ~~As part of the development of Stage II, an unlined landfill located in the general vicinity of the Stage II footprint was excavated and relocated to the Stage I landfill area. Phase I of Stage IV was constructed in 2006. Phase II A of Stage IV was constructed in 2011.~~

The facility is a commercial disposal facility and has no restricted service area. The facility receives waste from commercial and residential sources.

### 2.0 AUTHORIZED AND PROHIBITED WASTES

#### 2.1 Authorized Wastes

Wastes which may be accepted at the facility include:

- Municipal solid waste (MSW) as defined in State of New Hampshire Solid Waste rules.
- Construction and demolition (C&D) waste which includes non-putrescible building material waste and rubble. Examples of such waste include, but are not limited to, bricks, concrete, and other masonry materials, wood, wall coverings, plaster, dry wall, plumbing,

fixtures, non-asbestos insulation or roofing shingles, asphaltic pavement, glass, plastics, electrical wiring and components containing no hazardous liquids and/or metals that are incidental to any of the above.

- NHDES approved certified waste derived products
- Special solid wastes which are not hazardous or otherwise a prohibited waste that is a solid waste and meets the conditions for disposal consistent with the NCES Special Waste Characterization Profile. Solid Non-liquid Special Waste, as defined in Section 3.3.2, which has received prior approval of NCES, in accordance with Section 3.3.2.1. Special Waste may include but is not limited to the following: which have received prior approval of the NHDES before being accepted. Requests for approval are to be accompanied by sufficient waste profile and generation information to facilitate NHDES' review and decision making process. Special wastes may include but are not limited to the following:
  - Waste from industrial processes;
  - Waste from pollution control processes including but not limited to water and wastewater treatment plant sludges and air pollution control residues;
  - Residue from a spill of a non-hazardous chemical substance or commercial chemical product or a waste listed above;
  - Commercial products which are off-specification, outdated, or unused;
  - Waste produced during the demolition or dismantling of industrial process equipment;
  - Waste produced during the demolition or dismantling of automobiles (auto fluff);
  - Ash which has been determined to be nonhazardous under the provisions of Env Hw 502 which is managed in accordance with the requirements of Env-Sw 902;
  - Contaminated soils and media managed in accordance with Env-Sw 903; and
  - Contaminated residuals from the clean-up of a facility generating, storing, treating, recycling, or disposing wastes, chemical substances or commercial products listed above;
  - Treated infectious waste which has been autoclaved, or otherwise treated and disinfected in accordance with the requirements of Env-Sw 904; and
  - Other non-hazardous solid waste that requires special handling prior to disposal or acceptance in accordance with Section 3.3.2, such as wastes with excessive moisture content, fine particulate (i.e., dusty) wastes, and any waste that is not identifiable prior to analytical characterization.

- NHDES Certified Waste Derived Products as follows:
  - o CWDP #14 - Auto Shredder Alternative Daily Cover (ADC)
  - o CWDP #13 – Biosolids Incinerator Ash ADC
  - o CWDP #10 Bottom Ash from Wood Fired Boilers ADC
  - o CWDP #6 - C&D & Soil Mixture ADC
  - CWDP Merrimack Coal Fly Ash
  - CWDP Processed C&D (Refer to Appendix H)
  - Any other Certified Waste Derived Products approved by NHDES

- NHDES Certified Waste Derived Product requirements for the CWDPs listed above are provided on the NHDES website below:

[http://des.nh.gov/organization/divisions/waste/swmb/pdrs/waste\\_derived.htm](http://des.nh.gov/organization/divisions/waste/swmb/pdrs/waste_derived.htm)

- Other NHDES-Approved Alternative Daily Cover
  - o Asphalt Emulsion Treated Petroleum Contaminated Soils (NHDES Approved 1/20/05)
  - o Airspace Saver Synthetic Tarps (Type III Permit Modification 9/9/02)
  - o Processing C&D to Produce a Waste Derived Product as ADC (Type I-B Permit Modification 12/27/01)
  - o Geosynthetic Tarps (Type III Permit Modification 2/12/98)
  - o Casting Sands (Type III Permit Modification 2/12/98)
  - o Contaminated Soils approved by NHDES (Type III Permit Modification 2/12/98)
  - o ERRCO-Epping C&D Processing Residuals (Type III Permit Modification 2/12/98)

- Waste from industrial processes;
- Waste from pollution control processes including water and wastewater treatment plant sludge;
- Residue from a spill of a non-hazardous chemical substance or commercial product or a waste listed above;
- Commercial products which are off specification, outdated, or unused;
- Waste produced during the demolition or dismantling of industrial process equipment;
- Waste produced during the demolition or dismantling of automobiles (auto fluff) or;

~~— Ash which has been determined to be nonhazardous under the provisions of Env-Wm 502 which is managed in accordance with the requirements of Env-Sw 902.~~

## 2.2 Prohibited Wastes

Wastes which are prohibited from disposal at the facility include the following:

- Those wastes prohibited by state and federal law;
- Hazardous wastes (as defined by the federal and New Hampshire Hazardous Waste Rules);
- Infectious waste;
- Asbestos waste including solid waste containing more than 1 percent asbestos by weight;
- Liquid wastes (that is waste containing free liquids as defined by Method 9095 Paint Filter Liquids Test as described in “Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods” [USEPA Pub. No. SW-846]);
- Contained gaseous wastes;
- White goods;
- Leaf and yard waste;
- Whole tires;
- ~~SN~~Non-approved special wastes not explicitly approved by NCES;
- Mercury added products;
- Video Display Devices;
- Wet cell/M-Cad/Rechargeable Batteries; and
- Radioactive materials as defined by He-P 4000.

The definition of hazardous waste used at the NCES facility is as defined in the State of New Hampshire Hazardous Waste Rules. Customers are required to execute a Certificate of Acceptable Waste, and this form is included in Appendix A.

Incoming waste is to be monitored in accordance with the procedures outlined in Section 3.3. Those materials which are specified as unacceptable for disposal are to be rejected as described in Section 6.6.

### 3.0 ROUTINE OPERATIONS PLAN

#### 3.1 Hours of Operation

Facility operating hours are generally from 7:00 a.m. to 3:00 p.m. Monday through Friday, and the facility may be open from 7:00 a.m. to 12:00 p.m. on Saturday. The facility may be closed on Sundays and the following holidays: New Years Day, Thanksgiving Day and Christmas Day. Additionally, the facility may be closed on Memorial Day, Independence Day and Labor Day. Operating hours are expanded as necessary to meet actual disposal requirements of facility users but are restricted to the hours of 6:00 a.m. and 6:00 p.m. All routine landfill operations and inspections, maintenance, repairs, and monitoring under non-emergency circumstances is to be conducted between the hours of 6:00 a.m. and 6:00 p.m. unless otherwise approved by NHDES.

The facility serves as a dispatch location for over the road waste collection vehicles (hauling division), vehicles associated with this operation may leave the facility prior to 6:00 am to service required early morning accounts. These vehicles may not tip waste at the landfill until 6:00 am.

Leachate is generally removed from the facility during routine operating hours; however, from time to time (i.e., such as during the spring snow melt season) it may be necessary to remove leachate from the facility during the hours from 6:00 p.m. to 6:00 a.m.

#### 3.2 Access Control and On-Site Traffic Patterns

Access to the facility is restricted by an electronically operated locking gate located on the access road to the scale house from Trudeau Road. Another potential access point to the facility is via Muchmore Road located north of the landfill area. This abandoned access location has been blocked by a locked gate and boulders prohibiting vehicular access. ~~NCES also has additional security measures such as motion activated video surveillance and alarm systems.~~

Signs are to be posted and maintained at the entrance road, gate and scale house indicating:

1. The facility name and permit number;
2. The name, address, and telephone number of the Permittee;
3. The hours of operation;
4. The types of wastes accepted; and
5. A statement that unlawful dumping shall be subject to fine and prosecution.

The scale house is occupied by NCES personnel during daily operating hours. The scale house operator is also responsible for monitoring traffic flow at the facility gate. The gate is to be locked at night and when the landfill is closed.

The scale house is located near the entrance. Incoming vehicles stop at the scale and are weighed, then proceed to the landfill tipping area. The scale operator and equipment operators on the working face use a CB and/or a two-way radio to communicate. When appropriate, the scale operator will inform the operators at the working face that a truck has been cleared to proceed to the tipping area and provide any specifics on the load or special handling criteria. Operators use a CB radio to communicate with drivers and provide instructions as to where waste is to be discharged. After discharging loads, drivers return to the scale and are weighed to determine the net weight for the waste disposed. A weight ticket is then printed by the scale house operator and signed by the vehicle driver and the scale operator.

An access road is located around the facility. The location of access roadways to the active disposal area vary depending upon the location of the active disposal area. The landfill compactor operator has a CB radio and can contact waste haulers to provide instruction as to where waste is to be discharged.

### **3.3 Waste Review, Unloading and Inspection Procedures**

#### **3.3.1 Waste Review**

NCES implements measures to restrict acceptance of prohibited wastes at this facility. Loads identified as having prohibited wastes (as listed in Section 2.2) are to be rejected as described in Section 6.6.

All waste delivery vehicles stop at the scale prior to proceeding into the landfill. The scale operator identifies the customer and queries the customer's account in the facility's computer system or manually enters a customer's information. The driver of the vehicle identifies the type and origin of waste which is entered into the facility's computer system by the scale house operator prior to allowing the vehicle to proceed to the active working area. Only waste authorized for disposal at the facility and identified as such by the waste hauler is allowed to proceed beyond the scale location. The driver must sign a scale ticket for every load delivered which includes a certification statement:

*“I certify under penalty of perjury that I am familiar with wastes authorized at this facility and that to the best of my knowledge all waste contained in this load is authorized for disposal at this facility”.*

Loads of C&D materials delivered to the ~~s~~Site are to be visually inspected. Loads that are predominantly materials suitable for processing to produce alternative daily cover (ADC) (i.e., wood, cardboard, paper and other miscellaneous solid C&D debris), may be stockpiled within the active landfill. Loads of C&D materials that do not appear suitable for processing will be directed to the active face of the landfill and not stockpiled. In the event unsuitable materials (i.e., excessive trash or metals) are found in stockpiled materials they are to be removed by hand sorting or using a front loader or excavator. Metals may be recycled; trash and other debris are to be hauled to the working face for disposal.

In addition, trucks delivering Non-Hazardous Special Waste are not allowed beyond the scale area unless written approval has been ~~issued by NCES, please received from the NHDES. R~~refer to section 3.3.2 for Special Waste Program ~~for more detail~~.

The likelihood of unacceptable wastes being delivered to this facility will be minimized by:

1. Customer education;
2. Training landfill operations staff;
3. Signs posted at the facility; and
4. Inspections of incoming waste loads.

### **3.3.2 Special Waste Program**

The facility has a comprehensive program for management and handling of Special Waste. This program is in addition to the procedures for unloading and inspection in Sections 3.3.5 and 3.3.6. Special Waste is defined as:

*A non-hazardous waste, as defined by the New Hampshire Hazardous Waste Rules, which because of the process generating the waste or its physical, chemical and/or biological characteristics potentially requires special testing and/or handling.*

#### **3.3.2.1 Special Waste Acceptance**

The evaluation of ~~waste generated by s~~Special ~~w~~Waste customers is conducted by an NCES ~~technical~~ representative(s) and includes the following.

- After the initial waste evaluation, the Special Waste Generator must complete a Special Waste Profile Form Special Waste Characterization Profile Form (included in Appendix A), which characterizes the waste to be disposed and includes a certification statement declaring the waste is not hazardous.
- ~~The completed and signed Special Waste Profile Form is initially reviewed by an NCES representative. If necessary, additional information and testing is requested of the generator or customer, to sufficiently ensure the wastes are non-hazardous and can be accepted at the Facility.~~ Requests for the approval of Special Waste ~~is~~ are to be reviewed by the Special Waste ~~Technical Manager~~ staff to ensure that the wastes are non-hazardous and may be accepted under the facility permit. Waste streams are either approved by NCES, with or without special conditions for management of the material, or approval is denied.
- Odor generating potential will be assessed when Special Waste streams such as sludges are considered for disposal at the facility. NCES will impose as a condition of approval for special wastes (including wastewater treatment plant sludge) delivered to the facility that the generator shall provide odor control measures as necessary. NCES will also include as a condition of special waste approval that loads with unacceptable odors may be rejected at the discretion of landfill operating staff.
- In addition to evaluating new waste streams, the waste streams of existing customers are also to be reviewed periodically. This review may involve site visits, review of Material Safety Data Sheets (MSDS), waste stream analysis, load inspections, or the re-evaluation of special waste management decisions.
- ~~Upon review and approval of the waste stream data by a company technical representative, the waste stream data is submitted to the NHDES for review and written approval. A special waste is not to be accepted until written approval has been received by the NHDES.~~
- ~~Upon NHDES approval, t~~The ~~waste profile~~ Special Waste Characterization Profile Form and approval documentation is maintained on file at the landfill. If the approval is conditional on tonnage or testing, the approval limitations are entered into the scale system at the scale house and tracked with each incoming load.
- ~~Each customer of s~~Special wWaste delivery generated by a one-time disposal event will be required to have a waste tracking document (i.e., non-hazardous manifest, or bill of lading, etc.) used to track the waste from the point of generation

through transportation, to disposal. The waste tracking document contains the customer / generator information, a description of the waste, the transporter information, and the approved disposal facility (destination). ~~Customers of continuous special waste generation (as a part of a business concern) will not be required to utilize a waste tracking document.~~

- A copy of the waste tracking document is attached to the scale ticket and maintained on file at the Facility.

### 3.3.2.2 Special Waste Handling

- Upon arrival at the ~~Facility~~facility, the ~~d~~Driver will present the required waste tracking document (~~If if one-time event generated waste~~) to the ~~Scale~~scale ~~Attendant~~attendant. The ~~s~~Scale ~~a~~Attendant will review the documentation and verify the waste approval number and all limitations (e.g. tonnage, ~~testing~~handling requirements, etc.) have been satisfied. Once all the paperwork has been checked and verified, the ~~Scale~~scale ~~o~~Operator will notify the Operations Manager or his designee that the ~~s~~Special ~~w~~Waste load is proceeding to the working face.
- The NCES staff will visually inspect the ~~s~~Special ~~w~~Waste for consistency with the description provided by the generator on the ~~Generator Special Waste Profile~~ Special Waste Characterization Profile Form as the material is unloaded. This confirmation will include comparing the physical state of the waste with those characteristics as described in the ~~Special Waste Profile Form~~Special Waste Characterization Profile Form and the waste tracking document.

**NOTE:** If a discrepancy is found during the visual inspection, the Landfill Manager or his designee can reject the load. Procedures for rejecting a load are outlined in Section 6.6.

- After the visual inspection is performed and the load is verified, if applicable, ~~the~~NCES staff must sign the waste tracking document for the approved acceptable (if one-time event generated waste) load and return a copy of the signed document to the Transporter.
- The completed documentation will be filed at the facility office.

### 3.3.3 Customer Education

NCES staff will inform customers of the services provided at the Bethlehem landfill facility and to educate them as to what wastes are acceptable and unacceptable for disposal. All customers approved to bring acceptable solid waste to the NCES facility must follow standard Rules and Regulations for Facility Use. They are required to accept and sign a copy of the Rules and Regulations and to execute a Certificate of Acceptable Waste form. Copies of these forms are provided in Appendix A.

Customers are also provided with informational packets. The information packet includes:

- NHDES Construction & Demolition Waste Management Outreach Effort information
- NHDES Asbestos Abatement Inspection and Notification Requirements
- NHDES Asbestos Demolition/Renovation Notification Form & Instructions
- NHDES Certified Asbestos Consultant List
- USEPA Asbestos Containing Materials Sample List and Table

NCES will provide updated information to new and existing customers on acceptable and prohibited wastes with any changes in the prohibited list in the regulations via mail or distributed at the scale house. NCES staff encourages customers to contact the facility with any questions they may have on acceptable wastes.

### **3.3.4 Facility Signs**

A sign is posted at the entrance of the facility. Additional signs adjacent to the scales clearly identify acceptable and unacceptable wastes.

### **3.3.5 Waste Unloading & Routine Inspection**

Once vehicles are in the disposal area, compactor operators visually inspect the waste as the vehicles discharge their load onto the working face. As refuse is spread at the working face, operators continue to visually inspect for unacceptable materials.

### **3.3.6 Random Load Inspection**

In addition to the routine visual inspection of the waste as it is discharged at the working face, 5% of loads are chosen to be inspected more thoroughly on random basis.

Consideration for random inspection is given based on the type of waste, accounts serviced, and whether the hauler has a record of disposing unauthorized wastes at the facility.

Random load inspections are performed by NCES personnel with NHDES Solid Waste Operator Certification training.

