Interim Remedial Measures (IRM) Work Plan

Lumber Yard Relocation
Phase III Business Park
Lackawanna, New York
BCP Site No. C915199

August 2011 0071-011-300

Prepared For:

Tecumseh Redevelopment Inc.

Prepared By:

TurnKey Environmental Restoration, LLC

Benchmark Environmental Engineering & Science, PLLC

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CERTIFICATION

I, Thomas H. Forbes, P.E., certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measures (IRM) Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Thomas H. Forbes, P.E.

8-15-11

Date

License No.: 070950-1

Registration State: New York

SEAL:

IRM WORK PLAN FOR LUMBER YARD RELOCATION
TECUMSEH REDEVELOPMENT SITE
LACKAWANNA, NEW YORK

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1.0 INTRODUCTION

This document presents the planned scope of work for implementation of an Interim Remedial Measure (IRM) within the Phase III Business Park (Site No. C915199) of the Tecumseh Redevelopment property in Lackawanna, New York (see Figure 1). The IRM will be performed on behalf of Tecumseh Redevelopment Inc. (Tecumseh) through the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP).

The IRM work will involve moderate re-grading activities followed by placement of a 1-foot thick layer of cover material across an approximate 15-acre portion of the Phase III Business Park Area. Upon completion of the cover placement work the National Distribution Services (NDS) lumber yard will be relocated from its current location near the southeastern portion of the Tecumseh property to the covered portion of Phase III Business Park area (see Figure 1).

In May 2008, TurnKey Environmental Restoration, LLC (TurnKey) performed a Remedial Investigation (RI) at the Phase III Business Park (Ref. 1). This IRM Work Plan includes a summary of relevant RI investigation findings, and the planned approach for implementation of the IRM activities.

1.1 Background

The National Distribution Services lumber yard is presently located on approximately 17.7 acres of the Tecumseh property along NY State Route 5 (Hamburg Turnpike) near the south bank of Smokes Creek. The yard is serviced by Genesee Wyoming Railroad Company, and serves as a staging/laydown point for truck transport to regional commercial customers. Little to no pavement or aggregate cover is present on the property. Consequently, fork truck traffic and to a lesser degree tractor trailer transport trucks generate significant quantities of dust, particularly during dry summer months. Prevailing winds from the west frequently carry visible dust offsite. Although NDS routinely applies water to the property and has further attempted to reduce particulate emissions through calcium-based dust suppressants, the size of the operation makes it infeasible to control dust emissions in this manner.

The NYSDEC and National Distribution have expressed an interest in relocating the lumber yard west of the current location onto an adjacent, approximate 15 acre portion of the Phase III Business Park area of the Tecumseh property to mitigate offsite

dust migration. Concurrently, Genesee Wyoming Railroad will extend a rail spur into the relocation area to service NDS. The spur will serve as part of the IRM cover system via one foot of ballast and ties, with 1-foot of cover material placed in the remainder of the relocation area per NYSDEC Brownfield Cleanup Program (BCP) requirements for industrial redevelopment.

1.2 Purpose and Scope

The proposed lumber yard relocation is slated to begin in September 2011 prior to completion of remedial activities in the Phase III Business Park area. Accordingly, Tecumseh is proposing to remediate the portion of the Phase III Business Park Site on which the lumber yard is being relocated as an IRM to expedite remedial activities in this portion of the Site. The proposed scope of IRM activities includes:

- Clearing, grubbing and moderate re-grading to prepare the IRM area for cover.
- Installing and compacting NYSDEC Beneficial Use Determination (BUD)-approved slag to a minimum (1) foot thickness within the 15-acre IRM Area (outside of the planned rail spur).
- Placement of a combination of ballast and rail ties to a minimum one foot thickness beneath the planned rail spur.
- Implementation of proper soil/fill management techniques to identify and manage any impacted soil/fill, if encountered.

This IRM Work Plan has been prepared in accordance with Section 5.3.b of NYSDEC's May 2010 DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2). As such, it addresses the following items:

- A description of the remedial actions to be undertaken as part of the IRM and the basis for the actions (Sections 2.0 and 3.0).
- The location and description of any temporary construction facilities (Section 3.2).
- Dust, storm water, and erosion control measures required for minimizing potential releases of soil/fill outside the work zone during construction (Section 3.2).
- Health, safety, and community air monitoring procedures (Sections 3.1.4 and 4.0).
- A description of documentation sampling to establish the IRM scope (Section 2.0).

- Equipment decontamination and site restoration requirements, including requirements for cover materials (Section 3.3).
- Project documentation requirements and anticipated construction schedule (Sections 5.0 and 6.0).
- A description of institutional controls and Site Management requirements that will be implemented as part of the overall remedy for the Phase III Business Park Site (Section 7.0).
- A summary of drawings and information to be provided as part of the Construction Completion Report (Section 5.3).

1.3 Project Organization and Responsibilities

TurnKey will implement the IRM work, on behalf of Tecumseh Redevelopment, on a design-build basis. A qualified subcontractor experienced in remedial measures will be retained to assist in implementing the construction. The NYSDEC Division of Environmental Remediation will monitor the remedial actions to verify that the work is performed in accordance with the approved IRM Work Plan.

2.0 REMEDIAL INVESTIGATION FINDINGS

The investigation approach for the subject IRM area was documented in the RI-AAR Report for the Phase III Business Park Area (Ref. 1). The RI included the following field activities to delineate and characterize on-site soil/fill and assess groundwater quality at the Site:

- Visual, olfactory, and PID characterization of surface and subsurface soil/fill through test pit excavation.
- Collection of surface and subsurface soil/fill samples.
- Advancement of on-site borings completed as groundwater monitoring wells.
- Collection and analysis of groundwater samples from existing and newly installed monitoring wells at the site.

RI field activities were conducted by TurnKey Environmental Restoration, LLC (TurnKey) in accordance with the approved Work Plans (Refs. 3 and 4); herein referred to as the RI Work Plan. Environmental sample collection was performed in accordance with TurnKey's Field Operating Procedures (FOPs). USEPA- and NYSDEC-approved sample collection and handling techniques were used. Samples for chemical analysis were analyzed in accordance with USEPA SW-846 methodology to meet the definitive-level data requirements. Analytical results were evaluated by a third-party data validation expert in accordance with provisions described in the RI Work Plan. The majority of field activities were conducted under NYSDEC oversight.

2.1 IRM Relocation Area Samples

Several of the test pits completed as part of the Phase III Business Park Area RI were located within or near the planned NDS lumber yard relocation area. Specifically, test pits BPA-3-TP-61 through BPA-3-TP-66 as well as BPA-3-TP-79 and BPA-3-TP-80 were advanced within the southwestern portion of the Phase III Business Park where the IRM activities will be performed. In addition, groundwater monitoring wells MWS-30A and MWS-33A were installed within the planned relocation area. Figure 1 presents the locations of the test pit and monitoring wells discussed in this section.

All of the test pits and borings completed as monitoring wells were monitored for field indications of contamination, including visual, olfactory and photoionization detector (PID) measurement of the excavation and cuttings (headspace measurement). Appendix A includes the field logs for all test pits excavated within or near the IRM area and the boring logs for wells MWS-30A and MWS-33A. Samples were collected from several of these locations in accordance with the RI-AAR Work Plan. Table 1 identifies the sampling rationale and laboratory analyses undertaken.

2.2 Investigation Results

2.2.1 Field Observations

As indicated in Appendix A, fill materials comprised of an approximate 8 foot layer of slag intermingled with cinders and brick and underlain by native silty clay soils were typically encountered within the planned IRM area. PID readings were generally reported at non-detectable or low levels at all locations, with no record of staining or odor with the exception of a slight sheen on groundwater and elevated PID reading identified at the slag/fill interface at test pits BP#-TP-61 and BP-3-TP-62. A PID reading of 20.4 ppm and slight musty odor was also noted at the fill/groundwater interface at MWS-33A, however groundwater samples from MWS-33A indicate no impact.

2.2.2 Analytical Results

Tables 2 and 3 present a summary of the test pit soil/fill and groundwater analytical data for the IRM area locations, respectively. Laboratory analytical data is included in the draft RI-AAR report (Ref. 1). For purposes of comparison, Table 2 presents Industrial Soil Cleanup Objectives (SCOs) per 6NYCRR Part 375. Comparison of the soil/fill results to Industrial SCOs is appropriate based on the industrial nature of the historic operation and the planned use of the IRM area for lumber yard distribution activities. Table 3 compares the groundwater data to NYSDEC Class GA groundwater quality standards and guidance values (GWQS/GVs) per Technical Operations and Guidance Series (TOGS) 1.1.1.

As indicated on Table 2, no volatile organic compounds (VOCs) or PCBs were detected in the relocation area test pits. Several semi-volatile organic compounds (SVOCs) were detected with benzo(a)pyrene reported slightly above the associated

Industrial SCO at BPA 3-TP-62 and BPA 3-TP-80. All of the metals analyzed were detected at levels below the Industrial SCOs with the exception of arsenic, which exceeded the SCO of 16 mg/kg at 5 of the 6 slag/fill sample locations.

Groundwater sample results generally indicate non-detectable concentrations for all of the laboratory parameters analyzed with the exception of trace SVOC concentrations at MWS-33A, which were present well below the GWQS/GVs. Field pH measurements collected during low flow sampling at MWS-33A indicated a final reading of 6.28, which is slightly below the GWQS/GV of 6.5

2.3 Summary

Field observations as well as soil and groundwater data for the IRM-area test pits and wells indicate no specific source areas or hotspot concerns. Groundwater concentrations fall below the GWQS/GVs with the limited exception of pH at MWS-33A, which was only slightly below the standard. Only arsenic was present in the soil/fill samples above the SCOs at a maximum detected concentration 25.7 parts per million (ppm).

Based on the widespread detection of arsenic within the soil/fill matrix it is not anticipated that focused excavation to meet SCOs would be feasible. Accordingly, cover placement is the presumptive remedy. Detailed analysis of the IRM approach in the context of final remedial measures requirements will be completed upon issuance of the final RI-AAR report for the Phase III Business Park Area.

3.0 TECHNICAL APPROACH

3.1 Pre-Mobilization Tasks

3.1.1 Public Information and Outreach

Citizen Participation (CP) Plans have been prepared for each of the Tecumseh Business Park Sites. Upon approval of this IRM Work Plan, a fact sheet containing information about the IRM will be developed and submitted to the NYSDEC Region 9 Project Manager for review. After addressing any comments the fact sheet will be finalized and transmitted, either electronically or by U.S. mail, to individuals on the Phase III Business Park CP Plan contact list who previously indicated a desire for such notification. The intent of this effort is to seek community cooperation; minimize disruption of nearby neighborhood residential and commercial activities; and facilitate a safe and secure work site. In addition, a copy of this Work Plan has been made available for public review at the NYSDEC Region 9 office and the Lackawanna Public Library.

3.1.2 Pre-Construction Meeting

A project coordination meeting will be held with key representatives of the Project Team both before clearing and placement of cover materials. Attendees at the initial meeting will include TurnKey's Project Manager and the remediation subcontractor. The designated NYSDEC Project Manager and New York State Department of Health (NYSDOH) representative will also be notified and invited to attend. Agenda items will include:

- Construction schedule.
- Work sequencing.
- Designation of responsibilities, contact personnel and pager/phone numbers.
- Project documentation requirements.
- Staging of equipment.
- Transportation routes/site egress.
- Health and safety requirements.
- Temporary controls (dust suppression, storm water management).

- Work hours.
- Site security.

TurnKey will prepare meeting minutes for distribution to attendees following the project coordination meeting.

3.1.3 Progress Meetings

Progress meetings will be conducted on a regular basis throughout the construction period. Progress meetings will be attended by TurnKey and subcontractor field management personnel. NYSDEC and NYSDOH will have access to all progress meetings.

3.1.4 Health and Safety Plan Development

The April 2010 Site Health and Safety Plan (HASP) for Brownfield Cleanup Program (Appendix B), prepared in accordance with the requirements of 40 CFR 300.150 of the NCP and 29 CFR 1910.120 and previously approved by the NYSDEC for Business Park investigation work, will be used for the IRM activities described herein. TurnKey will be responsible for site control and for the health and safety of its authorized site workers. All subcontractors and other parties involved in onsite construction will be required to develop a HASP as or more stringent than TurnKey's HASP. The HASP will be subject to revision, as necessary, based on new information that is discovered during the IRM.

TurnKey will also be responsible for the performance of community air monitoring during intrusive activities involving subgrade disturbance as discussed in Section 4.0 of this Work Plan.

3.2 Temporary Facilities and Controls

3.2.1 Temporary Construction Facilities

The former Water Quality Control Station 3A garage located on the Phase III Business Park Site will serve as field office for the personnel involved in IRM work. The location of the facilities will be discussed with the NYSDEC during the pre-construction meeting.

3.2.2 Dust Suppression & Water Application

Dust suppression will be an integral component of intrusive activities. During re-grading work, water will be sprayed across the surface of the work area as necessary to mitigate airborne dust formation and migration and assure conformance with community air monitoring thresholds. Water will also be sprayed as needed to control visible dust during cover placement and to flush into the subsurface any fine-grained solids that may be generated during placement and compaction of the BUD-approved slag cover material. Other dust suppression techniques that may be used to supplement the water spray include:

- Applying water on haul roads.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum and adhere to particulate emissions limits identified in the Community Air Monitoring Plan (Section 4.0).

3.2.3 Storm Water Management

Due to the highly permeable nature of the slag/fill material, its coarse gradation, and the relatively flat topography in the proposed work area, storm water ponding/runoff is not expected to pose a significant soil particulate or contaminant transport pathway due to IRM activities. Nevertheless, the project will encompass over 1-acre of property. Accordingly, the Benchmark/TurnKey has prepared a Site Wide Master Erosion Control Plan (MECP) for the Phase III Business Park Area (see Appendix C). The MECP will be implemented during construction activities.

3.3 Construction

3.3.1 Clearing and Grading

Survey control will be employed by TurnKey to establish the limits of the 15-acre IRM area and corresponding area for clearing and grubbing work. Woody vegetation removed from the area will be transported offsite or mulched and spread onsite in a

manner to prevent settlement. Remaining cut to remove vegetation and/or eliminate high areas will be spread across the site and used to fill in low areas, precluding the need for offsite disposal.

If field evidence of potentially impacted soil/fill is encountered during clearing and re-grading activities, TurnKey will arrange for the subject material to be delineated and characterized and an appropriate disposal plan will be developed and submitted to the NYSDEC for approval and implementation in accordance with the requirements of NYSDEC DER-10. Field evidence of impact is defined as having readily identifiable visual or olfactory signs of contamination, including product, tars, or elevated PID readings (i.e., sustained readings >20 ppm).

All impacted soil/fill removal work will be directed by an experienced TurnKey scientist. Removal will continue until visually impacted soil/fill is removed or NYSDEC agrees that no further removal is required.

Following sub-grade preparation work, all equipment will be cleaned free of any soil clods, mud, or clinging debris prior to removal from the site or use in cover placement activities.

3.3.2 Cover System

3.3.2.1 Demarcation Layer

The demarcation layer will be placed following grading of the IRM area and prior to import of cover system material. Demarcation will be constructed and placed as to easily identify the existing site sub-grade from the cover system material, and prevent the potential for inadvertent removal of sub-grade material during other site work. The demarcation material will be comprised of an orange three quarter inch (3/4 in) mesh, plastic industrial netting material, which will be rolled across the sub-grade and overlapped approximately 1 foot a seams.

3.3.2.2 Cover Placement

Construction of the cover system will follow re-grading activities. The cover system will involve placement of a minimum 1-foot layer of BUD-approved slag material (NYSDEC BUD #555-9-15) from Iron City Recovery. This material has been subjected to gradation testing and meets the requirements of DER-10 for exemption from import

analytical testing (see Appendix D). The cover material may not be visually discernible from the underlying slag, to minimize potential for inadvertent removal during other site work; a demarcation layer will be installed between the existing site grade and the cover system.

Railroad spur cover material will be comprised of select stone aggregate and ties. TurnKey will ascertain the source of the ballast materials and verify that they meet non-soil import criteria per DER-10 Section 5.4(e)5. The source of the ballast materials will be submitted to the NYSDEC for approval prior to construction.

Cover material shall be compacted to mitigate potential for settlement. Verification of ballast material and BUD-approved slag cover depth will be verified by TurnKey through survey or grade stake level measurements spaced no greater than 100 feet on center. Depth verification measurements will be included in the IRM Construction Closeout Report discussed later in this Work Plan.

4.0 COMMUNITY AIR MONITORING

Real-time community air monitoring will be performed by TurnKey during all intrusive IRM activities at the Site, including grading activities involving soil/fill cut. A Community Air Monitoring Plan (CAMP) is included with TurnKey's HASP. Particulate and vapor monitoring will be performed at a distance of approximately 100 feet downwind of the work area during excavation and grading activities involving subgrade disturbance. In addition, no visible dust will be allowed beyond the site perimeter during these activities or during import/cover material placement/compaction activities. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic Community Air Monitoring Plan (dated June 20, 2000) and NYSDEC Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

5.0 DOCUMENTATION AND REPORTING

TurnKey will be on-site during regrading and cover material placement to document IRM activities. Such documentation will include, at minimum, reports of construction activities, community air monitoring results, and photographs and sketches, as necessary.

5.1 Construction Monitoring

Standard reporting procedures for site activities will include preparation of a daily report and, when appropriate, problem identification and corrective measures reports. Appendix E contains sample project documentation forms. Information that may be included on the daily report form includes:

- Processes and locations of construction under way.
- Equipment and personnel working in the area, including subcontractors.
- A description of off-site materials received, including any quality verification (certification) documentation.

The completed reports will be available on-site and will be submitted to the NYSDEC as part of the IRM Construction Closeout Report.

Problem identification and corrective measures reports will be completed whenever major field problems are encountered and corrective measures are necessary. These reports will be attached to the monthly progress reports. The NYSDEC will be promptly notified of problems requiring modifications to this Work Plan prior to proceeding or completion of the construction item. Changes or additions will be noted in the Construction Closeout Report.

Photo documentation of IRM activities will be prepared by TurnKey throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or special circumstances arise. Photos will be provided in digital format.

5.2 Progress Reports

TurnKey will prepare and submit to NYSDEC monthly progress reports that include:

- Activities performed during reporting period.
- Results of tests or other pertinent data.
- Work scheduled for the upcoming reporting period.
- Other actions/information pertinent to the project.
- Percentage of completion, delays encountered or anticipated that may affect the schedule, and a description of efforts made to mitigate those delays or anticipated delays.

5.3 IRM Construction Completion Report

An IRM Construction Completion Report (CCR) will be prepared and submitted to the NYSDEC after the cover system is constructed. The report will be submitted within 60 days of completion of the work. The CCR will be prepared consistent with the requirements of Section 5.8 of DER-10 and will include:

- A description of any problems encountered, deviations from the Work Plan and associated corrective measures taken; and other pertinent information necessary to document that the Site activities were carried out in accordance with this Work Plan.
- Tabular summary of volume/type/source of cover system material.
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports.
- A certification by a licensed NYS Professional Engineer in accordance with Section 1.5 of DER-10

The IRM CCR will be incorporated by reference in the Final Engineering Report for BPA III.

6.0 PROJECT SCHEDULE

Cover system activities are expected to begin within 2 weeks of approval of this Work Plan, and are tentatively scheduled for initiation in September 2011. It is anticipated that the IRM field activities will be completed within approximately six weeks of initiation barring significant weather delays or unexpected conditions. The NYSDEC Project Manager will be notified 7 days in advance of all field activities.

7.0 SITE MANAGEMENT AND INSTITUTIONAL CONTROLS

The IRM activities described herein are expected to become an integral component of the final remedy for the associated Phase III Business Park Area. Because the IRM employs a cover system to achieve the remedial objectives (representing a Track IV cleanup under the BCP), it will be necessary to prepare and implement a Site Management Plan to assure that the IRM remains effective throughout the post-remedial period as described below.

7.1 Site Management Plan

Site Management Plan (SMP) will be prepared and submitted concurrent with the Final Engineering Report (FER) for the Phase III Business Park Site. The purpose of the Site Management Plan is to assure that proper procedures are in place to provide for long-term protection of human health and the environment after remedial construction is complete. The SMP is comprised of four main components:

- Engineering and Institutional Control Plan
- Site Monitoring Plan
- Operation and Maintenance Plan
- Inspections, Reporting, and Certifications

7.1.1 Engineering and Institutional Control Plan

An institutional control in the form of a new Environmental Easement will be necessary to limit future use of the Business Park Sites to restricted (commercial or industrial) applications and prevent groundwater use for potable purposes. An existing deed restriction is on file for the Tecumseh Site limiting reuse to commercial/industrial applications. However, industrial uses are loosely defined and allow incidental commercial-type facilities such as offices and laboratories, provided that they do not allow for occupancy by multiple numbers of persons under the age of 18. The deed restriction also prohibits construction or use of groundwater extraction wells (excluding monitoring and remediation wells).

Tecumseh will prepare an Engineering and Institutional Control (EC/IC) Plan for each of the Business Park Areas that will include a complete description of all institutional and/or engineering controls employed on the Business Park Sites, including the mechanisms that will be used to continually implement, maintain, monitor, and enforce such controls. The EC/IC Plan will include:

- A description of all EC/ICs on the site.
- The basic implementation and intended role of each EC/IC.
- A description of the key components of the ICs set forth in the Environmental Easement.
- A description of the features to be evaluated during each required inspection and periodic review, including the EC/IC certification, reporting, and Site monitoring.
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

7.1.2 Site Monitoring Plan

The Site Monitoring Plan will describe the measures for evaluating the performance and effectiveness of the final remedy to reduce or mitigate contamination at the Site, including:

- Sampling and analysis of all appropriate media (e.g., groundwater).
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly ambient groundwater standards and Part 375 SCOs for soil.
- Assessing achievement of the remedial performance criteria.
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

7.1.3 Operation and Maintenance Plan

An Operation & Maintenance (O&M) plan governing maintenance of the IRM cover system and other Site cover system, to the extent employed, will be prepared. The O&M plan will include:

- Operation and maintenance activities necessary to allow individuals unfamiliar with the Site to maintain the cover systems.
- An O&M contingency plan in the event of cover system failure.
- Periodic evaluations to confirm that the remedy continues to be effective for the protection of public health and the environment. If necessary, the O&M Plan will be updated to reflect changes in Site conditions or the manner in which the cover system is maintained.

