Remedial Investigation/ Alternatives Analysis Report (RI/AAR) Work Plan

Phase II Business Park Area
Lackawanna, New York
BCP Site No. C915198

November 2008
Revised July 2009

0071-007-300

Prepared For:

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REMEDIAL INVESTIGATION / ALTERNATIVE ANALYSIS REPORT WORK PLAN

ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

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BCP SITE NO. C915198

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CERTIFICATION:

3-18-09

Thomas H. Forbes, P.E. **Date**

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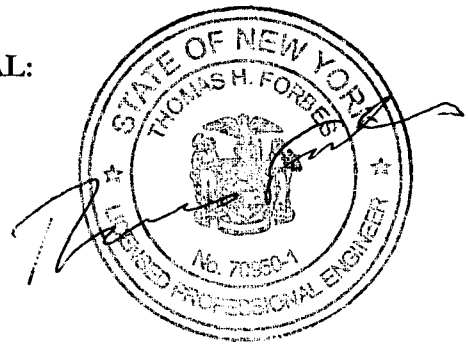

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1.0 INTRODUCTION

1.1 Background

Tecumseh Redevelopment Inc. (Tecumseh) owns approximately 1,100-acres of land (property) located on the west side of New York State Route 5 (Hamburg Turnpike) in the City of Lackawanna, NY (see Figures 1 and 2). The majority of Tecumseh's property is located in the City of Lackawanna (the City), with a portion of the property extending into the Town of Hamburg. Tecumseh's property is bordered by NY State Route 5 on the east, Lake Erie to the west and northwest, and other industrial properties to the south and the northeast.

The property was formerly used for the production of steel, coke, and related products by Bethlehem Steel Corporation (BSC). Steel production on the property was discontinued in 1983 and the coke ovens ceased activity in 2000. Tecumseh acquired its Lackawanna property from BSC's bankruptcy estate 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 October 2004 (Ref. 1). In August 2006, USEPA approved the RFI and terminated Bethlehem Steel's obligations 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.

Redevelopment of the entire Tecumseh property is guided by a Master Plan (see Figure 3). Specifically, in April of 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. The resultant Master Plan calls for a variety of site uses, including wind energy, passive recreation, and business development. At present one parcel encompassing 29 acres along the Lake Erie shoreline, has been redeveloped by BQ Energy, LLC under lease to Tecumseh. This parcel, referred to as the "Steel Winds Site," contains eight wind turbines and supporting power generation equipment and infrastructure. The

Steel Winds Site was investigated and underwent remedial measures through the NY State Brownfield Cleanup Program.

Tecumseh has separately applied for and received NYSDEC acceptance of three additional parcels into the NY State Brownfield Cleanup Program. The present status of each of these parcels is summarized below:

- **Phase I Business Park:** An Interim Remedial Measure (IRM) involving removal and onsite bioremediation of petroleum impacted soil/fill and removal and offsite disposal of characteristically hazardous soil/fill is scheduled to begin on the 102-acre Phase I Business Park Area in 2009.
- **Phase IA Business Park:** A Brownfield Cleanup Agreement (BCA) has been issued to Tecumseh by the NYSDEC for the 12.9-acre Phase IA Business Park Area, located to the west of the Phase I Business Park.
- **Phase III Business Park:** Remedial Investigation activities on the 93.4-acre Phase III Business Park Area were initiated in August 2008 and are currently on-going.

1.2 Purpose and Scope

Tecumseh intends to investigate groundwater and soil/fill within the Phase II Business Park Site for the purpose of characterizing the Site and identifying/evaluating remedial alternatives per the New York State BCP. Accordingly, this RI/AAR Work Plan identifies the scope of the planned RI activities and the means by which it will be completed, including sampling and reporting requirements, as well as the identification and evaluation of remedial options for on-site groundwater and soil/fill.

This Work Plan proposes the following activities to identify and delineate, if present, soil/fill and groundwater impacts on the Site:

- Excavation of test pits and analysis of representative soil/fill samples to establish concentrations of Constituents of Potential Concern (COPCs) within the soil/fill matrix.
- Visual/olfactory/PID characterization of subsurface soil/fill to identify and quantify field-discernible areas of impact.
- Installation of on-site upgradient and downgradient groundwater monitoring wells.

- Collection and analysis of on-site groundwater samples and groundwater potentiometric data from existing and newly installed monitoring wells on and off the Site.

A detailed description of the scope of work follows. A summary of the soil/fill and groundwater data obtained during the RI and historical investigations on the Phase II Business Park Area Site will be presented in the RI/AAR report.

1.3 Project Organization and Responsibilities

Tecumseh has submitted the Phase II Business Park Area Site for entrance into the BCP as a non-responsible party (volunteer) per ECL§27-1405. TurnKey Environmental Restoration, LLC (TurnKey) in association with Benchmark Environmental Engineering & Science, PLLC (Benchmark) will manage the brownfield cleanup on behalf of Tecumseh. The NYSDEC Division of Environmental Remediation shall monitor the remedial actions to verify that the work is performed in accordance with the Brownfield Cleanup Agreement, the approved RI/AAR Work Plan, and NYSDEC DER-10 guidance.

2.0 ENVIRONMENTAL CONDITIONS

2.1 Historical Operations

The Phase II Business Park Area Site formerly housed a portion of BSC's steel making operations. Five historical SWMUs (i.e., P-38 through P-42) are present within the Phase II Business Park Site (see Figure 2). BSC performed assessments for these SWMUs during the RCRA Facility Assessment (RFA) and subsequent RFI. Based on the findings, USEPA Region II issued "No Further Action" determination for the identified SWMUs within the Business Park II area (Final RFI Report, URS, October 2004)

Buildings and operations historically located on the Site are shown on Figure 2. As indicated, prior facilities within the Phase II Business Park boundaries included:

- 48" and 54" Mills
- 14"-18", 28", and 35" Mills
- Structural Shipping Yard (Cold Saws)
- Car Repair Shop
- Metal Storage
- Miscellaneous office production support buildings, and Welfare buildings.
- South Linde Area

The South Linde Area, shown on Figure 2, is a former pure oxygen generating station that serviced BSC's basic oxygen furnaces. Releases related to oil-sealed compressors employed in the oxygen generating operation resulted in petroleum impacts to soil and groundwater within the vicinity of the South Linde Area and the issuance of NY Spill Number 9607786 by the NYSDEC. Impacted soil/fill was excavated and subjected to onsite bioremediation by BSC as part of the corrective measures for this area, which have been undertaken in accordance with a Stipulation order issued by the NYSDEC Spills Division. Two biopad areas adjacent to the South Linde Area, deemed the East and West biopad (shown on Figure 2), were inspected in September 2004 and exhibited no discernible petroleum impact. Soil/fill from the west biopad was sampled on September 29, 2004 and analyzed for STARS List volatile organic compounds (VOCs) and semi-volatile organic compound (SVOCs); the data indicated conformance with NYSDEC TAGM HWR-94-4046 recommended soil cleanup objectives (RSCOs).

The South Linde Area also includes a groundwater collection and treatment system employing an approximately 230' long x 23' deep groundwater collection trench fitted with an 18-inch diameter recovery sump was installed by BSC in 2000 (see Figure 2). The recovery sump, identified as RW-1, is fitted with an oil skimmer to remove floating product from the water table. A submersible pump within the sump maintains an inward hydraulic gradient toward the collection trench to mitigate contaminant migration toward Smokes Creek. Collected groundwater is processed through an oil/water separator and a granular activated carbon (GAC) polishing filter prior to discharge to the South Water Return Trench via State Pollutant Discharge Elimination System permit No. NY-0269310. In 2004, Tecumseh retained TurnKey to install two additional product recovery wells and oil skimmers upgradient of the collection trench, identified as RW-2 and RW-3. Collected oils from these recovery wells and the collection trench recovery sump are drummed and stored on secondary containment pads located within locked utility sheds for off-site disposal (see Figure 2).

Monitoring wells and piezometers in the vicinity of the collection trench are sounded on a monthly basis for elevation and presence of floating product. Measureable product is manually evacuated from the wells and the recovered product is stored in the recovery well drums/sheds. Effluent samples are collected from the treatment system on a monthly basis as well. Monthly reports describing the monitoring events are transmitted to the NYSDEC Region 9 Spills Division in accordance with the Stipulation. A copy of the monthly report is provided to the NYSDEC Region 9 Division of Environmental Remediation.

The collection and product recovery systems have been effective in preventing migration of oils to Smokes Creek, and the treatment system has reliably reduced dissolved phase contaminant levels to below levels acceptable for discharge to the Creek. Additional detail concerning the efficacy of the collection, recovery and treatment systems will be presented in the Remedial Investigation Report. Measures to enhance groundwater remediation in this area of the site will be evaluated in the Alternatives Analysis Report.

2.2 Current Conditions

2.2.1 Site Topography, Physiography, and Drainage

The Phase II Business Park Area Site is generally characterized as a flat area covered by sparse brush and low lying vegetation. The Site is transected by Smokes Creek; however, Smokes Creek is not included in the Site. The Site contains no discernable features, except for the 54" Bar Mill building; two separate electrical transformer stations; a former storage/welfare building to the south of Smokes Creek currently being leased as an office for a lumber distribution company; the South Linde groundwater treatment system; and remnants of overhead lines, access roads, electrical power lines, and railroad tracks. The land surface is sparsely vegetated with voluntary indigenous shrubs, grasses, weeds, and emergent trees.

Due to the nature of the slag/soil fill, there is very little ponded storm water or surface runoff as most of the precipitation seeps into the highly permeable slag/soil fill.