Random Load Inspection:

- A. An NCES representative will randomly select a hauler at the scale or the working face;
- B. The NCES Representative will notify the hauler of the random load inspection program that he/she has been selected for an inspection;
- C. If the hauler will not allow the inspection, they will not be permitted to unload at the site and may be banned from future use of the facility;
- D. If the hauler will allow the inspection the scale house will notify operators at the working face and the truck will be directed to the designated random load inspection area and met by NCES representative(s);
- E. The load will be discharged in an area where it can be spread and visually inspected for unauthorized waste. The NCES representative shall not handle the waste. A Load Inspection Form will be completed;
- F. Any unauthorized waste as identified in Section 2.2 of this document will be handled in accordance with Section 6.6 Receipt of Prohibited Waste and will be noted on the Load Inspection Form. The hauler will be given a copy of the inspection form if they request it. A copy of the Waste Inspection Form is included in Appendix A;
- G. Photographs may be taken of the unauthorized waste, truck or its contents;
- H. Unauthorized waste will be segregated and handled according to Section 6.6 of the Facility Operating Plan;
- I. Any load identified as having a confirmable or suspected unauthorized waste

will be documented on the Load Inspection Form. The hauler shall be sent a letter and may include photographs and an invoice for expenses associated with the management and proper disposal of any confirmed unauthorized waste. The hauler may be banned from future use of the facility;

J. Site personnel will file the report at the site where it will be available for NHDES review and will consist of:

- 1) The completed Load Inspection Form
- 2) Any photos
- 3) A copy of the scale ticket

K. Records are kept in accordance with procedures outlined in Section 8.0.

Please refer to the contingency section (Section 6) for management of an unauthorized waste.

#### **3.3.6.1 Personal Protective Equipment for Random Load Inspections**

Personal Protective Equipment appropriate for the specific job will be provided by NCES.

### **3.4 Method for Tracking Waste Quantities**

As indicated in Section 3.2, haulers bringing waste to the facility are required to stop at the facility scale for weighing. They then proceed into the landfill. After off-loading, trucks return to the scale for re-weighing to determine the weight of the delivered waste. A scale ticket is generated and signed by the scale house operator and the driver of the vehicle. One part of the weight ticket is given to the truck driver while the other part is used for billing and record keeping purposes by the facility.

Waste quantity tracking records are to be maintained at the facility until such time as approval to move or destroy the records is granted by NHDES.

### **3.5 Method of Tracking Outgoing Waste or Certified Waste-Derived Products**

The facility is a disposal facility and should not generate solid waste requiring off-site disposal. Leachate is collected at the facility and transported off-site for disposal in accordance with the procedures outlined in Section 4.0. Any vehicle hauling leachate

off-site is weighed prior to and after loading to determine the volume removed. Trucks hauling C&D debris which is segregated for off-site transport will be weighed before and after loading to track the quantity leaving the site.

### **3.6 Waste Storage Time and Capacity Limits**

Authorized waste materials delivered to the facility will be disposed within the lined landfill. C&D debris suitable for processing to produce alternative daily cover (“ADC”) occurs in accordance with the procedures identified in Appendix H. The volume of C&D stockpiled on-~~Site~~-site for processing is not to exceed 3,000 cubic yards. Processed C&D material may also be stockpiled within the active landfill and used by the facility as ADC. As indicated in Section 3.3, prohibited waste delivered to the facility may be stored temporarily on-site until such time as the hauler or qualified disposal company removes the waste.

### **3.7 Waste Management Following Receipt (Fill Sequence Plan)**

An objective of the design and development of Stage IV is to limit leachate generation by limiting the amount of precipitation that contacts waste.

A minimum of 4 feet of cover is to be provided over the anchor trench and the landfill liner system in other areas where temporary access roads are to be constructed. Swales may be constructed on slopes above the active fill area to divert stormwater runoff away from the landfill.

The filling of the landfill will be under the supervision of the landfill manager.

#### **3.7.1 Initial Lift in Base Areas and Above Overlay Liner**

An initial +/- 5-foot lift of select refuse (typically household trash) is to be placed above the liner system. Care is to be taken during initial refuse placement in these areas to remove items from the waste that could damage the liner system. During placement of the initial lift in the base areas, a full-time spotter is to observe the placement of refuse onto the base area of the landfill and remove items such as poles, pipes, and steel rods. Compaction of the initial lift in the base area will be performed with a bulldozer or similar equipment to limit the potential for damage to the liner system.

### 3.7.2 Subsequent Lifts

Once the initial lift is placed, additional waste is spread and compacted in shallow layers generally about 2 feet thick with a landfill compactor. Following placement of the initial lift, fill placement is to proceed in daily cells built in successive compacted layers to a height typically between 6 and 12 feet depending upon the incoming refuse volume. Once filling proceeds above perimeter anchor trench grades, lifts will be graded to drain to the perimeter slopes to promote run-off to the perimeter swale. Grading of the top of each daily cell is to slope away from the active face to direct run-off away from the operating area.

It is noted that actual day-to-day operations are left to the discretion of the Landfill Manager, and the fill sequencing and lift development outlined above may be adjusted based on actual operating conditions including waste volumes and weather conditions.

### 3.7.3 Landfill Cover<sup>†</sup>

Daily cover consisting of soil or a NHDES approved Alternative Daily Cover (ADC) material is to be applied to the working face at the conclusion of each working day. Twelve inches of intermediate cover soil or NHDES approved alternative is to be applied in areas where active filling will not occur for a period of one month or more.

The purpose of the daily and intermediate cover is to limit odors from the [Site](#), limit the potential to attract vectors, promote drainage of surface water, limit windblown litter, reduce the potential for fire, provide stability, and to serve as subgrade for the capping system. Soil cover material is to be applied and graded to direct runoff away from the filled area and limit leachate production. Silt fences and/or hay bales, or stone check dams are to be used as necessary to filter suspended soil particles from within the runoff from areas which have received soil cover.

ADC is often superior to soil covers as they eliminate the use of natural resources. ADC must serve all the cover material functions identified above and may be used only after gaining approval from the NHDES.

Leachate recirculation operations will be performed in the active Stage IV Phase IIA, and inactive Stage IV Phase I under the conditions of a Type IB Permit Modification

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<sup>†</sup>-Section 3.7.3 revised; 5/24/12

granted by NHDES. During the active filling of the Stage IV Phase IIA area, approved temporary tarpaulins will be used for daily cover, when practical. Daily cover soil materials may be used in lieu of tarpaulins; however, any soil cover material of low permeability such as till used as daily cover must be removed prior to resumption of daily landfill operations. Sand or permeable alternative daily cover materials that will not restrict leachate flow may be utilized and left in place when resuming landfill operations. For more information on leachate recirculation operations, see Section 4.3.

## **4.0 RESIDUAL WASTE MANAGEMENT**

### **4.1 Leachate Management Plan**

The leachate collection system for the NCES facility consists of a double liner system with primary and secondary liquid collection. The collection, pumping and handling system is designed so that liquids are removed from the landfill as rapidly as possible.

#### **4.1.1 Anticipated Leachate Generation Quantities**

The quantity of leachate generated varies and is a function of weather conditions, (temperature and precipitation); the amount of waste in place, how long the cell has been open, whether the fill has progressed above grade so that runoff may occur, and the landfill cover condition.

Based on operating experience at the facility, the long-term average leachate generation during operation ranges from about ~~300-250~~ to ~~500-650~~ gallons per acre per day (g/a/d). Following construction of final cover, leachate generation rates gradually diminish with time.

#### **4.1.2 Phasing and Cell Development**

To limit leachate quantities, the NCES facility has been developed in phases.

#### **4.1.3 Pumping/Removal Schedule**

Leachate is automatically pumped from collection sumps through piping to two underground storage tanks using dedicated submersible pumps. Leachate consolidated in the underground storage tanks may be pumped to a reserve 150,000 gallon above

ground storage tank. Leachate is pumped to a leachate loading facility where leachate tankers will be loaded.

Primary leachate levels are monitored with a supervisory control and data acquisition (SCADA) system. The pump controls are designed to activate the pumps when the leachate level is equivalent to the liner grade adjacent to the sump. The pump controls can be monitored on a daily basis remotely to determine that the system is operating properly.

Liquids collected from the secondary systems of all stages will be pumped automatically, measured, and consolidated with primary leachate. Quantities pumped are measured to about 90% accuracy using flow meters.

A leachate loadout facility is located adjacent to the above ground storage tank.

Facility staff calculates the leakage rates into the secondary detection system. If it is determined that the calculated monthly rate exceeds 25 gallons per contributory acre per day, it is to be reported to NHDES within one week of the rate identification except for flow which the NHDES agrees is the result of dewatering or a construction project. If the rate exceeds 100 gallons per contributory acre per day, NCES is to file an investigative report consistent with Env-Sw 806.09 unless the NHDES agrees the rate is the result of a dewatering activity or a construction related project.

Leachate which is pumped into tankers for off-site disposal will be disposed of at one or more of the facilities listed below.

| FACILITY                    |
|-----------------------------|
| Concord, New Hampshire      |
| Montpelier, Vermont         |
| Essex Junction , Vermont    |
| Burlington (North), Vermont |
| Barre, Vermont              |
| Plattsburgh, New York       |

Current ~~Letters of Agreement permits~~ for the Concord, Plattsburgh and four Vermont facilities indicating the facilities will accept leachate from NCES are kept on file at the site in the ~~Permit-permit bB~~inder.

~~NCES may enter into agreements with other facilities but must maintain agreements with at least two facilities to manage the quantity of leachate generated by the facility.~~

A supervisory control and data acquisition (SCADA) system shall control the process of transferring liquids from the sumps to the underground storage tanks. The SCADA system is configured such that pumps will not be activated if the leachate underground storage tanks are full. Furthermore, an alarm will be activated if the underground storage tanks are full.

While the leachate sump to storage tank transfer system is designed to operate automatically, it may also be operated manually. Pumping leachate to a tanker truck at the leachate loadout facility is ~~to be initiated manually~~ a manual operation.

#### **4.1.4 Leachate Contingency Considerations**

In the event of an extended power outage, NCES is to institute alternative power supply contingencies. A generator of adequate capacity is available for use as an alternative power supply. The generator is to be connected at transfer switches around the site, individually.

Should the contingency or other large storm occur and the leachate exceeds the capacity available in the facility's leachate storage tanks, additional storage is available on the liner system. As discussed in Section 6.1, operations staff is to take steps to remove leachate to increase storage capacity when severe weather is predicted. NCES is to implement measures to remove the additional leachate from the ~~Site-site~~ in an expeditious manner using additional tank trucks to haul the excess leachate to the treatment plants indicated in Section 4.1.3. Under no circumstances is temporary storage on the liner to last for more than seven days.

#### **4.1.5 Record Keeping and Monitoring**

The facility is to maintain records for each load of leachate shipped, identifying the quantity of leachate shipped, the date shipped, and the name of the wastewater treatment facility receiving the leachate.

NCES is to sample the leachate consistent with the requirements of the NHDES Rules, the facility permit, and the requirements of the various disposal facilities.

## 4.2 Landfill Gas Condensate Management

Condensate generated between the landfill and the gas management system blower is collected and pumped into the leachate collection system. Samples of condensate are to be collected at least once per year and analyzed. If the condensate is determined to be nonhazardous, it may continue to be mixed with leachate.

## 4.3 Leachate Recirculation System<sup>2</sup>

Leachate recirculation operations will be performed in permitted landfill cells to accelerate the degradation and stabilization of waste, enhance gas production, and improve leachate quality. The following sections describe the leachate system design and operating guidelines.

### 4.3.1 Design Description

The leachate recirculation system is comprised of Pump Station I, leachate forcemains, and horizontal leachate injection wells which are located in Stage IV Phase I & II-A. The Phase II-A recirculation area is confined to the landfilled waste area that is connected to the Stage I Phase IV liner and its leachate collection system-, and does not extend into Stage I Phases III, II or I.

During normal operations, leachate collected at the Stage IV Phase II sump is pumped from Pump Station I through the forcemain which runs along the Stage IV Phase I anchor trench to the leachate management area east of Stage IV Phase I, where it is temporarily stored and then offloaded into tanker trucks for delivery to waste water treatment facilities for disposal. During leachate recirculation operations, leachate collected in the Stage IV Phase II sump will be transmitted via Pump Station I to the horizontal leachate injection wells in either Stage IV Phase I or Stage IV Phase II-A.

Leachate recirculation in Stage IV Phase I is accomplished by opening each of the leachate lateral control valves at the leachate forcemain to direct flow to the horizontal landfill gas collection wells. The horizontal gas collection wells were installed during waste placement and were connected to the landfill gas collection system in 2009. The horizontal gas collection wells have been modified with valving to allow operation either for gas collection or leachate injection by isolating the connection to the landfill

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<sup>2</sup>-Section 4.3 added; 5/24/12

gas or leachate lateral. The flow of leachate to each injection well is balanced using the lateral control valve and installed flow meter to evenly distribute the recirculated leachate to each of the selected horizontal wells.

Leachate recirculation in Stage IV Phase II-A will require manual operation of the leachate recirculation valve within the pump station to activate the recirculation forcemain and shut off flow to the leachate storage system. The leachate forcemain from Pump Station I is located in a common trench with the 14-inch landfill gas header pipe which runs along the western Stage IV, Phase II anchor trench. As land-filling progresses in Stage IV Phase II-A, NCES will construct landfill gas collection wells and leachate injection wells in a combined trench. The combined trenches are ~~be~~ spaced approximately 160 feet horizontally from each other, and separated 20 feet vertically from the stages above and below that are offset 80 feet horizontally to increase coverage. The flow from the recirculation forcemain into each lateral and injection well will be balanced using the control valve and installed flow meter to evenly distribute the recirculated leachate to each of the selected horizontal injection wells.

#### 4.3.2 Recirculation Operations

In order to appropriately monitor the leachate recirculation system, leachate will ~~only~~ be recirculated to wells in either Stage IV, Phase I or Phase II-A and not both simultaneously. Only leachate collected in the Stage IV, Phase II sump will be available for leachate recirculation via Pump Station I.

Operators shall utilize each lateral's flow meter and control valve to distribute leachate evenly to the desired injection wells. Typically recirculation will be completed using 5 to 7 injection wells at a time. Once the leachate recirculation system is balanced for a particular configuration, it should remain balanced as the hydraulic pumping conditions will not vary.

During prolonged recirculation operation in an area, the flows in each lateral will be monitored on a monthly basis and adjusted if necessary to maintain balanced flow.

Recirculation flow rates to Stage IV Phase I are estimated to be 70 gpm, while flow to Stage IV Phase II-A is estimated to be 65 gpm for the lower and middle stages (LR-201 – LR 210) and approximately 60 gpm for the upper stage (LR 211-217)

Leachate recirculation operations will cease for a given landfill phase when:

- primary leachate flow rate increases above the following threshold flow rates:
  - o Stage IV Phase I = 14,800 gpd
  - o Stage IV Phase II-A = 21,000 gpd
- Leachate flow rates indicate that field capacity has been reached by comparing recirculation flows to historical base flows while accounting for precipitation, snow melt and seasonal effects.
- leachate outbreaks occur;
- secondary flow is greater than 25 gal/acre/day.

When the primary leachate flow rates approach twice the historic baseline flow rate, the refuse influenced by recirculation is likely to be at or near its field capacity. Field capacity is the moisture content of the waste at which the maximum amount of liquid is held in the voids. Field capacity can vary but is anticipated to be approximately 40 to 50% by weight depending on waste composition, age, density, and porosity. When at field capacity, refuse will no longer have the ability to absorb additional liquid and recirculation short circuiting may occur, or the waste will leach out an equivalent weight of water added. When field capacity is attained in the waste mass influenced by the injection well, recirculation at this location will be discontinued.

Leachate injection and gas collection in the Stage IV Phase II-A recirculation areas can be performed at the same time, provided that the daily discharge rate does not exceed the capacity of the waste to accept the leachate or the amount that can be stored within the recirculation trench below the gas collection header. If simultaneous operation is desired or necessary to control gas emissions or odor, then the injection rates shall be monitored and adjusted to prevent leachate from fouling the gas collection system. Ordinarily, the horizontal gas collection system would be operated at alternate times from the recirculation.

#### **4.3.3 Leachate Recirculation Permit Renewal, Record Keeping, and Reporting**

NCES is permitted to conduct leachate recirculation operations in the approved landfill cells Stage IV Phase I and Stage IV Phase II-A as an innovative leachate management method. Per Env-Sw 806.04 (j), the leachate recirculation operations permit is valid for three years from the date of issuance, and is renewable ~~as not to exceed up to~~ 12 years of operations.

