



Wood Environment & Infrastructure Solutions, Inc.
511 Congress Street
Suite 200
Portland, Maine 04101
USA
T: 207-775-5401
www.woodplc.com

February 25, 2020

Ms. Megan Kuczka
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: Amended Site Management Plan
Alltft Landfill
Buffalo, New York (Site No. 915054)

Dear Ms. Kuczka,

On behalf of Honeywell International Inc. (Honeywell), Wood Environment & Infrastructure Solutions, Inc., (Wood E&IS) is submitting the enclosed amended Site Management Plan updated to include annual emergent contaminant sampling, defined as 1,4-dioxane and per- and -polyfluoroalkyl substances (PFAS), for the on-site sumps and monitoring well MW-2 in accordance with your letter correspondence dated January 7, 2020. The Site Management Plan was originally developed in December 2012 by amending the 2006 Operations, Maintenance, and Monitoring Manual, as approved by the Department.

In addition to adding annual emergent contaminant sampling requirements as described above, the Site Management Plan has also been amended or revised as follows:

- Cover page has been updated to identify the amendments.
- Updated Section 2 to reflect the following changes to the sampling and analysis requirements.
 - Updated Table 2.1 to include sampling of 1,4-dioxane and PFAS.
 - Updated Table 2.2. to reflect the current locations and frequencies for the monitoring and testing tasks.
 - Removed MW-1, which had been damaged, could not be sampled, and was removed in 2019 from text and tables.
 - Removed PZ-14 and PZ-16, which had been damaged, could not provide water level measurements, and were decommissioned in 2018, from text and tables.
 - Updated text and tables to remove requirement for analysis of polychlorinated biphenyls and pesticides as approved by the NYSDEC following submittal of the 2012 Periodic Review Report. PCBs and pesticides had not been detected in groundwater samples collected at the site since monitoring activities began in 2006.
- Updated the Honeywell and NYSDEC contact information, as applicable, in Sections 3 and 5.
- Updated the following Appendices with current information:
 - Appendix D – “Permits”
 - Appendix J – “Spare Parts”
 - Appendix K – “OM&M Health and Safety Plan”
- Amended Appendix E – “Sampling Information/Forms” with the following information;
 - *Guidelines for Sampling and Analysis of PFAS under NYSDEC's Part 375 Remedial Programs (January 2020).*

The schedule for the additional emerging contaminant sampling will be consistent with the current annual sampling program; however, the sampling for emergent contaminants may be conducted prior to initiating sampling for the current required parameters due to special protocols for the collection and handling of samples for PFAS.

Please contact Ryan Belcher at 207-828-3530 or ryan.belcher@woodplc.com should you have any questions.



Sincerely,



Ryan T. Belcher
Senior Engineer



Robert Gersh
Project Manager

Electronic Copy (Cover Letter only) to:

Stanley Radon – NYSDEC

Maurice Moore – NYSDEC

Jason Paananen – City of Buffalo, Director of Environmental Affairs

Eric Christodoulatos – Honeywell International Inc.

John Formoza – Jacobs



Letter of Transmittal

To: NYSDEC Date: March 6, 2006

File No.: 440788
Subject: Alltift Landfill/Ramco Steel Site OM&M Manual
Attn: Mr. Maurice Moore

We are sending you ☒ Enclosed ☐ Under Separate Cover ☐ Via Fax
the following items:

1. Alltift Landfill/Ramco Steel Site Operations, Maintenance, and Monitoring Manual (hard copy and CD version)

These are transmitted as checked below:

☐ For Your Information ☐ For Your Use ☐ Approved as Noted
☐ As Requested ☒ For Approval ☐ For Review

Remarks: CD version has bookmarks to facilitate navigation. If you have any questions, feel free to call me at 633-7074.

Signed: Robert Kuberka
Robert Kuberka

Copy to: M. Desmond (NYSDEC); C. O'Connor (NYSDOH); G. Litwin (NYSDOH); E. Belmore (NYSDEC); T. Metcalf (Honeywell); C. Burns (for Honeywell); J. Scrabis (MACTEC); D. Sutton (City of Buffalo); Dudley Branch Library, File (440788 No. 26)

Operations, Maintenance, and Monitoring Manual For:

**ALLTIFT LANDFILL SITE
Buffalo, New York
NYSDEC Site No. 9-15-054
and
RAMCO STEEL SITE
Buffalo, New York
NYSDEC Site No. 9-15-046B**

SUBMITTED TO:



**NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS
WASTE REMEDIATION**

PREPARED FOR:

Honeywell

Morristown, New Jersey

PREPARED BY:

PARSONS

180 Lawrence Bell Drive, Suite 104
Williamsville, New York 14221

This document has been appended by NYSDEC (11/20/12) to include:

Engineering and Institutional Control Plan
Soils/Fill Management Plan
ALTA Survey dated 6/23/11 by TVGA
Environmental Notice - 302 Abby Street
Deed Restriction - 106 Abby Street
Deed Restriction - Skyway Auto Parts

March 2006

This document has been appended by Honeywell (February 2020) to include annual emergent contaminant sampling for the on-site sumps and MW-2 in accordance with NYSDEC's letter correspondence to Honeywell dated January 7, 2020. All updates in this amendment are listed in the cover letter.

OPERATIONS, MAINTENANCE, AND MONITORING MANUAL

TABLE OF CONTENTS

SECTION 1 INTRODUCTION	1-1
1.1 Purpose.....	1-1
1.2 Site Background and Description	1-1
1.2.1 Site Location.....	1-1
1.2.2 History of Site Operations	1-2
1.2.3 Site Geology and Hydrogeology	1-3
1.3 Remedial Action Summary	1-3
 SECTION 2 MONITORING AND TESTING	 2-1
2.1 Groundwater Monitoring Plan	2-1
2.1.1 Groundwater Sampling Program Summary.....	2-1
2.1.2 Groundwater Sampling Procedures	2-2
2.1.3 Field Sample Custody.....	2-4
2.1.4 Quality Assurance/Quality Control	2-5
2.1.5 Hydraulic Monitoring.....	2-6
2.2 Landfill Gas Monitoring.....	2-6
2.2.1 Gas Monitoring Locations.....	2-6
2.2.2 Procedures	2-6
2.2.3 Frequency	2-7
2.3 Records/Reporting	2-7
 SECTION 3 SITE INSPECTION AND MAINTENANCE	 3-1
3.1 Summary of Inspection Activities.....	3-1
3.2 Maintenance Activities.....	3-2
3.2.1 Vehicle Access Road.....	3-2
3.2.2 Landfill Cover	3-2
3.2.3 Runoff Control Structures	3-4
3.2.4 Flexible Membrane Liner Repair	3-4
3.2.5 Groundwater Monitoring System	3-4
3.2.6 Groundwater Collection System.....	3-4
3.2.7 Animal Control on Landfill	3-5
3.2.8 Unauthorized Disposal and Vandalism	3-5

OPERATIONS, MAINTENANCE, AND MONITORING MANUAL

TABLE OF CONTENTS

3.2.9 Wetland Maintenance	3-6
3.2.10 Maintenance Schedule	3-6
3.2.11 Health and Safety Requirements	3-6
3.3 Records/Reporting	3-6
SECTION 4 REPORTING REQUIREMENTS	4-1
4.1 Introduction	4-1
4.2 Quarterly Data Summary	4-1
4.3 Annual Report	4-1
4.4 Five-Year Review Report	4-2
4.5 Monitoring Records	4-2
4.6 Inspections/Maintenance Records	4-2
SECTION 5 PERSONNEL AND CITIZEN PARTICIPATION	5-1
5.1 Organization	5-1
5.2 Responsibilities and Duties	5-1
5.2.1 Honeywell	5-1
5.2.2 OM&M Personnel	5-1
5.2.3 Subcontracted Analytical Laboratory	5-2
5.3 Qualifications and Training	5-2
5.4 Citizen Participation Program	5-2
SECTION 6 REFERENCES	6-1

OPERATIONS, MAINTENANCE, AND MONITORING MANUAL

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE 1.1 SITE LOCATION MAP	1-6
FIGURE 1.2 SITE PLAN	1-7

LIST OF TABLES

TABLE 2.1 ANALYTICAL SUMMARY (PER SAMPLING EVENT)	2-10
TABLE 2.2 TASK FREQUENCY SUMMARY	2-11

LIST OF APPENDICES

APPENDIX A	SELECTED RECORD DRAWINGS
APPENDIX B	MONITORING WELL AND PIEZOMETER CONSTRUCTION INFORMATION
APPENDIX C	GROUNDWATER TRIGGER PLAN
APPENDIX D	PERMITS
APPENDIX E	SAMPLING INFORMATION / FORMS
APPENDIX F	POST-CLOSURE INSPECTION AND MAINTENANCE REPORT FORM
APPENDIX G	SELECTED SPECIFICATIONS AND FIELD CHANGES
APPENDIX H	GEOMEMBRANE REPAIR SPECIFICATIONS AND WARRANTIES
APPENDIX I	GROUNDWATER COLLECTION SYSTEM STARTUP PROCEDURES AND MAINTENANCE MANUAL
APPENDIX J	SPARE PARTS INVENTORY
APPENDIX K	OM&M HEALTH AND SAFETY PLAN

SOILS/FILL MANAGEMENT PLAN

1. Overview and Objectives

The Alltft Landfill Site, (Site) is a 25.15 acre landfill situated on properties currently restricted to commercial use and is owned by City of Buffalo Prefecting. Historic use of the property included a municipal landfill that received commercial and industrial wastes including dye and auto manufacturing waste. The site has been characterized during several previous investigations culminating in a Record of Decision (ROD) dated March 1995. The Site was the subject of a remedial action documented in a Construction Certification Report (CCR) dated April, 2006, by Parsons. Any user should refer to the ROD, the CCR and previous investigation reports for more detail, as needed.

The objective of this Soils/Fill Management Plan (SFMP) is to set guidelines for management of soil material during any future activities which would breach the cover system at the site.

2. Nature and Extent of Contamination

Based on data obtained from previous investigations and the remediation done at the site the constituents of potential concern (COPCs) for soil consist primarily of; semi-volatile organic compounds (SVOCs), including benzo(a)anthracene and benzo(a)pyrene, metals, including antimony, arsenic, chromium, cadmium lead, and mercury, volatile organic compounds (VOCs), including benzene and chlorobenzene, PCBs and pesticides. Results of ground water sampling indicate that constituents in the soil/fill material have impacted ground water quality with the COPC VOCs, requiring collection and discharge to the POTW.

Remediation of the site required consolidation of soils in areas around the landfill and sediments from adjacent wetlands. Contaminated soils and sediments were excavated to native, clay soils and/or bedrock. All consolidated material was placed into the landfill. A low permeability clay liner was placed over the wetland bottoms and all upland excavated areas were backfilled with clean, off-site soils and vegetated. Remediation of the Site in conformance with the ROD has mitigated human health and environmental threats.

3. Contemplated Use

After the remediation project, the majority of the property remains a landfill. However, future use has been identified for recreational opportunities such as, a golf course. An Environmental Notice filed on the Site and Declaration of Covenants and Restrictions filed on adjacent properties specifically prohibit higher than restricted commercial and restricted industrial uses.

4. Purpose and Description of Surface Cover System

Impacted areas were excavated and consolidated into the landfill. The landfill was capped in accordance with 6NYCRR Part 360 Regulations for Solid Waste Management Facilities. The

multi-layer cap consists of a suitable subbase, a geonet composite gas venting system, a geomembrane barrier layer, a geonet composite drainage layer, two feet of cover soil to protect the barrier layer, and a 6-inch topsoil layer to support vegetation. Direct exposure to remaining contamination in soil at the Site is minimized by this cap.

5. Management of Soils/Fill

Even though a soil cover system is in place at the Site potential exists for material in the sub-surface to become displaced or removed during excavation. Additionally there is a need to clarify acceptable material to be used for backfill at the Site. The purpose of this section is to provide environmental guidelines for management of subsurface soils/fill and the long-term maintenance of the cover system during any future intrusive work which breaches the cover system.

The soil/fill management plan includes the following conditions:

- Any intrusive, sub-surface, including for the purposes of construction or utilities, work must be replaced or repaired using an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. The repaired area must be covered with clean soil and reseeded or covered with impervious product such as concrete or asphalt, to prevent erosion in the future.
- Control of surface erosion and run-off of the entire property at all times, including during construction activities. This includes proper maintenance of the vegetative cover established on the property.
- Site soil that is excavated and is intended to be removed from the property must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives.
- Soil excavated at the site may be reused as backfill material on-site provided it contains no visual or olfactory evidence of contamination, and it is placed beneath a cover system allowing for commercial re-use.
- Any off-site fill material brought to the site for filling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. Off-site borrow sources should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL metals plus cyanide. The soil will be acceptable for use as cover material provided that all parameters meet the NYSDEC recommended soil cleanup objectives for commercial re-use included in 6NYCRR Part 375 6.7(d).
- Prior to any construction activities, workers are to be notified of the site conditions with clear instructions regarding how the work is to proceed. Invasive

work performed at the property will be performed in accordance with all applicable local, state, and federal regulations to protect worker health and safety.

If the soil has excavated during the year covered by that specific year's Annual Report, the owner of the property shall include the following in that annual report:

- Certification that all work was performed conforming to the Site's "Operations Maintenance and Monitoring Manual For: Alltft Landfill Site, Buffalo, New York, NYSDEC Site No. 9-15-054 and Ramco Steel Site, Buffalo, New York NYSDEC Site No. 9-15-046B" dated March 2006, by Parsons (OM&M Manual.)

5.1 Excavated and Stockpiled Soil/Fill Disposal

Soil/fill that is excavated as part of development which can not be used as fill below a cover system will be further characterized prior to transportation off-site for disposal at a permitted facility. For excavated soil/fill with visual evidence of contamination (i.e., staining or elevated PID measurements), one composite sample and a duplicate sample will be collected for each 100 cubic yards of stockpiled soil/fill. For excavated soil/fill that does not exhibit visual evidence of contamination but must be sent for off-site disposal, one composite sample and a duplicate sample will be collected for 2000 cubic yards of stockpiled soil, and a minimum of 1 sample will be collected for volumes less than 2000 cubic yards.

The composite sample will be collected from five locations within each stockpile. A duplicate composite sample will also be collected. PID measurements will be recorded for each of the five individual locations. One grab sample will be collected from the individual location with the highest PID measurement. If none of the five individual sample locations exhibit PID readings, one location will be selected at random. The composite sample will be analyzed by a NYSDOH ELAP-certified laboratory for pH (EPA Method 9045C), Target Compound List (TCL) SVOCs, pesticides, and PCBs, and TAL metals, and cyanide. The grab sample will be analyzed for TCL VOCs.

Soil samples will be composited by placing equal portions of fill/soil from each of the five composite sample locations into a pre-cleaned, stainless steel (or Pyrex glass) mixing bowl. The soil/fill will be thoroughly homogenized using a stainless steel scope or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars will then be labeled and a chain-of-custody form will be prepared.

Additional characterization sampling for off-site disposal may be required by the disposal facility. To potentially reduce off-site disposal requirements/costs, the owner or site developer may also choose to characterize each stockpile individually. If the analytical results indicate that concentrations exceed the standards for RCRA characteristics, the material will be considered a hazardous waste and must be properly disposed off-site at a permitted disposal facility within 90 days of excavation. If the analytical results indicate that the soil is not a hazardous waste, the material will be properly disposed off-site at a non-hazardous waste facility. Stockpiled soil cannot be transported on or off-site until the analytical results are received.

5.2 Backfill Material

Material used to backfill excavations or placed to increase site grades or elevation shall meet the following criteria:

- Excavated on-site soil/fill shall be sampled and analyzed. If analytical results indicate that the contaminants, if any, are present at concentrations below the NYSDEC recommended soil cleanup objectives for commercial re-use included in 6NYCRR Part 375 6.7(d), the soil/fill can be used as backfill on-site.
- Any off-site fill material brought to the site for filling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination.
- Off-site soils intended for use as site backfill cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).
- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin soils will be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the SSALs.
- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet SSALs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the SSALs.
- The top six inches of the cover material shall be; topsoil containing organic content suitable for vegetative growth, meeting all the criteria above, free of deleterious organic material and be free of rocks larger than two inches in diameter.

ENGINEERING CONTROL/INSTITUTIONAL CONTROL PLAN

1.0 Introduction

As defined by 6NYCRR Part 375-1.2(aa), “Institutional Control” means any non-physical means of enforcing a restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides notice the potential owners, operators, or members of the public, or prevents actions that would interfere with the monitoring activities at or pertaining to a remedial site.

“Engineering Control” as defined by 6NYCRR Part 375-1.2(o) means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternate water supplies, and installing filter devices on private supplies.

Since contaminated soil and groundwater remain at the Alltft Landfill Site (Site), Engineering Controls (ECs) and Institutional Controls (ICs), have been implemented to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of EC/ICs at the Site.

1.1 General

Site management of any completed remedial action is an evolving process requiring, continually updated, operational procedures. At the Site, engineering controls are described in the document entitled “Operations Maintenance and Monitoring Manual For: Alltft Landfill Site, Buffalo, New York, NYSDEC Site No. 9-15-054 and Ramco Steel Site, Buffalo, New York NYSDEC Site No. 9-15-046B” dated March 2006, by Parsons (OM&M Manual.) After submittal of the OM&M Manual, institutional controls, in the form of an Environmental Notice on the subject property and Deed Restrictions on the adjacent CSX and Skyway Auto Parts property, were filed with the Erie County Clerk. The following sections describe those institutional controls and are intended to be included as an addendum to the OM&M Manual. Long-term management of these ICs, as well as the ECs and residual contamination will continue to be performed under the amended OM&M Manual. This addendum along with the OM&M Manual shall constitute a comprehensive Site Management Plan (SMP) for the Site, subject to revision, should future conditions warrant.

1.2 Purpose

This plan provides:

- A description of ICs on the Site;
- The basic implementation and intended role of each IC;
- A description of the key components of the ICs set forth in the Environmental Notice and Deed Restrictions;

- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ICs, such as the development and implementation of an Excavation Work Plan for the proper handling of remaining contamination on the Site; and,
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the New York State Department of Environmental Conservation (NYSDEC or Department).

2.0 Engineering Controls

The landfill was capped in accordance with 6NYCRR Part 360 Regulations for Solid Waste Management Facilities. The multi-layer cap consists of a suitable subbase, a geonet composite gas venting system, a geomembrane barrier layer, a geonet composite drainage layer, two feet of cover soil to protect the barrier layer, and a 6-inch topsoil layer to support vegetation. Direct exposure to remaining contamination in soil at the Site is minimized by this cap.

The liner and soil serve as a physical barrier minimizing the potential for dermal contact by human and other animal receptors with the remaining contamination.

In addition to the controls detailed in the OM&M Manual, development of an Excavation Work Plan is required outlining the procedures to be implemented before any soils are to be removed from the properties covered by the ICs and before the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. This work plan, submitted to the Department for review, will include details on reporting requirements excavation procedures, soil screening, proper soil disposal and site restoration.

3.0 Institutional Controls

Remaining contamination and the remedy identified in the ROD for the Alltiff Landfill Site required that restrictive covenants be placed on the subject property and adjacent properties that:

- Restricts disturbance or excavation of the Property without prior written approval of the Department;
- Limits the use and development of the property to commercial use, which would also permit industrial uses;
- Requires compliance with the approved OM&M Manual; and
- Restricts the uses of groundwater as a source of potable or process water, without permission from the Relevant Agency;

An Environmental Notice for the Site was prepared and filed with the Erie County Clerk by the NYSDEC and Declarations of Covenants and Restrictions (Deed Restrictions) have been filed on the adjacent, CSX and Skyway Auto Parts properties. These documents require adherence to the OM&M Manual and the institutional controls on the Site. Copies of these documents have been included in the Construction Certification Report (CCR) for this Site and appended to the OM&M Manual.

3.1 Excavation Work Plan

The Site has been remediated for restricted commercial use. Future intrusive work that could penetrate the soil cover or landfill cap, or encounter or disturb any remaining contamination including any modifications or repairs to the existing cover system will not be permitted without prior approval from the NYSDEC. No intrusive work will commence without an accompanying Soil/Fill Management Plan, task-specific Health and Safety Plan and Dust Monitoring Plan.

3.2 Soil Vapor Intrusion Evaluation

Prior to the construction of any enclosed structures located over areas that may contain remaining contamination, or modification that would breach the integrity of the existing cap, a Soil Vapor Intrusion (SVI) evaluation would be required to be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors. This evaluation must be submitted to NYSDEC and NYSDOH for approval before implementation.

3.3 Inspections and Notifications

3.3.1 Inspections

Inspections of all remedial components installed at the Site will be conducted at the frequency specified in the OM&M Manual Monitoring/Inspection Schedule. A Periodic Review Report (PRR) will be required at frequency determined by the Department. Currently the annual reporting is required at this Site. Regardless of the frequency of the Periodic Review Report a comprehensive Site-wide inspection will be conducted quarterly. The inspections will determine and document the following:

- Whether engineering controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Notice and applicable Deed Restrictions;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the OM&M Manual (Section 3.) The reporting requirements are outlined in the OM&M Manual (Section 4) excepting for; if an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site by a qualified environmental professional as determined by NYSDEC will be conducted within five days of the event to verify the effectiveness of the EC/ICs implemented at the Site.

3.3.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in Site use;
- Notice within 48-hours of any damage to the landfill cover or other components that reduces or has the potential to reduce, the effectiveness of the remedial system or the engineering controls; and
- Verbal notice by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of engineering controls in place at the Site.

Any change in the ownership of the Site will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of approved work plans and reports, including this SMP; and,
- Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

4.0 Certification of Engineering and Institutional Controls

After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York will prepare the following certification:

For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional and/or engineering controls employed at this Site are unchanged from the date the controls were put in place, or last approved by the NYSDEC;
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for the controls;
- Access to the Site will continue to be provided to the NYSDEC to evaluate the remedy, including access to evaluate the continued maintenance of the controls;
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the Site is compliant with the Environmental Notice, and relevant Deed Restrictions;

- The engineering control systems are performing as designed and are effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices;
- The information presented in this report is accurate and complete; and
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, (name of certifying environmental professional), of (name of certifying company), am certifying as Owner or Owner’s Designated Site Representative for the site.

The signed certification will be included in the Periodic Review Report described below.

4.1 Periodic Review Report

A Periodic Review Report will be prepared, continuing with the current submittal schedule. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site. The report will be prepared in accordance with NYSDEC DER-10 and DER-31 and submitted no later than 30 days after the end of each certification period. Media sampling results will also be summarized in the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site;
- Results of the required periodic Site inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated for the Site, that were not previously submitted in a monitoring report during the reporting period, in electronic format;
- A summary of any monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- A summary of the contraventions of water quality standards, discussion of results, and any proposed modifications to the sampling and analysis schedule necessary to meet the groundwater monitoring requirements;
- If not previously submitted as part of a monitoring report or an electronic data deliverable, results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period electronically in a NYSDEC-approved format; and,
- A Site evaluation, which includes the following:

- The compliance of the remedy with the requirements of the Site-specific ROD;
- An assessment of the operation and the effectiveness of the remedy, including identification of any needed repairs or modifications;
- Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
- Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and,
- Comments, conclusions, and recommendations based on data evaluation.

Approximately 45 days before the end of the certifying period the Department will send a reminder letter with an attached IC/EC certification form to the Owner with a copy to the Remedial Party that the above noted Periodic Review Report is due.

The Periodic Review Report and signed IC/EC certification form will be submitted to the Regional Office in which the site is located in a hard-copy format and in an acceptable electronic to the Regional Office and New York State Department of Health.

4.2 Corrective Measures Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an IC or EC, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the corrective measures plan until it is approved by the NYSDEC

ERIE COUNTY CLERK'S OFFICE



County Clerk's Recording Page

Return to:

FRONTIER ABSTRACT & RESEARCH
SERVICES
30 W BROAD ST
ROCHESTER, NY 14814

Book Type: D Book: 11219 Page: 1336

Page Count: 6

Doc Type: NT FILING

Rec Date: 03/12/2012

Rec Tim: 10:00:13 AM

Control #: 2012058602

UserID: Diane

Receipt#: 12038669

Document Sequence Number

Party 1:

NEW YORK STATE DEPT OF
ENVIRONMENTAL CONSERVATION

Party 2:

Consideration Amount:

Recording Fees:

Fee 1	\$50.00
Fee 2	\$1.00
COE STATE \$14.25 GEN	\$14.25
COE STATE \$4.75 RM	\$4.75

BASIC	\$0.00
SONYMA	\$0.00
ADDL	\$0.00
NFTA MT	\$0.00
TRANSFER	\$0.00
NFTA TT	\$0.00

Total: \$70.00

STATE OF NEW YORK
ERIE COUNTY CLERK'S OFFICE

WARNING – THIS SHEET CONSTITUTES THE CLERK'S ENDORSEMENT REQUIRED
BY SECTION 319&316-a (5) OF THE REAL PROPERTY LAW OF THE STATE OF NEW
YORK. DO NOT DETACH. THIS IS NOT A BILL.

Christopher L. Jacobs
COUNTY CLERK

Site Name: Alltft Landfill
Site No.: 915054
302 Abby Street, Buffalo, New York
County of Erie
Tax Map: 132.12-1-21

ENVIRONMENTAL NOTICE

THIS ENVIRONMENTAL NOTICE is made the 22 day of November 2011, by the New York State Department of Environmental Conservation (Department), having an office for the transaction of business at 625 Broadway, Albany, New York 12233

WHEREAS, that parcel of real property located at 302 Abby Street in the City of Buffalo, County of Erie, State of New York, which is part of lands conveyed to the City of Buffalo by Referee's Deed dated December 9, 1992 and recorded in the Erie County Clerk's Office on December 18, 1992 in Book 10576 of Deeds at Page 92, Tax Map Number 132.12-1-21, and that parcel of real property identified as Abby Street, both parcels being more particularly described as "Parcels 2 and 4" on the survey attached to this Notice and made a part hereof and hereinafter referred to as "the Property", are the subject of a remedial program performed by the Department; and

WHEREAS, the Property is part of an inactive hazardous waste disposal site known as the Alltft Landfill Site (the "Site") which is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 915054; and

WHEREAS, the Department approved a cleanup to address contamination disposed at the Property and such cleanup was conditioned upon certain limitations.

NOW, THEREFORE, the Department provides notice that:

FIRST, the part of lands subject to this Environmental Notice is as shown on a map attached to this Notice as Appendix "A" and made a part hereof.

SECOND, unless prior written approval by the Department or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, where contamination remains at the Property subject to the provisions of the Operations, Maintenance, and Monitoring Manual (OM&M Manual), March 2006, and the Construction Certification Report ("CCR"), April 2006, there shall be no disturbance or excavation of the Property which threatens the integrity of the engineering controls or which results or may result in a significantly increased threat of harm or damage at any site as a result of exposure to soils. The OM&M Manual and CCR are available from the Department. A violation of this provision is a violation of 6 NYCRR 375-1.1(b)(2).

THIRD, no person shall disturb, remove, or otherwise interfere with the installation, use, operation, and maintenance of engineering controls required for the Remedy, including but not limited to those engineering controls described in the OM&M Manual and the CCR unless in each instance they first obtain a written waiver of such prohibition from the Department or Relevant Agency.

704-5 - 58602

Site Name: Alltiff Landfill
Site No.: 915054
302 Abby Street, Buffalo, New York
County of Erie
Tax Map: 132.12-1-21

FOURTH, the remedy was designed to be protective for commercial/industrial use. Therefore, any use for purposes other than commercial/industrial use without the express written waiver of such prohibition by the Relevant Agency may result in a significantly increased threat of harm or damage at any site.

FIFTH, the no person shall use the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Department or Relevant Agency. Use of the groundwater without appropriate treatment may result in a significantly increased threat of harm or damage at any site.

SIXTH, it is a violation of 6 NYCRR 375-1.11(b) to use the Property in a manner inconsistent with this environmental notice.

IN WITNESS WHEREOF, the undersigned has executed this instrument the day written below.

By:


Dale A. Desnoyers, Director
Division of Remediation

STATE OF NEW YORK) ss:
COUNTY OF ALBANY)

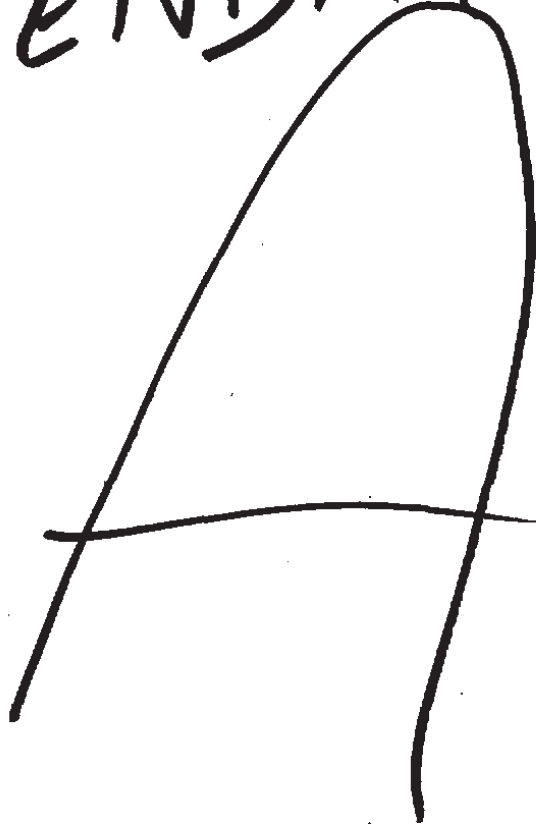
On the nd 22 day of November, in the year 2011, before me, the undersigned, personally appeared Dale Desnoyers, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.


Notary Public – State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 20 14

APPENDIX A

APPENDIX



1. THE SUBJECT PROPERTY IS LOCATED IN ZONE X (AREA OF MINIMAL FLOODING) PER FIRM (FLOOD INSURANCE RATE MAP), COMMUNITY PANEL NO. 38029 C 0327 G, EFFECTIVE DATE SEPTEMBER 24, 2008 AND 38029 C 0329 G PANEL, NOT FLOODED (NO SPECIAL FLOOD AREA);

2. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA. EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE THE ONLY EXISTING UTILITIES. THE SURVEYOR HAS NOT BEEN AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF EXCAVATION.

ABSTRACT BY STEWART TITLE No. 544772. DATED 5/18/70
RECORD DESCRIPTION

[illegible]

ALL THAT TRACT OR PARCEL OF LAND situated in the City of Buffalo, Erie County, New York, being part of Lot No. 17 of the Original Town of Buffalo, and more particularly described as follows:

Beginning of a point in the present south line of Tenth Street where said line is intersected by the south line of the Buffalo and Erie Railroad; thence South 17° 15' 00" West by deed recorded in the Erie County Clerk's Office in Lbr. 1991 of Deeds at page 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185

ABSTRACT BY STEWART TITLE No. 646774, DATED 5/18/10

ALL THAT TRACT OR PARCEL OF LAND ALIENS in the City of Buffalo, County of Erie and State of New York, being part of Lot No. 45 in the Buffalo Creek Indian Reservation and part of Lot No. 17 of the Dugden Green Tract, as defined, as shown on a certain map made for the purpose of recording the same in the County of Erie, New York, in the County Clerk's Office under cover No. 1006 of maps, being more particularly described as follows:

BEGINNING at the point of intersection of the easterly line of Abby Street with the westerly line of Albany Street; thence southerly along the easterly line of Abby Street, 800 feet; thence southerly at right angles to said easterly line of Abby Street, 262.25 feet more or less to the easterly line of lands conveyed to the South Buffalo Railway Company by the Buffalo and Tonawanda Railway Company, on the 15th day of January, 1862; thence southerly along the easterly line of said lands, 146.75 feet; thence southerly along the easterly line of said lands, 561.46 feet; thence southerly along the easterly line of said lands, 340 feet more or less, to an angle point; thence southeasterly, bounding an adjacent tract of land, 480.73 feet; thence southerly along the easterly line of said lands, 174.36 feet more or less to the point or place of beginning.

ALL THAT TRACT OR PARCEL OF LAND situate in the City of Buffalo, County of Erie and State of New York, being part of Lot No. 4 of the Buffalo Indian Reservation and part of the Buffalo Indian Reservation, and being more particularly described as follows: To-wit: The parcel of land owned by and in the possession of the late John C. Dwyer, deceased, and now owned and in the possession of Edward & Randall by George C. Dwyer, Civil Engineer, and filed in the Erie County Clerk's Office under No. 1006, being more particularly described as follows:

Beginning at the northeast corner of the east side of Abby street with the north line of Colgate Avenue (corner street); thence S 69° 47' 40" E along the east line of Abby street 600.00 feet; thence S 88° 25' 18" E, 582.51 feet to the west line of land conveyed to the South Buffalo Railway Company by deed recorded in the Erie County Clerk's Office in New 4016 of Deeds at page 541 on November 13 1948; thence S 00° 47' 40" E along said west line of land 100.00 feet to the north line of Colgate Avenue; thence along the north line of said lands 450.77 feet to the north line of Colgate Avenue; thence S 88° 25' 18" E along the said north line of Colgate Avenue, 174.30 feet to the Point or Place of Beginning.

LOCATION MAP
not to scale

ABSTRACT BY STEWART TITLE No. 548773. DATED 5/18/10

PANEL 10. TRACT OR PARCEL OF LAND adjacent to the City of Buffalo, County of Erie and State of Ohio, bounded and described as follows: Beginning at a point in the Street where the same would be intersected by an extension southerly of the westerly line of Abby Street on the same is now called Erie County Clerk's Office Block No. 1008, and running southerly therefrom for a distance of 58.27 feet to the easterly line of lands conveyed to William H. Donner by deed recorded in the Erie County Clerk's Office in Year 1385 of Deeds at page 424; thence southerly and parallel with the easterly line of said lands for a distance of 100 feet to the easterly line of the lands of the Erie County Clerk's Office, for a distance of 650 feet to a point; thence southerly and parallel with the center line of the Erie County Clerk's Office Block No. 1008 for a distance of 172.23 feet to the Erie County Clerk's Office Block No. 1009, thence northerly and along the easterly line of proposed Abby Street for a distance of 23.11 feet to an angle point; thence southerly and parallel with the easterly line of the lands of the Erie County Clerk's Office Block No. 1009 for a distance of 172.23 feet to the center line of the RR Street one of the places of beginning, containing 11.04 acre situated in the Erie County Clerk's Office Block No. 1008, Block No. 1009 on the north may filed in the Erie County Clerk's Office under Cover No. 1008.

beginning at a point in the western line of the proposed Abbe Street northwesterly
marked where the same would be intersected by the southerly line of the lands described in
the above plat, and thence northerly and westerly to the intersection of the same with the
a distance of 1,712.18 feet to the northern line of lands conveyed to the South British
Railroad Company by deed recorded in the Erie County Clerk's Office in Liber 1175 of Deeds
of Erie County, Ohio, and thence northerly and westerly to the intersection of the same with
of 128.35 feet to the southerly line of lands conveyed to William H. Donner by deed recorded
in the Erie County Clerk's Office in Liber 1303 of Deeds of Erie County, Ohio, and thence northerly
and along the said southerly line of lands to the intersection of the same with the
of 1,508.17 feet to the southerly line of the lands described in parcel No. 1;
thence northerly parallel with the center line of 11th Street and along the southerly line
of lands described in Parcel No. 1 to the intersection of the same with the southerly line
of lands described in Parcel No. 2, the place of beginning, containing 14.71 acres marked "C" on
a certain map filed in the Erie County Clerk's Office under Cover No. 1008.

ALL THAT TRACT OR PARCEL OF LAND situate in the City of Buffalo, County of Erie and State of New York, being part of Lot Nos. 17 and 18 of the Ogden Gore Tract and as shown on a map filed in the Erie County Clerk's Office under Cover No. 1008 as being Block E and part of Block F, bounded and described as follows:

[illegible]

ABSTRACT BY STEWART TITLE No. 548775, DATED 5/18/10

BEGINNING at a point in the center line of TTH Street where the same would be intersected by the extension southerly of the center line of Abby Street, the same line of TTH Street for a distance of 30.33 feet to a point; thence southerly and parallel with Hopkins Street for a distance of 672.31 feet to an angle point; thence continuing southerly and parallel with Hopkins Street for a distance of 1,000.00 feet to an angle point; thence southerly and parallel with the South Buffalo Railway Company by deed recorded in the Erie County Clerk's Office in Liber 117 of Deeds of page 470; thence southerly on a curve with a radius of 385.68 feet and a central angle of 100.00 degrees to an angle point; thence southerly and parallel with a distance of 1,748.73 feet to an angle point; thence continuing northerly and parallel with Hopkins Street for a distance of 66.82 feet to the center line of TTH Street; thence southerly along the center line of TTH Street for a distance of 65.32 feet to the place of beginning.

ALL THAT TRACT OR PARCEL OF LAND situated in the City of Buffalo, County of Erie and State of New York, bounded and described as follows:

BEING that certain lot in the center line of T1M Street, where the same would be intersected by the extension southerly of the center line of Abby Street, on the same line sold out north of T1M Street, 150'00" x 60'00" and parcel with Hopkins Street, 672.31' to an angle point; thence S 00°47'40" E and parallel with Hopkins Street, 1,733.04' to the north line of lands conveyed to the South Buffalo Railway Company by deed recorded in the Erie County Clerk's Office in Volume 1772, page 172, and a corner bearing S 77°23'00" E, 67.46' feet to a point; thence N 00°34'40" E and parallel with Hopkins Street, 1,747.02' to an angle point; thence N 00°34'40" E and parallel with Hopkins Street, 687.54' to the center line of the same street southerly and along the center line of T1M Street, 33.32' to the Point of Beginning.

TO NEW YORK STATE - DEPARTMENT OF ENVIRONMENTAL CONSERVATION

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS," JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND MPMS IN 2005 AND PURSUANT TO THE ACCURACY STANDARDS (AS ADOPTED BY ALTA AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION), THE UNDERSIGNED FURTHER CERTIFIES THAT IN MY PROFESSIONAL OPINION, THE RELATIVE POSITIONAL ACCURACY OF THIS SURVEY DOES NOT EXCEED THAT WHICH IS SPECIFIED THEREIN.

DATED: June 25, 2010
Latest Revision 6/23/2011

PART OF LOT 45, T 10, R 7
PART OF LOTS 17 & 18 OF THE OGDEN GORE TRACT
CITY OF BUFFALO, COUNTY OF ERIE, STATE OF NEW YORK

ALLTIFT LANDFILL
SITE CODE 9-15-054

PART OF L _____		PAGE _____ OF _____	
NAME OF _____		CITY/TOWN OF <u>BUFFALO</u> COUNTY OF <u>WARREN</u> STATE OF <u>NEW YORK</u>	
NOTICE: This document is to be returned to the sender if it is not a valid document. It is the responsibility of the sender to ensure that the document is valid.			
DATE <u>5/23/71</u>		JOB <u>30055028-00</u>	
PERSON <u>LANCELL CHIP PUTT</u>		Description of work to be done: <u>PUTTING</u> Location: <u>Warren Golf Club, Buffalo, NY 14226</u> Phone: <u>716.835.4343</u>	
ORDERED BY <u>NAVER</u> CHECKED BY <u>ZAPP</u> GOLF FILE <u>NAVER-PUTTING</u>		SCALE <u>1"=100'</u> JOB NO. <u>POTA 0288-00</u> FIELD/DRAWN DATE <u>6/23/70</u>	
SUN. No. <u>A.S. SHAWNEY</u>		BOOK <u>300</u> PAGE <u>100</u> MAP <u>30055-0070</u>	

Donna Walker

From: Donna Walker
Sent: Thursday, August 11, 2011 4:08 PM
To: Jones, Betty (Betty_D_Jones@CSX.com)
Subject: NY-Erie-Declaration of Restrictions
Attachments: Scanned COPY of Document Recorded 081011.pdf; Recording Receipt 11206-9804.pdf

Your document has been recorded. The book and page information is printed on the attached recording receipt. Attached is a scan of the COPY provided by the recorder's office, marked FILED. The Erie County recorder is at least 2 months behind in filing original documents. I've been told not expect to receive the original document until sometime in October. I have it on my calendar to follow up toward the end of that month. It will be returned directly to me and I will forward to you at that time.

Donna M. Walker
Office Manager

Walker Title, LLC
and Jeffrey J. Walker, P. A.
118A West Main Street
Mountain City, TN 37683
423-727-0207 Toll Free: 866-727-0207
Fax: 423-727-0212
Email: dwalker@walkertitleTN.com
VISIT US ON THE WEB AT: www.walkertitleTN.com

"EVERYTHING COUNTS"

JOHN J. CRANGLE, JR., INTERIM ERIE COUNTY CLERK

PARALEGAL SERVICES/WALKER TITLE

ACCOUNT #:

RECEIPT: 11114512

DATE: 8/10/2011 TIME: 11:42:52 AM

ITEM - 01 774

RECD: 8/10/2011 11:42:52 AM

FILE: 2011162340 BK/PG D 11206/9804

CSX TRANSPORTATION INC SUC

Recording Fees	90.50
Sub. Total	90.50

TOTAL DUE	\$90.50
PAID TOTAL	\$90.50
PAID CHECK	90.00
Check #2330:	90.00
PAID CASH	0.50

REC BY: Francine
COUNTY RECORDER

Return to: Donna Walker
Walker Title LLC
118 A West Main St
Mountain City TN 37683

DECLARATION of COVENANTS and RESTRICTIONS

THIS COVENANT, made the 5th day of August 2011, by CSX Transportation, Inc., a Virginia corporation, successor by merger to Adrian Realty Co., a corporation organized and existing under the laws of the State of Virginia and having an office for the transaction of business at 500 Water Street, Jacksonville, Florida 32202;

WHEREAS, CSX Transportation, Inc. is the owner of property at 106 Abby Street in the City of Buffalo which is part of lands conveyed by William H. Donner and Dora B. Donner to Adrian Realty Company by deed dated November 18, 1919 and recorded in the Erie County Clerk's Office in Book 1436 of Deeds at Page 446, and which is identified by tax parcel number 132.12-1-22, hereinafter referred to as "the Property"; and

WHEREAS, the Property is part of an inactive hazardous waste disposal site which is known as the Alltft Landfill which is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 915054 (the "Site"); and

WHEREAS, the New York State Department of Environmental Conservation (the "Department") set forth a remedy to eliminate or mitigate all significant threats to the environment presented by hazardous waste disposal at the Alltft Landfill Site in a Record of Decision ("ROD") dated March 27, 1995, and at the adjacent Ramco Steel Site Number 915046B in a ROD dated March 21, 1996, and such RODs required that the Property be subject to restrictive covenants.

WHEREAS, the Site and the adjacent Ramco Steel Site are the subjects of a consent order issued by the Department on January 28, 1998 pursuant to which a Department approved remedial program was conducted; and

NOW, THEREFORE, CSX Transportation, Inc., for itself and its successors and/or assigns, covenants that:

First, the Property subject to this Declaration of Covenants and Restrictions is identified as "Parcel 1" on a survey attached to this declaration as Appendix "A" and made a part hereof;

Second, unless prior written approval by the New York State Department of Environmental Conservation or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, no person shall engage in any activity that will, or that reasonably is anticipated to, prevent or interfere significantly with any proposed, ongoing or completed program at the Property or that will, or is reasonably foreseeable to, expose the public health or the environment to a significantly increased threat of harm or damage.

FILED
AUG 10 2011
ERIE COUNTY
CLERK'S OFFICE

Third, the owner of the Property shall not impede the maintenance of the cap covering the Property and shall not impair the cap's grass cover, barrier protection layer or synthetic liner.

Fourth, the owner of the Property shall prohibit any new use of the Property without the express written waiver of such prohibition by the Department or the Relevant Agency.

Fifth, the owner of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Department or the Relevant Agency.

Sixth, the owner of the Property shall allow access to the Property for maintenance of the components of the remedy and shall allow access by the Department or the Relevant Agency to evaluate maintenance of the required controls.


Seventh, the owner of the Property shall not interfere with and shall allow the maintenance of all surface wetlands, as required, in accordance with wetland permit "Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002," issued by the United States Army Corps of Engineers on March 24, 2004.

Eighth, the owner of the Property shall not impede the maintenance of the wetlands water elevation control structure ("HEADWALL" on survey) and the associated discharge area.

Ninth, the owner of the Property shall not interfere with and shall continue in full force and effect any institutional and engineering controls the Department required to be put into place and maintained as set forth in relevant site documentation including the Operations, Maintenance, and Monitoring Manual (OM&M Manual), March 2006, and the Construction Certification Report, April 2006.

Tenth, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property and shall provide that the owner, and its successors and assigns, consents to the enforcement by the Department or the Relevant Agency of the prohibitions and restrictions that are required to be recorded, and hereby covenants not to contest the authority of the Department to seek enforcement.

Eleventh, any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Relevant Agency has consented to the termination of such covenants and restrictions that said conveyance is subject to this Declaration of Covenants and Restrictions.


 Notary Public State of Florida
 Carmen E Benitez
 My Commission DD912898
 Expires 10/16/2013

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS," JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND NSPS IN 2005 AND PURSUANT TO THE ACCURACY STANDARDS (AS ADOPTED BY ALTA AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION), THE UNDERSIGNED FURTHER CERTIFIES THAT IN MY PROFESSIONAL OPINION, THE RELATIVE POSITIONAL ACCURACY OF THIS SURVEY DOES NOT EXCEED THAT WHICH IS SPECIFIED THEREIN.

DATED: June 25, 2010

Latest Revision 6/23/2011

RECEIVED
N.Y.S. DEPT OF

JUN 30 2011

ENVIRONMENTAL CONSERVATION
REGION 9


DOUGLAS R. HAGER
PROFESSIONAL LAND SURVEYOR NO. 050204

ALTA/ACSM LAND TITLE SURVEY

PART OF LOT 45, T 10, R 7
PART OF LOTS 17 & 18 OF THE OGDEN GORE TRACT
CITY OF BUFFALO, COUNTY OF ERIE, STATE OF NEW YORK

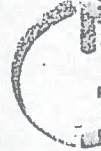
ALLTIFT LANDFILL SITE CODE 9-15-054

PART OF L _____ S _____ T _____ R _____ OF THE _____ VILLAGE OF _____ : CITY/TOWN OF _____ : COUNTY OF _____ : STATE OF NEW YORK

NOTE: UNAUTHORIZED ALTERATION OR ADDITION TO ANY SURVEY, DRAWING, DESIGN SPECIFICATION PLAN OR REPORT IS A VIOLATION OF SECTION 7209 PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

REVISION	
DATE	DESCRIPTION
6/23/11	2010.0229.00 LANDFILL CAP PLOTTED

SBL No. AS SHOWN



One Thousand Maple Road,
Elmira, NY 14859-9530
www.tvga.com

P. 716.655.8842 F. 716.655.0937

TVGA
CONSULTANTS

DRAWN BY	HAW	SCALE	1"=100'
CHECKED BY	DRH	JOB NO.	2010.0229.00
CAD FILE	26055-2010.DWG	FIELD/OFFICE DATE	6/25/10
BOOK	366	PAGE	105
		MAP	56055-2010

ARTICLES OF MERGER
OF
ADRIAN REALTY COMPANY
(A Pennsylvania corporation)
(the "Subsidiary Corporation")

NEW DOM

INTO

CSX TRANSPORTATION, INC.
(A Virginia corporation)
("CSXT")

Pursuant to the provisions of Sections 13.1-719 and 720 of the Code of Virginia.

1. The Plan of Merger is attached as Exhibit A ("Plan of Merger").
2. No shareholder approval of the Plan of Merger is required by the Subsidiary Corporation or CSXT as CSXT owns 100% of the outstanding shares of the Subsidiary Corporation. .
3. This merger is permitted by Section 13.1-719 of the Code of Virginia. All conditions required by such laws, and any other applicable provisions, have been satisfied.
4. CSXT, the surviving corporation, will continue to be a domestic corporation.
5. There is no change in the stated capital of CSXT as the surviving corporation.

The undersigned declares that the facts herein are true as of the 22nd day of December, 1995.

CSX TRANSPORTATION, INC.

By: *Patricia J. Pittman*
Vice President

By: *James A. Wolan*
Assistant Corporate Secretary

ADRIAN REALTY COMPANY

By: *Patricia J. Pittman*
Vice President

By: *James A. Wolan*
Assistant Corporate Secretary

**PLAN OF MERGER
OF
ADRIAN REALTY COMPANY

INTO

CSX TRANSPORTATION, INC.**

Plan of Merger dated as of the December 22, 1995, by and between CSX TRANSPORTATION, INC., a Virginia corporation ("Parent Corporation") and ADRIAN REALTY COMPANY, a Pennsylvania corporation ("Subsidiary Corporation"), such corporations being herein sometimes collectively called the "Constituent Corporations."

WHEREAS, the Parent Corporation owns 100% of the outstanding shares of stock of the Subsidiary Corporation and the Board of Directors of the Parent Corporation deemed it advisable that the Subsidiary Corporation be merged into the Parent Corporation, which shall also be called the "Surviving Corporation";

NOW, THEREFORE, the Subsidiary Corporation shall be merged with and into the Parent Corporation under and subject to the terms hereinafter set forth:

I. Terms, Conditions and Effective Date of Merger

1.1 Following adoption of this Plan of Merger by the Boards of Directors of the Constituent Corporations, the parties hereto shall cause Articles of Merger to be filed with the State Corporation Commission of the Commonwealth of Virginia and Articles of Merger to be filed with the Secretary of State of the Commonwealth of Pennsylvania. The separate existence of the Subsidiary Corporation shall cease as of the close of business on the Effective Date (as hereinafter defined) and the Subsidiary Corporation shall thereupon be merged into the Surviving Corporation.

1.2 The Effective Date of the Merger shall be December 29, 1995.

II. Conversion and Cancellation of Shares

2.1 The manner and basis of converting, cancelling or exchanging shares of capital stock of the Constituent Corporations on the Effective Date shall be as follows:

- (a) Each share of the Parent Corporation's common stock and preferred stock which is issued and outstanding on the Effective Date shall remain issued and outstanding as capital stock of the Surviving Corporation.
- (b) Each share of the Subsidiary Corporation's common stock shall be cancelled and no new shares or other securities or obligations or cash shall be issuable in respect thereto.

III. Effect of the Merger

3.1 Upon the Effective Date the assets and liabilities of Subsidiary Corporation shall be taken on the books of the Surviving Corporation at the amount at which they shall at the time be carried

on the books of Subsidiary Corporation, subject to such adjustments, if any, as may be necessary to conform to the accounting procedures of the Surviving Corporation.

3.2 After the Effective Date, the Surviving Corporation shall thereupon and thereafter possess all the rights, privileges, immunities, powers, franchises and authority, both public and private, of each of the Constituent Corporations. All property of every description, including every interest therein and all obligations of or belonging or due to each of the Constituent Corporations, shall thereafter be taken and deemed to be transferred to and vested in the Surviving Corporation without further act or deed. The officers of the Surviving Corporation, on behalf of Subsidiary Corporation, shall execute and deliver or cause to be executed and delivered after the Effective Date all such deeds and other instruments and shall take or cause to be taken such further action as the Surviving Corporation may deem necessary or desirable in order to confirm the transfer to and vesting in the Surviving Corporation of title to and possession of all such rights, privileges, immunities, franchises and authority. All rights of creditors of each Constituent Corporation shall be preserved unimpaired, limited in lien to the property affected by such liens immediately prior to the Effective Date, and the Surviving Corporation shall thereafter be liable for all the obligations of each of the Constituent Corporations.

3.3 The Articles of Incorporation of the Parent Corporation shall not be amended in any respect by reason of this Plan of Merger, and said Articles of Incorporation shall constitute the Articles of Incorporation of the Surviving Corporation until further amended in the manner provided by law.

0050336 - 7

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

December 29, 1995

The State Corporation Commission finds the accompanying articles submitted on behalf of

CSX TRANSPORTATION, INC.

to comply with the requirements of law. Therefore, it is ORDERED that this

CERTIFICATE OF MERGER

be issued and admitted to record with the articles in the office of the Clerk of the Commission. Each of the following:

ADRIAN REALTY COMPANY (A PA CORPORATION NOT
QUALIFIED IN VA)

is merged into CSX TRANSPORTATION, INC., which continues to exist under the laws of VIRGINIA with the name CSX TRANSPORTATION, INC.. The existence of each non-surviving entity ceases, according to the plan of merger.

The certificate is effective on December 29, 1995.

STATE CORPORATION COMMISSION

By *J. V. Morrison*

Commissioner

HEBGACPT
CIS20436
95-12-29-0089

CHRISTOPHER L. JACOBS, ERIE COUNTY CLERK

ROBERT BILTEKOFF

ACCOUNT #:

RECEIPT: 12033141

DATE: 3/1/2012 TIME: 2:55:15 PM

DUPLICATE RECEIPT

ITEM - 01 774

RECD: 3/1/2012 2:55:15 PM

FILE: 2012050389 BK/PG D 11218/5702

SKYWAY AUTO PARTS INC

Recording Fees	65.50
Sub. Total	65.50

TOTAL DUE	\$65.50
PAID TOTAL	\$65.50
PAID CHECK	65.50
Check #1511:	65.50

REC BY: Francine
COUNTY RECORDER

Return to Box 277

FILED
MAR - 1 2012
ERIE COUNTY
CLERK'S OFFICE

DECLARATION OF COVENANTS AND RESTRICTIONS

THIS COVENANT, is made the 15th day of February 2012, by Skyway Auto Parts, Inc., a corporation organized and existing under the laws of the State of New York and having an office for the transaction of business at 637 Tift Street, Buffalo, New York.

WHEREAS, Skyway Auto Parts, Inc. ("Skyway") is the owner of property at 637 Tift Street in the City of Buffalo which is part of lands conveyed by Samuel P. Redino, Nicholas J. Redino and Wayne Rosen to Skyway Auto Parts by deed recorded in the Erie County Clerk's Office on October 25, 1982 in Book 09170 of Deeds at Page 00229, and which is identified by tax parcel number 133.09-1-17, hereinafter referred to as "the Skyway Property"; and

WHEREAS, the Skyway Property is adjacent to an inactive hazardous waste disposal site which is known as the Alltft Landfill Site which is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 915054; and

WHEREAS, the New York State Department of Environmental Conservation (the "Department") set forth a remedy to eliminate or mitigate all significant threats to the environment presented by hazardous waste disposal at the Alltft Landfill Site in a Record of Decision ("ROD") dated March 27, 1995, and such ROD also required that the Skyway Property be subject to certain restrictive covenants.

WHEREAS, the Alltft Landfill Site is the subject of a consent order issued by the New York State Department of Environmental Conservation on January 28, 1998; and

NOW, THEREFORE, Skyway, for itself and its successors and/or assigns, covenants that:

First, the Property subject to this Declaration of Covenants and Restrictions is as shown on the Erie County Tax Map Number 133.09-1-17 attached to this Declaration as Appendix A and made a part hereof.

Second, unless prior written approval by the New York State Department of Environmental Conservation or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency", is first obtained, no person shall engage in any activity that will, or that reasonably is anticipated to, prevent or interfere significantly with any proposed, ongoing or completed program at the Alltft Landfill Site or that will, or is reasonably foreseeable to, expose the public health or the environment to a significantly increased threat of harm or damage.

Third, the owner of the Skyway Property shall provide notice of any change of use of the Skyway Property to the Department or the Relevant Agency at least 60 days before the change of use.

Fourth, the owner of the Skyway Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the owner first obtains permission to do so from the Department or

the Relevant Agency.

Fifth, the owner of the Skyway Property shall allow access to the Skyway Property for maintenance of the components of the remedy and shall allow access by the Department or the Relevant Agency to evaluate maintenance of required controls.

Sixth, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Skyway Property and shall provide that the owner, and its successors and assigns, consents to the enforcement by the Department or the Relevant Agency of the prohibitions and restrictions that are required to be recorded, and hereby covenants not to contest the authority of the Department or the Relevant Agency to seek enforcement.

Seventh, any deed of conveyance of the Skyway Property, or any portion thereof, shall recite, unless the Department or the Relevant Agency has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the undersigned has executed this instrument the day written below.

Skyway Auto Parts Inc.

By: Frank L. Dragone
Frank L. Dragone, Secretary/Treasurer

STATE OF NEW YORK)

) ss:

COUNTY OF ERIE)

On the 15 day of February, in the year 2012, before me the undersigned, personally appeared Frank L. Dragone, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by hi/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Robert A. Bilteoff

Notary Public State of New York

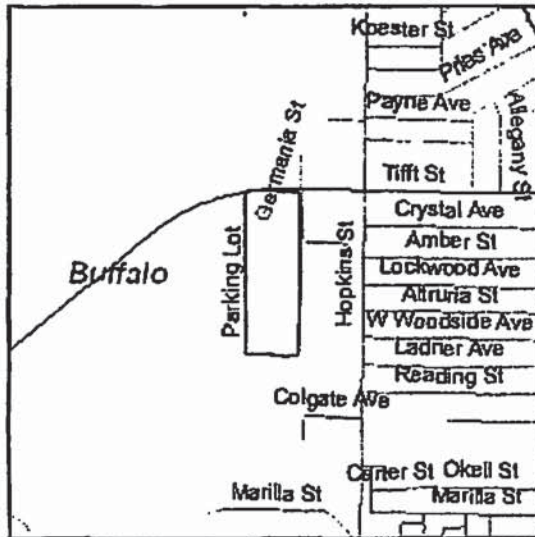
ROBERT A. BILTEOFF
Notary Public, State of New York
Qualified in Erie County
My Commission Expires 02/12/20 14

Erie County On-Line Mapping System
Parcel Detail Report

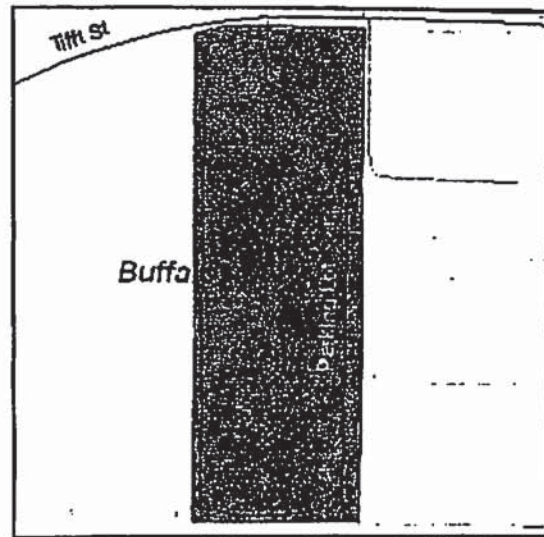
Address: 637 TIFFT

SBL: 133.09-1-17

Report generated: 10/19/2011 4:15:20 PM



Parcel Overview Map



Parcel Detail Map

**Operations, Maintenance, and Monitoring Manual
Alltft Landfill Site and Ramco Steel Site
NYSDEC Site No: 9-15-054 and 9-15-046B**

Engineering Seal




Thomas Andrews, P.E.
New York State Professional Engineer
No. 047438

PARSONS

180 Lawrence Bell Drive, Suite 104
Williamsville, New York 14221

SECTION 1

INTRODUCTION

1.1 PURPOSE

In accordance with a New York State Department of Environmental Conservation (NYSDEC) Order on Consent, Honeywell has completed the remediation of the combined Alltft Landfill and Ramco Steel Sites (Site). The key remedial actions for the property included consolidation of landfill waste and pond sediments, regrading and capping of site soils, construction of groundwater collection and groundwater relief trenches, groundwater monitoring, and restoration of onsite wetlands.

This document presents an operations, maintenance, and monitoring (OM&M) manual for post-remedial construction activities at the Site, which complies with the requirements set forth under 6 NYCRR Part 360-2.15(i)(7). Ongoing OM&M will be conducted to ensure the effectiveness and integrity of the landfill cap, site security systems, erosion control structures, and site access roads. This manual describes groundwater monitoring; landfill cover, erosion control structures, and drainage system inspection; reporting requirements; emergency response procedures; and community involvement. This manual was prepared in accordance with guidance from NYSDEC Draft DER-10 (NYSDEC, 2002).

1.2 SITE BACKGROUND AND DESCRIPTION

1.2.1 Site Location

The Alltft Landfill Site is located at 579 Tift Street in the southern portion of the City of Buffalo, Erie County, New York (Figure 1.1). It is located south of Tift Street, approximately 1,300 feet west of Hopkins Street and 5,000 feet east of the intersection of Tift Street and Route 5. It is bounded on the north by Tift Street; on the west by a Conrail railroad right-of-way and tracks; on the south by several ponds and the Ramco Steel Site; and on the east by Skyway Auto Parts, Inc. A Site plan, with property boundaries, is provided in Figure 1.2. There are wetlands and ponds on the southern portion of the Site and along the western edge. The southern pond has been referred to as Ramco Pond, and the western ponds as Ponds A, B, and C. Prior to remedial construction, the landfill was approximately 25 to 30 acres in size and triangular in shape with the surface of the fill rising about 30 feet above the surrounding terrain.

The Ramco Steel Site is adjacent to the southeastern tip of the Alltft Landfill. The Ramco Steel Site is approximately 8.5 acres in size and generally square in shape. It is bounded on the north by the Alltft Landfill and Skyway Auto Parts, Inc.; on the east by Niagara Cold Drawn; on the west by the Conrail railroad right-of-way and tracks and on the south by Republic Steel or LTV (NYSDEC Site. No. 9-15-047) and an abandoned

facility formerly housing Sloan Auto Parts. The Ramco Steel Site encompasses the body of water known as the Ramco Pond.

1.2.2 History of Site Operations

Ramco Steel

The Ramco Steel Site was owned and operated by a number of companies from 1929 to the present. Bliss and Laughlin operated the plant from 1929 to 1972. Ramco/Fitzsimmons purchased the property in 1972, and operated there until 1986. In 1986, the property was subdivided into two parcels, consisting of the main building structure and the western pond area. The pond area became the property of Hopkins-Tifft Realty. The western property, containing the pond, is the current Ramco Steel Site.

During the manufacturing of steel products, a sulfuric acid bath (also known as a pickling operation) was used to clean the steel. The spent acid, or pickle liquor, and wash-water from the operation, were discharged into the pond until 1979. Occasionally the pond was dredged, with the sediments left onsite.

The Ramco Steel Site was entered into the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites as a Class 2A(temporary classification). Based on the results of the Phase I Investigation completed by NYSDEC in June 1989, it was reclassified as a Class 2 (significant threat to public health or the environment – action required) Site in 1990.

In 1991, NYSDEC contacted the potentially responsible parties to undertake a remedial investigation and feasibility study. In November 1992, Axia, Inc., the successor to Bliss and Laughlin, entered into a Consent Order to conduct a remedial investigation. In 1994, Axia entered into a second Order to complete a feasibility study.

The Remedial Investigation Report for the Ramco Steel Site was issued in August 1994 (Dames and Moore), and the Feasibility Study was completed in January 1995 (Dames and Moore).

In March 1996, NYSDEC issued a Record of Decision which identified the selected remedy as excavation of contaminated sediments and soils, with the material to be consolidated under the proposed cap at the Alltift Landfill Site. The pond and wetland areas were to be restored as a productive wetland.

Alltift Landfill Site

The Alltift Landfill was operated from the 1930s until 1984. It was owned and operated by the City of Buffalo as a municipal landfill until 1957. From 1957 through 1984, Alltift Realty owned and operated it as a landfill. From 1957 to 1984, the landfill was used for the disposal of wastes, including wastes from an automobile shredder operation, fly ash, foundry sand, and demolition debris. Landfilling activities ceased in February 1984.

The initial environmental investigation was conducted in 1978 in support of a Part 360 permit application. (Recra Research, 1980). In 1983, Dames and Moore completed a Phase I Investigation for NYSDEC, with a Phase II Investigation completed in 1986 (Engineering-Science, 1986).

In June 1991, Allied-Signal, Inc., the predecessor to Honeywell, entered into an Order on Consent (Index No. B9-0194-87-07) with NYSDEC to complete a remedial investigation and feasibility study. The Remedial Investigation Report was issued in August 1994 (AFI, 1994) and the Feasibility Study Report was issued in January 1995 (ERM, 1995).

In March 1995, NYSDEC completed a Record of Decision (ROD). The ROD identified a selected remedy consisting of excavation and consolidation of contaminated soil and sediments, capping of the landfill, pond and wetland restoration, construction of a groundwater collection trench, and, if needed, operation of the collection trench.

Joint Remediation of the Alltft Landfill Site and Ramco Steel Site

In December 1997, AlliedSignal, Inc. entered into an Order-on-Consent with NYSDEC for the development and implementation of a joint remedial program for both sites. Pre-design investigation work was completed in 1997, consisting of a groundwater evaluation and treatability study, geotechnical investigation, landfill gas survey and sediment sampling and dewatering. The results of these investigations were included in the Final (100%) Design Report, that was issued in May 2003 (Parsons, 2003a). Contract documents for construction, including drawings and specifications, were issued in June 2003 (Parsons, 2003b). Remedial construction began in November 2003 and was completed in November 2005.

1.2.3 Site Geology and Hydrogeology

The site geology consists of glacial-lacustrine sediments. Near surface deposits are predominantly fine-grained sand, silt, and clay. These are separated from bedrock by a thin layer of compacted glacial till. Bedrock, occurring below the till, consists of a sequence of shales and limestones. Two aquifers have been identified at the Site: a shallow aquifer, which is present in the surface fill and permeable silts and sands, and a deep aquifer in the bedrock. These two systems are separated by a clay layer across most of the site except the south end of the landfill, where the clay is not present. The overall groundwater flow direction is west in the shallow aquifer and west-northwest in the deep aquifer. The shallow flow directly under the landfill is radial due to groundwater mounding in the fill material.

1.3 REMEDIAL ACTION SUMMARY

Remedial construction at the Alltft Landfill Site began in November 2003, and was concluded in November 2005. The remedial construction activities, including record

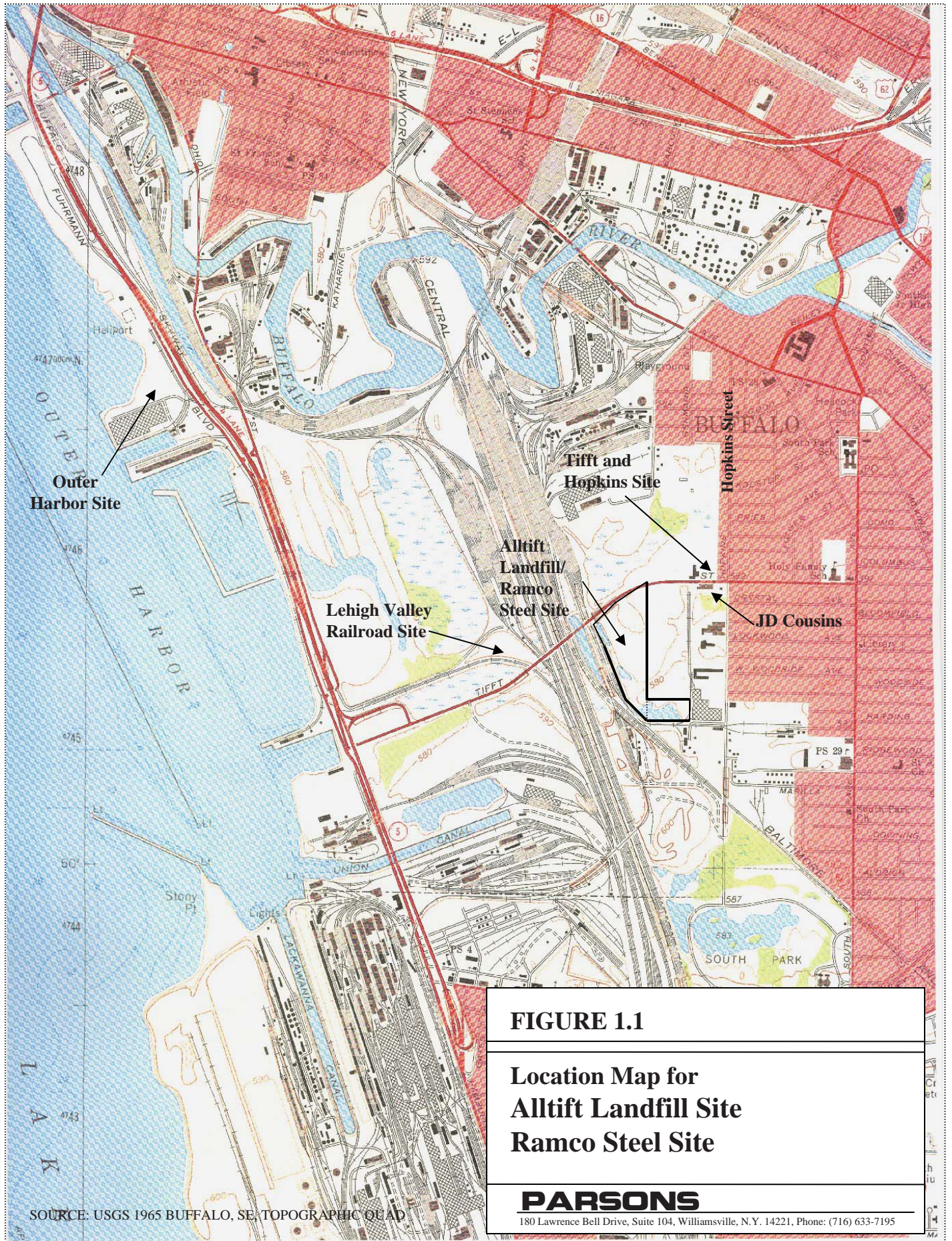
drawings, are described in the Construction Certification Report (Parsons, 2005). Selected record drawings are included in Appendix A of this manual.

The remedy selected for the Alltift Landfill/Ramco Steel Site was identified in each of the Records of Decision for the Alltift Landfill Site (March 1995) and the Ramco Steel Site (March 1996). In accordance with the RODs and NYSDEC's criteria for protection of human health and the environment, the following remedial action items were implemented:

- **Sediment Management.** Sediments from Ponds A, B, C, and the Ramco Pond were excavated and consolidated onto the landfill. Areas excavated as part of the sediment management task were restored. Restoration included the placement of clay soils to seal the bottom of the restored pond and the placement of substrate soil over the clay and fill areas for revegetation with wetland plant species. Disturbed pond and wetland areas were revegetated with wetland plants.
- **Waste Consolidation.** Alltift Landfill waste that occurred outside the margins of the natural clay layer was consolidated within the boundaries determined appropriate from predesign investigations. Ramco Steel waste located outside of the Ramco Pond was excavated and consolidated with the Alltift Landfill waste. Approximately 37,950 cubic yards of materials from the nearby J.D. Cousins Site, Lehigh Valley Railroad Site, the Tifft and Hopkins Site, and the Outer Harbor/Radio Tower Area Site were imported and consolidated under the capped area.
- **Capping.** The landfill was capped in accordance with 6 NYCRR Part 360 - Regulations for Solid Waste Management Facilities. The multi-layer cap consists of a suitable subbase, a geonet composite gas venting system, a geomembrane barrier layer, a geonet composite drainage layer, two feet of cover soil to protect the barrier layer, and a 6-inch topsoil layer to support vegetation.
- **Surface Water Management.** Appropriate surface water management systems were installed to control Site storm water and provide recharge of Site ponds/wetlands.
- **Groundwater Control.** A groundwater collection trench was installed along the western and southern perimeter of the landfill cap to intercept shallow groundwater, including water from the Skyway Auto Parts property. Also, a shallow groundwater relief trench was added during construction to control seepage emanating from locations along the western toe of the landfill adjacent to the access road. The relief trench was constructed parallel to, and east of the groundwater collection trench. The trench contains four vertical pumping points, constructed similar to extraction wells. Currently, pumps have been installed in the northern two sumps, and pumping commenced on October 15, 2005. Water is routed from the collection trench and relief trench

to a lift station at the southeastern corner of the Site. The lift station pumps the water through a force main to a manhole located on Hopkins Street, under a permit with the Buffalo Sewer Authority.

A series of two background monitoring wells and 16 piezometers were installed to monitor water quality and water levels, upgradient, within, and downgradient of the collection trench. The background wells will be monitored for potential migration of chemicals of concern (COCs) onto the Site, and to the ponds and wetlands.



SECTION 2

MONITORING AND TESTING

This section describes routine groundwater, surface water, and landfill gas monitoring activities. A combination of monitoring wells and piezometers will be used to determine groundwater elevations and to determine the potential for groundwater to impact the adjacent wetlands. Landfill gas vents will be utilized for landfill gas monitoring. Wetlands and habitat monitoring is discussed in Section 5. The following subsections describe the procedures for monitoring, sampling, evaluating, and reporting of results.

Note that NYSDEC personnel will be notified prior to implementing any changes in the OM&M program as described in this manual.

2.1 GROUNDWATER MONITORING PLAN

2.1.1 Groundwater Sampling Program Summary

A sampling summary is provided in Table 2.1, and includes the list of chemicals to be analyzed, method numbers, numbers of field samples, and required quality assurance/quality control samples.

A groundwater collection trench, groundwater relief trench, and groundwater monitoring system were installed as part of the remedial construction. The groundwater monitoring system consists of two upgradient monitoring wells, the groundwater collection trench, and 16 piezometers. PZ-1 thru PZ-3 were installed in the groundwater collection trench, PZ-4 thru PZ-8 were installed between the collection trench and the wetlands, PZ-14 and 16 were installed through the top of the landfill; however, due to obstructions and/or damage they were decommissioned in 2018, and PZ-10 thru 13 and 15 are located around the perimeter of the cap (Drawing C-1). A summary of monitoring well and piezometer information, including total depths with screen and riser lengths, and boring logs, is presented in Appendix B.

The groundwater relief trench was installed and activated in November 2004 to eliminate seepage observed along the western toe of the landfill. The groundwater collection trench was activated in October 2005, in accordance with the Groundwater Trigger Plan (Appendix C), based upon five rounds of sampling at approximately one-month intervals. Details regarding future decision-making for the groundwater collection trench, including compliance points, applicable groundwater criteria, and statistical procedures, are provided in the Groundwater Trigger Plan.

The background wells and the groundwater collection trench will be sampled for the chemical parameters listed in Table 2.1, which were previously identified to be chemicals of concern (COCs). The monitoring wells and groundwater collection trench will be sampled twice during the first year of O&M (2006), (spring and fall), and annually thereafter. In addition, water samples will be collected from the lift station for compliance with the BSA permit (Appendix D). The BSA permit requires sampling for the COCs, and other parameters.

2.1.2 Groundwater Sampling Procedures

Groundwater Monitoring Well Sampling

Prior to sampling, the background well MW-2 will be purged. Background well MW-1, which had been damaged and could not be sampled, was removed in 2019. Samples will be collected utilizing low-flow sampling techniques, and analyzed for the parameters listed in Table 2.1. Quality assurance/quality control (QA/QC) samples, including a matrix spike and a matrix spike duplicate, and a field duplicate sample will be collected as identified in Table 2.1.

During sampling, information such as water levels, purge volumes, and field parameters (pH, temperature, conductivity, and turbidity) will be recorded for each of the samples.

The wells will be sampled using peristaltic or submersible pumps and HDPE or similar tubing. The tubing will be securely fastened to the well casing during sampling to prevent movement and disturbance of any sediments in the well annulus. Pumps will be operated at less than 1,000 milliliters per minute or less during purging and sampling. The objective of the low-flow sampling technique is to minimize turbidity during sampling, thus more correctly approximating the actual groundwater concentrations.

Sampling for per- and -polyfluoroalkyl substances (PFAS) will be completed in accordance with NYSDEC guidelines provided in Appendix E.

Groundwater Collection Trench Sampling

Because S-1 and S-2 (the two northern sumps) are continually pumping, purging will not be necessary prior to sampling from any of the groundwater collection trench sumps.

VOC Samples - Individual samples will be collected from each of the collection sumps (S-1 through S-4) and analyzed separately for the presence of volatile organic compounds (VOCs). This change from the Groundwater Trigger Plan was requested by NYSDEC to minimize the potential volatilization of compounds during compositing.

Composite Sample – One composite sample will be collected from the groundwater collection trench. Approximately one gallon of water from each of the four sumps will be collected in individual glass containers. Each of the four 1-gallon containers will then be composited into a single 5-gallon glass container. The water from this 5-gallon container will provide the volume needed for analysis of semivolatile organic compounds (SVOCs) and total metals.

As described above for monitoring wells, low-flow sampling techniques, using peristaltic or submersible pumps, and HDPE or similar tubing, will be used for collecting samples from the sumps. Water levels and field parameters (pH, temperature, conductivity, and turbidity) will be recorded for each of the samples.

Sampling for PFAS will be completed in accordance with NYSDEC guidelines provided in

Appendix E.

BSA Monthly Compliance Sampling

Samples will be collected from the lift station in accordance with the BSA permit. Prior to sample collection, the main discharge valve is turned off, and samples are collected directly from the sampling port within the lift station.

Detailed Sampling Procedures

Sampling for PFAS will be completed in accordance with NYSDEC guidelines provided in Appendix E. The following is a step-by-step sampling procedure to be used to collect the groundwater samples from the sumps and monitoring wells for the remaining parameters.

- Assemble all field equipment necessary for sample collection (Appendix E, Table E.1).
- Ensure sampling personnel are wearing appropriate health and safety equipment in accordance with the health and safety plan.
- Measure headspace with PID upon opening the well cap.
- Measure the static water level from the surveyed well (or collection sump) elevation mark on the top of the casing with a water level indicator. Water levels will be measured to the nearest 0.01 foot and recorded on the Groundwater Sampling Record (Appendix E, Figure E.1).
- Decontaminate the water level indicator. (See below for decontamination procedures.)
- Temperature, conductivity, pH, and turbidity will be measured, and sample description and location noted on the Groundwater Sampling Record. Conductivity and pH will be measured by precalibrated electronic probes, or other appropriate means. Temperature will be measured by a precalibrated probe or thermometer.
- Collect groundwater samples from the monitoring well or collection sump, using peristaltic or submersible pumps, and HDPE or equivalent tubing. Pumps must be operated at 1,000 milliliters/minute or less. Fill sample containers to be analyzed for VOCs first. Sample containers to be analyzed for SVOCs, total metals and other analytes will then be filled. Note the sampling location, time analytical parameter, preservative, and sampler's name or initials on the bottle label.

- The groundwater samples will be placed in a laboratory cooler, packed on ice and either shipped overnight to the laboratory, or delivered to the laboratory by the next day. Quality assurance blanks will be sent with each sample shipment. Chain-of-Custody procedures will be strictly followed as outlined in Section 2.1.3.

Prior to sampling equipment use, and between sampling points, all non-dedicated equipment (water-level indicators) coming in contact with well water will be properly decontaminated. The decontamination procedure is as follows:

- Thoroughly clean the water-level indicator with a biodegradable detergent, such as Alconox and tap water, then rinse the water-level indicator with distilled water.
- All decontamination liquids will be containerized and handled as described below under water handling.
- Allow water-level indicator to air dry or wipe dry using disposable paper towels.
- Wrap water-level indicator in aluminum foil or place in clean plastic bag so that no outside contaminants are introduced.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground.
- To prevent cross-contamination between wells, separate (dedicated) tubing will be used for each well.

Sample containers will be properly washed and decontaminated by the laboratory prior to use. The containers will be tagged and Chain-of-Custody initiated before shipping or delivering to the sampling site in coolers. The types of containers and preservation techniques are shown in Appendix E, Table E.2. All bottles will contain the necessary preservatives from the laboratory. Following sample collection, the bottles will be placed on ice in the shipping cooler. The samples will be cooled to 4°C but not frozen.

Water and Waste Handling

If necessary, purge water and decontamination water will be temporarily contained on the Site in drums or other containers. Purge water will be emptied into the lift station sump, which discharges to the BSA manhole on Hopkins Street under the existing BSA discharge permit (Appendix D).

All disposable sample collection clothing (i.e. disposable gloves) and materials will be disposed of as general refuse. No hazardous waste is expected to be generated during OM&M activities.

2.1.3 Field Sample Custody

Evidence of sample traceability and integrity is provided by Chain-of-Custody (COC) procedures (see Appendix E, Figure E.2 for example chain-of-custody form). These procedures document the sample traceability from the selection and preparation of the sample

containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented; and
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody or in a secured area which is restricted to authorized personnel only.

An example COC record accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, the sampler will write his or her signature and the date and time on the first "RELINQUISHED BY" space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper air bill number on the top of the COC. Mistakes will be crossed out with a single line and initialed by the author.

One copy of the COC is retained by sampling personnel and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the sample signs his name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel, to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the designated person, and the sample will not be analyzed.

2.1.4 Quality Assurance/Quality Control

Quality assurance/quality control samples will be collected in accordance with Table 2.1. These include site-specific matrix spike/matrix spike duplicates, trip blanks, and duplicate sample, at a rate of one QA/QC set per 20 samples. Field or equipment blanks will not be necessary because new, dedicated tubing will be installed in each monitoring well, and replaced when worn or damaged.

2.1.5 Hydraulic Monitoring

Monthly monitoring of surface water levels in the wetlands will be performed during the first year of operation, from the weir at the northern outlet. During the second year, bi-monthly monitoring (every two months) of the water levels in the wetlands will be performed. Following the second year, water levels will be measured quarterly in conjunction with quarterly groundwater monitoring.

Water levels in monitoring wells and piezometers will be measured monthly for the first year, then quarterly. The water levels will be used to construct groundwater contour maps, and determine groundwater flow directions and hydraulic gradients. All hydraulic monitoring data will be stored in an electronic project database.

2.2 LANDFILL GAS MONITORING

Landfill gas monitoring will be conducted quarterly at the three gas vents and other locations to determine if the gas venting system is functioning properly.

2.2.1 Gas Monitoring Locations

Monitoring will be conducted for combustible gas at locations GV-1, GV-2, and GV-3, Sumps 1-4, and monitoring near the ground surface at four locations along the perimeter of the landfill (refer to Table 2.2).

2.2.2 Procedures

Gas monitoring will be conducted with an MSA Model 62S gas scope or similar instrument. The meter is capable of measuring both lower explosive limit (LEL) and percentage of methane gas. The measurements taken at each location will be recorded in a log book. The following activities will be conducted during routine gas monitoring at the site.

- a. The meter shall be calibrated monthly, at a minimum. Calibration will be accomplished using a bottled calibration gas. Dual scale meters need to be calibrated on 2% or 2.5% methane for the LEL scale and 40% or 50% methane for the percentage of gas scale. Calibration data will be recorded on an instrument calibration report. If the meter does not correct the probe, return the meter to the factory for service.
- b. Prior to use, the meter will be cleared and each scale zeroed. This will be accomplished by pumping the bulb with the probe in fresh air. After clearing the meter, the scale will be readjusted to zero, as necessary. Each measurement will be started with the instrument set to percentage of gas to avoid over-ranging the meter and damaging the elements.
- c. To measure gas levels in the gas vents, a meter probe will be held directly adjacent to the top of the gas vent. The meter bulb will be pumped to obtain a sample. Five to seven (5-7) pumps will be necessary to obtain a sample. For ground surface locations, the procedure will be the same, but the probe will be placed within two inches of the ground surface prior to pumping the bulb. For the groundwater collection trench sumps, the cap will be removed, and the probe inserted into the 6-inch diameter sump to obtain a reading.

2.2.3 Frequency

Combustible gas monitoring will be conducted quarterly along with groundwater monitoring. If three consecutive sets of quarterly monitoring consistently show gas concentrations below the lower explosive limit (LEL) gas concentrations at the gas monitoring vents or other locations, the monitoring frequency can be reduced to annually. If, after one year of monitoring, concentration continue to exceed the LEL at the sampling locations, quarterly monitoring shall be continued.

The gas monitoring points will be monitored during the initial quarterly inspection for gas pressure buildup. If gas pressure buildup is noted at any given location during the monitoring program, the monitoring point with the excessive pressure will be activated by simply installing an above-grade vent with a wind-driven turbine ventilator. Excessive pressure is defined as pressure exceeding 0.5 pounds per square inch (psi). If pressure is below 0.5 psi, that point will not require further monitoring, as pressures are expected to diminish with time.

2.3 RECORDS/REPORTING

See Section 4 details regarding records and reporting for monitoring and maintenance activities.

Table 2.1 Annual Monitoring Well and Groundwater Collection Trench Sampling

Parameter	Analytical Method	Field Samples				QC Samples			Total Samples
		Number of Samples and Where Collected		Field Duplicate ⁵	MS/MSD ⁵	Field Blank	Trip Blank ⁴	Control Blank	
Volatile Organic Compounds benzene, chlorobenzene, ethylbenzene, xylenes 1,2-dichlorobenzene, 1,4-dichlorobenzene	EPA 8260	5	MW-2 and Sump 1 thru 4	1	1		1		9
Semivolatile Organic Compounds naphthalene 4-chloroaniline	EPA 8270	3	MW-2, Sump 4, and Sump Composite ¹	1	1				6
1,4-dioxane ³	EPA 8270 SIM			1	1				6
Metals antimony, arsenic, cadmium, chromium, iron, lead, manganese, mercury	EPA 6010 EPA 6020 EPA 7470	3	MW-2, Sump 4, and Sump Composite ¹	1	1				6
Per- and -Polyfluoroalkyl Substances (PFAS)²	EPA 537M	5	MW-2, Sump Composite ¹ , and Sump 1 thru 4	1	1		1		10

Notes:

1. Composite of Sumps 1 through Sump 4.
2. Guidelines for Sampling and Analysis of PFAS under NYSDEC's Part 375 Remedial Programs (January 2020) provided in Appendix E.
3. The method detection limit (MDL) for 1,4-dioxane should be no higher than 0.28 µg/l.
4. Laboratory provided.
5. Due to low recovery for MW-2, these samples are collect from Sump 4.

Table 2.2
Task Frequency Summary
Alltift Landfill/Ramco Steel Site

Task	Location	Frequency
BSA Monitoring	Lift Station Composite	Semiannual
Groundwater Monitoring	MW-2, Sump Composite, Sumps 1-4	Annual
Water Level Monitoring	PZs, MWs, Sumps 1-4, Relief Trench Sumps 1-2, and overflow weir	Quarterly
Pull and clean level control floats	Lift Station sump	As needed
Check electronic sensors	GWCT Sumps	As needed
Wetland Inspection	Ramco Pond, Ponds A,B, and C	Discontinued pursuant to permit closure (refer to Appendix D)
Gas Vent Monitoring	GV-1, GV-2, GV-3, Ground Locations 1-4, and Sumps 1-4	Annually
Site Inspection a. Vegetative cover b. Integrity of Drainage Systems c. Condition of Access/Perimeter Roads d. Integrity of MWs, PZs, and GWCT sumps e. Integrity of Cap f. Gas Vent System g. Erosion control structures	Site-wide	Quarterly

SECTION 3

SITE INSPECTION AND MAINTENANCE

3.1 SUMMARY OF INSPECTION ACTIVITIES

This section contains procedures for post-closure care and maintenance of the landfill cover system, cap, surface water drainage systems, erosion control structures, groundwater collection system, wetlands, woody buffer zone, and other site structures. Specific procedures include routine inspections, routine maintenance, and contingency actions.

The site will be inspected each quarter throughout the post-closure period. The site will be inspected for:

- Visible debris, litter and waste;
- Loss of vegetative cover;
- Integrity of drainage system including:
 - sediment build-up;
 - pooling or ponding; and
 - slope integrity;
- Condition of gas vent pipes;
- Condition of access road, gates, and the fence and guy-wire system temporarily installed around the ponds and wetlands to prevent predation by wildfowl;
- Integrity of groundwater monitoring wells and piezometers (to be inspected during water level measurement);
- Condition of groundwater collection system, including pumps within the sumps, the pump in the lift station, controllers, and level control systems;
- Integrity of cap including:
 - erosion or settling of cap material;
 - leachate breakthroughs;
 - animal burrows; and
 - woody vegetation; and
- Integrity of erosion control structures including:
 - erosion or settling of riprap; and
 - woody vegetation;
- Evidence of trespassing; and
- Condition of the protective fencing and guy-wire system in the wetland areas and ponds.

In addition to the items listed above, a permit with the US Army Corps of Engineers (USACE) has been established, requiring inspection and reporting on the condition of the wetlands (see Appendix D for permit). The permit also contains specific requirements for growth and propagation of the wetland plants. The Site will be inspected annually

PARSONS

during the growing season, to ensure the establishment and growth of the trees, shrubs, wetland, and aquatic vegetation in the vicinity of the ponds. Photographs will be taken each year from fixed locations to document the growth. These areas (woody buffer zone, upland, wet meadow emergent marsh, and deep water emergent marsh), are depicted on Drawing C-8 in Appendix A). Shallow (wet meadow) and deep water emergent marsh vegetation is expected to propagate and become established within the first two to three years after construction is complete. After five years, monitoring of trees, shrubs, and wetlands will be discontinued. Further details of the monitoring requirements for the wetlands are contained in the USACE permit.

A site inspection map, and post-closure inspection checklist are contained in Appendix F. The site map is to be used to document problems and indicate areas that require attention. Specific maintenance activities are further discussed below.

3.2 MAINTENANCE ACTIVITIES

3.2.1 Vehicle Access Road

The access road will be maintained in good condition so that routine inspections and required maintenance activities can be carried out. Plowing will be conducted during the winter months, as needed. The gate will be kept in good condition and locked to prevent unauthorized access. Repairs to gates and the access road will be conducted as needed. Signs will be posted warning against unauthorized entry. Access to the Site may be arranged by contacting:

Tim Metcalf
Honeywell
101 Columbia Road
Morristown, NJ 07962
Phone: (973) 455-4107
Fax: (973) 455-3082

Eric Christodoulatos
Honeywell
115 Tabor Road
Morris Plains, NJ 07950
Phone: (973) 455-2877

3.2.2 Landfill Cover

The following items pertain to routine maintenance of the landfill cover system:

- Landfill vegetation progress will be monitored annually to confirm that the desired grass species have become established and that the desired ground cover is forming. Local spots will be reseeded and retreated if the vegetation fails to become established by the end of the second growing season.
- Annual ground inspections will be conducted at the beginning of each summer to determine the status of woody plant species on the landfill surface and side slopes.
- The landfill cap surface will be mowed at the end of each summer to control woody vegetation, and promote grass species. Mowing will not be conducted in

the upland habitat area north of the Ramco Pond, or any other areas designated as upland habitat on Drawing C-8 in Appendix A.

- If woody plants are detected in undesired areas, the plants will be removed by mowing the area once a year in the late summer to early fall. Mowing should be deferred until after the grass cover has become firmly established and will not be damaged by mowing equipment.

Indications of erosion or other maintenance problems detected during routine inspections or following particularly heavy storm events will be corrected as soon as possible. Repairs of eroded areas will be made with materials and methods specified herein. If erosion of the topsoil layer is encountered, the repair action may include, but not be limited to, the following:

- Covering repaired areas with topsoil, as specified in the remedial construction Contract Documents to minimum thickness (min. 6 inches) and design grades; and
- Reseeding and fertilizing in accordance with materials and application rates specified in Section 02990, Finish Grading, Topsoil, and Seeding, of the Contract Documents (Appendix G).

If erosion is persistent in certain areas, alternate methods for maintaining soil and vegetative cover or erosion protection will be evaluated on a case-specific basis.

Spots barren of vegetation in the final cap will be reseeded and fertilized as necessary. Seed and fertilizer will be of the same type and quality as specified in Section 02990 (Appendix G). Any undesirable species will be removed if their presence is suspected of deteriorating the integrity of the cap.

The need for cap repairs due to subsidence or erosion will be determined based on an evaluation of whether the function of the cap in the affected area has been impaired. Those areas where the function has been impaired will be repaired to ensure that the integrity of the cap is maintained.

Repair actions may include, but are not limited to:

- If erosion is noted, replace topsoil, seed and fertilize to reestablish vegetative cover as described previously;
- If settling is observed, and does not result in ponding, no action is needed. If ponding could result from the settling, add topsoil, seed, and fertilize as described above.
- See Section 3.2.7 for animal control measures.

3.2.3 Runoff Control Structures

All elements of the drainage system, including drainage swales and down chutes, will be maintained throughout the post-closure period. All elements will be inspected quarterly or after a particularly heavy storm event to verify the structures are intact and undisturbed, and that channels and discharge areas are free of obstructions which would impair the free flow or surface water run-off. In the event any of the structures are found to be damaged or incapable of conveying the design flows, repairs will be made as soon as practical. Any obstructions found in swales will be immediately removed, and channels regraded as necessary. If any culverts are found to be damaged such that their function is impaired, they will be repaired or replaced. Accumulated sediment will be removed from drainage channels and/or around outlet structures as required to maintain required capacity and proper operation.

3.2.4 Flexible Membrane Liner Repair

The LLDPE geomembrane cannot be visually inspected because it is covered by 30 inches of soil. However, should the geomembrane become exposed, it will be inspected for holes and repairs made prior to soil replacement. Repairs will be conducted in accordance with the procedures presented in Appendix H. Other information regarding the liner, including manufacturer and installer contacts, and liner warranties, is also included in Appendix H.

3.2.5 Groundwater Monitoring System

Monitoring wells or piezometers which are damaged (i.e., bent casings) such that representative groundwater samples or water levels cannot be obtained will be repaired or replaced. Repair measures will be based on case-specific evaluation. Any well damaged beyond repair or rendered inoperative will be replaced with a new well of similar depth and construction, after discussion with NYSDEC, and the damaged well will be properly abandoned. Detailed requirements for well installation and decommissioning are specified in Sections 02015 and 02085 of the June 2003 Contract Documents (Parsons 2003b), Groundwater Monitoring Wells and Piezometers, and Groundwater Monitoring Well Abandonment, respectively. Field changes to these specifications are found in the Construction Certification Report (Parsons, 2005). Specifications 02015 and 02085, and the referenced field changes, are included in Appendix G.

3.2.6 Groundwater Collection System

The groundwater collection trench, groundwater relief trench, lift station, and pumping system will be inspected and maintained during the post-closure period.

- The collection trench sumps, which are similar to monitoring wells, will be inspected (from the surface) to determine depth to water and total depth. Repairs or maintenance (i.e., removing sediment from sumps) will be conducted as needed. Sump screens may potentially become clogged with iron or other

types of precipitation. If flows from the sumps decrease, the sumps may require development or treatment.

- During monthly water level monitoring, ensure that the pumps in the sumps are cycling on and off.
- The electronic level-control sensors in the collection trench sumps will be pulled during quarterly inspections, or more frequently if needed. The sensors will be cleaned as necessary to prevent biological or chemical buildup.
- Pull and clean level control floats in the lift station sump following monthly BSA sampling events.
- The maintenance manuals containing manufacturer's contact information, and detailed information related to the pumps and level controllers is provided in Appendix I.
- A summary of startup procedures and troubleshooting upon startup for the sumps and lift station are contained in Appendix I.
- A spare parts inventory is contained in Appendix J.

3.2.7 Animal Control on Landfill

For animal control, the following procedures will be followed:

- Inspect for groundhog or other animal burrow or den entrances on the landfill. If den or burrow entrances are found, the entrances will be plugged with bentonite and the bare areas will be reseeded and fertilized. Seed and fertilizer will be of the same type and quality as originally specified.
- If burrowing becomes persistent, an animal control specialist will be contacted to conduct trapping and removal of burrowing animals.

3.2.8 Unauthorized Disposal and Vandalism

Unauthorized dumping or waste disposal will be reported to Honeywell, the NYSDEC, and local enforcement officials. Appropriate measures will be taken to determine the waste characteristics, containment requirements and the necessary removal and disposal techniques. The waste will be removed and disposed of at an approved disposal facility, as appropriate. Efforts will be taken to eliminate further dumping and to restrict subsequent entry to the site.

Vandalism will be reported to the local law enforcement authorities and Honeywell. Efforts will be undertaken to minimize the impacts of vandalism. Vandalism to monitoring wells will be repaired as appropriate on a case-specific basis. Damage caused by unauthorized vehicles will be repaired where the damage is determined to have compromised the integrity of the cap or the function of the surface drainage system.

3.2.9 Wetland Maintenance

Wetlands and wooded shoreline habitats will be inspected during each growing season for growth and propagation. Geese and other waterfowl that may feed on new plantings will be restricted, primarily by maintaining the fencing/guy-wire system for the first two years. Maintenance of the protective fencing is expected to primarily include tightening or replacing stakes, and tightening or replacing the guy wires. The fencing and guy wires will be removed after two years.

If needed, re-planting will be conducted, or invasive species removed or controlled, to maintain compliance with the required plant coverage in the USACE permit.

3.2.10 Maintenance Schedule

Maintenance activities will be performed as determined necessary based on routine inspections. During all maintenance activities, vehicle traffic shall be confined to appropriate areas.

3.2.11 Health and Safety Requirements

A Site-specific Post-Remedial Construction Health and Safety Plan has been prepared for the Alltft Landfill Site, specifically for conducting OM&M activities. The plan was prepared in accordance with the Occupational, Health and Safety Administration's regulations in 29 CFR 1910.120, and all appropriate state and local regulations. The plan is included as Appendix K to this document, and contains the following, in addition to other required information:

- Organization and responsibilities of the project/health and safety team;
- Characterization of the chemical and physical hazards present at the Site;
- A description of the medical program required for OM&M personnel;
- A summary of the air monitoring program to be conducted during OM&M activities;
- Instruction on selection and use of personal protective equipment (PPE) and action levels for upgrading or downgrading PPE;
- Proper delineation of work zones and equipment personal decontamination; and
- An accident prevention and contingency plan.

3.3 RECORDS/REPORTING

See Section 4 details regarding reporting requirements for monitoring and maintenance activities, and for project records.

