REQUEST FOR PROPOSALS

A. Introduction

ecomaine is requesting proposals for the continuation of its environmental monitoring program for the period beginning April 1, 2016 through March 31, 2019. This program includes sample collection, laboratory analyses, data management and reporting, for its Ashfill/Balefill and Closed Balefill facilities and effluent pumped to the Portland sewer system. This document outlines the Environmental Monitoring Program requirements as well as general requirements for firms interested in implementing this program for **ecomaine**.

B. Background

ecomaine, formerly Regional Waste Systems, Inc. (RWS) is a quasi-municipal corporation consisting of 20 member and 7 associate member communities in the greater Portland, Maine area. Presently, **ecomaine** operates a waste-to-energy (WTE) and recycling facility in Portland, Maine and an Ashfill and closed Balefill in Scarborough and South Portland.

Operation of these facilities requires extensive monitoring of groundwater, surface water and leachate, to meet site-specific permit conditions and applicable Maine Department of Environmental Protection (ME DEP) regulations, particularly, but not solely, ME DEP solid waste regulations in Chapters 400-405. **ecomaine** is requesting proposals from qualified firms to perform the required environmental monitoring at the Ashfill and Closed Balefill facilities. The Monitoring program consists of two annual events and includes approximately 42 groundwater, surfacewater, leachate and effluent samples. Additionally **ecomaine** is required to provide quarterly analysis of its effluent to the City of Portland as required by the conditions of its Industrial Discharge permit.

ecomaine believes that this document contains all of the basic information required to develop a proposal, however additional plans, maps, permits and other documents are available for review at **ecomaine's** Landfill office at 85 Scott Drive, Westbrook. Please call Art Colvin, PE, Landfill Manager at (207) 532-3152 to make an appointment if interested in reviewing these documents or to inspect the site.

C. Monitoring Program Requirements

C.1 Surface Water, Groundwater, and Leachate Monitoring

Information on groundwater, surface water and leachate monitoring locations and parameters at **ecomaine** Ashfill/Balefill and Closed Balefill are contained in the attached Appendix A. We have also included in Appendix B, a document that has been superseded but contains some background information which may prove helpful. **DO NOT USE THE DOCUMENT IN APPENDIX B FOR ANYTHING OTHER THAN GENERAL INFORMATIONAL PURPOSES!!**

Scope of Services

- Ashfill/Balefill Environmental Monitoring Program Management and Coordination.

- Collection and analysis of samples, procedures and additional details are given in the attached Appendix A. In Appendix A you will find the "ENVIRONMENTAL MONITORING PLAN, May 2015 Revision, **ecomaine** Landfill, Scarborough AND South Portland, Maine" prepared by St. Germain Collins, Westbrook Maine.

  - Data Evaluation and reporting
    - data validation
    - statistical analysis,
    - data tabulation and reporting
  - Preparation of a Monitoring Report for each of the two sampling events per year suitable for submittal to ME DEP within 30 days of receipt of data. The second of the semi-annual reports must be an Annual Report that includes a review of data for the full year, an evaluation of trends using the Mann-Kendall method and a graphical presentation of the trends for each monitoring point going back to 1997.

All monitoring activities must be performed in conformance with all applicable regulations including, but not limited to, CMR 06-096-405.

Monitoring results must be managed in a format that allows for hard copy as well as electronic submittal to Maine DEP utilizing the Maine DEP's EDD Environmental Analysis Database (EGAD) format. The contractor shall also

provide 1 paper/electronic copy and the EDD file to **ecomaine** for all reporting.

C.2 Wetlands Treatment System Monitoring

The Balefill Closure includes an engineered Wetlands Treatment System to treat the Balefill UD (underdrain) discharge from Closed Balefill Cells 1-6. The effluent from the WTS discharges into a detention basin, which then discharges to a stream (Red Brook). The schedule for sampling the WTS and the Detention Basin is outlined in Table 4 of Appendix A (Appendix A of"ENVIRONMENTAL MONITORING PLAN, May 2015 Revision, **ecomaine** Landfill, Scarborough AND South Portland, Maine" prepared by St. Germain Collins, Westbrook Maine). Weekly monitoring of field parameters including specific conductance, pH and flow is done by **ecomaine** staff. This data will be provided to the contractor as an excel spreadsheet for inclusion in the reports.

Scope of Services

- Wetlands Treatment System Monitoring Program Management and Coordination
- Collect and Analyze Samples as described above and in conformance with DEP Water Resource regulation, CMR 06-096-530
- Data Evaluation and Reporting
  - Data validation
  - Evaluation with respect to applicable limits
  - Incorporate wetlands monitoring results into semi-annual Environmental Monitoring Report for Surface and Groundwater and Leachate submitted to ME DEP within 30 days of receipt of data from laboratory

C.3 Effluent Monitoring

Effluent Monitoring, as summarized below, is required to maintain compliance with **ecomaine'** Industrial Discharge Permit with the City of Portland. Monitoring is on a quarterly basis and shall be done to the parameters and requirements contained in the Industrial Discharge Permit. A copy of the latest permit dated November 20, 2015 is attached as APPENDIX C.

Scope of Services

- Collect and Analyze Samples as described in Appendix C
- Provide 1 paper copy and an electronic copy of the monitoring data to **ecomaine** for submittal to the City of Portland prior to January 15, April 15, July 15 and October 15 of each year.

D. General Proposal Requirements

Proposers are required to submit three copies of their proposal by 3 PM on Monday February 29, 2016 to:
Arthur J. Colvin, P.E., Landfill Manager
ecomaine
64 Blueberry Road
Portland, ME 04102

Each proposal must contain:

1. A complete description of the proposed scope of work
2. An organizational chart identifying key personnel that would be involved in the program
3. Resumes of key personnel
4. Material demonstrating relevant experience on similar projects
5. Provide description and contact information for relevant projects completed by the firm within the last 3 calendar years
6. A statement of qualifications for individuals to be used in supervising, testing and report preparation
7. Identification of any subcontractors that will be used
8. A Cost Proposal presenting detailed annual costs for labor, expenses and other items to implement the program outlined in the RFP. Please organize the cost proposal as follows:
    - Ashfill and Closed Balefill Monitoring
        * Ashfill/and Closed Balefill Surface Water, Groundwater, and Leachate Monitoring
        * Wetlands Treatment System Monitoring
        * Effluent Monitoring
9. Standard rate schedule
10. Standard Terms and Conditions

A proposal submitted in response to this RFP must provide sufficient detail and information to permit a complete evaluation of its merits.

E. Selection Criteria

In order to be considered for selection, consultant must meet the following

minimum requirements:

- Demonstrated experience in successfully implementing environmental monitoring programs at municipal landfills including groundwater monitoring, surface water monitoring, and landfill gas monitoring
- Demonstrated experience in working successfully on landfill projects involving close interaction with the Maine DEP
- A Maine Certified Geologist (CG) or Maine Licensed Professional Engineer (PE) must review and certify the Ashfill/Balefill Monitoring reports

The consultant will be selected based on the following criteria:

- Understanding of project requirements as described in proposed scope of work
- Expertise in hydrogeologic monitoring programs at landfills
- The cost of proposed services
- Expertise in engineered wetland treatment systems
- A successful track record with the Maine DEP
- Expertise in statistical evaluation of monitoring data

F. **ecomaine** Rights and Options

ecomaine reserves the discretion to exercise the following rights and options with regard to each proposal submitted in response to this RFP to:

1. Select and enter into competitive negotiations with the proposers whose proposal in the sole judgment of **ecomaine** best satisfies the goals and objectives of the project, the interests of **ecomaine** and is responsive to this RFP;
2. Waive technicalities and irregularities in any proposal and to reject any and all proposals;
3. Supplement, amend, or otherwise modify this RFP with or without substitution of another RFP;
4. Negotiate with one or more proposers either concurrently or consecutively for amendments or other modifications of their proposals;
5. Enter into agreements as contemplated by the RFP;
6. Change or alter the schedule for any event called for in the RFP or the competitive negotiations;

7. Establish minimum qualifications for subcontractors and suppliers and to disapprove proposed subcontractors and suppliers in accordance with the qualifications set; and
8. Substitute another proposer of its choice during the RFP process should any of the proposers selected withdraw or be excluded from the same by **ecomaine**. **ecomaine** may also exclude a Proposer from further participation in the RFP process if, in its sole judgment, the Proposer is delaying the overall progress selection in a way that may harm the interests of **ecomaine**. In such a case, notice will be sent to the Proposer signed by **ecomaines'** authorized representative.

G. Confidential Information

The Freedom of Information Law mandates public access to government records. **ecomaine** assumes no responsibility for disclosure or use of data for any purpose.

H. Signature Requirements

Each proposal shall be accompanied by an original cover letter committing the Proposer, if selected, to carry out the proposed Scope of Services in accordance with all the provisions of the proposal. It must also state that all information submitted in the support of the proposal is accurate. The cover letter must contain the signature of a person authorized to commit the Proposer to a contract.

I. Proposal Review and Negotiation

During the evaluation phase, **ecomaine** will determine any required modifications or additions to any proposal and will notify Proposers of these requirements and the schedule for their implementation.

J. Public Policy

It is the policy of **ecomaine** that during the performance of this contract, the Proposer, or Subcontractors, where applicable, will not discriminate against any employee or applicant for the employment because of age, race, creed, color, national origin, ancestry, marital status or sex.

All bidders shall be aware that **ecomaine**, as a public agency, maintains a strict ethics policy regarding the acceptance of gifts which prohibits all of its board members and employees from accepting any meals, travel, product, material or

service from any firm doing business or attempting to do business with e**comaine**

K. Insurance Requirements

Proposers must be able to meet the following insurance requirements at a minimum:

General Liability	$1 million
Automobile Liability	$1 million - bodily injury $1 million - property damage
Workmen's Compensation	per statutory requirements
Professional Liability	$1 million
Pollution Liability	$1 million

No Contract will be signed until the required insurance is obtained and an acceptable Certificate of Insurance is filed with **ecomaine**.

L. Contractor Responsibilities

- The successful contractor will be required to comply with all OSHA requirements for health & safety and review **ecomaine**'s Environmental, Health & Safety Policy in accordance with **ecomaine**'s ISO 14001 & OHSAS 18001 certifications (see web-site under 'contractor' tab www.ecomaine.org to review contractor training and to submit quiz to receive hard-hat sticker for 2016)

February 5, 2012

APPENDIX A

ENVIRONMENTAL CONSULTING GROUP

St.Germain · Collins

ENVIRONMENTAL MONITORING PLAN
May 2015 Revision
ecomaine Landfill
Scarborough and South Portland, Maine

Prepared For:
ecomaine
64 Blueberry Road
Portland, Maine

Prepared by:
St.Germain Collins
846 Main Street
Westbrook, Maine 04092

St.Germain Collins File No.: 3297

May 2015

ENVIRONMENTAL MONITORING PLAN
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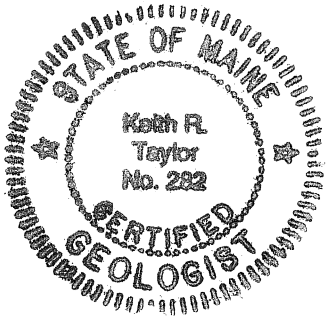
St.Germain File No. 3297

May 2015

Keith Taylor, C.G., Senior Environmental Geologist

Mark S. St.Germain, President



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APPENDICES

1.0 INTRODUCTION

The last modification to the Environmental Monitoring Plan (EMP) for the ecomaine Ashfill/Balefill and closed Balefill facilities occurred in April 2013. This revision of the EMP is in response to discussions between the Maine Department of Environmental Protection (MEDEP) and St.Germain Collins, on behalf of ecomaine, in the fall of 2014. Specific revisions include:

- Reduce the sampling frequency from three times per year to two times per year.
- Eliminate silver from all analyses.
- Modify the low flow sampling method with respect to the frequency of field parameter measurements.

Appendix A, MEDEP Communications, contains St.Germain Collins' written proposal for modifying the EMP and MEDEP's response in a memo dated September 10, 2014.

2.0 FACILITY DESCRIPTION

ecomaine is a quasi-municipal, regional solid waste disposal entity with a waste-to-energy incinerator and a recycling facility in Portland, Maine. ecomaine also operates a landfill located in Scarborough and South Portland, Maine that receives ash from the incinerator; the landfill received baled solid waste before the incinerator began operation. **Figure 1, Site Location Map**, shows the location of the ecomaine Landfill. For the purpose of this EMP, the ecomaine Landfill consists of four areas: Balefill, Ashfill/Balefill, Ashfill/Balefill Lateral Expansion, and Wetlands Treatment System. These units are described in the following sections.

2.1 Balefill

Balefill Cells 1 through 6, the first landfill cells constructed at the facility, are synthetically-lined cells constructed in stages beginning in 1977. The cells are located on a side slope that was previously mined for sand and gravel (see **Figure 2, Monitoring Locations**). Cells 1 through 6 operated from 1977 to 1985 and are primarily filled with baled municipal wastes. Environmental sampling has occurred at the Balefill since 1978. As Balefill Cells 1 through 6 reached capacity, Balefill Cells 7 and 8 were constructed. Balefill Cells 7 and 8 are synthetically-lined cells that operated between 1984 and 1987. Balefill Cells 7 and 8 are located on a side slope east of Balefill Cells 1 through 6. Cells 7 and 8 were closed in October 1987. In 1999, a more intensive closure of Balefill Cells 1 through 8 was completed, including the elimination of settlement areas, and the installation of a landfill gas collection system and a synthetic cap (see Figure 2 for location).

2.2 Ashfill/Balefill

Northeast of Balefill Cells 7 and 8 is an active landfill designated the Ashfill/Balefill, which has been in operation since 1988. The Ashfill/Balefill area receives combustion residues (bottom ash, flyash and slag) from the **ecomaine** incinerator, grits and screenings from several local municipalities, and baled solid waste in the past.

2.3 Ashfill/Balefill Lateral Expansion

The Ashfill/Balefill Lateral Expansion was permitted in 2003 and construction was to be completed in two phases. Phase 1 was constructed in 2006 with geomembrane-lined cells including a leak detection system. Phase 2 was completed in the fall of 2012. The Ashfill/Balefill Lateral Expansion is projected to be active for at least 20 years and is permitted to receive incinerator ash and other non-hazardous solid waste materials (see Figure 2 for location).

2.4 Wetlands Treatment System

The Wetlands Treatment System (WTS) was constructed in October 1999. The treatment system receives groundwater from the Balefill Cells 1 through 6 underdrain discharge. The system was designed to facilitate biological and chemical reactions to reduce the concentrations of several inorganic constituents found within the groundwater collected by the underdrain system. It was designed to handle an underdrain flow of up to 20 gpm to provide an 11-day residence time in the system.

The WTS is comprised of a series of five vegetated wetland cells connected by weirs that control the level of water within each cell and the flow from one cell to the next. In addition, each of the cells includes a precast concrete vault section fitted with a PVC inlet pipe whose inlet elevation can be adjusted using a swivel mechanism. This feature allows for lowering the elevation of water in the cell below the weir elevation either to drain the cell for maintenance or to adjust residence time in the cells if needed.

The effluent from the WTS is designed to flow into the detention basin where it mixes with storm water runoff from the adjacent portions of the ecomaine Landfill. From the detention basin outfall, the mixture of treated underdrain discharge and storm water runoff drains to a small tributary of Red Brook (see Figure 2 for locations).

3.0 SAMPLING METHODS

Groundwater, surface water and leachate will be sampled on a biannual basis.

3.1 Groundwater

The objective of groundwater sampling is to detect changes in water quality attributable to landfill operations. Groundwater is monitored using a network of 102 monitoring wells and piezometers, including 24 monitoring wells that historically have been monitored or sampled tri-annually The groundwater monitoring protocols are presented below.

3.1.1 Low-Flow Sampling

Prior to sampling monitoring wells, the static water levels will be measured from the reference elevation (top of PVC riser) to the closest 0.01 feet for each monitoring well that will be sampled. Once the static water levels are measured, monitoring wells will be sampled using the modified low-flow sampling techniques described below. Non-dedicated field equipment (i.e., water level meters, field instruments) will be decontaminated between each well.

Groundwater sampling at the ecomaine Landfill will be completed in accordance with the MEDEP Standard Operating Procedure (SOP) titled *Groundwater Sampling using Low Flow Purging and Sampling for Long Term Monitoring* (SOP RWM-DR-003) with one modification described in the next paragraph. This method begins with the use of a pump and flow-through cell to measure the field parameters pH, temperature, turbidity, oxidation-reduction potential (ORP), specific conductance (SC), and dissolved oxygen (DO) prior to laboratory sample collection. The samples for laboratory analysis will be collected with the pump after stabilization of field parameters.

Under the MEDEP SOP, field parameters are measured at several minute intervals from the beginning of purging and measurements continue until the field parameters stabilize. However, based on purging results over several years, the average time for stabilization has been determined for each well. **Table 1, Well Purge Stabilization Times**, summarizes the purge times for the wells currently sampled at the landfill. We will measure field parameters at the beginning of purging and then at least twice at the estimated stabilization time to confirm that all five field parameters have stabilized. When artesian conditions exist, purging is not completed for wells MW-102, MW-802A, PW-2A, and PW-3A. When these wells are not flowing, the conventional low-flow method will be used.

Each sample bottle will be labeled with the sampling location, sampling time, required analysis, sampler's initials, and preservatives used. A continuous chain-of-custody will be maintained for each sample.

3.1.2 Artesian Well Sampling

Three monitoring wells (MW-102, PW-2A and PW-3A) are classified as having artesian conditions where the groundwater flows up and out of the top of the monitoring well casing. Recognizing that ambient groundwater enters the well screen at the same rate that it flows out of the top of the well, purging is not necessary; therefore, artesian wells will be sampled for field and laboratory parameters using a peristaltic pump and dedicated tubing with an intake within the screened interval of the well.

3.1.3 Residential Well Sampling

This residential well, located south of the Balefill Cells 1-56, is sampled annually.

3.2 Surface Water

The objective of surface water quality monitoring is to detect changes in surface water quality that may be attributable to facility operations. Several open channels are used as monitoring locations for surface water, including Red Brook located to the west of Balefill Cells 1-6, several swales/ditches located on the property, the outlet to a stormwater pond located west of the Ashfill/Balefill, and an unnamed tributary to Long Creek located to the north of the Ashfill/Balefill. The surface water sampling protocols are described below.

3.2.1 Flow Rate Measurement

Prior to sample collection, the surface water flow rate will be measured at each surface water sampling location. Measurements in feet/second will be collected with a flow meter.

3.2.2 Surface Water Sampling

After measuring the flow rate, the following sample collection procedures will be used.

- When samples are collected from shallow water, care will be taken to avoid entraining bottom sediments in the sample. In addition, samples will be collected downstream first to avoid collecting sediments that could be disturbed in the upstream sampling. Samples will be collected upstream of the sampler.
- A large, decontaminated container will be utilized to collect a grab sample to obtain readings for pH, temperature, turbidity, ORP, SC, and DO.
- Samples will be unfiltered and will be collected in a manner that produces the least possible turbidity.
- Sample bottles will be filled in the same location as the grab sample for the field parameters.
- Each sample bottle will be labeled with the sampling location, sample time, required analysis, sampler's initials and preservatives used. A continuous chain-of-custody will be maintained for each sample.

3.3 Leachate and Leak Detection

Leachate and leak detection samples will be collected from designated points in each leachate collection system as shown on Figure 2.

3.3.1 Balefill Leachate

The Balefill sampling points are manhole KC-1 located east of the WTS and manhole MH-33 located northeast of Balefill Cells 7-8. Dedicated tubing is set in the manholes that can be attached to a peristaltic pump. The leachate flows through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to sample collection. One set of field readings will be obtained for pH, temperature, turbidity, ORP, SC, and DO. Samples will be collected directly into the containers from the dedicated tubing.

3.3.2 Ashfill/Balefill Leachate

The Ashfill/Balefill leachate sampling point (SW-6/MH-1A) is located in a manhole near the treatment building. Dedicated tubing is set in the manholes that can be attached to a peristaltic pump. The leachate is flowing through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to sample collection. One set of field readings will be obtained for pH, temperature, turbidity, ORP, SC, and DO. Samples will be collected directly into the containers from the dedicated tubing.

The Ashfill/Balefill Lateral Expansion leachate sample will be collected from a manhole (MH-C) located near the southeast corner of the Ashfill/Balefill. A dedicated bucket on a rope is set in the manhole, which can be used to collect leachate. The leachate flows through the manhole, so purging will not be needed; however, the sampler will rinse the bucket three times prior to sample collection. One set of field readings will be obtained for pH, temperature, turbidity, ORP, SC, and DO. Samples will be collected directly into the containers from the bucket.

3.3.3 Ashfill/Balefill Leak Detection System

The Ashfill/Balefill Lateral Expansion leak detection system (LDS) sample is collected from the leak detection riser system that is piped into the riser house associated with each phase of expansion. Both the Phase 1 (LDS #1) and new Phase II (LDS #2) samples will continue to be collected with a dedicated pump and piping located in the leak detection riser. The system requires the sampler to plug in the pump and open a valve that is attached to a dedicated flexible hose used for sample collection. The flexible hose is directed into the leak detection riser and purged for 2 minutes prior to sample collection. One set of field

readings will be obtained at each sampling location for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers.

3.3.4 Ashfill/Balefill Groundwater Underdrains

The Ashfill/Balefill Phase 1 Expansion groundwater underdrain system sample is collected from manhole MH-9 located near the southeast corner of the Ashfill/Balefill. Dedicated tubing is set in the manhole, which can be attached to a peristaltic pump. The groundwater is flowing through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to collecting the sample. The Phase 2 West Expansion underdrain consists of a 4-inch diameter pipe discharging into the surface water swale on the southeast side of the expansion boundary. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers from the dedicated tubing.

3.4 Decontamination

Non-dedicated field equipment (i.e., water level meters, field instruments) will be decontaminated prior to use to prevent sample contamination. Equipment utilized in the field at more than one sampling location will be decontaminated between locations using the following procedures:

1. The equipment will be cleaned with a solution of water and phosphate-free laboratory detergent such as Alconox.
2. Use of a clean brush free of contamination may be necessary to remove films and particulate matter from field equipment.
3. Equipment will be rinsed thoroughly with tap water to remove the detergent.
4. Commercially-available distilled water will be used for final rinse of the equipment.
5. Handling and storage of decontaminated equipment will be done in a way to prevent recontamination.

4.0 ANALYTICAL METHODS

The laboratory will utilize analytical methods having detection limits that will not exceed one half the United State Environmental Protection Agency (EPA) maximum contaminant level (MCL) or Maine Department of Health and Human Services' maximum exposure guideline (MEG) for each parameter, where possible. Internal QA/QC appropriate for the analyses performed will be the responsibility of the analytical laboratory. The analytical results will be validated using the QA/QC procedures outlined in Section 6.0. **Table 2, Analytical Method Information**, provides the analytical methods used, type of containers required for each analysis, methods used to preserve the sample, and the holding times required for each method.

5.0 SUMMARY OF MONITORING PROGRAMS

The following subsections describe the specific monitoring that will be conducted under the EMP for each of the four units at the ecomaine Facility. Sampling for the Balefill, Ashfill/Balefill and the Ashfill/Balefill Expansion will be performed on a biannual basis in April/May and October/November. The Wetland Treatment System (WTS) will be sampled on a biannual basis and monitored on a weekly basis by ecomaine for flow, pH and SC. Figure 2 illustrates the locations of the biannual sampling points for each of the four units at the ecomaine Facility.

Table 3, Description of Sampling Locations, describes the selected monitoring locations relative to the associated unit.

Table 4, Summary of Sampling Parameters, provides a summary of the sampling locations, sampling methods, parameter lists and sampling frequency at the four units.

Table 5, Sampling Parameter Lists, summarizes the three parameter lists referenced in Table 3 for facility-wide samplings locations other than the WTS, and includes parameter changes recently approved by the MEDEP.

Table 6, Wetland Treatment System Monitoring Program, provides a summary of the parameter lists and sampling frequency at the WTS.

Table 7, Biennial Monitoring Wells, lists the wells that will be monitored on a biennial basis. One round of groundwater elevations and well depth will be collected in the fall (October/November) of every other year with the next event in 2016. Field parameters will be measured every four years with the next event in 2016. The field parameter data for the four-year events will be measured in-situ using a multimeter at the middle of the screened interval.

6.0 QUALITY ASSURANCE / QUALITY CONTROL

6.1 Field Quality Control

6.1.1 Duplicate Samples

Duplicate samples will be collected to assess the reproducibility of groundwater and surface water analytical results as required by the Maine Solid Waste Management Rules (Chapter 405 Section 2). Selection of the duplicate sample location will be random from one sampling event to the next and the duplicate sample identification will be coded such that its origin is not known to the laboratory.

One duplicate water quality sample will be collected for every tenth surface water or groundwater sample collected over the course of consecutive sampling events. Twenty-

three water quality samples are collected during the spring and summer sampling events, therefore two duplicate samples will be collected. Thirty-five water quality samples are collected during the fall sampling event, therefore three duplicate samples will be collected. In the event that some of the water quality sampling locations are dry, then one duplicate water quality sample will be collected for every ten samples collected over the course of consecutive sampling events.

Duplicate sample collection is not required for the leachate sampling points, the leak detection system sampling point, or the groundwater underdrain sampling points.

6.1.2 Blank Samples

Trip blanks will accompany each cooler or shipping container containing samples for volatile organic compounds (VOC) analyses submitted to the laboratory. Trip blanks will only be analyzed for VOCs. A trip blank will be prepared prior to the sampling event and stored with the samples collected throughout the event. The blank will be packaged for shipment with the samples and not opened until the samples reach the laboratory. The purpose of the trip blank will be to identify VOC contamination that may be attributed to sample handling and shipment.

Equipment blanks will not be collected as part of the monitoring program because dedicated peristaltic pump sampling tubes and whale pumps and were installed in 2001 and 2012, respectively.

6.1.3 Chain-of-Custody

Samples will be collected, transported to the laboratory, and received by the laboratory under appropriate chain-of-custody protocols.

6.1.4 Holding Time

Holding times will be compared to the standard EPA method-specified maximum holding times for each parameter analysis as provided in Table 2.

6.2 Quality Assurance Assessment

The analytical methods and results for each sampling round will undergo the following QA/QC procedures on an annual basis:

- Verification that the chain-of-custody for each sample is continuous, that samples were analyzed for the specified parameters, and that analyses were performed within the method-specified holding time.

- As specified in Maine Solid Waste Management Rules (Chapter 405), the ratio of total dissolved solids (TDS) to SC will be compared tri-annually. Determination of the TDS to SC ratio, and a comparison of the ratio to the MEDEP-established acceptable range of 0.55-0.75. Samples of surface water and groundwater with ratios outside the 0.55-0.75 range will be reported.

- Evaluation of data reproducibility by calculating the RPD for duplicate samples that meet the specified criteria. As specified in Chapter 405 of Maine Solid Waste Management Rules, the Relative Percent Difference (RPD) will be calculated and tabulated for duplicate samples. The RPD for a given parameter will be calculated only when both sample and duplicate values are greater than 5 times the practical quantitation limit of the analyte. Analytes with an RPD exceeding 10 percent will be identified in the report.

- Evaluation of well depth changes since construction.

- Identification of VOCs present in trip blanks (as discussed in Section 6.1.2).

- Identification of laboratory-related QA/QC issues (e.g., matrix spike/matrix spike duplicate or laboratory control sample issues).

7.0 REPORTING

7.1 Biannual Reporting

Biannual reporting consists of submittal of all laboratory data in the MEDEP Electronic Data Deliverable (EDD) format. St.Germain Collins will supplement the EDD files provided by the analytical laboratory with the field parameter and surface water flow data.

7.2 ANNUAL REPORTING

7.2.1 Basic Data Summary

The annual report will include the following basic data and observations:

- A map of the facility showing the licensed facility site and waste handling area boundaries, the current waste handling area boundary, and the location of each monitoring point.

- Results of the quality assurance assessment outlined in Section 6.2.

- Tabulation of the tri-annual data, including field parameters and groundwater elevation data.

- Identification of the elevation reference datum (e.g., mean sea level).

- Comparison of groundwater laboratory analytical results to the US EPA MCLs and the Maine Center for Disease Control Maximum Exposure Guidelines for drinking water.

- Copies of the laboratory data sheets, chain-of-custody sheets and field notes will be available for staff inspection, if requested, for two years after a sampling event. Field notes sheets will include:

    - Date and time each sample was collected, and the sampler's signature;
    - Temperature and weather conditions;
    - Purge volumes, pumping rates and purge stabilization data for each monitoring well;
    - Presence or absence of color, odor or surface sheen on water samples;
    - Well depth measured during last annual inspection;
    - As-built well depth;
    - Instrument calibration data;
    - Static water level (pre-purge);
    - Identification of the reference point for depth measurements; and
    - For surface water, an estimate of the flow rate.

- Tabulation and a brief discussion of the WTS tri-annual compliance monitoring.

7.2.2 Trend Analysis

Trend analysis will be performed for each parameter sampled using results from 2000 through the present. Intra-well trends will be analyzed for each groundwater, surface water, and underdrain sample. The method used for the trend analysis will be the Mann-Kendall test. The Mann-Kendall test is a statistical test that assesses whether constituent concentrations in samples collected from a sampling point are increasing, decreasing, or stable over time. The test evaluates each data point relative to previous data points to calculate the number of positive and negative differences between constituent concentrations. Based on the number of data points and the sum of negative and positive differences, the probability that a trend exists is calculated at a selected confidence limit.

Only data sets that have five or more data points will be evaluated. A confidence limit of 95 percent will be utilized (i.e., there is a 95 percent certainty that the trend calculated by the test exists). A graph of each parameter observed to have a significant trend and a discussion of whether the identified trend is of significant magnitude will be included in the report.

<u>Note</u>: Only post-2006 water quality data from groundwater underdrain sample location (manhole MH-9) will be used for trend analysis; prior to 2006, the sample location

identification "MH-9" was a leachate sample designation used prior to the construction of the Ashfill/Balefill Lateral Expansion.

7.2.3 Comparison of Upstream to Downstream Surface Water Quality

An comparison of surface water quality from the upstream location to the downstream location using the fall event data will be conducted for the Balefill (RD BRK UP and RD BRK DWN), the Ashfill/Balefill (SW-1 and SW-3), and the Ashfill/Balefill Lateral Expansion (SW-A-2011 and SW-B). The comparison will consist of summarizing the analytical data for these surface water locations and identifying downstream parameters that were detected at or above five times the practical quantitative limit (PQL). Of the downstream parameters detected at or above five times the PQL, concentrations exceeding 120 percent of the upstream concentrations will be discussed.

7.2.4 Comparison of Upgradient to Downgradient Groundwater Quality

An comparison of groundwater quality from the upgradient to downgradient locations using the fall event data will be conducted. The comparison will consist of a semi-quantitative analysis of historically elevated parameters including any MEG or MCL exceedences. **Table 8, Wells for Upgradient to Downgradient Comparisons**, lists the wells and the rationale for their choice.

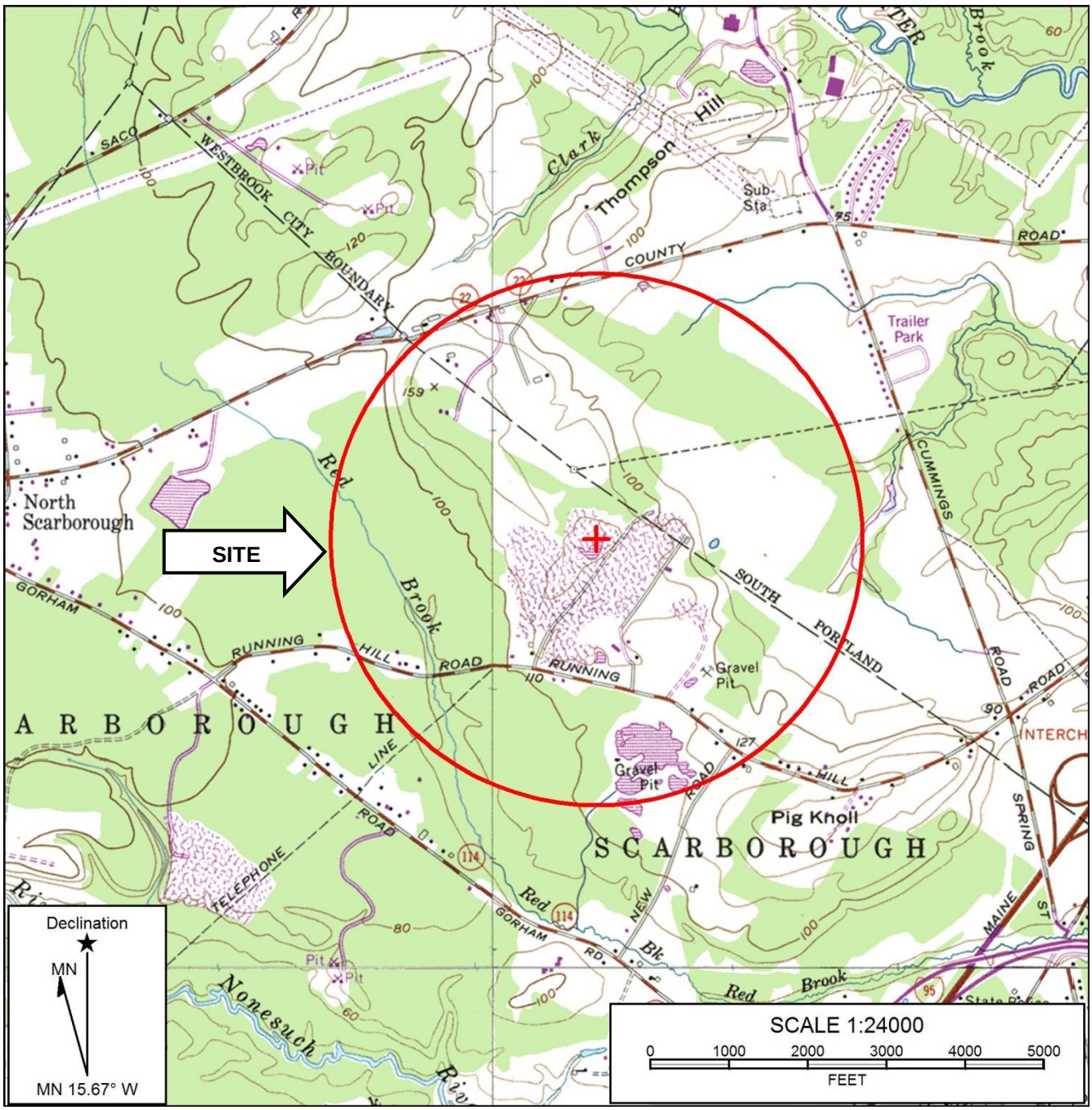
7.2.5 Site Groundwater Elevation and Specific Conductance

As previously stated in Section 5.0, water level measurements will be collected from accessible monitoring wells and piezometers across the facility every two years during the fall sampling event. The next site-wide water level collection event will be in 2016. For the annual reports that include these data, groundwater contour maps will be prepared for the shallow and intermediate depth wells. A table summarizing the groundwater elevations and interpretations will be included as part of that annual report.

On a four-year basis, beginning in 2016, SC measurements will also be collected during the site-wide groundwater level measurements. A figure will be prepared with SC contours for the shallow and intermediate depth wells, as well as a data table, for those annual reports.

APPENDIX A

Exhibits



SOURCE: USGS PORTLAND WEST, MAINE QUADRANGLE 1978.