Record keeping should conform to all other record keeping procedures. The dates of operation of each well and the total and average daily volume of leachate recirculated will be recorded by operators. Leachate primary flow totals will be compared to recirculation flow totals to monitor for refuse field capacity and for leachate short circuiting. Maintenance performed on the leachate recirculation system will be recorded and an inventory of replacement parts incorporated into the recirculation system will also be kept to evaluate performance of the system. The settlement/consolidation of the landfill waste in the recirculation areas will also be tracked to quantify positive impacts from the recirculation on the stabilization of waste. Waste filling operations atop recirculation areas will also influence settlement, and will need to be factored into the settlement analyses.

Quarterly surveys of the recirculation areas will be completed concurrent with the quarterly survey of active filling areas. Surveys will also locate the leachate injection wells at the penetration of intermediate cover soils to track any horizontal and vertical movement of the trenches, as the waste degrades and settles.

Monthly visual inspection will be performed in areas where recirculation is performed. Operators shall note:

- differential settlement
- leachate outbreaks
- leaks in piping

## 5.0 FACILITY MAINTENANCE, INSPECTION, AND MONITORING PLAN

The areas in and around the vicinity of the landfill are to be maintained in a neat and orderly manner. The access roads are to be graded when necessary and maintained in a serviceable condition.

Closed portions of the facility will also be visually inspected. The purpose of inspecting the closed portions of the ~~Site-site~~ is to evaluate the integrity of the final capping system, the stormwater management system, erosion control measures, and leachate collection systems.

### 5.1 Spontaneous Combustion and Other Fire Hazards

Fire protection controls on-site consist of cover soils, fire extinguishers and the ~~Site-site~~ water truck. Gas ~~Management-management System-system~~ records are to be periodically reviewed to observe that system monitoring is being performed and that the concentrations of the various gases within the landfill gas collection system are within expected ranges. (Operation and ~~Maintenance-maintenance~~ provisions for the ~~Gas-gas Management-management System-system~~ are included in Appendix C.)

### 5.2 Vector Production

Compaction and the use of cover material limits vector access to the waste. If necessary, appropriate measures such as use of a professional exterminator would be employed.

### 5.3 Gas Monitoring and Control

An active landfill gas system has been constructed at the NCES facility and will be expanded as necessary. The system consists of drilled gas extraction wells and lateral extraction trenches which are connected to gas collection piping. Blowers are used to extract the landfill gas and control devices are utilized to ~~destruct-destroy~~ the gas.

A written plan for confined space entry is maintained on site.

Monitoring for landfill gas outside the limits of the landfill will involve sampling gas monitoring probes as described in the Gas Monitoring Plan in Appendix C. These probes are to be monitored for explosive gas, using a dual-range natural gas indicator such as a Gas Tech Model NP-204 or equivalent.

The following steps are to be implemented in the event that monitoring results indicate combustible gas concentrations in the soil exceed 50 percent of the lower explosive limit (LEL) at the property line or 25 percent of the LEL in on-Site structures excluding leachate collection and gas recovery components (note that the LEL defined above corresponds to 5 percent methane by volume in air):

- Take all necessary steps to ensure protection of human health and notify NHDES [This notification shall be deemed to have taken place when the Department's Project Manager in the Solid Waste Compliance Section 603-271-2925 is notified.];
- Within seven (7) days of detection, place in the operating record the methane gas levels detected and a description of the steps taken to protect human health; and
- Within sixty (60) days of detection, implement a remediation plan for the methane gas release, place a copy of the plan in the operating record, and notify the ~~Director~~ NHDES that the plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.

Locations where gas concentrations exceed 50 percent of the LEL at the property line are to be identified in a separate report which is to be forwarded to NHDES.

Should the combustible gas concentrations be determined to exceed 50 percent of the LEL at any permanent probe location, an evaluation is to be made to determine whether the frequency of monitoring should be increased, and whether the monitoring network and type of monitoring should be modified to enhance detection. If continued monitoring indicates elevated levels of landfill gas at the property line, an appropriate plan to control gas concentrations, such as further expansion of the active gas system, is to be developed and submitted to NHDES for review.

If monitoring indicates that additional control measures are necessary, they are to be installed so that:

1. Gas concentrations at the property boundaries will be less than 50 percent of the LEL; and
2. Gas concentrations at any structure will be less than 25 percent of the LEL.

## 5.4 Odors

The application of daily cover in conjunction with the active gas management system should provide effective odor control. The final cover system has been designed with a synthetic membrane. This membrane will further minimize odors by constraining gas to the active system.

Other measures to control odors which may be considered include deployment of odor control products. An odor-neutralizing chemical may also be applied as a mist in areas where odors are noted.

If waste streams are identified which routinely exhibit unacceptable odor, the generator will be informed and required to take measures to reduce odor. If this cannot be accomplished, the generator's waste stream will not be accepted at the facility.

Items to check during routine inspections include:

- The active gas collection system records to observe that gas is being extracted effectively from the various collection locations;
- That there is adequate daily or intermediate cover on the waste; and
- If necessary, solid odor neutralizing products or misting agents be deployed.

When the facility receives an odor complaint, the facility is to implement an odor inspection to confirm the odors at the alleged source and if necessary to identify the source of the odor. For those persons who may be calling during hours when the facility is not open, the call is automatically forwarded to an answering service which will contact an NCES representative. The NCES representative will follow the procedures outlined d above.

The facility is to maintain a log of odor complaints using the form included in Appendix D. The completed form provides a log of the time and place odors are noted and are to identify the response implemented by the facility.

## 5.5 Dust Control

Dust control procedures include proper maintenance of vegetated areas and gravel service roads. Dust is to be controlled on the facility access roads by the application of gravel as needed and by watering. Water is available from stormwater detention ponds or with the Town's permission, the hydrant located near the northern end of the Sitesite.

## 5.6 Windblown Litter

Blowing litter is to be minimized by limiting the active working face, applying daily cover to the active fill areas and fencing. Other methods, such as the utilization of litter pickers and portable fencing, are employed. Any windblown litter must be collected promptly and taken to the active disposal area.

Litter will also be collected along the entrance area and roadways. Refuse hauling trucks are required to have their loads tarped or use closed containers/truck bodies which reduces windblown litter.

## 5.7 Leachate

The leachate systems are monitored through the SCADA system. The quantity of liquid pumped from the primary and secondary collection systems is recorded and provided to the NHDES. Leachate manholes are equipped with leak detection features for monitoring of subsurface leachate for leaks.

## 5.8 Spills

NCES has a spill prevention and countermeasure control plan (SPCC Plan). Spills will be managed in accordance with this plan.

## 5.9 Stormwater Management Systems<sup>3</sup>

The surface water management systems are inspected and managed in accordance with the Site's Stormwater Pollution Prevention Plan (SWPPP). ~~Catch basins and swales on the reinforced earth berm are to be maintained to be free of snow, ice, sediment and debris.~~

~~In addition to the ditches~~ Ditches and detention ponds, sideslopes and surfaces of the exterior landfill berms are to be inspected for erosion. All sideslopes should have well-established vegetation or be in the process to be vegetated.

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<sup>3</sup> Section 5.9 revised; 7/14/10

## 5.10 Groundwater Monitoring

Sampling and analyses of groundwater is performed in accordance with the current NHDES Groundwater Management and Release Detection Permit.

Permanent groundwater monitoring wells are installed to monitor groundwater quality at the ~~Site~~Site. The monitoring wells are typically constructed using polyvinyl chloride (PVC) well screen and riser piping. The well screen for the monitoring wells is surrounded by a sand filter. A bentonite seal and cement/bentonite grout surrounds the riser pipe from the sand filter to the ground surface. Monitoring wells are provided with protective casings and locking caps.

## 5.11 Leachate Breakouts

Inspections are to include observations of landfill sideslopes for evidence of leachate breakouts. Breakouts are to be repaired promptly. Methods to repair breakouts may include excavation of the breakout and backfill with free draining material to promote drainage into the landfill. Leachate breakout locations are recorded on a field sketch and submitted with the monthly facility report. A copy of the repair log form and field sketch are provided in Appendix E.

## 5.12 Bird Control

The facility is to take steps to limit the number of birds present and foraging at the landfill. Steps to discourage birds from visiting the site are identified in the Bird Control Plan provided in Appendix G.

## ~~5.13 Liner Settlement Monitoring~~

~~In accordance with Condition 5(b) of the Stage IV permit, settlement of the liner system is to be monitored and liner strain evaluated. Settlement monitoring is to be performed in accordance with the Liner Settlement Monitoring Plan provided in Appendix H. This portion of the liner system over Phase I of Stage I was constructed in 2008.~~

## ~~5.14~~ 13 Asbestos Records and Plan<sup>4</sup>

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<sup>4</sup>-Section 5.14 added; 8/9/10

~~As part of the construction of Stage IV, Phase 2, of the landfill, NCES will excavate waste in Stage I to expose the leachate collection sumps to build a new sump and connect the new leachate collection system to it. The area where the excavation will take place, Stage I, was permitted to accept asbestos.~~ The NH Solid Waste Rules require that the asbestos disposal locations be documented, which was done for Stage IV. These records are maintained at the site, and are included as Appendix II.

Construction and demolition debris from the Mountain View Grand Hotel renovation project, which the DES alleged to have contained asbestos, was received between October 1999 and May 2002, while NCES was operating Stages II and III. As noted above, the excavation of waste required for the construction of Stage ~~IV, Phase 2~~V will take place entirely within Stage IV. Therefore, C&D waste from the Mountain View Hotel will not be encountered in this project.

Nevertheless, in any waste excavation project unexpected wastes, including asbestos, may be encountered. Therefore, for these types of projects, the contractors are required to implement a DES-approved Site Safety and Contingency Work Plan to control and monitor the work, including procedures for safely handling asbestos waste and assuring no releases occur.

## 6.0 CONTINGENCY PLAN<sup>5</sup>

Specific actions to be taken in the event of severe storm, fire, operator injury, spills and receipt of prohibited wastes are described in the following section. A list of emergency phone numbers is provided below. For police, fire and medical emergencies, 911 may be dialed.

| List of Emergency <del>Organizations</del> <sup>6</sup> <u>Organizations</u> <sup>1</sup> |                                    |                                                 |
|-------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------|
| Type of Service                                                                           | Name of Organization               | Telephone Number                                |
| Fire                                                                                      | Bethlehem Fire Department          | (603) 869-2232<br><u>In Emergency: Dial 911</u> |
| Poison Center                                                                             | Northern New England Poison Center | 1-800-222-1222                                  |
| Hospital                                                                                  | Littleton Regional Hospital        | (603) 444-9000                                  |
| Spill Notification                                                                        | NHDES (M-F, 8AM-4PM)               | (603) 271-3899                                  |

<sup>5</sup>~~Section 6.0 revised; 7/14/10~~

<sup>6-1</sup>List of Emergency Organizations revised; 8/16/102/4/14

|                    |                                                   |                                                      |
|--------------------|---------------------------------------------------|------------------------------------------------------|
| Spill Notification | NH State Police<br>(Nights – Weekends – Holidays) | (800) 346-4009<br><br>Out of State<br>(603) 271-3636 |
|--------------------|---------------------------------------------------|------------------------------------------------------|

## 6.1 Severe Storm

If severe weather is predicted including the potential for a large amount of precipitation or high winds, operating staff are to evaluate if the facility should be closed temporarily.

A preemptive closure may allow operating staff more time to cover the refuse, secure equipment, and secure the facility.

## 6.2 Fire and Explosions

The Bethlehem Fire Department (869-2232) will be contacted in the event of a fire at the facility.

Loads of refuse which are suspected to be burning will not be disposed in the active disposal area. Instead, such loads will be dumped in the hot load area. If an incoming load of refuse is suspected of being on fire, the haul vehicle will be directed immediately to the hot load area. The hot load will be monitored, allowed to cool and possibly quenched with water (if necessary) prior to disposal in the active area.

Soil may also be used to smother fires in support of the Fire Department at the working face.

Appropriate fire extinguishers are carried on the facility's heavy equipment at all times and used to control small fires that may occur. Fire fighting will not be done at the risk of personal injury.

## 6.3 Injury

In the event of personal injury, first aid should be administered and an assessment should be made as to whether emergency (ambulance) care is required.

## 6.4 Petroleum Spills<sup>6</sup>

Please refer to [the](#) SPCC (Spill Prevention Control & Countermeasures Plan) and SWPPP (Stormwater Pollution and Prevention Plan) plans.

## 6.5 Leachate Spills

When a leachate [release or](#) spill occurs a determination is to be made as to:

- Location of the release, or spill;
- Source of the leachate;
- An estimate of any quantity released;
- The direction in which any spill or release is heading; and/or
- The possibility of fire and/or explosion.

There are three major steps that can be taken in the event of a release or spill. These include:

- Control
- Transfer
- Disposal

The following are general procedures that are to be followed in the event of a spill at the facility:

**Control** – The first task should be to stop the release of leachate, if possible, by such actions as shutting off pumps, placing soil against a leak, or diverting flow to a collection point. If the release of leachate cannot be controlled, begin the second step (transfer) immediately.

If a spill occurs on the ground surface, use absorbents if the spill is relatively small. Otherwise, use dirt, sand, or other relatively impervious material to dam the spill and

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<sup>6</sup>~~Section 6.4 revised; 7/14/10~~

prevent flow. Plug any drains in the area of the spill as soon as possible after a spill has occurred.

If the spill has reached a body of water the entire body of water must be considered leachate until such time analytical testing can suggest that impact has been remediated.

**Transfer** – Once a spill is contained, the spilled material must be transferred to appropriate storage containers before disposal. If a spill is small and absorbents are used, they may be manually placed in waste containers and transported to the landfill workface for disposal at the facility. Collected liquids are to be transported off-Site for disposal at an appropriate wastewater treatment facility or discharged back to the landfill.

Leachate should be pumped into an appropriate bulk tank truck or to a container or tank suitable for storage of the material. Handling of spilled material is not to be done at the risk of personal injury.

**Disposal** – The disposal methods would be the landfill or a permitted wastewater treatment facility.

## 6.6 Receipt of Prohibited Waste<sup>7</sup>

When a prohibited waste stream is discovered, the procedure outlined below is to be followed:

- ~~An unapproved special waste~~ Special Waste that has not been approved in accordance with Section 3.3.2.1 or other prohibited waste which is deposited on the working face and which does not appear to NCES personnel to be an immediate threat to health or safety (e.g., whole tires, white goods, etc.) is to be isolated by the landfill equipment operator ~~the compactor operator~~. The customer is to be identified, and requested to remove the waste. If the source of the waste or hauler cannot be identified, NCES will evaluate the situation and implement appropriate procedures for the management of the waste. NCES staff will notify the Landfill ~~landfill~~ Manager ~~manager~~ and/or PCE ~~Permits, Compliance and Engineering~~ personnel immediately. The unauthorized waste will be separated and if appropriate, placed in a secure container. The unauthorized waste will be evaluated by trained personnel and characterized for

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<sup>7</sup> ~~Section 6.6 revised; 7/14/10~~

proper disposal. If the waste is identified to be potentially hazardous, NCES staff will contact an authorized hazardous waste company as identified in Section 2.2. NCES would utilize one of the following companies (or similar qualified firms) for removal and disposal of unauthorized waste:

CYN Environmental  
8 Progress Drive  
Dover, NH 03820  
1-800-417-7455

Clean Harbors Environmental Services, Inc.  
20 Dunklee Road  
Bow, NH  
1-603-~~644-3633~~224-6626

- In the event a waste disposed on the working face is believed to present an immediate threat to health and safety (e.g., reactive chemicals, ruptured drums containing liquids), the waste is to be left in place undisturbed and NCES staff will immediately notify the ~~Landfill~~landfill Manager~~manager~~. The NHDES will also be notified. The waste is to be evaluated and characterized for proper handling and transportation. Such waste is to be weighed and promptly transferred using licensed waste transporters and transported to a licensed disposal facility.
- The following table describes management of specified prohibited wastes. This list is not intended to be all inclusive, but a general tabulation of typical materials. The “Disposal/Transfer” vendor information is intended for reference only and may be modified by the Facility.