2.2.2 Site Geology and Hydrogeology

The United States Department of Agriculture Soil Survey of Erie County, New York indicates that the Site is covered by surface soil classified as Urban Land; soil consisting of paved, foreign, or disturbed soils. Drilling logs from monitoring wells constructed on or near the Site indicate that the upper two feet (east side) to eight feet (west side) is typically composed of steel and iron-making slag and/or other fill material. The fill is underlain by lacustrine clays and silts, which are underlain by shale or limestone bedrock. Bedrock at the Tecumseh Site is approximately 60 feet below grade near the western perimeter of the Site (e.g., Lake Erie) and about 30 feet below the surface in the eastern portions of the Site (e.g., NY State Route 5).

Historically, due to the proximity of Lake Erie, groundwater in the area has not been developed for industrial, agricultural, or public supply purposes. There is a deed restriction that prohibits the use of groundwater on the property. Consequently, no groundwater supply wells are present on the entire 1,100-acre Tecumseh property. Measurements taken in several monitoring wells on or near the Site indicate that the water table is 5 to 6 feet below grade within the soil/fill unit. Monitoring wells MW-07A and MW-07B were installed along the eastern boundary of the Site on May 2, 1980 (see Figure 2). Well MW-07A was

installed to 15 feet below ground surface (fbgs) and screened within the soil/fill unit from 5 to 15 fbgs. Well MW-07B was installed to 27.6 fbgs and screened within the bedrock unit from 17.6 to 27.6 fbgs (Ref. 1). Although not installed or utilized during the RFI, overburden monitoring well MW-01 located within the South Linde Area of the Phase II BPA will be used during this investigation. Well depth is approximately 31 fbgs, however the screened interval and installation date for well MW-01 could not be located.

During the RFI, groundwater samples were collected from existing wells MW-07A and MW-07B in November 1999. There were no exceedances of the Class GA groundwater quality standards for VOCs, SVOCs, or metals. No analytical data exists for shallow monitoring well MW-01.

2.2.3 Utilities

The following utilities, shown on Figure 2, are present on or near the Site:

- Electric Utility: Overhead electric power lines on wooden utility poles, owned by Niagara Mohawk Power Corporation (NMPC), run north and south along the western portion of the Site.

- Railroad Tracks: Several active railroad tracks, owned and operated by South Buffalo Railway, are located on the eastern portion of the Site parallel to NY State Route 5 (Hamburg Turnpike). These tracks are used to service licensed tenants within the 1,100-acre Tecumseh property, Gateway Trade Center facilities, and for storage of railroad cars for customers.

- Water: Erie County currently supplies potable water to the site. Lake Erie is not accessible from the Site without accessing properties owned by Tecumseh or Gateway Trade Center.

- Sanitary Sewers: Active and abandoned sewer lines are located at the approximate locations indicated on Figure 2. Several sewer pump lift stations are also present along the active sanitary sewer line, although they are not presented on the figure.

- Former Coke Gas Line: The abandoned coke oven gas line, shown at the approximate location on Figure 2, enters the Site along the western boundary just north of Smokes Creek, continuing southeast crossing the creek. From the creek, the utility continues southeast exiting the Site in the southeast corner.

- National Fuel Gas Pipeline: A high-pressure 6-inch natural gas line crosses the northern portion of the property from east to west and is easily identified at the surface by natural gas markers (white PVC post with dark blue top).

2.2.4 Wetlands and Floodplains

No state/federal wetlands or floodplains exist within the Site boundaries.

2.3 Constituents of Potential Concern (COPCs)

Based on the Site history, groundwater sampling data, and SWMU investigation reports discussed in Section 2.1, the following environmental concerns have been identified on the Phase II Business Park Area Site:

- The potential impact of soil/fill by metals associated with steel manufacturing operations and presence of slag fill.
- The potential impact of soil/fill by base-neutral SVOCs associated with oils, greases, and fuels associated with the operation of steel mills and petroleum bulk storage.
- Potential soil and groundwater impacts from VOCs associated with petroleum storage and/or maintenance activities.
- The potential impact of soil/fill by PCBs associated with transformers and other electrical equipment.

Based on these potential conditions, the constituents of potential concern (COPCs) for the Phase II Business Park Site are presented on Table 1. The COPC parameter list presented in Table 1 includes provisions for analysis of an "expanded" list of parameters presented in Table 2. The "expanded" list will be employed at a frequency of approximately 1 per 10 samples per matrix to check for the presence of other constituents.

3.0 DATA OBJECTIVES

3.1 Acceptance or Performance Criteria

Acceptance or performance criteria specify the quality of data required to support decisions regarding remedial response activities. Acceptance or performance criteria are based on the data quality objectives. Specifically, the data quality and level of analytical documentation necessary for a given set of samples will vary depending on the intended use of the data.

As part of the RI process, site-specific remedial action objectives will be developed. Sampling data will be used to evaluate whether or not remedial alternatives can meet the objectives. The intended uses of these data dictate the data confidence levels. Two data confidence levels will be employed in the RI: screening level data and definitive level data. In general, screening level confidence will apply to field measurements, including photoionization detector (PID) measurements, groundwater elevation measurements, and field analyses (i.e., pH, temperature, specific conductivity, and turbidity). Definitive level confidence will apply to samples for chemical analysis.

The applicability of these levels of data will be further specified in the Quality Assurance Project Plan (QAPP). Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, will also be defined in the QAPP.

3.2 Collection of Defensible Data

The RI scope of work is focused on providing defensible data to identify areas of the Site requiring remediation, define chemical constituent migration pathways, qualitatively assess human health and ecological risks, and perform the remedial alternatives evaluation. The investigation will also include the collection and analysis of soil/slag-fill and groundwater samples to support remedial action objectives. Definitive level data quality will be required for chemical analysis of groundwater and soil/slag-fill samples.

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the Sampling and Analysis Plan presented in the QAPP. USEPA and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed, in accordance with USEPA SW-846

methodology to meet the definitive-level data requirements, by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) CLP-certified laboratory. A full (Category B) deliverables package will be provided for all site characterization samples (i.e., excluding waste profile samples). Analytical results for site characterization samples will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP.

4.0 INVESTIGATION ACTIVITIES

The following sections present media-specific scopes of work developed for the Remedial Investigation. Figure 2 shows the proposed locations of the on-site RI activities. Table 3 summarizes the RI sampling and analytical program.

4.1 Underground Utility Clearance

Prior to any intrusive activity (e.g., excavation, Geoprobe®, drill rig), TurnKey will request a utility clearance from the Underground Facilities Protective Organization (or approved other), and underground utilities will be identified and clearly marked. TurnKey will also review historic plant engineering drawings for on-site utility locations prior to initiating fieldwork.

4.2 Soil/Slag-Fill Investigation

4.2.1 Test Pit Excavation

Approximately 105 test pits will be excavated across the Phase II Business Park Site to allow for visual/olfactory/PID assessment of subsurface conditions as well as to obtain representative samples for chemical characterization. As summarized in Table 4 and presented on Figure 2, test pit locations have been preliminarily identified; however, locations may need to be modified and/or additional test pits may be excavated pending field findings.

In general, test pits will be advanced using an excavator from ground surface to native soils or groundwater, whichever is encountered first. Test pits where groundwater is encountered first, prohibiting visual confirmation of native soils, may be advanced to native soils as necessary and as directed by field personnel. Test pit dimensions (i.e., depths and lengths) will vary depending on the vertical and horizontal extent of the soil/slag-fill horizon, depth to groundwater, or encountered impacts (test pits exhibiting evidence of significant impact will require further delineation as described in Section 4.2.4). Test pit walls and excavated soil/slag-fill will be examined by qualified TurnKey personnel and characterized by visual-manual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) and for impacts via visual and/or olfactory observations. Excavated soil/slag-fill and the test pit

atmosphere will be field-screened for the presence of VOCs using a calibrated MiniRAE 2000 PID equipped with a 10.6 eV lamp (or equivalent) as a procedure for ensuring the health and safety of personnel at the Site and to identify potentially impacted soil/slag-fill samples for laboratory analysis. If field screening indicates potential VOC impact or olfactory evidence of impact, the test pit will also be subjected to headspace screening as discussed below.

The majority of the test pit samples will be biased toward the upper 2-foot interval, as this is the depth where most exposure is likely to occur prior to and following redevelopment. At locations where field observations suggest greater potential impact with depth, the sample will be collected from the subsurface interval (i.e., 2 feet to native/groundwater depth). In any event, a minimum of 1 per 10 samples will be collected from the subsurface interval for analysis. All test pit soil/slag-fill samples will be retrieved from the sidewall of the excavation using dedicated stainless steel sampling equipment. For deeper samples, the excavator bucket will be used to obtain the sample, with a representative subsurface soil/slag-fill sample collected from the center of the excavator bucket using a dedicated stainless steel hand trowel or spoon. Samples will be transferred to laboratory supplied, pre-cleaned sample containers for laboratory analysis as discussed below.

For test pits exhibiting elevated PID readings in the test pit atmosphere or in the excavated spoils, a second representative aliquot from each soil/slag-fill location will be transferred to a sealable plastic bag for discrete headspace determination. In general, representative soil/slag-fill samples will be collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70°F) for a minimum of 15 minutes prior to PID measurement. Headspace determinations will be recorded on the appropriate field forms and Project Field Book. PID scan and/or headspace determination values greater than 20 parts per million (ppm) will require the collection of an additional sample for VOC analysis using USEPA SW-846 methodology. The chosen soil/slag-fill samples will be transferred directly into a laboratory supplied, pre-cleaned sample container for analysis of full List VOCs.

Following completion of each test pit, soil/slag-fill material will be returned to the excavation in the opposite order in which it was removed and compacted to match the existing grade. Only the number of test pits that can be adequately backfilled during a single workday will be excavated. No excavated test pit will be left open overnight.