SECTION 4 REPORTING REQUIREMENTS

4.1 INTRODUCTION

This section describes the reporting and record keeping that will be followed during the post-closure period. Monitoring data will be submitted to the NYSDEC on a quarterly basis. An annual report summarizing monitoring and maintenance activities will also be submitted to the NYSDEC and NYSDOH.

All reports will be sent to Honeywell as well as the following agencies:

- One copy to the Director, Division of Hazardous Waste Remediation, NYSDEC, 625 Broadway, Albany, New York 12233-7013;
- One copy to the Director of Environmental Exposure Investigation, Division of Env. Health Assessment, NYSDOH, Flanigan Square, Room 300, 547 River Street, Troy, NY 12180-2216;
- One copy to the Project Manager, NYSDEC Region 9, 270 Michigan Avenue, Buffalo, New York 14203-2999; and
- One copy of the annual report only to the USACE, in compliance with the permit.

4.2 QUARTERLY DATA SUMMARY

The quarterly data summary will include all of the groundwater analytical data, groundwater and surface water levels, gas vent measurements, and site inspection results with site inspection checklists. Specific maintenance items performed will be listed. Tables summarizing groundwater analytical data and water levels will be presented.

Groundwater sample results will be compared to NYSDEC Class GA groundwater standards. The NYSDEC standards were identified in the Alltft Site Record of Decision (ROD) as groundwater cleanup goals for the Site. The standards presented in the Groundwater Trigger Plan (Appendix C) are the most current Class GA standards for the ROD-specified chemical parameters (October 1998 issue date).

4.3 ANNUAL REPORT

An annual summary report will be prepared and submitted to NYSDEC, presenting all data collected during the calendar year as identified above in the quarterly data summary. In addition, results of the annual wetlands inspection will be presented. Relative to groundwater sampling, the report will include statistical analyses (when conducted), and recommendations regarding the need for continued groundwater collection. Groundwater contour maps showing hydraulic gradients and flow directions,

and hydrographs of monitoring wells, piezometers, and surface water stations showing water level trends, will also be presented.

If appropriate, based on evaluation of the data, recommendations for changes in the monitoring program will be made, such as reduction of groundwater sampling frequency. Inspection and maintenance activities will be summarized, including activities related to the cap, drainage structures, gas vents, monitoring wells and piezometers, collection trench, access road, and other site structures. The progress of the wetlands and upland habitat, including the woody buffer zone, as well as utilization of these habitats by wildlife, will be documented within the annual report. The wetlands and habitat section of the report will be prepared in accordance with the USACE permit requirements (Appendix D).

4.4 FIVE-YEAR REVIEW REPORT

A five-year review report will also be submitted to NYSDEC, in accordance with NYSDEC's O&M Manual Guidance Memorandum. The report will summarize the first five years of OM&M activities, and provide recommendations for continued OM&M, and, where appropriate, modifications to various components of the OM&M Manual. For example, the monitoring frequency for groundwater sampling may be reduced based on results obtained over the five-year period, groundwater collection may potentially be discontinued. If results are acceptable, monitoring of wetland propagation and growth may no longer be needed after the five-year period.

4.5 MONITORING RECORDS

Environmental monitoring records, which will be maintained, include the following:

- A field information log which contains well purge information, sampling information, field analytical data, instrument calibration check data, and general information such as weather conditions, observation, etc.;
- Chain-of-custody forms for all environmental samples;
- Records of data, drawings, and calculations of data evaluation;
- Electronic and hard copy records of all environmental chemical analyses, such as chemical analytical results from groundwater sampling events (see Section 4.7 for details); and
- Photographs.

4.6 INSPECTIONS/MAINTENANCE RECORDS

A field log book will be maintained to track all inspection and maintenance activities conducted. Routine inspections will be conducted quarterly, or whenever there is a heavy storm event. A site inspection form (Appendix F) will be used to record the results of the post-closure facility inspections. Site plans or drawings will also be utilized,

where appropriate, to document results of the inspections. Original records will be kept by Honeywell or Honeywell's OM&M contractor for at least five years.

SECTION 5

PERSONNEL AND CITIZEN PARTICIPATION

5.1 ORGANIZATION

The principal parties involved in implementation of the OM&M program at the Alltft Landfill Site are: NYSDEC; Honeywell; the OM&M Project Manager; OM&M field personnel; and a subcontracted analytical laboratory. Responsibilities, qualification, and training requirements for the OM&M personnel are described in the following paragraphs.

5.2 RESPONSIBILITIES AND DUTIES

Implementation of the Alltft Landfill OM&M Plan will require onsite personnel. Personnel will conduct routine inspections, sampling, and maintenance, as well as operate and maintain the groundwater collection system. Additionally, the OM&M Project Manager will be required to organize and oversee all field activities on behalf of Honeywell.

5.2.1 Honeywell

Honeywell will perform or contract for the services of a Project Manager, operation and maintenance field personnel, and an analytical laboratory.

5.2.2 OM&M Personnel

The OM&M Project Manager will have the following responsibilities:

- Schedule and coordinate all monitoring activities as described in Section 2;
- Evaluate all environmental monitoring data to determine if reportable exceedances occur, and to determine if any health or environmental hazards are present;
- Inspect the Site to ensure adequate maintenance is being conducted as described in Section 3;
- Maintain and submit all required documentation and records of OM&M activities as described in Sections 4 this Plan;
- Oversee all activities conducted by the OM&M field personnel;
- Be available to respond in an emergency situation in accordance with the Contingency Plan (Attachment A);
- Serve as the primary interface between NYSDEC and Honeywell; and
- Maintain records of all OM&M costs for the Site.

The OM&M field personnel will have the following responsibilities:

- Obtain environmental samples as described in Section 2 of this manual, and complete of chain-of-custody forms and field notes;
- Conduct all Site inspection and maintenance activities as described in Section 3 of this Plan;
- Conduct regular calibration of site sampling and monitoring equipment and maintain calibration records;
- Adhere to the requirements of the O&M Health and Safety Plan (Appendix K); and
- Promptly inform Honeywell of any problems associated with the landfill cap system, groundwater monitoring system, groundwater treatment system, or Site security system.

5.2.3 Subcontracted Analytical Laboratory

The responsibilities of the subcontracted analytical laboratory system include:

- Coordinate all analytical testing with the Project Manager;
- Schedule, analyze, and maintain quality assurance of all analytical work; and
- Provide timely reports to the OM&M Project Manager, summarizing the analytical results.

5.3 QUALIFICATIONS AND TRAINING

The OM&M onsite field personnel must each have a high school diploma or equivalent (as a minimum), secondary education in environmental science, and receive the following training:

- OSHA 40-hour hazardous waste site worker training (29 CFR 1910.120) (only required for personnel performing groundwater sampling, liner repairs, or other activities which could result in exposure to waste materials);
- Site specific health and safety and contingency plan implementation and training; and
- Training regarding Site specific O&M procedures described in Sections 2 and 3 of this manual.

In addition, all O&M personnel must be familiar with the Site's engineering drawings, relevant specifications, sampling and analysis protocols, environmental monitoring, and reporting requirements.

5.4 CITIZEN PARTICIPATION PROGRAM

The goal of the citizen participation program is to increase public understanding of the remediation process at this Site.

- A local Document Repository has been established, which will contain all pertinent documents relating to the investigation and remediation of the Site, including the O&M reports discussed in Section 4 at the following address:

Public Repository
Dudley Branch Library
2010 South Park Avenue
Buffalo, New York 14220

- NYSDEC will prepare a Fact Sheet summarizing the completion of remedial construction, and describing the ongoing O&M activities. The Fact Sheet will be mailed out to the same list that was developed prior to remedial construction.

Key Contacts

The Honeywell project manager is:

Tim Metcalf
Honeywell
101 Columbia Road
Morristown, NJ 07962
Phone: (973) 455-3302
Fax: (973) 455-3082

Eric Christodoulatos
Honeywell
115 Tabor Road
Morris Plains, NJ 07950
Phone: (973) 455-2877

Key New York State Department of Environmental Conservation contact is:

Maurice Moore
270 Michigan Ave.
Buffalo, NY 14203-2999
Phone: (716) 851-7220
Fax: (716) 851-7226

Megan Kuczka
270 Michigan Avenue
Buffalo, NY 14203-2915
Phone: (716) 851-7220

SECTION 6

REFERENCES

- NYSDEC, 1992. April 20, 1992, memorandum regarding suggested contents of an Operations, Maintenance, and Monitoring Plan for Hazardous Waste Site.
- NYSDEC, 1995. March 17, 1995, Record of Decision, Alltift Landfill Site, City of Buffalo, Erie County, Site No. 9-15-054, signed by Michael J. O'Toole, Jr.
- NYSDEC, 1996. March 21, 1996, Record of Decision, Ramco Steel, City of Buffalo, Erie County, Site No. 9-15-046B, signed by Michael J. O'Toole, Jr.
- NYSDEC, 1997. Order on Consent between AlliedSignal, Inc. and NYSDEC, Index #B9-87-194, #B9-0358-91-02, Site Codes #9515054 and 915046B, December 1997.
- NYSDEC, 1998a. Division of Water Technical Operational Guidance Series (1.1.1) Memorandum, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998.
- NYSDEC, 2002. Draft DER-10, Technical Guidance for Site Investigation and Remediation. December 2002.
- Parsons, 2003a. Final (100%) Remedial Design Report, Alltift Landfill Site (NYSDEC Site No. 9-15-054) and Ramco Steel Site (NYSDEC Site No. 9-15-046B), Buffalo, New York. May 2003.
- Parsons, 2003b. Contract Documents for Alltift Landfill Site (NYSDEC Site No. 9-15-054) and Ramco Steel Site (NYSDEC Site No. 9-15-046B), Buffalo, New York. June 2003.
- Parsons, OBG, MWH, 2004. Syracuse Portfolio Data Management Plan. May 2004.
- Parsons, 2005. Construction Certification Report for Alltift Landfill Site (NYSDEC Site No. 9-15-054) and Ramco Steel Site (NYSDEC Site No. 9-15-046B), Buffalo, New York. December 2005.

APPENDIX A SELECTED RECORD DRAWINGS

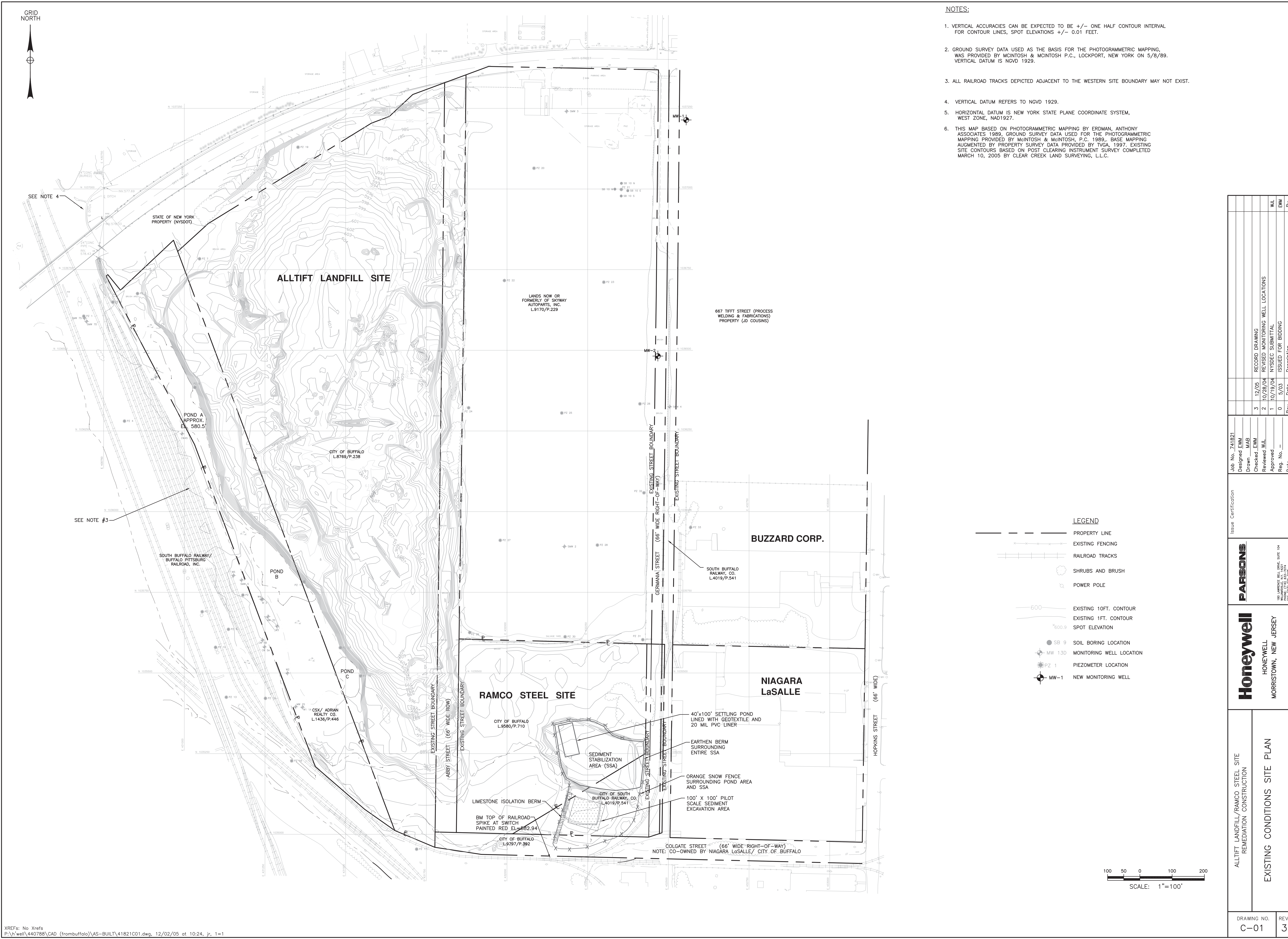
C-01 (Existing Conditions Site Map)

C-05 (Cap Panel Layout)

C-06 (Final Grade Plan, 1 of 2)

C-07 (Final Grade Plan, 2 of 2)

C-08 (Wetland Habitat Restoration Plan)

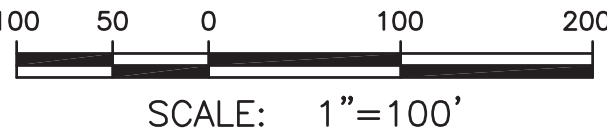


NOTES:

1. VERTICAL ACCURACIES CAN BE EXPECTED TO BE +/- ONE HALF CONTOUR INTERVAL FOR CONTOUR LINES, SPOT ELEVATIONS +/- 0.01 FEET.
2. GROUND SURVEY DATA USED AS THE BASIS FOR THE PHOTOGRAMMETRIC MAPPING, WAS PROVIDED BY MCINTOSH & MCINTOSH P.C., LOCKPORT, NEW YORK ON 5/8/89. VERTICAL DATUM IS NGVD 1929.
3. ALL RAILROAD TRACKS DEPICTED ADJACENT TO THE WESTERN SITE BOUNDARY MAY NOT EXIST.
4. VERTICAL DATUM REFERS TO NGVD 1929.
5. HORIZONTAL DATUM IS NEW YORK STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD1927.
6. THIS MAP BASED ON PHOTOGRAMMETRIC MAPPING BY ERDMAN, ANTHONY ASSOCIATES 1989, GROUND SURVEY DATA USED FOR THE PHOTOGRAMMETRIC MAPPING PROVIDED BY MCINTOSH & MCINTOSH, P.C. 1989. BASE MAPPING AUGMENTED BY PROPERTY SURVEY DATA PROVIDED BY TVGA, 1997. EXISTING SITE CONTOURS BASED ON POST CLEARING INSTRUMENT SURVEY COMPLETED MARCH 10, 2005 BY CLEAR CREEK LAND SURVEYING, L.L.C.

LEGEND

- PROPERTY LINE
- EXISTING FENCING
- RAILROAD TRACKS
- SHRUBS AND BRUSH
- POWER POLE
- EXISTING 10FT. CONTOUR
- EXISTING 1FT. CONTOUR
- SPOT ELEVATION
- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- NEW MONITORING WELL



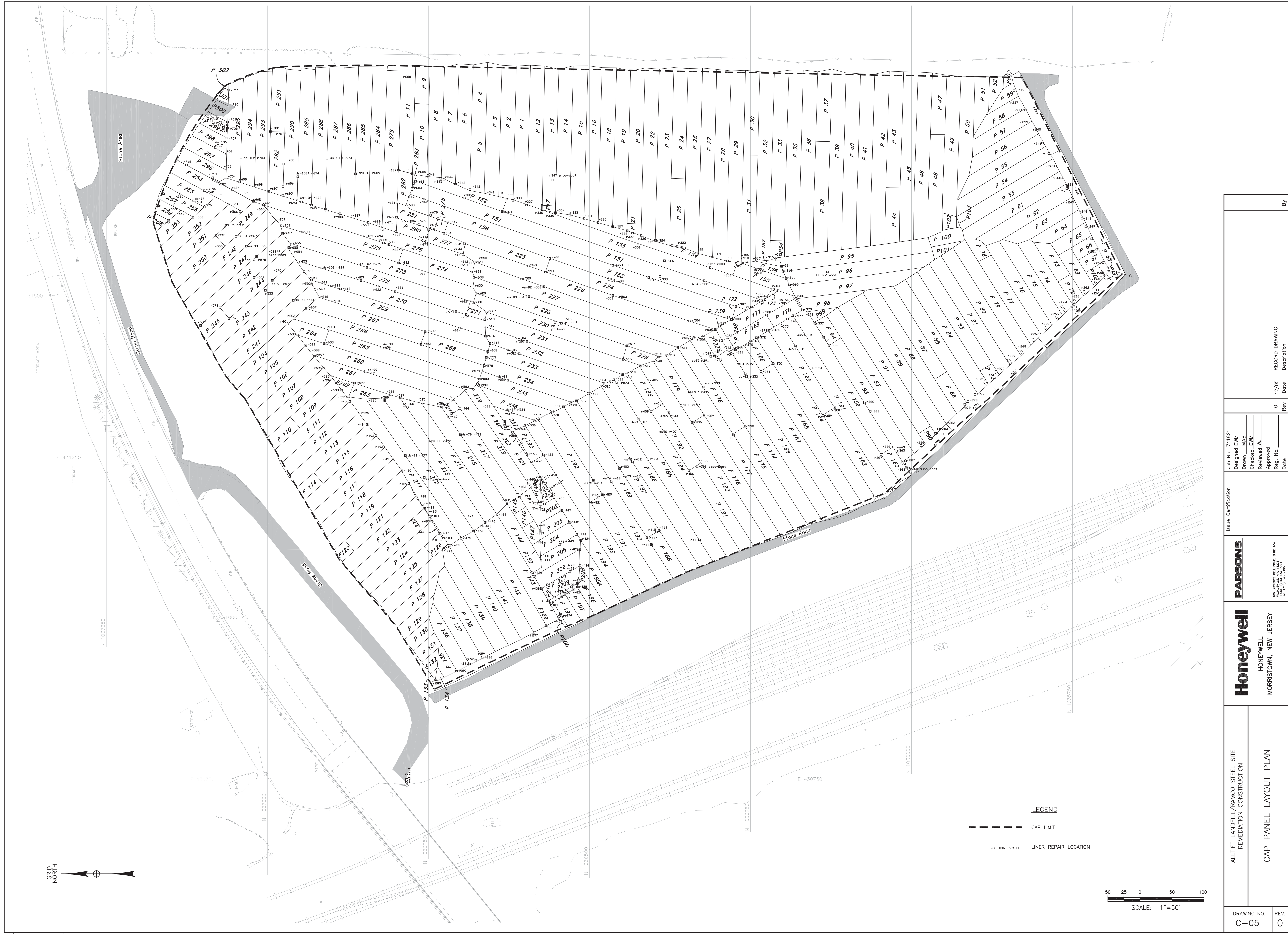
Job No. 741821		Issue Certification	
Designed EWM	Drawn MAB	<div>PARSONS</div> <div>Honeywell</div> <div>HONEYWELL MORRISTOWN, NEW JERSEY</div>	
Checked EWM	Reviewed WLL		
2 12/05	RECORD DRAWING		
2 10/28/04	REVISED MONITORING WELL LOCATIONS		
1 10/19/04	NYSEEC SUBMITTAL		
0 5/03	ISSUED FOR BIDDING	Rev	Date
Reg. No. —		Description	
By			

ALTIFT LANDFILL/RAMCO STEEL SITE
REMEDIATION CONSTRUCTION

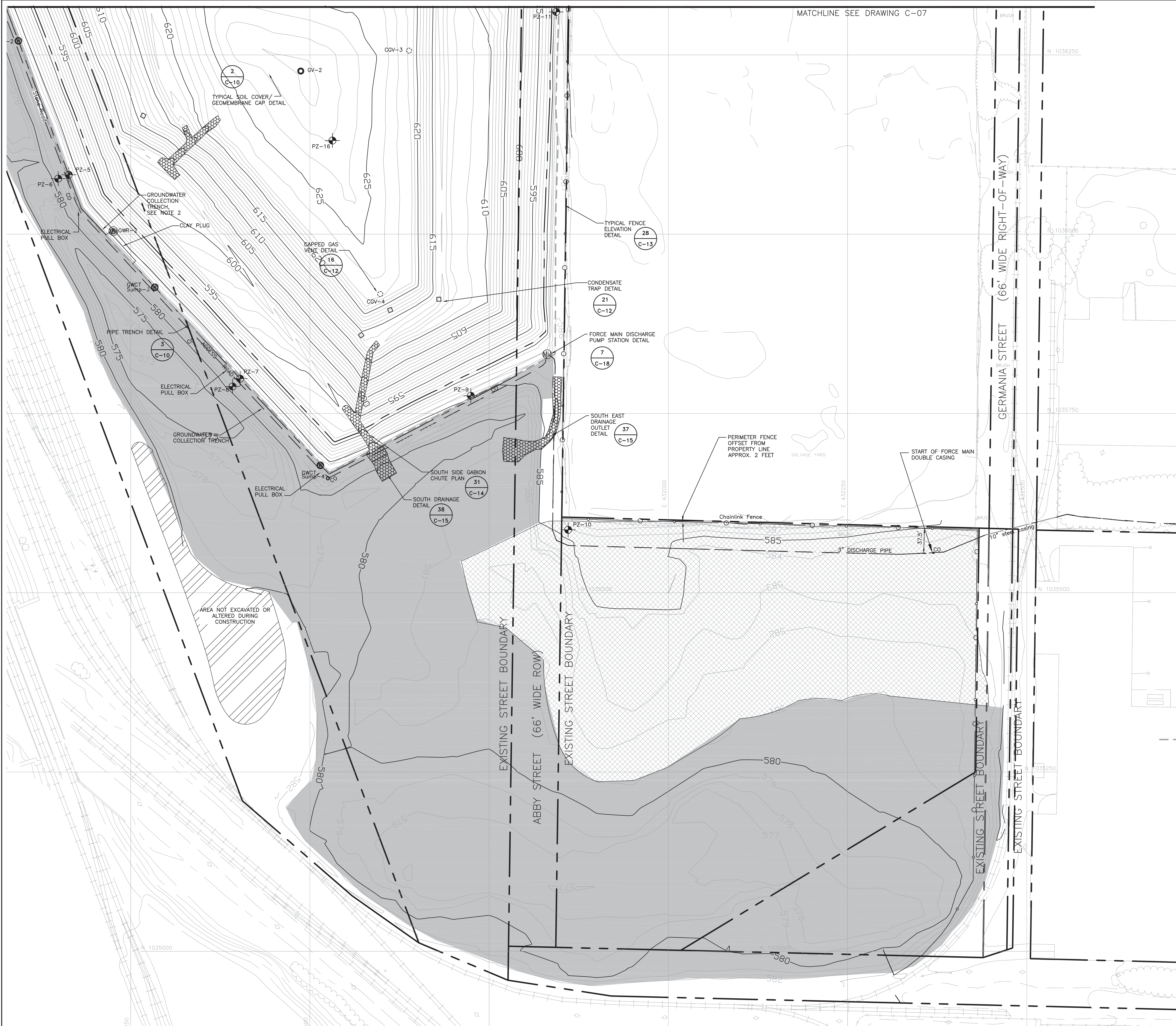
EXISTING CONDITIONS SITE PLAN

DRAWING NO.
C-01

REV.
3



Job No. 741821		Issue Certification		PARSONS		Honeywell		ALTIT LANDFILL/RAMCO STEEL SITE REMEDIATION CONSTRUCTION		DRAWING NO. C-05	
Designed EWM	Drawn MAB	Checked EWM	Reviewed WIL	Approved	Reg. No.	Date	HONEYWELL	HONEYWELL	REVISION	REV.	0
0		12/05		RECORD DRAWING		By		Description		0	



NOTES:

- REFER TO DRAWING C-01 FOR GENERAL NOTES AND LEGEND.
- REFER TO DRAWING C-16 FOR GROUNDWATER COLLECTION TRENCH/ DISCHARGE PIPE LOCATION AND DETAILS.
- REFER TO DRAWING C-01 FOR LOCATIONS OF BACKGROUND MONITORING WELLS MW-1 AND MW-2.

GRID NORTH

LEGEND

- MW-6 NEW MONITORING WELL
- PZ-3 NEW PIEZOMETER WELL
- GV-1 GAS VENT WITH TURBINE VENTILATOR
- CGV-1 CAPPED GAS VENT
- CONDENSATE TRAP
- DRAINAGE CHUTE
- CAP LIMIT
- AREA COVERED WITH COVER SOIL AND 6 INCHES TOPSOIL
- AREA COVERED WITH 6 INCHES OF TOPSOIL

SCALE: 1"=50'

Job No. 741821
Designed EWM
Drawn MAB
Checked TLB
Reviewed WIL
Approved
Reg. No. —
Date

Issue Certification

PARSONS
180 LAWRENCE HILL DRIVE, SUITE 104
ROCKFORD, ILL. 61081
PHONE: 815.398.1000
FAX: 815.398.7100

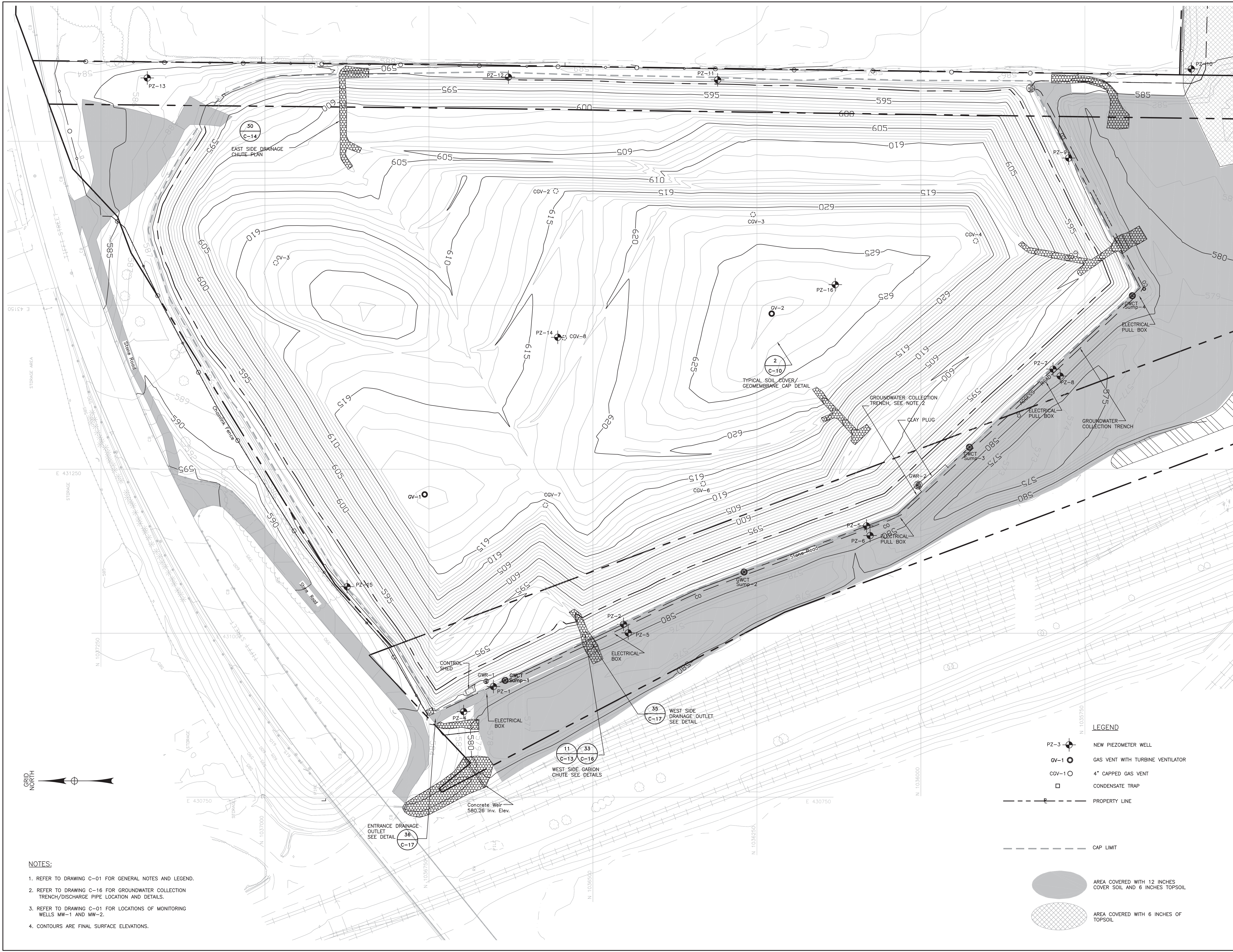
Honeywell
HONEYWELL
MORRISTOWN, NEW JERSEY

ALTIFT LANDFILL/RAMCO STEEL SITE
REMEDIATION CONSTRUCTION

FINAL GRADE PLAN
(1 OF 2)

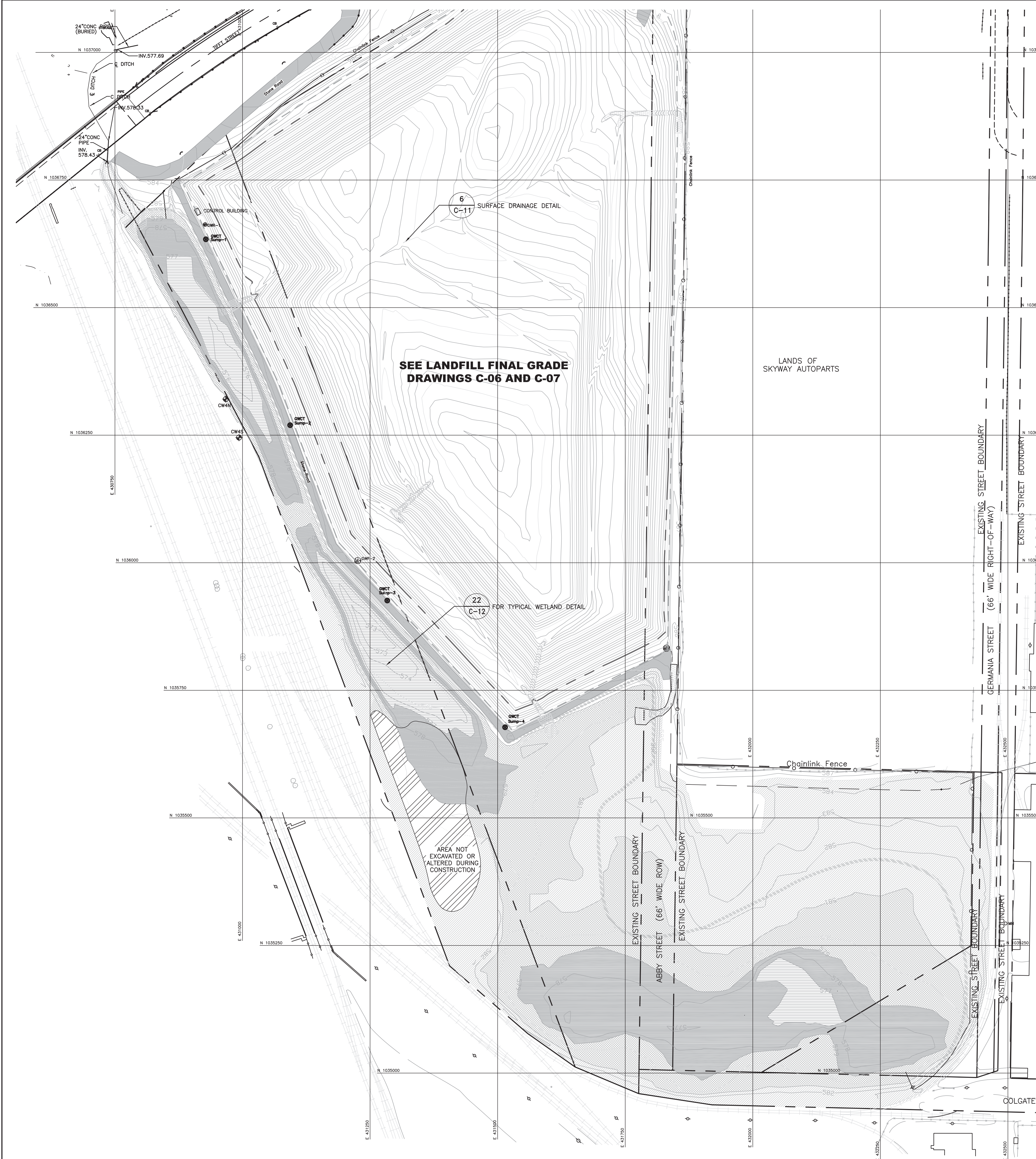
DRAWING NO. C-06
REV. 1

Rev	Date	Description	By
1	12/05	RECORD DRAWING	WIL
0	5/03	ISSUED FOR BIDDING	EWM



- NOTES:
1. REFER TO DRAWING C-01 FOR GENERAL NOTES AND LEGEND.
 2. REFER TO DRAWING C-16 FOR GROUNDWATER COLLECTION TRENCH/DISCHARGE PIPE LOCATION AND DETAILS.
 3. REFER TO DRAWING C-01 FOR LOCATIONS OF MONITORING WELLS MW-1 AND MW-2.
 4. CONTOURS ARE FINAL SURFACE ELEVATIONS.

ALTITF LANDFILL/RAMCO STEEL SITE REMEDIATION CONSTRUCTION		HONEYWELL MORRISTOWN, NEW JERSEY		Job No. 741821 Designed EWM/JF Drawn MAB Checked TLB Reviewed WLB Approved Reg. No. — Date		Issue Certification		Job No. 741821 Designed EWM/JF Drawn MAB Checked TLB Reviewed WLB Approved Reg. No. — Date		1 12/05 RECORD DRAWING 0 5/03 ISSUED FOR BIDDING Rev Date Description		By	
DRAWING NO. C-07		REV. 1											



NOTES:

- REFER TO DRAWING C-1 FOR GENERAL NOTES AND LEGEND.
- SEED LANDFILL CAP AREA WITH GRASS SEED MIX PER SECTION 02990.
- CONTOURS SHOWN ARE FINAL GRADES.

WETLAND PLANTING NOTES:

THE FOLLOWING IS A PLANTING GUIDE FOR THE WETLAND RESTORATION OF THE ALLTIFT/RAMCO SITE.

PLANTING:

The planting of bare root herbaceous vegetation is most suitable in the fall or spring. Plant replacement wetland plantings during the most suitable season following construction after the hydrology has been established.

Within each planting area, the specified plant species should be planted in spaced groupings. Each plant species must be established in the shallow range of its known tolerance. Plant material planted too deep may break dormancy and grow, but will not survive to establish as planned.

Seeding and mulching of the wet meadow and upland areas must be completed prior to inundation of the wet meadow area. Seeding should be conducted in the early fall, prior to the first killing frost. Wet meadow seed locations should be broadcast seeded (not hydroseeded). Hydroseeding is acceptable for the upland areas.

ZONE	HABITAT	ELEVATION	INUNDATION	SPECIES	PLANTING RATE
1	UPLAND	581 - 585	NONE	Smooth brome grass Timothy grass Perennial rye grass Birdfoot trefoil	15 lb/acre 15 lb/acre 15 lb/acre 8 lb/acre
2	WET MEADOW EMERGENT MARSH	579 - 581	0 IN - 1 FT	Fox sedge Rice cut-grass Bull rush Soft rush Wool grass Bearded sedge Smart weed Reed canary grass Fowl manna grass Meadow fescue Red Top grass	Seed rate of 3.25 lb/acre 15 lb/acre 10 lb/acre 15 lb/acre 20 lb/acre 3 lb/acre
3	DEEP WATER EMERGENT	577 - 579	1.0 FT - 3 FT	SEE SPECIAL PLANTING NOTES:	
4	OPEN WATER	575 - 577	3 FT - 5 FT	NONE	NA

SPECIAL PLANTING NOTES:

PLANTS (TUBERS AND RHIZOMES) CAN BE BUOYANT. PERSONNEL PLANTING THE FOLLOWING SPECIES MUST INSURE THAT THIS MATERIAL IS PLANTED AT THE PROPER DEPTH. TO PREVENT FLOATING, THE TUBERS OR RHIZOMES MUST BE EITHER WEIGHTED (HOG CLIPS OR OTHER SUCH WEIGHT) OR SECURELY PLACED INTO THE SUBSTRATE.

SPECIES:

PLANTING SUBZONE 3A: ELEVATION 578.50-579.00 (APPROX. 18 TO 24 INCHES OF WATER)

CATTAIL -

Plants grown from sprouted rhizomes.

Rhizomes should be planted in spring (March through July).

Secure plants into substrate by either weights or shoving firmly into mud.

Plant rhizomes at a rate of 6 foot on center.

GIANT BUR-REED -

Plants grown from sprouted rhizomes.

Rhizomes should be planted in spring (March through July).

Secure plants into substrate by either weights or shoving firmly into mud.

Plant rhizomes at a rate of 6 foot on centers (offset 3ft from cattail).

PLANTING SUBZONE 3B: ELEVATION 578.00-578.50 (APPROX. 12 TO 18 INCHES OF WATER)

PICKEREL WEED -

Plants grown from sprouted rhizomes.

Rhizomes should be planted in the fall (before November).

Secure plants into substrate by either weights or shoving firmly into mud.

Plant rhizomes at a rate of 6 foot on center intervals for uniform cover over desired areas.

DUCK POTATO -

Plants grown from tubers.

Tubers should be planted in the spring (March through July) or fall before freeze-up.

Secure plants into substrate by either weights or shoving firmly into mud.

Plant at a rate of 6 foot on center (offset 3ft from pickerel weed).

PLANTING SUBZONE 3C: ELEVATION 577.00-578.00 (APPROX. 24 TO 36 INCHES OF WATER)

SAGO PONDWEED -

Plants grown from tubers.

Tubers should be planted in the spring (March - July) or before fall freeze-up.

Tubers can be pre-weighted with hog clip or fence staple to prevent floating.

Plant at a rate of 6 feet on center for uniform cover over desired areas.

SPATTERDOCK -

Plants grown from sprouted rhizomes.

Rhizomes should be planted in fall (before November).

Secure plants into substrate by either weights or shoving firmly into mud.

Plant rhizomes at a rate of 6 foot on center (offset 3ft from sago pondweed).

LEGEND

RAILROAD TRACKS

575 5FT. CONTOUR LINE

576 1FT. CONTOUR LINE

CAP LIMIT LINE

ZONE 1
ELEVATIONS BETWEEN 581 TO 585

ZONE 2
ELEVATIONS BETWEEN 579 TO 581 - 6.00 ACRES

ZONE 3
ELEVATIONS BETWEEN 577 TO 579 - 4.03 ACRES

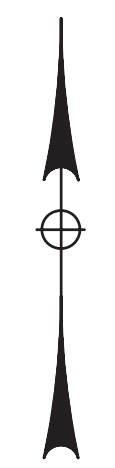
ZONE 4
ELEVATIONS BETWEEN 575 TO 577 - 1.37 ACRES

WOODY BUFFER ZONE

80 40 0 80 160

SCALE: 1"=80'

GRID NORTH



Job No. 741821
Designed EWM
Drawn MAB
Checked EWM
Reviewed WIL
Approved
Reg. No. -
Date

Issue Certification
PARSONS
180 LAWRENCE HILL DRIVE, SUITE 104
ROCKFORD, ILL. 61151
PHONE 815.398.7100
FAX 815.398.7105

Honeywell
HONEYWELL
MORRISTOWN, NEW JERSEY

ALLTIFT LANDFILL/RAMCO STEEL SITE
REMEDIATION CONSTRUCTION
WETLAND HABITAT RESTORATION PLAN
DRAWING NO. C-08
REV. 1

APPENDIX B
MONITORING WELL AND PIEZOMETER CONSTRUCTION
INFORMATION

TABLE B.1
MONITORING WELL DATA SUMMARY
ALLTIFT LANDFILL
BUFFALO, NEW YORK

Well ID	Date Installed	Total Depth (ft.)	Top of Casing Elevation	Size/Type of Riser/Screen	Depth to Top of Screen (ft.)	Depth to Bottom of Screen (ft.)	Top of Screen Elevation (ft.)	Bottom of Screen Elevation (ft.)	Northing	Easting
Piezometers										
PZ-1	1/14/2005	16.8	585.01	4" S.S.	10.8	16.8	574.21	568.21	1,036,652.33	430,919.22
PZ-2	1/13/2005	16.9	584.96	4" S.S.	11.9	15.9	573.06	569.06	1,036,453.30	431,013.68
PZ-3	1/12/2005	16.9	585.05	4" S.S.	12.8	16.8	572.25	568.25	1,036,082.78	431,163.68
PZ-4	1/17/2005	16.6	585.79	4" S.S.	11.6	16.6	574.19	569.19	1,036,697.02	430,880.49
PZ-5	1/17/2005	16.9	584.52	4" S.S.	10.9	16.9	573.62	567.62	1,036,446.10	431,000.50
PZ-6	1/17/2005	17.8	584.74	1.5" PVC	9.8	17.8	574.94	566.94	1,036,077.19	431,148.50
PZ-7	1/11/2005	20.0	584.99	4" S.S.	12.0	20.0	573.0	565.0	1,035,798.50	431,402.69
PZ-8	1/14/2005	20.7	584.48	4" S.S.	12.7	20.7	571.8	563.8	1,035,787.57	431,392.07
PZ-9	10/5/2004	15.1	586.86	1.5" PVC	10.1	15.1	576.8	571.8	1,035,774.59	431,724.50
PZ-10	10/5/2004	11.5	589.41	1.5" PVC	6.5	11.5	582.9	577.9	1,035,587.65	431,860.39
PZ-11	10/5/2004	19.5	594.72	1.5" PVC	14.5	19.5	580.2	575.2	1,036,309.66	431,844.37
PZ-12	10/6/2004	21.8	592.78	1.5" PVC	16.8	21.8	576.0	571.0	1,036,628.80	431,847.86
PZ-13	1/20/2005	22.5	589.04	1.5" PVC	12.5	22.5	576.5	566.5	1,037,179.40	431,846.58
PZ-14	1/20/2005	55.0	619.11	1.5" PVC	45.0	55.0	574.1	564.1	1,036,553.67	431,451.21
PZ-15	10/6/2004	17.0	588.79	1.5" PVC	12.0	17.0	576.8	571.8	1,036,874.60	431,070.70
PZ-16	1/19/2005	66.5	629.30	1.5" PVC	56.5	66.5	572.8	562.8	1,036,130.56	431,531.43
Monitoring Wells										
MW-1	1/24/2005	20.4	585.22	2" PVC	5.4	20.4	579.82	564.82	1,037,213.96	432,555.14
MW-2	1/24/2005	17.0	586.67	2" PVC	8.0	17.0	578.7	569.7	1,036,482.18	432,467.37
Groundwater Collection Trench Sumps										
S-1	1/13/2005	17.2	585.19	6" S.S.	13.2	17.2	571.99	567.99	1036633.9	430,927.80
S-2	1/13/2005	24.8	585.45	6" S.S.	12.8	24.8	572.65	560.65	1036269.8	431,093.00
S-3	1/12/2005	17.3	585.25	6" S.S.	12.3	17.3	572.95	567.95	1035926.016	431,283.60
S-4	1/11/2005	17.77	585.00	6" S.S.	13.77	17.77	571.23	567.23	1035677.671	431,514.50

Notes:

S.S. = stainless steel

PVC = polyvinyl chloride

PARSONS DRILLING RECORD					WELL NO. MW-1	
Contractor: SJB Services					Sheet 1 of 1	
Driller: Tony Jakubluzak, Carl Dennies					Location	
Inspector: Andy Janik					Elevation	
Rig Type: Track Rig					Northing = 1037213.96	
Method: 4.25" H.S.A					Ground Surface = 582.17'	
					Easting = 432555.14	
					Top Of Casing = 585.22'	
					x	
GROUNDWATER OBSERVATIONS					J.D. Cousins	
Date					Date/Time Start 1/21/05 @ 1035	
Time					Date/Time Finish 1/24/05 @ 1315	
Depth					← N Tift Street	
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	
		0				
0.0	1	1	5	5	Fill	
				4		
				2		
		2		2		
0.0	2			2	moist, brown S, some gravel fill	
		3	70	2		
				2		
		4		2		
0.0	3			3	wet, brown, S	
		5	100	2		
				2		
		6		2		
0.0	4			4	wet, brown S, to moist gray \$	
		7	100	5		
				5		
		8		8		
0.0	5			4	wet/moist, gray \$ to gray \$yC at 9.5'	
		9	100	4		
				5		
		10		7		
0.0	6			4	wet, gray, \$yC to wet gray C	
		11	85	4		
				4		
		12		4		
0.0	7			3	wet, gray, \$yC	
		13	75	2		
				3		
		14		3		
0.0	8			3	wet, gray, Sy\$yC	
		15	90	2		
				2		
		16		3		
0.0	9			3	wet, gray Sy\$yC	
		17	85	2		
				2		
		18		1		
0.0	10			W.O.H.	moist, gray, C	
		19	100	/ 12"		
				1		
		20		2		
					End of Boring at 20.0' bgs	
		21				

P:\440788\Draft Report Sections\New Well Borelogs\PZs and MWs boring logs

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-1	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Alltft Landfill		Sheet 1 of 1	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location Elevation	
Rig Type: Track Rig					Weather overcast, low 30's		Northing = 1036652.33 Ground Surface = 581.91'	
Method: 6.25" H.S.A					Date/Time Start 1/14/05 @0800		Easting = 430919.22 Top Of Casing = 585.01'	
Date/Time Finish 1/14/05 @ 1135					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
GROUNDWATER OBSERVATIONS								
Date								
Time								
Depth								
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT				
		0			6.25" H.S.A 0-4', brown C fill			
		1						
		2						
		3						
		4						
0.0	1	5	75	7	Brown C			
				5				
				5				
		6		6				
0.0	2	7	85	4	Brown C			
				4				
		8		5				
0.0	3	9	90	4	Wet, C-S			
				3				
		10		4				
0.0	4	11	55	3	Wet, C-S			
				W.O.H				
		12		/ 8"				
0.0	5	13	65	3	some wet C-S			
				3	gray native C at 13.0'			
		14		4				
End of Boring at 14.0' bgs								
		15						
		16						
		17						
		18						
		19						

STANDARD PENETRATION	SUMMARY:	Total Depth of Piezometer = 16.8' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-2	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Alltft Landfill		Sheet 1 of 1	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 6.25" H.S.A							Northing = 1036453.30 Easting = 431013.68	
GROUNDWATER OBSERVATIONS					Weather cloudy, mid 60's			
Date					Date/Time Start 1/13/05 @ 1005			
Time					Date/Time Finish 1/13/05 @ 1220			
Depth					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
Photovac Reading	Sample LD.	Sample Depth	Percent Recovery	SPT				
		0						
		1			6.25" H.S.A 0-4', brown C fill			
		2						
		3						
		4						
		5						
0.0	1	5	35	5	Brown C			
		6		5				
0.0	2	7	65	3	Brown C			
		8		3				
		9		5				
0.0	3	9	70	W.O.H / 24"	Wet, C-S			
		10						
0.0	4	11	35	W.O.H / 24"	Wet, C-S			
		12						
0.0	5	13	45	W.O.H / 24"	some wet C-S			
		14			gray native C at 13.0'			
					End of Boring at 14.0' bgs			
		15						
		16						
		17						
		18						
		19						

STANDARD PENETRATION	SUMMARY:	Total Depth of Piezometer = 16.9' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

					PARSONS DRILLING RECORD		BORING NO. PZ-3		
Contractor: SJB Services					PROJECT NAME Alltft Landfill PROJECT NUMBER 440788		Sheet 1 of 1		
Driller: Tony Jakubluzak, Carl Dennies							Location		Elevation
Inspector: Andy Janik							Northing = 1036082.78		Ground Surface = 582.05'
Rig Type: Track Rig							Easting = 431163.68		Top Of Casing = 585.05'
Method: 6.25" H.S.A.					Weather showers, low 50s				
GROUNDWATER OBSERVATIONS					Date/Time Start 1/12/05 @ 1310				
Date					Date/Time Finish 1/12/05 @ 1520				
Time									
Depth					FIELD IDENTIFICATION OF MATERIAL		COMMENTS		
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT					
		0			6.25" H.S.A. 0-4', clay fill				
		1							
		2							
		3							
		4			Brown C		Cement/bentonite grout to surface		
0.0	1	5	55						
		6			Brown C wet, C-S at ~ 7'		bentonite chips 8.8' to 10.8'		
		7	45						
		8							
		9	60		Wet, C-S		Sand pack 10.8' to 17.5'		
0.0	2	10							
		11	NA		Wet, C-S		12.8' to 16.8' SS 0.010" slot screen		
		12							
		13	NA		Wet, C-S				
0.0	3	14							
		15	NA		native, Grey C				
		16							
		17			End of Boring at 16.0' bgs				
		18							
		19							
STANDARD PENETRATION					SUMMARY:		Total Depth of Piezometer = 16.9' bgs		
SS = SPLIT SPOON							SPT counts not recorded in field book		
A = AUGER CUTTINGS							6" of sand below screen (as per specification 02015 of Contract Documents)		

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-4	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Altift Landfill		Sheet 1 of 1	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 4.25" H.S.A					Weather cold, snow, mid 10's		Northing = 1036697.02	
					Date/Time Start 1/17/05 @ 1400		Ground Surface = 582.67'	
					Date/Time Finish 1/17/05 @ 1545		Easting = 430880.49	
							Top Of Casing = 585.79'	
GROUNDWATER OBSERVATIONS								
Date					Date/Time Start 1/17/05 @ 1400			
Time					Date/Time Finish 1/17/05 @ 1545			
Depth								
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
		0					3.12' stick-up	
		1			4.25" H.S.A. 0-4', Brown C		4" steel pro-casing	
		2					1.5" PVC well riser	
		3					Cement/bentonite grout to surface	
		4						
0.0	1	5	35	4	Brown C			
				4				
				3				
		6		3				
0.0	2	7	55	6	Brown C			
				8				
				6				
		8		9				
0.0	3	9	60	4	Brown C		bentonite chips 7.6' to 9.6'	
				4	brown f-s			
		10		4				
0.0	4	11	90	1	wet, brown f-s		Sand pack 9.6' to 17.1'	
				1				
		12		5	gray SyC			
0.0	5	13	100	4	some wet brown f-s then gray C		11.6' to 16.6' PVC 0.010" slot screen	
				5				
		14		6				
					End of Boring at 14.0' bgs			
		15						
		16						
		17						
		18						
		19						
		20						

STANDARD PENETRATION	SUMMARY:	Total depth of Piezometer = 16.6' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

PARSONS DRILLING RECORD					BORING NO. PZ-5																																																																																																																																																		
Contractor: SJB Services					Sheet 1 of 1																																																																																																																																																		
Driller: Tony Jakubluzak, Carl Dennies					Location																																																																																																																																																		
Inspector: Andy Janik					Elevation																																																																																																																																																		
Rig Type: Track Rig					Northing = 1036446.10																																																																																																																																																		
Method: 4.25" H.S.A					Easting = 431000.50																																																																																																																																																		
PROJECT NAME Alltft Landfill					Ground Surface = 581.54'																																																																																																																																																		
PROJECT NUMBER 440788					Top Of Casing = 584.52'																																																																																																																																																		
Weather cold, snow, mid 10's																																																																																																																																																							
Date/Time Start 1/17/05 @ 1050																																																																																																																																																							
Date/Time Finish 1/17/05 @ 1215																																																																																																																																																							
FIELD IDENTIFICATION OF MATERIAL					COMMENTS																																																																																																																																																		
<table border="1"> <thead> <tr> <th>Photovac Reading</th> <th>Sample I.D.</th> <th>Sample Depth</th> <th>Percent Recovery</th> <th>SPT</th> </tr> </thead> <tbody> <tr><td></td><td></td><td>0</td><td></td><td></td></tr> <tr><td></td><td></td><td>1</td><td></td><td></td></tr> <tr><td></td><td></td><td>2</td><td></td><td></td></tr> <tr><td></td><td></td><td>3</td><td></td><td></td></tr> <tr><td></td><td></td><td>4</td><td></td><td></td></tr> <tr><td>0.0</td><td>1</td><td>5</td><td>65</td><td>7</td></tr> <tr><td></td><td></td><td>6</td><td></td><td>8</td></tr> <tr><td></td><td></td><td>6</td><td></td><td>6</td></tr> <tr><td>0.0</td><td>2</td><td>7</td><td>45</td><td>6</td></tr> <tr><td></td><td></td><td>8</td><td></td><td>5</td></tr> <tr><td></td><td></td><td>8</td><td></td><td>4</td></tr> <tr><td>0.0</td><td>3</td><td>9</td><td>80</td><td>6</td></tr> <tr><td></td><td></td><td>10</td><td></td><td>6</td></tr> <tr><td></td><td></td><td>10</td><td></td><td>5</td></tr> <tr><td>0.0</td><td>4</td><td>11</td><td>80</td><td>3</td></tr> <tr><td></td><td></td><td>12</td><td></td><td>4</td></tr> <tr><td></td><td></td><td>12</td><td></td><td>4</td></tr> <tr><td></td><td></td><td>12</td><td></td><td>5</td></tr> <tr><td>0.0</td><td>5</td><td>13</td><td>95</td><td>7</td></tr> <tr><td></td><td></td><td>14</td><td></td><td>6</td></tr> <tr><td></td><td></td><td>14</td><td></td><td>5</td></tr> <tr><td></td><td></td><td>14</td><td></td><td>6</td></tr> <tr><td></td><td></td><td>15</td><td></td><td></td></tr> <tr><td></td><td></td><td>16</td><td></td><td></td></tr> <tr><td></td><td></td><td>17</td><td></td><td></td></tr> <tr><td></td><td></td><td>18</td><td></td><td></td></tr> <tr><td></td><td></td><td>19</td><td></td><td></td></tr> <tr><td></td><td></td><td>20</td><td></td><td></td></tr> </tbody> </table>					Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT			0					1					2					3					4			0.0	1	5	65	7			6		8			6		6	0.0	2	7	45	6			8		5			8		4	0.0	3	9	80	6			10		6			10		5	0.0	4	11	80	3			12		4			12		4			12		5	0.0	5	13	95	7			14		6			14		5			14		6			15					16					17					18					19					20			<div> <div>2.98' stick-up</div> <div>4" steel pro-sacing</div> <div>1.5 " PVC well riser</div> <div>Cement/bentonite grout to surface</div> <div>bentonite chips 6.9' to 8.9'</div> <div>Sand pack 8.9' to 17.4'</div> <div>10.9' to 16.9' PVC 0.010" slot screen</div> </div>	
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT																																																																																																																																																			
		0																																																																																																																																																					
		1																																																																																																																																																					
		2																																																																																																																																																					
		3																																																																																																																																																					
		4																																																																																																																																																					
0.0	1	5	65	7																																																																																																																																																			
		6		8																																																																																																																																																			
		6		6																																																																																																																																																			
0.0	2	7	45	6																																																																																																																																																			
		8		5																																																																																																																																																			
		8		4																																																																																																																																																			
0.0	3	9	80	6																																																																																																																																																			
		10		6																																																																																																																																																			
		10		5																																																																																																																																																			
0.0	4	11	80	3																																																																																																																																																			
		12		4																																																																																																																																																			
		12		4																																																																																																																																																			
		12		5																																																																																																																																																			
0.0	5	13	95	7																																																																																																																																																			
		14		6																																																																																																																																																			
		14		5																																																																																																																																																			
		14		6																																																																																																																																																			
		15																																																																																																																																																					
		16																																																																																																																																																					
		17																																																																																																																																																					
		18																																																																																																																																																					
		19																																																																																																																																																					
		20																																																																																																																																																					
End of Boring at 14.0' bgs																																																																																																																																																							
STANDARD PENETRATION					SUMMARY:																																																																																																																																																		
SS = SPLIT SPOON					Total depth of Piezometer = 16.9' bgs																																																																																																																																																		
A = AUGER CUTTINGS					6" of sand below screen (as per specification 02015 of Contract Documents)																																																																																																																																																		

					PARSONS DRILLING RECORD		BORING NO. PZ-6		
Contractor: SJB Services					PROJECT NAME Altift Landfill PROJECT NUMBER 440788		Sheet 1 of 1		
Driller: Tony Jakubluzak, Carl Dennies							Location		Elevation
Inspector: Andy Janik							Northing = 1036077.19		Ground Surface = 581.71'
Rig Type: Track Rig							Easting = 431148.50		Top Of Casing = 584.74'
Method: 4.25" H.S.A					Weather cold, snow, mid 10's				
GROUNDWATER OBSERVATIONS					Date/Time Start 1/17/05 @ 0750				
Date					Date/Time Finish 1/17/05 @ 1040				
Time									
Depth									
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL				
		0			4.25" H.S.A. 0-4', clay fill				
		1							
		2							
		3							
		4			Brown C				
0.0	1	5	30	8					
				6					
		6		4					
					Brown C				
0.0	2	7	55	4					
				3					
		8		3					
					native gray \$yC				
0.0	3	9	90	3					
				2					
		10		3					
					native gray \$yC moist				
0.0	4	11	95	4					
				5					
		12		7					
					native, wet, \$ySyC				
0.0	5	13	100	5					
				4					
		14		3					
					native, gray C				
0.0	6	15	75	5					
				4					
		16		7					
					End of Boring at 16.0' bgs				
		17							
		18							
		19							
		20							
STANDARD PENETRATION					SUMMARY: Total depth of Piezometer = 17.8' bgs				
SS = SPLIT SPOON					6" of sand below screen (as per specification 02015 of Contract Documents)				
A = AUGER CUTTINGS									

[illegible]

P:\440788\Draft Report Sections\New Well Borelogs\PZs and MWs boring logs

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-9	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Alltift Landfill		Sheet 1 of 1	
Inspector: Sara Chmura					PROJECT NUMBER 440788		Location Elevation	
Rig Type: Track Rig					Weather Chilly, windy, ~ 50°F		Northing = 1035774.59 Ground Surface = 585.60'	
Method: 4.25" H.S.A					Date/Time Start 10/05/04 @ 1025		Easting = 431724.50 Top Of Casing = 586.86'	
GROUNDWATER OBSERVATIONS					Date/Time Finish 10/05/04 @ 1202			
Date					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
Time								
Depth								
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT				
		0						1.26' stick-up
0.0	1	1	100	1	Red hard clay fill			4" steel pro-casing
		2		1				
0.0	2	3	100	1	Red hard clay fill			1.5" PVC well riser
		4		2				
0.0	3	5	100	1	4'-5' Red hard clay fill			Cement/bentonite grout to surface
		6		2	5'-6' red/grey clay			
0.0	4	7	100	4	red grey clay, firm			bentonite chips 6.1' to 8.1'
		8		4				
0.0	5	9	100	4	8'-9' red/grey clay, firm			Sand pack 8.1' to 15.6'
		10		5	Grey clay-silt, firm, some brown red spots			
0.0	6	11	100	4	Grey clay-silt, firm, some brown red spots			
		12		5	Firm grey "moldable" clay			
					End of Boring at 12.0' bgs			10.1' to 15.1' PVC 0.010" slot screen
		13						
		14						
		15						
		16						
		17						
		18						
		19						

STANDARD PENETRATION	SUMMARY:	Total depth of Piezometer = 15.1' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-10	
Driller: Tony Jakubuzak, Carl Dennies					PROJECT NAME Alltiff Landfill		Sheet 1 of 1	
Inspector: Sara Chmura					PROJECT NUMBER 440788		Location Elevation	
Rig Type: Track Rig					Weather Chilly, windy, ~ 50°F		Northing = 1035587.65 Ground Surface = 586.18'	
Method: 4.25" H.S.A.					Date/Time Start 10/05/04 @ 0830		Easting = 431860.39 Top Of Casing = 589.41'	
GROUNDWATER OBSERVATIONS					Date/Time Finish 10/05/04 @ 1015			
Date					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
Time								
Depth								
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT				
		0						
0.0	1	1	100	3	Brown/brown-black grading to orange/brown sand, medium grained.		3.23' Stick-up	
		2		4			4" steel pro-casing	
				5				
0.0	2	3	100	5	orange/brown medium sand		1.5" PVC riser	
				6				
				5	tan sand, medium grained, some small rounded gravel.		bentonite chips 2.5' to 4.5'	
		4		6				
0.0	3	5	95	3	firm red/grey silty clay, some tan sand.			
				5				
		6		7				
				7				
0.0	4	7	85	9	silty sand, grey, some grey rounded to sub rounded gravel.		Sand pack 4.5' to 12.0'	
				13				
		8		12				
				30				
0.0	5	9	0	50/3	no recovery, rock fragments in split spoon, hit bedrock.		0.010" slot screen 6.5' to 11.5'	
		10						
					End of Boring at 10.0' bgs			
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						

STANDARD PENETRATION	SUMMARY:	Total depth of Piezometer = 11.5' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-11	
Driller: Tony Jakubczak, Carl Dennies					PROJECT NAME Alltiff Landfill		Sheet 1 of 1	
Inspector: Sara Chmura					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 4.25" H.S.A							Northing = 1036309.66 Ground Surface = 588.60'	
					Weather Chilly, windy, ~ 50°F		Easting = 431844.37 Top Of Casing = 591.72'	
GROUNDWATER OBSERVATIONS					Date/Time Start 10/05/04 @ 1410		← N Skyway Auto	
Date					Date/Time Finish 10/05/04 @ 1630		x Road	
Time								
Depth								
Photovac Reading	Sample ID	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
		0						
0.0	1	1	100	6	Red clay fill		3.12' Stick-up	
				6			4" steel pro-casing	
				7				
		2		8				
0.0	2	3	100	6	Red clay fill		Cement/bentonite grout to surface	
				7				
				6				
		4		8				
0.0	3	5	95	10	4.0'-5.0' red clay fill		1.5" PVC riser	
				8				
				8	5.0'-6.0' wet, black/brown material, odorous.			
		6		2				
0.0	4	7	90	2	Saturated, grey sand with pieces of glass, pottery, brick (angular pieces).			
				1				
		8		2				
0.0	5	9	100	1	Saturated black sand-like material, odorous, debris, wood chips			
				1				
				1				
		10		1				
0.0	6	11	98	1	10.0'-11.0' Saturated black sand-like material, odorous, debris, wood chips		Bentonite chips 10.5 to 12.5"	
				1				
		12		1	11.0'-12.0' less debris, more silty sand, black, medium/fine grained			
0.0	7	13	100	wh/12	12.0' -13.0' silty sand, black, medium/fine grained			
				2				
				2	13.0'-14.0' grey/green sand, medium grained		Sand pack 12.5' to 20.0'	
		14		-				
0.0	8	15	100	1	grey silt with sand, fine-medium grained			
				1				
				2				
		16		3				
0.0	9	17	90	4	"flowing" sand layer, tan/brown (16'-17')		14.5' to 19.5' PVC 0.010" slot screen	
				6				
				11	17.0'-18.0' silt with sand, grey, becoming more clay-like			
		18		9				
0.0	10	19	95	2	18.0'-18.2' silt with sand, grey, becoming more clay-like			
				2				
				4	18.2'-20.0' grey clay, wet firm, "moldable"			
		20		4				
					End of boring at 20.0' bgs			
STANDARD PENETRATION					SUMMARY:		Total depth of Piezometer = 19.5' bgs	
SS = SPLIT SPOON							6" of sand below screen (as per specification 02015 of Contract Documents)	
A = AUGER CUTTINGS								

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-13	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Alltft Landfill		Sheet 1 of 1	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 4.25" H.S.A							Northing = 1037179.40 Ground Surface = 585.98'	
					Weather snow, mid 10's		Easting = 431846.58 Top Of Casing = 589.04'	
GROUNDWATER OBSERVATIONS					Date/Time Start 1/20/05 @ 1400		Staging Area	
Date					Date/Time Finish 1/20/05 @ 1545		Skyway	
Time							Auto	
Depth							x	
Photovac Reading	Sample LD.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
		0					3.06' stick-up	
0.0	1	1	35	18	sand from staging area.		4" steel pro-sacing	
		2		6				
		3		4				
0.0	2	3	20	8	clay fill from staging area.		1.5" PVC well riser	
		4		6				
		5		12				
		6		11				
0.0	3	5	80	1	black, granular material, some sludge (?), wet.		Cement/bentonite grout to surface	
		6		2				
		7		1				
0.0	4	7	15	9	wood debris, black water		bentonite chips 6.0' to 9.0'	
		8		6				
		9		3				
0.0	5	9	45	1	black, granular material, to wet \$ySyC at 9.5'			
		10		1				
		11		2				
		12		3				
0.0	6	11	70	5	brown/gray Sy\$, moist			
		12		6				
		13		6				
		14		9				
0.0	7	13	100	7	moist, gray/brown Sy\$		Sand pack 9.0' to 23.0'	
		14		6				
		15		8				
		16		6				
0.0	8	15	55	4	moist, gray, \$yC			
		16		5				
		17		7				
0.0	9	17	80	7	moist, gray, \$yC			
		18		9				
		19		6				
		20		4				
0.0	10	19	75	3	moist, gray, C trace \$		12.5' to 22.5' PVC 0.010" slot screen	
		20		3				
		21		4				
		22		4				
		23						
					End of Boring at 20.0' bgs			

STANDARD PENETRATION	SUMMARY:	Total depth of Piezometer = 22.5' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

PARSONS DRILLING RECORD					BORING NO. PZ-14	
Contractor: SJB Services Driller: Tony Jakubluzak, Carl Dennies Inspector: Andy Janik Rig Type: Track Rig Method: 4.25" H.S.A					Sheet 1 of 1 Location: _____ Elevation: _____ Northing = 1036553.67 Easting = 431451.21 Ground Surface = 616.60' Top Of Casing = 619.11'	
PROJECT NAME: Alltiff Landfill PROJECT NUMBER: 440788					Weather: snow, mid 10's Date/Time Start: 1/19/05 @ 1300 Date/Time Finish: 1/20/05 @ 1330	
GROUNDWATER OBSERVATIONS Date: _____ Time: _____ Depth: _____						
FIELD IDENTIFICATION OF MATERIAL Photovac Reading, Sample I.D., Sample Depth, Percent Recovery, SPT					Skyway Auto COMMENTS	
		0				
		1			4.25" HAS through waste to 40.0' bgs	
		2				
		40				
0.0	1	41	90	1	wet, oily, S, brown/green.	2.51' stick-up
				1		4" steel pro-sacing
				2		Cement/bentonite grout to surface
				3		1.5" PVC well riser
0.0	2	43	100	3	wet S, then moist, gray \$	bentonite chips
				4		44.0' to 39.0'
				4		
		44		6		
0.0	3	45	95	1	wet, brown S	
				1		
				3		
		46		4		
0.0	4	47	100	4	wet, brown S, then gray \$yC.	Sand pack
				4		44.0' to 55.5'
				4		
		48		6		
0.0	5	49	70	4	wet, gray/brown \$yS	
				4		
				4		
		50		4		
0.0	6	51	75	3	wet, gray/brown \$yS, some gray \$yC	
				3		
				4		
		52		3		45.0' to 55.0' SS
						0.010" slot screen
0.0	7	53	100	4	wet, gray, \$yC, then gray C.	
				5		
				W.O.H.		
		54		/ 12"		
					Augured to 55.0' bgs	
		55				
					End of Boring at 55.0' bgs	
		56				

STANDARD PENETRATION

SS = SPLIT SPOON

A = AUGER CUTTINGS

SUMMARY:

Total depth of Piezometer = 55.0' bgs

6" of sand below screen (as per specification 02015 of Contract Documents)

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-15	
Driller: Tony Jakubczak, Carl Dennies					PROJECT NAME Alltiff Landfill		Sheet 1 of 1	
Inspector: Sara Chmura					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 4.25" H.S.A					Weather Cool, windy, ~ 50°F		Northing = 1036874.60	
					Date/Time Start 10/06/04 @ 1100		Ground Surface = 587.00'	
					Date/Time Finish 10/06/04 @ 1400		Easting = 431070.70	
							Top Of Casing = 588.79'	
GROUNDWATER OBSERVATIONS								
Date								
Time								
Depth								
Photovac Reading	Sample I.D.	Sample Depth	Percent Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
		0					1.79' stick-up	
0.0	1	1	100	4	Clay fill		4" steel pro-casing	
				8				
		2		5				
0.0	2	3	100	8	Clay fill		cement/bentonite grout to surface	
				7				
		4		10				
0.0	3	5	85	6	4.0'-5.5' clay fill			
				5				
		6		4	5.5'-6.0' black "waste" material, slight odor, wet			
				6				
0.0	4	7	85	2	black "waste" material, odorous		1.5" PVC riser	
				1				
		8		1				
0.0	5	9	90.0	1	8.0'-8.5' black "waste" material grading to red clay		Bentonite chips 8.0' to 10.0'	
				1				
		10		2	8.5'-10.0' red clay grading to grey silt with sand, medium grained			
				5				
0.0	6	11	100.0	2	Brown medium grained silt with sand		Sand pack 10.0' to 17.5'	
				3				
		12		4				
0.0	7	13	100.0	2	12.0'-13.2' brown medium grained silt with sand			
				2				
		14		3	13.2'-14.0' grey clay, firm, "moldable"			
				5				
					End of Boring at 14.0' bgs		12.0'-17.0' PVC 0.010" slot screen	
		15						
		16						
		17						
		18						
		19						

STANDARD PENETRATION	SUMMARY:	Total Depth of Piezometer at 17.0' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)
A = AUGER CUTTINGS		

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-16	
Driller: Tony Jakubczak, Carl Dennies					PROJECT NAME Alltft Landfill		Sheet 1 of 2	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location Elevation	
Rig Type: Track Rig					Weather snow, low 20's		Northing = 1036130.56 Ground Surface = 626.90'	
Method: 4.25" H.S.A					Date/Time Start 1/18/05 @ 1315		Easting = 431531.43 Top Of Casing = 629.30'	
Date/Time Finish 1/19/05 @ 1300					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
GROUNDWATER OBSERVATIONS								
Date								
Time								
Depth								
Photovac Reading	Sample LD.	Sample Depth	Percent Recovery	SPT				
		0						
		1			4.25" HAS through waste to 40.0' bgs			
		2						
		40						
0.0	1	41	85	28	wet, black siners			
				50	C + D			
				31				
		42		17				
0.0	2	43	90	40	wet, black siners			
				44	C + D			
				33				
		44		22				
0.0	3	45	0		No Recovery			
		46						
0.0	4	47	95	6	black, oily liquid with sheen.			
				5				
				8				
		48		11				
0.0	5	49	0	W.O.R.	No Recovery			
				/ 24"				
		50						
0.0	6	51	0	W.O.R.	No Recovery			
				/ 62"				
				W.O.H.				
		52		/ 6"				
0.0	7	53	35	W.O.H.	black, oily sludge			
				/ 12"				
		54		1				
0.0	8	55	75	1	black oily sludge, pieces of China to 55.0', then native brown			
				1	\$yS.			
				2				
		56		2				

STANDARD PENETRATION

SS = SPLIT SPOON

A = AUGER CUTTINGS

SUMMARY:

2.40' stick-up

4" steel pro-casing

1.5" PVC well riser

Cement/bentonite grout to surface

bentonite chips 49.0' to 54.0'

Sand pack 54.0' to 67.0'

Contractor: SJB Services					PARSONS DRILLING RECORD		BORING NO. PZ-16	
Driller: Tony Jakubluzak, Carl Dennies					PROJECT NAME Alltft Landfill		Sheet 2 of 2	
Inspector: Andy Janik					PROJECT NUMBER 440788		Location	
Rig Type: Track Rig							Elevation	
Method: 4.25" H.S.A							Northing = 1036130.56	
							Ground Surface = 626.90'	
					Weather snow, low 20's		Easting = 431531.43	
					Date/Time Start 1/18/05 @ 1315		Top Of Casing = 629.30'	
					Date/Time Finish 1/19/05 @ 1300			
GROUNDWATER OBSERVATIONS					FIELD IDENTIFICATION OF MATERIAL		COMMENTS	
Date								
Time								
Depth								
Photovac Reading	Sample LD.	Sample Depth	Percent Recovery	SPT				
		56						
9	0.0	57	45	4	Native, brown, \$yS			
				3				
		58		34				
10	0.0	59	90	4	Native, brown, wet, f-s			
				6				
		60		10				
				14				
11	0.0	61	100	3	some wet brown S, then wet plastic, smooth, brown + \$yC			
				4				
		62		5				
				7				
12	0.0	63	100	6	gray \$, moist, some f-s, gray.			
				9				
				9				
		64		14				
13	0.0	65	100	2	moist, gray, C			
				3				
				4				
		66		3				
					End of Boring at 66.0' bgs			
		67						
		68						
		69						
		70						
		71						
		72						
		73						
		74						
		75						

STANDARD PENETRATION		SUMMARY:	Total Depth of Piezometer = 66.5 ' bgs
SS = SPLIT SPOON		6" of sand below screen (as per specification 02015 of Contract Documents)	
A = AUGER CUTTINGS			

APPENDIX C

GROUNDWATER TRIGGER PLAN

Revised Groundwater Trigger Plan :

ALLTIFT LANDFILL SITE

Buffalo, New York
NYSDEC Site No. 9-15-054

and

RAMCO STEEL SITE

Buffalo, New York
NYSDEC Site No. 9-15-046B

Submitted To:

New York State Department of Environmental Conservation

Submitted By:

Honeywell

101 Columbia Road
Morristown, New Jersey 07962

Prepared By:

PARSONS

180 Lawrence Bell Drive, Suite 104
Williamsville, New York 14221
Phone: (716) 633-7074
Fax: (716) 633-7195

January 2005

ATTACHMENT C

GROUNDWATER TRIGGER PLAN

C.1 INTRODUCTION

As part of the remedial construction, a groundwater collection system will be installed, consisting of a passive groundwater collection trench, pumping points, and piping. The collection system will not be equipped with extraction pumps unless post-remedial construction groundwater monitoring, conducted in accordance with the OM&M Manual and this Groundwater Trigger Plan, indicate the need for groundwater collection. In accordance with the ROD for the site, this Plan establishes the parameters by which the decision to collect groundwater will be made. The Plan identifies all required information and procedures for triggering the collection of groundwater from the trench. This information includes the sampling (compliance) points, sampling methodology, sampling frequency, analytical testing requirements, methods for data analysis, and groundwater quality standards to be utilized as action limits. Details concerning sampling methodology and analytical requirements are contained in Section 4 of the OM&M Manual.

C.2 BACKGROUND

Historical groundwater results from the remedial investigation (1991), as well as more recent groundwater analytical data (May 2002 and January 2003) were reviewed and compared to the NYSDEC Class GA groundwater standards identified as cleanup criteria in the Record of Decision (ROD). This data review indicated that few, if any, exceedances of the Class GA standards are expected beyond the landfill boundaries after closure activities are complete. No organic compounds were detected above the standards in shallow monitoring wells located on the western side of the western ponds (MW-2S, MW-3S, and SMW-6), with the exception of one pesticide (4,4-DDD) in MW-3S. Several metals were detected above the standards, but some of these metals were also found at comparable concentrations in background wells upgradient of the site. Background concentrations will be considered during the analysis of groundwater monitoring data (see Section C.4).

Groundwater monitoring results obtained in May 2002 and January 2003 indicate that concentrations of chemicals of concern have remained relatively stable over the past 10 years. Groundwater quality is expected to remain stable or improve following completion of the remediation and installation of an impermeable cap system, due to a reduction in surface water entering the landfill. Three wells (MW-4S, MW-6S, and MW-9S) were sampled in January 2003, utilizing low-flow sampling techniques to minimize turbidity and obtain more representative groundwater samples. These results indicate that actual groundwater concentrations, particularly metals and PCBs, may be lower than previously observed. Using the low-flow sampling techniques, the only metals listed as chemicals of concern in the ROD that exceeded the criteria, were iron in all three wells, and manganese in MW-4S. PCBs were not detected. In general, metals and PCB concentrations in these wells decreased substantially compared to the 1991 and 2002 results.

PARSONS

C.3 COMPLIANCE POINTS

The compliance points include the groundwater collection trench and two upgradient background monitoring wells located east of the Skyway property (see attached sketch C-1A for upgradient monitoring well locations). Construction details for the monitoring wells are shown on drawing C-15 in the May 2003 design report.

Samples from the collection trench, in conjunction with the two upgradient background wells, will be used to make decisions regarding activation or deactivation of the collection trench. Results from the two background wells will be statistically compared to the trench results to determine site background and/or impacts from offsite sources, if any. A description of the decision-making process for activation and/or deactivation of the collection trench is provided below.

C.4 COLLECTION TRENCH TRIGGER MECHANISMS

Approximately one month following initial installation of extraction and monitoring points in the groundwater collection trench, groundwater monitoring will commence, concurrently with other aspects of the remedial construction. As described in Section 4 of the OM&M Manual, groundwater samples will be collected from the trench and from the two background monitoring wells. Low-flow sampling techniques will be employed while sampling from the background monitoring wells (see Section 4 of the OM&M Manual for details on sampling technique).

Four extraction points within the trench, consisting of 6-inch diameter stainless steel screens and casing, will be utilized to purge and sample the trench (see attached sketch SK-C-33 for locations and SK-C-38 and SK-C-39 for construction details). The water derived from each point during purging will be directed to onsite storage tanks. Temporary flow meters will be installed at each pumping point to determine purge volumes at each point.

Purging

The trench will be purged by pumping simultaneously from all four pumping points using submersible pumps, immediately prior to each sampling event. Based on hydraulic conductivity estimates of the trench backfill material, purge rates of approximately 20 gallons per minute (gpm) per pumping point are expected. For the first sampling event, a maximum of one trench volume of water (porewater volume) will be purged. Field parameters at each pumping point (pH, temperature, conductivity) will be measured at regular intervals throughout the purging process. During this initial event, pumping from each point will be roughly proportional to the volume of trench backfill material expected to be drained from that point. The maximum expected volume from each pumping point is as follows:

- Sump 1: 13,100 gallons
- Sump 2: 22,900 gallons
- Sump 3: 22,600 gallons
- Sump 4: 19,300 gallons

Because the trench has no impermeable barrier, groundwater flow is not impeded between sampling events. Thus, during subsequent sampling events, it is not necessary to purge an entire

PARSONS

trench volume to obtain representative groundwater samples. Purge volumes will be limited to a maximum of three volumes from each 6-inch diameter sampling point, as follows:

- Sump 1: 100 gallons
- Sump 2: 150 gallons
- Sump 3: 120 gallons
- Sump 4: 80 gallons

Purge water will be temporarily contained on the Site, and managed in similar fashion to groundwater encountered during construction activities. Water will be discharged to the storm sewer, the Buffalo Sewer Authority, or other management facility, following appropriate sampling, handling, and/or treatment.

Sampling

Following purging, groundwater will be collected from each of the four pumping points. Groundwater from each of these four locations will then be composited in the field to comprise a single sample.

The single combined trench sample, and the samples from the two background monitoring wells, will be analyzed for the chemical parameters shown on Table C.1, and compared to NYSDEC Class GA groundwater standards. The NYSDEC standards were identified in the Record of Decision (ROD) as groundwater cleanup goals for the site. The standards presented in Table C.1 are the most current Class GA standards for the ROD-specified chemical parameters (October 1998 issue date). Samples from the trench and the two wells will be collected approximately once every 1.5 months. An interim evaluation will be conducted after three rounds of data have been collected, followed by a longer term evaluation period. The interim evaluation and long-term trigger period are described below.

Interim Evaluation Period

1. Groundwater data will be reviewed to determine if substantial exceedances (as defined in No. 2 below) of the Class GA standards exist that may warrant groundwater collection. The interim analysis will begin after three rounds of data have been collected. No decisions will be made prior to three rounds of data collection.
2. Concentrations for each chemical of concern will be averaged over the three rounds. Groundwater collection, or collection and treatment, will be considered necessary if the following conditions exist during the interim evaluation period, based on the average concentration of each chemical of concern over the three rounds of data collection:
 - a. Three or more chemicals of concern (excluding metals) exceed Class GA standards by a factor of 25; or
 - b. Two chemicals (excluding metals) exceed the standards by 50 times; or
 - c. One chemical (excluding metals) exceeds the standard by 100 times.

3. If any of the above conditions are established during the interim analysis, the design of a collection system and preparation to implement appropriate temporary measures to manage groundwater will be conducted. Groundwater collection and temporary management of the groundwater will commence within three months of the decision point. Discharge to the Buffalo Sewer Authority (BSA) will begin as soon as possible. The time frame to begin collection will be minimized by (1) installing the permanent piping between the groundwater collection trench and the BSA during the remedial construction; and (2) preparing specifications for pumping and electrical needs, and selecting equipment vendors during the sampling period.
4. If collection AND treatment are determined to be necessary, arrangements to properly manage the collected groundwater will be made within three months of the decision to collect and treat. During this same 3-month time frame, a permanent treatment system will be designed. It is expected that a permanent system can be constructed within approximately six to nine months following completion and approval of the design. The treatment system will be constructed with the necessary elements, based on groundwater chemical analytical results and BSA requirements. The design will consider the need for sediment and iron removal, the potential for mercury removal, and treatment for organic compounds.
5. If the interim trigger plan conditions are not met, the groundwater sampling at 1.5-month intervals will continue until a total of six rounds of samples have been collected and analyzed per the long-term trigger period described below.

Long-term Trigger Period

As mentioned, if groundwater collection is not required based on the interim evaluation, sampling will continue until six rounds of data have been collected. Following receipt of the analytical data for the sixth round of monitoring, a statistical analysis will be conducted for the ROD-specified chemical parameters using NYSDEC Class GA groundwater standards for comparison (see Table C.1). The analysis will include confidence interval testing in accordance with EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA, 1989), and analysis of variance (ANOVA) testing. Details of the statistical analysis are provided in Section C.5 of this Plan. The general decision-making strategy is as follows:

1. Conduct confidence interval testing on at least six rounds of collection trench samples to determine whether there are statistical exceedances of any groundwater standards for the ROD-specified chemical parameters.
2. Conduct ANOVA testing to statistically compare background concentrations of metals to the trench samples.
3. No actions other than continued monitoring are necessary if the data analysis yields the following results:
 - a. confidence interval testing indicates no statistical exceedances of the ROD-specified chemical parameters, or
 - b. for metals, ANOVA analysis indicates that the exceedance is related to background concentrations.

4. If after six rounds of sampling, groundwater collection is not deemed necessary in accordance with the above criteria, the monitoring frequency will be reduced to quarterly (every three months) and the statistical analysis will be conducted once per two years, using the most recent eight rounds of sampling data (excluding the initial six rounds at 1.5-month intervals). Monitoring will continue in accordance with this protocol until a 5-year project review is conducted.
5. If confidence interval testing indicates a statistical exceedance of a ROD-specified chemical parameter, and ANOVA analysis (for metals only) confirms that the exceedance is not related to background concentrations, then collection, or collection and treatment will be initiated. Preparations for collection or collection and treatment will be conducted in the same manner as described above under the Interim Evaluation Period, Items 3 and 4.
6. If continued statistical analysis prior to the NYSDEC 5-year review period (5 years after acceptance of remedial action by NYSDEC) indicates that there are no statistical exceedances of any ROD-specified chemical parameters, the trench will either remain off, or if previously activated, will be deactivated. Quarterly monitoring will continue until a 5-year project review is conducted (see Section C.6 for details on 5-year project review).
7. If the continued statistical analysis prior to the 5-year review period indicates an exceedance of ROD-specified chemical parameters, the trench will either be activated (if not previously activated), or remain active. Quarterly monitoring will continue until a project 5-year review is conducted (see Section C.6 for details on 5-year project review).

C.5 STATISTICAL ANALYSIS

Statistical analyses will be conducted on groundwater monitoring data from the collection trench to provide statistically significant data for comparison to Class GA groundwater standards for ROD-specified chemical parameters. The two upgradient wells will be utilized as background monitoring points. Results from these wells will be statistically compared to the trench sample results to determine site background and/or impacts from offsite, if any (from metals).

Results of the statistical analyses will form the basis for making decisions regarding operation of the groundwater extraction trench. Confidence interval tests will be conducted (using at least four rounds of monitoring data) for the mean concentration from the collection trench and for each chemical of concern. The confidence interval testing will be conducted at a 95% confidence level. The calculated lower confidence interval for each chemical will then be compared to the established criterion (NYSDEC Class GA groundwater standard). If the lower confidence interval exceeds the criterion, then potential impacts to groundwater exist.

The equation used to calculate normal and log-normal confidence intervals is as follows:

$$\bar{X} \pm t_{(0.95, n-1)} S/\sqrt{n}$$

where \bar{X} is the mean, and S is the standard deviation of the sample values.

$t_{(0.95, n-1)}$ is obtained from a t-table, and n is the sample number.

Prior to confidence interval testing, the data will be tested for normal distribution (when enough data is available for such testing). When the sample data follows a normal distribution, then confidence intervals based on normal distribution will be constructed. When the sample data fail a normality test, then a natural log-transformation of the data is conducted to normalize the data. If there is evidence that the transformed data follow a normal distribution, then confidence intervals based on log-normal data will be constructed, and the lower confidence interval will be compared to the compliance interval.

In the case where sample data fail both normality and log-normality tests, non-parametric confidence intervals will be calculated. Non-parametric confidence intervals use rank order statistics to form the confidence intervals, then the lower confidence interval is compared to the criterion as in the cases above.

ANOVA testing will also be conducted, comparing the background wells to the trench samples to determine potential influences from offsite (for metals parameters only). This procedure compares the means of groups of observations to determine whether there are any significant difference among the groups. In other words, it is to determine whether differences in mean concentrations among wells, or groups of wells, are statistically significant. ANOVA analysis will be utilized during the long-term trigger period using a minimum of six rounds of data for the analysis. Descriptions of ANOVA analysis in the literature recommend at least three samples with a minimum of three observations in each sample. The procedure proposed within this trigger plan will utilize three samples (two background well samples and one trench sample) over at least six rounds of sampling. During later phases of the trigger plan, eight rounds of data will be utilized.

Parametric and non-parametric are the two types of analysis of variance used in ground water monitoring programs. The hypothesis tests with parametric analysis of variance assume that the residuals are normally distributed (or a log transformation is successful in normalizing the data), whereas a non-parametric analysis of variance is used when the residuals from a parametric ANOVA test are found different from normal, and when a log transformation also fails to normalize the data.

The basic procedure for ANOVA is presented below. Details can be found in EPA's Statistical Analysis of Groundwater Monitoring Data (EPA 1989) referenced in Section C.4 above. A multiple comparison test will be conducted to determine whether the compliance point (trench sample) has significantly higher concentrations than the background wells.

1. Determine the sample size of the background wells and compute the mean concentration for a given chemical.
2. Compute the difference (d) between the mean concentration of the compliance point and the average concentration of the background wells.
3. Compute the standard error of each difference (using an ANOVA lookup table to find the error of the mean squares).

4. Obtain a t -statistic from Bonferroni's t -table for a given significance level (usually 5%) and degrees of freedom.
5. Compute the value D , which equals the standard error of differences multiplied by the t -statistic. If d is less than D , then the conclusion is that the compliance point does not have significantly greater concentrations than the mean of the background wells. If d is greater than D , then compliance point (trench sample) does have a significantly greater concentration than the background wells.

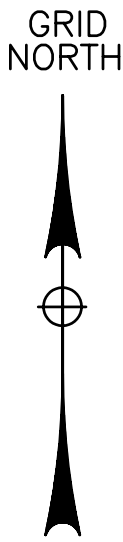
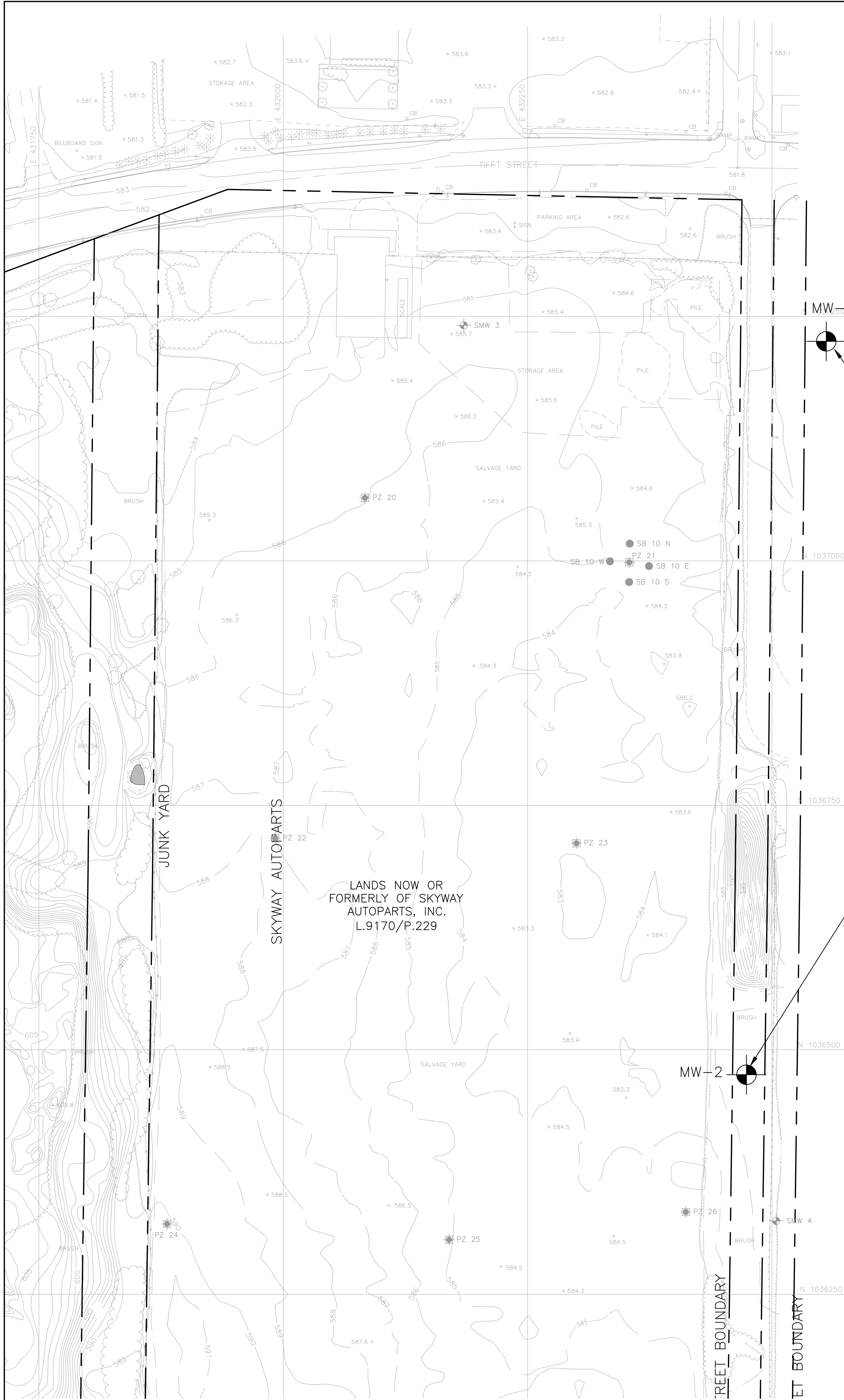
C.6 FIVE-YEAR PROJECT REVIEW

A five-year project review will be conducted five years from the completion of the construction phase. All monitoring data collected during the OM&M period will be evaluated. Recommendations will be made regarding continued OM&M, and, where appropriate, modifications to various components of the OM&M program and manual. For example, the parameter list and monitoring frequency for groundwater sampling may be reduced based on results obtained over the five-year period. Recommendations regarding operation or deactivation of the groundwater collection trench will also be made based on the cumulative data collected during the five-year period. For example, if statistical analysis has resulted in the trench remaining off for more than two years, then the monitoring frequency and statistical analysis may be reduced.

Table C.1
Water Quality Criteria for ROD-specified
Chemical Parameters

Chemical Parameter	NYSDEC Class GA Standards/Guidelines (ug/L)
benzene	1
chlorobenzene	5
ethylbenzene	5
xylene	5
naphthalene	10
1,4-dichlorobenzene	3
1,2-dichlorobenzene	3
4-chloroaniline	5
4,4 DDD	0.3
4,4 DDE*	0.2
PCBs*	0.09
antimony	3
arsenic	25
cadmium*	5
chromium	50
iron	300
lead	25
manganese	300
mercury*	0.7

*These chemical parameters were not specified in the ROD, but have been added at the request of NYSDEC.



NOTES:

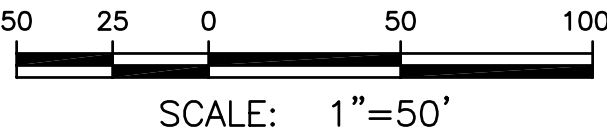
1. THIS MAP WAS PRODUCED ENTIRELY BY PHOTOGRAMMETRIC METHODS, BY ERDMAN, ANTHONY ASSOCIATES FROM 1"=500' PHOTOGRAPHY TAKEN ON APRIL 14, 1989. THE USER OF THIS MAP IS CAUTIONED THAT CERTAIN AREAS OBSCURED BY SHADOWS AND HEAVY VEGETATION MAY REQUIRE FIELD VERIFICATION. THE OUTLINE OF ALL BUILDINGS IS THE ROOF LINE.
2. VERTICAL ACCURACIES CAN BE EXPECTED TO BE +/- ONE HALF CONTOUR INTERVAL FOR CONTOUR LINES, SPOT ELEVATIONS +/- ONE QUARTER OF A CONTOUR INTERVAL IN 90% OF THE AREAS WHICH WERE CLEARLY VISIBLE PHOTOGRAMMETRICALLY.
3. GROUND SURVEY DATA USED AS THE BASIS FOR THE PHOTOGRAMMETRIC MAPPING, WAS PROVIDED BY MCINTOSH & MCINTOSH P.C., LOCKPORT, NEW YORK ON 5/8/89. VERTICAL DATUM IS NGVD 1929.
4. THE BASE MAP WAS AUGMENTED WITH PROPERTY SURVEY DATA PROVIDED BY TVGA, ELMA, NEW YORK, 6/19/97.
5. ALL RAILROAD TRACKS DEPICTED ADJACENT TO THE WESTERN SITE BOUNDARY MAY NOT EXIST.
6. THE EASTERN END OF RAMCO POND WAS MODIFIED TO REFLECT CONDITIONS RESULTING FROM A PILOT SCALE WETLAND EXCAVATION STUDY, CONDUCTED FALL 1998. APPROXIMATELY 1,270 CUBIC YARDS OF SEDIMENT AND UNDERLYING SOIL WERE EXCAVATED FROM RAMCO POND AND PLACED THROUGHOUT THE SSA AT AN APPROXIMATE AVERAGE DEPTH OF 1 FOOT.
7. THE BASE MAP WAS AUGMENTED WITH TOPOGRAPHIC MAPPING OF THE SKYWAY AUTOPARTS SITE AND NEW ALIGNMENT FOR THE TIFFT STREET BRIDGE AND APPROACH. THE ADDITIONAL MAPPING WAS PRODUCED BY PHOTOGRAMMETRIC METHODS BY TVGA FROM AERIAL PHOTOGRAPHY TAKEN JUNE 4, 1999.
8. HORIZONTAL DATUM IS NEW YORK STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 1927.

MW-1 AND MW-2 ARE APPROXIMATE LOCATIONS, FINAL LOCATIONS TO BE DETERMINED IN THE FIELD.