| MATERIAL             | TEMPORARY STORAGE LOCATION                                             | WASTE CONTAINER TYPE                   | MAXIMUM DURATION ON-SITE STORAGE                         | DISPOSAL / TRANSFER         |
|----------------------|------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------|-----------------------------|
| Anti-Freeze          | Maintenance Garage                                                     | Drum                                   | < 1 year per Universal Waste Rules                       | Recycler                    |
| Asbestos             | Near Working Face -Secure location determined at the time of incident. | Covered Dumpster / Roll-off or Trailer | Removed upon testing and proper management arrangements. | Alternate Disposal Facility |
| Batteries (Wet Cell) | Maintenance Garage                                                     | Storage Rack or Plastic Bin            | < 1 year per Universal Waste Rules                       | Universal Waste Recycler    |
| Batteries            | Electronics Storage Shed                                               | Drum                                   | < 1 year per Universal Waste Rules                       | Universal Waste Recycler    |

|                                          |                                                                                                      |                                                                      |                                                          |                                             |
|------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------|
| Cathode Ray Tubes (CRT's)                | Electronics Storage Shed                                                                             | Labeled Cardboard Box                                                | < 1 year per Universal Waste Rules                       | Universal Waste Recycler                    |
| CFC Containing Appliances                | Designated Area                                                                                      | Roll-off                                                             | 3-6 Months                                               | Certified Technician removes CFCs. Recycler |
| Contained Gaseous (Propane Tanks)        | Designated Area                                                                                      | Roll-off                                                             | 3-6 Months                                               | Littleton Town Transfer Station             |
| Fluorescent Bulbs and Lighting Ballasts  | Electronics Storage Shed                                                                             | Labeled Cardboard Box                                                | < 1 year per Universal Waste Rules                       | Universal Waste Recycler                    |
| Medical Waste (Untreated)                | Near Working Face -Secure location determined at the time of incident.                               | Container it was shipped in / Dumpster / Roll-off                    | Removed upon testing and proper management arrangements. | Alternate Disposal Facility                 |
| Mercury Containing Devices               | Electronics Storage Shed                                                                             | Drum                                                                 | < 1 year per Universal Waste Rules                       | Universal Waste Recycler                    |
| Motor Oil                                | Maintenance Garage                                                                                   | Drum                                                                 | Removed upon testing and proper management arrangements. | Licensed Hazardous Waste Contractor         |
| Tires - whole                            | Designated Area                                                                                      | Roll-off                                                             | 3-6 Months                                               | Recycler or Alternate Disposal Facility     |
| Unidentified Waste that may be Hazardous | Where off-loaded, until identified. Secured storage per NHDES Solid and Hazardous Waste Division(s). | Container as recommended by DES and Contractor. Substance Dependant* | Removed upon testing and proper management arrangements. | Licensed Hazardous Waste Contractor         |
| White Goods                              | Designated Area                                                                                      | Roll-off                                                             | 3-6 Months                                               | Recycler                                    |

## 7.0 EMPLOYEE TRAINING PROGRAM

~~NCES's Operations Supervisor The operations management functions must have a certified NHDES be an NHDES-certified at the facility is are to be provided by persons who are certified by NHDES for the level of responsibilities performance of their assigned responsibilities. At least one person on site shall be a certified Level IV Principal Operator operator Certification consistent with under Env-Sw 1600. For every five operators (person directly involved in solid waste management activities), there is to be at least one Level III or Level IV Operator.~~

NCES provides training to staff on job responsibilities, human resource matters, operations/equipment, health and safety, and environmental compliance. Training is primarily done by qualified internal staff, however third-party consultants/experts, or certificate programs and seminars may be incorporated. Necessary job-related training is provided to new-hire employees. Training related to landfill operations staff includes:

### 1. Health and Safety

Training on a variety of ~~Health~~health and ~~Safety~~safety related topics is provided primarily by on-site management. Generally training occurs once per month and ranges from ½ hour to 1 hour sessions depending on the topic.

## **2. Specific Technical Training on Operating Equipment and Procedures**

The ~~Landfill-landfill Manager-manager~~ will ensure employees are technically trained in proper equipment use prior to operation. On-site and off-site training is provided for staff and management on specific equipment from suppliers.

## **3. Facility Operating Plan**

The Facility Operating Plan is reviewed annually by the ~~Landfill-landfill Manager-manager~~ and/or Compliance Staff. Facility operations staff is trained annually on the Facility Operating Plan or more frequently if changes are made subsequent to the most prior training.

Within thirty days of NHDES approval of any changes to the Facility Operating Plan, each employee will receive training with respect to any change related to the employee's responsibilities. Each training session will require attendees to sign a log specifying the sections of the Facility Operating Plan on which the operator received training. Employee familiarity with the Facility Operating Plan is monitored through interaction with the instructor during training.

### **a. Identification of Acceptable and Unacceptable Waste**

Annual training is provided to equipment/compactor operators in identification of acceptable and unacceptable waste (Hazardous waste, CFC's, asbestos, etc.). Training topics may include: definitions, what is unacceptable, identification practices, load inspection, handling procedures, and procedures for unapproved or unacceptable deliveries; ~~and~~ and contact information.

### **b. Special Waste Training**

Annual training is provided to the ~~Landfill-landfill Managermanager~~, sales representative, and equipment/compactor operators, involved in the management

of ~~s~~Special ~~w~~Wastes, as applicable to their related duties. Additional training may be required when there are new handling requirements, new rules or policies, or new waste streams. Training topics may include: definitions, examples of ~~s~~Special ~~w~~Wastes, identification of ~~s~~Special ~~w~~Waste, ~~s~~Special ~~w~~Waste approval process, load inspection, handling procedures, and procedures for unapproved or unacceptable deliveries; and contact information.

**c. Emergency and Contingency Plan Procedures**

The ~~Emergency-emergency~~ and ~~Contingency-contingency Plan-plan Procedures~~ procedures are reviewed annually by the ~~Landfill-landfill Managermanager~~. Facility ~~Operations-operations Staff-staff~~ are trained regularly and as necessary on various components of the Plan.

**4. Spill Prevention Control and Countermeasures (SPCC)**

~~Provided-T~~he Facility-facility is required to have a SPCC Plan ~~by-under~~ 40 CFR 112; ~~annually, Annual~~ training ~~will-is be~~ held for employees on the SPCC Plan and emergency response procedures. In addition, the training includes a review of the NHDES criteria for reporting petroleum discharges and emergency contact information.

**5. Storm Water Pollution Prevention Plan (SWPPP)**

~~Provided-T~~he Facility is required to have a SWPPP by the US EPA National Pollution Discharge Elimination System (NPDES) Program; ~~annually, S~~storm water pollution prevention training ~~will-be is~~ conducted for operational employees annually.

## **8.0 RECORD KEEPING AND REPORTING**

The following records are to be maintained at the facility as well as the NCES's Permitting and Compliance office:

- Copies of facility permits and approvals;
- Quantity, type, and origin of all waste received by the facility;
- Quantity and destination of leachate generated by the facility;

- Quantity, type and destination of all certified waste-derived products used or produced by the facility, if any;
- Record of inspections, maintenance, and repairs;
- Record of accidents, violations, remedial and emergency event response actions;
- Record of complaints received and related response actions;
- Data from all environmental monitoring performed at or for the facility, whether required by the Solid Waste Rules or the permit or undertaken voluntarily;
- Documentation of contact with the waste management district(s) served by the facility as required by Env-Sw 1105.06 (11);
- The facility design reports;
- Hydrogeologic reports;
- Special Waste profile documentation and analysis, as applicable, for all Special Waste delivered to the site;
- Other record keeping information and documentation required by the Solid Waste Rules; and
- Other information and documentation as required by the terms and conditions of the facility permits and approvals.

The operating records identified above are to be maintained at the facility at all times during the active life of the facility, unless approval is granted ~~pursuant to a Type V Permit Modification or a Waiver is granted~~ to relocate or destroy the records pursuant to a Type V permit modification or a waiver. Operating records are to be made available for NHDES inspection and copies provided to the department pursuant to Env-Sw 2000. Following closure of the facility, the operating records are to be maintained at a location approved by NHDES in the Closure Plan, unless destruction of the records is approved pursuant to a Type V ~~Permit-permit Modification~~modification.

~~The Permittee is to~~NCES will notify the ~~Department~~department in writing within thirty (30) calendar days of any change in the facility address, telephone number, key operators or contact person(s).

An annual facility report is to be filed by March 31 each year for the prior calendar year and include the information required by Env-Sw 1105.13.

## Appendix A

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*Rules and Regulation for Facility Use, Certificates of Acceptable  
Waste Forms~~and~~, Random Waste Inspection ~~Worksheet~~ Form and  
~~Special Waste Profile Form~~ Special Waste Characterization Profile  
Form*

## *Appendix B*

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### *Facility Inspection Checklist*

## *Appendix C*

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### *Operations and Maintenance Manual, Gas Management System*

*Appendix D*

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*Odor Complaint Form*

## *Appendix E*

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### *Leachate Breakout Repair Logs and Field Sketch*

## *Appendix F*

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### *Operating Procedures for Segregating and On-Site Stockpiling and Processing of Construction and Demolition Debris (C&D)*

## *Appendix G*

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### *Bird Control Plan*

## *Appendix H*

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### *Liner Settlement Monitoring Plan*

## **APPENDIX H**

### **Liner Settlement Monitoring Plan**

#### **INTRODUCTION**

This Liner Settlement Monitoring Plan (Plan) describes the means to monitor settlement and evaluate strain in that portion of the Stage IV liner constructed above the waste in Stage I.

#### **SETTLEMENT MONITORING PROGRAM**

A settlement monitoring system provided by Geokon, Inc. of Lebanon, New Hampshire will be used to monitor settlement at three locations along the slopes of the overlay liner system. A total of five slope lengths of the overlay liner will be monitored, three on the north slope and two slope lengths on the south slope. The system (Geokon's Model 4600 Settlement System) consists of a settlement plate and reservoir installed above the liner system within the select sand. The settlement reservoirs are connected to a vibrating wire pressure transducer via a liquid-filled line. The pressure transducers are set in a manhole located outside the landfill anchor trench, and will have a known and fixed reference elevation. Three sensors will be installed in each manhole. The pressure transducers signal cable is routed to a remote terminal box mounted central to the manhole locations. A single terminal box will be installed on the north and south sides of the landfill. The sensor detects hydraulic head from the settlement plate and reservoir above and relays this signal to the terminal box. The hydraulic head at the terminal box can be measured for each settlement location, converted to elevation and compared to an initial reading to calculate settlement.

Prior to obtaining readings, the elevation at the location of the settlement plate and transducers will be surveyed to provide a current reference elevation. Readings will be taken and recorded following construction, and then quarterly. Data will be presented in tabular form comparing initial readings with subsequent measurements to evaluate settlement at the established locations along each slope.

#### **STRAIN EVALUATION**

It is anticipated that settlement will result in relaxation of the geomembrane over the majority of the slope and not cause damaging tensile strain. Tensile strain may occur in areas where there is differential settlement leading to elongation of the geomembrane and could be induced as locations on the slope settle more relative to locations further up the slope. The strain between adjacent monitoring locations will be calculated and the maximum tensile strain will be identified following each monitoring event. The calculated maximum tensile strain will be compared against a yield strain for HDPE geomembrane of 10 percent. Note that this yield strain is appreciably lower than the strain at break, which for textured HDPE geomembrane is typically 100 percent or more. With time, it is anticipated that secondary settlement will tend to lessen overall differential settlement and associated strain.

#### **DATA REPORTS**

Data from the monitoring events will be provided in the annual report to NHDES. The data reports will include the tabulated data and discussion of the calculated tensile strain relative to the strain at yield and break for geomembrane.

Appendix *II*

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*Asbestos Disposal Location Plans*

Appendix I

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~~Metal Shredder Residue—Alternative Daily Cover Specifications  
and Restrictions~~

## *Appendix B – Closure Plan Revisions*

*Appendix B.1 – Revised Closure and Post Closure Cost Estimates and Supporting Documentation*

*Appendix B.2 – Revised Sheets C-2 and C-4 of Closure Plan Drawing Set*

*Appendix B.1 – Revised Closure and Post Closure  
Cost Estimates and Supporting Documentation*

# Cost Estimate Form for Closure of a Lined Landfill

LOG#

(for DES use only)

|                             |                                               |
|-----------------------------|-----------------------------------------------|
| <b>Facility Name:</b>       | North Country Environmental Services Landfill |
| <b>Address of Facility:</b> | Trudeau Road, Bethlehem, NH                   |
| <b>Owner:</b>               | North Country Environmental Services, Inc.    |
| <b>Phase:</b>               | Stage I through Stage V                       |
| <b>Acreage:</b>             | 40.66 acres require closure (5.80 are capped) |
| <b>DES Permit #:</b>        | DES-SW-SP-03-002                              |
| <b>Site# (DES Use Only)</b> | <b>Facility # (DES Use Only)</b>              |

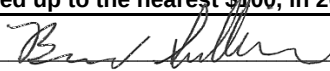
**State of New Hampshire**  
**Waste Management Division**  
**Department of Environmental Services**  
 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095  
 (603) 271-2925 FAX 603-271-2456  
 TDD Access: Relay NH 1-800-735-2964

Complete this form in accordance with the NH Solid Waste Rules Part Env-Sw 313.

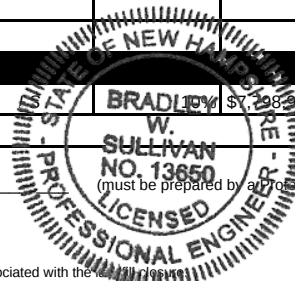
| Task                                                                                                                                | DES Use Only | Unit | Unit Cost    | Quantity  | Total Cost     |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|------|--------------|-----------|----------------|
| <b>I Design of Final Closure Plans</b>                                                                                              | <b>Cat1</b>  |      |              |           |                |
| Engineering Cost                                                                                                                    | 100          | TS   | \$95,000.00  | 1         | \$95,000.00    |
| Plans                                                                                                                               | 110          | TS   | \$8,000.00   | 1         | \$8,000.00     |
| Modification/Closure Plan Review Fees                                                                                               | 120          | TS   | \$5,500.00   | 1         | \$5,500.00     |
| <b>II Mobilization, Demobilization &amp; Insurance</b>                                                                              | <b>Cat 2</b> |      |              |           |                |
| Total cost                                                                                                                          | 200          | TS   | \$300,000.00 | 1         | \$300,000.00   |
| Other (Health and Safety Plan)                                                                                                      | 210          | LS   | \$5,000.00   | 1         | \$5,000.00     |
| <b>III Erosion Control</b>                                                                                                          | <b>Cat 3</b> |      |              |           |                |
| Silt Fence                                                                                                                          | 300          | LF   | \$3.50       | 1,000     | \$3,500.00     |
| Erosion Matting/ Blanket                                                                                                            | 310          | LS   | \$5,000.00   | 1         | \$5,000.00     |
| Hay Bale Sediment Barrier                                                                                                           | 320          | LF   | \$5.50       | 360       | \$1,980.00     |
| Hay Mulch Cover                                                                                                                     | 330          |      |              |           |                |
| Check Dams                                                                                                                          | 340          | EA   | \$50.00      | 16        | \$800.00       |
| Other (Misc.)                                                                                                                       | 350          | LS   | \$5,000.00   | 1         | \$5,000.00     |
| <b>IV Waste Relocation</b>                                                                                                          | <b>Cat 4</b> |      |              |           |                |
| Test Pits (to define limits of refuse and/or ground water to refuse contact)                                                        | 400          | DAY  |              |           |                |
| Clearing & Grubbing                                                                                                                 | 410          | AC   |              |           |                |
| Waste Regrading (Refuse Excavation/Relocation & Compaction)                                                                         | 420          | LS   |              |           |                |
| Other (Misc. Grading)                                                                                                               | 430          | LS   |              |           |                |
| <b>V Capping</b>                                                                                                                    | <b>Cat 5</b> |      |              |           |                |
| <b>A</b> Cap (Material and Installation)                                                                                            |              |      |              |           |                |
| Geomembrane (Includes testing)                                                                                                      | 510          | SF   | \$0.55       | 1,771,150 | \$974,132.28   |
| Soil                                                                                                                                | 520          | CY   |              |           |                |
| Testing                                                                                                                             | 530          |      |              |           |                |
| Anchor Trench                                                                                                                       | 540          | LF   | \$1.50       | 5,445     | \$8,167.50     |
| Other (Geocomposite)                                                                                                                | 550          | SF   | \$0.65       | 1,771,150 | \$1,151,247.50 |
| <b>B</b> Gas Vents & Devices                                                                                                        | Cat 6        |      |              |           |                |
| Capping System Repair (Wellhead boot)                                                                                               |              | EA   | \$350.00     | 116       | \$40,600.00    |
| Cost of Replacing 20% of the Active Gas Collection System at Closure<br>(see Supplemental LFG Closure Cost Estimate for item above) |              | LS   | \$831,300.00 | 1         | \$831,300.00   |
| Other                                                                                                                               | 610          | LS   |              |           |                |
| <b>C</b> Layers                                                                                                                     | Cat 7        |      |              |           |                |
| Drainage Layer - Free Draining Sand - 12" thick                                                                                     | 700          | CY   | \$18.00      | 65,598    | \$1,180,764.00 |
| Intermediate Cover Placement                                                                                                        | 710          | CY   |              |           |                |
| Sand - Protective Gas Venting Layer - 6" thick                                                                                      | 720          | CY   | \$14.00      | 32,799    | \$459,186.00   |
| Topsoil/Loam or Manufactured Soil - 4" thick                                                                                        | 730          | CY   | \$22.00      | 21,866    | \$481,052.00   |
| Other (Screened Till - 6" thick bedding & 6" thick moisture retention)                                                              | 740          | CY   | \$10.00      | 65,598    | \$655,980.00   |