8.0 REFERENCES

1. TurnKey Environmental Restoration, LLC. 2010. *Draft Remedial Investigation/Alternatives Analysis Report for Phase III Business Park Site.* October (revised November).

2. New York State Department of Environmental Conservation. 2010. *DER-10/Technical Guidance for Site Investigation and Remediation.* May 3.

3. *Remedial Investigation/Alternatives Analysis Report Work Plan for Phase III Business Park*, prepared for ArcelorMittal Tecumseh Redevelopment Inc. by TurnKey Environmental Restoration, LLC, May 2008.

4. *Remedial Investigation/Alternatives Analysis Report Work Plan for Steel Winds II Site*, prepared for BQ Energy, LLC by Benchmark Environmental Engineering & Science, PLLC, May 2008.

TABLES

TABLE 1

ANALYTICAL PROGRAM SUMMARY FOR IRM-AREA BORINGS: PHASE III BUSINESS PARK

Interim Remedial Measures (IRM) Work Plan
Phase III BPA Lumber Yard Relocation
Tecumseh Redevelopment Inc.
Lackawanna, New York

Test Pit/Monitoring Well Sample Identifier	Investigation Rationnale	Depth Sampled/ Screened (fbgs)	Date Sampled	Analysis																		Comments
				TCL + STARS VOCs	STARS VOCs	TCL SVOCs	TCL SVOCs (Base Neutrals Only)	Total Metals	TAL Metals	Arsenic	Cadmium	Chromium	Cyanide	Lead	Mercury	TCL PCBs	Flashpoint	pH	TCLP VOC	TCLP SVOC	TCLP Metals	
Soil/Fill																						
BPA-3-TP-61	Area of 1,000 gal. tank	0-2	8/26/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
BPA-3-TP-62		0-2	8/26/2008	--	X	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	
BPA-3-TP-63	Former stripper building	0-2	8/26/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
BPA-3-TP-64		0-2	8/26/2008	--	--	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	MS/MSD
BPA-3-TP-65	General Coverage: No known or suspected impact	0-2	8/26/2008	--	--	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	
BPA-3-TP-66		0-2	8/28/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
BPA-3-TP-79	General Coverage: No known or suspected impact	0-2	8/28/2008	--	--	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	
BPA-3-TP-80		0-2	8/28/2008	--	--	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	
BPA-3-TP-80		2-7	8/28/2008	--	--	--	X	--	--	X	X	X	X	X	X	--	--	--	--	--	--	
Groundwater																						
MWS-33A			1/16/2009	--	X	--	X	X	--	X	--	X	--	X	--	--	--	X	--	--	--	
MWS-30A			1/16/2009	--	X	--	X	X	--	X	--	X	--	X	--	--	--	X	--	--	--	

TABLE 2

SUMMARY OF IRM AREA SOIL/FILL ANALYTICAL RESULTS

IRM Work Plan for Lumber Yard Relocation
Tecumseh Redevelopment Inc.
Lackawanna, New York

Parameter [1]	TP-62 (0-2')	TP-64 (0-2')	TP-65 (0-2')	TP-79 (0-2')	TP-80 (0-2')	TP-80 (2-7')	Industrial SCOs [2] (ppm)
8260B Full List Volatile Organic Compounds (VOCs) - mg/kg							
Total VOCs	0	0	0	0	0	0	--
Base-Neutral Semi-Volatile Organic Compounds (SVOCs - Method 8270) - mg/kg							
Acenaphthylene	0.29 J	ND	ND	ND	0.61 J	ND	**1000**
Anthracene	0.26 J	0.15 J	ND	ND	0.7 J	ND	**1000**
Benzo(a)anthracene	1.2 J	0.72 J	0.23 J	0.11 J	2.8 J	0.7 J	**11**
Benzo(b)fluoranthene	1.4 J	0.93 J	0.31 J	0.26 J	3.2 J	0.8 J	**11**
Benzo(k)fluoranthene	1 J	0.4 J	ND	0.077 J	1.1 J	0.39 J	**110**
Benzo(g,h,i)perylene	1.3 J	0.62 J	0.25 J	0.11 J	1.8 J	0.47 J	**1000**
Benzo(a)pyrene	1.4 J	0.66 J	0.2 J	0.055 J	2.8 J	0.67 J	**1.1**
Chrysene	1.6 BJ	1.2 BJ	0.54 BJ	0.33 BJ	3.1 BJ	1 BJ	**110**
Dibenzo(a,h)anthracene	0.35 J	0.19 J	ND	ND	0.6 J	0.16 J	**1.1**
Fluoranthene	2.3 J	0.76 J	0.22 J	0.22 J	5.1	1.1 J	**1000**
Fluorene	ND	ND	ND	ND	0.16 J	ND	**1000**
Indeno(1,2,3-cd)pyrene	1.1 J	0.51 J	0.19 J	0.11 J	1.9 J	0.45 J	**11**
Phenanthrene	0.78 BJ	0.31 BJ	ND	0.089 J	2.5 J	1 J	**1000**
Pyrene	1.9 J	0.74 J	0.24 J	0.11 J	4.1	0.94 J	**1000**
PCBs/Pesticides- mg/kg							
Total	0	0	0	0	0	0	**25**
Inorganic Compounds - mg/kg							
Arsenic	22.1	6.3	18.9	21 EN*	26 EN*	26 EN*	**16**
Cadmium	1.2 E	1.7 E	1.2 E	1.1 N*	1.7 N*	0.69 N*	**60**
Chromium	304	270	586	54.6 N*	125 N*	141 N*	**800**
Lead	114 N	110 N	49.5 N	224 E*	763 E*	80.4 E*	**3900**
Mercury	0.21	0.033	0.029	4.8	0.284	0.105	**5.7**

Notes:

1. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparison to SCOs.
2. Soil Cleanup Objective (SCO) values per NYSDEC Part 375 table 375.6(b)

Definitions:

ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
"--" = No SCO available.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
* = Indicates the spike or duplicate analysis is not within the quality control limits.
N = Indicates spike sample recovery is not within the quality control limits.
E = Indicates value estimated or not reported due to the presence of interferences.

= Exceed Industrial SCOs

TABLE 3

SUMMARY OF IRM AREA GROUNDWATER ANALYTICAL RESULTS

IRM Work Plan for Lumber Yard Relocation
Phase III Business Park Area
Tecumseh Redevelopment Inc.
Lackawanna, New York

PARAMETER[1]	GWQS [2]	MWS-33A		MWS-30A	
Field Measurements [3] :					
Sample No.	--	Initial	Final	Initial	Final
pH (units)	6.5 - 8.5	6.73	**6.28**	7.69	7.74
Temperature (^{o}C)	NA	1.9	5.9	7.6	7.3
Sp. Conductance (uS)	NA	1031	947.7	834.7	836.7
Turbidity (NTU)	NA	43.20	38.20	13.00	6.84
DO (ppm)	NA	7.07	3.29	2.09	2.47
Eh (mV)	NA	-44	0	-36	-61
Total Inorganic Compounds (mg/L):					
Total	--	ND		ND	
Volatile Organic Compounds (ug/L):					
Total	--	ND		ND	
Semi-Volatile Organic Compounds (ug/L):					
Di-n-butyl phthalate	50*	0.57 J		ND	
Naphthalene	10*	0.21 J		ND	

Notes:

1. Only those compounds detected above the method detection limit at a minimum of one sample location are reported in this table.
2. NYSDEC Class "GA" Groundwater Quality Standards/GuIdance Values (GWQS/GV) as per TOGS 1.1.1
3. Field measurements were collected immediately before and after groundwater sample collection.

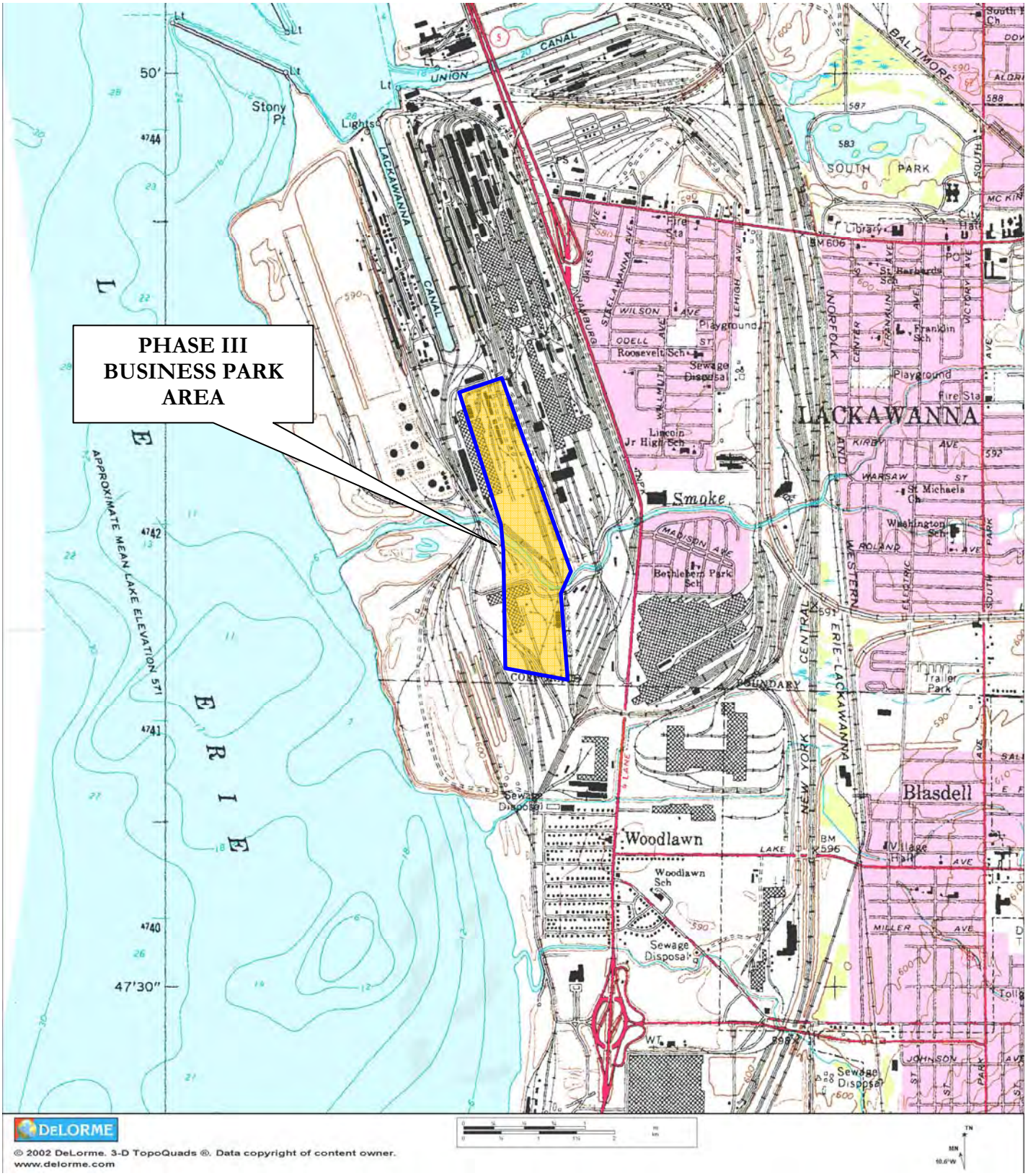
Definitions:

J = Estimated Value; result is less than the sample quantitation limit but greater than zero.
NA = Not available
ND = Indicates parameter was not detected above laboratory reporting limit.
* = The Guidance Value was used where a Standard has not been established.

BOLD = Result exceeds the GWQS/GV.

FIGURES

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-635

PROJECT NO.: 0071-007-300

DATE: JANUARY 2008

DRAFTED BY: NTM

FILEPATH:

SITE LOCATION AND VICINITY MAP

PHASE III BUSINESS PARK AREA
LACKAWANNA, NEW YORK

PREPARED FOR
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

LEGEND:

EXISTING BOUNDARY OF PROPOSED NATIONAL DISTRIBUTION LICENSED PARCEL

APPROXIMATE BOUNDARY OF PROPOSED NATIONAL DISTRIBUTION LICENSED PARCEL WITHIN TECUMSEH SITE BOUNDARY

APPROXIMATE LOCATION OF NEW RAIL ROAD SPUR

NOTE: FINAL LOCATION TO BE ESTABLISHED BY GENESEE-WYOMING RAIL ROAD PRIOR TO IRM CONSTRUCTION.

N

250' 0' 250' 500'

SCALE: 1 INCH = 250 FEET
SCALE IN FEET
(approximate)

DATE: JULY 2011
DRAFTED BY: JGT

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

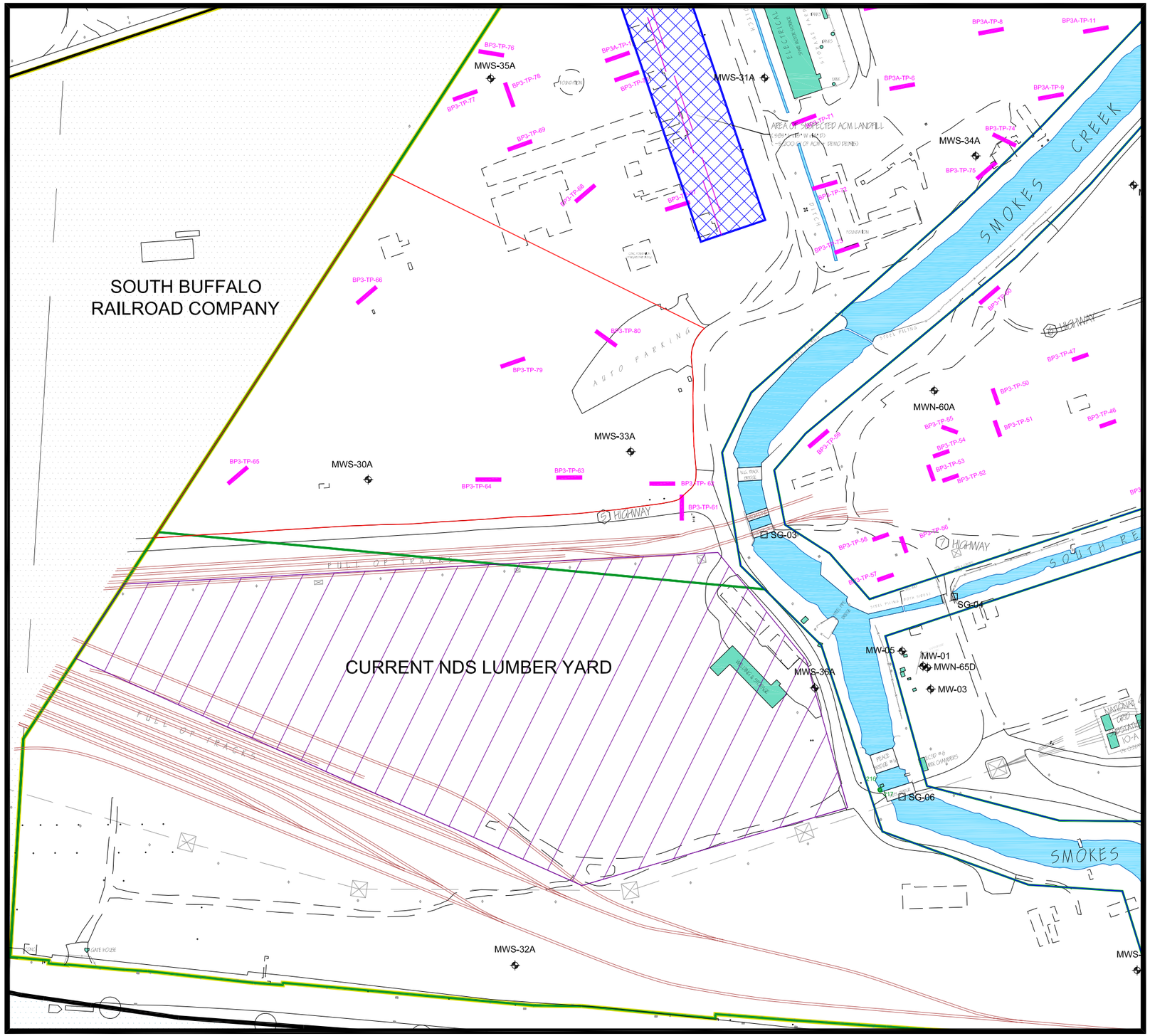
TURNKEY ENVIRONMENTAL RESTORATION, LLC

JOB NO.: 0071-011-300

SITE PLAN (AERIAL)

LUMBER YARD RELOCATION IRM WORK PLAN
PHASE III BUISNESS PARK
LACKAWANA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT

FIGURE 2



LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE (see Note 1)
- APPROXIMATE BOUNDARY OF NON-TECUMSEH PROPERTY
- RAILROAD TRACK
- APPROXIMATE BOUNDARY OF PROPOSED NATIONAL DISTRIBUTION LICENSED PARCEL WITHIN TECUMSEH SITE BOUNDARY
- BP3-TP-66 BUSINESS PARK PHASE III TEST PIT
- MWN-15A FILL UNIT MONITORING WELL

N

250' 0' 250' 500'

SCALE: 1 INCH = 250 FEET
SCALE IN FEET
(approximate)

DATE: JULY 2011
DRAFTED BY: BCH

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-011-300

LUMBER YARD IRM AREA: PHASE III SAMPLE LOCATIONS

LUMBER YARD RELOCATION IRM WORK PLAN
PHASE III BUISNESS PARK
LACKAWANA, NEW YORK
PREPARED FOR
TECUMSEH REDEVELOPMENT

FIGURE 3

APPENDIX A

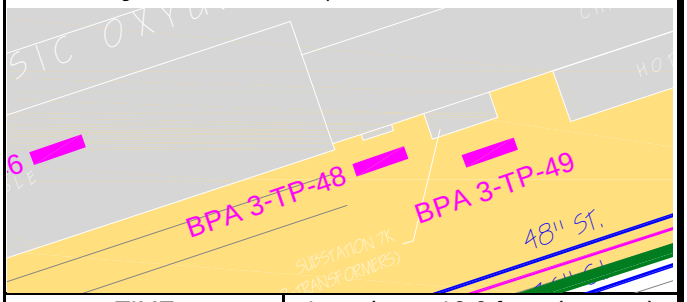
TEST PIT AND MONITORING WELL BORING LOGS

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-60**
Project No.:	0071-008-300	Excavation Date:	08/22/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

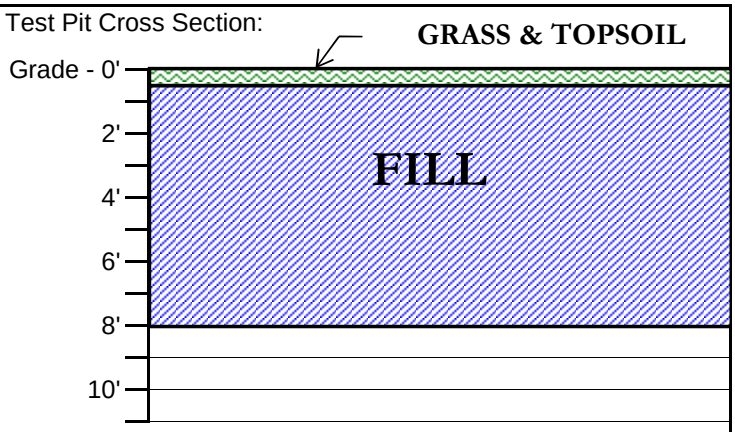
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	14:50	Length:	10.0 ft.	(approx.)
End:	16:00	Width:	3.0 ft.	(approx.)
		Depth:	8.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.2	Y	YES
0.5 - 2.0	**Fill:** Gray, moist, Slag fill with rail road ties and little Silt, dense, loose when disturbed	0.2	Y	YES
2.0 - 8.0	**Fill:** Brown, moist, Slag fill with cindery ash, brick and little Silt, dense, loose when disturbed	0.2	Y	YES
8.0	End of Test Pit			

COMMENTS:

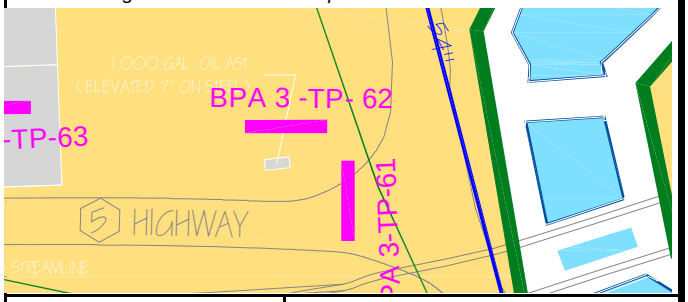
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	8.0'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-60 (0-2')
			Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-61**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

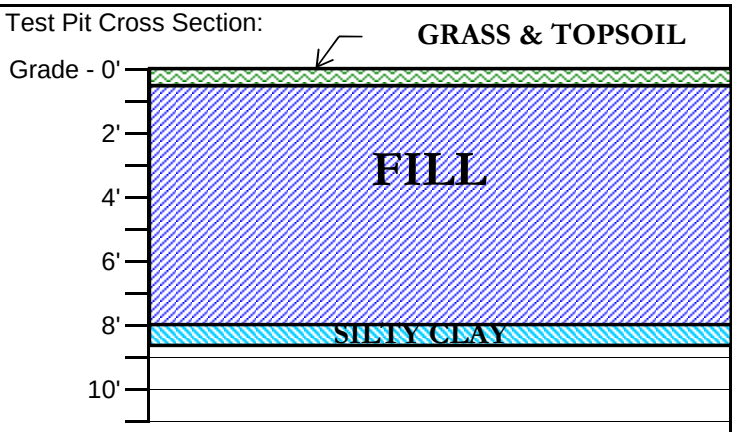
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	13:40	Length:	10.0 ft.	(approx.)
End:	14:15	Width:	3.0 ft.	(approx.)
		Depth:	8.5 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	2.2	Y	YES
0.5 - 2.0	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	2.2	Y	YES
2.0 - 8.0	**Fill:** Brown, moist, brick fill with cindery ash, dense, loose when disturbed	37.0	Y	NO
8.0 - 8.5	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
8.5	End of Test Pit			

COMMENTS: Relocated to the southwest out of road

GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7'
VISUAL IMPACTS:	☑ YES	☐ NO	Describe:	Sheen on water
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO		Slag, ash, and brick