LEGEND

- PROPERTY LINE
- EXISTING FENCING
- RAILROAD TRACKS
- SHRUBS AND BRUSH
- POWER POLE
- MARSH AREA
- EXISTING 10FT. CONTOUR
- EXISTING 1FT. CONTOUR
- SPOT ELEVATION
- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- NEW MONITORING WELL
- PONDED AREAS
- MARSH AREA

MONITORING WELL COORDINATES		
WELL ID	NORTHING	EASTING
MW-1	1037271.09	432555.57
MW-2	1036441.09	432473.94



Job No. 741821
Designed EWM
Drawn MAB
Checked EWM
Reviewed WLL
Approved
Reg. No. —
Date

Issue Certification

100 LAWRENCE HILL DRIVE, SUITE 104
ROCKFORD, ILL. 61081
PHONE: 815.399.3300
FAX: 815.399.7100

HONEYWELL
MORRISTOWN, NEW JERSEY

ALTITF LANDFILL/RAMCO STEEL SITE
REMEDATION CONSTRUCTION

ENLARGED MONITORING WELL
RELOCATION PLAN

DRAWING NO.
C-1A

REV.
2

By

Rev

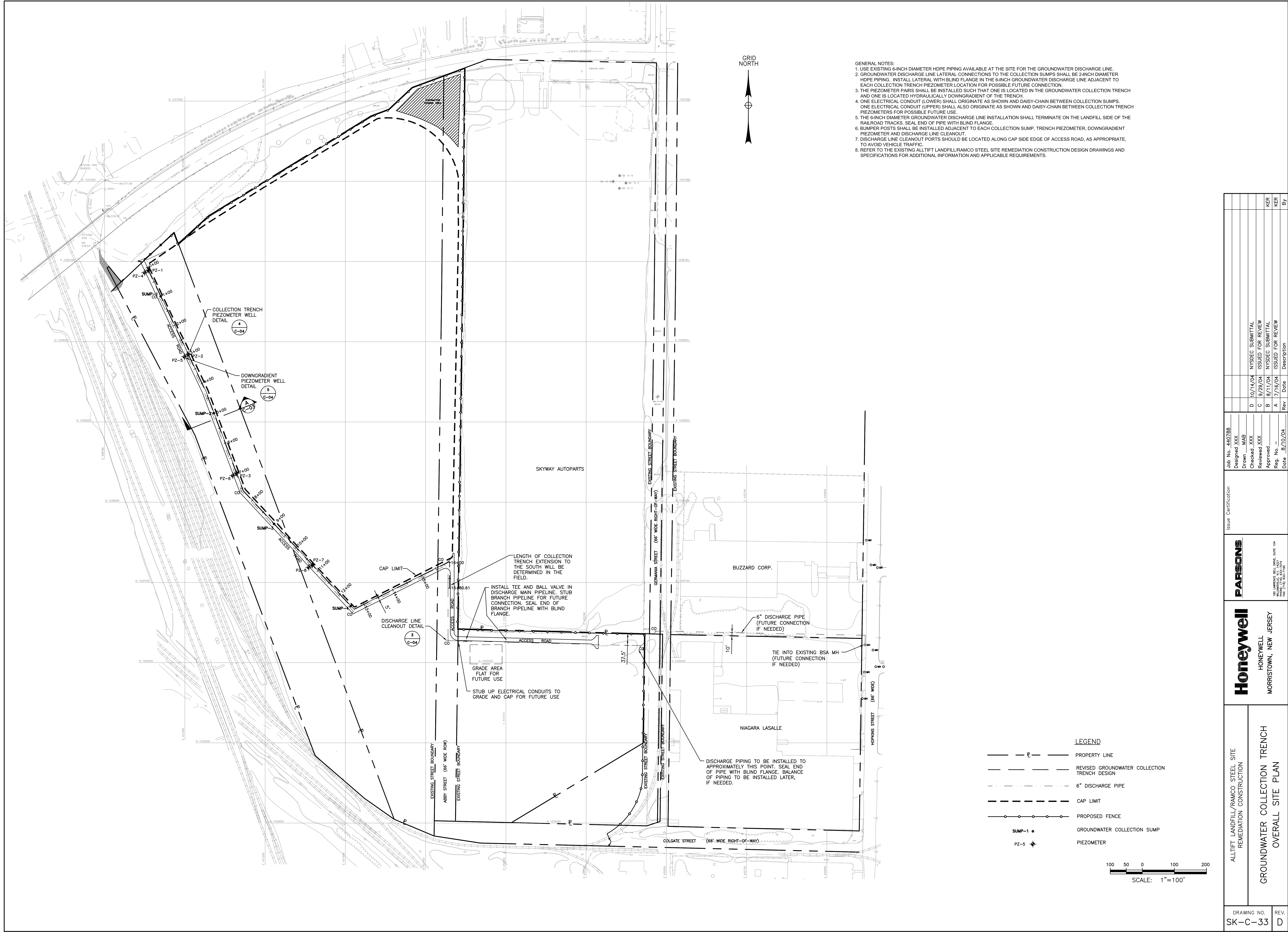
Date

Description

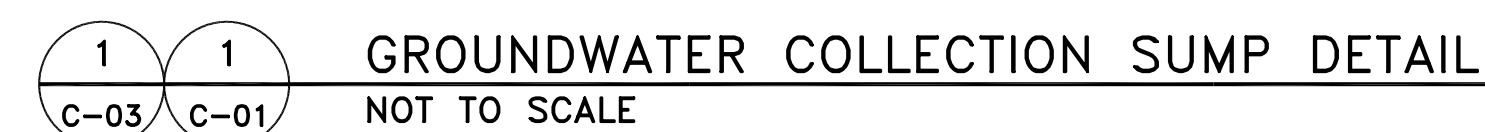
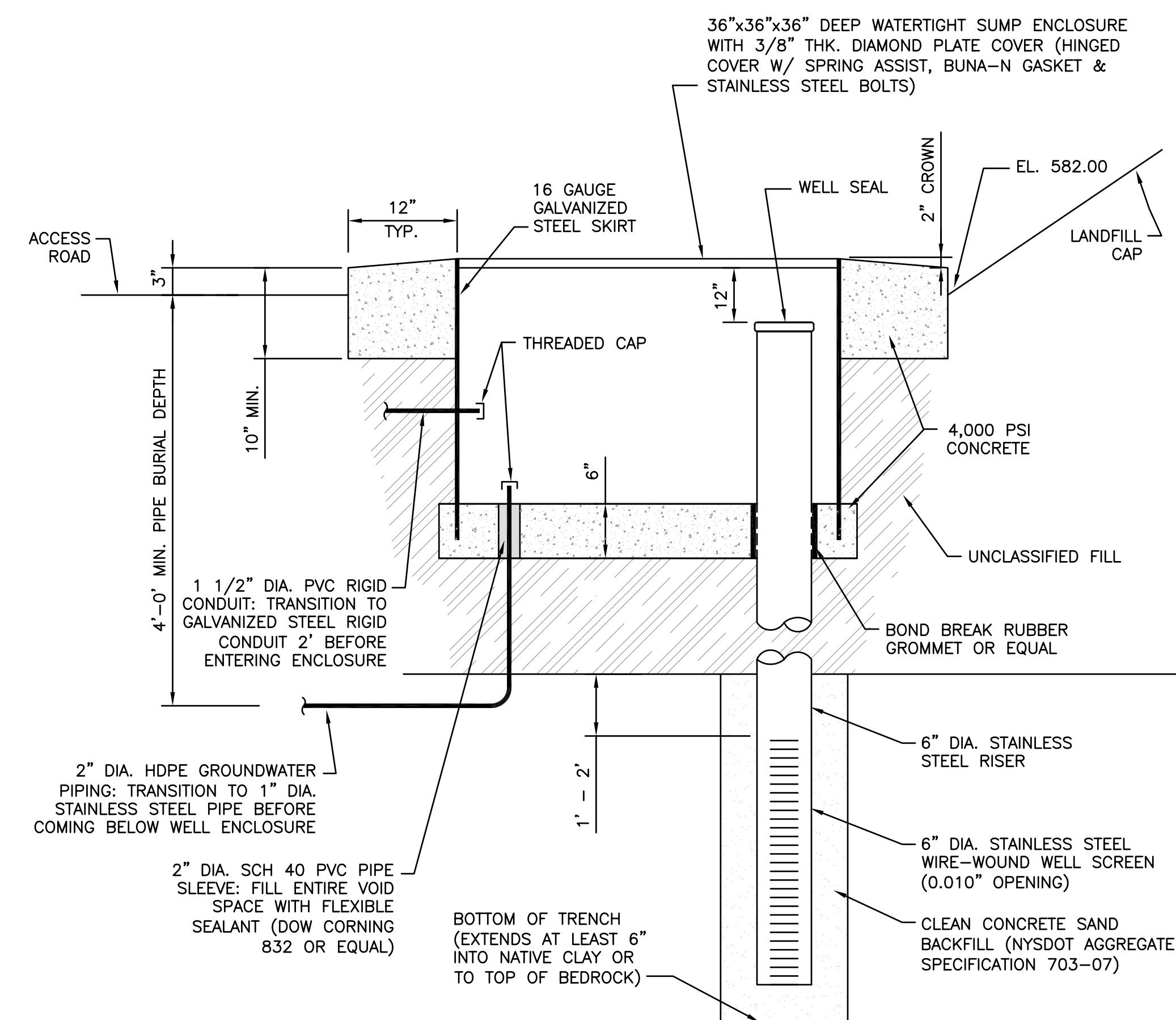
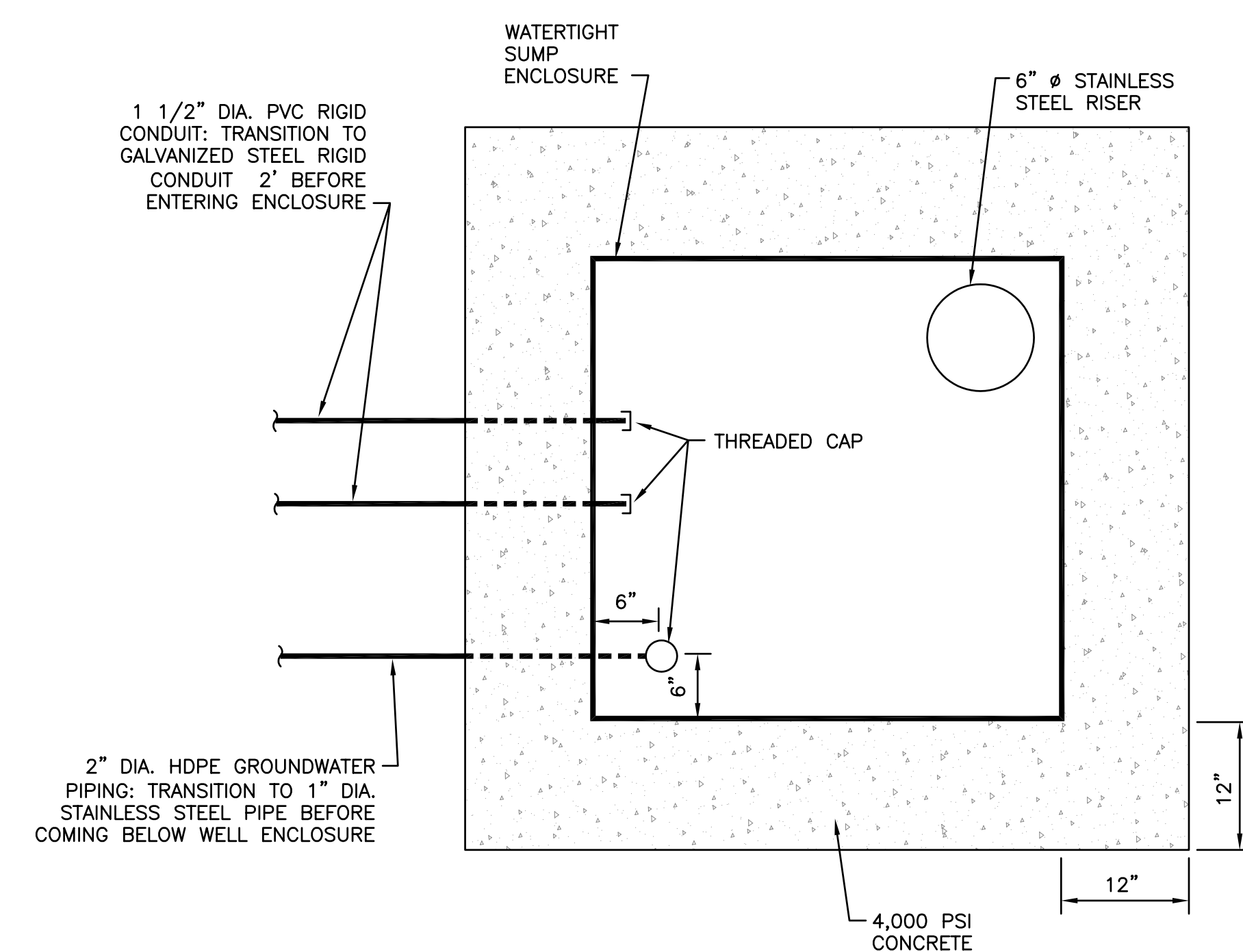
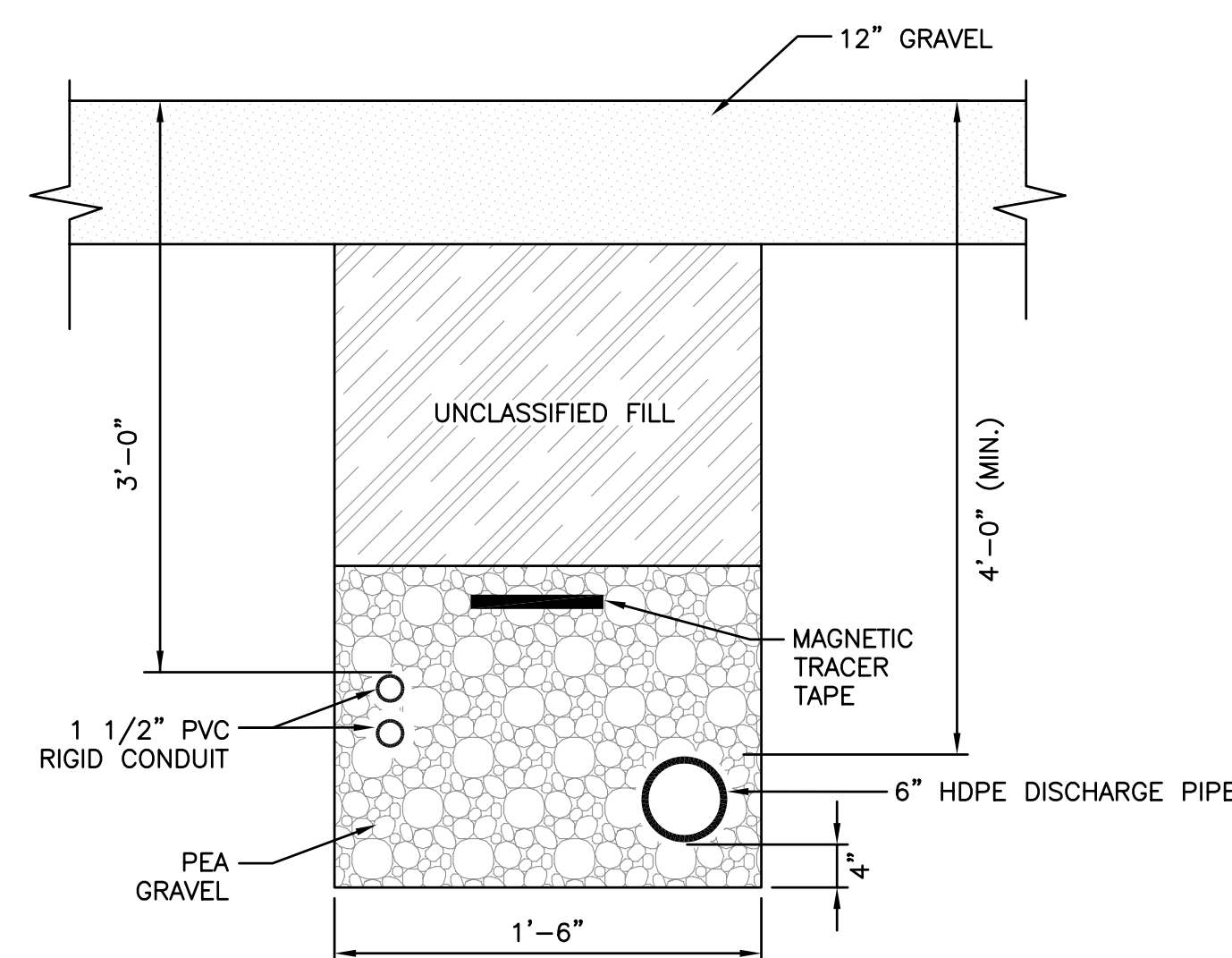
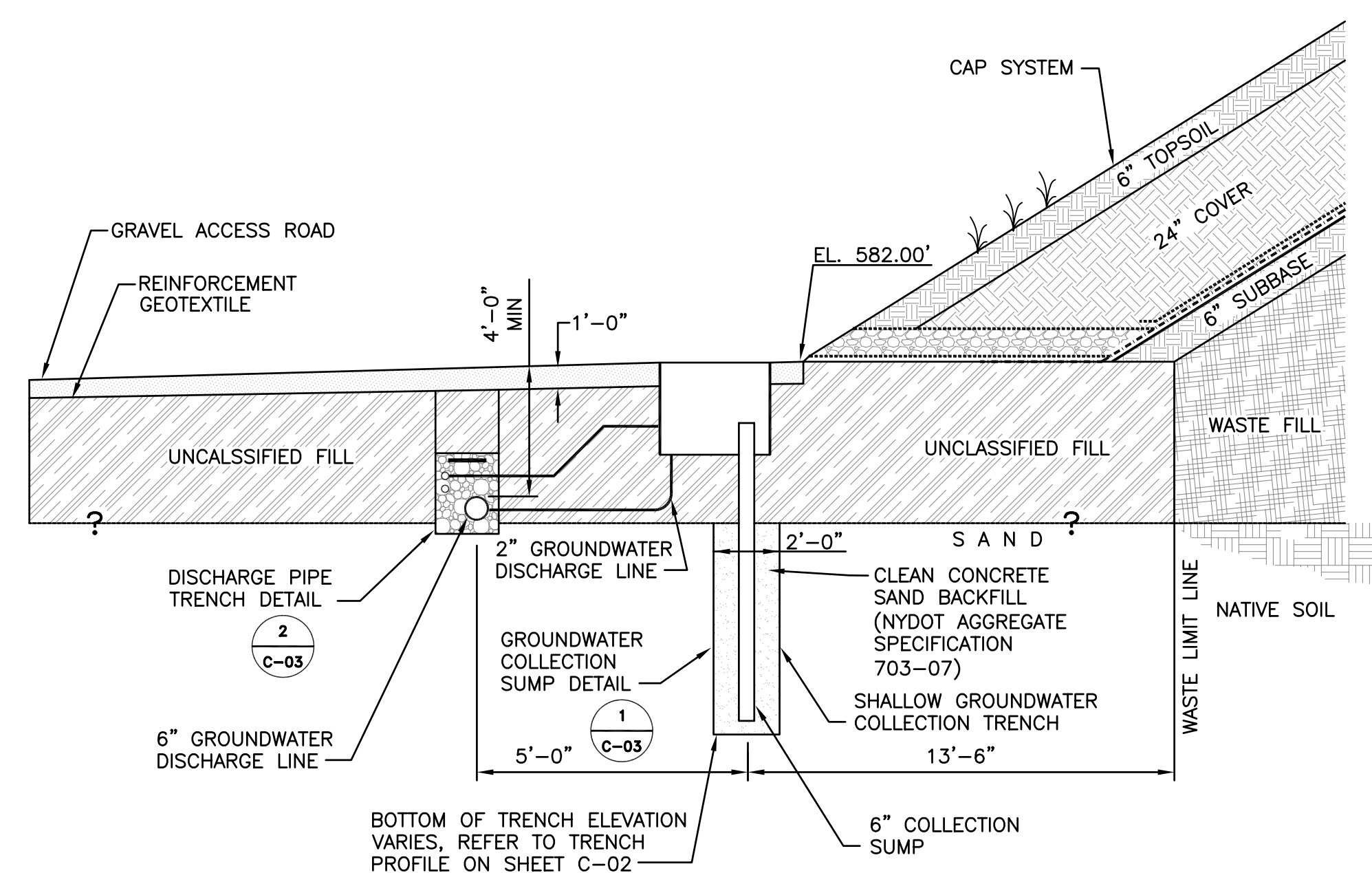
2 11/24/04 REVISED MONITORING WELL LOCATIONS

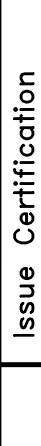

1 10/25/04 REVISED MONITORING WELL LOCATIONS

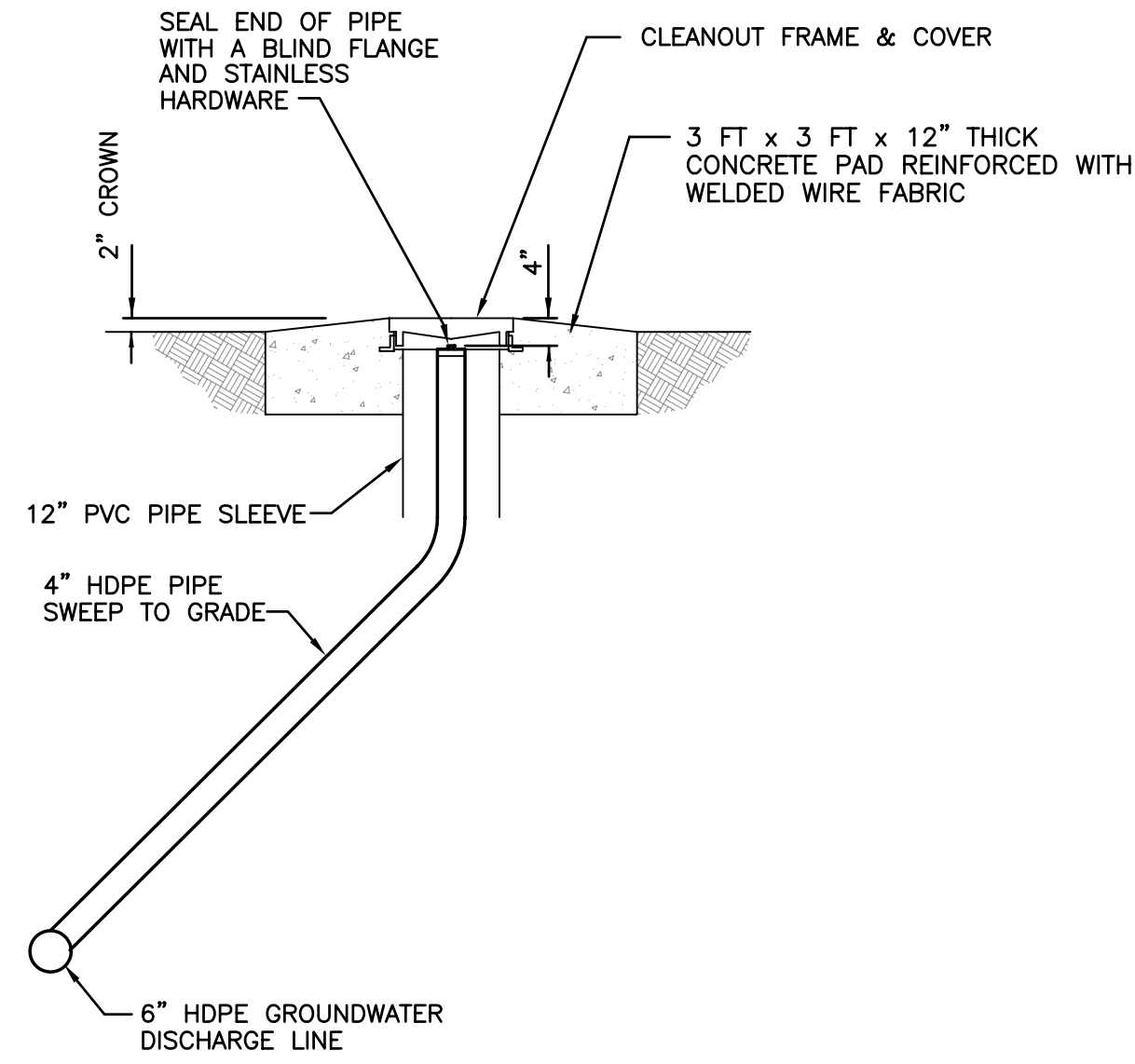
0 10/19/04 NYSECC SUBMITTAL



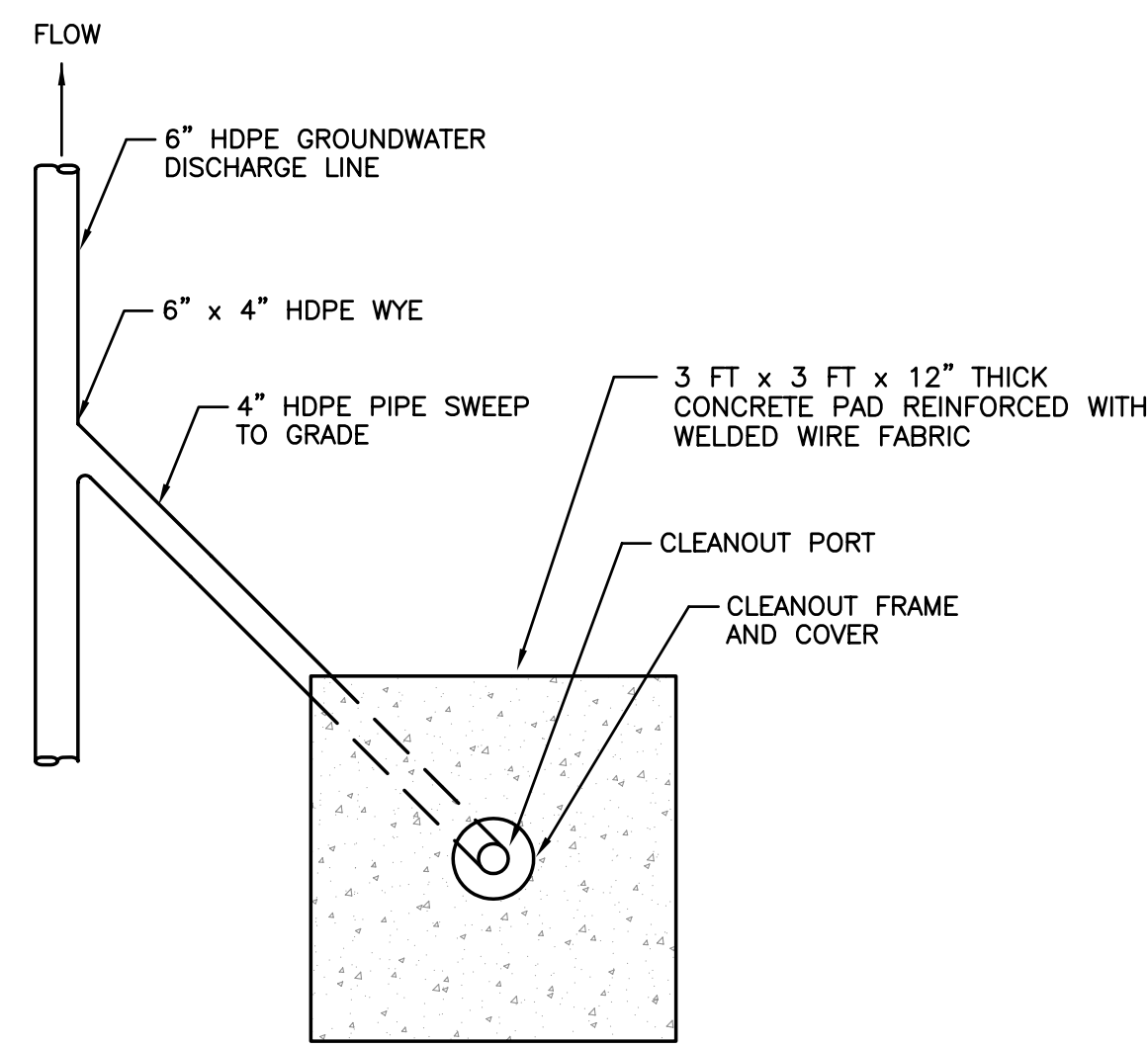
DRAWING NO.	SK-C-33	ALTIFT LANDFILL/RAMCO STEEL SITE REMEDATION CONSTRUCTION	Honeywell	HONEYWELL MORRISTOWN, NEW JERSEY	Issue Certification	Job No. 440788		Ker
						Designed XXX		
REV.	D	GROUNDWATER COLLECTION TRENCH OVERALL SITE PLAN				Drawn MAB	D 10/14/04	Ker
						Checked XXX	C 9/29/04	
						Reviewed XXX	B 8/11/04	Ker
						Approved	A 7/16/04	
						Reg. No. —	Rev Date	By
						Date 8/10/04	Description	



DRAWING NO. SK - C - 38	ALLTFT LANDFILL/RAMCO STEEL SITE REMEDATION CONSTRUCTION	<div> HONEYWELL MORRISTOWN, NEW JERSEY</div>	<div> 480 LAWRENCE HILL DRIVE, SUITE 104 MORRISTOWN, NJ 07960 PHONE: 908.287.2070</div>	Issue Certification		Job No. 440788	Designed By: JMB Drawn By: MAB Checked: XXX Reviewed: XXX Approved Reg. No. — Date 7/15/04	C 10/19/04 B 8/11/04 A 7/15/04 Rev Date 7/15/04	NYSDC SUBMITTAL NYSDC SUBMITTAL ISSUED FOR REVIEW Description	KER KER By

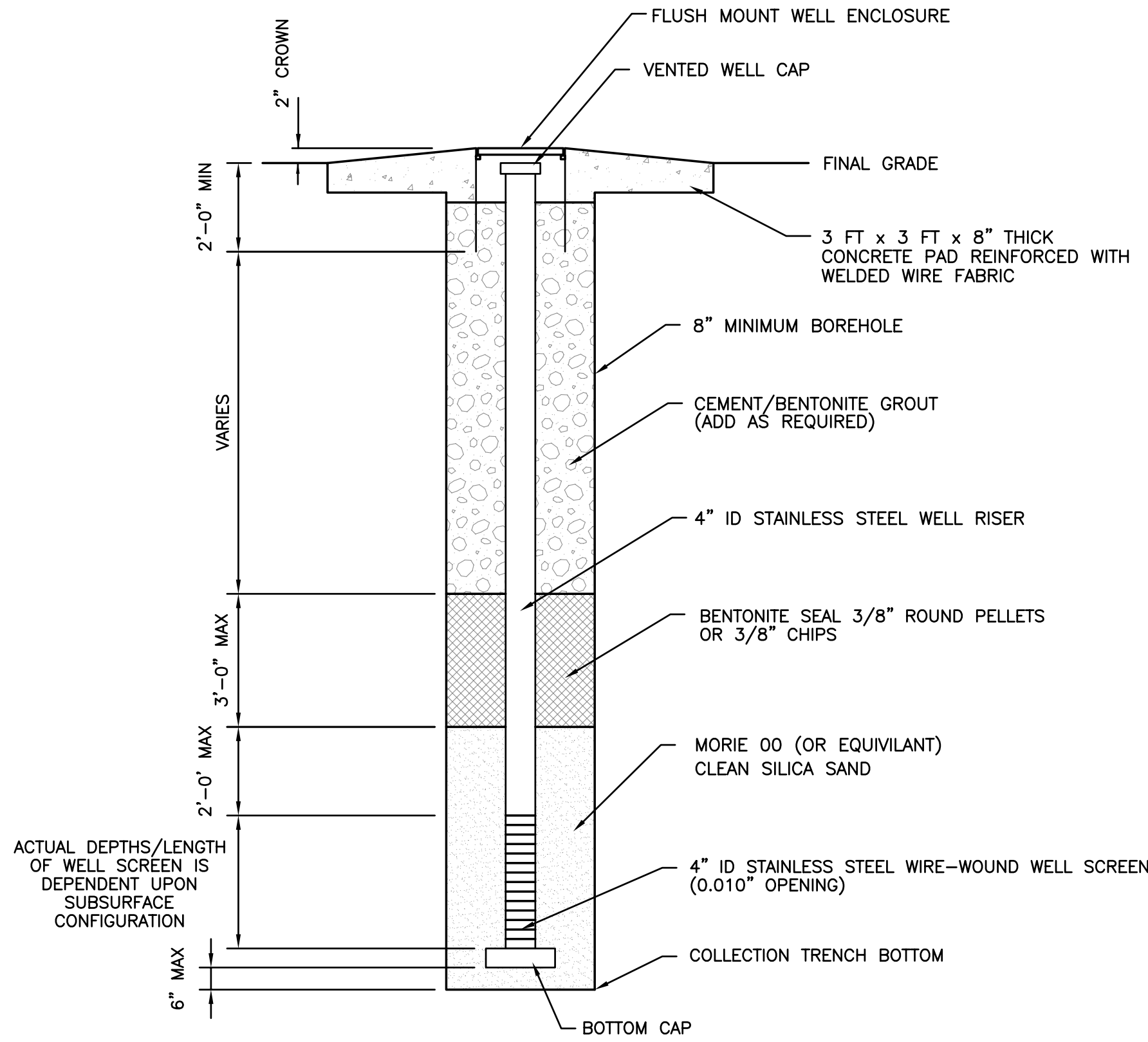


SECTION

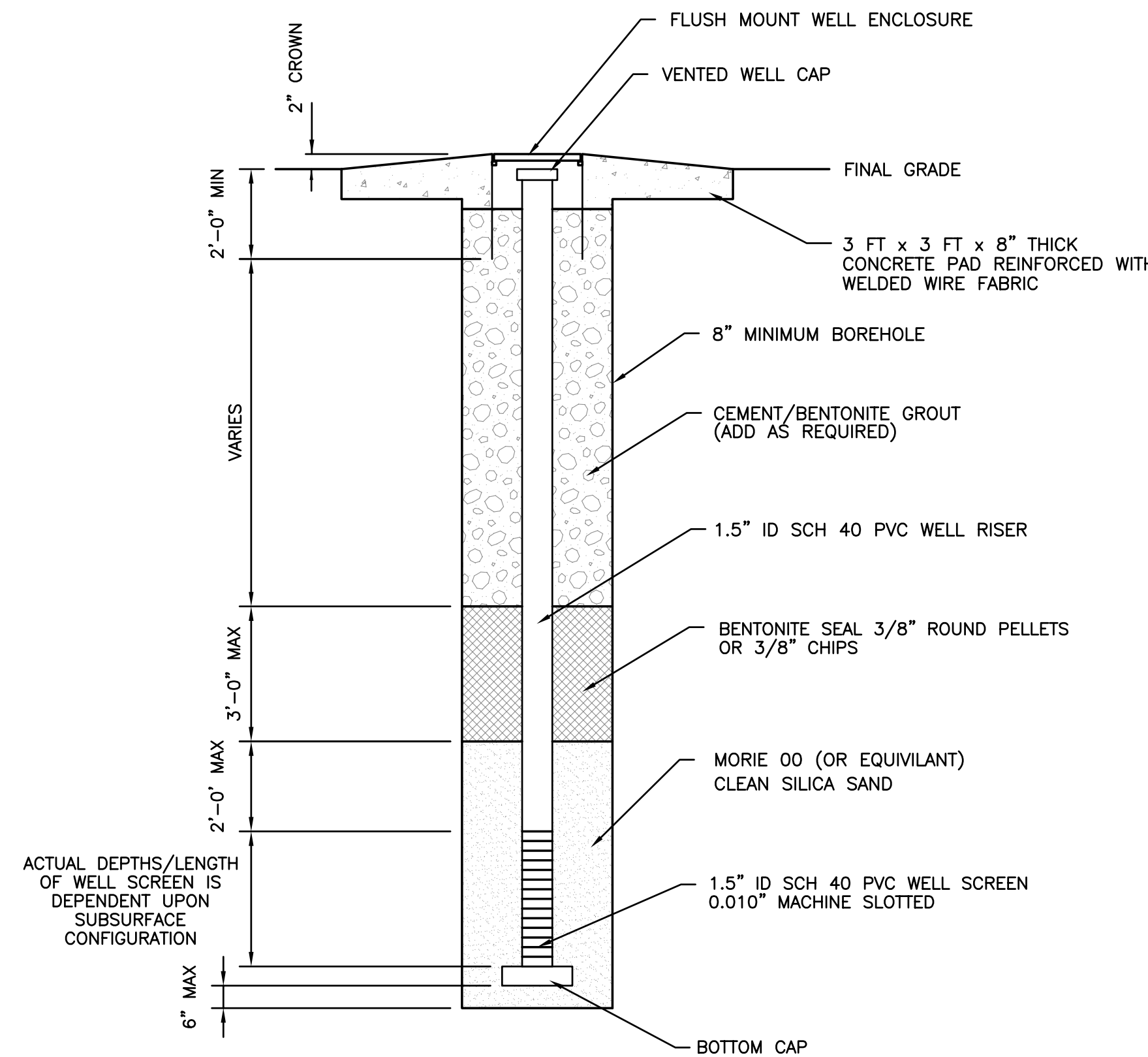


PLAN

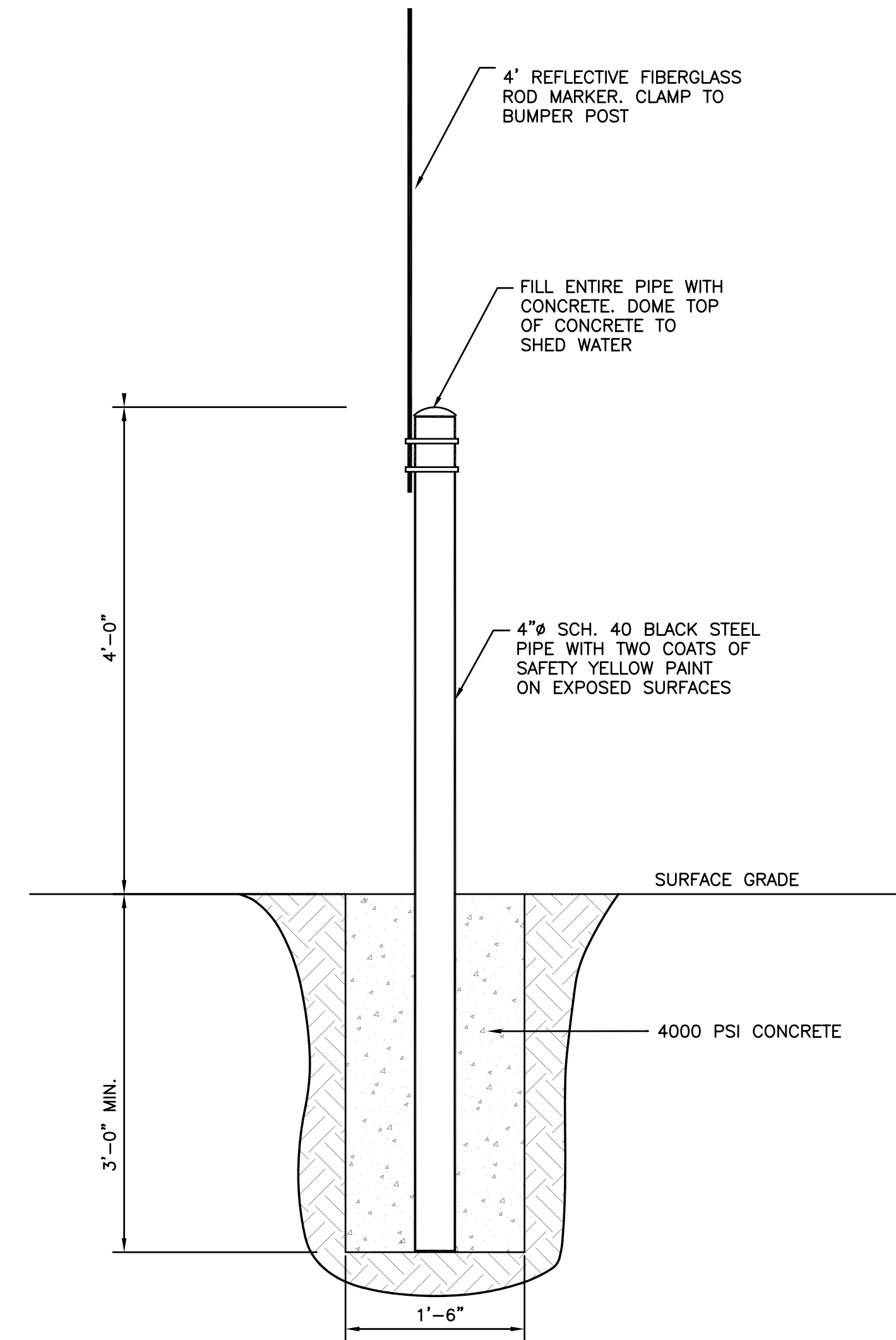
3 TYPICAL DISCHARGE LINE CLEANOUT
C-01 NOT TO SCALE



4 COLLECTION TRENCH PIEZOMETER DETAIL
C-01 NOT TO SCALE
(TYPICAL FOR PIEZOMETERS PZ-1 THROUGH PZ-4
IN THE COLLECTION TRENCH)



5 DOWNGRADIENT PIEZOMETER DETAIL
C-01 NOT TO SCALE
(TYPICAL FOR PIEZOMETERS PZ-5 THROUGH PZ-8
DOWNGRADIENT OF THE COLLECTION TRENCH)



6 BUMPER POST DETAIL
C-01 NOT TO SCALE

ALLTIFT LANDFILL/RAMCO STEEL SITE REMEDIATION CONSTRUCTION	GROUNDWATER COLLECTION TRENCH SECTIONS AND DETAILS	HONEYWELL MORRISTOWN, NEW JERSEY	PARSONS 180 LAWRENCE HILL DRIVE, SUITE 104 PRINCETON, NJ 08540 TEL: 609-771-1000 FAX: 609-771-1001	ISSUE CERTIFICATION						
				Job No. 440788						
				Designed XXX						
				Drawn MAB						
				Checked XXX						
				Reviewed XXX						
				Approved						
				Reg. No. XXX						
				Date 7/15/04						

APPENDIX D PERMITS

**AUTHORIZATION TO DISCHARGE UNDER THE BUFFALO
POLLUTANT DISCHARGE ELIMINATION SYSTEM**

**PERMIT NO. 18-12-BU098
EPA CATEGORY 40 CFR 403**

In accordance with the provisions of the Federal Water Pollution Control Act, as amended, and the Sewer Regulations of the Buffalo Sewer Authority, authorization is hereby granted to:

HONEYWELL INTERNATIONAL, INC.

to discharge wastewater from a facility located at:

**ALLTIFT LANDFILL/RAMCO STEEL REMEDIATION SITES
579 TIFFT STREET
BUFFALO, NEW YORK 14220**

to the Buffalo Municipal Sewer System.

Issuance of this permit is based upon a permit application filed on **June 8, 2018** and analytical data. This permit is granted in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

Effective this 1st day of December, 2018

To Expire the 30th day of November, 2021



General Manager

Signed this 25th day of October, 2018

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS**

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall (see attached map) shall be limited and monitored **semi-annually** by the permittee as specified below.

Sample Point 001	Parameter	Discharge Limitations ⁽¹⁾	Sampling Requirements	
		Daily Max	Period	Type
	pH	5.0 – 12.0 S.U.	1 day	Composite ⁽²⁾
	Total Suspended Solids ⁽⁴⁾	250 mg/L	1 day	Composite ⁽²⁾
	USEPA Test Method 624 ⁽⁷⁾	To be monitored	1 day	Grab ⁽³⁾
	USEPA Test Method 625 ⁽⁷⁾	To be monitored	1 day	Grab ⁽³⁾
	Mercury ⁽⁸⁾	0.0008 mg/L	1 day	Composite ⁽²⁾
	Copper ⁽⁶⁾	7.68 lbs.	1 day	Composite ⁽²⁾
	Zinc ⁽⁶⁾	12 lbs.	1 day	Composite ⁽²⁾
	T. Phosphorus ⁽⁴⁾⁽⁶⁾	15.35 mg/L	1 day	Composite ⁽²⁾
	Total Flow	57,600 gallons ⁽⁵⁾	1 day	Discharge meter reading

Footnotes are explained on page 4.

PART I: SPECIFIC CONDITIONS

B. DISCHARGE MONITORING REPORTING REQUIREMENTS

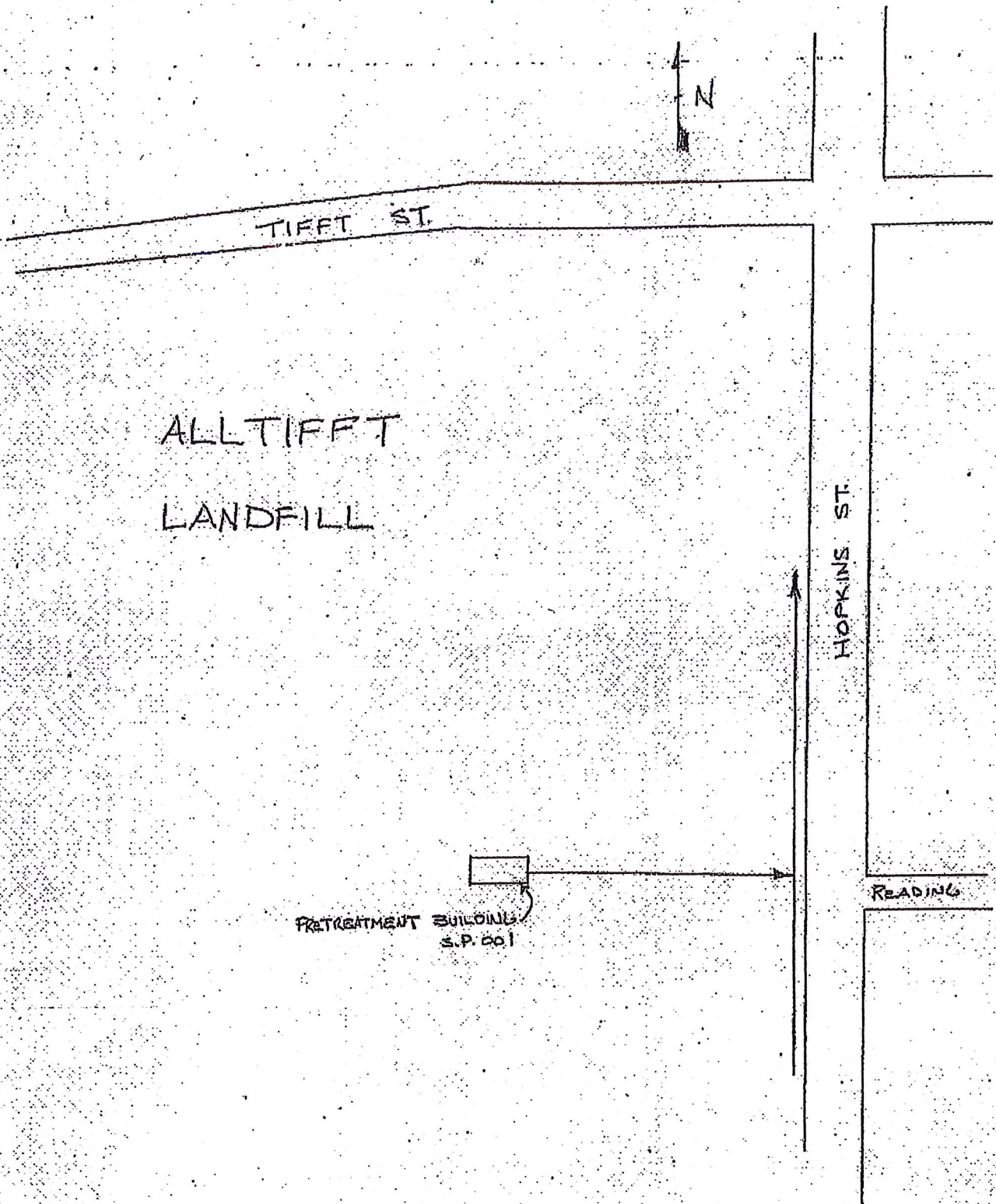
During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported **semi-annually** by the permittee on the days specified below:

Sample Point	Parameter	Reporting Requirements	
		Initial Report	Subsequent Reports
001	All parameters	December 31, 2018	June 30, 2019 December 31, 2019 June 30, 2020 December 31, 2020 June 31, 2021

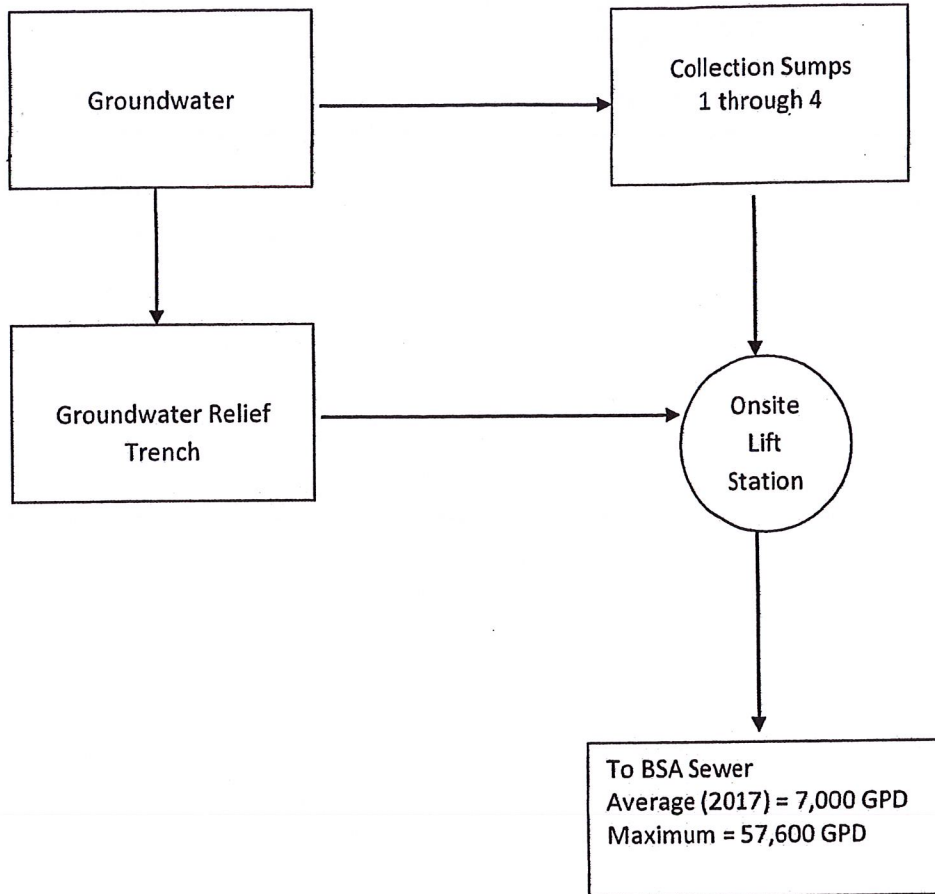
PART I: SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS

1. Mass limits based on an average discharge of 57,600 gpd, based on historical data.
2. Composite samples may be time proportioned.
3. Four grab samples must be collected at equally spaced intervals throughout the sample day. The four (4) grab samples must be composited by a NYSDOH certified laboratory prior to analysis.
4. Surchargeable parameter.
5. Flow is an action level only. If the permittee exceeds this level, the BSA must be notified so that this permit can be modified. Flow meter readings for the previous six months must be submitted with each monitoring report.
6. These parameters are to be monitored and results submitted with the initial monitoring report, due December 31, 2015. If parameters are below detection limit, then monitoring will not be required for those parameters in subsequent monitoring reports. If parameters are detected at the Method Detection Limit (MDL) of the test method or higher, then any compound detected may, at the discretion of the Buffalo Sewer Authority, be specifically limited and incorporated into this permit. For EPA Test Method 608, if parameters are detected at the Practical Quantitation Limit (PQL) of the test method or higher, then any compound detected may, at the discretion of the Buffalo Sewer Authority, be specifically limited and incorporated into this permit.
7. The permittee must report any compound whose concentration is greater than 0.01 mg/L. The permittee is not authorized to discharge any of the parameters evaluated by this test procedure which may cause or contribute to a violation of water quality standards or harm the sewerage system. Any parameter detected may, at the discretion of the BSA, be specifically limited and incorporated into the permit. When submitting self-monitoring reports to the BSA, the laboratory's complete analytical report must also be submitted. A summary page is acceptable; as long as the laboratory's analytical report is also included.
8. This limit is the compliance level for the BSA's Industrial Pretreatment Program approved local limits. When testing for Mercury, EPA Test Method 245 is acceptable. However, the BSA may occasionally request EPA Test Method 1631, Low Level Mercury analysis and EPA Test Method 1669. EPA Test Method 1669 is the required sampling method for EPA Test Method 1631 when it is believed that Mercury may be present in the manufacturing process or analytical results consistently show the presence of Mercury.



Schematic Flow Diagram
Alltiff Landfill, Buffalo, New York



Prepared by/Date: Ryan Belcher 3-27-2018

**BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT
PART II: GENERAL CONDITIONS**

A. MONITORING AND REPORTING

1. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes for the Clean Water Act.

2. Definitions

Definitions of terms contained in this permit are as defined in the Buffalo Sewer Authority Sewer Use Regulations.

3. Discharge Sampling Analysis

All Wastewater discharge samples and analyses and flow measurements shall be representative of the volume and character of the monitored discharge. Methods employed for flow measurements and sample collections and analyses shall conform to the Buffalo Sewer Authority "Sampling Measurement and Analytical Guidelines Sheet".

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of the permit, the permittee shall record the information as required in the "Sampling Measurement and Analytical Guidelines Sheet".

5. Additional Monitoring by Permittee

If the permittee monitors any pollutants at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in 40 CFR Part 136 the results of such monitoring shall be included in the calculation and reporting of values required under Part I, B. Such increased frequency shall also be indicated.

6. Reporting

All reports prepared in accordance with this Permit shall be submitted to:

**Industrial Waste Section
Buffalo Sewer Authority Treatment Plant
90 West Ferry Street
Buffalo, New York 14213**

All self-monitoring reports shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines Sheet". These reporting requirements shall not relieve the permittee of any other reports, which may be required by the N.Y.S.D.E.C. or the U.S.E.P.A.

7. Certification Statement

All self-monitoring reports shall include the following certification statement, signed by the preparer of the 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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the systems, 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 fine and imprisonment for knowing violations".

B. PERMITTEE REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit and with the information contained in the BPDES permit application on which basis this permit is granted. In the event of any facility expansions, production increases, process modifications or the installation, modification or repair of any pretreatment equipment which may result in new, different or increased discharges of pollutants, a new BPDES Permit application must be submitted prior to any change. Following receipt of an amended application, the BSA may modify this permit to specify and limit any pollutants not previously limited. In the event that the proposed change will be covered under an applicable Categorical Standard, a Baseline Monitoring Report must be submitted at least ninety (90) days prior to any discharge.

2. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation shall be retained at this facility for a minimum of three (3) years, or longer if requested by the General Manager.

3. Slug Control Plan

Upon written notification by the BSA that a slug control plan is necessary for the permittee, the plan shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines" sheet. Within 90 days of the BSA notification, the permittee must implement the slug control plan

4. Notification of Slug, Accidental Discharge or Spill

In the event that a slug, accidental discharge or any spill occurs at the facility for which this permit is issued, it is the responsibility of the permittee to immediately notify the B.S.A. Treatment Plant of the quantity and character of such discharge. During normal business hours, Monday – Friday, 7:30 AM - 3:00 PM call 716-851-4664, ext. 5374. After normal business hours call 716-851-4664, ext. 600. For all slug discharges, and when requested by the BSA following an accidental discharge or spill, within five (5) days following all such discharges, the permittee shall submit a report describing the character and duration of the discharge, the cause of the discharge, and measures taken or that will be taken to prevent a recurrence of such discharge.

5. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitation specified in this permit, the permittee or their assigns must verbally notify the Industrial Waste Section at 716-851-4664 ext. 5374 within twenty-four (24) hours of becoming aware of the violation. The permittee shall provide the Industrial Waste Section with the following information, in writing, within five (5) days of becoming aware of such condition:

- a. a description of the discharge and cause of noncompliance and;
- b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the non-complying discharge.

Additionally, the permittee shall repeat the sampling and analysis and submit these results of the report analysis to the Industrial Waste Section within 30 days after becoming aware of the violation.

6. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the Buffalo Sewerage System resulting from noncompliance with any discharge limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

7. Waste Residuals

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters and/or the treatment of intake waters, shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the Buffalo Sewer System.

8. Power Failures

In order to maintain compliance with the discharge limitations and prohibitions of this permit, the permittee shall provide an alternative power source sufficient to operate the wastewater control facilities; or, if such alternative power source is not provided the permittee shall halt, reduce or otherwise control production and/or controlled discharges upon the loss of power to the wastewater control facilities.

9. Treatment Upsets

- a. Any industrial user which experiences an upset in operations that places it in a temporary state of noncompliance, which is not the result of operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation, shall inform the Industrial Waste Section immediately upon becoming aware of the upset. Where such information is given verbally, a written report shall be filed by the user within five (5) days. The report shall contain:
 - (i) A description of the upset, its cause(s) and impact on the discharger's compliance status;
 - (ii) The duration of noncompliance, including exact dates and times of noncompliance, and if the non-compliance is continuing, the time by which compliance is reasonably expected to be restored;
 - (iii) All steps taken or planned to reduce, eliminate, and prevent recurrence of such an upset.
- b. An industrial user which complies with the notification provisions of this Section in a timely manner shall have an affirmative defense to any enforcement action brought by the Industrial Waste Section for any

noncompliance of the limits in this permit, which arises out of violations attributable to and alleged to have occurred during the period of the documented and verified upset.

10. Treatment Bypasses

- a. A bypass of the treatment system is prohibited unless the following conditions are met:
 - (i) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; or
 - (ii) There was no feasible alternative to the bypass, including the use of auxiliary treatment or retention of the wastewater; and
 - (iii) The industrial user properly notified the Industrial Waste Section as described in paragraph b. below.
- b. Industrial users must provide immediate notice to the Industrial Waste Section upon discovery of an unanticipated bypass. If necessary, the Industrial Waste Section may require the industrial user to submit a written report explaining the cause(s), nature, and duration of the bypass, and the steps being taken to prevent its recurrence.
- c. An industrial user may allow a bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it is for essential maintenance to ensure efficient operation of the treatment system. Industrial users anticipating a bypass must submit notice to the Industrial Waste Section at least ten (10) days in advance. The Industrial Waste Section may only approve the anticipated bypass if the circumstances satisfy those set forth in paragraph a. above.

C. PERMITTEE RESPONSIBILITIES

1. Permit Availability

The originally signed permit must be available upon request at all times for review at the address stated on the first page of this permit.

2. Inspections

The permittee shall allow the General Manager of the Buffalo Sewer Authority and/or his authorized representatives, upon the presentation of credentials and during normal working hours or at any other reasonable times, to have access to and copy any records required in this permit; and to sample any discharge of pollutants.

3. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities for which this permit has been issued the permit shall become null and void. The succeeding owner shall submit a completed Buffalo Sewer Authority permit application prior to discharge to the sewer system.

D. PERMITTEE LIABILITIES

1. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to the following:

- a. Violation of any terms or conditions of this permit,
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts,
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

2. Imminent Danger

In the event there exists an imminent danger to health or property, the permitter reserves the right to take immediate action to halt the permitted discharge to the sewerage works.

3. Civil and Criminal Liability

Nothing in this permit shall relieve the permittee from any requirements, liabilities, or penalties under provisions of the "Sewer Regulations of the Buffalo Sewer Authority" or any Federal, State and/or local laws or regulations.

E. NATIONAL PRETREATMENT STANDARDS

If a pretreatment standard or prohibition (including any Schedule of Compliance specified in such pretreatment standard or prohibition) is established under Section 307 (b) of the Act for a pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with such pretreatment standard or prohibition.

F. PLANT CLOSURE

In the event of plant closure, the permittee is required to notify the Industrial Waste Section in writing as soon as an anticipated closure date is determined, but in no case later than five days of the actual closure.

G. CONFIDENTIALITY

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Buffalo Sewer Authority. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

H. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

**DEPARTMENT OF THE ARMY**

BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF:

March 24, 2004

Regulatory Branch

SUBJECT: Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002

Mr. John K. Mojka
Honeywell, Inc.
101 Columbia Road
Morristown, New Jersey 07962

Dear Mr. Mojka:

This pertains to your application for a Department of the Army permit to discharge fill into about 8.4 acres of jurisdictional wetland in connection with the remediation of the Alltift Landfill and Ramco Steel sites. The project site is located in the City of Buffalo, Erie County, New York.

I have evaluated the impacts associated with your proposal, and have concluded that they are authorized by the enclosed Nationwide Permit provided that the attached conditions are satisfied.

Verification of the applicability of this Nationwide Permit is valid for two years from the date of affirmation unless the Nationwide Permit is modified, suspended or revoked. This verification will remain valid for two years if during this two year period the Nationwide Permit is reissued without modification or your activity complies with any subsequent permit modification. Please note that if you commence or are under contract to commence this activity in reliance of your Permit prior to the date this Nationwide Permit is suspended or revoked, or is modified such that your activity no longer complies with the terms and conditions, you have twelve months from the date of permit modification, expiration, or revocation to complete the activity under the present terms and conditions of this Nationwide Permit, unless this Nationwide Permit has been subject to the provisions of discretionary authority.

It is your responsibility to remain informed of changes to the Nationwide Permit program. A public notice announcing any

Regulatory Branch

SUBJECT: Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002

changes will be issued when they occur. Finally, note that if your activity is not undertaken within the defined period or the project specifications have changed, you must immediately notify this office to determine the need for further approval or reverification.

In addition to the general conditions attached to the Nationwide Permit, your attention is directed to the following Special Conditions which are also appended at the end of the Nationwide Permit General Conditions:

1. That you are responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of terms and conditions of the authorization and that a copy of the permit document is at the project site throughout the period the work is underway.
2. As mitigation to compensate for unavoidable and permanent impacts to 8.4 acres of wetland, the permittee shall create, at a minimum, 11.2 acres of wetland on-site as shown on the attached maps and drawings which, are incorporated into and made part of this permit.
3. A baseline report shall be forwarded to this office by December 31 in the year of completion of all mitigation construction activities, or by an approved extension. For purposes of this special condition, "completion" means all activities associated with site grading and seeding and/or planting. The baseline report must include the following:
 - a. An "as-built" topographic survey of the mitigation area at 0.5 foot contour intervals.
 - b. Photographs from fixed locations with a photolocation map.
 - c. A list of plants introduced through seeding and/or planting.
 - d. Water depth and date of measurement from representative locations within the mitigation area. The sample points will be fixed locations and shall be plotted on a map.
 - e. A list of any modifications that were made from the original mitigation plan.

Regulatory Branch

SUBJECT: Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002

4. Annual monitoring and/or compliance reports for the mitigation project must be submitted to this office for the first five years following completion of the mitigation construction based upon data collected during each monitored year between June and October. The first annual report is due by December 31 in the year following completion of mitigation construction, or by an approved extension date. Subsequent reports must be submitted by December 31 of the subsequent four years, or by an approved extension date. This requirement may be waived for years 3 and 4 if, after the first two growing seasons, the mitigation is shown to meet the requirements for successful mitigation. These reports must include:

- a. An "as-built" topographic survey of the mitigation area at 0.5 foot contour intervals, including a delineated boundary of the wetland and wetland acreage determination.
- b. Photographs from fixed locations with a photolocation map.
- c. A plant series list which give USFWS Wetland Indicator Status and strata. Dominant plants should be highlighted and the percent cover is to be noted. Plants introduced through seeding or planting shall also be indicated. The date of field inspection is to be noted.
- d. Water depth and date of measurement from representative locations within the mitigation area during the growing season. The sample points will be fixed locations and shall be plotted on a map.
- e. Fish and wildlife observations on the mitigation site. f. A summary statement regarding the perceived success of the wetland creation project. The report will evaluate the goals as set forth in the permit or mitigation and monitoring plan as well as current wetland functions. These reports must also address any potential problem areas and include suggestions and timetable for correction if it is anticipated that projected goals may not be met.

5. The mitigation area shall be vegetated with a minimum of 80% aerial cover of hydrophytic vegetation, with no more than 50% of one species.

6. At least 50% of the dominant vegetation shall have a wetland

Regulatory Branch

SUBJECT: Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002

indicator status of FACW or wetter, with at least one OBL species.

7. No more than 5% aerial cover shall be vegetated with the following species: Lythrum salicaria, Phalaris arundinacea, Phragmites australis, Rhamnus spp., Typha angustifolia and Typha x glauca. Corrective measures shall be implemented to preclude the growth of the above listed species throughout the 5 year monitoring period should they appear within the wetland mitigation areas.

8. The permittee shall assume all liability for accomplishing corrective work should the District Engineer determine the compensatory mitigation to be unsuccessful. In the event that the mitigation area does not meet the criteria set forth in this permit, the permittee may be required to undertake additional mitigative measures. These actions may include, but are not limited to corrective actions on-site including regrading or replanting.

9. There shall be no removal, destruction, or cutting of vegetation, spraying with herbicides, grazing of domestic animals, or disturbance or manipulation of the mitigation area without first obtaining Department of the Army authorization. Control of nuisance vegetation, or any other manipulation within the mitigation areas, shall only occur after Corps of Engineers concurrence that such management practices are necessary to ensure the long-term success of the mitigation program.

10. At the request of an authorized representative of the Buffalo District, U.S. Army Corps of Engineers, the permittee shall allow access to the project site and the mitigation parcel to determine compliance with the conditions of this permit.

During our review we considered all applicable Federal requirements as well as state Water Quality Certification (WQC) conditions. We have made every effort to ensure that your project complies with these requirements. However, we have neither the resources nor the statutory authority to conclusively determine whether your project complies with ALL New York State Water Quality Certification conditions. In this regard, I strongly suggest that you closely review the WQC conditions attached at the end of this document. If you are certain that you will remain in compliance with ALL conditions attached to

Regulatory Branch

SUBJECT: Application No. 98-976-0162(0), Nationwide Permit No. (38) as Published in the Federal Register, Volume 67, No. 10, on Tuesday January 15, 2002

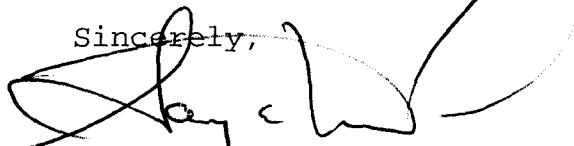
this Permit no further coordination is required. However, if you have any doubt about your ability to comply with the state WQC conditions you must resolve those issues with the appropriate DEC Regional office before you commence work. If the state determines that you need to obtain a project specific WQC you should forward to this office a copy of their final decision at the conclusion of the process. Your initiation of work as authorized by the enclosed Nationwide Permit acknowledges your acceptance of the general and special conditions contained therein. Direct your WQC inquiries to:

Mr. Steve Doleski
New York State Department of Environmental Conservation
Region 9 - DEP
270 Michigan Avenue
Buffalo, New York 14203-2999

Finally, this affirmation is limited to the attached Nationwide Permit and associated Water Quality Certification, and does not obviate the need to obtain any other project specific Federal, state, or local authorization. Specifically, you may need to obtain Article 15 (Protection of Water), Article 24 (Freshwater Wetland), and/or Article 34 (Coastal Erosion Management) authorization from the New York State Department of Environmental Conservation.

Questions pertaining to this matter should be directed to me at (716) 879-4322, by writing to the following address: U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, New York 14207, or by e-mail at: gary.e.mcdannell@usace.army.mil

Sincerely,

A handwritten signature in black ink, appearing to read 'Gary E. McDannell', written over a horizontal line.

Gary E. McDannell
Biologist

Enclosures

COMPLIANCE CERTIFICATION

General Condition 14 of the Nationwide Permit you were affirmed requires that:

"Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b) A statement that any required mitigation was completed in accordance with the permit conditions; c) The signature of the permittee certifying the completion of the work and mitigation."

APPLICANT:
Honeywell, Inc.
101 Columbia Road
Morristown, NJ 07962

POINT of CONTACT:
Mr. John K. Mojka
Honeywell, Inc.
101 Columbia Road
Morristown, New Jersey 07962

File Number: 98-976-0162(0)
File Closed: 03/25/2004

Upon completion of the activity authorized by this permit, and any mitigation required by the Permit, excepting any future mitigation monitoring requirements, sign this certification and return it to the address listed on the reverse side of this form within **30-days** of project completion.

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

Honeywell, Inc.

Date

Project Location: located at Alltift Landfill, the City of Buffalo, Erie County, New York

Project Description:

Authorized Impacts (Waters of U.S. Impacted by Project): 8.4 Acres

Waterway and/or Project Setting: isolated wetland

Fold Here

John K. Mojka
Honeywell, Inc.
101 Columbia Road
Morristown, New Jersey 07962

Place
Stamp
Here

Gary E. McDannell
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Fold Here

ACTIVITIES AUTHORIZED BY NATIONWIDE PERMIT

38. Cleanup of Hazardous and Toxic Waste. Specific activities required to effect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority provided the permittee notifies the District Engineer in accordance with the "Notification" General Condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. Court ordered remedial action plans or related settlements are also authorized by this NWP. This NWP does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste. Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the CWA or Section 10 of the Rivers and Harbors Act. (Sections 10 and 404)

Water Quality Certification

Pursuant to Section 401 of the Clean Water Act and 6 NYCRR Part 608, Section 608.9, the New York State Department of Environmental Conservation hereby certifies that activities authorized by this Permit, undertaken in accordance with all of the special and general conditions listed below, will comply with the applicable provisions of the Clean Water Act and applicable New York State water quality standards. Those NWPs with no special Water Quality Certification (WQC) conditions remain subject to general WQC conditions unless otherwise indicated (Reference I below).

Special Conditions: none

PERMIT CONDITIONS

C. NATIONWIDE PERMIT GENERAL CONDITIONS

The following General Conditions must be followed in order for any authorization by an NWP to be valid:

1. **Navigation.** No activity may cause more than a minimal adverse effect on navigation.
2. **Proper Maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
4. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
5. **Equipment.** Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.
6. **Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its Section 401 Water Quality Certification and Coastal Zone Management Act consistency determination.
7. **Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).
8. **Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. **Water Quality.**
 - (a) In certain states and tribal lands an individual 401 Water Quality Certification must be obtained or waived (See 33 CFR 330.4(c)).
 - (b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the state or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that minimizes degradation of the downstream aquatic system, including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs). This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.
10. **Coastal Zone Management.** In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see 33 CFR 330.4(d)).
11. **Endangered Species.**
 - (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of

the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS the District Engineer may add species-specific regional endangered species conditions to the NWP.

- (b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at <http://www.fws.gov/r9endspp/endspp.html> and http://www.nmfs.noaa.gov/prot_res/overview/es.html respectively.

12. **Historic Properties.** No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

13. **Notification.**

- (a) Timing; where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the notification is complete within 30 days of the date of receipt and can request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the notification is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:
- (1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or
 - (2) If notified in writing by the District or Division Engineer that an Individual Permit is required; or
 - (3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).
- (b) Contents of Notification: The notification must be in writing and include the following information:
- (1) Name, address and telephone numbers of the prospective permittee;
 - (2) Location of the proposed project;
 - (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);
 - (4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

(5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed;

(6) For NWP 14 (Linear Transportation Projects), the PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

(7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

(8) For NWP 27 (Stream and Wetland Restoration Activities), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee;

(9) For NWP 29 (Single-Family Housing), the PCN must also include:

- (i) Any past use of this NWP by the Individual Permittee and/or the permittee's spouse;
- (ii) A statement that the single-family housing activity is for a personal residence of the permittee;
- (iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 1/4-acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 1/4-acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));
- (iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(10) For NWP 31 (Maintenance of Existing Flood Control Facilities), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

- (i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided the approved flood control protection or drainage is not increased;
- (ii) A delineation of any affected special aquatic sites, including wetlands; and,
- (iii) Location of the dredged material disposal site;

(11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

(12) For NWPs 39, 43 and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

(13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

(14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal

streams, the District Engineer waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;

- (15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;
 - (16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);
 - (17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and
 - (18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.
- (c) **Form of Notification:** The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.
 - (d) **District Engineer's Decision:** In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the

minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

- (e) **Agency Coordination:** The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. For activities requiring notification to the District Engineer that result in the loss of greater than 1/2-acre of waters of the US, the District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.
 - (f) **Wetland Delineations:** Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than 1/4-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate
- 14. **Compliance Certification.** Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:
 - (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;
 - (b) A statement that any required mitigation was completed in accordance with the permit conditions; and
 - (c) The signature of the permittee certifying the completion of the work and mitigation.
 - 15. **Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).
 - 16. **Water Supply Intakes.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.
 - 17. **Shellfish Beds.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.
 - 18. **Suitable Material.** No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may consist of

unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).

19. **Mitigation.** The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.
 - (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).
 - (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
 - (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.
 - (d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWP. For example, 1/4-acre of wetlands cannot be created to change a 3/4-acre loss of wetlands to a 1/2-acre loss associated with NWP 39 verification. However, 1/2-acre of created wetlands can be used to reduce the impacts of a 1/2-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.
 - (e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.
 - (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.
 - (g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.
 - (h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.
20. **Spawning Areas.** Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.
21. **Management of Water Flows.** To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow. This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.
22. **Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.
23. **Waterfowl Breeding Areas.** Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
24. **Removal of Temporary Fills.** Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.
25. **Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.
 - (a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.
 - (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.
26. **Fills Within 100-Year Floodplains.** For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.
 - (a) Discharges in Floodplain; Below Headwaters. Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e. five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.
 - (b) Discharges in Floodway; Above Headwaters. Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.
 - (c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.

27. **Construction Period.** For activities that have not been verified by the Corps and the project was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project). For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps. For projects that have been verified by the Corps, an extension of a Corps approved completion date may be requested. This request must be submitted at least one month before the previously approved completion date.

D. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

E. Definitions

Best Management Practices (BMPs): BMPs are policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural. A BMP policy may affect the limits on a development.

Compensatory Mitigation: For purposes of Section 10/404, compensatory mitigation is the restoration, creation, enhancement, or in exceptional circumstances, preservation of wetlands and/or other aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Creation: The establishment of a wetland or other aquatic resource where one did not formerly exist.

Enhancement: Activities conducted in existing wetlands or other aquatic resources that increase one or more aquatic functions.

Ephemeral Stream: An ephemeral stream has flowing water only during and for a short duration after precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Farm Tract: A unit of contiguous land under one ownership that is operated as a farm or part of a farm.

Flood Fringe: That portion of the 100-year floodplain outside of the floodway (often referred to as "floodway fringe").

Floodway: The area regulated by Federal, state, or local requirements to provide for the discharge of the base flood so the cumulative increase in water surface elevation is no more than a designated amount (not to exceed one foot as set by the National Flood Insurance Program) within the 100-year floodplain.

Independent Utility: A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Intermittent Stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of Waters of the US: Waters of the US that include the filled area and other waters that are permanently adversely affected by flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent

above-grade, at-grade, or below-grade fills that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the US is the threshold measurement of the impact to existing waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and values. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Impacts to ephemeral streams are not included in the linear foot measurement of loss of stream bed for the purpose of determining compliance with the linear foot limits of NWPs 39, 40, 42, and 43. Waters of the US temporarily filled, flooded, excavated, or drained, but restored to preconstruction contours and elevations after construction, are not included in the measurement of loss of waters of the US.

Non-tidal Wetland: A non-tidal wetland is a wetland (i.e., a water of the US) that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open Water: An area that, during a year with normal patterns of precipitation, has standing or flowing water for sufficient duration to establish an ordinary high water mark. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. The term "open water" includes rivers, streams, lakes, and ponds. For the purposes of the NWPs, this term does not include ephemeral waters.

Perennial Stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Permanent Above-grade Fill: A discharge of dredged or fill material into waters of the US, including wetlands, that results in a substantial increase in ground elevation and permanently converts part or all of the waterbody to dry land. Structural fills authorized by NWPs 3, 25, 36, etc. are not included.

Preservation: The protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection and/or enhancement of the overall aquatic ecosystem.

Restoration: Re-establishment of wetland and/or other aquatic resource characteristics and function(s) at a site where they have ceased to exist, or exist in a substantially degraded state.

Riffle and Pool Complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Single and Complete Project: The term single and complete project is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers (see definition of independent utility). For linear projects, the single and complete project (i.e., a single and complete crossing) will apply to each crossing of a separate water of the US (i.e., a single waterbody) at that location. An exception is for linear projects crossing a single waterbody several times at separate and distant locations: each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies.

Stormwater Management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater Management Facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and BMPs, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances

and other pollutants) of stormwater runoff.

Stream Bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream Channelization: The manipulation of a stream channel to increase the rate of water flow through the stream channel. Manipulation may include deepening, widening, straightening, armoring, or other activities that change the stream cross-section or other aspects of stream channel geometry to increase the rate of water flow through the stream channel. A channelized stream remains a water of the US, despite the modifications to increase the rate of water flow.

Tidal Wetland: A tidal wetland is a wetland (i.e., water of the US) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line (i.e., spring high tide line) and are inundated by tidal waters two times per lunar month, during spring high tides.

Vegetated Buffer: A vegetated upland or wetland area next to rivers, streams, lakes, or other open waters which separates the open water from developed areas, including agricultural land. Vegetated buffers provide a variety of aquatic habitat functions and values (e.g., aquatic habitat for fish and other aquatic organisms, moderation of water temperature changes, and detritus for aquatic food webs) and help improve or maintain local water quality. A vegetated buffer can be established by maintaining an existing vegetated area or planting native trees, shrubs, and herbaceous plants on land next to open-waters. Mowed lawns are not considered vegetated buffers because they provide little or no aquatic habitat functions and values. The establishment and maintenance of vegetated buffers is a method of compensatory mitigation that can be used in conjunction with the restoration, creation, enhancement, or preservation of aquatic habitats to ensure that activities authorized by NWP's result in minimal adverse effects to the aquatic environment. (See General Condition 19.)

Vegetated Shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: A waterbody is any area that in a normal year has water flowing or standing above ground to the extent that evidence of an ordinary high water mark is established. Wetlands contiguous to the waterbody are considered part of the waterbody.

New York State Regional General Conditions

F. Conditions Specific to Nationwide Permits 39 and 42:

The prospective permittee must notify the District Engineer in accordance with the Notification general condition for any discharges subject to Nationwide Permits 39 and 42, into the following waters of the United States:

Cayuga County

- Bear Swamp, Town of Sempronius
- Montezuma Wetlands, Towns of Conquest and Montezuma

Chautauqua County

- Alder Bottom Swamp, Towns of Sherman and Clymer

Cortland County

- Beaver Brook fens, Cortland marl ponds and Chicago Bog, Town of Cortlandville

Jefferson County

- Adams Swamp, Town of Adams
- Johnny Cake Road Sinkholes, Town of Cape Vincent

Lewis County

- Blue Swamp, Town of Croghan
- Bonaparte Swamp, Town of Diana

- Carley Swamp, Town of Diana

Madison County

- Fiddler's Green, Town of Eaton
- Nelson Swamp, Towns of Cazenovia and Nelson

Monroe County

- Thousand Acre Swamp, Town of Penfield

Oneida County

- Rome Sand Plains wetlands, City of Rome

Ontario County

- Honeoye Inlet wetlands, Towns of Canadice and Richmond

Oswego County

- Regan's Silver Lake (aka Mud Pond Fen), Town of Oswego
- North and South Pond and adjacent fens, Tug Hill Plateau, Town of Amboy
- Boylston Tamarack Swamp, Town of Boylston
- Fox Brook Swamp, Towns of Orwell and Redfield
- Big Bay Swamp and Toad Harbor Swamp, Towns of Constantia, and West

Monroe

Seneca County

- Junius Ponds, Town of Junius

Tompkins County

- Fall Creek and Beaver Brook Fens, Towns of Dryden and Groton

Wayne County

- Zurich Bog, Town of Arcadia

Wyoming County

- Java Lake wetlands and Younger Road fens, Towns of Java and Arcade

G. Generally-Applicable Conditions apply to all Nationwide Permits.

1. A PCN to Buffalo District is required for any in-water work or discharges of dredged or fill material in the following: Bergen Swamp and the western edge of Seneca Lake (Glenora Cliff Area). The Buffalo District will provide the U.S. Fish and Wildlife Service with a five (5) day review period in these areas to comment on effects on Federally listed threatened and endangered species. Permittees shall not commence work in these areas until notified by the District Engineer.

2. Compensatory Mitigation Compliance Report: For approved mitigation proposals, the permittee must submit evidence of the following listed actions to the Buffalo District Corps of Engineers when the mitigation has been completed.

- Purchase of credits from a Corps-approved mitigation bank;
- Acknowledgment of transfer of funds for In Lieu Fee Arrangements;
- Recording of deed restrictive covenants;
- Execution of conservation easements.

The permittee must submit such evidence before commencement of the authorized activity or within 60 days of issuance of the authorization letter by the Buffalo District Corps of Engineers, whichever is later. This reporting requirement does not waive or supersede the reporting requirements set forth in Nationwide General Permit General Condition No. 14.

3. Construction Best Management Practices (BMP's): Unless specifically approved otherwise, following review of a PCN, the following BMP's must be implemented to the maximum degree practicable, to minimize erosion, migration of sediments, and adverse environmental impacts:

- Mulch, hay bales, silt fences, or other means must be properly employed to minimize erosion and migration of sediments during construction. Temporary measures must be removed upon completion.
- Construction access shall be by means that avoid or minimize impacts to

aquatic sites (e.g. upland access, floating barges, mats, etc.).

c. All excess excavated material remaining on site must be properly contained and permanently stabilized to prevent erosion.

d. Upon project completion, impacted land surfaces must be permanently stabilized to prevent erosion.

e. Upon project completion, impacted aquatic sites must be restored to their original contours and conditions.

f. All return flow shall not result in an increase in turbidity in the receiving water body that will cause a substantial visible contrast to natural conditions.

g. No in-stream work shall occur during predicted periods of high flow.

4. No Nationwide Permit may be used in Lakes Erie or Ontario for purposes of diverting water from the Great Lakes.

5. For all proposals requiring a PCN, the applicant shall also include:

a. a location map and project drawings on 8.5 by 11 inch paper;

b. a description of the proposed construction practices that would be implemented to perform the proposed work and a description of the reasonably foreseeable direct and indirect effects to waters of the U.S from the proposed construction practices.

H. Critical Resource Waters:

1. NOAA-Designated Marine Sanctuaries: There are no NOAA-designated marine sanctuaries within the New York State portion of the Buffalo District.

2. National Estuarine Research Reserves (NERR): There are no NERRs within the Buffalo District.

3. National Wild and Scenic Rivers (NWSR): There are no NWSR within the New York State portion of the Buffalo District.

4. Critical Habitat for Federally Listed Threatened and Endangered Species: Proposed designated critical habitat for the piping plover (*Charadrius melodus*) is defined as lands 0.62 miles inland from normal high water line from the mouth of the Salmon River, Oswego County, northward to Eldorado Road, Jefferson County, encompassing approximately 17 miles.

5. State Natural Heritage Sites: There are no areas designated as state natural heritage sites through a state legislative or regulatory process.

6. Outstanding National Resource Waters or Other Waters Officially Designated by New York State: As of this date, New York State has not proposed any such waters, and the Buffalo District is not proposing to add critical resource waters under this category.

I. General Conditions applicable to all NWP for which Water Quality Certification has been provided are as follows:

1. **Monitoring Requirement.** The Corps of Engineers shall prepare and submit an annual report that evaluates the use and effectiveness of the Nationwide Permit program in New York State. Such report must contain, as a minimum, the number of times each Nationwide Permit has been used in the reporting period; the number of acres of disturbance or linear feet of disturbance on a by-permit basis; and the number of acres of mitigation required on a by-permit basis. The first report will be submitted by January 31, 2003 and by January 31 of each year following. At its discretion, and not as a substitute for the required annual report, the Corps may provide copies of any monthly reports that are submitted to headquarters.

2. This certification does not apply to any activity that is likely to jeopardize the continued existence of an endangered species or threatened species listed in 6 NYCRR Part 182 or which is likely to destroy or adversely modify the critical habitat of such species. Information on New York State endangered or threatened species may be obtained from the regional office of the NYS Department of Environmental Conservation responsible for the area in which a proposed activity is to be undertaken or on the

NYSDEC Website at: www.dec.state.ny.us/website/dfwmr/wildlife/endspec/index.html.

3. This certification does not apply to any activities occurring in aquatic sites identified in the attached list of Priority Natural Heritage sites.

4. Prior to undertaking any Nationwide Permit activity that will involve or occupy state-owned lands now or formerly under the waters of New York State, the party proposing the activity must first obtain all necessary approvals from:

NYS Office of General Services
Division of Real Estate Development
Corning Tower Building, 26th Floor
Empire State Plaza
Albany, NY 12242
Tel. (518) 474-4944

5. This authorization does not apply to any activities in the tidal wetlands of New York State with the exception of NWP numbers 4, 5, 6 and 20.

6. This certification does not apply to activities in Wild, Scenic and Recreational Rivers segments listed in the National Rivers Inventory.

7. This authorization does not allow the stacking of NWPs so that in combination they exceed 1/10 acre of fill or 200 linear feet of stream disturbance. When used in combination, the most restrictive conditions apply.

8. This certification does not address activities regulated under Articles VII and X of the New York State Public Service Law. For utility lines regulated pursuant to Article VII, the jurisdiction to issue or deny a Section 401 Water Quality Certification rests with the New York State Public Service Commission. For major electric generating facilities regulated pursuant to Article X, the jurisdiction to issue or deny a Section 401 Water Quality Certification rests with the New York State Board of Electric Generation and the Environment.

J. Priority Natural Heritage Sites (Buffalo District ONLY)

DEC	County	Town	Location	Name/element	Species/other
Region 6	Herkimer	Webb	Stillwater Reservoir Northwest	Northern Clustered Sedge	Carex arcta
	Lewis	Lowville	Black River Beaches Landing	Tomah Mayfly	Siphonisca aerodromia
			Black River Route 812 Bridge	Tomah Mayfly	Siphonisca aerodromia
		Watson	Black River Bushes Landing	Tomah Mayfly	Siphonisca aerodromia
			Black River River Road Farm	Tomah Mayfly	Siphonisca aerodromia
Region 7	Cayuga	Conquest	Howland Island	Inland Salt Marsh	
		Montezuma	Fox Ridge Salt Marsh	Inland Salt Marsh	
				Seaside Crowfoot	Ranunculus cymbalaria
			Montezuma Salt Marsh	Inland Salt Marsh	
	Madison	Nelson	Nelson Swamp	Striped Coralroot	Corallorhiza striata
	Onondaga	De Witt	White Lake Swamp	Marl Fen	
		Manlius	White Lake Swamp	Marl Fen	
		Salina	Onondaga Salt Marsh	Inland Salt Pond	
	Oswego	Oswego	Mud Pond Fen	Bogbean Buckmoth	Hemileuca sp 1
		Palermo	Russ Pond	Ogden's Pondweed	Potamogeton ogdenii
		Richland	Brennan Beach Fen	Bogbean Buckmoth	Hemileuca sp 1
			Deer Creek Marsh	Bogbean Buckmoth	Hemileuca sp 1
		Sandy Creek	Rainbow Shores Bog	Bogbean Buckmoth	Hemileuca sp 1
			South Pond Fen	Bogbean Buckmoth	Hemileuca sp 1
Region 8	Genesee	Bergen	Bergen Swamp	Sheathed Sedge	Carex vaginata
				Northern Bog Sedge	Carex gynocrates
				Marl Fen	
			Bergen Swamp East Lobe	Marl Fen	
		Tonawanda Indian	Tonawanda Creek Alabama	Spreading Chervil	Chaerophyllum procumbens
	Ontario	Naples	Wolf Gully	Log Fern	Dryopteris celsa
	Seneca	Junius	Junius Ponds & Lowery Pond	Marl Fen	
	Wayne	Savannah	Carncross Salt Pond	Inland Salt Marsh	Inland Salt Marsh
Region 9	Cattaraugus	City of Olean	Olean Creek	Rayed Bean	Villosa fabalis
	Chautauqua	Ellicott	Cassadaga Creek Ross Mills	Rayed Bean	Villosa fabalis
		French Creek	French Creek	Spotted Darter	Etheostoma maculatum
		Kiantone	Big Pond Burgeson	Floating Pennywort	Hydrocotyle ranunculoides

INFORMATION ON NATIONWIDE PERMIT VERIFICATION

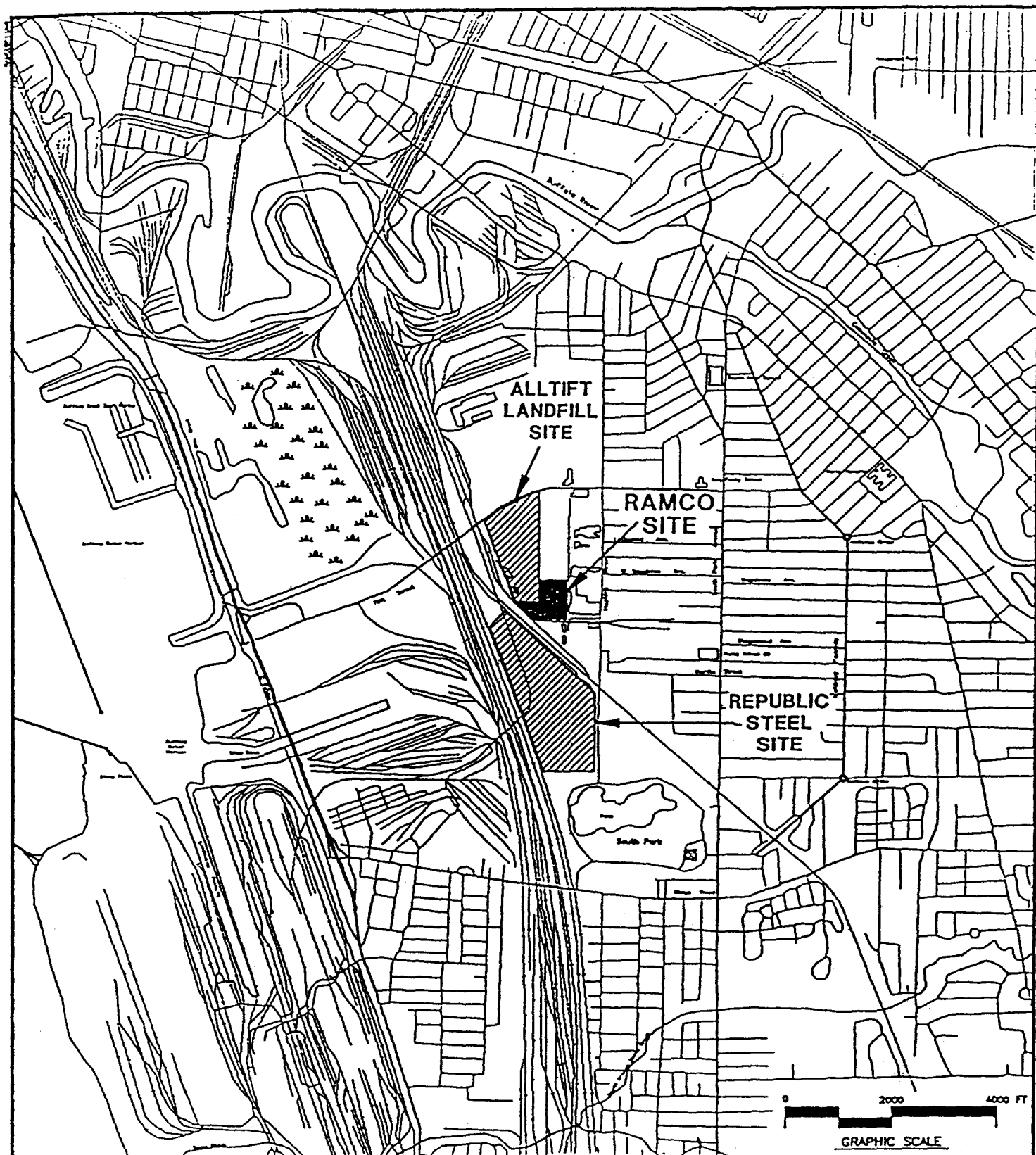
Verification of the applicability of this Nationwide permit is valid for two years from the date of affirmation unless the Nationwide permit is modified, suspended or revoked. This verification will remain valid for two years if during this two year period the Nationwide permit is reissued without modification or your activity complies with any subsequent permit modification. Please note that if you commence or are under contract to commence this activity in reliance of your permit prior to the date this Nationwide permit is suspended or revoked, or is modified such that your activity no longer complies with the terms and conditions, you have twelve months from the date of permit modification, expiration, or revocation to complete the activity under the present terms and conditions of this permit, unless this permit has been subject to the provisions of discretionary authority.

It is your responsibility to remain informed of changes to the Nationwide Permit program. A public notice announcing any changes will be issued when they occur. Finally, note that if your activity is not undertaken within the two year period or the project specifications have changed, you must immediately notify this office to determine the need for further approval or reverification.

Possession of this permit does not obviate you of the need to contact all appropriate state and/or local governmental officials to insure that the project complies with their requirements.

NATIONWIDE PERMIT SPECIAL CONDITIONS

1. That you are responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of terms and conditions of the authorization and that a copy of the permit document is at the project site throughout the period the work is underway.
2. As mitigation to compensate for unavoidable and permanent impacts to 8.4 acres of wetland, the permittee shall create, at a minimum, 11.2 acres of wetland on-site as shown on the attached maps and drawings which, are incorporated into and made part of this permit.
3. A baseline report shall be forwarded to this office by December 31 in the year of completion of all mitigation construction activities, or by an approved extension. For purposes of this special condition, "completion" means all activities associated with site grading and seeding and/or planting. The baseline report must include the following:
 - a. An "as-built" topographic survey of the mitigation area at 0.5 foot contour intervals.
 - b. Photographs from fixed locations with a photolocation map.
 - c. A list of plants introduced through seeding and/or planting.
 - d. Water depth and date of measurement from representative locations within the mitigation area. The sample points will be fixed locations and shall be plotted on a map.
 - e. A list of any modifications that were made from the original mitigation plan.
4. Annual monitoring and/or compliance reports for the mitigation project must be submitted to this office for the first five years following completion of the mitigation construction based upon data collected during each monitored year between June and October. The first annual report is due by December 31 in the year following completion of mitigation construction, or by an approved extension date. Subsequent reports must be submitted by December 31 of the subsequent four years, or by an approved extension date. This requirement may be waived for years 3 and 4 if, after the first two growing seasons, the mitigation is shown to meet the requirements for successful mitigation. These reports must include:
 - a. An "as-built" topographic survey of the mitigation area at 0.5 foot contour intervals, including a delineated boundary of the wetland and wetland acreage determination.
 - b. Photographs from fixed locations with a photolocation map.
 - c. A plant series list which give USFWS Wetland Indicator Status and strata. Dominant plants should be highlighted and the percent cover is to be noted. Plants introduced through seeding or planting shall also be indicated. The date of field inspection is to be noted.
 - d. Water depth and date of measurement from representative locations within the mitigation area during the growing season. The sample points will be fixed locations and shall be plotted on a map.
 - e. Fish and wildlife observations on the mitigation site.
 - f. A summary statement regarding the perceived success of the wetland creation project. The report will evaluate the goals as set forth in the permit or mitigation and monitoring plan as well as current wetland functions. These reports must also address any potential problem areas and include suggestions and timetable for correction if it is anticipated that projected goals may not be met.
5. The mitigation area shall be vegetated with a minimum of 80% aerial cover of hydrophytic vegetation, with no more than 50% of one species.
6. At least 50% of the dominant vegetation shall have a wetland indicator status of FACW or wetter, with at least one OBL species.
7. No more than 5% aerial cover shall be vegetated with the following species: Lythrum salicaria, Phalaris arundinacea, Phragmites australis, Rhamnus spp., Typha angustifolia and Typha x glauca. Corrective measures shall be implemented to preclude the growth of the above listed species throughout the 5 year monitoring period should they appear within the wetland mitigation areas.
8. The permittee shall assume all liability for accomplishing corrective work should the District Engineer determine the compensatory mitigation to be unsuccessful. In the event that the mitigation area does not meet the criteria set forth in this permit, the permittee may be required to undertake additional mitigative measures. These actions may include, but are not limited to corrective actions on-site including regrading or replanting.
9. There shall be no removal, destruction, or cutting of vegetation, spraying with herbicides, grazing of domestic animals, or disturbance or manipulation of the mitigation area without first obtaining Department of the Army authorization. Control of nuisance vegetation, or any other manipulation within the mitigation areas, shall only occur after Corps of Engineers concurrence that such management practices are necessary to ensure the long-term success of the mitigation program.
10. At the request of an authorized representative of the Buffalo District, U.S. Army Corps of Engineers, the permittee shall allow access to the project site and the mitigation parcel to determine compliance with the conditions of this permit.