4.2.2 Boring Advancement

In the event that test pit activities experience refusal at the surface due to the presence of concrete or other obstructions, an alternative location will be field selected. However, if an alternative location cannot be accessed within reasonable proximity (25 feet) of the intended location, direct-push technology via a Geoprobe® drill rig equipped with a concrete core barrel will be implemented to obtain subsurface soil/slag-fill samples. Once the surface obstruction is breached, each boring location will be advanced a minimum of one-foot into native soil or first groundwater, whichever is encountered first, using a 1.5-inch diameter, 4-foot core sampler with dedicated PVC sleeve. Recovered samples will be examined by qualified TurnKey personnel and characterized by visual-manual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), scanned for total volatile organic vapors with a calibrated MiniRAE 2000 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. As with the test pit soil/slag-fill samples, headspace determinations will also be completed based on field screening observations.

Upon reaching the desired depth, representative subsurface soil/slag-fill samples from each sample location will be collected from the PVC sleeve(s) using a dedicated stainless steel hand trowel or stainless steel spoon. Following sample collection, the Geoprobe® boreholes will be backfilled with the remaining soil cuttings and supplemented, as necessary, with bentonite powder.

4.2.3 Soil/Slag-Fill Sample Analysis

The planned soil/slag-fill analytical program is identified on Tables 3 and 4. As indicated, a minimum of 71 soil/slag-fill samples are slated for analysis. Depending on historical use, several of the soil/slag-fill samples will be analyzed for SVOCs (base neutrals only), COPC metals, polychlorinated biphenyls (PCBs), cyanide, and/or STARS-list VOCs[1]. An expanded analytical list (see Table 2) will be employed at a frequency of one per 10 samples.

[1] Samples with a headspace PID reading greater than 20 ppm will be analyzed for "full list" (i.e., NYSDEC STARS List plus USEPA Target Compound List) VOCs, and Target Compound List SVOCs.

Although certain test pit locations are not necessarily planned for analysis (see Table 4), representative samples will be collected from all test pit locations and the laboratory will be instructed to archive samples for potential analysis pending the outcome of the results for surrounding locations.

4.2.4 Grossly Impacted Soil/Slag-Fill

If grossly impacted soil/slag-fill samples are encountered, the extent of the impacts will be determined in the field, to the degree feasible, so as to allow estimation of the volume and extent of the impact. This will involve expanding the test pit dimensions and/or stepping out from the source area with perimeter test pits, as necessary. In addition, representative samples of the grossly impacted soil/slag-fill will be subjected to waste profile analysis to determine whether they would require special handling (e.g., as hazardous waste) or treatment if disposed off-site. Waste profile analysis will include Toxicity Characteristic Leaching Procedure (TCLP) VOCs, TCLP SVOCs, and TCLP metals, as well as total PCBs and flashpoint via USEPA SW-846 Methodology. Field adjustment of the waste profile parameters may be modified depending on observations and the location of the impacts relative to historic site features.

4.3 Groundwater Investigation

Groundwater elevation maps completed during the RFI (Ref. 1) indicate that groundwater generally flows west across the Site toward Lake Erie, with local influence in the southern portion of the Site toward Smokes Creek, which eventually discharges into Lake Erie.

Historical groundwater elevation measurements taken from monitoring wells on the Site indicate that the first water bearing zone (i.e., water table) ranges from approximately 6.3 to 13.4 feet below grade within the soil/slag-fill unit. In order to supplement existing historic groundwater quality data (see Appendix A), groundwater at the Site will be sampled in accordance with this section of the Work Plan. The existing Site monitoring wells (MW-01, MW-07A, and MW-07B) will be incorporated into a comprehensive sampling plan to provide sufficient information on groundwater quality at the Site. Existing monitoring well installation logs, well completion details, and groundwater elevation tables are presented in Appendix B. Well completion details for existing well MW-01 could not be located.

An evaluation of on-site groundwater quality data collected during the RI will be performed to determine if an increase in constituents of concern is evident compared to upgradient off-site groundwater. If the groundwater evaluation determines that the Phase II Business Park Site is contributing adverse impacts to Site groundwater quality, potential remedial alternatives will be identified and evaluated in the AAR (see Section 5.0).

4.3.1 Monitoring Well Installation

In addition to the three existing on-site groundwater monitoring wells (MW-01, MW-07A, and MW-07B), five new shallow overburden monitoring wells, identified as MWS-32A, MWS-36A, MWS-37A, MWN-63A and MWN-64A, and two new bedrock monitoring wells, identified as MWN-63D and MWN-65D will be installed to further assess groundwater quality at the Site. The location of the newly installed wells will be based on field observations recorded during the soil/slag-fill investigation, but will be generally located as shown on Figure 2.

Each shallow overburden monitoring well boring location will be advanced into the unconsolidated overburden soil/slag-fill to a depth of approximately 15 feet below ground surface (fbgs) or a minimum of 10 feet below the first encountered groundwater, whichever is greater. The bedrock monitoring well boring locations will be advanced into the first water bearing bedrock unit, which is approximately 30 feet below ground surface. Upon auger refusal, the augers will be seated into the bedrock and temporarily left in place during rock coring activities to prevent sloughing of the overburden soils. If DNAPL is encountered at or near the bedrock interface during the soil boring, the borehole will be sealed with temporary steel casing to prevent migration of DNAPL into the bedrock. Once the augers or casing are set, a double-tube, swivel-type core barrel will be used to obtain an NQ core sample of the upper 10 feet of competent bedrock. Rock coring will continue until the first saturated zone (i.e., fractured zone) is encountered. Each bedrock borehole will be advanced a minimum of 10 feet into the bedrock groundwater zone to accommodate well installation. Following coring activities, a 3⅞-inch tri-cone roller bit will be used to ream the borehole to the desired depth to facilitate well installation. Potable water obtained from a known source will be used as the drilling fluid. Water return will be monitored during bedrock drilling and zones of significant water loss to the formation will be noted on the drilling logs.

Shallow overburden well borings will be advanced using 4.25-inch I.D. hollow stem augers (HSA). A 2-inch diameter, 2-foot long split spoon sampler will be advanced ahead of the auger string with a standard 140-pound hammer falling freely over a 30-inch fall until 24 inches have been penetrated or 50 blows applied. Recovered samples will be examined by qualified TurnKey personnel and characterized by visual-manual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), scanned for total volatile organic vapors with a calibrated MiniRAE 2000 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

In addition, PID scans will be supplemented with headspace determinations. In general, representative soil/slag-fill samples from each recovered interval will be collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70°F) for a minimum of 15 minutes prior to PID measurement.

Subsequent to boring completion, each monitoring well will be constructed of 2-inch I.D. flush-joint Schedule 40 PVC solid riser and machine slotted screen (0.010-inch slot size). The monitoring well screen will be approximately 10 feet in length. Approximately 6 inches of silica sand will be placed at the bottom of each boring as a base for the well screen and as part of the sand pack. The well screen and attached riser will be placed within the borehole on top of the 6-inch sand layer and the remainder of the sand pack will be installed within the borehole annulus to a level of 2 to 3 feet above the top of the well screen. A bentonite seal (2 to 3 feet thick) will be installed immediately above the sand layer. The bentonite seal will be constructed with 3/8-inch bentonite pellets or medium bentonite chips and allowed to hydrate sufficiently to mitigate the potential for down-hole grout contamination. Cement/bentonite grout will be installed via pressure tremie pipe injection to fill the remaining annulus to approximately 1 foot below ground surface.

The top of the well riser pipe will extend approximately 3 feet above grade and will be fitted with a lockable J-plug and protected by a vented, 4-inch diameter protective steel casing. The steel casing will be installed to a depth of approximately 2 fbgs and anchored in a 2-foot by 2-foot concrete surface pad. Each steel protective casing will be fitted with a locking cap, keyed alike lock, and labeled with permanent markings for identification. The

concrete surface pad will be placed around the protective steel casing to allow surface water to drain away from the well. Drill cuttings will be disposed onsite unless gross contamination, as defined in 6NYCRR Part 375-1.2(u), is encountered, in which case they will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal.

4.3.2 Well Development

All newly installed and existing monitoring wells will be developed in accordance with NYSDEC and TurnKey protocols. Each well will be left undisturbed for a minimum of 24 hours following installation before development activities begin to ensure that the cement/ bentonite grout has set. Prior to development, the static water level and well depth will be measured. Development will be accomplished using a bottom-discharging bailer (either polyethylene or PVC) and submersible pump via purge and surge methodologies. Development will be recorded on field forms and considered completed when the pH, specific conductivity and temperature have stabilized; and when the turbidity is below 50 Nephelometric Turbidity Units (NTU), or has stabilized above 50 NTU and a minimum of 10 well volumes have been removed. Stability is defined as variation between measurements of 10 percent or less and no overall upward or downward trend in the measurements. Water removed during development will be discharged to the ground surface no closer than 50 feet in any radial direction from the monitoring well unless visual non-aqueous phase liquid (NAPL) is present, in which case the purged groundwater will be drummed for characterization and disposal.

Field personnel will perform visual NAPL surveillance during development of each well. All data collected during well development will be recorded on TurnKey's Groundwater Well Development and Purge Logs. Well development procedures, including the field forms, and calibration and maintenance of field instruments used to measure stability parameters will be performed and/or completed in accordance with TurnKey's Field Operating Procedures (FOPs).

4.3.3 Groundwater Elevation Measurements

Following installation, the locations and elevations of the newly installed monitoring wells will be surveyed against a fixed benchmark and located on the Site plan. The top of

the PVC casings will be referenced to existing Site vertical datum to provide a reference point for groundwater elevation measurements. Approximately 72 hours or more following completion of Site well development activities, depth to groundwater will be measured in all newly installed and existing monitoring wells from the top of each riser using an electric water level indicator to the nearest 0.01 feet. Depth to water measurements will be used to calculate the groundwater elevations for each location. Groundwater elevations will be used to prepare an isopotential map of the Site. This site-specific isopotential map will be used to determine the groundwater flow direction and hydraulic gradient at the Site.