| Task                                                                 |               | Unit | Unit Cost    | Quantity | Total Cost            |
|----------------------------------------------------------------------|---------------|------|--------------|----------|-----------------------|
| <b>VI Stabilization, Run-off Control</b>                             | <b>Cat 8</b>  |      |              |          |                       |
| Seed & Mulch (Include Lime, Fertilizer, Seed & Hay Mulch)            | 800           | AC   | \$1,800.00   | 40.66    | \$73,188.00           |
| Stone Lined Drainage Benches                                         | 810           | LF   | \$40.00      | 14,663   | \$586,520.00          |
| Stone Rip-Rap (Swales, Spillways)                                    | 820           | CY   | \$35.00      | 150      | \$5,250.00            |
| Seepage Bench                                                        |               | LF   | \$20.00      | 5,450    | \$109,000.00          |
| Catch Basins, Manholes & Drop Inlets                                 | 830           |      |              |          |                       |
| Toe Drain                                                            | 840           | LF   | \$50.00      | 3,390    | \$169,500.00          |
| Detention Pond and Associated Outlet Devices                         | 850           |      |              |          |                       |
| Other – Tri-Lock Lined Dropchutes                                    | 860           | LF   |              |          |                       |
| <b>VII Monitoring Devices</b>                                        | <b>Cat 9</b>  |      |              |          |                       |
| Settlement Monuments/Plates                                          | 900           | EA   | \$650.00     | 30       | \$19,500.00           |
| Groundwater Monitoring Wells                                         | 910           | EA   |              |          |                       |
| Gas Monitoring Probes                                                | 920           |      |              |          |                       |
| Other                                                                | 930           |      |              |          |                       |
| <b>VIII Roadway</b>                                                  | <b>Cat 10</b> |      |              |          |                       |
| Access Roadway (Gravel Perimeter + Top Berm Access)                  | 1000          | LF   | \$75.00      | 800      | \$60,000.00           |
| Drainage Ditches (Grass Lined)                                       | 1010          |      |              |          |                       |
| Culvert Inlet & Outlet Headwalls                                     | 1020          |      |              |          |                       |
| Guide Rail (Single and Double)                                       | 1030          | LF   |              |          |                       |
| Dust Control - Calcium Chloride                                      | 1040          |      |              |          |                       |
| New/Replaced Pavement                                                | 1050          | SY   |              |          |                       |
| Other                                                                | 1060          |      |              |          |                       |
| <b>IX Miscellaneous</b>                                              | <b>Cat 11</b> |      |              |          |                       |
| Signs                                                                | 1100          | LS   |              |          |                       |
| Perimeter Fence                                                      | 1110          | LF   | \$18.50      | 6,000    | \$111,000.00          |
| Entry Gate - Double Unit                                             | 1120          | EA   |              |          |                       |
| Miscellaneous Work and Cleanup                                       | 1130          | LS   |              |          |                       |
| Ledge Removal                                                        | 1140          | CY   |              |          |                       |
| Other                                                                | 1150          |      |              |          |                       |
| <b>X Surveying</b>                                                   | <b>Cat 12</b> |      |              |          |                       |
| Baseline, Bench Marks, and Survey Control                            | 1200          | LS   | \$20,000.00  | 1        | \$20,000.00           |
| Other                                                                | 1210          |      |              |          |                       |
| <b>XI Construction Phase Testing</b>                                 | <b>Cat 13</b> |      |              |          |                       |
| Compaction Testing                                                   | 1300          |      |              |          |                       |
| QAQC                                                                 | 1310          | AC   | \$4,000.00   | 40.66    | \$162,640.00          |
| Other                                                                | 1320          |      |              |          |                       |
| <b>XII Engineering</b>                                               | <b>Cat 14</b> |      |              |          |                       |
| Resident Engineer, Project Manager, Project Engineer                 | 1400          | LS   | \$250,000.00 | 1        | \$250,000.00          |
| Record Drawings/ As-Built                                            | 1410          | LS   | \$20,000.00  | 1        | \$20,000.00           |
| Other                                                                | 1420          |      |              |          |                       |
| <b>XIII Other (list)</b>                                             | <b>Cat 15</b> |      |              |          |                       |
|                                                                      | 1500          |      |              |          |                       |
|                                                                      | 1510          |      |              |          |                       |
| <b>XIV Contingency (minimum 10%)</b>                                 | <b>Cat 16</b> |      |              |          |                       |
|                                                                      | 1600          |      |              |          |                       |
| <b>Total Cost (Rounded up to the nearest \$100, in 2014 dollars)</b> |               |      |              |          | <b>\$8,578,700.00</b> |

Signature of Preparer:



Date: 8/1/2014



(must be prepared by a Professional Engineer)

This form provides a basis for cost estimating closure costs for a lined landfill. This form is not inclusive of all costs that may be associated with the landfill. The cost estimate must include all items needed to comply with all DES permits. Please use the spaces provided above noted as "Other" or attach an additional sheet if necessary.

**Stage V Supplemental LFG Closure Construction Cost Estimate**  
**Cost for Replacement of 20% of the Active LFG System per Env-Sw 1403.02(g)(7)**

**Active LFG Collection System in-place as of August 2014**

| Item                                                     | Unit     | Unit Cost  | Quantity | Item Cost       | 20% of Existing Quantity | Replacement Item Cost |
|----------------------------------------------------------|----------|------------|----------|-----------------|--------------------------|-----------------------|
| Vertical Wellheads                                       | EA       | \$650.00   | 68       | \$ 44,200.00    | 14                       | \$ 9,100.00           |
| Vertical Wells                                           | VF       | \$120.00   | 6,329    | \$ 759,480.00   | 1,266                    | \$ 151,920.00         |
| Header Pipe (Size varies, 8" - 12" dia, price for 12")   | LF       | \$70.00    | 20,781   | \$ 1,454,670.00 | 4,157                    | \$ 290,990.00         |
| Total Lateral Pipe (Size varies 4" - 6" dia,)            | Total LF |            | 10,171   | \$ -            |                          | \$ -                  |
| 6" Lateral Pipe (Assume half is 6")                      | LF       | \$64.00    | 5,086    | \$ 325,472.00   | 1,018                    | \$ 65,152.00          |
| 4" Lateral Pipe (Assume half is 4")                      | LF       | \$55.00    | 5,086    | \$ 279,702.50   | 1,018                    | \$ 55,990.00          |
| Control Valves (Size varies 8" - 12" dia, price for 12") | EA       | \$4,000.00 | 12       | \$ 48,000.00    | 3                        | \$ 12,000.00          |
| Horizontal Wellheads                                     | EA       | \$650.00   | 17       | \$ 11,050.00    | 0                        | \$ -                  |
| Horizontal Well                                          | LF       | \$40.00    | 2,666    | \$ 106,640.00   | 0                        | \$ -                  |
| Vertical Wellheads (to replace horizontals on west)      | EA       | \$650.00   | 3        | \$ -            | 1                        | \$ 650.00             |
| Vertical Well (to replace horizontals on west)           | VF       | \$120.00   | 325      | \$ -            | 65                       | \$ 7,800.00           |
| 6" Lateral Pipe (to replace horizontals on west)         | LF       | \$64.00    | 548      | \$ -            | 110                      | \$ 7,040.00           |
| Condensate Traps                                         | EA       | \$2,000.00 | 17       | \$ 34,000.00    | 4                        | \$ 8,000.00           |
| Condensate Trap/Cleanout Wellhead                        | EA       | \$2,000.00 | 12       | \$ 24,000.00    | 3                        | \$ 6,000.00           |
| Other                                                    |          |            |          |                 |                          | \$ -                  |
| Subtotal                                                 |          |            |          |                 |                          | \$ 614,642.00         |

Notes:

1. Red highlight denotes horizontal wells in the western portion of Stage IV, Phase II in place prior to Stage V filling. At the time of Stage V closure, active wellheads in this area will be booted and wells will be maintained.
2. Orange highlight denotes the equivalent vertical well coverage of the existing western Stage IV, Phase II horizontal wells. Replacement of 20% of the existing western Stage IV, Phase II horizontal wells is provided by the equivalent coverage of new vertical wells.
3. Existing lateral piping was summed and conservatively assumed for purposes of this cost estimate that half is 4" diameter and half is 6" diameter.

**Active LFG Collection System to be Constructed during Stage V Filling**

| Item                              | Unit | Unit Cost  | Quantity | Item Cost    | 20% of Existing Quantity | Replacement Item Cost |
|-----------------------------------|------|------------|----------|--------------|--------------------------|-----------------------|
| Vertical Wellheads                | EA   | \$650.00   | 35       | \$22,750.00  | 7                        | \$ 4,550.00           |
| Vertical Well                     | VF   | \$120.00   | 4,129    | \$495,480.00 | 826                      | \$ 99,120.00          |
| 14" Header Pipe                   | LF   | \$75.00    | 1,587    | \$119,025.00 | 318                      | \$ 23,850.00          |
| 6" Lateral Pipe                   | LF   | \$64.00    | 2,018    | \$129,152.00 | 404                      | \$ 25,856.00          |
| 4" Lateral Pipe                   | LF   | \$55.00    | 4,786    | \$263,230.00 | 958                      | \$ 52,690.00          |
| 14" Control Valves                | EA   | \$6,500.00 | 1        | \$6,500.00   | 1                        | \$ 6,500.00           |
| Condensate Traps                  | EA   | \$2,000.00 | 1        | \$2,000.00   | 1                        | \$ 2,000.00           |
| Condensate Trap/Cleanout Wellhead | EA   | \$2,000.00 | 1        | \$2,000.00   | 1                        | \$ 2,000.00           |
| Other                             |      |            |          |              |                          | \$ -                  |
| Subtotal                          |      |            |          |              |                          | \$ 216,566.00         |

**Active LFG Collection System in place at time of Stage V Closure (Sum of above tables)**

| Stage V                           | Unit | Unit Cost  |  | 20% of Total Existing Quantity | Replacement Item Cost |
|-----------------------------------|------|------------|--|--------------------------------|-----------------------|
| Vertical Wellheads                | EA   | \$650.00   |  | 22                             | \$14,300.00           |
| Vertical Wells                    | VF   | \$120.00   |  | 2,157                          | \$258,840.00          |
| 14" Header Pipe                   | LF   | \$75.00    |  | 318                            | \$23,850.00           |
| 12" Header Pipe                   | LF   | \$70.00    |  | 4,157                          | \$290,990.00          |
| 6" Lateral Pipe                   | LF   | \$64.00    |  | 1,532                          | \$98,048.00           |
| 4" Lateral Pipe                   | LF   | \$55.00    |  | 1,976                          | \$108,680.00          |
| 14" Control Valves                | EA   | \$6,500.00 |  | 1                              | \$6,500.00            |
| 12" Control Valves                | EA   | \$4,000.00 |  | 3                              | \$12,000.00           |
| Condensate Traps                  | EA   | \$2,000.00 |  | 5                              | \$10,000.00           |
| Condensate Trap/Cleanout Wellhead | EA   | \$2,000.00 |  | 4                              | \$8,000.00            |
| Other                             |      |            |  |                                | \$ -                  |
| Total                             |      |            |  | \$                             | 831,208.00            |

**Total, Rounded up to the Nearest Hundred \$ 831,300.00**

# Cost Estimate Form for Post Closure of a Landfill

(lined or unlined)

## State of New Hampshire Department of Environmental Services

Waste Management Division  
29 Hazen Drive, PO Box 95, Concord, NH 03302-0095  
(603) 271-2925 FAX 603-271-2456  
TDD Access: Relay NH 1-800-735-2964

|                                                         |                                   |
|---------------------------------------------------------|-----------------------------------|
| Facility Name:<br>North Country Environmental Services  | Date:<br>7/28/2014                |
| Owner:<br>North Country Environmental Services, Inc.    |                                   |
| Address of Facility:<br>581 Trudeau Road, Bethlehem, NH |                                   |
| Acreage:<br>46.46 Acres                                 | Phase:<br>Stage I through Stage V |
| DES Permit #:<br>DES-SW-SP-03-002                       | Log #:<br>(for DES Use Only)      |
| Facility #:<br>(for DES Use Only)                       | Site #:<br>(for DES Use Only)     |

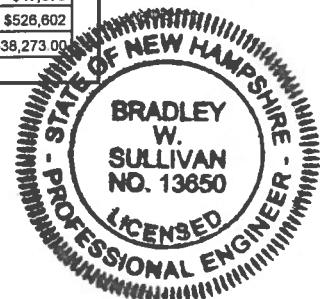
Complete this form in accordance with the NH Solid Waste Rules Part Env-Wm 3100.

| Task                                                  | Unit | Unit Cost   | Quantity     | Total Cost     |
|-------------------------------------------------------|------|-------------|--------------|----------------|
| <b>I Water Monitoring</b>                             |      |             |              |                |
| Surface Water Sampling & Analysis                     |      |             |              |                |
| Other (Permit Requirement)                            |      |             |              |                |
| Ground Water Sampling & Analysis                      | LS   | \$44,000.00 | 1            | \$44,000       |
| Other (Permit Requirement) Repair of MWs              | LS   | \$1,100.00  | 1            | \$1,100        |
| Other                                                 |      |             |              |                |
| <b>II Gas Monitoring</b>                              |      |             |              |                |
| Landfill Gas Migration Monitoring                     | LS   | \$9,000.00  | 1            | \$9,000        |
| Operation and Maintenance of Gas Collection System    | LS   | \$134,530   | 1            | \$134,530      |
| Other                                                 | LS   |             | 1            | \$0            |
| <b>III Settlement Monitoring</b>                      |      |             |              |                |
| Field Survey                                          | LS   | \$2,500     | 1            | \$2,500        |
| Data Tabulation                                       | LS   |             |              |                |
| Other                                                 |      |             |              |                |
| <b>IV Leachate Collection/Monitoring</b>              |      |             |              |                |
| Sewer Charges                                         | LS   | \$226,203   | 1            | \$226,203      |
| Electricity                                           |      |             |              |                |
| Maintenance of Collection System                      |      |             |              |                |
| Sampling & Analysis                                   | LS   | \$4,150.00  | 1            | \$4,150        |
| Other - Pump System O&M                               | LS   | \$24,000    | 1            | \$24,000       |
| <b>V Air Quality Data</b>                             |      |             |              |                |
| Monitoring & Analysis                                 |      |             |              |                |
| Other                                                 |      |             |              |                |
| <b>VI Repair &amp; Site Maintenance Costs</b>         |      |             |              |                |
| Snow Removal                                          | LS   | \$500.00    | 1            | \$500          |
| Roadway Maintenance                                   | LS   |             |              |                |
| Mowing                                                | AC   | \$100.00    | 46.46        | \$4,646        |
| Soil Cover Maintenance and Planting (\$5,000/2 years) | LS   | \$2,500.00  | 1            | \$2,500        |
| Maintenance of Gas Venting System                     |      |             |              |                |
| Subsidence Repair (\$10,000/5 years)                  | LS   | \$2,000.00  | 1            | \$2,000        |
| Stormwater Maintenance                                | LS   | \$2,000.00  | 1            | \$2,000        |
| Other                                                 |      |             |              |                |
| <b>VII Inspections</b>                                |      |             |              |                |
| Annual Report                                         | LS   | \$6,000.00  | 1            | \$6,000        |
| Annual Site Inspections                               | LS   | \$6,000.00  | 1            | \$6,000        |
| Other                                                 |      |             |              |                |
| <b>VIII Other</b>                                     |      |             |              |                |
| Qualified Professional Oversight                      | LS   | \$9,600.00  | 1            | \$9,600        |
|                                                       |      |             |              |                |
|                                                       |      |             |              |                |
| <b>IX Contingency (10 % min)</b>                      |      |             |              |                |
|                                                       | LS   | 10%         | \$478,729.00 | \$47,873       |
| <b>Total Yearly Cost</b>                              |      |             |              | \$526,802      |
| <b>Total 30-Year Cost*</b>                            |      |             |              | \$8,538,273.00 |

Signature of Preparer: [Signature] (Must be prepared by a Professional Engineer)

Date: 7/28/14

The cost estimate must include all expenses associated with compliance of all DES permits. Please use the spaces provided above noted as "Other" or attach an additional sheet if necessary.  
\* The 30-year total costs (2014 dollars) assumes reductions in the operation and maintenance costs, sampling costs and leachate disposal costs beginning in the 6th year following closure.  
(See attached Tables 1 and 2)



## **Supporting Documentation for Stage V Post-Closure Costs**

February 2014  
Revised July 2014

The following assumptions were made in developing the post-closure cost estimate. The estimated initial annual cost is summarized in the NHDES Post-Closure Cost Estimate form and the estimated annual costs for the entire 30-year post-closure period are summarized in Table 1 with the present value for the annual costs presented in Table 2. The costs were developed based on information provided by North Country Environmental Services, previous cost estimates developed for the facility, and our experience.