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-61**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

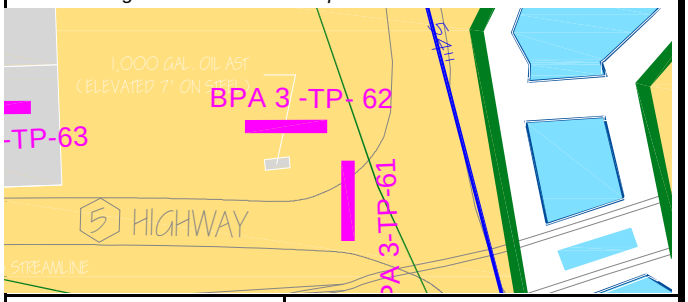
OTHER OBSERVATIONS:	☐ YES ☑ NO	Describe:	
SAMPLES COLLECTED:		Sample I.D.:	TP-61 (0-2')
		Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-62**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

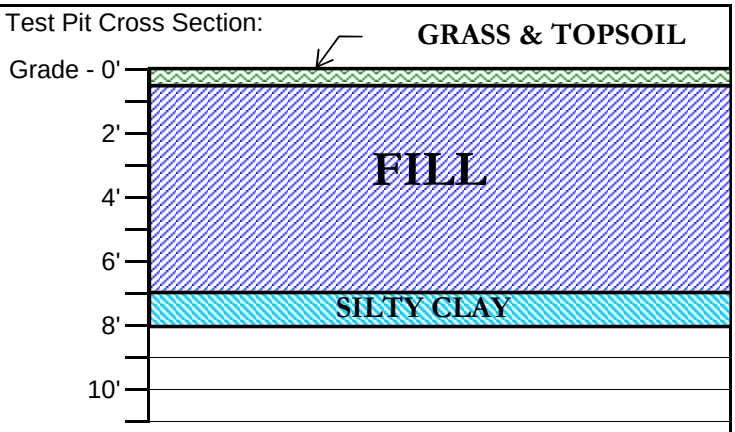
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	12:50	Length:	10.0 ft.	(approx.)
End:	13:40	Width:	3.0 ft.	(approx.)
		Depth:	8.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	2.9	Y	YES
0.5 - 2.0	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	2.9	Y	YES
2.0 - 7.0	**Fill:** Brown, moist, slag fill with cindery ash and brick, dense, loose when disturbed	40.0	Y	NO
7.0 - 8.0	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
8.0	End of Test Pit			

COMMENTS:

GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7'
VISUAL IMPACTS:	☑ YES	☐ NO	Describe:	Sheen on water
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO		Slag, ash, and brick

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-62**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

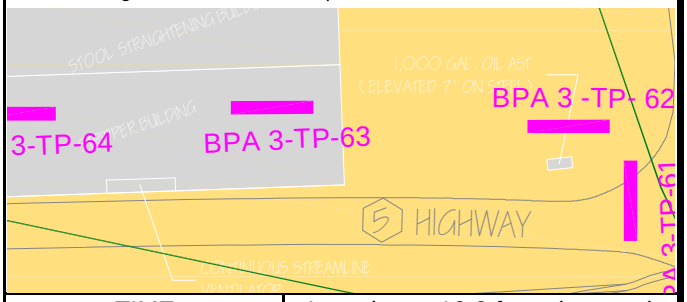
OTHER OBSERVATIONS:	☐ YES ☑ NO	Describe:	
SAMPLES COLLECTED:		Sample I.D.:	TP-62 (0-2')
		Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-63**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

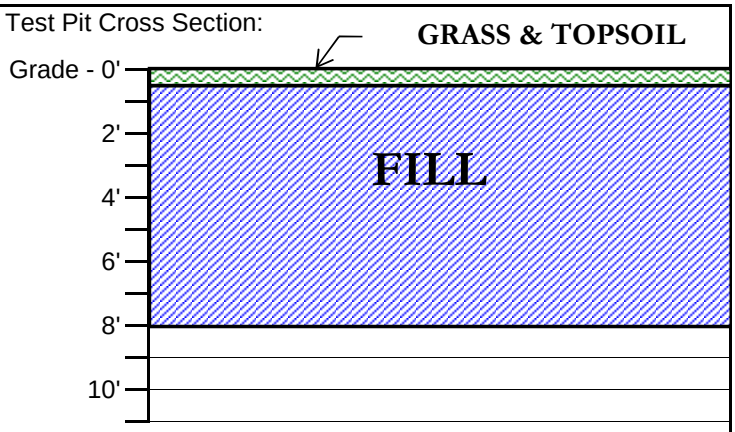
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	14:15	Length:	10.0 ft.	(approx.)
End:	15:25	Width:	3.0 ft.	(approx.)
		Depth:	8.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Reddish brown, moist, silt with some slag, loose	0.9	Y	YES
0.5 - 2.0	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	0.9	Y	YES
2.0 - 8.0	**Fill:** Brown, moist, slag fill with cindery ash and brick, dense, loose when disturbed	1.2	Y	NO
8.0	End of Test Pit			

COMMENTS:

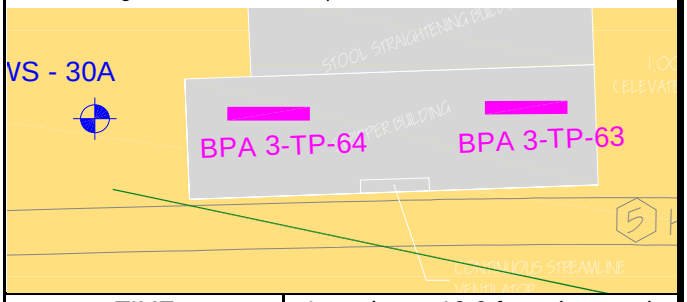
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	8'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-63 (0-2')
			Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-64**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

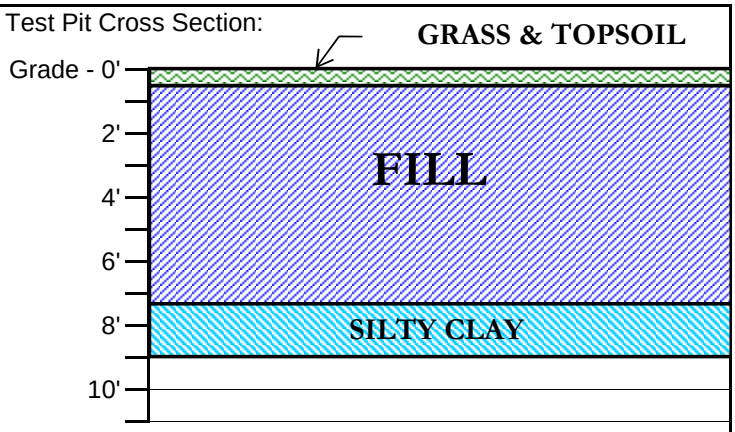
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	15:25	Length:	10.0 ft.	(approx.)
End:	16:00	Width:	3.0 ft.	(approx.)
		Depth:	9.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Reddish brown, moist, silt with some slag, loose	1.2	Y	YES
0.5 - 2.0	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	1.2	Y	YES
2.0 - 7.5	**Fill:** Brown, moist, slag fill with cindery ash and brick, dense, loose when disturbed	0.8	Y	NO
7.5 - 9.0	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
9.0	End of Test Pit			

COMMENTS:

GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7.5'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-64**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

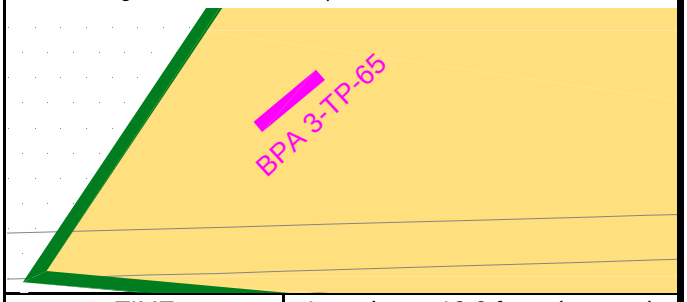
OTHER OBSERVATIONS:	☐ YES ☑ NO	Describe:	
SAMPLES COLLECTED:		Sample I.D.:	TP-64 (0-2')
		Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-65**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

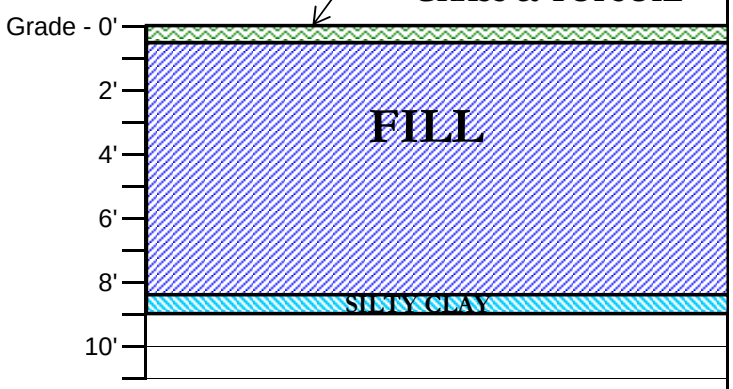
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	16:00	Length:	10.0 ft.	(approx.)
End:	16:25	Width:	3.0 ft.	(approx.)
		Depth:	9.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.8	Y	YES
0.5 - 1.5	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	0.8	Y	YES
1.5 - 8.5	**Fill:** Brown, moist to wet (7'), slag fill with cindery ash and brick, dense, loose when disturbed	0.8	Y	NO
8.5 - 9.0	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
9.0	End of Test Pit			

COMMENTS:

GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-65**
Project No.:	0071-008-300	Excavation Date:	08/26/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	Case 9030
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

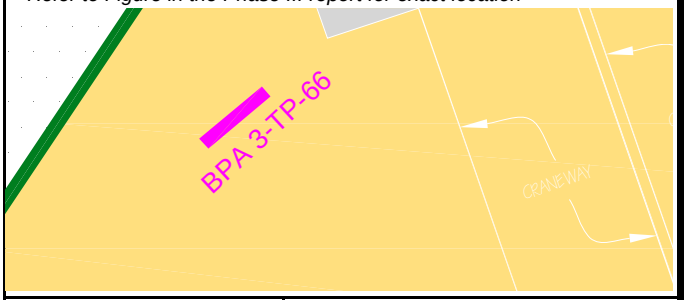
OTHER OBSERVATIONS:	☐ YES ☑ NO	Describe:	
SAMPLES COLLECTED:		Sample I.D.:	TP-65 (0-2')
		Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-66**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

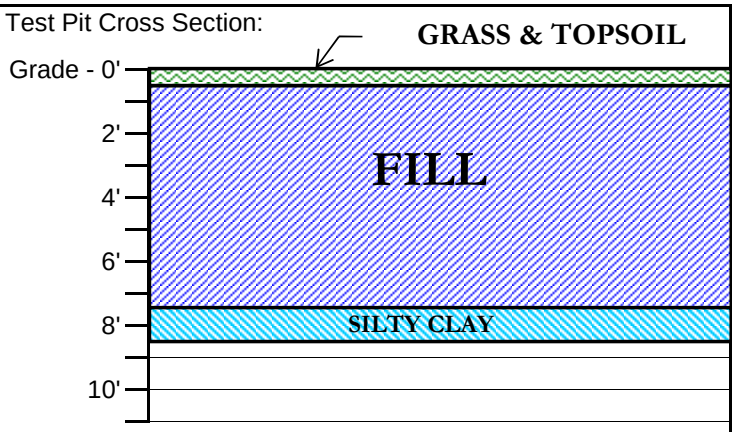
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	10:50	Length:	10.0 ft.	(approx.)
End:	11:30	Width:	3.0 ft.	(approx.)
		Depth:	8.5 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.7	Y	YES
0.5 - 7.5	**Fill:** Brown, moist to wet (6'), slag fill with cindery ash and brick, dense, loose when disturbed	0.6	Y	YES
7.5 - 8.5	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
8.5	End of Test Pit			

COMMENTS:

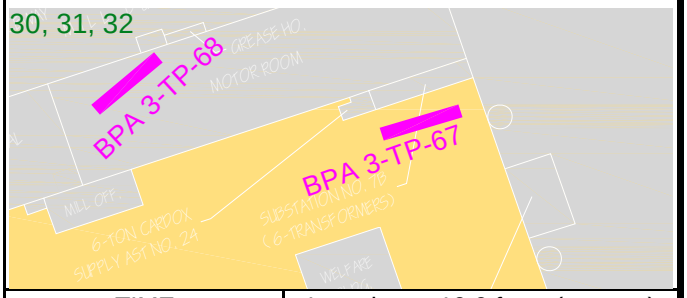
GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 6'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag, ash, and brick
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-66 (0-2')
					Sample I.D.:

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-67**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

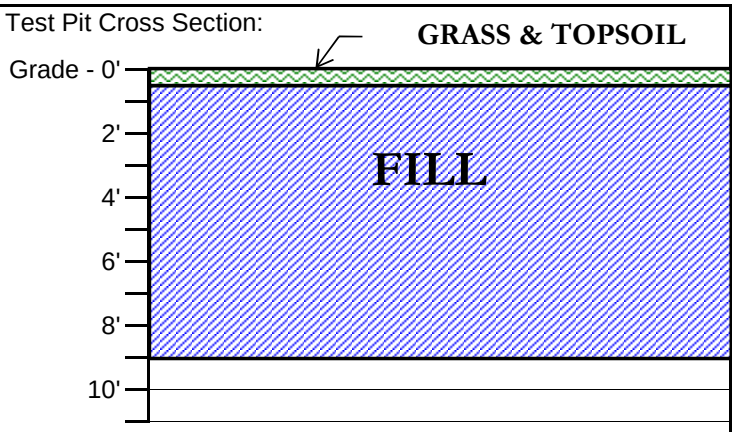
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	12:05	Length:	10.0 ft.	(approx.)
End:	12:45	Width:	3.0 ft.	(approx.)
		Depth:	9.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.4	Y	YES
0.5 - 1.5	**Fill:** Gray, moist, Slag fill with cindery ash and little Silt, dense, loose when disturbed	0.8	Y	YES
0.5 - 9.0	**Fill:** Brown, moist to wet (8.5'), brick fill with slag and cindery ash, dense, loose when disturbed	0.3	Y	YES
9.0	End of Test Pit			

COMMENTS:

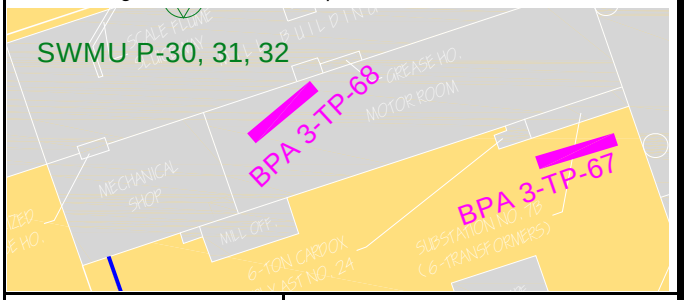
GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 8.5'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag, ash, and brick
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-67 (0-2')
					Sample I.D.:

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-68**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

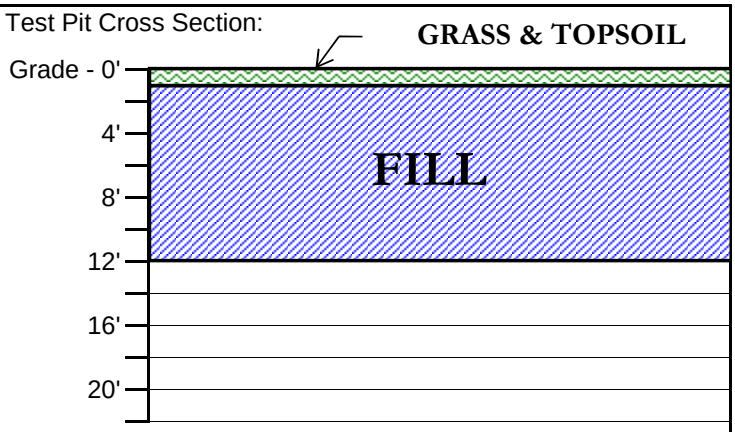
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	11:30	Length:	10.0 ft.	(approx.)
End:	12:05	Width:	3.0 ft.	(approx.)
		Depth:	12.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.8	Y	YES
0.5 - 3.0	**Fill:** Brown, moist, brick fill with slag and cindery ash, dense, loose when disturbed	0.8	Y	YES
3.0 - 12.0	**Fill:** Brown, moist to wet (8'), brick fill, dense, loose when disturbed	0.3	Y	NO
12	End of Test Pit			

COMMENTS:

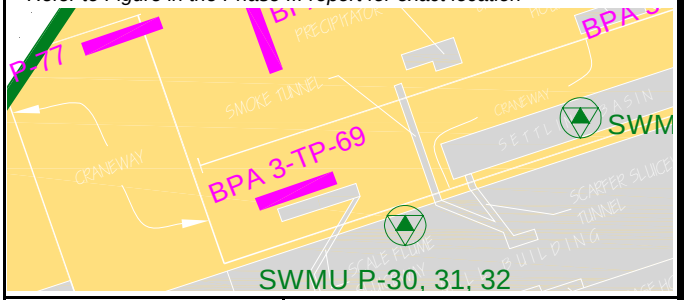
GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 8'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag, ash, and brick
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-68 (0-2')
					Sample I.D.:

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-69**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

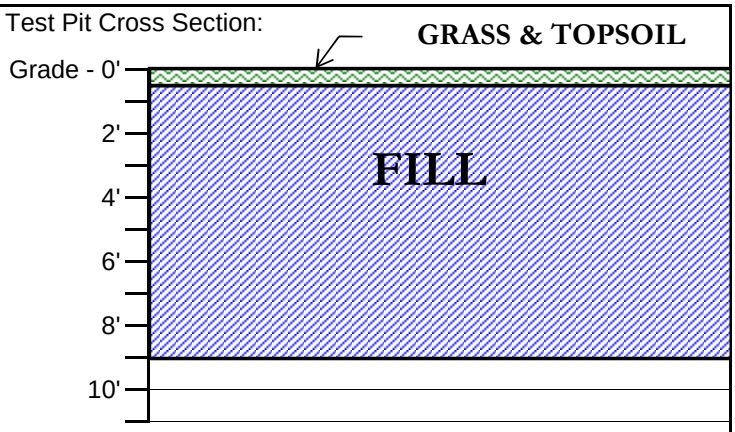
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	12:45	Length:	10.0 ft.	(approx.)
End:	14:00	Width:	3.0 ft.	(approx.)
		Depth:	9.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.9	Y	YES
0.5 - 9.0	**Fill:** Gray and dark grayish blue, moist to wet (8'), slag fill with cindery ash and little silt, dense, loose when disturbed	0.6	Y	YES
9.0	End of Test Pit			

COMMENTS: sample include both colors of slag

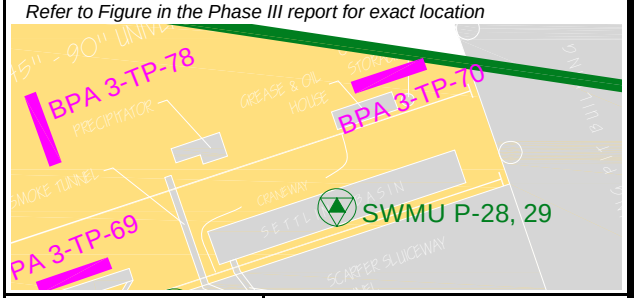
GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 8'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag and ash
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-69 (0-2')
					Sample I.D.:

TEST PIT EXCAVATION LOG

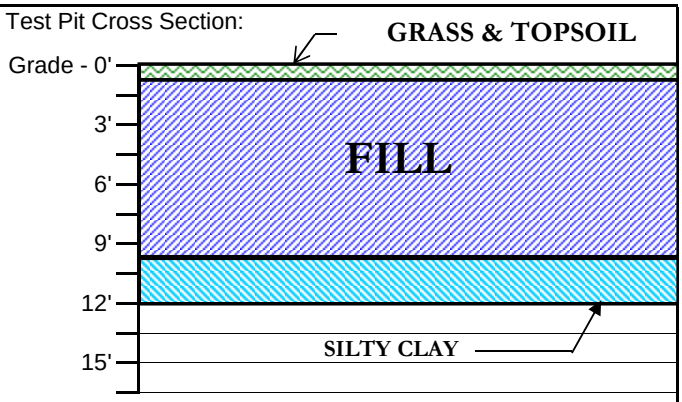
Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-70**
Project No.:	0071-008-300	Excavation Date:	08/29/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



Test Pit Cross Section:



TIME				
Start:	8:00	Length:	10.0 ft.	(approx.)
End:	9:45	Width:	3.0 ft.	(approx.)
		Depth:	12.0 ft.	(approx.)

Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.4	Y	YES
0.5 - 6.0	**Fill:** Brown, moist, slag fill with cindery ash, brick and little silt, dense, loose when disturbed	0.9	Y	YES
6.0 -10.0	**Fill:** Yellowish brown, moist to wet (8.0), Fill, silt with some clay and few slag	0.9	Y	YES
10.0 - 12.0	**Silty Clay:** Brown and gray, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
12.0	End of Test Pit			

COMMENTS:

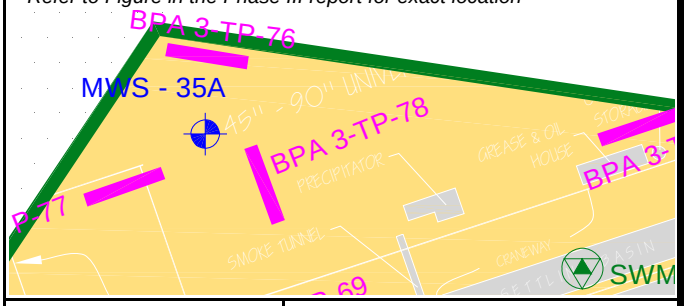
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	8'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-70 (0-2')
			Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-76**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

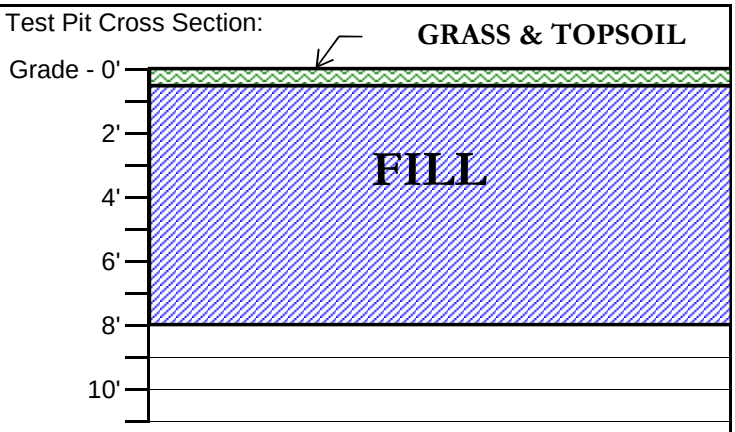
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	15:25	Length:	10.0 ft.	(approx.)
End:	15:40	Width:	3.0 ft.	(approx.)
		Depth:	8.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.5	Y	YES
0.5 - 8.0	**Fill:** Yellow brown, moist to wet (7.5), Slag fill with cindery ash and few Silt, dense, loose when disturbed	0.5	Y	YES
8	End of Test Pit			

COMMENTS: sample include both colors of slag

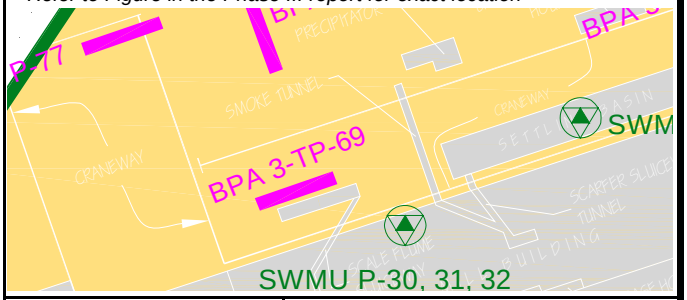
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7.5'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag and ash	
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-76 (0-2')
			Sample I.D.:	TP-76 (2-7')

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-77**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

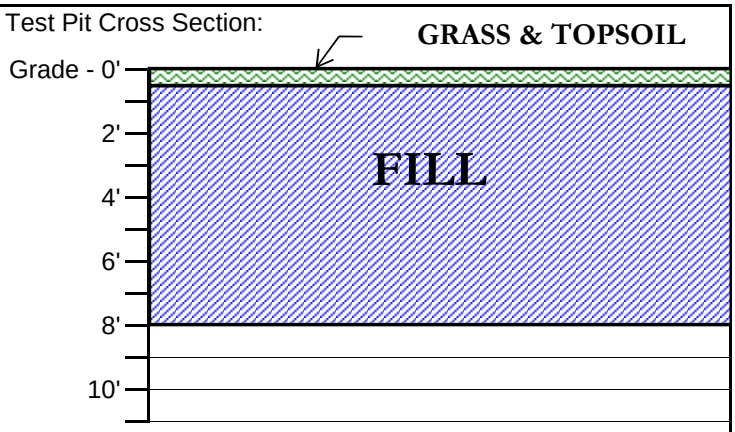
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	14:50	Length:	10.0 ft.	(approx.)
End:	15:25	Width:	3.0 ft.	(approx.)
		Depth:	8.0 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.8	Y	YES
0.5 - 8.0	**Fill:** Brown, moist to wet (7.5), Slag fill with cindery ash and few Silt, dense, loose when disturbed	0.8	Y	YES
8	End of Test Pit			

COMMENTS: sample include both colors of slag

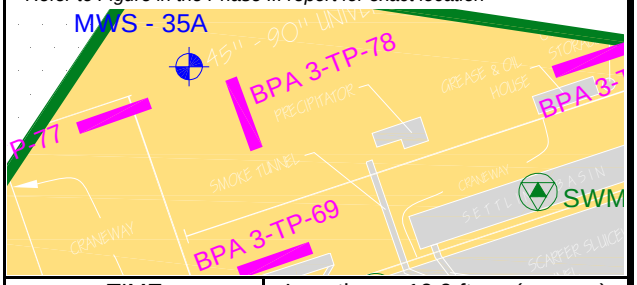
GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 8'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag and ash
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-77 (0-2')
					Sample I.D.:

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-78**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

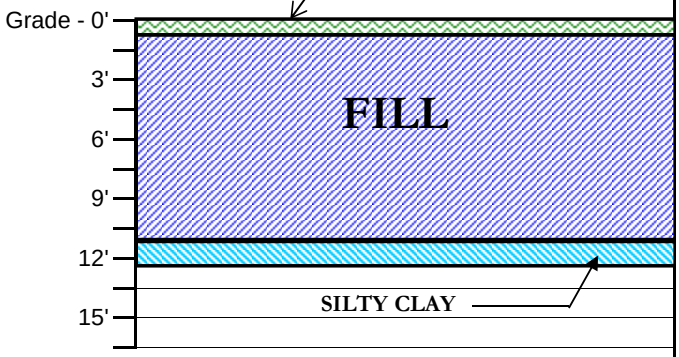
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	14:00	Length:	10.0 ft.	(approx.)
End:	14:50	Width:	3.0 ft.	(approx.)
		Depth:	12.5 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.5	Y	YES
0.5 - 5.5	**Fill:** Brown, moist, slag fill with cindery ash, brick and little silt, dense, loose when disturbed	0.5	Y	YES
5.5 -11.5	**Fill:** Brown, moist to wet (9.5'), sandy silt with, dense, loose when disturbed	0.5	Y	YES
11.5 - 12.5	**Silty Clay:** Brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
12.5	End of Test Pit			

COMMENTS:

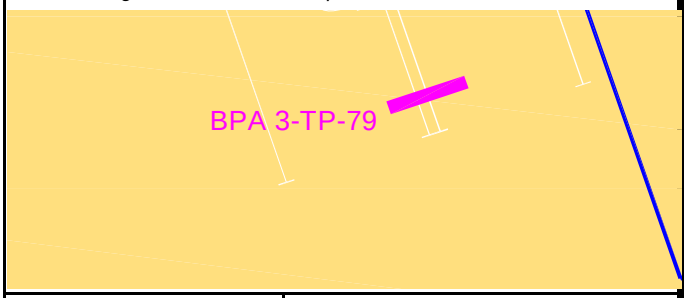
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	9.5'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO		Slag, ash, and brick
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-78 (0-2')
			Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-79**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

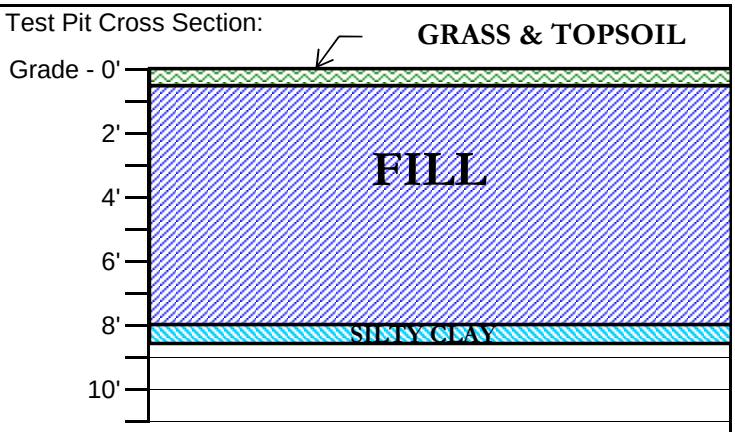
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	10:15	Length:	10.0 ft.	(approx.)
End:	10:50	Width:	3.0 ft.	(approx.)
		Depth:	8.5 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.6	Y	YES
0.5 - 8.0	**Fill:** Brown, moist to wet (7'), slag fill with cindery ash and brick, dense, loose when disturbed	0.4	Y	YES
8.0 - 8.5	**Silty Clay:** Grayish brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
8.5	End of Test Pit			

COMMENTS:

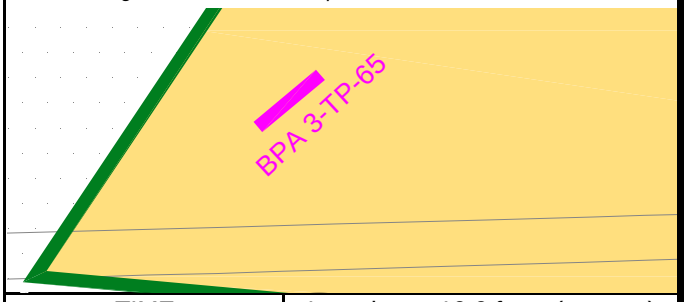
GROUNDWATER ENCOUNTERED:	☑ YES	☐ NO	If yes, depth to GW:	7'
VISUAL IMPACTS:	☐ YES	☑ NO	Describe:	
OLFACTORY OBSERVATIONS:	☐ YES	☑ NO	Describe:	
NON-NATIVE FILL ENCOUNTERED:	☑ YES	☐ NO	Slag, ash, and brick	
OTHER OBSERVATIONS:	☐ YES	☑ NO	Describe:	
SAMPLES COLLECTED:			Sample I.D.:	TP-79 (0-2')
			Sample I.D.:	

TEST PIT EXCAVATION LOG

Project:	Phase III BPA Remedial Investigation	TEST PIT I.D.:	**BPA 3-TP-80**
Project No.:	0071-008-300	Excavation Date:	08/28/08
Client:	ArcelorMittal Tecumseh Redevelopment, Inc	Excavation Method:	John Deere 330
Location:	Tecumseh, Phase III BPA	Logged / Checked By:	BG/BH

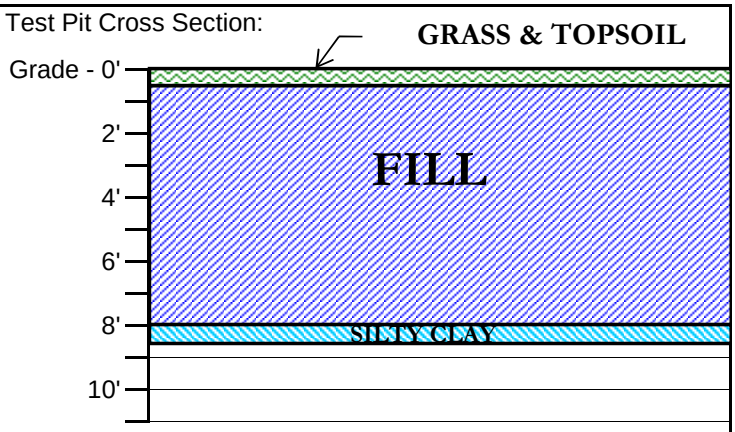
Test Pit Location: *NOT TO SCALE*

Refer to Figure in the Phase III report for exact location



TIME				
Start:	9:30	Length:	10.0 ft.	(approx.)
End:	10:15	Width:	3.0 ft.	(approx.)
		Depth:	8.5 ft.	(approx.)

Test Pit Cross Section:



Depth (fbgs)	USCS Symbol & Soil Description	PID Headspace (ppm)	Photos Y / N	Samples Collected (fbgs)
0.0 - 0.5	**Grass and topsoil:** Brown, moist, silt with some slag, loose	0.5	Y	YES
0.5 - 8.0	**Fill:** Brown, moist to wet (7'), slag fill with cindery ash and brick, dense, loose when disturbed	0.5	Y	YES
8.0 - 8.5	**Silty Clay:** Grayish brown, moist, Silty Clay, medium plasticity, stiff	NA	Y	NO
8.5	End of Test Pit			

COMMENTS:

GROUNDWATER ENCOUNTERED:	☑	YES	☐	NO	If yes, depth to GW: 7'
VISUAL IMPACTS:	☐	YES	☑	NO	Describe:
OLFACTORY OBSERVATIONS:	☐	YES	☑	NO	Describe:
NON-NATIVE FILL ENCOUNTERED:	☑	YES	☐	NO	Slag, ash, and brick
OTHER OBSERVATIONS:	☐	YES	☑	NO	Describe:
SAMPLES COLLECTED:					Sample I.D.: TP-80 (0-2')
					Sample I.D.: TP-80 (2-7')

APPENDIX B

SITE HEALTH AND SAFETY PLAN
AND
COMMUNITY AIR MONITORING PLAN

Site-Wide Health and Safety Plan

Tecumseh Redevelopment Site
Lackawanna, New York

July 2007 0071-007-350

Prepared For:

Tecumseh Redevelopment, Inc.
Richfield, Ohio

Prepared By:

726 Exchange Street, Suite 624, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

SITE HEALTH AND SAFETY PLAN
for
BROWNFIELD CLEANUP PROGRAM

TECUMSEH REDEVELOPMENT SITE

LACKAWANNA, NEW YORK

July 2007 0071-007-350

TECUMSEH REDEVELOPMENT SITE
SITE-WIDE HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: _____

Project Manager: _____

Designated Site Safety and Health Officer: _____

Acknowledgement:
I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

TECUMSEH REDEVELOPMENT SITE
SITE-WIDE HEALTH AND SAFETY PLAN

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1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by TurnKey Environmental Restoration, LLC and Benchmark Environmental Engineering & Science, PLLC employees (referred to jointly hereafter as "TurnKey-Benchmark") during Brownfield Cleanup Program (BCP) activities on the Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), located in the City of Lackawanna, New York.. This HASP presents procedures for TurnKey-Benchmark employees who will be involved with remedial field activities; it does not cover the activities of other contractors, subcontractors, or other individuals on the Site. These firms will be required to develop and enforce their own HASPs as discussed in Section 2.0. TurnKey-Benchmark accepts no responsibility for the health and safety of contractor, subcontractor, or other personnel.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards.

1.2 Background

Tecumseh Redevelopment, Inc. (Tecumseh) owns approximately 1,100 acres of land at 1951 Hamburg Turnpike, approximately 2 miles south of the City of Buffalo (see Figure 1). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with portions of the property extending into the Town of Hamburg. Tecumseh's property is bordered by: NY State Route 5 (Hamburg Turnpike) on the east; Lake Erie to the west and northwest; and other industrial properties to the south and the northeast. Figure 2 provides an overview of the Tecumseh Property, including major leased or licensed parcels, and adjacent parcels owned by others.

The Tecumseh property is located on a portion of the Site of the former Bethlehem Steel Corporation (BSC) Lackawanna Works in a primarily industrial area. The property was

formerly used for the production of steel, coke and related products by Bethlehem Steel Corporation (BSC). According to the Real Estate Records, in 1937, Bethlehem Steel Company owned the subject Site. In 1964, Bethlehem Steel Company merged into Bethlehem Steel Corporation. Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired the property, along with other BSC assets, out of bankruptcy in 2003.

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the entire former Bethlehem Steel Lackawanna Works was initiated by BSC under an Administrative Order issued by the United States Environmental Protection Agency (USEPA) in 1990. Tecumseh completed the RFI in January 2005. In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh is presently negotiating an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) to undertake corrective measures at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property.

In April 2005, Tecumseh signed a Memorandum of Understanding (MOU) with Erie County and the City of Lackawanna to promote redevelopment of the former BSC Lackawanna property following cleanup. Figure 3 illustrates the conceptual Redevelopment Master Plan for redevelopment of the entire 1,100-acre Site. Tecumseh has entered into Brownfield Cleanup Agreements with the NYSDEC to investigate, remediate, and redevelop the Phase I, II and III Business Parks. Tecumseh is also preparing a BCP application to the NYSDEC for the Phase IA Business Park.

In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's (and in turn Tecumseh's) obligation under the 1990 Administrative Order. Tecumseh is presently negotiating an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) to undertake corrective measures at certain solid waste management units (SWMUs) primarily on the western slag fill and coke manufacturing portion of the property. In addition, Tecumseh has applied for and received NYSDEC acceptance of three parcels, referred to as Business Park Phase I, II and III, into the NY State Brownfield Cleanup Program. Brownfield Cleanup Agreements have been signed for all three of these parcels. Business Park Phase I encompasses approximately 102 acres, and is presently in the final stages of a Remedial Investigation and Alternatives Analysis Report

(RI/AAR). Phases II and III encompass approximately 173 and 128 acres, respectively, and are slated to undergo remedial investigation.

BQ Energy, LLC has entered into a long-term lease agreement with Tecumseh to construct and operate wind turbines and supporting power generation equipment and infrastructure on approximately 29 acres of the Tecumseh property, referred to as the "Steel Winds Site." This 29-acre parcel, located along the Lake Erie shoreline, was investigated and is presently undergoing final remedial measures under the NY State Brownfield Cleanup Program. Eight wind turbines and supporting power generation equipment and infrastructure are presently operating on this parcel.

Consistent with the Redevelopment Master Plan, BQ Energy, LLC has submitted applications to the NYSDEC for participation in the Brownfield Cleanup Program for construction of wind turbines on two additional parcels. BQ Energy is proposing construction two additional wind turbines to the north of the existing eight turbines on an approximate 9.33-acre parcel, referred to as Steel Winds IA. The Steel Winds IA Site is part of an existing lease agreement between Tecumseh Redevelopment, Inc and BQ Energy. The project has been subjected to SEQRA review and has been issued a negative declaration by the City of Lackawanna, the lead agency for the project. BQ Energy, LLC is also proposing construction of additional turbines, seven to eight of which will be located along the western boundary of the Phase III Business Park Area of the Tecumseh property. These seven to eight additional turbines will occupy approximately an approximate 55.47-acre parcel deemed "Steel Winds II." The Steel Winds II BCP Site would be extended along the full length of the western boundary of Phase III Business Park. As this parcel is already in the BCP as part of Tecumseh Redevelopment, Inc.'s Phase III Business Park, this application seeks to "carve out" or reassign this portion of the Phase III Business Park to BQ Energy, LLC for the express purpose of expediting the RI/AAR and expanding the wind farm on this portion of the site under the BCP. BQ Energy, LLC is in the process of negotiating a lease with Tecumseh for this project.

1.3 Known and Suspected Environmental Conditions

The Phase I, II, and III Business Park Areas were formerly used to house portions of BSC's steel making operations. The Phase IA Business Park Area was formerly used to house several buildings; these facilities were used to support steel making and related

operations performed by BSC. The Steel Winds IA Site is located on a portion of the former BSC Lackawanna Works that was created from the historic disposal of slag fill along the Lake Erie shoreline. The slag and other industrial fill materials contain highly variable and sometimes elevated concentrations of metals, as well as semi-volatile and volatile organic compounds (SVOCs and VOCs). The existing Steel Winds Site (Turbines 1 through 8) is also associated with elevated concentrations of metals and PAHs, as well as naphthalene. In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX) in groundwater.

1.4 Parameters of Interest

Constituents of potential concern (COPCs) at the Site include:

- **Volatile Organic Compounds (VOCs)** – VOCs present at elevated concentration may include benzene, toluene, ethylbenzene and xylene (i.e., BTEX). These VOCs are typically associated with storage and handling of petroleum products such as gasoline.

- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs present at elevated concentrations may include base-neutral semi-volatile organic compounds (SVOCs) associated with oils, greases, and fuels associated with the operation of locomotive engines, steel mills, petroleum bulk storage and other historic steel manufacturing operations. Specifically, polynuclear aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Although PAHs are commonly found in urban soil environments, they may be present at the Site at concentrations that are elevated compared to typical "background" levels. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned.

- **Polychlorinated Biphenyls (PCBs)** – The potential impact of surface and subsurface soils by PCBs in discrete areas associated with former substations, rail yards, and hydraulic pump houses.

- **Inorganic Compounds** – Inorganic COPCs potentially present at elevated concentrations due to steel making activities may include arsenic, cadmium, chromium, lead, and mercury. Several of these parameters are components of coke and slag which are prevalent in the planned work area.

In addition, groundwater in contact with the soil/fill materials described above may exhibit elevated concentrations of corresponding soluble COPCs (e.g., BTEX).

1.5 Overview of BCP Activities

TurnKey-Benchmark personnel will be on-site to observe BCP remedial activities. General field activities to be completed are described below. Detailed BCP activities are more fully described in the individual work plans for each property.

1. **Subgrade Work:** Significant grading of the Site may be required before implementation of remedial measures (e.g., cover system placement).

2. **Soil/Fill Excavation:** TurnKey-Benchmark will monitor all soil/fill excavations (e.g., wind turbine foundation excavation) and related activities to visually inspect soil/fill for evidence of contamination.

3. **Soil/Fill Documentation Sampling:** TurnKey-Benchmark will collect surface and subsurface soil/fill documentation samples following excavation.

4. **Surface Water Management:** During excavations, surface water and/or perched groundwater infiltration may occur. TurnKey-Benchmark will direct the contractor to collect and characterize the surface water for proper disposal.

5. **Cover Soil Placement:** A soil cover system will be placed over select portions of the Site to reduce potential contact with impacted soil/fill.

6. **Groundwater Monitoring Well Installation and Sampling:** TurnKey-Benchmark will collect groundwater samples for the long-term groundwater monitoring program.

7. **Groundwater Remediation:** Possible groundwater remediation at the Site includes installation of *Advanced*™ Oxygen Reducing Compound (ORC) filter socks in groundwater monitoring wells.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility, and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establishes the lines of communications among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

All Turnkey-Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The TurnKey-Benchmark Corporate Health and Safety Director is ***Mr. Thomas H. Forbes***. The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates TurnKey-Benchmark's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Ste is ***Mr. Patrick T. Martin, P.E.*** The Project Manager has the responsibility and authority to direct all TurnKey-Benchmark work operations at the site. The Project Manager coordinates safety and health functions with the

Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the site work plan.
- Providing TurnKey-Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this site is ***Mr. Richard L. Dubisz***. The qualified alternate SSHO is ***Mr. Thomas Behrendt.*** The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for TurnKey-Benchmark personnel on the site.
- Serving as the point of contact for safety and health matters.
- Ensuring that TurnKey-Benchmark field personnel working on the site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing site monitoring as required by the HASP.

- Assisting in the preparation and review of the HASP
- Maintaining site-specific safety and health records as described in this HASP
- Coordinating with the Project Manager, Site Workers and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e., Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other site personnel who will have health and safety responsibilities will include the Remedial Contractor, who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than TurnKey-Benchmark's HASP. TurnKey-Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. Each Contractor's HASP shall cover all non-TurnKey/ Benchmark site personnel. Each Contractor shall assign a SSHO who will coordinate with TurnKey-Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to TurnKey-Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the Site, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of fill/soils prior to cover placement, and through the inhalation of contaminated particles or vapors. In addition, the use of heavy construction equipment (e.g., dozer) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

As discussed in Section 1.3, historic activities related to the former steel-manufacturing operations and facilities have resulted in elevated concentrations of VOCs, SVOCs, PCBs, and inorganic compounds in Site soils and groundwater. Table 1 identifies COPCs detected throughout the Tecumseh property. Table 2 lists exposure limits for airborne concentrations of the COPCs identified in Section 1.4 of this HASP. Brief descriptions of the toxicology of the prevalent constituents of potential concern and related health and safety guidance and criteria are provided below.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.