RAMCO STEEL BUFFALO, NEW YORK

ALLTIFT LANDFILL/RAMCO STEEL PILOT PROJECT

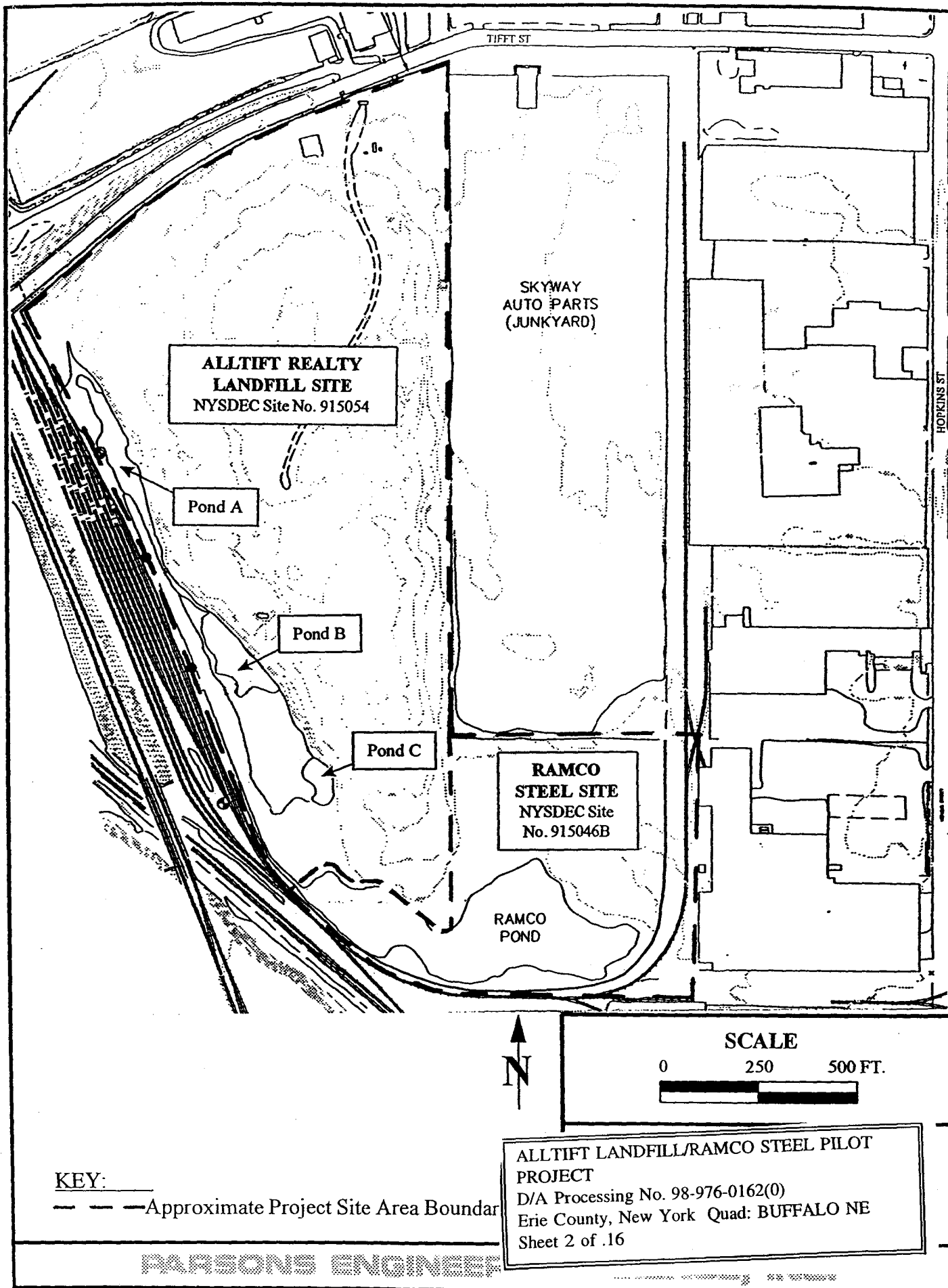
D/A Processing No. 98-976-0162(0)
 Erie County, New York Quad: BUFFALO NE
 Sheet 1 of 16

SOURCE:
 USGS 7.5 MIN. QUADRANGLE
 BUFFALO SE NEW YORK 1966

SCALE AS NOTED

Davis & Moore

JOB No: 25848-001-152



**ALLTIFT REALTY
LANDFILL SITE**
NYSDEC Site No. 915054

Pond A

Pond B

Pond C

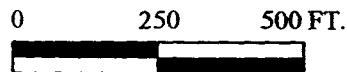
SKYWAY
AUTO PARTS
(JUNKYARD)

**RAMCO
STEEL SITE**
NYSDEC Site
No. 915046B

RAMCO
POND



SCALE



KEY:

--- Approximate Project Site Area Boundary

**ALLTIFT LANDFILL/RAMCO STEEL PILOT
PROJECT**

D/A Processing No. 98-976-0162(0)

Erie County, New York Quad: BUFFALO NE

Sheet 2 of .16

PARSONS ENGINEERING

ATTACHMENT A
PROJECT NARRATIVE
ALLTIFT LANDFILL/RAMCO STEEL SITE
SUPPLEMENTAL INFORMATION FOR
JOINT APPLICATION FOR PERMIT (DECEMBER 2003)
SITE NO'S 9-15-054/9-15-046B

In accordance with the Alltift Landfill and Ramco Steel Records of Decision, impacted pond sediment and wetland soils on the combined Site are to be excavated and consolidated onto the Alltift Landfill. This work is planned for February through April of 2004. The wetlands will subsequently be restored (Spring 2005) in accordance with the remedial design approved by NYSDEC.

Based on wetlands delineation work, the total area of Federal Jurisdictional wetlands that will be impacted by the proposed remedial action is 8.43 acres. Of that total, 3.5 acres are found within and adjacent to Ponds A, B and C on the west side of the Alltift Landfill (see Figure A-1). The remaining 4.93 acres are found within and adjacent to the Ramco Pond (see Figure A-2).

As shown on Table A-1, wetland mitigation will be undertaken, with the creation of of 11.15 acres of shallow and emergent wetlands during the remedial construction. In addition, the remedial action includes 1.56 acres of open water with depths greater than three feet. The following narrative provides details on the sediment removal, and also provides a summary of the wetland mitigation plan.

A.1 Sediment Removal

Impacted pond sediment and wetland soils on the combined Site are to be excavated and consolidated onto the Alltift Landfill. The excavation plan (Drawing Nos. C-3 and C-4) in these areas was based on sediment sampling events and soil borings conducted during the Alltift Landfill and Ramco Steel Remedial Investigations (AFI Environmental, 1994, Dames and Moore, 1994), and sediment sampling conducted as part of the pre-design investigation.

The total volume of sediments to be removed from the four ponds is estimated to be between 30,000 and 40,000 cubic yards (CY). The sediment removal volume estimate was based upon removal of all sediments in Ponds A, B, C, and the Ramco Pond to native soils. In addition, approximately 2,000 CY of soils in the adjacent wetlands areas were planned to be removed and consolidated onto the landfill to facilitate surface water drainage. For the wetland/marsh areas, the subgrade plan has been developed to preserve the current wetland habitat to the extent practicable, while providing sufficient conveyance of surface water runoff from the landfill, through the wetland areas, and to the storm sewer via the outlet at the northwest corner of the Site.

Prior to the start of sediment removal, the ponds will be dewatered and surveyed. Pond water was sampled during the pilot sediment excavation program (September/October 1998) to determine the suitability of the water for direct discharge to the stormwater conduit in the northwest corner of the Site. A report was prepared and included as Appendix D in the May 2003 Final Design Report. The initial pond water can be directly discharged into the downstream wetlands, for eventual discharge to the storm sewer. As the water becomes more turbid toward the bottom of the ponds, it may be directed to an onsite settling basin, and may require discharge to the BSA following sedimentation.

After the ponds have been dewatered, sediments will be removed to native soils to achieve cleanup goals. Excavation will be conducted to the approximate elevations shown on the construction drawings (C-3 and C-4). Because of the fluid nature of the sediments, and soft consistency of the underlying soils, undercutting of the underlying native soils will occur. The drawings show contours depicting excavation depths as a guide for sediment removal. The final depth of cut during these operations will depend upon actual field conditions.

Excavated sediment and wetland soils will be placed on the Alltft Landfill for drying and consolidation into the landfill. Where required, sediments will be mixed with dry soils/waste material, and placed in thin lifts over large flat areas for natural drying.

Additional details concerning sediment removal are contained in the Remedial Action Work Plan prepared by Tug Hill Construction, Inc. Excerpts and appropriate figures from the work plan are attached to this narrative description.

A.2 Wetland Mitigation Plan

Excavated pond and wetland areas will be covered with a 12-inch clayey soil layer to create a "seal" that will inhibit exfiltration of groundwater. A minimum 6-inch layer of substrate soil consistent with wetland soil will be placed over the clay "seal", and re-vegetated with appropriate wetland species. The purpose of the 6-inch soil cover is to provide a medium to establish new vegetative growth. Restoration will provide for a combination of vegetated marsh and open water ponds on the Site. Restoration activities are tentatively planned for the spring of 2005. The planned delay in restoration until the spring of 2005 will accommodate a 9-month sampling period for the groundwater collection trench, as agreed to with the NYSDEC. Sampling of groundwater from the trench will begin when the groundwater construction trench is completed, and will continue for approximately nine months.

As shown on the construction drawings, the limited excavation of sediments between the onsite ponds will hydraulically connect the ponds to facilitate surface water drainage to the storm sewer. The water surface elevation will be controlled by a weir at the northwest corner of the property set to an elevation of 580.25. The water surface elevation was selected to mitigate flooding of the rail lines along the western and southern boundaries of the property. Currently, during wet periods, the ponds overflow onto the rail lines. The selected weir elevation will also maintain pond water elevations

similar to normal pre-construction conditions. The proposed final grades and water surface elevations are depicted on Drawings C-8 and C-9.

In summary, the plan provides for re-vegetation with plant species (submergent, emergent, and wet meadow, etc.) that will provide food sources for deer, birds, and other animals following remedial construction. Also, a woody buffer strip will be planted along the western and southern perimeter of the landfill. The woody buffer strip will be located adjacent to the wetlands and between the gravel maintenance road. The woody buffer strip will consist of several moisture tolerant trees and shrubs, typical of similar regional wetland habitats. The plantings will also provide shade to help promote establishment of the restored wetlands, by reducing the growth of undesirable species.

Seeding and mulching of the wet meadow and upland areas must be completed prior to inundation of the wet meadow area. Wet meadow seed locations should be broadcast (not hydroseeded). Hydroseeding is acceptable for the upland areas. For the deep water emergent marsh, tubers or rhizomes should be either weighted or securely placed into the substrate.

The wetland mitigation plan and planting guide is shown on Drawing C-10, and described below in Table A-1.

**Table A-1
Wetland Mitigation Plan**

Zone	Habitat	Elev. (feet AMSL)	Acre	Indun- dation	Species	Planting Rate	Planting Time
1	Upland	581-585	5.16	None	Smooth brome grass Timothy grass Perennial rye grass Birdfoot trefoil	15 lb/acre 15 lb/acre 15 lb/acre 8 lb/acre	
2	Wet Meadow Emergent	579-581	5.33	0 to 1 foot	Fox sedge Rice cut-grass Bulrush Soft rush Wool rush Bearded sedge	Seed rate of 3.25 lb/acre	
3	Deep Water Emergent	577-579	5.82	1 to 3 feet	See sub-zones below.		
3A					Cattail, Giant bur reed.	6-foot centers	March to July
3B					Pickerel weed, Duck potato	6-foot centers	Early Fall for Pickerel, March to July or early Fall for Duck potato.
3C					Sago pondweed, Spatterdock	6-foot centers	March to July or early Fall for Sago Pondweed, Early Fall for Spatterdock
4	Open Water	575-577	1.56	3 to 5 feet	None	N/A	
	Woody Buffer	Variable	C-10		None	C-10	variable

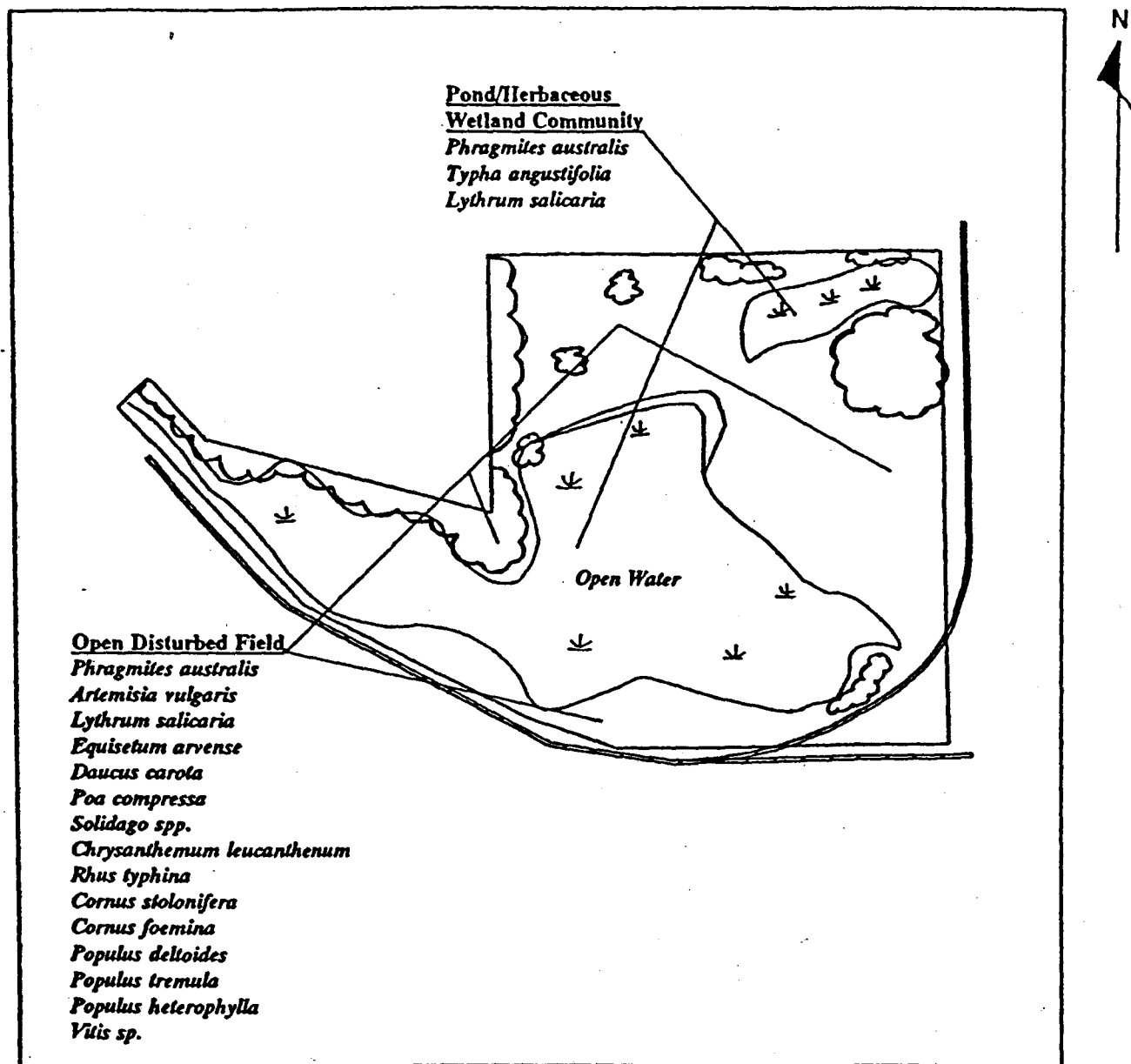


Figure A-2

Ramco Steel Site
 City of Lackawanna
 Erie County, New York

Earth Dimensions, Inc.

After reviewing the Pilot Sediment Excavation Program Report prepared by Parsons Engineering Science, dated February 1999, Tug Hill Construction proposes to excavate the pond sediments using the following methods.

The excavation of sediments within the ponds will occur in two phases. Phase I will include the excavation and removal of sediments from Ponds A, B, and C. This work will occur with Phase I waste excavation along the west perimeter of the site. The ponds will be decanted to an elevation where the water quality (turbidity) can no longer be maintained at turbidity levels less than 100 NTU's. (See section 4.7 Pond Dewatering). The remaining sediments and sediment slurry will be excavated and hauled to the top of Alltft Landfill. A berm will be constructed around the saturated sediments to prevent migration. Over a period of time (approx 3 to 4 months) the sediments will be allowed to dewater by gravity. When the proper moisture content is achieved, the sediments will be spread over the landfill or mixed with the waste and soils excavation.

Phase II will consist of removing and stabilizing sediments from Ramco Pond as stated in section 4.7 Pond Dewatering. The water will initially be decanted thru the filter dam and pumped to the Tift Street storm sewer. Discharge will be monitored for turbidity. Once the water is drawn down to the lowest practical level, channels will be cut to the sump and filter dam using a track excavator and low ground pressure bulldozer. This will further yield dewatering of the sediments. The sediments will then be pushed up into windrows and crowded towards the excavator. The moisture content will be measured and decisions will be made concerning the handling process. It is anticipated from the Pilot Sediment Excavation Program and experience that the moisture content of these sediments will be suitable to load and haul to the Alltft Landfill. Should additional drying be required then the sediments will either be laid out on the landfill for drying or mixed with other excavated waste or soils to achieve the desired compaction.

An excavator (Cat 345 or equivalent) will load the sediments onto off-road articulated trucks (Volvo A-35 or equivalent). The trucks will haul the sediments to the landfill for disposal. A low ground pressure bulldozer (Cat D6-LGP) will place the sediments. Articulated trucks will be fitted with gates and lined with on site soils (if necessary) to minimize spills of saturated sediments out the back on inclined roads. Haul roads will be periodically scrapped to remove spillage.

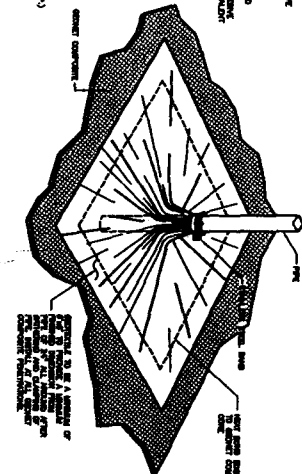
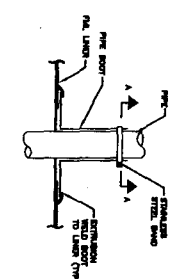
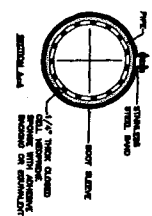
Survey control will be established prior to excavation. A grade foreman will oversee the operation to control depth of excavation. The sediment excavation subgrade presented in the Drawings are provided as guidance. The actual extent of sediment excavation will be determined in the field as directed by the Engineer.

ALLTIFT LANDFILL/RAMCO STEEL PILOT
PROJECT

D/A Processing No. 98-976-0162(0)

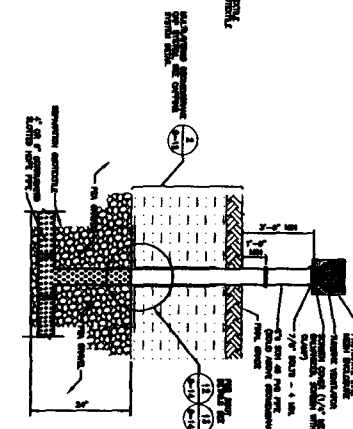
Erie County, New York Quad: BUFFALO NE

Sheet 8 of .16

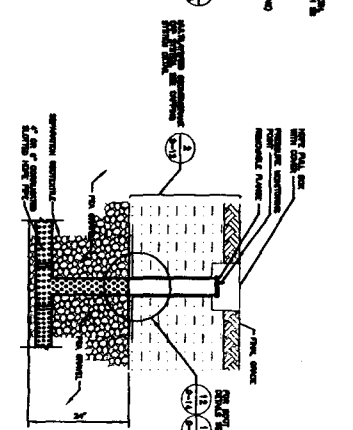


14 GEOTEXTILE BOOT DETAIL
NOT TO SCALE

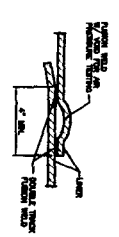
15 GEOTEXTILE BOOT DETAIL
NOT TO SCALE



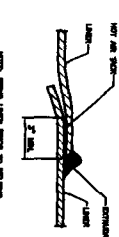
16 ACTIVE GAS VENT DETAIL
NOT TO SCALE



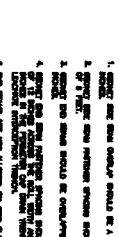
17 CAPPED GAS VENT DETAIL
NOT TO SCALE



18 FUSION WELD DETAIL
NOT TO SCALE



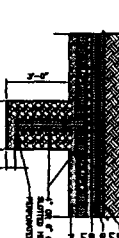
19 EXTRUSION WELD DETAIL
NOT TO SCALE



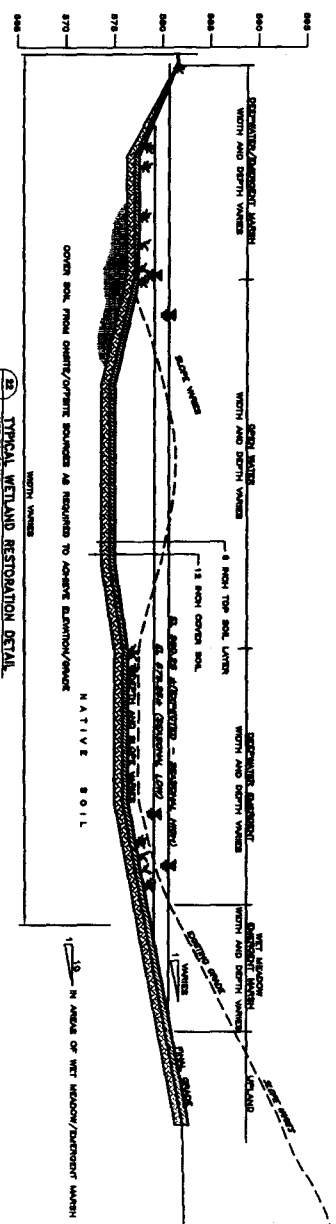
20 COMPOSITE GEONET SEAM CONNECTION DETAIL
NOT TO SCALE



21 GAS VENTING PIPE DETAIL
NOT TO SCALE



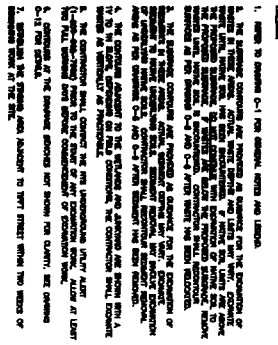
22 CONDENSATE TRAP DETAIL
NOT TO SCALE



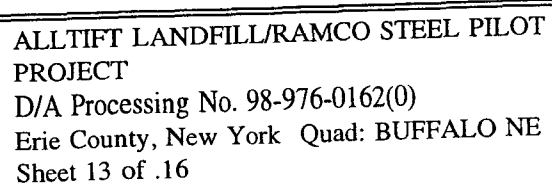
23 TYPICAL WETLAND RESTORATION DETAIL
NOT TO SCALE

TYPICAL CROSS SECTION ALONG REMEDIATION MONITORING/VENTING LINE. WITH PROPOSED GEOTEXTILE BOOT DETAIL. SEE DETAIL 14 FOR GEOTEXTILE BOOT DETAIL. SEE DETAIL 15 FOR GEOTEXTILE BOOT DETAIL. SEE DETAIL 16 FOR ACTIVE GAS VENT DETAIL. SEE DETAIL 17 FOR CAPPED GAS VENT DETAIL. SEE DETAIL 18 FOR FUSION WELD DETAIL. SEE DETAIL 19 FOR EXTRUSION WELD DETAIL. SEE DETAIL 20 FOR COMPOSITE GEONET SEAM CONNECTION DETAIL. SEE DETAIL 21 FOR GAS VENTING PIPE DETAIL. SEE DETAIL 22 FOR CONDENSATE TRAP DETAIL.

ALLTIFT LANDFILL/RAMCO STEEL PILOT PROJECT
D/A Processing No. 98-976-0162(0)
Erie County, New York Quad: BUFFALO NE
Sheet 10 of .16



DRAWING NO. C-4	ALLIANT LANDFILL/PAVED STEEL SITE REMEDIATION CONSTRUCTION
	SUBGRADE EXCAVATION/DREDGING PLAN (2 OF 2)



Job No. 74020					
Designed <u>CHM</u>					
Drawn <u>MBR</u>					
Civilized <u>CHM</u>					
Reviewed <u>MA</u>					
Approved					
Proj. No. —	<input type="checkbox"/>	6/78	MAILED FOR RECORD		
Rev. <u>246</u>		<u>246</u>	Revised		

NOTES:

1. REFER TO DRAWING C-1 FOR GENERAL NOTES AND LEGEND.
2. REFER TO DRAWING C-11 FOR OVERFLOWER COLLECTION TRENCH/DISCHARGE PIPE PROFILE.
3. REFER TO DRAWING D-10 FOR LOCATIONS OF OVERFLOWER MONITORING WELLS MW-3 AND MW-5.



APPENDIX C-1: LINES		
LINE NUMBER	DESCRIPTION	REMARKS
1A	100000.000	100000.000
2A	100000.000	100000.000
3A	100000.000	100000.000
4A	100000.000	100000.000
5A	100000.000	100000.000
6A	100000.000	100000.000
7A	100000.000	100000.000
8A	100000.000	100000.000
9A	100000.000	100000.000
10A	100000.000	100000.000

LEGEND

- MW-3 NEW MONITORING WELL
- PE-3 NEW PNEUMATIC WELL
- PE-3 NEW PNEUMATIC WELL
- BN-1 6" VENT WITH TUBING VENTILATION
- CM-1 4" x 6" CAPPED GAS VENT
- COMBUSTIBLE TRAP
- GROUND CHUTE
- PROPERTY LINE
- TRIANGULAR SURFACE DRAINAGE
- TRIANGULAR SURFACE DRAINAGE
- OVERFLOWER COLLECTION TRENCH/DISCHARGE PIPE
- DISCHARGE PIPE
- DCP LINE
- FENCE
- AREA COVERED WITH 12 INCHES COVER SOIL AND 8 INCHES TOPSOIL
- AREA COVERED WITH 6 INCHES OF TOPSOIL

ALLTIFT LANDFILL/RAMCO STEEL PILOT PROJECT
D/A Processing No. 98-976-0162(0)
Erie County, New York Quad: BUFFALO NE
Sheet/5 of .16

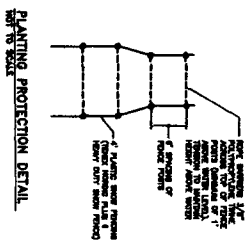
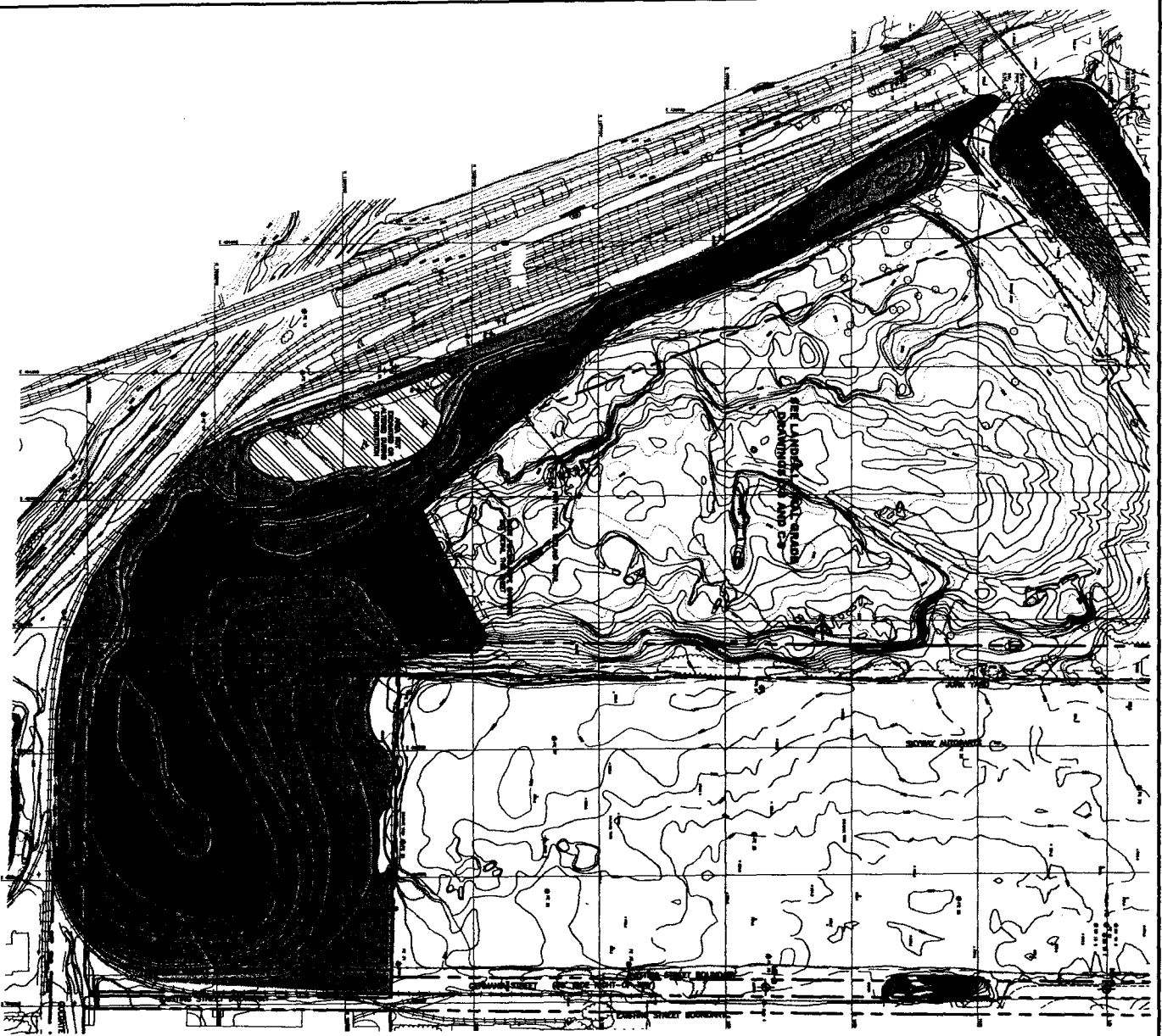
DRAWING NO.
C-9
REV
0

ALLTIFT LANDFILL/RAMCO STEEL SITE
REMEDATION CONSTRUCTION
FINAL GRADE PLAN
(2 OF 2)

Honeywell
HONEYWELL
MORRISTOWN, NEW JERSEY

PARSONS
PARSONS
NEW YORK, NEW YORK

Job No. 98-976-0162(0)
Project No. 98-976-0162(0)
Drawing No. C-9
Sheet No. 5 of 16
Date 10/1/98



ALLTIFT LANDFILL/RAMCO STEEL PILOT PROJECT
 D/A Processing No. 98-976-0162(0)
 Erie County, New York Quad: BUFFALO NE
 Sheet 6 of .16

DATE	REVISION	DESCRIPTION	BY	CHKD
12/10/00	1	Initial Design	J. J. J.	J. J. J.
01/10/01	2	Revised Design	J. J. J.	J. J. J.
02/10/01	3	Final Design	J. J. J.	J. J. J.
03/10/01	4	Construction	J. J. J.	J. J. J.
04/10/01	5	Final	J. J. J.	J. J. J.

ALLTIFT LANDFILL/RAMCO STEEL PILOT PROJECT
 D/A Processing No. 98-976-0162(0)
 Erie County, New York Quad: BUFFALO NE
 Sheet 6 of .16

DRAWING NO. C-10 0	ALLTIFT LANDFILL/RAMCO STEEL SITE RESTORATION CONSTRUCTION	Honeywell HONEYWELL MONROVIA, NEW JERSEY	PARSONS	Issue Certification
	WETLAND HABITAT RESTORATION PLAN			



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO

October 24, 2012

Regulatory Branch

SUBJECT: Non-Compliance Resolution for Department of the Army Permit No. 1998-9760162

Mr. Rich Galloway
Honeywell, Inc.
101 Columbia Road
Solvay-4
Morristown, New Jersey 07962

Dear Mr. Galloway:

This is in reference to the required terms and conditions of your Department of the Army (DA) permit for impacts to aquatic resources in connection with the remediation of the Alltiff Landfill and Ramco Steel site. The project is located in the City of Buffalo, Erie County, New York.

After review of the Corrective Action Report dated September 28, 2012 submitted by AMEC on your behalf, I have determined that the wetland mitigation corrective measures you completed address the requirements of my letter dated February 13, 2012. Thus, your project is in compliance with all terms and conditions of your DA Permit No. 1998-9760162.

This correspondence shall serve as written confirmation that you have fulfilled all DA requirements for your project, including the required mitigation and monitoring. No further action is necessary at this time.

Questions pertaining to this matter should be directed to me at (716) 879-4159, by writing to the following address: U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, New York 14207, or by e-mail at: melissa.j.tarasiewicz@usace.army.mil

Sincerely,

Melissa J. Tarasiewicz

Melissa Tarasiewicz
Biologist

cc: Mr. Ryan Belcher, AMEC
Mr. Maurice Moore, New York State Department of Environmental Conservation

APPENDIX E

SAMPLING INFORMATION / FORMS

Figure E.1**WELL SAMPLING RECORD**Site Name Alltiff GWCT Well ID _____Samplers _____
_____Total Well Depth (TOC) _____ feet
Initial Static Water Level (TOC) _____ feet
Well Diameter _____ inches**Purging Data**

Method _____ Date/Time _____

Well Volume = (Total Depth of Well - Depth To Water) x Casing Volume per Foot

= _____ - _____ x _____

= _____ gallons

Purge Volume = _____ gallons

Casing Volumes (gal/ft.):					
1-inch	0.041	1.5-inch	0.092	2-inch	0.16
3-inch	0.36	4-inch	0.64	6-inch	1.4
8-inch	2.5			10 inch	4

Field Parameters	1 Volume	2 Volumes	3 Volumes
pH			
Temp. (F)			
Spec. Cond. (uS/cm)			
Turbidity (NTU)			

Volume of Purge Water Removed _____ gallons

Sampling Data

Method _____ Date/Time _____

Parameters	Bottle	Pres.	Method
<i>Metals</i>	<i>1- 6oz. Plastic</i>	<i>HNO₃</i>	<i>200.7 (Select)</i>
<i>PCBs</i>	<i>2- 1L amber</i>	-	<i>8082</i>
<i>Pesticides</i>	<i>2- 1L amber</i>	-	<i>8081 (Select)</i>
<i>SVOAs</i>	<i>1- 1L amber</i>	-	<i>8270 (Select)</i>
<i>VOAs</i>	<i>3- 40 mL vials</i>	<i>HCL</i>	<i>8260 (Select)</i>

Field Parameters	Sample
pH	
Temp. (F)	
Spec. Cond. (uS/cm)	
Turbidity (NTU)	

Comments: _____

				Figure E.2 - Chain Of Custody / Analysis Request																AESI Ref: 38281.57801											
				Privileged & Confidential												Site Name:								COC # :							
																Location of Site:								Lab Use Only							
Client Contact: (name, co., address)				Sampler:												Grab/Composite Field Filtered Sample ?		Preservative						Lab Proj #							
				P O #																				Lab ID							
Honeywell International				Analysis Turnaround Time:																				Job No.							
101 Columbia Road				Standard -																											
Morristown, NJ 07962				Rush Charges Authorized for -																											
				2 weeks -																											
				1 week -																											
				Next Day -																											
Sample Identification				Sample Date		Sample Time		Sample Type		Sample Matrix		Sample Purpose		# of Cont.																	
Location ID		Start Depth (ft)	End Depth (ft)	Field Sample ID												Units										Lab Sample Numbers					
1																															
2																															
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															
Special Instructions:																															
Relinquished by				Sampling Company				Received by				Company				Condition				Custody Seals Intact											
				Date/Time								Date/Time				Cooler Temp.															
Relinquished by				Company				Received by				Company				Condition				Custody Seals Intact											
				Date/Time								Date/Time				Cooler Temp.															
Relinquished by				Company				Received by				Company				Condition				Custody Seals Intact											
				Date/Time								Date/Time				Cooler Temp.															
Preservatives: 0 = None; [1 = HCL]; [2 = HNO3]; [3 = H2SO4]; [4 = NaOH]; [5 = Zn. Acetate]; [6 = MeOH]; [7 = NaHSO4]; 8 = Other (specify):																															

Table E.1

SAMPLING EQUIPMENT

Sampling Vehicle
55-Gallon Lined Drum
Photoionization detector
Explosive gas meter
Personal safety equipment (hard hats, etc.)
Sampling and analysis program
Appropriate number (including spares) of sample bottles
Water-level indicator (electric drop-line)
Polyethylene ground cloth
Aluminum Foil
Distilled water
Alconox detergent
Tap water source
Disposable surgical gloves
Disposable towels
pH meter
Conductivity meter
Buckets (small: 5 gallon; large: 25 to 30 gallon)
Peristaltic or submersible pump
Appropriate tubing for pump
Nylon rope (individual lengths for each well)
Pump hoist
Flashlight
Camera and Film

SHIPPING AND PACKAGING EQUIPMENT

Shipping labels
Sufficient ice chests to hold all sample bottles, packing material and ice

DOCUMENTATION EQUIPMENT

Well Sampling Record
Chain-of-Custody Forms
Waterproof Pens

Table E.2
Groundwater Sample Containerization and Holding Times

Analysis	Bottle Type	Preservation¹	Holding Time²
pH, Temperature, Specific Conductance	P,G	None	Field measure immediately
Turbidity	P,G	None	Field Measurement
Metals	1 liter plastic bottle	Nitric Acid to pH <2 Cool to 4°C	5 Days
Volatile Organic Compounds (VOCs)	40 ml glass vial w/ Teflon septum	Cool to 4° C	7 Days
Semi-volatile Organic Compounds (SVOCs)	G-TLC, 1 liter amber	Cool to 4° C	7 Days
Pesticides and PCBs	G-TLC, 1 liter amber	Cool to 4° C, pH 5-8	7/40 Days
<p>1. All samples to be preserved in ice after collection and during transport.</p> <p>2. Days from validated time of sample receipt (VTSR)</p> <p>P - polyethylene; G - glass</p> <p>G-TLC - teflon-lined cap</p>			

[illegible]

Remarks: _____



NEW YORK
STATE OF
OPPORTUNITY.

**Department of
Environmental
Conservation**

GUIDELINES FOR SAMPLING AND ANALYSIS OF PFAS

Under NYSDEC's Part 375 Remedial Programs

January 2020



Contents

Objective	1
Applicability	1
Field Sampling Procedures	1
Data Assessment and Application to Site Cleanup	2
Testing for Imported Soil	2
Analysis and Reporting	2
Appendix A: Quality Assurance Project Plan (QAPP) Guidelines for PFAS	4
Appendix B: Sampling Protocols for PFAS in Soils, Sediments and Solids	5
Appendix C: Sampling Protocols for PFAS in Monitoring Wells	7
Appendix D: Sampling Protocols for PFAS in Surface Water	9
Appendix E: Sampling Protocols for PFAS in Private Water Supply Wells	11
Appendix F: General Fish Handling Procedures for Contaminant Analysis.....	13
Appendix G: PFAS Analyte List	21
Appendix H: Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids	22
Appendix I: Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids	24

ERRATA SHEET for

Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Program

Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date

Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis and reporting of PFAS, DER has developed this document to summarize procedures and update previous DER technical guidance pertaining to PFAS.

Applicability

Sampling for PFAS has already been initiated at numerous sites under DER-approved work plans, in accordance with specified procedures. All future work plans should include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day or one per twenty samples, whichever is more frequent.

Data Assessment and Application to Site Cleanup

Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10.

Water Sample Results

PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt). In addition, further assessment of water may be warranted if either of the following screening levels are met:

- a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or
- b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L

If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase.

Sites in the site management phase should evaluate for PFAS to determine if modification to any components of the SMP is necessary (e.g., monitoring for PFAS, upgrading treatment facilities, or performing an RSO).

Testing for Imported Soil

Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the *PFAS Analyte List* (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs.

If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Analysis and Reporting

As of January 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third party data validator. Electronic data submissions should meet the requirements provided at: <https://www.dec.ny.gov/chemical/62440.html>.

DER has developed a *PFAS Analyte List* (Appendix F) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP) does not offer certification for PFAS in matrices other than finished drinking water. However, laboratories analyzing environmental samples for PFAS (e.g., soil, sediments, and groundwater) under DER's Part 375 remedial programs need to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1 or ISO 25101. Laboratories should adhere to the guidelines and criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids). Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist.

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay). Commercially methods are also available for biota and air samples.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.

Please note that TOP Assay analysis of highly-contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
 - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP-approved lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an “Analytical Methods/Quality Assurance Summary Table” specifying:
 - Matrix type
 - Number or frequency of samples to be collected per matrix
 - Number of field and trip blanks per matrix
 - Analytical parameters to be measured per matrix
 - Analytical methods to be used per matrix with minimum reporting limits
 - Number and type of matrix spike and matrix spike duplicate samples to be collected
 - Number and type of duplicate samples to be collected
 - Sample preservation to be used per analytical method and sample matrix
 - Sample container volume and type to be used per analytical method and sample matrix
 - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by LC-MS/MS for PFAS using methodologies based on EPA Method 537.1
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
 - Reporting Limits should be less than or equal to:
 - Aqueous – 2 ng/L (ppt)
 - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
- Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1, EPA Method 533, or ISO 25101
- Include detailed sampling procedures
 - Precautions to be taken
 - Pump and equipment types
 - Decontamination procedures
 - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification. Previous results of “non-detect” for PFAS from the UCMR3 water supply testing program are acceptable as verification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^{\circ}$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., wash room sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^{\circ}$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the latest guidelines developed by the Division of Fish and Wildlife (DFW) entitled “General Fish Handling Procedures for Contaminant Analysis” (Ver. 8).

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

- A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:
1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).
 2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.
 3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.
- B. The following data are required on each **Fish Collection Record** form:
1. Project and Site Name.
 2. DEC Region.
 3. All personnel (and affiliation) involved in the collection.
 4. Method of collection (gill net, hook and line, etc.)
 5. Preservation Method.
- C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:
1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.
 2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.
 3. Date collected.
 4. Sample location (waterway and nearest prominent identifiable landmark).
 5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.
 2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.
 3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.
 4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate "Age" column.
 5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.
 6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.
 7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.
- E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish's tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

- F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.
- G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.
- H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:
 - No materials containing Teflon.
 - No Post-it notes.
 - No ice packs; only water ice or dry ice.
 - Any gloves worn must be powder free nitrile.
 - No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
 - No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
 - Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
 - Wash hands after handling any food containers or packages as these may contain PFCs.
 - Keep pre-wrapped food containers and wrappers isolated from fish handling.
 - Wear clothing washed at least six times since purchase.
 - Wear clothing washed without fabric softener.
 - Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.
- I. All fish must be kept at a temperature $<45^{\circ}\text{F}$ ($<8^{\circ}\text{C}$) immediately following data processing. As soon as possible, freeze at $-20^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.
- J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.
- K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

page _____ of _____

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: ☐ Electrofishing ☐ Gill netting ☐ Trap netting ☐ Trawling ☐ Seining ☐ Angling ☐ Other _____

Preservation Method: ☐ Freezing ☐ Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ()	WEIGHT ()	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)
 following on _____, 20____ from _____
(Date) (Water Body)
 in the vicinity of _____
(Landmark, Village, Road, etc.)
 Town of _____, in _____ County.
 Item(s) _____

 Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20____.

Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelopes, approximately 2" x 3.5", if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFD _o A	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFT _r DA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFT _e DA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluorooctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) developed the following guidelines for laboratories analyzing environmental samples for PFAS under DER programs. If laboratories cannot adhere to the following guidelines, they should contact DER's Quality Assurance Officer, Dana Maikels, at dana.maikels@dec.ny.gov prior to analysis of samples.

Isotope Dilution

Isotope dilution techniques should be utilized for the analysis of PFAS in all media.

Extraction

For water samples, the entire sample bottle should be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

For samples with high particulates, the samples should be handled in one of the following ways:

1. Spike the entire sample bottle with isotope dilution analytes (IDAs) prior to any sample manipulation. The sample can be passed through the SPE and if it clogs, record the volume that passed through.
2. If the sample contains too much sediment to attempt passing it through the SPE cartridge, the sample should be spiked with isotope dilution analytes, centrifuged and decanted.
3. If higher reporting limits are acceptable for the project, the sample can be diluted by taking a representative aliquot of the sample. If isotope dilution analytes will be diluted out of the sample, they can be added after the dilution. The sample should be homogenized prior to taking an aliquot.

If alternate sample extraction procedures are used, please contact the DER remedial program chemist prior to employing. Any deviations in sample preparation procedures should be clearly noted in the case narrative.

Signal to Noise Ratio

For all target analyte ions used for quantification, signal to noise ratio should be 3:1 or greater.

Blanks

There should be no detections in the method blanks above the reporting limits.

Ion Transitions

The ion transitions listed below should be used for the following PFAS:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
N-EtFOSAA	584 > 419
N-MeFOSAA	570 > 419

Branched and Linear Isomers

Standards containing both branched and linear isomers should be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. As more standards become available, they should be incorporated in to the method. All isomer peaks present in the standard should be integrated and the areas summed. Samples should be integrated in the same manner as the standards.

Since a quantitative standard does not exist for branched isomers of PFOA, the instrument should be calibrated using just the linear isomer and a technical (qualitative) PFOA standard should be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers should be integrated in the samples and quantitated using the calibration curve of the linear standard.

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated for each target analyte and the ratio compared to standards. Lab derived criteria should be used to determine if the ratios are acceptable.

Reporting

Detections below the reporting limit should be reported and qualified with a J qualifier.

The acid form of PFAS analytes should be reported. If the salt form of the PFAS was used as a stock standard, the measured mass should be corrected to report the acid form of the analyte.

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report. Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Maikels, at dana.maikels@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 14 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6°C upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of five standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%. Linear fit calibration curves should have an R^2 value greater than 0.990.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects
$R^2 > 0.990$	J flag detects and UJ non detects
Low-level calibration check <50% or >150%	J flag detects and UJ non detects
Mid-level calibration check <70% or >130%	J flag detects and UJ non detects

Initial Calibration Verification

An initial calibration verification (ICV) standard should be from a second source (if available). The ICV should be at the same concentration as the mid-level standard of the calibration curve.

ICV recovery <70% or >130%	J flag detects and non-detects
----------------------------	--------------------------------

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results
---------------------------	----------------

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample
----------	------------------------------------

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects
---	---

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated from the standards for each target analyte. Lab derived criteria should be used to determine if the ratios are acceptable. If the ratios fall outside of the laboratory criteria, qualify results as an estimated maximum concentration.

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Branched and Linear Isomers

Observed branched isomers in the sample that do not have a qualitative or quantitative standard should be noted and the analyte should be qualified as biased low in the final data review summary report. Note: The branched isomer peak should also be present in the secondary ion transition.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

APPENDIX F
POST-CLOSURE INSPECTION AND MAINTENANCE REPORT
FORM

ALLTIFT LANDFILL SITE POST-CLOSURE SITE INSPECTION CHECKLIST

Date/Time: _____
 Weather: _____
 Personnel (Organization): _____

Instructions: Complete the checklist of visual evaluation items and then complete specific data items. Field measurements should be made with a cloth tape and noted on the attached Site plan. Estimated measurements shall be so noted. Attach hand sketches or photographs to the Site plan to further define conditions or problems.

VISUAL EVALUATION ITEMS

		<u>CONDITION: (Check)</u>				
		Action Required				
	Acceptable	Not Acceptable	Yes	No	Remarks	
1. Vegetative Cover						
a.	Landfill site	_____	_____	_____	_____	_____
b.	Drainage Bench	_____	_____	_____	_____	_____
c.	Woody Vegetation	_____	_____	_____	_____	_____
2. Integrity of Drainage Systems						
a.	Sediment Buildup	_____	_____	_____	_____	_____
b.	Pooling or Ponding	_____	_____	_____	_____	_____
c.	Slope Integrity	_____	_____	_____	_____	_____
d.	Erosion Protection (riprap, grout, vegetation)	_____	_____	_____	_____	_____
e.	Obstruction of Culverts	_____	_____	_____	_____	_____
3. Condition of Access/ Perimeter Maintenance Roads						
a.	Road Condition	_____	_____	_____	_____	_____
b.	Gates/Locks/Signs	_____	_____	_____	_____	_____
4. Integrity of Groundwater Monitoring Wells, Piezometers, Groundwater Collection Trench Sumps						
		_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____
		_____	_____	_____	_____	_____

ALLTIFT LANDFILL SITE POST-CLOSURE SITE INSPECTION CHECKLIST (Continued)

VISUAL EVALUATION ITEMS

		<u>CONDITION: (Check)</u>				Remarks
		Acceptable	Not Acceptable	Action Required		
		Yes	No			
5. Integrity of Cap						
a.	Erosion Damage	_____	_____	_____	_____	_____
b.	Leachate/Waste Breakthrough	_____	_____	_____	_____	_____
c.	Settlement	_____	_____	_____	_____	_____
d.	Animal Burrows	_____	_____	_____	_____	_____
5. Gas Venting System						
a.	Gas vents free of obstructions	_____	_____	_____	_____	_____
6. Erosion Control Structures (riprap)						
		_____	_____	_____	_____	_____
7. Wetlands Vegetation Conditions						
		_____	_____	_____	_____	_____
8. Other (liter, unauthorized dumping, etc.)						
		_____	_____	_____	_____	_____

SPECIFIC DATA ITEMS (Write N.A. if not applicable)

A Erosion Settlement

1. Approximate size in feet or eroded cap area(s) (List separately)
 - a) NA feet by _____
 - b) NA feet by _____
 - c) NA feet by _____
2. How deep is the most extreme point of erosion when measured from the adjacent surface (List separately)
 - a) NA feet
 - b) NA feet
 - c) NA feet
3. Approximate size in feet of eroded areas outside the soil cap area such as drainage ditches, roads, or slopes.

**ALLTIFT LANDFILL SITE
POST-CLOSURE SITE INSPECTION CHECKLIST (CONTINUED)**

4. Attach a hand sketch or photograph to the attached Site plan showing the location(s) of the eroded area(s). Identify each area by using the letter a, b, c, etc. from Question 1.

-
5. Approximate size in feet of leachate/waste breakout(s).

a) NA feet by
b) NA feet by
c) NA feet by

6. Approximate size in feet of any settlement area within the soil cap area. (List separately.)

a) NA feet by
b) NA feet by
c) NA feet by

7. Approximate size and location of animal burrows. (Attach a sketch showing approximate locations.)

-
8. Approximate depth of each settlement area when measured from the adjacent surface. (List separately.)

a) NA feet
b) NA feet
c) NA feet

9. Attach a hand sketch or photograph to the attached Site plan showing the location of the settlement area(s). Identify each area by using the letter a, b, or c, etc. from Question 6.

NA

-
10. Approximate size and depth of eroded areas of eroded areas of rip-rap along peninsula.

a) NA Feet
b) NA feet
c) NA feet

11. Attach a sketch or photograph to the attached Site plan showing location of any eroded areas.

Signature of Inspector(s)

Attachments

 Yes No

Other Comments:



Site Inspection Form

Site Name: _____
Project Number: _____
Date: _____

Weather: _____
Assessment by: _____

Yes	No	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A. Security

1. Does fence exist? _____
2. Is there a breach in fence? _____
3. Locks on gate? _____
4. Posted signs? _____
5. Signs of trespassers/vandalism? _____
6. Other _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. General Site Conditions

1. Vegetation stress? _____
2. Mowing required? _____
3. Access road drivable? _____
4. Odors? _____
5. Other _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Cap Inspection

1. Exposed waste? _____
2. Side slope stable? _____
3. Erosion? _____
4. Leachate seeps (discolored vegetation)? _____
5. Synthetic liner exposed? _____
6. Bare spots? _____
7. Presence of burrowing animals? _____
8. Deep rooted vegetation? _____
9. Cracking? _____
10. Ponding water? _____
11. Evidence of methane seeps? _____
12. Other _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. Surface Water

1. Obstruction of flow ditches? _____
2. Erosion of ditches? _____
3. Silt & erosion control? _____
4. Culverts in good condition? _____
5. Evidence of overflow or uncontrolled flow? _____
6. Outfalls in good condition? _____
7. Sedimentation basin/ponds secure? _____
8. Other _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

E. Methane Gas Control

1. Does one exist? _____



Site Inspection Form

Yes No N/A

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Is system active or passive? _____
3. Permanent methane gas probes? _____
4. Locks on monitoring wells? _____
5. Vents in working order? _____
6. Well seals in place? _____
7. Methane levels within LEL limits? _____
8. Monitoring reports current? _____
9. Other _____

F. Leachate Collection System

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

1. Does one exist? _____

2. Collection method:

- a. Sump? 2
- b. Well point? _____
- c. Earthen basin/pond? _____
- d. Structure secured? _____
- e. Other _____

3. Pumping system:

- a. Automatic? _____
- b. Manual? _____
- c. Mechanically operable? _____
- d. Leaks/failures? _____

4. Disposals:

- a. Onsite pretreatment/treatment? _____
- b. Surface discharge? (NPDES/SPDES) _____
- c. POTW – hardpiped? _____
- d. Quick disconnect caps in place? _____

5. Transportation (if any):

- a. Chemicals? _____
- b. Filter cake? _____

6. Ancillary equipment in good condition? (Pipes, valves, pumps, vaults, instruments and etc.) _____

7. Monitoring reports current? _____

8. Other _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

G. Groundwater Monitoring & Recovery Wells (if any)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

1. Locks on wells? _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

2. Wells in good condition? _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

3. Well seals in good condition? _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

4. Access to wells? _____

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

5. Monitoring reports current? _____

6. Other _____



Site Inspection Form

<u>Yes</u>	<u>No</u>	<u>N/A</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

H. Treatment Plant

1. Building in good condition? (Doors, windows, wells, roof) _____
2. Visual tank inspection performed? _____
3. Visual inspection of pipes, valves, fittings etc.? _____
4. Pump operation/inspection performed? _____
5. Instruments operation/calibration? _____
6. Mixer operation/inspection? _____
7. Proper personal protection equipment? _____
8. Air compressor system functioning properly? _____
9. Filter press inspected? _____
10. Emergency generator functioning properly? _____

J. General Comments

APPENDIX G

SELECTED SPECIFICATIONS AND FIELD CHANGES

SECTION 02015

GROUNDWATER MONITORING WELLS AND PIEZOMETERS

PART 1 - GENERAL

1.01 WORK SPECIFIED

- A. The Drilling Subcontractor (Subcontractor) shall provide all labor, materials, equipment, and incidentals as required by this specification to complete the work as described.
- B. Groundwater monitoring wells and piezometers will be installed at the Site in locations shown on the drawings (C-1 for background wells, C-8 and C-9 for piezometers). The wells will be constructed using the appropriate equipment to advance the borehole to its completion depth and install respective monitoring wells and piezometers. See Drawing C-15 for detailed cross-section of monitoring well and piezometer construction.

1.02 SUBMITTALS

- A. Product Data: The product data for each component to be used in construction of the monitoring wells, including well screen, filter pack, cement and bentonite must be submitted to the Contractor. Product data must include manufacturers name and the source of the material and be submitted prior to use in well construction.
- B. Installer: The name and address of the proposed Subcontractor and a list of at least five completed projects of similar construction must also be submitted to the Contractor.

1.03 REFERENCE STANDARDS

Title 6, New York Code of Rules and Regulations, Part 360.

PART 2 - PRODUCTS

2.01 CASINGS

- A. Protective Casing. The casing shall be 6-inch diameter (or 6-inch square) carbon steel pipe with a hinged locking cap and lock. All locks are to be keyed alike to match existing locks on site. The well riser will be terminated with a vented locking cap and matching lock.

2.02 RISER

- A. The monitoring well riser pipe will be 2-inch ID, flush joint, threaded, schedule 40 PVC.
- B. The piezometer riser pipe will be 1.5-inch ID, flush joint, threaded, schedule 40 PVC.

2.03 WELL SCREEN

- A. The monitoring well screen will be a 2-inch ID, flush joint, threaded, schedule 40 PVC pipe with a threaded PVC bottom plug. The screen sections shall be to lengths noted on the drawings with a machined slot size of 0.01 inches (10-slot).
- B. The piezometer screen will be 1.5-inch ID, flush joint, threaded, schedule 40 PVC pipe with a threaded PVC bottom plug. The screen sections shall be to lengths noted on the drawings with a machine slot size of 0.01 inches (10 slot).

2.04 VENT CAPS

A PVC vent cap shall be provided for PVC well risers.

2.05 SAND PACK

- A. The primary sand pack surrounding the well screen will be a clean, inert, siliceous material with a grain size greater than 0.01 inches or equivalent to a "Morie" 00 sand.
- B. The secondary sand pack will be composed of fine sand with 100 percent of the grains passing the No. 30 sieve and less than two percent of the grains passing the No. 200 sieve.

2.06 BENTONITE SEAL

- A. The seal will consist of 3/8-inch diameter sodium bentonite pellets. In unsaturated conditions, the bentonite pellets will be hydrated with potable water. The bentonite pellets will be allowed to hydrate a minimum of 30 minutes after installation, prior to installation of the cement/bentonite grout above the seal.

2.07 GROUT MIXTURE

- A. The grout mixture shall be a mixture of Type I, Portland Cement (1-94 lb. bag), minus No. 200 sieve bentonite powder (3 lbs.), and potable water (7 gallons) in appropriate quantity to fill the borehole.

2.08 CONCRETE SURFACE SEAL

- A. The concrete surface seal must be constructed such that it extends below the frost line and is a minimum of three feet in diameter. The surface seal will contain

Type I Portland Cement with processed aggregates containing no deleterious materials. The cement will be mixed with clean, potable water to obtain a mix strength of 3,000 pounds per square inch (psi) at a minimum. The cement mix will be placed in a 3 foot diameter form or 3 x 3 foot form around the base of the protective casing at ground surface. The surface seal must also be constructed to prevent ponding around the well and surface water from entering the well.

PART 3 - EXECUTION

3.01 WELL INSTALLATION

- A. Installations shall be supervised by the Geologist/Engineer and recorded in a field log book.
- B. Wells and piezometers shall be installed in the subsurface to specified depths using hollow stem auger and casing (spin and wash or drive and flush) drilling techniques. The wells will be screened as noted on the Drawings. Drilling equipment shall be decontaminated prior to drilling, between boreholes, and before leaving the site, as outlined in this specification.
- C. Following the completion of drilling, monitoring well/piezometer will be constructed through the auger casing. Each monitoring well/piezometer will be constructed with respective PVC riser with an appropriate length well screen. The annulus around the outside of the well screen will be backfilled with a properly sized clean, inert, silica sand that extends from six inches below the bottom of the well screen to 2 feet or 20 percent of the length of the well screen (whichever is greater) above the top of the well screen. A secondary sand pack, composed of fine grained, clean, inert silica sand will be extended six inches above the top of the primary sand pack. Both the primary and secondary sand packs will be placed using methods that avoid bridging and ensure accurate placement of filter materials. A minimum three foot thick bentonite pellet seal will be placed above the secondary sand pack, hydrated, if necessary, and allowed to swell a minimum of 30 minutes. After allowing the bentonite seal to swell, cement/bentonite grout will be installed above the bentonite seal to within three to five feet of ground surface. The grout will be placed ensuring that it is not diluted by formation water and that any water in the annular space is displaced. The thickness of the bentonite seal and the cement/bentonite grout may need to be reduced, depending on the planned depth of the well/piezometer or the depth to the water table. Any reductions in thickness should be approved by the Supervising Geologist/Engineer prior to making the change.
- D. Each monitoring well/piezometer shall have a vented cap and a six-inch diameter or six-inch square steel casing with a hinged locking cap placed over the monitoring well. The protective casing shall extend at least two feet above the ground surface and be cemented and sealed in place with a concrete surface seal. A permanent measuring point shall be marked on the PVC riser.

- E. The concrete surface seal shall consist of a concrete pad conforming to the following dimensions: 3 feet wide by 3 feet long (or 3 feet in diameter) by the depth obtained by the bottom of the protective casing. The surface of the concrete pad shall be sloped away from the well casing and be flush with the ground surface at its outside edge.

A drum type batch machine mixer, or other capable means of mixing concrete must be used to create the concrete mix. The concrete will be protected from physical damage or reduced strength due to weather extremes during mixing, placement, and curing. All concrete will be solid, compact and smooth, free of laitance, cracks, and cold joints. A non-slip broom surface will be applied. The formed surface will be cured by use of moisture-retaining cover or membrane-forming curing compound.

- F. After wells are completed, they will be labeled with paint or other permanent markings to identify the wells.
- G. Wells shall be developed by pumping to remove fine sediments. Development shall continue until Supervising Geologist/Engineer approves the results of the development. A maximum of three hours of pumping per well shall be conducted for development. All pumping and ancillary equipment used in development must be decontaminated prior to moving to another well (see Section 3.05 for details.)

3.02 ACCEPTANCE

- A. If at any time during the installation of a monitoring well, the Supervising Geologist/Engineer determines that the well has not been properly installed, the Subcontractor shall abandon the hole and slurry grout its full depth as directed by the Supervising Geologist/Engineer and initiate construction of a new well at a location determined by the Supervising Geologist/Engineer at no cost to the Owner.
- B. Upon completion of a well, the Subcontractor shall demonstrate to the Supervising Geologist/Engineer that the full depth of the monitoring well is free from any obstructions and clear of any formation materials and that the well will produce clean sediment-free water, or the well shall be deemed unacceptable and shall be abandoned and re-drilled at no cost to the company.

3.03 DRILLING RECORDS

- A. The Supervising Geologist/Engineer will record all drilling activities in a well log. The well log will contain the following information:
 - 1. A record of the soil materials penetrated and the depth to which they were encountered in accordance with 6 NYCRR 360-2.11(a)(10).
 - 2. A record showing lengths of each diameter of casing and screen used and the location of packers, plugs and seals.

3. Static groundwater level, in the new well and the levels at which water was encountered during drilling.

3.04 SURVEYING

- A. Vertical and horizontal coordinates of newly installed wells shall be determined by a state licensed land surveyor. Each well shall be surveyed from the permanent measuring point scribed onto the well riser. Vertical measurements (elevations) shall be measured to within ± 0.01 feet and horizontal measurements within 0.1 feet. Measurements shall be tied into the horizontal and vertical control established for the site.
- B. Surveying shall be provided by the Contractor.

3.05 DECONTAMINATION

- A. The Subcontractor will not use, reuse, or remove any equipment, materials, samples, or other goods at or from the site until it is certified to be uncontaminated. Decontamination will consist of washing and steam cleaning all equipment and materials that may be required as specified above or at the request of the Supervising Geologist/Engineer. The drilling crew will undertake the decontamination of the given equipment or materials under the supervision of the Supervising Geologist/Engineer. The Subcontractor shall comply with all requests and procedures of the onsite Supervising Geologist/Engineer regarding decontamination during the course of the work, close of the workday, and upon completion of the project. Anticipated requests and procedures for decontamination are outlined as follows:
- B. General Decontamination Procedures and Requirements
 1. All drilling equipment shall be inspected for integrity of hydraulic and oil fluid handling systems and general overall cleanliness. Leaking hoses, tanks, hydraulic lines, etc., shall be replaced or repaired prior to beginning work.
 2. All well casing, screens, and other construction materials must be new or unused. Used materials shall not be permitted in well construction.
- C. Initial Cleaning
 1. All drilling equipment and associated tools shall be steam cleaned, upon arrival at the Site. Equipment will include at a minimum, but not be limited to:
 - drilling rods, bits;
 - augers (clips, pins, and associated hardware);
 - samplers (i.e. split spoon, hydropunch);
 - casing materials (both temporary and permanent);
 - wrenches;
 - hammers;
 - other hand tools and tool boxes;

- hoses, tanks;
 - cable clamps and other holding devices in direct contact with drilling rods; and
 - drill rig and undercarriage, wheel wells, chassis.
2. During and following cleaning, equipment shall be handled only with clean gloves. A new set of gloves will be utilized between each location.
 3. Cleaned materials shall be protected from contamination by such means as the Supervising Geologist/Engineer deems necessary.

D. Onsite Cleaning

1. Following use, all equipment with the exception of the carrier truck and undercarriage, shall be steam-cleaned between borings.
2. Down hole sampling equipment must be washed in laboratory grade detergent and water, and rinsed in clean, clean potable municipal water between consecutive samples and/or each boring, as appropriate.
3. If immiscible products are encountered during drilling, the drilling and sampling equipment must be cleaned in a manner consistent with the equipment decontamination procedures.

End Of Section 02015

SECTION 02085

GROUNDWATER MONITORING WELL ABANDONMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Abandonment of existing groundwater monitoring wells as noted on Drawing C-2.
- B. Related work specified elsewhere in other section.
 - 1. Section 02219 - Waste Excavation, Consolidation, and Disposal

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

The publications listed below form a part of the specifications to the extent referenced. The publications are referred to in the text by basis designation only.

- A. American Society of Testing and Materials (ASTM)
 - ASTM C150-89 Type I Portland Cement

1.03 SUBMITTALS

- A. Methods - Proposed drilling and abandonment methods.
- B. Mixes - Grout mixes, bentonite mixture.
- C. Equipment - Drill rig and related equipment.

PART 2 - PRODUCTS

2.01 GROUT

- A. Grout shall be a Portland Cement/bentonite grout mixture. The grout shall consist of a mixture of Portland Cement (ASTM C150 Type I), bentonite and water in the proportions of one 94 pound bag of Type I Portland Cement, 3.9 pounds of powdered bentonite, and 6 gallons of potable water.

2.02 BENTONITE

- A. Baroid - Ben Seal

PART 3 - EXECUTION

3.01 GENERAL

- A. No monitoring well abandonment activities shall commence without approval of the proposed method by the Engineer/Supervising Geologist.
- B. All monitoring well abandonment shall be performed in accordance with the requirements of this Section and to the satisfaction of the Engineer/Supervising Geologist.
- C. Review all available information concerning each well to be abandoned which may include a site map, well construction diagram, field inspection log, and proposed well decommissioning procedure. See attached table showing list of wells, approximate depths, diameters, etc.
- D. Verify the depth of the well location with a weighted tape and compare measurements with the well construction log.
- E. Verify the well location and identification before proceeding with decommissioning.
- F. Well materials and soil cuttings shall be disposed of within the limits of the proposed capped area as directed by the Engineer/Supervising Geologist. No well materials to be disposed of within the limits of the capped area shall be greater than 5 feet in length.
- G. The Contractor shall restore the area in the vicinity of each well location as directed by the Engineer/Supervising Geologist.
- H. Following drilling activities, the Contractor shall decontaminate equipment in accordance with the decontamination protocol in paragraph 3.03.

3.02 ABANDONMENT

Well abandonment will only proceed after determining the appropriate well grouping.

- A. Group 1 Wells
 - 1. Group 1 wells include wells which are single cased and generally constructed of 2-inch diameter PVC well materials (refer to individual monitoring well figures for construction details).
 - 2. Well casing pulling procedures include the following:
 - a. The Contractor shall lower a drill rod down the well and perforate the bottom well cap.
 - b. The Contractor shall add the grout to the well casing and riser prior to pulling the casing.

- c. The Contractor shall pull the well by grappling the protective casing with appropriate devices and pulling the casing and well materials as a single unit.
 - d. The Contractor shall add grout on an intermittent basis to ensure that the void spaces are adequately filled with grout as the casing and well are withdrawn. Grout is to be added until the level is within five feet of existing ground surface. The balance of the borehole is to be backfilled with clean soil by the Contractor.
 - e. If all of the well materials are not withdrawn during the pulling process, over-drilling of the remaining portions may be required by the Contractor as directed by the Engineer/Supervising Geologist.
3. Well over-drilling procedures include the following:
- a. The Contractor shall remove the protective casing, if present, from each well in a manner which minimized disturbance to the well.
 - b. The Contractor shall lower a drill rod down the well and perforate the bottom well cap.
 - c. The Contractor shall over-drill the well using minimum 6 1/4-inch inside diameter (I.D.) hollow stem augers with outward facing cutting teeth to a minimum of 2 feet below the total depth of the original boring or over-reaming tool with a pilot bit approximately similar in size to the inside diameter of the well material.
 - d. Following over-drilling, the Contractor shall withdraw the well materials from within the auger.
 - e. The Contractor shall seal the borehole with cement bentonite grout by using a tremie pipe to fill the inside of the augers to ground surface.
 - f. Additional grout shall be added as required as the augers are removed to maintain the level of grout at ground surface. Grout is to be added until the level is within five feet of the existing ground surface. The balance of the borehole is to be backfilled with clean soil by the Contractor.

B. Group 2 Wells

- 1. Group 2 wells (if present) include wells which were constructed as double cased overburden monitoring wells. The wells are typically constructed with 10-inch diameter steel casing and 2-inch diameter PVC monitoring well.
- 2. The Contractor shall remove the protective casing, if present, from each well in a manner which minimizes disturbance to the well. If the 10-inch steel casing is used as a protective cover, it shall be cut near the ground surface.
- 3. The Contractor shall install the cement bentonite grout into the 2-inch diameter well by using a tremie pipe placed at bottom of the well.
- 4. Contractor shall advance minimum 4 1/4-inch I.D. hollow stem augers or 8-inch flush jointed temporary casing inside the 10-inch diameter well casing to a minimum of two feet below the total depth of the original boring. The Contractor shall minimize damage to the 10-inch casing.

5. Following over-drilling, the Contractor shall withdraw the well materials from within the augers.
6. The Engineer/Supervising Geologist shall inspect the condition of the 10-inch diameter well casing (visually and by testing it for movement.)
 - a. If, in the opinion of the Engineer/Supervising Geologist, the well casing and annular seal do not appear to be compromised, then the 10-inch casing shall be left in place.
 - b. If, in the opinion of the Engineer/Supervising Geologist the integrity of the casing appears to be suspect (including, but not limited to, conditions such as the ability to move 10-inch casing, cracked seal, casing has excess rust), the casing shall be removed by over-drilling. A minimum 12-inch ID hollow stem auger shall be advanced over the top of the 10-inch casing to a depth below ground surface that allows removal.
7. The Contractor shall install the cement bentonite grout by using a tremie pipe to fill the inside of the augers/temporary casing to the surface.
 - a. If the 10-inch diameter casing is to be left in place, the grout shall be installed to the ground surface.
 - b. If the 10-inch diameter casing is to be removed, the grout shall be installed to a depth of 12 feet below ground surface.
 - c. Additional grout shall be added as required as the augers are removed to maintain the level of grout at ground surface.
 - d. Grout shall be allowed to cure a minimum of 24 hours.
8. Contractor shall remove 10-inch casing.
9. Contractor shall install grout to the ground surface by using a tremie pipe.

C. Group 3 Wells

- 1. Group 3 wells include triple cased bedrock monitoring wells constructed with 10-inch diameter casing, 4-inch diameter steel casing, and 2-inch diameter PVC riser pipe and well screen.
2. The Contractor shall remove the protective casing, if present, from each well in a manner which minimizes disturbances to the well. If the 10-inch steel casing is used as a protective casing, it shall be cut near the ground surface.
 3. The Contractor shall install the cement bentonite grout into the 2 inch diameter well by using a tremie pipe from the bottom of the borehole.
 4. Contractor shall over-drill the 2-inch monitoring well with 3-inch flush jointed temporary casing to the bottom of the boring.
 5. The Contractor shall install the cement bentonite grout by using a tremie pipe from the bottom of the borehole to the bottom of the 4-inch diameter casing.
 6. Additional grout shall be added as required as to maintain the level of grout at the bottom of the 4-inch diameter casing. The grout shall be allowed to cure a minimum of 24 hours.
 7. Contractor shall over-drill the 4-inch steel casing using 8-inch flush jointed temporary casing. The Contractor shall minimize damage to the 10-inch casing.

8. The Contractor shall remove the 4-inch steel casing.
9. The Engineer/Supervising Geologist shall inspect the condition of the 10-inch diameter well casing.
 - a. If, in the opinion of the Engineer/Supervising Geologist, the well casing and annular seal do not appear to be compromised, then the 10-inch casing shall be left in place.
 - b. If, in the opinion of the Engineer/Supervising Geologist, the integrity of the casing appears to be suspect (including, but not limited to, conditions such as the ability to move 10-inch casing, cracked seal, casing has excessive rust). the casing shall be removed by over-drilling. A minimum 12-inch ID hollow system auger shall be advanced over the top of the 10-inch casing to a depth of 12 feet.
10. The Contractor shall install the cement bentonite grout by using a tremie pipe inside the 8-inch temporary casing.
 - a. If the 10-inch casing is to be left in place, the grout shall be installed to the ground surface.
 - b. If the 10-inch casing is to be removed, the grout shall be installed to a depth of 12 feet below ground surface.
 - c. Additional grout shall be added as required as the temporary casing is removed.
 - d. Grout shall be allowed to cure for a minimum of 24 hours.
11. Contractor shall remove 10-inch casing.
12. Contractor shall install grout to ground surface by using a tremie pipe.

3.03 DECONTAMINATION

- A. The contractor will not use, reuse, or remove any equipment, materials, samples, or other goods at or from the site until it is certified to be uncontaminated. Decontamination will consist of washing and steam cleaning all equipment and materials that may be required as specified above or at the request of the Supervising Geologist. The drilling crew will undertake the decontamination of the given equipment or materials under the Supervising Geologist's supervision. The Contractor shall comply with all request and procedures of the Supervising Geologist regarding decontamination during the course of the work, close of the workday, and upon completion of the project. Anticipated requests and procedures for decontamination are outlined below:
- B. General Decontamination Procedures and Requirements:
 1. All drilling equipment shall be inspected for integrity of hydraulic and oil fluid handling systems and general overall cleanliness. Leaking hoses, tanks, hydraulic lines, etc., shall be replaced or repaired prior to beginning work.
- C. Initial Cleaning
 1. All drilling equipment and associated tools shall be steam cleaned, upon arrival at the Site. Equipment will include at a minimum, but not be limited to:

- drilling rods, bits;
 - augers (clips, pins, and associated hardware);
 - samplers (i.e. split spoon, hydropunch);
 - casing materials (both temporary and permanent);
 - wrenches;
 - hammers;
 - other hand tools and tool boxes;
 - hoses and tanks;
 - cable clamps and other holding devices in direct contact with drilling rods; and
 - drill rig and undercarriage, wheel wells, chassis.
2. During and following cleaning, equipment shall be handled only with clean gloves. A new set of gloves will be utilized between each location.
 3. Cleaned materials shall be protected from contamination by such means as the Supervising Geologist deems necessary.

D. Onsite Cleaning

1. Following use, all equipment with the exception of the carrier truck and undercarriage, shall be steam-cleaned between borings.
2. Down hole sampling equipment must be washed in laboratory grade detergent and water, and rinsed in clean, clean potable municipal water between consecutive samples and/or each boring, as appropriate.
3. If immiscible products are encountered during drilling, the drilling and sampling equipment must be cleaned using a high pressure, heated water washer, scrubbed with a trisodium phosphate cleaning solution, and rinsed using the high pressure, heated water washer.

End Of Section 02085

Existing Well Construction Alltift Landfill Construction Project

Well ID	Casing diameter and material	Total Well Depth (ft.)	Well Class	Construction comments
MW-5S	2" PVC	24.6	G1	4" steel protective casing to 3' 8" - stick up
MW-4S	2" PVC	27	G1	4" steel protective casing to 3' 8" - stick up
PZ-15	1.25" OD steel	7	N/A	2' steel screen
PZ-12	1.25" OD steel	7	N/A	2' steel screen
MW-6S	2" PVC	34.25	G1	4" steel protective casing to 3' 7" - stick up
MW-6D	2" PVC	77.33	G3	8" PVC to 39' 0", 6" steel to 65' 4"
MW-7S	2" PVC	27.25	G1	4" steel protective casing to 3' 8" - stick up
MW-7D	2" PVC	85.75	G3	10" steel to 31' 5", 8" PVC to 34' 0", 6" steel to 75' 6"
W6 *				
PZ-11	1.25" OD steel	7	N/A	2' steel screen
W7 *				
W8 *				
MW-8S	2" PVC	28.25	G1	4" steel protective casing to 3' 11" - stick up
MW-8D	2" PVC	89.5	G3	8" PVC to 36' 6", 6" steel to 76' 0"
MW-9S	2" PVC	28	G1	4" steel protective casing to 3' 11" - stick up
MW-11S	2" PVC	25	G1	4" steel protective casing to 4' 2" - stick up
CW-3B	2" PVC	18	G1	4" steel protective casing to 3' 6" - stick up (depths estimated)
MW-13S	2" PVC	18.5	G1	4" steel protective casing to 3' 11" - stick up
MW-13D	2" PVC	76	G3	8" PVC to 19' 0", 6" steel to 65' 0"
CW-2N *				
PZ-6	1.25" OD steel	12	N/A	2' steel screen
PZ-? *				
PZ-19	1.25" OD steel	7	N/A	2' steel screen
SMW-1	2" PVC	22.5	G1	6" steel protective casing to 8' 6" - stick up
CW-1	2" PVC	14	G1	6" steel protective casing to 3' 0" - stick up (depths estimated)
CW-4N *				
SMW-6	2" PVC	11.6	G1	6" steel protective casing to 1' 3" - stick up

Estimated Total Length: 780

Note: All depth and construction data based on best available data.

Actual depths and/or construction may vary.

* Assume single cased 2-inch PVC well, 20 feet deep.

**Monitoring Well and Piezometer Schedule
Bid Addendum No. 1
Alltift Landfill/Ramco Steel Remediation**

Piezometer/Well ID	Approximate Land Surface Elevation (ft.asl)	Approx. Groundwater Elevation (ft.asl)	Depth to Water (ft.)	Est. Total Well Depth (ft.)	Est. Screen Length (ft.)
MW-1	585	583	2	14	5
MW-2	585	582	3	14	5
PZ-1	584	581	3	14	5
PZ-2	582	581	1	14	5
PZ-3	584	581	3	14	5
PZ-4	582	581	1	14	5
PZ-5	584	581.5	2.5	14	5
PZ-6	582.5	581.5	1	14	5
PZ-7	583.5	582	1.5	14	5
PZ-8	582.5	582	0.5	14	5
PZ-9	583.5	583.5	0	14	5
PZ-10	586	582.5	3.5	14	5
PZ-11	587	584	3	14	5
PZ-12	587	584	3	14	5
PZ-13	585.5	582	3.5	14	5
PZ-14	617	584	33	50	15
PZ-15	587	582	5	14	5
Total estimated drilling footage = 274					

Note: Estimates of land surface elevation, shallow groundwater elevation, and depth to water are based on the best available information but are likely to vary based on field conditions when the work is done.

SECTION 02990

FINISH GRADING, TOPSOIL, AND SEEDING

PART 1 GENERAL

1.01 WORK SPECIFIED

- A. The work specified herein includes the material, equipment, and labor necessary to provide finish grading and to place topsoil, fertilizer, seed, mulch, and biodegradable and permanent erosion control fabric. The mulch and erosion control fabric shall be placed as follows:
 - 1. Topsoil, fertilizer, seed and mulch - shall be utilized on all slopes.
 - 2. Biodegradable erosion control fabric - shall be utilized as specified in 3.05 or indicated on the Drawings.
 - 3. Permanent erosion control fabric - shall be utilized as specified in 3.06 or indicated on the Drawings.
- B. Related work specified in other sections:
 - 1. Section 01500 - Construction Facilities and Temporary Controls
 - 2. Section 01564 - Erosion Control
 - 3. Section 02100 - Site Clearing
 - 4. Section 02222 - Excavation
 - 5. Section 02260 - Landfill Cover Construction
 - 6. Section 02910 - Wetland Restoration

1.02 SUBMITTALS

- A. Materials and Products: Submit for approval data.
 - 1. Topsoil Source: The Contractor shall submit for approval by the Engineer, a written statement giving location of topsoil source. If soil amendments are proposed, submit amendment types, quantities, mixes and test results.
 - 2. Grass Seed Vendors Certificate: The Contractor shall submit the seed vendor's certified statement for the grass seed mixture required, stating common name, percentage by weight, and percentages of purity, and germination.
 - 3. Fertilizer: Submit manufacturer's product data showing contents and test results.
 - 4. Hydroseeders: The Contractor shall submit for approval by the Engineer, all data concerning hydroseeding equipment (if used) including all material application rates.
 - 5. Erosion Control Fabrics: The Contractor shall submit for approval by the Engineer, the erosion control fabric manufacturer's literature, samples and specifications.
- B. Installer - Submit the name of subcontractors (if used) and Qualification Statements.
- C. Manufacturer's Certification - Certify that products meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

- A. All plants shall conform to or surpass minimum quality standards as defined by the American Association of Nurserymen. All plant materials must be clearly labeled with genus, species, and common name. These plants may be inspected for conditions of root ball, disease, insects, or injury. All rejected plant materials must be removed immediately from the job site and must be replaced by the Contractor at no cost to the Owner within 5 working days. The Engineer has the right to inspect and reject plant materials up to the final acceptance.
- B. Certificates. In addition to any other certificates specified, the Contractor shall furnish a certificate with each delivery of material, in containers or bulk, the analysis of the material, together with the date of delivery. All certificates shall be delivered to the Engineer, who will inspect the materials prior to its use.
- C. Seeding. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination which shall be within a period of six (6) months prior to commencement of planting operations. Seeding material shall be inspected upon arrival at the job site, and unacceptable material shall be removed from the job site. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85%, a percentage of germination not less than 90%, shall have a weed content of not more than 1% and contain no noxious weeds.

PART 2 - PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be natural, friable, fertile soil of loamy character, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than 2 inches in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter. Topsoil as delivered to the site or stockpiled shall meet the following requirements:
 - 1. shall be well graded with a maximum particle size of 2 inches, 85 to 100 percent passing 1 inch, 65 to 95 percent passing 1/4 inch, and 20 to 80 percent passing a Number 200 sieve. Clay content of material passing the Number 200 sieve shall not be greater than 30 percent, as determined by hydrometer analysis;
 - 2. pH between 6.0 and 7.5;
 - 3. shall contain not less than 3 percent organic matter nor more than 20 percent as determined by loss of ignition of moisture-free samples dried at 100° to 110° Celsius;
 - 4. free of pest larvae; and
 - 5. soluble salt content not greater than 500 ppm.

2.02 FERTILIZER

- A. Fertilizer shall be a starter fertilizer of commercial stock, of neutral character, with elements derived from organic sources. It shall be a complete, prepared and packaged material. Fertilizer will conform to NYSDOT specification 713-03, Type 3 Fertilizer. Fertilizer may be either fluid or dry formation consisting of 10-6-4 NPK (50% N-UA).

2.03 GRASS SEED

The seed mixture will consist of the following proportions or approved equal.

<u>Common Name</u>	<u>Variety</u>	<u>% By Weight</u>	<u>Application Rate</u> <u>(lbs. per acre)</u>
Tall Fescue	KY-31	36	70.6
Orchard Grass	Pennlate	15	29.4
Creeping Red Fescue	Ensylva	20	39.2
Fine Textured Perennial Rye Grass	Polly	25	49
Birds-foot Trefoil*	Viking	4	7.8

* All leguminous seed requiring inoculation will be inoculated before sowing. A certificate of inoculation will accompany the seed.

2.04 MULCH

- A. Straw Mulch

Mulch shall be comprised of clean, threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10 inches or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

- B. Hydromulch

Hydromulch - Wood Cellulose Fiber Pulp.

1. Provide a specially prepared wood cellulose fiber, processed to contain no growth or germination inhibitor factors, and dyed an appropriate color to facilitate visual metering of application of the materials.
2. Hydromulch manufactured from recycled paper products will be acceptable.
3. Product and Manufacturer:
 - a. Conwed Virgin Wood Fiber Mulch by Conwed, Inc.
 - b. Silva Fiber by Weyerhaeuser Co.
 - c. or equal

2.05 BIODEGRADABLE EROSION CONTROL FABRIC

- A. The natural erosion control fabric shall be a machine-produced mat of 100 percent biodegradable material.
 - 1. Straw matting
 - a. The material shall contain straw at 0.5 pounds per square yard with netting on one side only.
 - b. Product and Manufacturer:
 - 1. Erosion Mat S75 by North American Green
 - 2. or equal
- B. The wire staples for securing erosion control fabrics shall be U-shaped and formed of 11-gauge plain iron wire with dimensions of 6-inch minimum length and 2-inch minimum width.

2.6 PERMANENT EROSION CONTROL FABRIC

- A. The permanent erosion control fabric shall be a machine-produced mat of 100% UV stable polypropylene fiber. The matting shall be of consistent thickness with synthetic fibers evenly distributed over the entire area of the mat.
- B. Product and Manufacturer:
 - 1. Erosion Mat P300 by North American Green
 - 2. or equal.

PART 3 - EXECUTION

3.01 APPLICATION PROCEDURES

- A. All final grade surfaces shall receive six (6) inches minimum of compacted topsoil, seeding, mulch/or erosion control fabric, and fertilizer in accordance with this section.
- B. All final grade surfaces outside the cover limits that have been disturbed or damaged during completion of the work shall be reseeded using a mixture of seed which shall produce similar vegetative growth as existed prior to commencement of the work.
- C. The Contractor shall place mulch or erosion control fabric as follows:
 - 1. Mulch on all slopes less or equal to 15 percent.
 - 2. Natural erosion control fabric on all disturbed or constructed slopes greater than 15 percent or as indicated on the Drawings, whichever is more stringent.

3.02. TOPSOIL

- A. The Contractor shall place a minimum of six (6) inches of topsoil over excavated areas, the landfill cover area, and disturbed areas as noted on the Drawings.

- B. The underlying soil shall be tilled to a depth of 2 inches by disking or harrowing before topsoil placement. Tillage shall be parallel to contours, and shall not be performed when the cover is frozen or excessively wet.
- C. Topsoil shall be placed to a depth sufficiently greater than required so that after compaction, the complete work will conform to the lines, grades, and elevations indicated on the Drawings and the six (6) inch minimum requirement. No topsoil shall be spread in water or while frozen or muddy.
- D. The topsoil shall then be rolled or compacted with a cultipacker weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional topsoil, and the surface shall be regraded and rolled until a smooth and even finished grade is created. All stiff clods, lumps, roots, litter and other foreign material shall be removed from the area and disposed of by the Contractor.
- E. Quality Control
 - 1. The Contractor shall provide the services of an Engineer and an independent soils testing laboratory to conduct quality assurance testing.
 - 2. The following material property test methods and frequency shall be conducted for soil:

Material Property	Test Method	Frequency
Grain-size Analysis with Fines	ASTM D-422	5,000 cubic yards
Soil pH	ASTM D-4972	5,000 cubic yards
Organic Content	ASTM D-2974	5,000 cubic yards

-
- 3. Additional testing will required if alternate sources are proposed or utilized.

3.03. FERTILIZER

- A. The fertilizer shall be applied to the entire seeded area with a mechanical or hydraulic spreader. Fertilizer will be applied to conform with NYSDOT specification 610-3.01 and 610-3.02, applied at a rate of approximately 800 lbs/acre.
- B. After topsoil has been spread and the fertilizer applied, it shall be carefully prepared by scarifying or harrowing to a depth of 2 inches and left in a roughened condition for seeding.

3.04. SEEDING

- A. Turf Grass: The seed mixture shall be applied uniformly upon the prepared surface with a mechanical or hydraulic spreader at application rates specified in Part 2.04. The seed shall be raked lightly into the surface and rolled. Seeding shall be conducted from April 1 to May 30 or from August 15 to September 23.

3.05. MULCH AND BIODEGRADABLE EROSION CONTROL FABRICS

- A. Mulch or biodegradable erosion control fabric shall be placed immediately after the application of fertilizer and seed.
- B. Areas that have been seeded and have a slope less than or equal to 15 percent shall be protected from erosion by the placement of straw mulch or hydromulch. Straw mulch shall be applied with a mulch blower at a uniform rate of 1500 lbs/acre and anchored by use of a tackifier.
- C. Biodegradable erosion control fabrics shall be installed in lieu of the mulch in areas that have a slope greater than 15 percent or as indicated on the Drawings. The installation shall be in accordance with the written instruction of the manufacturer.

3.06. PERMANENT EROSION CONTROL FABRICS

- A. Permanent erosion control fabric shall be placed immediately after the application of fertilizer and seed.
- B. All surface drainage shall be covered by permanent erosion control fabrics and the installation shall be in accordance to the written instruction of manufacturer.

3.07. WATERING

- A. Following applications of the mulch or erosion control fabric, the seed bed shall be moistened. A muddy soil condition will not be acceptable. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory growth. Watering shall be done in such a manner to prevent washing out of seed.
- B. The stand of grass resulting from the seeding shall not be considered satisfactory until accepted by the Owner. If areas are determined to be unacceptable, the remaining mulch or erosion control fabric will be removed and all areas shall be reseeded, refertilized and remulched and erosion control fabric replaced as per the above application procedures at the Contractor's expense.

3.08 MAINTENANCE

- A. The Contractor shall begin a maintenance period immediately after planting of grass and landscape materials.
- B. The Contractor shall maintain grass areas, for the periods required to establish an acceptable growth, but not less than 60 days, after seeding. If seeded in the fall and not given a full 60 days of maintenance, or if not considered acceptable by the Owner and the Engineer at that time, continue maintenance during following spring until acceptable grass stand is established.
- C. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed.

3.09 WARRANTY

- A. The warranty period shall be one year from the date of substantial completion or correction period. Areas of erosion shall be immediately repaired, re-seeded, re-mulched and maintained until an acceptable grass stand is established. Areas to be repaired shall also include areas failing to produce a full, uniform strand of grass.

END OF SECTION 02990

FIELD CHANGE FORM # 002

Project Number: 440788

Date: 7/1/04

Engineer: Parsons

Remedial Action Contractor: Tug Hill

You are hereby authorized and instructed to complete the following modifications to the approved Final Design:

Well Abandonment:

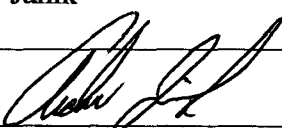
- Please refer to Technical Specification Section 02085, Groundwater Monitoring Well Abandonment, Section 3.02 A (G-1) for the accepted methodology involved in well/piezometer abandonment.
- Due to the proximity of the ponds adjacent to the landfill, piezometers/wells PZ-6, PZ-11, PZ-12, PZ-15, MW-1S, and "6256" will be removed during sediment and waste excavation activities, not in accordance with the Technical Specification referenced above. The total depth of these piezometers/wells range from 7'-10' below existing ground surface and do not extend into the underlying clay layer.

APPROVALS:

Parsons Representative

Name: Andy Janik

Date: 7/6/04

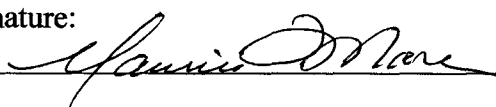
Signature: 

NYSDEC Representative

Name:

MAURICE F. MOORE

Date: 7/6/04

Signature: 

ALLTIFT LANDFILL SITE
BUFFALO, NEW YORK

FIELD CHANGE FORM # 004

Project Number: 440788

Date: 8/13/04

Engineer: Parsons

Remedial Action Contractor: Tug Hill

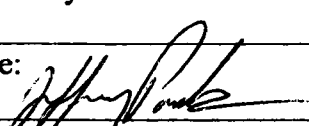
You are hereby authorized and instructed to complete the following modifications to the approved Final Design:

Groundwater Monitoring Wells and Piezometers:

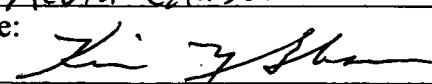
- 02015 (2.01) Casings;
The protective casing shall be sized to be at least 2-inches in diameter larger than the PVC riser. No casings will be less than 4-inches in diameter.
- 02015 (2.06) Bentonite Seal;
As an alternate to pellets – medium chips can be used for depths less than 100 feet.

APPROVALS:

Parsons Representative

Name: Jeffrey Poulsen	Date: 8/13/04
Signature: 	

NYSDEC Representative

Name: Kevin Glaser	Date: 8/14/04
Signature: 	

APPENDIX H

GEOMEMBRANE REPAIR SPECIFICATIONS AND WARRANTIES

GEOMEMBRANE REPAIR SPECIFICATIONS

The geomembrane installed at the Alltift Landfill Site is a 40-mil linear low density polyethylene (LLDPE) geomembrane manufactured by Poly-Flex, Inc. Installation was performed by Chenango Contracting, Inc., as a subcontractor to Tug Hill Construction, Inc. The geomembrane is covered by a 1-year warranty for installation and a 20-year warranty for materials. The warranty period began on 9/20/05 and ends on 9/20/06 for the 1-year installation warranty and began on 9/20/05 and ends on 9/20/25 for the 20-year material warranty. Required geomembrane repairs may be made by Honeywell or by the installer and manufacturer if covered under the warranties.

This Appendix includes a point-of-contact list, copies of the warranties, installation quality assurance/quality control procedures, and repair procedures. A record drawing showing seam locations is included in Appendix A.

Geomembrane Contacts:

Manufacturer: Poly-Flex, Inc.

2000 W. Marshall Drive, Grand Prairie, TX 75051.

Phone: 888-POLYFLX, ext. 7314 (Engineering and Technical Support)

Fax: 972-337-8314

Website: www.poly-flex.com

Installer: Chenango Contracting, Inc.

29 Arbutus Road, Johnson City, NY 13790

Phone: (607) 729-8500

Fax: (607) 729-2415

Website: www.chenangocontracting.com

Poly-Flex, Inc. QA/QC and Repair Procedures

(from <http://www.poly-flex.com/sbqqgi13.html>)

13. FIELD TEST PROCEDURES

13.1 Non-Destructive Seam Testing

The installer shall non-destructively test every field seam over its full length. All test equipment shall be furnished by the installer.

13.1.1 Vacuum Box Testing

Equipment for testing extrusion seams shall be comprised of the following:

1. A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
2. Soapy solution in a plastic bucket with a mop.

The following procedures shall be followed by the installer:

1. Excess sheet overlap shall be trimmed away.
2. Wet a strip of geomembrane approximately 12 inches by the length of box with the soapy solution.
3. Place the box over the wetted area and compress.
4. Create a vacuum of 3 - 5 psi.
5. Ensure that a leak tight seal is created.
6. For a period of approximately 15 seconds, examine the geomembrane through the viewing window for the presence of animated soap bubbles.
7. If no animated bubbles appear after 15 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches overlap and repeat the process.
8. All areas where animated soap bubbles appear shall be marked, repaired and then retested.

The following procedures shall apply to locations where seams cannot be non-destructively tested.

1. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation.
2. If the seam cannot be tested prior to final installation, the seams shall be spark tested according to the spark tester manufacturer's procedures.

13.1.2 Air Pressure Testing (For Double Fusion Seams Only)

Equipment for testing double fusion seams shall be comprised of the following:

1. An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi.
2. A pressure gauge equipped with a sharp hollow needle.

The following procedures shall be followed by the installer:

PARSONS

1. Seal one end of the seam to be tested.
2. Insert needle or other approved pressure feed device through the sealed end of the channel created by the double wedge fusion weld.
3. Seal the other end of the channel.
4. Energize the air pump to a pressure between 25 and 30 psi, close valve, allow 2 minutes for the injected air to come to equilibrium in the channel, and sustain pressure for approximately 5 minutes.
5. If pressure loss exceeds 4 psi, or pressure does not stabilize, locate faulty area, repair and retest.
6. If pressure does not drop below the acceptable value after five minutes, cut the air channel open at the opposite end from the pressure gauge. The air channel should deflate immediately indicating that the entire length of the seam has been tested.

13.2 Destructive Seam Testing

Destructive seam testing should be minimized to preserve the integrity of the liner. The installer shall provide the inspector with one destructive test sample per project specifications (usually once per 500 feet of seam length) from a location specified by the inspector.

13.2.1 Sampling Procedure

In order to obtain test results prior to completion of liner installation, samples shall be cut and marked by the installer as the seaming progresses. The installer shall also record the date, location, and pass or fail description. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately repaired and vacuum tested.

13.2.2 Size and Disposition of Samples

The samples shall be 12 inches wide by 36 inches long with the seam centered lengthwise. The sample shall be cut into three equal-length pieces, one to be given to the inspector, one to be given to the owner's representative and one to the installer.

13.2.3 Field Laboratory Testing

The inspector shall test ten 1 inch wide specimens from his sample, five specimens for shear strength and five for peel strength. To be acceptable, four out of the five specimens must pass.

13.2.4 Independent Laboratory Testing

The owner, at his discretion and expense, may send seam samples to a laboratory for testing. The test method and procedures to be used by the independent laboratory shall be the same as used in field testing.

13.2.5 Procedures for Destructive Test Failure

The following procedures shall apply whenever a sample fails the field destructive test:

1. The installer shall cap strip the seam between the failed location and any passed test locations.
2. The installer can retrace the welding path to an intermediate location (usually 10 feet from the location of the failed test), and take a sample for an additional field test. If this test passes, then the seam shall be cap stripped between that location and the original failed location. If the test fails, then the process is repeated.

3. Over the length of seam failure, the installer shall either cut out the old seam, reposition the panel and reseam, or add a cap strip.

13.3 Defects and Repairs

All seams and non-seam areas of the geomembrane shall be inspected by the inspector for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection.

13.3.1 Evaluation

Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of the inspector. Each location that fails the non-destructive testing shall be marked by the inspector, and repaired accordingly.

13.3.2 Repair Procedures

1. Defective seams shall be cap stripped or replaced.
2. Small holes shall be repaired by extrusion welding. If the hole is larger than 1/4 inch, it shall be patched.
3. Tears shall be repaired by patching. Where the tear is on a slope or an area of stress and has a sharp end it must be rounded prior to patching.
4. Blisters, large cuts and undispersed raw materials shall be repaired by patches.
5. Patches shall be done by extrusion welding. The weld area shall be cleaned no more than 10 minutes prior to the repair. No more than 10% of the thickness shall be removed by grinding. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted. The welding shall restart by grinding the existing seam and rewelding a new seam.
Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects. All patches shall be of the same material and thickness as the geomembrane.

13.3.3 Verification of Repairs

Each repair shall be non-destructively tested. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

Daily documentation of all non-destructive and destructive testing shall be provided to the inspector by the installer. This documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

13.3.4 Cover Soil Placement

The earthwork contractor shall place the soil cover layer over the liner system on a daily basis as soon as a lined area of the facility has been completed and accepted by the owner.

Extreme care shall be taken by the earthwork contractor not to damage the liner system during the cover soil placement. A minimum of 12 inches of cover soil is needed prior to placing any earth-moving machinery over the liner system. The soil and rock particles of the cover material shall be of such size and shape as not to damage the liner. The upper particles' size limit is usually 3/8 inch. Angular or sharp rock fragments are not allowed.

The earthwork contractor should conduct a test on the job site simulating field subgrade, liner system, and cover soil placement. The earthwork contractor should use the proposed method of cover soil placement and equipment to verify the integrity of the liner. The liner installer is not

PARSONS

responsible for damage to the liner as a result of using unsuitable cover material or improper methods of cover placement over the liner. That is the responsibility of the earthwork contractor.