### **Item Ia – Water Quality Monitoring**

#### **Years 1 – 5**

- Annual Costs for sampling and reporting were estimated to be **\$44,000**. These costs will remain unchanged in the first five years of the post-closure monitoring program.

#### **Years 6 - 10**

- We have assumed that after the first five years of monitoring, that a reduction from tri-annual to bi-annual sampling will be allowed by NHDES, based on our experience at many unlined landfill closure sites. This will reduce the annual costs by approximately \$9,000 to an annual cost of **\$35,000**.

#### **Years 11 – 30**

- We have assumed that after ten years of monitoring that a further reduction in sampling parameters or locations will be allowed by NHDES. This will reduce the annual sampling costs to an estimated **\$25,000**

### **Item Ib – Repair of Monitoring Wells**

#### **Years 1 - 30**

- Cost to purchase and install a new bladder pump is estimated to be about \$1,400.
- Pumps are required in 14 of the monitoring wells at the Site.
- Assuming each pump is replaced once during the post-closure period would result in a cost of \$19,600.
- **Carry an annual cost of \$1,100, which provides additional funds for minor repairs or for replacement of additional pumps.**

### **Item IIa - Landfill Gas Migration Monitoring**

- The annual costs of **\$9,000** for the quarterly monitoring of landfill gas migration will be required to be completed throughout the post-closure monitoring period. It is possible that NHDES may permit some reductions to the frequency and locations, after several years of monitoring and data gathering, but this is not relied upon in the estimate.

### **Item IIb – Landfill Gas Collection System Operation and Maintenance**

#### *Maintenance Costs*

#### Years 1 - 5

- Routine maintenance of control system and flare, monthly monitoring of collection system and balancing. Assumed 4 hours per week for weekly tasks and 10 hours per month for monthly tasks. Estimated labor costs at \$65/hr are \$1,690/month, or approximately **\$20,280** per year.

#### Years 6 – 10

- With reduction in landfill gas generation following closure, the routine maintenance of control system and flare, and regular monitoring of collection system and balancing is anticipated to be reduced. Assumed 12 hours per month with estimated labor costs at \$65/hr are \$780/month, or approximately **\$9,360** per year.

#### Years 11 -30

- With further reduction in landfill gas generation following closure, the routine maintenance of control system and flare, and monitoring of collection system and balancing is anticipated to be reduced. Assumed 6 hours per month with estimated labor costs at \$65/hr are \$390/month, or approximately **\$4,680** per year.

#### Years 1 - 30

- Semi-annual maintenance of blower bearings, testing automated devices, gas canister maintenance/refill, and coordinating any unscheduled maintenance. Assuming 4 hours per event, \$260 per event or **\$520** per year.
- Annual calibration and maintenance of GEM field instrument are estimated to be **\$1,500** per year.
- Replacement of condensate knockout pump every 10-years. Assuming a cost of \$4,300 installed an annual cost of **\$430** has been included.
- Assuming unscheduled responses to alarm conditions occurs 4 times per year. At 6 hours per event, and 24 hours per year, **\$1,560** has been included in the annual cost for alarm conditions.

- Included **\$3,620** per year for replacement parts for blower/flare/controls etc.

**Therefore, the annual costs for years 1 through 5 shall include \$27,910 per year, Years 6-10 shall include \$16,990, and years 11-30 shall include \$12,310.**

#### *Operational Costs*

##### Years 1 – 5

Landfill gas wells will tend to accumulate liquid over time. Based on the existing operational experience, we have assumed that the purchase and installation of 2 pneumatic pumps for insertion in the landfill gas extraction wells will be required by year 5. These 2 pumps can then be rotated between remaining wells as needed to remove accumulated liquid from the wells. Assume the pumps discharge through a short hose to the LFG lateral pipe. Assume the pumps cost about \$8,000 each, installed. The total pump cost will be **\$16,000**.

The pumps require a compressed air delivery system, including a compressor and air drying equipment. The cost of a typical air compressor of sufficient capacity with an 80-gallon receiver tank is about \$3,000, and air drying equipment, including a refrigerated dryer and a desiccant dryer, costs about \$2,500. The equipment has to be sheltered from the elements. Therefore, assume \$4,100 for a shelter and installation of the equipment. The total assumed cost of the compressed air system is **\$9,600**.

Assume that a compressed air distribution system has to be constructed to deliver air to the pneumatic pumps at the LFG wells. Assume 2,000 linear feet of pipe is required for initial construction with an average burial depth of 1-foot installed with a "Ditch Witch" type of pipe installation. Based on an assumed pipe cost of \$3.00 per linear foot and an installation cost of approximately \$4.50 per linear foot, plus \$2,500 of fittings and detail work at the terminations, the cost is **\$17,500**.

Therefore, the cost of the pumps and compressed air delivery system is about \$43,100, **or \$8,620 per year to be added to the routine annual costs in years 1 through 5.**

Assume that quarterly surface scans will be required for the first five years of the post-closure period, along with 20 hours per quarter of labor and equipment associated with addressing methane emission exceedances. Assume that the cost of a surface scan, excluding reporting, is about \$2,500, and the labor and equipment cost associated with correcting exceedances is about \$5,200 per quarter. Therefore, **the annual cost for surface scans and repair is about \$36,000 in years 1 through 5.**

##### Years 6 - 30

Assume that annual surface scans are required for years 6 through 30, with no repair of cap associated with exceedances required through the period. Assume the same \$2,500 per surface scan cost. Therefore, **the annual cost for surface scans is \$2,500 for years 6 through 30.**

#### *Electricity Costs*

Based on historical information, the annual electricity cost to operate the LFG system in the current configuration is estimated to be approximately **\$62,000 per year.**

#### Years 11 - 20

Assume that starting in year 11, the LFG collection system operates on one blower and one flare. Assume the electricity cost, in 2014 dollars, would be 40 percent of the current total electricity cost, or about **\$24,800 per year for 10 years.**

#### Years 20 - 30

Assume that the one blower and one flare operate on a part-time basis with a 50 percent duty cycle. Therefore, the annual electricity cost would be about **\$12,400 per year for the last 10 years of the period.**

### **Item III – Settlement Monitoring**

#### Years 1 - 30

- **Assume settlement survey costs will average about \$2,500 per year for years 1 through 20. Years 20 through 30 will not require instrument survey and only a visual inspection at an estimated cost of \$650 per year.**

### **Item IVa – Leachate/Condensate Disposal**

Leachate evaporation operations at the NCES were discontinued in 2007. Leachate generated at NCES is now hauled to an off-site disposal facility. Based on information provided by NCES, the average transportation and disposal cost is \$0.097 per gallon of leachate.

#### Years 1 - 5

- Assume the Eastern Slope cap remains, which is 5.8 acres, and will have been in place more than 10 years at the time of closure and that the leachate flow rate will average 50 gallons per acre per day (gpad), which would produce about 290 gallons per day (gpd).
- Assume 40.66 acres of cap are constructed in Year 1 and that leachate is produced in this area at the rate of 150 gpad or 6,099 gpd.
- **Therefore, the annual cost for years 1 through 5 is approximately \$226,202.**

- Years 6 - 10

- Assume flow rate of 50 gpad over 5.8 acres, or 290 gpd.
- Assume a flow rate of 75 gpad for the remaining 40.66 acres, or 3,050 gpd.
- **Therefore, the annual cost for years 6 through 10 is approximately \$118,253.**

#### Years 11 - 20

- Assume a flow rate of 50 gpad over 5.8 acres, or 290 gpd.
- Assume a flow rate of 60 gpad over 40.66 acres, or 2,440 gpd.
- **Therefore, the annual cost for years 11 through 20 is approximately \$96,656.**

#### Years 21 - 30

- Assume flow rate of 50 gpad over the entire 46.46 acres, or 2,323 gpd.

**Therefore, the annual cost for years 21 through 30 is approximately \$82,246.**

### **Item IVb – Leachate Monitoring**

#### Years 1 - 10

- Assume leachate is collected for analysis for the parameters required by the Solid Waste Rules three times per year from all Stages.
- Based on current costs for analytical testing, the annual laboratory cost is \$2,350.
- Assume labor and expenses total \$600 per round or \$1,800 annually.
- **Therefore, the annual cost for years 1 through 10 is \$4,150.**

#### Years 11 - 30

- Assume based on diminishing flows and stabilization of the leachate that the frequency of sampling may be cut by one-third so that the cost of monitoring is two-thirds of the initial cost. During years 11-20 following closure, sampling will be conducted twice per year. With stabilization, it is likely that the parameters for which analyses are required could also be reduced resulting in a further reduction in the monitoring cost, which is not reflected here.
- **Therefore, the annual cost for years 11 through 30 is about \$2,767.**

### **Item IV-c Leachate Pump Station Operation & Maintenance**

#### Years 1 - 30

- Assume routine inspections coincide with gas system maintenance under Item 2 at a cost of **\$3,500** per year.
- Assume replacement parts and repairs for system components cost approximately **\$3,000** per year.
- Assume pipes are cleaned every two years at a cost of \$5,000 (annualized cost of **\$2,500**).

- **Therefore, the annual maintenance cost for years 1 through 30 is about \$9,000.**

#### Electricity Costs

##### Years 1 - 5

- Assume the annual electricity cost for years 1 through 5 is about **\$15,000**.

##### Years 6 -10

- Assume the leachate flow rates drops to about 55 percent of flow at closure on average over the 5 year period due to the cap so that the annual electricity cost for years 6 through 10 is about **\$8,250**.

##### Years 11 - 20

- Assume the leachate flow rates drop to about 40 percent of the flow at closure on average over the 10 year period so that the annual electricity cost for years 11 through 15 is about **\$6,000**.

##### Years 21 - 30

- Assume the leachate flow rates drop to about 30 percent of the flow at closure on average over the 10 year period so that the annual electricity cost for years 21 through 30 is about **\$4,800**.

#### Item VI - Cap Maintenance/Repair

##### Years 1 - 5

- Assume snow removal of **\$500** per year.
- Assume mowing costs will be approximately \$100/acre or **\$4,629** per year.
- Assume costs for repair of minor erosion of the final capping system will involve a day for an excavator, truck and laborer every two years at a cost of \$5,000 (annualized cost of **\$2,500**).
- Assume costs for repair of capping system settlement at a cost of \$10,000 every five years (annualized cost of **\$2,000**).
- Assume stormwater maintenance including removal of sediments which collect in ponds and swales will be required on a yearly basis. Costs assumed to be **\$2,000** per year.
- **Therefore the annual cost for years 1 through 5 is approximately \$11,629.**

##### Years 6 - 10

- Snow removal and mowing costs remain the same. Stabilization of the capping system and slowing of settlement results in a reduction in the repair work required.
- **An annual cost of \$9,750 is estimated.**

#### Years 11 - 20

- Further stabilization of the capping system and the annualized cost is reduced to **\$6,500** per year.

#### Years 21 - 30

- Further stabilization of the capping system and the annualized cost is reduced to **\$4,400** per year, and primarily includes mowing costs.

### **Item VII - Inspections**

#### Years 1 - 5

- Assume semi-annual site inspections and reporting for the first 5 years of the post-closure period to be **\$12,000** per year. Work includes groundwater reporting, site inspection reporting, settlement reporting and reporting on the landfill gas collection system.

#### Years 6 - 30

- Site inspections are reduced to once per year and the reporting becomes more straightforward over time. Assume that annual inspection and reporting costs are **\$8,000** per year.

### **Item VIII – Other**

**Professional Oversight** – Per Env-Sw 1403.02(g)(2), this item includes the cost for an environmental consultant to provide oversight for all post closure activities including management and coordination of all operation, maintenance and repairs, preparing O&M budgets, and all other post closure operations oversight.

#### Years 1 - 5

- Assume consulting services are required 8 hours per month on average at a billing rate of \$100 per hour which is **\$9,600 annually**.

#### Years 6 - 10

- Due to landfill stabilization, there is a reduction of required professional oversight services. Assume consulting services are required 6 hours per month on average at a billing rate of \$100 per hour which is **\$7,200 annually**.

#### Years 11 - 20

- Due to landfill stabilization, there is a reduction of required professional oversight services. Assume consulting services are required 4 hours per month on average at a billing rate of \$100 per hour which is **\$4,800 annually**.

Years 21 - 30

- Due to landfill stabilization, there is a reduction of required professional oversight services. Assume consulting services are required 2 hours per month on average at a billing rate of \$100 per hour which is **\$2,400 annually**.

Table 1  
Estimated Post-Closure Monitoring/Maintenance Costs  
North Country Environmental Services, Inc.  
July 2014

| Task         |                                    | Annual Cost<br>Years 1-5 | Annual Cost<br>Years 6-10 | Annual Cost<br>Years 11-20 | Annual Cost<br>Years 21-30 |
|--------------|------------------------------------|--------------------------|---------------------------|----------------------------|----------------------------|
| I-a          | Water Quality Monitoring           | \$ 44,000                | \$ 35,000                 | \$ 25,000                  | \$ 25,000                  |
| I-b          | Repair of Monitoring Wells         | \$ 1,100                 | \$ 1,100                  | \$ 1,100                   | \$ 1,100                   |
| II-a         | Landfill Gas Migration Monitoring  | \$ 9,000                 | \$ 9,000                  | \$ 9,000                   | \$ 9,000                   |
| II-b         | Landfill Gas Collection System O&M | \$ 134,530               | \$ 81,490                 | \$ 39,610                  | \$ 27,210                  |
| III          | Settlement Monitoring              | \$ 2,500                 | \$ 2,500                  | \$ 2,500                   | \$ 650                     |
| IV-a         | Leachate/Condensate Disposal       | \$ 226,203               | \$ 118,253                | \$ 96,656                  | \$ 82,246                  |
| IV-b         | Leachate Monitoring                | \$ 4,150                 | \$ 4,150                  | \$ 2,767                   | \$ 2,767                   |
| IV-c         | Leachate Pump Station O&M          | \$ 24,000                | \$ 17,250                 | \$ 15,000                  | \$ 13,500                  |
| V            | Air Quality Monitoring             | \$ -                     | \$ -                      | \$ -                       | \$ -                       |
| VI           | Capping System Maintenance/Repair  | \$11,646                 | \$ 9,750                  | \$ 6,500                   | \$ 4,400                   |
| VII          | Inspections                        | \$ 12,000                | \$ 8,000                  | \$ 8,000                   | \$ 8,000                   |
| VIII         | Other - Professional Oversight     | \$ 9,600                 | \$ 7,200                  | \$ 4,800                   | \$ 2,400                   |
| IX           | 10% Contingency                    | \$ 47,873                | \$ 29,369                 | \$ 21,093                  | \$ 17,627                  |
| <b>TOTAL</b> |                                    | <b>\$ 526,602</b>        | <b>\$ 323,062</b>         | <b>\$ 232,026</b>          | <b>\$ 193,900</b>          |

Table 2  
Present Value of Post-Closure Monitoring/Maintenance Costs  
North Country Environmental Services, Inc.  
July 2014

**Assumptions:**

**Discount Rate (ir)** 2.44%

**Annual Inflation (j)** 2.41%

| Years After Closure | Annual Post Closure Cost | Annual Present Value Cost |
|---------------------|--------------------------|---------------------------|
| 1                   | \$ 526,602               | \$ 526,754                |
| 2                   | \$ 526,602               | \$ 526,905                |
| 3                   | \$ 526,602               | \$ 527,057                |
| 4                   | \$ 526,602               | \$ 527,209                |
| 5                   | \$ 526,602               | \$ 527,361                |
| 6                   | \$ 323,062               | \$ 323,621                |
| 7                   | \$ 323,062               | \$ 323,714                |
| 8                   | \$ 323,062               | \$ 323,808                |
| 9                   | \$ 323,062               | \$ 323,901                |
| 10                  | \$ 323,062               | \$ 323,994                |
| 11                  | \$ 232,026               | \$ 232,763                |
| 12                  | \$ 232,026               | \$ 232,830                |
| 13                  | \$ 232,026               | \$ 232,897                |
| 14                  | \$ 232,026               | \$ 232,964                |
| 15                  | \$ 232,026               | \$ 233,031                |
| 16                  | \$ 232,026               | \$ 233,098                |
| 17                  | \$ 232,026               | \$ 233,165                |
| 18                  | \$ 232,026               | \$ 233,233                |
| 19                  | \$ 232,026               | \$ 233,300                |
| 20                  | \$ 232,026               | \$ 233,367                |
| 21                  | \$ 193,900               | \$ 195,077                |
| 22                  | \$ 193,900               | \$ 195,133                |
| 23                  | \$ 193,900               | \$ 195,189                |
| 24                  | \$ 193,900               | \$ 195,246                |
| 25                  | \$ 193,900               | \$ 195,302                |
| 26                  | \$ 193,900               | \$ 195,358                |
| 27                  | \$ 193,900               | \$ 195,414                |
| 28                  | \$ 193,900               | \$ 195,471                |
| 29                  | \$ 193,900               | \$ 195,527                |
| 30                  | \$ 193,900               | \$ 195,583                |