4.3.4 In-Situ Hydraulic Conductivity Testing

In-situ permeability of the first water bearing zone screened by all newly installed monitoring wells will be determined using the variable-head test method ("rising head") by the method of Bouwer and Rice (1976). The hydraulic conductivity testing will be performed in accordance with TurnKey's field operating procedure presented in the QAPP.

4.3.5 Groundwater Sample Collection and Analysis

The groundwater monitoring network for this project will include 10 monitoring well locations, including existing wells MW-01, MW-07A and MW-07B, as well as new wells MWN-63A, MWN-63D, MWN-64A, MWS-32A, MWS-36A, MWS-37A and MWN-65D. All monitoring locations are shown on Figure 2. Prior to sampling these monitoring wells, static water levels will be measured and recorded as described above. Two on-site piezometers P-49S and P-41S will be measured for water level only. In addition, downgradient off-site monitoring wells MWN-56A, MWN-58A, and MWS-30A, and piezometers P-46S, P-38S will be measured for depth to water only. Groundwater elevations obtained from these piezometers and monitoring wells will be used to sharpen the site-wide shallow groundwater isopotential map as it relates to the South Return Water Trench (see Figure 2). Following water level measurement, TurnKey personnel will purge and sample each monitoring well in accordance with low-flow/minimal drawdown purge and sample collection procedures. Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min). Field measurements for pH, specific conductance, temperature, turbidity, and water level as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Purging will be

considered complete when pH, specific conductivity and temperature stabilize and when turbidity measurements fall below 50 NTU, or become stable above 50 NTU. Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed for the parameters presented in Table 3. In the event that low-flow purging and sampling techniques cannot be accomplished, standard purging and sampling techniques will be implemented via a dedicated polyethylene disposable bailer.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, Eh, and water level as well as visual and olfactory field observations will be recorded. All collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to the analytical laboratory for analysis as indicated in Table 3.

4.4 Railroad Realignment Investigation

South Buffalo Railroad (SBRR), now owned by Genesee and Wyoming, Inc., operates short haul railroad services supplying local manufacturing plants and connecting them with four Class I railroads: CSX, Norfolk Southern, Canadian National, and Canadian Pacific. SBRR operates switching yards and provides rail service for the entire Tecumseh Site, including the Port of Buffalo. The approximate 18 acre SBRR property south of Smokes Creek and south of the Site along NYS Route 5 (see Figure 2) is also used for temporary storage of goods waiting for distribution. In order to maximize the redevelopment potential along NYS Route 5 and improve the currently limited access to and from the Site along NYS Route 5, the Tecumseh redevelopment plan includes a proposal to relocate the active rail lines along NYS Route 5 to the western edge of the BCP Business Park Phases I and II as well as into a portion of BCP Business Park Phase III as shown in Figure 2. The rail line relocation will also better serve the medium and heavy industrial transportation needs further toward the west and interior portions of the Tecumseh property as well as the intermodal (e.g. ship to truck, rail to ship, etc.) transportation needs in the vicinity of the Gateway Metroport located north of the Site.

The proposed railroad realignment measures approximately 12,500 feet, with approximately 10,000 feet located on the Tecumseh property. Approximately 52 test pits spaced equidistantly approximately 100 feet apart will be excavated along the proposed Railroad Realignment Area to allow for visual/olfactory/PID assessment of subsurface conditions as well as to obtain representative samples for chemical characterization. As presented on Figure 2, test pit locations have been preliminarily identified; however, locations may need to be modified and/or additional test pits may be excavated pending field findings. Areas along the rail alignment corridor already assigned a test pit as part of the proposed Soil-Slag/Fill Investigation described in Section 4.2 of this Work Plan (e.g., test pits BPA 2-TP-24, 30, 34, 74, and 92) or completed during the Phase III BPA investigation (e.g., test pits BPA 3-TP-56 and 58) will not require coverage as part of this investigation, although the analytical results from those test pits will be incorporated in the final assessment.

In general, test pits will be advanced, assessed, characterized, and sampled in accordance with Section 4.2 above. Representative soil/slag-fill samples will be collected from alternating test pits for COPC metal analysis (see Table 1). For test pits exhibiting elevated PID readings in the test pit atmosphere or in the excavated spoils, a second representative aliquot from the associated soil/slag-fill location will be transferred to a sealable plastic bag for discrete headspace determination as previously discussed. Headspace determination values greater than 20 ppm will require the collection of an additional sample transferred directly into a laboratory supplied, pre-cleaned sample container for analysis of TCL VOCs via Method 8260.

Following completion of each test pit, soil/slag-fill material will be returned to the excavation in the opposite order in which it was removed and compacted to match the existing grade. Only the number of test pits that can be adequately backfilled during a single workday will be excavated. No excavated test pit will be left open overnight.

4.5 Decontamination & Investigation-Derived Waste (IDW)

Every attempt will be made to utilize dedicated sampling equipment, however if non-dedicated equipment is required, the equipment will be decontaminated, at a minimum, with a non-phosphate detergent (i.e., Alconox®) and potable water mixture, rinsed with distilled water, and air-dried before each use in accordance with TurnKey's field operating

procedures. All decontaminated sampling equipment will be kept in a clean environment prior to sample collection. Heavy equipment, such as an excavator and drilling tools, will be decontaminated via high-pressure steam cleaning on a temporary decontamination pad between grab sample locations and composite groups (i.e., test pits, borings, etc.), as necessary.

Investigative-Derived Waste (IDW) generated during this investigation will not require containment unless visual and/or olfactory evidence of gross impact are observed or as requested by the Department. Soil cuttings generated during drilling and test pitting activities will either be spread out at the surface or placed back into the excavation in the order in which it was removed. Groundwater removed during monitoring well development and purging will be discharged to the ground surface no closer than 50 feet in any radial direction from the monitoring well unless visual non-aqueous phase liquid (NAPL) is present, in which case the purged groundwater will be placed in sealed NYSDOT-approved 55-gallon drums and labeled with an alphanumeric identifier for characterization and disposal. Liquid IDW (e.g., decontamination rinse water) will also be discharged to the ground surface unless visual/olfactory evidence of impact is observed, in which case, it will be containerized for characterization and disposal.

Discarded personal protective equipment (PPE) (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., stainless steel spoons) will be placed in sealed plastic garbage bags and disposed of as municipal solid waste. TurnKey field personnel will coordinate the onsite handling and temporary storage of impacted IDW, if necessary, including transportation and offsite disposal.

4.6 Field Specific Quality Assurance/Quality Control (QA/QC)

In addition to the soil/slag-fill and groundwater samples described above, site-specific field quality assurance/quality control (QA/QC) samples will be collected and analyzed to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, and blind duplicates. Trip blanks will accompany the VOC samples only. Dedicated sampling equipment will be used to minimize field decontamination time and avoid the need for equipment blanks. QA/QC field sampling requirements are summarized in the QAPP. A brief summary of each is presented below:

- **Trip Blanks** – A sufficient number of trip blanks for VOC analysis will be prepared by the laboratory and delivered to the sampling team prior to a sampling event. One sealed blank will be carried into the field per day along with the sample containers for each day that water matrix VOC samples are collected. Trip blanks will be transported and handled in the same manner as the actual samples. The results of the trip blank analysis will be reviewed to evaluate if the potential for sample contamination during transportation and handling exists. The trip blanks will be analyzed for "full list" VOCs (TCL plus STARS List) by USEPA Method 8260B.
- **Blind Duplicate** – One blind duplicate will be collected and analyzed per 20 samples collected for the parameters presented in Table 3 per matrix (i.e., groundwater, soil/slag-fill, etc.). The location of the sample collection point will not be disclosed to the analytical laboratory, therefore the field sample containers will be returned to the laboratory identified only as the "blind duplicate." The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log and the results will be compared to review analytical precision.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD)** – A sufficient volume of sample will be collected at one sampling location per sampling event for MS/MSD analysis for the parameters presented in Table 3 per matrix (i.e., groundwater, slag/fill, etc.). The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

The laboratory will be required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation and preparation of a DUSR by a third-party validation expert. Accordingly, the samples will be analyzed by an NYSDOH ELAP-approved laboratory certified to perform CLP work.

4.7 Documentation

All investigation field activities will be documented in the Project Field Book. This logbook will provide a record of activities conducted at the Site. All entries will be signed and dated at the end of each day of fieldwork by the Field Team Leader. The field logbook will include, at a minimum, the following: date and time of all entries, names of all personnel on site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity. Sampling activities will be logged and photographed as necessary to document the activities at the Site. TurnKey personnel will complete the following standard field forms (examples of which are provided in the QAPP under separate cover):

- Chain of Custody Form
- Daily Drilling Report, (as necessary)
- Drilling Safety Checklist, (as necessary)
- Equipment Calibration Log
- Field Activity Daily Log (FADLs)
- Field Borehole/Geoprobe/Monitoring Well Installation Log, (as necessary)
- Groundwater Well Development Log
- Groundwater Well Inspection Form
- Groundwater Purge & Sample Collection Log – Low Flow
- Investigative-Derived Waste Container Log
- Photographic Log
- Real-Time Air Monitoring Log
- Sample Summary Collection Logs (groundwater and slag/fill)
- Tailgate Safety Meeting Form
- Test Pit Excavation Log
- Underground/Overhead Utility Checklist for Sampling
- Variance Log (as necessary)
- Water Level Monitoring Record
- Well Completion Detail: Stick-up (Monitoring Well)

4.8 Site Mapping & Survey

The investigation locations identified in this Work Plan were selected based on historical Site features and operations. Because few historical site features remain, X-Y coordinates for all proposed test pit locations will be determined and marked in the field using a Trimble GeoXT handheld GPS unit. Monitoring well locations and elevations will be measured by TurnKey's resident surveyor. All sample locations and remaining Site monuments will be measured relative to a fixed benchmark and a base map will be prepared.