Cover soil shall be placed on side slopes from the bottom to the top of the slope. During the cover soil placement, the driver shall not make sharp turns or sudden starts and stops. The machinery speed shall be slow. Frozen soils are not to be used as cover material unless screened prior to placement.

Cover soils shall be placed during the coolest time of the day to prevent folds in the liner. Special techniques shall be implemented to isolate small liner ripples and prevent the liner from folding over itself during cover soil placement.

13.3.5 Pipe Penetrations

Pipe boots should be isolated from the seasonal effects of liner expansion and contraction. Such penetrations should allow for reasonable access for extrusion welding and testing equipment.

Letter of Transmittal

TO: Tug Hill Construction, Inc.

40 Pine Street

Lockport, New York 14094

Date: 12/8/2005

Job No.: 440788

RE: Alltft Landfill

02405-8 (1.04C)

WE ARE SENDING YOU THE FOLLOWING ITEMS:

☐ Shop drawings ☐ Attached ☐ Under separate cover via _____ the following items:☐ Copy of Letter ☐ Prints ☐ Plans ☐ Samples ☐ SpecificationsDated: _____ ☐ Change Order ☒ Submittal #117

COPIES	DATE	NO.	DESCRIPTION
1	12/2/2005	117	Chenango Contracting Inc. Limited Workmanship Warranty
			Poly-flex Liner Limited Material Warranty
			Chenango Contracting Inc. Penetration Detail
			Chenango Contracting Inc. Statement of Certification Letter

THESE ARE TRANSMITTED as checked below:

<input type="checkbox"/> For approval	<input type="checkbox"/> For checking	<input type="checkbox"/> Resubmit ____ copies for approval
<input type="checkbox"/> For your use	<input checked="" type="checkbox"/> Approved as submitted	<input type="checkbox"/> Design only, not for construction
<input type="checkbox"/> For review and comment	<input type="checkbox"/> Approved as noted	<input type="checkbox"/> Return ____ corrected prints
<input type="checkbox"/> For your action	<input type="checkbox"/> Returned for corrections	<input type="checkbox"/> Resubmit items noted

REMARKS:

COPY TO: file 440788, distribution

SIGNED: _____





Construction, Inc.

ENVIRONMENTAL EARTHWORK CONTRACTORS

40 Pine Street
Lockport, New York 14094
Tel: (716) 433-6606
Fax: (716) 433-6607

LETTER OF TRANSMITTAL

117

TO: Parsons 180 Lawrence Bell Drive Williamsville, NY 14221	DATE: December 2, 2005
	PROJECT: HONEYWELL - ALLTIFT PROJECT
	ATTENTION: Jeff Poulsen
RE: Submittal No - 02405-8 (1.04 C)	

We are sending you:

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> Attached | <input checked="" type="checkbox"/> Delivered by Hand | <input type="checkbox"/> via Overnight |
| <input type="checkbox"/> Prints | <input type="checkbox"/> Copy of Letter | <input type="checkbox"/> Specifications |
| <input type="checkbox"/> Shop Drawings | <input type="checkbox"/> Samples | <input checked="" type="checkbox"/> Submittals |
| | | <input type="checkbox"/> Other _____ |

COPIES	DATE	NO.	DESCRIPTION
3	09/20/05		Chenango Contracting, Inc Limited Workmanship Warranty
3	09/20/05		Poly-Flex Liner Limited Material Warranty
3	NA		Chenango Contracting, Inc Penetration Detail
3	12/02/05		Chenango Contracting, Inc Statement of Certification Letter

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> For your use | <input type="checkbox"/> Approval as noted | <input type="checkbox"/> Return ____ corrected prints |
| <input checked="" type="checkbox"/> For approval | <input type="checkbox"/> Approved for construction | <input type="checkbox"/> For bids due _____ |
| <input checked="" type="checkbox"/> As requested | <input type="checkbox"/> Returned for corrections | <input type="checkbox"/> Submit ____ copies for |
| <input type="checkbox"/> For review/distribution | <input type="checkbox"/> Returned after loan to us | <input type="checkbox"/> Re-submit ____ copies for |
| <input type="checkbox"/> Other _____ | | |

Remarks Please contact me if you have any question concerning the above. Thanks

If enclosures are not as indicated,
please notify us at once.

Signed:

Jeff Dunn, Project Controls Engineer

**CHENANGO CONTRACTING, INC.
LIMITED WORKMANSHIP WARRANTY**

Purchaser: Honeywell International, Inc.
Address: 101 Columbia Road
City, State, Zip: Morristown, NJ 07962

Project Name: Alltitt Landfill
Description: Landfill Cap
Address: 579 Tiffitt Street
City, State, Zip: Buffalo, NY 14220

Warranty Number: 0401

Project Number: 0401

Effective Date: 9/20/2005

Chenango Contracting, Inc. (CCI) warrants each liner installed by CCI to be free from defects in the installation workmanship. The term of this "Workmanship Warranty" shall be for a period of one (1) year from the date that the installation of the liner is complete, strictly conditioned on normal use of the liner in only approved applications.

This Limited Warranty does not include, and expressly excludes, any and all defects to the liner itself, excepting only those defects or damages caused solely and exclusively by CCI's workmanship in the installation of the liner.

Should defects within the definition of the above Limited Workmanship Warranty occur, CCI will repair the liner. CCI will have the right to inspect and determine the cause of any alleged defect in the liner and to take appropriate steps to repair the liner if a defect exists in CCI's workmanship and such claim is otherwise within the terms and conditions of this Limited Warranty.

This Limited Warranty is limited to CCI's workmanship related to the installation of the liner only and CCI makes no warranties of any kind with respect to the liner system itself.

Any claim under the terms of this warranty shall be made in writing, by certified mail, to the President of Chenango Contracting Inc. within thirty (30) days after the alleged defect is first noticed. Should the required notice not be given, the defect and all warranty rights hereunder shall be deemed to be waived by the Purchaser, and the Purchaser shall have no right of action or recovery against CCI. In the event the repairs are to be effected, said repair shall not become due until the area subject to the repair of the liner is available to CCI in a clean, dry, unencumbered condition. This includes, but is not limited to, the area made available for repair of the liner to be free from all water, dirt, sludge, residuals and liquids of any kind.

Under no circumstances shall CCI's warranty, liability or exposure under this warranty exceed CCI's actual original cost of the particular installation for the above referenced project. Further, under no circumstances, shall LSLC, and/or its related entities, officers, shareholders, affiliates, agents, assigns and/or successors be liable for any special, indirect or consequential damages, including, but not limited to, damages arising from loss of use and/or any other losses or damages for personal injuries and/or product liability injuries as a result of a defect in or failure of the installation. Under no circumstances shall this Limited Warranty apply to or for repairs or alterations made by the Purchaser without the express written consent of CCI.

CCI does not authorize any person other than an officer of CCI to approve a warranty claim hereunder or any other additional liability in connection with the workmanship installation which forms the sole basis of this Limited Warranty. This Limited Warranty on the installation is herein given in lieu of all other possible material warranties, either express or implied, and by accepting delivery of the installation, Purchaser waives all other possible workmanship warranties except those specifically given.

The parties expressly agree that the subject matter of this Limited Warranty is for commercial or industrial use only.

This Limited Warranty is made to the original Purchaser and is non transferable and non-assignable. Any actions or lawsuits by a Purchaser to enforce any rights and/or collect any damages under this Limited Warranty shall be brought in a court located in Broome County of the State of New York.

CCI MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES BOTH EXPRESS AND IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

WARRANTY BECOMES EFFECTIVE UPON RECEIPT OF FINAL PAYMENT AND ALL OTHER CONDITIONS OF THE CONTRACT AND/OR PURCHASE ORDER WITH THE PURCHASER.

I hereby state that I have read and understand the above and foregoing Limited Warranty and agree to such by signing hereunder.

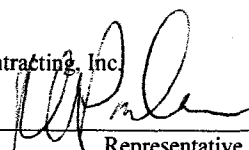
Purchaser Name:

Signature:

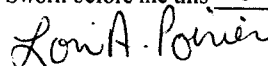
Title:

Date:

Chenango Contracting, Inc.


Representative

Sworn before me this 30th of November 2005



<p style="text-align: center;">LORI A. POIRIER NOTARY PUBLIC, STATE OF NEW YORK No. 01PD6061331 QUALIFIED IN BROOME COUNTY MY COMMISSION EXPIRES JULY 16, 2007</p>

**POLY-FLEX LINER
LIMITED WARRANTY**

Warranty No.: 05-54-59

Project No.: 230534

Effective Date: 9/20/05

USER: Honeywell International,
Inc.

PROJECT NAME: Alltiff Landfill

ADDRESS: 101 Columbia Road

DESCRIPTION: Landfill Cap

CITY, STATE, ZIP: Morristown, NJ 07962

ADDRESS: 579 Tift Street

CITY, STATE, ZIP: Buffalo, NY 14220

POLY-FLEX, INC. warrants each Poly-Flex Liner to be free from defects in materials and to be able to withstand normal weathering from the date of installation for a period of twenty (20) years for normal use in approved applications.

This Limited Warranty does not include damages or defects in the Poly-Flex Liner resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornados or force majeure. The term "normal use" as used herein does not include, among other things, the exposure of the Poly-Flex Liner to harmful chemicals, abuse of the Poly-Flex Liner by machinery, equipment or people, excessive pressures or stress from any source. This Limited Warranty is intended for commercial use only and is not in effect for a "consumer" as defined in the Magnuson-Moss Warranty Act or any similar federal, state, or local statutes.

Should defects or premature loss of use within the scope of the above Limited Warranty occur, Poly-Flex, Inc. will, at its option, repair or replace the Poly-Flex Liner on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. Poly-Flex, Inc. will have the right to inspect and determine the cause of any alleged defect in the Poly-Flex Liner and to take appropriate steps to repair or replace the Poly-Flex Liner if a defect exists and is within the term of this Limited Warranty.

Any claim for any alleged breach of this Limited Warranty must be made in writing, by certified mail, to the President of Poly-Flex, Inc. within thirty (30) days after the alleged defect is first noticed. Should the required notice not be given, the defect and all warranties shall be deemed to have been waived by the Purchaser/User, and Purchaser/User shall have no right of recovery against Poly-Flex, Inc. In the event repairs and/or replacements are to be effected, said repairs and/or replacements shall not become due until the area subject to repair and/or replacement of Poly-Flex Liner is available in a clean, dry, unencumbered condition, including without limitation being free from all water, dirt, sludge, residuals, and liquids of any kind.

Poly-Flex, Inc.'s, and its related entities', officers', shareholders', affiliates', agents', assigns', and successors' liability under this Limited Warranty shall in no event exceed the replacement cost of the material for the particular installation. Further, under no circumstances shall Poly-Flex, Inc., and/or its related entities, officers, shareholders, affiliates, agents, assigns and/or successors be liable for any special, direct, indirect, or consequential damages arising from loss of production or any other losses, including losses due to personal injuries and product liability, owing to the failure of the material or improper installation and no allowance will be made for repairs, replacements, or alterations made by the Purchaser/User without the express written consent of an officer of Poly-Flex, Inc.

BY USE OF THIS PRODUCT IT IS AGREED THAT ANY CONTROVERSY OR CLAIM ARISING OUT OF OR RELATING TO SAID USE SHALL BE DECIDED BY BINDING ARBITRATION IN ACCORDANCE WITH THE UNITED STATES ARBITRATION ACT (Title 9, U.S. Code) IN DALLAS, TEXAS. THE ARBITRATION SHALL BE CONDUCTED BY A MUTUALLY AGREEABLE ARBITRATOR. IF THE PARTIES ARE UNABLE TO AGREE UPON AN ARBITRATOR, THEN EACH PARTY SHALL PICK AN INDIVIDUAL QUALIFIED TO SERVE AS AN ARBITRATOR AND THOSE TWO INDIVIDUALS SHALL THEN APPOINT A THIRD ARBITRATOR. THE ARBITRATOR'S AWARD SHALL BE FINAL AND MAY BE CONFIRMED BY THE JUDGMENT OF A STATE OR FEDERAL COURT IN THE JURISDICTION WHERE THE ARBITRATION OCCURRED. THE ARBITRATOR(S) SHALL HAVE NO POWER OR AUTHORITY TO AWARD EXEMPLARY OR PUNITIVE DAMAGES, OR TO ALTER, AMEND, OR

SUPPLEMENT ANY TERM, CONDITION, OR PROVISION OF THIS AGREEMENT. THE PARTIES CONSENT TO JURISDICTION AND VENUE IN COMPETENT STATE AND FEDERAL COURTS IN DALLAS, TEXAS. EACH PARTY SHALL BEAR ITS OWN ATTORNEY'S FEES, REGARDLESS OF THE OUTCOME OF THE ARBITRATION. ALL COSTS OF ARBITRATION, INCLUDING BUT NOT LIMITED TO FILING FEES, ARBITRATOR(S) FEES, AND STENOGRAPHER FEES, SHALL BE SHARED EQUALLY BY THE PARTIES.

Poly-Flex, Inc. neither assumes nor authorizes any person other than an officer of Poly-Flex, Inc. to assume for it any other or additional liability in connection with the Poly-Flex Liner made the basis of this Limited Warranty. The Limited Warranty on the Poly-Flex Liner herein is given in lieu of all other possible warranties, either express or implied, including warranties of merchantability and of fitness for a particular purpose and by accepting delivery of the material, Purchaser/User waives all other possible warranties, except those specifically given.

The parties expressly agree that the sale of the Poly-Flex Liner is for commercial or industrial use only.

The Poly-Flex Liner Limited Warranty is extended to the Purchaser/User and is non-transferable and non-assignable, without the written consent of an officer of Poly-Flex, Inc.

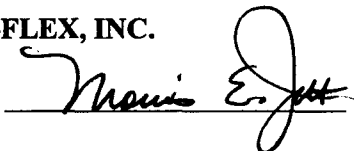
POLY-FLEX, INC. MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESS OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

If any provision of this Warranty shall be found to be illegal, invalid, or unenforceable under the present or future laws, such provision shall be fully severable and the remaining provisions shall remain in full force and effect. Any provision of this Warranty held illegal, invalid, or unenforceable shall remain in full force and effect to the extent not so held. In lieu of the provision held illegal, invalid, or unenforceable, there shall be automatically added as part of this Warranty a provision as similar in its terms to such invalid provision as may be possible and may be legal, valid, and enforceable.

I have read and agree to be bound by the terms and conditions of the foregoing warranty. The said warranty shall not be honored until an original dated and signed copy, by an authorized representative of User, has been duly returned to Poly-Flex and until full payment has been made to Poly-Flex.

POLY-FLEX, INC.

By:



Its: President

USER: _____

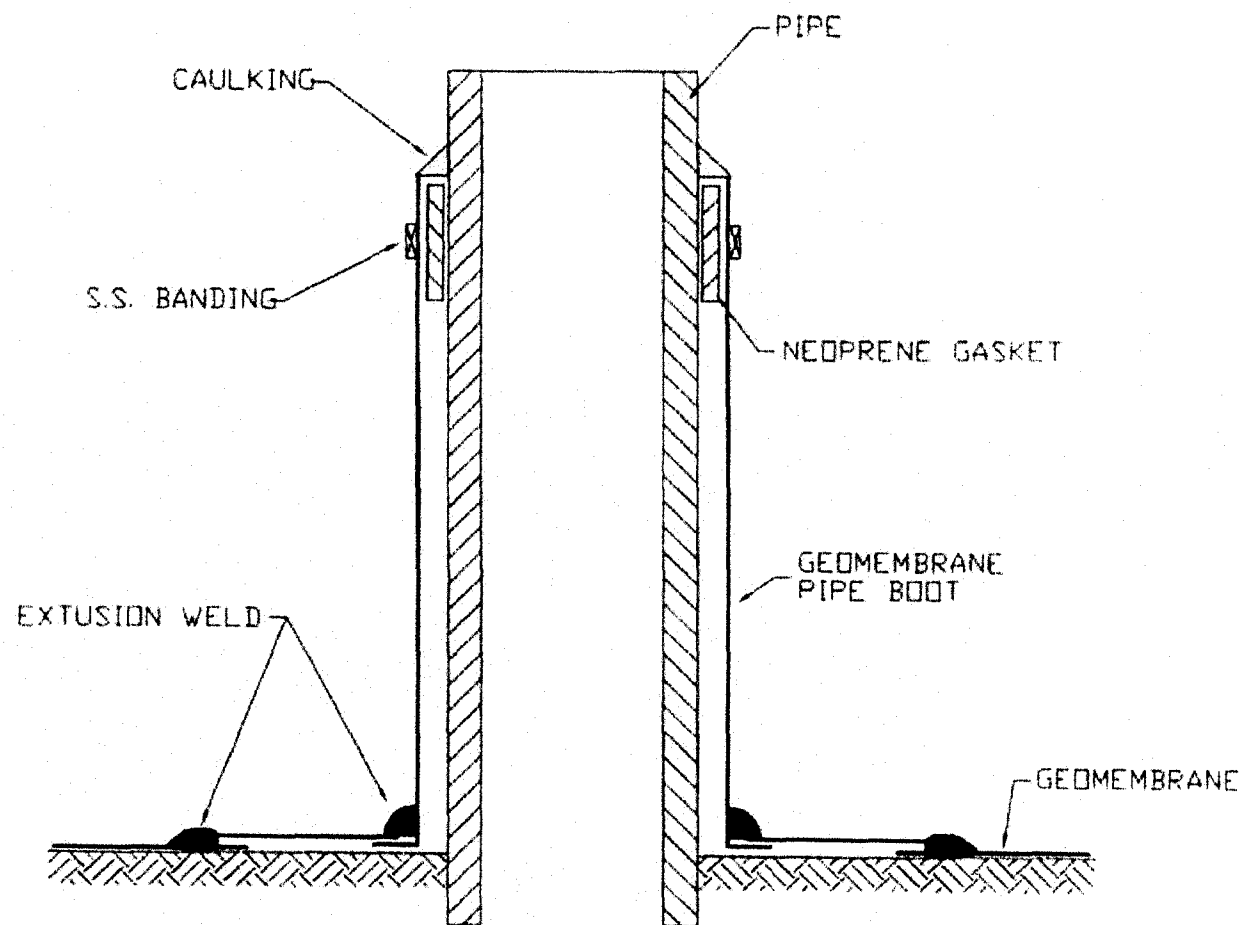
By: _____

Its: _____

POLY-FLEX, INC.

2000 W. Marshall Drive

Grand Prairie, TX 75051



SINGLE BANDED
BOOT DETAIL

CHENANGO CONTRACTING, INC.

29 ARBUTUS RD. JOHNSON CITY, NY 13790

TEL. (607) 729-8500 FAX (607) 729-2415

CERTIFICATE OF ACCEPTANCE

PROJECT NAME: Altift LF
PROJECT NUMBER: 0401

DATE: 12/2/2005
QC REPRESENTATIVE: PRM / JC

DETAILS OF WORK COMPLETED AND MEASURED

40-mil LLDPE Textured Geomembrane installed between 8/18/04 and 8/2/05 totaling
approximately 995,795 SF.

I, THE UNDERSIGNED, THE AUTHORIZED REPRESENTATIVE OF
CHENANGO CONTRACTING, INC.

HAVE REVIEWED THE WORK DETAILED ABOVE AND BELIEVE THAT THE WORK HAS BEEN
COMPLETED IN GENERAL ACCORDANCE WITH THE SPECIFICATIONS AND THE TERMS
AND CONDITIONS OF THE CONTRACT

EXCEPTIONS None

AUTHORIZED REPRESENTATIVE:

Carl J. Burdick  Engineer 12/2/2005
NAME SIGNATURE TITLE DATE

APPENDIX I
GROUNDWATER COLLECTION SYSTEM STARTUP
PROCEDURES AND MAINTENANCE MANUAL

Groundwater Collection System Startup Procedures

The following procedures are for starting the groundwater collection system, including the Lift Station, Sump 1, and Sump 2.

Lift Station

1. Energize the MAIN POWER FEED on the panel located outside of the shed in the NE corner.
2. Energize the lift station breaker on the MAIN DISTRIBUTION PANEL inside of the shed.
3. Open the LIFT STATION DISTRIBUTION PANEL and de-energize the main breaker.
4. Open the LIFT STATION CONTROL PANEL and confirm that the HOA is in the AUTO position (CAUTION – STORED VOLTAGE).
5. Close LIFT STATION CONTROL PANEL.
6. Open the LIFT STATION ACCESS HATCH and confirm that the CONTROL FLOATS are free of obstruction.
7. Open the DISCHARGE VALVE and close the SAMPLING VALVE.
8. Energize the breakers on the LIFT STATION DISTRIBUTION PANEL.
9. LIFT STATION PUMP should start when the middle float is in the “up” position.
10. After the LIFT STATION PUMP starts, confirm flow by observing 1/10 gallon wheel on the DISCHARGE FLOW METER.

Groundwater Collection Trench SUMPs

1. Energize the MAIN POWER FEED on the panel located outside of the shed in the NE corner.
2. De-energize the circuit breaker(s) in the MAIN DISTRIBUTION PANEL for the groundwater collection trench sumps.
3. Open the SUMP CONTROL PANEL for each of the sumps located in the shed. (CAUTION – STORED VOLTAGE)
4. Put the HOA control in the AUTO position.
5. Close the CONTROL PANEL.
6. Re-energize the circuit breaker(s) in the MAIN DISTRIBUTION PANEL.
7. De-energize the SUB-FEEDER PANEL at each of the sumps, remove the well cap and confirm that the LEVEL CONTROLS (3) are not fouled.
8. Close the well cap and energize the SUB-FEEDER PANEL.
9. Confirm that the subgrade SUMP DISCHARGE VALVE is open.
10. Confirm that the groundwater collection trench DISCHARGE VALVE in the LIFT STATION is in the open position.
11. The pump should start when the water level reaches the middle level control.

Troubleshooting

Problem	Solution
Lift Station pump does not start.	<ol style="list-style-type: none">1. Check that all power sources are engaged.2. Ensure that the floats in the lift station are not obstructed.3. Check that the hand/off/auto (HOA) switch in the control panel is in the Auto position.
Sump pump does not turn on.	<ol style="list-style-type: none">1. Ensure that power is engaged.2. Pull level control sensors to check for fouling.3. Check controls in shed, HOA control should be in auto position.

Table of Contents

1	GRUNDFOS WELL PUMPS
2	GRUNDFOS UTILITY PUMPS
3	WARRICK - LEVEL CONTROLLERS/ SENSOR PROBES
4	SJE RHOMBUS – CONTROL PANEL & FLOAT CONTROL SWITCHES
5	TRUMETER
6	GUARD IT – AUTO DIALER
7	
8	

SECTION 1
GRUNDFOS WELL PUMPS

SQ, SQE

- Ⓢ Installation and operating instructions
- ⓕ Notice d'installation et d'entretien
- ⓔ Instrucciones de instalación y funcionamiento



LIMITED WARRANTY

Products manufactured by GRUNDFOS PUMPS CORPORATION (Grundfos) are warranted to the original user only to be free of defects in material and workmanship for a period of 24 months from data of installation, but not more than 30 months from data of manufacture. Grundfos' liability under this warranty shall be limited to repairing or replacing at Grundfos' option, without charge, F.O.B. Grundfos' factory or authorized service station, any product of Grundfos' manufacture. Grundfos will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by Grundfos are subject to the warranty provided by the manufacturer of said products and not by Grundfos' warranty. Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of Grundfos' products from which it was purchased together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, the distributor or dealer will contact Grundfos or an authorized service station for instructions. Any defective product to be returned to Grundfos or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

GRUNDFOS WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limit actions on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

SQ, SQE

**Installation and
operating instructions**

Page

4



**Notice d'installation
et d'entretien**

Page

15



**Instrucciones de instalación
y funcionamiento**

Pág.

27



CONTENTS



1. General description	4
1.1 Applications	4
2. Preinstallation	4
2.1 Well preparation	4
2.2 Make sure you have the right pump	4
2.3 Pumped liquid requirements	4
2.4 Motor cooling requirements	5
2.5 Liquid temperatures/cooling	5
2.6 Motor preparation	5
2.7 Refilling of motor liquid	5
3. Installation positions	6
3.1 Positional requirements	6
4. Electrical connection	6
4.1 General	6
4.2 Motor protection	6
4.3 Connection of motor	6
5. Cable sizing	7
6. Splicing the cable	7
7. Fitting the cable plug to the motor	7
8. Fitting the cable guard	8
9. Piping	8
10. Installing the pump	9
10.1 Installation depth	9
11. Generator operation	9
12. Starting the pump for the first time	10
12.1 Motor cooling and other considerations	10
12.2 Impurities in the water	10
12.3 Minimum flow rate	10
12.4 Built-in protection	10
12.5 Resetting the pump	10
12.6 MS 3 motors	10
12.7 MSE 3 motors	10
12.8 Maintenance and service	10
13. Assembly of pump and motor	11
14. Troubleshooting	12
14.1 Instruments not allowed	13
15. Checking of motor and cable	13
16. Environment	13
17. Disposal	13
18. Technical data	14



Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

1. General description

The SQ/SQE is a 3 inch diameter submersible pump mainly designed for the pumping of raw water in domestic water supply. This manual is designed to assist in the proper set-up, installation and operation of these pumps.

1.1 Applications

Typical applications are:

- residential housing
- small waterworks
- pressure boosting
- irrigation systems
- liquid transfer in tanks.

2. Preinstallation

2.1 Well preparation

If the pump is to be installed in a new well, the well should be fully developed and bailed or blown free of cuttings and sand.

The construction of the Grundfos SQ/SQE submersibles makes them resistant to abrasion; however, no pump made of any material can forever withstand the destructive wear that occurs when constantly pumping sandy water.

If this pump is used to replace an oil-filled submersible or oil-lubricated line-shaft turbine in an existing well, the well must be blown or bailed clear of oil.

2.2 Make sure you have the right pump

Determine the maximum depth of the well and the drawdown level at the maximum pump capacity. Pump selection and setting depth should be made based on this data.

2.3 Pumped liquid requirements

Submersible well pumps are designed for pumping clear, cold water; free of air or gases. Decreased pump performance and life expectancy can occur if the water is not clear, cold or contains air or gases.

The water temperature should not exceed 104°F.

A check should be made to ensure that the installation depth of the pump will always be at least three feet below the maximum drawdown level of the well. The bottom of the motor should never be installed lower than the top of the well screen or within five feet of the well bottom.

2.4 Motor cooling requirements

To ensure proper motor cooling, refer to the table below for minimum flow requirements:

Flow velocity past the motor	Maximum liquid temperature
0.0 f/s (free convection)	86°F (30°C)
Min. 0.5 f/s	104°F (40°C)

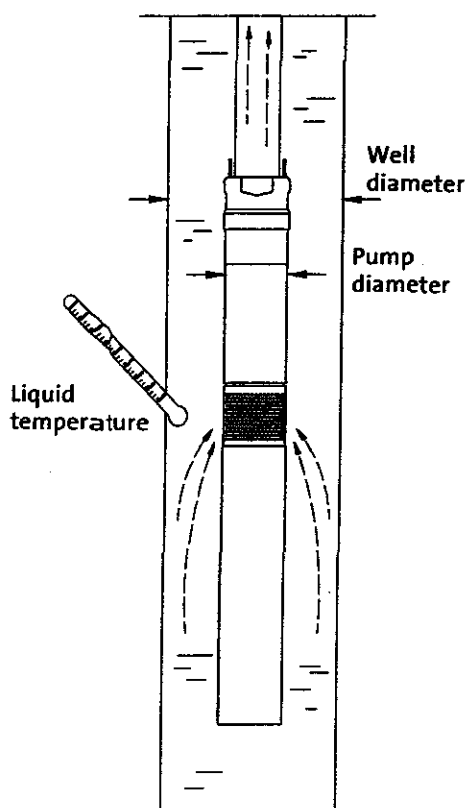
If the pump is to be installed horizontally, e.g. in a tank, and there is a risk that the pump might be covered by mud, it must be installed in a flow sleeve.

2.5 Liquid temperatures/cooling

Figure 1 shows an SQ/SQE pump installed in a well. With the pump operating, figure 1 illustrates the following:

- Well diameter
- Pump diameter
- Temperature of pumped liquid
- Flow past the motor to the pump suction strainer.

Note: The well diameter must be at least 3 inches. If there is a risk that the motor will be covered with sediment, it is recommended the pump be placed in a flow sleeve. The motor should always be installed above the well screen.



TM01 0518 1297

Fig. 1 Pump installed in well

2.6 Motor preparation

Grundfos MS 3 and MSE 3 submersible motors have water-lubricated slide bearings. No additional lubrication is required.

The submersible motors are factory-filled with a special Grundfos motor liquid, type SML 2, which will protect the motor liquid down to 4°F (-20°C) and prevent the growth of bacteria. The level of motor liquid is important for the operating life of the bearings and consequently the life of the motor.



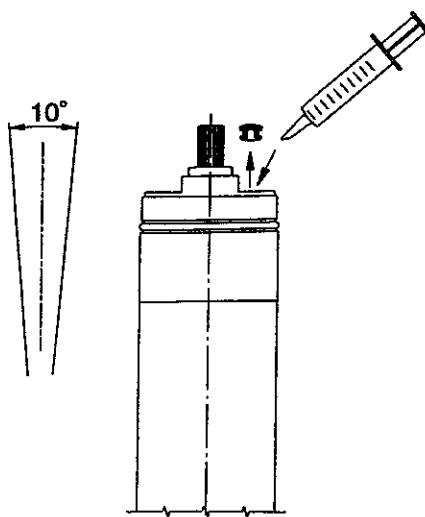
2.7 Refilling of motor liquid

It is recommended to refill the motor with Grundfos motor liquid SML 2.

To refill the motor, proceed as follows:

1. Remove the cable guard and separate the pump end from the motor.
2. Place the motor in vertical position with an inclination of approximately 10°.
3. Remove the filling plug using a screwdriver or a similar tool.
4. Inject motor liquid into the motor with a filling syringe or similar tool, see fig. 2.
5. To allow possible air to escape, move the motor from side to side and turn the shaft.
6. Replace the filling plug and make sure it is tight.
7. Assemble pump end and motor.
8. Fit the cable guard.

The pump is now ready for installation.



TM01 1434 4597

Fig. 2 Injecting motor liquid

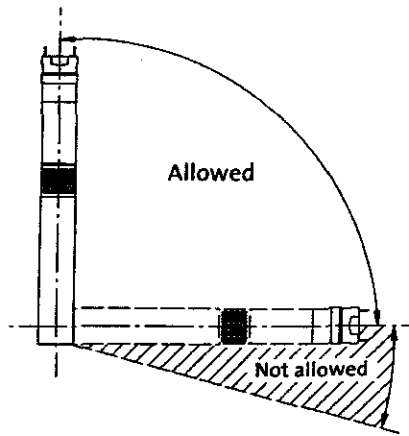
3. Installation positions

3.1 Positional requirements



The pump is suitable for vertical as well as horizontal installation, however, the pump shaft must never fall below the horizontal plane, see fig. 3.

If the pump is to be installed horizontally, e.g. in a tank, and there is a risk that the pump might be covered by mud, it must be installed in a flow sleeve.



TM01 1375 4397

Fig. 3 Pump position

4. Electrical connection

4.1 General

The electrical connection should be carried out by an authorized electrician in accordance with local regulations.



Before starting work on the pump, make sure that the electricity supply has been switched off and that it cannot be accidentally switched on.

The pump must be grounded.

The pump must be connected to an external mains switch.

The supply voltage, rated maximum current and power factor (PF) appear on the motor nameplate. The required voltage for Grundfos submersible MS 3/MSE 3 motors, measured at the motor terminals, is $-10\%/+6\%$ of the nominal voltage during continuous operation (including variation in the supply voltage and losses in cables).

If the pump is connected to an installation where a Ground Fault circuit breaker (GFI) is used as additional protection, this circuit breaker must trip out when ground fault currents with DC content (pulsating DC) occur.

Note: The pump must never be connected to a capacitor or to another type of control box than CU 300 or CU 301.

Note: The pump must never be connected to an external frequency converter.

Supply voltage:

1 x 100-115 V or 1 x 200-240 V $-10\%/+6\%$, 50/60 Hz.

The current consumption can only be measured accurately by means of a true RMS instrument. If other instruments are used, the value measured will differ from the actual value.

The SQE pumps can be connected to a CU 300 or CU 301 control box.

4.2 Motor protection

The motor has built-in automatic thermal overload protection and requires no additional motor protection.

4.3 Connection of motor

The motor can be connected directly to the main circuit breaker.

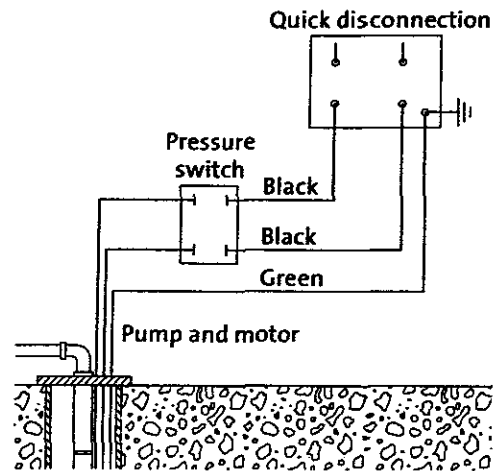
Start/stop of the pump will typically be done via a pressure switch, see fig. 4.

Note: The pressure switch must be rated for the maximum amps of the specific pump.



Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding. If the means of connection to the supply connected box is other than grounded metal conduit, ground the pump back to the service by connecting a copper conductor, at least the size of the circuit supplying the pump.

Single-phase 2-wire wiring diagram for Grundfos motors



TM02 8736 0804

Fig. 4 Wiring diagram

Note: The pump must never be connected to a capacitor or to another type of control box than CU 300 or CU 301.

. Cable sizing

ingle-phase 60 Hz maximum cable length motor service to entrance:

Motor rating		Copper wire size							
hp		14	12	10	8	6	4	2	0 00
115	1/3	130	210	340	540	840	1300	1960	2910
115	1/2	100	160	250	390	620	960	1460	2160
230	1/3	550	880	1390	2190	3400	5250	7960	
230	1/2	400	650	1020	1610	2510	3880	5880	
230	3/4	300	480	760	1200	1870	2890	4370	6470
230	1	250	400	630	990	1540	2380	3610	5360 6520
230	1 1/2	190	310	480	770	1200	1870	2850	4280 5240

US

. Splicing the cable

splice the drop cable with the motor cable. If the splice is carefully made, it will be as efficient as any other portion of the cable and will be completely watertight.

There are a number of cable splicing kits available today - epoxy-filled, rubber-sealed, etc. Many perform well if the manufacturer's directions are followed carefully. If one of these kits is not used, we recommend the following method for splicing the motor cable to the drop cable:

Examine the motor cable and the drop cable carefully for damage.

- Cut the motor leads off in a staggered manner.
- Cut the ends of the drop cable so that the ends line up with the motor leads.
- Be sure to match the colors.
- Strip back and strip off one inch of insulation from each lead, making sure to scrape the wire bare to obtain a good connection. Be careful not to damage the copper conductor when stripping off the insulation.
- Insert a properly sized Sta-Kon™-type connector on each pair of leads, again making sure that colors are matched.
- Using Sta-Kon™ crimping pliers, indent the lugs. Be sure to squeeze down hard on the pliers, particularly when using large cable.

Form a piece of electrical putty tightly around each Sta-Kon™. The putty should overlap on the insulation of the wire.

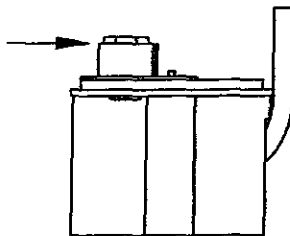
Use a good quality tape such as #33 Scotch Waterproof or Plymouth Rubber Company Slipknot Grey. Wrap each wire and joint tightly for a distance of about 2½ inches on each side of the joint.

Make a minimum of four passes over each joint and overlap each pass approximately one inch to ensure a completely watertight seal.

Note: Do not lower or lift the pump using the motor cable.

7. Fitting the cable plug to the motor

The cable plug supplied with the motor is factory-greased. Check that the plug is greased correctly, see fig. 5.

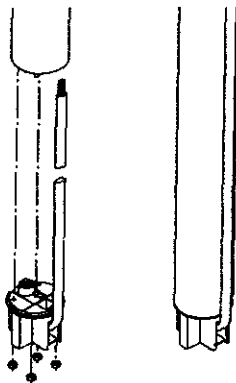


TM02 8738 0803

Fig. 5 Greasing of plug

To fit the cable plug, proceed as follows:

1. Check that the cable is of the correct type, cross-section and length.
2. Check that the mains on the location has correct connection to ground.
3. Check that the motor socket is clean and dry.
4. Press the cable plug into the motor socket. The plug will only fit one way, see fig. 6.
5. Fit and tighten the four nuts, see fig. 6. When the plug has been fitted, there must not be a clearance between the motor and the cable plug.



TM01 2871 2698

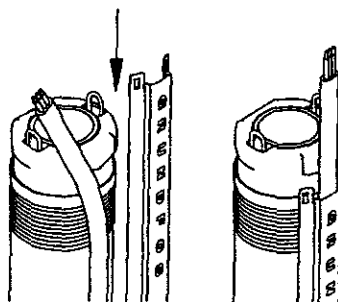
Fig. 6 Fitting the cable plug

8. Fitting the cable guard

To fit the cable guard, proceed as follows:



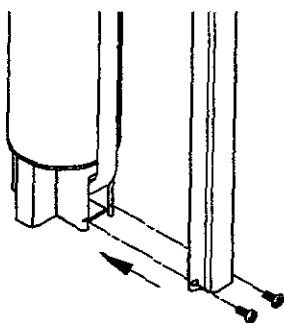
1. Make sure that the motor lead lies flat in the cable guard.
2. The two flaps of the cable guard must engage with the upper edge of the pump sleeve, see fig. 7.



TM01 2863 2698

Fig. 7 Placing the cable guard

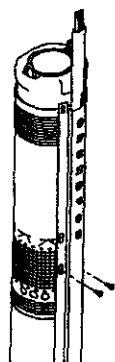
3. Fasten the cable guard to the cable plug with the two screws supplied, see fig. 8.



TM01 2868 2698

Fig. 8 Fitting the cable guard to the cable plug

4. Fasten the cable guard to the pump suction strainer with the two self-tapping screws supplied, see fig. 9.

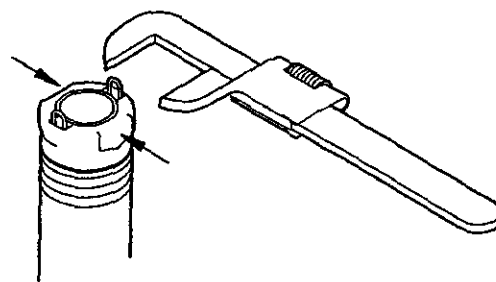


TM01 4427 0299

Fig. 9 Fitting the cable guard to the pump suction strainer

9. Piping

- The pump should only be gripped by the two flats at the top of the pump, see fig. 10.
- The pump can be installed vertically or horizontally. During operation, the pump must always be completely submerged in water.
- When plastic pipe is used, a stainless steel safety wire is recommended for lowering and lifting the pump. Fasten the wire to the eyelet on the pump, see fig. 11.
- The threaded joints must be well cut and fit together tightly to ensure that they do not work loose.



TM02 8739 0804

Fig. 10 Gripping the pump

10. Installing the pump

10.1 Installation depth

The dynamic water level should always be above the pump head. See fig. 11.

- A = Dynamic water level
- B = Static water level
- C = Minimum 3 inch well diameter
- D = Drawdown
- E = Installation depth below static water level. Maximum 500 feet.

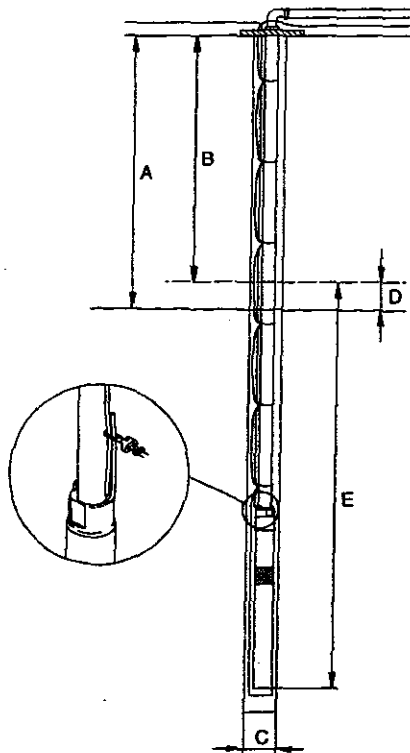


Fig. 11 Installation depth

TM02 8740 0804

Procedure:

To install the pump, proceed as follows:

1. Attach the enclosed data plate sticker at the well head.
 2. Check the well for proper clearance. The well must be at least 3 inches in diameter. It is a good idea to check the well for clearance using a plumb ring (2.95" x 10 in.).
 3. Attach the first section of riser pipe to the pump.
 4. Lower the pump into the well. Make sure the motor cable is not damaged when the pump is lifted or lowered into the well, especially in 3 inch wells.
- Note:** Do not lower or lift the pump using the motor cable.

5. When the pump has been installed to the required depth, the installation should be finished by means of a well seal.
Note that the dynamic water level should always be above the pump.
6. Loosen the safety wire so that it becomes unloaded and lock it to the well seal using a cable clamp.
7. Complete the electrical connections.

Note: The pump must never be connected to a capacitor or to another type of control box than CU 300 or CU 301.

Installation depths:

Maximum installation depth:
500 feet below the static water level.

Minimum installation depth:
1.75 feet below the dynamic water level.

Vertical installation:

During start-up and operation, the pump must always be completely submerged in water.

Horizontal installation:

The pump must be installed at least 1.75 feet below the dynamic water level.

If there is a risk that the pump might be covered by mud, the pump must always be placed in a flow sleeve.

Note: Do not lower or lift the pump using the motor cable.

11. Generator operation

It is safe to operate the SQ/SQE with a generator.

The generator must be sized 50% above the P1 (input power) values of the pump. See the following table.

Motor [hp]	Min. generator size [Watt]	Recommended generator output [Watt]
1/3 - 1/2 A	1100	1500
1/2 - 3/4 B	1700	2300
1 - 1 1/2 C	2000	3500





12. Starting the pump for the first time

When the pump has been connected correctly, the pump should be started with the discharge valve closed approximately one third.

Due to the soft start feature, the pump takes approximately 2 seconds to develop full pressure.

12.1 Motor cooling and other considerations

- Make sure the well is capable of yielding a minimum quantity of water corresponding to the pump capacity.
- Do not start the pump until it is completely submerged in the liquid.
- As the valve is being opened, the drawdown should be checked to ensure that the pump always remains submerged.
- To ensure the necessary cooling of the motor, the pump should never be set so low that it gives no water.
If the flow rate suddenly falls, the reason might be that the pump is pumping more water than the well can yield. The pump must immediately be stopped and the fault corrected.

12.2 Impurities in the water

If there are impurities in the water, the valve should be opened gradually as the water becomes clearer. The pump should not be stopped until the water is clean, otherwise the pump parts and the check valve may become clogged.

When the water is clean, the valve should be fully opened.

12.3 Minimum flow rate

To ensure the necessary cooling of the motor, the pump flow rate should never be set to a value lower than 0.2 gpm.

If the flow rate suddenly falls, the reason might be that the pump is pumping more water than the well can yield. The pump must immediately be stopped and the fault corrected.

Note: The pump's dry-running protection is effective only within the recommended duty range of the pump.

Note: Do not let the pump run against a closed discharge valve for more than 5 minutes. When the discharge valve is closed, there is no cooling flow and there is a risk of overheating in motor and pump.

12.4 Built-in protection

The motor incorporates an electronic unit which protects the motor in various situations.

- In case of overload, the built-in overload protection will stop the pump for 5 minutes. After that period, the pump will attempt to restart.
- If the pump is started and the well has not recovered, the pump will stop after 30 seconds.
- If the pump has been stopped as a result of dry running, it will start automatically after 5 minutes.

12.5 Resetting the pump

Switch off the electricity supply for 1 minute.

The motor is protected against the following conditions:

- dry running
- voltage surges (up to 4000 V)
In areas with high lightning intensity, external lightning protection is required.
- overvoltage
- undervoltage
- overload
- overtemperature.

12.6 MS 3 motors

Note: All MS 3 motors are factory-set to detect dry-running conditions. However, it is important to ensure that the configurations of both the SQ pump and motor are the same. Configurations can be found on both SQ pump and motor nameplates as "Config".

Example: Config. A-2 must match the other nameplate A-2.

See section 18. *Technical data* on page 14 for quick referencing on all configurations.

12.7 MSE 3 motors

Note: To set dry-running limit in the MSE/SOE pump, you need to connect the pump to a CU 300. Refer to the installation and operating instructions for CU 300 for proper connections.

To set dry-running protection, proceed as follows:

1. Start the pump against closed discharge.
2. Rapidly read the power consumption value (W) on the R100 display 2.5.
3. Multiply this value by 0.9.
4. With the R100, go to display 4.6 and enter the new value (minimum power limit).
5. Go to display 4.7 and change the setting to "Active".

For further information on dry-running, refer to the installation and operating instructions for CU 300.

12.8 Maintenance and service

The pumps are normally maintenance-free.

Deposits and wear may occur. For that purpose, service kits and service tools are available from Grundfos.

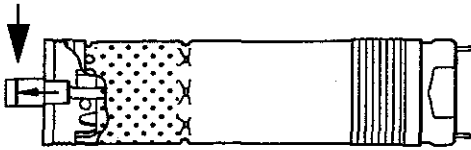
The Grundfos Service Manual is available on request.

The pumps can be serviced at a Grundfos service center.

13. Assembly of pump and motor

To assemble pump end and motor, proceed as follows:

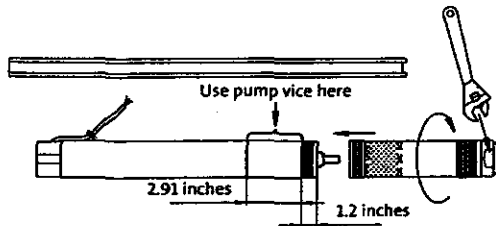
1. Place the motor horizontally in a vice and tighten, see fig. 13.
2. Pull the pump shaft out to the position shown in fig. 12.



TM02 8425 5203

Fig. 12 Pump shaft position

3. Grease the motor shaft end with the grease supplied with the motor.
4. Screw the pump end on the motor (55 Nm).
Note: The pump shaft must engage with the motor shaft.
A spanner may be used on the clamping faces of the pump end, see fig. 13.
5. Fit the cable guard as described in section 8.



TM01 2854 2299

Fig. 13 Pump in vice

When pump end and motor have been assembled correctly, there must be no clearance between pump end and motor.

To disassemble, reverse procedure.



14. Troubleshooting



Fault	Cause	Remedy
1. The pump does not run.	a) The fuses are blown.	Replace the blown fuses. If the new fuses blow too, check the electrical installation and the drop cable.
	b) The GFI circuit breaker has tripped.	Reset the circuit breaker.
	c) No electricity supply.	Contact the electricity provider.
	d) The motor protection has cut off the electricity supply due to overload.	Check for motor/pump blockage.
	e) The drop cable is defective.	Repair or replace the pump/cable.
	f) Overvoltage has occurred.	Check the electricity supply.
2. The pump runs but gives no water.	a) The discharge valve is closed.	Open the valve.
	b) No water or too low water level in well.	Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model.
	c) The check valve is stuck in its closed position.	Pull the pump and clean or replace the valve.
	d) The suction strainer is closed.	Pull the pump and clean the strainer.
	e) The pump is defective.	Repair or replace the pump.
3. The pump runs at reduced capacity.	a) The drawdown is larger than anticipated.	Increase the installation depth of the pump, throttle the pump or replace it with a smaller capacity model.
	b) The valves in the discharge pipe are partly closed/blocked.	Check and clean or replace the valves as necessary.
	c) The discharge pipe is partly choked by impurities (iron bacteria).	Clean or replace the discharge pipe.
	d) The check valve of the pump is blocked.	Pull the pump and clean or replace the valve.
	e) The pump and the riser pipe are partly choked by impurities (iron bacteria).	Pull the pump. Check and clean or replace the pump, if necessary. Clean the pipes.
	f) The pump is defective.	Repair or replace the pump.
	g) Hole in discharge pipe.	Check and repair the piping.
	h) The riser pipe is defective.	Replace the riser pipe.
	i) Undervoltage has occurred.	Check the electricity supply.
4. Frequent starts and stops.	a) The differential of the pressure switch between the start and stop pressures is too small.	Increase the differential. However, the stop pressure must not exceed the operating pressure of the pressure tank and the start pressure should be high enough to ensure sufficient water supply.
	b) The water level electrodes or level switches in the reservoir have not been installed correctly.	Adjust the intervals of the electrodes/level switches to ensure suitable time between the cutting-in and cutting-out of the pump. See installation and operating instructions for the automatic devices used. If the intervals between start/stop cannot be changed via the automatics, the pump capacity may be reduced by throttling the discharge valve.
	c) The check valve is leaking or stuck half-open.	Pull the pump and clean or replace the check valve.
	d) The supply voltage is unstable.	Check the electricity supply.
	e) The motor temperature is too high.	Check the water temperature.

14.1 Instruments not allowed

Note: The use of the following instruments is not allowed during troubleshooting.

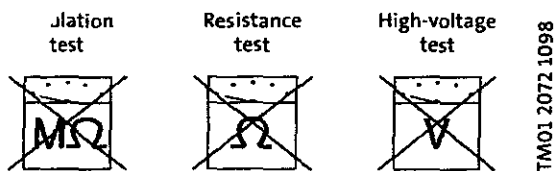




Fig. 14 Instruments not allowed

Note: When measuring, use RMS instruments.

15. Checking of motor and cable

<p>1. Supply voltage</p>  <p>TM00 1371 5092</p>	<p>Measure the voltage L1 (RMS) between phase and L2. Connect the voltmeter to the terminals at the connections.</p>	<p>The voltage should, when the motor is loaded, be within the range specified in section 4. <i>Electrical connection</i>. Large variations in supply voltage indicate poor electricity supply, and the pump should be stopped until the problem has been corrected.</p>
<p>2. Current consumption</p>  <p>TM00 1372 5082</p>	<p>Measure the current (RMS) while the pump is operating at a constant discharge head (if possible, at the capacity where the motor is most heavily loaded). For maximum current, see motor nameplate.</p>	<p>If the current exceeds the full-load current, there are the following possible faults:</p> <ul style="list-style-type: none"> • Poor connection in the leads, possibly in the cable joint. • Too low supply voltage, see item 1.

16. Environment

During handling, operation, storage and transport, all environment regulations dealing with the handling of hazardous materials must be observed.



When the pump is taken out of operation, it must be ensured that no hazardous material is left in the pump and in the riser pipe, which can be injurious to persons and the environment.

17. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

1. Use the local public or private waste collection service.
2. If such waste collection service does not exist or cannot handle the materials used in the product, please deliver the product or any hazardous materials from it to your nearest Grundfos company or service center.





18. Technical data

Supply voltage

1 x 100-115 V -10%/+6%, 50/60 Hz, PE.
1 x 200-240 V -10%/+6%, 50/60 Hz, PE.

Operation via generator

Recommended generator output must be equal to $P1 [kW] + 50\%$ and minimum $P1 + 10\%$.

Starting current

The motor starting current is equal to the highest value stated on the motor nameplate.

Starting

Soft starting.

Run-up time

Maximum 2 seconds.

Motor protection

The motor is protected against dry running, overvoltage, undervoltage, overload and overtemperature.

Power factor

PF = 1.

Service factor

0.33-0.50 A [hp]: 1.75 at 115 V/230 V.
0.50-0.75 B [hp]: 1.4 at 230 V.
1.0-1.5 C [hp]: 1.15 at 230 V.

Motor cable

3 Wire, 14 AWG XLPE.
Length: 5 feet.

Motor liquid

Type SML 2.

pH values

5 to 9.

Liquid temperature

The temperature of the pumped liquid must not exceed 104°F.

Note: If liquids with a viscosity higher than that of water are to be pumped, please contact Grundfos.

Discharge port

5 SQ/SQE: 1" NPT.
10-15 SQ/SQE: 1½" NPT.
22-30 SQ/SQE: 1½" NPT.

Storage conditions

Minimum ambient temperature: 4°F.
Maximum ambient temperature: 140°F.

Freeze protection

Note: The motor must be stored without being filled with motor liquid.

If the pump has to be stored after use, it must be stored on a frost-free location or it must be ensured that the motor liquid is frost-proof.

Operating conditions

Minimum ambient liquid temperature: 4°F.
Maximum ambient liquid temperature: 140°F.

Motor dimensions (MS 3 and MSE 3)

0.33-0.50 A [hp]: 20.9" length x 2.68" diameter.
0.50-0.75 B [hp]: 20.9" length x 2.68" diameter.
1.0-1.5 C [hp]: 22.3" length x 2.68" diameter.

Motor weights (MS 3 and MSE 3)

0.33-0.50 A [hp]: 6.0 lbs.
0.50-0.75 B [hp]: 7.1 lbs.
1.0-1.5 C [hp]: 8.2 lbs.

Pump end dimensions

Pump diameter: 2.68".
Pump diameter, incl. cable guard: 2.91".

Pump end dimensions (min. and max.)

5 SQ/SQE: 10.6" to 18.0".
10 SQ/SQE: 10.6" to 16.9".
15 SQ/SQE: 10.6" to 16.9".
22 SQ/SQE: 10.6" to 16.9".
30 SQ/SQE: 10.6" to 13.7".

Pump end weights (min. and max.)

All SQ/SQE models: 2.2 lbs to 3.5 lbs.

Well diameter

Minimum 3".

Installation depth

Maximum 500 feet below static water level.

Subject to alterations.

Pump models

Pump type	hp	Voltage	Flow range	Min. well dia.	Disch.
55SQ/SQE03A-90	1/3 A	230 V/115 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE03A-140	1/3 A	230 V/115 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE05A-180	1/2 A	230 V/115 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE05B-230	1/2 B	230 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE05B-270	1/2 B	230 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE07B-320	3/4 B	230 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE10C-360	1 C	230 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE10C-410	1 C	230 V	1.5-7.5 gpm	3"	1" NPT
55SQ/SQE10C-450	1 C	230 V	1.5-7.5 gpm	3"	1" NPT
105SQ/SQE03A-110	1/3 A	230 V/115 V	3-15 gpm	3"	1½" NPT
105SQ/SQE05B-160	1/2 B	230 V/115 V	3-15 gpm	3"	1½" NPT
105SQ/SQE05B-200	1/2 B	230 V	3-15 gpm	3"	1½" NPT
105SQ/SQE10C-240	1 C	230 V	3-15 gpm	3"	1½" NPT
105SQ/SQE10C-290	1 C	230 V	3-15 gpm	3"	1½" NPT
105SQ/SQE10C-330	1 C	230 V	3-15 gpm	3"	1½" NPT
155SQ/SQE03A-70	1/3 A	230 V/115 V	4-20 gpm	3"	1½" NPT
155SQ/SQE05A-110	1/2 A	230 V/115 V	4-20 gpm	3"	1½" NPT
155SQ/SQE05B-150	1/2 B	230 V	4-20 gpm	3"	1½" NPT
155SQ/SQE07B-180	3/4 B	230 V	4-20 gpm	3"	1½" NPT
155SQ/SQE10C-220	1 C	230 V	4-20 gpm	3"	1½" NPT
155SQ/SQE10C-250	1 C	230 V	4-20 gpm	3"	1½" NPT
155SQ/SQE15C-290	1 1/2 C	230 V	4-20 gpm	3"	1½" NPT
225SQ/SQE03A-40	1/3 A	230 V/115 V	7-33 gpm	3"	1½" NPT
225SQ/SQE05A-80	1/2 A	230 V/115 V	7-33 gpm	3"	1½" NPT
225SQ/SQE05B-120	1/2 B	230 V	7-33 gpm	3"	1½" NPT
225SQ/SQE10C-160	1 C	230 V	7-33 gpm	3"	1½" NPT
225SQ/SQE10C-190	1 C	230 V	7-33 gpm	3"	1½" NPT
225SQ/SQE15C-220	1 1/2 C	230 V	7-33 gpm	3"	1½" NPT
305SQ/SQE05A-40	1/2 A	230 V/115 V	8-42 gpm	3"	1½" NPT
305SQ/SQE05B-90	1/2 B	230 V	8-42 gpm	3"	1½" NPT
305SQ/SQE10C-130	1 C	230 V	8-42 gpm	3"	1½" NPT

Accessories

Product	Part number
CU 300	96422776
CU 301	96436754
Flow sleeve	96037505
Grease	96037562
Flow switch	96022967
Pressure transmitter	96026030

U.S.A.

GRUNDFOS Pumps Corporation
17100 West 118th Terrace
Olathe, Kansas 66061
Phone: +1-913-227-3400
Telefax: +1-913-227-3500

Canada

GRUNDFOS Canada Inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Phone: +1-905 829 9533
Telefax: +1-905 829 9512

Mexico

Bombas GRUNDFOS de Mexico
S.A. de C.V.
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
Apodaca, N.L. 66600
Mexico
Phone: +52-81-8144 4000
Telefax: +52-81-8144 4010

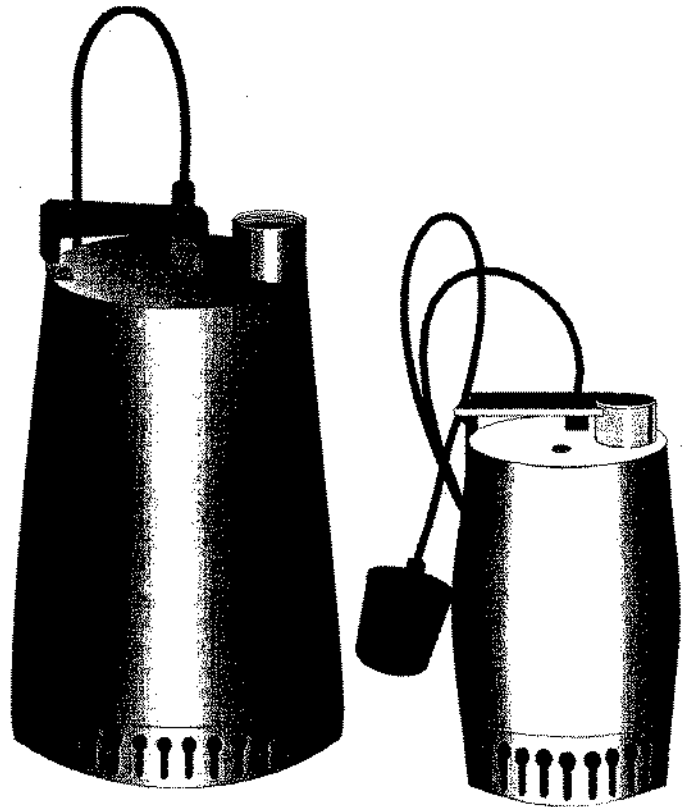
96 47 78 69 0504	61
Repl. 96 47 78 69 1101	

SECTION 2
GRUNDFOS UTILITY PUMPS

“The AP & KP”

**Sump and Utility Pumps
Models KP 150 · 250 · 350
AP 12**

Installation and Operating Instructions



Please leave these instructions with the owner for future reference

GRUNDFOS

Safety Warning

WARNING:

Risk of electric shock — This pump has not been investigated for use in swimming pool areas.

The safe operation of this pump requires that it be grounded in accordance with National Electric Code and local governing codes and regulations.

Technical Specifications

Motor Protection:	Built-in thermal overload protection	
Discharge Port:	KP 1 1/4" NPT	AP 1 1/2" NPT
Noise Level:	Less than 65 dB(A), measured in accordance with ISO 3743.	
Installation Depth:	Min: Water level above strainer inlet Max: 33 feet below liquid level	
Storage Temperature:	Min -5°F	

Pre-Installation Checklist

1. Check the Condition of the Pump

Examine the pump carefully to make sure no damage has occurred during shipment. "The AP, KP" pump should remain in its shipping carton until it is ready to be installed. This carton is especially designed to protect it from damage. During unpacking and prior to installation, care should be taken to ensure the pump is not dropped or mishandled.

2. Electrical Requirements

The operating voltage and other electrical data are marked on the motor label. Make sure that the motor is suitable for the electrical supply on which it will be used. All electrical cords must be of an adequate size to prevent any drop in the supply voltage. All "AP/KP" models have built-in thermal overload motor protection which resets automatically. "AP/KP" models are supplied complete with a power cord. When fitted, the automatic float switch is connected between the pump power cord and the power supply. Wiring of the pump should be in accordance with NEC regulations for permanent or temporary installations, whichever is applicable.

3. Pumped Liquid Requirements

The operating limits of "The KP & AP" pumps include:

Liquid Temperature:	Min	Max
KP 150, 250 & 350	32°F	122°F
AP 12	32°F	131°F

At intervals of at least 30 minutes, a liquid temperature of up to 158°F is allowed for short periods (2 minutes).

Pre-Installation Checklist

4. Is the Application Correct for This Pump ?

SUITABLE APPLICATIONS

"The AP/KP" pumps are single-stage submersible pumps suitable for pumping waste water. The pump is capable of pumping water which contains solids up to $\frac{3}{8}$ "(KP), $\frac{7}{16}$ "(AP) in diameter. The pump is suitable for:

- Drainage of basements or buildings prone to flooding.
- Pumping of waste water from washing machines, sinks, baths, showers, etc., up to the sewer level.
- Dewatering of sites or excavations or the pumping of water for fountains.
- Pumping in draining wells
- Emptying swimming pools, ponds, tanks, or fountains (*except when there are persons in the water*).

UNSUITABLE APPLICATIONS

The pump **IS NOT** suitable for pumping:

- Sewage
- Liquids containing long fibers
- Liquids containing solid particles larger than $\frac{3}{8}$ "(KP), $\frac{7}{16}$ "(AP) in diameter.
- Flammable liquids (oil, gasoline, etc.)
- Aggressive liquids

Note: If the pump has been used for very dirty or chlorinated water it should be flushed thoroughly with clean water after use.

5. Read this Guide Thoroughly

Even if you are very familiar with the installation of this pump, a quick glance through the remaining sections of this guide may help you avoid a potential problem.

Installation and Operation

Handling the Pump

It is recommended that a cable be secured to the pump handle to make it easier to remove the pump.

Do not lower or lift the pump by means of the electric cord.

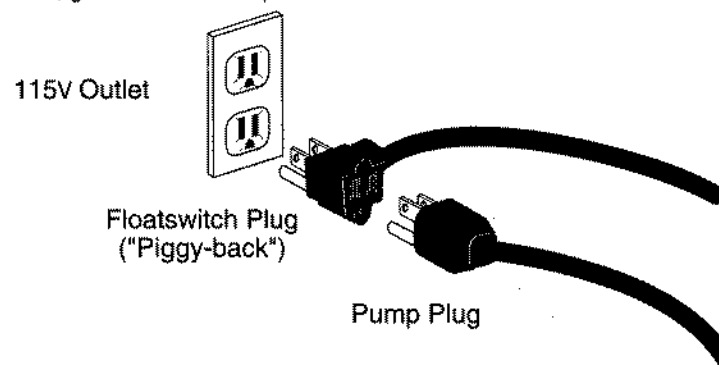
Electrical Connection

The electrical connection should be carried out in accordance with local regulations and following the National Electrical Code. The pump should be grounded. The operating voltage and frequency are marked on the nameplate.

"THE AP/KP" pumps have built-in thermal overload protection and require no additional motor protection. If the motor is overloaded, it will stop automatically. When it has cooled to normal temperature it will start automatically.

Installation and Operation

When connecting the pump for manual operation, the 115V plug is inserted into a 115V outlet. If a floatswitch is included for automatic operation it will be of the "Piggy-back" design. Plug the 115V plug on the floatswitch into the 115V outlet then plug the 115V plug from the pump into the floatswitch plug. Suitable for use with GFI, ground fault interruptor.

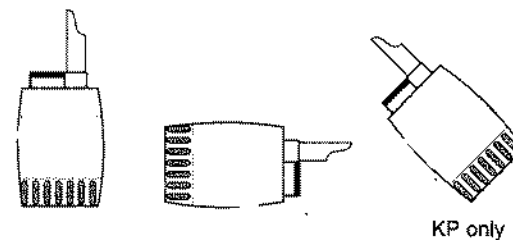


Pump Location and Positioning

Before positioning the pump, make sure that the strainer will not be blocked or partly blocked by silt, mud, or similar materials. This can be avoided by positioning the pump on bricks or a concrete pad, or by letting the pump hang from the discharge pipe or a cable 2-4 inches above the bottom.

"The AP & KP" can be used in the following positions:

When used in the horizontal position, the pump must be completely covered by liquid, and discharge port at the highest position on the pump (as shown).



Pipe Connection

Steel or rigid plastic pipe can be screwed directly into the 1 $\frac{1}{4}$ " inch NPT for KP, 1 $\frac{1}{2}$ " inch NPT for AP12 pump discharge port. For permanent installation, a union fitting at a convenient point is recommended to facilitate ease of removal for cleaning and servicing. A few other recommendations:

- For portable or temporary installations, plastic discharge pipe can be used in conjunction with a suitable screwed/hose connector.
- Removal of the pump should be by a cable secured to the pump handle and not by the discharge pipework.
- Screwed threads should be sealed using Teflon® tape.

Installation and Operation

Non-Return Check Valve Recommended

Whenever the pump is installed in a permanent installation with a float switch, a non-return check valve must be fitted in the discharge pipe or hose.

Adjusting the Float Switch

The float switch can automatically turn the pump on and off. Switching adjustment is possible by repositioning the float switch in the handle of the pump. The free cable length must always be:

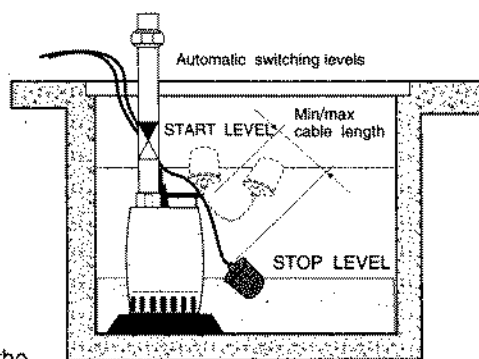
KP 150, 250 & 350

- At least 2 1/2 inches
- No more than 6 inches

AP 12

- At least 4 inches
- No more than 14 inches

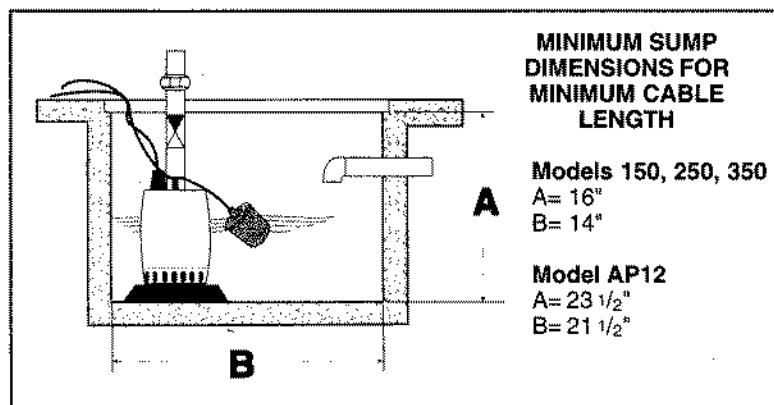
For manual operation, unplug both the pump and floatswitch from the 115V outlet. Plug the 115V plug on the pump into the outlet.



Minimum drain depth (manual operation) 1/2"

Basin Requirements

When the pump is installed in a permanent installation with a float switch, and the cable length is set to the minimum length as listed above, the minimum dimensions of the well should be as shown below. Furthermore, the well should be dimensioned according to the relation between the water flow to the well and the pump capacity.



MINIMUM SUMP DIMENSIONS FOR MINIMUM CABLE LENGTH

Models 150, 250, 350

A= 16"
B= 14"

Model AP12

A= 23 1/2"
B= 21 1/2"

Installation and Operation

Starting "The AP/KP"

Before starting the pump, check:

- Whether the pump is submerged in liquid. During normal operation, the strainer of the pump must be below the surface of the liquid.
- Whether the pump is positioned on a base so that the strainer is not blocked by silt, mud or similar materials.
- Whether the pipe/hose connection is tight.
- Whether the discharge pipe is open (bend of hose, etc).
- Whether the pump is connected to the electric supply in accordance with the instructions.
- Check the float switch for free movement.

Then:

- Switch on and check to make sure the pump operates properly, that water is being pumped, and the pump operates through the control sequence.
- The float switch will allow the pump to pump down to a level of approximately 4". To pump out below this level secure the switch in the manual position. See Adjusting the Float Switch.

Maintenance

Regular Maintenance

Under normal operating conditions, "The AP/KP" is maintenance free. It is always advisable to flush the pump after each use, particularly if it has been pumping liquids containing particles that may settle in the pump.

Cleaning the Pump

If the pump does not deliver a sufficient quantity of water because of sediment, dismantle and clean the pump. To dismantle the pump:

1. Disconnect the electrical supply. Allow the pump to drain.
2. **KP 150, 250 & 350** — (Refer to Fig. 1 Pg.6) Carefully loosen the suction strainer by inserting a screwdriver in the recess between the outer casing and the strainer and pressing it hard. Repeat until the strainer is free and can be removed.
- AP 12** — (Refer to Fig. 2 Pg.7) Carefully loosen the strainer by inserting a screwdriver through one of the holes of the strainer and press it downwards (towards bottom). Repeat the procedure until the strainer is free and can be removed.
3. Remove the suction strainer, clean, and refit it. Connect the electricity supply and start the pump.

If the pump still doesn't deliver sufficient water, then:

4. Disconnect the electricity supply.
5. **KP 150, 250 & 350** — (Refer to Fig. 1 Pg.6) Turn the pump housing 90° counter-clockwise using a screwdriver. Pull off the housing. Clean and flush the pump with water to remove possible impurities between the motor and the outer casing. Clean the impeller by spraying it with a hose. Check to make sure the impeller can rotate freely. If not:
 - a. Hold the impeller in place with a screwdriver while loosening and removing the nut on the motor shaft (13mm).
 - b. Clean the impeller and around the shaft.

Maintenance

Check the impeller, the housing, and the gasket. Assemble the pump in reverse order of dismantling. When doing so, check to make sure the sealing part of the housing is positioned correctly. Moisten the gasket with water to facilitate the fitting.

6. **AP 12** — (Refer to Fig.2) Unscrew the six screws close to the edge of the pump sleeve and lift the pump housing out of the pump sleeve. Clean the pump housing, the pump, and the impeller. Check to make sure the impeller can rotate freely. If not:
 - a. Hold the impeller in place with a screwdriver while loosening and removing the nut on the motor shaft (13mm).
 - b. Clean the impeller and around the shaft. Check the impeller and around the shaft. If the impeller is worn or defective, install a new one. Assemble the pump in reverse order of dismantling. Do so by:
 - c. Fit the impeller with the washer and nut. Make sure the impeller engages with the shaft.
 - d. Position the O-ring in the pump sleeve and lower the pump into the intermediate chamber.
 - e. Fit the six screws with gaskets in the pump housing and tighten securely.

KP Kits

Description	Product No.
KP150 Impeller Kit	015783
KP250 Impeller Kit	015784
KP350 Impeller Kit	015786
(Kit incl. Impeller, nut, and gasket)	
Replacement Cord 10'	016728

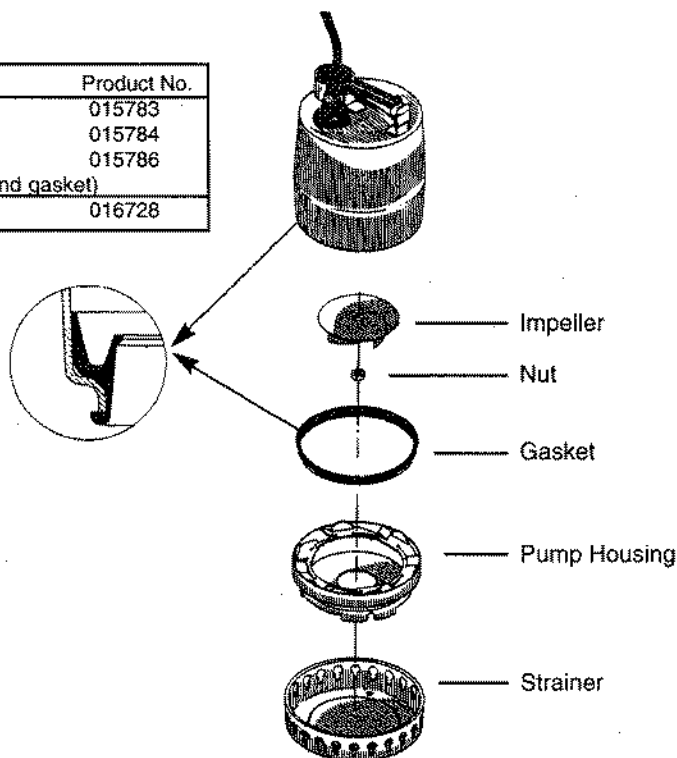


Fig. 1 KP 150, 250 & 350

Maintenance

AP Kits

Description	Product No.
Impeller AP12	96422174
Cord w/nut 10'	96023909
Cord w/nut 25'	96023910
Shaft Seal & Oil Kit NBR	96010604
Shaft Seal Kit AP12,35,50 NBR	96427804
Shaft Seal Kit AP12,35,50 FKM	96426650

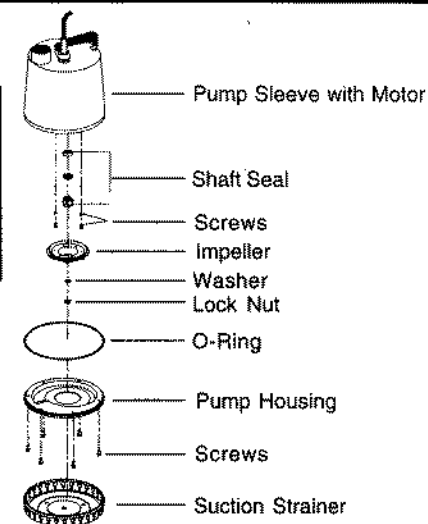


Fig. 2 AP 12

Troubleshooting

Problem	Cause
1. Motor does not start	<ol style="list-style-type: none"> a) Supply failure. b) Pump switched off by float switch. c) Fuses are blown. d) Thermal relay has cut out the electricity supply to the motor (see Electrical Connection — pg.2). e) Check cable for defects.
2. Thermal relay trips out after short time of operation.	<ol style="list-style-type: none"> a) Temperature of pumped liquid higher than stated under "Pumped Liquid Requirements" on pg.1. b) Pump partly blocked by particles (see "Cleaning the Pumps" — pg.5). c) Pump mechanically locked (see "Cleaning the Pumps" — pg.5). d) Check volts and amperage. e) Check cable for defects.
3. Pump runs but gives insufficient water.	<ol style="list-style-type: none"> a) Strainer partly blocked by particles. b) Pump partly blocked by particles (see "Cleaning the Pumps"). c) Discharge pipe partly blocked. Check the check valve, if fitted. d) Check the wear plate and the impeller for wear (see "Cleaning the Pumps").
4. Pump runs but gives no water.	<ol style="list-style-type: none"> a) Strainer blocked by particles. b) Pump partly blocked by particles (see "Operation and Maintenance"). c) Discharge pipe partly blocked. Check the check valve, if fitted. d) Liquid level is too low. During starting, the liquid level must be above the strainer. e) The float switch cable length is set too long.

LIMITED WARRANTY

Products manufactured by GRUNDFOS are warranted to the original user only to be free of defects in material and workmanship for a period of 18 months from date of installation, but not more than 24 months from date of manufacture. GRUNDFOS' liability under this warranty shall be limited to repairing or replacing at GRUNDFOS' option, without charge, F.O.B. GRUNDFOS factory or authorized service station, any product of GRUNDFOS manufacture. GRUNDFOS will not be liable for any costs of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by GRUNDFOS are subject to the warranty provided by the manufacturer of said products and not by GRUNDFOS' warranty. GRUNDFOS will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair, or if the product was not installed in accordance with GRUNDFOS printed installation and operating instructions.

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of GRUNDFOS products from which it was purchased together with proof of purchase and installation date, failure date, and supporting installation data. Unless otherwise provided, the distributor or dealer will contact GRUNDFOS or an authorized service station for instructions. Any defective product to be returned to GRUNDFOS or a service station must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Material Authorization must be included if so instructed.

MANUFACTURER WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING FROM INSTALLATION, USE, OR ANY OTHER CAUSES. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE WARRANTIES DESCRIBED OR REFERRED TO ABOVE. EXCEPT AS EXPRESSLY HEREIN PROVIDED THE GOODS ARE SOLD "AS IS", THE ENTIRE RISK AS TO QUALITY AND FITNESS FOR A PARTICULAR PURPOSE, AND PERFORMANCE OF THE GOODS IS WITH THE BUYER, AND SHOULD THE GOODS PROVE DEFECTIVE FOLLOWING THEIR PURCHASE, THE BUYER AND NOT THE MANUFACTURER, DISTRIBUTOR, OR RETAILER ASSUMES THE ENTIRE RISK OF ALL NECESSARY SERVICING OR REPAIR.

Some jurisdictions do not allow the exclusion or limitation of implied warranties of merchantability and fitness for a particular purpose, of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last or require you to pay certain expenses as set forth above. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

The telephone number of our service and repair facilities central directory, from which you can obtain the locations of our service and repair facilities is, 1-800-333-1366.

GRUNDFOS®

GRUNDFOS PUMPS CORPORATION • 3131 Business Park Avenue • Fresno, CA • 93727

Customer Support Centers: Allentown, PA • Fresno, CA

(800) 333-1366 • FAX (800) 333-1363

Canada: Oakville, Ontario • Mexico: Apodaca, N.L.

01 07 32

V7 09 05 53 03 00	US
Rept. V7 09 05 53 04 98	
LKP-TL-001	
	03/00

SECTION 3
WARRICK – LEVEL CONTROLLERS/SENSOR PROBES

Warrick® Dual Function Controls

Installation and Operation Bulletin

This bulletin should be used by experienced personnel as a guide to the installation of Dual Function Controls. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Gems Sensors or its representative if further information is required.

Specifications

Control Design: Open circuit board design

Contact Design: SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C.), non powered contacts for limit control and SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C.), non powered contacts for level control

Contact Ratings: 10A @ 120, 208/240, 240 VAC resistive (120°F), 1A @ 120, 208/240, 240 resistive (150°F), 1/3 Hp @ 120, 208/240, 240 VAC

Contact Life: Mechanical - 5 million operations
Electrical - 100,000 operations minimum at rated load

Supply Voltage: 120, 240, or 24 VAC models, +10%, -15%, 50/60 Hz. 208/240 Model: 187V Min to 255V Max, VAC 50/60 Hz

Power Consumption: 120, 208/240, 240, or 24 VAC both relays energized - 4.4 VA.

Secondary Circuit: 12 VAC RMS voltage on robes, 1.5 milli-amp current.

Sensitivity: Models operate from 0-100K ohms maximum specific resistance (factory set)

Temperature: -40° to 150° F ambient

Terminals: Probe connections 3/16" male quick connects, Line and Power connections 1/4" male quick connects

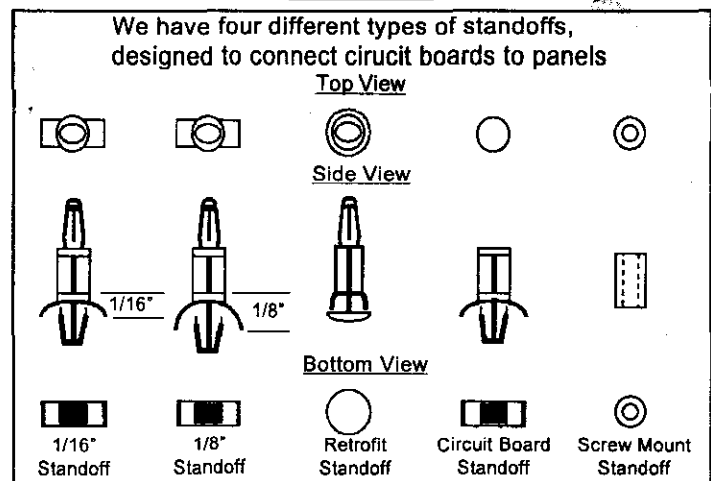
Time Delays: Standard, 0.5 seconds rising level, LLCO probe, 3 seconds standard for lowering level.

Listings: Entire control carries U.L. motor controller recognition (UL 508) and U.L. Limit control recognition (UL 353). 208/240 and 240 VAC models carry only motor controller recognition (UL 508)

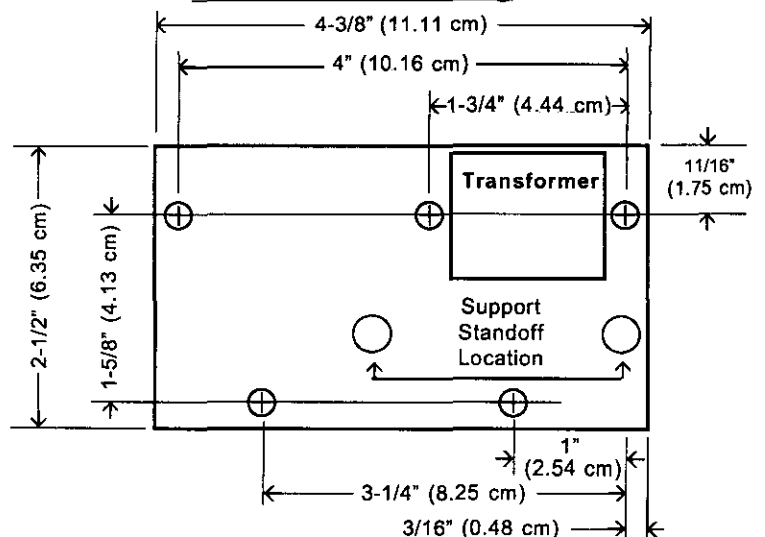
Installation

1. Drill five .187 holes in customer supplied back plate using stick on template supplied with control. Standard standoffs are designed for back plate thickness of 0.062 (1/16"). Standoffs are available for back plates of 0.125 (1/8") nominal thickness. If retrofit plate standoffs are used, drill 5 (five) 0.250 dia. Holes in proper locations.
2. Install five standoffs into back plate. Install two support standoffs into circuit board. Snap circuit board onto standoffs. See sketch for proper installation. Install control in an appropriate enclosure.
3. Wire control per wiring diagram, following N.E.C. and local codes. Use appropriately sized spade terminals.

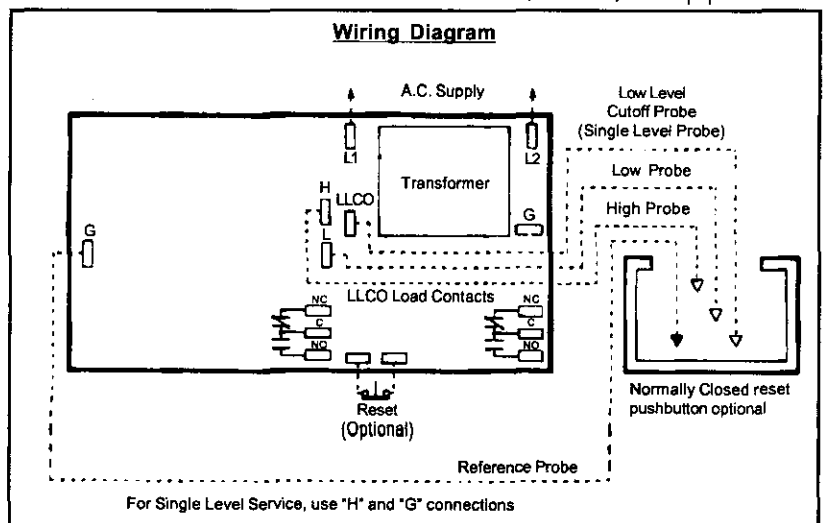
Standoffs



Dimensional Drawing



Wiring Diagram



Operation

DIRECT MODE BOTH FUNCTIONS

LLCO Function: When the liquid rises to the electrode on terminal LLCO, the relay associated with terminal LLCO energizes, changing state of the load contacts. (LED will be lit). The relay remains energized until the liquid level recedes below electrode on terminal LLCO. The associated relay then de-energizes, (LED will not be lit) returning load contacts to original state. Unless otherwise specified, there is a three-second time delay on decreasing level. Liquid must be below probe on terminal LLCO for full three seconds before control de-energizes.

H-L Function: When the liquid rises to the electrode on terminal H, the associated relay energizes, changing the state of the load contacts. (LED will be lit). The relay remains energized until the liquid level recedes below electrode on terminal L. The associated relay then de-energizes, (LED will not be lit) returning load contacts to original state. Unless otherwise specified, there is a one half second time delay on increasing level. Liquid must be in contact with probe on terminal H for a full half second before control energizes. This function can be wired for single level service by using only the H terminal.

INVERSE MODE

LLCO Function: LLCO always functions in direct mode only see above for operation.

H-L Function: Associated relay energizes with power, (LED will be lit) changing the state of the load contacts. When the liquid rises to the electrode on terminal H, the relay de-energizes, returning load contacts to shelf state. (LED will not be lit). The associated relay remains de-energized until the liquid level recedes below electrode on terminal L. The relay then energizes.

Options

Optional Manual Reset (Normally closed pushbutton across reset terminals. Pushbutton ordered separately): Manual reset only applies to the function associated with terminal LLCO. When the liquid rises to the electrode on terminal LLCO, the control will remain de-energized (load contacts in original state) until the pushbutton is depressed. The control will then energize, (LED will be lit) changing the state of the contacts. The control remains energized until the liquid level recedes below electrode on terminal LLCO. The control then de-energizes, (LED will go off) returning load contacts to their original state. Unless otherwise specified, there is a three second time delay on decreasing level. Liquid must be below probe on terminal LLCO for full three seconds before control de-energizes.

Manual Reset with optional Power Outage Feature: Reset (Normally closed pushbutton across reset terminals. Pushbutton ordered separately) Control will ignore power loss to control. With liquid in contact with electrode on terminal LLCO, a power outage of less than 250 m sec. Will cause the control to de-energize, but will automatically energize upon return of power. However, loss of liquid will cause control to de-energize and remain so until liquid again rises to electrode and pushbutton is depressed.

Time Delays associated with terminals H and L : With time delay on increasing level, the liquid must be in contact with the high electrode for the full duration of the time delay before control will operate. With delay on decreasing level, the liquid must be below the low electrode for the full duration of the time delay before control will operate. In single level service, terminals 3 and 4 must be jumpered together to achieve time delays on both increasing and decreasing levels or just decreasing level.

Time Delays associated with terminal LLCO: 3 Second time delay on decreasing level is standard. Delay up to 90 seconds, can be specified and would act in the same manner as listed above.

Dirty Electrode Detection: The LED will flash every half-second once the probe resistance reaches a value greater than the nominal control sensitivity rating. The relay state will not change until it exceeds the nominal sensitivity by more than 25% (typically) at nominal input voltage. At which time the LED and relay contact return to the dry state. Such a condition may suggest electrode maintenance is required.

Time Out Option: The latching circuit for the high and low electrode has an optional timer. In some applications the High or Low electrode may become short circuited or disconnected. Such an occurrence may potentially over fill in fill applications, or cause the pump to run dry in pump down applications. The time option is custom programmed up to 3 minutes. When a fault condition occurs, the Fill LED will have a blink sequence of .5 seconds on 2 seconds off. See Chart A-1 for time delay options.

Test Feature: Allows LLCO circuit to be tested. Holding down the reset button for 3 seconds will allow the LLCO circuit to trip which simulates the loss of water, without the need of draining the water level in the boiler. The control will return to normal operation once the reset button is pressed a second time. (Test feature option only available with the manual reset function.)

DF X X X X XX XX XX X

Dirty Probe/Timeout Timer Option:

(See Chart A-1)

Time Delay Decreasing Level:

LLCO function 3-90 seconds,
blank = 3 seconds

Time Delay Decreasing Level:

H/L function 0-90 seconds,
blank = 0 seconds

Time Delay Increasing Level:

H/L function 0-90 seconds,
blank = 0 seconds

Optional Character: (See Chart B-1)

Enclosure: 0-None, 1-Nema 1, 4-Nema 4

Standoff Style/Socket Type:

A - 1/16" Panel C - Screw Mount

B - 1/8" Panel D - Retrofit

Supply Voltage:

1 - 120 VAC 3 - 24 VAC

2 - 240 VAC 8 - 208/240 VAC

Mode/Sensitivity:

Direct Inverse

A - 4.7K K - 4.7K

B - 10K L - 10K

C - 26K M - 26K

D - 50K N - 50K

E - 100K P - 100K

Chart A-1

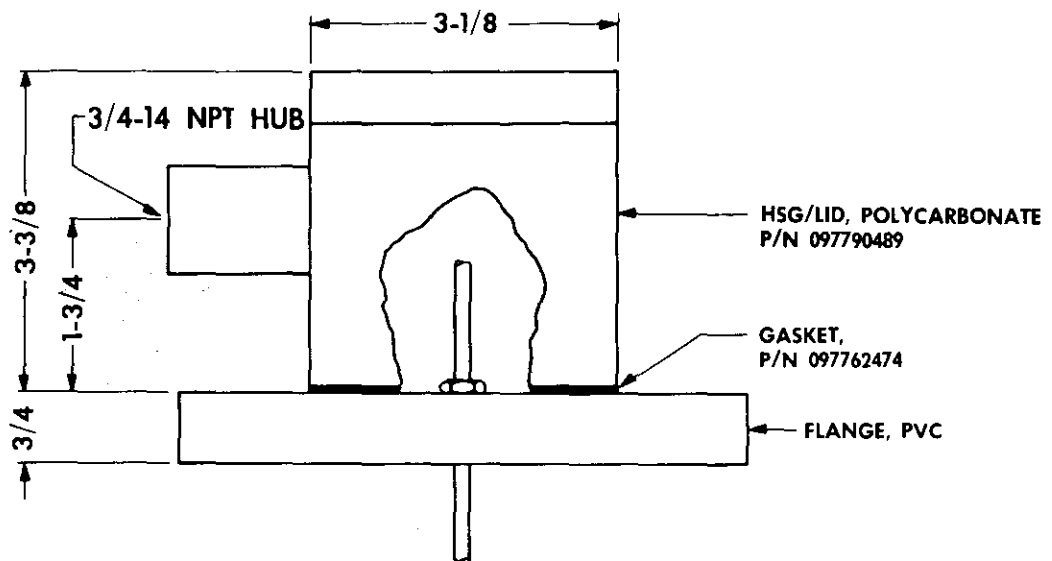
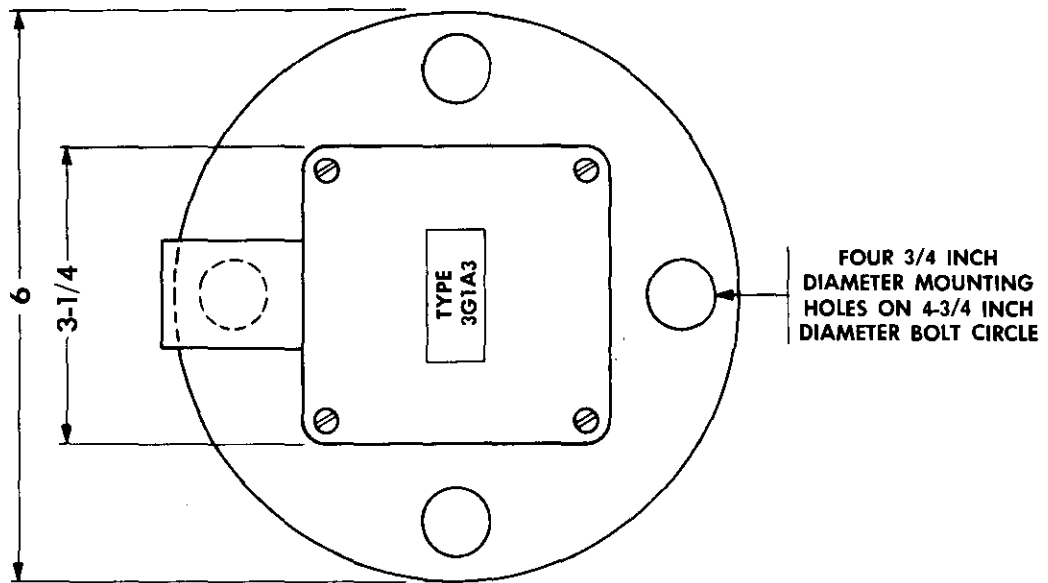
	OPTIONAL CHARACTER	Time Out Option							
		DRY PROBE	25% OF RANGE	30 SEC	60 SEC	90 SEC	120 SEC	150 SEC	180 SEC
A	X								
B	X	X							
C	X			X					
D	X				X				
E	X					X			
F	X						X		
G	X							X	
K		X							
L			X						
M				X					
N					X				
P						X			
Q							X		

Chart B-1

	Reset Function	N.C. Pushbutton	Power Outage	Retrofit Plate	Test Feature
A	x	x	x		x
B	x				x
D	x				
G	x	x	x		
J	x	x	x	x	
K	x		x		
L	x		x	x	
R				x	
S	x	x			
T	x	x		x	
W	x			x	
Y	x	x			x
Z	x		x		x
X	No Option				



Gems Sensors Inc.
One Cowles Road
Plainville, CT 06062-1198
Tel: 860-793-4579
Fax: 860-793-4580



SERIES 3G 3 A3 PLASTIC ELECTRODE FITTING - 2" FLANGE

SPECIFY NUMBER
OF ELECTRODES
REQUIRED
(1 THRU 7)

SERIES 3W/3Y ELECTRODE(S)
ORDER SEPARATELY



DATE: 18 FEB 83

SERIES 3GXA3
ELECTRODE FITTINGS

WARRICK CONTROLS, INC.
ROYAL OAK, MI 48073-2264

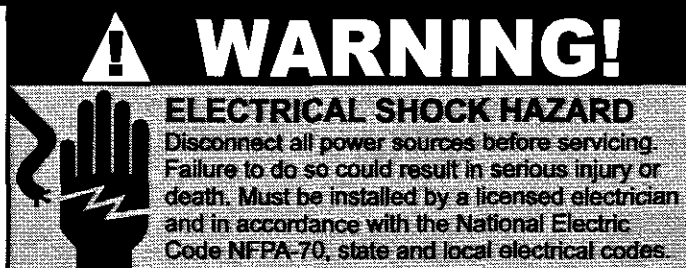
DRWG NO: B5352D

SECTION 4
SJE RHOMBUS – CONTROL PANEL
& FLOAT CONTROL SWITCHES

SINGLE PHASE SIMPLEX - 112

Standard Field Wiring Diagram 208/240V Pump System

Use wiring diagram in conjunction with schematic for panel installation.



1 Wire Floats

- Connect float switches to TB1 (on circuit board) as shown.
(Pump down application is shown)

2 Wire pump power cable

- Connect pump power cable to TB3-3 and TB3-4.
- Connect pump ground wire to ground lug.

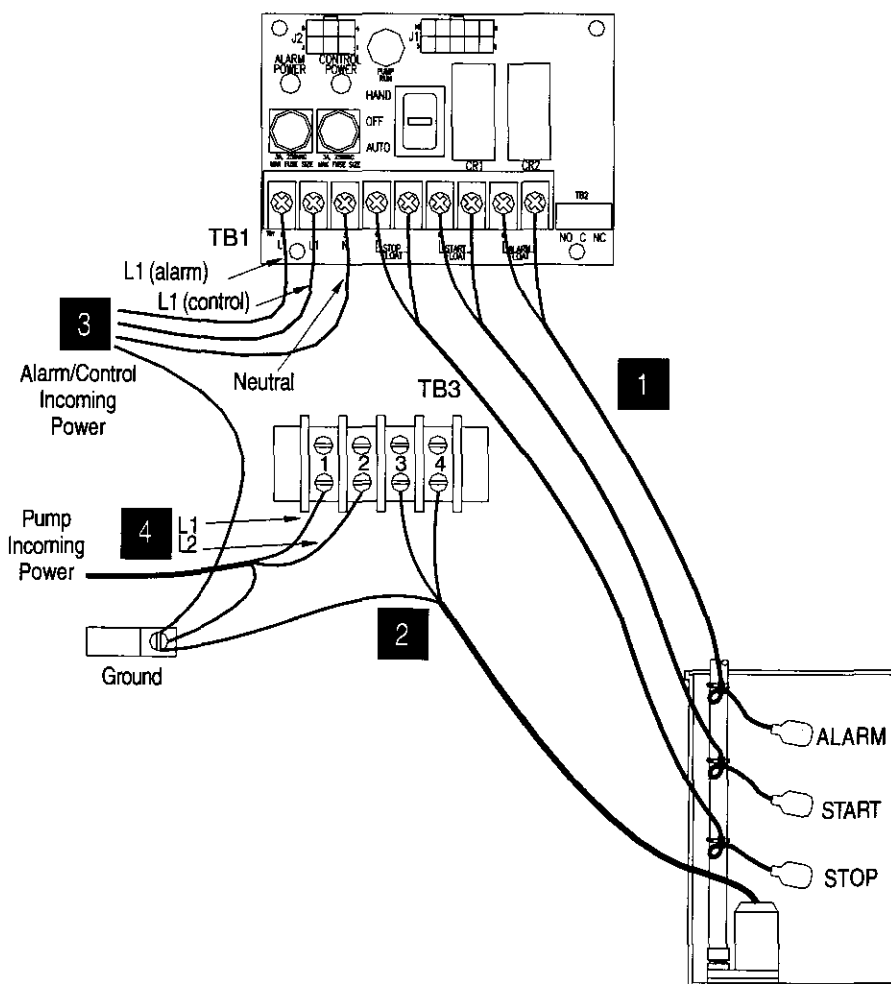
3 Wire incoming power Control and Alarm on circuit board

- Connect L1 (alarm) to TB1-1.
- Connect L1 (control) to TB1-2.
- Connect Neutral to TB1-3.
- Connect incoming ground line to ground lug.