SITE LOCATION MAP

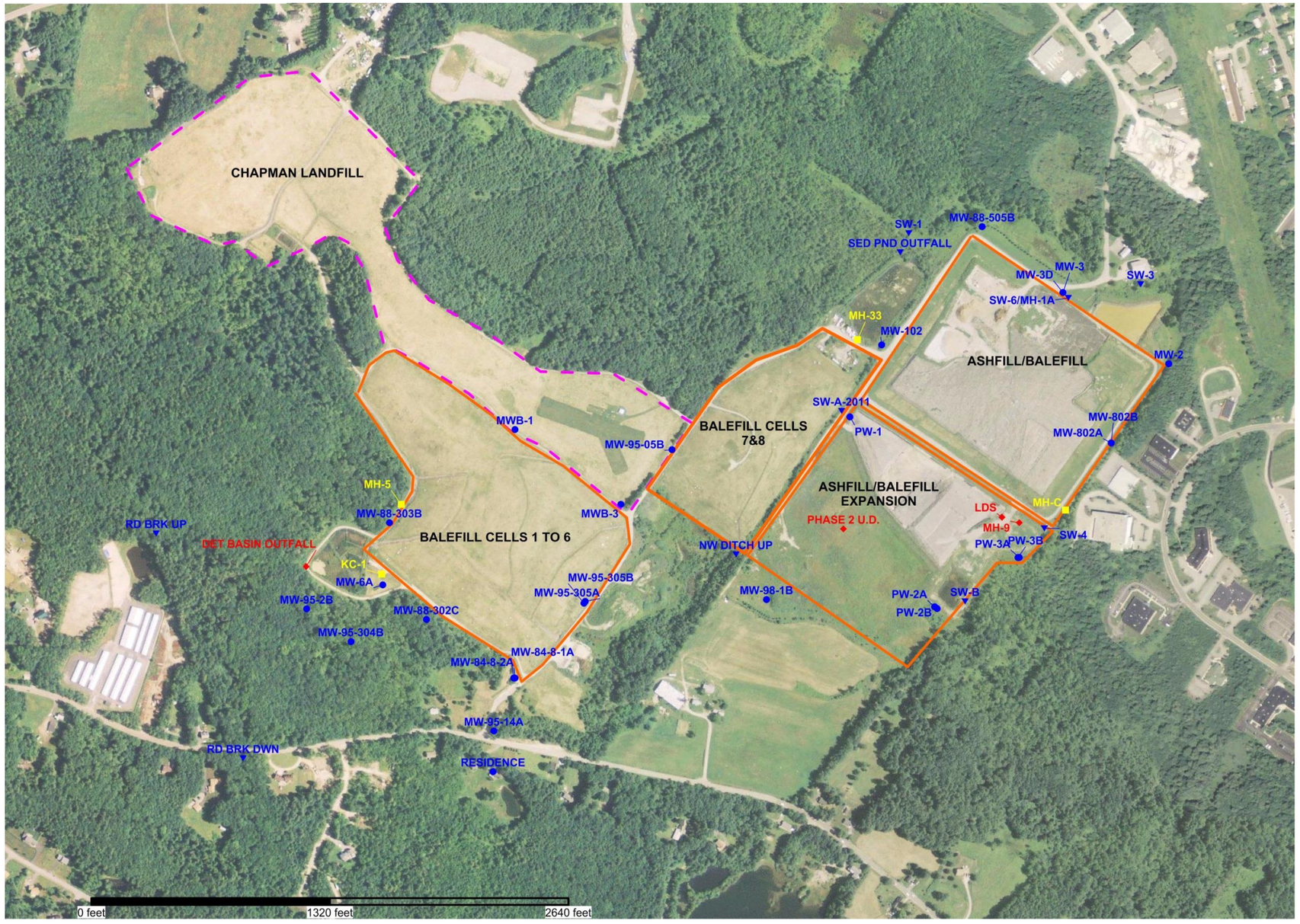
ECOMAINE LANDFILL
SOUTH PORTLAND AND SCARBOROUGH, MAINE

ECOMAINE LANDFILL
64 BLUEBERRY ROAD
PORTLAND, MAINE

ENVIRONMENTAL CONSULTING GROUP
St.Germain · Collins

FIGURE 1

DATE: 4/15/15	SCALE: SEE ABOVE	PROJECT NO.: 3297	FILE: FIGURE 1	846 MAIN STREET, WESTBROOK, ME 04092 207-591-7000 WWW.STGERMAINCOLLINS.COM



LEGEND

MW-102	MONITORING WELL
SW-1	SURFACE WATER
KC-1	LEACHATE
LDS	OTHER (LEAK DETECTION AND UNDERDRAINS)

N

ENVIRONMENTAL MONITORING LOCATIONS

ECOMAINE LANDFILL
SOUTH PORTLAND AND SCARBOROUGH, MAINE

ECOMAINE LANDFILL
64 BLUEBERRY ROAD
PORTLAND, MAINE 04102

ENVIRONMENTAL CONSULTING GROUP
St.Germain · Collins

FIGURE 2

DATE: 4/15/15 | SCALE: SEE ABOVE | PROJECT NO.: 3297 | FILE: FIGURE 2

846 MAIN STREET, WESTBROOK, ME 04092 207-591-7000 WWW.STGERMAINCOLLINS.COM

Table 1
Well Purge Stabilization Times
ecomaine Landfill
Scarborough and South Portland, Maine

Well	Date Sampled				
	Aug-13	Nov-13	Apr-14	Aug-14	Average
MM-102	Often artesian				**NC**
MW-2	15	NA	20	18	**18**
MW-3	15	15	15	21	**17**
MW-3D	15	30	30	15	**23**
MW-6A	25	10	15	12	**16**
MW-84-8-1A	15	30	NA	9	**18**
MW-84-8-2A	15	15	20	18	**17**
MW-88-302C	25	35	15	12	**22**
MW-88-303B	15	30	NA	9	**18**
MW-95-14A	15	20	20	20	**19**
MW-95-2B	13	15	20	27	**19**
MW-95-304B	23	25	15	9	**18**
MW-95-305A	15	15	15	15	**15**
MW-95-305B	15	15	10	15	**14**
MW-95-5B	15	15	10	28	**17**
MWB-1	15	15	15	32	**19**
MWB-3	15	5	20	25	**16**
MW-802A	Often artesian				**NC**
MW-802B	15	NA	10	12	**12**
MW-88-505B	15	15	20	18	**17**
MW-98-1B	10	25	15	18	**17**
PW-2A	Often artesian				**NC**
PW-3A	Often artesian				**NC**
PW-1	15	25	20	9	**17**
PW-2B	15	10	15	15	**14**
PW-3B	15	10	20	12	**14**

Notes:
All units in minutes.
NA = not available.
NC = not calculated.

Table 2
Analytical Method Information
ecomaine Balefill and Ashfill /Balefill Facilities
South Portland and Scarborough, Maine

Analytical Parameter	USEPA Method Number	Container Type	Sample Preservation	Maximum Holding Time
Wet Chemistry Parameters				
Ammonia	350.1	250 mL glass	H2SO4	28 Days
Total Alkalinity	310.2	250 mL plastic	4°C	14 Days
Chemical Oxygen Demand (COD)	5220C	250 mL glass	H2SO4	28 Days
Chloride	9056	250 mL plastic	4°C	28 Days
Cyanide, Total	335.2	1 L plastic	NaOH	14 Days
Nitrate-Nitrite-Nitrogen	353.2	250 mL plastic	4°C	24 Hours*
Sulfate	9056	250 mL plastic	4°C	28 Days
Biochemical Oxygen Demand (BOD)	5210B	1 L plastic	4°C	48 Hours
Total Organic Carbon (TOC)	9060	250 mL glass	H2SO4	28 Days
Total Dissolved Solids (TDS)	2540C	500 mL plastic	4°C	7 Days
Total Phosphorous	6010	250 mL plastic	HNO3	28 Days
Total Sus pended Solids (TSS)	160.2	1 L plastic	4°C	7 Days
Metals				
Arsenic, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Barium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Cadmium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Calcium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Chromium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Copper, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Iron, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Lead, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Magnesium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Manganese, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Mercury, Total	7470A	250 mL plastic	HNO3	28 Days
Nickel, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Potassium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Selenium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Sodium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Vanadium, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Zinc, Total	SW846 - 6010B	250 mL plastic	HNO3	6 Months
Organic and Other Parameters				
Volatile Organic Compounds	SW846 - 8260B	(3) 40 mL glass vials	HCL	14 Days

* = unless preserved with sulfuric acid.

Table 3
Description of Sampling Locations
ecomaine Facilities, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Sampling Locations	Associated Unit	Purpose
Balefill Groundwater		
MW-102	Balefill Cells 7 and 8	Downgradient of Balefill Cells 7 and 8 and upgradient of Ashfill/Balefill unit
MW-6A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-84-8-1A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-84-8-2A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-88-302C	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-88-303B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-14A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-2B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6 and downgradient of Wetland Treatment System
MW-95-304B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-305A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-305B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-5B	Balefill Cells 7 and 8	Upgradient of Balefill Cells 7 and 8, and downgradient of Chapman Landfill
MWB-1	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6, and downgradient of Chapman Landfill
MWB-3	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6, and downgradient of Chapman Landfill
Residence	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
Balefill Surface Water		
NW DITCH UP	Balefill Cells 7 and 8	Upgradient of Balefill Cells 7 and 8
RD BRK DWN	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6
RD BRK UP	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6
SED PND OUTFALL	Balefill Cells 7 and 8	Treated stormwater discharge quality downgradient of Balefill Cells 7-8
Ashfill/Balefill and Ashfill/Balefill Expansion Groundwater		
MW-2	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-3	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-3D*	Ashfill/Balefill	Downgradient of Ashfill/Balefill (installed 2013)
MW-802A*	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-802B	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-88-505B	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-98-1B	Ashfill/Balefill Expansion	Upgradient of Ashfill/Balefill Expansion
PW-1	Balefill Cells 7 and 8, Ashfill/Balefill	Downgradient of Balefill Cells 7 and 8, and Upgradient of Ashfill/Balefill
PW-2A	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-2B	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-3A	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-3B	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
Ashfill/Balefill and Ashfill/Balefill Expansion Surface Water		
SW-1	Ashfill/Balefill	Upgradient Ashfill/Balefill
SW-3	Ashfill/Balefill	Downgradient Ashfill/Balefill
SW-4	Ashfill/Balefill	Downgradient Ashfill/Balefill
SW-A-2011	Ashfill/Balefill Expansion	Upgradient Ashfill/Balefill Expansion
SW-B	Ashfill/Balefill Expansion	Downgradient Ashfill/Balefill Expansion
Ashfill/Balefill Expansion Underdrain		
MH-9	Ashfill/Balefill Expansion	Ashfill/Balefill Phase 1 Expansion groundwater underdrain
PHASE 2 EXP UNDERDRAIN*	Ashfill/Balefill Expansion	Ashfill/Balefill Phase 2 Expansion groundwater underdrain
Facility-wide Leachate and Leak Detection System		
KC-1	Balefill Cells 1-6	Balefill Cells 1-6 leachate quality
MH-33	Balefill Cells 7 and 8	Balefill Cells 7 and 8 leachate quality
MH-C	Ashfill/Balefill Expansion	Ashfill/Balefill Expansion leachate quality
SW-6/MH-1A	Ashfill/Balefill	Ashfill/Balefill leachate quality
LDS #1 and #2	Ashfill/Balefill Expansion	Ashfill/Balefill Expansion leak detection system water quality
(WTS)		
MH-5	Balefill Cells 1-6	Groundwater collected by the Balefill Cells 1-6 underdrain - Influent to Wetland Treatment System.
DETENTION BASIN OUTFALL	Balefill Cells 1-6	Final discharge point for a mixture of treated stormwater runoff and WTS effluent.

Table 4
Summary of Sampling Parameters
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Sampling Locations	Purge and Sample Method	Sampling Parameters	
		Spring (March/April)	Fall (October/ November)
Balefill Groundwater			
MW-102	Artesian/Grab	Field	Field and Parameter List 2
MW-6A	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-84-8-1A	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-84-8-2A	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-88-302C	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-88-303B	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-14A	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-2B	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-304B	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-305A	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-305B	Peristaltic/Low Flow	Field	Field and Parameter List 2
MW-95-5B	Peristaltic/Low Flow	Field	Field and Parameter List 2
MWB-1**	Bladder/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MWB-3**	Bladder/Low Flow	Field and Parameter List 1	Field and Parameter List 2
Residence	Domestic well/Grab	Not sampled	Field and Parameter List 2
Balefill Surface Water			
NW DITCH UP	Grab	Field and Parameter List 1	Field and Parameter List 2
RD BRK DWN	Grab	Field and Parameter List 1	Field and Parameter List 2
RD BRK UP	Grab	Field and Parameter List 1	Field and Parameter List 2
SED PND OUTFALL	Grab	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Groundwater			
MW-2	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-3	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-3D*	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-802A*	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-802B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-88-505B**	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
MW-98-1B**	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
PW-1**	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
PW-2A	Artesian/Grab	Field and Parameter List 1	Field and Parameter List 2
PW-2B**	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
PW-3A	Artesian/Grab	Field and Parameter List 1	Field and Parameter List 2
PW-3B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Surface Water			
SW-1	Grab	Field and Parameter List 1	Field and Parameter List 2
SW-3	Grab	Field and Parameter List 1	Field and Parameter List 2
SW-4	Grab	Field and Parameter List 1	Field and Parameter List 2
SW-A-2011	Grab	Field and Parameter List 1	Field and Parameter List 2
SW-B	Grab	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Expansion Underdrain			
MH-9	Grab	Field and Parameter List 1	Field and Parameter List 2
PHASE 2 U.D.*	Grab	Field and Parameter List 1	Field and Parameter List 2
Leachate			
KC-1	Grab	Field and Parameter List 3	Field and Parameter List 3
MH-33	Grab	Field and Parameter List 3	Field and Parameter List 3
MH-C	Grab	Field and Parameter List 3	Field and Parameter List 3
SW-6/MH-1A	Grab	Field and Parameter List 3	Field and Parameter List 3
L.D.S #1	Grab	Field and Parameter List 3	Field and Parameter List 3
L.D.S #2*	Grab	Field and Parameter List 3	Field and Parameter List 3
Wetlands Treatment System			
MH-5 (Balefill Cells 1-6 Underdrain)	Grab	See Table 5	See Table 5
DETENTION BASIN OUTFALL	Grab	See Table 5	See Table 5

Notes:
* = new monitoring point as of 2013.
** = well to be sampled with low-flow and HydraSleeve for 2013.
Field = field parameters = depth to water level or flow rate, temperature, specific conductivity, dissolved oxygen, pH, ORP and turbidity.
Parameter List 1 = basic suite of groundwater and surface water analytics; see Table 4 for a detailed list of laboratory analytes
Parameter List 2 = VOCs and basic suite of groundwater and surface water analytics; see Table 4 for a detailed list of laboratory analytes
Parameter List 3 = suite of leachate analytes; See Table 4 for a detailed list of laboratory analytes.

Table 5
Sampling Parameter Lists
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

	Biannual Water Quality Standard Suite	Annual Water Quality Expanded Suite	Leachate Standard Suite
Parameter	**Parameter List 1**	**Parameter List 2**	**Parameter List 3**
Field Parameters			
Static Water Level	monitoring wells only	monitoring wells only	
Turbidity	X	X	
Specific Conductance	X	X	X
Temperature	X	X	X
pH	X	X	X
Oxidation Reduction Potential (ORP)	X	X	X
Dissolved Oxygen (DO)	X	X	X
Well Depth*	X	X	X
Pumping Rate During Sampling	monitoring wells only	monitoring wells only	
Drawdown During Sampling	monitoring wells only	monitoring wells only	
Surface Water Flow Rate	surface water only	surface water only	
Wet Chemistry Parameters			
Ammonia	X	X	X
Total Alkalinity	X	X	X
Chemical Oxygen Demand (COD)			X
Chloride	X	X	X
Cyanide, Total			X
Nitrate + Nitrite-Nitrogen	X	X	X
Sulfate	X	X	X
Biochemical Oxygen Demand (BOD)			X
Total Organic Carbon (TOC)	X	X	X
Total Dissolved Solids (TDS)	X	X	X
Total Phosphorous			X
Total Suspended Solids (TSS)	surface water only	surface water only	X
Metals			
Arsenic, Total	X	X	X
Barium, Total		X	X
Cadmium, Total			X
Calcium, Total	X	X	X
Chromium, Total			X
Copper, Total			X
Iron, Total	X	X	X
Lead, Total			X
Magnesium, Total	X	X	X
Manganese, Total	X	X	X
Mercury, Total			X
Nickel, Total	X	X	X
Potassium, Total	X	X	X
Selenium, Total			X
Sodium, Total	X	X	X
Vanadium, Total			X
Zinc, Total			X
Organic and Other Parameters			
Volatile Organic Compounds		X	X

Notes:
* = measured biennually.

Table 6
Wetland Treatment System Monitoring Program
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

	Weekly Monitoring			Biannual		Annual (fall)	
Parameter	**MH-5**	**WTS Effluent**	**Detention Basin Outfall**	**MH-5**	**Detention Basin Outfall**	**MH-5**	**Detention Basin Outfall**
Field Parameters							
Turbidity				X	X	X	X
Specific Conductance	X	X	X	X	X	X	X
Temperature				X	X	X	X
pH			X	X	X	X	X
Oxidation Reduction Potential (ORP)				X	X	X	X
Dissolved Oxygen (DO)				X	X	X	X
Other Field Observations				X	X	X	X
Surface Water/Leachate Flow Rate	X	X	X	X	X	X	X
Wet Chemistry Parameters							
Ammonia				X	X	X	X
Total Alkalinity				X	X	X	X
Chemical Oygen Demand (COD)				X	X	X	X
Cyanide, Total				X	X	X	X
Nitrate + Nitrite - Nitrogen				X	X	X	X
Sulfate				X	X	X	X
Total Organic Carbon (TOC)				X	X	X	X
Total Dissolved Solids (TDS)				X	X	X	X
Total Phosphorous				X	X	X	X
Total Suspended Solids (TSS)				X	X	X	X
Metals							
Arsenic, Total				X	X	X	X
Barium, Total				X	X	X	X
Cadmium, Total				X	X	X	X
Calcium, Total				X	X	X	X
Chromium, Total				X	X	X	X
Copper, Total				X	X	X	X
Iron, Total				X	X	X	X
Lead, Total				X	X	X	X
Magnesium, Total				X	X	X	X
Manganese, Total				X	X	X	X
Nickel, Total				X	X	X	X
Potassium, Total				X	X	X	X
Sodium, Total				X	X	X	X
Organic and Other Parameters							
Volatile Organic Compounds						X	X

Table 7
Biennual Monitoring Wells
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Site ID	Monitored Zone	Unit Screened	Well Diameter (in)	Measuring Point Elevation (ft msl)	Total Depth (ft)
MW-101A	R	Rock	0.75	76.11	165.10
MW-101B	D	Till	0.75	76.15	158.10
MW-101C	S	Clay	0.75	76.94	10.71
MW-102	D	Clay	1.0	75.74	128.00
MW-104A	I	Till	1.0	80.59	56.20
MW-104C	S	Sand	1.0	81.35	32.45
MW-2	S	Clay	2.0	71.46	15.71
MW-3	S	Clay	2.0	73.42	21.71
MW-3D	D	Sand	2.0	NA	66.50
MW-6A	S	Sand	2.0	101.14	9.80
MW-7A	S	Outwash	2.0	111.36	30.78
MW-8	S	Sand	2.0	111.38	12.93
MW-802A	D	Till	2.0	72.62	6.64
MW-802B	S	Clay	2.0	73.11	15.20
MW-804A	D	Till	1.0	73.00	61.91
MW-804B	I	Clay	1.0	73.00	31.82
MW-804C	S	Clay	1.0	73.00	13.90
MW-84-5	I	Sand	1.5	128.43	86.15
MW-84-6	D	Till	1.5	89.72	72.80
MW-84-6C	S	Clay	1.5	85.08	20.08
MW-84-7	I	Sand	1.5	117.14	61.50
MW-84-8-1A	S	Till	2.0	126.23	29.91
MW-84-8-2A	I	Sand	2.0	125.69	67.09
MW-85-1	S	Sand	2.0	103.09	12.16
MW-85-2A	D	Till	2.0	94.54	71.00
MW-88-301B	S	Sand	2.0	105.27	17.30
MW-88-302A	I	Clay / Till	2.0	108.11	56.81
MW-88-302C	S	Sand	2.0	108.45	16.65
MW-88-303A	I	Clay	2.0	105.83	49.50
MW-88-303B	S	Sand	2.0	106.02	14.75
MW-88-306	S	Sand / Till	2.0	120.05	27.81
MW-88-307A	I	Till	2.0	121.29	44.65
MW-88-307B	S	Sand	2.0	121.51	20.08
MW-88-308A	I	Till	2.0	110.85	72.65
MW-88-308B	S	Sand	2.0	110.85	18.00
MW-88-309A	D	Till	2.0	141.35	79.04
MW-88-505B	S	Clay	2.0	74.44	12.75
MW-9	I	Clay	2.0	110.63	18.30
MW-95-10	S	Sand	2.0	90.84	11.99
MW-95-11	S	Clay	2.0	92.72	12.11
MW-95-12	I	Till	2.0	116.94	60.11
MW-95-13	S	Sand	2.0	93.28	11.85
MW-95-14A	I	Till	2.0	116.32	44.11
MW-95-14B	S	Till	2.0	115.90	27.51
MW-95-2B	S	Sand	2.0	93.35	12.29

Table 7
Biennual Monitoring Wells
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Site ID	Monitored Zone	Unit Screened	Well Diameter (in)	Measuring Point Elevation (ft msl)	Total Depth (ft)
MW-95-304A	I	Clay	2.0	95.62	30.39
MW-95-304B	S	Sand	2.0	95.16	10.39
MW-95-305A	I	Till	2.0	120.81	51.41
MW-95-305B	S	Till	2.0	121.17	24.66
MW-95-3A	D	Till	2.0	82.24	31.00
MW-95-3B	S	Clay	2.0	81.83	15.49
MW-95-3R	R	Rock	2.0	81.73	159.00
MW-95-4A	I	Till	2.0	146.14	70.70
MW-95-5B	S	Till	2.0	144.36	47.60
MW-95-6A	D	Till	2.0	84.22	90.91
MW-95-6B	I	Till	2.0	84.86	72.84
MW-95-7B	S	Sand	2.0	116.71	22.45
MW-95-8A	D	Till	2.0	101.35	91.36
MW-95-9A	I	Clay	2.0	83.44	41.68
MW-95-9B	S	Clay	2.0	84.01	17.12
MW-98-1A	I	Till	2.0	118.98	100.90
MW-98-1B	S	Sand	2.0	118.67	27.68
MW-98-2A	I	Till	2.0	119.39	82.82
MW-98-2B	S	Sand	2.0	119.24	20.85
MW-99-1A	I	Sand	2.0	119.59	57.70
MW-99-1B	S	Sand	2.0	119.47	25.00
MW-99-2B	S	Gravel	2.0	124.38	32.31
MW-99-2R	R	Bedrock	2.0	124.40	68.17
MW-99-5B	S	Clay	2.0	127.43	29.16
MWB-1	S	Sand	2.0	141.28	32.34
MWB-2	S	Till	2.0	147.53	26.25
MWB-3	S	Till	2.0	142.30	35.91
NO#	S	NA	2.5	115.30	26.34
P-109	S	Clay	1.0	77.14	14.20
P-112	S	Clay	1.0	87.08	25.80
PW-1	S	Till	2.0	93.13	17.7
PW-2A	I	Till	2.0	NA	44.26
PW-2B	S	Sand / Clay	2.0	87.73	17.70
PW-3A	I	Clay	2.0	NA	81.7
PW-3B	S	Clay	2.0	73.49	17.3
RB-1B	S	Clay/Sand	1.0	NA	7.15
RB-1S	S	Clay/Sand	1.0	82.50	7.30
RB-2S	S	Clay/Sand	1.0	81.78	7.38
RB-3B	S	Clay/Sand	1.0	80.73	6.81
RB-3S	S	Clay/Sand	1.0	80.61	7.32
RB-4B	S	Clay/Sand	1.0	80.63	7.40
RB-4S	S	Clay/Sand	1.0	80.54	7.38
RB-5B	S	Clay/Sand	1.0	78.99	7.32
RB-5S	S	Clay/Sand	1.0	78.96	7.15

Table 7
Biennual Monitoring Wells
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Site ID	Monitored Zone	Unit Screened	Well Diameter (in)	Measuring Point Elevation (ft msl)	Total Depth (ft)
RW-2A	R	Rock	0.75	74.69	21.90
RW-2B	I	Sand	0.75	75.03	55.30
RW-2C	S	Clay	0.75	74.76	10.95
TB-7	I	Silt / Clay	2.5	112.07	6.42
X-2	S	NA	2.5	115.97	45.10
X-3	S	NA	2.5	121.05	18.24
X-4A	S	NA	1.0	117.85	20.30
X-4B	S	NA	1.0	117.99	35.21
X-5	S	NA	3.0	106.52	8.26
X-6	S	NA	1.0	106.82	31.60
X-7	S	NA	2.5	108.66	37.24
X-8A	S	NA	1.0	107.71	6.15
X-8B	S	NA	1.0	107.88	5.50
X-9	S	NA	2.5	106.91	10.35

Notes:
NA = Not available
NM = Not measured
Dry = monitoring point dry at the time of measurement.
0.00' indicates water at top of PVC casing at the time of depth to water measurement.
Monitored Zone: S=shallow, I=intermediate, D=deep and R=rock.
Measuring point elevation and total depth from top of PVC casing.

Table 8
Wells for Upgradient to Downgradient Comparisons
ecomaine Facility, Balefill and Ashfill/Balefill
South Portland and Scarborough, Maine

Upgradient Monitoring Wells (screened material)	Downgradient Monitoring Wells (screened material)	Rationale for Comparison
MWB-1 (sand)	MW-88-303B (sand)	MW-88-303B is located downgradient of MWB-1 along the landfill toe. Both wells are screened in the sand unit above the till unit.
MWB-3 (till)	MW-95-305A (till)	Wells screened in the same unit (till). Wells chosen for downgradient comparison represent shallow (MW-95- 305B) and intermediate (MW-95-305A) zones of overburden. The downgradient wells are located near the landfill toe.
	MW-95-305B (till)	
MW-95-5B (till)	PW-1 (till)	Wells screened in the same unit (till). The downgradient well is located near the landfill toe.
PW-1 (till)	MW-2 (clay)	MW-2 and MW-3 are located downgradient of PW-1. Wells are screened in the shallow overburden zone.
	MW-3 (clay)	
MW-98-1B (sand)	PW-2B (sand/clay)	PW-2B and PW-3B are located downgradient of MW-98-1B. Wells are screened in shallow overburden zone. The downgradient wells are located near the landfill toe.
	PW-3B (clay)	

APPENDIX B

MEDEP Communications

St.Germain ▪ Collins

August 28, 2014

Randy McMullin
Maine Department of Environmental Protection
State House Station 17
Augusta, Maine 04333

Re: Proposed Revisions to Environmental Monitoring Plan
ecomaine Landfill, South Portland and Scarborough, Maine
St.Germain Collins File No.: 3297.3

Dear Mr. McMullin:

As recently discussed at the ecomaine Landfill on August 1, 2014, ecomaine would like to modify its Environmental Monitoring Plan. These changes were in part prompted by a previous meeting with the Maine Department of Environmental Protection (MEDEP) regarding the use of HydraSleeve sampling equipment. At that meeting, MEDEP indicated that HydraSleeve would not be acceptable without more data and/or testing, and perhaps would only be appropriate for higher yielding wells. The conversation proceeded to other possible modifications to the sampling program to maintain the integrity of the monitoring program while reducing costs for ecomaine. Based on these conversations and a review of monitoring data, the following changes are proposed:

1. Reduce sampling frequency from three to two times per year. We propose sampling in the spring (April-May) and in the early fall (October-November), but are open to suggestion.

2. Eliminate silver from the leachate analyses. Silver has been detected only 16 times since 2000 out of about 580 analyses and none exceeded the Maximum Exposure Guideline.

3. Modify the low flow sampling method with respect to the frequency of field parameter measurements. Normally, field parameters are measured at several minute intervals from the beginning of purging and measurements continue until the field parameters stabilize. However, based on purging results over several years, the average time for stabilization can be determined for each well. **Table 1, Well Purge Stabilization Times**, summarizes the purge times for the wells currently sampled at the landfill. We propose to measure field parameters at the beginning of purging and then at least twice at the estimated stabilization time to confirm that all five field parameters have stabilized. When artesian conditions exist, purging is not completed for wells MW-102, MW-802A, PW-2A, and PW-3A. When these wells are not flowing, the conventional low-flow method will be used.

If you have any questions, feel free to contact us at 207-591-7000.

Sincerely,
ST.GERMAIN COLLINS

Keith R. Taylor, Maine C.G. #282
Senior Environmental Geologist

cc: Tom Raymond, ecomaine
Dick Behr, MEDEP

Attachment:

Table 1, Well Purge Stabilization Times

Table 1
Well Purge Stabilization Times
ecomaine Landfill
Scarborough and South Portland, Maine

Well	Date Sampled				Average
	Aug-13	Nov-13	Apr-14	Aug-14	
MM-102	Often artesian				**NC**
MW-2	15	NA	20	18	**18**
MW-3	15	15	15	21	**17**
MW-3D	15	30	30	15	**23**
MW-6A	25	10	15	12	**16**
MW-84-8-1A	15	30	NA	9	**18**
MW-84-8-2A	15	15	20	18	**17**
MW-88-302C	25	35	15	12	**22**
MW-88-303B	15	30	NA	9	**18**
MW-95-14A	15	20	20	20	**19**
MW-95-2B	13	15	20	27	**19**
MW-95-304B	23	25	15	9	**18**
MW-95-305A	15	15	15	15	**15**
MW-95-305B	15	15	10	15	**14**
MW-95-5B	15	15	10	28	**17**
MWB-1	15	15	15	32	**19**
MWB-3	15	5	20	25	**16**
MW-802A	Often artesian				**NC**
MW-802B	15	NA	10	12	**12**
MW-88-505B	15	15	20	18	**17**
MW-98-1B	10	25	15	18	**17**
PW-2A	Often artesian				**NC**
PW-3A	Often artesian				**NC**
PW-1	15	25	20	9	**17**
PW-2B	15	10	15	15	**14**
PW-3B	15	10	20	12	**14**

Notes:
All units in minutes.
NA = not available.
NC = not calculated.

STATE OF MAINE

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF REMEDIATION AND WASTE MANAGEMENT

M E M O R A N D U M

TO: Randy McMullin, Project Manager
Division of Solid Waste Management
Bureau of Remediation and Waste Management

FROM: Richard S. Behr, Environmental Hydrogeology Specialist - GE#342
Division of Technical Services
Bureau of Remediation and Waste Management

DATE: September 10, 2014

RE: Proposed Revisions to Environmental Monitoring Plan Ecomaine Landfill, South Portland and Scarborough, Maine - Prepared by: St.Germain-Collins, Environmental Consulting Group, St.Germain-Collins File No.: 3297.3 August 28, 2014

****

I have reviewed the proposal prepared by Keith Taylor. The proposal describes three modifications to the current Environmental Monitoring Program intended to reduce the overall cost of the sampling program. We discussed all of the proposed modifications during the July 2, 2014 meeting.

Overall I concur with the proposed revisions but have a few questions and suggestions. The following comments are preceded by the numbering system used in the St.Germain - Collins proposal. Don't hesitate to contact me with any questions you may have.

1) I am in favor of the proposal to reduce the monitoring frequency from three to two times per year. The proposal for a spring and fall sampling schedule is also acceptable to me. The Solid Waste Rules include provisions for alternative sampling programs. However, ecomaine should provide a technical justification in order for the

Department to approve this significant change to its EMP. In my view, the hydrogeological characteristics of this site favor reducing the sampling frequency. The favorable site characteristics and extensive historical water quality data set should be discussed in the justification.

2) I have no issue with the elimination of silver from the list of leachate parameters. In fact, careful review of the analytical data may identify additional parameters that may only require periodic analysis.

3) The third proposed revision relates to the routine collection of field parameters during low flow sampling. During the July meeting I suggested that one might justifiably eliminate the collection of multiple rounds of low flow field parameters from monitoring wells that have been part of an EMP for several years. Review of the historic records of purge times for a particular well can readily be used to estimate a reasonable purge time before collecting samples for laboratory analysis. To this end, St.Germain-Collins has calculated an average purge stabilization time for wells in the program. The average time for each well is included in Table 1.

In general, I like this approach but have one primary concern regarding purging times. During the July discussion about the HYDRASleeve versus low flow sampling protocols, I outlined my concern that some of the wells used in the evaluation may have been sampling before all the field parameters reached stabilization (e.g., dissolved oxygen). To address this issue, I plan to accompany St.Germain-Collins during the November 2014 sampling round to collect additional data. My aim will be to collect additional field data after the scheduled purge times have elapsed. This work will be performed without disrupting St.Germain-Collins' field schedule by using peristaltic pumps and field meters provided by the Department. At this time I plan to complete the additional evaluation on the four wells previously included in the HYDRASleeve - low flow sampling evaluation.

attachment

Email: Steve Farrar
Richard Heath

APPENDIX B

ENVIRONMENTAL MONITORING PLAN

ecomaine LANDFILL FACILITIES
SCARBOROUGH AND SOUTH PORTLAND, MAINE

Prepared for:

ecomaine
64 Blueberry Road
Portland, Maine

Prepared by:
SUMMIT ENVIRONMENTAL CONSULTANTS, INC.
640 Main Street
Lewiston, Maine 04240

Revised June 2011
Project # 16588

PN: 16588

June 21, 2011

Bureau of Remediation and Waste Management
Department of Environmental Protection
17 State House Station
Augusta, ME 04333

Attn: Mr. Randy McMullin

RE: 2011 Environmental Monitoring Plan
ecomaine Landfill Facility – Scarborough and South Portland, Maine

Dear Mr. McMullin:

On behalf of **ecomaine**, Summit Environmental Consultants, Inc. (Summit) is hereby submitting a revised Environmental Monitoring Plan (EMP) for the **ecomaine** Landfill facilities located in Scarborough and South Portland, Maine. This revised EMP has been prepared in accordance with Summit's Environmental Monitoring Plan Evaluation report to the Maine Department of Environmental Protection (MEDEP) dated March 25, 2011, comments from Dick Behr of the MEDEP emailed to Summit on April 15, 2011, and the Solid Waste Order, License Amendment (No. S-13127-WD-AC-A), issued by MEDEP on June 23, 1997.

Major revisions to the 2006 EMP include a revised list of sampling locations and sampling parameters, updated sample locations maps and revised upgradient versus downgradient groundwater quality comparisons. Based on a verbal agreement with the MEDEP, monitoring in accordance with this revised EMP was initiated during the spring (March/April) 2011 sampling event.

Comments from Dick Behr of the MEDEP emailed to Summit on April 15, 2011 indicate that there is still some concern regarding the number of groundwater monitoring wells located downgradient of the Ashfill/Balefill. Summit is continuing to review this issue and will provide additional information to Dick Behr in the near future.

Should you have any questions regarding the revised EMP, please do not hesitate to call.

Sincerely,
SUMMIT ENVIRONMENTAL CONSULTANTS, INC.