An isopotential map showing the general direction of groundwater flow will be prepared based on water level measurements relative to USGS vertical datum. The maps will be provided with the RI report. Prior to receiving a certificate of completion the area of investigation will be surveyed by a New York State professional licensed survey team.

5.0 REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT

Upon completion of the RI fieldwork, a comprehensive RI/AAR report will be completed summarizing the tasks completed as described below.

5.1 Remedial Investigation Report

The RI section of the RI/AAR report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 2).

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this Work Plan.
- The data obtained during the RI and historical data considered by Benchmark to be of useable quality. This will include geochemical data, field measurements, etc.
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP.
- Comparative criteria that may be used to calculate cleanup levels during the alternatives analysis report (AAR) process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative exposure assessment and fish and wildlife impact analysis, including any recommendations for more detailed assessments, if applicable.
- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.

In addition, TurnKey will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be

prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and draft DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

5.2 Alternative Analysis Report

The AAR Report will include a remedial alternatives evaluation for on-site groundwater and soil/fill on portions of the Site if determined, based on the Remedial Investigation and reasonably anticipated future Site use, to exhibit elevated concentrations of constituents of concern. The Alternative Analysis Report (AAR) will meet the requirements identified in NYSDEC Standards, Criteria, and Guidance (SCGs) (e.g., Part 375 SCO's and GA Groundwater Quality Standards)

Based on the remedial action objectives (RAOs) and cleanup goals established for the Site, volumes and areas of media potentially requiring remediation will be calculated. General Response Actions will then be delineated to address each of the Site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.8(f):

- Protection of Human Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Short-term Effectiveness & Impacts
- Long-term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume
- Implementability
- Cost
- Land Use

In addition, the criteria of Community Acceptance will be considered based on public comments on the RI/AAR Report and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate recommendation of a remedial action.

6.0 INVESTIGATION SUPPORT DOCUMENTS

6.1 Site-Wide Health and Safety Plan (HASP)

A Health and Safety Plan (HASP) has been prepared in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 for the entire Tecumseh property. The HASP will be enforced by TurnKey and any subcontractors engaged in RI field activities in accordance with the requirements of 29 CFR 1910.120. The HASP covers all on-site investigation activities. TurnKey's HASP is provided for informational purposes in Appendix C. Subcontractors will be required to develop and implement a HASP as or more stringent than TurnKey's HASP. Health and safety activities will be monitored throughout the Remedial Investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation activities. The HASP and CAMP will be modified/expanded as appropriate if significant site invasive activities are performed, such as those associated with a remedial alternative involving soil/slag-fill excavation. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (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.

6.2 Community Participation Plan (CP Plan)

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan (CP Plan) is required for the Phase II Business Park investigative activities. The CP Plan, included as Appendix D, meets the requirements of Attachment 2 of the

NYSDEC Technical Administrative Guidance Memorandum (TAGM) DER-97-4058 and NYSDEC's Draft DER-10 guidance. TurnKey will coordinate and lead community relations throughout the course of the project.

6.3 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) will be prepared as a stand-alone document (under separate cover) for the RI activities described herein. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as Section 4.0 of the QAPP. The RI project management methods, organizational structure, and schedule are also included in the QAPP.

The QAPP will assure the accuracy and precision of data collection during the site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to assure compliance with USEPA SW-846 methodology. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5); the EPA Region II CERCLA Quality Assurance Manual, and NYSDEC's December 2002 draft DER-10 Technical Guidance for Site Investigation and Remediation.

7.0 PROJECT SCHEDULE AND SEQUENCE OF THE WORK

Figure 4 presents the tentative schedule for completion of RI activities. As indicated, start of field activities is dependent on NYSDEC approval of the RI/AAR Work Plan.

8.0 REFERENCES

1. URS Consultants, Inc., *RCRA Facility Investigation (RFI) Report for the Former Bethlehem Steel Corporation Facility, Lackawanna, New York, Parts I through VII*, prepared for Bethlehem Steel Corporation, October 2004.

2. New York State Department of Environmental Conservation. *Draft DER-10; Technical Guidance for Site Investigation and Remediation.* December 2002.

TABLES

TABLE 1

CONSTITUENTS OF PRIMARY CONCERN (COPCs)

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

COMPOUND	CAS #
Volatile Organic Compounds	
(STARS Method 8021B)	
Benzene	*71-43-2*
n-Butylbenzene	*104-51-8*
sec-Butylbenzene	*135-98-8*
tert-Butylbenzene	*98-06-6*
p-Cymene	*99-87-6*
Ethylbenzene	*100-41-4*
Isopropylbenzene	*98-82-8*
Methyl tert butyl ether	*1634-04-4*
n-Propylbenzene	*103-65-1*
Toluene	*108-88-3*
1,2,4-Trimethylbenzene	*95-63-6*
1,3,5-Trimethylbenzene	*108-67-8*
m-Xylene	*95-47-6*
o-Xylene	*106-42-3*
p-Xylene	*108-38-3*
TCL Semi-Volatile Organic Compounds	
(Method 8270C - base/neutrals only)	
Acenaphthene	*83-32-9*
Acenaphthylene	*208-96-8*
Anthracene	*120-12-7*
Benzo(a)anthracene	*56-55-3*
Benzo(b)fluoranthene	*205-99-2*
Benzo(k)fluoranthene	*207-08-9*
Benzo(g,h,i)perylene	*191-24-2*
Benzo(a)pyrene	*50-32-8*
Benzyl alcohol	*100-51-6*
Bis(2-chloroethoxy) methane	*111-91-1*
Bis(2-chloroethyl) ether	*111-44-4*
2,2'-Oxybis (1-Chloropropane)	*108-60-1*
Bis(2-ethylhexyl) phthalate	*117-81-7*
4-Bromophenyl phenyl ether	*101-55-3*
Butyl benzyl phthalate	*85-68-7*
4-Chloroaniline	*106-47-8*
2-Chloronaphthalene	*91-58-7*
4-Chlorophenyl phenyl ether	*7005-72-3*
Chrysene	*218-01-9*
Dibenzo(a,h)anthracene	*53-70-3*
Dibenzofuran	*132-64-9*
Di-n-butyl phthalate	*84-74-2*
1,2-Dichlorobenzene	*95-50-1*
1,3-Dichlrobenzene	*541-73-1*
1,4-Dichlrobenzene	*106-46-7*
3,3'-Dichlorobenzidine	*91-94-1*
Diethyl phthalate	*84-66-2*

COMPOUND	CAS #
TCL Semi-Volatile Organic Compounds (cont'd)	
(Method 8270C - base/neutrals only)	
Dimethyl phthalate	*131-11-3*
2,4-Dinitrotoluene	*121-14-2*
2,6-Dinitrotoluene	*606-20-2*
Di-n-octyl phthalate	*117-84-0*
Fluoranthene	*206-44-0*
Fluorene	*86-73-7*
Hexachlorobenzene	*118-74-1*
Hexachlorobutadiene	*87-68-3*
Hexachlorocyclopentadiene	*77-47-4*
Hexachloroethane	*67-72-1*
Indeno(1,2,3-cd)pyrene	*193-39-5*
Isophorone	*78-59-1*
2-Methylnaphthalene	*91-57-6*
Naphthalene	*91-20-3*
2-Nitroaniline	*88-74-4*
3-Nitroaniline	*99-09-2*
4-Nitroaniline	*100-01-6*
Nitrobenzene	*95-95-3*
N-Nitrosodiphenylamine	*86-30-6*
N-Nitroso-Di-n-propylamine	*621-64-7*
Phenanthrene	*85-01-8*
Pyrene	*129-00-0*
1,2,4-Trichlorobenzene	*120-82-1*
Total Metals	
(Method 6010B)	
Arsenic	*7440-38-2*
Barium	*7440-39-3*
Cadmium	*7440-43-9*
Chromium	*7440-47-3*
Lead	*7439-92-1*
Mercury *(Method 7470A(water) and 7471A(so*	*7439-97-6*
Wet Chemistry	
Cyanide *(Method 9010B)*	*57-12-5*
PCBs	
Method 8082	
Aroclor 1016	*12674-11-2*
Aroclor 1221	*11104-28-2*
Aroclor 1232	*11141-16-5*
Aroclor 1242	*53469-21-9*
Aroclor 1248	*12672-29-6*
Aroclor 1254	*11097-69-1*
Aroclor 1260	*11096-82-5*

TABLE 2

EXPANDED PARAMETER LIST

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

Collected 1 per 10 samples per matrix

COMPOUND	CAS #
TCL Volatile Organic Compounds	
(Full List TCL VOCs plus STARS, via Method 8260B)	
Acetone	67-64-1
Benzene	71-43-2
Bromoform	75-25-2
Bromochloromethane	74-97-5
Bromodichloromethane	75-27-4
Bromomethane (Methyl bromide)	74-83-9
2-Butanone (MEK)	78-93-3
n-Butylbenzene	104-51-8
sec-Butylbenzene	135-98-8
tert-Butylbenzene	98-06-6
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroethane	75-00-3
Chloroform	67-66-3
Chloromethane (Methyl chloride)	74-87-3
Cyclohexane	110-82-7
p-Cymene (p-isopropyltoluene)	99-87-6
1,2-Dibromo-3-chloropropane	96-12-8
1,2-Dibromoethane (EDB)	106-93-4
Dibromochloromethane	124-48-1
Dichlorodifluoromethane (Freon-12)	75-71-8
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane (EDC)	107-06-2
1,1-Dichloroethylene (1,1-DCE)	75-35-4
trans-1,2-Dichloroethylene	156-60-5
cis-1,2-Dichloroethylene	156-59-2
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
1,2-Dichloropropane	78-87-5
Ethylbenzene	100-41-4
2-Hexanone	591-78-6
Isopropylbenzene (Cumene)	98-82-8
Methyl acetate	79-20-9
Methylene chloride	75-09-2
Methylcyclohexane	108-87-2
4-methyl-2-pentanone (MIBK)	108-10-1
Methyl tert butyl ether (MTBE)	1634-04-4
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane	630-20-6
Tetrachloroethylene (PCE)	127-18-4
Toluene	108-88-3
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Trichloroethylene (TCE)	79-01-6
Trichlorofluoromethane (Freon-11)	75-69-4
1,1,2-Trichloro-1,2,2-trifluoroethane (Freo	76-13-1
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride	75-01-4
m-Xylene	95-47-6
o-Xylenes	106-42-3
p-Xylene	108-38-3
Total Xylenes	1330-20-7