4 Wiring incoming pump power

- Connect L1 to TB3-1.
- Connect L2 to TB3-2.
- Connect ground line to ground lug.

5 Field wire options according to schematic (if applicable)



NOTE: It is the recommendation of the factory to use separate pump and alarm power sources.

SJE Rhombus CONTROLS

P.O. Box 1708 ■ 22650 County Highway 6 ■ Detroit Lakes, MN 56502

1-888-DIAL-SJE (1-888-342-5753)

Fax: 218-847-4801

Visit our website: www.sjerhombus.com

SINGLE PHASE SIMPLEX - 112

Standard Field Wiring Diagram 120V Pump System

Use wiring diagram in conjunction with schematic for panel installation.

1

Wire Floats

- Connect float switches to TB1 (on circuit board) as shown.
(Pump down application is shown)

2

Wire pump power cable

- Connect pump power cable to TB3-3 and TB3-4.
- Connect pump ground wire to ground lug.

3

Wire incoming power

Control and Alarm on circuit board

- Connect L1 (alarm) to TB1-1.
- Connect L1 (control) to TB1-2.
- Connect Neutral to TB1-3.
- Connect incoming ground line to ground lug.

4

Wiring incoming pump power

- Connect L1 to TB3-1.
- Connect N to TB3-2.
- Connect ground line to ground lug.

5

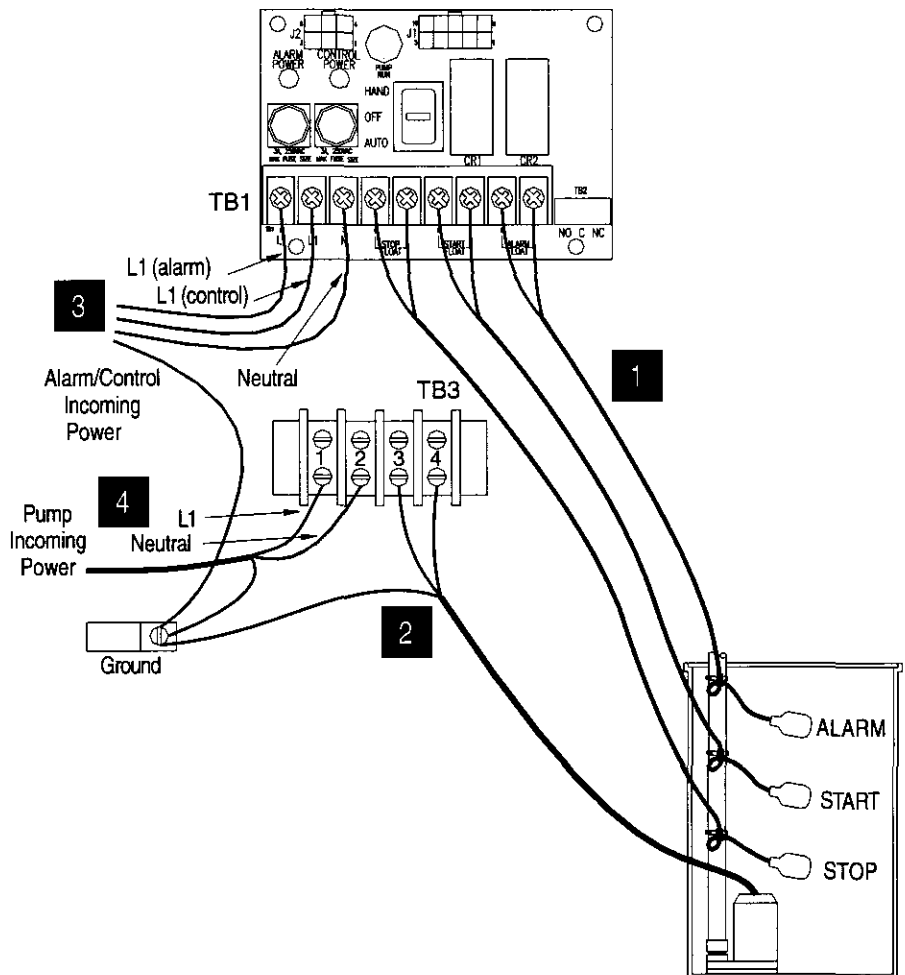
Field wire options according to schematic (if applicable)



WARNING!

ELECTRICAL SHOCK HAZARD

Disconnect all power sources before servicing. Failure to do so could result in serious injury or death. Must be installed by a licensed electrician and in accordance with the National Electric Code NFPA-70, state and local electrical codes.



NOTE: It is the recommendation of the factory to use separate pump and alarm power sources.

SJE Rhombus CONTROLS

P.O. Box 1708 ■ 22650 County Highway 6 ■ Detroit Lakes, MN 56502

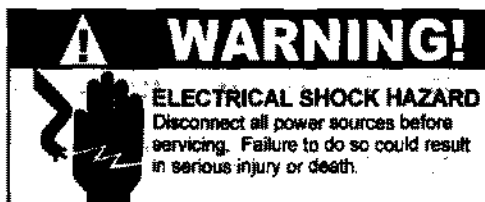
1-888-DIAL-SJE (1-888-342-5753)

Fax: 218-847-4801

Visit our website: www.sjerrhombus.com

Single Phase Simplex SJE-Rhombus® Type 112

Installation Instructions and Operation/Troubleshooting Manual



This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes.

All conduit running from the sump or tank to the control panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. **NEMA 1 enclosures are for indoor use only**, primarily to provide a degree of protection against contact with enclosed equipment. Cable connectors are not required to be liquid-tight in NEMA 1 enclosures. **Do not use NEMA 1 enclosures if subjected to rain, splashing water or hose-directed water. NEMA 4X enclosures are for indoor or outdoor use**, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Installation

A standard Type 112 panel is designed to operate with three floats. These floats operate pump stop, pump start, and high level alarm functions.

NOTE: Options ordered may affect the number of floats and their functions. Please reference the schematic provided with the control panel for proper installation.

Installation of Floats

CAUTION: If control switch cables are not wired and mounted in the correct order, the pump system will not function properly.

WARNING: Turn off all power before installing floats in pump chamber. Failure to do so could result in serious or fatal electrical shock.

1. Use float label kit to label floats for specific operation (stop, start, alarm, etc.). See schematic for float options.
2. Determine your normal operating level, as illustrated in **Figure 1**.
3. Mount float switches at appropriate levels as illustrated in **Figures 2-4**. Be sure that floats have free range of motion without touching each other or other equipment in the basin.

If using the mounting clamp; follow steps 4-6.

4. Place the cord into the clamp as shown in **Figure 2**.
5. Locate the clamp at the desired activation level and secure the clamp to the discharge pipe as shown in **Figure 2**.

NOTE: Do not install cord under hose clamp.

6. Tighten the hose clamp using a screwdriver. Over tightening may result in damage to the plastic clamp. Make sure the float cable is not allowed to touch the excess hose clamp band during operation.

NOTE: All hose clamp components are made of 18-8 stainless steel material. See your SJE-Rhombus® supplier for replacements.

Warranty void if panel is modified.

Call factory with servicing questions:

1-800-RHOMBUS

(1-800-746-6287)

Manufactured by:

SJE
Rhombus
CONTROLS

22650 County Highway 6 ■ P.O. Box 1708

Detroit Lakes, Minnesota 56502 USA

1-888-DIAL-SJE (1-888-342-5753)

Phone: 218-847-1317 ■ Fax: 218-847-4617

E-mail: sje@sjerhombus.com

Website: www.sjerhombus.com

©SJE-Rhombus
Printed in USA
PN1008704B • Rev 1000

Installation Instructions

Mounting the Control Panel

1. Determine mounting location for panel. If distance exceeds the length of either the float switch cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of an SJE-Rhombus® liquid-tight junction box with liquid-tight connectors to make required connections. **You must use conduit sealant to prevent moisture or gases from entering the panel.**
2. Mount control panel (mounting flanges are furnished with control panel).
3. Determine conduit entrance locations on control panel. Check local codes and schematic for the number of power circuits required.

NOTE: Be sure the proper power supply voltage, and phase are the same as the pump motor being installed. If in doubt, see the pump identification plate for electrical requirements.

4. Drill proper size holes for type of connectors being used.

NOTE: If using conduit, be sure that it is of adequate size to pull the pump and switch cables through. **You must use conduit sealant to prevent moisture or gases from entering the panel.**

5. Attach cable connectors and/or conduit connectors to control panel.

**FOR INSTALLATION WITHOUT A SPLICE,
GO TO STEP 11;
FOR INSTALLATION REQUIRING
A SPLICE, FOLLOW STEPS 6-10.**

6. Determine location for mounting junction box according to local code requirements. **Do not** mount the junction box inside the sump or basin.
7. Mount junction box to proper support.
8. Run conduit to junction box. Drill proper size holes for the type of conduit used. Attach liquid-tight connectors to junction box.

9. Identify and label each wire before pulling through conduit into control panel and junction box. Pull pump power cables and control switch cables through connectors into junction box. Make wire splice connections at junction box.
10. Firmly tighten all fittings on junction box. Insure all cable connectors are liquid-tight and sealed.
11. If a junction box is not required, identify and label cables on both float and stripped ends.
12. Connect pump and float wires to proper position on terminals. See schematic inside control panel for terminal layouts.
13. Connect control, alarm and pump power conductors to proper position on terminals. See schematic inside control panel for terminal connections.

NOTE: It is the recommendation of the factory to use separate pump and control/alarm power sources.

VERIFY CORRECT OPERATION OF CONTROL PANEL AFTER INSTALLATION IS COMPLETE.

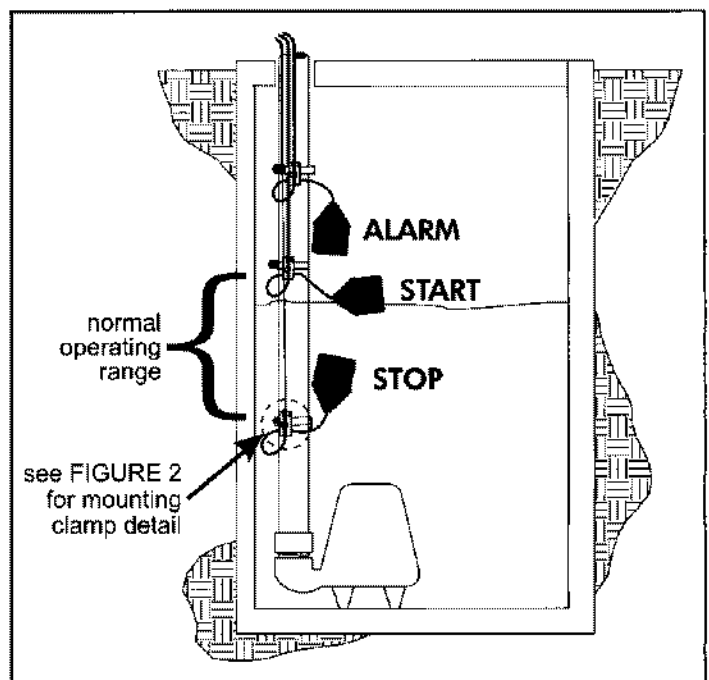


FIGURE 1-
Three float simplex - pump down installation

Installation Instructions

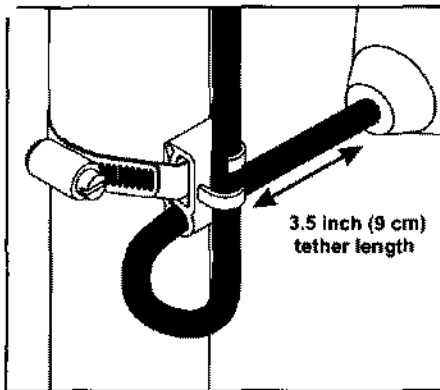


FIGURE 2
Mounting clamp detail

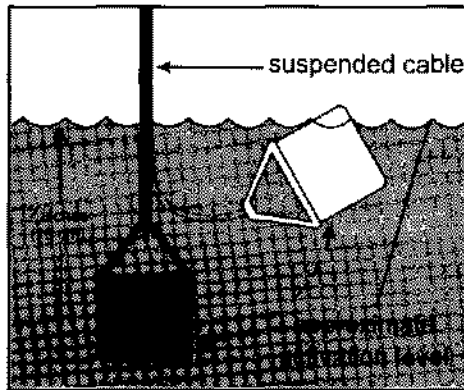


FIGURE 3
Internally weighted float

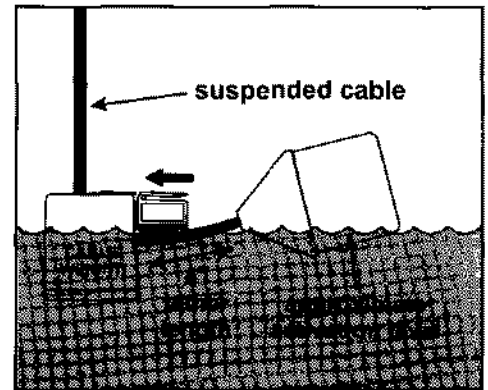


FIGURE 4
Float with cable weight

Operations

SJE-Rhombus® Type 112 control panels are designed to operate in a three float system as standard. When all floats are in the open or OFF position, the panel is inactive. As the liquid level changes and closes the stop float, the panel remains inactive until the start float also closes. At this point the pump will start, providing the HOA switch is in the AUTOMATIC mode and the power is ON. The pump will remain ON until both the stop and start floats open (return to the OFF position). If the liquid level travels beyond both the stop and start floats and reaches the alarm float, the alarm will be activated. The alarm horn can be silenced by moving the test/normal/silence switch to the silence position.

Alarm System (Horn and Indicator)

When an alarm condition occurs, a red light and horn will be activated. If the test/normal/silence switch is moved to the silence position, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset. The alarm system can be tested by moving the test/normal/silence switch to the test position.

HOA Switch

A hand-off-automatic switch is provided for the pump. In the hand mode, the pump will turn on unless other safety features are employed. In the automatic mode, the pump will turn on from commands by the float switches.

Pump Run Light

The run light will be ON in either the hand or the automatic mode when the pump is called to run.

Circuit Breaker (optional)

The pump circuit has a thermal-magnetic circuit breaker which provides pump disconnect and branch circuit protection.

Dry Auxiliary Contacts (optional)

Normally open - Contacts are open under normal conditions and closed when alarm condition is present.

Normally closed - Contacts are closed under normal conditions and open when alarm condition is present. Both types automatically reset once alarm condition is cleared.

NOTE: Some options ordered may not be included in this manual.

For information regarding the operations of options not listed here or servicing questions,

please call a SJE-Rhombus®

customer service technician at

1-800-RHOMBUS

(1-800-746-6287)

Warranty void if panel is modified.

Troubleshooting

Alarm Horn

Moving the test/normal/silence switch to the test position or activating the alarm float should turn on the alarm horn. If the horn does not sound, replace horn with same type.



Alarm Light

Moving the test/normal/silence switch to the test position or activating the alarm float should turn on the alarm light. If the light does not activate, replace bulb with same type.

Circuit Breaker (optional)

Check each pole of the circuit breaker for proper resistance reading using the following procedure.

WARNING: Disconnect incoming power to panel.

1. Isolate the circuit breaker by disconnecting either line side or load side wires.
2. Place the ohmmeter leads across the corresponding line and load terminals of each pole.
3. With the ohmmeter on the R X 1 scale and the breaker in the OFF position, the reading should be infinity (very high resistance). With the breaker in the ON position, the reading should be nearly zero ohms (very low resistance). If the readings are not as stated, replace the circuit breaker with one of the same ratings.

NOTE: Readings may vary slightly depending on the accuracy of the measuring device.

Float Controls

Check the floats during their entire range of operation. Clean, adjust, or replace damaged floats.

Checking the float resistance - The float resistance can be measured to determine if the float is operating correctly or is defective. Use the following procedure to measure the float resistance. **WARNING: Disconnect incoming power to panel.**

1. Isolate the float by disconnecting one or both of the float leads from the float terminals.
2. Place one ohmmeter lead on one of the float wires, and the other ohmmeter lead on the other float wire.
3. Place the ohmmeter dial to read ohms and place on the R X 1 scale. With the float in the "off" position, the scale should read infinity (high resistance). Replace the float if you do not get this reading. With the float in the ON position, the scale should read nearly zero (very low resistance). Replace the float if you do not get this reading.

NOTE: Readings may vary depending on the length of wire and accuracy of the measuring device.

Fuses

Check the continuity of the fuse. With power OFF, pull the fuse out of the fuse block. With the ohmmeter on the R X 1 scale, measure resistance. A reading of infinity indicates a blown fuse and must be replaced. Replace fuse with same type, voltage and amp rating.

Magnetic Contactor Coil

WARNING: Disconnect incoming power to panel.

Check the coil by disconnecting one of the coil leads. Measure the coil resistance by setting the ohmmeter on the R X 1 scale. A defective coil will read zero or infinity, indicating a short or opened coil respectively. Replace defective contactor with same type.

NOTE: Readings may vary depending on the accuracy of the measuring device.

SJE-Rhombus® Three-Year Limited Warranty

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for three years after the date of consumer purchase. During that time period and subject to the conditions set forth below, **SJE-RHOMBUS®** will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of **SJE-RHOMBUS®**.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lighting or conditions beyond the control of **SJE-RHOMBUS®**; (B) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; (C) to failures resulting from abuse, misuse, accident, or negligence; (D) to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and (E) to units repaired and/or modified without prior authorization from **SJE-RHOMBUS®**.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to **SJE-RHOMBUS®**, or such place as designated by **SJE-RHOMBUS®**.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

SENSOR FLOAT® Control Switch

Mercury-activated, narrow-angle float switch designed to activate pump control panels and alarms.

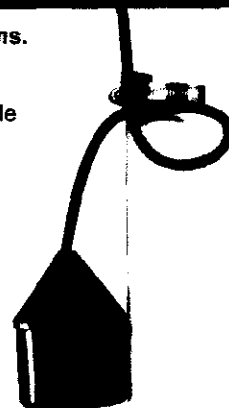
This narrow-angle sensing device is used to accurately monitor liquid levels in sewage and non-potable water applications. The Sensor Float® control switch is not sensitive to rotation and is suitable for use with intrinsically safe circuits. Contact SJE-Rhombus regarding specific intrinsically safe applications.

Normally Open Model (high level)

The control switch turns on (closes) when the float tips slightly **above** horizontal signaling a high level, and turns off (opens) when the float drops slightly below horizontal.

Normally Closed Model (low level)

The control switch turns on (closes) when the float drops slightly **below** horizontal signaling a low level, and turns off (opens) when the float tips slightly above horizontal.



FEATURES

- Suitable for use with intrinsically safe circuits.
- Not sensitive to rotation.
- Control differential of .5 inches (1 cm) above or below horizontal.
- UL Listed for use in non-potable water and sewage.
- CSA Certified.
- Three-year limited warranty.



Hydraulic

OPTIONS

This switch is available:

- for normally open (high level) applications or normally closed (low level) applications.
- in standard cable lengths of 10, 15, 20, or 30 feet and 3, 5, 6, or 10 meters.
- with three mounting options that allow for flexibility in installation:

Mounting Clamp: for applications where the switch can be attached to a discharge pipe or similar mounting device.

Internally Weighted: for applications where the switch can be suspended from above.

Externally Weighted: for applications where the switch can be suspended from above.

SPECIFICATIONS

CABLE: flexible 18 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE) jacket

FLOAT: 3.38 inch diameter x 4.55 inch long (8.58 cm x 11.56 cm), high-impact, corrosion resistant, PVC housing for use in sewage and non-potable water up to 140°F (60°C)

MAXIMUM WATER DEPTH: 30 feet (9 meters), 13 psi

MERCURY TILT SWITCH: single pole, single throw, mercury-to-mercury contacts, hermetically sealed in a steel capsule and epoxy sealed in the float housing

ELECTRICAL: 5 amp, 120/230 VAC, 50/60 Hz

CONTROL SWITCHES

**SJE
Rhombus®**
CONTROLS

PO Box 1708, Detroit Lakes, MN 56502

1-888-DIAL-SJE • 1-218-847-1317

1-218-847-4617 Fax

email: sje@sjerhombus.com

www.sjerhombus.com

SEE BACKSIDE FOR PRICING/ORDERING INFORMATION.



Control Switch Installation Instructions

SJE-Rhombus® narrow angle control switches accurately monitor liquid levels in sewage, and non-potable water applications. These switches are designed to activate pump control panels and alarms.

The SJE SignalMaster® and SJE SignalMaster® SPDT control switches passed NSF Standard 61 protocol by an approved Water Quality Association laboratory for use in potable water applications.

SENSOR FLOAT®



- Mercury activated.
- Suitable for use with an intrinsically safe circuit.**
- Not sensitive to rotation.
- Mounting options: mounting clamp, internal or cable weight.

**Contact SJE-Rhombus for specific intrinsically safe applications.

SENSOR FLOAT® MINI



- Mercury activated.
- Narrow angle float switch in a small float housing.
- Suitable for use with an intrinsically safe circuit.**
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

**Contact SJE-Rhombus for specific intrinsically safe applications.

SJE SIGNALMASTER®



- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

SJE SIGNALMASTER® SPDT



- Mechanically activated.
- Control differential of 1.5 inches above or below horizontal.
- Not sensitive to rotation.
- Mounting options: mounting clamp or cable weight.

PREVENTATIVE MAINTENANCE

- Periodically inspect the product. Check that the cable has not become worn or that the housing has not been damaged so as to impair the protection of the product. Replace the product immediately if any damage is found or suspected.
- Periodically check to see that the float is free to move and operate the switch.
- Use only SJE-Rhombus® replacement parts.
- The Sensor Float® and Sensor Float® Mini control switches contain mercury and MUST be recycled or disposed of according to local, state, and federal codes.

SJE-RHOMBUS® THREE-YEAR LIMITED WARRANTY

SJE-RHOMBUS® warrants to the original consumer that this product shall be free of manufacturing defects for three years after the date of consumer purchase. During that time period and subject to the conditions set forth below, SJE-RHOMBUS® will repair or replace, for the original consumer, any component which proves to be defective due to defective materials or workmanship of SJE-RHOMBUS®.

THIS EXPRESS WARRANTY DOES NOT APPLY TO THE MOTOR START KIT COMPONENT. SJE-RHOMBUS® MAKES NO WARRANTIES OF ANY TYPE WITH RESPECT TO THE MOTOR START KIT.

ELECTRICAL WIRING AND SERVICING OF THIS PRODUCT MUST BE PERFORMED BY A LICENSED ELECTRICIAN.

THIS WARRANTY DOES NOT APPLY: (A) to damage due to lightning or conditions beyond the control of SJE-RHOMBUS®; (B) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; (C) to failures resulting from abuse, misuse, accident, or negligence; (D) to units which are not installed in accordance with applicable local codes, ordinances, or accepted trade practices, and (E) to units repaired and/or modified without prior authorization from SJE-RHOMBUS®.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE: The consumer shall assume all responsibility and expense for removal, reinstallation, and freight. Any item to be repaired or replaced under this warranty must be returned to SJE-RHOMBUS®, or such place as designated by SJE-RHOMBUS®.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. SJE-RHOMBUS® SHALL NOT, IN ANY MANNER, BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AS A RESULT OF A BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.

SENSOR FLOAT® Control Switch

Mercury-activated, narrow-angle float switch designed to activate pump control panels and alarms.

PRICING/ORDERING INFORMATION

Normally Open		Normally Closed		Suggested List Price	Shipping Weight
Part #	Description	Part #	Description		
1002108	10PCNO	1002111	10PCNC	\$28.88	1.29 lbs.
1002072	10SWINO	1002075	10SWINC	\$31.19	1.85 lbs.
1002143	10SWENO	1002146	10SWENC	\$34.65	3.26 lbs.
1002117	15PCNO	1002120	15PCNC	\$31.29	1.64 lbs.
1002080	15SWINO	1002083	15SWINC	\$33.60	2.22 lbs.
1002152	15SWENO	1002155	15SWENC	\$37.07	3.50 lbs.
1002125	20PCNO	1002128	20PCNC	\$33.71	1.99 lbs.
1002089	20SWINO	1002092	20SWINC	\$36.02	2.59 lbs.
1002161	20SWENO	1002164	20SWENC	\$39.48	3.87 lbs.
1002134	30PCNO	1002137	30PCNC	\$38.96	2.13 lbs.
1002098	30SWINO	1002101	30SWINC	\$41.27	3.28 lbs.
1002170	30SWENO	1002173	30SWENC	\$44.73	4.48 lbs.

PC = Pipe Clamp WI = Weighted Internally WE = Weighted Externally

NO = Normally Open NC = Normally Closed

NOTE: Descriptions are grouped by cable length measured in feet (10, 15, 20, 30).

OPTIONS

PACKAGING

Bagged - Standard
Boxed - Specify and add \$1.80 to list price.

Bulk - Specify and deduct 20¢ from list price.

No Mounting - deduct 60¢ from mounting clamp list price.

ADDITIONAL CABLE

Additional cable length over 30 feet is available at 70¢ per foot (list price).

UL Listed for Water & Sewage



SPECIFICATIONS

CABLE: flexible 18 gauge, 2 conductor (UL, CSA) SJOW, water-resistant (CPE) jacket

FLOAT: 3.38 inch diameter x 4.55 inch long (8.58 cm x 11.56 cm), high impact, corrosion resistant, PVC housing for use in sewage and non-potable water up to 140°F (60°C)

MAXIMUM WATER DEPTH: 30 feet (9 meters), 13 psi

MERCURY SWITCH: single pole, single throw, mercury-to-mercury contacts, hermetically sealed in a steel capsule and epoxy sealed in the float housing

ELECTRICAL: 5 amp 120-/230 VAC, 50/60 Hz

NOTE: Suitable for use with intrinsically safe circuits

Contact SJE-Rhombus regarding specific intrinsically safe applications.

OTHER INFORMATION

NORMALLY OPEN (HIGH LEVEL) OPERATION

The control switch closes (turns on) when the float tips slightly **above** horizontal signaling a high level, and opens (turns off) when the float drops slightly **below** normal.

NORMALLY CLOSED (LOW LEVEL) OPERATION

The control switch closes (turns on) when the float drops slightly **below** horizontal signaling a low level, and opens (turns off) when the float tips slightly **above** horizontal.

SJE Rhombus
CONTROLS

www.sjerhombus.com
sje@sjerhombus.com

Call or fax your order!

1-888-DIAL-SJE (1-888-342-5753) ■ Fax 218-847-4617

⚠ WARNING**ELECTRICAL SHOCK HAZARD**

Disconnect power before installing or servicing this product. A qualified service person must install and service this product according to applicable electrical and plumbing codes.

⚠ WARNING**EXPLOSION OR FIRE HAZARD**

Do not use this product with flammable liquids. Do not install in hazardous locations as defined by National Electrical Code, ANSI/NFPA 70.

Failure to follow these precautions could result in serious injury or death. Replace product immediately if switch cable becomes damaged or severed. Keep these instructions with warranty after installation. This product must be installed in accordance with National Electric Code, ANSI/NFPA 70 so as to prevent moisture from entering or accumulating within boxes, conduit bodies, fittings, float housing, or cable.

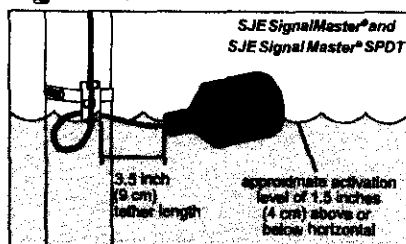
For detailed specifications on this product, or for the complete line of SJE-Rhombus® panel, alarm, and switch products, visit our web-site at www.sjerrhombus.com.

MOUNTING THE SWITCH

WARNING: Do not install switch in direct line of incoming liquid.

1. Place the cord into the clamp as shown in Figure C.
2. Locate clamp at desired activation level and secure the clamp to the discharge pipe as shown in Figures A and B.
Note: Do not install cord under hose clamp.
3. Tighten the hose clamp using screwdriver. Over tightening may result in damage to the plastic clamp. Make sure the float cable is not allowed to touch the excess hose clamp band during operation.
4. Wire switch as shown in Figure D.
5. Check installation. Allow system to cycle to insure proper operation.

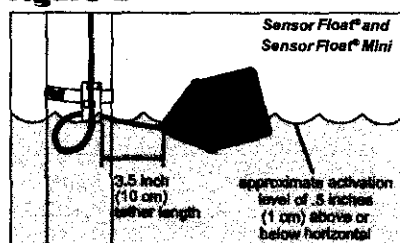
Note: All hose clamp components are made of 18-8 stainless steel material. See your SJE-Rhombus® supplier for replacements.

Figure A**CABLE WEIGHT**

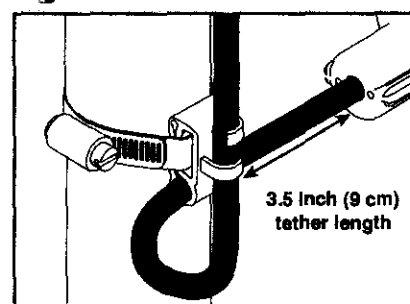
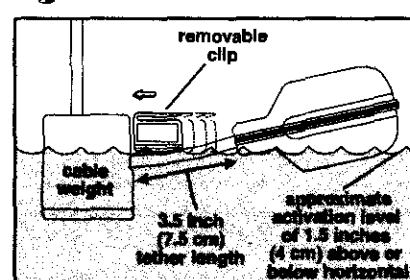
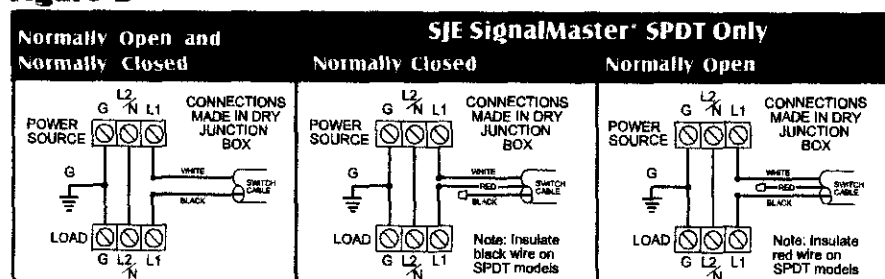
1. Determine desired activation level.
2. Suspend switch and cable weight at desired activation level as shown in Figure E.
3. Wire switch as shown in Figure D.
4. Check installation. Allow system to cycle to insure proper operation.

To adjust cable weight tether length:

1. Release clip.
2. Adjust cable weight to desired position.
3. Lay switch cable in weight channel.
4. Align clip with weight channel and slide towards switch cable as shown in Figure E.
5. Snap clip snugly up to cable, moving clip to tightest possible position.

Figure B**INTERNAL WEIGHT****SENSOR FLOAT® CONTROL SWITCH ONLY**

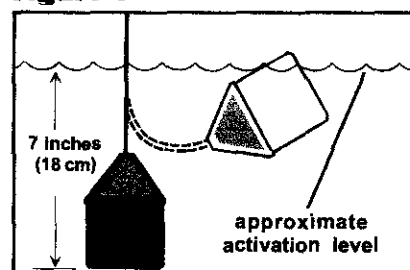
1. Determine desired activation level as shown in Figures A & B.
2. Suspend switch 7 inches below desired activation level as shown in Figure F. Switch remains partially submerged during the "on" tipping action. Switch can be totally submerged and still continue to operate properly.
3. Wire switch as shown in Figure D.
4. Check installation. Allow system to cycle to insure proper operation.

Figure C**Figure E****Figure D****⚠ WARNING**

In 230 VAC installations, one side of the line going to the load is always **HOT**. This condition exists if the switch is on or off. Install double pole disconnect on all 230 VAC circuits.

On SPDT Models, insulate unused red or black wires with wire nut. Wire can become electrically hot.

Ensure cable connections are performed in a dry junction box or other watertight seal that seals both conductors and cable jacket. Failure to do so could result in electrical shock hazard and/or water traveling down cable and entering the switch. Failure to guard against this may effect switch performance.

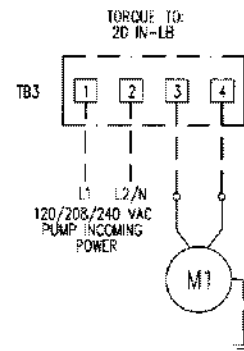
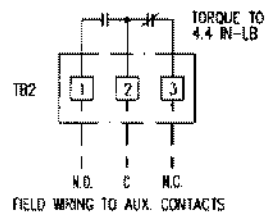
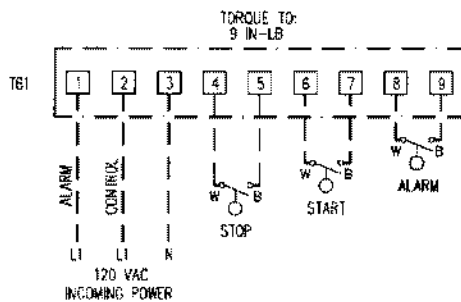
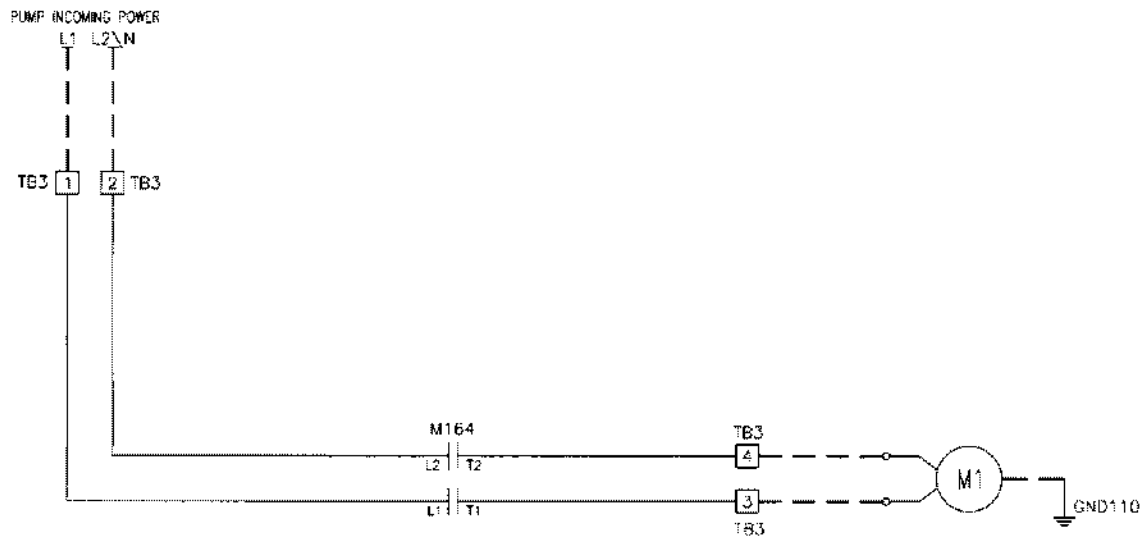
Figure F

SJE Rhombus

CONTROLS

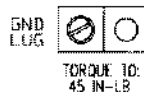
22650 County Highway 6 ■ P.O. Box 1708 ■ Detroit Lakes, Minnesota 56502 USA
1-888-DIAL-SJE (1-888-342-5753) ■ Phone: 218-847-1317 ■ Fax: 218-847-4617 ■ E-mail: sje@sjerrhombus.com

Instl. Instr. PN1011974D
©SJE-Rhombus Printed in USA 06/05



OPTIONAL - WIRE DIFFERENTIAL PUMP SWITCHES OR PRESSURE SWITCHES TO TERMINALS (4,7), AND (8,9)

THE USE OF SEPARATE POWER SOURCES FOR PUMP AND ALARM ARE RECOMMENDED



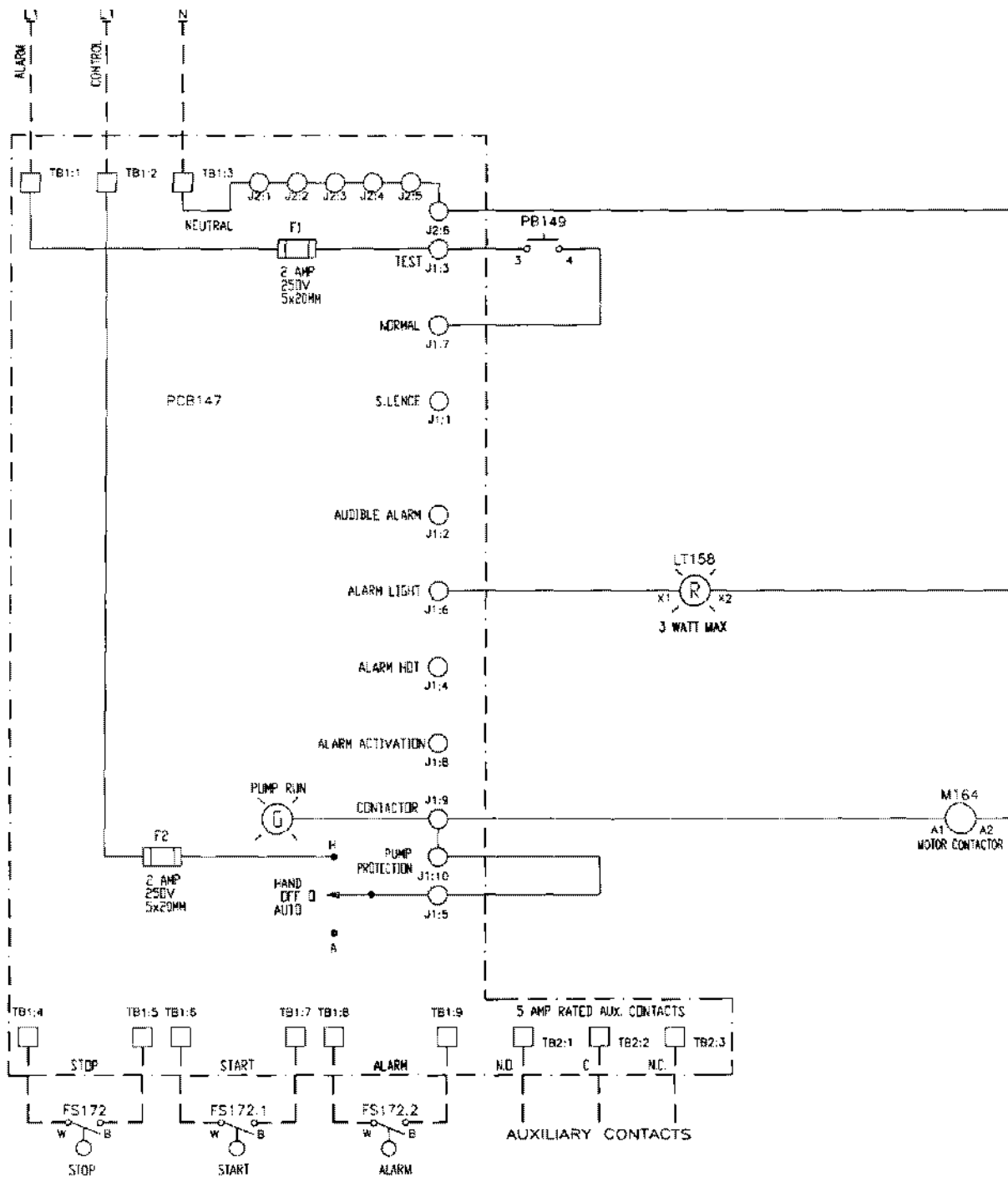
BRANCH CIRCUIT PROTECTION, OVERLOAD PROTECTION AND MAIN DISCONNECT PROVIDED BY OTHERS AND MUST BE SIZED ACCORDING TO PUMP/MOTOR MANUFACTURING SPECIFICATIONS.

TEMPERATURE RATING OF FIELD INSTALLED CONDUCTORS MUST BE AT LEAST 140 DEG. F. (60 DEG. C.). TERMINAL STRIPS AND GROUND LUG USE COPPER CONDUCTORS ONLY.

CONNECT GROUND LUG IN PANEL TO A SECURE EARTH GROUND

DASHED LINES REPRESENT FIELD WIRING

FIELD WIRING SECTION



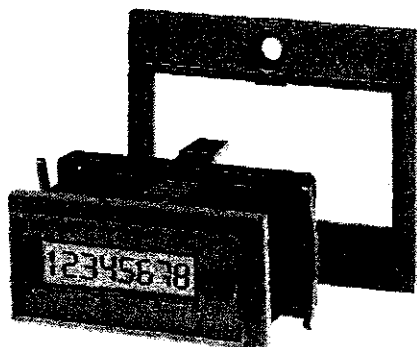
1	12/2/02
2	10/9
3	12/2
4	

NOTICE: THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND IT SHALL NOT BE USED OR REPRODUCED OR ITS CONTENTS DISCLOSED IN WHOLE OR IN PART, WITHOUT PRIOR WRITTEN CONSENT.				SJE-Rhombus CONTROLS			
REV	ECO NO.	DATE	DRWN	APPD	DRWN BY	DATE	CHKD BY
					MM	8/29/05	MM
					JJ	8/29/05	JJ
					DEM NAME	DEM P/N	PAGE
					N/A	N/A	1 of 1
					SCALE	QWG SIZE	
					NONE	D	
PROJECT NO. 36513				SHEET NO. N/A		REV A	
TITLE				1120W100H1AE8A			

SECTION 5
TRUMETER

TRUMETER

Keep you in control



7110DIN

7200DIN

7210DIN



WARNING: Read page 2 first.

ACHTUNG: Lesen Sie zuerst Seite 4!

RECOMMANDATION IMPORTANTE:

Reportez-vous tout d'abord à la page 6

ATENCIÓN: Primero lea la página 8

ATTENZIONE: Leggere per prima la pagina 10.

8 Digit Totalising Counter

Adaptors: Terminal Block and Isolated High Voltage Input

English

Page 3

8-Stelliger Summenzähler

Schraubklemmenadapter 1:1 und Universal

Schraubklemmenadapter (Opto Koppler)

Deutsch

Seite 5

Compteur Totalisateur à 8 chiffres

Modules adaptateurs: bornier et optocoupleur pour entrée tension

Français

Page 7

Contador totalizador de 8 Dígitos

Adaptadores: bloque de terminales y entrada de alta tensión aislada

Español

Página 9

Contatore Totalizzatore ad 8 cifre

Adattatori: morsettiera e per ingressi ad alta tensione isolate

Italiano

Pagina 11

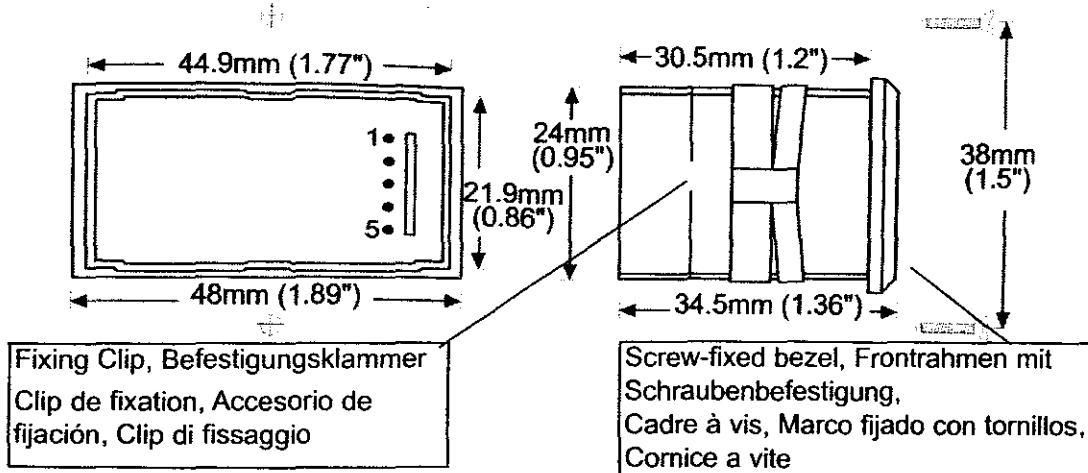
Dimensions, Abmessungen, Dimensiones, Dimensioni

Page 2

Seite 2

Pagina 2

Dimensions, Abmessungen, Dimensiones, Dimensioni



Trumeter Company Ltd, Milltown Street, Radcliffe, Manchester
M26 1NX, England
Tel: (44) (0)161 724 6311 Fax: (44) (0)161 724 9455
e-mail: sales.uk@trumeter.com

Trumeter Ireland, PO Box 5050, Drogheda, Ireland
Tel: (353) (0)41 983 7755 Fax: (353) (0)41 983 7753
e-mail: sales.ireland@trumeter.com

Trumeter Company Inc., 1020 North West 6 Street, Suite D, Deerfield Beach
Florida 33442, U.S.A.
Tel: (1) 954 725 6699 Fax: (1) 954 725 5599
email: sales.usa@trumeter.com

Trumeter Canada, 190 Britannia Road East, Unit 5, Mississauga,
Ontario, L4Z 1W6, Canada
Tel (1) 905 890 0622 Fax: (1) 905 890 7994
email: sales.canada@trumeter.com

Trumeter Deutschland, Postfach 1215, D-71141, Steinenbronn, Deutschland
Tel: (49) (0) 7157 20801 Fax: (49) (0) 7157 20813
email: verkauf.deutschland@trumeter.de

Trumeter, 99 rue Parmentier, BP 304, 59666 Villeneuve d'Ascq Cedex, France
Tel: (33) (0) 3 20 59 16 26 Fax: (33) (0) 3 20 59 16 27
email: ventes.france@trumeter.com

<http://www.trumeter.com>

Specification

Battery

Non-replaceable Lithium battery.
Expected life 10 years at 20°C

Display

8 digit black LCD, 7mm characters

Count Range

99999999 - rollover to 0

Operating temperature

-10°C to +60°C

Storage temperature

-20°C to +60°C

Altitude

Up to 2000m

Relative Humidity

80% max up to 31°C, decreasing to
50% max at 40°C

Sealing

Front panel sealed to IP65 when used
with clip mount and gasket provided.

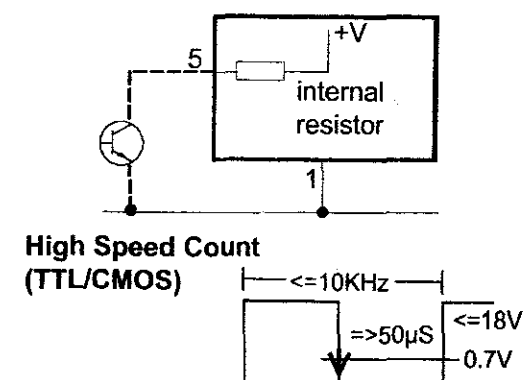
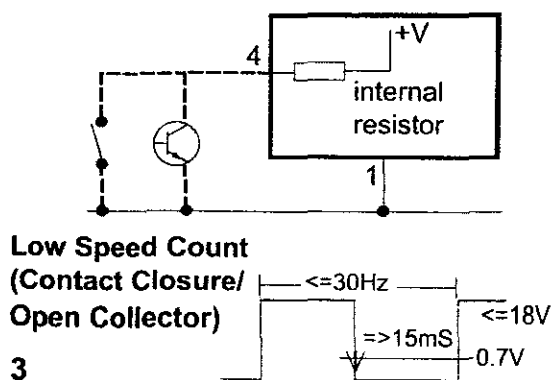
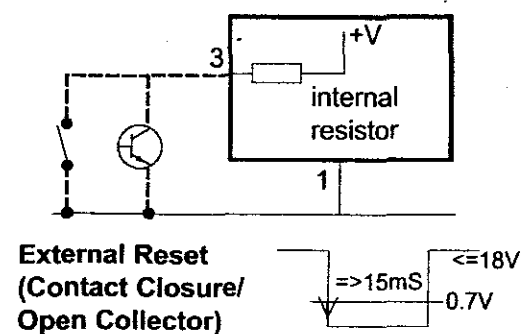
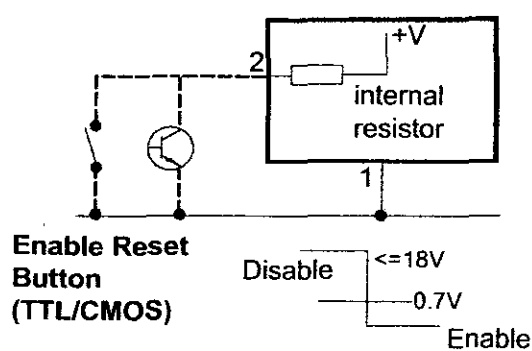


WARNING

THIS UNIT CONTAINS A LITHIUM BATTERY AND MUST NOT BE DISPOSED OF
IN A FIRE OR EXPOSED TO TEMPERATURES BELOW -20°C OR ABOVE +70°C.

Connections

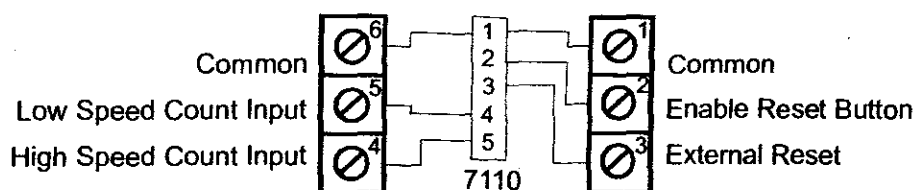
Black	1	Common
Green	2	Enable Reset Button
Yellow	3	External Reset
Brown	4	Low Speed Count Input
Blue	5	High Speed Count Input



Please note:

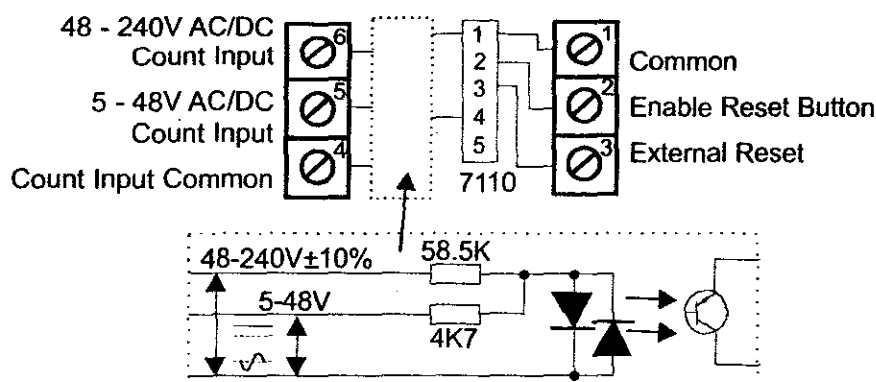
Any signal cables connected to this device must not exceed 30 metres in length. If signal cables are installed that are routed outside the building, it will be necessary to install additional surge protection devices.

7200DIN Terminal Block Adaptor



- Plug the adaptor directly into the connector at the rear of the 7110DIN.
- Finger-proof screw connections for wires up to 2.5mm²

7210DIN Isolated High Voltage Input Adaptor



- For use with 7110DIN only.
- Plug the adaptor directly into the connector at the rear of the 7110DIN.
- Finger-proof screw connections for wires up to 2.5mm²
- Overvoltage Category II, Pollution Degree 2 (IEC 64)
- Uses 7110DIN Low Speed Count Input.

Mounting	Panel Cutout Size	Maximum Panel Thickness
using Built-in Fixing Clip	45.5 x 22.5mm (1.78 x 0.88")	7.5mm
using 50 x 25 Adaptor	50.3 x 25.3mm (1.98 x 0.99")	7.5mm
using Screw-Fixed Bezel	<= 48 x 33mm	—

SECTION 6
GUARD IT – AUTO DIALER

User's Guide



<http://www.omega.com>
e-mail: info@omega.com

OMA-GUARD IT
Owner's Manual



OMEGAnet® On-Line Service Internet e-mail

<http://www.omega.com>

info@omega.com

Servicing North America:

USA:
ISO 9001 Certified
Tel: (203) 359-1660
e-mail: info@omega.com
Canada:
Laval (Quebec) H7L 5A1
Tel: (514) 856-6928
e-mail: info@omega.ca

One Omega Drive, Box 4047
Stamford, CT 06907-0047
FAX: (203) 359-7700

976 Bergar
FAX: (514) 856-6886

For immediate technical or application assistance:

USA and Canada:
Customer Service: 1-800-622-2378 / 1-800-622-BEST
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA
Mexico and
Latin America:

Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA

Tel: (95) 800-826-6342
En Español: (95) 203-359-7803

FAX: (95) 203-359-7807
e-mail: espanol@omega.com

Servicing Europe:

Benelux:
Tel: (31) 20 6418405

Postbus 8034, 1180 LA Amstelveen, The Netherlands
FAX: (31) 20 6434643
Toll Free in Benelux: 0800 0993344
e-mail: nl@omega.com

Czech Republic:
Tel: 420 (69) 6311899

ul. Rude armady 1868, 733 01 Karvina-Hranice
FAX: 420 (69) 6311114
Toll Free: 0800-1-66342 e-mail: czech@omega.com

France:
Tel: (33) 130-621-400
Toll Free in France: 0800-4-06342

9, rue Denis Papin, 78190 Trappes
FAX: (33) 130-699-120

e-mail: france@omega.com

Germany/Austria:
Tel: 49 (07056) 3017
Toll Free in Germany: 0130 11 21 66

Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
FAX: 49 (07056) 8540

e-mail: info@omega.de

United Kingdom:
ISO 9002 Certified

One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5EX, England
Tel: 44 (161) 777-6611 FAX: 44 (161) 777-6622
Toll Free in the United Kingdom: 0800-488-488
e-mail: info@omega.co.uk

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

Table of Contents

1	Product Overview	
1.1	Product Description	1-1
1.2	Manual Description	1-2
1.2.2	Conventions	1-2
2	Installation	
2.1	Mounting Location	2-1
2.2	Mounting Onto A Back Surface	2-1
2.3	Mounting Flush Into A Front Panel	2-1
2.4	Mounting Without An Enclosure	2-2
3	Wiring Connections	
3.1	Power Connections	3-1
3.2	Connecting To Electrical Ground	3-1
3.3	Phone Line Connection	3-2
3.4	Input Signal Connections	3-2
3.5	Connecting Unpowered ("DRY") Contact Inputs	3-2
3.6	Connecting Analog or Digital Logic Signal Inputs	3-2
3.7	Digital Alarm Output (DAO) Connections	3-3
3.8	Optional External Battery Connections	3-3
	<i>Basic Wiring Connection Diagram</i>	3-3
3.9	Writing Channel Descriptions In White Bar Areas	3-3
	<i>Guard-It™ Front Panel Diagram</i>	3-4
4	Program Your Guard-It™ Autodialer	
4.1	Programming Menu	4-1
	<i>Guard-It™ Programming Flow Chart</i>	4-2
4.1.1	Input Configuration	4-3
4.1.2	Phone Number Programming	4-4
4.1.3	Recording Voice Messages	4-5
4.1.4	General Programming Items	4-6
4.1.4.1	Alarm Trip Delay	4-6
4.1.4.2	Alarm Reset Time	4-6

4.1.4.3	Answer Delay	4-7
4.1.4.4	Time Between Alarms Calls	4-7
4.1.4.5	Dialing Delay	4-8
4.1.4.6	Tone/Pulse Dialing	4-8
4.1.4.7	Phone Fault Monitor	4-8
4.1.4.8	Call Progress Control	4-9
4.1.5	Status Report (Input Review)	4-10
4.1.6	Programming Review	4-10
4.1.7	Acknowledged Alarm Reset	4-10
4.2	Restoring Programming To Factory Default Settings	4-11
4.2.1	Programming Log Sheet	4-11

5 The Guard-It™ Autodialer In Operation

5.1	The Alarm Process	5-1
	<i>Guard-It™ Alarm Process Diagram</i>	5-2
5.2	Receiving And Acknowledging An Alarm Call	5-3
5.3	Power Failure Alarms	5-4
5.4	Placing An Inquiry Call To The Guard-It™ Autodialer	5-4
5.5	Acknowledging An Alarm From The Front Panel	5-5
5.6	Clearing An Acknowledged Alarm From The Front Panel	5-5

6 Troubleshooting & Repair Service

6.1	Phone Support Procedures	6-1
-----	--------------------------------	-----

7 Testing

8 Maintenance

A Analog (4-20 ma) Inputs

A.1	Connecting 4-20 ma Analog Signal Inputs	A-1
A.2	Programming For Analog Signal Inputs	A-2
A.3	Analog Translation Table	A-4
	<i>Analog 4-20 ma Signal Input Wiring Connection Diagram</i>	A-5

B	Connecting Digital Logic Signal Inputs	
	<i>Digital Logic Signal Input Wiring Connection Diagram</i>	<i>B-2</i>
C	Digital Alarm Output (DAO)	
	<i>Optional Digital Alarm Output (DAO) Connection Diagram.....</i>	<i>C-1</i>
D	Optional External Gel Cell Backup Battery	
	<i>Optional External Battery Connection Diagram</i>	<i>D-1</i>
E	Programming For Use With Numeric Pagers	
F	Enclosure Mechanicals & Wiring Diagrams	
	<i>Mounting the Guard-It™ Autodialer Enclosure Flush into a Front Panel.....</i>	<i>F-1</i>
	<i>Mounting the Guard-It™ Autodialer Enclosure onto a Back Surface</i>	<i>F-2</i>
	<i>Guard-It™ NEMA 4X Enclosure</i>	<i>F-3</i>
	FCC Notice to Users	

1

Product Overview

1.1

Product Description

The Guard-It™ alarm autodialer is designed to monitor conditions at remote facilities and place alarm notification telephone calls to personnel, delivering specific pre-recorded messages.

Users may also call the product at any time from any telephone, to check for alarm conditions.

Four signal inputs are provided for monitoring. The signals which the user connects to these four inputs may be any combination of contact closure, digital logic level, or analog 4-20 ma current loop. In addition, the product monitors the 12 volt DC power connected to it, and if an optional rechargeable battery has been installed, it will place alarm calls to report power failures.

The product will work with any standard dial-up public telephone line, as well as with the available Cellularm™ option. Leased lines are not required.

Using a programming phone at the front panel, the user may pre-record informative, high-fidelity voice messages up to 12 seconds in length, for each of the four input channels, plus a station identification message which is played during every phone call.

The user may program up to 8 phone numbers, which may be up to 60 digits in length. The product may also be programmed to call numerical display pagers in addition to regular phone numbers.

If desired, the user may program a number of detail parameters such as alarm trip delays, ring answer delays, etc.

A special Call Progress function may be turned on, which allows the product to detect busy signals and move automatically to the next programmed phone number, delay the voice reporting until the called phone has answered, and move to the next phone number if a programmable maximum number of rings has been exceeded.

A phone line fault monitor function may also be turned on, which detects the disconnection or failure of the phone line.

Informative, multi-color front panel LED's advise local personnel at a glance of any problems.

The product may be mounted on a back surface, or flush into a larger front panel, or as a stand-alone circuit board.

The Guard-It™ autodialer is ruggedly built to a high standard of quality by the world leader in industrial alarm autodialers. It includes internal noise filters and surge protection on all signal, power and phone line inputs, and is built for many years of reliable service.

1.2 Manual Description

This manual guides you through the following procedures:

- Location and mounting
- Initial programming
- Voice message recording
- Using Your Guard-It™ autodialer
- Advanced programming



A glossary explaining the terms used in this manual is included the end of the manual, along with a troubleshooting guide, an index, a return authorization form, and FCC notice to users.

Worksheets are provided to document and clarify your programming and message recording steps.

Please take a moment to read, complete, and mail the warranty registration card at the back of this manual.

1.2.2 Conventions

Throughout this manual various icons are used to visually identify information. They are as follows:

- ◆ The solid diamond symbol shows a list of procedures, decisions, or single step tasks.
- The bullet symbol shows a list of items.
-  The bomb indicates a warning message. The information concerns process that may result in damage to equipment or harm to a person.
-  The hand indicates a caution message. The information concerns a process that may result in equipment failure.



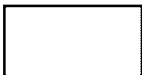
The pencil indicates general information.



The open diamond pattern indicates one or more exceptions or special considerations for a process.



The phone indicates that you can access the Guard-It™ autodialer through your phone.



Other icons include menu indicators as seen on the Guard-It™ autodialer front panel.

“items in quotes”

Quotation marks indicate titles of sections and messages.

italic

Italic text indicates items for emphasis, message text, and sample text.

ALL CAPITALS

Capital letters reference the names of keys, lights, and LEDs.

Initial Capital Letters

Capitalization of the first letter of a set of words indicates mode and function types.

2

Installation

2.1 Mounting Location

Ideally, the Guard-It™ autodialer and the wiring connected to it should be located away from heavy duty power wiring and wiring which is likely to emit substantial electrical interference. The location must be free of condensing moisture, and must remain within a temperature range of 20 to 120 degrees F for proper operation. Allow clearance room for the plug-on connector block and phone line connectors at the bottom.

The product should be located within 5 feet of an RJ11 telephone line jack, otherwise a telephone extension cord will be needed to make the phone line connection.

If you are using the optional 12 VDC wall adaptor to power the product, you will need a 120 VAC electrical outlet to plug the adaptor into. The product should be located within five feet of this outlet; otherwise it may be necessary to splice in additional wire length for the 12 VDC line.

2.2 Mounting Onto A Back Surface

Referring to the diagram, attach the mounting brackets to the product. Prepare the back surface by drilling pilot or clearance holes for the mounting screws. The mounting centers are 3.6" high by 9" wide. #8 Wood screws, self tapping screws and machine screws (with lock washers and nuts) are provided to accommodate a variety of back panel materials. Refer to the diagram (See Appendix F).

2.3 Mounting Flush Into A Front Panel

To mount the product flush into a larger front panel (maximum panel thickness 1/8"), you will need a rectangular cutout in the panel to clear 6-3/16" high by 8-3/16" wide. Slide the product into the opening from the front, and use the 6-32 screws to attach the two mounting brackets to the product in the proper orientation so that they hold the product firmly in place against the larger front panel. Refer to the diagram (See Appendix F).

2.4

Mounting Without An Enclosure

To mount the product as a circuit board only, open the enclosure via the two screws on each side of the enclosure, lift out the front panel, and then remove the four screws which secure the circuit board to the front panel. Pass appropriate mounting screws (not provided with product) through the white nylon standoffs to mount the circuit board to a back surface. The small inner panel is printed with markings to identify the LED's and switch functions.

3

Wiring Connections



Note:

Note that the connector block is unpluggable for convenience in making wiring connections.

3.1 Power Connections

The Guard-It™ autodialer requires 8 to 16 VDC power connected to the connector block, in order to operate.

The power source should be capable of delivering a current of 500 milliamperes.

Power must be connected observing the correct polarity. Refer to the diagram.

3.2 Connecting To Electrical Ground

Your Guard-It™ autodialer has several internal protective devices built in. However, for them to work effectively it is important that the product be well grounded. A grounding wire with a terminal lug is included on the product for this purpose.

If the Product is mounted to a grounded metal back surface, then simply connect the terminal end of the wire to the lower right hand mounting screw as shown in the diagram.

If the product is not mounted to a grounded metal back surface, connect the end of the wire to the nearest available electrical grounding point. If the installation is within a grounded metal electrical panel or enclosure, connecting to the metalwork will be sufficient. If you need to extend the ground wire, use 18 gauge wire or heavier, and keep the total length as short as possible.

This grounding wire will also ground the (-) side of the incoming 12 VDC power. If you are using a pre-existing source of 12 VDC power, you will need to verify that the grounding of the (-) side of this supply will not cause a problem.

3.3 Phone Line Connection

Plug one end of the supplied telephone extension cord into the telephone line jack located to the left of the connector block (not the programming jack located on the front panel). Plug the other end of this same cable into a telephone line (RJ11) jack.



Caution:

The phone line must be such that a standard telephone set can work on it. *Certain in-house PABX phone systems have "digital" line connections which can damage the product!*

Ideally this phone line should be for the exclusive use of the Guard-It™ autodialer. However, the product will generally function if there is an extension phone on the same line, as long as that extension phone is not in use when it is time for the Guard-It™ to place or receive a phone call.

3.4 Input Signal Connections

The four signal inputs on the Product can be used with several different types of input signals, in any combination.

3.5 Connecting Unpowered ("DRY") Contact Inputs

Connect unpowered contact inputs as shown in the diagram. Each input has two input connection points. The points marked "C" are internally connected together and to common ground.



Warning:

Before making any such connections, verify that there is *no electrical power present on the signal wires*, otherwise serious damage to the product could result.

3.6 Connecting Analog or Digital Logic Signal Inputs

Refer to Appendix A regarding analog signal inputs and Appendix B regarding digital logic signal inputs.

3.7 Optional Digital Alarm Output (DAO) Connections

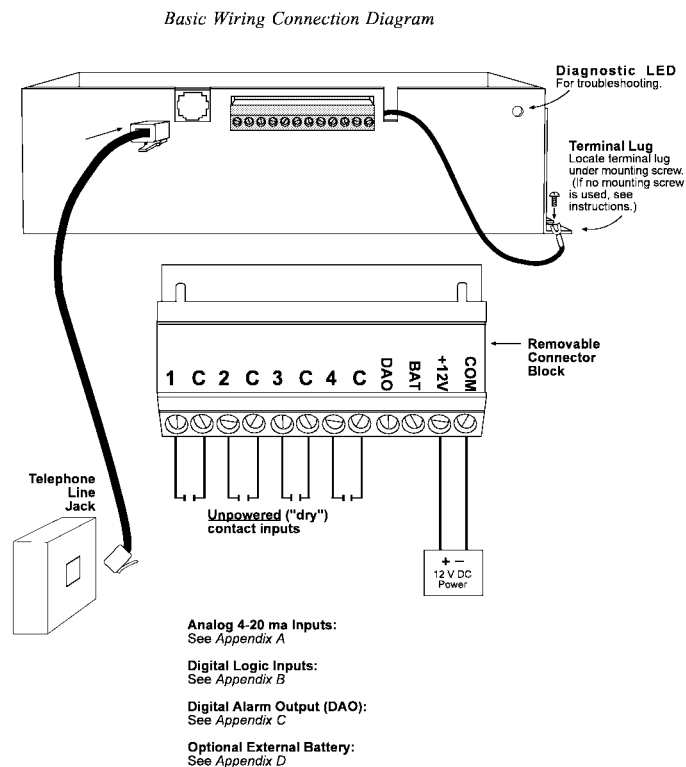
The digital alarm output circuit activates whenever there is an unacknowledged alarm. It deactivates whenever such alarms are acknowledged. It may be used to power a customer supplied 12 VDC relay, or to drive a 5 volt logic circuit. See appendix C for details.

3.8 Optional External Battery Connections

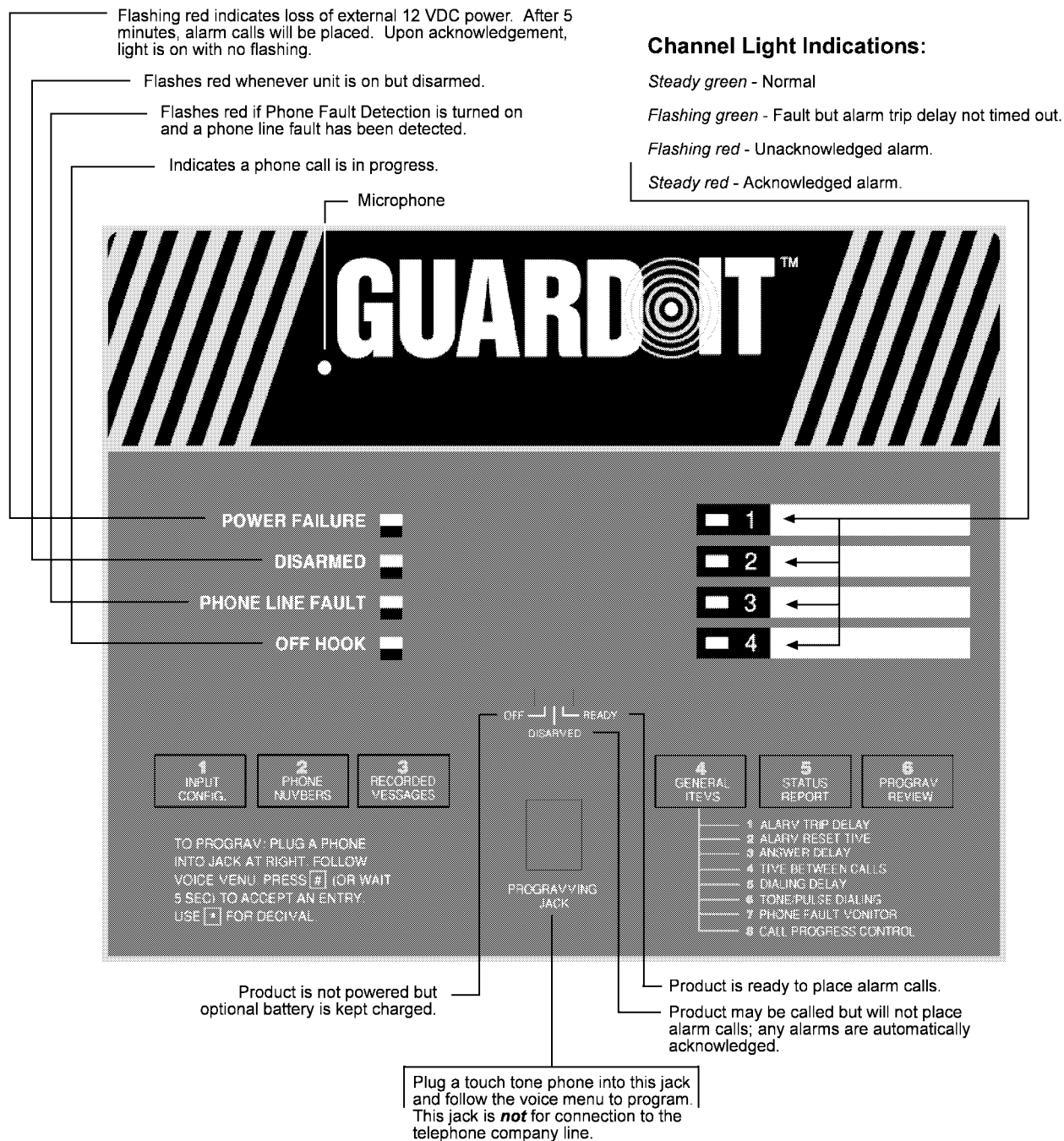
The Product may be used with a customer-supplied external 6 VDC (not 12 VDC) gel cell lead acid battery for backup during power failure. An internally mounted gel cell battery is also available as an option from Racore. Refer to appendix D if using an external gel cell battery.

3.9 Writing Channel Descriptions In White Bar Areas

You may want to use the white bar area to the right of each of the four input channel status LED's, to write in short descriptions of what each input channel is being used to monitor. You may use a plain lead pencil (which is erasable), or a marker pen.



Guard-It™ Front Panel Diagram



4

Programming Your Guard-It™ Autodialer

4.1 Programming Menu

To program your Guard-It™ autodialer, you will need a standard touch-tone telephone.

Telephones which have the keypad located separately from the handset, are most convenient for this purpose.

Just plug the telephone temporarily into the Programming Jack on the front panel of the product, lift the receiver, and follow the voice menu to enter your programming and record your voice messages.

If you do not make any selection from the “top” menu, it will be repeated once and then the program mode will be terminated.

To begin again, simply hang up the programming phone for a second or so, and then pick it up again. You may do this from most places in the programming menu, whenever you want a fresh start.

For most programming items, you will hear the present programming entry if any, and then you will be given a chance to either accept this existing entry by pressing pound (#), or else make a new entry.

If you make a new entry, it will be repeated back to you for confirmation.

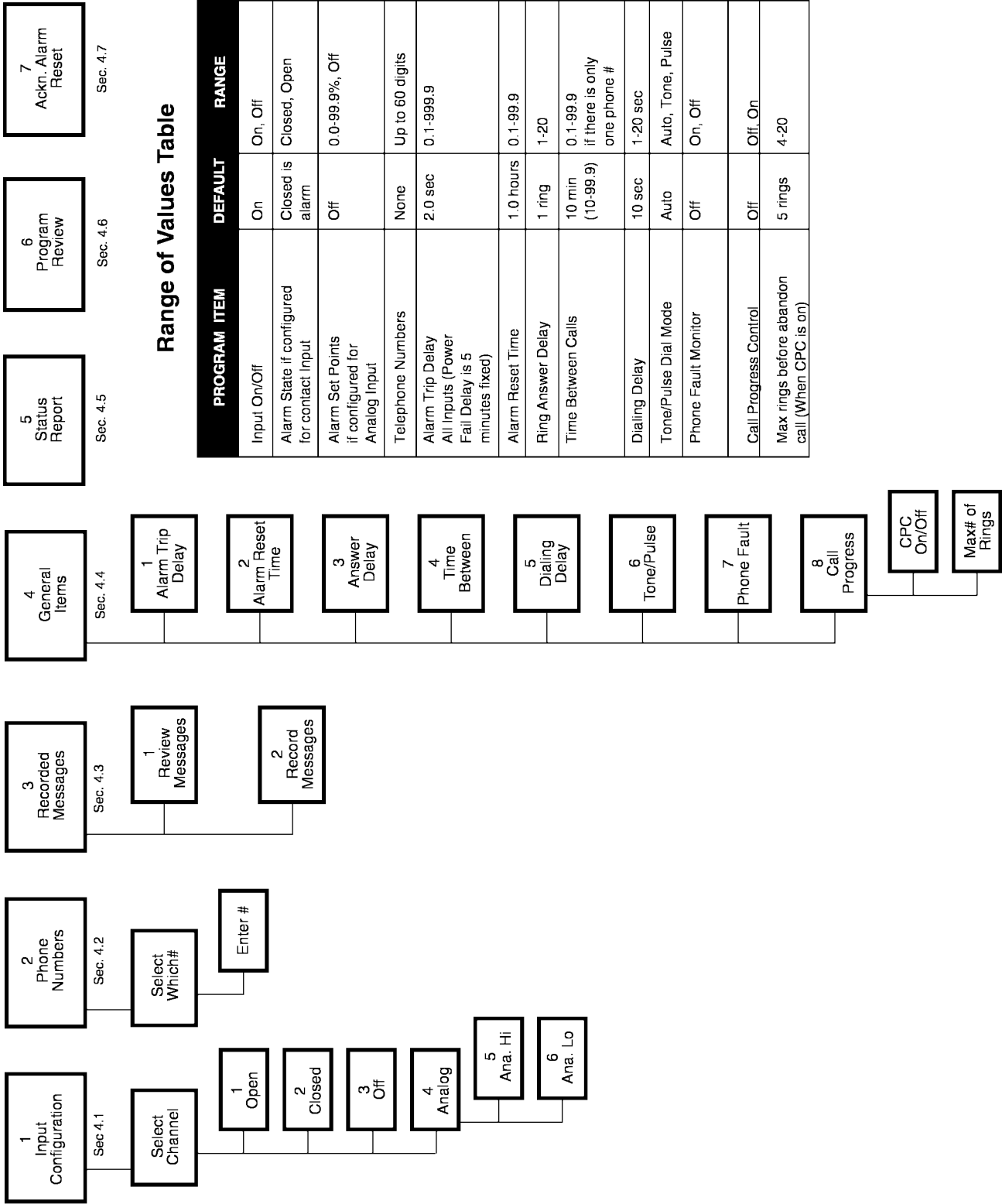
In general, pressing the pound (#) key will cause whatever you have keyed in to be accepted and recited back for confirmation.

When keying in a menu choice rather than a value, the choice will be accepted and recited without need to press pound (#).

Pressing the pound (#) key when you have not keyed in any entry, will generally return you to the previous menu level.

If you make an entry that the Product considers invalid, it will respond with a statement, “*Value fault. Enter a new value.*” The previous valid setting will be retained and restated, and then you will be prompted to make a new entry if you wish to do so. This would occur, for example, if you entered a value that was outside the allowable range of values for that programming item.

Guard-It™ Programming Flow Chart



Refer to the table later in this section, for a listing of the initial default values and allowable range of values which you can program, for each programming item.



Note:

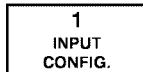
If you delay more than five seconds without pressing any new key, the Product will treat this the same as pressing the pound (#) key, except when recording messages.

Also note that your Guard-It™ autodialer will not respond to new alarm conditions while you are programming. The LED's will generally remain in the state they were in prior to the beginning of the programming session, until a few seconds after the programming session has ended. Most program changes do not take effect until you end the programming session. The same is true during an alarm call; messages for new alarms are not included in a call that is already underway.

4.1.1

Input Configuration

The default input configuration for each of the four input channels is *contact input, alarming on closed circuit*.



If you need a different configuration, after selecting [1] from the top menu, you must select which of the four available input channels (first, second, etc.) you want to configure. The voice menu will ask you for this number which will be a number from 1 to 4.

After you select the input channel number to configure, the voice menu will prompt you with the following choices:

- ◆ [1] Alarm on Open Circuit
- ◆ [2] Alarm on Closed Circuit (which is the default setting)
- ◆ [3] Off (so that this input channel will not report or activate its corresponding front panel LED)
- ◆ [4] Analog (4-20 ma current loop) signal.

If an input channel is configured for an analog signal, the menu also gives you two additional choices:

- ◆ [5] To program an analog high alarm level set point value
- ◆ [6] To program an analog low alarm level set point value

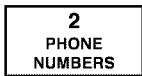
Example:

To configure input channel 3 to alarm on Open Circuit, from the top menu press:

1 3 1

Refer to Appendix A for additional information on programming for analog signal inputs.

4.1.2



Phone Number Programming

You must program at least one phone number for your Guard-It™ autodialer to dial when it has an alarm to report.

Note:

Until you do so, any alarms which are detected will be automatically acknowledged without any alarm calls being placed.

To program phone numbers, you must first select which of 8 available phone numbers (first, second, etc.) you want to program. The voice menu will ask you for this number, which will be a number from 1 to 8. Then it will recite the presently programmed phone number for that selection, if any. Then it will allow you to accept the current entry by pressing pound (#), or else enter a new phone number for that selection.

Be sure to include any necessary prefixes or area codes, just as you would dial it on an ordinary telephone.

As you enter each digit, be sure to listen for the voice to repeat back that digit, before you enter the next digit.

Example:

To program the third phone number to be 1 (510) 658-6713, from the top menu you would press [2] for phone number programming, then [3] to select the third phone number, then:

1 5 1 0 6 5 8 6 7 1 3 #

Listen carefully as the completed entry is repeated back to you, to be sure it was entered and accepted correctly.

To delete a phone number, program it to be 00.

For example, to clear out the fourth phone number, from the top menu you would press [2] for phone number programming, then [4] to select the fourth phone number, then:

0 0 #.

To program a phone number for use with numeric pagers, see Appendix E.

4.1.3

<p>3 RECORDED MESSAGES</p>

Recording Voice Messages

Your Guard-It™ autodialer has “canned” generic alarm messages (“Channel one alarm”, etc.) but you will probably want to record your own more specific and informative alarm messages.

There are five alarm messages which you can record: a message for each of the four input channels, plus a “Station ID” message which identifies the site where the Product is located.

In order to prevent one message from being recorded or re-recorded over another message, *it is necessary to record all five messages, in proper order, in one sequence of steps.*

Under the Message Review and Recording menu which you get by pressing [3] from the top menu, you will be prompted to choose:

- ◆ [1] to review the existing set of five messages, or
- ◆ [2] to begin the sequence of recording all five messages.

If you select [2] to begin the recording sequence, the Guard-It™ autodialer moves you automatically through the sequence of all five messages to record, starting with the message for input channel number one.

The voice menu identifies which message is to be recorded next (i.e. for input channel number 1, for input channel number 2, etc.).

To actually record the message, wait for the sound of the beep, then speak clearly into the telephone mouthpiece of the programming phone. When you are done, press pound (#). The Product will then play back the message you have just recorded.

If you want to re-record the resulting message after hearing it played back, press star (*) instead of pound (#). You may re-record as many times as you wish, until you are satisfied with a given message. When you are satisfied with the message, press pound (#) to move on to the next message.

Proceed in this manner to record *all five messages*. The Station ID message is the last message in the set of five messages. It is the message that will be recited during every phone call, to identify the site that is calling or being called.

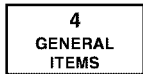
If you have configured a given input channel as “OFF”, you will still be asked to record a message for it. Just “record” a moment of silence for that departed input channel, and proceed with recording the remaining messages.

For any input channels which you have programmed for analog signal input, record the message in the form of: “The water level percentage is”. Whenever you call in or when an alarm call is placed, analog channels will be reported with the message you record followed immediately by the percentage value. You may want to include a spoken reference to the translation table which is found in Appendix A.

If you later need to change a message, simply re-record the entire set of 5 messages.

Each message may be as long as 12 seconds, for an available total of 60 seconds.

4.1.4



General Programming Items

The following general programming items allow you to “custom tailor” some specialized aspects of product operation.

Many users will find that the default settings work well, without need to program any of the items in this general category.

4.1.4.1 [1] Alarm Trip Delay

The alarm trip delay is the number of seconds during which the alarm violation (fault) must be continuously present on any input channel, before the Product will trip that input channel into Unacknowledged Alarm condition and begin dialing the first programmed phone number.

The default value is two seconds. If you wish to alter this value, the range of programmable values is 0.1 to 999.9 seconds. Use the star (*) key if you want to use a decimal point, but it is also OK to use whole numbers.

During the time period when a fault exists but has not yet lasted long enough to trip an alarm, the LED for that input channel will change from green to flashing green. Also during this interval, if you should hear a spoken status report on this channel, the word "fault" will be added to the message.

Note that the Product also has an internal power failure alarm. The trip delay for this alarm is fixed at 5 minutes.

4.1.4.2 [2] Alarm Reset Time

In the Unacknowledged Alarm state, the Product will place alarm calls, going endlessly through the list of up to 8 programmed phone numbers until the alarm is acknowledged by someone pressing a “9” at the sound of the tone, or by placing a return call to the Product and pressing “9” at the sound of the tone.

Either way, when the alarm is acknowledged, further alarm calls on behalf of that input channel (or power failure alarm) will be suspended. An internal Alarm Reset Timer begins timing, and when it has completely timed out, the acknowledged alarm status for that input channel is automatically cleared. As a result, if there is no current alarm condition, no new alarm will be created. If an alarm condition does still exist, then after the alarm trip delay expires, a new Unacknowledged Alarm and alarm calling will occur.

The default value for the Alarm Reset Time is one hour. If you wish to alter this value, the range of programmable values is 0.1 to 99.9 hours. Use the star (*) key if you want to use a decimal point, but it is also OK to use whole numbers.



Note:

Note that when testing, once you trip an alarm on a given input channel and acknowledge the alarm, you will not be able to promptly re-create an Unacknowledged Alarm for that input channel, since the Alarm Reset Timer will not have timed out, and this input channel will still be in an Acknowledged Alarm state. To create a new alarm, you can trip an alarm on another input, or you can force a clearout of all Alarm Reset Timers by using selection [7] on the top menu, or by turning the product off and then on again.

4.1.4.3 [3] Answer Delay

When you place a call to the Product, it will wait for a programmed number of rings before answering the call. This number of rings is called the Answer Delay.

The default value is one ring. If you wish to alter this value, the range of programmable values is 1 to 20 rings.



Note About Extension Phones:

The best practice is to provide a phone line service for the exclusive use of the Guard-It™ autodialer. However, if you do need to have an extension phone on the same line for use by personnel, you might want to program a ring delay of, say, 6 rings, so that anyone present at the site would have a chance to answer the call before the Guard-It™ autodialer answers it. If the line is in use by an extension phone when the Guard-It™ tries to place an alarm call, the call will not be completed, but the messages will be heard on the extension phone.

4.1.4.4 [4] Time Between Alarms Calls

After the Product is finished placing a call to a given phone number, and if the alarm was not acknowledged during that call, the Product enters a waiting period before it begins placing the next alarm call. This waiting period is the Time Between Alarm Calls.

The default value is 10.0 minutes. If you wish to alter this value, the range of programmable values is 0.1 to 99.9 minutes.

Note, however, that in order to comply with governmental regulations for alarm autodialers, if only one phone number is programmed, the product will not allow the time between alarm calls to be less than 10 minutes.

4.1.4.5 [5] Dialing Delay

If you want your Guard-It™ autodialer to place alarm calls to a numerical pager, you will need to refer to Appendix E for special instructions, which include programming the special Dialing Delay.

The default value is 10 seconds. If you wish to alter this value, the range of programmable values is 1 to 20 seconds.

4.1.4.6 [6] Tone/Pulse Dialing

Your Guard-It™ autodialer is capable of dialing using Pulse Dialing or Tone Dialing.

- For Tone Dialing, press [1]
- For Pulse Dialing, press [2].
- For "Auto Detect," press [3]. This is the default setting.

When Auto-Detect is chosen, the Product will periodically test the phone line and it will automatically use Tone Dialing if it determines that Tone Dialing works on the phone service line it is connected to.

4.1.4.7 [7] Phone Fault Monitor

Occasionally a telephone line will cease to operate. When the Phone Fault Monitor function is turned on, the Product will go "off hook" to check for the presence of a dial tone. If it fails to hear a dial tone, it begins flashing the "PHONE LINE FAULT" LED on the front panel, and continues to do so until such later time as it again hears a dial tone during another periodic check.

This action of going off hook every few minutes (as indicated by the yellow light on the front panel) may make it seem like the product is behaving erratically, to someone who is not familiar with its functioning.

Because the line is checked only periodically, if there is a change in the status of the phone line connection, *it will take a few minutes for the LED to reflect the change.*

**Note:**

Note that if this feature is turned on and there is another phone device connected to the Guard-It™ autodialer's phone line, if that device happens to be "off hook" (in use) when the product checks the phone line, a phone line fault indication may occur.

Even if the product has detected an apparent phone line fault, if it needs to place an alarm call it will attempt to do so. Thus in some circumstances during a call to or from the product, you might hear the message "phone line fault, now normal." This generally would mean that a phone extension was in use at last check, or that the phone line is intermittent and should be checked.

When the product has detected a phone line fault and then subsequently finds the line to be operational, the warning LED will be turned off. However the verbal warning will be retained until after you either place a call to the product, or acknowledge an alarm call.

Detection of a phone line fault will not cause an attempt to place alarm calls.

The default setting for this feature is "Off". To turn it on, when prompted press [1].

4.1.4.8 [8] Call Progress Control and "Maximum Number of Rings"

The Guard-It™ autodialer can be programmed to monitor the progress of the alarm calls it places, by listening to the tones and voice signals on the phone line.

Based on the signals the product hears, it knows when to start delivering its messages, and it also knows if it should abandon the current call attempt, as described below.

If Call Progress Control is turned on, when placing alarm calls the product counts the number of ring signals it hears. If more than the programmed "Maximum Number of Rings" occurs with no answer, it ends the phone call attempt without issuing any spoken message. It then waits the programmed Time Between Alarm Calls, before placing a call to the next phone number.

If Call Progress Control is turned on, the programming menu will allow you to program this "Maximum Number of Rings." The default value is 5 rings. If you wish to alter this value, the range of programmable values is 4 to 20 rings.

Also when Call Progress Control is turned on, when placing alarm calls the product listens for the ring signals, and only begins speaking when it misses the sound of the next ring. For this reason, there may be a delay of a few seconds after picking up the phone, before the first message is heard, when this function is turned on.

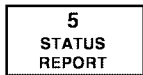
Also when Call Progress Control is turned on, when placing alarm calls the product listens for a busy signal. If it hears a busy signal it immediately ends the call and waits the programmed Time Between Alarm Calls, before placing a call to the next phone number.

The default setting for Call Progress Control is “off”.

Call Progress Control depends upon the product’s ability to interpret the various tone signals heard on the phone line. Because there is a lot of variance in the nature of these signals from one local phone company to another, it is important to thoroughly test the proper functioning of Call Progress Control, if you choose to turn this feature on.

4.1.5

Status Report (Input Review)



This selection in the top menu causes the Guard-it™ to recite the status of any input channels which are in any kind of non-normal state. Any channels which have been programmed “off” will not be mentioned.

4.1.6

Programming Review



This feature allows you to review all the programming settings. Any messages which you have recorded will also be recited. We suggest that you use this feature to write all your programming entries on the **Programming Log Sheet** provided in this manual. This will allow you to easily re-create your Guard-It™ autodialer setup should it ever be necessary to replace or reprogram the unit. It is also helpful in the event you need to call for Customer Support.

4.1.7



Acknowledged Alarm Reset

Note:

Note that unlike the other six menu choices, this choice is not printed on the front label of the product.

As previously mentioned, under test conditions you cannot quickly recreate an unacknowledged alarm on a given input when that input is already in an Acknowledged Alarm state. The reset feature allows you to force a clearout of the alarm reset timers, so that all input channels (and power failure alarm) are immediately ready to be tripped into Unacknowledged Alarm for the purpose of further testing or alarm monitoring.

4.2 Restoring Programming To Factory Default Settings

It is possible to restore your Guard-It™ autodialer to factory default settings for all programming items, including clearing out all recorded messages.

To do this, locate the plugged hole in the top of the enclosure, and remove the plug. While the product is turned on (but not in programming mode), use a screwdriver blade or similar device to momentarily connect the two pins which are accessible through the hole.

The four input channel LED's will turn orange while the unit "reprograms" itself to factory default settings. When this process is completed, the LED's are restored to their normal color and the product is ready for new programming.

4.2.1 Programming Log Sheet

Range of Values Table

PROGRAM ITEM	DEFAULT	RANGE	REPROGRAMMED TO:
Input On/Off	On	On, Off	
Alarm State if configured for contact Input	Closed is alarm	Closed, Open	
Alarm Set Points if configured for Analog Input	Off	0.0-99.9%, Off	
Telephone Numbers	None	Up to 60 digits	
Alarm Trip Delay All Inputs (Power Fail Delay is 5 minutes fixed)	2.0 sec	0.1-999.9	
Alarm Reset Time	1.0 hours	0.1-99.9	
Ring Answer Delay	1 ring	1-20	
Time Between Alarm Calls	10 min (10-99.9)	0.1-99.9 if there is only one phone #	
Interdigit Dialing Delay	10 sec	0-99.9 sec	
Tone/Pulse Dial Mode	Auto	Auto, Tone, Pulse	
Phone Line Alarm On/Off	Off	On, Off	
Call Progress Monitoring	Off	Off, On	
Max rings before abandon call (When CPM is on)	5 rings	4-20	

PROGRAMMING LOG SHEET

PROGRAM ITEM	DEFAULT	RANGE	REPROGRAMMED TO:
Input Channel 1	Alarm on Closed Circuit	Analog, Alarm Closed, Alarm Open, Off	<div> <div>Closed <input type="checkbox"/></div> <div>Open <input type="checkbox"/></div> <div>Analog <input type="checkbox"/></div> <div>Off <input type="checkbox"/></div> <div> <div>→ _____ %</div> <div>High Set Point</div> </div> <div> <div>→ _____ %</div> <div>Low Set Point</div> </div> </div>
Input Channel 2	Alarm on Closed Circuit	Closed, Open	<div> <div>Closed <input type="checkbox"/></div> <div>Open <input type="checkbox"/></div> <div>Analog <input type="checkbox"/></div> <div>Off <input type="checkbox"/></div> <div> <div>→ _____ %</div> <div>High Set Point</div> </div> <div> <div>→ _____ %</div> <div>Low Set Point</div> </div> </div>
Input Channel 3	Alarm on Closed Circuit	Analog, Alarm Closed, Alarm Open, Off	<div> <div>Closed <input type="checkbox"/></div> <div>Open <input type="checkbox"/></div> <div>Analog <input type="checkbox"/></div> <div>Off <input type="checkbox"/></div> <div> <div>→ _____ %</div> <div>High Set Point</div> </div> <div> <div>→ _____ %</div> <div>Low Set Point</div> </div> </div>
Input Channel 4	Alarm on Closed Circuit	Analog, Alarm Closed, Alarm Open, Off	<div> <div>Closed <input type="checkbox"/></div> <div>Open <input type="checkbox"/></div> <div>Analog <input type="checkbox"/></div> <div>Off <input type="checkbox"/></div> <div> <div>→ _____ %</div> <div>High Set Point</div> </div> <div> <div>→ _____ %</div> <div>Low Set Point</div> </div> </div>
Phone Number 1			
Phone Number 2			
Phone Number 3			
Phone Number 4			
Phone Number 5			
Phone Number 6			
Phone Number 7			
Phone Number 8			
Message for Input 1	Channel 1 Alarm		
Message for Input 2	Channel 2 Alarm		
Message for Input 3	Channel 3 Alarm		
Message for Input 4	Channel 4 Alarm		
Message for Station ID	This is Phone Alarm Station		

PROGRAM ITEM	DEFAULT	RANGE	REPROGRAMMED TO:
Ring Answer Delay	1 ring	1-20	
Time Between Calls	2.0 seconds	0.1-999.9[1]	
Alarm Reset Time	1.0 hours	0.1-99.9	
Tone/Pulse Dialing	Auto detect	Tone, Pulse, Auto	
Pager Dialing Delay	10.0 seconds	0.1-99.9	
Phone Line Fault Monitor	Off	On, Off	
Call Progress Monitor	Off	On, Off	
Max Rings Before Abandon Call Attempt [3]	5	4-20	
Input Channel 4	Alarm on Closed Circuit	Analog, Alarm Closed, Alarm Open, Off	

Notes:

[1] For power failure alarm, Alarm Trip Delay is fixed at 5 minutes.

[2] Minimum programmable Time Between Calls is 10 minutes, if only one phone number is programmed.

[3] Call Progress Monitoring must be On for this to apply.

5

The Guard-It™ Autodialer In Operation

5.1 The Alarm Process

Much of the operation of the Guard-it™ was explained in the previous chapter on programming.

To review the sequence of events that starts with the detection of a fault condition on a given input channel, refer to the Alarm Process diagram.

Please keep in mind the following facts:

A fault condition must be detected continuously for the duration of the programmed Alarm Trip Delay, before an Unacknowledged Alarm will occur. During this timeout, the corresponding input channel LED will blink green.

The Alarm Trip Delay for input channels is programmable, with a default value of 2 seconds. For power failure alarm, the Alarm Trip Delay is fixed at 5 minutes.

Once an Unacknowledged Alarm occurs, the corresponding LED will blink red, and alarm calls will be placed indefinitely until the alarm is acknowledged, even if the fault condition returns to normal.

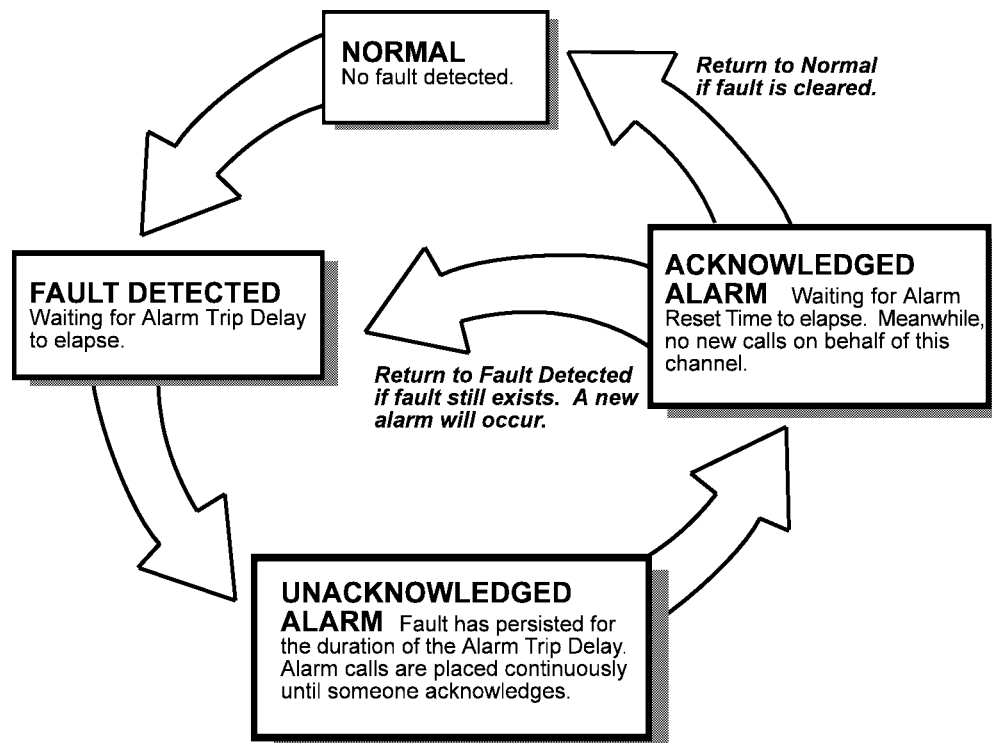
When the alarm is acknowledged, the corresponding LED turns solid red, and further alarm calls on behalf of that input channel (or power failure alarm) will be suspended.

At the moment of acknowledgment, an internal Alarm Reset Timer begins timing, and when it has completely timed out, the acknowledged alarm status for that input channel is automatically cleared. As a result, if the fault condition no longer exists, no new alarm will be created. If a fault condition does still exist, then after the alarm trip delay elapses, a new Unacknowledged Alarm and a new cycle of alarm calling will occur.

If the product loses all power or is turned off, when power is restored the acknowledged alarm status will have been cleared. Therefore, if a fault is still present, then after the alarm trip delay has elapsed, a new unacknowledged alarm will occur, resulting in new calls being placed.

If the OFF/DISARMED/READY switch on the front panel is in the DISARMED position, any such alarm will be automatically acknowledged so that no alarm calls will be placed.

Guard-It™ Alarm Process Diagram



Channel Light (LED) Indications:

Steady green - Normal

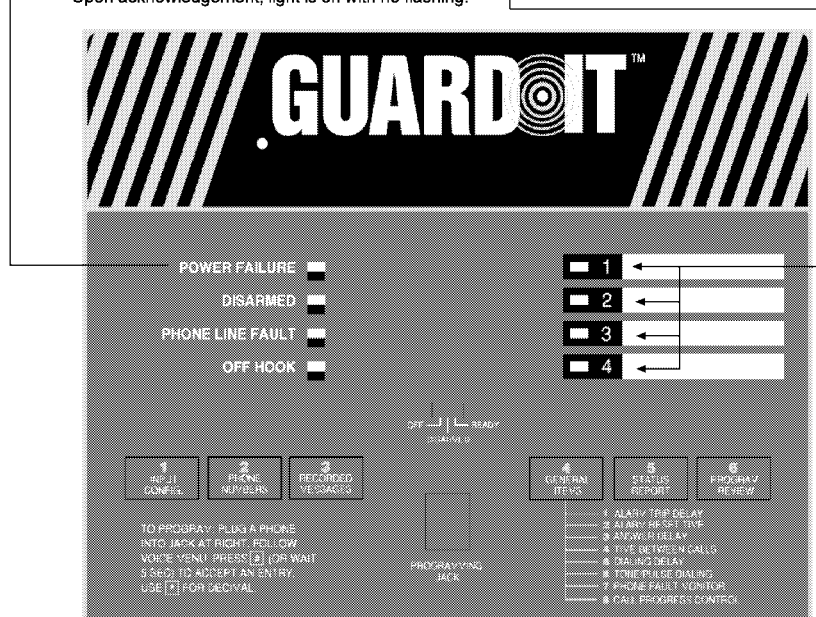
Flashing green - Fault detected but alarm trip delay not timed out.

Flashing red - Unacknowledged alarm.

Steady red - Acknowledged alarm.

Power Failure Alarm (LED) Indications:

Flashing red indicates loss of external 12 VDC power. After 5 minutes, alarm calls will be placed. Upon acknowledgement, light is on with no flashing.



If the phone line connected to the Guard-it™ autodialer has an extension phone and it is in use at the time the product attempts to place an alarm call, the call will not go through to the programmed phone number, but the alarm message will be superimposed on the phone call in progress on the extension phone.

Note that the alarm reset function is somewhat similar to a “snooze alarm” on an alarm clock. If someone acknowledges an alarm but does not correct the condition, a new series of calls will be placed after a “snoozing” period has elapsed.

5.2 **Receiving And Acknowledging An Alarm Call**

When you receive an alarm call from your Guard-it™ autodialer, listen to the message to learn what alarm(s) exist. The message round will start with the Station ID message, followed by the specific alarm message for the input channel(s) in alarm, and/or a message stating “power is off”.

Note that any input channels which have been programmed for analog, will be reported regardless of whether they are in alarm or not. If there is a high or low level alarm on an analog channel, the words “high (or low) level alarm” will be added.

The additionally informative words “fault”, “now normal”, and “acknowledged” may be added as follows:

If the input of a given input channel is in fault but has not yet persisted long enough to trip an alarm for that input, the message for that input will be included with the word “fault” added.

If the input of a given channel in alarm has returned to normal as of the time of the phone call, the message for that input will be included with the words “now normal” added.

If a given input channel is already in an acknowledged alarm state, the message for that input will be included with the word “acknowledged” added.

At certain points in the message round, a prompting beep will be issued. This is your cue to press a “9” immediately after the tone to acknowledge the alarm. Upon detecting the “9”, the Product will say “Alarm is acknowledged. Goodbye”, and the call will end.

Following the final message round, the microphone will be turned on so that you can hear sounds occurring in the area of the product. Then there will be one last beep to allow acknowledgment before the call ends.

If you do not acknowledge an alarm call, the Product will end the call and wait for the programmed Time Between Alarm Calls (default 10 minutes), before going on to place a call to the next programmed phone number, repeating the calling endlessly until the alarm is acknowledged.

If the Call Progress Monitoring function is not turned on, you will generally pick up the phone in the middle of a message. Simply continue to listen, and the message will continue to the start of a complete new round.

If the Call Progress Monitoring function is turned on, there may be a delay when you answer the phone, before the messages begin.



9

You may also acknowledge the alarm by placing a return call to the Guard-it™ autodialer. The best way to do this is to wait for the alarm call to end before you place your return call, so that the line will not be busy. At the sound of the prompting beep, press a “9”, and the Product will respond by saying “Alarm is acknowledged. Goodbye.”

5.3

Power Failure Alarms

The alarm trip delay for power failure alarm is fixed at 5 minutes.

Note that you can only receive a power failure alarm if an optional rechargeable lead acid “Gel Cell” battery is installed, since otherwise the power failure would prevent operation of the product. If you have installed an external “uninterruptible” source of 12 VDC power for the product, it will not know that there has been a failure of primary power unless this is reflected at one of the signal inputs.

5.4

Placing An Inquiry Call To The Guard-It™ Autodialer



You may call the Guard-it™ autodialer at any time other than when you are programming, to get a status report of all input channels.

The product will answer the phone after waiting for the programmed ring answer delay (default 1 ring).

The message you hear may include particular informative phrases such as “no phone numbers programmed”, “power is off”, “disarmed”, etc. There will be two complete message rounds, followed by a listening period when the microphone is turned on, before the product ends the phone call.

If there are any unacknowledged alarms, you may acknowledged them by pressing “9” immediately following the beep.

5.5 Acknowledging An Alarm From The Front Panel

To acknowledge an alarm from the front panel, move the selector switch to the DISARMED position, then return it to the READY position. The product must not be in programming mode or presently placing a phone call, for the alarm to be acknowledged in this way.

5.6 Clearing An Acknowledged Alarm From The Front Panel

To force a clearing of the acknowledged alarm status in advance of the time when the alarm reset timer would otherwise do it, select choice [7] from the top menu, or simply turn the product off and then on again. If there is still a fault being detected, then after the expiration of the alarm trip delay, a new unacknowledged alarm will occur with new alarm calls being placed.

6

Troubleshooting & Repair Service

If the product appears “dead” with no lights or action of any kind, suspect the external power source (most likely) or a blown internal fuse (less likely). There is a diagnostic light located behind a round hole on the lower right hand edge of the enclosure. If this light is lit, it means that there is at least 8 VDC (the minimum voltage required) reaching the product and that the internal fuse (5 x 20 mm, 0.8 ampere) is good.

In turn, this means that if the light is not lit, then you can track down and correct the problem without need to return the product to the factory for service. If it is lit and the product appears dead, then factory service is needed.

Verify that all connections are correct and that the connector block is plugged firmly into place in the correct orientation.

If there is a problem with phoning, use the programming phone to test the phone line, temporarily plugging it into the premises phone line jack in place of the autodialer connection.

Most other apparent problems, especially at startup, are the result of incorrect connection or programming, or misunderstanding of how the product operates.

If after reviewing this manual you still have difficulty, Omega’s Customer Support department is available from 8:30 a.m. through 6:00 p.m. E.S.T. on weekdays.

6.1 Phone Support Procedures

Make sure you have the following before you call:

- Serial #: Found on the enclosure.
- Note the unit's symptoms: Exact speech pattern, what it is saying, if it is calling or not. The more specific and accurate you are in describing the symptoms, the quicker the Customer Support Department will be able to diagnose and troubleshoot the problem. In many cases, it may save a return to the factory.

THEN call 1-800-327-4333 for Customer Support.

If Customer Support determines that the unit needs repair, you will be given a Return Materials Authorization (RMA) number.

7

Testing

A suitable program of testing is highly advisable for any alarm autodialer. The frequency and thoroughness of the test should be gauged according to the potential consequences of missing an alarm call.

Test the unit by simulating an alarm at one or more of the inputs. If you have an optional rechargeable battery installed, you can create a power failure alarm by disconnecting the external 12 VDC power source and waiting 5 minutes for a power failure alarm to be tripped.

You can leave the power disconnected and see how long the unit remains operational, running on its optional rechargeable battery. You might temporarily program an alarm reset time of, say, four hours, so that you would get a new set of calls every four hours until the battery lost charge.

8

Maintenance

The only maintenance item on the Guard-It™ autodialer is the optional rechargeable battery. It should be replaced every three years, since it will eventually fail with old age in the same way that an automobile battery does.

Replacements for this battery must be ordered near the time of changeout, since long storage on a shelf without a charger will damage the battery. It may be ordered from Omega or from the manufacturer as printed on the battery.

A

ANALOG (4-20 MA) INPUTS

A.1

Connecting 4-20 MA Analog Signal Inputs

As an alternative to contact inputs or digital logic inputs, you may connect 4-20 ma analog signals to any of the inputs. The connections must be made with the correct polarity. Refer to the diagram.

Note that the negative connection points for each of the inputs are connected to each other, and to common ground, inside the product. Most 4-20 ma signal circuits are “floating” with respect to ground, and for such signal circuits the grounded inputs on the Guard-It™ autodialer will usually cause no problems.

However some 4-20 ma signal circuits already have a connection to ground at some other point in the current loop. If your current loop has such a connection and if you cannot remove it, it is best to install an “isolator” such as Model T700-0000 made by Action Instruments (619) 279 5726 . Otherwise, signal errors will be introduced, both for the Guard-It™ autodialer and for any other elements in the same current loop.

Note that similar devices are available from the same manufacturers, which accept signals in different formats (such as 0-1 VDC, etc.) and which translate such signals into standard 4-20 ma signals which the Guard-It™ autodialer can accept.

The easiest way to verify that there are no grounding problems, is to verify that the current in the loop does not change when the Guard-It™ autodialer is added to the loop.

For example, if there is a chart recorder or readout device in the current loop, first take a reading with the Guard-It™ autodialer completely disconnected from the loop.

Do this by unplugging the connector block and temporarily shorting the + and - inputs on the signal input points on this connector block. Observe the reading, and then remove the short and plug in the connector block to include the Guard-It™ autodialer in the loop, turn it on, and verify that this does not change the reading on the readout device. All power and ground connections to the Guard-It™ autodialer must be in place for this test to be valid. Also, the input channel being tested must be programmed for analog input as described below.

If you are troubleshooting by making voltage measurements across the signal input connection points on the Guard-It™ autodialer, bear in mind that if the product is turned off or if it has not been programmed for analog input, an internal voltage clamp will result in a fixed voltage drop of about 7 VDC. If the product is turned on and the input has been programmed for analog input, a loop resistance of about 220 ohms will result in a voltage drop of approximately 0.88 VDC with a signal level of 4 ma, and approximately 4.4 VDC with a signal level of 20 ma.

A.2 Programming For Analog Signal Inputs

From the top menu, when you select [1] for input programming and then select an input channel number to program, the voice menu will prompt you with the following choices:

- [1] Alarm on Open Circuit
- [2] Alarm on Closed Circuit
- [3] Off (so that this input channel will not report or activate its corresponding front panel LED)
- [4] Analog (4-20 ma current loop) signal.

If an input channel is configured for an analog signal, the menu also gives you two additional choices:

- [5] To program an analog high alarm level set point value
- [6] To program an analog low alarm level set point value

Example: to program input channel number four for analog input, from the top menu you would press [1] for input programming, then [4] to select input number four, then [4] again to configure this input channel for analog input.

Input channels which have been programmed for analog (4-20 ma) signals, will report a 4 ma signal level as 0.0% and a 20 ma signal level as 100.0%. Signal levels between these limits will be reported in linear scale proportion as a percentage between 0.0% and 100.0 %. Note that as a result of this linear analog scale, an input current of 0 ma would give a reading of *minus* 25.0%.

The Guard-It™ autodialer is very sensitive, being capable of detecting variations as little as 0.1%. Absolute accuracy should be within 0.5%. Due to substantial input filtering, it takes several seconds for any sudden change in input level to become fully settled.

A translation table appears below, relating the analog input signal in milliamperes to the spoken percentage reading. It also allows you to write in the corresponding actual physical readings (such as water level in feet, etc.) for various signal levels.

When programming analog high or low alarm set points, enter the set points as a percentage value, using the star (*) key for a decimal point if desired.

EXAMPLE: to enter a high set point value of 56.8% for input channel number 4, from the top menu you would press [1] for input programming, then [4] to select input number four, then [5] to select the high alarm set point for this input channel, and then:

5 6 * 8 #.

The menu will allow you to program high or low analog set points only if the input channel has first been programmed for analog input.

To turn off a given alarm set point so that it will not create an alarm, press “star” (*) and then pound (#).

In operation, whenever a high or low level alarm setpoint is exceeded continuously for the duration of the programmed alarm trip delay, an unacknowledged alarm will occur.

A.3

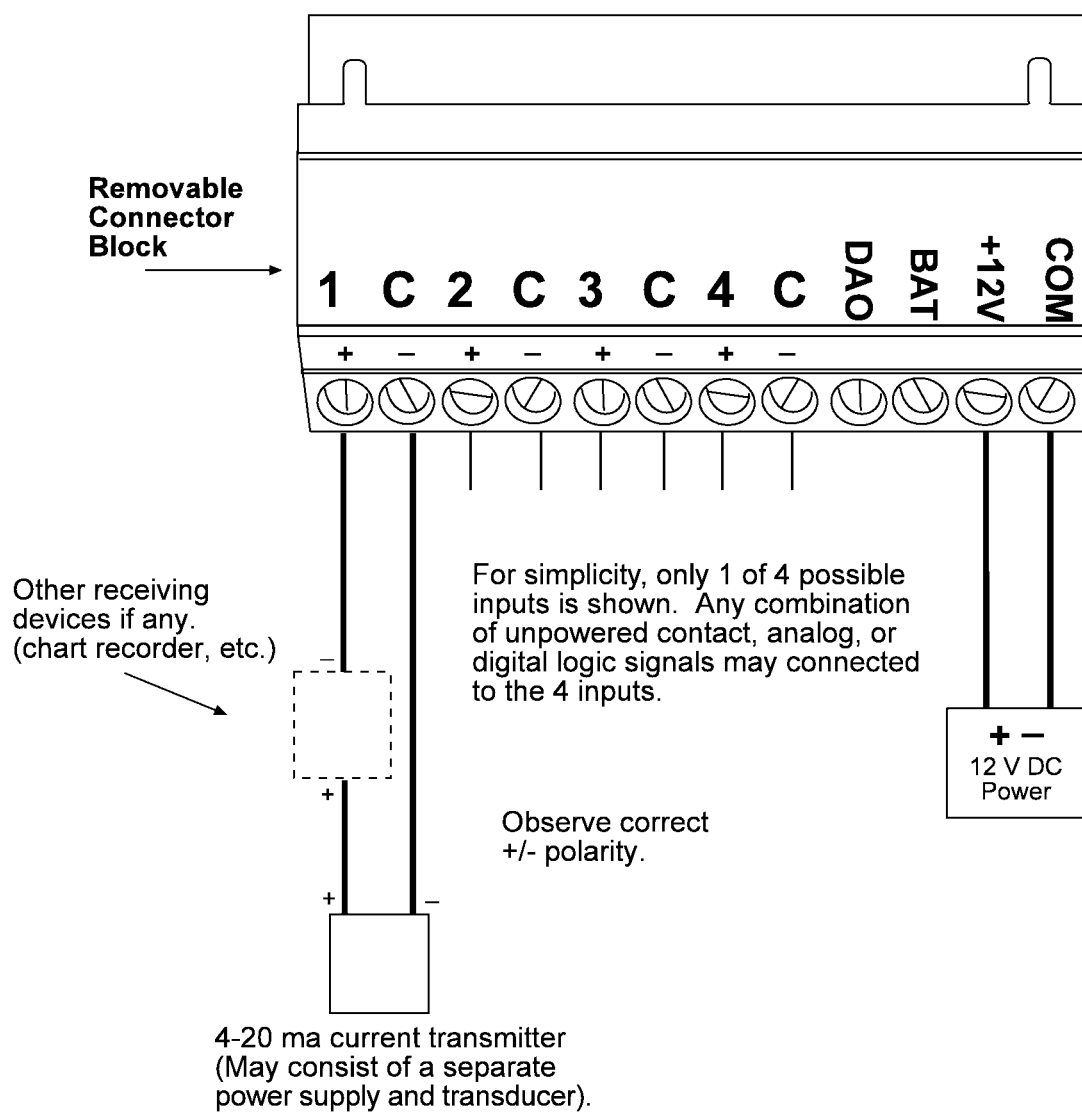
Analog Translation Table

This table translates various input signal levels in milliamperes, to the corresponding percentage values which will be reported.

It also allows you to write in the corresponding translation to the actual physical parameter being measured, such as water level in feet, etc. You can make copies of this for later use, even including reference to this table in your recorded message, which might be: "Referring to the analog translation table, the water level percentage reading is."

SIGNAL LEVEL:	SPOKEN READING:	CORRESPONDS TO PHYSICAL VALUE ON INPUT CHANNEL NUMBER (Description)			
		1(_____)	2(_____)	3(_____)	4(_____)
4.0 Millamperes	0%				
4.8 Millamperes	5%				
5.6 Millamperes	10%				
6.4 Millamperes	15%				
7.2 Millamperes	20%				
8.0 Millamperes	25%				
8.8 Millamperes	30%				
9.6 Millamperes	35%				
10.4 Millamperes	40%				
11.2 Millamperes	45%				
12.0 Millamperes	50%				
12.8 Millamperes	55%				
13.6 Millamperes	60%				
14.4 Millamperes	65%				
15.2 Millamperes	70%				
16.0 Millamperes	75%				
16.8 Millamperes	80%				
17.6 Millamperes	85%				
18.4 Millamperes	90%				
19.2 Millamperes	95%				
20.0 Millamperes	100%				

Analog 4-20 ma Signal Input Wiring Connection Diagram



B

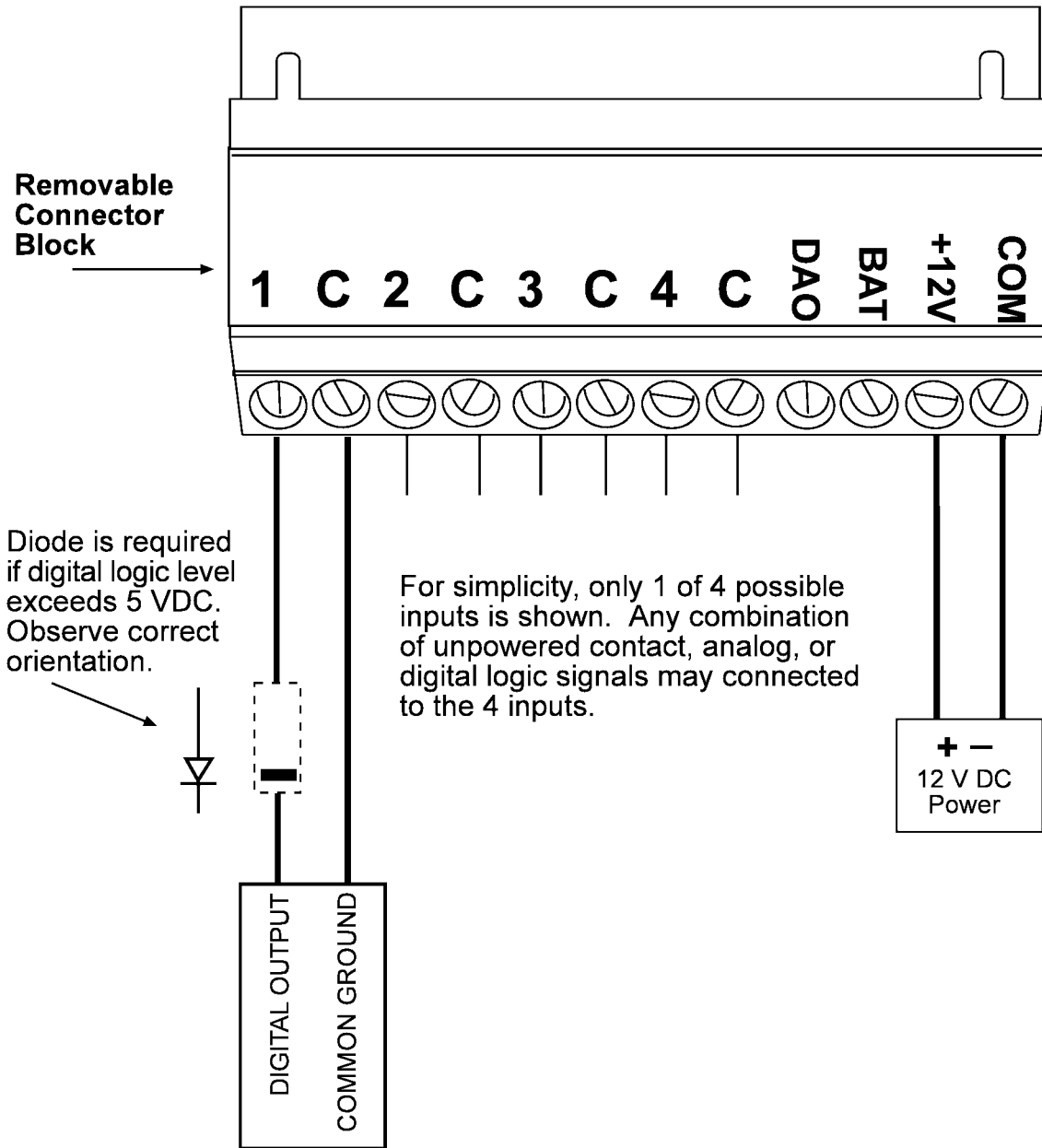
CONNECTING DIGITAL LOGIC SIGNAL INPUTS

As an alternative to contact inputs, you may connect 5-volt logic signals as long as the common electrical ground for the Guard-It™ autodialer is the same as for the 5 volt logic system.

A logic “0” will be interpreted by the Guard-It™ autodialer as a closed circuit, and a logic “1” will be interpreted as an open circuit.

If you want to connect higher voltage logic signals (up to 24 VDC), insert a rectifier diode (such as a 1N914, 1N4005, etc.) between the logic signal and the signal input on the Guard-It™ autodialer. *The diode must be oriented so that the cathode (banded) end is connected to the logic signal.*

Digital Logic Signal Input Wiring Connection Diagram



C

DIGITAL ALARM OUTPUT (DAO)

The digital alarm output may be used to activate an external device such as the coil of a relay or the input of a logic circuit.

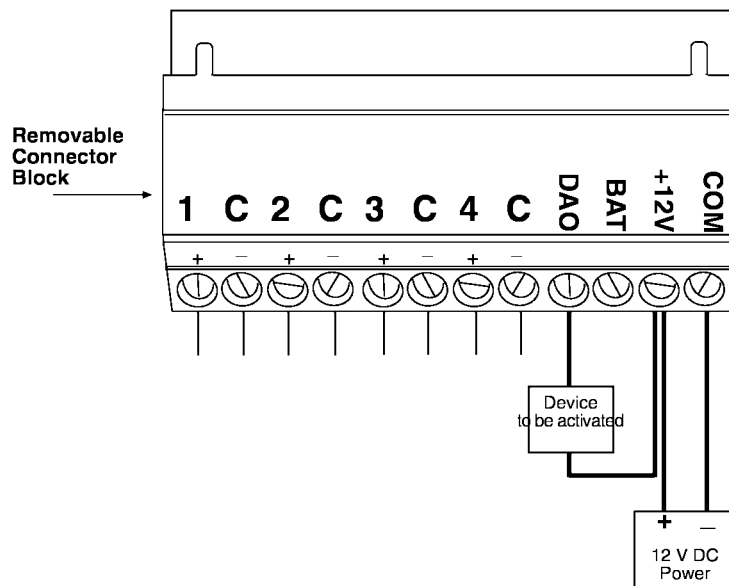
This output is activated (pulled down to common ground voltage) whenever there is an unacknowledged alarm. It is deactivated when the alarm is acknowledged.

The load you connect will have 12 VDC applied across it when activated, if you connect as shown in the diagram. It must draw no more than 200 milliamperes, and so it must have a resistance of at least 60 ohms.

A typical application would be to power the coil of a relay. The contacts of the relay may then be used to control devices of higher voltage and power, such as outside warning lights or buzzers.

Alternatively, the DAO output may be connected directly into a DC logic input circuit. It has an internal 10k resistor pulling it to +5VDC when deactivated, and it is pulled to ground when activated. It may even be connected into a 24 VDC logic input such as found on PLC's, but due to the resistor connected to +5VDC, an external pullup resistor (nominally 1K) to a +24 VDC source may be needed.

Optional Digital Alarm Output (DAO) Connection Diagram



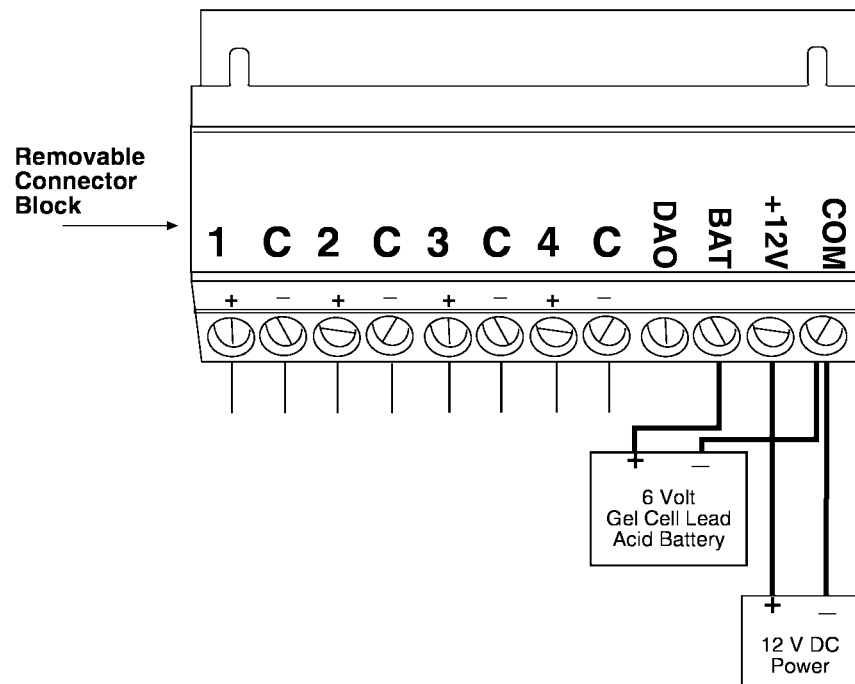
D

OPTIONAL EXTERNAL GEL CELL BACKUP BATTERY

An internal 6 volt, 4 ampere-hour battery is an available option for the Guard-It™ autodialer. However as an alternative or in addition to the optional internal battery, you may connect your own 6 volt gel cell lead acid battery as shown in the diagram. It may have a capacity of up to 10 ampere hours. The battery will be kept charged by the product's internal circuitry.

The function of any such battery is to maintain operation of the product during failures of primary power. Each ampere hour of capacity will keep the product operational for approximately 6 hours depending on the number of alarm calls placed and other factors.

Optional External Battery Connection Diagram



E

PROGRAMMING FOR USE WITH NUMERIC PAGERS

Numeric pager systems require the caller to dial the phone number of the pager service, wait for a prompting beep, and then enter some additional digits which are to be displayed on the receiving pager, and then finally, enter a pound(#) to complete the entry.

To call and cause a display on a numeric pager, your Guard-It™ autodialer will do essentially the same thing, except that it will wait for a delay period which you set, instead of listening for the pager system's beep, before sending the remaining digits.

This is all accomplished by programming an “extended” phone number, which includes a delay which you invoke by pressing the star (*) key.

To program this special “extended” phone number, after selecting which of the 8 phone numbers to program, key in the telephone number of the paging service, then press the star (*) key, then continue with the digits that you want to appear on the receiving pager, and finally press pound (#) when your entry is complete, then wait three seconds for the Guard-It™ autodialer to automatically accept and repeat back the extended phone number which you have entered.

In this special case after you have invoked a dialing delay by using the star (*) key, the Guard-It™ autodialer treats the pound (#) key in a special way. Normally, the pound (#) key is used to accept an entry or to return to a previous menu level. However once a delay has been invoked, *the star and pound keys are treated as “dialable” digit values for the remainder of this programmed phone number.* This allows for the desired result of including a # which will actually be “dialed” to complete the communication with the pager system.

For example, to display “12345” on a pager which can be “paged” by calling 555 1000, you would key in:

5 5 5 1 0 0 0 * 1 2 3 4 5 #

and then wait three seconds for the Guard-It™ autodialer to accept and recite back this extended phone number, which it will recite as:

5 5 5 1 0 0 0 “Delay 1 0 seconds” 1 2 3 4 5 “Pound”.

(The stated number of delay seconds will be whatever Dialing Delay value is programmed—see below).

In a typical application, the Guard-It™ autodialer's own phone number would be the number to be programmed for display.

The other step you must take, is to place several calls to the pager system in order to determine by experiment how long a waiting time is suitable before the paging system will reliably have issued its prompting beep, so that it is definitely ready to accept the digits to be displayed. Begin the timing at the moment you dial the last digit of the pager service number, and end the timing when you hear the pager service's prompting beep. We suggest you add three seconds to the longest time period you observe. Use a regular telephone to place the calls.

Then program this delay value in seconds, as the Dialing Delay under the General Programming Menu. The default value is ten seconds, and this value will work for many pager systems without alteration.

With the extended phone number and Dialing Delay value fully programmed, it is best to verify (three times is suggested) that the Guard-It™ autodialer will successfully cause the pager to be reached with the intended display.

This is done by manipulating one of the signal inputs to cause an alarm.

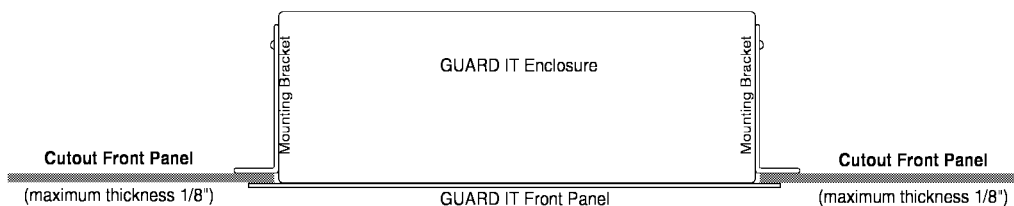
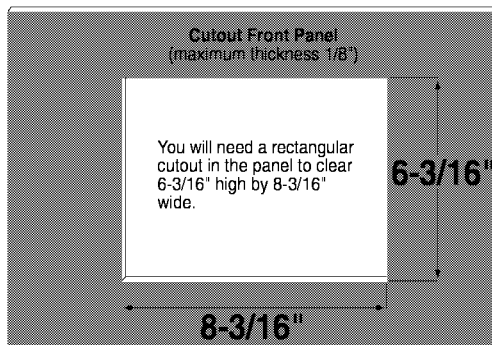
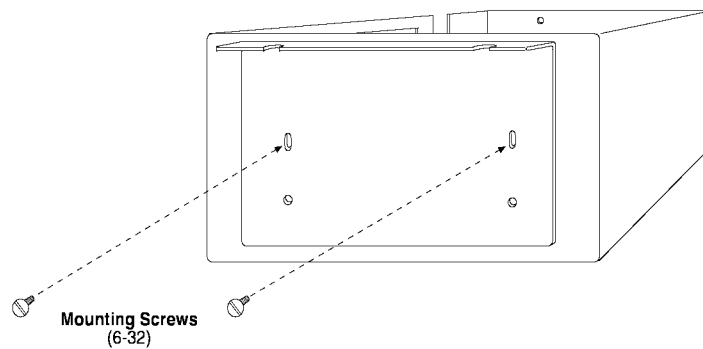
Note: Because pager systems issue a variety of special signaling tones, it is best to keep the Call Progress feature turned off if using pager systems.

You can "eavesdrop" on the progress of the test calls using a programming phone, as long as Call Progress is turned off. Do not pick up the programming phone until the dialing begins.

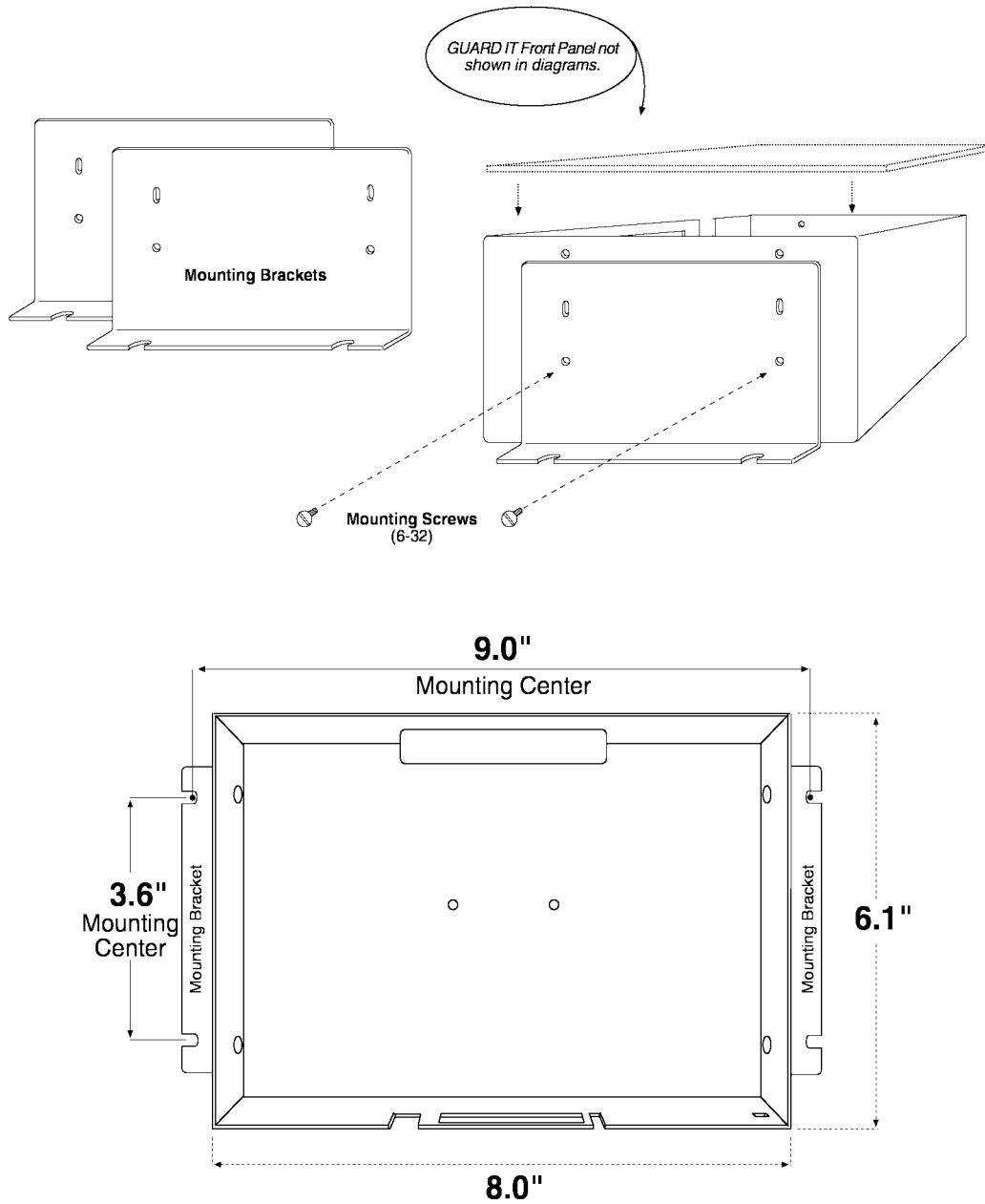
F

ENCLOSURE MECHANICALS & WIRING DIAGRAMS

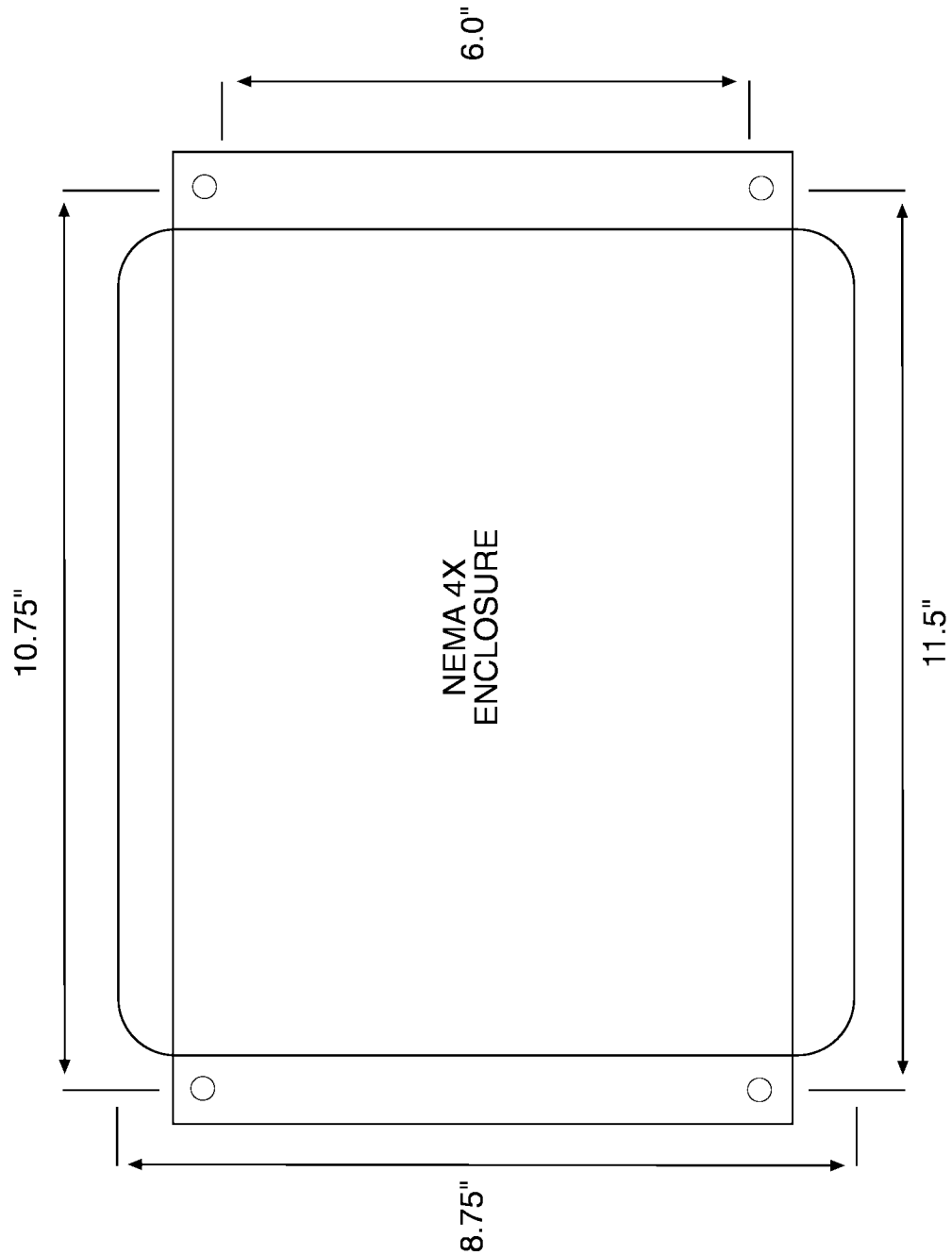
Mounting the Guard-It™ Autodialer Enclosure Flush into a Front Panel



Mounting the Guard-It™ Autodialer Enclosure onto a Back Surface



Guard-It™ NEMA4X Enclosure



FCC Notice to Users

FCC Requirements

1. The Federal Communications Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin phones.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes. You will be advised of your right to file a complaint with the FCC.
4. If the telephone company requests information on what equipment is connected to their lines, inform them of:
 - a. The telephone number to which this unit is connected.
 - b. The Ringer Equivalence Number. [0.8B]
 - c. The USOC jack required. [RJ11C]
 - d. The FCC Registration Number. [EMRUSA-30496-AL-E]

Items (b) and (d) are indicated on the label. The Ringer Equivalence Number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of REN's of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

Service Requirements

In the event of equipment malfunction, all repairs should be performed by our Company. It is the responsibility of users requiring service to report the need for service to our Company. Service can be obtained from **Omega Engineering at (800) 327-4333**, to obtain an RMA# and our shipping address.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible.

This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 1999 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for
Process Measurement and Control?
OMEGA... Of Course!

TEMPERATURE

Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
Wire: Thermocouple, RTD & Thermistor
Calibrators & Ice Point References
Recorders, Controllers & Process Monitors
Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

Transducers & Strain Gauges
Load Cells & Pressure Gauges
Displacement Transducers
Instrumentation & Accessories

FLOW/LEVEL

Rotameters, Gas Mass Flowmeters & Flow Computers
Air Velocity Indicators
Turbine/Paddlewheel Systems
Totalizers & Batch Controllers

pH/CONDUCTIVITY

pH Electrodes, Testers & Accessories
Benchtop/Laboratory Meters
Controllers, Calibrators, Simulators & Pumps
Industrial pH & Conductivity Equipment

DATA ACQUISITION

Data Acquisition & Engineering Software
Communications-Based Acquisition Systems
Plug-in Cards for Apple, IBM & Compatibles
Datalogging Systems
Recorders, Printers & Plotters

HEATERS

Heating Cable
Cartridge & Strip Heaters
Immersion & Band Heaters
Flexible Heaters
Laboratory Heaters

ENVIRONMENTAL

MONITORING AND CONTROL

Metering & Control Instrumentation
Refractometers
Pumps & Tubing
Air, Soil & Water Monitors
Industrial Water & Wastewater Treatment
pH, Conductivity & Dissolved Oxygen Instruments

APPENDIX J

SPARE PARTS INVENTORY

Recommended Spare Parts and Equipment Information List^a

P&ID Identifier	Description	Specification	Vendor/MFG Model #	Vendor	Vendor Contact Information	Recommended Spares Quantity on Hand ^b
	Lift Station sump pumps		Grundfos KP 150	Grainger	716-684-1000 50 McKesson Pkwy, Buffalo, NY 14225	1
	Sump #1 and #2 Well Pump	1/3A, 115V 3-15 gpm	Grundfos 10SQ/SQE03A-110	FW Webb	315-476-9322	1
	Lift Station Flow Meter	1-1/2" DJ150 with couplings and contact head register 10GPC US gallon Reg 5/06	Daniel L Jerman Co		1-800-654-3733 watermeters.com	1

^aAll listed parts may be substituted with an equivalent manufacturer's model pending Alliance Partner (AP) Engineers approval.

^bRecommended quantity should be on hand, or capability must exist to obtain from vendor within 72 hours.

APPENDIX K

OM&M HEALTH AND SAFETY PLAN

Health, Safety and Environmental Plan

Alltift Landfill And Outer Harbor

Operations, Maintenance & Monitoring

Buffalo, NY

Prepared for
Honeywell International Inc.

November 2018

Prepared by

JACOBS®

HEALTH AND SAFETY PLAN
Alltift Landfill and Outer Harbor
Tift Street at Hopkins St (Alltift Landfill)
910 Fuhrmann Boulevard (Outer Harbor)
Buffalo, NY

PHONE

Project Number: 693093

Project Manager (PM): Mike Stout

(315) 468-1663
Cell: (315) 558-4018

Safety Coordinator (SC): Mike Stout

see above

Honeywell H&S Program Manager (HSPM): Bill Berlett
Project H&S Manager: Bill Berlett

(312) 612-6025
Cell: (847) 770-0209

Preparation Date: November 27, 2019

Expiration Date: November 30, 2020

APPROVALS

Project Manager:



November 27, 2019

(DATE)

Safety Coordinator/SC



November 27, 2019

(DATE)

Honeywell Program or Project Health and Safety Manager:



November 27, 2019

CIH/CSP

(DATE)

This Health and Safety Plan is valid only for this specific project as described in Section 1.0. It is not to be used for other projects or subsequent phases of this project without the written

approval of the Honeywell Program Health and Safety Manager. **A copy of this plan is to be maintained at the site at all times.**

Change Management Form

Honeywell Project HSE Change Management Form

This evaluation form will be reviewed on an annual basis by the Project Manager and/or the Project H&S Manager to determine if the current site health and safety plan adequately addresses ongoing project work. If necessary to have an evaluation prior to the annual review the Project Manager will complete this form. On completion of the review the H&S Managers will make appropriate changes to this plan

At any time there are any changes to the H&S plan or process; employees are to be trained on the changes and sign off acknowledging they have been trained and aware of the changes.

Project Task: Operations, Maintenance & Monitoring activities
 Project Number: HWOMM307 Project/Task Manager: Mike Stout
 Name: Buffalo Alltiff Landfill and
 Buffalo Outer Harbor sites

<i>Evaluation Checklist</i>		Yes	No
1.	Has the JACOBSHILL staff listed in the original HSP changed?		
2.	Has a new subcontractor been added to the project?		
3.	Is any chemical or product to be used that is not listed in Attachment 7 of the plan?		
4.	Have additional tasks been added to the project, which were not originally addressed in the plan?		
5.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
6.	Has additional safety, equipment, activity or environmental hazards been encountered that are not addressed in the plan?		
7.	Has new tasks been add or changed at this project? If so has the SOP and AHA been written or revised? Have the employees signed off on them stating that they have been trained on the SOP and AHA?		
8.	Has there been a change in the process or piping?		

If the answer is "YES" to Question 3, an HSP revision is NOT needed. Please take the following actions:

- ◆ Add the chemical to Chemical Inventory - Attachment 7;
- ◆ Ensure employees handling the chemical are trained; and
- ◆ Ensure appropriate Safety Data Sheet documentation is added to Attachment 8.

If the answer is "YES" to Questions 1, 2 or 4-6, an HSP/FSI revision MAY BE NEEDED. Please contact Bill Berlett (312-873-9784) directly.

Emergency Contacts

JACOBS Injury (Work Care) Reporting 888-449-7787 JACOBS Serious Incident Reporting 443-221-6281

Medical Emergency – 911 Fire/Spill Emergency – 911 Security & Police – 911 Local Facility Emergency Response Number: 911	JACOBS Medical Consultant 855-328-6547 JACOBS Human Resources Department Phone: Employee Connect toll-free number 1-877-586-4411 (U.S. and Canada) JACOBS Worker's Compensation: Contact Business Group HR dept. to have form completed
Client Contact Name: Ryan Belcher Company: Wood Address: PO Box 7050, Portland, ME 04112-7050 Title: Senior Engineer Phone: (207) 828-3436 Cell: (207) 233-0093 Fax: (207) 772-4762	Site Contact Name: Mark Sweitzer Company: Honeywell Inc. Address: 115 Tabor Road Morris Plains NJ Title: Honeywell Remediation Manager Phone: (412) 279-6661
Project Manager (PM) Name Michael Stout Address: 1563 Willis Avenue, Syracuse, NY 13204 Phone: (315) 468-1663 Cell: (315) 558-4018	Honeywell Program Environmental Manager Name: Beth Vaughan Phone: 334-734-4489
Safety Coordinator Name John Formoza Phone: (315) 468-1663 Cell: (315) 532-5608	Honeywell H&S Program Manager (HSPM) Project H&S Manager Name: Bill Berlett/CHI Phone: 312-612-6025 Cell: 847-770-0209 Fax: 773-693-3823
Federal Express Dangerous Goods Shipping Phone: 800-238-5355 JACOBS Emergency Number for Shipping Dangerous Goods Phone: 800-255-3924	Automobile Accidents Rental: AutoClaims@jacobs.com and CH2Mglobaltravel@ch2m.com JACOBS owned vehicle: Michelle Garcia Phone: 720-286-4273
Facility Alarms: Audible and visual fire alarm	Evacuation Assembly Area(s): Tift Street near bridge
Facility/Site Evacuation Route(s): Proceed to Tift Street	

Hospital Name/Address:

From: Alltft

Sheehan Memorial Hospital

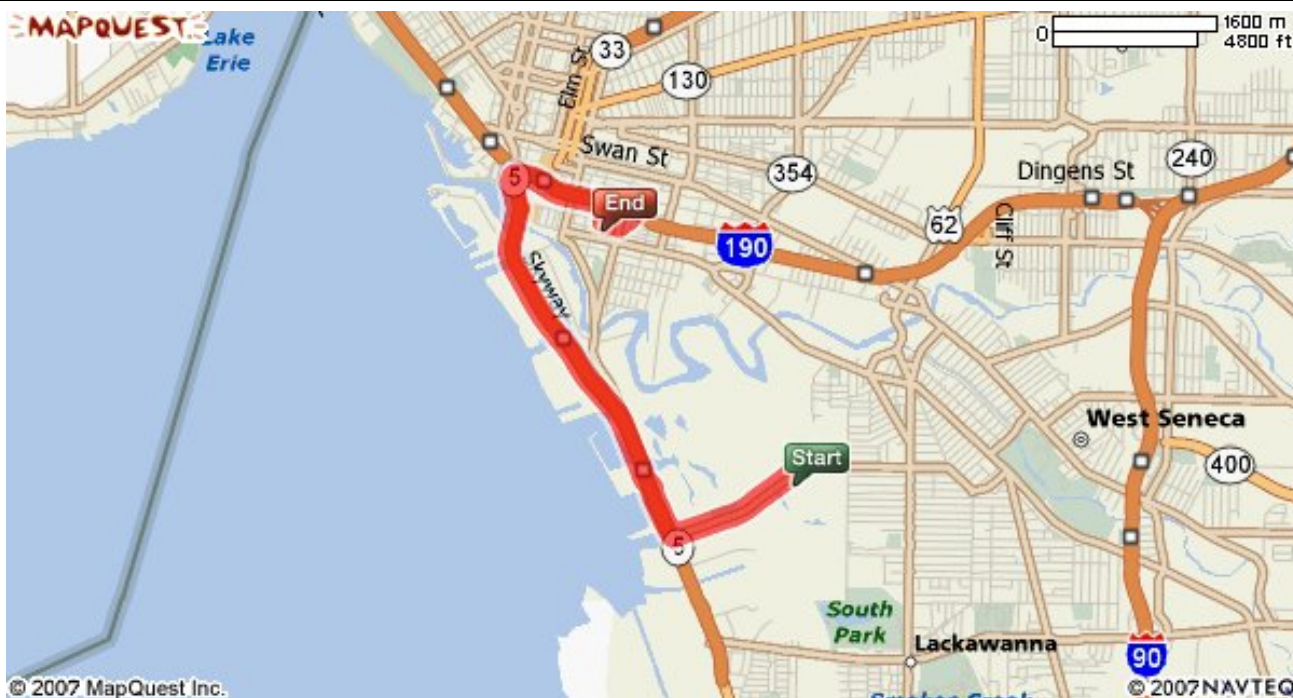
305 Perry St.

Buffalo, NY 14204, US

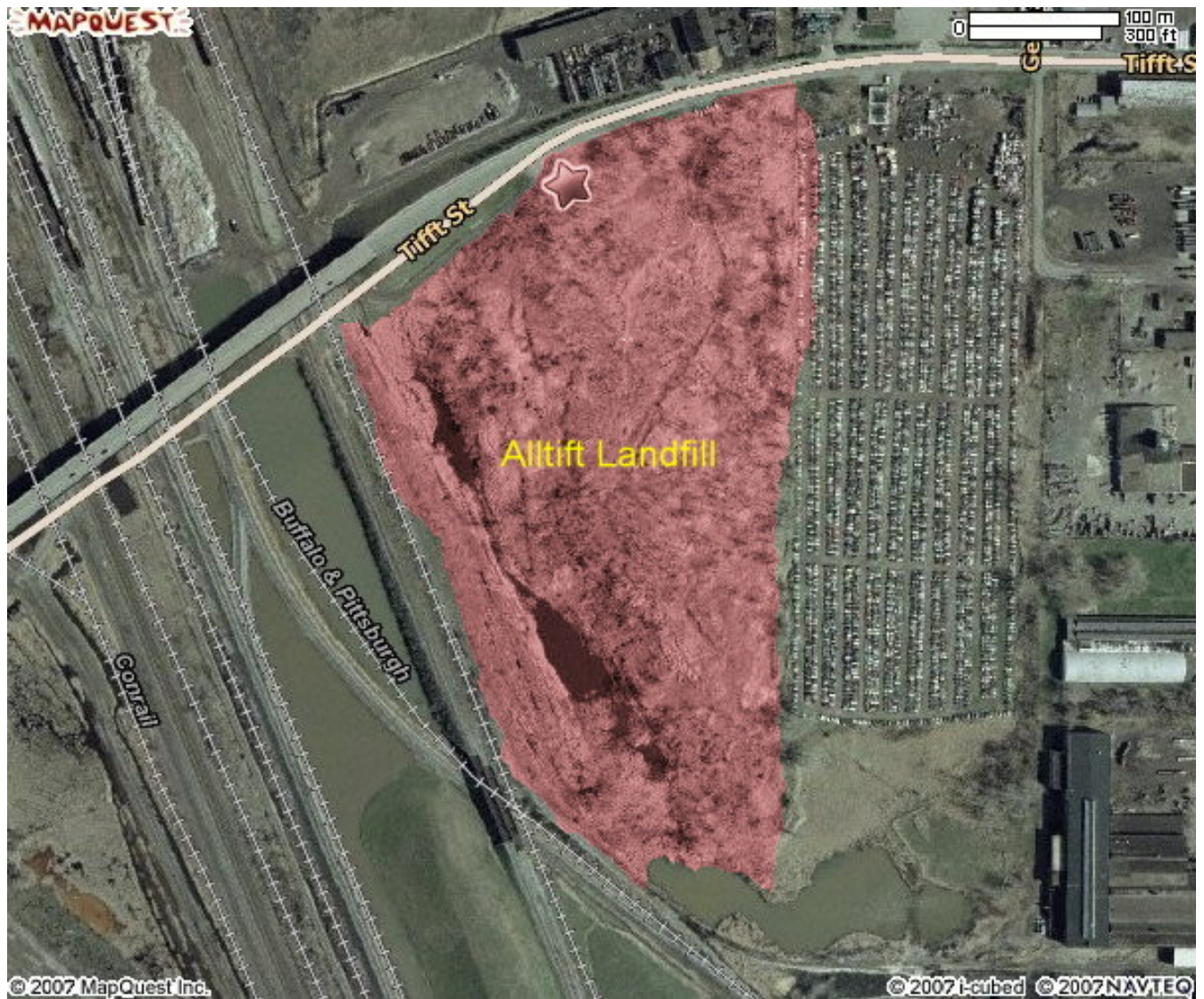
716-848-2000

Directions to Hospital

Go Southwest on Tiftt St. toward Furmann Blvd. Turn right on Furmann Blvd (.4 miles). Merge onto NY 5 E Skyway via the ramp on the left (2.6 miles). Merge onto I-190 S/ New York State Thruway (.8 miles). Take Louisiana St – Exit 5 (.1 miles). Turn Left on Louisiana St. (.1 Miles). Turn Right on Perry St. (.1 miles). Follow to hospital



Site Map



Hospital Name/Address:

From Outer Harbor to Hospital

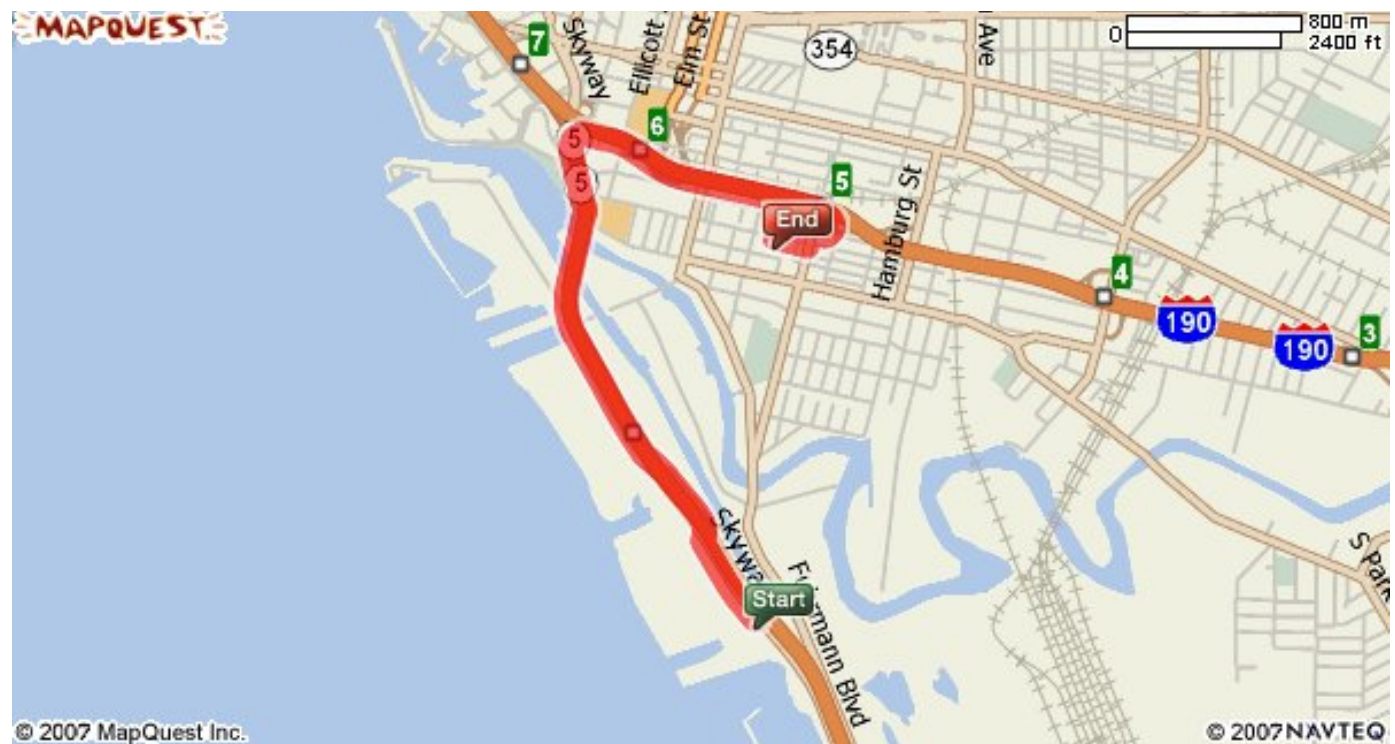
Sheehan Memorial Hospital:

305 Perry St,
Buffalo, NY 14204, US

716-848-2000

Directions to Hospital

Go Northwest on Fuhrmann Blvd (.3 miles). Turn right on and stay on Fuhrmann Blvd. (.2 miles). Merge onto NY-5 E / Skyway via the ramp on the left (1.2 miles). Merge onto I-190 S / New York State Thruway (.8 miles). Take Louisiana St exit 5 (.1 miles). Turn left onto Louisiana St. (.1 miles). Turn Right on Perry St. (.1 miles). Follow to the hospital.



Site Map



Contents

Change Management Form	iv
Emergency Contacts.....	v
Site Map	viii
Site Map	x
Acronyms and Abbreviations.....	1-1
1.0 Introduction	1-1
1.1 JACOBS Policy and Commitment	1-2
1.1.1 Safe Work Policy	1-2
1.1.2 Health and Safety Commitment	1-2
1.1.3 Project-Specific Health, Safety, and the Environment Goals.....	1-2
1.2 About This Document	1-3
1.3 Site Background	1-3
1.4 Description of Tasks	1-4
1.4.1 Hazwoper-Regulated Tasks	1-4
1.4.2 Non-Hazwoper-Regulated Tasks	1-5
1.4.3 Environmental-Regulated Tasks and Conditions	1-5
1.4.4 Honeywell Permit Required Tasks.....	1-5
1.5 Task Hazard Analysis	1-5
1.6 Environmental Impacts.....	1-5
2.0 Safety Management.....	2-1
3.0 Employee Empowerment	3-1
4.0 Roles and Responsibilities.....	4-1
4.1 JACOBS Staff Responsibilities.....	4-1
4.1.1 Project Manager	4-1
4.1.2 Program/Project Health and Safety Manager	4-2
4.1.3 Safety Coordinator.....	4-2
4.1.4 JACOBS Employees.....	4-3
4.2 JACOBS Employee Training, Medical Surveillance, & Drug Testing	4-4
4.2.1 Training	4-4
4.2.2 Medical Surveillance	4-5
4.2.3 Drug Testing	4-5
4.3 Organization Chart.....	4-6
4.4 JACOBS Subcontractors	4-7
4.5 Third Parties	4-8
4.6 Visitors.....	4-10
5.0 Hazard Controls and Safe Work Practices	5-1
5.1 Administrative Controls	5-1
5.1.1 HSE Plans.....	5-1
5.1.2 Activity Hazard Analysis	5-1
5.1.3 Safety Meetings	5-1
5.1.4 Self-Assessments	5-2
5.1.5 Site Compliance/ Audits	5-2
5.1.6 Safe Behavior Observation	5-2
5.2 Incident Reporting and Investigation	5-3
5.2.1 Definitions.....	5-3
5.2.2 Incident Notification and Communication	5-3
5.2.3 Incident Reporting.....	5-4

5.2.4	Incident Investigation.....	5-5
5.2.5	Corrective Actions	5-5
5.2.7	Injury Management – Injury Care for Employees (ICE)	5-5
5.3	Personal Protective Equipment.....	5-6
5.3.1	Types of Personal Protective Equipment	5-6
5.3.2	Contact Lenses.....	5-7
5.3.3	PPE Specifications.....	5-7
5.3.4	Reasons for Changing Level of Protection	5-8
5.4	Project-Specific Hazards and Controls	5-9
5.4.1	Benzene.....	5-9
5.4.2	Confined Space Entry	5-9
5.4.3	Groundwater Sampling/Water Level Measurements.....	5-10
5.4.4	Hand and Power Tools	5-11
5.4.5	Lockout/Tagout.....	5-12
5.4.6	Noise Hazards	5-13
5.4.7	Working Alone.....	5-15
5.4.9	Lifting	5-16
5.4.10	Pressure Washing Operations.....	5-17
5.5	General Hazards and Controls	5-17
5.5.1	General Practices and Housekeeping	5-17
5.5.2	Hazard Communication	5-18
5.5.3	Shipping and Transportation of Chemical Products	5-18
5.5.4	Fire prevention	5-19
5.5.5	General Fire Information	5-21
5.5.6	Electrical.....	5-22
5.5.7	Stairways and Ladders.....	5-23
5.5.8	Temperature Extremes	5-24
5.5.9	Backing Field Vehicles.....	5-31
5.5.10	Driving in Areas with Tall Grass/Brush	5-31
5.5.11	Tools.....	5-31
5.6	Biological Hazards and Controls.....	5-32
5.6.1	Poison Ivy and Poison Sumac	5-32
5.6.2	Ticks.....	5-32
5.6.3	Bees and Other Stinging Insects.....	5-32
5.6.4	Blood borne Pathogens	5-33
5.6.5	Mosquito Bites.....	5-33
5.6.6	Giant Hogweed	5-33
5.7	Chemicals of Potential Concern.....	5-34
5.8	Potential Routes of Exposure	5-37
6.0	Air Monitoring/Sampling	6-1
6.1	Air Monitoring Specifications	6-1
6.2	Calibration	6-2
6.3	Air Sampling.....	6-2
7.0	Decontamination.....	7-1
7.1	Contamination Prevention	7-1
7.2	Personnel and Equipment Decontamination.....	7-1
7.3	Decontamination During Medical Emergencies	7-2
7.4	Waste Collection and Disposal	7-2

7.5	Diagram of Personnel-Decontamination Line	7-2
8.0	Spill Containment Procedures	8-1
9.0	Site-Control Procedures	9-1
9.1	Site-Control Procedures	9-1
9.2	Remediation Work Area Zones.....	9-1
9.2.1	Support Zone	9-1
9.2.2	Contamination Reduction Zone.....	9-2
9.2.3	Exclusion Zone	9-2
9.2.4	Other Controlled Areas	9-2
10.0	Hazwoper Compliance Plan	10-1
11.0	Emergency Preparedness	11-1
11.1	Pre-Emergency Planning	11-1
11.2	Emergency Equipment and Supplies	11-1
11.3	Incident Response	11-2
11.4	Emergency Medical Treatment	11-2
11.5	Evacuation.....	11-3
11.6	Evacuation Signals.....	11-3
11.7	Inclement Weather.....	11-3
12.0	Recordkeeping.....	12-5

Tables

Table 1-1	Task Hazard Analysis.....	1-6
Table 1-2	Environmental Impacts Table.....	1-8
Table 5-1	PPE Specifications.....	5-7
Table 5-2	Chemicals of Potential Concern	5-35
Table 6-1	Air Monitoring Specifications	6-1
Table 7-1	Decontamination Procedures	Error! Bookmark not defined.
Table 8-1	Spill Kit Equipment List	Error! Bookmark not defined.
Table 12-1	Recordkeeping Requirements	12-5

Figures

Figure 1	Organization Chart.....	4-6
Figure 2	Incident Report Flow Chart.....	Error! Bookmark not defined.
Figure 3	First Aid Only Flow Chart.....	Error! Bookmark not defined.

Attachments

1	Employee Signoff Form
2	Activity Hazard Analysis
3	Daily Tailgate Safety Briefing Form
4	Pre-Task Safety Plan
5	Project Activity Self-Assessment Checklists
6	Safe Work Observation Form
7	Project-Specific Chemical Product Hazard Communication Form
8	Applicable Material Safety Data Sheets
9	Chemical-Specific Training Form
10	Biological Hazard Information
11	Drug Testing Hospital Kit Notice
12	Incident Report Form and Root Cause Investigation Information

Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	activity hazard analysis
AIHA	American Industrial Hygiene Association
APR	air-purifying respirator
cm	centimeter
CNS	central nervous system
COC	chemical of concern
CPR	cardiopulmonary resuscitation
dBA	decibel (A-weighted scale)
DEET	N,N-diethyl-meta-toluamide
DOT	Department of Transportation
ECC	Environmental Compliance Coordinator
GFCI	ground fault circuit interrupter
Hazwoper	Hazardous waste operations and emergency response
Honeywell	Honeywell International Inc.
HSE	health, safety, and environment
HSM	Health and Safety Manager
HSPM	Health and Safety Program Manager
IDLH	immediately dangerous to life and health
IRF	incident report form
LID	Legal and Insurance Department
NIOSH	National Institute for Occupational Safety and Health
NSC	National Safety Council
OM&M	Operations, Maintenance & Monitoring
OSHA	Occupational Safety and Health Administration
PCB	poly-chlorinated biphenyl
PEL	permissible exposure limit

PFD	personal flotation device
PIP	photoionization potential
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
PTSP	pre-task safety plan
RES	Remediation and Environmental Services
RQ	reportable quantity
SC	Safety Coordinator
SCBA	self-contained breathing apparatus
SDS	safety data sheet
SOP	standard of practice
SPCC	spill prevention, control, and countermeasures
SSR	Subcontractor Safety Representative
TLV	threshold limit value
TSDF	treatment, storage, and disposal facility

1.0 Introduction

Health, Safety and Environment (HSE) Policy



BeyondZero® Health, Safety & Environment (HSE) Policy

At Jacobs, we understand that Health, Safety and Environment (HSE) management is crucial to a sustainable business and we hold it as a core value – not just something we do, but who we are – at work, at home, and in the community.

Our goal is to create and sustain a safe and healthy work environment and to prevent injury and ill health for our employees, business partners, and the public, and to prevent harm to the environment.

We are committed to:

- Prevention of injury and ill health.
- Responsible use and protection of the environment.
- Continual improvement of our HSE management system, performance, and our BeyondZero® culture of caring
- Proactive engagement and participation by everyone in our HSE program.
- Compliance with legal and other requirements including HSE legislation and Jacobs Core Processes.

Effective implementation of our HSE Management System enables us to meet these commitments by:

- Ensuring HSE is an integral part of the business.
- Identifying and managing HSE risks arising from the business including our Critical Risks.
- Establishing clear objectives, monitoring performance, and taking action to improve.
- Informing and consulting with our employees and stakeholders on matters related to HSE.
- Ensuring employees are trained and competent and have the resources to work safely.

Finally, we will ensure leadership at all levels is responsible and held accountable for delivering on the commitments of this policy. We also expect our employees to understand their personal responsibilities and demonstrate a commitment to the goal of zero injuries and to the protection of the environment.

This policy is communicated to all employees and business partners and is available to the public and other interested parties. It is reviewed annually to ensure it is appropriate and relevant to Jacobs.

A handwritten signature in black ink, appearing to read "Steve Demetriou".

Steve Demetriou

Chairman and CEO

1.1 JACOBS Policy and Commitment

1.1.1 Safe Work Policy

It is the policy of JACOBS to perform work in the safest manner possible. Safety must never be compressed. To fulfill the requirements of this policy, an organized and effective safety program must be carried out at each location where work is performed.

JACOBS believes that all injuries are preventable, and we are dedicated to the goal of a safe work environment. To achieve this goal, every employee on the project must assume responsibility for safety.

Every employee is empowered to:

- Conduct their work in a safe manner;
- Stop work immediately to correct any unsafe condition that is encountered; and
- Take corrective actions so that work may proceed in a safe manner.

Safety, occupational health, and environmental protection will not be sacrificed for production. These elements are integrated into quality control, cost reduction, and job performance, and are crucial to our success.

1.1.2 Health and Safety Commitment

JACOBS has embraced a philosophy for health and safety excellence. The primary driving force behind this commitment to health and safety is simple: employees are JACOBS's most significant asset and JACOBS management values their safety, health, and welfare. Also, top management believes that all injuries are preventable. JACOBS's safety culture empowers employees at all levels to accept ownership for safety and take whatever actions are necessary to eliminate injury. Our company is committed to world-class performance in health and safety and also understands that world-class performance in health and safety is a critical element in overall business success.

JACOBS is committed to the prevention of personal injuries, occupational illnesses, and damage to equipment and property in all of its operations; to the protection of the general public whenever it comes in contact with the Company's work; and to the prevention of pollution and environmental degradation.

Company management, field supervisors, and employees plan safety into each work task in order to prevent occupational injuries and illnesses. The ultimate success of JACOBS's safety program depends on the full cooperation and participation of each employee.

JACOBS management extends its full commitment to health and safety excellence.

1.1.3 Project-Specific Health, Safety, and the Environment Goals

All management and employees are to strive to meet the project-specific Health, Safety, and the Environment (HSE) goals outlined below. The team will be successful only if everyone makes a concerted effort to accomplish these goals. The goals allow the project to stay focused on optimizing the health and safety of all project personnel and, therefore, making the project a great success.

The Project has established eleven specific goals and objectives:

- Create an injury-free environment;
- Have zero injuries or incidents;
- Provide management leadership for HSE by communicating performance expectations, reviewing and tracking performance, and leading by example;
- Ensure effective implementation of the HSP through education, delegation, and team work;
- Ensure 100 percent participation in HSE compliance;
- Continuously improve our safety performance;
- Maintain free and open lines of communication;
- Make a personal commitment to safety as a value;
- Focus safety improvements on high-risk groups;
- Continue strong employee involvement initiatives; and
- Achieve health and safety excellence.

1.2 About This Document

This Health, Safety and Environment (HSE) Plan will be kept on the site during all field activities conducted under the Honeywell International Inc. (Honeywell) Operations, Maintenance and Monitoring (OM&M) program. The plan will be reviewed on an annual basis by the Project Manager and Project Health and Safety Manager and amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the JACOBS *Health, Safety, and Environmental Protection (HSE) Program Manual and Management Systems*. In addition, this plan adopts procedures in the project Work Plan and incorporates applicable elements of Honeywell's HSE requirements. The Safety Coordinator (SC) is to be familiar with the SOPs contained in the HSE Program Manual and the contents of this plan. The Project Health and Safety Manager (PHSM) must review and approve any changes to this plan.

JACOBS personnel must sign the JACOBS Employee Sign-Off Form included in Attachment 1 after reading/reviewing this HSE Plan. Any changes to this plan sets forth the following actions: 1) Document changes 2) Update revision covered in morning safety meeting 3) Employees must sign off on changes acknowledging that they have reviewed the changes

1.3 Site Background

ALLTIFT LANDFILL

The Alltift Landfill Site is located in the southern portion of the City of Buffalo, Erie County, New York. The site is located south of Tifft Street, approximately 1,300 feet west of Hopkins Street and 5,000 feet east of the intersection of Tifft Street and Route 5. The landfill is approximately 25 to 30 acres in size, and triangular in shape with the surface rising about 30 feet above the surrounding topography. The 8.5 acre Ramco Steel Landfill is located immediately adjacent to the southern tip of the Alltift Landfill and is considered part of the site for purposes of this project.

The Alltift Landfill was operated by various entities from the 1930s until 1984 when Alltift Realty, Inc., ceased operations at the site. Until 1957, the site operated as a municipal landfill. After this time, the site was reportedly used for the disposal of materials containing naphthalene, monochlorobenzene, dye, oil, phenolic compounds, and other industrial and commercial wastes. Environmental investigations indicated that groundwater and the ponds adjacent to the site were impacted by the landfill. Contaminants of concern include metals, pesticides, polychlorinated biphenyls (PCBs), chlorinated solvents, and polynuclear aromatic hydrocarbons.

Remedial actions at the site, completed in late 2005, consisted of waste consolidation, landfill capping, wetlands restoration, and groundwater collection. The final landfill cover consists of, from the top down, a 6-inch layer of topsoil, a 24-inch layer of cover soil, a geonet composite drainage layer, a 40-mil linear low-density polyethylene geomembrane, a geonet composite gas venting layer, and a 6-inch geomembrane sub-base layer. A gravity-flow groundwater collection trench was constructed within the shallow aquifer along the western perimeter of the site. The trench and associated pumps convey water to the Buffalo Sewer Authority (BSA) for direct discharge.

BUFFALO OUTER HARBOR

The Buffalo Outer Harbor Site (Site No. 37971) is located in the southern portion of the City of Buffalo, Erie County, New York, at 910 Fuhrmann Boulevard. The property consists almost entirely of fill material, containing dredged harbor sediments, construction and demolition debris, as well as unknown quantities of casting sands, paint sludge and refuse from local automobile plants. The most significantly contaminated portion of the property is a 6-acre area near a radio tower at the southern end of the property. This area is considered the Buffalo Outer Harbor Site and was found to contain high levels of nitrobenzene and metals during environmental investigations. As a result, remedial actions, including in-situ chemical oxidation with soil stabilization, were completed in 2000. A cover of 2 feet of clean soil and topsoil was placed over the area and seeded with grass.

In 2005, a groundwater monitoring program was initiated to evaluate the performance of the remedial actions.

1.4 Description of Tasks

Refer to project documents (e.g., OM Manual or the project Work Plan) for detailed task information. A task hazard analysis has been performed for each task and is included below while project-specific hazard controls are provided in the next section. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Hazwoper Compliance Plan Section of this HSE Plan for procedures related to “clean” tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

1.4.1 Hazwoper-Regulated Tasks

The following tasks are regulated under the OSHA Hazwoper Standard - 29 CFR 1910.120.

Alltift Landfill site:

- System startup and/or shutdown
- Sample groundwater at lift station
- Clean water level sensors and floats

- Measure water levels in 2 offsite wells, 16 piezometers, 4 groundwater trenches, 2 relief trenches and the lift station sump – Measure pressure and gas monitoring points
- General site inspection
- Landfill gas vent monitoring
- Collect groundwater samples from monitoring wells
- Maintain and repair pumps and level controllers and system sensors
- Force main and collection trench line lancing
- Flow meter cleaning

Outer Harbor site:

- Groundwater sampling
- Inspection of capped area

1.4.2 Non-Hazwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel.

The following tasks are considered non-hazardous.

- Program auto-dialer
- Snow removal
- Mow landfill cap
- Perform minor repairs and seeding of landfill cap

1.4.3 Environmental-Regulated Tasks and Conditions

Project tasks and site conditions that could impact the environment are subject to environmental regulations. Section 1.5 covers Environmental impacts relating to each task or condition.

All personnel shall: (1) implement control measures described in Hazard Control Section; (2) obtain appropriate environmental training (e.g., Waste Management or Dangerous Goods Shipping) and (3) seek assistance from the regional Environmental Compliance Coordinator (ECC) for all environmental questions or issues.

1.4.4 Honeywell Permit Required Tasks

Not Applicable at this time. If the conditions change this HSE Plan will be updated

1.5 Task Hazard Analysis

Table 1-1 presents the hazard analysis for work to be conducted under this HSE Plan.

1.6 Environmental Impacts

Table 1-2 summarizes the potential environmental impacts of the work to be conducted under this HSE Plan.

Table 1-1 Task Hazard Analysis

Tasks																															
	Aerial Lifts	Back Injury (Bending/Lifting)	Biological Hazards	Buried Utilities	Cold Stress	Chemical Exposure	Confined Space Entry	Electrical	Elevated Work Areas/Falls	Entanglement	Excavations	Fires	Flying Debris/Objects/Splash	Gas Cylinders	Hand and Power Tools	Heat Stress	Heavy Equipment Exposure	Ionizing Radiation	Lockout-Tagout	Noise	Radio-Frequency Radiation	Respiratory Protection	Slips, Trips and Falls	Stairways and Ladders	Suspended Loads	Traffic Exposure	Vehicle Backing Exposure	Working Above or Near Water			
Operation and Maintenance																															
System Startup			X		X	X		X								X			X			X									
System Shutdown			X		X	X		X								X		X	X			X									
Collect/record system readings		X	X		X			X								X			X												
Collect lift station samples		X	X		X	X							X		X	X						X					X	X			
Measure pressure and gas monitoring points		X	X		X	X										X											X	X			
Inspect groundwater contingency trench pumps			X		X	X	X						X		X	X						X					X	X			
Inspect/maintain sump level sensors			X		X	X	X						X		X	X						X					X	X			
Inspect/clean flow meters and floats			X			X	X	X							X	X						X					X	X			
Gas and Groundwater Sampling/Monitoring																															
Calibrate equipment			X		X	X								X	X	X						X									
Collect groundwater levels		X	X		X	X							X		X	X						X					X	X			
Collect groundwater samples		X	X		X	X							X		X	X						X					X	X			

Tasks																													
	Aerial Lifts	Back Injury (Bending/Lifting)	Biological Hazards	Buried Utilities	Cold Stress	Chemical Exposure	Confined Space Entry	Electrical	Elevated Work Areas/Falls	Entanglement	Excavations	Fires	Flying Debris/Objects/Splash	Gas Cylinders	Hand and Power Tools	Heat Stress	Heavy Equipment Exposure	Ionizing Radiation	Lockout-Tagout	Noise	Radio-Frequency Radiation	Respiratory Protection	Slips, Trips and Falls	Stairways and Ladders	Suspended Loads	Traffic Exposure	Vehicle Backing Exposure	Working Above or Near Water	
Measure water levels		x	x		x	x							x		x	x							x					x	x
Monitor landfill gas at gas vents, near ground surface at four to six locations along the perimeter of the landfill, and at groundwater collection trench sumps.		x	x		x	x									x	x							x					x	x
Building and Grounds Maintenance																													
Mowing			x										x		x	x				x			x					x	x
Weed whacking			x										x		x	x				x			x						
Perform cap repairs and seeding		x	x		x						x		x		x	x	x						x					x	
Hand wicking of phragmites		x	x			x							x		x	x							x					x	x
Force Main Lancing		x	x		x	x				x		x	x		x	x				x			x				x	x	
Snow removal (plowing/shoveling)		x			x															x			x					x	

Table 1-2 Environmental Impacts Table**Table 1-2**

Environmental Impacts Table

Tasks/Conditions	Impacts						
	Air Pollution	Land Pollution	Land Disposal	Noise Pollution	Water Pollution	Resource Depletion	Human Hazard
Mowing or Clearing	X			X	X		X
O&M System	X	X			X		
Water (Waste or Storm) Stored or Discharged		X	X		X		X

2.0 Safety Management

JACOBS is committed to sound safety management principles that promote a culture where a zero accident philosophy is inherent to all phases of the project contract. The objective of safety management is to integrate Health Safety and Environmental protection into all work practices at all levels of the job task. The approach to a sound safety management program must include integrating safety into all aspects of the work. JACOBS will accomplish this approach by (1) ensuring that employees take complete ownership of the HSE Program and (2) involving employees in the work planning process, development of the HSE Program, and development and updating of procedures. The HSE program is tailored to JACOBS activities and is critical to the success of JACOBS. These programs are used as a resource to help accomplish our mission while integrating them into all levels of management and work practices to ensure the protection of workers, the public and the environment.

Safety leadership starts with the total commitment to safety at the corporate level and flows down to the JACOBS Project and/or Site Manager and on to all workers. With this commitment and culture, JACOBS will achieve excellence in all HSE areas. All project employees are empowered and required to make safety first a reality at each job task. It is imperative that employees take ownership of the HSE Program to obtain zero accidents and zero environmental issues. Our Project Manager is accountable for protecting the environment, safety and health of every worker on the project. The project in turn protects the safety and health of workers and the public by identifying, analyzing and mitigating hazards and implementing effective work practices. We will not compromise safety for the sake of any other objective.

3.0 Employee Empowerment

Employees are our most valuable asset, their safety is of vital concern. Each member of management is responsible for the safety of his or her employees. Each JACOBS employee and subcontract employee shall adhere to all HSE requirements. Employees have the right and responsibility to report unsafe acts and/or conditions and areas of concern and to interrupt or stop work without fear of reprisal. No employee will be asked to complete a task that the employee feels is unsafe or may endanger the environment. The intent of JACOBS is for employees to take complete ownership of the HSE Program.

4.0 Roles and Responsibilities

4.1 JACOBS Staff Responsibilities

4.1.1 Project Manager

The JACOBS project manager (PM) is responsible for providing adequate resources (budget and staff) for project-specific implementation of the HSE management process. The PM has overall management responsibility for the tasks listed below. The PM may delegate specific tasks to other staff, as described in sections that follow, but retains ultimate responsibility for completion of the following in accordance with this HSE Plan:

- Incorporate standard terms and conditions, and contract-specific HSE roles and responsibilities in the contract with the client.
- Budget for the appropriate level of HSE oversight during field activities. Contact the PHSM for budget requirements and guidelines.
- Manage the site and interface with third parties in a manner consistent with our contract and subcontract agreements and the applicable standard of reasonable care.
- Ensure that the overall, project-specific HSE goals are fully and continuously implemented.
- Ensure that JACOBS's SC is completing all duties outlined in this HSE Plan.
- Promoting a safety culture with onsite JACOBS personnel and setting the example for safe behavior.

The PM has the following additional responsibilities when subcontractors are hired:

- Incorporate standard terms and conditions, and contract-specific HSE roles and responsibilities in subcontract agreements (including flow-down requirements to lower-tier subcontractors).
- Select safe and competent subcontractors by implementing the JACOBS Subcontractor Management Program. This program includes the review of subcontractor pre-qualification questionnaires, training and medical monitoring records, and site-specific safety procedures prior to the start of subcontractor's field operations.
- Ensure that acceptable certificates of insurance, including JACOBS as named additional insured, are secured as a condition of subcontract award.
- Maintain copies of subcontracts and subcontractor certificates of insurance, bond, contractor's license, training and medical monitoring records, and project-specific HSE procedures in the project file accessible to site personnel.
- Provide adequate oversight of subcontractor HSE practices per the HSE Plan.

4.1.2 Program/Project Health and Safety Manager

The JACOBS Honeywell Program Health and Safety Manager (PHSM) are responsible to:

- Support the SCs oversight of HSE practices and interfaces with onsite third parties per the HSE Plan.
- Conduct audits, as necessary, to assess site conditions and review HSE program implementation.
- Assist the PM with HSE budget guidelines.
- Assist with program implementation as needed.

The PHSM has the following additional responsibilities when subcontractors are hired:

- Ensure that subcontractor pre-qualification questionnaires are reviewed and assist as applicable in the acceptance or rejection.
- Review and accept or reject subcontractor training records and site-specific safety procedures prior to start of subcontractor's field operations.
- Support the SCs oversight of subcontractor's (and lower-tier subcontractor's) HSE practices per the HSE Plan.

4.1.3 Safety Coordinator

The Safety Coordinator (SC) is responsible for verifying that the project is conducted in a safe manner including the following obligations:

- Verify that this HSE Plan is current. When project activities or conditions change inform the PHSM to make the appropriate amendments to the HSE Plan.
- Verify that JACOBS site personnel read this HSE Plan and sign the JACOBS Employee Sign-Off Form included in Attachment 1.
- Verify compliance with the requirements of this HSE Plan, applicable contractor health and safety plan(s) and any federal, state, and local regulations.
- Review and understand contractual obligations regarding HSE roles and responsibilities.
- Manage the site and interfacing with third parties in a manner consistent with our contract/subcontract agreements and the applicable standard of reasonable care.
- Ensure that programs are effectively functioning to prevent and control hazards on the project.
- Verify that all JACOBS employees working in the field have the appropriate level of HSE training, medical surveillance, and drug and alcohol testing for their job duties including required specialty training (e.g., fall protection, confined space entry) identified in the Hazard Controls and Safe Work Practices Section of this HSE Plan.
- Conduct an HSE orientation for all JACOBS team members prior to entering the project work areas and deliver field HSE training as needed based on project-specific hazards and activities.

- Maintain active and visible involvement using open communication with employees regarding safety issues on the project.
- Verify that safety meetings are conducted and document in the project file as needed throughout the course of the project (e.g., as tasks or hazards change).
- Attend Contractor safety meetings and ask questions about access to work areas, safety hazards, precautions and other general safety issues.
- Post required information onsite. An Occupational Safety and Health Administration (OSHA) job-site poster is required at sites where project field offices, trailers, or equipment-storage boxes are established. Contact the PHSM for posters.
- Maintain HSE records and documentation.
- Act as the project “Hazard Communication Coordinator” and perform the responsibilities outlined in the Hazard Communication section of this HSE Plan.
- Verify that project HSE forms, permits and self-assessment checklists are being used as outlined in this plan.
- Verify appropriate PPE use, availability, and training.
- Facilitate OSHA or other government agency inspections including accompanying inspector and providing all necessary documentation and follow-up.
- Report all incidents to the PHSM and/or the Honeywell HSPM immediately. Depending on the type and severity of incident, we may have to report it to Honeywell within hours of occurrence. The Honeywell HSPM will determine what needs to be reported, the timing of the reporting, and coordinate client notification so local and Corporate Honeywell personnel are appropriately notified.

The SC has the following additional responsibilities when subcontractors are hired:

- Verify that project files available to site personnel include copies of executed contracts and certificates of insurance, bond, contractor’s license, training, medical monitoring, and drug and alcohol testing records, and project-specific HSE procedures prior to start of subcontractor’s field operations.
- Verify that ongoing training, medical monitoring, and drug and alcohol testing requirements are being met (e.g., 8-hour refresher, random drug testing programs, etc).
- Perform oversight and/or assessments of subcontractor HSE practices per this HSE plan and verify that project activity self-assessment checklists have been completed (Attachment 5).

4.1.4 JACOBS Employees

All personnel are assigned responsibility for safe and healthy operations. This concept is the foundation for involving all employees in identifying hazards and providing solutions. For any operation, individuals have full authority to stop work and initiate immediate corrective action or control. In addition, each worker has a right and responsibility to report unsafe conditions/practices. This right represents a significant facet of worker empowerment and program ownership. Through shared values and a belief that all accidents are preventable, our

employees accept personal responsibility for working safely. Each employee is responsible for the following:

- Perform work in a safe manner without injury, illness or property damage.
- Perform work in accordance with company policies, and report near misses, injuries, illnesses, and unsafe conditions.
- Report all incidents, including near misses, immediately to supervisor and file proper forms with a human resources representative. It is important to do incident notification immediately because, depending on the type of incident, we may be required to report to Honeywell within hours of the event.
- Report all hazardous conditions and/or hazardous activities immediately to the Project Lead for corrective action.
- Intervene when an unsafe behavior and/or condition is observed.
- Complete an HSE orientation prior to being authorized to enter the project work areas.
- Inspect assigned PPE to ensure the absence of defects and proper function.

4.2 JACOBS Employee Training, Medical Surveillance, & Drug Testing

4.2.1 Training

All new staff reporting to the project site will receive safety indoctrination by reviewing and discussing all subjects in this plan with the Safety Department or Supervisor. Safety indoctrination/training will be documented.

4.2.1.1 Mandatory Training

Employees assigned to this project will have the following minimum training.

- 40-hour hazardous waste operations training
- 3-day on-the-job experience
- 8-hour annual hazardous waste refresher training
- Fall Protection
- Confined Space
- DOT Hazmat (Dangerous goods shipping – JACOBS On-line module)
- Hazardous Waste Management Training (JACOBS On-line module)
- Employees who are in an onsite supervisor role will complete 8 hours of hazardous waste supervisor training
- Drug-Free Workplace training (when drug testing is required)
- Site-specific training/orientation

Employees must be trained to the chemicals that they may come in contact with and proper first aid if they are exposed to the chemical. The chemicals at this site are Arsenic, Benzene, Cadmium, Chlorobenzene, Chromium, Diesel Fuel, Gasoline, Lead, Motor Oil and Lubricating Oil, Naphthalene, Poly-Chlorinated Biphenyl, Toluene

- Employees designated as SC will also have completed a 8-hour safety coordinator-hazardous waste course. The safety coordinator training course meets the requirements of 29 CFR 1910.120 for on-site supervisor training. A SC must be present during all tasks performed in exclusion or decontamination zones.

4.2.1.2 Periodic HSE Training

Training will be provided as needed concerning safe work practices, the safe use of equipment, emergency procedures, emergency assistance notification procedures, accident prevention, the HSE plan and lessons learned to facilitate the accomplishment of the project in a safe and effective manner. Whenever evaluations identify a potential problem appropriate training will be performed.

4.2.1.3 Emergency Response Training Requirements

The SC and additional designated employees, as necessary, will be certified in first aid and CPR by the American Red Cross, or equivalent. At least one first aid/CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training. Additional training requirements are addressed in the specific hazard sections of this plan. All staff will be trained in proper use of fire extinguishers and evacuation procedures from the JACOBS facilities.

4.2.2 Medical Surveillance

Employees who perform work activities in the decontamination or exclusion zone shall be enrolled in and have a current medical clearance as required by the medical surveillance program for hazardous waste workers. Pregnant employees shall consult with the Corporate Consulting Physician prior to performing site activities and obtain a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork. Reference SOP 113 Medical Monitoring for additional information

4.2.3 Drug Testing

Drug testing is required for JACOBS employees working at Honeywell OM&M sites. Employees are required to pass an initial 5-panel drug screen and an alcohol screen two weeks prior to starting work. The staff also is required to enroll in a random testing program for the duration of work on Honeywell and will be subject to post-incident and "for cause" testing. JACOBS's drug testing policy meets Honeywell and Dow drug testing requirements.

Based on specific work activities/tasks, subcontractor personnel may be required to be drug and alcohol screened prior to conducting their field activities. Please contact the Honeywell Health and Safety Program Manager (HSPM) for details and to determine if subcontractor personnel require drug testing.

Refer to JACOBS HSE SOP-113, Medical Surveillance, SOP-110, Training, and SOP-105, Drug-Free Workplace, for additional information.

4.3 Organization Chart

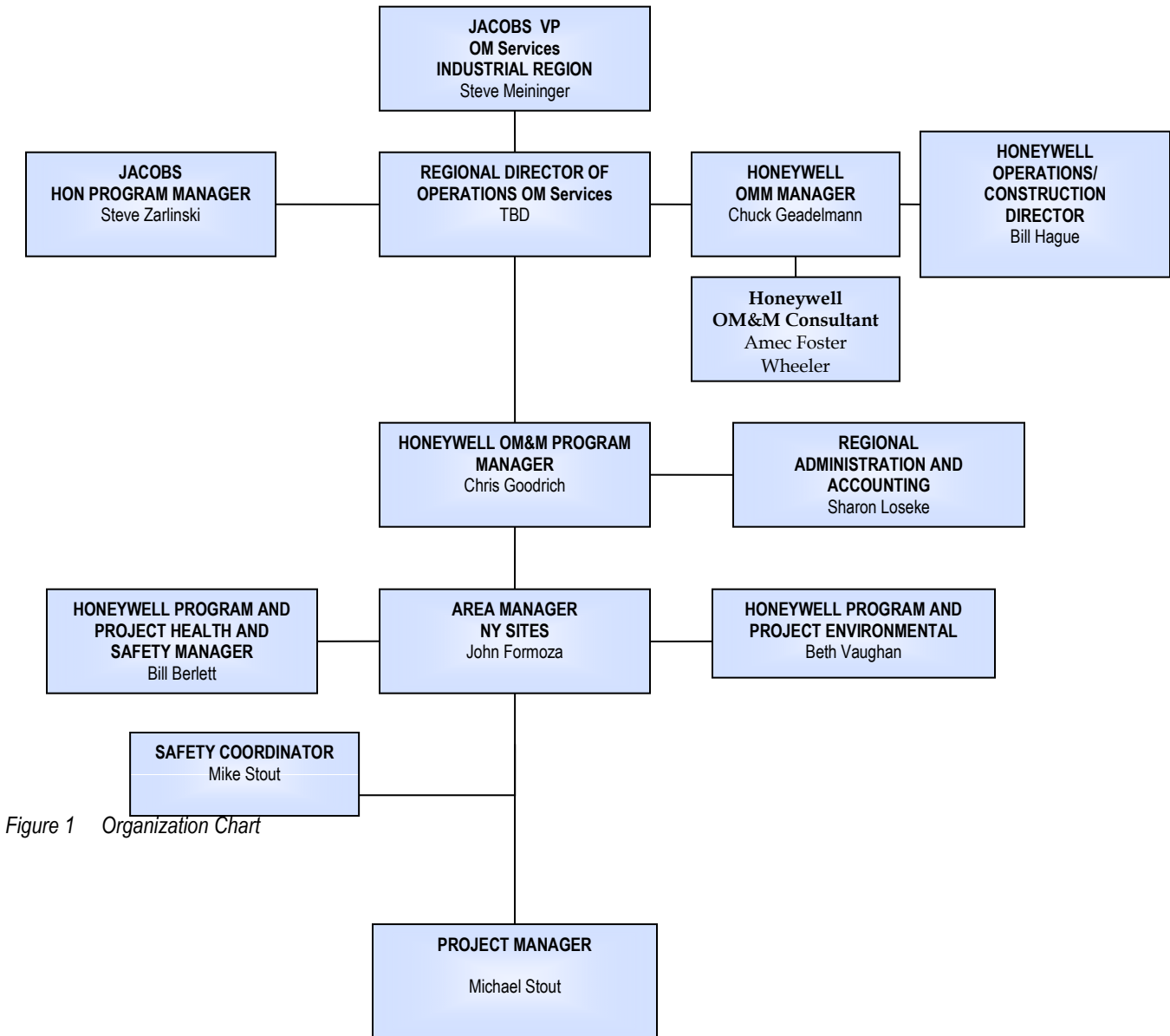


Figure 1 Organization Chart

Honeywell
Buffalo OM&M
JACOBS Program Organization

4.4 JACOBS Subcontractors

The table(s) below lists the name of each subcontractor, the subcontractor safety representative, and a description of the subcontracted activities to be performed at the site.

Subcontractor	Arrow Contracting Incorporated
---------------	--------------------------------

Subcontractor Safety Rep	John Bumpus
--------------------------	-------------

Subcontractor Onsite Tasks	Brush Hog
----------------------------	-----------

Subcontractor	Sun Environmental
---------------	-------------------

Subcontractor Safety Rep	Matt Notaro
--------------------------	-------------

Subcontractor Onsite Tasks	Solids removal from sump
----------------------------	--------------------------

Subcontractor	Op-Tech
---------------	---------

Subcontractor Safety Rep	Bill Hunter
--------------------------	-------------

Subcontractor Onsite Tasks	Solids removal from sump
----------------------------	--------------------------

The subcontractors work to their Health and Safety Plan and/or Activity Hazard Analyses (AHAs). The subcontractors Health and Safety Plan and/or AHAs must address hazards associated with the tasks and equipment for which the subcontractors are engaged (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit a copy of their Health and Safety Plan and/or AHAs to JACOBS for review. The subcontractors Health and Safety Plan and/or AHAs must be reviewed prior to the start of field work. The JACOBS SC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established HSE Plan(s). JACOBS's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

JACOBS team members should endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observation of hazards or unsafe practices that are both readily observable and occur in common work areas. JACOBS is not responsible for exhaustive observation for hazards and unsafe practices. The SC or PM is responsible for confirming subcontractor performance against both the subcontractor's task specific safety procedures and applicable self-assessment checklists, as provided in Attachment 5.

HSE related communications with JACOBS subcontractors should be conducted as follows:

- Request subcontractor(s) to brief project team on the hazards and precautions related to their work.
- When non-compliant or unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliant or unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected personnel, notify subcontractor safety representative, stop affected work until adequate corrective measures are implemented, and notify the Project Manager, PHSM, and SC as appropriate.
- Document all verbal HSE related communications in project field logbook, daily reports, or other records.

Subcontractors are responsible to:

- Comply with all local, state, and federal HSE standards and project/owner HSE requirements.
- Provide a qualified subcontractor safety representative (SSR) to oversee the subcontractor activities and conduct safety inspections for their work.
- Conduct site-specific orientations for all subcontractor employees.
- Actively participate in the project HSE program and attend all required safety meetings.
- Meet training, medical monitoring, and drug and alcohol testing requirements for their staff.
- Intervene when they observe unsafe behaviors and/or conditions.
- Maintain equipment and supplies necessary to complete activities in a safe manner.
- Notify the JACOBS SC of any injury or incident, including near-misses, immediately and submit reports to JACOBS within 24 hours. Additionally, all incidents must be reported to the PHSM and Honeywell HSPM immediately so we can meet Honeywell's incident reporting requirements.