- **Benzene (CAS #71-43-2)** poisoning occurs most commonly through inhalation of the vapor, however, benzene can also penetrate the skin and poison in that way. Locally, benzene has a comparatively strong irritating effect, producing

erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., 3,000 ppm or higher) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of 100 ppm or less) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.

- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.

- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin liver and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, headache. Narcosis and coma may result in more severe cases.

- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists or ankles and possibly affect memory. Lead may cause anemia.

- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue and salivation. Mercury is a skin and eye irritant.

- **Naphthalene (CAS #91-20-3)** is a white solid with a strong smell; is also called mothballs, moth flakes, white tar, and tar camphor. Naphthalene is a natural

component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned. Acute exposure to naphthalene can cause systemic reactions, including nausea, headache, diaphoresis, hematuria, fever, anemia, liver damage, vomiting, convulsions, and coma. Acute exposure can also cause eye irritation, confusion, excitement, malaise, abdominal pain, irritation to the bladder, profuse sweating, jaundice, hematopoietic, hemoglobinuria, renal shutdown, and dermatitis. Exposure to a large amount of naphthalene can cause red blood cells to be damaged or destroyed, a condition called hemolytic anemia, which leads to fatigue, lack of appetite, restlessness, and a pale appearance. Poisoning may occur by ingestion of large doses, skin and/or eye contact, inhalation, or skin absorption.

- **Polycyclic Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAH's are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

- **Polychlorinated Biphenyls (PCBs)** are associated with former substations, rail yards, and hydraulic pump houses on the Site. Aroclors 1248, 1254, and 1260 have been observed in Site soil/fill. PCBs can be absorbed into the body by inhalation of its aerosol, through the skin, and by ingestion. Repeated or prolonged contact with skin may cause dermatitis. PCBs may have effects on the liver. Animal tests show that that PCBs possibly cause toxic effects in human reproduction. In the food chain, bioaccumulation takes place, specifically in aquatic organisms. A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness,

drowsiness and coordination loss. Repeated exposures may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.

- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposures may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure of high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

With respect to the anticipated BCP activities discussed in Section 1.5, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contamination. Exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

BCP remedial activities at the Tecumseh Redevelopment Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as grading equipment, excavators, and tandem trucks.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may be present during remedial activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing remedial activities at the Site (such as, but not limited to, equipment operators, general laborers, and supervisors) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.

- Work zones and site control.
- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at TurnKey-Benchmark's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health and other hazards present on the Site.

- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure as described in Chapter 5 of this HASP.
- Decontamination procedures as detailed in Chapter 12 of this HASP.
- The emergency response plan as detailed in Chapter 15 of this HASP.
- Confined space entry procedures, if required, as detailed in Chapter 13 of this HASP.
- The spill containment program as detailed in Chapter 9 of this HASP.
- Site control as detailed in Chapter 11 of this HASP.

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (i.e., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1,

above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix A of this HASP, Emergency Response Plan.

4.4 Site Visitors

Each Contractor's SSHO will provide a site-specific briefing to all site visitors and other non-TurnKey/Benchmark personnel who enter the Site beyond the site entry point. The site-specific briefing will provide information about site hazards, the site layout including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to TurnKey-Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all TurnKey-Benchmark employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by ADP Screening & Selection Services, an occupational health care provider under contract with TurnKey-Benchmark. ADP's local facility is Health Works WNY, Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the TurnKey-Benchmark Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).

- Medical certification of physical requirements (i.e., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, TurnKey-Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All TurnKey-Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the site as required by the HASP or as modified by the site safety officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the TurnKey-Benchmark occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for TurnKey-Benchmark employees, as requested and required.

The recommended specific safety practices for working around the contractor's equipment (e.g., backhoes, bulldozers, excavators, etc.) are as follows:

- Although the Contractor and subcontractors are responsible for their equipment and safe operation of the site, TurnKey-Benchmark personnel are also responsible for their own safety.
- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.

- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.

- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to

escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.

- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air-monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the remedial activities, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that organic vapors and/or particulates may be released to the air during intrusive construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

TurnKey personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by TurnKey personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Air Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH Appendix 1A Generic Community Air Monitoring Plan (Reference 4) and attached as Appendix C. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and

the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community because of site investigation work.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID, explosimeter, or other appropriate instrument(s), will be used by TurnKey personnel to monitor organic vapor concentrations as specified in this HASP. In addition, fugitive dust/particulate concentrations will be monitored during major soil intrusion using a real-time particulate monitor as specified in this plan. In the absence of such monitoring, appropriate respiratory protection for particulates shall be donned. Sustained readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for TurnKey-Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Appendix A).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID -

Continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during RD activities involving deep excavation, if required. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5-21% oxygen - proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of site soil/fill. Action levels based on the instrument readings shall be as follows:

- Less than 50 $\mu g/m^3$ - Continue field operations.
- 50-150 $\mu g/m^3$ - Don dust/particulate mask or equivalent
- Greater than 150 $\mu g/m^3$ - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (i.e., wetting of excavated soils or tools at discretion of SSHO).

Readings with the organic vapor analyzer, combustible gas meter, and particulate monitor will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume but more frequent intervals of monitoring, as directed by the SSHO, must be conducted.

  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the SSHO, are conducted.

  - If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone, the SSHO must be notified and work activities shut down. The SSHO will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) personnel to review.

- **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**
  - If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.
  - If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).
  - If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

- ***Major Vapor Emission Response Plan*:**

  Upon activation, the following activities will be undertaken:

  1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.
  2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.
  3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the SSHO.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

- **EXPLOSIVE VAPORS:**
  - Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  - Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **Airborne Particulate Community Air Monitoring**

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than the background (upwind perimeter) reading for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and that visible dust is not migrating from the work area.
- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 $\mu g/m^3$ above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding RQ.

- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding RQ.

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes that could form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during Remedial efforts.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented as Appendix A of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be

contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned, or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Contractor will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (NYSDEC approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the site. The response contractor may use heavy equipment (i.e., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- AAA Environmental (585) 750-2811

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Site will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to TurnKey-Benchmark employees. The SSHO and/or his or her designee will be responsible for monitoring TurnKey-Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed

to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same. If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period

should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No TurnKey-Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

  1) **Frost nip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

  2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue, which will be firm to the touch but will yield little pain. The treatment is identical for Frost nip.

  3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frost nip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

  1) Shivering

  2) Apathy (i.e., a change to an indifferent or uncaring mood)

3) Unconsciousness

4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
  - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
  - At a workers request.

- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).

- As a screening measure whenever anyone worker on site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established on a daily basis and communicated to all employees and other site users by the SSHO. It shall be each Contractor's SSHO's responsibility to ensure that all site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contamination Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated.

- Support Zone - The part of the site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation and construction activities involving disruption or handling of site soils or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling/construction activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling/construction activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the

completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The SSHO will maintain a Health and Safety Logbook containing the names of TurnKey-Benchmark workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for TurnKey-Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions that may arise at the site. All TurnKey-Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for a duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR

1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

Decontamination of heavy equipment will be conducted by the Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

Decontamination of all tools used for sample collection purposes will be conducted by TurnKey-Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal), which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment.
- Water wash to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space that is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by TurnKey-Benchmark employees is not anticipated to be necessary to complete the remedial activities identified in Section 2.0. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by TurnKey-Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through TurnKey-Benchmark's corporate Health and Safety Director. TurnKey-Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the NFPA.

14.4 Hot Work

If the scope of work necessitates welding or blowtorch operation, the hot work permit presented in Appendix B will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix A. The hospital route map is presented as Figure A-1.

16.0 REFERENCES

1. New York State Department of Health. 2002. *Generic Community Air Monitoring Plan, Appendix 1A, Draft DER-10 Technical Guidance for Site Investigation and Remediation.* December.

TABLES

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

Steel Winds Site
BQ Energy, LLC
Lackawanna, New York

Parameter	CAS No.	Maximum Detected Concentration		
		Groundwater (mg/L)	Surface Soil/Fill (mg/kg)	Sub-Surface Soil/Fill (mg/kg)
Volatile Organic Compounds (VOCs):		0.46	NA	0.044
Polycyclic Aromatic Hydrocarbons (PAHs):		NA	75	364
Inorganics:				
Arsenic	7440-38-2	70.6	28	17.7
Cadmium	7440-43-9	20.6	9.7	3.7
Chromium	7440-47-3	306	1190	508
Lead	7439-92-1	26.3	160	224
Mercury	7439-97-6	0.22	0.23	0.99

Notes:
NA = not analyzed.

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN [1]

Site-Wide Health and Safety Plan
Tecumseh Redevelopment Site
Lackawanna, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs): ppm						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	200	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Polycyclic Aromatic Hydrocarbons (PAHs)[2] : ppm						
Acenaphthene	*none*	83-32-9	*none*	--	--	--
Acenaphthylene	*none*	208-96-8	*none*	--	--	--
Anthracene	*none*	120-12-7	*none*	--	--	--
Benz(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(ghi)perylene	*none*	191-24-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenz(ah)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Coal Dust (mg/m^3)	Anthracite, Bituminous, or Lignite coal dust	NA	*none*	2.4	--	ND
Polychlorinated Inorganic Compounds: mg/m^3						
Aroclor 1248	Chlorodiphenyl, 48% chlorine	12672-29-6	Ca	--	--	--
Aroclor 1254	Chlorodiphenyl, 54% chlorine	11097-69-1	Ca	0.5	0.5	5
Aroclor 1260	Chlorodiphenyl, 60% chlorine	11096-82-5	*none*	--	--	--
Inorganic Compounds: mg/m^3						
Arsenic	*none*	7440-38-2	Ca	0.01	0.01	5
Cadmium	*none*	7440-43-9	Ca	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10

Notes:
1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. Individual parameters listed are those most commonly detected at steel/coke manufacturing sites.
3. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:
Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hours/day @ 40 hours/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA. It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceeded.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximium exposure conconcentration allowable for 8 hours per day @ 40 hours per week

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN [1]

Site-Wide Health and Safety Plan
Tecumseh Redevelopment Site
Lackawanna, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Slag/Fill Subgrade Preparation	**x**	**x**	
2. Soil/Fill Excavation	x	x	
3. Soil/Fill Documentation Sampling	**x**	**x**	
4. Surface Water Management			**x**
5. Cover Soil Placement	**x**	**x**	
6. Groundwater Monitoring Well Installation/Sampling	**x**	**x**	**x**
7. Groundwater Remediation			

Notes:
1. Activity as described in Section 1.5 of the Health and Safety Plan.

TABLE 4

REQUIRED LEVELS OF PROTECTION
FOR BCP REMEDIAL ACTIVITIES

Site-Wide Health and Safety Plan
Tecumseh Redevelopment Site
Lackawanna, New York

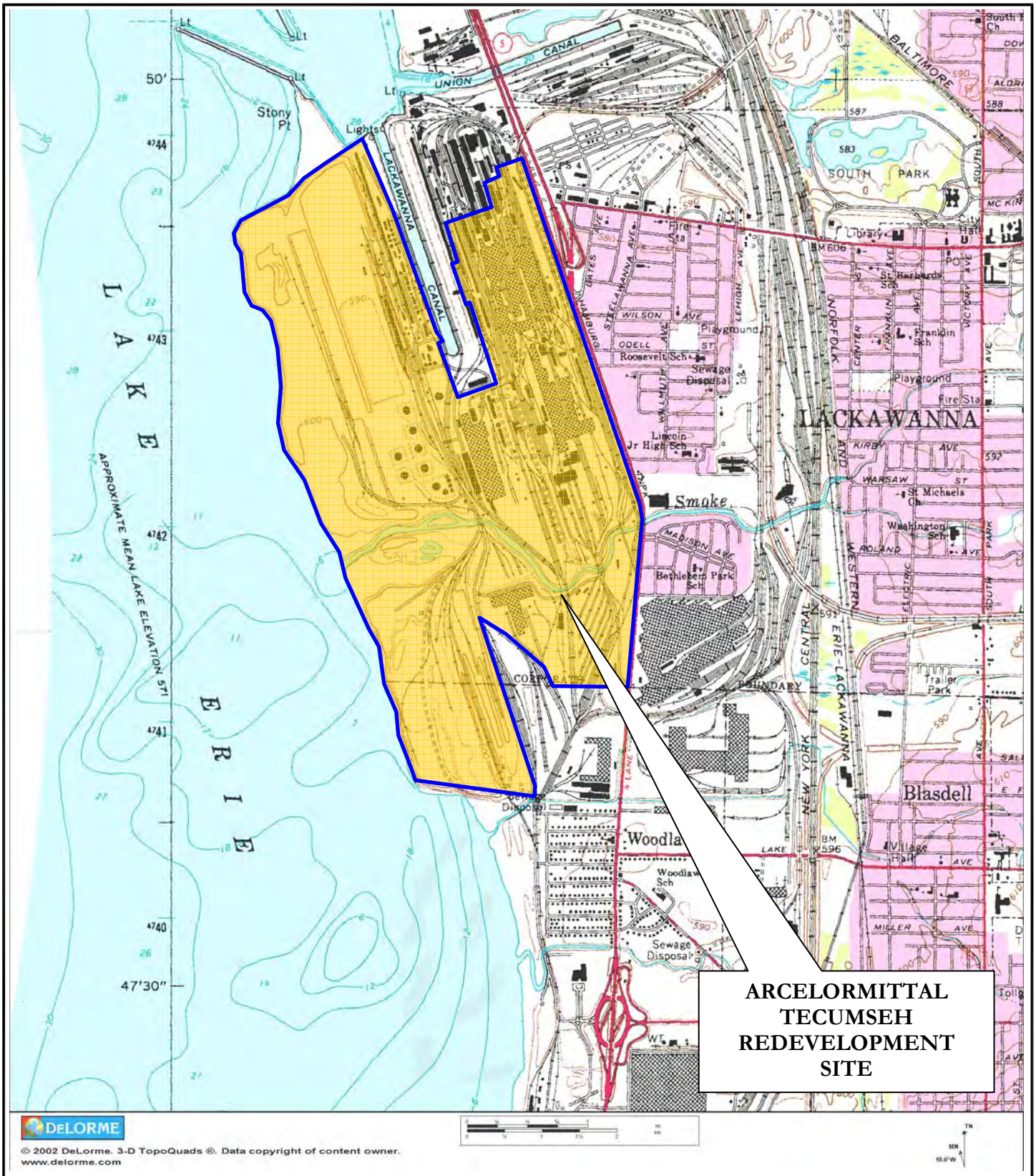
Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil/Fill Subgrade Preparation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
2. Soil/Fill Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
3. Soil/Fill Documentation Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
4. Surface Water Management	Level D (upgrade to Level C if necessary)	Poly-coated Tyvek or S	L/N	outer: L inner: STSS	HH SGSS
5. Cover Soil Placement	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS
6. Groundwater Monitoring Well Installation/Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
7. Groundwater Remediation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

FIGURE B-1



TURNKEY ENVIRONMENTAL RESTORATION, LLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0083-003-100

DATE: MAY 2006

DRAFTED BY: BCH

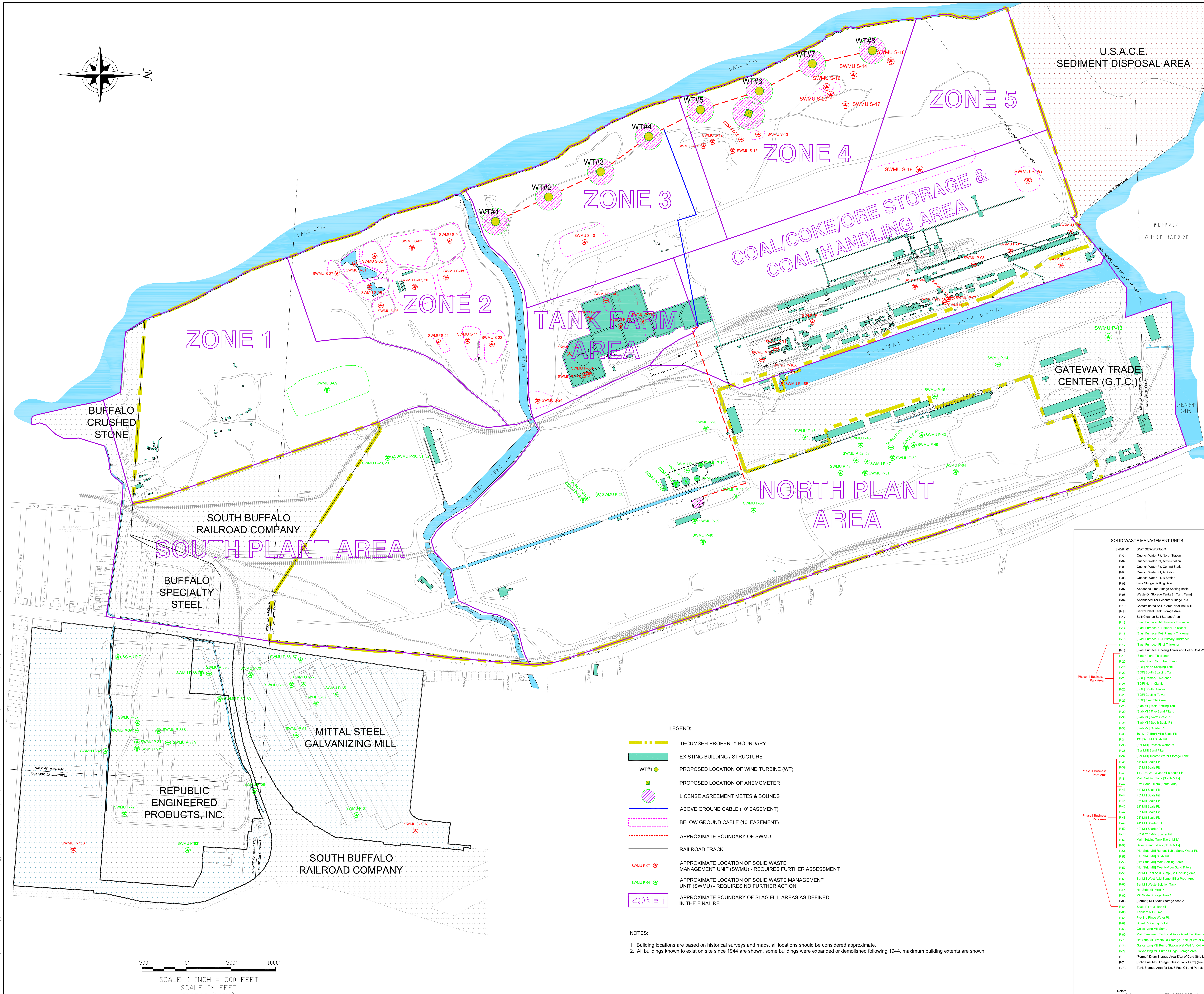
SITE LOCATION AND VICINITY MAP

APPENDIX B - HEALTH AND SAFETY PLAN

STEEL WINDS FACILITY
LACKAWANNA, NEW YORK

PREPARED FOR

BQ ENERGY, LLC



LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- WT#1 PROPOSED LOCATION OF WIND TURBINE (WT)
- PROPOSED LOCATION OF ANEMOMETER
- LICENSE AGREEMENT METES & BOUNDS
- ABOVE GROUND CABLE (10' EASEMENT)
- BELOW GROUND CABLE (10' EASEMENT)
- APPROXIMATE BOUNDARY OF SWMU
- RAILROAD TRACK
- SWMU P-07 APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES FURTHER ASSESSMENT
- SWMU P-44 APPROXIMATE LOCATION OF SOLID WASTE MANAGEMENT UNIT (SWMU) - REQUIRES NO FURTHER ACTION
- ZONE 1 APPROXIMATE BOUNDARY OF SLAG FILL AREAS AS DEFINED IN THE FINAL RFI

NOTES:

1. Building locations are based on historical surveys and maps, all locations should be considered approximate.
2. All buildings known to exist on site since 1944 are shown, some buildings were expanded or demolished following 1944, maximum building extents are shown.