Suzanne Chase
Project Geologist

Michael A. Deyling, C.G., P.Hg.
Principal Hydrogeologist, President

cc: Tom Raymond P.L.S., P.E.; **ecomaine**
Dick Behr, C.G.; MEDEP
Attachments

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1.0 INTRODUCTION

This revision of the *Environmental Monitoring Plan* (EMP) for the **ecomaine** Ashfill/Balefill and closed Balefill facilities incorporates changes to the 2006 Environmental Monitoring Plan (Golder Associates, Inc. 2006) pursuant to Summit's proposed EMP revisions dated March 25, 2011 and the Maine Department of Environmental Protection's (MEDEP) comments dated April 15, 2011. This revised EMP includes the following:

- Facility background;
- Revised list of sampling locations reflecting existing groundwater, surface water, and leachate monitoring network;
- Field sampling techniques required by the EMP for groundwater, surface water, and leachate;
- Analytical methods;
- Monitoring programs for the four units at the facility (Balefill, Ashfill/Balefill, Ashfill/Balefill Lateral Expansion, and Wetlands Treatment System [WTS]);
- Quality assurance and quality control (QA/QC) procedures used to assess the sampling and laboratory techniques and the validity of the data; and
- Content of the annual and tri-annual reports required under the EMP.

2.0 FACILITY BACKGROUND

ecomaine (formerly Regional Waste Systems (RWS)) is a quasi-municipal, regional solid waste disposal entity with a waste-to-energy facility and a recycling facility in Portland, Maine, and a landfill facility located in Scarborough and South Portland, Maine that receives solid waste from 21 owner member municipalities in Maine and about 20 other associate/contract member municipalities in Maine. Figure 1 shows the location of the **ecomaine** Landfill Facility on the Portland West, Maine Quadrangle prepared by the United States Geological Survey. For the purpose of this EMP, the **ecomaine** Landfill Facility currently consists of four areas: Balefill, Ashfill/Balefill, Ashfill/Balefill Lateral Expansion, and Wetlands Treatment System. These units are described in the following sections.

2.1 BALEFILL

Balefill Cells 1 through 6, the first landfill cells constructed at the facility, are synthetically-lined cells constructed in stages beginning in 1977. The cells are located on a side slope that was previously mined for sand and gravel. Cells 1 through 6 operated from 1977 to 1985 and are primarily filled with baled municipal wastes. Environmental sampling has occurred at the Balefill since 1978, and monitoring wells have been added in the vicinity of these cells to assess the influence of the facility on the surrounding water quality (Evolving Solutions, 2003).

As Balefill Cells 1 through 6 reached capacity, Balefill Cells 7 and 8 were constructed. Balefill Cells 7 and 8 are synthetically-lined cells that operated between 1984 and 1987. Balefill Cells 7 and 8 are located on a side slope east of Balefill Cells 1 through 6. Cells 7 and 8 were closed in October 1987 (Evolving Solutions, 2003). In 1999, a more intensive closure of Balefill Cells 1 through 8 was completed, including the elimination of settlement areas, and the installation of a landfill gas collection system and a synthetic cap.

2.2 ASHFILL/BALEFILL

Northeast of Balefill Cells 7 and 8 is an active landfill designated the Ashfill/Balefill, which has been in operation since 1988. The Ashfill/Balefill area receives combustion residues (bottom ash, flyash and slag) from the **ecomaine** waste-to-energy incinerator in Portland, Maine; grits and screenings from several local municipalities; and has also received baled municipal solid waste.

2.3 ASHFILL/BALEFILL LATERAL EXPANSION

The Ashfill/Balefill Lateral Expansion was permitted in 2003 and construction was to be completed in two phases. Phase 1 was constructed in 2006 with geomembrane-lined cells including a leak detection system. Plans to construct Phase 2 are under consideration at this time. The Ashfill/Balefill Lateral Expansion is projected to be active for at least 20 years and is permitted to receive incinerator ash and other non-hazardous solid waste materials.

2.4 WETLANDS TREATMENT SYSTEM

The Wetlands Treatment System (WTS) was constructed in October 1999. The treatment system receives groundwater from the Balefill Cells 1 through 6 underdrain discharge. The system was designed to facilitate biological and chemical reactions to reduce the concentrations of several inorganic constituents found within the groundwater collected by the underdrain system. It was designed to handle an underdrain flow of up to 20 gpm to provide an 11-day residence time in the system.

The WTS is comprised of a series of five vegetated wetland cells connected by weirs that control the level of water within each cell and the flow from one cell to the next. In addition, each of the cells includes a precast concrete vault section fitted with a PVC inlet pipe whose inlet elevation can be adjusted using a swivel mechanism. This feature allows for lowering the elevation of water in the cell below the weir elevation either to drain the cell for maintenance or to adjust residence time in the cells if needed (SCS Engineers, 1997).

The effluent from the WTS is designed to flow into the detention basin where it mixes with storm water runoff from the adjacent portions of the **ecomaine** Facility. From the detention basin outfall, the mixture of treated underdrain discharge and storm water runoff drains to a small tributary of Red Brook.

3.0 SAMPLING METHODS

Under this revised EMP, groundwater, surface water and leachate will be sampled on a tri-annual basis. The field procedures specified in this section are in accordance with Chapter 405, Section 2 of the Maine Solid Waste Management Rules, last revised June 16, 2006.

3.1 GROUNDWATER

The objective of groundwater sampling is to detect changes in water quality attributable to landfill operations. Groundwater is monitored using a network of 102 monitoring wells and piezometers, including 24 monitoring wells that are monitored or sampled tri-annually, and 78 monitoring wells that are monitored annually for water level, well depth and specific conductivity. Site specific information regarding the groundwater monitoring plan is presented in Section 5.0. The groundwater monitoring protocols are presented below.

Prior to sampling monitoring wells, the static water levels will be measured from the reference elevation (top of PVC riser) to the closest 0.01 feet for each monitoring well that will be sampled. Once the static water levels are measured, monitoring wells will be sampled progressively from the least contaminated to the most contaminated (unless dedicated equipment is used) using the low-flow sampling techniques described in the following paragraphs. Non-dedicated field equipment (i.e., water level meters, field instruments) will be decontaminated between each well.

3.1.1 LOW-FLOW SAMPLING

Wherever possible, purging and sampling will be accomplished at low flow rates using a peristaltic pump. A bladder pump will be used for low-flow techniques on wells that are two inches in diameter and where the depth to groundwater is greater than 20 feet below the ground surface (bgs). A peristaltic pump with dedicated tubing will be used on wells where depth to groundwater is less than 20 feet bgs. The pump intake will be within the screened interval of the well, and the purging and sampling procedure will be performed at a flow rate of between 0.01 liter per minute (L/min) and 1.0 L/min.

Dissolved oxygen (DO), pH, Eh, turbidity, temperature, and specific conductivity (SC) will be measured inline at the discharge of the pump in a closed flow cell every three to five minutes. Field meters will be operated and calibrated at the beginning of the day according to manufacturer's specifications. Decontamination of the field meters will occur between each well. A new pair of nitrile gloves will be donned at the start of sampling for each well to ensure sample integrity and adequate protection of the sampler from sample preservatives. Field filtering of samples is prohibited. Sample collection can occur when parameters have stabilized as follows:

1. SC, DO and turbidity stabilize within 10% of the reading range for three consecutive readings;

2. pH stabilizes within 0.1 standard units for three consecutive readings;

3. Water level stabilizes, meaning the amount of groundwater being pumped out of the well equals the amount of groundwater recharging into the well.

Each sample bottle will be labeled with the sampling location, sampling time, required analysis, sampler's initials, and preservatives used. Sample bottles from each well will be filled based on the parameters volatility and this order will remain consistent throughout sampling. The order is as follows:

1. Volatile organic compounds (VOCs)
2. Total organic carbon (TOC)
3. Total metals
4. Nutrients and anions

3.1.2 Artesian Well Sampling

Three monitoring wells (MW-102, PW-2A and PW-3A) are classified as having artesian conditions where the groundwater flows up and out of the top of the monitoring well casing. Recognizing that ambient groundwater enters the well screen at the same rate that it flows out of the top of the well, purging is not necessary; therefore, artesian wells will be sampled using a peristaltic pump and dedicated tubing with an intake within the screened interval of the well. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature, and SC. Samples will be collected from this tubing in the order specified in Section 3.1.1.

3.1.3 Residential Well Sampling

Samples from the residential well located at 61 Running Hill Road (Sheriff/Comstock residence) will be collected directly from the hose bib located to the left of the main entrance to the house. The system will be flushed for a minimum of fifteen (15) minutes at a minimum flow rate of at least five (5) gallons per minute prior to collection of the sample. Sample bottles will be filled in the same order specified in Section 3.1.1.

3.2 SURFACE WATER

The objective of surface water quality monitoring is to detect changes in surface water quality that may be attributable to facility operations. Several open channels are used as monitoring locations for surface water, including Red Brook located to the east of the Balefill Cells 1-6, several swales/ditches located on the property, the outlet to a stormwater pond located west of the Ashfill/Balefill and an unnamed tributary to Long Creek located to the north of the Ashfill/Balefill. The surface water sampling protocols are described below.

3.2.1 Flow Rate Measurement

Prior to sample collection, the surface water flow rate will be measured at each surface water sampling location. Measurement with a flow meter is the preferred method for obtaining the flow rate in feet per second (ft/s). Flow rate may also be estimated by timing a floating object as it moves along a measured length of channel or culvert. The flow rate will be calculated by dividing the length of the flow path (feet) by the time (seconds) the floating object took to flow along the path. A flow rate in feet per second (ft/s) will be reported for the monitoring point.

A flow rate of 0.05 ft/s is the minimum detection limit of most flow meters; therefore, flows less than 0.05 ft/s are a likely indication of stagnant water and will be considered "too slow to measure". In such circumstances, a surface water sample will not be collected.

3.2.2 Surface Water Sampling

After measuring the flow rate, the following sample collection procedures will be used. A new pair of nitrile gloves will be donned at the start of the sampling process to ensure sample integrity and adequate protection of the sample from sample preservatives.

1. When samples are collected from shallow water, care will be taken to avoid entraining bottom sediments in the sample. In addition, samples will be collected downstream first to avoid collecting sediments that could be disturbed in the upstream sampling. Samples will be collected upstream of the sampler.

2. A large, decontaminated container will be utilized to collect a grab sample to obtain readings for DO, pH, Eh, turbidity, temperature and SC.

3. Samples will be unfiltered and will be collected in a manner that produces the least possible turbidity.

4. Sample bottles will be filled in the same location as the grab sample for the field parameters. Bottles will be filled in the order specified in Section 3.1.1.

5. Each sample bottle will be labeled with the sampling location, sample time, required analysis, sampler's initials and preservatives used.

6. A continuous chain-of-custody will be maintained for each sample. The sample container, preservation method and holding time will be appropriate for each parameter and method involved in the monitoring program.

3.3 LEACHATE

Leachate samples will be collected from designated points in each leachate collection system as shown on Figure 2.

The Balefill sampling points are manhole KC-1 located east of the WTS and manhole MH-33 located northeast of Balefill Cells 7-8. Dedicated tubing is set in the manholes, which can be attached to a peristaltic pump. The leachate is flowing through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to sample collection. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers from the dedicated tubing in the same order of collection described in Section 3.1.1.

The Ashfill/Balefill leachate sampling point (SW-6/MH-1A) is located in a manhole near the treatment building. Dedicated tubing is set in the manhole, which can be attached to a peristaltic pump. The leachate is flowing through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to sample collection. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature and

SC. Samples will be collected directly into the containers from the dedicated tubing in the same order of collection described in Section 3.1.1.

The Ashfill/Balefill Lateral Expansion leachate sample will be collected from a manhole (MH-C) located near the southeast corner of the Ashfill/Balefill. A dedicated bucket on a rope is set in the manhole, which can be used to collect leachate. The leachate is flowing through the manhole, so purging will not be needed; however, the sampler will rinse the bucket three times prior to sample collection. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers from the bucket in the same order of collection described in Section 3.1.1.

3.3.1 Ashfill/Balefill Lateral Expansion Leak Detection System Sampling

The Ashfill/Balefill Lateral Expansion leak detection system (LDS) sample is collected from the leak detection riser system that his piped into the riser house associated with each phase of expansion; the Phase 1 riser house is currently being sampled at this time. The sample is collected with a dedicated pump and piping located in the leak detection riser. The system currently requires the sampler to plug in the pump and open a valve that is attached to a dedicated flexible hose used for sample collection. The flexible hose is directed into the leak detection riser and purged for 2 minutes prior to sample collection. One set of field readings will be obtained at each sampling location for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers in the same order of collection described in Section 3.1.1.

3.3.2 Ashfill/Balefill Lateral Expansion Groundwater Underdrain Sampling

The Ashfill/Balefill Lateral Expansion groundwater underdrain system sample is collected from manhole MH-9 located near the southeast corner of the Ashfill/Balefill. Dedicated tubing is set in the manhole, which can be attached to a peristaltic pump. The groundwater is flowing through the manhole, so purging is not needed; however, the sampler will allow the tubing to be flushed out for one minute prior to collecting the sample. One set of field readings will be obtained for DO, pH, Eh, turbidity, temperature and SC. Samples will be collected directly into the containers from the dedicated tubing in the same order of collection described in Section 3.1.1.

3.4 DECONTAMINATION

Non-dedicated field equipment (i.e., water level meters, field instruments) will be decontaminated prior to use to prevent sample contamination. Equipment utilized in the field at more than one sampling location will be decontaminated between locations using the following procedures:

1. The equipment will be cleaned with a solution of water and phosphate-free laboratory detergent such as Alconox®.

2. Use of a clean brush free of contamination may be necessary to remove films and particulate matter from field equipment.

3. Equipment will be rinsed thoroughly with tap water to remove the detergent.

4. Commercially-available distilled water will be used for final rinse of the equipment.

5. Handling and storage of decontaminated equipment will be done in a way to prevent recontamination.

4.0 ANALYTICAL METHODS

The laboratory will utilize analytical methods having detection limits that will not exceed one half the United State Environmental Protection Agency (EPA) maximum contaminant level (MCL) or Maine Department of Health and Human Services' maximum exposure guideline (MEG) for each parameter, where possible. Internal QA/QC appropriate for the analyses performed will be the responsibility of the analytical laboratory. The analytical results will be validated using the QA/QC procedures outlined in Section 6. Table 1 provides the analytical methods used, type of containers required for each analysis, methods used to preserve the sample, and the holding times required for each method.

5.0 MONITORING PROGRAMS

The following subsections describe the specific monitoring that will be conducted under the EMP for each of the four units at the **ecomaine** Facility. Sampling for the Balefill, Ashfill/Balefill and the Ashfill/Balefill Lateral Expansion will be performed on a tri-annual basis. The Wetland Treatment System (WTS) will be sampled on a tri-annual basis and monitored on a weekly basis for flow, pH and SC. Figure 2 illustrates the locations of the tri-annual sampling points for each of the four units at the **ecomaine** Facility.

Table 1 provides the quality control information for the parameters sampled during each sampling event. Table 2 describes the selected monitoring locations relative to the associated unit. Table 3 provides a summary of the sampling locations, sampling methods, parameter lists and sampling frequency at the four units. Table 4 summarized the three parameter lists referenced in Table 3 for facility-wide samplings locations other than the WTS. Table 5 provides a summary of the parameter lists and sampling frequency at the WTS.

In addition to the tri-annual sampling, one round of groundwater elevations, well depth and SC measurements will be collected in the fall (October/November) sampling event from wells and piezometers listed on Table 6 and shown on Figure 3; the list was updated as part of this EMP revision. The SC data for wells listed on Table 3 will be collected using low flow sampling protocols. The SC data for wells listed on Table 6, but not listed on Table 3, will be collected using a SC probe (or a combo SC and depth to water level probe) dropped down the well to the middle of the screened interval.

5.1 BALEFILL

The Balefill monitoring program includes collection of samples from fourteen monitoring wells and a residential well on Running Hill Road, four surface water sampling points, and two leachate sampling points.

A reduced sampling program for Balefill wells was approved by the MEDEP as part of discussions leading to this Revised 2011 EMP; the reduced sampling program is outlined in Tables 3 and 4. In the spring and summer, twelve of the fourteen monitoring wells will be monitored for field parameters only, and two of the fourteen monitoring wells (MWB-1 and MWB-3 located downgradient of an off-site landfill) will be monitored for field parameters and sampled for total metals, and several wet-chemistry parameters. In the fall, all fourteen monitoring wells and one residential well, will be monitored for field parameters and sampled for VOCs, total metals, and several wet-chemistry parameters.

Tri-annually, four surface water sampling locations (NW DITCH UP, RD BRK UP, RD BRK DWN, and SED PND OUTFALL) and two leachate sampling locations (manholes KC-1 and MH-33) will be sampled and analyzed for parameters at the frequency outlined in Tables 3 and 4.

5.2 ASHFILL/BALEFILL

The Ashfill/Balefill monitoring program includes collection of samples from monitoring wells, surface water sampling points, and a leachate sampling point. Groundwater samples will be collected from five wells (PW-1, MW-2, MW-3, MW-802B, and MW-88-505B) located around the Ashfill/Balefill. Samples will be collected for analysis of VOCs, total metals and several wet-chemistry and organic parameters at the frequency outlined in Tables 3 and 4.

In addition to groundwater samples, three surface water locations (SW-1, SW-3, and SW-4) and one leachate location (manhole SW-6/MH-1A) will be sampled for parameters at the frequency outlined in Tables 3 and 4.

5.3 ASHFILL/BALEFILL LATERAL EXPANSION

The **ecomaine** Ashfill/Balefill Lateral Expansion monitoring program includes collection of samples from monitoring wells, surface water sampling points, a leachate sampling point, a leak detection system sampling point and a groundwater underdrain sampling point. Groundwater samples will be collected from five monitoring wells (PW-2A, PW-2B, PW-3A, PW-3B and MW-98-1B) in the vicinity of the Ashfill/Balefill Lateral Expansion. Samples will be collected for analysis of VOCs, total metals and several wet-chemistry parameters at the frequency outlined in Tables 3 and 4.

In addition to groundwater samples, two surface water locations (SW-A-2011 and SW-B), one leachate location (manhole MH-C), one groundwater underdrain location (manhole MH-9) and the leak detection system will be sampled and analyzed for the parameters at the frequency outlined in Tables 3 and 4.

5.4 WETLANDS TREATMENT SYSTEM

The Wetlands Treatment System (WTS) receives groundwater from the Balefill Cells 1 through 6 underdrain discharge. The WTS is a series of five vegetated wetland cells connected by weirs that discharge to a detention basin.

The WTS influent (manhole MH-5) and the Detention Basin Outfall will be sampled on a tri-annual basis for water quality, and monitored on a weekly basis for flow, pH, and SC. A summary table including the weekly WTS monitoring data will be included in the tri-annual and annual reports. Table 5 outlines the frequency of sampling and parameters analyzed.

6.0 QUALITY ASSURANCE / QUALITY CONTROL

6.1 FIELD QUALITY CONTROL

6.1.1 Duplicate Sample Evaluation

Duplicate samples will be collected to assess the reproducibility of analytical results as required by the Maine Solid Waste Management Rules (Chapter 405 Section 2). Selection of the duplicate sample location will be random from one sampling event to the next and the duplicate sample identification will be coded such that its origin is not known to the laboratory.

One duplicate water quality sample will be collected for every tenth surface water or groundwater sample collected over the course of consecutive sampling events. Twenty-two water quality samples are collected during the spring and summer sampling events, including twelve monitoring wells and ten surface water locations; therefore two duplicate samples will be collected. Thirty-four water quality samples are collected during the fall sampling event, including twenty-four monitoring wells and ten surface water locations; therefore three duplicate samples will be collected. In the event that some of the water quality sampling locations are dry, then one duplicate water quality sample will be collected for every tenth samples collected over the course of consecutive sampling events.

Duplicate sample collection is not required for the residential well, the leachate sampling points, the leak detection system sampling point or the groundwater underdrain sampling points.

6.1.2 Blank Evaluations

Trip blanks will accompany each cooler or shipping container containing samples for VOC analysis submitted to the laboratory. Trip blanks will only be analyzed for VOCs. A trip blank will be prepared prior to the sampling event and stored with the samples collected throughout the event. The blank will be packaged for shipment with the samples and not opened until the samples reach the laboratory. The purpose of the trip blank will be to identify VOC contamination that may be attributed to sample handling and shipment.

Equipment blanks will not be collected as part of the monitoring program because dedicated sampling equipment (i.e. dedicated bladder pumps and peristaltic pump sampling tubes) was installed in October 2001.

6.1.3 Continuous Chain-of-Custody

Samples will be collected, transported to the laboratory, and received by the laboratory under appropriate chain-of-custody protocols.

6.1.4 Holding Time Exceedances

Holding times will be compared to the standard EPA method-specified maximum holding times for each parameter analysis. Table 1 lists the holding times for each parameter.

6.2 QUALITY ASSURANCE ASSESSMENT

The analytical methods and results for each sampling round will undergo the following QA/QC procedures on a tri-annual and annual basis:

- Verification that the chain-of-custody for each sample is continuous, that samples were analyzed for the specified parameters, and that analyses were performed within the method-specified holding time.

- As specified in Maine Solid Waste Management Rules (Chapter 405), the ratio of total dissolved solids (TDS) to SC will be compared tri-annually. Determination of the TDS to SC ratio, and a comparison of the ratio to the MEDEP-established acceptable range of 0.55-0.75. Samples of surface water and groundwater with ratios outside the 0.55-0.75 range will be reported.

- Evaluation of data reproducibility by calculating the RPD for duplicate samples that meet the specified criteria. As specified in Chapter 405 of Maine Solid Waste Management Rules, the Relative Percent Difference (RPD) will be calculated and tabulated for duplicate samples. The RPD for a given parameter will be calculated only when both sample and duplicate values are greater than 5 times the practical quantitation limit of the analyte. Analytes with an RPD exceeding 10 percent will be identified in the report.

- Identification of results outside the range of plus or minus two standard deviations for the given sample point ("outliers"). Outlier tests will be performed to identify anomalous data that could be the result of field sampling techniques, laboratory error, or atypical field conditions. For the purposes of this evaluation, detected results outside the range of two standard deviations from the mean (95% confidence) will be considered outliers.

- Evaluation of well depth changes since construction.

- Identification of VOCs present in trip blanks (as discussed in Section 6.1.2).

- Identification of laboratory-related QA/QC issues (e.g., matrix spike/matrix spike duplicate or laboratory control sample issues).

7.0 REPORTING

The MEDEP requirements for environmental monitoring reports are outlined in the Maine Solid Waste Management Rules (Chapter 405). These regulations, along with the facility's Solid Waste License application materials and variance requests submitted by RWS (now **ecomaine**, on February 28, 1997, and March 24, 1997, respectively) form the basis of the existing Order, which specifies the requirements of the **ecomaine** sampling, analysis and reporting program. Reports will be submitted within 30 days of the date the laboratory analyses are reported and accepted, and before the next sampling event occurs. Reports will be filed in paper format and analytical results will be submitted to the MEDEP as an electronic data deliverable (EDD). A digital or paper copy of the complete report will be maintained at the facility.

7.1 TRI-ANNUAL REPORT

The tri-annual reports will include the following:

1. A map of the facility showing the licensed facility site and waste handling area boundaries, the current waste handling area boundary, and the location of each monitoring point.

2. Results of the quality assurance assessment outlined in Section 6.2.

3. Tabulation of the tri-annual data, including field parameters and groundwater elevation data.

4. Identification of the elevation reference datum (e.g., mean sea level).

5. Identification of groundwater analytical results exceeding MCLs and/or MEGs.

6. Copies of the laboratory data sheets, chain-of-custody sheets and field data sheets will be available for staff inspection, if requested, for two years after a sampling event. Field data sheets will include:
    a. Date and time each sample was collected, and the sampler's signature;
    b. Temperature and weather conditions;
    c. Purge volumes, pumping rates and purge stabilization data for each monitoring well;
    d. Presence or absence of color, odor or surface sheen on water samples;
    e. Well depth measured during last annual inspection;
    f. As-built well depth;
    g. Results of the routine well inspection, maintenance and testing;
    h. Instrument calibration data (on a separate form);
    i. Static water level (pre-purge) and depth to water at the time of sampling;
    j. Identification of the reference point for depth measurements; and
    k. For surface water, an estimate of the flow rate.

7. Tabulation and a brief discussion of the WTS tri-annual compliance monitoring.

Groundwater and surface water laboratory analytical results will be compared to the EPA MCLs and the Maine Department of Health and Human Services MEGs for drinking water. MCLs are the maximum permissible level of a contaminant in water delivered to users of a public water system. MEGs represent the Maine Department of Health and Human Services' most recent recommendations for concentrations of chemical constituents in drinking water.

The tri-annual reports will contain a limited discussion of the results. A detailed discussion of the results will be provided in the annual report.

7.2 ANNUAL REPORT

The annual report will be prepared in conjunction with the third tri-annual report. In addition to presenting the fall sampling event results, the report will summarize the results for the three sampling events conducted that year, discuss the trends of key parameters, and provide recommendations. The additional content of the annual report are outlined in the following subsections.

7.2.1 Trend Analysis

As part of the annual reporting, trend analysis will be performed for each parameter sampled using results from 2000 through the present. Intra-well trends will be analyzed for each location sampled (e.g., monitoring well, surface water sampling point, etc.). The method used for the trend analysis will be the Mann-Kendall test. The Mann-Kendall test is a statistical test that assesses whether constituent concentrations in samples collected from a sampling point are increasing, decreasing, or stable over time. The test evaluates each data point relative to previous data points to calculate the number of positive and negative differences between constituent concentrations. Based on the number of data points and the sum of negative and positive differences, the probability that a trend exists is calculated at a selected confidence limit.

The trend analysis will be used to assess analytical and field data collected since 2000. Only data sets that have five or more data points will be evaluated. A confidence limit of 95 percent will be utilized (i.e., there is a 95 percent certainty that the trend calculated by the test exists). A graph of each parameter observed to have a significant trend and a discussion of whether the identified trend is of significant magnitude will be included in the report.

Note: *Only post-2006 water quality data from groundwater underdrain sample location (manhole MH-9) should be used for trend analysis; the sample location identification "MH-9" is a leachate sample designation that was used prior to the construction of the Ashfill/Balefill Lateral Expansion in 2006.*

7.2.2 Annual Comparison of Upstream to Downstream Surface Water Quality

An annual comparison of surface water quality from the upstream location to the downstream location will be conducted for the Balefill (RD BRK UP and RD BRK DWN), the Ashfill/Balefill (SW-1 and SW-3), and the Ashfill/Balefill Lateral Expansion (SW-A-2011 and SW-B). The comparison will consist of summarizing the analytical data for these surface water locations and identifying downstream parameters that were detected at or above five times the practical

quantitative limit (PQL). Of the downstream parameters detected at or above five times the PQL, concentrations exceeding 120 percent of the upstream concentrations will be discussed.

7.2.3 Facility-Wide Groundwater Elevation and Specific Conductance

As previously stated in Section 5.0, water level and SC measurements will be measured from accessible monitoring wells and piezometers across the facility during the fall sampling event. A table summarizing the groundwater elevations and SC measurements will be included as part of the annual report. Figures will be included in the report that illustrate the potentiometric surface elevations and the SC isometric contours of the shallow and intermediate groundwater zones beneath the facility based on the measurements. The annual report will include an assessment of the annual facility-wide SC well survey data in the context of the historic data set (e.g., changes in isometric contour geometry or location, outliers, etc.). Table 6 provides a list of the wells that will be measured for groundwater elevations and SC. Available boring logs for the monitoring wells at the **ecomaine** facility are provided in Appendix A.

7.2.4 Annual Comparison of Upgradient to Downgradient Groundwater Quality

An annual review of time series plots will be conducted to compare upgradient versus downgradient groundwater quality for the monitoring wells listed below:

Proposed Upgradient Monitoring Wells (screened material)	Proposed Downgradient Monitoring Wells (screened material)	Rationale for Comparison
MWB-1 (sand)	MW-88-303B (sand)	MW-88-303B is located downgradient of MWB-1 along the landfill toe. Both wells are screened in the sand unit above the till unit.
MWB-3 (till)	MW-95-305A (till) MW-95-305B (till)	Wells screened in the same unit (till). Wells chosen for downgradient comparison represent shallow (MW-95-305B) and intermediate (MW-95-305A) zones of overburden. The downgradient wells are located near the landfill toe.
MW-95-5B (till)	PW-1 (till)	Wells screened in the same unit (till). The downgradient well is located near the landfill toe.
PW-1 (till)	MW-2 (clay) MW-3 (clay)	MW-2 and MW-3 are located downgradient of PW-1. Wells are screened in the shallow overburden zone.
MW-98-1B (sand)	PW-2B (sand/clay) PW-3B (clay)	PW-2B and PW-3B are located downgradient of MW-98-1B. Wells are screened in shallow overburden zone. The downgradient wells are located near the landfill toe.

8.0 REFERENCES

Caswell, Eichler and Hill, Inc.; Regional Waste Systems, Inc. Balefill Closure, Volume II, Environmental Assessment Report. September 1995.

Caswell, Eichler and Hill, Inc. and Jacques Whitford; Final 1997 Environmental Monitoring Plan, Regional Waste Systems, Inc. Balefill and Ashfill/Balefill Facilities. August 4, 1997.

Evolving Solutions Inc.; 2003 Environmental Monitoring Plan, Regional Waste Systems, Inc. Balefill and Ashfill/Balefill Facilities. April 2003.

Golder Associates, Inc.; Revised 2006 Environmental Monitoring Plan, ecomaine Landfill Facilities Scarborough and South Portland, Maine; September 29, 2006.

Maine Department of Environmental Protection; Maine Solid Waste Management Rules: Chapter 405 – Water Quality Monitoring, Leachate Monitoring, and Waste Characterization; Last revised June 16, 2006.

SCS Engineers; Constructed Wetlands Design, Balefill 1-6 Underdrain Treatment, September 27, 1997.

Tables 1 to 6

TABLE 1
Analytical Method Holding Times, Containers and Sample Preservation
ecomaine Balefill and Ashfill/Balefill Facilities

Analytical Parameter	USEPA Method Number	Container Type	Sample Preservation	Maximum Holding Time
Wet Chemistry Parameters				
Ammonia	350.1	250 mL glass	H_2SO_4	28 Days
Bicarbonate Alkalinity	310.1	250 mL plastic	6°C	14 Days
Chemical Oxygen Demand (COD)	5220C	250 mL glass	H_2SO_4	28 Days
Chloride	9056	250 mL plastic	6°C	28 Days
Cyanide, Total	335.2	1 L plastic	NaOH	14 Days
Hardness by Calculation	6010B	250 mL plastic	HNO_3	6 Months
Nitrate	9056	250 mL plastic	6°C	48 Hours
Nitrite	9056	500 mL plastic	6°C	48 Hours
Sulfate	9056	250 mL plastic	6°C	28 Days
Biochemical Oxygen Demand (BOD)	5210B	1 L plastic	6°C	48 Hours
Total Organic Carbon (TOC)	9060	250 mL glass	H_2SO_4	28 Days
Total Dissolved Solids (TDS)	2540C	500 mL plastic	6°C	7 Days
Total Phosphorous	6010	250 mL plastic	HNO_3	28 Days
Total Suspended Solids (TSS)	160.2	1 L plastic	6°C	7 Days
Metals				
Aluminum, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Arsenic, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Barium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Cadmium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Calcium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Chromium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Copper, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Iron, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Lead, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Magnesium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Manganese, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Mercury, Total	7470A	250 mL plastic	HNO_3	28 Days
Molybdenum, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Nickel, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Potassium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Selenium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Silver, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Sodium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Vanadium, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Zinc, Total	SW846 - 6010B	250 mL plastic	HNO_3	6 Months
Organic and Other Parameters				
Volatile Organic Compounds	SW846 - 8260B	(3) 40 mL glass vials	HCL	14 Days
Total Coliform	600-R-00-013	120 mL	sterile	30 Hours

Table 2
Description of Sampling Locations
ecomaine Facilities, Balefill and Ashfill/Balefill

Sampling Locations	Associated Unit	Purpose
Balefill Groundwater		
MW-102	Balefill Cells 7 and 8	Downgradient of Balefill Cells 7 and 8 and upgradient of Ashfill/Balefill unit
MW-6A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-84-8-1A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-84-8-2A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-88-302C	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-88-303B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-14A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-2B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6 and downgradient of Wetland Treatment System
MW-95-304B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-305A	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-305B	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
MW-95-5B	Balefill Cells 7 and 8	Upgradient of Balefill Cells 7 and 8, and downgradient of Chapman Landfill
MWB-1	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6, and downgradient of Chapman Landfill
MWB-3	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6, and downgradient of Chapman Landfill
Residence (Sheriff/Comstock)	Balefill Cells 1-6	Downgradient of Balefill Cells 1-6
Balefill Surface Water		
NW DITCH UP	Balefill Cells 7 and 8	Upgradient of Balefill Cells 7 and 8
RD BRK DWN	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6
RD BRK UP	Balefill Cells 1-6	Upgradient of Balefill Cells 1-6
SED PND OUTFALL	Balefill Cells 7 and 8	Treated stormwater discharge quality downgradient of Balefill Cells 7-8
Ashfill/Balefill and Ashfill/Balefill Expansion Groundwater		
MW-2	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-3	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-802B	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-88-505B	Ashfill/Balefill	Downgradient of Ashfill/Balefill
MW-98-1B	Ashfill/Balefill Expansion	Upgradient of Ashfill/Balefill Expansion
PW-1	Balefill Cells 7 and 8, Ashfill/Balefill	Downgradient of Balefill Cells 7 and 8, and Upgradient of Ashfill/Balefill
PW-2A	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-2B	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-3A	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
PW-3B	Ashfill/Balefill Expansion	Downgradient of Ashfill/Balefill Expansion
Ashfill/Balefill and Ashfill/Balefill Expansion Surface Water		
SW-1	Ashfill/Balefill	Upgradient Ashfill/Balefill
SW-3	Ashfill/Balefill	Downgradient Ashfill/Balefill
SW-4	Ashfill/Balefill	Downgradient Ashfill/Balefill
SW-A-2011	Ashfill/Balefill Expansion	Upgradient Ashfill/Balefill Expansion
SW-B	Ashfill/Balefill Expansion	Downgradient Ashfill/Balefill Expansion

Ashfill/Balefill Expansion Underdrain		
MH-9	Ashfill/Balefill Expansion	Ashfill/Balefill Expansion groundwater underdrain discharge water quality
Facility-wide Leachate and Leak Detection System		
KC-1	Balefill Cells 1-6	Balefill Cells 1-6 leachate quality
MH-33	Balefill Cells 7 and 8	Balefill Cells 7 and 8 leachate quality
MH-C	Ashfill/Balefill Expansion	Ashfill/Balefill Expansion leachate quality
SW-6/MH-1A	Ashfill/Balefill	Ashfill/Balefill leachate quality
Leak Detection Ashfill/Balefill Expansion	Ashfill/Balefill Expansion	Ashfill/Balefill Expansion leak detection system water quality
Wetlands Treatment System (WTS)		
MH-5	Balefill Cells 1-6	Groundwater collected by the Balefill Cells 1-6 underdrain - Influent to Wetland Treatment System.
DETENTION BASIN OUTFALL	Balefill Cells 1-6	Final discharge point for a mixture of treated stormwater runoff and WTS effluent

Table 3
Summary of Sampling Parameters
ecomaine Facility, Balefill and Ashfill/Balefill

Sampling Locations	Purge and Sample Method	Sampling Parameters		
		Spring (March/April)	Summer (July/August)	Fall (October/ November)
Balefill Groundwater				
MW-102	Artesian/Grab	Field	Field	Field and Parameter List 2
MW-6A	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-84-8-1A	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-84-8-2A	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-88-302C	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-88-303B	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-14A	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-2B	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-304B	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-305A	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-305B	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MW-95-5B	Peristaltic/Low Flow	Field	Field	Field and Parameter List 2
MWB-1	Bladder/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
MWB-3	Bladder/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
Residence (Sheriff/Comstock)	Domestic Well/Grab	Not Sampled	Not Sampled	Field and Parameter List 2
Balefill Surface Water				
NW DITCH UP	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
RD BRK DWN	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
RD BRK UP	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
SED PND OUTFALL	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Groundwater				
MW-2	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
MW-3	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
MW-802B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
MW-88-505B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
MW-98-1B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
PW-1	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
PW-2A	Artesian/Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
PW-2B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
PW-3A	Artesian/Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
PW-3B	Peristaltic/Low Flow	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Surface Water				
SW-1	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
SW-3	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
SW-4	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
SW-A-2011	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
SW-B	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
Ashfill/Balefill Expansion Underdrain				
MH-9	Grab	Field and Parameter List 1	Field and Parameter List 1	Field and Parameter List 2
Leachate				
KC-1	Grab	Field and Parameter List 3	Field and Parameter List 3	Field and Parameter List 3
MH-33	Grab	Field and Parameter List 3	Field and Parameter List 3	Field and Parameter List 3
MH-C	Grab	Field and Parameter List 3	Field and Parameter List 3	Field and Parameter List 3
SW-6/MH-1A	Grab	Field and Parameter List 3	Field and Parameter List 3	Field and Parameter List 3
Leak Detection Ashfill/Balefill Expansion	Grab	Field and Parameter List 3	Field and Parameter List 3	Field and Parameter List 3
Wetlands Treatment System				
MH-5 (Balefill Cells 1-6 Underdrain)	Grab	See Table 5	See Table 5	See Table 5
DETENTION BASIN OUTFALL	Grab	See Table 5	See Table 5	See Table 5

Notes:

Field = field parameters = depth to water level or flow rate, temperature, specific conductivity, dissolved oxygen, pH, ORP and turbidity.