**Total Cost in 2014 \$** \$ 8,507,587

**Total Present Value Cost** \$ 8,538,273

Notes:

Annual present value cost calculated by multiplying the annual post closure cost by a discount factor (DF) calculated as follows:

$$DF = (1 + ir - j - ir*j)^{-t}$$

where:

ir = average discount rate for Boston listed by the Federal Reserve Bank

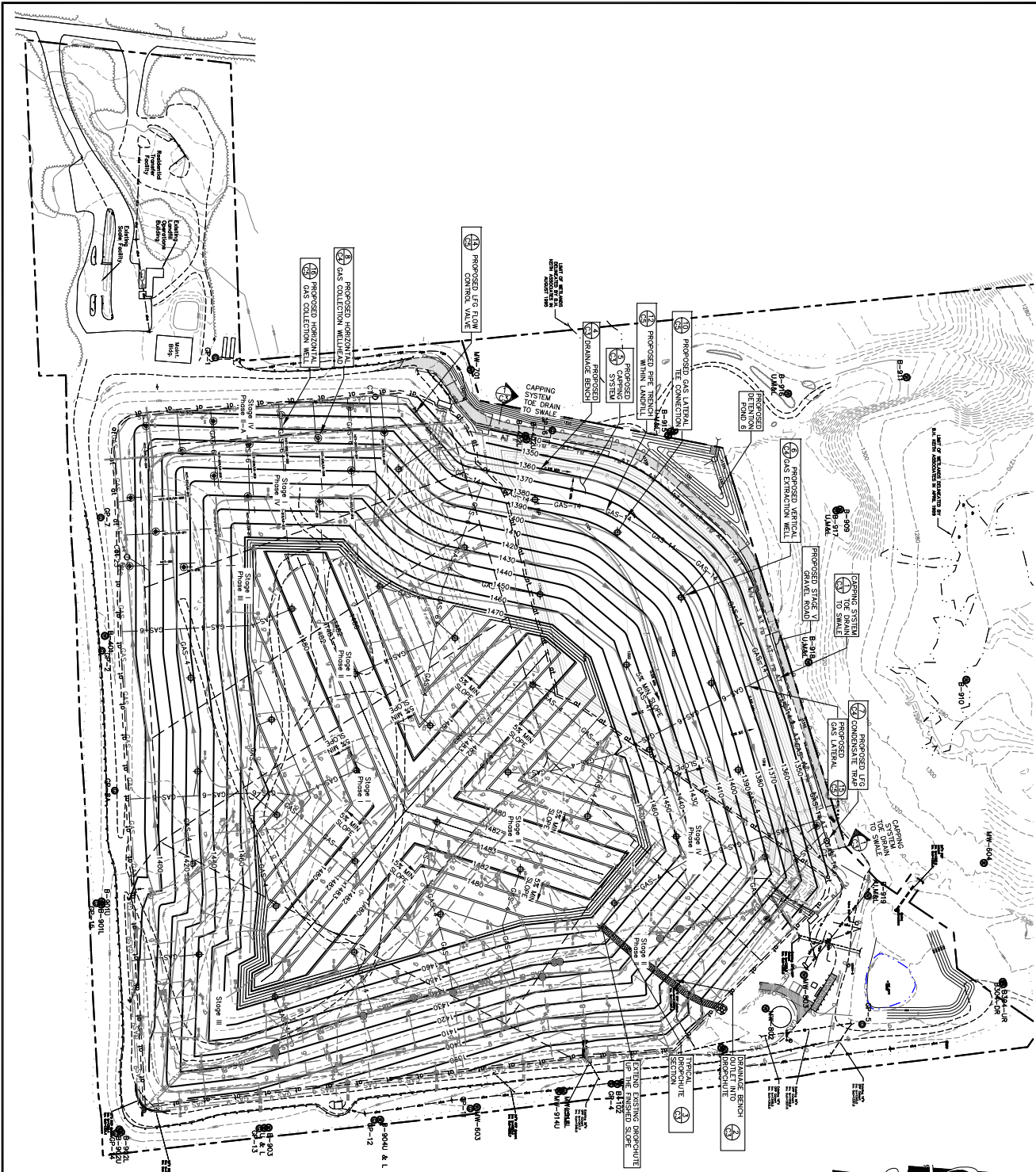
for the period 1/03 - 11/13 (source: [www.frbdiscountwindow.org](http://www.frbdiscountwindow.org))

Please note the discount rate has remained the same since 2/19/10

j = average inflation rate for the previous 10 years (2003-2013) (source: [www.inflationdata.com](http://www.inflationdata.com))

t = years since closure

*Appendix B.2 – Revised Sheet C-2 of Closure Plan  
Drawing Set*



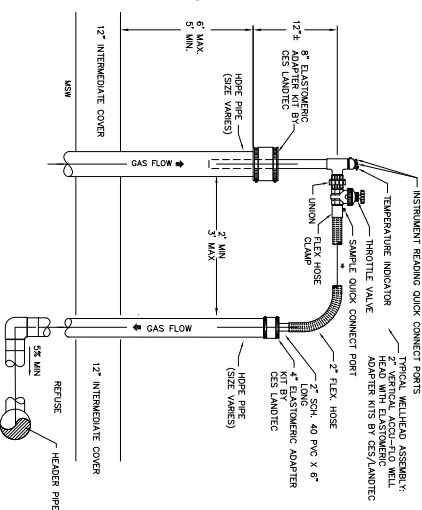
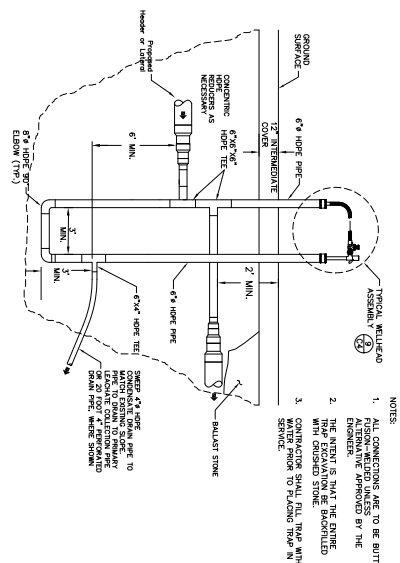
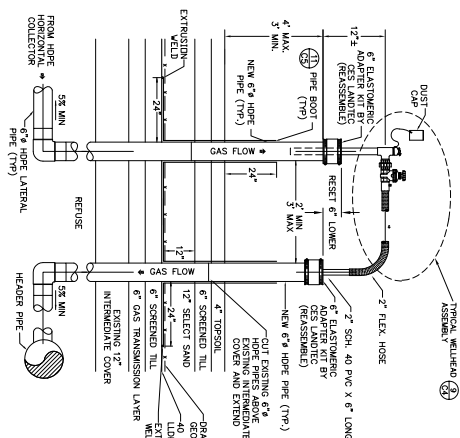
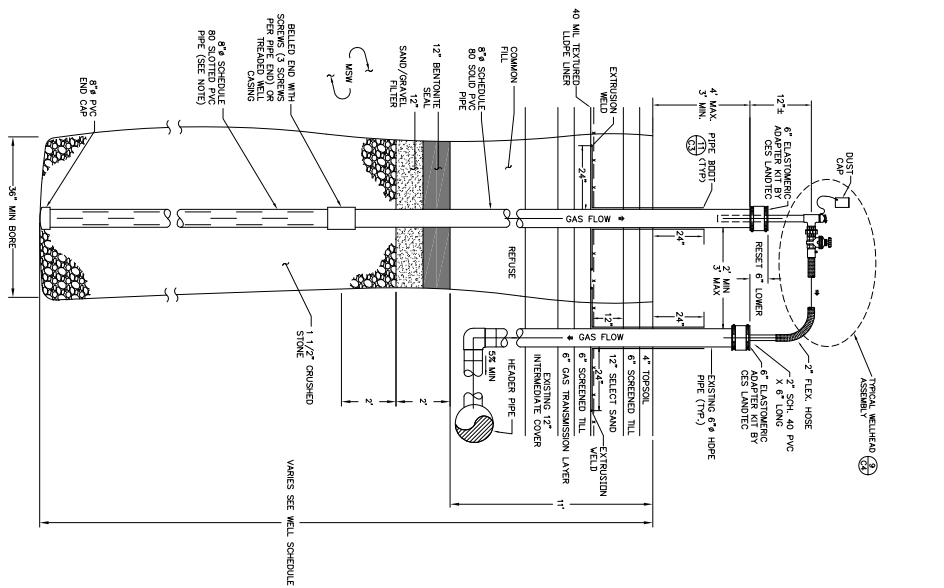
- Notes:
1. Existing topography shown is from the October 9, 2013 aerial survey performed by Eastern Topographics, Inc. and shown for clarity. Proposed Stage V top of drainage grades. Top of waste grades are 3.5' lower than existing topography.
  2. All proposed landfill capping system drainage benches shall be spaced away 10' on center horizontally at a minimum and shall have a maximum slope of 3:1 and a minimum slope of 5:1 above a maximum elevation of 145' above mean sea level.
  3. Proposed Stage V top of closure contour.
  4. Proposed Stage V top of closure contour.
  5. Proposed Stage V top of closure contour.
  6. Proposed Stage V top of closure contour.

- Legend
- Existing 2' Contour
  - Existing 10' Contour
  - Existing Property Line
  - Existing Tree Line
  - Existing Quercus
  - Existing Edge of Gravel
  - Existing Paving Wall
  - Existing Edge of Road
  - Existing Primary Leachate Pipe
  - Existing Secondary Leachate Pipe
  - Existing Leachate Force Main
  - Existing Overhead Electric
  - Existing Monitoring Well
  - Existing Vents
  - Existing Gas Probe
  - Existing Soil Vapor Probe
  - Existing Gas Extraction Well and Method
  - Existing Gas Well
  - Existing Gas Line
  - Existing Underground Electric
  - Existing Fence
  - Existing Anchor Trench
  - Existing Limit of Waste
  - Proposed Stage V 10' Primary Sand Contour
  - Proposed Stage V 10' Closure Contour
  - Proposed Anchor Trench
  - Proposed Limit of Waste
  - Proposed Drainage Basin Centerline
  - Proposed Horizontal LFG Gas Collector
  - Proposed Vertical LFG Gas Collector
  - Proposed LFG Pipe (Number denotes diameter)

| <p>North Country Environmental Services<br/>Bethlehem, NH</p> <p>Stage V Landfill Expansion<br/>Type I-A Permit Modification</p> <p>Final Grading Plan</p> |                                                   | <p>date: February 2014</p> <p>designed by: RJB/BWS</p> <p>project no: 553</p> <p>file name: 833-Closure Plan-406.dwg</p> <p>approved by: RJB</p> <p>scale: 1" = 100'</p> |     | <p><b>CMA ENGINEERS</b><br/>Civil/Environmental Engineers</p> <p>35 Bow Street<br/>Portsmouth, NH<br/>603/431-6196</p> <p>55 So. Commercial Street<br/>Manchester, NH<br/>603/627-0708</p> <p>Lafayette Center<br/>State Street Building<br/>Suite 208<br/>Manchester, NH<br/>603/985-8717</p> <p>info@cmaengineers.com      www.cmaengineers.com</p> | <p>revision</p> <table border="1"> <tr> <th>no.</th> <th>description</th> <th>date</th> <th>by</th> </tr> <tr> <td>1</td> <td>Issued to NHDES with Type I-A Permit Modification</td> <td>FEB 2014</td> <td>RJB</td> </tr> <tr> <td>2</td> <td>Issued for NHDES Review - Supplemental Submittal</td> <td>3/7/14</td> <td>RJB</td> </tr> <tr> <td>3</td> <td>Issued for NHDES Review - May 22, 2014 Comments</td> <td>6/19/14</td> <td>RJB</td> </tr> <tr> <td>4</td> <td>Issued for NHDES Review - July 18, 2014 Comments</td> <td>7/28/14</td> <td>RJB</td> </tr> </table> | no. | description | date | by | 1 | Issued to NHDES with Type I-A Permit Modification | FEB 2014 | RJB | 2 | Issued for NHDES Review - Supplemental Submittal | 3/7/14 | RJB | 3 | Issued for NHDES Review - May 22, 2014 Comments | 6/19/14 | RJB | 4 | Issued for NHDES Review - July 18, 2014 Comments | 7/28/14 | RJB |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------|------|----|---|---------------------------------------------------|----------|-----|---|--------------------------------------------------|--------|-----|---|-------------------------------------------------|---------|-----|---|--------------------------------------------------|---------|-----|
| no.                                                                                                                                                        | description                                       | date                                                                                                                                                                     | by  |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |             |      |    |   |                                                   |          |     |   |                                                  |        |     |   |                                                 |         |     |   |                                                  |         |     |
| 1                                                                                                                                                          | Issued to NHDES with Type I-A Permit Modification | FEB 2014                                                                                                                                                                 | RJB |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |             |      |    |   |                                                   |          |     |   |                                                  |        |     |   |                                                 |         |     |   |                                                  |         |     |
| 2                                                                                                                                                          | Issued for NHDES Review - Supplemental Submittal  | 3/7/14                                                                                                                                                                   | RJB |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |             |      |    |   |                                                   |          |     |   |                                                  |        |     |   |                                                 |         |     |   |                                                  |         |     |
| 3                                                                                                                                                          | Issued for NHDES Review - May 22, 2014 Comments   | 6/19/14                                                                                                                                                                  | RJB |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |             |      |    |   |                                                   |          |     |   |                                                  |        |     |   |                                                 |         |     |   |                                                  |         |     |
| 4                                                                                                                                                          | Issued for NHDES Review - July 18, 2014 Comments  | 7/28/14                                                                                                                                                                  | RJB |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |             |      |    |   |                                                   |          |     |   |                                                  |        |     |   |                                                 |         |     |   |                                                  |         |     |

Drawing File: F:\CADD\PROJECTS\KAS\NDES Stage V\Map\DES Comments 1408\Closure Plan-406.dwg 7/28/2014 3:27pm Printed by: CADDTEAM