COMPOUND	CAS #
TCL Semi-Volatile Organic Compounds	
(Method 8270C - base-neutrals and acid extractables)	
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Anthracene	120-12-7
Benzo(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Benzo(g,h,i)perylene	191-24-2
Benzo(k)fluoranthene	207-08-9
Benzyl alcohol	100-51-6
bis(2-Chloroethoxy)methane	111-91-1
bis(2-Chloroethyl)ether	111-44-4
2,2'-oxybis(1-chloropropane); bis(2-chloroisopropyl)ether	108-60-1
bis(2-Ethylhexyl)phthalate	117-81-7
Butyl benzyl phthalate	85-68-7
4-Bromophenyl phenyl ether	101-55-3
4-Chloroaniline	106-47-8
4-Chloro-3-methylphenol	59-50-7
2-Chloronaphthalene	91-58-7
2-Chlorophenol	95-57-8
4-Chlorophenyl-phenylether	7005-72-3
Chrysene	218-01-9
Dibenzo(a,h)anthracene	53-70-3
Dibenzofuran	132-64-9
3,3'-Dichlorobenzidine	91-94-1
2,4-Dichlorophenol	120-83-2
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Diethyl phthalate	84-66-2
2,4-Dimethylphenol	105-67-9
Dimethyl phthalate	131-11-3
Di-n-butyl phthalate	84-74-2
Di-n-octyl phthalate	117-84-0
4,6-Dinitro-2-methylphenol	534-52-1
2,4-Dinitrophenol	51-28-5
2,4-Dinitrotoluene	121-14-2
2,6-Dinitrotoluene	606-20-2
Fluoranthene	206-44-0
Fluorene	86-73-7
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachlorocyclopentadiene	77-47-4
Hexachloroethane	67-72-1
Indeno(1,2,3-cd)pyrene	193-39-5
Isophorone	78-59-1
2-Methylnaphthalene	91-57-6
2-Methylphenol (o-Cresol)	95-48-7
4-Methylphenol (p-Cresol)	106-44-5
Naphthalene	91-20-3
2-Nitroaniline	88-74-4
3-Nitroaniline	99-09-2
4-Nitroaniline	100-01-6
Nitrobenzene	98-95-3
2-Nitrophenol	88-75-5
4-Nitrophenol	100-02-7

COMPOUND	CAS #
TCL Semi-Volatile Organic Compounds	
(Method 8270C - base-neutrals and acid extractables)	
N-Nitrosodiphenylamine	86-30-6
N-Nitroso-di-n-propylamine	621-64-7
Pentachlorophenol	87-86-5
Phenanthrene	85-01-8
Phenol	108-95-2
Pyrene	129-00-0
1,2,4-Trichlorobenzene	120-82-1
2,4,5-Trichlorophenol	95-95-4
2,4,6-Trichlorophenol	88-06-2
TAL Metals	
(Method 6010B)	
Antimony	7440-38-2
Arsenic	7440-38-2
Barium	7440-39-3
Beryllium	7440-39-3
Cadmium	7440-43-9
Calcium	7440-70-2
Chromium	7440-47-3
Cobalt	7440-48-4
Copper	7440-50-8
Iron	7439-89-6
Lead	7439-92-1
Mercury (Method 7470A(water) and 7471A(solid))	7439-97-6
Magnesium	7439-95-4
Manganese	7439-96-5
Nickel	7440-02-0
Potassium	7440-09-7
Selenium	7782-49-2
Silver	7440-22-4
Sodium	7440-23-5
Thallium	7440-28-0
Vanadium	7440-62-2
Zinc	7440-66-6
Wet Chemistry	
Cyanide (Method 9010B)	57-12-5
PCBs	
Method 8082	
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5

TABLE 3

ANALYTICAL PROGRAM QUALITY ASSURANCE/ QUALITY CONTROL SUMMARY

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

Matrix	Parameter [1]	Estimated Number of Samples	Estimated Number of QC Samples			
			Trip Blank [2]	MS [3]	MSD [3]	Blind Duplicate [3]
Soil/Fill - Subsurface	STARS VOCs [4]	14		1	1	1
	Full List + STARS VOCs [5]	18		1	1	1
	TCL SVOCs (BN only) [6]	51		3	3	3
	TCL SVOCs [7]	18		1	1	1
	COPC Metals [8]	55		3	3	3
	TAL Metals [9]	13		1	1	1
	Cyanide [10]	45		3	3	3
	TCL PCBs[11]	28		2	2	2
Groundwater [15]	STARS VOCs [4]	8				
	Full List + STARS VOCs [5]	2	1	1	1	1
	TCL SVOCs (BN only) [6]	8				
	TCL SVOCs [7]	2		1	1	1
	COPC Metals [8]	8				
	TAL Metals + Cyanide [9, 10, 12]	2		1	1	1
	Equipment Blank [13]	1				
	Field Parameters [14]	10				

Notes:

1. All analyses will be performed via SW-846 methodologies with Category B equivalent deliverables package.
2. Trip blanks will be submitted to the laboratory each day groundwater volatile organic samples are collected.
3. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected.
4. NYSDEC Spill Technology and Remediation Series (STARS) List VOCs via Method 8021B.
5. Full TCL list of VOCs plus the STARS List VOCs, via Method 8260B.
6. TCL SVOCs, base-neutrals (BN) only, via Method 8270C.
7. Full TCL list of SVOCs, including base-neutrals and acid extractables, via Method 8270C.
8. COPC Metals include: arsenic (6010B), barium (6010B), cadmium (6010B), chromium (6010B), lead (6010B), mercury (7470A for water; 7471A for soil).
9. TAL Metals, via Method 6010B, per Table 2.
10. Cyanide via Method 9010B.
11. Full TCL list of PCBs via Method 8082.
12. A filtered (soluble) metals sample will be collected and analyzed if sample turbidity exceeds 50 NTU.
13. An Equioment Blank will be analyzed for full list parameters only if non-dedicated equipment is used.
14. Field parameters include: pH, specific conductance, Eh, turbidity, and temperature.
15. Groundwater will be analyzed from existing wells MW-01, MW-07A and MW-07B and new monitoring wells MWN-63A, MWN-63D, MWN-64A, MWS-32A, MWS-36A, and MWS-37A and MWN-65D (see Figure 2).

Acronyms:

BN = Base Neutral SVOC Compounds
TCL = Target Compound List
TAL = Target Analyte List
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
PCBs = Polychlorinated Biphenyls
STARS = Spill Technology And Remediation Series; NYSDEC
COPCs = Constituents of Potential Concern
MS = Matrix Spike
MSD = Matrix Spike Duplicate
NA = Not Applicable

TABLE 4

SUBSURFACE SOIL/FILL ANALYTICAL PROGRAM SUMMARY
TEST PIT INVESTIGATION

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

Investigation Location (BPA 2-TP-#)	Rationale	Estimated Number of Samples [1,2]	STARS List VOCs	Full List VOCs [3,4]	SVOCs (BN only)	TCL SVOCs	COPC Metals	TAL Metals	Cyanide	PCBs
TP-1	General Coverage: No known or suspected impact	1			1		1			
TP-2	General Coverage: No known or suspected impact									
TP-3	General Coverage: No known or suspected impact	1			1		1			
TP-4	General Coverage: No known or suspected impact									
TP-5	General Coverage: No known or suspected impact									
TP-6	General Coverage: No known or suspected impact	1			1		1			
TP-7	Area of fuel and oil tanks	1		1		1		1	1	1
TP-8										
TP-9	Area of incinerator and paint storage shed									
TP-10		1	1		1		1		1	
TP-11	General Coverage: No known or suspected impact	1			1		1			
TP-12	Area of fuel and oil tanks	1	1		1		1		1	
TP-13		1		1		1		1	1	1
TP-14	Area of outdoor substation (transformers)									
TP-15		1			1		1		1	1
TP-103		1			1		1			1
TP-16	Area of former diesel tank and pump house									
TP-17		1		1		1		1	1	1
TP-18		1	1		1		1		1	
TP-19	Area of fuel oil tank	1			1		1		1	
TP-20	General Coverage: No known or suspected impact	1		1		1		1	1	1
TP-21	Area of former oil house and tar storage	1	1		1		1		1	
TP-22										
TP-23		1		1		1		1	1	1
TP-24	General Coverage: No known or suspected impact	1			1		1			
TP-25	Area of former incinerator	1			1		1		1	
TP-26										
TP-27	General Coverage: No known or suspected impact	1			1		1			
TP-28										
TP-29	Area of former Cold Saw No. 3									
TP-30		1		1		1		1	1	1
TP-31	Area of former Cold Saw No. 4									
TP-32		1			1		1		1	
TP-33	Area of former Cold Saw No. 5	1			1		1		1	
TP-34										
TP-35	Former Cold Saw Oil House	1			1		1		1	
TP-36	Area of former transformer (Cold Saw Area)	1			1		1		1	1
TP-37	Area of Cold Saw No. 6									
TP-38		1	1		1		1		1	
TP-39	Area of former Cold Saw Shed No. 3	1			1		1		1	
TP-40	Area of Electric Service Building	1			1		1		1	1