Refer to JACOBS HSE SOP-215, Contracts, Subcontracts, and HSE Management Practices, for additional information.

4.5 Third Parties

The table(s) below lists the name of each third party, the third party safety representative, and a description of the third party activities being performed at the site which have the potential to impact JACOBS's activities.

Third Party	Amec Foster Wheeler
Third Party Safety Rep	Cindy Sundquist
Third Party Onsite Tasks	Honeywell OM&M Consultant

This HSE Plan does not cover parties who do not have a contractual relationship with JACOBS. JACOBS is not responsible for the health and safety or means and methods of a third party's work, and we must never assume such responsibility through our actions (e.g., advising on HSE issues). In addition to this plan, JACOBS staff should review third parties' safety plans to be aware of appropriate precautions that apply to the company. Except in unusual situations when conducted by the PHSM, JACOBS must never comment on or approve a third party's safety procedures. Self-assessment checklists, provided in Attachment 5, are to be used by the SC to review the third party's performance ONLY as it pertains to evaluating JACOBS employee and subcontractor exposure and safety.

HSE related communications with third parties should be conducted as follows:

- Request the third party to brief JACOBS employees and subcontractors on the precautions related to the contractor's work.
- When an apparent third party's non-compliant or unsafe condition or practice poses a risk to JACOBS employees or subcontractors:
 - Notify the third party's safety representative
 - Request that the third party determine and implement corrective actions
 - If needed, stop affected JACOBS work until the third party corrects the condition or practice. Notify the client, Project Manager, and PHSM as appropriate.
- If apparent third party's non-compliant or unsafe conditions or practices are observed, inform the third party's safety representative. JACOBS's obligation is limited strictly to informing the third party of the observation – the third party is solely responsible for determining and implementing necessary controls and corrective actions.
- If an apparent imminent danger is observed, immediately warn the third party's employee(s) in danger and notify the third party's safety representative. JACOBS's obligation is limited strictly to immediately warning the affected individual(s) and informing the third party of our observation – the third party is solely responsible for determining and implementing necessary controls and corrective actions.
- Document all verbal HSE related communications in project field logbook, daily reports, or other records.

Refer to JACOBS HSE SOP-215, Contracts, Subcontracts, and HSE Management Practices, for additional information

4.6 Visitors

The JACOBS sites on occasionally have visitors, to ensure their safety, visitors must be briefed on site safety policies.

At a minimum they must be briefed on the following:

- Sign in
- Informed of exit routes and assembly areas in case of an emergency
- Informed of all hazards that they may be exposed and how to properly protect themselves.
- Provided proper PPE for on site visit.
- ***Visitors are not allowed in areas that require respiratory protection unless approved by PM.

5.0 Hazard Controls and Safe Work Practices

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. JACOBS employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. JACOBS employees and subcontractors who do not understand any of these provisions should contact the SC for clarification. In addition to the hazard controls specified in this section, the following are required for Honeywell projects.

5.1 Administrative Controls

5.1.1 HSE Plans

JACOBS requires HSE plans for all field projects, and subcontractors are required to submit detailed Activity Hazard Analysis for their activities. The HSE plan provides a risk analysis of each task and identifies the potential hazards and control measures (including personal protective equipment (PPE) and air monitoring requirements) for each task.

5.1.2 Activity Hazard Analysis

An AHA is required by JACOBS for all tasks unless the PHSM specifically determines it is unnecessary. The AHA provides a step-by-step analysis of the activity being performed and identifies the equipment and control measures necessary to conduct the work safely. Each AHA must be reviewed and signed by the employee(s) immediately prior to conducting each task and periodically reviewed as necessary based on frequency of conducting the activity. The AHA can be a source of information for the daily safety meeting. Project-specific AHAs are provided in Attachment 2.

If an unknown hazard is recognized while performing the task, stop the work immediately. Evaluate the recognized hazard and find the safest way to continue the work. If assistance is needed, contact the SC. Once the hazard has been addressed, assign the proper PPE, the AHA is to be updated. All employees performing that task are required to review and sign off on the updated AHA prior to performing the work.

5.1.3 Safety Meetings

JACOBS requires that the PM or SC conduct daily safety meetings to discuss with the field team the task to be performed that day and the potential hazards and mitigation measure whenever there are two (2) or more site workers on site (including subcontractor workers). The safety meeting can be used to review the AHA with the team. A Daily Tailgate Safety Briefing Form is included in Attachment 3.

A Pre-Task Safety Plan (PTSP) must be developed each day prior to performing specific work tasks. Each member of the team performing the task must be included in the planning so all are aware of the task hazards and controls. A PTSP is required even if there is just one worker conducting activities. A copy of a PTSP is included in Attachment 4.

5.1.4 Self-Assessments

Project Activity Self-Assessment Checklists are contained in Attachment 5. These checklists provide a method of verifying compliance with established safe work practices, regulations, and industry standards pertaining to hazardous activities. The checklists can be used by any JACOBS employee who may be exposed to a hazardous activity or by the PTSL when providing oversight of a subcontractor performing a hazardous activity. Self-assessments shall be completed prior to subjecting JACOBS staff to hazardous operations for any reason. Self-assessment checklists should be completed initially when the work activity starts, then monthly (for hazard waste management – if applicable) thereafter as long as the work is being conducted.

If hazardous conditions exist or are apparent during the self-assessment, immediately stop the task being performed, notify the employees in the area and do not continue work in that area until the conditions are safe. If an imminent danger situation (immediately life threatening or capable of causing serious injury) exists, immediately stop work, warn all personnel in danger and notify the SC and if additional assistance is needed contact the Project Health and Safety Manager. Non-compliance issues identified during the self-assessment shall be immediately rectified. If corrective action assistance is required, the Project Health and Safety Manager should be contacted for guidance.

Any site-specific requirements outlined in this HSE Plan that are more stringent than those contained in the self-assessment checklists are to take precedence. The self-assessment checklists are based upon minimum regulatory compliance and some site-specific requirements may be more stringent. The self-assessment checklists, including documented corrective actions, shall be made part of the permanent project records and maintained by the PTSL.

5.1.5 Site Compliance/Audits

In order to ensure compliance with requirements contained in the Honeywell Remediation and Environmental Services (RES) Health and Safety Manual, Specification 01620, and Honeywell RES SOP-HS-10, audits will be conducted by a HSE professional every other year in accordance with Honeywell RES OM&M audit program.

5.1.6 Safe Behavior Observation

Safe Behavior Observations (SBOs) shall be conducted by SC or designee for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific HSE Plan and AHAs. SBOs are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. The SC or designee shall perform at least one SBO each site visit whenever there are two or more site workers on site for tasks/operations addressed in the project-specific HSP or AHA. Completed SBOs shall be submitted directly into the SBO Entry tool on the JACOBS HSE website periodically and to the Honeywell Program Health and Safety Manager at wberlett@jacobs.com.

5.2 Incident Reporting and Investigation

This section describes the notification and investigation requirements pertaining to a site incident. Refer to JACOBS HSE SOP-111, Incident Reporting and Investigation, for additional information.

5.2.1 Definitions

5.2.1.1 Incident

An incident is an undesired event that results or could have resulted in an injury, illness, damage to assets or environmental harm. The following events shall be considered incidents:

- Injury or illness to a JACOBS employee or JACOBS subcontractor employee
- Injury or illness to a third party that was caused by a JACOBS activity
- Hazardous substance exposure
- Damage to property or equipment
- Motor vehicle accident
- Fire or explosion
- Spill or release
- Environmental issue permit violation
- A “near-miss”

5.2.1.2 Near-Miss

A near-miss occurs when an intervening factor prevented an injury, damage to property, or environmental harm from occurring. Examples of near-miss situations include: a hard hat or other PPE prevented an injury, secondary containment or emergency shutoff prevented a spill, or an alert co-worker prevented an accident.

5.2.1.3 Serious Incidents

The PHSM and Legal and Insurance Department (LID) shall determine if an event should be considered as a serious incident after reviewing the initial incident facts. The general criteria for serious incidents include:

- Intervention by external emergency response organizations
- Hospitalization
- Spills and releases of hazardous substances exceeding the reportable quantity (RQ)
- Potential violations of law or regulation
- Estimated property damage in excess of \$500,000

5.2.2 Incident Notification and Communication

Injury Reporting

- If a JACOBS employee is injured immediately notify their group leader.
- Call the JACOBS Occupational Health Nurse

1-866-893-2514

- In case of emergency call 911.

Incident Notification and Reporting

- Upon any other project incident (fire, spill, near miss, death, etc.), immediately notify the PM and SC. Call the emergency beeper number if SC is unavailable.
- Notify and submit reports to client as required in contract.
- Serious Incidents must be reported in accordance with JACOBS Standard of Practice, *Serious Incident Reporting Process*, immediately. Serious incidents are those that involve any of the following:
 - Work related death, or life-threatening injury or illness of a JACOBS employee, subcontractor, or member of the public
 - Kidnap/missing person
 - Acts or threats of terrorism
 - Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage
 - Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment

All JACOBS and subcontractors' employees shall immediately report any incident in which they are involved to their Project Lead/Project Manager. The PM will contact the PHSM and/or the Honeywell HSPM immediately. Immediate reporting is critical, because there are certain types of incidents that must be reported to Honeywell within hours of occurrence. The Honeywell HSPM will help the team determine what needs to be reported to Honeywell, how quickly it needs to be reported to Honeywell, and who at Honeywell (local, corporate, etc) needs to be notified.

Incident communications regarding serious incidents (regardless of the party involved) shall be considered sensitive in nature and must be controlled in a confidential manner. Internal communications regarding a serious incident may be conducted with affected project, regional, and Market Group staff but must be kept to a minimum. Communication should be oral whenever possible. If e-mail communications are necessary they shall be sent as confidential emails following the procedure provided in section 6.2.2 of JACOBS HSE SOP-111, Incident Reporting and Investigation. A LID representative shall direct all internal and external communications, including internal incident reporting, agency reporting, client notification, and incident investigations.

5.2.3 Incident Reporting

The PM or the HSPM will be responsible to ensure that the incident is entered into Honeywell's event tracking system and an IRF is completed within 24 hours of any incident. The HSPM can assist with the requirements of entering information into Honeywell's event tracking system. JACOBS's requirements can be met by entering an electronic IRF directly into the IRF database. The electronic IRF is found on the JACOBS HSE web page under Tools and Forms>Electronic Tools and Forms. If unable to submit an IRF electronically, the SC shall complete the hardcopy IRF provided in Attachment 12 and fax the IRF to the human resources representative (for JACOBS employee injuries), the PM, or the PHSM (for all other incidents) for database entry. A copy of the hard-copy form should also be sent to the Honeywell HSPM. **An IRF for a serious incident shall not be initiated until directed by a representative of the LID.**

When additional or updated information becomes available that was not included in the original IRF, the PM shall forward such information to the human resources representative (for JACOBS employee injuries) or the PHSM (for all other incidents) so that the IRF may be

updated. Updates to IRF reports should also be sent to the Honeywell HSPM. JACOBS staff shall comply with all applicable statutory incident reporting requirements such as those required by Federal agencies (EPA, OSHA, etc) and local authorities.

In addition to internal JACOBS reporting, Honeywell has a separate reporting process (Event Tracker System) that may or may not be triggered depending upon the actual incident. The Honeywell HSPM will work with the program manager, PM, and Honeywell's RM to determine if an incident should be entered into Honeywell's Event Tracker system. Additional information regarding Honeywell's Event Tracker incident reporting process (HSER-1 Event Reporting – Adverse HSER/Security Events and HSEMS 701 Incident Investigation) can be found in Attachment 12.

5.2.4 Incident Investigation

Incident investigations are to be initiated and completed as soon as possible, but no later than 72 hours after the incident has occurred. The level and type of investigation will be determined by Honeywell and/or the Honeywell HSPM. **All serious incidents shall be investigated as directed by a representative of the LID.** The PHSM/ECC may conduct the investigation directly or may delegate this function to the SC or other party, depending on the extent of the incident and staff availability.

The Incident Investigation Guideline provided in Attachment 12 shall be followed when documenting an investigation. Typically, minor incident investigations will be completed by the PHSM/ECC by including the investigation facts in the IRF. The PHSM/ECC may require completion of a separate investigation report or the Root Cause Analysis Form for more extensive investigations. The PHSM/ECC shall ensure that the PM and SC are made aware of investigation findings and all corrective actions and shall verify that corrective actions are implemented to prevent further incidents.

5.2.5 Corrective Actions

All corrective actions recommended from the incident investigation report shall be implemented to prevent recurrence of the incident. The PM or SC should hold a review meeting to discuss the incident and the corrective actions. The responsible supervisors shall be assigned to carry out the corrective actions and shall inform the SC upon successful implementation of all corrective actions.

5.2.7 Injury Management – Injury Care for Employees (ICE)

(Reference JACOBS, SOP HSE-124, Injury Management)

5.2.7.1 Background

The Injury Management Program (ICE) has been established to provide orderly, effective and timely medical treatment and return-to-work transition for an employee who sustains a work-related injury or illness. It also provides guidance and assistance with obtaining appropriate treatment to aid recovery, keep supervisors informed of employee status, and to quickly report and investigate work-related injury/illnesses to prevent recurrence.

To implement the ICE Program successfully, supervisors and/or SC should:

- Ensure employees are informed of the ICE Program;

- Become familiar with the Notification Process (detailed below)

5.2.7.2 The Injury Management (ICE) Notification Process:

- Employee informs their supervisor.
- Employee calls the ICE Program toll free number 1855-328-6547 immediately and speaks with the Occupational Injury Nurse. This number is operable 24 hours per day, 7 days a week.
- Supervisor ensures employee immediately calls the ICE Program number. Supervisor makes the call with the injured worker or for the injured worker, if needed.
- Nurse assists employee with obtaining appropriate medical treatment, as necessary schedules clinic visit for employee (calls ahead, and assists with any necessary follow up treatment). The supervisor or SC accompanies the employee if a clinic visit is necessary to ensure that employees receive appropriate and timely care.
- Supervisor or SC completes the HITS entry or Incident Report Form immediately (within 24 hours) and forwards it to the Project Manager and PHSM.
- Nurse notifies appropriate JACOBS staff by e-mail (supervisor, Health & Safety, Human Resources, Workers' Compensation).
- Nurse communicates and coordinates with and for employee on treatment through recovery.
- Supervisor ensures suitable duties are identified and available for injured or ill workers who are determined to be medically fit to return to work on transitional duty (temporary and progressive).
- Supervisor ensures medical limitations prescribed (if any) by physician are followed until the worker is released to full duty.

5.3 Personal Protective Equipment

Each daily activity is to be assessed by the Supervisor when creating the AHA, which identifies potential risks and hazards. The Supervisor will conduct a pre-work safety meeting with the workers. If additional safety concerns are brought up they are to be addressed, and the supervisor will issue the appropriate PPE.

JACOBS work activities are conducted in many areas in which hazard are not able to be resolved by engineered, therefore, require the use of PPE by the employees. The information in this section provides general guidance on the use and requirements of PPE. Specific PPE requirements necessary to control the hazards identified for each job will be established as part of the job hazard analysis

5.3.1 Types of Personal Protective Equipment

Refer to each AHA for specific types of PPE required for each task. Table 5-1 provides a general set of requirements for PPE, but the AHA will be specific.

5.3.2 Contact Lenses

The National Society to Prevent Blindness points out that contact lenses do not provide eye protection in the industrial sense and must be worn only in conjunction with approved safety eyewear. In addition, identification of contact lens wearers should be ensured for appropriate emergency care and for protection in work areas hazardous to the eyes.

5.3.3 PPE Specifications

The PPE hazard assessment performed by the PHSM requires the following PPE for use during site activities. The PPE required by the table will be evaluated periodically by the SC to ensure the adequacy based on air monitoring results or changes to expected site conditions. The SC shall coordinate all changes with the PHSM.

Refer to JACOBS HSE SOP-117, Personal Protective Equipment, and SOP-121, Respiratory Protection, for additional information.

PPE requirements for the project are summarized in Table 5-1.

Table 5-1 PPE Specifications

TABLE 5-1
PPE Specifications ^a

General Routine OM&M Task	Level	PPE	Head	Respirator ^b
Collect Ground water samples	D	Work clothes; steel-toe, leather work boots; double layer nitrile gloves	Hardhat ^c Safety glasses Ear protection ^d	None required
System startup/shutdown	D	Work clothes; steel-toe, leather work boots; nitrile gloves if touching potentially contaminated equipment – leather work gloves as necessary such as when using a hand/power tool	Hardhat ^c Safety glasses Ear protection ^d	None required
Inspect landfill and repair/reseed as necessary	D	Work clothes; steel-toe, leather work boots; leather work gloves as appropriate (i.e., when handling hand/power tools)	Hardhat ^c Safety glasses Ear protection ^d	None required
Measure water levels for on-site and off-site wells and trenches	D	Work clothes; steel-toe, leather work boots; nitrile gloves if touching potentially contaminated equipment	Hardhat ^c Safety glasses Ear protection ^d	None required
Mowing	D	Work clothes; steel-toe, leather work boots; leather work gloves as appropriate	Hardhat ^c Safety glasses Ear protection ^d	None required
Monitor landfill gas vents	D	Work clothes; steel-toe, leather work boots; nitrile gloves if touching potentially contaminated equipment – leather work gloves as necessary	Hardhat ^c Safety glasses Ear protection ^d	None required
Inspect, clean, change system sensors/controls	D	Work clothes; steel-toe, leather work boots; nitrile gloves if touching potentially contaminated equipment – leather work gloves as necessary	Hardhat ^c Safety glasses Ear protection ^d	None required

TABLE 5-1
PPE Specifications ^a

General Routine OM&M Task	Level	PPE	Head	Respirator ^b
Pump repair or replacement	D	Work clothes; steel-toe, leather work boots; nitrile gloves if touching potentially contaminated equipment or leather work gloves as appropriate – Add Tyvek™ or similar coverall to protect skin and clothing from potentially contaminated material	Hardhat ^c Safety glasses Ear protection ^d	None required
Work tasks that require upgrade	C	Coveralls: Polycoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Ear protection ^d Spectacle inserts	APR, full face, with cartridges.

Notes:

^a JACOBS will provide PPE only to JACOBS employees.

^b No facial hair that would interfere with respirator fit is permitted.

^c Hardhat and splash-shield areas are to be determined by the SC.

^d Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

^e Cartridge change-out schedule will be established by the PHSM and at a minimum shall be at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSE Plan, contact the PHSM.

5.3.4 Reasons for Changing Level of Protection

Reasons for upgrading or downgrading the level of PPE are provided below.

5.3.4.1 Upgrade

Potential reasons for upgrading PPE level are listed below. *Note: Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the PHSM, and a SC qualified at that level is present.*

- Request from individual performing tasks
- Change in work tasks that will increase contact or potential contact with hazardous materials
- Occurrence or likely occurrence of gas or vapor emission
- Known or suspected presence of dermal hazards
- Instrument action levels (Section 5) exceeded

5.3.4.2 Downgrade

Potential reasons for downgrading PPE level are listed below. All downgrading of PPE level must be approved by the SC.

- New information indicating that situation is less hazardous than originally thought
- Change in a site condition that decreases the hazard

- Change in work task that will reduce contact with hazardous material.

5.4 Project-Specific Hazards and Controls

The following sections describe potential hazards and control measures that may be encountered during site activities.

5.4.1 Benzene

(Reference JACOBS SOP HSE-503, *Benzene*)

Benzene is considered a “Confirmed Human Carcinogen.” JACOBS is required to control employee workplace exposure to benzene when personal exposures is at or above 0.5 parts per million (ppm) as an 8-hour time-weighted average (TWA) or above 5.0 ppm short term exposure limit (STEL), by implementing a program that meets the requirements of the OSHA Benzene standard, 29 CFR 1910.1028. The elements of the JACOBS benzene program include the following:

- Exposure monitoring;
- Methods of control, including personal protective equipment (PPE) and respirators;
- Medical surveillance;
- Training on hazards of benzene and control measures (includes project-specific training and the computer-based training on JACOBS’s Virtual Office, *Benzene*); and
- Record keeping requirements.
- If air monitoring indicates there is potential exposure at the action level concentrations above, notify the RHSM to ensure the above have been adequately addressed. Other exposure control measures include:
 - Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met;
 - Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas;
 - Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person; and
 - Review the fact sheet included as an attachment to this HSP.

5.4.2 Confined Space Entry

The following requirements must be met prior to confined space entry:

- Confined space entrants, attendants and entry supervisors must complete the Confined Space Entry training.
- A Confined Space Entry Permit (CSEP), Alternative Procedure Certificate (APC) or Non-permit Certificate (NPC) must be completed and posted near the space entrance point for review.
- Each confined space entrant and attendant must attend a pre-entry briefing conducted by the entry supervisor.

- Each confined space entrant and attendant must verify that the entry supervisor has authorized entry and that all permit or certificate requirements have been satisfied.
- Only individuals with current training and Entry Supervisor Approval are permitted to enter the space.
- Each confined space entrant and attendant must verify that atmospheric monitoring has been conducted at the frequency specified on the permit or certificate and that monitoring results are documented and within acceptable safe levels

The following requirements must be met during confined space entry:

- Communication must be maintained between the attendant and entrants to enable the attendant to monitor entrant status
- Employee must be trained on non-entry rescue procedures and tied off by a restraint lanyard or retrieval device
- Entrants must use equipment specified on the permit or certificate accordingly.
- All permit or certificate requirements must be followed.
- Entrants must evacuate the space upon orders of the attendant or entry supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized.
- Entrants and attendants must inform the entry supervisor of any hazards confronted or created in the space or any problems encountered during entry

All subcontractors of JACOBS who will be conducting CSE activities are to implement all required regulations. They are required to submit a complete plan of the CSE activity to the assigned JACOBS Supervisor overseeing their activities. This plan must be submitted at least 3 days prior to the date of activity. It must include a list of personnel involved, training verification documents, CSE permit (if needed) or Alternative Procedure Certificate or Non-permit Certificate, a description of the proposed activities and PPE required. The subcontractor will forward these documents to the PHSM for review. Approval to commence work will be granted if all documents are found to be complete and in compliance with all regulatory requirements. If at any time during activity, the JACOBS Supervisor feels that there is an imminent danger to workers, the subcontractor will be requested to stop work and the activity re-evaluated for appropriate corrective actions.

Refer to JACOBS SOP HS-203, Confined Space Entry, for additional information.

5.4.3 Groundwater Sampling/Water Level Measurements

Below are the hazard controls and safe work practices to follow when personnel or subcontractors are performing groundwater sampling and/or water level measurements.

- Full coolers are heavy. Plan in advance to have two people available at the end of the sampling effort to load full coolers into vehicles. If two people won't be available use several smaller coolers instead of fewer large ones.
- Wear the appropriate PPE when sampling, including safety glasses, nitrile gloves, and steel toe boots (see PPE section of this HSP).
- Monitor headspace of wells prior to sampling to minimize any vapor inhalation (refer to the "Site Monitoring" section of this HSP).
- Use caution when opening well lids. Wells may contain poisonous spiders and hornet or wasp nests.

- Use the appropriate lifting procedures (see JACOBS SOP HSE-112) when unloading equipment and sampling at each well.
- Avoid sharp edges on well casings.
- If dermal contact occurs with groundwater or the acid used in sample preservation, immediately wash all affected skin thoroughly with soap and water.
- Avoid eating and drinking on site and during sampling.
- Use ear plugs during sampling if sampling involves a generator.
- Containerize all purge water and transport to the appropriate storage area.
- Use two people to transport full coolers/containers whenever possible. If two people are not available use a dolly to move coolers. If the coolers weigh more than 40 pounds Attachment 1 of the HSE-112, *Manual Lifting*, shall be completed by the SC. If the coolers weigh more than 50 pounds they should never be lifted by one person.

5.4.4 Hand and Power Tools

(Reference JACOBS, SOP HSE-210, *Hand and Power Tools*)

Below are the hazard controls and safe work practices to follow when personnel or subcontractors are using hand and power tools. Ensure the requirements in the referenced SOP are followed:

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service;
- Hand tools will be used for their intended use and operated in accordance with manufacturer's instructions and design limitations;
- Maintain all hand and power tools in a safe condition;
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool;
- Do not carry or lower a power tool by its cord or hose;
- Portable power tools will be plugged into GFCI protected outlets;
- Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated;
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters);
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed;
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials;
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications;
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.); and

- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

Machine Guarding

- Ensure that all machine guards are in place to prevent contact with drive lines, belts, chains, pinch points or any other sources of mechanical injury.
- Unplugging jammed equipment will only be performed when equipment has been shut down, all sources of energy have been isolated and equipment has been locked/tagged and tested.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.

5.4.5 Lockout/Tagout

Reference JACOBS SOP HSE-310, *Lockout and Tagout*)

Lockout/tagout (LO/TO) shall be performed whenever service or maintenance is necessary on equipment that could cause injury to personnel from the unexpected equipment energizing or start-up or unexpected release of stored energy. Energy sources requiring lockout/tagout may include electrical, pneumatic, kinetic, and potential.

If work on energized electrical systems is necessary – contact the RHSM. Specific training and procedures are required to be followed before any work on energized electrical systems can be performed and are NOT covered in this section. Energized electrical work is defined as work performed **on or near** energized electrical systems or equipment with exposed components operating at 50 volts or greater. Working near energized live parts is any activity inside a Limited Approach Boundary (anywhere from 3.5 feet to 24 feet [1 meter 7.3 meters] depending on voltage). Examples of energized electrical work include using a voltmeter to troubleshoot electrical systems and changing out controllers.

When lockout/tagout is necessary to perform maintenance/repair of a system, all the requirements of SOP HSE-310, Lockout and Tagout, shall be met including the following bulleted items:

- When JACOBS controls the work, JACOBS must verify that subcontractors affected by the unexpected operation of equipment develop a written lockout/tagout program, provide training on lockout/tagout procedures and coordinate its program with other affected subcontractors. This may include compliance with the owner or facility lockout/tagout program.
- When JACOBS personnel are affected by the unexpected operation of equipment they must complete the electrical safety awareness module on the VO. Authorized personnel shall inform the affected personnel of the LO/TO. Affected personnel shall not tamper with LO/TO devices.

- Standard lockout/tagout procedures include the following six steps: 1) notify all personnel in the affected area of the lockout/tagout, 2) shut down the equipment using normal operating controls, 3) isolate all energy sources, 4) apply individual lock and tag to each energy isolating device, 5) relieve or restrain all potentially hazardous stored or residual energy, and 6) verify that isolation and deenergization of the equipment has been accomplished. Once verified that the equipment is at the zero energy state, work may begin.
- All safe guards must be put back in place, all affected personnel notified that lockout has been removed and controls positioned in the safe mode prior to lockout removal. Only the individual who applied the lock and tag may remove them.
- JACOBS authorized employees shall complete the LO/TO training module on the VO and either the electrical safety training module on the VO or 10-hour construction training. The authorized employee must also be trained and qualified on the system they are working on (e.g., qualified electrician for working on electrical components of a system).
- When equipment-specific LO/TO procedures are not available or when existing procedures are determined to be insufficient, JACOBS authorized employees shall also complete the Equipment-Specific LO/TO Procedure Development Form, provided as an attachment to this HSP, to create an equipment-specific lockout/tagout procedure.

5.4.6 Noise Hazards

Generally, noise levels that can cause interference with verbal communication when people are only a few feet away from each other may be high enough to produce a risk to hearing.

Hearing Conservation Program

JACOBS Hearing Conservation Program requires an employee's occupational exposure to noise to be maintained below the OSHA Permissible Exposure Limit (PEL) through the use of engineering controls, administrative controls and PPE.

Exposure Limits

JACOBS uses the OSHA PEL for determining employee noise exposures and for complying with OSHA's Hearing Conservation Amendment to the Occupational Noise Exposure regulation. The OSHA PEL for an 8-hour Time Weighted Average (TWA) is 90 dB. Generally, this is the maximum noise level that employees may be exposed to without hearing protection during an 8-hour work shift. OSHA requires implementation of noise exposure controls at exposures at or above the OSHA 8-hour TWA action limit of 85 dB. Exposure controls include participation in a Hearing Conservation Program, including audiometric testing and training. Furthermore, OSHA requires that the employee be offered hearing protection.

Hearing Loss and Audiograms

Exposure to high noise levels may cause hearing loss that can be temporary or permanent. Temporary hearing loss, or auditory fatigue, may occur after a few minutes of exposure to excessive noise levels, but normal hearing is recovered after a short period of time away from the noise. Permanent hearing loss may occur when exposure to high noise levels is repeated and the time away from the noise is limited. Hearing loss typically occurs in the frequency range of

3,000 to 6,000 hertz, and the affected person is usually unaware that initial hearing loss has occurred. Audiograms are conducted on potentially exposed employees to determine if any hearing loss has occurred.

Employees who are exposed to noise at or above the OSHA action level of 85 dB must have an initial baseline audiogram within 6 months of the start of the noise exposure and must have annual audiograms for the duration of the exposure. The HSE Manager tracks employees who may be exposed above the OSHA action level.

High Noise Area

The Supervisor or Safety Department identifies high noise areas and machinery by posting noise hazard warning signs. These signs identify the noise level and the total time allowed in the work area for personnel who are not wearing hearing protection. Employees who suspect they are working in an area or with machinery that may be generating high noise levels should contact the Supervisor or SC. The Supervisor or SC will evaluate the potential noise exposure, perform sound level measurements and/or post the appropriate noise hazard signs, as needed.

Hearing protectors must be designed and worn to control employee noise exposures to levels below the OSHA 8-hour TWA of 90 dB. Noise Reduction Ratings (NRRs) are assigned to all hearing protection devices and are usually displayed on the hearing protection package. The NRR is a method developed for estimating the adequacy of hearing protection attenuation. To calculate an employee's estimated noise exposure while wearing hearing protection, OSHA requires 7 dB to be deducted from the NRR as a safety margin. For example, if an employee is working in an area where the noise level is 95 dB and the selected hearing protection has an NRR of 29, then the estimated noise exposure would be calculated as follows:

- $(\text{Manufacturer's NRR of } 29) - (\text{OSHA safety margin of } 7 \text{ dB}) / 2 = \text{calculated noise protector attenuation of } 11 \text{ dB}$
- $(\text{Noise level of } 95 \text{ dB}) - (\text{calculated noise attenuation of } 11 \text{ dB}) = \text{estimated employee exposure of } 84 \text{ dB}$

The following hearing protection criteria must be met:

- Headband-type hearing protection must provide protection by insertion into the ear canal, allow wearing under the chin or behind the neck and must have NRRs of at least 22 while worn under the chin. Ear canal caps are unacceptable.
- Earmuffs must cover the entire ear and have an NRR of at least 22. In addition, earmuff headbands must be adjustable and the inner acoustical material must be removable for cleaning and sanitizing.

Nuisance Level Noise

Nuisance noise levels are not intense enough to cause occupational hearing loss, however, they may disturb or interfere with activities such as speech communication and telephone use. The Safety Department can assist in determining if noise levels may cause hearing loss.

Refer to JACOBS HSE SOP-108, Hearing Conservation Program, for additional information.

5.4.7 Working Alone

Working Alone refers to performing official duties at a work site unaccompanied by another JACOBS employee or other designated/identified person where worker assistance is not “readily available” in the event of injury, ill health or other emergency situation. Examples of JACOBS potential work alone operations include:

- Operations or facilities with only one person on the premises
- Employees who work separately in buildings, warehouses, treatment plants and laboratories.
- Workers who work outside of normal business hours and weekend.
- Mobile workers away from their fixed base such as engineers, sales representatives, drivers, maintenance and service workers

JACOBS employees will be required to complete training that supports their ability to safely work alone to include:

- a) Review and understanding of working alone hazards, control measures, emergency notification and work practices to follow as described in the hazard assessment
- b) Understanding of the operation of communication devices or personal monitors to maintain contact with designated personnel
- c) Other relevant training identified in the hazard assessment required to safely perform the work alone. (i.e., First Aid/CPR, Fire Extinguisher, etc.)

Employees are prohibited from working alone in the following situations:

- When entering any type of “confined space” as defined by 29 CFR 1910.146
- Working on systems requiring the use of Lockout/Tagout as defined by 29 CFR 1910.147
- Working on electrical systems with 480 volts or greater
- Working at unprotected heights requiring fall restraint or fall arrest systems as required in 29 CFR 1910 and 1926
- While operating any type of water craft or the potential for drowning exist
- Performing hazardous substance emergency response
- At any locations listed in a site-specific Health and Safety Plan where working alone is prohibited
- Working in excavations or trenches as defined in 29 CFR 1926, Subpart P
- Working with equipment capable of inflicting serious injury such as chainsaw.
- Working or contact with munitions or explosives
- Working in hot environments requiring heat stress work/rest ratios as defined by the American Conference of Governmental Industrial Hygienist
- Wearing air purifying respirators (APR) when the expected or known hazardous material concentration is above the PEL
- When wearing any type of air-supplied respiratory protective device, including but not limited to, self-contained breathing apparatus (SCBA) and airline respiratory systems and/or working in any area that is defined as an “immediately dangerous to life and/or health” (IDLH) atmosphere as defined by in 29 CFR 1910.134
- In situations where employees may have reason to believe that an unfriendly or hostile encounter could occur to include public interfaces

- Other operations prohibited by an Occupational Safety and Health Administration (OSHA) Regulation or other locations that have been identified by the either JACOBS 's or the client's safety personnel as prohibited from working alone

Reference Working Alone Directive for more information

5.4.9 Lifting

Loading and unloading materials (such as supplies, equipment and tools) presents a variety of hazards. These include cuts and abrasions from sharp objects, back injuries from poor lifting techniques, injuries from setting up and dismantling equipment, crushing injuries from falling or moving loads, pinch points and impacts between personnel and moving equipment or loads.

The following guidelines provide the proper lifting techniques that are essential to the prevention of back injuries:

- First, consider the size, shape and weight of the object to be lifted. Do not lift any object that weighs over 40 pounds without assistance. Use mechanical lifting devices or required assistance when lifting objects over the 40-pound limit. First choice should be to always use mechanical lifting equipment when possible
- Inspect the anticipated path to be taken by the lifter for slip, trip and fall hazards
- Face the load squarely, get a firm footing and spread your feet 12-14 inches apart. If possible, place one foot alongside the object being lifted
- Get as close to the load as possible. Bend the legs at the knees
- Keep the back as straight as possible. Tighten the abdominal muscles
- Straighten the legs from a bending position to raise the object
- Keep the load close to your body throughout the entire lifting procedure
- If it is necessary to turn, change foot position. Do not twisting body
- When the load is heavy or awkward to handle, use teamwork - lift slowly and evenly together
- Never carry a load that cannot be seen over or around
- When placing an object down, the legs are bent at the knees and the object lowered. This stance and position are identical to that for lifting
- When two or more workers are required to handle the same object, coordination is essential. Ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker will face the direction in which the object is being carried, if possible

When handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:

- Firmly grip the object and wear leather gloves if necessary
- Keep the hands and object free of oil, grease and water that might prevent a firm grip. Keep the fingers away from areas that could cause the fingers to be pinched or crushed, especially when setting the object down

Inspect the object for metal slivers, jagged edges, burrs and rough or slippery surfaces prior to lifting.

5.4.10 Pressure Washing Operations

Below are the hazard controls and safe work practices to follow when working around or performing pressure washing.

- Only trained, authorized personnel may operate the high-pressure washer.
- Follow manufacturer's safety and operating instructions.
- Inspect pressure washer before use and confirm deadman trigger is fully operational
- The wand must always be pointed at the work area.
- The trigger should never be tied down
- Never point the wand at yourself or another worker.
- The wand must be at least 42 inches (1.1 meter) from the trigger to the tip and utilize greater than 10 degree tips.
- The operator must maintain good footing.
- Non-operators must remain a safe distance from the operator.
- No unauthorized attachment may be made to the unit.
- Do not modify the wand.
- All leaks or malfunctioning equipment must be repaired immediately or the unit taken out-of-service.
- Polycoated Tyvek or equivalent, 16-inch-high steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves will be worn, at a minimum.

5.5 General Hazards and Controls

5.5.1 General Practices and Housekeeping

General "good housekeeping" practices include:

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness requires enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.

- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

Refer to JACOBS HSE SOP-209, General Practices, for additional information.

5.5.2 Hazard Communication

(Reference JACOBS HILL SOPs HSE-107, *Hazard Communication* and HSE-403, *Hazardous Material Handling*)

The hazard communication coordinator is to perform the following:

- Complete an inventory of chemicals brought on site by JACOBS HILL using the chemical inventory form included as an attachment to the project safety plan;
- Confirm that an inventory of chemicals brought on site by JACOBS HILL subcontractors is available;
- Request or confirm locations of safety data sheets (SDSs) from the client, contractors, and subcontractors for chemicals to which JACOBS HILL employees potentially are exposed;
- Before or as the chemicals arrive on site, obtain an SDS for each hazardous chemical and include on the chemical inventory sheet (attached to the project safety plan) and add the SDS to the SDS onsite notebook;
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly;
- Give employees required chemical-specific HAZCOM training using the chemical-specific training form included as an attachment to the project safety plan; and
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

5.5.3 Shipping and Transportation of Chemical Products

(Reference JACOBS HILL SOP HSE-417, *Hazardous Materials Transportation*)

The U.S. Department of Transportation (DOT) has specific regulations governing shipping of hazardous materials (also called dangerous goods). Chemicals brought to the site might be defined as hazardous materials by the U.S. DOT. Hazardous wastes that may be shipped offsite are also defined as hazardous materials by U.S. DOT. Other wastes may also be U.S. DOT hazardous materials. To confirm whether a material or a waste is a U.S. DOT hazardous material, check with the E&NM Waste Coordinator (Lisa Schwan/ATL), the project EM, or the JACOBS HILL Dangerous Goods Shipping Coordinators (Rob Strehlow/MKW).

All staff who affect shipment of hazardous materials, including receiving hazardous materials, preparing profiles or manifests, packaging hazardous wastes, labeling, or transporting hazardous materials by road, are called HazMat employees (note JACOBS HILL cannot

transport hazardous wastes by public road). HazMat employees must receive JACOBS HILL online training in shipping dangerous goods. JACOBS HILL's online Dangerous Goods Shipping course can be found on the JACOBS HILL HSSE website.

All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. If the material is a product that is being shipped (e.g., calibration gas), use the HazMat ShipRight tool on the JACOBS HILL virtual office (under Company Resources – Online Shipping). Contact the Dangerous Goods Shipping coordinators, the E&NM Waste Coordinator or the project EM for additional information.

49 CFR 172 requires that all hazmat employees be aware of potential transportation security concerns. Hazardous materials security is addressed in JACOBS HILL's Hazardous Materials SOP (HSE-403). The following points are provided as an overview of security measures to increase awareness of this important matter:

- It is essential that each employee understand the security risks involved with transporting hazardous materials;
- All transporters of hazardous materials must be prequalified by a Contracts Administrator who evaluate the carrier's safety rating, security measures, and employee screening procedures;
- When shipping hazardous materials, check driver credentials and ask about shipping details;
- When receiving a hazardous materials shipment, inspect packages for signs of tampering or damage to the contents. Verify the drivers and company information on the form with the driver; and
- If there is suspicious or unusual behavior (e.g., driver without credentials, evasive answers) or any discrepancies identified, do not offer or accept the shipment, and immediately notify the project manager or the RHSM.

Employees responsible for shipping hazard materials must also review the JACOBS HILL Transportation Security Plan (HSE-417 Appendix A).

5.5.4 Fire prevention

Fire prevention measures include the following:

- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.
- Fire prevention is the responsibility of every JACOBS employee. Awareness of ignition sources and flammable/combustible materials is the key to fire prevention. Good housekeeping, compliant electrical and mechanical equipment, proper use of engineering controls and protective equipment and adherence to all company policies and procedures are all essential requirements of the fire prevention system.
- Flammable substances are among the most common hazardous materials found in the workplace; however, the ability to vaporize, ignite, burn, or explode varies with the specific

type or class of substance. Prevention of fires and explosions requires knowledge of the flammability characteristics (limits of flammability, ignition requirements and burning rates) of combustible materials likely to be encountered under various conditions of use, as well as the appropriate procedures to use in handling such substances. JACOBS will provide support to fire department personnel in the development of pre-fire plans for the facilities and areas within the scope of work as requested.

- Internal combustion engines will not be permitted to operate in buildings unless authorized by the Supervisor, Project Manager, or Safety Department. All fuel storage areas and storage tanks must have written authorization. Marking and labeling of fuel tanks will meet the requirements of 29 CFR 1926.59. All heating devices and their locations must be inspected before use. Fueling areas and tanks will comply with all applicable National Fire Protection Association (NFPA) and OSHA requirements. Refueling will not take place inside buildings. Exceptions will be evaluated on a case-by-case basis and approved by the Safety Department.
- Flammable or combustible liquid storage will comply with NFPA 30 and OSHA 1926.152. All gas cans will be free of deformities and constructed of metal with self-closing lids and flame arresters. Fuel cans will be labeled for their contents. Fuel cans will not be transported in vehicle passenger enclosures (e.g., vans, truck cabs, inside vehicles). Fuel cans must be secured during transport. All equipment will be fueled through funnels or spouts to prevent spills.
- The following storage rules will apply:
 1. Flammable liquids stored in an open area will be kept to the minimum necessary for the work being done.
 2. Flammable liquids must be stored in containers approved for their storage.
 3. Flammable liquids must not be stored in a manner that blocks aisles or exits from the work area.
 4. Flammable liquids are to be stored away from heat sources and direct sunlight.
 5. Flammable liquids must be stored so that accidental contact with strong oxidizing agents (e.g., permanganates or chlorates) is avoided.
- The lower explosive limit (LEL) or lower flammability limit refers to the lowest concentration of fuel in air that will light if ignited. Limiting the concentration of hazardous material in a room to 10 percent of the LEL limit ensures that a neither toxic nor flammable environment can be created in any room.

Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 75 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. The area in front of extinguishers must be kept clear.

- Fire extinguishers will be placed as required by OSHA and NFPA in facilities, storage areas, vehicles and equipment. JACOBS will perform inspection of fire extinguishers as required by OSHA and NFPA and make inspection reports available to JACOBS management on request.
- Fire extinguishers are labeled according to their fire fighting proficiency and safety in extinguishing various types of fires. Use of the wrong type of extinguisher can endanger the user and cause the fire to worsen.
- Post "Exit" signs over exiting doors and post "Fire Extinguisher" signs over extinguisher locations.

- For ease of identification, labels (A, B, C or D) and, more recently, pictograms are used to indicate the type of fire on which the extinguisher is to be used. These are identified as follows:
 1. Type A - Ordinary Combustibles- Fires in paper, cloth, wood, rubber and many plastics require a water or dry chemical type extinguisher.
 2. Type B - Flammable Liquids- Fires in solvents and other flammable liquids require a dry chemical, Halon or carbon dioxide (CO₂) extinguisher.
 3. Type C - Electrical Equipment- Fires in wiring, fuse boxes, energized electrical equipment and other electrical sources require a dry chemical, Halon, or CO₂ extinguisher.
 4. Type D - Metals- Combustible metals such as magnesium and sodium require special extinguishers.
- Monthly inspections will be performed on all extinguishers supplied by JACOBS. Supervisors will check extinguishers supplied by the project in their work areas regularly for the following:
 1. Accessibility
 2. Charge gauge
 3. Physical damage
 4. Undergo a maintenance check each year
 5. Document inspections on tags affixed to the extinguishers located in the buildings

5.5.5 General Fire Information

- A flammable liquid does not burn, is the vapors from the liquid that burn. The rate at which different liquids produce flammable vapors depends on their vapor pressure. The degree of fire hazard also depends on the ability to form combustible or explosive mixtures with air. The LEL of the lower flammability limit refers to the lowest concentration of fuel in air that will light if ignited.
- The flash point is the lowest temperature, as determined by standard tests, at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid within the test vessel. Many common solvents and chemicals have flash points that are lower than room temperature.
- The ignition temperature (auto-ignition temperature) of a substance, whether solid, liquid, or gaseous, is the minimum temperature required to initiate or cause self-sustained combustion independent of the heat source.
- Spontaneous ignition or combustion takes place when a substance reaches its ignition temperature without the application of external heat. The possibility of spontaneous combustion should be considered, especially when materials are stored or discarded. Materials susceptible to spontaneous combustion include oily rags, dust accumulations, organic materials mixed with strong oxidizing agents (e.g., nitric acid, chlorates, permanganates, peroxides, and per sulfates), alkali metals (e.g., sodium and potassium), finely divided pyrophoric metals, and phosphorus.
- Several potential sources of sparks, flames, or heat in the workplace—open flames, static electricity, and heated surfaces—can ignite flammable substances. When flammable materials are being used, close attention should be given to all potential sources of ignition in the vicinity. The vapors of all flammable liquids are heavier than air and capable of traveling considerable distances. This possibility should be recognized, and special note

should be taken, of ignition sources at a lower level than that at which the substance is being used.

- Flammable vapors from massive sources, such as spillages, have been known to descend into stairwells and elevator shafts and ignite on a lower story. If the path of vapor with the flammable range is continuous, the flame will propagate itself from the point of ignition back to its source.
- Metal lines and vessels discharging flammable substances should be properly bonded and grounded to discharge static electricity. When nonmetallic containers (especially plastic) are used, the bonding can be made to the liquids rather than to the container.
- The basic precautions for the safe handling of flammable materials include the following:
 1. Flammable substances should be handled only in areas free of ignition sources.
 2. Flammable substances should never be heated by using an open flame. Preferred heat sources include steam baths, water baths, oil baths, heating mantels, and hot air baths.
 3. When transferring flammable liquids in metal equipment, static-generated sparks should be avoided by bonding and use of ground straps.
 4. Ventilation is one of the most effective ways to prevent the formation of flammable mixtures. An exhaust hood should be used whenever appreciable quantities of flammable substances are transferred from one container to another, allowed to stand in open containers, heated in open containers, or handled in any other way.
 5. When flammable liquids are withdrawn from a drum or when a drum is filled, both the drum and the other equipment must be individually electronically grounded and bonded to each other.
 6. Containers of flammable liquids will not be drawn from or filled within buildings unless provisions are made to prevent the accumulation of flammable vapors in hazardous concentrations.

5.5.6 Electrical

Electrical safety measures include:

- Only trained qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
 - Equipped with third-wire grounding.
 - Covered, elevated, or protected from damage when passing through work areas.
 - Protected from pinching if routed through doorways.
 - Not fastened with staples, hung from nails, or suspended with wire.

- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

Refer to JACOBS HSE SOP-206, Electrical, for additional information.

5.5.7 Stairways and Ladders

Safety guidelines pertaining to stairways and ladders include the following:

- Stairway or ladder is generally required when a break in elevation of 19 inches or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.
- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials
- Straight and extension ladders must be tied off to prevent displacement
- Ladders that may be displaced by work activities or traffic must be secured or barricaded
- Portable ladders must extend at least 3 feet above landing surface
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder
- Stepladders are to be used in the fully opened and locked position

- Users are not to stand on the top two steps of a stepladder nor are users to sit on top or straddle a stepladder
- Fixed ladders \geq 24 feet in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than six feet from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

Refer to JACOBS HSE SOP-214, Stairways and Ladders, for additional information.

5.5.8 Temperature Extremes

(Reference JACOBS SOP HSE-211, *Heat and Cold Stress*)

Each employee is responsible for the following:

Recognizing the symptoms of heat or cold stress;

Taking appropriate precautionary measures to minimize their risk of exposure to temperature extremes (see following sections); and

Communicating any concerns regarding heat and cold stress to their supervisor or SC.

5.5.8.1 Heat

Heat-related illnesses are caused by more than just temperature and humidity factors.

Physical fitness influences a person's ability to perform work under heat loads. At a given level of work, the more fit a person is, the less the physiological strain, the lower the heart rate, the lower the body temperature (indicates less retrained body heat—a rise in internal temperature precipitates heat injury), and the more efficient the sweating mechanism.

Acclimatization is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress. Acclimatization requires physical activity under heat-stress conditions similar to those anticipated for the work. With a recent history of heat-stress exposures of at least two continuous hours per day for 5 of the last 7 days to 10 of the last 14 days, a worker can be considered acclimatized. Its loss begins when the activity under those heat-stress conditions is discontinued, and a noticeable loss occurs after 4 days and may be completely lost in three to four weeks. Because acclimatization is to the level of the heat-stress exposure, a person will not be fully acclimatized to a sudden higher level; such as during a heat wave.

Dehydration reduces body water volume. This reduces the body's sweating capacity and directly affects its ability to dissipate excess heat.

The ability of a body to dissipate heat depends on the ratio of its surface area to its mass (surface area/weight). **Heat dissipation** is a function of surface area, while heat production depends on body mass. Therefore, overweight individuals (those with a low ratio) are more susceptible to heat-related illnesses because they produce more heat per unit of surface area than if they were thinner. Monitor these persons carefully if heat stress is likely.

When wearing **impermeable clothing**, the weight of an individual is not as important in determining the ability to dissipate excess heat because the primary heat dissipation mechanism, evaporation of sweat, is ineffective.

SYMPTOMS AND TREATMENT OF HEAT STRESS					
	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool—but not cold—water. Call ambulance, and get medical attention immediately!

Precautions

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°Fahrenheit (10 degrees Celsius [C]) to 60°Fahrenheit (F) (15.6 degrees C) should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons (7.5 liters) per day. Remind employees to drink water throughout their work shift.
- Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate to site work conditions by slowly increasing workloads; for example, do not begin site work with extremely demanding activities. Closely monitor employees during their first 14 days of work in the field.
- Supervisors and SCs must continually observe employees throughout the work shift for signs and symptoms of heat stress or illness. Employees must monitor themselves for heat stress as well as observe their co-workers.
- Effective communication must be maintained with employees throughout the work shift either by voice, observation, or electronic device.
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.

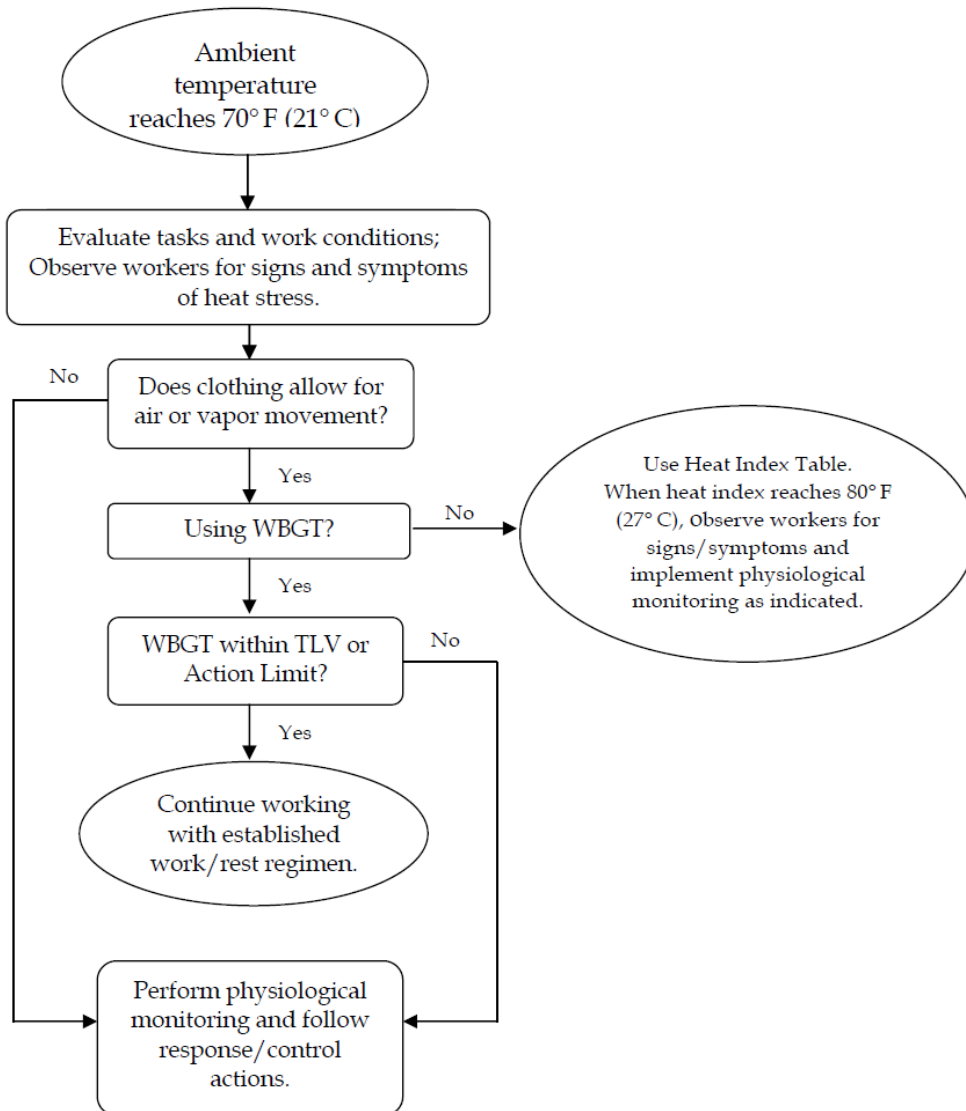
Provide adequate shade to protect personnel against radiant heat (sun, flames, hot metal).

- Use portable fans for convection cooling or in extreme heat conditions, an air-conditioned rest area when needed.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.
- Brief employees initially before the project work begins and routinely as part of the daily safety briefing, on the signs and symptoms, of heat-relatedness illnesses, precautions to measures and emergency procedures to follow as described in this plan.

Observe one another for signs of heat stress. PREVENTION and communication is key.

Thermal Stress Monitoring

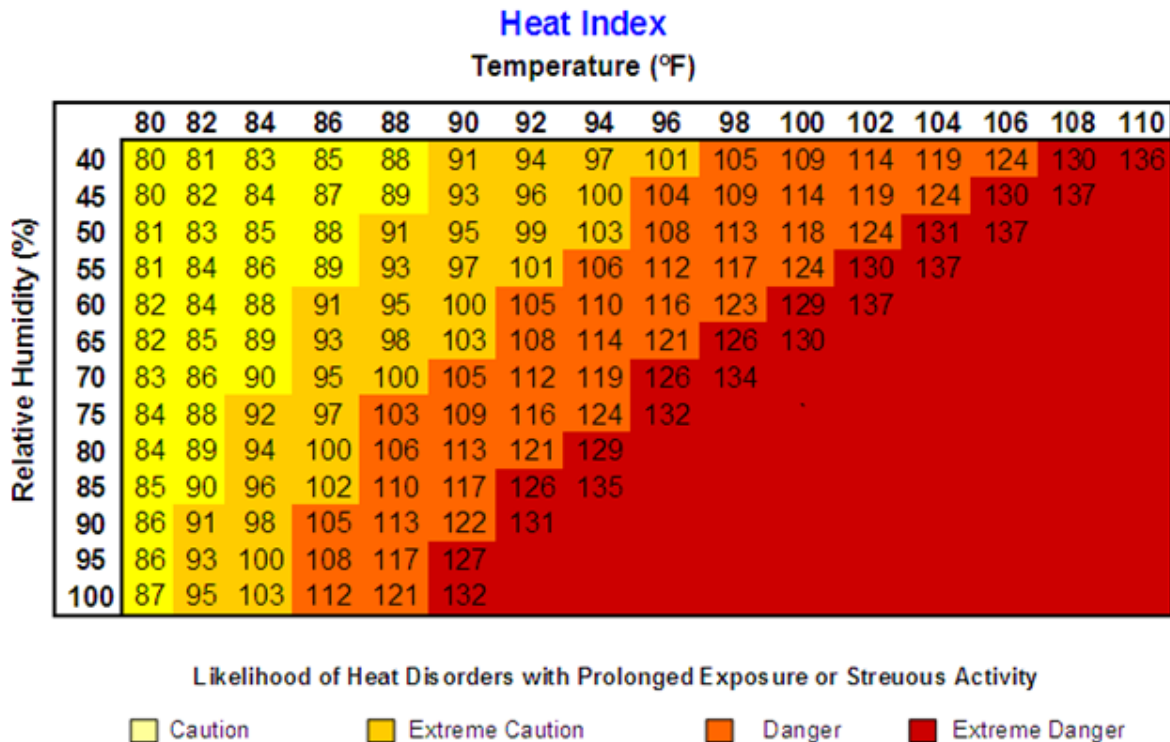
Thermal Stress Monitoring Flow Chart



Thermal Stress Monitoring – Permeable or Impermeable Clothing

When **permeable work clothes** are worn (street clothes or clothing ensembles over street clothes), regularly observe workers for signs and symptoms of heat stress and implement physiological monitoring as indicated below. This should start when the heat index reaches 80° F (27° C) [see Heat Index Table below], or sooner if workers exhibit symptoms of heat stress indicated in the table above. These heat index values were devised for shady, light wind conditions; exposure to full sunshine can increase the values by up to 15°F (8°C). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

When wearing **impermeable clothing** (e.g., clothing doesn't allow for air or water vapor movement such as Tyvek), physiological monitoring as described below shall be conducted when the ambient temperature reaches 70° F (21° C) or sooner when climatic conditions may present greater risk of heat stress combined with wearing unique variations of impermeable clothing, or workers exhibit symptoms of heat stress



Heat Index	Possible Heat Disorders	Minimum Frequency of Physiological Monitoring
80°F - 90°F (27°C - 32°C)	Fatigue possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline and observe workers for signs of heat stress and implement physiological monitoring if warranted.
90°F - 105°F (32°C - 41°C)	Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline, then at least every hour, or sooner, if signs of heat stress are observed.
105°F - 130°F (41°C - 54°C)	Sunstroke, heat cramps, or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.	Conduct initial monitoring as baseline, then every 30 minutes or sooner if signs of heat stress are observed.
130°F or Higher (54°C or Higher)	Heat/Sunstroke highly likely with continued exposure.	Conduct initial monitoring as baseline, then every 15 minutes or sooner if signs of heat stress are observed.

Source: National Weather Service

Physiological Monitoring and Associated Actions

For employees wearing permeable clothing, follow the minimum frequency of physiological monitoring listed in the Heat Index Table.

For employees wearing impermeable clothing, physiological monitoring should begin initially at a 15 minute interval, then if the employee's heart rate or body temperature is within acceptable limits, conduct the subsequent physiological monitoring at 30 minutes, and follow the established regimen protocol below.

The following physiological monitoring protocol below, using either radial pulse or aural temperature, will occur when the heat index is 80 degrees F or greater (or when personnel exhibit signs of heat stress), the following will be performed:

- The sustained heart rate during the work cycle should remain below 180 beats per minute (bpm) minus the individual's age (e.g. 180 – 35 year old person = 145 bpm). The sustained heart rate can be estimated by measuring the heart rate at the radial pulse for 30 seconds as quickly as possible prior to starting the rest period.
- The heart rate after one minute rest period should not exceed 120 beats per minute (bpm).
- If the heart rate is higher than 120 bpm after the FIRST minute into the rest period, the next work period should be shortened by 33 percent, while the length of the rest period stays the same.
- If the pulse rate still exceeds 120 bpm at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent.
- Continue this procedure until the rate is maintained below 120 bpm after the FIRST minute into the rest period.

- Alternately, the body temperature can be measured, either oral or aural (ear), before the workers have something to drink.
- If the oral or aural temperature exceeds 99.6° F (37.6 ° F) at the beginning of the rest period, the following work cycle should be shortened by 33 percent.
- Continue this procedure until the oral or aural (ear) temperature is maintained below 99.6 ° F (37.6° C). While an accurate indication of heat stress, oral temperature is difficult to measure in the field, however, a digital aural (aural) thermometer is easy to obtain and inexpensive to purchase.

Procedures for when Heat Illness Symptoms are Experienced

- **Always** contact the RHSM when any heat illness related symptom is experienced so that controls can be evaluated and modified, if needed.
- In the case of cramps, reduce activity, increase fluid intake, move to shade until recovered.
- In the case of all other heat-related symptoms (fainting, heat rash, heat exhaustion), and if the worker is a JACOBS worker, contact the occupational physician at 1-866-893-2514 and immediate supervisor.
- In the case of heat stroke symptoms, call 911, have a designee give location and directions to ambulance service if needed, follow precautions under the emergency medical treatment of this HSP.
- Follow the Incident Notification, Reporting, and Investigation section of this HSP.

5.5.8.2 Cold

General

Low ambient temperatures increase the heat lost from the body to the environment by radiation and convection. In cases where the worker is standing on frozen ground, the heat loss is also due to conduction.

Wet skin and clothing, whether because of water or perspiration, may conduct heat away from the body through evaporative heat loss and conduction. Thus, the body cools suddenly when chemical protective clothing is removed if the clothing underneath is perspiration soaked.

Movement of air across the skin reduces the insulating layer of still air just at the skin's surface. Reducing this insulating layer of air increases heat loss by convection.

Non-insulating materials in contact or near-contact with the skin, such as boots constructed with a metal toe or shank, conduct heat rapidly away from the body.

Certain common drugs, such as alcohol, caffeine, or nicotine, may exacerbate the effects of cold, especially on the extremities. These chemicals reduce the blood flow to peripheral parts of the body, which are already high-risk areas because of their large surface area to volume ratios. These substances may also aggravate an already hypothermic condition.

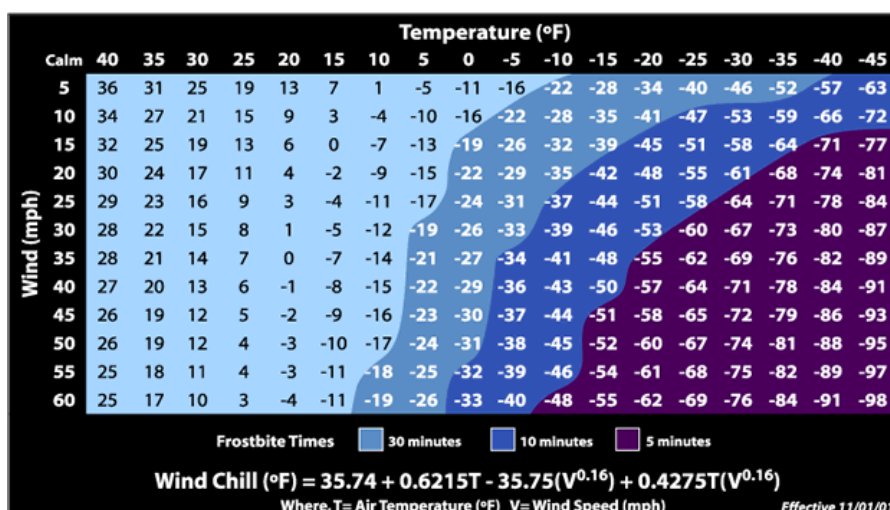
Precautions

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in wet weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index (below) is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- Persons who experience initial signs of immersion foot, frostbite, and/or hypothermia should report it immediately to their supervisor/PM to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm—but not hot—water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.



Wind Chill Chart



5.5.9 Backing Field Vehicles

The following precautions shall be implemented to prevent incidents during backing of field vehicles:

- Avoid backing whenever possible. The SC will be responsible for determining when “backing” is allowed. If extensive backing is required, alarms that sense when an object is close must be used
- If backing is required, there MUST BE a spotter. If a spotter is not available, the driver MUST walk completely around the vehicle before backing up
- When “backing” is likely to be a part of the activities, it must be discussed in the daily safety briefings to remind staff of the hazards and controls
- Learn vehicle’s blind spots

5.5.10 Driving in Areas with Tall Grass/Brush

Driving in areas with tall grass/brush can present a potential fire hazard if the grass/brush gets caught under and/or remains in contact with the vehicle exhaust system. Employees should exercise the following precautions:

- When stopping vehicle, ensure it is in an area where grass is not tall
- Do not leave vehicle idling once stopped
- When possible, try to drive through areas where grass is not tall or grass has been beaten down
- When driving, keep an eye out for fallen trees, rocks, and wells
- Ensure that a fire extinguisher is available for each vehicle
- Keep fire extinguisher readily available in passenger area of vehicle while driving
- Keep fire extinguisher outside of vehicle upon stopping
- Address fire hazards and controls in daily safety briefings as appropriate

5.5.11 Tools

All tools will be kept in good condition and properly stored. Tools will not be altered and they will be used only for their intended purposes and within the manufacturers’ guidelines. Guards will not be removed from tools and all nip points, open drums, and fly wheels will be guarded.

Power tools will be equipped with constant pressure switches that will shut the tool off when the switch is released. All power tools and electrical equipment will be double insulated or equipped with ground plugs.

All bench-mounted and floor-mounted tools will be secured. Bench-mounted grinders will be set up and operated according to 29 CFR 1926.303. Tools equipped with handles will have the handles installed. Cracked, splintered, or taped wooden handles will be replaced.

Impact tools will be free of mushroomed heads and cracks. Workbenches and sawhorses will be provided when needed. All cords, hoses and leads must be kept out of walkways and must be

strung 7 feet or more over walkways or along the sides of walkways. Cords, hoses and leads are not to be exposed to vehicle or equipment traffic unless protected. Cords, hoses, or leads must never be attached to the handrails of any type of man-lift, scissors-lift, or scaffold unless a breakaway attachment is used. Such equipment must never be supported by a conductive material or run through doorways, man-ways, or other wall or floor openings unless protected from damage. Any damage detected on cords, hoses and leads will require removal from the project. Repairs are not permitted.

5.6 Biological Hazards and Controls

5.6.1 Poison Ivy and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention. Additional information and photographs of each are provided in Attachment 10.

5.6.2 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permanone and spray skin with only DEET; and check frequently for ticks.

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Symptoms of tick-borne diseases include chills, fever, headache, fatigue, stiff neck, and bone pain. Other symptoms include:

- Lyme Disease - A rash might appear that looks like a bull's eye with a small welt in the center
- Rocky Mountain Spotted Fever - A rash of red spots may appear under the skin 3-10 days after the tick bite

If any of these symptoms appear, seek medical attention.

5.6.3 Bees and Other Stinging Insects

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

5.6.4 Blood borne Pathogens

Exposure to blood borne pathogens may occur when rendering first aid or cardiopulmonary resuscitation (CPR) or when cng into contact with landfill waste or waste streams containing potentially infectious material. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

Refer to JACOBS HSE SOP-202, Blood borne Pathogens, for additional information regarding exposure controls and PPE.

5.6.5 Mosquito Bites

Due to the recent detection of the West Nile Virus in the Southeastern United States it is recommended that preventative measures be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent.

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants outdoors.
- Spray clothing with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET (N,N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- When using an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.

Note: Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

Symptoms of Exposure to the West Nile Virus

The West Nile Virus incubation period is from 3-15 days. Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death.

For questions or to report any suspicious symptoms, contact the project PHSM.

5.6.6 Giant Hogweed

Giant hogweed is a noxious weed that has become established in New York, Pennsylvania, Ohio, Maryland, Oregon, Washington, Michigan, Virginia, Vermont, New Hampshire Maine, and adjacent areas of Canada, but can be spread to surrounding areas.

Its sap, in combination with moisture and sunlight, can cause phytophotodermatitis – a serious skin inflammation and severe eye irritation leading to blindness. Contact between the skin and

the sap of this plant occurs either through brushing against the bristles on the stem or breaking the stem or leaves. Eye exposure to the sap can occur during the breaking of the stems (during clearing/grubbing). Heat, sunlight, and moisture worsen the skin reaction.

Giant hogweed is a biennial or perennial which can grow up to 12 feet (approximately 3.5 meters) or more. Its hollow, ridged stems grow 2-4 inches (5-10 cm) in diameter and have dark reddish-purple blotches. Its large compound leaves can grow up to five feet (1.5 meters) wide. Its white flower heads can grow up to 2.5 feet (approximately 1 meter) in diameter.

Symptoms of exposure include initial itching and redness, then painful blisters form within 48 hours with the area becoming dark and pigmented. Long-term effects include scarring, sensitivity of the affected area to sunlight, temporary or permanent blindness if it gets into the eyes.

As with all hazardous plants, recognition and avoidance is key. Do not touch any portion of the plant. Become familiar with the identity of these plants (see below). Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and cold water immediately. Keep exposed area away from sunlight for 48 hours. Contact the occupational nurse immediately.



5.7 Chemicals of Potential Concern

Table 5-2 summarizes information pertaining to chemicals of potential concern (COPCs) at the project site.

Table 5-2 Chemicals of Potential Concern**TABLE 5-5**

Chemicals of Potential Concern Summary Table

Contaminant ^a	Impacted Media ^b	Maximum Conc(s) ^c	Exposure Limit ^d	IDLH ^e	Symptoms and Effects of Exposure	PIP ^f (eV)
Antimony	GW	0.0023 mg/l	0.5 mg/m ³	50 mg/m ³	Headache, dizziness, cyanosis, effects red blood cell count.	NA
Arsenic (Ca)	GW	0.017 mg/l	0.0254 mg/m ³	5 mg/m ³	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation	NA
Benzene (Ca)	GW	10 µg/l	0.5 ppm STEL: 5 ppm	500 ppm	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
Cadmium (Ca)	GW	0.00046 mg/l	0.002 mg/m ³	9 mg/m ³	Pulmonary edema, coughing, chest tightness/pain, headache, chills, muscle aches, nausea, vting, diarrhea, difficulty breathing, loss of sense of smell, emphysema, mild anemia	NA
4-Chloroaniline	GW	11 µg/l	NE	NE	Poison by ingestion, inhalation, skin contact, subcutaneous and intravenous routes. Skin and eye irritant	NA
Chlorobenzene	GW	80 µg/l	10 ppm	1,000 ppm	Skin, eye, and nose irritation; drowsiness; loss of coordination; CNS depression	9.07
Chrum (as Cr(II) & Cr(III))	GW	0.0066 mg/l	0.5 mg/m ³	250 mg/m ³	Irritated eyes, sensitization dermatitis, histologic fibrosis of lungs	NA
Manganese	GW	7.78 mg/l	0.2 mg/m ³	NE	Parkinson's, asthenia, insomnia, mental confusion, metal fume fever, dry throat, cough, tight chest, dyspnea, rales, flu-like fever, low-back pain, vting, kidney damage	NA

TABLE 5-5
Chemicals of Potential Concern Summary Table

Contaminant ^a	Impacted Media ^b	Maximum Conc(s) ^c	Exposure Limit ^d	IDLH ^e	Symptoms and Effects of Exposure	PIP ^f (eV)
Mercury compounds (Hg)	GW	0.00008 mg/l	0.025 mg/m ³ skin	10 mg/m ³	Irritation of eyes, skin; cough, chest pain, breathing difficulty, bronchitis, pneumonia; tremor, headache, lassitude; salivation; gastrointestinal disturbance, anorexia	NA
Poly-Chlorinated Biphenyls (PCBs) (Ca)	GW		0.5 mg/m ³	5 mg/m ³	Eye and skin irritation, acne-form dermatitis, liver damage, reproductive effects	UK
Process/Treatment Chemicals						
Diesel Fuel	TK	100%	400 ppm	10,000 ppm	Nausea, eye irritation, increased blood pressure, headache, light-headedness, loss of appetite, poor coordination, and difficulty concentrating	NA
Gasoline	TK	100%	300 ppm (890 mg/m ³)	NE	Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage	NA
Motor Oil and Lubricating Oil	TK	100%	NA – Avoid skin contact	NE	Skin rashes, headaches and tremors. Note: Used oil contains high concentrations of lead, zinc, calcium, barium, and magnesium along with lower concentrations of iron, sodium, copper, aluminum, chromium, manganese, potassium, nickel, tin, silicon, boron, and molybdenum	NA

TABLE 5-5
Chemicals of Potential Concern Summary Table

Contaminant ^a	Impacted Media ^b	Maximum Conc(s) ^c	Exposure Limit ^d	IDLH ^e	Symptoms and Effects of Exposure	PIP ^f (eV)
--------------------------	-----------------------------	------------------------------	-----------------------------	-------------------	----------------------------------	-----------------------

Notes:

^a "Ca" = potential occupational carcinogen.

^b Specify all impacted media to which site workers may be exposed using the following definitions:

A (Air)	SB (Soil)	SW (Surface Water)
D (Drums)	SL (Sludge)	TK (Tank)
GW (Groundwater)	SV (Soil Vapor)	

^c The maximum concentrations detected at the site for each media of concern.

^d The lower of the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) is listed. Values are given in parts per million (ppm) or milligrams per cubic meter (mg/m³).

^e IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); ND = Not determined.

^f PIP = photoionization potential; NA = Not applicable; UK = Unknown.

NE = None Established

NA = Not Available/Not Applicable

Workers may also be exposed to chemicals used during sampling and remediation activities. MSDSs are required for all virgin (i.e., non-contaminant) chemicals brought to the site. These MSDSs are presented as Attachment 8.

A summary of the personal protective equipment required to minimize exposure to environmental contaminants and virgin chemicals is presented in Section 4.

5.8 Potential Routes of Exposure

Potential routes of exposure include the following:

- **Dermal:** Skin contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Personal Protective Equipment Section of this plan.
- **Inhalation:** Inhalation of vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in the PPE and Air Monitoring/Sampling Sections of this plan, respectively.
- **Ingestion:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

6.0 Air Monitoring/Sampling

Air monitoring and sampling must be performed to verify that employees are not be exposed to harmful levels of airborne contaminants and that airborne contaminants are not migrating into public areas.

Refer to JACOBS SOP HSE-207, *Exposure Assessment for Airborne Chemical Hazards*, for additional information

6.1 Air Monitoring Specifications

Air monitoring specifications are summarized in Table 6-1.

Table 6-1 Air Monitoring Specifications

TABLE 6-1
Air Monitoring Specifications

Instrument	Tasks	Action Levels ^a	PPE or Action Required	Frequency ^b	Calibration
Photoionization Detector: OVM with 10.6eV lamp or equivalent	Intrusive activities Opening pumps or process piping with contaminated materials	0.5 ppm – 1 ppm 1 - 10 ppm 10 – 50 ppm > 50 ppm	Level D – Initiate Benzene monitoring Level D Level C – Air Purifying Respiratory protection Level B – not authorized – contact HSM immediately	Initially and periodically during task	Prior to use or monthly whichever is first
Combustible Gas Indicator: MSA model 260 or 261 or equivalent	Landfill vent inspections	0-5% LEL >5% LEL	No explosion hazard Potential explosion hazard; evacuate or vent	Continuous during advancement of boring or trench	Daily
Oxygen Meter: MSA model 260 or 261 or equivalent	Landfill vent inspections	>23.5% ^c O ₂ 20.9% ^c O ₂ <19.5% ^c O ₂	Explosion hazard; evacuate or vent Normal O ₂ O ₂ deficient; vent or use SCBA	Continuous during advancement of boring or trench	Daily
Colorimetric Tube: Drager benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent	Intrusive activities Opening pumps or process piping with contaminated materials	0 - 0.5 ppm 0.5 – 25 ppm > 25 ppm	Level D Level C – Air Purifying Respiratory protection Level B – not authorized – contact HSM immediately	Initially and periodically when PID/FID >1 ppm	Not applicable Expiration date must be checked prior to use
Nose-Level Monitor ^e		<85 dB(A) 85-120 dB(A) 120 dB(A)	No action required Hearing protection required Stop; re-evaluate	Areas should be checked yearly unless there is a change in the process that could increase or decrease the dB	Prior to use

TABLE 6-1
Air Monitoring Specifications

Instrument	Tasks	Action Levels ^a	PPE or Action Required	Frequency ^b	Calibration
------------	-------	----------------------------	------------------------	------------------------	-------------

Notes:

^a Action levels apply to sustained breathing-zone measurements above background.

^b The exact frequency of monitoring depends on field conditions and is to be determined by the SC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3," "at surface/SB-2," etc.).

^c If the measured percent of O₂ is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O₂ action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O₂ action levels are required for confined-space entry (refer to Section 2).

^d Refer to SOP HSE-604 for instructions and documentation related to radiation monitoring and screening.

^e Noise monitoring and audiometric testing also required.

6.2 Calibration

Instruments will be function tested in accordance with the respective manufacturer's instructions for proper instrument use and maintenance. The instrument vendor or the JACOBS staff will ensure equipment has been calibrated in accordance with manufacturer's specifications.

All direct reading instruments will be function tested daily by the SC using span gas, prior to performing work activities and after the completion of the daily activities.

6.3 Air Sampling

At this time, personal air sampling is not warranted based on historic ambient air monitoring results. If site conditions change and the action levels in the table above are exceeded personal air sampling may be warranted. If that occurs, the following applies.

Sampling, in addition to real-time monitoring, may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, beryllium, hexavalent chromium, benzene, methylene chloride, vinyl chloride and certain volatile organic compounds. Air sampling methods will be National Institute for Occupational Safety and Health (NIOSH) or OSHA-certified and samples analyzed by a laboratory that is accredited by the American Industrial Hygiene Association (AIHA) for the compound specific method.

The SC with the help of the Honeywell Program HSM will develop and specify a sampling approach that includes the number and frequency of sampling events. This approach will be included in this section. The SC shall interpret all air sampling results and modify the requirements of this HSE Plan, based on the interpretation. Written notification of air sampling results will be provided to the JACOBS site employees and maintained in the HSE records.

7.0 Decontamination

Reference JACOBS SOP HSE-218, *Hazardous Waste Operations*)

Decontamination areas will be established for work in potentially contaminated areas to prevent the spread of contamination. Decontamination areas should be located upwind of the exclusion zone where possible and should consider any adjacent or nearby projects and personnel. The SC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SC. The SC must ensure that procedures are established for disposing of materials generated on the site.

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SC should establish areas for eating, drinking, and smoking.

7.1 Contamination Prevention

Preventing or avoiding contamination of personnel, tools, and equipment will be considered in planning work activities at all field locations. Good contamination prevention and avoidance practices will assist in preventing worker exposure and result in a more efficient decontamination process. Procedures for contamination prevention and avoidance include the following:

- Do not walk through areas of obvious or known contamination;
- Do not directly handle or touch contaminated materials;
- Make sure there are no cuts or tears in PPE;
- Fasten all closures in suits and cover them with duct tape, if appropriate;
- Take particular care to protect any skin injuries;
- Stay upwind of airborne contamination, where possible;
- Do not eat or drink in contaminated work areas;
- Do not carry food, beverages, tobacco, or flame-producing equipment into contaminated work areas;
- Minimize the number of personnel and amount of equipment in contaminated areas to that necessary for accomplishing the work;
- Choose tools and equipment with nonporous exterior surfaces that can be easily cleaned and decontaminated;
- Cover monitoring and sampling equipment with clear plastic, leaving openings for the sampling ports, as necessary; and
- Minimize the amount of tools and equipment necessary in contaminated areas.

7.2 Personnel and Equipment Decontamination

Personnel exiting an EZ must ensure that they are not spreading potential contamination into clean areas or increasing their potential for ingesting or inhaling potential contaminants. Personal decontamination may range from removing outer gloves as exiting the EZ, to proceeding through an outer layer doffing station including a boot and glove wash and rinse, washing equipment, etc.

Equipment that has come into contact with contaminated media must also be cleaned/decontaminated when it is brought out of the EZ.

7.3 Decontamination During Medical Emergencies

Standard personnel decontamination practices will be followed whenever possible. For emergency life saving first aid and/or medical treatment, normal decontamination procedures may need to be abbreviated or tted. In this situation, site personnel shall accompany contaminated victims to advise emergency response personnel on potential contamination present and proper decontamination procedures.

Outer garments may be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Protective clothing can be cut away. If the outer garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances or medical personnel. Outer garments can then be removed at the medical facility.

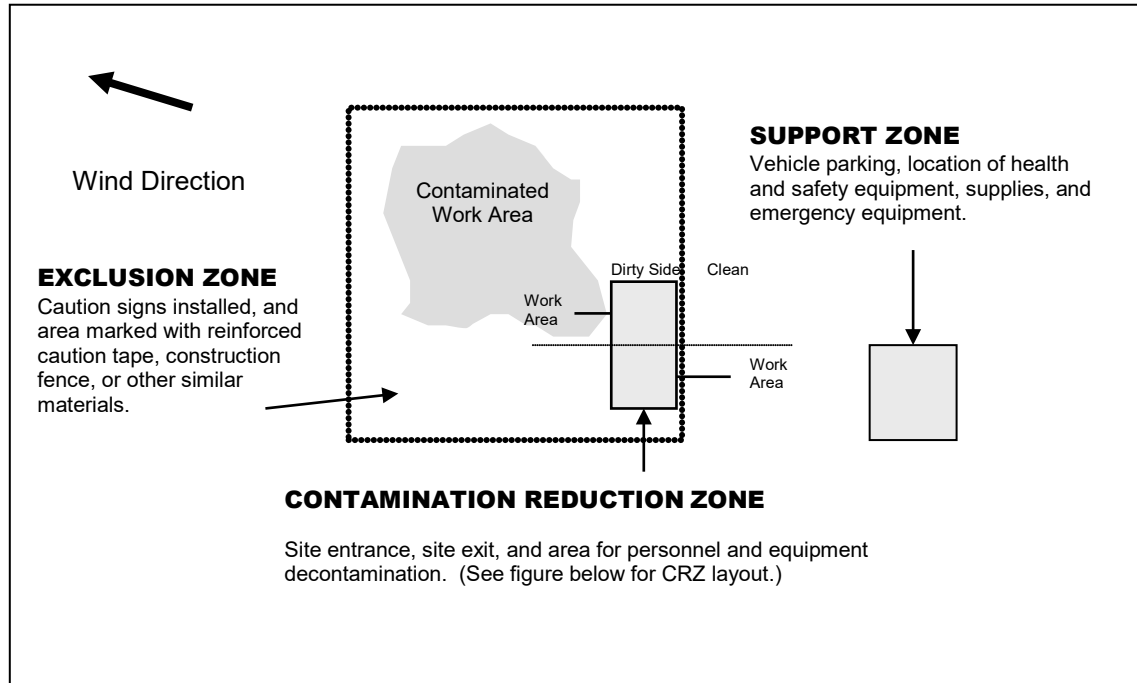
7.4 Waste Collection and Disposal

All contaminated material generated through the personnel and equipment decontamination processes (e.g., contaminated disposable items, gross debris, liquids, sludges) will be properly containerized and labeled, stored at a secure location, and disposed in accordance with the project plans.

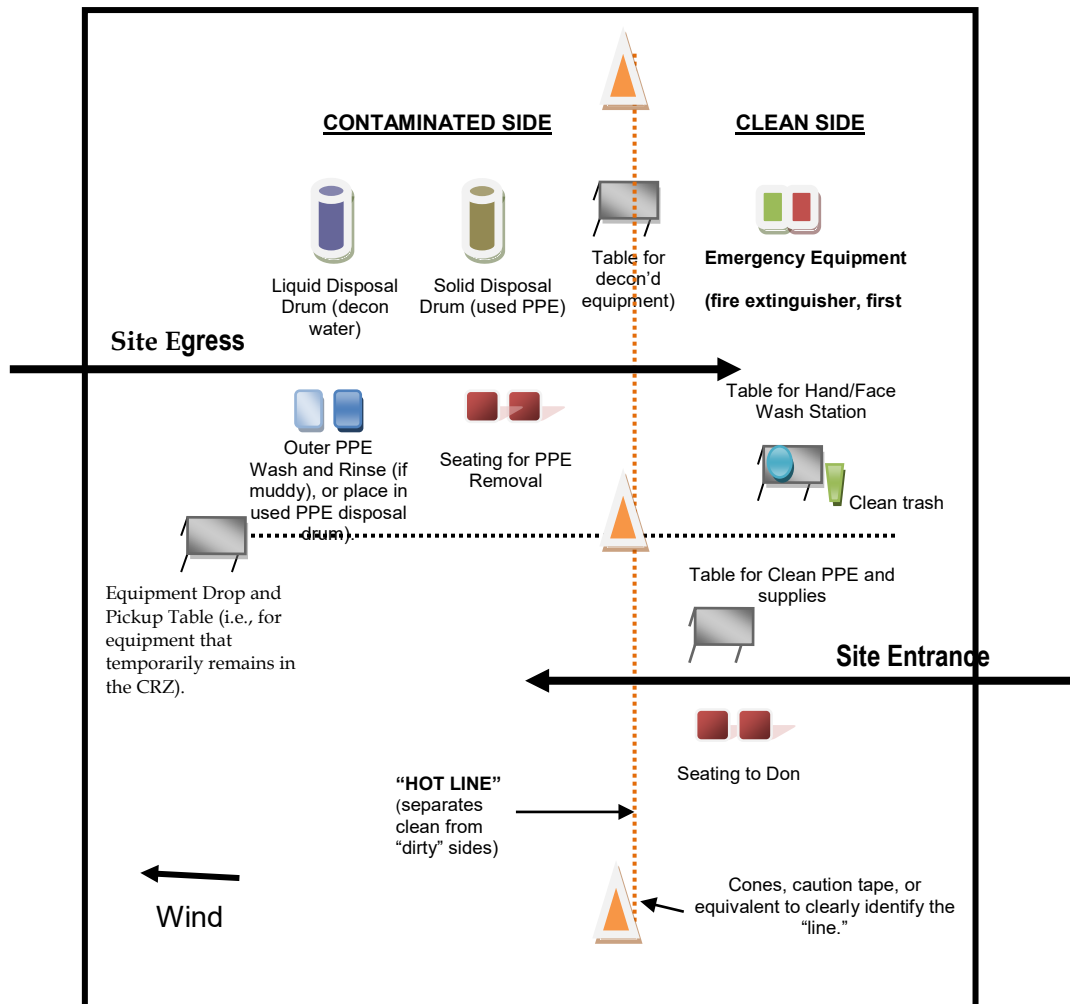
7.5 Diagram of Personnel-Decontamination Line

The following figure illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SC to accommodate task-specific requirements.

Work Area - Set up appropriately based on wind direction



Typical Contamination Reduction Zone



8.0 Spill Containment Procedures

JACOBS and subcontractor personnel working at the project site shall be knowledgeable of the potential health, safety and environmental concerns associated with petroleum and other substances that could potentially be released at the project site.

The following is a list of criteria that must be addressed in JACOBS's or the subcontractor's plans in the event of a spill or release. In the event of a large quantity spill notify emergency services. Personnel discovering a spill shall (only if safe to do so):

- Stop or contain the spill immediately (if possible) or note source. Shut off the source (e.g., pump, treatment system) if possible. If unsafe conditions exist, then leave the area, call emergency services, inform nearby personnel, notify the site supervisors, and initiate incident reporting process. The SC shall be notified immediately;
- Extinguish sources of ignition (flames, sparks, hot surfaces, cigarettes);
- Clear personnel from the spill location and barricade the area;
- Use available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread;
- Use sorbent materials to control the spill at the source;
- Construct a temporary containment dike of sorbent materials, cinder blocks, bricks or other suitable materials to help contain the spill;
- Attempt to identify the character, exact source, amount, and extent of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified;
- Contact the PHSM and Project EM in the event of a spill or release immediately so evaluation of reportable quantity requirements and whether agency reporting is required;
- Assess possible hazards to human health or the environment as a result of the release, fire or explosion; and
- Follow incident notification, reporting, and investigation section of this plan.

This section describes spill containment and notification requirements.

9.0 Site-Control Procedures

9.1 Site-Control Procedures

(Reference JACOBS SOP HSE-218, *Hazardous Waste Operations*)

Site control is established to prevent the spread of contamination throughout the site and to ensure that only authorized individuals are permitted into potentially hazardous areas.

The SC will implement site control procedures including the following bulleted items.

- Establish support, contamination reduction, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
 - Line-of-sight and hand signals;
 - Air horn; and
 - Two-way radio or cellular telephone if available.
- Establish offsite communication.
- Establish and maintain the “buddy system.”

9.2 Remediation Work Area Zones

(Reference JACOBS SOP HSE-218 Hazardous Waste Operations)

A three-zone approach will be used to control areas where site contaminants exist. Access will be allowed only after verification of appropriate training and medical qualification. The three-zone approach shall include an EZ, Contamination Reduction Zone (CRZ) and a Support Zone (SZ). The three-zone approach is not required for construction work performed outside contaminated areas where control of site contamination is not a concern.

Specific work control zones shall be established as necessary during task planning. Site work zones should be modified in the field as necessary, based on such factors as equipment used, air monitoring results, environmental conditions, or alteration of work plans. The following guidelines shall be used for establishing and revising these preliminary zone designations.

9.2.1 Support Zone

The SZ is an uncontaminated area (trailers, offices, field vehicles, etc.) that will serve as the field support area for most operations. The SZ provides field team communications and staging for emergency response. Appropriate sanitary facilities and safety and emergency response equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged and decontaminated materials, or personnel with medical emergencies that cannot be decontaminated.

9.2.2 Contamination Reduction Zone

The CRZ is established between the EZ and the SZ, upwind of the contaminated area where possible. The CRZ provides an area for decontamination of personnel, portable handheld equipment and tools, and heavy equipment. In addition, the CRZ serves as access for heavy equipment and emergency support services.

9.2.3 Exclusion Zone

The EZ is where activities take place that may involve exposure to site contaminants and/or hazardous materials or conditions. This zone shall be demarcated to prevent unauthorized entry. More than one EZ may be established if there are different levels of protection to be employed or different hazards that exist in the same work area. The EZ shall be large enough to allow adequate space for the activity to be completed, including field personnel and equipment, as well as necessary emergency equipment.

The EZ shall be demarcated with some form of physical barrier or signage. The physical barrier or signage shall be placed so that they are visible to personnel approaching or working in the area. Barriers and boundary markers shall be removed when no longer needed.

9.2.4 Other Controlled Areas

Other work areas may need to be controlled due to the presence of an uncontrolled hazard, to warn workers of requirements, or to prevent unauthorized entry. Examples include general construction work areas, open excavations, high noise areas, vehicle access areas, and similar activities or limited access locations. These areas shall be clearly demarcated with physical barriers (fencing, cones, reinforced caution tape or rope) as necessary and posted with appropriate signage.

10.0 Hazwoper Compliance Plan

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.3.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.3.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staffs are working in proximity to Hazwoper activities. Sample results (e.g., soil) also must document that there is no potential for exposure. The PHSM must approve the interpretation of these data. Refer to subsections 5.7 and 6.0 for contaminant data and air sampling requirements, respectively
- When non-Hazwoper-trained personnel are at risk of exposure, the SC must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
 - Nature of the existing contamination and its locations
 - Limitations of their access
 - Emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards
- Procedures for remediation treatment system start-ups are: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. No non-Hazwoper-trained personnel can enter the TSDF area of the site

Refer to JACOBS HSE SOP-220, Site-Specific Written Safety Plans, for additional information.

11.0 Emergency Preparedness

(Reference JACOBS SOP HSE-106, *Emergency Planning*)

11.1 Pre-Emergency Planning

The Emergency Response Coordinator (ERC), typically the SC or designee, performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with JACOBS onsite parties, the facility, and local emergency-service providers as appropriate. Pre-Emergency Planning activities performed by the ERC include:

- Review the facility emergency and contingency plans where applicable;
- Determine what onsite communication equipment is available (two-way radio, air horn);
- Determine what offsite communication equipment is needed (nearest telephone, cell phone);
- Confirm and post the “Emergency Contacts” page and route to the hospital located in this section in project trailer(s) and keep a copy in field vehicles along with evacuation routes and assembly areas. Communicate the information to onsite personnel and keep it updated;
- Field Trailers: Post “Exit” signs above exit doors, and post “Fire Extinguisher” signs above locations of extinguishers. Keep areas near exits and extinguishers clear;
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures;
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies;
- Inventory and check site emergency equipment, supplies, and potable water;
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases;
- Rehearse the emergency response plan before site activities begin. This may include a “tabletop” exercise or an actual drill depending on the nature and complexity of the project. Drills should take place periodically but no less than once a year;
- Brief new workers on the emergency response plan; and
- The ERC will evaluate emergency response actions and initiate appropriate follow-up actions.

11.2 Emergency Equipment and Supplies

The ERC shall ensure the following emergency equipment is on the site. Verify and update the locations of this equipment as needed. The equipment will be inspected in accordance with manufacturer’s recommendations. The inspection shall be documented in a field logbook or similar means to be kept in the project files.

Emergency Equipment and Supplies	Location
20 (or two 10) class A,B,C fire extinguisher	
First aid kit	
Eye wash bottles	
Potable water	
Bloodborne-pathogen kit	

11.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Notify appropriate response personnel;
- Shut down JACOBS operations and evacuate the immediate work area;
- Account for personnel at the designated assembly area(s);
- Assess the need for site evacuation, and evacuate the site as warranted;
- Implement HSE-111, Incident Notification, Reporting and Investigation; and
- Notify and submit reports to clients as required in contract.

Small fires or spills posing minimal safety or health hazards may be controlled with onsite spill kits or fire extinguishers without evacuating the site. When in doubt evacuate. Follow the incident reporting procedures in the “Incident Notification, Reporting, and Investigation” section of this HSP.

11.4 Emergency Medical Treatment

Emergency medical treatment is needed when there is a life-threatening injury (such as severe bleeding, loss of consciousness, breathing or heart has stopped). When in doubt if an injury is life-threatening or not, treat it as needing emergency medical treatment.

- Notify 911 or other appropriate emergency response authorities as listed in the “Emergency Contacts” page located in this section.
- The ERC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury, perform decontamination (if applicable) where feasible; lifesaving and first aid or medical treatment takes priority.
- Initiate first aid and CPR where feasible.
- Notify supervisor and if the injured person is a JACOBS employee, the supervisor will call the occupational nurse at 1-866-893-2514 and make other notifications as required by HSE SOP-111, *Incident Notification, Reporting and Investigation*.
- Make certain that the injured person is accompanied to the emergency room.
- Follow the Serious Incident Reporting process in HSE SOP-111, Incident Notification, Reporting and Investigation, and complete incident report using the HITS system on the VO or if not feasible, use the hard copy forms provided as an attachment to this HSP.

- Notify and submit reports to client as required in contract.

11.5 Evacuation

- Evacuation routes, assembly areas, and severe weather shelters (and alternative routes and assembly areas) are to be specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the ERC or designee before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The ERC and a “buddy” will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The ERC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The ERC will follow the incident reporting procedures in the “Incident Notification, Reporting and Investigation” section of this HSP.

11.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

11.7 Inclement Weather

Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Field crew members performing work outdoors should carry clothing appropriate for inclement weather. Personnel are to take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.

Protective measures during a lightning storm include seeking shelter; avoiding projecting above the surrounding landscape (don't stand on a hilltop--seek low areas); staying away from open water, metal equipment, railroad tracks, wire fences, and metal pipes; and positioning people several yards apart. Some other general precautions include:

- Know where to go and how long it will take to get there. If possible, take refuge in a large building or vehicle. Do not go into a shed in an open area;
- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers;

- If the area is wide open, go to a valley or ravine, but be aware of flash flooding;
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward and put your hands on your knees or crouch. The idea is to make yourself less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous, since the wet earth can conduct electricity. Do not touch the ground with your hands; and
- Do not use telephones during electrical storms, except in the case of emergency.

Remember that lightning may strike several miles from the parent cloud, so work should be stopped and restarted accordingly. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash; and do not resume activity until 30 minutes after the last thunder clap.

High winds can cause unsafe conditions, and activities should be halted until wind dies down. High winds can also knock over trees, so walking through forested areas during high-wind situations should be avoided. If winds increase, seek shelter or evacuate the area. Proper body protection should be worn in case the winds hit suddenly, because body temperature can decrease rapidly.

Tornado Safety

Recognizing imminent tornado signs include seeing an unusually dark sky, possibly with some green or yellow clouds. You may hear a roaring or rumbling sound like a train, or a whistling sound like a jet. Large hail may also be falling. You may be able to see funnels, or they may be hidden by rain or hail.

Listen to your radio for tornado warnings during bad thunderstorms. If a tornado warning is issued, don't panic. Instead, listen and look. Quickly but calmly follow directions for getting to shelter.

Take cover. Indoors you should go down into the basement and crouch down under the stairs, away from windows. Do not take an elevator. If you can't get to a basement, go into a closet or bathroom and pull a mattress over you or sit underneath a sturdy piece of furniture on the ground floor near the center of the building. Pull your knees up under you and protect your head with your hands.

A bad place to be in a tornado is in a building with a large freestanding roof such as a gymnasium, arena, auditorium, church or shopping mall. If you are caught in such a building, take cover under something sturdy.

More than half of tornado deaths occur in mobile homes. If a tornado threatens, get out and go to a building with a good foundation, or lay down in a ditch away from vehicles and other objects. If you are driving, get to a shelter, lie down in a ditch or seek cover up under the girders of an overpass or bridge. Stay as close to the ground as you can. Protect your head and duck flying debris. Stay away from metal and electrical equipment because lightning accompanies tornadoes.

If you have time before the tornado strikes, secure objects such as garbage cans and lawn furniture which can injure people. While most tornado damage is a result of the violent winds, most injuries and deaths actually result from flying debris.

12.0 Recordkeeping

The following records (see Table 12-1) shall be maintained as indicated. Refer to JACOBS SOP HSE-15 for complete recordkeeping requirements and additional information.

Table 12-1 Recordkeeping Requirements

TABLE 12-1
Recordkeeping Requirements

Record	Location	Duration
Medical and Exposure Records	Medical & Training Administrator	Employment + 30 years
HSE Plans	Project File; MTA	Project duration + 5 years
HSE Training Records	Project File; HandS Database	Employment + 30 years
Environmental Documentation (permits, approvals, manifests)	Project File; HSE Archive	Project duration + 5 years