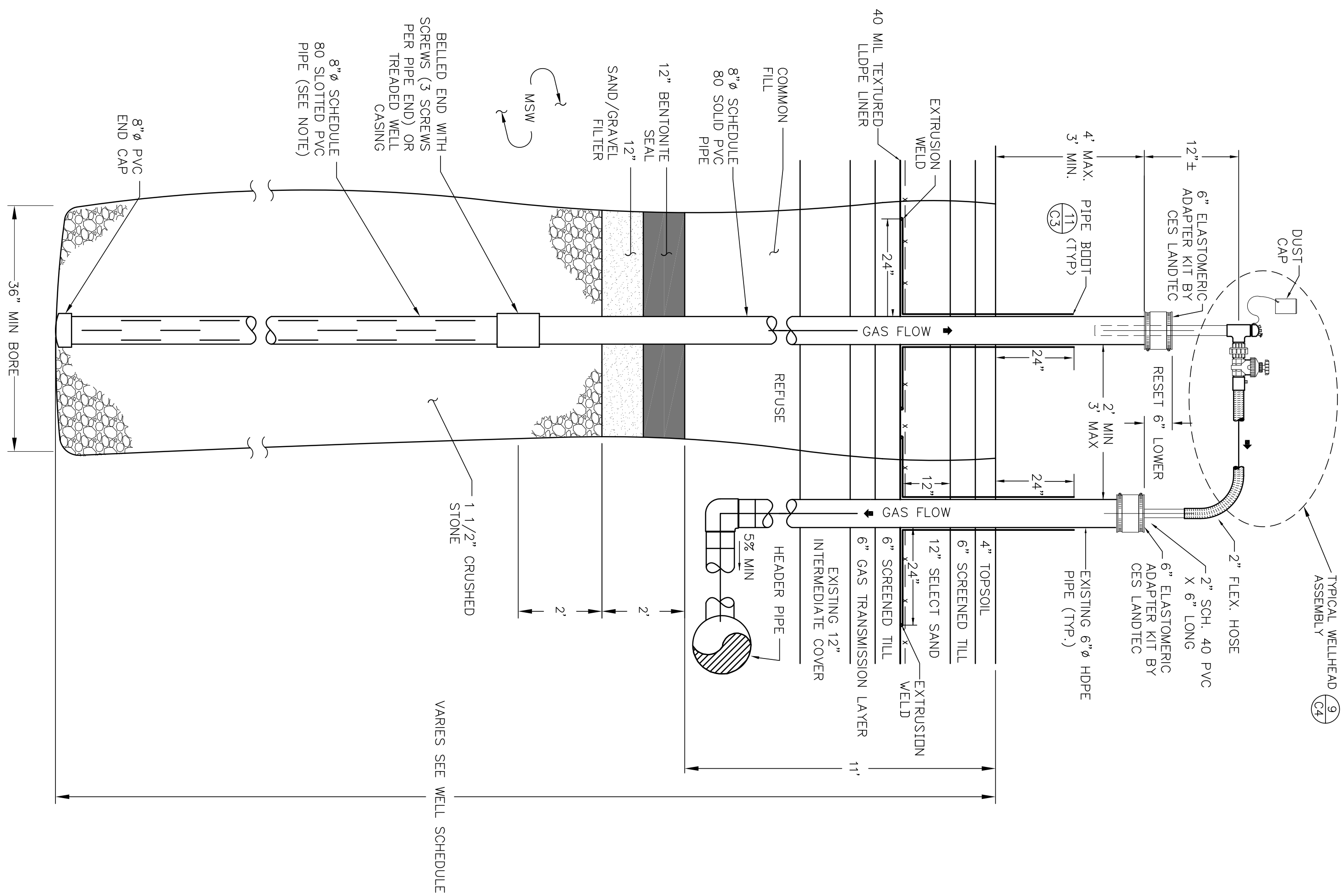




| no. | revision                                         | date    | by  |
|-----|--------------------------------------------------|---------|-----|
| 1   | Issued for NHDES Comments                        | 2/7/13  | RJG |
| 2   | Issued for NHDES Review- May 22, 2014 Comments   | 6/19/14 | RJG |
| 3   | Issued for NHDES Review - July 18, 2014 Comments | 7/30/14 | RJG |
|     |                                                  |         |     |
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|                                       |                         |                                                                                     |                                                                                     |                                                                                             |                                                          |
|---------------------------------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------|
| date:<br>February 2014                | designed by:<br>RJB/GWS |  |  | Lafayette Center<br>Slater Street Building<br>Slater Street<br>Portsmouth, NH<br>06032-0708 | 55 So. Commercial Street<br>Manchester, NH<br>06032-0708 |
| project no:<br>833                    | drawn by:<br>BWS        |                                                                                     |                                                                                     |                                                                                             |                                                          |
| file name:<br>232 Closure Details.dwg | approved by:<br>RJB     |                                                                                     |                                                                                     |                                                                                             |                                                          |
| scale:                                |                         |                                                                                     |                                                                                     |                                                                                             |                                                          |

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NOTE:

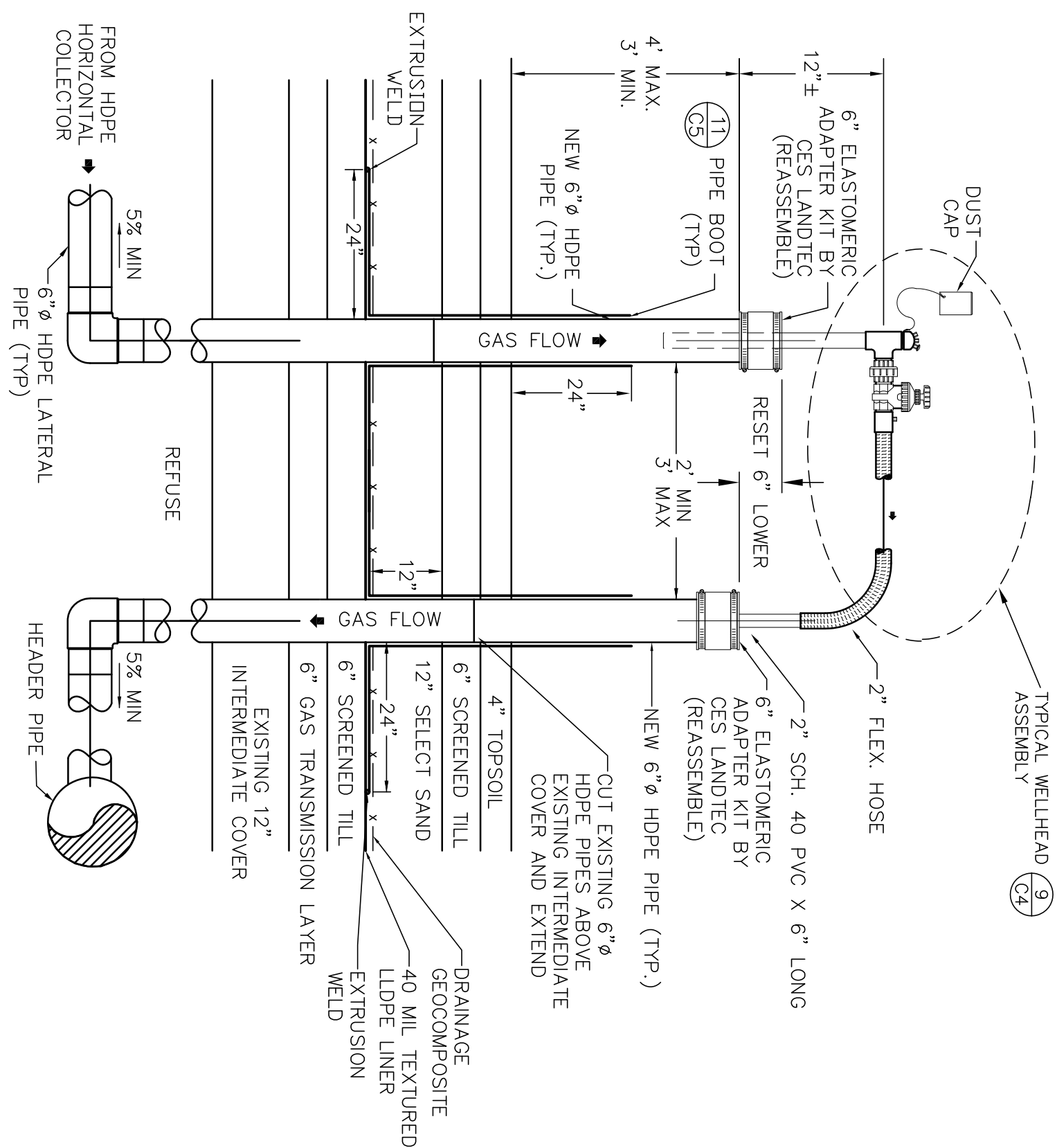
1. PIPE PERFORATED WITH SLOTS  $\frac{1}{8}$ " TO  $\frac{1}{4}$ " WIDE BY 8" LONG. FOUR SLOTS PER ROW SPACED 90° APART, WITH ADJACENT ROWS OFFSET BY 45°.

## Vertical Gas Extraction Well

**Not to Scale**

6

C2



**Horizontal Gas Collection  
Wellhead**

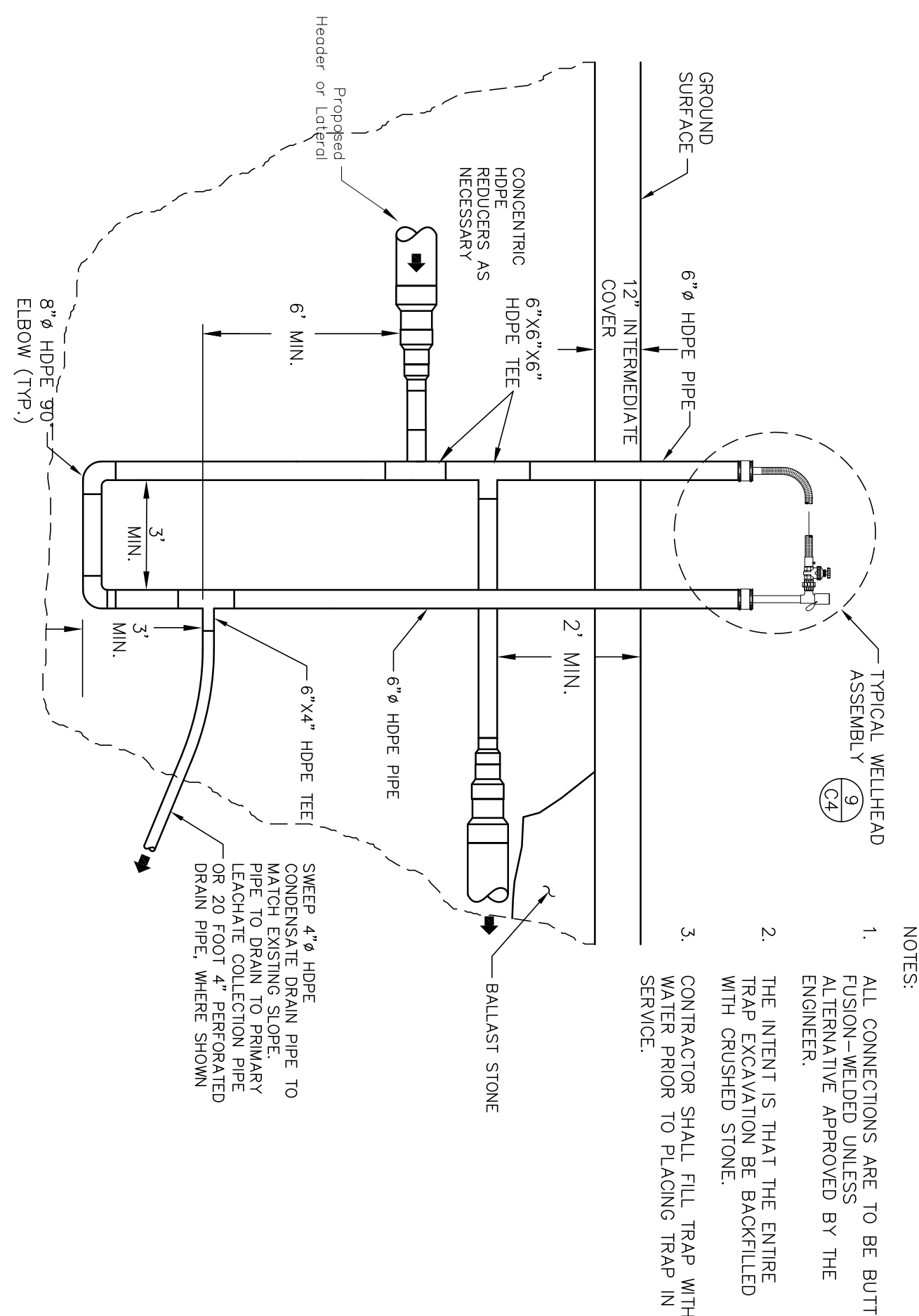
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**Not to Scale**

**Not to Scale**

8

62



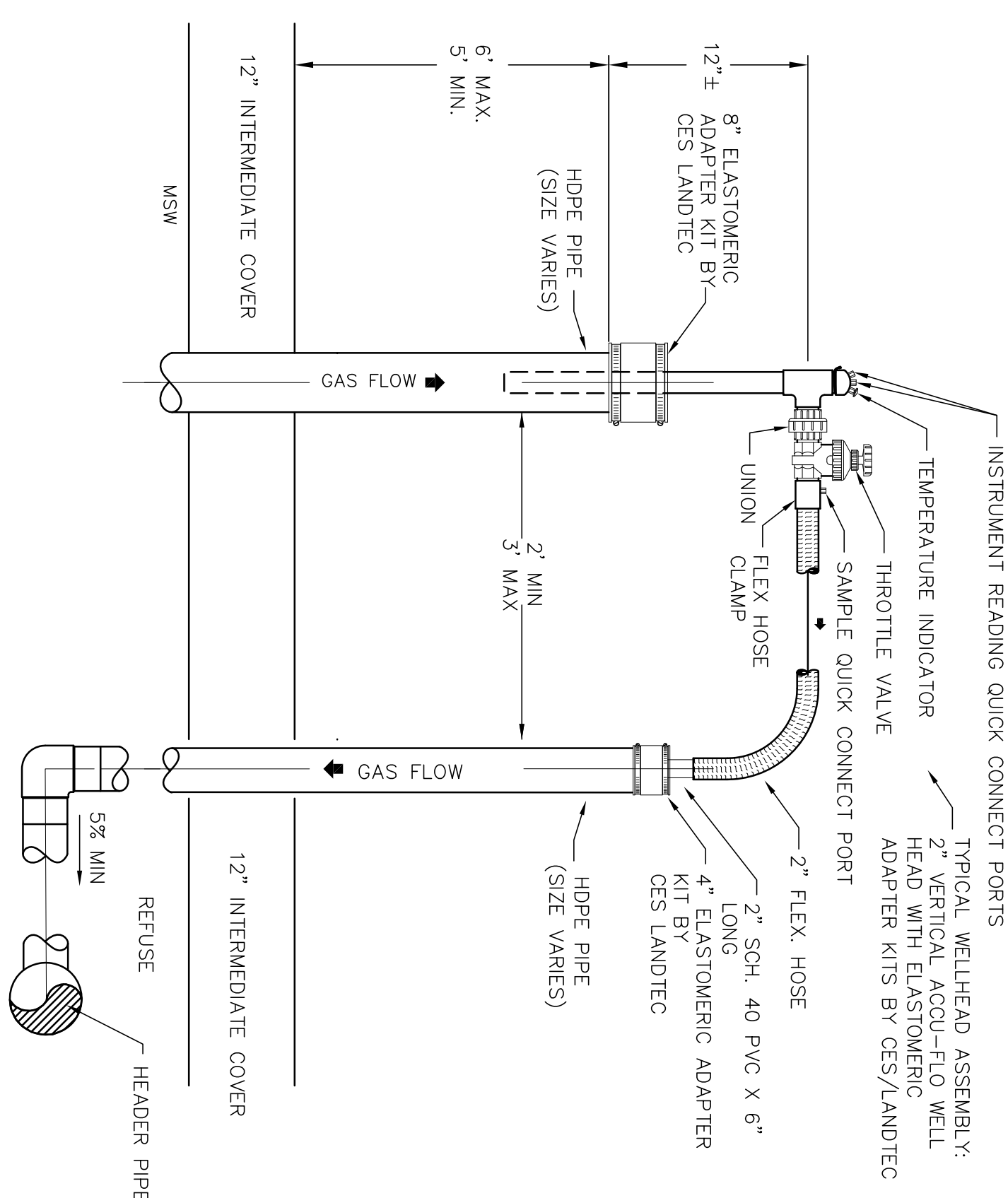
1. ALL CONNECTIONS ARE TO BE BUTT FUSION-WELED UNLESS ALTERNATIVE APPROVED BY THE ENGINEER.
2. THE INTENT IS THAT THE ENTIRE TRAP EXCAVATION BE BACKFILLED WITH CRUSHED STONE.
3. CONTRACTOR SHALL FILL TRAP WITH WATER PRIOR TO PLACING TRAP IN SERVICE.

## Condensate Trap

**Not to Scale**

7

(C2)



**Typical Wellhead Assembly**  
**Not to Scale**

**Not to Scale**

9

C4

| no. | revision                                         | date    | by   |
|-----|--------------------------------------------------|---------|------|
| 1   | Issued for NHDES Comments                        | 2/7/13  | R/JG |
| 2   | Issued for NHDES Review- May 22, 2014 Comments   | 6/19/14 | R/JG |
| 3   | Issued for NHDES Review - July 18, 2014 Comments | 7/30/14 | R/JG |
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**ENGINEERS**  
CIVIL / ENVIRONMENTAL ENGINEERS

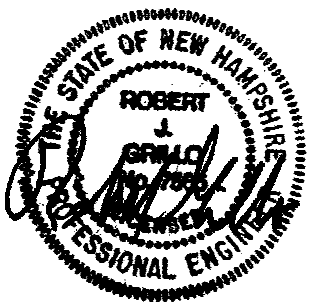
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35 Bow Street  
Portsmouth, NH  
603/431-6196

55 So. Commercial Street  
Manchester, NH  
603/627-0708

Lafayette Center  
Storor Street Building  
Suite 208  
Kennebunk, ME  
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|                                                  |                                |
|--------------------------------------------------|--------------------------------|
| date:<br><i>February 2014</i>                    | designed by:<br><i>RJG/BWS</i> |
| project no:<br><i>833</i>                        | drawn by:<br><i>BWS</i>        |
| file name:<br><i>833-Closure Details1406.cwg</i> | approved by:<br><i>RJG</i>     |
| scale:                                           |                                |

*North Country Environmental Services  
Bethlehem, NH*

*Stage V Landfill Expansion  
Type I-A Permit Modification*

### Gas System Details

|             |        |
|-------------|--------|
| drawing no. |        |
| C4          |        |
| sheet:      | 4 of 5 |