Parameter List 1 = basic suite of groundwater and surface water analytics; see Table 4 for a detailed list of laboratory analytes

Parameter List 2 = VOCs and basic suite of groundwater and surface water analytics; see Table 4 for a detailed list of laboratory analytes

Parameter List 3 = suite of leachate analytes; See Table 4 for a detailed list of laboratory analytes

Table 4

Sampling Parameter Lists

Parameter	Triannual Water Quality Standard Suite Parameter List 1	Annual Water Quality Expanded Suite Parameter List 2	Leachate Standard Suite Parameter List 3
Field Parameters			
Static Water Level	monitoring wells only	monitoring wells only	
Turbidity	X	X	
Specific Conductance	X	X	X
Temperature	X	X	X
pH	X	X	X
Oxidation Reduction Potential (ORP)	X	X	X
Dissolved Oxygen (DO)	X	X	X
Other Field Observations	X	X	X
Pumping Rate During Sampling	monitoring wells only	monitoring wells only	
Drawdown During Sampling	monitoring wells only	monitoring wells only	
Surface Water Flow Rate	surface water only	surface water only	
Wet Chemistry Parameters			
Ammonia	X	X	X
Bicarbonate Alkalinity	X	X	X
Chemical Oxygen Demand (COD)	X	X	X
Chloride	X	X	X
Cyanide, Total			X
Hardness by Calculation	X	X	X
Nitrate	X	X	X
Nitrite			X
Sulfate	X	X	X
Biochemical Oxygen Demand (BOD)			X
Total Organic Carbon (TOC)	X	X	X
Total Dissolved Solids (TDS)	X	X	X
Total Phosphorous			X
Total Suspended Solids (TSS)	surface water only	surface water only	X
Metals			
Aluminum, Total	X	X	X
Arsenic, Total	X	X	X
Barium, Total	X	X	X
Cadmium, Total			X
Calcium, Total	X	X	X
Chromium, Total			X
Copper, Total			X
Iron, Total	X	X	X
Lead, Total			X
Magnesium, Total	X	X	X
Manganese, Total	X	X	X
Mercury, Total			X
Molybdenum, Total			X
Nickel, Total	X	X	X
Potassium, Total	X	X	X
Selenium, Total			X
Silver, Total			X
Sodium, Total	X	X	X
Vanadium, Total			X
Zinc, Total			X
Organic and Other Parameters			
Volatile Organic Compounds		X	X
Total Coliform		residential well only	

Table 5
Wetland Treatment System Monitoring Schedule and Sampling Parameter Lists
ecomaine, Balefill and Ashfill/Balefill Facilities

	Weekly Monitoring			Triannual (Spring/Summer)		Annual (Fall)	
Parameter	**MH-5**	**WTS Effluent**	**Detention Basin Outfall**	**MH-5**	**Detention Basin Outfall**	**MH-5**	**Detention Basin Outfall**
Field Parameters							
Turbidity				X	X	X	X
Specific Conductance	X	X	X	X	X	X	X
Temperature				X	X	X	X
pH			X	X	X	X	X
Oxidation Reduction Potential (ORP)				X	X	X	X
Dissolved Oxygen (DO)				X	X	X	X
Other Field Observations				X	X	X	X
Surface Water/Leachate Flow Rate	X	X	X	X	X	X	X
Wet Chemistry Parameters							
Ammonia				X	X	X	X
Bicarbonate Alkalinity				X	X	X	X
Chemical Oxygen Demand (COD)				X	X	X	X
Chloride				X	X	X	X
Cyanide, Total							
Hardness by Calculation				X	X	X	X
Nitrate				X	X	X	X
Nitrite							
Sulfate				X	X	X	X
Biochemical Oxygen Demand (BOD)							
Total Organic Carbon (TOC)				X	X	X	X
Total Dissolved Solids (TDS)				X	X	X	X
Total Phosphorous				X	X	X	X
Total Suspended Solids (TSS)				X	X	X	X
Metals							
Aluminum, Total				X	X	X	X
Arsenic, Total				X	X	X	X
Barium, Total				X	X	X	X
Cadmium, Total							
Calcium, Total				X	X	X	X
Chromium, Total							
Copper, Total							
Iron, Total				X	X	X	X
Lead, Total							
Magnesium, Total				X	X	X	X
Manganese, Total				X	X	X	X
Mercury, Total							
Molybdenum, Total							
Nickel, Total				X	X	X	X
Potassium, Total				X	X	X	X
Selenium, Total							
Silver, Total							
Sodium, Total				X	X	X	X
Vanadium, Total							
Zinc, Total							
Organic and Other Parameters							
Volatile Organic Compounds						X	X

Table 6
Annual Facility-Wide Groundwater Elevation and Specific Conductance Measurements
ecomaine Facility, Balefill and Ashfill/Balefill

Site ID	Monitored Zone	Unit Screened	Well Diameter (in)	Measuring Point Elevation (ft msl)	Total Depth (ft TOPVC)
MW-101A	R	Rock	0.75	76.11	165.10
MW-101B	D	Till	0.75	76.15	158.10
MW-101C	S	Clay	0.75	76.94	10.71
MW-102	D	Clay	1.0	75.74	128.00
MW-104A	I	Till	1.0	80.59	56.20
MW-104C	S	Sand	1.0	81.35	32.45
MW-2	S	Clay	2.0	71.46	15.71
MW-3	S	Clay	2.0	73.42	21.71
MW-6A	S	Sand	2.0	101.14	9.80
MW-7A	S	Outwash	2.0	111.36	30.78
MW-8	S	Sand	2.0	111.38	12.93
MW-802A	D	Till	2.0	72.62	6.64
MW-802B	S	Clay	2.0	73.11	15.20
MW-804A	D	Till	1.0	73.00	61.91
MW-804B	I	Clay	1.0	73.00	31.82
MW-804C	S	Clay	1.0	73.00	13.90
MW-84-5	I	Sand	1.5	128.43	86.15
MW-84-6	D	Till	1.5	89.72	72.80
MW-84-6C	S	Clay	1.5	85.08	20.08
MW-84-7	I	Sand	1.5	117.14	61.50
MW-84-8-1A	S	Till	2.0	126.23	29.91
MW-84-8-2A	I	Sand	2.0	125.69	67.09
MW-85-1	S	Sand	2.0	103.09	12.16
MW-85-2A	D	Till	2.0	94.54	71.00
MW-88-301B	S	Sand	2.0	105.27	17.30
MW-88-302A	I	Clay / Till	2.0	108.11	56.81
MW-88-302C	S	Sand	2.0	108.45	16.65
MW-88-303A	I	Clay	2.0	105.83	49.50
MW-88-303B	S	Sand	2.0	106.02	14.75
MW-88-306	S	Sand / Till	2.0	120.05	27.81
MW-88-307A	I	Till	2.0	121.29	44.65
MW-88-307B	S	Sand	2.0	121.51	20.08
MW-88-308A	I	Till	2.0	110.85	72.65
MW-88-308B	S	Sand	2.0	110.85	18.00
MW-88-309A	D	Till	2.0	141.35	79.04
MW-88-505B	S	Clay	2.0	74.44	12.75
MW-9	I	Clay	2.0	110.63	18.30
MW-95-10	S	Sand	2.0	90.84	11.99
MW-95-11	S	Clay	2.0	92.72	12.11
MW-95-12	I	Till	2.0	116.94	60.11
MW-95-13	S	Sand	2.0	93.28	11.85
MW-95-14A	I	Till	2.0	116.32	44.11
MW-95-14B	S	Till	2.0	115.90	27.51
MW-95-2B	S	Sand	2.0	93.35	12.29
MW-95-304A	I	Clay	2.0	95.62	30.39
MW-95-304B	S	Sand	2.0	95.16	10.39
MW-95-305A	I	Till	2.0	120.81	51.41
MW-95-305B	S	Till	2.0	121.17	24.66
MW-95-3A	D	Till	2.0	82.24	31.00
MW-95-3B	S	Clay	2.0	81.83	15.49
MW-95-3R	R	Rock	2.0	81.73	159.00
MW-95-4A	I	Till	2.0	146.14	70.70
MW-95-5B	S	Till	2.0	144.36	47.60

MW-95-6A	D	Till	2.0	84.22	90.91
MW-95-6B	I	Till	2.0	84.86	72.84
MW-95-7B	S	Sand	2.0	116.71	22.45
MW-95-8A	D	Till	2.0	101.35	91.36
MW-95-9A	I	Clay	2.0	83.44	41.68
MW-95-9B	S	Clay	2.0	84.01	17.12
MW-98-1A	I	Till	2.0	118.98	100.90
MW-98-1B	S	Sand	2.0	118.67	27.68
MW-98-2A	I	Till	2.0	119.39	82.82
MW-98-2B	S	Sand	2.0	119.24	20.85
MW-99-1A	I	Sand	2.0	119.59	57.70
MW-99-1B	S	Sand	2.0	119.47	25.00
MW-99-2B	S	Gravel	2.0	124.38	32.31
MW-99-2R	R	Bedrock	2.0	124.40	68.17
MW-99-5B	S	Clay	2.0	127.43	29.16
MWB-1	S	Sand	2.0	141.28	32.34
MWB-2	S	Till	2.0	147.53	26.25
MWB-3	S	Till	2.0	142.30	35.91
NO#	S	NA	2.5	115.30	26.34
P-109	S	Clay	1.0	77.14	14.20
P-112	S	Clay	1.0	87.08	25.80
PW-1	S	Till	2.0	93.13	17.7
PW-2A	I	Till	2.0	NA	44.26
PW-2B	S	Sand / Clay	2.0	87.73	17.70
PW-3A	I	Clay	2.0	NA	81.7
PW-3B	S	Clay	2.0	73.49	17.3
RB-1B	S	Clay/Sand	1.0	NA	7.15
RB-1S	S	Clay/Sand	1.0	82.50	7.30
RB-2S	S	Clay/Sand	1.0	81.78	7.38
RB-3B	S	Clay/Sand	1.0	80.73	6.81
RB-3S	S	Clay/Sand	1.0	80.61	7.32
RB-4B	S	Clay/Sand	1.0	80.63	7.40
RB-4S	S	Clay/Sand	1.0	80.54	7.38
RB-5B	S	Clay/Sand	1.0	78.99	7.32
RB-5S	S	Clay/Sand	1.0	78.96	7.15
RW-2A	R	Rock	0.75	74.69	21.90
RW-2B	I	Sand	0.75	75.03	55.30
RW-2C	S	Clay	0.75	74.76	10.95
TB-7	I	Silt / Clay	2.5	112.07	6.42
X-2	S	NA	2.5	115.97	45.10
X-3	S	NA	2.5	121.05	18.24
X-4A	S	NA	1.0	117.85	20.30
X-4B	S	NA	1.0	117.99	35.21
X-5	S	NA	3.0	106.52	8.26
X-6	S	NA	1.0	106.82	31.60
X-7	S	NA	2.5	108.66	37.24
X-8A	S	NA	1.0	107.71	6.15
X-8B	S	NA	1.0	107.88	5.50
X-9	S	NA	2.5	106.91	10.35

Notes:
NA = Not Available
NM = Not Measured
Dry = monitoring point dry at the time of measurement
'0.00' indicates water at top of PVC casing at the time of depth to water measurement
'diameter too small' indicates well diameter too small for specific conductivity probe
Monitored Zone: S=shallow, I=intermediate, D=deep and R=rock

Figures 1 to 3

SITE LOCATION MAP
ecomaine LANDFILL

RUNNING HILL ROAD - SCARBOROUGH, MAINE

PREPARED FOR: **ecomaine**

64 BLUEBERRY ROAD - PORTLAND, MAINE

FIGURE 1	DRAWN BY: SBM	CHECKED BY: MAD
JOB: 16588	NOT TO SCALE	DATE: MAY 2011

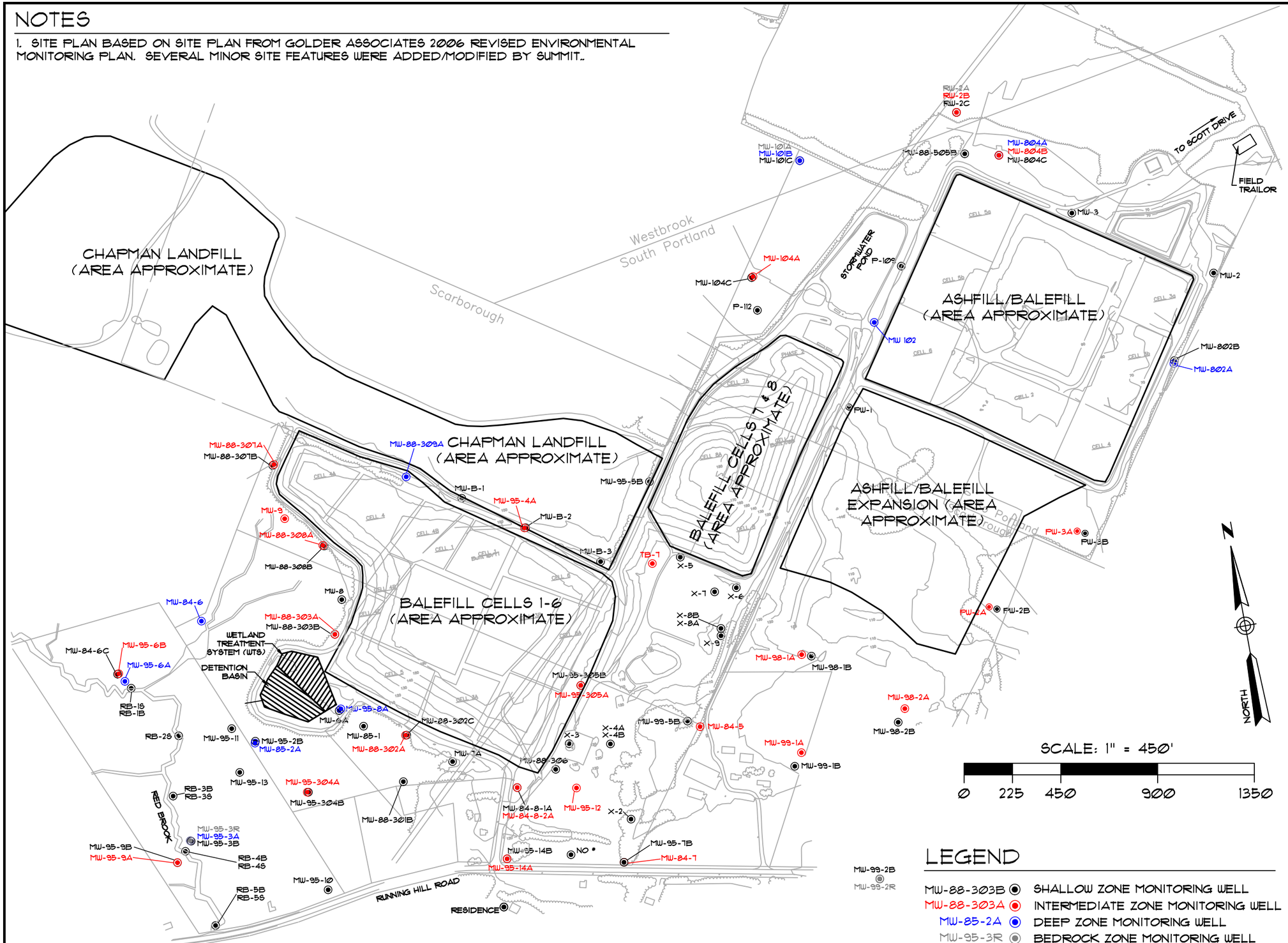
Summit
Environmental Consultants, Inc

640 MAIN ST.
LEWISTON, MAINE 04240

Tel.: (207) 795-6009
Fax: (207) 795-6128

NOTES

1. SITE PLAN BASED ON SITE PLAN FROM GOLDER ASSOCIATES 2006 REVISED ENVIRONMENTAL MONITORING PLAN. SEVERAL MINOR SITE FEATURES WERE ADDED/MODIFIED BY SUMMIT..



LEGEND

MW-88-303B	SHALLOW ZONE MONITORING WELL
MW-88-303A	INTERMEDIATE ZONE MONITORING WELL
MW-85-2A	DEEP ZONE MONITORING WELL
MW-95-3R	BEDROCK ZONE MONITORING WELL

640 MAIN ST.
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www.summitenv.com
Summit
Environmental Consultants, Inc

SCALE: 1 INCH = 450 FEET
CADD: 16588 FIGURE 2&3.DWG
DRAWN BY: SBM
CHECKED BY: SC
DATE: MAY 2011
JOB NUMBER: 16588

ANNUAL FACILITY-WIDE MONITORING WELL LOCATIONS
ecomaine LANDFILL

RUNNING HILL ROAD - SCARBOROUGH, MAINE
PREPARED FOR
ecomaine
64 BLUEBERRY ROAD - PORTLAND, ME

FIGURE 3

NOTES

1. SITE PLAN BASED ON SITE PLAN FROM GOLDER ASSOCIATES 2006 REVISED ENVIRONMENTAL MONITORING PLAN. SEVERAL MINOR SITE FEATURES WERE ADDED/MODIFIED BY SUMMIT..

CHAPMAN LANDFILL (AREA APPROXIMATE)

Westbrook
South Portland
Scarborough

CHAPMAN LANDFILL (AREA APPROXIMATE)

MW-B-1
MW-95-5B
MW-B-3
MW-88-303B
WETLAND TREATMENT SYSTEM (WTS)
DETENTION BASIN
KC-1
MW-6A
MH-5
RD BRK UP
DETENTION BASIN OUTFALL
MW 95-2B
MW-88-302C
MW-95-304B
RED BROOK
BALEFILL CELLS 1-6 (AREA APPROXIMATE)
BALEFILL CELLS 7 & 8 (AREA APPROXIMATE)
MW-95-305B
MW-95-305A
MW-84-8-1A
MW-84-8-2A
MW-95-14A
RUNNING HILL ROAD
RESIDENCE
RD BRK DWN
MW-98-1B
NW DITCH UP
SW-1
SED PND OUTFALL
MW-88-505B
STORMWATER POND
MH-33
MW 102
PW-1
SW-A-2011
ASHFILL/BALEFILL (AREA APPROXIMATE)
MW-802B
MW-2
MW-3
SW-6/MH-1A
TO SCOTT DRIVE
SW-3
FIELD TRAILOR
ASHFILL/BALEFILL EXPANSION (AREA APPROXIMATE)
MH-C
SW-4
PW-3A
PW-3B
LEAK DETECTION
MH-9 GROUNDWATER UNDERDRAIN
SW-B
PW-2A
PW-2B

NORTH

SCALE: 1" = 450'

0 225 450 900 1350

LEGEND

MW-88-303A ◉ MONITORING WELL
SW-B ⊕ SURFACE WATER SAMPLING POINT
MH-5 ⊞ WETLAND TREATMENT SYSTEM SAMPLING POINT
KC-1 ✦ LEACHATE SAMPLING POINT

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www.summitenv.com
Summit Environmental Consultants, Inc

DATE: MAY 2011
JOB NUMBER: 16588
DRAWN BY: SBM
CHECKED BY: SC
SCALE: 1 INCH = 450 FEET
CADD: 16588 FIGURE 2.DWG

TRI-ANNUAL MONITORING LOCATIONS
ecomaine LANDFILL
RUNNING HILL ROAD - SCARBOROUGH, MAINE
PREPARED FOR
ecomaine
64 BLUEBERRY ROAD - PORTLAND, ME

FIGURE 2

Appendix A – Boring Logs

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Jordan Carroll Associates

SHEET 1 OF 4
HOLE NO. S-102

Jon Rudnicki

PROJECT NAME: Oily Waste Site

LINE & STATION: (MW-102)

JOB NUMBER: 81-34

LOCATION: South Portland, Maine

OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	BYC3
SIZE I.D	2 3/8"	1 1/8"	1 3/3"
HAMMER WT	300	140	
HAMMER FALL	16"	30"	

DATE START 4-13-81 DATE FIN 4-17-
SURFACE ELEV 73.3
GROUND WATER ELEV. ____

CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger										1.0	Topsoil
"	1D	2"	24"		2.0	1	3	5	9		
"											
"	2D	2"	24"		4.0	6	12	15	17		Brown mottled silty clay w/few thin fine sand partings
"											
"	3D	2"	24"		6.0	15	14	16	16		
"										7.0	
"	4D	2"	24"		8.0	12	12	11	10		
"											~~Gray silty clay w/trace seashells~~
"	5D	2"	24"		10.0	8	5	4	3		
WOH										11.0	
"	6D	2"	24"		12.0	3	2	1	1		
"											
"	7D	2"	24"		14.0	Wt of Hammer					
"											
"	8D	2"	24"		16.0	Wt of Hammer					
"											
WOC	9D	2"	24"		18.0	Wt of Rods					Gray silty clay
"											
"	10D	2"	24"		20.0	Wt of Rods					
"											
"	11D	2"	24"		22.0	Wt. of Rods					
"											
"	12D	2"	24"		24.0	Wt. of Rods				24.0	
"											
"	13D	2"	24"		26.0	Wt of Rods					
"											
"	14D	2"	24"		28.0	Wt. of Rods					
"											
"	15D	2"	24"		30.0	Wt of Rods					
"											
"											
"											
"											
"											
"	D	2"	24"	0.0	32.0	Wt. of Rods					Gray silty clay w/ black streaks & trace seashells
"											
"											
"											
"											

SAMPLES
D = Split Spoon
C = 3" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY
X Driller - Visually
Soil Technician - Visually
Laboratory Tests

REMARKS
PRELIMINARY

HOLE NO S-102

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Jordan Gorrill Associates

SHEET 2 OF 4
HOLE NO. B-102

DRILL: Jon Rudnicki

PROJECT NAME: Oily Waste Site

LINE & STATION: (MW-102)

JOB NUMBER: 81-34

LOCATION: South Portland, Maine

OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT AFTER ____ HOURS
AT ____ FT AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	BXCJ
SIZE O.D.	2 3/8"	1 3/8"	1 3/8"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 4-13-81 DATE FIN 4-17-8
SURFACE ELEV.
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE O.D.	SAMPLE PEN	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
WOC											Gray silty clay w/ black streaks & trace seashells
"	1 OD	2"	24"		42.0	Wt. of Rods					
"										43.0	
"											
"											
"											
"	17 D	2"	24"		47.0	Wt. of Rods					
"											
"											
"											
"											
"	18 D	2"	24"		52.0	Wt. of Rods					Gray silty clay w/ black streaks
"											
"											
"											
"											
"	19 D	2"	24"		57.0	Wt. of Rods					
"										62.0	
"											
"											
"											
"	20 D	2"	24"		62.0	Wt. of Rods					
"											Gray silty clay w/ sand layers
"											
"											
"	21 D	2"	24"		67.0	Wt. of Rods					
"											
"										73.0	
"											
"											
"	1 D	2"	24"	0.0	72.0	Wt. of Rods					Gray silty clay w/ gravelly sand
"											
"											
"											
"											
"	22 D	2"	24"		77.0	WOH	1	2	3		
"											
"											
"											

SAMPLES
D = Split Spoon
C = 3" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technician - Visually
[ ] Laboratory Tests

REMARKS: PRELIMINARY

HOLE NO B-102

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Jordan Conrail Associates

SHEET 3 OF 4
HOLE NO B-103

Jon Rudnicki

PROJECT NAME: Olin Waste Site

LINE & STATION: (MW-102)

JOB NUMBER: 81-34

LOCATION: South Portland, Maine

OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	5W	SS	BWC1
SIZE I.D.	2 3/8"	1 3/8"	1 7/8"
HAMMER WT.	300	140	
HAMMER FALL	18"	30"	

DATE START 4-13-81 DATE FIN 4-17-81
SURFACE ELEV
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
2	22D	2"	18"		21.5	7	13	9			Gray silty clay w/ gravelly sand
32											
10											
26										84.0	
28											
10	26D	2"	18"		86.5	65	85	110			Gr STRATIFIED SILT AND FINE SAND w/ GRAY SILTY SAND-TILL
28											
75										89.0	
200											
260											
235	25D	2"	18"		91.5	57	66	110			
54											
47											
55											
48											
48	26D	2"	18"		96.5	70	91	115			
23											Gray silty gravelly sand
30											
47											
53											
60	27D	2"	18"		101.5	60	81	39			
145											
230											
200											
270											
175	28D	2"	12"		106.5	115	130				
165											
200											
80											
305										110.0	
100	29D	2"	12"		111.0	40	150				
100											
175											
450											Gray silty sandy gravel w/ cobbles & boulders
80											
Spoon	30D	2"	8"		115.7	100	150/2"				
Casing-R	*	44"	25"		120.0	Cobbles					

PRELIMINARY

SAMPLES
D = Sonic Spoon
C = 2" Shelby Tube
U = 3" Shelby Tube

SOIL CLASSIFIED BY:
Driller - Visually
Soil Technician - Visually
Laboratory Tests

REMARKS
* Washed ahead
* 2 3/8"

HOLE NO B-103

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Jordan Gorrill Associates

SHEET 1 OF 1
HOLE NO. B-102

FOREMAN: Jon Budnicki
PROJECT NAME: Oily Waste Site
LINE & STATION: (MW-102)

TB JOB NUMBER: 81-34
LOCATION: South Portland, Maine
OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT AFTER ____ HOURS
AT ____ FT AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	BW	SS	BXC1
SIZE I.D.	2 3/8"	1 3/8"	1 3/8"
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 4-13-81 DATE FIN 4-17-8
SURFACE ELEV. ____
GROUND WATER ELEV. ____

CASING BLOWS PER FOOT	SAMPLE NO	O.D.	PEN	REC.	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
Spin Casing											Gray silty sandy gravel w/ cobbles & boulders
	1D	2"	12"		126.7	95	150	100/2"		126.7	
											Bottom of boring @ 126.7' Installed well @ 126.0' Moved 5' and installed well @ 9.0'

PRELIMINARY

SAMPLES
D = Split Spoon
U = 2" Shelby Tube
U = 3½" Shelby Tube

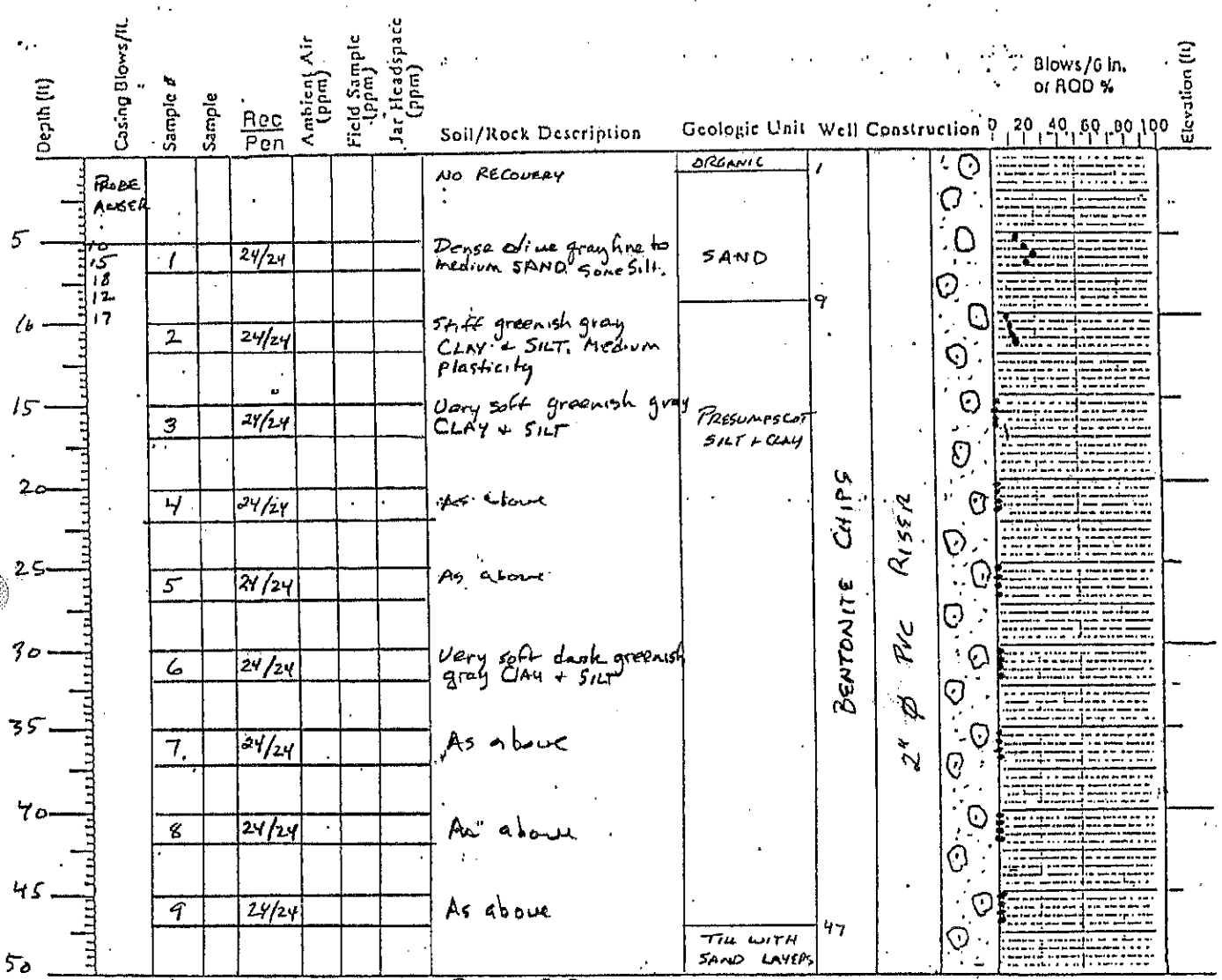
SOIL CLASSIFIED BY
[X] Driller - Visually
Soil Technician - Visually
Laboratory Tests

REMARKS
This was the third attempt at this hole: the first two attempts went 110' & 117'

HOLE NO. B-102

FCJ

Project RWS - BALEFILL 5' from MW-6A			Boring # MW-95-8A 35
Client RWS			Sheet 1 of 2
Contractor ATD - P. MICHAUD		Date Begun 3/22/95	Overburden Drilled 89.7'
Method DRIVEN CASING / 3 7/8" ROLLER BIT	Casing Size 4" ID.	Completed 3/23/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	☒ Above / Below Ground 8.0
Logged By D. CHAPMAN	Checked By	Date 3/23/95	Site SCARBOROUGH, MAINE



NOTES:
1) 0.5' SCREW-ON TYPE BOTTOM CAP
2) TEN FEET (2)" Ø PVC SCREEN FROM 88.6' TO 78.6' BELOW GROUND SURFACE (BGS)
3) 81.1 FEET (2)" Ø PVC RISER FROM 78.6' BGS TO 2.5' ABOVE GROUND SURFACE (AGS)
4) LOCKING (4)" Ø STEEL PROTECTIVE CASING FROM 2.6' BGS TO 2.7' AGS
5) PROBE AUGER 0-5' BGS
6) DRIVEN CASING / 3 7/8 ROLLER BIT 5' BGS - 90' BGS

CEH
CASWELL, EICHLER & HILL, INC.
GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-0032
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

35

Project RWS - BALEFILL			Boring # MW-95-8A
Client RWS			Sheet 2 of 2
Contractor ATO - P. MICHAUD		Date Begun 3/22/95	Overburden Drilled 89.1'
Method DRIVEN CASING/ 3 7/8" ROLLER CONE	Casing Size 4" ID	Completed 3/23/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	☒ Above / ~~Below~~ Ground 8.0'
Logged By D. CHAPMAN	Checked By	Date 3/23/95	Site SCARBOROUGH, MAINE

Depth (ft)	Casing Blows/ft.	Sample #	Sample	Rec / Pen	Ambient Air (ppm)	Field Sample (ppm)	Jar Headspace (ppm)	Soil/Rock Description	Geologic Unit	Well Construction	Blows/6 in. or RQD %	Elevation (ft)
55	22 40 42 55 40	10		24/24				Dense greenish gray fine SAND and Silt. Some Clay Tr. MS. to f G.	TILL WITH SAND LAYERS	BENTONITE CHIPS	0 20 40 60 80 100	
		11		24/24				Dense greenish gray fine SAND and Silt LITTLE (-) Clay.				
60		12		19/24				Very dense greenish gray F SAND and Silt. Some C. Tr MS to f G.				
65	35 35 25 28 26	13		15/24				Loose greenish gray fine SAND and Silt.				
70	17 19 25 40 70	14		15/24				Very dense olive gray fine SAND and Silt. Some Clay. Tr. MS to f G.				
75	10 25 20 20 40	15		2/24				Very dense greenish gray M. C SAND. Some Silt and Clay. Some fine Gravel		2" ø PVC RISER		
80	15 22 36 110 50/4"	16		5/24				Very stiff greenish gray SILT + CLAY	TILL WITH SAND AND CLAY LAYERS	76.7		
85	20 50 50 50 65	17		12/18				LAYERS of greenish gray SILTY CLAY, Fine SAND and Silt, and F.m SAND.		78.6 SAND PACK 80.5 80.6 2" ø PVC SCREEN 89.1		
90		18		15/24				Gray fine to medium SAND SILTY CLAY (CONTACT IS VERTICAL) OVER 6" dark gray SILTY CLAY. Medium plasticity				
95								BOTTOM OF BORING AT 92.0' BGS				
100												

NOTES:

CEH

CASWELL, EICHLER & HILL, INC.

GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING

AUGUSTA, ME (207) 622-0032

Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

BOTH IN SAME LOCATION ≈ MW-84-8-1A ≈ MW-84-8-2A

Field Boring Log (soil)

WOODARD & CURRAN INC. CONSULTING ENGINEERS

ROJECT: RWS - Well Replacement	PROJECT NO.: 90131.02	BORING NO.: B-84-8-2A
DATE-TIME START: 3/30 13:00	FINISH: 3/31 12:30	SHEET 1 OF 4
ENGINEER: Jay Moody	WEATHER: Cloudy, 30°, windy	SURFACE ELEVATION: 123.0'
CONTRACTOR: Northeast Diamond Drilling	DRILLER: Scott Fisher	DATUM:
DRILLING METHOD: 4" casing, pound and wash	SAMPLING METHOD: Tallings	

GROUNDWATER LEVEL								NOTES TO GWL:
	DATE-TIME							
	DAYS-HOURS							
	DEPTH							

SAMPLE NO:	BLOWS PER 6"	SAMPLE RANGE	INCHES SAMPLED / RECOVERY	DEPTH (FT)	SOIL LEGEND	SURFACE CONDITIONS OR OTHER NOTES: / DENSITY, COLOR, SOIL ADMIXTURES, STRENGTH, ODOR, TYPE QUALIFICATIONS:
				0		
				1		
				2		Sill and clay
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		Sill, clay and sand.
				11		
				12		
				13		

PROJECT: RWS | PROJECT NO.: 90131.02 | BORING NO.: B-84-8-2A

SURFACE ELEVATION: | SHEET 2 OF 4

SAMPLE NO.	BLOWS PER 6"	SAMPLE RANGE	INCHES SAMPLED	RECOVERY	DEPTH (FT)	SOIL LEGEND	NOTES: DENSITY, COLOR, SOIL ADMIXTURES, STRENGTH, ODOR, TYPE QUALIFICATIONS:
					13		
					14		
					15		
					16		
					17		
					18		Brown to olive gray silt, clay, sand and gravel,
					19		moist. Slow drilling due to dense material.
					20		
					21		
					22		
					23		
					24		
					25		
					26		
					27		
					28		Brown fine to coarse sand, and fine to coarse
					29		gravel, moist.
					30		
					31		
					32		
					33		

Field Boring Log (soil)

WOODARD & CURRAN INC.
CONSULTING ENGINEERS

PROJECT: RWS - Well Replacement	PROJECT NO.: 90131.02	BORING NO. B-04-8-2A
	SURFACE ELEVATION:	SHEET 3 OF 4

SAMPLE NO:	BLOWS PER 6"	SAMPLE RANGE	INCHES SAMPLED	RECOVERY	DEPTH (FT)	SOIL LEGEND	NOTES: / DENSITY, COLOR, SOIL ADMIXTURES, STRENGTH, ODOR, TYPE QUALIFICATIONS:
					33		
					34		
					35		
					36		
					37		Brown fine to coarse sand and fine to coarse
					38		gravel. Some cobbles.
					39		
					40		
					41		
					42		
					43		
					44		
					45		
					46		
					47		
					48		
					49		
					50		
					51		
					52		
					53		

Field Boring Log (soil)

WOODARD & CURRAN INC.
CONSULTING ENGINEERS

PROJECT: RWS-Well Replacement | PROJECT NO.: 90131.02 | BORING NO. B-84-8-2A

SURFACE ELEVATION: | SHEET 4 OF 4

SAMPLE NO:	BLOWS PER 6"	SAMPLE RANGE	INCHES SAMPLED	RECOVERY	DEPTH (FT)	SOIL LEGEND	NOTES: / DENSITY, COLOR, SOIL ADMIXTURES, STRENGTH, ODOR, TYPE QUALIFICATIONS:
					54		
					55		
					56		
					57		Brown fine to coarse sand and fine to coarse gravel. Some cobbles.
					58		
					59		
					60		
					61		
					62		
					63		
					64		
					65		End of boring at 65.0
					66		
					67		
					68		
					69		
					70		
					71		
					72		
					73		
					74		

B-88302A,B,C

06-5/86

BORING, MONITORING WELL AND PIEZOMETER INSTALLATION LOG

PROJECT REGIONAL WASTE SYSTEMS DATE MARCH 1988 JOB NO. 8807

BORING B-88301 A & B

DEPTH	STRATUM DESCRIPTION
	BROWN FINE TO MEDIUM SAND WITH TRACE SILT
13'	
	GRAY SILTY FINE SAND
19'	
	GRAY SILTY CLAY
39'	
	GRAY SILTY CLAY WITH THIN SAND LAYERS
51.5'	
	B.O.E.

INSTRUMENT LOG — A, B

A: 3/4" PVC; B: 2" PVC; BENTONITE; SAND

BORING B-88302 A, B & C

DEPTH	STRATUM DESCRIPTION
	GRAY FINE TO MEDIUM SAND WITH TRACE SILT
17'	
	GRAY SILTY CLAY
24'	
	MEDIUM SAND LAYER
	GRAY SILTY CLAY WITH THIN SAND LAYERS
43'	
	GRAY FINE TO COARSE SILTY SAND
	-GLACIAL TILL-
56.5'	
	B.O.E.

INSTRUMENT LOG — A, B, C

A: 2" PVC; B: 3/4" PVC; C: 2" PVC

SEVEE & MAHER ENGINEERS, PA

(Kayleen) 1 Pool Beach' west of Cozumel condos first floor Capitan lafitte
(Gravity clay made)

NORTHEAST DIAMOND DRILLING CO., INC.

P. O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 2
DATE 3-24-88
HOLE NO. 88302
LINE & STA. as
OFFSET per
SURF. ELEV. M. Muzz

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborogh, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-46

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.
At 4' after 15 Hours	Type	HW	SS	
	Size I.D.	4"	2"	
At ____ after ____ Hours	Hammer Wt.	300-lb	140-lb	BIT
	Hammer Fall	24"	30"	

	Date	Time
START	3-24-88	
COMPLETE	3-25-88	
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	M. Muzzy	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
	4	0'0"-1'6"	SS	1	3	2			Redish-Brown fine medium Sand trace silt	1	18	[illegible]
	10											
	25											
	36								same as above	2	18	
5	41	5'0"-6'6"	SS	5	9	10						
	7											
	13											
	28											
	36							11'0"	light Gray fine medium Sand little Silt	3	18	
10	50	10'0"-11'6"	SS	16	18	24						
	40											
	48											
	56											
	60								same as above	4	18	[illegible]
15	93	15'0"-16'6"	SS	17	28	20						
	60											
	48											
	48											
	51							20'6"	light Gray Sandy silt little Clay	5	18	
20	50	20'0"-21'6"	SS	wor	wor	wor						
	56											
	44											
	45											
	46							26'0"	light Brown fine medium Sand light Gray Silty Sand	6	18	
25	43	25'0"-26'6"	SS	3	7	7						
	70											
	57											
	55											
	53								dark Gray Snady Silt trace of Sea-shells	7	18	
30	56	30'0"-31'6"	SS	woh	woh	woh						
	53											
	54											
	49											
	47								same as above	8	18	
35	42	35'0"-36'6"	SS	wor	wor	wor						
	54											
	47											
	44											
	44											
	30											

GROUND SURFACE TO ____ USED ____ " CASING: THEN ____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used	
trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO. 8830[illegible]

TOWN PRESS EAST PROVIDENCE — (401) 434-4086

NORTHEAST DIAMOND DRILLING CO., INC.

P O. BOX 617 UNION, MAINE 04862

SHEET 2 OF 2
DATE 3-24-88
HOLE NO. 88302
LINE & STA. as
OFFSET per
SURF. ELEV. M. Muzzy

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborough, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-

GROUND WATER OBSERVATIONS
At 4' 3-25-88 after 15 Hours
At 12" 3-25-88 after 72 Hours

	CASING	SAMPLER	CORE BAR.
Type	HW	SS	
Size I.D.	4"	2"	
Hammer Wt.	300-lb	140-lb	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3-24-88	a.m. p.m.
COMPLETE	3-25-88	a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	M. Muzzy	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No	Pen	Rec
	43	40'0"-41'6"	ss	wor	wor	wor			dark Gray Clayey Silt	9	18	18
	49											
	50											
	60											
	59	45'-46'6"	ss	3	wor	4			light Gray Sandy Silt trace of fine Gravel	10	18	10
	53											
	52											
	56											
	59											
	63	50'0"-51'6"	ss	13	7	2		50'6"	Gray fine medium Sand coarse to medium Gravel little Till like Mat.	11	18	10
	61											
	78											
	74											
	79											
	86	55'0"-56'6"	ss	29	26	25			(no recovery) Bottom of Boring @ 56'6" Installed Well	12	18	0

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D: Dry C: Cored A: Augered
UP: Undisturbed Piston
TP: Test Pit S: Split Spoon V: Vane Test
UT: Undisturbed Thinwall

Proportions Used	
trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring _____
Rock Coring _____
Samples _____

HOLE NO. 88302

TOWN PRESS EAST PROVIDENCE (401) 434-4004

NORTHEAST DIAMOND DRILLING CO., INC.

P O BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 3-31-88
HOLE NO. MW-88302-C
LINE & STA. as
OFFSET
SURF. ELEV. M. .42'

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborough, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-

GROUND WATER OBSERVATIONS
At _____ after ____ Hours
At _____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	HW	SS	
Size I.D.	4"	2"	
Hammer Wt.	300-lb	140-lb	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3-31-88	
COMPLETE		
TOTAL HRS.		
BORING FOREMAN	R. GIST	
INSPECTOR	M. MUZZY	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From-To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc	SAMPLE No	Pen	Rs
	no samples required								Drove casing to 15'0"			
									no samples taken			
									Installed Well			
									Bottom of Boring @ 15'0"			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D: Dry C: Cored A: Auger
UP: Undisturbed Piston
TP: Test Pit S: Auger V: Vane Test
UT: Undisturbed Thin-wall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY:
Earth Boring
Rock Coring
Samples

HOLE NO.
MW-88302-C

TOWN PRESS EAST PROVIDENCE — (401) 434-4090

13

NORTHEAST DIAMOND DRILLING CO., INC.

P.O. BOX 617 UNION, MAINE 04862

SHEET 1 OF 1
DATE 3-29-88
HOLE NO. 88303-B
LINE & STA. as
OFFSET per
SURF. ELEV. M. Muzzy

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborough, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-

GROUND WATER OBSERVATIONS
At _____ after _____ Hours
At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type	HW	SS	
Size I.D.	4"	2"	
Hammer Wt.	300-lb	140-lb	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3-29-88	a.m. p.m.
COMPLETE	3-29-88	a.m. p.m.

TOTAL HRS.
BORING FOREMAN R. Gist
INSPECTOR M. Muzzy
SOILS ENGR.

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
		No samples required							Drove casing to 15'0" no samples taken -Clean out & Installed 2" Well			
5									See 88303A			
10												
15									Bottom of Boring @ 15'0" Installed Well 2"			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D=Dry C=Cuttings A=Auger
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY:
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO 88303-B

NORTHEAST DIAMOND DRILLING CO., INC.

P O BOX 617 UNION, MAINE 04862

SHEET 1 OF 2
DATE 3-28-88
HOLE NO. 88303-A
LINE & STA. as
OFFSET
SURF. ELEV. M. Mu...y

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborough, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-

GROUND WATER OBSERVATIONS
At 1'10" after 15½ Hours
At ____ after ____ Hours

	CASING	SAMPLER	CORE BAR.
Type	HW	SS	
Size I.D.	4"	2"	
Hammer Wt	300-lb	140-lb	BIT
Hammer Fall	24"	30"	

	Date	Time
START	3-28-88	a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	M. Muzzy	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc	SAMPLE No	Pen	Rec.
	3	0-1'6"	ss	1	1	1			light Brown fine medium Sand trace of silt	1	18	14
	13											
	24											
	69											
5	105	5'0"-6'6"	ss	14	20	24			light Gray fine medium Sand trace Silt	2	18	16
	33											
	40											
	51											
	52											
10	42	10'0"-11'6"	ss	4	7	20			same as above	3	18	18
	55											
	63											
	68											
	47							14'6"	change color of wash			
15	46	15'0"-16'6"	ss	woh	woh	woh			Gray Silty clay W/ Sand layers	4	18	6
	46											
	44											
	42											
	36											
20	33	20'-21'6"	ss	wor	wor	wor			same as above	5	18	18
	54											
	51											
	47											
	34											
25	41	25'0"-26'6"	ss	wor	wor	wor			same as above	6	18	18
	43											
	39											
	36											
	36											
30	28	30'0"-31'6"	ss	wor	wor	wor			dark Gray Sandy Silt some Sea-Shells	7	18	18
	35											
	35											
	29											
	27											
35	25	35'0"-36'6"	ss	wor	wor	wor			Gray Silty clay	8	18	18
	28											
	30											
	31											
	32											
	34											

GROUND SURFACE TO ____ USED ____ "CASING: THEN ____

Sample Type
D: Dry C: Cored A: Auger
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	
50 +	Very Dense	15-30	V-Stiff	

SUMMARY
Earth Boring ____
Rock Coring ____
Samples ____

HOLE NO 88303-A

14

NORTHEAST DIAMOND DRILLING CO., INC.

P O BOX 617 UNION, MAINE 04862

SHEET 2 OF 2
DATE 3-28-88
HOLE NO. 88303-A
LINE & STA. as
OFFSET per
SURF. ELEV. M. Muzzy

TO Sevee & Maher Engineers, Inc. ADDRESS Westbrook, Maine
PROJECT NAME Regional Waste Systems LOCATION Portland/Scarborough, M.E.
REPORT SENT TO Sevee & Maher Engineers Inc. PROJ. NO.
SAMPLES SENT TO Taken @ Site OUR JOB NO. M88 44-

GROUND WATER OBSERVATIONS
At _____ after ___ Hours
At _____ after ___ Hours

	CASING	SAMPLER	CORE BAR.
Type	HW	SS	
Size I.D.	4"	2"	
Hammer Wt.	300-lb	140-lb	BIT
Hammer Fall	24"	30"	

	Date	Time
START		a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		
BORING FOREMAN	R. Gist	
INSPECTOR	M. Muzzy	
SOILS ENGR.		

LOCATION OF BORING

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No	Pen	Rec.
	39	40'-41'6"	SS	WOR	WOR	WOR			Gray Sandy silt	9	18	18
	32											
	32											
	32											
	37	45'-46'6"	SS	WOR	WOR	WOR			same as above	10	18	18
	45											
	45											
	40											
	39											
	40	50'0"-51'6"	SS	7	20	12			Gray fine medium sand fine medium Gravel some Silt Till like mat. Bottom of Boring @ 51'6"	11	18	18
									Installed Wells			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D: Dry C: Cored A: Auger
UP: Undisturbed Piston
TP: Test Pit A: Auger V: Vane Test
UT: Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140lb Wt. x 30" fall on 2" O.D. Sampler

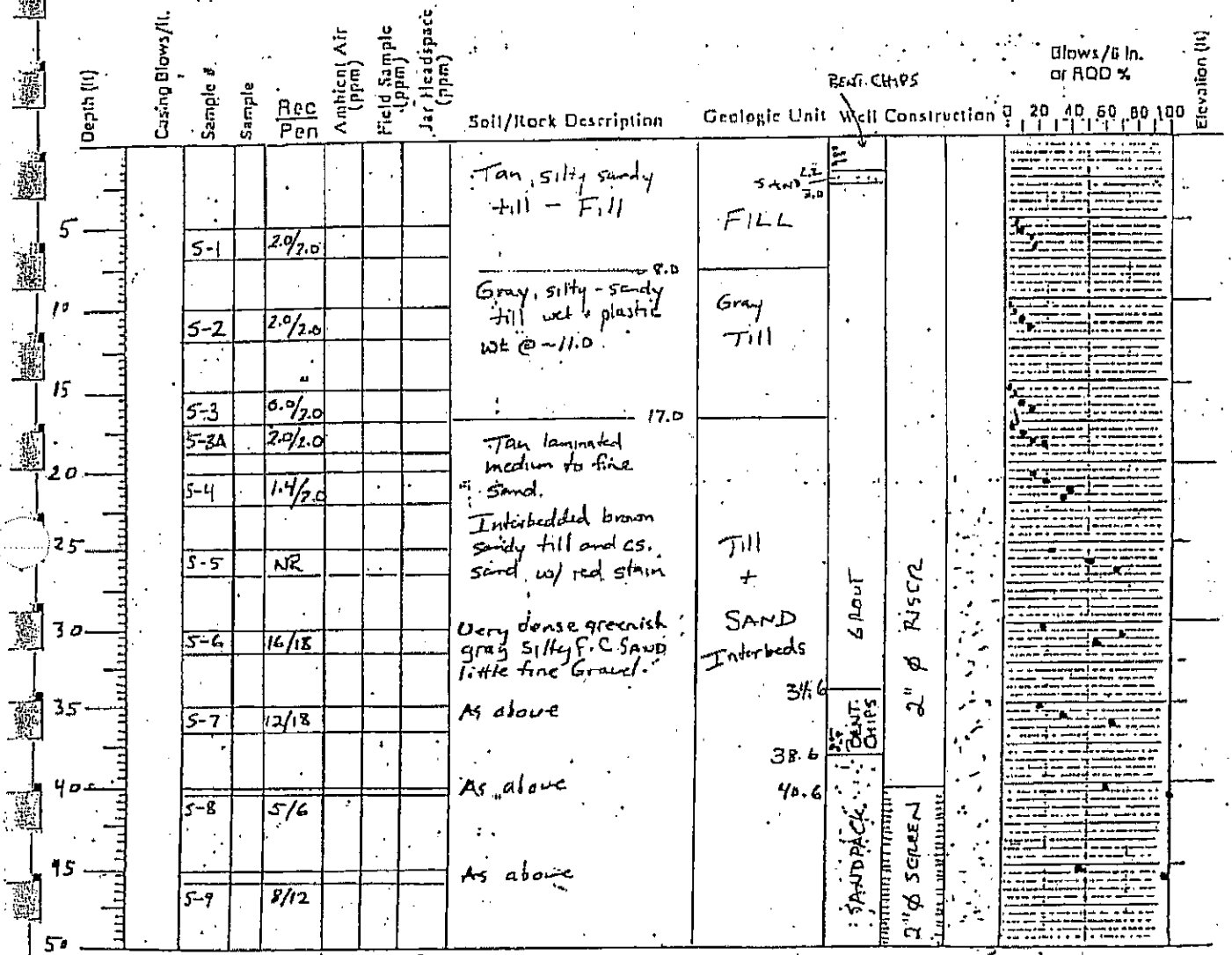
Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	V-Stiff
		30+	Hard

SUMMARY
Earth Boring 51'6"
Rock Coring
Samples 11

HOLE NO. 88303-A

TOWN PRESS - EAST PROVIDENCE - (401) 434-4088

Project RWS BALEFILL			Boring # MW-95-14A
Client RWS			Sheet 1 of 2
Contractor ALL TERRAIN DRILLING, P. MICHAUD		Date Begun 11/7/95	Overburden Drilled 50.5
Method DRIVEN CASING	Casing Size 4" ID-11W	Completed 11/7/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	▽ Below Ground 11'
Logged By D. CHAPMAN / TR Fargo	Checked By	Date 11/7/95	Site SCARBOROUGH, ME



NOTES: 1). 10' (2") Ø 10-SLOT PVC SCREEN SET 6 - 40.6' BELOW GROUND LEVEL (BGL)
2). 43.3' (2") DIAM. PVC RISER 40.6' BGL TO 2.7 FEET ABOVE GROUND LEVEL (AGL)
3). 4" I.D. LOCKING STEEL PROTECTIVE CASING 1.9' BGL TO 2.8' AGL.
4). SCREW-IN FLUSH-TYPE BOTTOM CAP.

CEH
CASWELL, EICHLER & HILL, INC.
GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-0032
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

Project RWS BACKFILL			Boring # HW-95-14A
Client RWS			Sheet 2 of 2
Contractor ALL TERRAIN DRILLING, P. MICHAUD		Date Begun 11/6/95	Overburden Drilled 50.5
Method DRIVEN CASING	Casing Size 4" ID HW	Completed 11/7/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	▽ Below Ground 11'
Logged By D. CHAPMAN	Checked By	Date 11/7/95	Site SCARBOROUGH, ME

Depth (ft)	Casing Blows/ft.	Sample #	Sample	Rec / Pen	Ambient Air (ppm)	Field Sample (ppm)	Jar Headspace (ppm)	Soil/Rock Description	Geologic Unit	Well Construction	Blows/6 in. or RQD % (0 20 40 60 80 100)	Elevation (ft)
55		S-10		20/24				BOTTOM OF BORING @ 51.1' BGL very dense greenish gray Silty fine SAND, Little Clay		Bottom of SCREEN @ 50.6'		
60												
65												
70												
75												
80												
85												
90												
95												
100												

NOTES:

CEH
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GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-0032
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

8

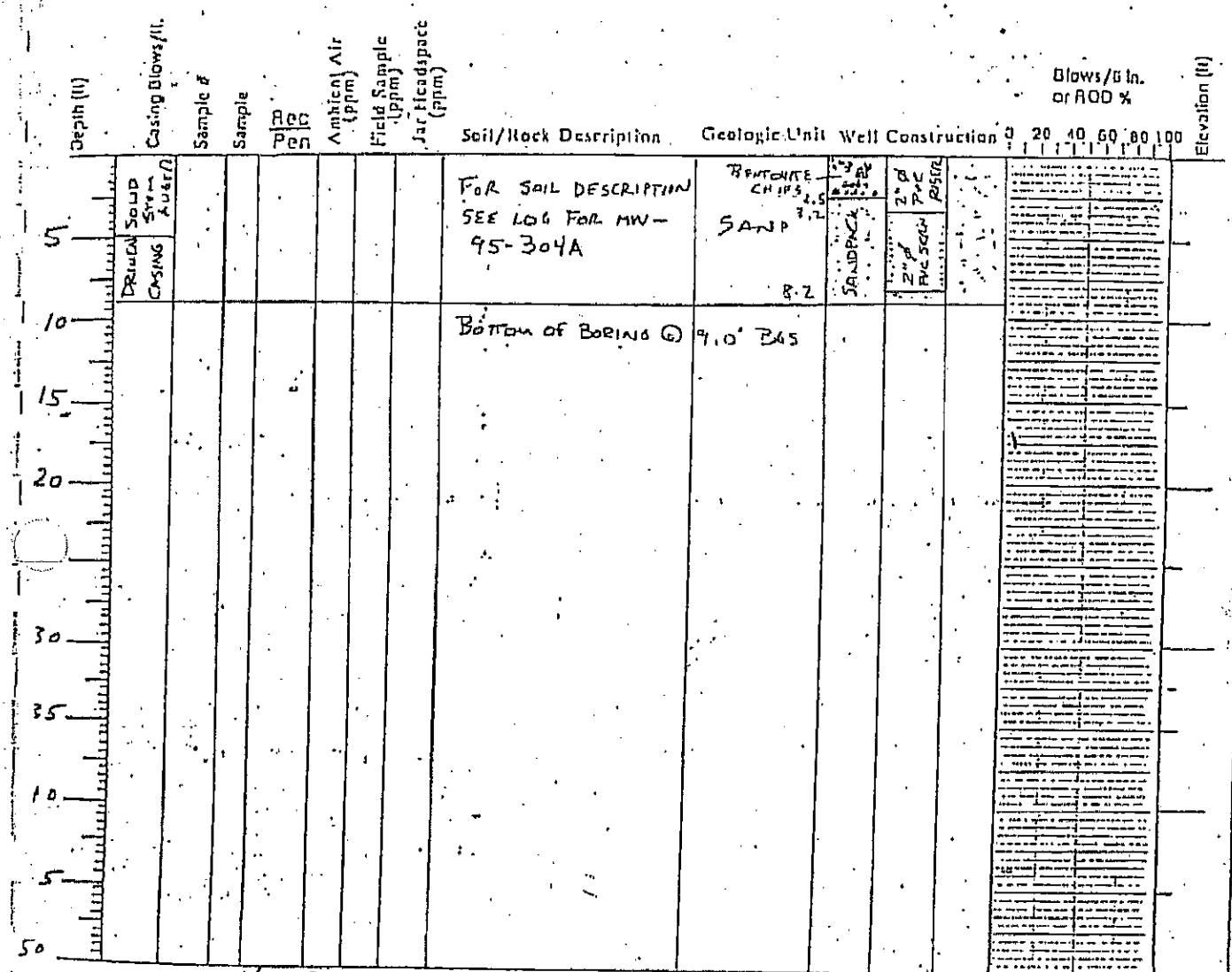
Project RWS - BALEFILL			Boring # MW-95-2B
Client RWS			Sheet 1 of 1
Contractor MAINE TEST BORINGS, G. LIDSTONE, HUSKEE		Date Begun 1/18/95	Overburden Drilled 15'
Method DRIVEN CASING	Casing Size 4" ID	Completed 1/18/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	▽ Below Ground 1'
Logged By D. CHAPMAN	Checked By	Date 1/18/95	Site SCARBOROUGH, MAINE

Depth (ft)	Casing Blows/ft.	Sample #	Sample	Rec / Pen	Ambient Air (ppm)	Field Sample (ppm)	Jar Headspace (ppm)	Soil/Rock Description	Geologic Unit	Well Construction	Blows/6 in. or RQD % 0 20 40 60 80 100	Elevation (ft)
5	PROBE AUGER	1		6/24				4 INCHES Black organic cover. Loose light brownish gray fine(+) to medium SAND. Little Silt.	ORGANIC SAND	BENT. CHIPS / SAND PACK		
	48 25 16 15 12	2		24/24				Hard olive gray SILT + CLAY. Trace Sand. Mottled. Sand lenses	SILT + CLAY AND SAND (2.5 – 9.8)	PVC 2" Ø PVC SCREEN		
10	17 13 15 9 4	3		18/24				2" Light olive brown f-m SAND and SILT + CLAY over 16" dark greenish gray CLAY + SILT				
		4		24/24				very soft dark greenish gray CLAY + SILT	FINE GRAINED PLEISTOCENE MARINE CLAY + SILT (9.8 – 10.0)	BENT. CHIPS		
15								Bottom of Boring @ 15.0' BGS				
20												
30												
35												
40												
45												
50												

NOTES:
1. TWO INCH I.D. TEN SLOT SCREEN FROM 9.5 FEET TO 3.5 FEET BELOW GROUND SURFACE (BGS)
2. TWO INCH ID PVC RISER: 3.8 FEET BGS TO 2.7 Feet ABOVE GROUND SURFACE (AGS)
3. LOCKING STEEL PROTECTIVE CASING 2.2' BGS. TO 2.8 Feet AGS.
4. PROBE AUGER 0-5', DRIVEN CASING AND 3 7/8" ROLLER BIT 5' - 15' BGS.

CEH
CASWELL, EICHLER & HILL, INC.
GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-6032
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

Project RWS BACKFILL			Boring # MW-95-304B
Client RWS			Sheet 1 of 1
Contractor ALL TERRAIN DRILLING, P. MICHAUD		Date Begun 11/9/95	Overburden Drilled
Method DRIVEN CASING	Casing Size 4" ID (11w)	Completed 11/9/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	▽ Below Ground 0.2'
Logged By D. CHAPMAN	Checked By	Date 11/9/95	Site SCARBOROUGH, MAINE

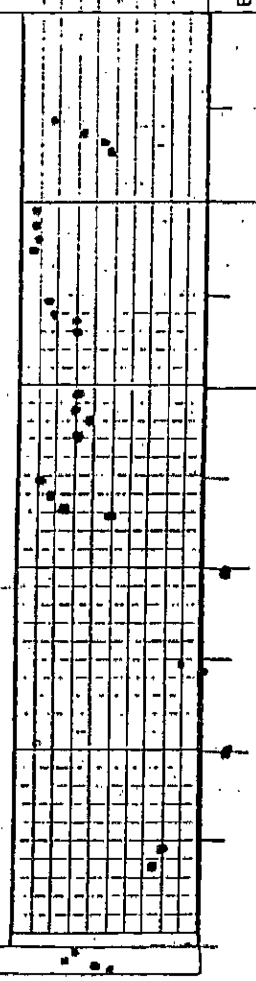


NOTES: (1) 5.8' (2" ø) 10-SLOT PVC SCREEN FROM 8.2' TO 3.2' BELOW GROUND SURFACE (BGS)
(2) 5.8' (2" ø) PVC RISER FROM 3.2' BGL TO 2.6' ABOVE GROUND SURFACE (AGS)
(3) 4" ID LOCKING STEEL PROTECTIVE CASING 2.3' BGS TO 2.7' AGS
(4) SLIP ON-TYPE BOTTOM CAP

CEH
CASWELL, EICHLER & HILL, INC.
GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-0032
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0201

Project: Regional Waste Systems Phase IV			Boring #: MW-95-305A
Client: RWS			Sheet 1 of 1
Contractor: CEH / ATD		Date Begun: Nov. 3, '95	Overburden Drilled: 52.0
Method: Drive and Wash	Casing Size: 4" ID	Completed: Nov. 6, 1995	Rock Drilled: 0.0
Ground Elevation:	PID: NA	Protection Level: D	▽ Below Ground: ~6.0'
Logged By: T R Fargo	Checked By:	Date:	Site: RWS - Scarborough

Depth (ft)	PID Ambient Air	Sample #	Sample	Rec/Pen	CLP	GC	PID Sample (ppm)	Soil/Rock Description	Lithologic Symbol	Well Construction	Soil Classification	Blows/6 in. or RQD % (0 20 40 60 80 100)	Elevation (ft)
0									Concrete				
									SAND				
5		S-1		1.3/2.0				Gray to tan silty till with interlayered gray to tan medium sandy-silty till					
10		S-2		2.0/2.0									
15		S-3		1.2/2.0				Same as above	Bentonite grout	2" ø SCH 40 PVC RISER			
20		S-4		1.0/2.0				Tan gray silty till - stiff					
25		S-5		1.0/2.0				Same as S-4					
30		S-6		.25/.25				6" boulder	30.0'				
35		S-7		.25/.75				Hard gray silty till	Tamped Bentonite Pellets; 38.0				
40		S-8		.25/.25				Same as above	SAND PACK	2" ø PVC SCREEN	40.0		
45		S-9		1.0/1.0				Same as above					
50		S-10		0.0/2.0				Sandy till ? (resample)			50.0		

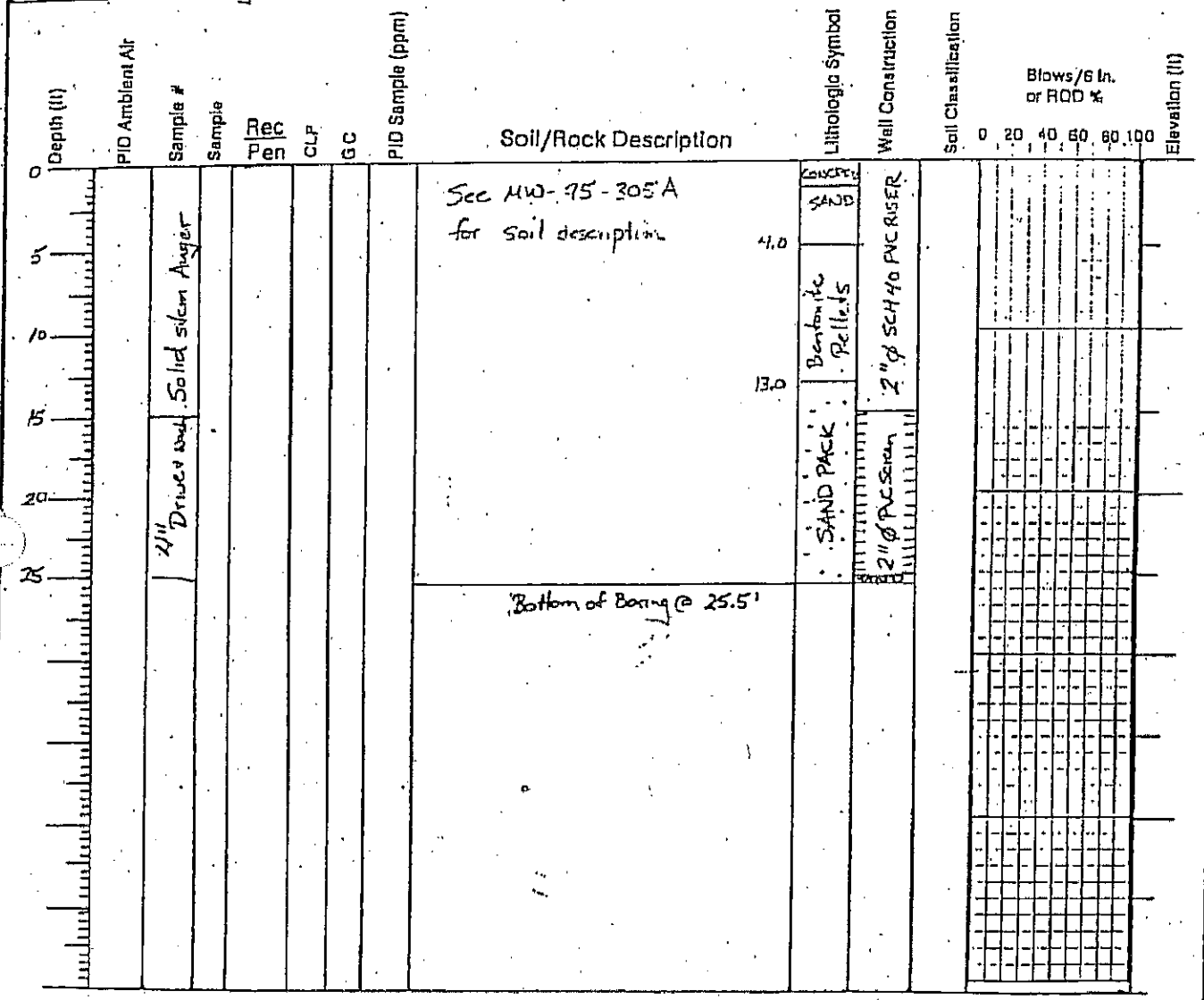


NOTES:

1.) 10' (2" ø) 10-SLOT PVC SCREEN 50.0' to 40.0' Below ground level
2.) 42' (2" ø) SCH 40 PVC RISER From 40.0 BGS to 2.0' Above ground level
3.) Locking steel protective casing 2.0 BGS to 3.0 AGS w/ concrete surface seal
4.) Screw-in flush type bottom cap on screen.

CEH Caswell, Eichler and Hill, Inc.
GEOLOGY HYDROLOGY GEOPHYSICS
P.O. Box 4696
Portsmouth, NH 03801

Project Regional Waste Systems : Phase IV			Boring # MW-95-305B
Client RWS			Sheet 1 of 1
Contractor CEH / ATD.		Date Begun Nov. 6, 1995	Overburden Drilled 25'
Method Drive and Wash + SSA	Casing Size 4" ID	Completed Nov. 6, 1995	Rock Drilled
Ground Elevation	PID NA	Protection Level D	☒ Below Ground
Logged By TRFargo	Checked By	Date	Site RWS - Scarborough



NOTES:
1.) 10' (2"ø) 10-SLOT PVC SCREEN 25.0 - 15.0' Below ground level
2.) 17' (2"ø) SCH 40 PVC RISER 15.0 Bgs to 2.0' Above ground surface
3.) Locking steel protective casing 2.0 BGS to 3.0 AGS w/ concrete surface seal
4.) Screw-in flush type bottom cap.