TABLE 4

SUBSURFACE SOIL/FILL ANALYTICAL PROGRAM SUMMARY
TEST PIT INVESTIGATION

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

Investigation Location (BPA 2-TP-#)	Rationale	Estimated Number of Samples [1,2]	STARS List VOCs	Full List VOCs [3,4]	SVOCs (BN only)	TCL SVOCs	COPC Metals	TAL Metals	Cyanide	PCBs
TP-41	Area of former Cold Saw Shed No. 2	1			1		1		1	
TP-42										
TP-43	Area of former Cold Saw Shed No. 1	1			1		1		1	
TP-44										
TP-45	Area of former Structural Shipping Yard (transformer)	1			1		1		1	1
TP-46	General Coverage: No known or suspected impact	1			1		1			
TP-47	General Coverage: No known or suspected impact	1			1		1			
TP-48	Area of former Car Repair Shop	1		1		1		1	1	1
TP-49		1			1		1			
TP-50		1			1		1		1	
TP-51										
TP-52		1			1		1		1	
TP-53										
TP-54										
TP-55		1	1		1		1		1	
TP-56	General Coverage: No known or suspected impact	1			1		1			
TP-57	Area of former 14"-18" Mill (5 - transformers)	1			1		1		1	1
TP-97		1			1		1			
TP-58	Area of former 14"-18" Mill (Furnace Building), fuel oil tank, pump house	1	1		1		1		1	
TP-59										
TP-60		1		1		1		1	1	1
TP-61										
TP-62	Area of former Repair Shop/Sump	1			1		1		1	
TP-63										
TP-64		1	1		1		1		1	
TP-95		1		1		1	1			
TP-65	General Coverage: No known or suspected impact	1			1		1			
TP-66	Area of former pipe tunnel/pump house	1	1		1		1		1	
TP-67	Area of former transformer vault	1			1		1		1	1
TP-68	Area of former 54" Blooming Mill, pump house, pit									
TP-69		1		1		1		1	1	1
TP-70										
TP-94		1	1		1		1			
TP-71	Area of former Splice Bar Shop tanks (quench & fuel oil), oil pump house	1			1		1		1	
TP-72										
TP-73										
TP-74		1		1		1		1	1	1
TP-93		1	1		1		1			
TP-75	General Coverage: No known or suspected impact	1			1		1			
TP-76	Area of former craneway hydraulic pump house	1	1		1		1		1	1
TP-77										
TP-78	General Coverage: No known or suspected impact	1			1		1			

TABLE 4

SUBSURFACE SOIL/FILL ANALYTICAL PROGRAM SUMMARY
TEST PIT INVESTIGATION

RI/AAR Work Plan
Phase II Business Park Site
Lackawanna, New York

Investigation Location (BPA 2-TP-#)	Rationale	Estimated Number of Samples [1,2]	STARS List VOCs	Full List VOCs [3,4]	SVOCs (BN only)	TCL SVOCs	COPC Metals	TAL Metals	Cyanide	PCBs
TP-79	Area of former 48" Roughing Mill, oil cellars									
TP-80		1		1		1		1	1	1
TP-81										
TP-82										
TP-83		1	1		1		1		1	
TP-84		1	1		1		1		1	
TP-85	Area of former 28"-35" Mill, pump house, transformers	1			1		1		1	1
TP-86		1		1		1		1	1	1
TP-87										
TP-88										
TP-96		1		1		1	1			1
TP-89	General Coverage: No known or suspected impact	1		1		1		1	1	1
TP-90	Area of former substation	1			1		1		1	1
TP-91	Area of active substation 7S	1			1		1			1
TP-92	Area of active substation 11A	1		1		1	1			1
TP-98	Area of active substation 10-A	1								1
TP-99		1								1
TP-100	General Coverage: No known or suspected impact	1		1		1	1			
TP-101	Area of former pedestrian tunnel									
TP-102	Area of former Plant No. 2									
TP-104	Area of former paint storage shed	1			1					
TP-105	General Coverage: No known or suspected impact	1		1		1	1			
TOTAL:		**71**	**14**	**18**	**51**	**18**	**55**	**13**	**45**	**28**

Notes:

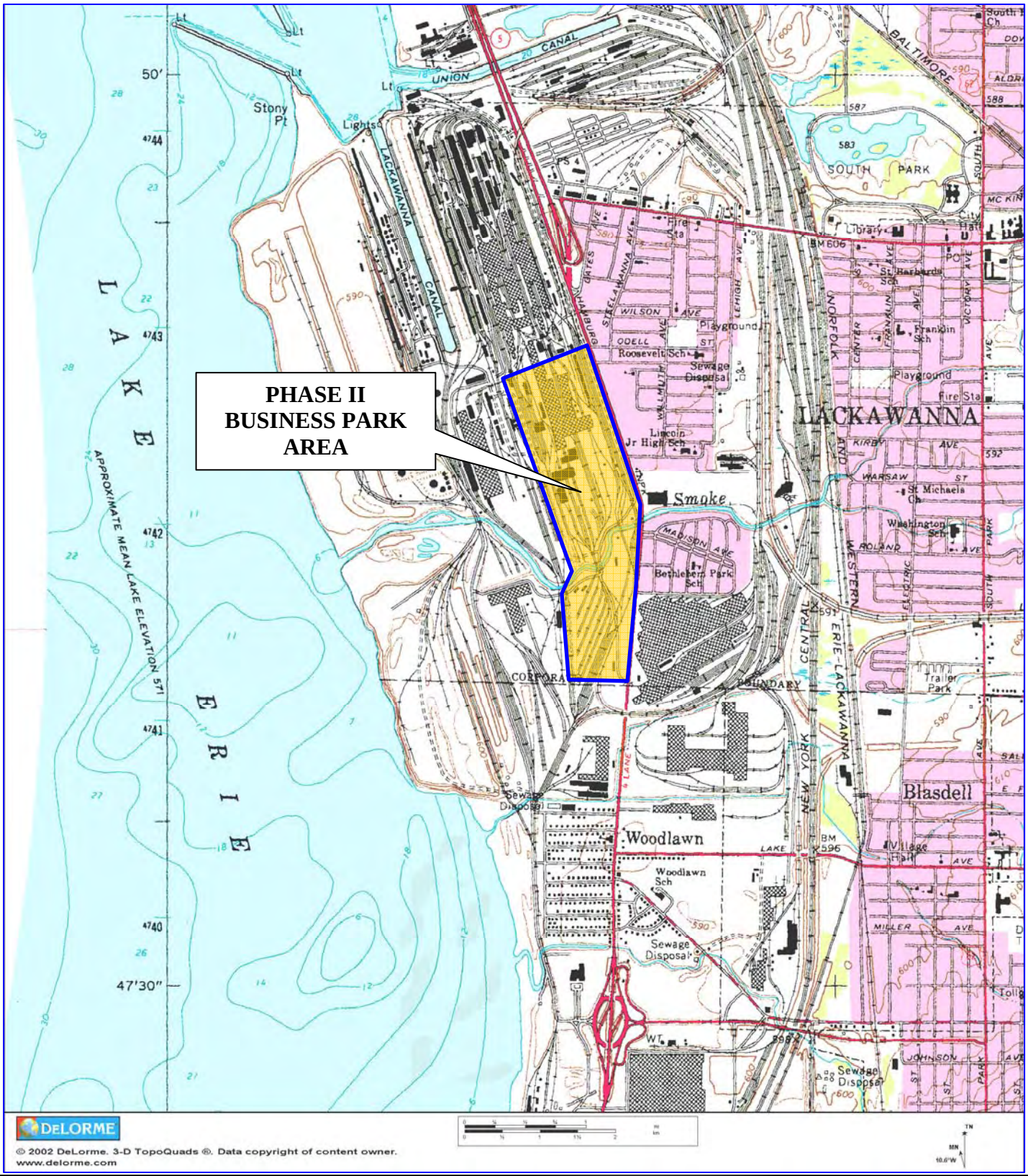
1. All samples to be collected from 0-2' BGS interval unless field observations indicate greater impact with depth. A minimum of one per 10 samples shall be collected from 2' to bottom depth.
2. All locations shall be sampled and archived by the laboratory for potential analysis/reanalysis.
3. Full List VOCs = TCL VOCs plus STARS List VOCs via Method 8260B.
4. Full List VOCs analysis will be taken from any additional Test Pit based on elevated PID readings (>20) and visual and/or olfactory observations..