SOLID WASTE MANAGEMENT UNITS

SWMU ID	UNIT DESCRIPTION
P-01	Quench Water Pit, North Station
P-02	Quench Water Pit, Arctic Station
P-03	Quench Water Pit, Central Station
P-04	Quench Water Pit, A Station
P-05	Quench Water Pit, B Station
P-06	Lime Sludge Settling Basin
P-07	Abadoned Lime Sludge Settling Basin
P-08	Waste Oil Storage Tanks [in Tank Farm]
P-09	Abandoned Tar Decanter Sludge Pits
P-10	Contaminated Soil in Area Near Ball Mill
P-11	Benzol Plant Tank Storage Area
P-12	Spill Cleanup Soil Storage Area
P-13	[Blast Furnace] A-B Primary Thickener
P-14	[Blast Furnace] C Primary Thickener
P-15	[Blast Furnace] F-G Primary Thickener
P-16	[Blast Furnace] H-J Primary Thickener
P-17	[Blast Furnace] Final Thickener
P-18	[Blast Furnace] Cooling Tower and Hot & Cold Wells
P-19	[Sinter Plant] Thickener
P-20	[Sinter Plant] Scrubber Sump
P-21	[BOF] North Scalping Tank
P-22	[BOF] South Scalping Tank
P-23	[BOF] Primary Thickener
P-24	[BOF] North Clarifier
P-25	[BOF] South Clarifier
P-26	[BOF] Cooling Tower
P-27	[BOF] Final Thickener
P-28	[Slab Mill] Main Settling Tank
P-29	[Slab Mill] Five Sand Filters
P-30	[Slab Mill] North Scale Pit
P-31	[Slab Mill] South Scale Pit
P-32	[Slab Mill] Scarfer Pit
P-33	10" & 12" [Bar] Mills Scale Pit
P-34	13" [Bar] Mill Scale Pit
P-35	[Bar Mill] Process Water Pit
P-36	[Bar Mill] Sand Filter
P-37	[Bar Mill] Treated Water Storage Tank
P-38	54" Mill Scale Pit
P-39	48" Mill Scale Pit
P-40	14", 18", 28", & 35" Mills Scale Pit
P-41	Main Settling Tank [South Mills]
P-42	Five Sand Filters [South Mills]
P-43	44" Mill Scale Pit
P-44	40" Mill Scale Pit
P-45	36" Mill Scale Pit
P-46	32" Mill Scale Pit
P-47	30" Mill Scale Pit
P-48	21" Mill Scale Pit
P-49	44" Mill Scarfer Pit
P-50	40" Mill Scarfer Pit
P-51	30" & 21" Mills Scarfer Pit
P-52	Main Settling Tank [North Mills]
P-53	Seven Sand Filters [North Mills]
P-54	[Hot Strip Mill] Runout Table Spray Water Pit
P-55	[Hot Strip Mill] Scale Pit
P-56	[Hot Strip Mill] Main Settling Basin
P-57	[Hot Strip Mill] Twenty-Four Sand Filters
P-58	Bar Mill East Acid Sump [Coil Pickling Area]
P-59	Bar Mill West Acid Sump [Billet Prep. Area]
P-60	Bar Mill Waste Solution Tank
P-61	Hot Strip Mill Acid Pit
P-62	Mill Scale Storage Area 1
P-63	[Former] Mill Scale Storage Area 2
P-64	Scale Pit at 8" Bar Mill
P-65	Tandem Mill Sump
P-66	Pickling Rinse Water Pit
P-67	Spent Pickle Liquor Pit
P-68	Galvanizing Mill Sump
P-69	Main Treatment Tank and Associated Facilities [at Water Quality Control Station #7]
P-70	Hot Strip Mill Waste Oil Storage Tank [at Water Quality Control Station #7]
P-71	Galvanizing Mill Pump Station Wet Well for Old Acid Sewer Line
P-72	Galvanizing Mill Sump Sludge Storage Area
P-73	[Former] Drum Storage Area EAst of Cord Strip Mill
P-74	[Solid Fuel Mix Storage Piles in Tank Farm] (see note 3)
P-75	Tank Storage Area for No. 6 Fuel Oil and Petroleum Tar [Tank Farm]

Phase III Business Park Area: P-17, P-19 – P-27
Phase II Business Park Area: P-38 – P-42
Phase I Business Park Area: P-43 – P-53, P-64

SOLID WASTE MANAGEMENT UNITS

SWMU ID	UNIT DESCRIPTION
S-01	Surface Impoundment A
S-02	Surface Impoundment B
S-03	Surface Impoundment C (Hazardous Waste Unit)
S-04	Surface Impoundment D
S-05	Surface Impoundment E
S-06	Surface Impoundment F
S-07	Surface Impoundment G
S-08	Surface Impoundment H (not used)
S-09	Waste Pile I
S-10	Slag Quench Area J
S-11	Landfill K [Acid Tar Pit, South]
S-12	Asbestos Landfill L
S-13	Coal Tar Sludge (Hazardous Waste Unit)
S-14	General Rubble Landfill N
S-15	General Rubble Landfill O
S-16	[Lime Stabilized SPL Sludge/Slag Landfill] (see note 4)
S-17	Vacuum Carbonate Blowdown - Landfill Q
S-18	Lime Dust and Kish Landfill R
S-19	Murphy's Mountain Landfill AA
S-20	Drying Area for Sludge from Impoundment F
S-21	Sludge Storage Area
S-22	Vacuum Carbonate Blowdown Impoundment South of Smokes Creek [Acid Tar Pit North]
S-23	Tar Pit Adjacent to [Lime Stabilized SPL Sludge Landfill]
S-24	Tar Pit North of Lime Plant
S-25	Landfill / Impoundment Under North End of Coal Pile
S-26	Fill Area Near Coke Battery No. 8
S-27	Sludge Disposal Area [Adjacent to SWMU S-01)
S-28	Drum Landfill
S-29	Drum Landfill

WATER COURSES

DESCRIPTION
45" X 90" Slabbing Mill Return Water Trench (filled in)
Blasdell Creek
South Return Water Trench
North Return Water Trench
Smokes Creek
Gateway Metroport Ship Canal (formerly Lackawanna Ship Canal)

Notes:
1. Unit names are as shown in RFA (USEPA 1988), unless changed as shown with brackets " [ ] ".
2. Units colored green have received a "No Further Assessment" determination from USEPA.
3. Called "Waste Storage Piles (Tar and Tank Fuel Tank Bottoms Mixed with Coke Breeze)" in RFA (USEPA 1988).
4. Called "Spent Pickle Liquor Sludge Landfill P (Hazardous Waste Unit)" in RFA (USEPA 1988).

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JOB NO.: 0083-003-100

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

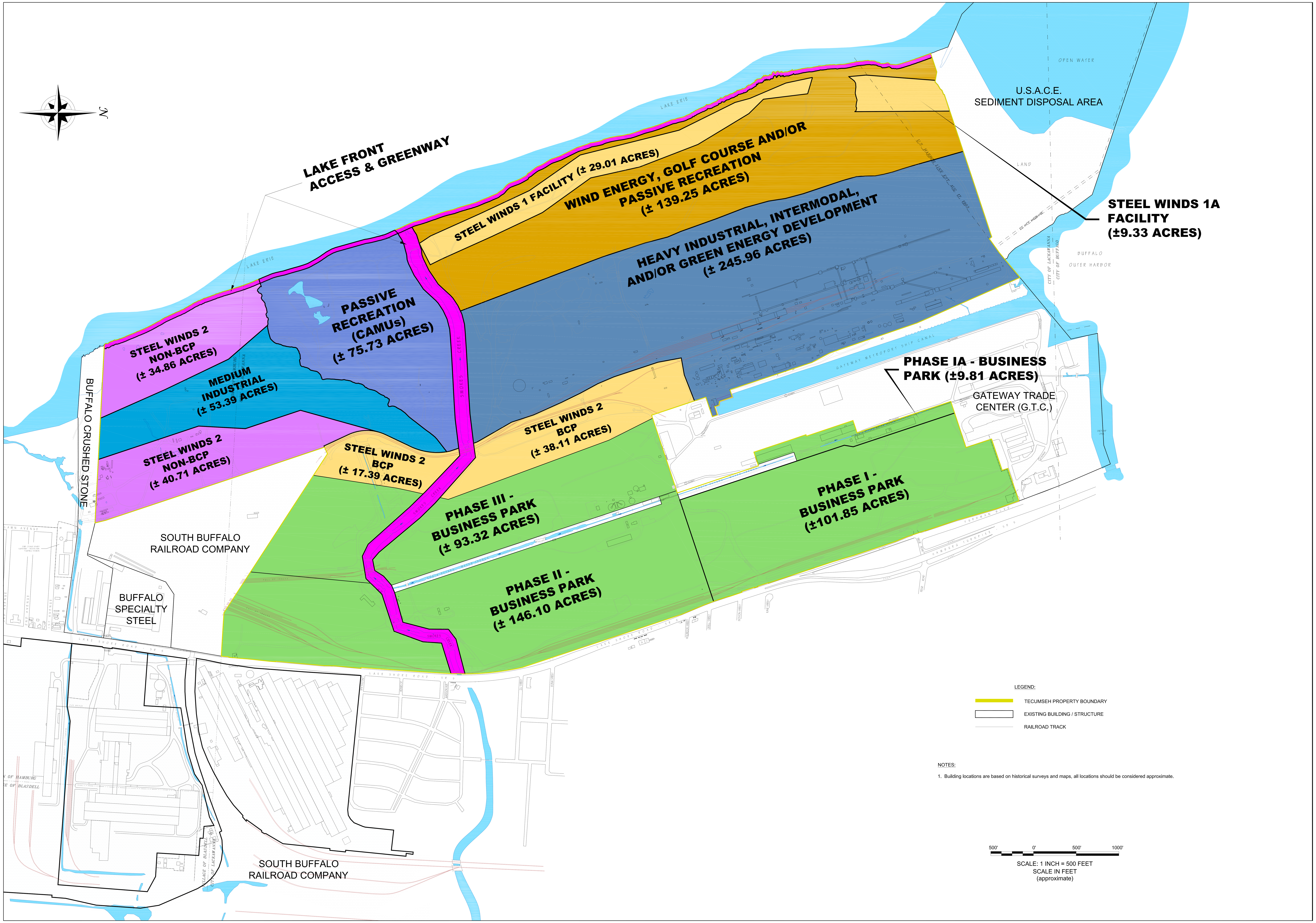
DRAWN BY: BCH
DATE: MARCH 2006
CHECKED BY: THF
APPROVED BY:

SITE PLAN

APPENDIX A - HEALTH AND SAFETY PLAN
FORMER BETHLEHEM STEEL LACKAWANNA COKE DIVISION
LACKAWANNA, NEW YORK

PREPARED FOR
TECUMSEH REDEVELOPMENT, INC.

FIGURE A-2



TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE
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BUFFALO, NY 14218
(716) 856-0635

JOB NO.: 0071-009-350

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: OCTOBER 2009
CHECKED BY:
APPROVED BY:

REDEVELOPMENT MASTER PLAN

APPENDIX B - SITE-WIDE HEALTH & SAFETY PLAN

FORMER BETHLEHEM STEEL LACKAWANNA COKE DIVISION

LACKAWANNA, NEW YORK

PREPARED FOR

TECUMSEH REDEVELOPMENT INC.

FIGURE 1

APPENDIX A

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
BROWNFIELD CLEANUP PROGRAM

at the
TECUMSEH REDEVELOPMENT SITE

LACKAWANNA, NEW YORK

July 2007 0071-007-350

TECUMSEH REDEVELOPMENT SITE
SITE-WIDE HEALTH AND SAFETY PLAN
APPENDIX A: EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site-Wide Health and Safety Plan (HASP) prepared for BCP remedial activities conducted at the Tecumseh Redevelopment Site (former Bethlehem Steel Lackawanna Works), Lackawanna, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
Spill Response Kit	1	Benzol Plant Field Enclosure
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Tecumseh Redevelopment Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features; however, the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Patrick T. Martin***
Work: (716) 856-0599
Mobile: (716) 867-2860

Corporate Health and Safety Director: ***Thomas H. Forbes***
Work: (716) 856-0599
Mobile: (716) 864-1730

Site Safety and Health Officer (SSHO): ***Richard L. Dubisz***
Work: (716) 856-0635
Mobile: (716) 998-4334

Alternate SSHO: ***Thomas Behrendt***
Work: (716) 856-0635
Mobile: (716) 818-8358

MERCY HOSPITAL (ER):	(716) 826-7000
FIRE:	911
AMBULANCE:	911
BUFFALO POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:
Tecumseh Redevelopment, Inc
1951 Hamburg Turnpike
Lackawanna, New York 14218
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's SSHO to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly

site. If any worker cannot be accounted for, notification is given to the SSHO (***Thomas Behrendt*** or ***Richard Dubisz***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the SSHO in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (i.e., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Mercy Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to Mercy Hospital.

- Ingestion: Decontaminate and transport to Mercy Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Mercy Hospital via ambulance. The SSHO will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Mercy Hospital (see Figure A-1):

The following directions describe the best route to Mercy Hospital:

- From Gate 2, proceed onto the Hamburg Turnpike (SR 5).

- Proceed east on Hamburg Turnpike (SR 5) to the Tifft Street Exit and turn right onto Tifft Street.

- Take Tifft Street east crossing South Park Avenue and McKinley Parkway. Bear left on Edgewood Avenue.

- Turn right on Abbott Road and Mercy Hospital will be on right hand side. Follow signs to emergency room (ER).

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

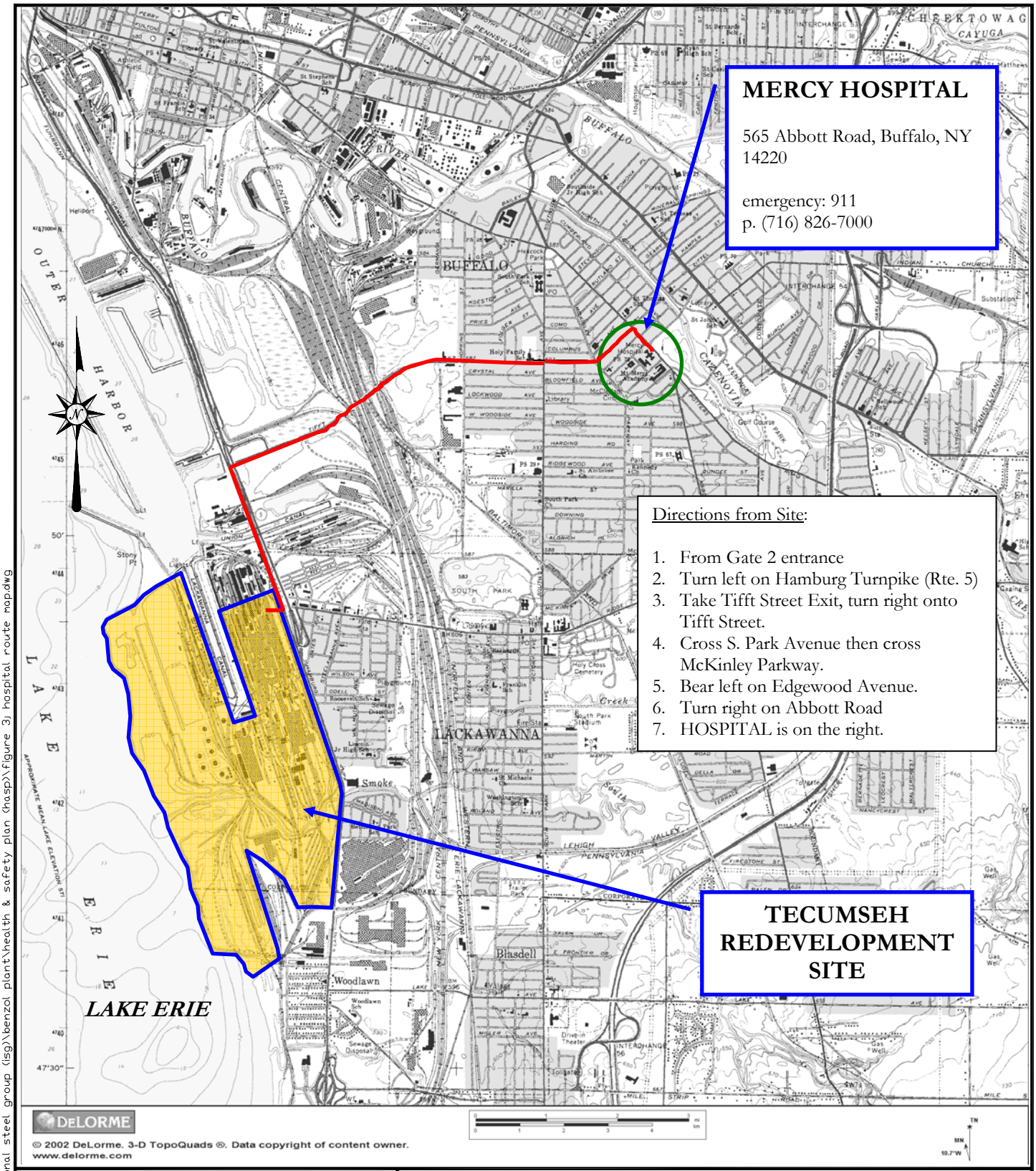
- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

FIGURE A-1



TURNKEY ENVIRONMENTAL RESTORATION, LLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0635

PROJECT NO.: 0071-002-901

DATE: NOVEMBER 2004

DRAFTED BY: BCH

HOSPITAL ROUTE MAP

HEALTH & SAFETY PLAN (HASP)

FORMER BETHLEHEM STEEL LACKAWANNA COKE DIVISION SITE
LACKAWANNA, NEW YORK

PREPARED FOR

TECUMSEH REDEVELOPMENT, INC.

FILEPATH(g:\coal\turnkey\international steel group (isg)\benzol plant\health & safety plan (hasp)\figure 3j hospital route map.dwg

APPENDIX B

HOT WORK PERMIT FORM

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

APPENDIX C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX C

MASTER EROSION CONTROL PLAN (MECP)

INTERIM REMEDIAL MEASURES WORK PLAN
APPENDIX C

MASTER EROSION CONTROL PLAN

PHASE III BUSINESS PARK AREA
LACKAWANNA, NEW YORK

BROWNFIELD CLEANUP PROGRAM SITE NO. C915199

August 2011 0071-011-300

Prepared for:

Tecumseh Redevelopment, Inc.

Prepared by:

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 Background

The Phase III Business Park Area (Site) is located west of New York State Route 5 (Hamburg Turnpike), east of Lake Erie, and south of land currently owned by Gateway Trade Center in the City of Lackawanna, New York. The Site is currently owned by ArcelorMittal Tecumseh Redevelopment (Tecumseh). The Site was accepted into the NY State Brownfield Cleanup Program (BCP) with the execution of the Brownfield Cleanup Agreement in November of 2005.

The approximately 149-acre Site is flat lying and comprised mostly of vacant land, but includes some active railroad spurs and other structures. The Site was formerly used to house a portion of Bethlehem Steel Corporation's integrated steel making operations. Most facility operations ceased in 1983, with a majority of the structures at the facility demolished in subsequent years.

Remedial Investigation activities on the eastern portion of the Phase III Business Park Area were initiated in August 2008. At that time the western side of the Phase III parcel was slated to be carved out under a separate BCP application and redeveloped as a latter phase of the Steel Winds project. However, the planned developer was unable to fulfill its responsibilities under the Brownfield Cleanup Agreement (BCA) and Tecumseh elected to resume obligations for this portion of the Site under the original Phase III Business Park Area BCA. Supplemental RI activities addressing the western portion of the Site were therefore undertaken in late 2009 through early 2010.

1.2 Purpose and Scope

This Master Erosion Control Plan (MECP) was prepared to provide guidance during Interim Remedial Measures (IRM) Construction involving cover placement over an approximate 15 acre portion of the Phase III Business Park Site. Following cover placement the National Distribution Services (NDS) Lumber Yard will be relocated on the covered parcel. Erosion control will be a critical component of preventing the potential migration of contaminants off-site during Site preparation and cover placement work. This document is intended to identify and provide minimum erosion control practices to be implemented during IRM construction. Additional practices and procedures will be effected as to control runoff and mitigate erosion.

2.0 POTENTIAL EROSION AND SEDIMENT CONTROL CONCERNS

The subject IRM construction area is comprised of several feet of slag fill material, which is well drained. In addition no storm sewers of trenches are present within the construction limits, and cover will be comprised of a similar well drained beneficial use determination (BUD)-approved-slag. Consequently, the potential for significant erosion and sedimentation issues during construction is minimal. Nevertheless, potential areas and items of concern that will be addressed during IRM activities include the following:

- Remediated areas or off-site properties adjacent to unremediated parcels need protection so they do not become impacted by Site operations.
- Runoff from soil stockpiles, if employed, will require erosion controls.
- Surface slopes need to be minimized as much as practical to control sediment transfer.
- Excavated soil/fill will require proper handling and disposal.

3.0 EROSION AND SEDIMENT CONTROL MEASURES

3.1 Background

Standard soil conservation practices need to be incorporated into IRM activities to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (i.e. grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the Site.

3.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during construction. These temporary measures will be installed and maintained until they are either no longer needed or until such time as permanent measures are installed and become effective. Erosion and sediment controls shall be installed in accordance with the standards and specifications presented in Attachment E-2. At a minimum, the following temporary measures will be employed as further described below.

- Silt fencing
- Straw/hay bales
- Temporary vegetation/mulching
- Temporary sedimentation basins
- Cautious placement, compaction and grading of stockpiles

3.2.1 Silt Fencing

IRM activities may result in surface water flow to drainage ditches and swales, Smokes Creek, and adjacent properties. Silt fencing will be the primary sediment control measure used in these areas. Prior to extensive soil excavation or grading activities, silt fences will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing site conditions.

Intermediate fencing may be used upgradient of the perimeter fencing to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing. Stockpiles will also be surrounded with silt fencing.

As sediment collects, the silt fences will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. All perimeter silt fences will remain in place until construction activities in an area are completed and vegetative cover has been established.

3.2.2 Straw and/or Hay Bales

Straw and/or hay bales will be used to intercept sediment laden storm water runoff if drainage channels are employed during construction. The use of either hay or straw will be based on the availability of materials at the time of construction.

Bales will be placed in swales and ditches where the anticipated flow velocity is not expected to be greater than 5 feet/second (fps). Intermediate bales will be placed upgradient of the final barrier to reduce flow velocities and sediment loadings where higher velocities are anticipated.

As with silt fencing, sediment will be removed as necessary from behind the bales and disposed of on-site. Bales that have become laden with sediment or that have lost their structural integrity or effectiveness due to the weather will be replaced.

3.2.3 Temporary Sedimentation Basins

Temporary sedimentation basins will be constructed as necessary upgradient of storm water inlets to reduce the volume of sediment laden runoff from the Site. The basins can be as simple as a small excavated area along the alignment of a storm water ditch or as elaborate as a full-scale sedimentation basin with outlet structures designed for certain storm events from a given area of the Site. The basins will be cleaned as necessary and the removed sediment used elsewhere on-site as subgrade fill material.

3.2.4 Cautious Placement of Stockpiles

IRM excavation activities will produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than 100 feet from surface water bodies, storm

water inlets, and parcel boundaries. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control.

3.3 Permanent Control Measures during Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Examples of permanent erosion control measures could include:

- Using maximum slopes in erosion prone areas to limit erosion.
- Minimizing the potential contact with, and migration of, subsurface soil/fill through the placement of a "clean" soil cover system in all areas not covered with structures, roads, parking areas, sidewalks, etc.
- Constructing permanent storm water detention ponds where necessary and appropriate.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.
- Lining collection channels with riprap, erosion control fabric, vegetation, or similar materials.

4.0 CONSTRUCTION MANAGEMENT PRACTICES

4.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during IRM activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e., phasing the work).
- Covering exposed or disturbed areas of the Site as quickly as practical.
- Installing erosion and sediment control measures before disturbing the Site subgrade.
- Minimizing both on-site and off-site tracking of soil by vehicles by using routine entry/exit routes.

4.2 Monitoring, Inspection and Maintenance

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the Site Manager within 24 hours of a heavy rainfall event (defined as more than 0.5 inches of precipitation in a 24-hour period) and repaired or modified as necessary to effectively control erosion or turbidity problems. Inspections should include areas under construction, stockpile areas, erosion control devices (i.e., silt fences, hay bales, etc.) and locations where vehicles enter and leave the site. Routine inspections of the entire Site should also be made on a monthly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date, observations made, and a description of the corrective actions taken should be completed. Attachment E-3 includes the Inspection and Maintenance Report Form.