CEH Caswell, Eichler and Hill, Inc.
GEOLOGY HYDROLOGY GEOPHYSICS
P.O. Box 4696
Portsmouth, NH 03801

Project RWS BALEFILL			Boring # MW-95-58
Client RWS			Sheet 1 of 1
Contractor ATD - PETER HICHMUD		Date Begun 3/21/95	Overburden Drilled 45'
Method DRIVEN CASING	Casing Size 4" ID	Completed 3/22/95	Rock Drilled —
Ground Elevation	OVA or PID	Protection Level D	▽ Below Ground 7.6
Logged By D. CHAPMAN	Checked By	Date 3/22/95	Site SCARBOROUGH, MAINE

Depth (ft)	Casing Blows/ft.	Sample #	Sample Rec/Pen	Ambient Air (ppm)	Field Sample (ppm)	Jar Headspace (ppm)	Soil/Rock Description	Geologic Unit	Well Construction	Blows/6 in. or RQD %	Elevation (ft)
5	PROBE AUGER	1	12/24				2" Topsoil over 10" Fill. Yellow brown to orange fine to Coarse SAND. Little Silt.	FILL 5.0			
		2	24/24				Dense olive gray fine SAND and Silt. Little(-) MS to FG. Mottled. Little Clay				
10		3	19/24				Very dense, olive gray fine SAND and Silt. Little(-) MS to fine Gravel Little Clay.				
15	14 16 100 100	4	24/24				Dense olive gray to greenish gray fine SAND and Silt. Little (-) MS to FG. Little Clay				
20	25 42 50 80	5	4/24				Very dense dark gray fine to medium SAND. Some Silt Trace CS to FG Little Clay.	TILL	BENTONITE CHIPS		
25	30 25 40 35	6	14/24				Very dense dark greenish gray fine SAND and Silt. Trace medium Sand to fine Gravel. Little Clay		2" DIAM. PVC RISER		
30	50	7	18/18				As above	32.7			
35		8	18/18				As above	35.1	FILTER SAND		
40		9	24/24				Very dense dark greenish gray fine SAND and Silt Little Clay		2" DIAM PVC SCREEN		
45		10	18/18				As above	45.1 45.3			
50							Bottom of boring @ 46.5' BGS				

NOTES: 1. PROBE AUGER 0-15' BELOW GROUND SURFACE (BGS)
2. 10' (2") DIAM PVC SCREEN FROM 45.1' TO 35.1' BELOW GROUND SURFACE (BGS).
3. 36.9' (2") DIAM. PVC RISER FROM 35.1' BGS TO 1.8' ABOVE GROUND SURFACE (AGS)
4. LOCKING 4" DIAM STEEL PROTECTIVE CASING FROM 3.0' BGS TO 2.3' AGS
5. PROBE AUGER 0-15' BGS
6. DRIVEN CASING 15' - 30' BGS
7. (2") SCREW ON TYPE BOTTOM CAP
8. 3 7/8" ∅ ROLLER CONE 15' - 45' BGS

CEH
CASWELL, EICHLER & HILL, INC.
GEOLOGY HYDROLOGY GEOPHYSICS ENGINEERING
AUGUSTA, ME (207) 622-0033
Portsmouth, NH (603) 431-4899 West Topsham, VT (802) 439-5220 Columbia, MD (301) 290-9444 Atlanta, GA (404) 840-0301

(MWB-1)

MAINE TEST BORINGS, INC.
EASTBROOK, MAINE 04634

CLIENT: Group Design

SHEET 1 OF
HOLE NO. (B-1) MWB

DRILLER: J. Rudnicki

PROJECT NAME: Bale Fill Site

LINE & STATION

JOB NUMBER: 78-21

LOCATION: Portland, Maine

OFFSET

GROUND WATER OBSERVATIONS
AT ____ FT AFTER ____ HOURS
AT ____ FT AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HS	SS	
SIZE ID	2¼	1 3/8	
HAMMER WT		140	
HAMMER FALL		30"	

DATE START 7-3-78 DATE FIN 7-6
SURFACE ELEV
GROUND WATER ELEV

CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE OD	SAMPLE PEN	SAMPLE REC	SAMPLE DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
	1D	2"	18"		3.5	2	1	2			Brown med. sand
	2D	2"	16"		6.5	11	18	21		9.0	
	3D	2"	18"		11.5	6	8	8			Brown med. sand w/mottled clay la
	4D	2"	18"		16.5	2	1	2		16.0	
										19.0	Gray silty clay
	5D	2"	18"		21.5	4	6	10			Brown fine to med. silty sand
	6D	2"	16"		26.5	7	8	9		29.0	
	D	2"	18"	0	31.5	5	4	4		35.0	Gray silty clayey sand
	7D	2"	18"		36.5	4	8	11		36.5	Gray gravelly silty sand
											Bottom of boring @ 36.5'

Water @ 14.2' w/augers @ 35. a. sitting for weekend

Piezometer installed @ 27.0'

SAMPLES
D = Split Spoon
C = Shelby Tube

SOIL CLASSIFIED BY
X Driller Visually
Soil Technician Visually

REMARKS

MWA-3

MAINE TEST BORINGS, INC
BREWER, MAINE 04412

DRILLER: J. Rudnicki	CLIENT: Group Design	SHEET 1 OF
MTB JOB NUMBER: 78-21	PROJECT NAME: Dale Fill Site	HOLE NO. MWA-3
	LOCATION: Portland, Maine	LINE & STATION
		OFFSET

GROUND WATER OBSERVATIONS

AT ___ FT AFTER ___ HOURS

AT ___ FT AFTER ___ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HS	SS	
SIZE I.D.	2½	1 3/8	
HAMMER WT.		140	
HAMMER FALL		30"	

DATE START 3-7-78 DATE FIN 3-

SURFACE ELEV

GROUND WATER ELEV

CASING BLOWS PER FOOT	SAMPLE NO	O.D.	PEN	REC	DEPTH @ BOT	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
											Brown silty med. sand w/traces of gravel
	1D	2"	18"		6.5	8	18	25		7.0	
										10.0	Brown med. sand w/mottled clay lr
	2D	2"	18"		11.5	21	53	64			Brown med. sand
	3D	2"	18"		16.5	10	41	49		18.0	
	4D	2"	18"		21.5	2	2	2		24.0	Gray gravelly silty clayey sand
	5D	2"	10"		25.8	125	150				Brown gravelly silty sand
	6D	2"	18"		31.5	90	100	125		33.0	
	7D	2"	8"		35.7	61	150			35.7	Gray gravelly silty sand
											Bottom of boring @ 35.7'. Well point installed @ 32.0

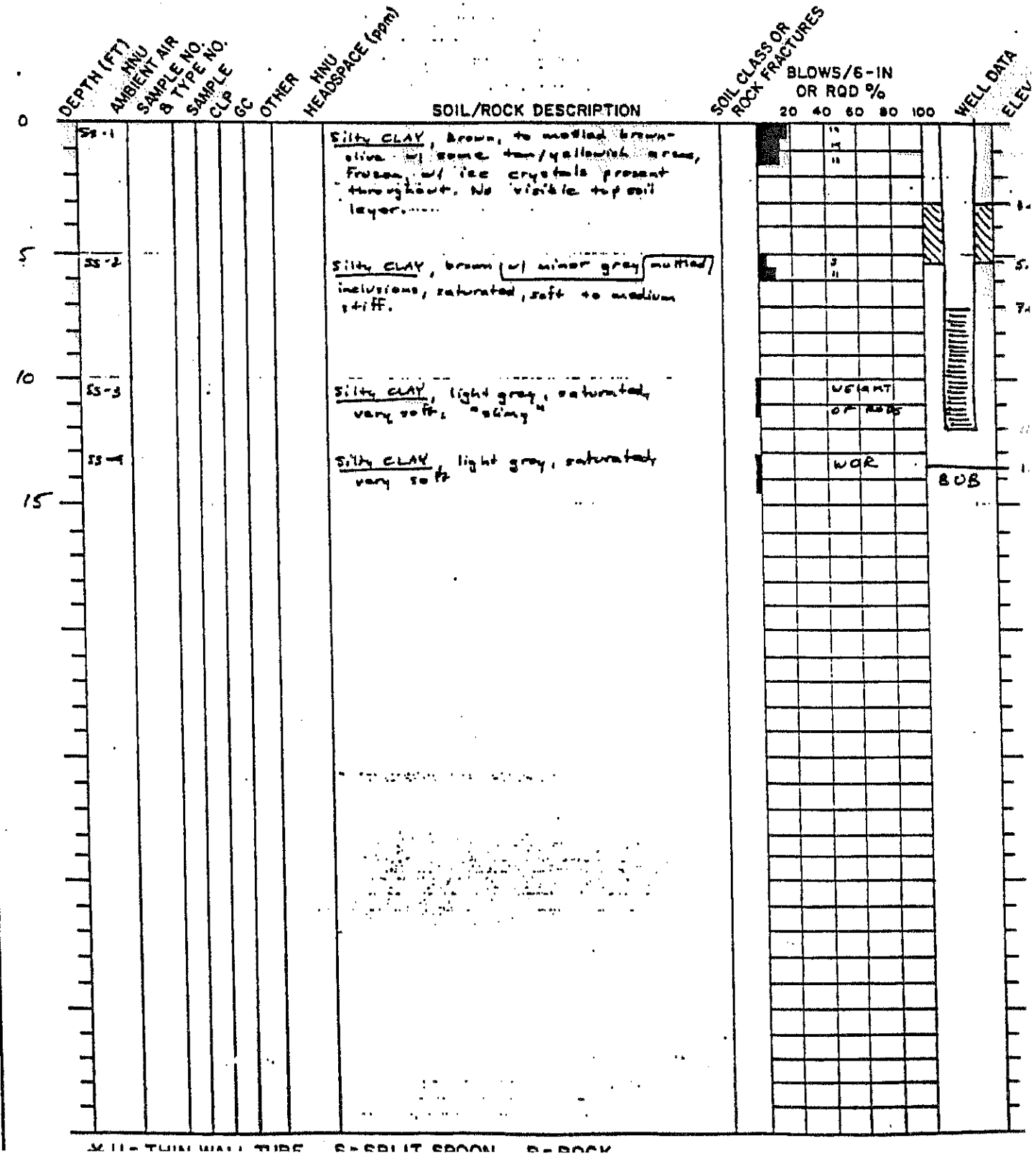
SAMPLES
D - Split Spoon
C - 2" Shelby Tube

SOIL CLASSIFIED BY
[x] Driller Visually
[ ] Soil Technician Visually
[ ] ... Tests

REMARKS

MW-2

CLIENT REGIONAL WASTE SYSTEMS			PROJECT NO. 4777-17
CONTRACTOR VALLEY NORTHEAST DIAMOND	DATE STARTED 3.21.88		COMPLETED 3.22.88
METHOD DRIVE & WASH	CASING SIZE 4"	HNU 11.7/10.2	PROTECTION LEVEL D
GROUND EL.	SOIL DRILLED 13.5'	ROCK DRILLED	TOTAL DEPTH 13.5'
LOGGED BY TRE	CHECKED BY	DATE	▽ BELOW GROUND



U = THIN WALL TUBE S = SPLIT SPOON R = ROCK

MW - 3

CLIENT REGIONAL WASTE SYSTEMS			PROJECT NO. 4777-17
CONTRACTOR ~~UNION~~ NORTHEAST DIAMOND	DATE STARTED 8.22.88		COMPLETED 8.22.88
METHOD DRIVE & WASH	CASING SIZE 4"	HNU 11.7/10.2	PROTECTION LEVEL D
GROUND EL.	SOIL DRILLED 13.0'	ROCK DRILLED	TOTAL DEPTH 13.0
LOGGED BY TRE	CHECKED BY	DATE	▽ BELOW GROUND

DEPTH (FT)	HNU AMBIENT AIR	SAMPLE NO. & TYPE NO.	SAMPLE CLP	GC	OTHER	HNU HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	SOIL CLASS OR ROCK FRACTURES	BLOWS/6-IN OR RQD % (20 40 60 80 100)	WELL DATA
0		SS-1					Silty Clay to Clayey Silt, brown w/ minor tan and reddish mottles, dry, frozen zones w/ large ice crystals, very stiff to soft.		23 19 3	
5		SS-2					Silty CLAY w/ trace coarse sand, especially in bottom part of core; brown w/ minor grey and tan inclusions; minor silty lenses; dry to moist; w/ stiff to stiff; evidence of desiccation (?) cracks in all orientations, many of which show a rust-brown dendritic pattern.		11 8 8	
10		SS-3					Silty CLAY, light grey w/ minor brown inclusions; saturated; very soft, uniform consistency.		WOR	
		SS-4					Silty CLAY w/ slight trace fine gravel to 1cm, grey to dark grey, saturated, very soft.		WOR	Bog
15										

* U = THIN WALL TUBE S = SPLIT SPOON R = ROCK

Glenn Drilling Inc.
R.F.D. #1, Lake Road
Fitchville, CT 06334
(203) 887-3621

CLIENT E. C. Jordan
PROJECT NAME RWS-Douglas
LOCATION Scarborough, Me

BORING NUMBER B-802B
SHEET No. 1 of 1

DRILLER Don Gray
INSPECTOR John Peterson
DATE START July 26, 1985
DATE FINISH July 26, 1985

ARCHITECT ENGINEER

	Casing	Sampler	Core Barrel
TYPE	H/S		
SIZE I.D.			
HAMMER WT.			
HAMMER FALL			

FILE NO. 715-8523
SURFACE ELEV. 69.7'
LINE & STATION
OFFSET

DEPTH	SAMPLE NO.	SAMPLE DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
									For strata, see B-802A
5'									
10'									
								13.6'	End of Boring 13.6'
									Installed 2" pvc monitor well Bottom at 12.6' 5' screen; 10' riser Protective casing and lock 350# sand; 20# Bentonite 0.75 hr. installation Seal at 1.5' to surface.

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD
W — WASH SAMPLE
A — AUGER SAMPLE

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	Medium
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	Very Stiff
		31 +	Hard

PROPORTIONS USED
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

REMARKS:
COL. A

802A

Glenn Drilling Inc.
R.F.D. #1, Lake Road
Fitchville, CT 06334
(203) 887-3621

CLIENT E. C. Jordan
PROJECT NAME RWS - Douglas
LOCATION Scarborough, ME

BORING NUMBER B-802A
SHEET No. 1 of 2

DRILLER Don Gray
INSPECTOR John Peterson
DATE START June 24, 1985
DATE FINISH

ARCHITECT ENGINEER

	Casing	Sampler	Core Barrel
TYPE	HW	SS	
SIZE I.D	4"	1½	
HAMMER WT	500	140	
HAMMER FALL	15"	30"	

FILE NO. 715-8523
SURFACE ELEV. 69.8'
LINE & STATION
OFFSET

DEPTH	SAMPLE NO.	SAMPLE DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
							10	1'	Silty top soil.
	1	1'-2.5'	10	17	23	1.2	38		Gray silty clay. Trace sand lenses
							65		
	2	2.5'-4'	18	21	27	1.2	78		
							88		
5'	3	5'-6.5'	6	8	8	1.3	70		
	1v	6.5'-6.9'	45/5				66		
	2v	7'-7.7'	35/5				60	8'	2 X 5" vane
							54		Gray silty clay.
							70		
10'	4	10'-11.5'	wt. of man			1.5	50		
							55		
							56		
			5				56		
							59		
15'	1t	15'-17'	wt. of r			2.0	38		
	3v	17'-17.75'	wt. of r 20/0				38		7.75 X 3 5/8" vane
	4v	18'-18.75'	wt. of r 30/0				41		
							48		
							45		
20'	5	20'-21.5'	wt. of r				105		
							80		
							55		
							68		
							57		
25'	6	25'-26.5'	wt. of r				99		
	5v	27'-27.75'			25/0		53		
	6v	28'-28.75'			30/0		37		
							41		
							38		
30'	2t	30'-32'	wt. of r				39		
	7v	33'-33.75'			30/0		41		
	8v	39'-39.75'			40/0		35		
							29		
							18		
35'	7	35'-36.5'	wt. of r				22		
							17		
							21		
							19		
							26		

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD
W — WASH SAMPLE
A — AUGER SAMPLE

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	Medium
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	Very Stiff
		31 +	Hard

PROPORTIONS USED
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

REMARKS:

COL. A Casing Blows

802A

Glenn Drilling Inc.
R.F.D. #1, Lake Road
Fitchville, CT 06334
(203) 887-3621

CLIENT E. C. Jordan
PROJECT NAME RWS- Douglas
LOCATION Scarborough, ME

B-802A
SHEET No. 2 of 2

DRILLER Don Gray
INSPECTOR John Peterson
DATE START June 24, 1985
DATE FINISH June 26, 1985

ARCHITECT ENGINEER

	Casing	Sampler	Core Barrel
TYPE	HW	SS	
SIZE I.D.	4"	1⅜	
HAMMER WT.	500	140	
HAMMER FALL	15"	30"	

FILE NO. 715-823
SURFACE ELEV. 69.9'
LINE & STATION
OFFSET

DEPTH	SAMPLE NO.	SAMPLE DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	mt	40'-42'	Wt. of r				34		
	9v	43'-43/75'			40/0		44		
	10v	44'-44.75'			40/0		45		
							39		
							42		
45'	3t	45'-47'			R/S		55		Gray silty clay.
	11v	48'-48.75'			50/0		54		
	12v	49'-49.75'			45/5		38		
							33	49.0'	
50'	8	50'-51.5'	wt. of r				51		gray clay silt.
							56		
							45		
							39		
							27		
							19	55.5'	
55'	9	55'-56.5'	woh	7	7		23		Gray silty gand. (till)
	13v	56.5'-	no penetration				36		
							33		
							38		
							47		
60'	10	60'-61.5'	5	12	12		48	=61.0'	
							56		Gray silty gray sand. (till)
							46		
							58		
							92	65.2'	
65'		65-65.2'	100	(Rec. Wash)					Refusal 65.2'

Installed 1 2" PVC Monitor Well
Bottom set at 64.3'
5' Screen; 62.1' Riser
1 Protective Casing and lock
750# sqnd; 75# Bentonite
5.5 Hrs Installation
Seals: 56.0'-53.6'
49.0'-47.1'
25.8'-23.7'
Surface

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD
W — WASH SAMPLE
A — AUGER SAMPLE

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

PROPORTIONS USED
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

REMARKS:

COL. A Casing Blows

MW-88-505B

06-5/86

BORING, MONITORING WELL AND PIEZOMETER INSTALLATION LOG

PROJECT REGIONAL WASTE SYSTEMS DATE 1/6/89 JOB NO. 8811Z

BORING MW-88505B

DEPTH	STRATUM DESCRIPTION	INSTRUMENT LOG
5	GRAY SILTY CLAY (V. SOFT)	BENTONITE RISER 3' SAND 5'
10		SAND
15 ft	BOTTOM OF BORING AT 15 FEET NO REFUSAL	2-INCH PVC SCREEN 15
20		

BORING

DEPTH	STRATUM DESCRIPTION	INSTRUMENT LOG

SEVEE & MAHER ENGINEERS, PA

...INE TEST BORINGS, INC. ...VER, MAINE 04412	CLIENT JACQUES WHITFORD COMPANY, INC.	SHEET 1 OF 1 HOLE NO. B-98-1B
...ER ...N SCHAEFER	PROJECT NAME RWS ASHFILL II	LINE & STATION
JOB NUMBER ...17	LOCATION SOUTH PORTLAND, ME	OFFSET

...UND WATER OBSERVATIONS		CASING	SAMPLER	CORE BARREL	DATE START	DATE FINISH
	TYPE	HW	SS		12/11/98	12/11/98
FT. AFTER HOURS	SIZE I.D.	4"	1 3/8"		SURFACE ELEVATION	
	HAMMER WT.	300	140			
FT. AFTER HOURS	HAMMER FALL	16"	30"			

...MPLE NOS.	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
										0.2	TOPSOIL
	1D	2"	24"		2.0	2	10	16	7	1.0	BROWN FINE SANDY SILT
										4.0	BROWN FINE SAND WITH LITTLE SILT
										6.0	GRAY SILTY CLAY
	2D	2"	24"		7.0	1	2	4	4		
											OLIVE SILTY CLAY WITH SILTY SAND LAYERS
	3	2"	24"		12.0	4	3	4	3	13.0	
											BROWN FINE SAND
	4D	2"	24"		17.0	17	18	20	28	18.0	
										20.5	BROWN FINE SAND WITH BROWN SILTY FINE SAND LAYERS, TRACE OF COARSE SAND & GRAVEL
	5D	2"	24"		22.0	11	14	18	22	23.0	BROWN FINE SAND WITH TRACE OF BROWN FINE SANDY SILTY LAYERS
	6D	2"	24"		27.0	7	11	13	14	27.0	BROWN FINE SAND WITH CLAYEY SILT & SILTY FINE SAND LAYERS
											BOTTOM OF BORING @ 27.0'

SAMPLES
SPLIT SPOON
2" SHELBY TUBE
= 3" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
INSTALLED WELL @ 25.1'

AINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT
JACQUES WHITFORD COMPANY, INC.

SHEET 1 OF 3
HOLE NO. B-98-1A

ER
N SCHAEFER

PROJECT NAME
RWS ASHFILL II

LINE & STATION

JOB NUMBER
-217

LOCATION
SOUTH PORTLAND, ME

OFFSET

UND WATER OBSERVATIONS

FT. AFTER HOURS

FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 12/07/98 DATE FINISH 12/11/98

SURFACE ELEVATION

SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
									0.2	TOPSOIL
1D	2"	24"		2.0	1	3	15	15	1.0	BROWN FINE SANDY SILTY
2D	2"	24"		4.0	6	5	5	8	4.5	BROWN SILTY FINE SAND WITH LITTLE GRAVEL
3D	2"	24"		6.0	6	6	4	4	7.0	GRAY SILTY CLAY
4D	2"	24"		8.0	2	2	3	5		GRAY SILTY CLAY WITH CLAYEY SILT & FINE SAND
5D	2"	24"		10.0	6	7	6	6	10.0	LAYERS
6D	2"	24"		12.0	6	12	12	8		GRAY SILTY CLAY WITH BROWN SILTY FINE SAND LAYERS
7D	2"	24"		14.0	5	9	10	12	14.0	
8D	2"	24"		16.0	12	18	27	25		BROWN FINE SAND
9D	2"	24"		18.0	14	20	22	24	18.0	
10D	2"	20"		19.7	16	20	40	100		
11D	2"	18"		22.0	28	24	20			BROWN SILTY FINE SAND WITH TRACE OF GRAVEL & COBBLES
12D	2"	24"		24.0	14	18	20	20	25.0	
13D	2"	24"		26.0	12	16	13	18	26.5	BROWN SILTY FINE SAND WITH OLIVE SANDY CLAYEY SILT LAYERS
14D	2"	24"		28.0	12	20	26	30	28.0	BROWN SILTY FINE SAND WITH BROWN M-F SAND LAYERS
15D	2"	24"		30.0	11	14	15	12		
16D	2"	24"		32.0	7	9	9	11		BROWN SILTY FINE SAND WITH OLIVE SILTY CLAY LAYERS
17D	2"	24"		34.0	9	5	4	6	34.0	
18D	2"	18"		35.5	2	20	85		35.2	BROWN F-M SAND WITH LITTLE SILT
19D	2"	5"		36.4	110					
										BROWN F-C SAND WITH SOME GRAVEL, TRACE OF COBBLES & SILT
20D	2"	20"		39.7	30	37	50	50	40.0	

SAMPLES
SPLIT SPOON
2" SHELBY TUBE
3" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

.NE TEST BORINGS, INC. 'AVER, MAINE 04412	CLIENT JACQUES WHITFORD COMPANY, INC.	SHEET 2 OF 3 HOLE NO. B-98-1A
R SCHAEFER	PROJECT NAME RWS ASHFILL II	LINE & STATION
JOB NUMBER 17	LOCATION SOUTH PORTLAND, ME	OFFSET

'ND WATER OBSERVATIONS

FT. AFTER HOURS

FT. AFTER HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START	DATE FINISH
12/07/98	12/11/98

SURFACE ELEVATION

SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
										GRAY-BROWN GRAVELLY SAND WITH SOME COBBLES
22D	2"	13"		43.1	16	48	50		43.0	
									44.4	BOULDER
23D	2"	24"		48.0	25	35	45	75		BROWN GRAVELLY SAND WITH COBBLES
24D	2"	8"		50.7	50	50			51.5	
25D	2"	24"		54.0	32	29	29	22		GRAY SILTY FINE SAND WITH LITTLE COARSE SAND & GRAVEL, TRACE OF COBBLES
26D	2"	13"		56.1	23	37	50			
27D	2"	17"		58.4	30	58	100			
D	2"	0"		59.0	25					
28D	2"	6"		60.5	95					
29D	2"	12"		63.0	58	85				
30D	2"	12"		65.0	32	80			70.0	
31D	2"	12"		67.0	42	88				GRAY SILTY FINE SAND WITH LITTLE COARSE SAND & GRAVEL, TRACE OF CLAY
32D	2"	19"		69.6	28	40	65			
33D	2"	24"		72.0	22	35	42	45		
34D	2"	12"		73.0	16	63				
35D	2"	18"		75.5	95	42	65		86.0	
D	2"	12"		78.0	45	82				GRAY, SILTY F-M SAND WITH SOME COARSE SAND & GRAVEL, TRACE COBBLES & CLAY
37D	2"	12"		80.0	48	103				

SAMPLES
SPLIT SPOON
" SHELBY TUBE
3" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
WASHED AHEAD 10.0'-99.0'

HOLE NO.

IE TEST BORINGS, INC. IEWER, MAINE 04412	CLIENT JACQUES WHITFORD COMPANY, INC.	SHEET 3 OF 3 HOLE NO. B-98-1A
HARPER	PROJECT NAME RWS ASHFILL II	LINE & STATION
B NUMBER	LOCATION SOUTH PORTLAND, ME	OFFSET

D WATER OBSERVATIONS		CASING	SAMPLER	CORE BARREL	DATE START	DATE FINISH
FT. AFTER HOURS	TYPE	HW	SS		12/07/98	12/11/98
	SIZE I.D.	4"	1 3/8"		SURFACE ELEVATION	
FT. AFTER HOURS	HAMMER WT.	300	140			
	HAMMER FALL	16"	30"			

SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
38D	2"	18"		32.5	18	45	85			GRAY SILTY FINE SAND WITH LITTLE COARSE SAND & GRAVEL, TRACE OF CLAY
39D	2"	13"		85.1	43	65	50		86.0	
40D	2"	12"		87.0	65	105				GRAY SILTY F-M SAND WITH SOME COARSE SAND & GRAVEL, TRACE OF COBBLES & CLAY
41D	3"	18"		89.5	27	35	25			
42D	3"	14"		91.2	27	35	25		91.2	
									93.0	BOULDER
43D	3"	18"		94.5	18	32	35			GRAY SILTY F-M SAND WITH SOME COARSE SAND & GRAVEL, TRACE OF COBBLES & CLAY
44D	3"	18"		96.5	28	30	32			
45D	3"	14"		98.2	14	20	25			
46D	3"	18"		100.5	30	30	25		100.5	
										BOTTOM OF BORING @ 100.5'
										INSTALLED WELL @ 98.0'

SAMPLES
PLIT SPOON
SHELBY TUBE
SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

MINE TEST BORINGS, INC.
BREWER, MAINE 04412

Sargent Corp.

SHEET 1 OF

HOLE NO. PW-1

LER: Tom Schaefer	PROJECT NAME: RWS	LINE & STATION:
JOB NUMBER: 06-146	LOCATION: Scarborough, ME.	OFFSET:

GROUND WATER OBSERVATIONS
Water @ 9.5'

	CASING	SAMPLER	CORE BARREL	DATE	D
TYPE	HW	SS		7/10/06	7/1(
SIZE I.D.	4"	1 3/8"		Start	Fi
HAMMER WT.	300#	140#		SURFACE ELEV	
HAMMER FALL	16"	30"			

ING WS R DT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
	1D	2"	24"		4.0	12	10	10	18			Brown Silty Fine Sand w/Trace of Gravel & Cobbles (Fill)
30											5.3	
65	2D	2"	24"		7.0	10	15	12	12			Mottled Silty F/M Sand w/Little Coarse Sand & Gravel
67											9.0	
73												Gray Brown Silty Fine Sand w/Little M/C Sand & Gravel
66												
47												
52	3D	2"	24"		12.0	5	9	9	11			
48												
40												
35											16.0	
	4D	2"	24"		17.0	18	16	10	7		17.0	Gray Silty Fine Sand w/Little M/C Sand & Gravel w/Trace of Clay
												Bottom of Boring @ 17.0'
												2" PVC Well Installed @ 15.0'
												Using 10.0' screen

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 1 OF 2

HOLE NO. PW-2A

DRILLER: Tom Schaefer	PROJECT NAME: Landfill	LINE & STATION:
T.E. JOB NUMBER: 05-203A	LOCATION: South Portland, ME	OFFSET:

GROUND WATER OBSERVATIONS
Artesian Pressure: Water @ 2.0' above ground w/16.0' casing, Hole depth= 17.0'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 11/03/05 Start
DATE 11/07/05 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING
Auger										
"	1D	2"	24"		2.0				WOH	
"										
"										
"										
Hydr.										
Push	2D	2"	24"		7.0	3	4	4	4	
"										
"										
"										
"										
"	3D	2"	24"		12.0	1	WOH	1	2	
"										
97										
82										
20										
52	4D	2"	24"		17.0	19	40	34	25	
43										
46										
88										
33										
32	6D	2"	24"		22.0	9	15	15	15	
55										
60										
80										
34										
65	6D	2"	24"		27.0	12	17	20	37	
85										
16										
15										
45										
60	7D	2"	24"		32.0	22	30	35	35	
112										
116										
145										
17										
23	8D	2"	24"		37.0	32	46	68	75	
30										
25										
33										

DEPTH	STRATUM DESCRIPTION
0.8	Dark Brown Organic Silt (Peat)
4.0	Mottled Sandy Clayey Silt
11.0	Olive Silty Clay
12.0	Olive Silty Clay, w/Trace of Silty Fine Sand Layers
17.0	Brown Fine Sand, w/Trace of Silt & F/C Sand Layers
20.0	Brown Silty F/C Sand w/Some Gravel
26.0	Brown Silty Very Fine Sand w/Olive Sandy Silt Layers
28.0	Brown Silty Fine Sand, w/Little Coarse Sand & Gravel
34.0	Brown Silty F/M Sand, w/Little Coarse Sand, & Fine Sandy Silt Layers, w/Trace of Gravel
	Gray Silty F/M Sand, w/Little Coarse Sand & Gravel, w/Trace of Cobbles

SAMPLES
D = SPLIT SPOON
C = 3" SHELBY TUBE
S = 3" SHELBY TUBE
T = 3" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[X] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 28.0' to 30.0' and from 35.0' to 50.0'

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 2 OF 2

HOLE NO. PW-2A

DRILLER: Tom Schaefer

PROJECT NAME: Landfill

LINE & STATION:

T.E. JOB NUMBER: 05-203A

LOCATION: South Portland, ME

OFFSET:

GROUND WATER OBSERVATIONS
Artesian Pressure: Water @ 2.9' above ground w/15.0' casing, Hole depth= 17.0'

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 11/03/05 Start
DATE 11/07/05 Finish
SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE SHEAR READING	DEPTH	STRATUM DESCRIPTION
40												
32	9D	2"	18"		41.5	35	60	90				
36												
30												
40												
28												
25	10D	2"	24"		47.0	38	58	62	60			Gray Silty F/M Sand, w/Little Coarse Sand & Gravel, w/Trace of Cobbles
25												
28												
45												
	11D	2"	14"		51.2	26	85	50			51.2	
												Bottom of Boring @ 51.2'
												2" PVC Well Installed @ 50.8'
												Using 10' of Screen

SAMPLES
D = SPLIT SPOON
U = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Washed ahead from 28.0' to 30.0' and from 35.0' to 50.0'

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 1 OF 1

HOLE NO. PW-2B

DRILLER: Tom Schaefer

PROJECT NAME: Landfill

LINE & STATION:

T.B. JOB NUMBER: 06-203A

LOCATION: South Portland, ME.

OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 11/8/05 Start	DATE 11/8/05 Finish
TYPE	HW				
SIZE I.D.	4"				
HAMMER WT.	300#				
HAMMER FALL	18"				

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READINGS	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
Hydr.												
Push												Same As PW-2A
"												
"												
"												
"												
"												
"												
"												
26												
48											15.0	
												Bottom of Boring @ 15.0'
												2" PVC Well Installed @ 15.0'

SAMPLES
S = SPLIT SPOON R = ROCK CORE
U = 2" SHELBY TUBE
T = 3" SHELBY TUBE V = VANE
W = WASH SHELBY TUBE TEST

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:
No spoon samples taken

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 1 OF 2

HOLE NO. PW3A

DRILLER: Tom Schaefer

PROJECT NAME: RWS Landfill

LINE & STATION:

T.B. JOB NUMBER: 05-203

LOCATION: South Portland, ME

OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL	DATE 11/01/05 Start	DATE 11/03/05 Finish
TYPE	HW	SS		SURFACE ELEVATION	
SIZE I.D.	4"	1 3/8"			
HAMMER WT.	300#	140#			
HAMMER FALL	16"	30"			

BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING	DEPTH	STRATUM DESCRIPTION
Auger												
"	1D	2"	24"		2.0	3	3	6	9			Mottled Clayey Silt w/Trace of Silty Fine Sand
"											4.0	
Hydr.												
Push	2D	2"	24"		7.0	4	5	5	5			Olive Silty Clay, w/Trace of Gray Sandy Clayey Silt Layers
"											9.5	
"	3D	2"	24"		12.0	WOH	WOH	WOH	WOH			Gray Silty Clay w/Trace of Sea Shells
"											15.0	
"	4D	2"	24"		17.0	WOH	WOH	WOH	WOH			
"	5D	2"	24"		22.0	WOR	WOR	WOR	WOR			Gray Silty Clay, w/Trace of Sandy ClayeySilt Layers
"											25.0	
"	6D	2"	24"		27.0	WOR	WOR	WOR	WOR			
"	7D	2"	24"		32.0	WOR	WOR	WOR	WOR			
WOG												
"	8D	2"	24"		37.0	WOR	WOR	WOR	WOR			Gray Silty Clay, w/Trace of Clayey Silt Layers, & Dark Gray Silty Clay Layers

SAMPLES
S = SPLIT SPOON R = ROCK CORE
T = 2" SHELBY TUBE
F = 3" SHELBY TUBE V = VANE TEST
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
XX DRILLER-VISUALLY
SOIL TECHNICIAN-VISUALLY
LABORATORY TESTS

REMARKS:
Bottom of Boring @ 79.0'
2" PVC Well Installed @ 79.0'
WOG = Weight of Casing

HOLE NO PW3A

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 2 OF 2

HOLE NO. PW3A

DRILLER: Tom Schaefer

PROJECT NAME: RWS Landfill

LINE & STATION:

T.B. JOB NUMBER: 05-203

LOCATION: South Portland, ME

OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL
TYPE	HW	SS	
SIZE I.D.	4"	1 3/8"	
HAMMER WT.	300#	140#	
HAMMER FALL	16"	30"	

DATE 11/01/05 Start — DATE 11/03/05 Finish

SURFACE ELEVATIO

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE READING
"	9D	2"	24"		42.0	WOR	WOR	WOR	WOR	
"										
"										
"										
"										
"	10D	2"	24"		47.0	WOR	WOR	WOR	WOR	
"										
"										
"										
"										
"	11D	2"	24"		52.0	WOR	WOR	WOR	WOR	
"										
"	12D	2"	24"		54.0	WOR	WOR	WOR	WOR	
"										
"	13D	2"	24"		56.0	WOR	WOR	WOR	WOR	
"										
"	14D	2"	24"		58.0	WOR	WOR	WOR	WOR	
"										
"	15D	2"	24"		60.0	WOR	WOR	WOR	WOR	
"										
"	16D	2"	24"		62.0	WOR	WOR	WOR	WOR	
"										
"	17D	2"	24"		64.0	WOR	WOR	WOR	WOR	
"										
"	18D	2"	24"		66.0	WOR	WOR	WOR	WOR	
"										
"	19D	2"	24"		68.0	WOR	WOR	WOR	WOR	
"										
"	20D	2"	24"		70.0	WOR	WOH	WOH	1	
Hydr. Push	21D	2"	24"		72.0	3	WOH	WOH	3	
"										
"										
"										
"	22D	2"	24"		76.0	WOR	WOR	WOR	WOR	
"										
10										
25										

DEPTH	STRATUM DESCRIPTION
	Gray Silty Clay, w/Trace of Clayey Silt Layers, & Dark Gray Silty Clay Layers
63.0	
64.3	Gray Silty Clay w/Trace of Dark Gray Silty Clay Layers & w/Trace of Gravel
67.5	Gray Silty Clay, w/Trace of Dark Gray Silty Clay Layers, & w/Trace of Silty Fine Sand Layers
70.0	Gray Silty Clay, w/Gray Silty Clayey F/M Sand Layers, w/Little Gravel
	Gray Silty Clay, w/Silty Fine Sand Layers, w/Trace of Gravel
77.0	
79.0	Gray Silty Clay, w/Silty Fine Sand Layers, w/Little Gravel

SAMPLES
D = SPLIT SPOON — R = ROCK CORE
= 2" SHELBY TUBE
= 3" SHELBY TUBE — V = VANE TEST

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
Bottom of Boring @ 79.0'
2" PVC Well Installed @ 79.0'
WOC = Weight of Casing

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: H.E. Sargent

SHEET 1 OF 1

HOLE NO. PW-3B

DRILLER: Tom Schaefer

PROJECT NAME: Landfill

LINE & STATION:

T.B. JOB NUMBER: 05-203A

LOCATION: South Portland, ME.

OFFSET:

GROUND WATER OBSERVATIONS

	CASING	SAMPLER	CORE BARREL
TYPE	HW		
SIZE I.D.	4"		
HAMMER WT.	300#		
HAMMER FALL	16"		

DATE 11/8/05 Start — DATE 11/8/05 Finish

SURFACE ELEVATION

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	VANE OBSERVATIONS	DEPTH	STRATUM DESCRIPTION
Auger												
"												
"												
"												
"												
Hydr.												
Push												Same As PW-3-A
"												
"												
"												
"												
"												
"												
"												
"												
"											15.0	
												Bottom of Boring @ 15.0'
												2" PVC Well Installed @ 15.0'

SAMPLES
S = SPLIT SPOON
U = 3" SHELBY TUBE
T = 3" SHELBY TUBE
R = ROCK CORE
V = VANE TEST

SOIL CLASSIFIED BY:
[X] DRILLER-VISUALLY
[ ] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:
No spoon samples taken

HOLE NO. PW-3B
TOTAL P.07

APPENDIX B

PORTLAND MAINE
Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Public Services Department
Michael J. Bobinsky, Director

June 30, 2011

Thomas Raymond, PE,PLS
Landfill Manager
ecomaine
64 Blueberry Road
Portland, Maine 04102

RE: INDUSTRIAL DISCHARGE PERMIT

Dear Tom:

Enclosed please find your **Revised** Discharge Permit Certificate, which is valid for a period from, **December 1, 2009 to December 1, 2012,** for your wastewater discharge from Green Rd. South Portland.

The permittee shall provide the City with results of the analysis for concentrations found in the industrial discharge required by the monitoring schedule below, (Section IV specified herein) or by the Director of the Department of Public Services.

Parameter	Frequency of Monitoring	Type of Sample	Screening Levels
Biochemical Oxygen Demand	**Quarterly**	**Composite**	**3,000 mg/L**
Total Suspended Solids	**Quarterly**	**Composite**	**1,500 mg/L**
Arsenic	**Quarterly**	**Composite**	**1.0 mg/L**
			Discharge limits
***pH**	**Quarterly**	**Composite**	**5-8.3 S.U.**
***pH**	**Quarterly**	**Grab**	**5-8.3 S.U.**
***Caustic alkalinity**	**As required**	**From pH Grab**	**1000 mg/l**
Cadmium	**Quarterly**	**Composite**	**0.024 mg/L**
Chromium	**Quarterly**	**Composite**	**1.90 mg/L**
Copper	**Quarterly**	**Composite**	**1.88 mg/L**
Lead	**Quarterly**	**Composite**	**0.60 mg/L**
Nickel	**Quarterly**	**Composite**	**0.76 mg/L**
Silver	**Quarterly**	**Composite**	**0.42 mg/L**
Zinc	**Quarterly**	**Composite**	**2.57 mg/L**
****Mercury**	**Quarterly**	**Grab**	**0.014 mg/l**

***pH of less than 5.0 standard units is prohibited; any pH result of over 8.3 S.U. must be accompanied by a result for caustic (hydroxide) alkalinity from the same sample. Caustic alkalinity over 1000 mg/l is prohibited.**

****Mercury Sampling must be conducted utilizing USEPA Method 1631**

Please note the following requirements in the permit:

This permit is conditional upon submittal of a written Chemical Management Plan. This plan must specify the nature and quantity of chemicals used or stored at your facility, the method of disposal used instead of dumping into the sewer, and procedures for assuring these chemicals do not spill or leak into the wastewater. Your plan must include Material Safety Data Sheets and the following statement:

> ***"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment for knowing violations."***

ecomaine Landfill, Greene Road,South Portland submittted a revised chemical management plan by **October 15, 2009** thereafter the above condition has been met. However, the certification statement quoted above must be submitted with your discharge monitoring report on a Quarterly basis. If you revise any of your chemical procedures or chemicals themselves, you are required to inform us as soon as possible.

ecomaine Landfill, Greene Road,South Portland shall display an Operations and Maintenance protocol and instructions in an appropriate location to facilitate the maintenance of all devices that are connected to your wastewater discharge point. An appropriate maintenance log certified by the signatory authority shall also be submitted annually. This plan has been updated to reflect the addition of the Kimberly-Clark Landfill flow and incorporates Operations and Maintenance associated with your administration of this facility. This O&M Manual shall be updated when significant changes are made and the revised manual submitted to the City.

An e-mail containing the "Sewers" section of the Portland City Code of Ordinances, and Rules and Regulations for the use of the Wastewater System , your Discharge Permit, and Discharge Monitoring Report Forms will be sent to you. Please refer to them to familiarize yourself with our sewer user regulations and requirements. You will find Prohibited Wastes under Sections 24-47 & 24-48 of City Code of Ordinances. Regulated pollutants are listed in section 2 and schedule "A" of the Rules and Regulations. Please be aware that all dischargers are required to comply with these limits, regardless of whether you are required to monitor for them.

Mr. Raymond, please feel free to contact me at 874-8843, by Fax at 874-8852, or by E-mail at skh@portlandmaine.gov if you have any questions or require further information about the **ecomaine Landfill, Greene Road,South Portland** Facility's Permit

Sincerely,
CITY OF PORTLAND

Stephen K. Harris
Assistant Engineer

SKH
Pc: Michael Bobinsky, Director, Public Services Department
David Margolis Pineo, Deputy City Engineer
Bradley A. Roland, PE, Project Engineer
Rebekah Sirois, Portland Water District

CITY OF PORTLAND

DEPARTMENT OF PUBLIC SERVICES

AUTHORIZATION TO DISCHARGE INDUSTRIAL WASTEWATER TO THE CITY OF PORTLAND TREATMENT FACILITIES

REVISED JUNE 30, 2011

Company Name: ecomaine.

Mailing Address: 64 Blueberry Road
Portland, Maine 04102

Effective Date: December 1, 2009

Expiration Date: December 1, 2012

ecomaine is hereby authorized by the City of Portland to discharge wastewater from their Green Road, South Portland Landfill into the City of Portland wastewater collection and treatment facilities subject to the general and specific conditions attached hereto, Section 24 of the City's Code of Ordinances and the Rules & Regulations for the Use of the Wastewater System, and applicable Federal and State laws.

Date: June 30, 2011

Approved by: _____

Michael J. Bobinsky, Director
Department of Public Services

CITY OF PORTLAND

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

ecomaine Landfill Facility

General Conditions

I. DEFINITIONS

Unless the context clearly indicates otherwise, the meaning of terms or abbreviations used in this discharge permit shall be as defined in the City of Portland Rules and Regulations for use of the Wastewater System and Section 24 of the City's Code of Ordinances or as defined below.

FOR THE PURPOSE OF THIS PERMIT, THE FOLLOWING DEFINITIONS SHALL APPLY:

1. Grab Sample: An individual sample collected in a period of less than 15 minutes.
2. Composite Sample: A sample consisting of a minimum of eight grab samples collected at regular intervals over a normal operating day (unless otherwise specified) and combined proportional to flow, or a sample continuously collected proportional to flow over a normal operating day.
3. Daily Maximum: The maximum value not to be exceeded during any 24 hour period.
4. Daily Average: The value of a composite sample or the mean value of the analysis of the specified number of samples collected at regular intervals over a normal operating day.
5. Average: The arithmetic average.
6. Continuous: Continuous monitoring of the characteristic in question.
7. 30 Day Average: Average of all daily values obtained from samples taken within thirty (30) consecutive days.
8. Caustic Alkalinity: A specified portion of the total alkalinity; Commonly referred to as hydroxide alkalinity in the literature.
9. Organic Scan: Testing for all toxic organic compounds listed on the latest EPA priority pollutant list; including pesticides and PCBs.
10. BOD: 5-day biochemical oxygen demand.
11. COD: Chemical oxygen demand.
12. TSS: Total suspended solids.
13. Mg/L: Milligrams per liter.
14. µg/L: Micrograms per liter.
15. GPM: Gallons per minute.
16. MGD: Million gallons per day.

II. DUTY TO COMPLY

A. All discharges authorized herein shall comply with the the City of Portland Rules and Regulations for use of the Wastewater System and the City of Portland's Sewer Use Ordinance (Section 24 of the City's Code of Ordinances) and with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit, the Sewer Use Ordinance and the Rules and Regulations for use of the Wastewater System shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of penalties as provided for in the City of Portland Sewer Use Ordinance and the Rules and Regulations for use of the Wastewater System, and/or Federal Clean Water Act (PL 92-500 and its amendments).

B. In addition, all permittees must comply with "CMR Chapter 528 Pretreatment Program"and the Federal Pretreatment standards found in Title 40 of the Code of Federal Regulations, Part 403 (typically referred to as 40 CFR Part 403). If the permittee is defined as a Categorical user, they must also comply with the applicable Federal Categorical Pretreatment standards.

III. FACILITY MODIFICATION

Modifications, additions, expansions and/or closures that cause a substantial change in the volume and/or character of wastewater discharged to the treatment works must be reported to the Director of the Department of Public Services, in care of the Pretreatment Coordinator, City of Portland, in writing, ***at least forty-five (45) days prior to the proposed modification***. This permit may then be modified or reissued to reflect such changes. No change in the permittee's discharge may be made unless reported to and approved by the Director. In no case shall new connections, increased flows, or significant changes in effluent quantity and/or quality be permitted if such will cause violation of the effluent limits specified herein.

IV. PERMIT MODIFICATION

A. After notice and opportunity for a hearing as provided by Section 24-57 of the City's Code of Ordinances and/or Section 5.4 of the City of Portland Rules and Regulations for use of the Wastewater System, this permit may be modified, suspended, or revoked in whole or in part during its term for causes including the following:

1. Violation of any terms or conditions of this permit.
2. Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts.
3. A change in conditions or the existence of a condition which requires either a temporary or permanent reduction or elimination of the authorized discharge.
4. Promulgation of a more stringent pretreatment standard by State or Federal agencies having jurisdiction over receiving waters. Permits modified under this section may include implementation schedules, self-monitoring requirements, revised effluent limitations and other provisions necessary to assure compliance.

B. Revisions - The Director of the Department of Public Services reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedule or compliance, or other provisions which may be authorized under Federal, State or City acts in order to bring all such discharges into compliance with these acts.

V. STATEMENT OF NON-TRANSFERABILITY

This permit may not be transferred to the permittee's successor or assigns. In the event of any change in control or ownership of the facility which is the source of the permitted discharge, the new owner shall be required to apply for a new permit for the discharge ***at least sixty (60) days prior to the transfer***. This permit, upon such transfer, shall be void.

VI. RE-APPLICATION

If the permittee desires to continue to discharge after the expiration of this permit, it shall reapply on the application forms then in use ***at least sixty (60) days before this permit expires. Under no circumstances shall the permittee continue to discharge after the expiration of the permit.***

VII. ACCESSIBILITY

The permittee shall permit the Director of the Department of Public Services and/or other duly authorized Department of Public Services personnel upon the presentation of proper credentials:

1. To have access to all points of user's facility and grounds;
2. To have access to and copy any records required to be kept under the terms and conditions of this permit;
3. To inspect any monitoring equipment or monitoring method required by this permit; or,
4. To measure and/or sample any intake, wastewater facility, or effluent so covered under the terms and conditions of this permit.

VIII. OTHER REGULATORY REQUIREMENTS

This permit does not preclude obtaining any other required Federal, State, or Local permits.

IX. SEVERABILITY CLAUSE

The provisions of this permit are severable, and the validity of any condition or subdivision thereof shall not make void any other condition or subdivision thereof.

X. RELIEF FROM PENALTIES

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not noncompliance is due to accident, equipment breakdown, labor dispute, or natural disasters.

XI. DISCHARGE LIMITATIONS

A. The discharge from Categorical users must conform to the limitations established by the applicable Federal Categorical Pretreatment standard(s); except as may be otherwise authorized or limited by this permit. See "Special Conditions, Section I" for details.

B. The permittee is authorized to discharge wastewater whose effluent characteristics shall not exceed the values listed in Section 24-47 of the City's Sewer Use Ordinance and / or Schedule “A” of the City of Portland Rules and Regulations for use of the Wastewater System as may be specified herein.

C. All limitations are conditional and may be revised should the concentrations prove detrimental to the proper operation and maintenance of the Treatment Facilities. Upon notification to reduce the specified concentrations, the permittee shall be responsible for all costs incurred at the Treatment Facilities, resulting from excessive discharge concentrations.

XII. PROHIBITED DISCHARGES

A. The permittee shall not discharge any prohibited waste identified in section 24-47(a) of the City's Sewer Use Ordinance and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System.

B. Slug discharges are prohibited. A slug discharge is defined as any discharge of a non-routine, episodic nature, including, but not limited, to an accidental spill or a non-customary batch discharge. For the purpose of this permit, any discharge of wastewaters whose characteristics are identified in Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System shall be considered a slug discharge and require immediate notification of the Pretreatment Coordinator. (see Section XVIII for notification requirements.)

C. General Prohibitions:
An Industrial User may not introduce into the Publicly Owned Treatment Works (POTW) any pollutants which cause Pass Through or Interference.

1. Pass Through is defined as a discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the National Pollutant Discharge Elimination System (NPDES) permit (including an increase in the magnitude or duration of a violation).
2. Interference is defined as a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

   (a) Inhibits or disrupts the POTW treatment processes or operations, or its sludge processes, use, or disposal; and
   (b) therefore is a cause of a violation of any requirement of the POTW NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, The Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

D. Specific Prohibitions:
In addition, the following pollutants shall not be introduced into the POTW:

(1) Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Farenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21.
(2) Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0 standard units;
(3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in Interference;
(4) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW.
(5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 degrees C (104 degrees F).
(6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
(7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
(8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

XIII. MONITORING AND REPORTING STATEMENT

This permit shall be subject to such monitoring requirements as may be reasonably required by the City of Portland, including the installation, use, and maintenance of monitoring equipment or methods, including, when appropriate, biological monitoring methods. The permittee shall provide the City of Portland with periodic monitoring reports as required in the special conditions section of this permit.

XIV. MONITORING/SAMPLING REQUIREMENTS

A. At each connection between the permittee's sewer system and the City's collection system, the permittee, if required by the Director of the Department of Public Services, shall install a flow meter(s), sampling station, or other device(s) that shall measure, sample and record the quantity/quality of wastewater flow from the industry at the times required by the monitoring schedule. All monitoring devices and sampling stations must be approved by the Director of the Department of Public Services. The permittee shall accept the estimates of quantities of wastewater flow as established by the Director of the Department of Public Services during all periods in which the meters fail to measure the wastewater flow correctly.

B. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at regular intervals to ensure accuracy of measurement.

C. The permittee shall provide the above records and shall demonstrate the accuracy of the monitoring devices upon request of the Director of the Department of Public Services.

D. Monitoring and sampling shall be conducted as follows:

1. Samples and measurements taken as required herein shall be representative of the typical volume and nature of of the monitored discharge.
2. The sampling, preservation, handling and analytical methods used shall conform to the requirements of 40 CFR 136.
3. The results of the above monitoring requirements shall be reported at the frequencies stated in the Special Conditions section of this permit.
4. Any reports or records of monitoring activities and results shall include for all samples:
   (a) The date, exact place, method, and time of sampling and the names of the person or persons taking the samples;
   (b) The dates analyses were performed;
   (c) Who performed the analyses;
   (d) The analytical techniques/methods used, including sampling, handling, and preservation techniques; and
   (e) The results of such analyses.
5. All correspondence regarding monitoring facilities should be directed to:
   Director of the Department of Public Services
   In care of the Pretreatment Coordinator
   City of Portland
   55 Portland Street
   Portland, Maine 04101
   (207) 874-8843
6. Results of any effluent monitoring for any pollutant more frequently than required by this permit shall be submitted to the City of Portland's Director of the Department of Public Services, in care of the Pretreatment Coordinator.
7. Information and data provided to the City of Portland, unless otherwise specified, shall be available to the public without restriction.

XV. PRETREATMENT FACILITIES OPERATION

All pretreatment facilities shall be operated in a manner consistent with the City of Portland Sewer Use Ordinance, the Rules and Regulations for use of the Wastewater System and any applicable Federal, State, or local regulations and guidelines. The permittee shall at all times maintain in good working order and operate as efficiently as possible any facilities or systems of control installed or utilized to achieve compliance with the terms and conditions of this permit.

XVI. SIGNATORY AUTHORIZATION

A. All reports shall be signed:

1. By a responsible corporate officer, if the permittee submitting the reports is a corporation. For the purpose of this paragraph, a responsible corporate officer means

   (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs a similar policy or decision-making function for the corporation, or
   (ii) the manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1997 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. By a general partner or proprietor if the permittee submitting the reports is a partnership or sole proprietorship respectively.

3. By a duly authorized representative of the individual designated in paragraph 1 or 2 of this section if:

   (i) The authorization is made in writing by the individual described in paragraph 1 or 2;
   (ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company; and
   (iii) the written authorization is submitted to the City's Pretreatment Coordinator.

4. If an authorization under paragraph 3 of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for environmental matters for the company, a new authorization satisfying the requirements of paragraph 3 of this section must be submitted to the City's Pretreatment Coordinator prior to or together with any reports to be signed by an authorized representative.

B. Approved signatory authorization forms must be on file with the City's Pretreatment Coordinator.

XVII. RECORDS RETENTION

All records and information resulting from any effluent monitoring activities, including all records of analyses performed, and calibration and maintenance of instrumentation and recordings from continuous monitoring and instrumentation shall be retained for a minimum of three (3) years.

XVIII. NONCOMPLIANCE REQUIREMENTS

The permittee shall immediately notify the City of Portland's Pretreatment Coordinator if they are unable to comply with any of the conditions of this permit. The **telephone number is 874-8843**. Oral notification must be received ***within twenty-four (24) hours*** of knowledge of the violation. ***Within five (5) days*** of such noncompliance and oral notification, the permittee shall provide the City of Portland's Director of the Department of Public Services in care of the Pretreatment Coordinator a detailed written report specifying (at a minimum) the following information:

1. The nature of the violation;
2. When and how the permittee became aware of the violation and the cause of noncompliance;
3. Anticipated time the condition of noncompliance is expected to continue, or if such conditions have been corrected, the duration of the period of noncompliance;
4. Steps taken by the permittee to reduce and eliminate the noncomplying discharge; and
5. Steps to be taken by the permittee to prevent recurrence of the condition of noncompliance.

Failure to make such notification may result in penalties; see Section XXII of this permit.

XIX. UNSPECIFIED DISCHARGE

Other materials ordinarily produced or used in operation of this facility which have not been specifically identified may be discharged provided

1. They are not
   (a) Designated as toxic or hazardous under the provisions of Sections 307 and 311 respectively of the Federal Water Pollution Act, Title 38, Section 420 Maine Revised Statues, or other applicable State Laws; or as identified in Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System
   (b) In violation of Federal standards or requirements.
   (c) Known to be hazardous or toxic by the permittee.

2. The discharge of such materials shall not interfere with the operation of the treatment facilities of the City of Portland or their ability to treat such materials to the extent covered by the City's permit to discharge. (See Section XII for more detail.)

XX. SPILL NOTIFICATION

The permittee shall notify the City of Portland's Pretreatment Coordinator immediately upon the occurrence of an accidental discharge of substances prohibited by Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System or any slug discharges or spills that may enter the public sewer. **The telephone number is 874-8843**. ***Notification must occur within twenty-four (24) hours of knowledge of the spill***. The notification shall include the location of discharge, volume, and corrective action taken. The permittee's notification of accidential releases in accordance with this section does not relieve if of other reporting requirements that arise under local, State, or Federal Laws, or from liability for costs to the City associated with corrective actions.

Within five (5) days following an accidental discharge, the permittee shall submit to the City of Portland's Director of the Department of Public Services, in care of the Pretreatment Coordinator a detailed written report. The report shall specify:

1. Description of the upset, slug load or accidental discharge, the cause thereof, and the impact on the permittee's compliance status. The description should also include location of discharge, type, concentration and volume of waste.
2. Duration of noncompliance, including exact dates and time of noncompliance and, if the noncompliance is continuing, the time by which compliance is reasonably expected to occur.

3. All steps taken or to be taken to reduce, eliminate, and/or prevent recurrence of such an upset, slug load, accidental discharge, or other conditions of noncompliance.

Failure to make such notification may result in penalties; see Section XXII of this permit.

XXI. CONFIDENTIALITY

Records or information submitted to the City of Portland may be claimed to be confidential by the submitter. All such claims of confidentiality shall be handled in accordance with 40 CFR 403.14, to the extent permitted by Maine law.

XXII. PENALTIES FOR VIOLATION

A. From Section 24-56 of the City's Sewer Use Ordinance and / or Section 5.2 of the City of Portland Rules and Regulations for use of the Wastewater System

"Any person failing to comply with or violating any provision of this article shall be served by the public services authority with written notice stating the nature of the failure or violation and providing a reasonable time limit for the satisfactory correction thereof. Such person shall, within the period of time stated in such notice, permanently cease or correct all such failures or violations. Any person who shall continue any failure or violation beyond the time limit required for compliance in any notice given pursuant to this section shall be guilty of an offense. Any person violating any of the provisions of this article shall be liable to the city and shall be assessed a civil penalty of a minimum of one thousand dollars ($1,000.00) per day for each violation of industrial pretreatment standards and requirements, and in addition, shall be liable for any expense, loss or damage occasioned by the city by reason of such violation. The city may seek injunctive relief for the purposes of enforcing this article."

B. In addition, violations of discharge limits, and/or reporting due dates as established in this permit may cause the permittee to be placed in significant non-compliance with the Portland Water District and City of Portland's Pretreatment Program.

C. At least annually the City must provide public notification in the largest daily newspaper of all industrial discharge permittees who were classified as being in significant non-compliance during the previous twelve months. Publication costs to meet this requirement shall be reimbursed to the city as part of the permit issuancy fee as provided in Section 24-50 of the City's Sewer Use Ordinance.

XXIII. COST REIMBURSEMENT

The permittee shall reimburse the Portland Water District, the City of Portland and their agents for expenditures incurred for the special handling, monitoring, treatment or disposal of the wastewater from their facility. This includes, but is not limited to, additional costs for maintaining the treatment plant, additional costs for disposal of sewage sludge and costs of additional wastewater monitoring and analyses as long as these costs are attributable to the wastewater discharge of the permittee.

CITY OF PORTLAND

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

ecomaine Landfill Facility

Special Conditions

PAGE NO.

I. PERMITTEE CLASSIFICATION

The permittee is a **SIGNIFICANT** industrial user as defined by Federal regulations and the City of Portland, and must comply with the Federal pretreatment standards found in 40 CFR Part 403.

II. MONITORING REQUIREMENTS

The permittee shall provide the City with results of the analysis for concentrations found in the industrial discharge as may be required by the monitoring schedule, (Section IV specified herein) or by the Director of the Department of Public Services.

III. SAMPLE POINT(S) LOCATION

A. Sampling of the wastewater discharge shall be done at approved locations only. A sketch and description of this location shall be submitted with each permit application, and shall be attached to this permit.

B. Revisions to this sample point location as necessary, shall be first approved by the Director of the Department of Public Services. Any samples taken from different location(s) shall be duly documented.

IV. MONITORING SCHEDULE

The permittee shall have samples of the industrial wastewater discharge collected and analyzed from the approved sample points in accordance with the following schedule:

Parameter	Frequency of Monitoring	Type of Sample	Screening Levels
Biochemical Oxygen Demand	**Quarterly**	**Composite**	**5,000 mg/L**
Total Suspended Solids	**Quarterly**	**Composite**	**1,500 mg/L**
Arsenic	**Quarterly**	**Composite**	**1.0 mg/L**
			Discharge limits
***pH**	**Quarterly**	**Composite**	**5-8.3 S.U.**
***pH**	**Quarterly**	**Grab**	**5-8.3 S.U.**
***Caustic alkalinity**	**As required**	**From pH Grab**	**1000 mg/l**
Cadmium	**Quarterly**	**Composite**	**0.024 mg/L**
Chromium	**Quarterly**	**Composite**	**1.90 mg/L**
Copper	**Quarterly**	**Composite**	**1.88 mg/L**
Lead	**Quarterly**	**Composite**	**0.60 mg/L**
Nickel	**Quarterly**	**Composite**	**0.76 mg/L**
Silver	**Quarterly**	**Composite**	**0.42 mg/L**
Zinc	**Quarterly**	**Composite**	**2.57 mg/L**
****Mercury**	**Quarterly**	**Grab**	**0.014 mg/l**

***pH of less than 5.0 standard units is prohibited; any pH result of over 8.3 S.U. must be accompanied by a result for caustic (hydroxide) alkalinity from the same sample. Caustic alkalinity over 1000 mg/l is prohibited.**

****Mercury Sampling must be conducted utilizing USEPA Method 1631**

V. REPORTING DUE DATES

A. Results of the required analyses shall be reported to the City of Portland's Director of the Department of Public Services, in care of the Pretreatment Coordinator on a quarterly basis, at a minimum. These ***REPORTS SHALL BE DUE JANUARY 15, APRIL 15, JULY 15, AND OCTOBER 15 OF EACH YEAR COVERED BY THIS PERMIT.***

B. Reports shall include, at a minimum, complete and signed discharge monitoring report forms (available from the Pretreatment Coordinator), actual approved laboratory analysis reports from all laboratories involved, wastewater flow information, properly completed chain(s) of custody, and a certification statement regarding total toxic organics and chemical management.

VI. NOTIFICATION OF VIOLATION/RESAMPLING REQUIREMENTS

A. If the results of any analyses performed for (or by) the permittee indicates a violation of a discharge limit noted in this permit or the City's Code of Ordinances, the permittee shall notify the City's Pretreatment Coordinator ***within twenty-four (24) hours*** of becoming aware of the potential violation. The telephone number is (207) 874-8843.

B. ***The permittee must resample immediately*** and submit the repeat analysis results to the Director of the Department of Public Services, in care of the Pretreatment Coordinator ***within thirty (30) days*** of becoming aware of any discharge violation. Please note that a regularly scheduled monitoring report will not generally be accepted as a resampling report. Resampling is required to help determine if the original violation represents a pattern, or a one-time digression. Therefore resampling must occur as soon as possible after a violation has been noted.

VII. COMPLIANCE MONITORING REPORTS

Each report submitted by the permittee shall indicate the precise nature and concentrations of the regulated pollutants in its discharge to the Portland sewer system, the average and maximum daily flow rates from each industrial process discharge, methods used to sample and analyze the data, and a certification that these methods conform with 40 CFR Part 136 or equivalent methods approved by EPA.

All private laboratory reports submitted to the City of Portland shall include chain of custody information documenting each person involved in the possession of the sample(s) from the person who collected the sample(s) to the person who analyzed the sample(s) in the laboratory.

All compliance discharge reports shall be signed by a responsible official; either an owner, corporate manager or department manager who supervises more than 250 employees. One of these may also appoint any other company representative to be authorized to sign the reports, but must do so with written notice to the City of Portland

VIII. PERMIT TERMS ACCEPTANCE CLAUSE

ecomaine Landfill, South Portland shall be deemed to agree to all of the terms of this permit upon its acceptance of this permit

IX. IMPLEMENTATION SCHEDULE FOR COMPLIANCE

If pretreatment or other facilities are required by Federal or State laws, or by the Director of the Department of Public Services; then an implementation schedule for compliance acceptable to the Director of the Department of Public Services shall be developed.

APPENDIX C

November 20, 2015

Art Colvin, PE, PLS
Landfill Manager
ecomaine
64 Blueberry Road
Portland, Maine 04102

RE: INDUSTRIAL DISCHARGE PERMIT

Dear Mr. Colvin:

Enclosed please find the **renewed** Discharge Permit Certificate, which is valid for a period from, **December 1, 2015 to December 1, 2018,** for your wastewater discharge from the Landfill Facility located off of Scott Drive in Westbrook. This landfill accepts municipal solid waste and ash from the **ecomaine** waste to energy facility on Blueberry Road.

The permittee shall provide the City with results of the analysis for concentrations found in the industrial discharge required by the monitoring schedule below, (Section IV specified herein) or by the Director of the Department of Public Works.

Parameter	Frequency of Monitoring	Type of Sample	Screening Levels
Biochemical Oxygen Demand	Quarterly	Composite	3,000 mg/L
Total Suspended Solids	Quarterly	Composite	1,500 mg/L
			Discharge limits
pH	Quarterly	Composite	Comparison Only
*pH	Quarterly	Grab	5-8.3 S.U.
*Caustic alkalinity	As required	From pH Grab	1000 mg/L
Arsenic	Quarterly	Composite	0.055 mg/L
Cadmium	Quarterly	Composite	0.024 mg/L
Chromium	Quarterly	Composite	1.90 mg/L
Copper	Quarterly	Composite	1.88 mg/L
Lead	Quarterly	Composite	0.60 mg/L
Nickel	Quarterly	Composite	0.76 mg/L
Silver	Quarterly	Composite	0.42 mg/L
Zinc	Quarterly	Composite	2.57 mg/L
Mercury	Quarterly	Grab	0.014 mg/L

***pH of less than 5.0 standard units is prohibited; any pH result of over 8.3 S.U. must be accompanied by a result for caustic (hydroxide) alkalinity from the same sample.**

Please note the following requirements in the permit:

This permit is conditional upon submittal of a chemical management plan. This plan must specify the nature and quantity of chemicals used or stored at your facility, the method of disposal used instead of dumping into the sewer, and procedures for assuring these chemicals do not spill or leak into the wastewater. Your plan must include Material Safety Data Sheets and the following statement:

> ***"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment for knowing violations."***

ecomaine Landfill Facility submitted information for chemical management in the Industrial Discharge Permit application dated November 16, 2015 therefore the above condition has been met. However, the certification statement quoted above must be submitted with your discharge monitoring report on a Quarterly basis. If you revise any of your chemical procedures or chemicals themselves, you are required to inform us as soon as possible.

ecomaine has submitted an Operation and Maintenance Plan updated as of 6-5-2014. The plan reflects the addition of the Kimberly-Clark Landfill flow and incorporates Operations and Maintenance associated with administration of this facility. This O&M Manual shall be updated when significant changes are made and the revised manual submitted to the City.

An e-mail containing the "Sewers" section of the Portland City Code of Ordinances, and Rules and Regulations for the use of the Wastewater System, your Discharge Permit, and Discharge Monitoring Report Forms will be sent to you. Please refer to them to familiarize yourself with our sewer user regulations and requirements. You will find Prohibited Wastes under Sections 24-47 & 24-48 of City Code of Ordinances. Regulated pollutants are listed in section 2 and schedule "A" of the Rules and Regulations. Please be aware that all dischargers are required to comply with these limits, regardless of whether you are required to monitor for them.

Mr. Colvin, please feel free to contact me at 874-8846, by Fax at 874-8852, or by E-mail at bnp@portlandmaine.gov if you have any questions or require further information about the **ecomaine** Landfill Facility's Permit

Sincerely,
CITY OF PORTLAND

Benjamin N. Pearson

Benjamin N. Pearson
Assistant Engineer

Pc: Rebekah Sirois, Portland Water District

CITY OF PORTLAND

DEPARTMENT OF PUBLIC WORKS

AUTHORIZATION TO DISCHARGE INDUSTRIAL WASTEWATER TO THE CITY OF PORTLAND TREATMENT FACILITIES

Company Name: ecomaine

Mailing Address: 64 Blueberry Road
Portland, Maine 04102

Effective Date: December 1, 2015

Expiration Date: December 1, 2018

ecomaine is hereby authorized by the City of Portland to discharge wastewater from their Landfill Facility into the City of Portland wastewater collection and treatment facilities subject to the general and specific conditions attached hereto, Section 24 of the City's Code of Ordinances and the Rules & Regulations for the Use of the Wastewater System, and applicable Federal and State laws.

Date: November 20, 2015

Approved by: _____

Bob Leeman, Acting Director
Department of Public Works

CITY OF PORTLAND

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

ecomaine Landfill Facility

General Conditions

I. DEFINITIONS

Unless the context clearly indicates otherwise, the meaning of terms or abbreviations used in this discharge permit shall be as defined in the City of Portland Rules and Regulations for use of the Wastewater System and Section 24 of the City's Code of Ordinances or as defined below.

FOR THE PURPOSE OF THIS PERMIT, THE FOLLOWING DEFINITIONS SHALL APPLY:

1. Grab Sample: An individual sample collected in a period of less than 15 minutes.
2. Composite Sample: A sample consisting of a minimum of eight grab samples collected at regular intervals over a normal operating day (unless otherwise specified) and combined proportional to flow, or a sample continuously collected proportional to flow over a normal operating day.
3. Daily Maximum: The maximum value not to be exceeded during any 24 hour period.
4. Daily Average: The value of a composite sample or the mean value of the analysis of the specified number of samples collected at regular intervals over a normal operating day.
5. Average: The arithmetic average.
6. Continuous: Continuous monitoring of the characteristic in question.
7. 30 Day Average: Average of all daily values obtained from samples taken within thirty (30) consecutive days.
8. Caustic Alkalinity: A specified portion of the total alkalinity; Commonly referred to as hydroxide alkalinity in the literature.
9. Organic Scan: Testing for all toxic organic compounds listed on the latest EPA priority pollutant list; including pesticides and PCBs.
10. BOD: 5-day biochemical oxygen demand.
11. COD: Chemical oxygen demand.
12. TSS: Total suspended solids.
13. Mg/L: Milligrams per liter.
14. µg/L: Micrograms per liter.
15. GPM: Gallons per minute.
16. MGD: Million gallons per day.

II. DUTY TO COMPLY

A. All discharges authorized herein shall comply with the City of Portland Rules and Regulations for use of the Wastewater System and the City of Portland's Sewer Use Ordinance (Section 24 of the City's Code of Ordinances) and with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit, the Sewer Use Ordinance and the Rules and Regulations for use of the Wastewater System shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of penalties as provided for in the City of Portland Sewer Use Ordinance and the Rules and Regulations for use of the Wastewater System, and/or Federal Clean Water Act (PL 92-500 and its amendments).

B. In addition, all permittees must comply with "CMR Chapter 528 Pretreatment Program "and the Federal Pretreatment standards found in Title 40 of the Code of Federal Regulations, Part 403 (typically referred to as 40 CFR Part 403). If the permittee is defined as a Categorical user, they must also comply with the applicable Federal Categorical Pretreatment standards.

III. FACILITY MODIFICATION

Modifications, additions, expansions and/or closures that cause a substantial change in the volume and/or character of wastewater discharged to the treatment works must be reported to the Director of the Department of Public Works, in care of the Pretreatment Coordinator, City of Portland, in writing, ***at least forty-five (45) days prior to the proposed modification***. This permit may then be modified or reissued to reflect such changes. No change in the permittee's discharge may be made unless reported to and approved by the Director. In no case shall new connections, increased flows, or significant changes in effluent quantity and/or quality be permitted if such will cause violation of the effluent limits specified herein.

IV. PERMIT MODIFICATION

A. After notice and opportunity for a hearing as provided by Section 24-57 of the City's Code of Ordinances and/or Section 5.4 of the City of Portland Rules and Regulations for use of the Wastewater System, this permit may be modified, suspended, or revoked in whole or in part during its term for causes including the following:

1. Violation of any terms or conditions of this permit.
2. Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts.
3. A change in conditions or the existence of a condition which requires either a temporary or permanent reduction or elimination of the authorized discharge.
4. Promulgation of a more stringent pretreatment standard by State or Federal agencies having jurisdiction over receiving waters. Permits modified under this section may include implementation schedules, self-monitoring requirements, revised effluent limitations and other provisions necessary to assure compliance.

B. Revisions - The Director of the Department of Public Works reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedule or compliance, or other provisions which may be authorized under Federal, State or City acts in order to bring all such discharges into compliance with these acts.

V. STATEMENT OF NON-TRANSFERABILITY

This permit may not be transferred to the permittee's successor or assigns. In the event of any change in control or ownership of the facility which is the source of the permitted discharge, the new owner shall be required to apply for a new permit for the discharge ***at least sixty (60) days prior to the transfer***. This permit, upon such transfer, shall be void.

VI. RE-APPLICATION

If the permittee desires to continue to discharge after the expiration of this permit, it shall reapply on the application forms then in use ***at least sixty (60) days before this permit expires. Under no circumstances shall the permittee continue to discharge after the expiration of the permit.***

VII. ACCESSIBILITY

The permittee shall permit the Director of the Department of Public Works and/or other duly authorized Department of Public Works personnel upon the presentation of proper credentials:

1. To have access to all points of user's facility and grounds;
2. To have access to and copy any records required to be kept under the terms and conditions of this permit;
3. To inspect any monitoring equipment or monitoring method required by this permit; or,
4. To measure and/or sample any intake, wastewater facility, or effluent so covered under the terms and conditions of this permit.

VIII. OTHER REGULATORY REQUIREMENTS

This permit does not preclude obtaining any other required Federal, State, or Local permits.

IX. SEVERABILITY CLAUSE

The provisions of this permit are severable, and the validity of any condition or subdivision thereof shall not make void any other condition or subdivision thereof.

X. RELIEF FROM PENALTIES

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not noncompliance is due to accident, equipment breakdown, labor dispute, or natural disasters.

XI. DISCHARGE LIMITATIONS

A. The discharge from Categorical users must conform to the limitations established by the applicable Federal Categorical Pretreatment standard(s); except as may be otherwise authorized or limited by this permit. See "Special Conditions, Section I" for details.

B. The permittee is authorized to discharge wastewater whose effluent characteristics shall not exceed the values listed in Section 24-47 of the City's Sewer Use Ordinance and / or Schedule “A” of the City of Portland Rules and Regulations for use of the Wastewater System as may be specified herein.

C. All limitations are conditional and may be revised should the concentrations prove detrimental to the proper operation and maintenance of the Treatment Facilities. Upon notification to reduce the specified concentrations, the permittee shall be responsible for all costs incurred at the Treatment Facilities, resulting from excessive discharge concentrations.

XII. PROHIBITED DISCHARGES

A. The permittee shall not discharge any prohibited waste identified in section 24-47(a) of the City's Sewer Use Ordinance and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System.

B. Slug discharges are prohibited. A slug discharge is defined as any discharge of a non-routine, episodic nature, including, but not limited, to an accidental spill or a non-customary batch discharge. For the purpose of this permit, any discharge of wastewaters whose characteristics are identified in Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System shall be considered a slug discharge and require immediate notification of the Pretreatment Coordinator. (see Section XVIII for notification requirements.)

C. General Prohibitions:
An Industrial User may not introduce into the Publicly Owned Treatment Works (POTW) any pollutants which cause Pass Through or Interference.

1. Pass Through is defined as a discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the National Pollutant Discharge Elimination System (NPDES) permit (including an increase in the magnitude or duration of a violation).
2. Interference is defined as a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

   (a) Inhibits or disrupts the POTW treatment processes or operations, or its sludge processes, use, or disposal; and
   (b) therefore is a cause of a violation of any requirement of the POTW NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, The Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

D. Specific Prohibitions:
In addition, the following pollutants shall not be introduced into the POTW:

(1) Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21.
(2) Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0 standard units;
(3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in Interference;
(4) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW.
(5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 degrees C (104 degrees F).
(6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
(7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
(8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

XIII. MONITORING AND REPORTING STATEMENT

This permit shall be subject to such monitoring requirements as may be reasonably required by the City of Portland, including the installation, use, and maintenance of monitoring equipment or methods, including, when appropriate, biological monitoring methods. The permittee shall provide the City of Portland with periodic monitoring reports as required in the special conditions section of this permit.

XIV. MONITORING/SAMPLING REQUIREMENTS

A. At each connection between the permittee's sewer system and the City's collection system, the permittee, if required by the Director of the Department of Public Works, shall install a flow meter(s), sampling station, or other device(s) that shall measure, sample and record the quantity/quality of wastewater flow from the industry at the times required by the monitoring schedule. All monitoring devices and sampling stations must be approved by the Director of the Department of Public Works. The permittee shall accept the estimates of quantities of wastewater flow as established by the Director of the Department of Public Works during all periods in which the meters fail to measure the wastewater flow correctly.

B. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at regular intervals to ensure accuracy of measurement.

C. The permittee shall provide the above records and shall demonstrate the accuracy of the monitoring devices upon request of the Director of the Department of Public Works.

D. Monitoring and sampling shall be conducted as follows:

1. Samples and measurements taken as required herein shall be representative of the typical volume and nature of the monitored discharge.
2. The sampling, preservation, handling and analytical methods used shall conform to the requirements of 40 CFR 136.
3. The results of the above monitoring requirements shall be reported at the frequencies stated in the Special Conditions section of this permit.
4. Any reports or records of monitoring activities and results shall include for all samples:
   (a) The date, exact place, method, and time of sampling and the names of the person or persons taking the samples;
   (b) The date's analyses were performed;
   (c) Who performed the analyses;
   (d) The analytical techniques/methods used, including sampling, handling, and preservation techniques; and
   (e) The results of such analyses.
5. All correspondence regarding monitoring facilities should be directed to:
   Director of the Department of Public Works
   In care of the Pretreatment Coordinator
   City of Portland
   55 Portland Street
   Portland, Maine 04101
   (207) 874-8846
6. Results of any effluent monitoring for any pollutant more frequently than required by this permit shall be submitted to the City of Portland's Director of the Department of Public Works, in care of the Pretreatment Coordinator.
7. Information and data provided to the City of Portland, unless otherwise specified, shall be available to the public without restriction.

XV. PRETREATMENT FACILITIES OPERATION

All pretreatment facilities shall be operated in a manner consistent with the City of Portland Sewer Use Ordinance, the Rules and Regulations for use of the Wastewater System and any applicable Federal, State, or local regulations and guidelines. The permittee shall at all times maintain in good working order and operate as efficiently as possible any facilities or systems of control installed or utilized to achieve compliance with the terms and conditions of this permit.

XVI. SIGNATORY AUTHORIZATION

A. All reports shall be signed:

1. By a responsible corporate officer, if the permittee submitting the reports is a corporation. For the purpose of this paragraph, a responsible corporate officer means

   (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs a similar policy or decision-making function for the corporation, or
   (ii) the manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1997 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. By a general partner or proprietor if the permittee submitting the reports is a partnership or sole proprietorship respectively.

3. By a duly authorized representative of the individual designated in paragraph 1 or 2 of this section if:

   (i) The authorization is made in writing by the individual described in paragraph 1 or 2;
   (ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company; and
   (iii) the written authorization is submitted to the City's Pretreatment Coordinator.

4. If an authorization under paragraph 3 of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for environmental matters for the company, a new authorization satisfying the requirements of paragraph 3 of this section must be submitted to the City's Pretreatment Coordinator prior to or together with any reports to be signed by an authorized representative.

B. Approved signatory authorization forms must be on file with the City's Pretreatment Coordinator.

XVII. RECORDS RETENTION

All records and information resulting from any effluent monitoring activities, including all records of analyses performed, and calibration and maintenance of instrumentation and recordings from continuous monitoring and instrumentation shall be retained for a minimum of three (3) years.

XVIII. NONCOMPLIANCE REQUIREMENTS

The permittee shall immediately notify the City of Portland's Pretreatment Coordinator if they are unable to comply with any of the conditions of this permit. The **telephone number is 874-8846**. Oral notification must be received ***within twenty-four (24) hours*** of knowledge of the violation. ***Within five (5) days*** of such noncompliance and oral notification, the permittee shall provide the City of Portland's Director of the Department of Public Works in care of the Pretreatment Coordinator a detailed written report specifying (at a minimum) the following information:

1. The nature of the violation;
2. When and how the permittee became aware of the violation and the cause of noncompliance;
3. Anticipated time the condition of noncompliance is expected to continue, or if such conditions have been corrected, the duration of the period of noncompliance;
4. Steps taken by the permittee to reduce and eliminate the noncomplying discharge; and
5. Steps to be taken by the permittee to prevent recurrence of the condition of noncompliance.

Failure to make such notification may result in penalties; see Section XXII of this permit.

XIX. UNSPECIFIED DISCHARGE

Other materials ordinarily produced or used in operation of this facility which have not been specifically identified may be discharged provided

1. They are not
   (a) Designated as toxic or hazardous under the provisions of Sections 307 and 311 respectively of the Federal Water Pollution Act, Title 38, Section 420 Maine Revised Statues, or other applicable State Laws; or as identified in Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System
   (b) In violation of Federal standards or requirements.
   (c) Known to be hazardous or toxic by the permittee.

2. The discharge of such materials shall not interfere with the operation of the treatment facilities of the City of Portland or their ability to treat such materials to the extent covered by the City's permit to discharge. (See Section XII for more detail.)

XX. SPILL NOTIFICATION

The permittee shall notify the City of Portland's Pretreatment Coordinator immediately upon the occurrence of an accidental discharge of substances prohibited by Section 24-47 (a) of the City's Code of Ordinances and / or Section 2.2 of the City of Portland Rules and Regulations for use of the Wastewater System or any slug discharges or spills that may enter the public sewer. **The telephone number is 874-8846**. ***Notification must occur within twenty-four (24) hours of knowledge of the spill***. The notification shall include the location of discharge, volume, and corrective action taken. The permittee's notification of accidental releases in accordance with this section does not relieve if of other reporting requirements that arise under local, State, or Federal Laws, or from liability for costs to the City associated with corrective actions.

Within five (5) days following an accidental discharge, the permittee shall submit to the City of Portland's Director of the Department of Public Works, in care of the Pretreatment Coordinator a detailed written report. The report shall specify:

1. Description of the upset, slug load or accidental discharge, the cause thereof, and the impact on the permittee's compliance status. The description should also include location of discharge, type, concentration and volume of waste.
2. Duration of noncompliance, including exact dates and time of noncompliance and, if the noncompliance is continuing, the time by which compliance is reasonably expected to occur.

3. All steps taken or to be taken to reduce, eliminate, and/or prevent recurrence of such an upset, slug load, accidental discharge, or other conditions of noncompliance.

Failure to make such notification may result in penalties; see Section XXII of this permit.

XXI. CONFIDENTIALITY

Records or information submitted to the City of Portland may be claimed to be confidential by the submitter. All such claims of confidentiality shall be handled in accordance with 40 CFR 403.14, to the extent permitted by Maine law.

XXII. PENALTIES FOR VIOLATION

A. From Section 24-56 of the City's Sewer Use Ordinance and / or Section 5.2 of the City of Portland Rules and Regulations for use of the Wastewater System

"Any person failing to comply with or violating any provision of this article shall be served by the public Works authority with written notice stating the nature of the failure or violation and providing a reasonable time limit for the satisfactory correction thereof. Such person shall, within the period of time stated in such notice, permanently cease or correct all such failures or violations. Any person who shall continue any failure or violation beyond the time limit required for compliance in any notice given pursuant to this section shall be guilty of an offense. Any person violating any of the provisions of this article shall be liable to the city and shall be assessed a civil penalty of a minimum of one thousand dollars ($1,000.00) per day for each violation of industrial pretreatment standards and requirements, and in addition, shall be liable for any expense, loss or damage occasioned by the city by reason of such violation. The city may seek injunctive relief for the purposes of enforcing this article."

B. In addition, violations of discharge limits, and/or reporting due dates as established in this permit may cause the permittee to be placed in significant non-compliance with the Portland Water District and City of Portland's Pretreatment Program.

C. At least annually the City must provide public notification in the largest daily newspaper of all industrial discharge permittees who were classified as being in significant non-compliance during the previous twelve months. Publication costs to meet this requirement shall be reimbursed to the city as part of the permit issuance fee as provided in Section 24-50 of the City's Sewer Use Ordinance.

XXIII. COST REIMBURSEMENT

The permittee shall reimburse the Portland Water District, the City of Portland and their agents for expenditures incurred for the special handling, monitoring, treatment or disposal of the wastewater from their facility. This includes, but is not limited to, additional costs for maintaining the treatment plant, additional costs for disposal of sewage sludge and costs of additional wastewater monitoring and analyses as long as these costs are attributable to the wastewater discharge of the permittee.

CITY OF PORTLAND

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

ecomaine Landfill Facility

Special Conditions

Page 10

PAGE NO.

I. PERMITTEE CLASSIFICATION

The permittee is a **SIGNIFICANT** industrial user as defined by Federal regulations and the City of Portland, and must comply with the Federal pretreatment standards found in 40 CFR Part 403.

II. MONITORING REQUIREMENTS

The permittee shall provide the City with results of the analysis for concentrations found in the industrial discharge as may be required by the monitoring schedule, (Section IV specified herein) or by the Director of the Department of Public Works.

III. SAMPLE POINT(S) LOCATION

A. Sampling of the wastewater discharge shall be done at approved locations only. A sketch and description of this location shall be submitted with each permit application, and shall be attached to this permit.

B. Revisions to this sample point location as necessary, shall be first approved by the Director of the Department of Public Works. Any samples taken from different location(s) shall be duly documented.

IV. MONITORING SCHEDULE

The permittee shall have samples of the industrial wastewater discharge collected and analyzed from the approved sample points in accordance with the following schedule:

Parameter	Frequency of Monitoring	Type of Sample	Screening Levels
Biochemical Oxygen Demand	**Quarterly**	**Composite**	**3,000 mg/L**
Total Suspended Solids	**Quarterly**	**Composite**	**1,500 mg/L**
			Discharge limits
pH	**Quarterly**	**Composite**	**Comparison Only**
***pH**	**Quarterly**	**Grab**	**5-8.3 S.U.**
***Caustic alkalinity**	**As required**	**From pH Grab**	**1000 mg/L**
Arsenic	**Quarterly**	**Composite**	**0.055 mg/L**
Cadmium	**Quarterly**	**Composite**	**0.024 mg/L**
Chromium	**Quarterly**	**Composite**	**1.90 mg/L**
Copper	**Quarterly**	**Composite**	**1.88 mg/L**
Lead	**Quarterly**	**Composite**	**0.60 mg/L**
Nickel	**Quarterly**	**Composite**	**0.76 mg/L**
Silver	**Quarterly**	**Composite**	**0.42 mg/L**
Zinc	**Quarterly**	**Composite**	**2.57 mg/L**
Mercury	**Quarterly**	**Grab**	**0.014 mg/L**

***pH of less than 5.0 standard units is prohibited; any pH result of over 8.3 S.U. must be accompanied by a result for caustic (hydroxide) alkalinity from the same sample.**

V. REPORTING DUE DATES

A. Results of the required analyses shall be reported to the City of Portland's Director of the Department of Public Works, in care of the Pretreatment Coordinator on a quarterly basis, at a minimum. These ***REPORTS SHALL BE DUE JANUARY 15, APRIL 15, JULY 15, AND OCTOBER 15 OF EACH YEAR COVERED BY THIS PERMIT.***

B. Reports shall include, at a minimum, complete and signed discharge monitoring report forms (available from the Pretreatment Coordinator), actual approved laboratory analysis reports from all laboratories involved, wastewater flow information, properly completed chain(s) of custody, and a certification statement.

VI. NOTIFICATION OF VIOLATION/RESAMPLING REQUIREMENTS

A. If the results of any analyses performed for (or by) the permittee indicates a violation of a discharge limit noted in this permit or the City's Code of Ordinances, the permittee shall notify the City's Pretreatment Coordinator ***within twenty-four (24) hours*** of becoming aware of the potential violation. The telephone number is (207) 874-8846.

B. ***The permittee must resample immediately*** and submit the repeat analysis results to the Director of the Department of Public Works, in care of the Pretreatment Coordinator ***within thirty (30) days*** of becoming aware of any discharge violation. Please note that a regularly scheduled monitoring report will not generally be accepted as a resampling report. Resampling is required to help determine if the original violation represents a pattern, or a one-time digression. Therefore resampling must occur as soon as possible after a violation has been noted.

VII. COMPLIANCE MONITORING REPORTS

Each report submitted by the permittee shall indicate the precise nature and concentrations of the regulated pollutants in its discharge to the Portland sewer system, the average and maximum daily flow rates from each industrial process discharge, methods used to sample and analyze the data, and a certification that these methods conform with 40 CFR Part 136 or equivalent methods approved by EPA.

All private laboratory reports submitted to the City of Portland shall include chain of custody information documenting each person involved in the possession of the sample(s) from the person who collected the sample(s) to the person who analyzed the sample(s) in the laboratory.

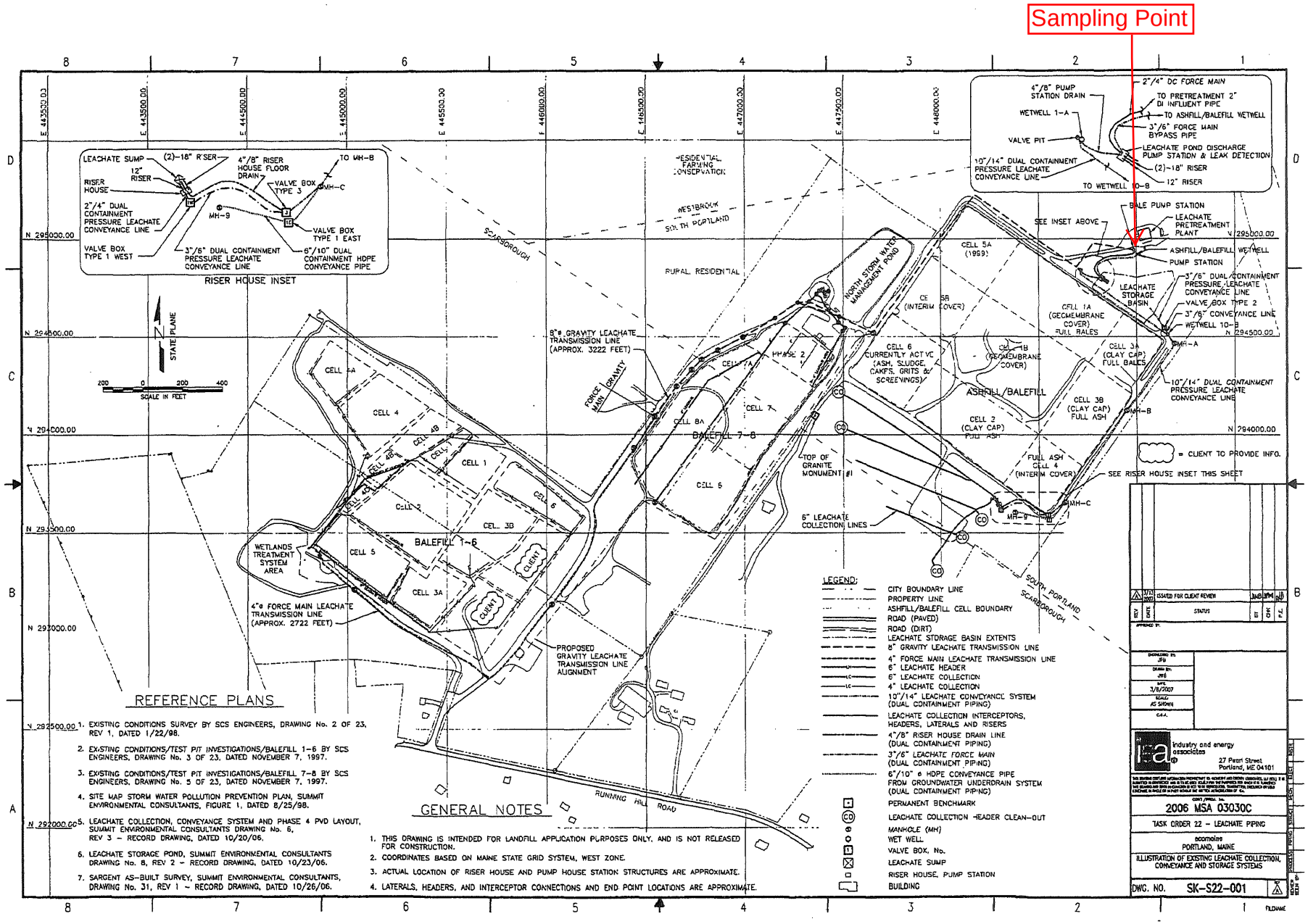
All compliance discharge reports shall be signed by a responsible official; either an owner, corporate manager or department manager who supervises more than 250 employees. One of these may also appoint any other company representative to be authorized to sign the reports, but must do so with written notice to the City of Portland.

VIII. PERMIT TERMS ACCEPTANCE CLAUSE

ecomaine Landfill Facility shall be deemed to agree to all of the terms of this permit upon its acceptance of this permit.

IX. IMPLEMENTATION SCHEDULE FOR COMPLIANCE

If pretreatment or other facilities are required by Federal or State laws, or by the Director of the Department of Public Works; then an implementation schedule for compliance acceptable to the Director of the Department of Public Works shall be developed.


Sampling Point
RISER HOUSE INSET
LEACHATE SUMP
(2)-18" RISER
12" RISER
RISER HOUSE
4"/8" RISER HOUSE FLOOR DRAIN
VALVE BOX TYPE 3
TO MH-B
MH-C
MH-9
2"/4" DUAL CONTAINMENT PRESSURE LEACHATE CONVEYANCE LINE
VALVE BOX TYPE 1 WEST
VALVE BOX TYPE 1 EAST
3"/6" DUAL CONTAINMENT PRESSURE LEACHATE CONVEYANCE LINE
6"/10" DUAL CONTAINMENT HDPE CONVEYANCE PIPE
4"/8" PUMP STATION DRAIN
2"/4" DC FORCE MAIN
TO PRETREATMENT 2" DI INFLUENT PIPE
WETWELL 1-A
TO ASHFILL/BALEFILL WETWELL
3"/6" FORCE MAIN BYPASS PIPE
VALVE PIT
LEACHATE POND DISCHARGE PUMP STATION & LEAK DETECTION
10"/14" DUAL CONTAINMENT PRESSURE LEACHATE CONVEYANCE LINE
(2)-18" RISER
12" RISER
TO WETWELL 10-B
BALE PUMP STATION
SEE INSET ABOVE
LEACHATE PRETREATMENT PLANT
ASHFILL/BALEFILL WETWELL PUMP STATION
LEACHATE STORAGE BASIN
3"/6" DUAL CONTAINMENT PRESSURE LEACHATE CONVEYANCE LINE
VALVE BOX TYPE 2
3"/6" CONVEYANCE LINE
WETWELL 10-B
MH-A
10"/14" DUAL CONTAINMENT PRESSURE LEACHATE CONVEYANCE LINE
MH-B
MH-C
MH-9
SCARBOROUGH
SOUTH PORTLAND
RESIDENTIAL FARMING CONSERVATION
WESTBROOK
RURAL RESIDENTIAL
NORTH STORM WATER MANAGEMENT POND
8"ø GRAVITY LEACHATE TRANSMISSION LINE (APPROX. 3222 FEET)
FORCE MAIN GRAVITY
CELL 1A (GEOMEMBRANE COVER) FULL BALES
CELL 1B (GEOMEMBRANE COVER)
CELL 3A (CLAY CAP) FULL BALES
CELL 3B (CLAY CAP) FULL ASH
CELL 2 (CLAY CAP) FULL ASH
CELL 5A (1989)
CELL 5B (INTERIM COVER)
CELL 6 CURRENTLY ACTIVE (ASH, SLUDGE, CAKES, GRITS & SCREENINGS)
CELL 7
CELL 8A
CELL 4
CELL 4A
CELL 4B
CELL 1
CELL 2
CELL 3
CELL 5
CELL 6
BALEFILL 1-6
BALEFILL 7-8
ASHFILL/BALEFILL
FULL ASH CELL 4 (INTERIM COVER)
TOP OF GRANITE MONUMENT #1
6" LEACHATE COLLECTION LINES
SEE RISER HOUSE INSET THIS SHEET
= CLIENT TO PROVIDE INFO.
WETLANDS TREATMENT SYSTEM AREA
4"ø FORCE MAIN LEACHATE TRANSMISSION LINE (APPROX. 2722 FEET)
PROPOSED GRAVITY LEACHATE TRANSMISSION LINE ALIGNMENT
RUNNING HILL ROAD
STATE PLANE
SCALE IN FEET
LEGEND:
CITY BOUNDARY LINE
PROPERTY LINE
ASHFILL/BALEFILL CELL BOUNDARY
ROAD (PAVED)
ROAD (DIRT)
LEACHATE STORAGE BASIN EXTENTS
8" GRAVITY LEACHATE TRANSMISSION LINE
4" FORCE MAIN LEACHATE TRANSMISSION LINE
6" LEACHATE HEADER
6" LEACHATE COLLECTION
4" LEACHATE COLLECTION
10"/14" LEACHATE CONVEYANCE SYSTEM (DUAL CONTAINMENT PIPING)
LEACHATE COLLECTION INTERCEPTORS, HEADERS, LATERALS AND RISERS
4"/8" RISER HOUSE DRAIN LINE (DUAL CONTAINMENT PIPING)
3"/6" LEACHATE FORCE MAIN (DUAL CONTAINMENT PIPING)
6"/10" ø HDPE CONVEYANCE PIPE FROM GROUNDWATER UNDERDRAIN SYSTEM (DUAL CONTAINMENT PIPING)
PERMANENT BENCHMARK
LEACHATE COLLECTION HEADER CLEAN-OUT
MANHOLE (MH)
WET WELL
VALVE BOX, No.
LEACHATE SUMP
RISER HOUSE, PUMP STATION
BUILDING
REFERENCE PLANS
1. EXISTING CONDITIONS SURVEY BY SCS ENGINEERS, DRAWING No. 2 OF 23, REV 1, DATED 1/22/98.
2. EXISTING CONDITIONS/TEST PIT INVESTIGATIONS/BALEFILL 1-6 BY SCS ENGINEERS, DRAWING No. 3 OF 23, DATED NOVEMBER 7, 1997.
3. EXISTING CONDITIONS/TEST PIT INVESTIGATIONS/BALEFILL 7-8 BY SCS ENGINEERS, DRAWING No. 5 OF 23, DATED NOVEMBER 7, 1997.
4. SITE MAP STORM WATER POLLUTION PREVENTION PLAN, SUMMIT ENVIRONMENTAL CONSULTANTS, FIGURE 1, DATED 8/25/98.
5. LEACHATE COLLECTION, CONVEYANCE SYSTEM AND PHASE 4 PVD LAYOUT, SUMMIT ENVIRONMENTAL CONSULTANTS DRAWING No. 6, REV 3 - RECORD DRAWING, DATED 10/20/06.
6. LEACHATE STORAGE POND, SUMMIT ENVIRONMENTAL CONSULTANTS DRAWING No. 8, REV 2 - RECORD DRAWING, DATED 10/23/06.
7. SARGENT AS-BUILT SURVEY, SUMMIT ENVIRONMENTAL CONSULTANTS, DRAWING No. 31, REV 1 - RECORD DRAWING, DATED 10/26/06.
GENERAL NOTES
1. THIS DRAWING IS INTENDED FOR LANDFILL APPLICATION PURPOSES ONLY, AND IS NOT RELEASED FOR CONSTRUCTION.
2. COORDINATES BASED ON MAINE STATE GRID SYSTEM, WEST ZONE.
3. ACTUAL LOCATION OF RISER HOUSE AND PUMP HOUSE STATION STRUCTURES ARE APPROXIMATE.
4. LATERALS, HEADERS, AND INTERCEPTOR CONNECTIONS AND END POINT LOCATIONS ARE APPROXIMATE.
ISSUED FOR CLIENT REVIEW
Industry and energy associates
27 Pearl Street Portland, ME 04101
2006 MSA 03030C
TASK ORDER 22 - LEACHATE PIPING
accmaine PORTLAND, MAINE
ILLUSTRATION OF EXISTING LEACHATE COLLECTION, CONVEYANCE AND STORAGE SYSTEMS
DWG. NO. SK-S22-001

CITY OF PORTLAND, MAINE DISCHARGE MONITORING REPORT

ecomaine

Facility or discharge location: ecomaine-Landfill

Name:	**ecomaine**	**Expiration Date of Permit:**	**December 1, 2018**
Address:	**64 Blueberry Road**	**Report Due Date:**	**1/15, 4/15, 7/15, 10/15**
City State/Zip Code:	**Portland, ME 04102**	**Date Sample Taken:**	
Telephone Number:	**(207) 523-3146**	**Date Submitted to the City:**	

****MUST INCLUDE FLOW DATA**** **DAILY WASTEWATER FLOW AT SAMPLE POINT:**

PARAMETER		CONCENTRATION	UNITS	FREQUENCY of ANALYSIS	SAMPLE TYPE	COMPLIANCE (Yes/No)	NOTES
BOD	Reported						
	Permit Condition	Screening Level 3000	mg/L	Quarterly	Composite		
TSS	Reported						
	Permit Condition	Screening Level 1500	mg/L	Quarterly	Composite		
pH	Reported						
	Permit Condition	Comparison Only	S. U.	Quarterly	Composite		
pH	Reported						*Results over 8.3 must be accompanied by a report of caustic alkalinity.
	Permit Condition	5 - 8.3*	S. U.	Quarterly	Grab		
Caustic Alkalinity	Reported						
	Permit Condition	1000	mg/L	As required	Grab		
Arsenic	Reported						
	Permit Condition	0.055	mg/L	Quarterly	Composite		

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment for knowing violations

SIGN HERE: _____ **DATE:** _____

ecomaine-LANDFILL DISCHARGE MONITORING REPORT

PARAMETER		CONCENTRATION	UNITS	FREQUENCY of ANALYSIS	SAMPLE TYPE	COMPLIANCE (Yes/No)	NOTES
Cadmium	Reported						
	Permit Condition	0.024	mg/L	Quarterly	Composite		
Chromium	Reported						
	Permit Condition	1.90	mg/L	Quarterly	Composite		
Copper	Reported						
	Permit Condition	1.88	mg/L	Quarterly	Composite		
Lead	Reported						
	Permit Condition	0.60	mg/L	Quarterly	Composite		
Nickel	Reported						
	Permit Condition	0.76	mg/L	Quarterly	Composite		
Silver	Reported						
	Permit Condition	0.42	mg/L	Quarterly	Composite		
Zinc	Reported						
	Permit Condition	2.57	mg/L	Quarterly	Composite		
Mercury	Reported						
	Permit Condition	.014	mg/L	Quarterly	Grab		

****A COPY OF THE ORIGINAL LAB ANALYSIS MUST BE INCLUDED WITH THIS REPORT****

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment for knowing violations

SIGN HERE: _____ **DATE:** _____

APPENDIX D

Sampling Locations

Well	X	Y	Interval
MW-102	-70.36402609	43.64148147	D
MW-95-05B	-70.36842669	43.63988746	D
MW-3D	-70.360222	43.642278	I
MW-802A	-70.35921089	43.63999243	I
MW-84-8-2A	-70.371722	43.636417	I
MW-95-14A	-70.372167	43.635611	I
MW-95-305A	-70.37025	43.637583	I
PW-2A	-70.362917	43.6375	I
PW-3A	-70.361139	43.63825	I
MW-2	-70.358	43.641194	S
MW-3	-70.360222	43.642278	S
MW-6A	-70.3745	43.637833	S
MW-802B	-70.35921089	43.63999243	S
MW-84-8-1A	-70.37175	43.636417	S
MW-88-302C	-70.373583	43.637306	S
MW-88-303B	-70.374361	43.638778	S
MW-88-505B	-70.361917	43.643278	S
MW-95-2B	-70.376097	43.637467	S
MW-95-304B	-70.375167	43.636972	S
MW-95-305B	-70.370278	43.637556	S
MW-98-1B	-70.366444	43.637611	S
MWB-1	-70.371722	43.640194	S
MWB-3	-70.3695	43.639056	S
PW-1	-70.364694	43.640389	S
PW-2B	-70.362861	43.637472	S
PW-3B	-70.361167	43.63825	S
RESIDENCE	-70.37218419	43.63499387	S

Leachate	X	Y
KC-1	-70.3745224	43.63799682
MH-33	-70.3645363	43.6415598
MH-5	-70.3741111	43.6390556
MH-C	-70.3601667	43.6389722

Surface Water	X	Y
NW DITCH UP	-70.36708454	43.63829596
RD BRK DWN	-70.37743059	43.63519661
RD BRK UP	-70.3792575	43.63861567
SED PND OUTFALL	-70.3636389	43.6428889
SW-1	-70.36345933	43.64317937
SW-3	-70.35859096	43.64240361
SW-4	-70.3606111	43.6386944
SW-6/MH-1A	-70.36010827	43.64219459
SW-A-2011	-70.36486961	43.64047753
SW-B	-70.3622778	43.6375833

Other	X	Y
MH-9	-70.3611389	43.6387778
LDS	-70.3615	43.6388611
PHASE 2 U.D.	-70.3648274	43.63868451
DET BASIN OUTFALL	-70.3761111	43.6381111

ADDENDUM

The paragraph below is from a Maine DEP review of the Environment Monitoring Plan prepared by St. Germain Collins (In Appendix A of RFP dated 2-5-16). The comments are related to Section 7.2.2 "Trend Analysis" in said St. Germain Collins Environmental Monitoring Plan. In your response to the RFP, please take into account the revised scope of services that will be required to satisfy the below comment in regards to Trend Analysis. Please put this in as an Add/Alternate line item as ecomaine intends to try to negotiate out of this additional effort, with the DEP, over the next couple of months.

7.2.2 Trend Analysis When reviewing the data to complete the trend analysis and the comparison of upgradient to downgradient water quality, it is only necessary to complete an analysis for parameters for which greater than half of the measurements exceed the detection limit. On a related manner, when completing the statistical analyses on data sets containing non-detects, replace all non-detects with the highest reported detection limit.