Acronyms:

VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
TCL = Target Compound List
TAL = Target Analyte List
BN = Base Neutrals
PCBs = Polychlorinated Biphenyls
STARS = Spill Technology And Remediation Series; NYSDEC
COPCs = Constituents of Potential Concern
SWMU = Solid Waste Management Unit
TP = Test Pit

FIGURES

FIGURE 1



TURNKEY ENVIRONMENTAL RESTORATION, LLC

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

PROJECT NO.: 0071-007-300

DATE: JUNE 2008

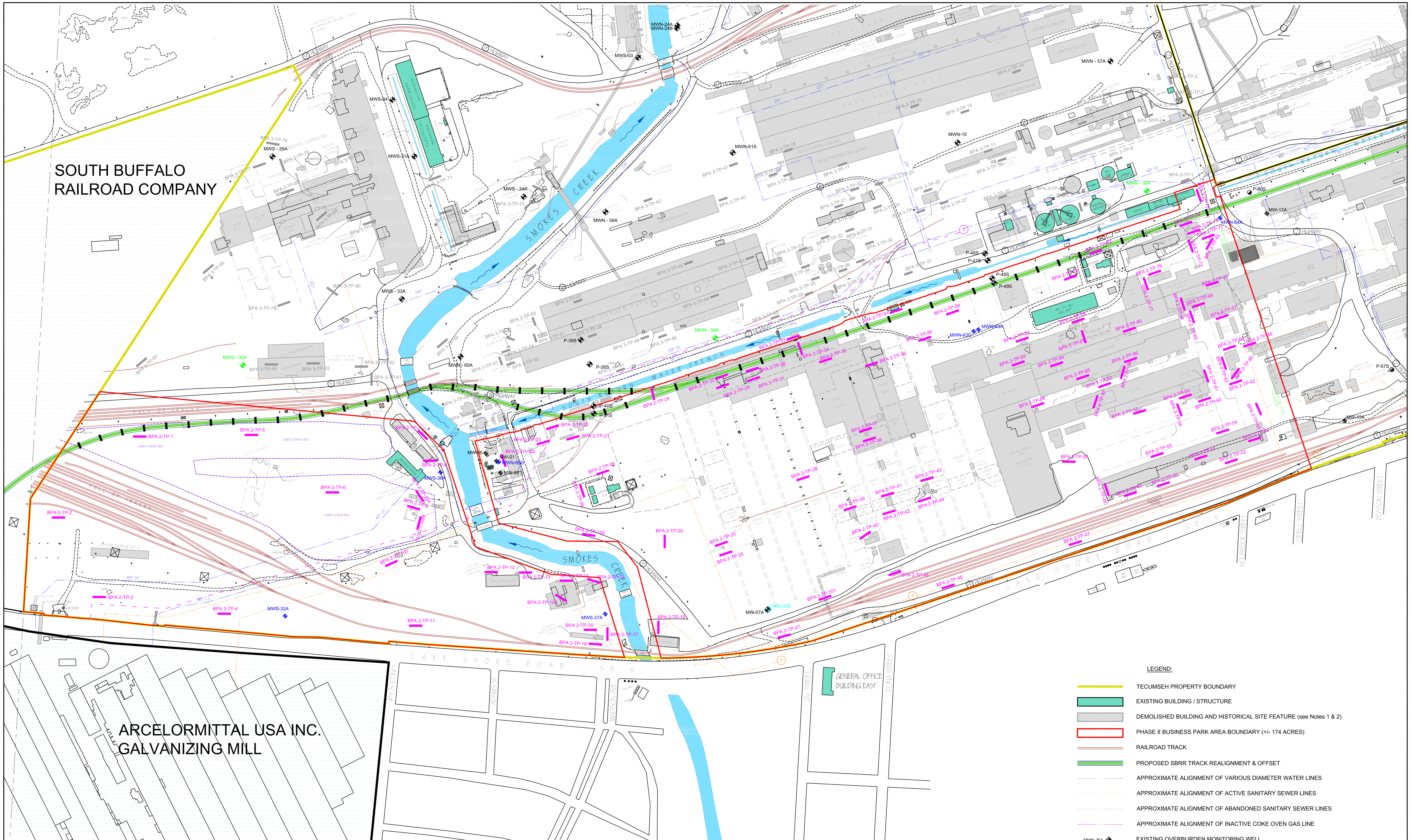
DRAFTED BY: JCT

SITE LOCATION AND VICINITY MAP

PHASE II BUSINESS PARK AREA
LACKAWANNA, NEW YORK

PREPARED FOR

ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.



SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- DEMOLISHED BUILDING AND HISTORICAL SITE FEATURE (see Notes 1 & 2)
- PHASE II BUSINESS PARK AREA BOUNDARY (+/- 174 ACRES)
- RAILROAD TRACK
- PROPOSED SBRR TRACK REALIGNMENT & OFFSET
- APPROXIMATE ALIGNMENT OF VARIOUS DIAMETER WATER LINES
- APPROXIMATE ALIGNMENT OF ACTIVE SANITARY SEWER LINES
- APPROXIMATE ALIGNMENT OF ABANDONED SANITARY SEWER LINES
- APPROXIMATE ALIGNMENT OF INACTIVE COKE OVEN GAS LINE
- MWN-25A — EXISTING OVERBURDEN MONITORING WELL
- MW-7B — EXISTING BEDROCK MONITORING WELL
- P-40S — EXISTING OVERBURDEN PIEZOMETER
- MWN-56A — PHASE III BPA DOWNGRADIENT OVERBURDEN MONITORING WELL
- BPA 3-TP-81 — PHASE III BPA TEST PIT
- MWS-63A — PLANNED PHASE II BPA OVERBURDEN MONITORING WELL (5)
- MWS-63D — PLANNED PHASE II BPA BEDROCK MONITORING WELL (2)
- BPA 2-TP-72 — PLANNED PHASE II BPA TEST PIT (105)
- PLANNED RAILROAD REALIGNMENT TEST PIT (52)
  - Phase II BPA (south): 12
  - Phase II BPA (north): 24
  - Phase III BPA (south): 3
  - Phase III BPA (north): 13

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.

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

JOB NO.: 0071-009-310

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: NOVEMBER 2008 (REV MAR 2009)
CHECKED BY:
APPROVED BY:

PLANNED SAMPLE LOCATIONS

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT

PHASE II BUSINESS PARK AREA

LACKAWANA, NEW YORK

PREPARED FOR

ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC

FIGURE 2

FILEPATH: P:\2007\Tecumseh Redevelopment\Environ\Brownfield Cleanup Program (BCP)\Phase II Brafferton Park Area\ExhA\R Work (EA.WP)\Figure 3, Redevelopment Master Plan (Feb 2009).dwg

N

LAKE FRONT ACCESS & GREENWAY

LAKE ERIE

STEEL WINDS 1 FACILITY (± 29.00 ACRES)

WIND ENERGY, GOLF COURSE AND/OR PASSIVE RECREATION (± 139.26 ACRES)

U.S.A.C.E. SEDIMENT DISPOSAL AREA

OPEN WATER

U.S. HARBOR LINE EST. AND TY. 1897

LAND

STEEL WINDS 1A FACILITY (±9.33 ACRES)

CITY OF LACKAWANNA
CITY OF BUFFALO

BUFFALO OUTER HARBOR

HEAVY INDUSTRIAL, INTERMODAL, AND/OR GREEN ENERGY DEVELOPMENT (± 247.34 ACRES)

PASSIVE RECREATION (CAMUs) (± 73.81 ACRES)

STEEL WINDS 2 NON-BCP (± 32.59 ACRES)

MEDIUM INDUSTRIAL (± 53.42 ACRES)

STEEL WINDS 2 NON-BCP (± 40.73 ACRES)

BUFFALO CRUSHED STONE

SMOKES CREEK

LAKE VALLEY

STEEL WINDS 2 BCP (± 17.38 ACRES)

STEEL WINDS 2 BCP (± 38.11 ACRES)

GATEWAY METROPORT SHIP CANAL

PHASE IA - BUSINESS PARK (±9.82 ACRES)

GATEWAY TRADE CENTER (G.T.C.)

UNION SHIP CANAL

PHASE III - BUSINESS PARK (± 93.31 ACRES)

PHASE I - BUSINESS PARK (±101.84 ACRES)

PHASE II - BUSINESS PARK (± 144.10 ACRES)

SOUTH BUFFALO RAILROAD COMPANY

BUFFALO SPECIALTY STEEL

TOWN OF HAMBURG
VILLAGE OF BLASDELL

VILLAGE OF BLASDELL
CITY OF LACKAWANNA

SOUTH BUFFALO RAILROAD COMPANY

CONRAIL RAIL SPUR

LEGEND:

- TECUMSEH PROPERTY BOUNDARY
- EXISTING BUILDING / STRUCTURE
- RAILROAD TRACK

NOTES:

1, Building locations are based on historical surveys and maps, all locations should be considered approximate,

500' 0' 500' 1000'

SCALE: 1 INCH = 500 FEET
SCALE IN FEET
(approximate)

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

JOB NO.: 0071-009-310

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: NOVEMBER 2008 (REV. FEB 2009)
CHECKED BY:
APPROVED BY:

REDEVELOPMENT MASTER PLAN

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
PHASE II BUSINESS PARK AREA
LACKAWANNA, NEW YORK

PREPARED FOR
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC

FIGURE 3

Task Name	2009													2010												
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Develop RI/AAR Work Plan																												
NYSDEC Work Plan Review/Revisions																												
Advertise RI Work Plan, Distribute Fact Sheet																												
Public Comment Period																												
Soil Sampling & Analysis																												
Groundwater Well Installation & Development																												
Well Sampling & Analysis																												
Soil & Groundwater Data Review & Validation																												
Data Summary/Interpretation																												
Draft RI Report with Remedial Alt Assessment																												
NYSDEC Report Review/Revisions																												
RI/Remedial Alt Assessment Report Fact Sheet Issued																			4/2									
Prepare Remedial Action Work Plan																												
Remedial Action Work Plan Report Review/Revisions																												
Issue Fact Sheet																								8/13				
Public Comment Period																												
Remedy Construction/Infrastructure																												
Final Engineering Report																												
Issue Eng. Report Fact Sheet																												
COC, Institutional Control Fact Sheet																												

726 EXCHANGE STREET
SUITE 824
BUFFALO, NEW YORK 14210
(716) 856-0635

JOB NO.: 0071-009-310

PROJECT SCHEDULE

REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT

PHASE II BUSINESS PARK AREA
LACKAWANNA, NEW YORK

PREPARED FOR
ARCELORMITTAL TECUMSEH REDEVELOPMENT, INC.

FIGURE 4

DATE: MARCH 2009
DRAFTED BY: BCH