4.2.1 Implementation

Erosion controls and features shall, at all times, be properly constructed, operated, and maintained in accordance with regulatory requirements and good engineering and construction practices. Erosion control measures and activities will be conducted in accordance with currently accepted Best Management Practices (BMPs).

Erosion control monitoring, inspection, and maintenance are an integral part of Site storm water and erosion control. The key elements of the monitoring effort include the following:

- Site inspections and maintenance
- BMPs monitoring
- Recordkeeping
- Review and modifications
- Certification of compliance

4.2.2 Site Inspections and Maintenance Practices

The temporary erosion control features will be maintained until no longer needed or permanent erosion control methods are installed. Site inspections are required every seven days or within 24 hours of a rainfall of 0.5 inches or greater. All disturbed areas, areas for material storage, locations where vehicles enter or exit the site, and all of the erosion and sediment controls identified as part of this Plan must be inspected. Controls must be in good operating condition until the affected area they protect has been completely stabilized and the construction activity is complete. If a repair is necessary, it must be completed within seven days of receipt of a report or notice, if practical. Inspection for specific erosion and sediment controls will include the following:

- Silt fence will be inspected to determine the following:
  1) Depth
  2) Condition of fabric
  3) That the fabric is attached to the posts
  4) That the fence posts are firmly in the ground
- The silt fences will be inspected weekly and within 24 hours of a 0.5 inch or greater storm event.
- Diversion berms, if used, will be inspected and any breaches promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and other potential erosion control problems.
- The Contractor shall designate individual(s) that will be responsible for erosion control, maintenance, and repair activities. The designated individual will also be

responsible for inspecting the site and filling out the inspection and maintenance report.

- Personnel selected for inspection and maintenance responsibilities will receive training as directed by the Engineer. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

The individual inspecting the Site must record any damages or deficiencies on the Inspection and Maintenance Report Form in Attachment E-3. This form can be used to request maintenance and repair and to document inspection and maintenance activities. Damages or deficiencies must be corrected as soon as possible after the inspection. Any changes that may be required to correct deficiencies in this Plan should also be made as soon as possible, but in no case later than seven days after the inspection.

4.2.3 Recordkeeping

A copy of the MECP and inspection and maintenance records must be kept at the Site from the time construction activities begins until the Site is stabilized. These documents will be made available upon request to regulatory agency representatives or members of the public.

4.2.4 Modifications to the Storm Water Management and Erosion Control Plan

During the course of construction, unanticipated changes may occur that affect this MECP such as schedule changes, phasing changes, staging area modifications, off-site drainage impacts, and repeated failures of designed controls. Any changes to the activities and controls identified in this Plan must be documented and the Plan revised accordingly. Certification of revisions to this plan shall be included at the end of the document.

ATTACHMENT C-1

EROSION CONTROL DETAILS

- Temporary Critical Area Plantings
- Mulching
- Temporary Swale
- Perimeter Dike/Swale
- Straw Bale Dike
- Silt Fence
- SedimentTrap

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

New York State Standards and Specifications for Erosion and Sediment Control

August 2005

New York State
Department of Environmental Conservation

George E. Pataki, Governor

STANDARD AND SPECIFICATIONS FOR TEMPORARY CRITICAL AREA PLANTINGS

Definition

Providing erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

Purpose

To provide temporary erosion and sediment control. Temporary control is achieved by covering all bare ground areas that exist as a result of construction or a natural event.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding.

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8” x 100” 2-sided plastic, 48” x 180” 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3” pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3”	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

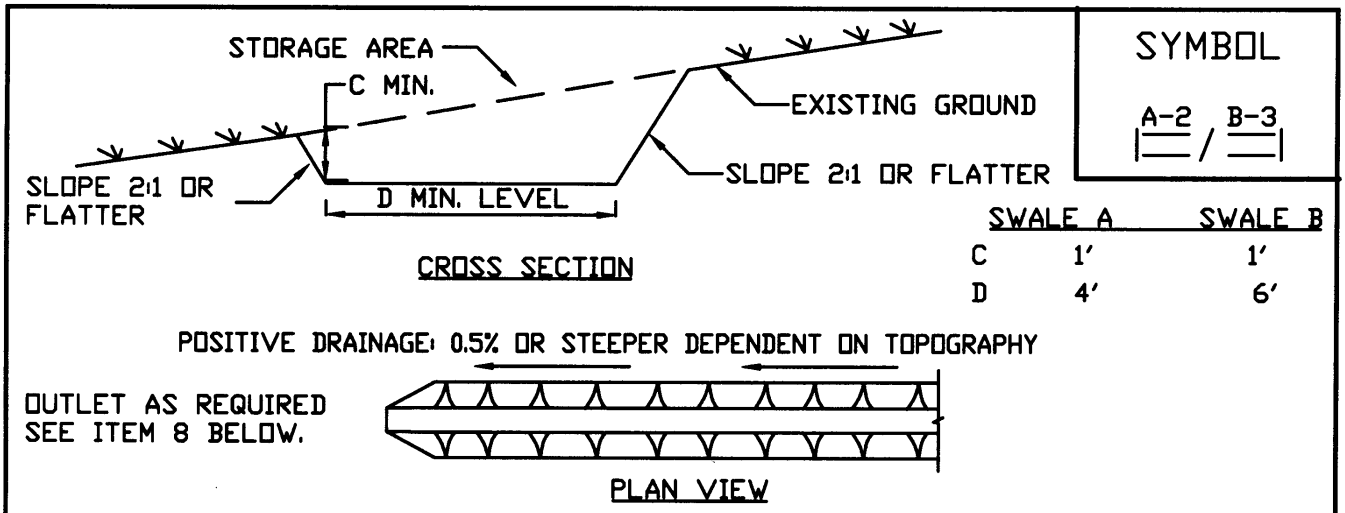
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale



CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.8 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or temporary swale; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 7 days of installation, in accordance with the standard and specifications for temporary swales.

Outlet

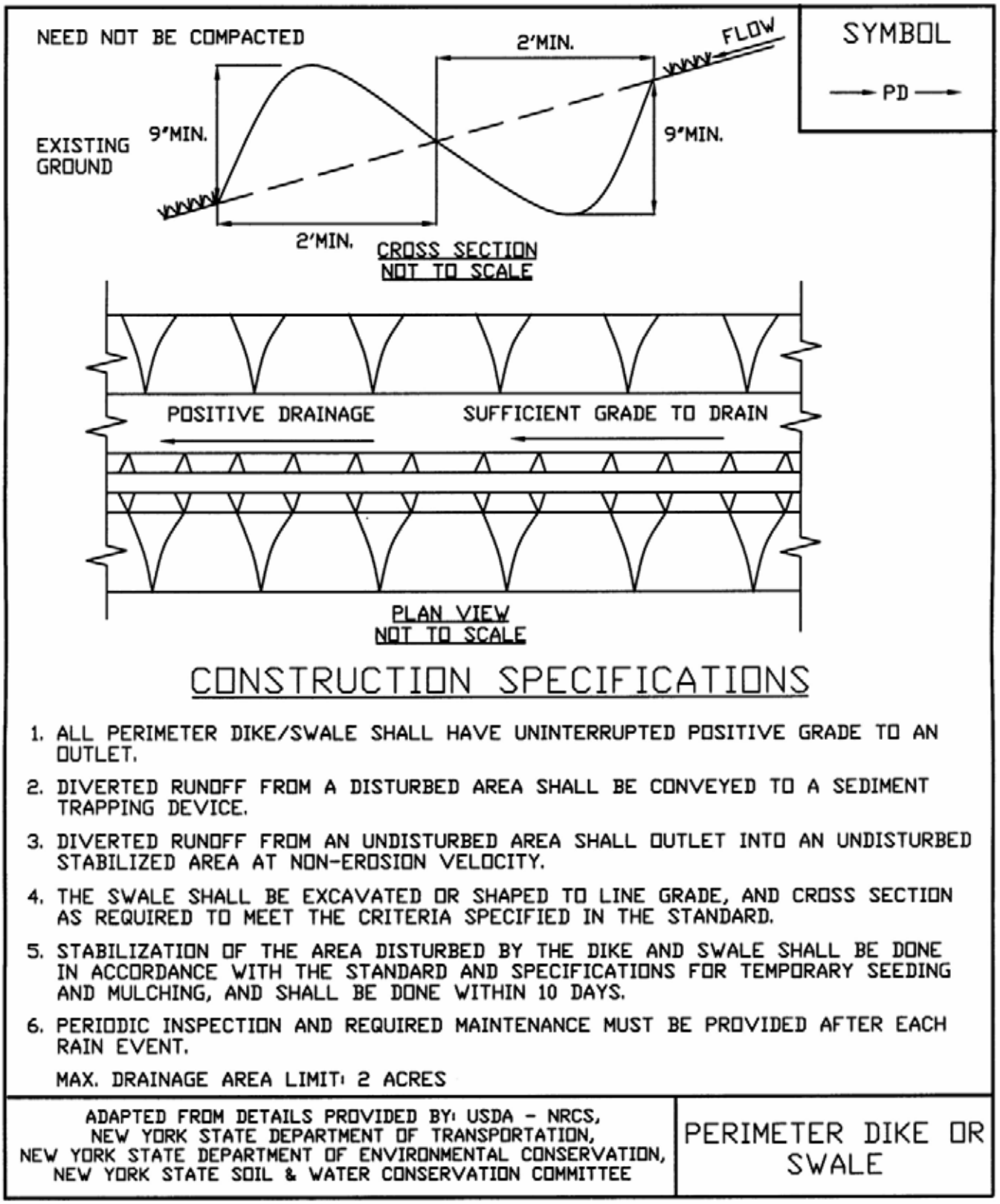
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

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NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

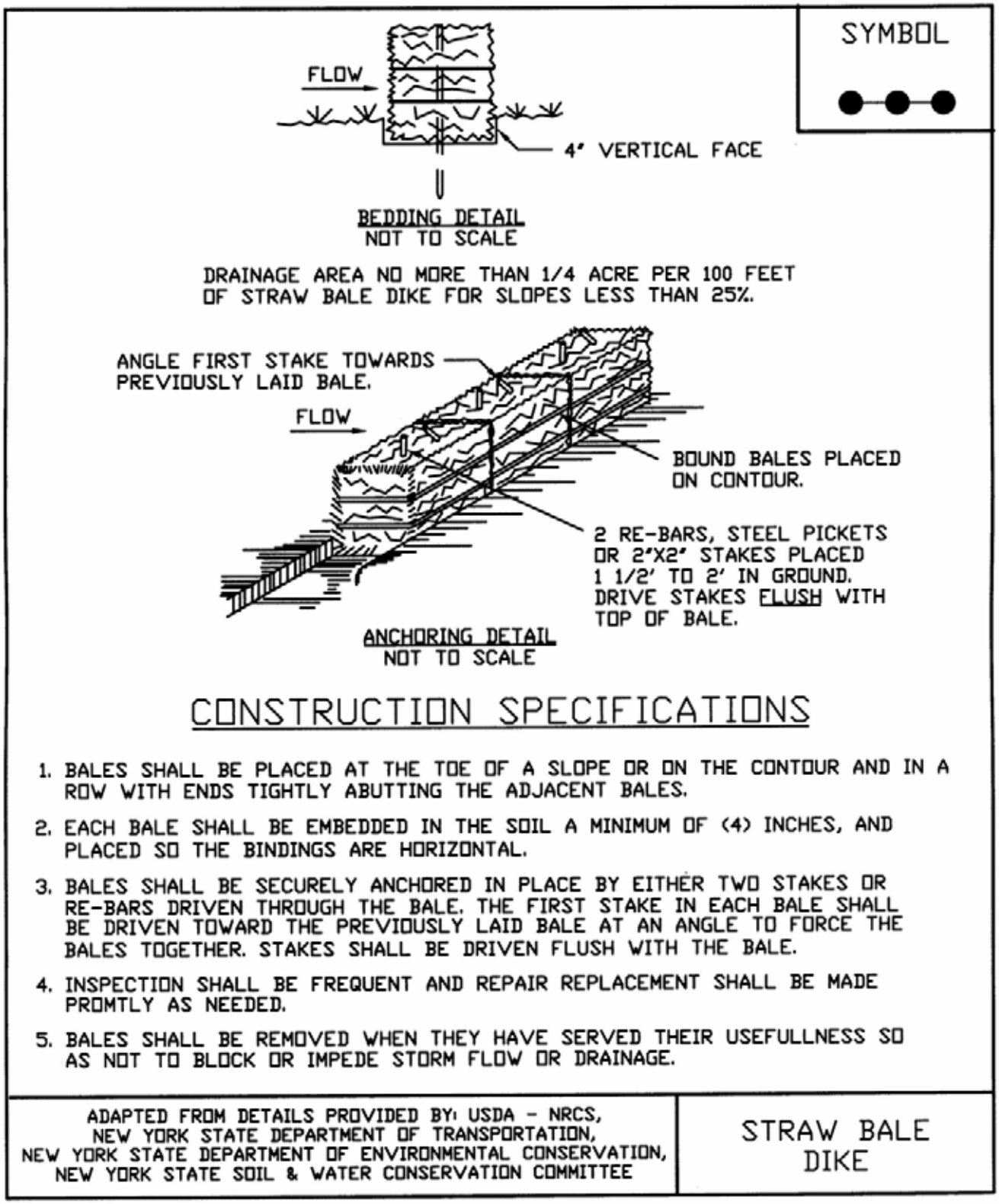
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

Figure 5A.7
Straw Bale Dike



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

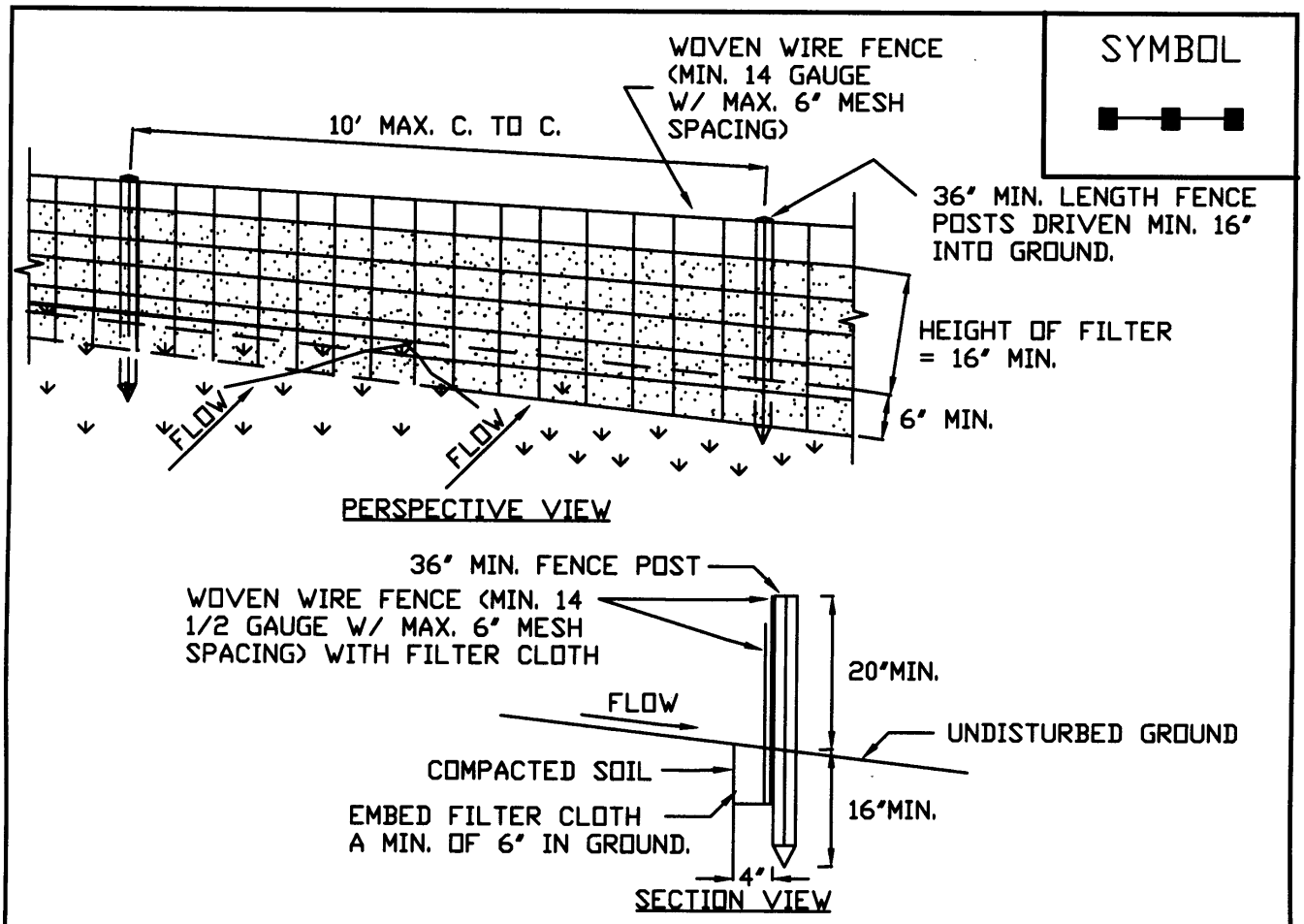
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP

Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I

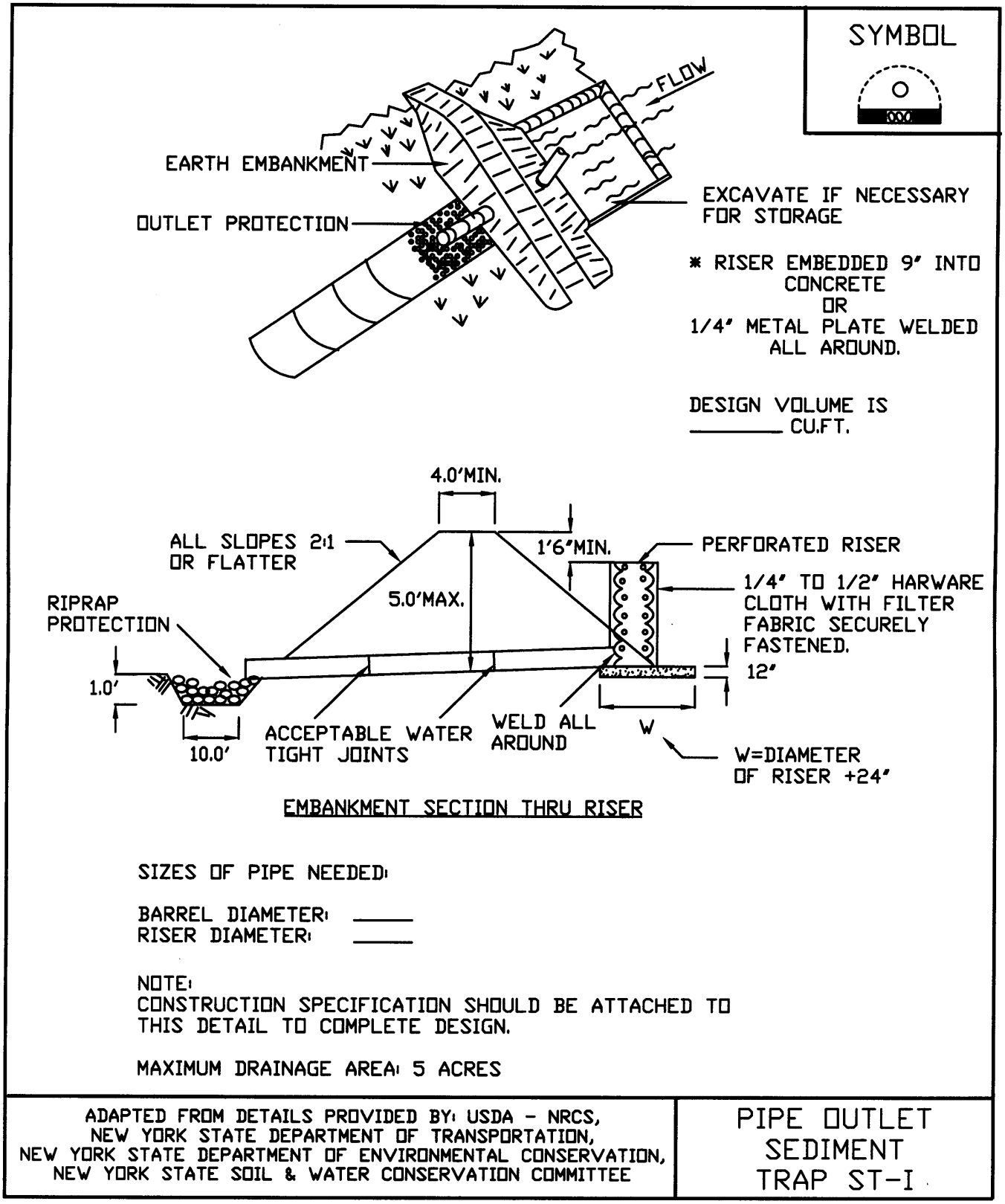


Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

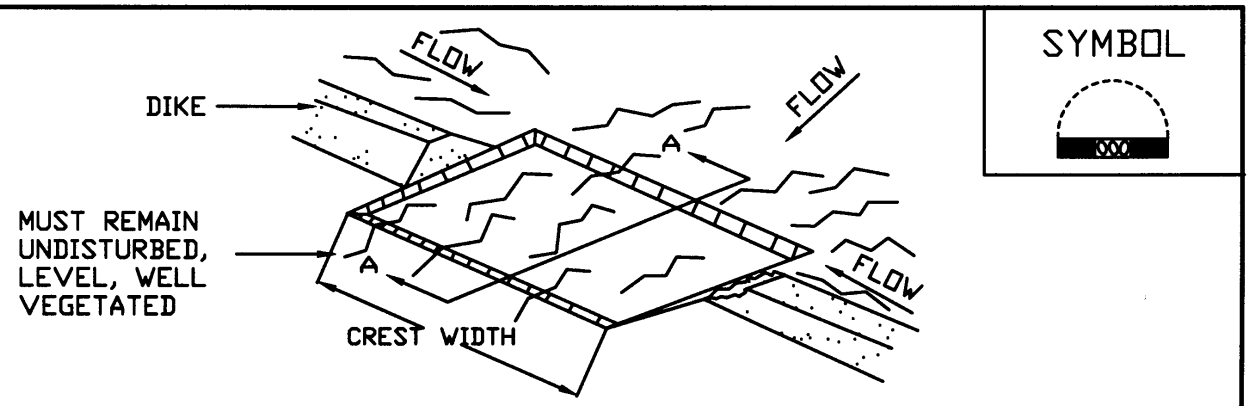
SYMBOL

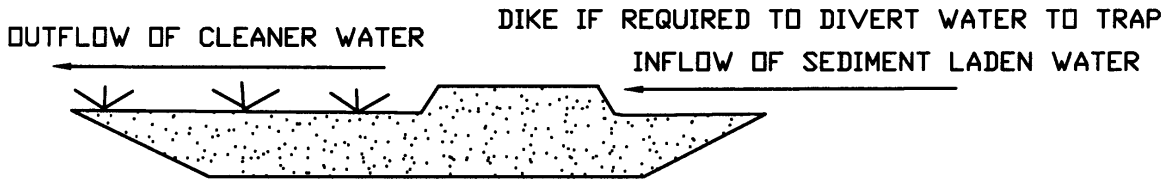
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PIPE OUTLET SEDIMENT TRAP ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II





CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A - A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

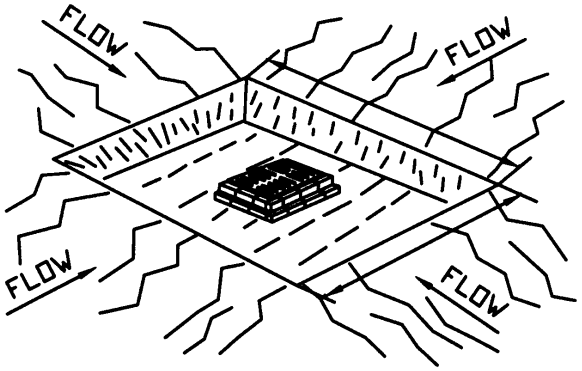
CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

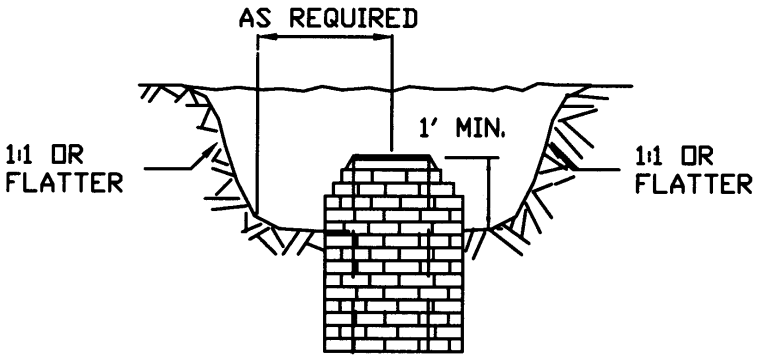
MAXIMUM DRAINAGE AREA: 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

Figure 5A.18
Catch Basin Sediment Trap: ST-III



YARD DRAIN



CROSS SECTION

SYMBOL

CONSTRUCTION SPECIFICATIONS

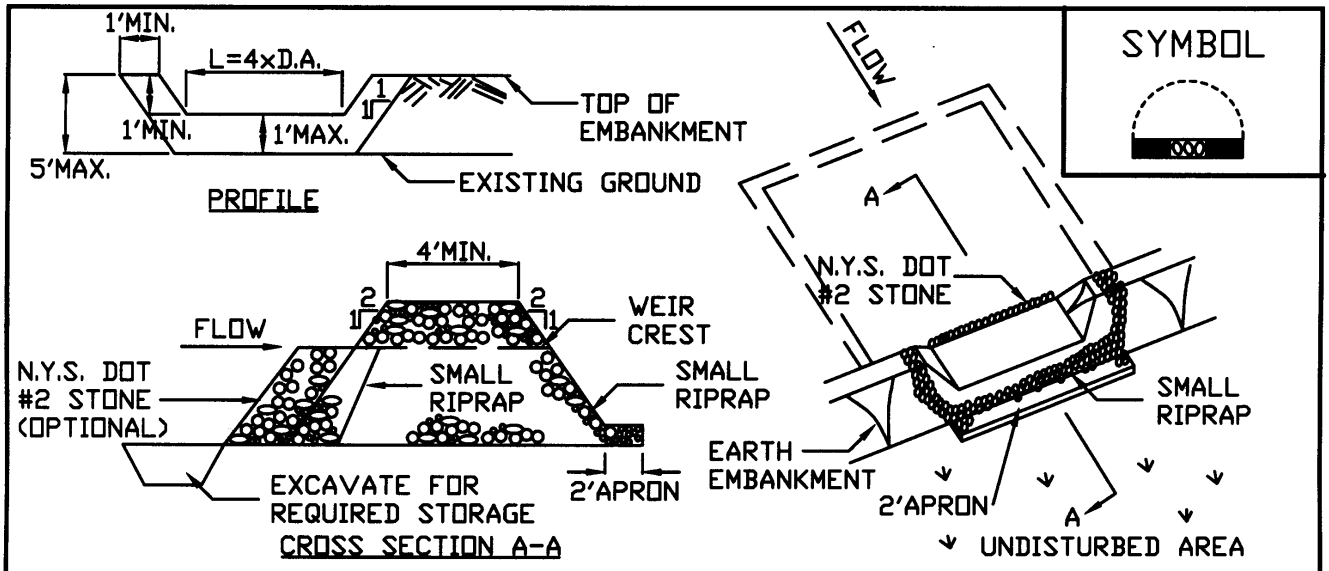
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

CATCH BASIN
SEDIMENT TRAP
ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

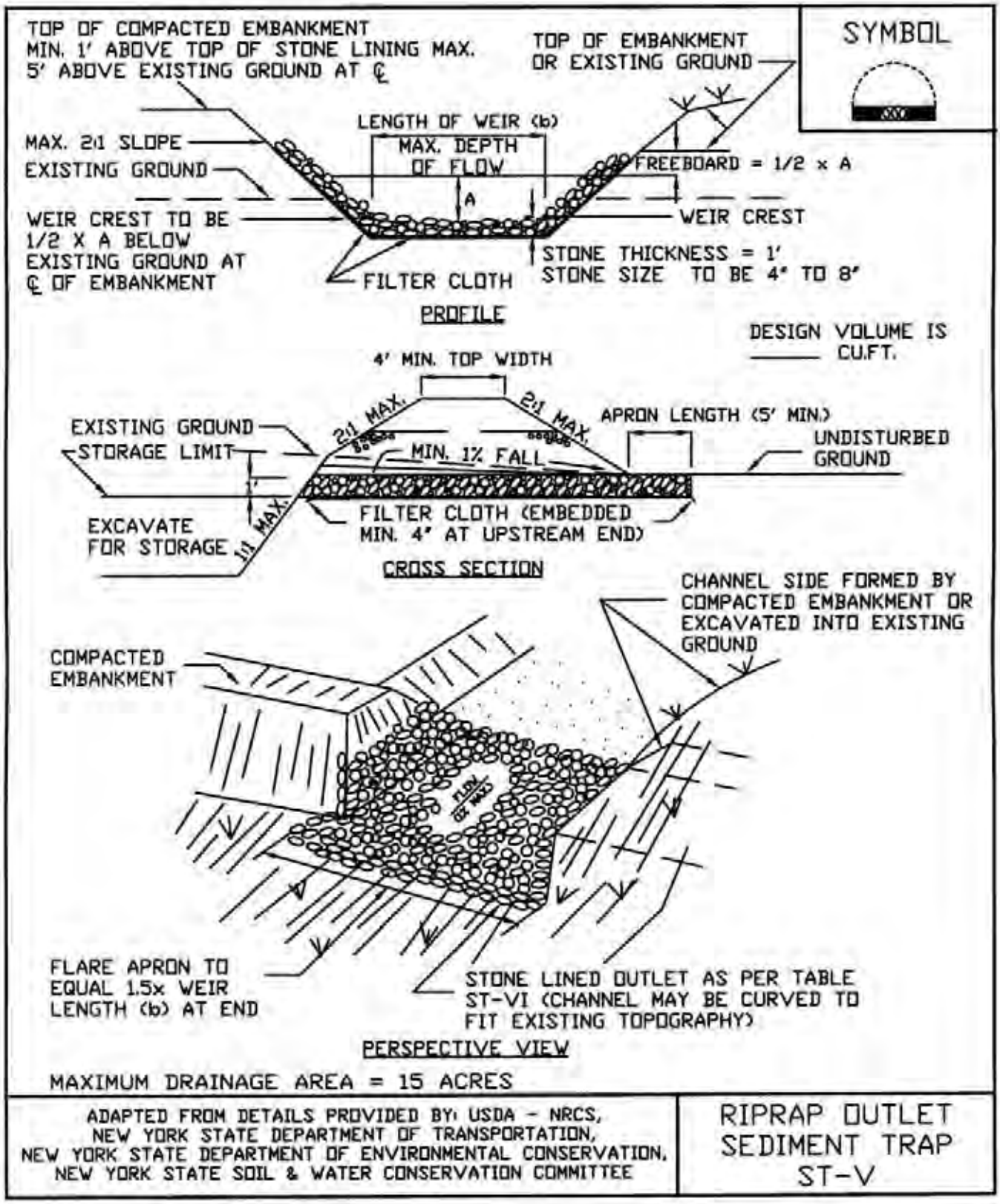


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

SYMBOL

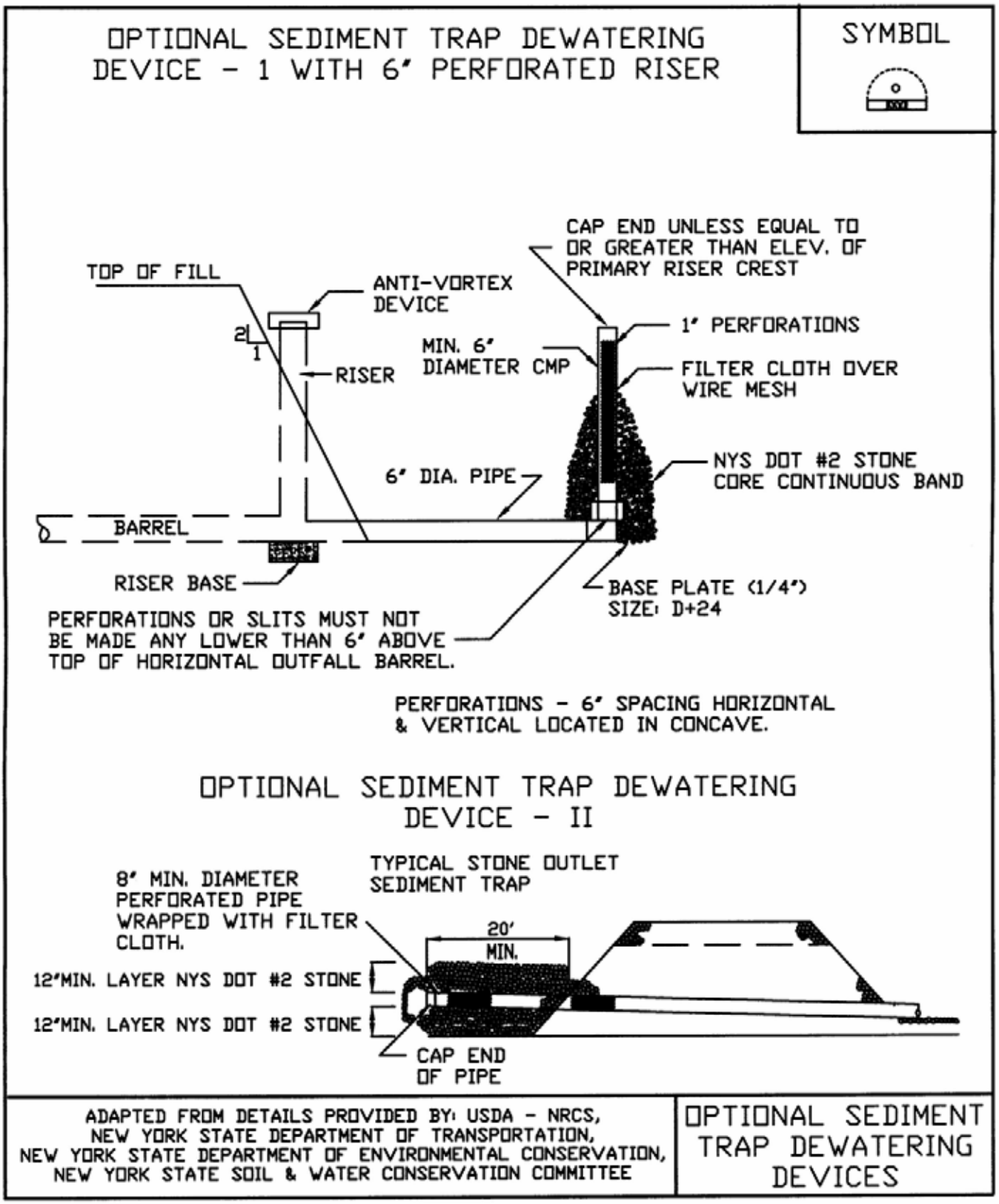
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

RIPRAP OUTLET
SEDIMENT TRAP
ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



ATTACHMENT C-2

INSPECTION AND MAINTENANCE REPORT FORM

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Regular Inspector:_____Rainfall Event Inspector:_____Rainfall (inches):_____

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking, and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stock piles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
General Erosion & Sediment Controls				
Are sediment and erosion BMPs installed in the proper location and according to the specifications set out in the SWM & ECP?				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
Perimeter Road Use				
Does much sediment get tracked on to the perimeter road? Is the gravel clean or is it filled with sediment? Does all traffic use the perimeter road to leave the site? Is maintenance or repair required for the perimeter road?				

_____ _____

Inspected by (Signature) Date

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Inspector:_____

STABILIZATION MEASURES					
Area	Date Since Last Disturbed	Date of Next Disturbance	Stabilized? Yes/No	Stabilized with	Condition

Stabilization Required: _____

_____

_____

_____

_____

_____

To be performed by: _____ On or before: _____

APPENDIX D

PROPOSED IMPORT MATERIAL GRADATION RESULTS

SLAG/FILL ANALYTICAL DATA SUMMARY

Borings in Iron City Reclamation Mining Area

PARAMETER[1]	B-10 (0.0-66 fbgs)	WT-10 Redrill (0.0-10 fbgs)	WT-10 Redrill (10-20 fbgs)	B-11 (0.0 - 10 fbgs)	NYSDEC Industrial SCOs (mg/Kg) [2]	Site Specific ISCOs (mg/Kg) [3]
TCL VOCs (mg/Kg)						
1,2,4-Trimethylbenzene	NA	NA	NA	NA	**380**	--
1,3,5-Trimethylbenzene	NA	NA	NA	NA	**380**	--
p-Cymene	NA	NA	NA	NA	--	--
Benzene	NA	NA	NA	NA	**89**	--
Cyclohexane	NA	NA	NA	NA	--	--
Ethylbenzene	NA	NA	NA	NA	**780**	--
Isopropylbenzene	NA	NA	NA	NA	--	--
Methylcyclohexane	NA	NA	NA	NA	--	--
m-Xylene & p-Xylene	NA	NA	NA	NA	**1000**	--
n-propylbenzene	NA	NA	NA	NA	**1000**	--
o-Xylene	NA	NA	NA	NA	**1000**	--
Toluene	NA	NA	NA	NA	**1000**	--
Total Xylenes	NA	NA	NA	NA	**1000**	--
SVOCs Base Neutrals Only (mg/Kg) [4]						
2-Methylnaphthalene	ND	ND	ND	ND	--	--
Acenaphthene	ND	ND	ND	ND	**1000**	--
Acenaphylene	ND	0.18 D12,J	ND	ND	**1000**	--
Anthracene	ND	0.52 D12,J	0.55 D12,J	ND	**1000**	--
Benzo (a) anthracene	0.13 D12,J	3.1 D12,J	3 D12,J	0.24 D02,J	**11**	--
Benzo (b) fluoranthene	0.14 D12,J	3.1 D12,J	3.4 D12,J	0.33 D02,J	**11**	--
Benzo (k) fluoranthene	ND	1.8 D12,J	1.1 D12,J	0.092 D02,J	**110**	--
Benzo (a) pyrene	ND	2.8 D12,J	2.4 D12,J	0.25 D02,J	**1.1**	**5.6**
Benzo (ghi) perylene	ND	1.7 D12,J	1.8 D12,J	0.16 D02,J	**1000**	--
Bis(2-ethylhexyl) phthalate	ND	ND	ND	ND	--	--
Chrysene	0.097 D12,J	3.3 D12,J	3 D12,J	0.19 D02,J	**110**	--
Dibenzo (a,h) anthracene	ND	0.61 D12,J	0.54 D12,J	ND	**1.1**	--
Dibenzofuran	ND	ND	0.2 D12,J	ND	--	--
Fluoranthene	0.2 D12,J	4.6 D12	5 D12	0.35 D02,J	**1000**	--
Fluorene	ND	ND	ND	ND	**1000**	--
Indeno (1,2,3-cd) pyrene	ND	1.6 D12,J	1.5 D12,J	0.15 D02,J	**11**	--
Naphthalene	ND	ND	0.18 D12,J,B	0.1 D02,J,B	**1000**	--
Phenanthrene	0.18 D12,J	3 D12,J	3.5 D12,J	0.15 D02,J	**1000**	--
Pyrene	0.13 D12,J	4.3 D12,J	4.3 D12	0.28 D02,J	**1000**	--

SLAG/FILL ANALYTICAL DATA SUMMARY

Borings in Iron City Reclamation Mining Area

PARAMETER[1]	B-10 (0.0-66 fbgs)	WT-10 Redrill (0.0-10 fbgs)	WT-10 Redrill (10-20 fbgs)	B-11 (0.0 - 10 fbgs)	NYSDEC Industrial SCOs (mg/Kg) [2]	Site Specific ISCOs (mg/Kg) [3]
RCRA Metals + Total Cyanide (mg/Kg)						
Arsenic	7.7	15.1	12.9	ND	**16**	**28**
Barium	105	77.1	71.5	427	**10000**	**--**
Cadmium	ND	2.23	0.975	ND	**--**	**--**
Chromium	1150	392	393	30.7	**6800**	**--**
Cyanide	NA	NA	ND	NA	**27**	**--**
Lead	41.3	98.4	116	2	**3900**	**--**
Silver	0.654	1.77	ND	ND	**6800**	**--**
Mercury	ND	0.156	0.127	ND	**5.7**	**--**
Wet Chemistry Analysis (units as indicated)						
Leachable pH (S.U.)	NA	NA	NA	NA	**--**	**--**
Pesticides						
delta-BHC	NA	NA	NA	NA	**1000**	
Herbicides						
Herbicides	NA	NA	NA	NA		
T. PCBs						
T. PCBS	NA	NA	NA	NA		

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per NYSDEC draft Part 375 Soil Cleanup Objectives for Industrial Uses (June 2006).
3. Values agreeded upon by NYSDEC per CMS Work Plan apendix B Soil/Fill Management Plan for Interim soil/fill management objectives (ISCOs)
4. Slag/Fill material was sampled for SVOCs Base Neutrals Only and Sediment/Soil Material was sampled for TCL SVOCs

Definitions:

fbgs = feet below ground surface
ND = Parameter not detected above laboratory detection limit.
NA = Sample not analyzed for parameter.
J =Analyte detected at a level less than reporting limit and greater than or equal to the method detection limit. Concentrations within this range are estimated.
B = Analyte was detected in the associated method blank.
D02 = Dilution required due to sample matrix effects.
D12 = Dilution required due to sample viscosity.
"--" = No SCO available.

BOLD

APPENDIX E

PROJECT DOCUMENTATION FORMS

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

INSPECTOR'S DAILY REPORT

CONTRACTOR			
CLIENT		DATE:	

LOCATION				DAY		JOB NO.	
WEATHER		TEMP	° F	START		END	

WORK PERFORMED:

CONTRACTOR ACTIVITIES:

[PUT CONTRACTOR ACTIVITIES HERE, BE SPECIFIC. TYPE OF EQUIPMENT, ACTIVITIES PERFORMED, BY WHOM, LOCATION OF LANDFILL ETC.]

TURNKEY ACTIVITIES:

[PUT ENGINEER ACTIVITIES HERE, BE SPECIFIC. TYPE OF EQUIPMENT, ACTIVITIES AND TESTING PERFORMED, SAMPLES COLLECTED, BY WHOM, LOCATION OF LANDFILL ETC.]

TEST PERFORMED		*QA PERSONNEL* SIGNATURE			
PICTURES TAKEN	none	REPORT NO.			
VISITORS	none	SHEET	1	OF	

INSPECTOR'S DAILY REPORT

CONTRACTOR			
CLIENT		DATE:	

LOCATION				DAY		JOB NO.	
WEATHER		TEMP	° F	START		END	

INSPECTOR'S DAILY REPORT

MEETINGS HELD & RESULTS:

CONTRACTOR'S WORK FORCE AND EQUIPMENT

DESCRIPTION	*H*	#	*DESCRIPTION*	*H*	#	*DESCRIPTION*	*H*	#	*DESCRIPTION*	*H*	#
Field Engineer						Equipment			Front Loader Ton		
Superintendent			Ironworker			Generators			Bulldozer		
						Welding Equip.			DJ Dump truck		
Laborer-Foreman			Carpenter						Water Truck		
Laborer									Backhoe		
Operating Engineer			Concrete Finisher						Excavator		
						Roller			Pad foot roller		
Carpenter						Paving Equipment					
						Air Compressor					

REMARKS:

REFERENCES TO OTHER FORMS:

SAMPLES COLLECTED:					
SAMPLE NUMBER					
APPROX. LOCATION OF STOCKPILE					
NO. OF STOCKPILE					
DATE OF COLLECTION					
CLIMATOLOGIC CONDITIONS					
FIELD OBSERVATION		SHEET		OF	

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

PROBLEM IDENTIFICATION REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

Variance No.: _____

Date of Issue: _____

Page: _____ of _____

Project Name:

Project Number:

Project Location: Date:

- Variance Log -

I. Summary of Nonconformance or Change: (completed by field team leader)

II. Variance Requested: (completed by field team leader)

III. Justification for Variance: (completed by field team leader)

IV. Applicable Document / Work Plan: (completed by field team leader)

Requested By: Date:

Project Manager Approval: Date: