Phase II (Fifth Round) Work Plan
Engineering Investigations and Evaluations at
Inactive Hazardous Waste Disposal Sites

REPUBLIC STEEL
City of Buffalo, Erie County
Site ID No. 915047

Prepared For:

New York State Department of Environmental Conservation

Prepared by:

Western Site Investigation Section
Bureau of Hazardous Site Control
Division of Hazardous Waste Remediation

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1.0 INTRODUCTION

All work will be conducted in conformance with the NYSDEC Phase II Generic Work Plan and Guidelines presented in Schedule 4 (Requirements of the Phase II Investigation) of the Contract, and this document.

The Republic Steel site is an industrial landfill located on Hopkins Street in the City of Buffalo, Erie County, New York. The site is approximately 100 acres in size. The site was used for the disposal of plant-generated wastes from the 1930's through 1981. The wastes included slag, precipitator dust, clarifier sludge, railroad ties, checker bricks, scrap wood, tool scale, Basic Oxygen Furnace (BOF) brick, construction debris, and blast furnace dust. Additionally, waste oils and acids were disposed of on-site.

Prior to the Resource Conservation and Recovery Act there was minimal segregation of wastes at the Republic Steel site. In November of 1980, however, BOF dust was classified as an EP Toxic hazardous waste due to lead leachability. The dust was reportedly then placed in a segregated fill area until steel making operations ceased in 1981.

Analytical results from site water samples (groundwater and surface water) indicated elevated levels of phenols, lead, cadmium, arsenic, manganese, sulfate, iron, and tetrachloroethylene.

The current site owner, LTV Steel Company, recently submitted closure plans to the NYSDEC Divisions of Solid Waste (DSW) and Hazardous Substances Regulation (DHSR). The plans are currently under review. The DHSR is reviewing the closure plan for the six acre BOF dust area and the DSW is reviewing closure plans for the remainder of the site. The New York State "Community Right-To-Know" (RTK) document indicates that 60,000 tons of BOF dust were disposed at the site between 1970 and 1981. In the Draft Phase I Investigation Report it is noted that the six acre BOF dust area contains an estimated 6,000 tons of BOF dust. It is therefore reasonable to assume that there are 54,000 tons of BOF dust landfilled elsewhere through the site. The RTK also indicates that 62,400 tons of Waste Pickle Liquor were disposed of at the site between 1952 and 1978. Waste Pickle Liquor is a listed hazardous waste due to its constituents, hexavalent chromium and/or lead. It is therefore suspected that hazardous waste was landfilled throughout the 100-acre site, which may adversely be impacting the landfill. The Phase II Investigation will assist in determining the extent of the contamination at the site and may impact current plans for the site closure.

A Phase I Investigation has been completed for this site. The report was prepared by Ecology and Environment, Inc. in 1988. As of February 1989 the report is in draft form.

2.0 OBJECTIVES

The purpose of this investigation is to study specific concerns regarding past waste disposal practices, evaluate the environmental significance of the site, and to prepare a report including calculation of a final Hazard Ranking System (HRS) Score.

In order to accomplish the above Phase II Objectives the following investigation tasks will be performed:

- o site reconnaissance and data compilation
- o geophysical survey
- o test borings
- o monitoring well installation
- o in-situ permeability testing
- o air monitoring
- o environmental sampling and analysis
- o surveying and mapping
- o site assessment
- o report preparation

3.0 SITE RECONNAISSANCE and DATA COMPILATION

A detailed record review will be conducted prior to the initiation of field work and preparation of the draft report. Records in local and state agency files will be reviewed as necessary to supplement any existing Phase I report or USEPA Preliminary Assessment/Site Inspection reports to allow for the proper completion of the field investigation, site assessment, and calculation of the final HRS.

A site visit will be conducted prior to the commencement of any drilling or sampling activities. At this time, markers designating the tentative locations for test borings, monitoring wells, and surface sampling locations will be emplaced. In addition, by either visual inspection, use of a portable hand-held magnetometer, or by contacting the appropriate utility firm, utilities potentially impacting drilling or other field activities should be identified. During the visit, specific information determined by NYSDEC personnel will be collaborated; as an example, access problems related to drilling, geophysical survey, sampling, or an on-site water source.

During the NYSDEC site reconnaissance, the following site specific information was noted:

- The site is bordered by railroad tracks to the north and west, by water (Republic Steel Wetland) to the south, and by Hopkins Street to the east.

- LTV has divided the site into five designated areas: Miscellaneous Debris/ Fine Refuse Area, Fine Refuse Area, Railroad Fill Area, Clarifier Sludge Area, and BOF Dust Area. The BOF dust area and clarifier sludge area are located adjacent to one another, immediately west of the railroad tracks which cross the site.

- There are reportedly nineteen wells on-site. Several of the wells were observed and appeared to be in sound condition. Inspection of well boring logs, however, indicated that at least four of the wells experienced cave-ins during installation.

- LTV Steel Company is mining/ salvaging brick, slag, and metal debris at the site. The area of the excavation was on the southeast portion of the site.

- The BOF dust was reportedly covered daily, when disposed, due to its fine consistency and potential for blowing off-site.

- The west face of the BOF dust and clarifier sludge areas has a steep slope. Both areas appear to be approximately 20-30 feet above original grade.

- A steep slope exists on the south face of the landfill, the change in elevation from top to toe varied from 30-60 feet.

- Surface water at the south end of the site appeared generally clear. Surface water along the west face was lime green in appearance and the water at the northern end (West Pond) of the site was brown.

- Drill rig access appeared good. It may be necessary to obtain permission from Baltimore and Ohio Railroad for use of the railroad access roads.

As part of the NYSDEC reconnaissance, a limited air monitoring study using a photoionization detector (PID) was performed. Based on the results, it is recommended that the consultant first enter onto the site in level D protection, with level C backup. The use of level C or abandonment of the site by the consultant will be based on an appropriate air monitoring program or field observations during the site visit.

Concurrent with the consultant's site visit, an air monitoring program will be performed using a PID for the purpose of establishing their own health and safety protocol. The air monitoring measurements will be taken in the zone of breathing, normally 4-6 feet above the ground surface. Continuous readings or individual readings at nodal points on a grid pattern throughout the site will be made; in addition to monitoring one upwind and one downwind location. Wind direction will be noted and recorded at the time of monitoring.

In the event that the downwind or on-site measurements indicate the presence of a contaminant (relative to the upwind location) personnel will leave the site and the contractor's Health and Safety Officer and the designated NYSDEC representative will be notified to determine how best to proceed. With NYSDEC concurrence, additional air measurements may be obtained to better delineate the source of the airborne contaminants. Additional air measurements will be performed by the field individuals utilizing the appropriate level of respiratory protection as agreed upon by the contractor's Health and Safety Officer and the NYSDEC representatives. All future site activities will be performed at the level of personal safety selected based upon the additional air monitoring and any other potential hazards (physical or chemical) identified at the site.

4.0 FIELD INVESTIGATION

The investigation has been divided into several tasks which are briefly described in Table 1. The following is a more detailed discussion of activities to be performed to satisfy the objectives of the Phase II program.

4.1 Air Monitoring

This task has been described earlier under the section entitled "Site Reconnaissance". In the case of the Republic Steel site, additional air monitoring beyond the photoionization study will be decided based upon the air monitoring and field observations made during the consultant's site visit.

4.2 Geophysical Survey

A geophysical survey shall be conducted to determine the location of buried materials, determine the presence of contaminant plumes and characterize the subsurface conditions. The consultant must determine the best geophysical method(s) (terrain conductivity, magnetometer, etc.) for meeting the goals of the investigation.

Generally the goals of a geophysical survey are:

- to determine the existence of contaminant plumes

- o to optimize the location and number of monitoring wells
- o to reduce risks associated with drilling into unknown terrain and wastes
- o to reduce the overall project time and cost, and to improve the accuracy of and confidence in the investigation
- o to define the thickness of and depth to layers of soil and rock
- o to determine the depth to the water table
- o to identify the existence of buried waste, it's vertical and horizontal boundaries
- o to determine vertical and horizontal anomalies
- o to determine the direction of groundwater flow

All geophysical data must be reduced by the consultant, analyzed and made available to the Bureau for review prior to the installation of monitoring wells. The findings of the geophysical survey must be used to determine the best location of wells, and to select other environmental sampling locations.

4.3 Test Borings and Well Installation

In order to obtain additional information concerning possible groundwater contamination, eight (8) test borings will be drilled. Final soil test boring and monitoring well locations will be determined following interpretation and review of geophysical data in consultation with NYSDEC. For the purposes of cost estimating, it is anticipated the total footage for drilling in overburden will be 277 feet with no rock coring. Drilling at the Republic Steel site, at some locations, will be through fill material.

The drilling program must be designed to obtain quality soil and water samples for environmental analysis and to provide the maximum level of safety for all personnel working on-site. The specific procedures and equipment required are outlined in this section. If additional precautions are required, these are to be discussed with the NYSDEC prior to initiation of the drilling program.

Prior to initiating drilling activities, the drilling rig, augers, rods, split spoons, pertinent equipment, well pipe and screens will be steam cleaned. This cleaning procedure will also be used between each boring. These activities will be performed in a designated on-site decontamination area. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures will be used. The drill rig and all equipment will be steam

cleaned upon completion of the investigation and prior to leaving the site.

Test borings will be advanced with 4 1/2" I.D. hollow stem augers through overburden, and NX sized diamond core barrels in competent rock, driven by truck, track, or trailer mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for site specific criteria, but must be approved by NYSDEC. Drilling fluids, other than water from a NYSDEC approved source will not be allowed without special consideration and agreement from the Department. The use of lubricants is also not allowed unless approved by the Department representative. One sample from each drilling water source must be analyzed for full TCL.

It will be the responsibility of the consultant to arrange for the appropriate drilling equipment to be present at the site. Standby time to arrange for additional equipment or a water supply will not be allowed unless caused by unexpected site conditions.

During the drilling, a PID will be used to monitor the gases exiting the hole. Auger cuttings will be contained, if the meter readings are greater than 5 ppm or show visible evidence of contamination. Soil samples will be collected using a two inch outside diameter split spoon sampler advanced in accordance with the standard penetration test procedure (ASTM D-1586). The sampler will be cleaned prior to each use by one of the following procedures:

- o initially cleaned of all foreign matter
- o sanitized with a steam cleaner

OR

- o initially cleaned of all foreign matter
- o washed with a detergent and water mixture
- o rinsed with potable water
- o rinsed with acetone or methanol
- o rinsed with distilled water
- o allowed to air dry

Each split spoon soil extraction will be visually inspected and monitored with a PID. One sample per test boring will be collected for EP Toxicity analysis. Waste (fill) material of potentially hazardous (EP Toxic) composition may be encountered. The sample selected for analysis will be based on field observation. Any split spoon extraction which is stained or with a PID meter reading greater than five ppm over background levels will be retained for possible TCL analysis. All samples will be placed in precleaned teflon-lined screw cap glass jars. The consultant must be prepared to obtain such

samples for shipment to a laboratory. Samples will be delivered, under chain of custody control to the designated NYSDEC technically acceptable laboratory.

The split spoon soil samples will be taken at five (5) foot intervals in the unsaturated zone and continuously below the water table, except for the deepest downgradient boring which will be sampled continuously. The sampling device will be decontaminated by the above described procedure prior to each sample. The actual split spoon sampling plan will be determined in the field by the supervising geologist or engineer in consultation with NYSDEC based on site conditions. Additional samples will be collected where major changes in lithology occur or as deemed necessary by the supervising geologist or engineer. Additional samples can also be requested by the NYSDEC on-site representative at a pre-agreed upon cost per sample basis. A grain size analysis for non-cohesive materials will be conducted for each separate soil unit in each well and within the screened interval. For cohesive units, one sample for Atterberg limits analysis will be collected. Only grain size analysis will be performed, if conditions are a mixture of cohesive and non-cohesive materials. Hydrometer analysis will also be performed on soils if twenty (20) percent of the sample is less than No. 200 sieve size.

One subsurface soil sample will be collected and analyzed per test boring. The sample will be analyzed for EP Toxicity. Based on field observation, the consultant will select the sample to be analyzed. Each split spoon soil extraction will be visually inspected for stains and monitored with a PID. Any split spoon soil extraction which is stained or with a PID reading greater than five ppm over background should be retained for possible TCL analysis. Generally, the most badly stained or the one with the highest PID reading (above 5 ppm) will be the sample collected for TCL analysis.

For costing purposes, the consultant shall assume as follows:

Two (2) soil samples per test boring for grain size analysis
One (1) soil sample per test boring for Atterburg limits analysis
One (1) soil sample per test boring for EP Toxicity analysis.
One (1) soil sample per test boring for full TCL analysis

Where bedrock wells are required, test borings shall be advanced into rock with NX coring tools. Only water from an approved source shall be used in rock coring. The consultant shall monitor and record the petrology, core recovery, fractures, rate of advance, water levels, and water lost or produced in each test boring. The Rock Quality Determination (RQD) value shall be calculated for each five (5) foot core. Each core shall be screened with a photoionization meter upon extraction to determine proper handling procedure. All core samples shall be retained and stored by the consultant, for review by the NYSDEC, in an approved wooden core box for a period of not less than one year. Prior to well installation the core hole shall be reamed out to a minimum diameter of 3 7/8 inches for the first two feet (or as required to reach competent bedrock) to form a rock socket to allow proper installation of the well screen and bentonite seal. A PVC

sleeve or similar device should be utilized on the outside of the well riser to insure proper location and integrity of the bentonite seal. The well screen must be installed in competent bedrock. Use of open hole well installation will be allowed on a site specific basis at the discretion of the NYSDEC representative. All wells installed using an open hole method will have a competent seal installed at the top of the screen. Wells will be installed consistent with NYSDEC protocols for rock wells unless otherwise directed by the Department's representative based on field conditions. See sections of the contract entitled "Guidelines for Rock Wells".

The consultant will have an experienced geologist or engineer on-site during drilling to ensure that NYSDEC protocol and work plan detail are adhered to, and to provide for general quality assurance. The on-site representative will maintain a field boring log, which as a minimum shall include:

- date, test hole identification, and project identification
- name of individual developing the log
- name of driller and assistant(s)
- drill, make and model, auger size
- identification of alternative drilling methods used and justification thereof (e.g. rotary drilling with a specific bit type to remove material from within the hollow stem augers)
- depths recorded in feet and fractions thereof (tenths or inches), referenced to ground surface
- standard penetration test (ASTM D-1586) blow counts
- the length of the soil sample interval and the length of the sample recovered
- the first encountered water table along with the method of determination, referenced to ground surface
- drill and borehole characteristics
- sequential stratigraphic boundaries
- field diagram of each monitoring well installed with the depths to bottom of screen, top of screen, sand pack, bentonite seal, etc.
- variations from the work plan with explanations
- other pertinent data

Eight groundwater monitoring wells will be installed within the original test borings. Tentative locations of proposed monitoring wells are shown on Figure 3. Groundwater monitoring wells will be designated GW-7D, GW-8S, GW-8D, GW-9S, GW-9D, GW-10S, GW-10D, and GW-12D. A summary of the well designations, the rationale for well placement, the screened aquifer, the approximate boring depths, and the length of screen are presented in Table 2. Wells will be constructed of two (2) inch threaded, flush joint, PVC pipe. Generally wells shall be constructed with ten (10) foot machine slotted screens, unless specified otherwise. All materials used to construct the wells will be NSF/ASTM approved. All well installations will include a quartz sand filter pack, a two (2) foot bentonite seal, and a bentonite-cement grout to grade. These materials will be placed by a "tremie method" and will require selection of an appropriate drill method to accommodate this requirement, unless otherwise directed by the NYSDEC representative.

During drilling operations, steps will be taken to ensure the integrity of each monitoring well. These procedures will be detailed in a Quality Assurance/Quality Control Plan for the site and will comply with the Generic Phase II Work Plan outlined in Schedule 4 of the Contract. All wells, upon completion, will be protected by a protective steel casing with locking cap and lock, with key provided to NYSDEC. Procedures used in well installation will follow NYSDEC monitoring well installation protocols and will be detailed in a QA/QC plan for the site.

Well development will be performed using air surging, surge blocking, pumping or bailing at each well no sooner than 24 hours after the well grouting has been completed. All PVC or other tubing used in well development by the air surging or air blocking methods will be steam cleaned prior to use in each well. Precleaned dedicated polyethylene tubing will be used at each well if the development is to be accomplished by pumping. Bailing will utilize precleaned, dedicated PVC, teflon, or stainless steel bailers at each well. New polypropylene line will be used for each bailer and monitoring well. Other methods or development will be allowed only if included in the consultants QA/QC plan and approved by the NYSDEC.

Prior to water and sediment evacuation, static water level and well bottom measurements will be recorded at each well using an electric level sounder or fiberglass tape. These tools will be cleaned prior to and after each use with a steam cleaner or wash procedure as outlined for the split spoons. The well water/sediment volume will also be calculated. Well evacuation will be supplemented by:

- Temperature, pH, and specific conductance measurements
- Evacuation volume measurements
- Measure of water clarity (goal of < 50 NTU's) and visual observation of color

o Visual identification of the physical characteristics of removed sediments

The development process will continue until a stabilization of pH, specific conductance, temperature, and clarity of the discharge is achieved. Water levels will be recorded at the completion of development.

Following the well development, permeability testing may be conducted on one of the newly installed monitoring wells. This task should be quoted on a contingent basis. Initial static water level measurements will be made in the selected well(s) followed by the injection of a weighted slug of specific volume. An instantaneous head displacement associated with the slug volume will be created and the subsequent decline in water level will be measured with an electric water level sounder. Once head conditions reach a static state, the slug will be removed and a negative head condition will result relative to the initial static water level. The subsequent rise in water level will be measured with an electric water level sounder. Data analysis will involve the determination of the coefficient of permeability. The analysis will utilize a technique provided by Harry R. Cedergren in "Seepage, Drainage and Flow Net", 2nd Edition, or other methods acceptable to NYSDEC.

The testing will provide data on the permeability of the materials at or near the top of the water table and used in the final HRS scoring. This data will be useful in estimating the rate of groundwater flow in the vicinity of the monitoring wells and in evaluating potential migration pathways, potential targets and conceptual remedial alternatives.

Monitoring wells should be allowed to stabilize for at least seven days following development and permeability testing prior to sampling. Groundwater elevations will be taken to the nearest 0.01 foot prior to sampling for determination of groundwater flow direction.

A temporary staff gauge or other surface water elevation measuring device will be established on any nearby surface water body, which may significantly influence groundwater movement. The surface elevation of these water bodies will be checked whenever groundwater elevations are measured.

4.4 Test Pits

The need for test pits is not anticipated at this time.

4.5 Sampling and Analysis

Sampling and chemical analysis will be performed by the consultant. The consultant shall develop a QA/QC document which will ensure the integrity of the analytical program and specifically address the following items.

Where dilution of any Phase II sample, greater than five fold, is to be conducted by the chemical analytical laboratory, certain specific steps must be followed:

a. if the problem is unusual or potentially unsolvable, concurrence on procedure from NYSDEC's Quality Assurance/ Quality Control Officer, John Rankin, telephone 518-457-3252 must be obtained.

b. if the five fold dilution practice is to be followed, the data package should identify its presence and justify its need as well as fully discuss the various methods utilized.

Although a method or extra work may be agreed upon by both chemists, clearance for any extra cost must be obtained by the consultant from the NYSDEC contract manager. Such cost will be paid from the contingency amount in the contract and clearance must be confirmed by the NYSDEC in writing.

4.5.1 Groundwater - Groundwater from the twenty monitoring wells identified in Figure 3 will be sampled for the parameters listed on Table 3. Samples will be acquired using dedicated PVC, teflon, or stainless steel bailers following evacuation of three (3) well volumes or complete purging of the well. New polypropylene line will be used for each bailer and monitoring well. The QA/QC plan will describe all procedure/protocol to be followed to prevent contamination of the wells and/or the samples. Each bailer will be decontaminated in the field prior to use, following the procedure outlined for split spoon samplers. Dedicated Waterra pumps may be used for permeability testing only. For well development and sample collection, the method employed must be one as specified in section 4.3. Use of dedicated bailers will be the preferred method for sample collection. Alternate methods of sample collection may be considered but must be approved by the NYSDEC.

4.5.2 Surface water and sediment - Seven surface water and seven sediment samples designated "SW" on Figure 3 will be taken from points upgradient and downgradient or other locations potentially impacted by the site. A description of hand filling bottles and steps to avoid cross contamination should be part of the QA/QC plan. Parameters for analysis are presented in Table 3.

4.5.3 Soil - No surficial soil sampling is anticipated at this time. Subsurface soil samples will be collected. One sample per test boring will be collected for EP toxicity analysis. If split spoon soil extractions are stained or PID readings exceed 5 ppm, analysis will include full TCL parameters.

4.5.4 Leachate - No leachate sampling is anticipated at this time.

4.5.5 Wastes - No waste sampling is anticipated at this time.

4.5.6 Laboratory Analyses QA/QC - All samples will be placed in precleaned bottles supplied from the laboratory. Samples will immediately be placed in coolers, with blue ice packs, upon collection. The laboratory will conduct all analyses in accordance with Contract Laboratory protocols and attach one copy of the QA/QC data to the final report.

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4.6 Surveying and Mapping

A map will be prepared showing the location and appropriate elevations (ground surface, top of monitor well casing) for each boring, monitoring well, sampling location, and other key contour points as determined by the consultant (a draft copy of the map will be made available to NYSDEC prior to its finalization and incorporation into reports). A licensed land surveyor will be used to establish the locations and elevations of each above mentioned point, as follows:

- Vertical Control - Elevations (0.01') will be established for the ground surface at the well, the top of monitor well casing (T.C.), and at least one other permanent object in the vicinity of the boring and the well. Elevations will be relative to a regional, local or project specific datum. USGS benchmarks will be used whenever available.

- Horizontal Control - Exploratory borings and monitoring wells will be located by ties (location and distance) to at least two nearby permanent objects. USGS benchmarks will be used whenever available.

5.0 HEALTH AND SAFETY PLAN

A separate Health and Safety Plan will be submitted within three weeks following the consultant's first site visit which will include an air monitoring (PID) survey. During this visit, level D protection is recommended (based on NYSDEC inspection) with level C available as backup.

The site specific Health and Safety Plan as a minimum will address the following concerns/activities:

- level of personal protection

- drilling safety practices/protocol for collection and disposal of cuttings and development water

- o handling samples
- o site specific characteristics (maneuverability, adequate working space, etc)
- o local residents/community
- o staff health and safety training
- o equipment available on site during field activities
- o medical emergency preparedness (names/phone numbers/location of hospitals, police, ambulance, medical rescue, fire department, etc.)
- o on-site release

6.0 QUALITY ASSURANCE PLAN

A Quality Assurance/Quality Control Plan, which will outline all installation and sample collection procedures, will be submitted to NYSDEC along with the Work Plans and cost estimates. The NYSDEC Generic Work Plan will be attached as a "guidance" document. The Generic Work Plan will be referenced as appropriate to assure Departmental protocol is being followed. For all Phase II work, Contract Laboratory Protocol (CLP) will be in effect and reflected in the QA/QC Plan. The Generic Work Plan includes CLP data requirements which must be met.

As part of the QA/QC Plan, names of specific individuals involved in or responsible for overseeing the drilling program or sampling (ground water, surface water, soils, sediment, and leachate) will be listed along with a short description of their qualifications and experience. Listed qualifications should include a 40 hour EPA training course and medical baseline monitoring exam among others. Potential substitute personnel should be included with the statement. The NYSDEC will receive notification of when the field investigation will begin at least five working days prior to initiating field work. This notice will include the names of the individuals that will represent the consultant on-site.

7.0 WATER USAGE SURVEY

As part of the investigation to satisfy the needs of the HRS and/or to determine public health risk due to use of potentially contaminated drinking water sources, all water supply sources (groundwater and/or surface water) within a three (3) mile radius of the site will be identified. The name and size of communities utilizing each source must be defined and alternative water sources

identified if available. The location of the nearest well (private or public) using the aquifer of concern will also be identified. Appropriate well logs will be collected through file review, interviews with private residents, and interviews with agency personnel to determine potential targets for each aquifer utilized. The consultant shall advise the Department of any contamination or suspected contamination (odor or leachate) reported by the residents.

8.0 SITE ASSESSMENT

At the completion of all field activities, the information acquired will be utilized to perform an assessment that will:

- identify present site conditions which require immediate response to protect the environment and/or public health
- identify the significance of environmental impacts by comparison of sample results to appropriate environmental standards and guidelines, background quality, or public health guidelines or standards, and by evaluation of the environmental and geological setting.
- identify and evaluate all potential targets and receptors of contaminants
- determine to the extent possible, the vertical and horizontal extent of contamination
- calculate and document a final HRS score
- identify additional informational needs to adequately assess the site remedial needs

9.0 REPORT PREPARATION

The information generated by the Phase II investigation will be prepared in the format presented in Appendix A. References utilized in narratives and the HRS package must be listed, and if appropriate, included. Initially, five (5) copies of the Draft Report will be submitted to NYSDEC for agency review.

A revised draft will be submitted to the NYSDEC within 5 weeks of the receipt of the Department's comments on the draft report. Fourteen copies of the final report will be submitted once the revised report is considered acceptable. Each copy of the final report will be signed and stamped by a Professional Engineer licensed to practice in the State of New York.

10.0 COST ESTIMATE

A cost estimate for the project will be provided, for negotiation purposes, using the enclosed tables.

APPENDIX A

vii. Sampling and Analysis: Locations and types of sampling should be described in a narrative; likewise, the proposed instrumentation and analyses for the samples should be described. A table denoting recommended type and number of samples and analyses must be submitted (see Table 2 and Section 4).

viii. Maps/Plans: A plot plan and proposed location of well(s) and all sampling points, and a site location map, e.g., USGS topographic map, must be included.

ix. Task Presentation: Construct and include a table which states the proposed tasks in the left column and a brief description of each task in the corresponding right column.

x. Project Team: There are various disciplines involved in a Phase II investigation. It is required that a project team be selected by the Engineer to conduct the tasks of the contract. The names of staff members, experience and the positions they will fill must be listed and will be subject to final approval by the Department.

Furthermore, qualification and experience must be provided to justify the selection of a person in performing a particular task. More than one staff member can be designated for any one task so that relief in the field may be provided. It is required by the Department that no one except those designated will be allowed to work on or oversee the project without the Department's prior approval.

8. Phase II Report Format

Cover:

The report cover shall be in accordance with the sample attached hereto as Attachment 3 and shall be printed on 65 lb. Atlantic Pastel uncoated cover, Misty Blue color. The back cover shall be of the same material as that of the front cover.

Title Page:

Indicate: name of project (i.e., "Engineering Investigations at Inactive Hazardous Waste Sites in the State of New York, Phase II Investigations"); the site name, location (i.e., municipality and county) and NYSDEC site number; prepared for (i.e., Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York, 12233-0001); prepared by (i.e., contractor's name and address); and date submitted.

Table of Contents:

List all sections and subsections of the Phase II Report.

Section I:

Executive Summary -

Briefly describe the site, Phase II effort, site assessment and HRS score. Include a portion of the USGS 7.5 minute Quadrangle Sheet (8½" x 11") with site located, name of the quadrangle and the coordinates of the site, identified on it. Also include a detailed sketch map of the site including north arrow and all appropriate information (leachate outbreaks, buildings, drums, slopes, lagoons, streams, property lines, etc.).

Section II:

Purpose -

Describe the goal of the Phase II effort at the specific site.

Section III:

Scope of Work -

Describe the scope of the Phase II effort including, but not necessarily limited to: geophysical studies, boring and monitoring well placement and installation, sampling and sampling station selection (soil, surface water, groundwater, air, sediment and liquid or solid waste sample).

Give reasons for the locations chosen for monitoring wells and sampling stations. Also include details of monitoring well installation and environmental sampling techniques used.

Section IV:

Site Assessment -

i) A detailed site history noting all past operations at the site. A description of waste disposal, operation of the site, change in ownership and significant events such as boil water notices issued by a health agency, reports of leachate outbreak, fish kills and remedial actions taken should be included.

ii) Description of site topography indicating such items as general slope of the site and proximity to surface waters, private and public wells, commercial buildings, dwellings and sensitive environments.

iii) Description of hydrology of the site, include data from geophysical studies (plots), boring logs, monitoring well data and soil test data. (Depth to groundwater, aquifers of concern, depth of bedrock, soil and bedrock permeabilities, and any unique

geological characteristics such as, but not limited to, multiple aquifer systems and karst topography should be noted.)

iv) Describe the observations of the site inspection, e.g., was leachate flow noted, were drums observed and were they full or empty. Assess site contamination. Summarize the results of both past and Phase II sampling programs. Indicate the waste types and quantities on site if known, and the extent of contamination of soil, surface water, groundwater and air. Note when samples were taken and the location of samples on a map or sketch of the site. Compare sampling results to appropriate State and federal environmental quality or effluent standards. For soil samples, compare to well documented ranges of concentrations in non-contaminated or background soil levels. (The applicable State standards are 6NYCRR Part 700 series. Appropriate guidelines are New York State Air Guide-1, Guidelines for the Control of Toxic Ambient Air Contaminants and the NYSDEC Solid Waste Management Facility Guidelines, Land Application of Sewage Sludge Table 1.) Include a report of how the QA/QC plan was applied to the site, noting any deviations from the QA/QC plan and explaining the reasons for any deviations. Discuss any necessary future studies of the site or actions that may be required.

Section V:

Final Application of the Hazard Ranking System - The final application of the HRS must incorporate all information collected in the Phase I and Phase II investigations of the site. This section of the report is to include:

i) Narrative Summary - Limit each narrative summary to one page (DOUBLE SPACED). Use active voice as much as possible and identify actors--that is, say "EPA erected a fence," not "a fence was erected," or "the State filed suit," not "a suit was filed." Be sure to tie the information to the response category/status codes you are assigning the site.

   a. Site name (including origin of name)
   b. Site location - town or city, county and state
   c. Size
   d. Nature of operations (landfill, recycling, manufacturing, etc.)
   e. History of ownership/operations - private, public, bankrupt, permitted (by whom? to do what?) currently operating (how long), closed (how long). Name responsible parties if they have taken cleanup action, either voluntary or negotiated
   f. Wastes present (types, amounts, in what form, buried, on surface, etc.)
   g. Media affected and with what (including source of analytical data)
   h. Important demographic information (population affected and how, proximity of groundwater wells and surface water intake)

i. Important geographic information (nearby surface water, aquifers, wetlands, etc.)
j. Cleanup actions (completed or scheduled)
k. Enforcement actions

A typical summary is outlined below. While no single example can cover the variety of conditions at hazardous waste sites, this one illustrates the types of information and form we want.

Name
Location

The ABC/DEF (name) site covers (size) acres in (location, including county). ABC (describe operations) on the site (date), when it purchased the property from DEF (relationship of DEF to the site operation), until (date), when it (describe operations/ ownership history).

The companies disposed of about (quantities of waste) of (types of waste) on the site by (describe disposal methods). According to tests conducted by (source of data), (media) are contaminated with (chemicals). The site is (important geographic information). About (population affected) are (affected how).

In (date), (who) filed (describe any legal action). In (date), (who) (describe any cleanup actions).

ii) Portion of USGS quadrangle with site located on it and the name of quadrangle identified as also required in Section I.

iii) Updated HRS Worksheets

All applicable data collected in the Phase I and Phase II investigations will be used to complete these worksheets.

iv) Updated HRS Documentation Records

All applicable data collected in the Phase I and Phase II investigations will be used to complete the HRS Documentation Records. All sources of information supplied in the documentation records must be clearly referenced on the same page where this information is presented. In addition, copies of all documents indicated as a source of information must be supplied. This includes correspondence, sampling and analytical data (even if previously presented in the Phase I report), professional papers and reports. A numbered reference list must be included with copies of the references also numbered accordingly. Copies of references must appear in the order they are used in the documentation records. Information based on conversations with knowledgeable individuals must be confirmed in a memorandum or a letter, and a copy included with the HRS Documentation Records.

Also, a copy of the site sketch or map indicating the location of samples (as required in Section IV) must also be included in this section. Copies of references included in the HRS documentation section do not need to be included in the appendices.

Updated EPA Form 2070-13 "Potential Hazardous Waste Site, Site Inspection Form," or any revision of such forms shall be used.

Note: Information presented on the HRS Documentation Records is to be typed and not handwritten or printed.

Appendix:

All raw data collected from the field, laboratory, literature search or any other source (i.e., geophysical, analytical, QA/QC, etc.) shall be presented in the appendix. This shall be in addition to any reduction of data presented elsewhere in the report.

9. Special Conditions

The consultant is required to observe certain conditions during the conduct of a Phase II investigation. These are:

a. Site visit must be made prior to completion of the work plans for reconnaissance and especially for determining access problems.

Those of concern should include: is physical access possible, is auxiliary equipment required, can wells be located on or off the site, is off-site access permitted, are easements necessary, etc.

If during the actual field activities of a Phase II investigation, the consultant should require a tractor to locate the drill rig, or determine that access through an adjacent property is needed and such requirements are not mentioned in the work plan, the Department will conclude that a reconnaissance was not done. The Department will not be responsible for costs incurred, which are not the result of carrying out an approved work plan.

b. Name and address of all sub-contractors must be submitted with an itemized list of jobs and charges.

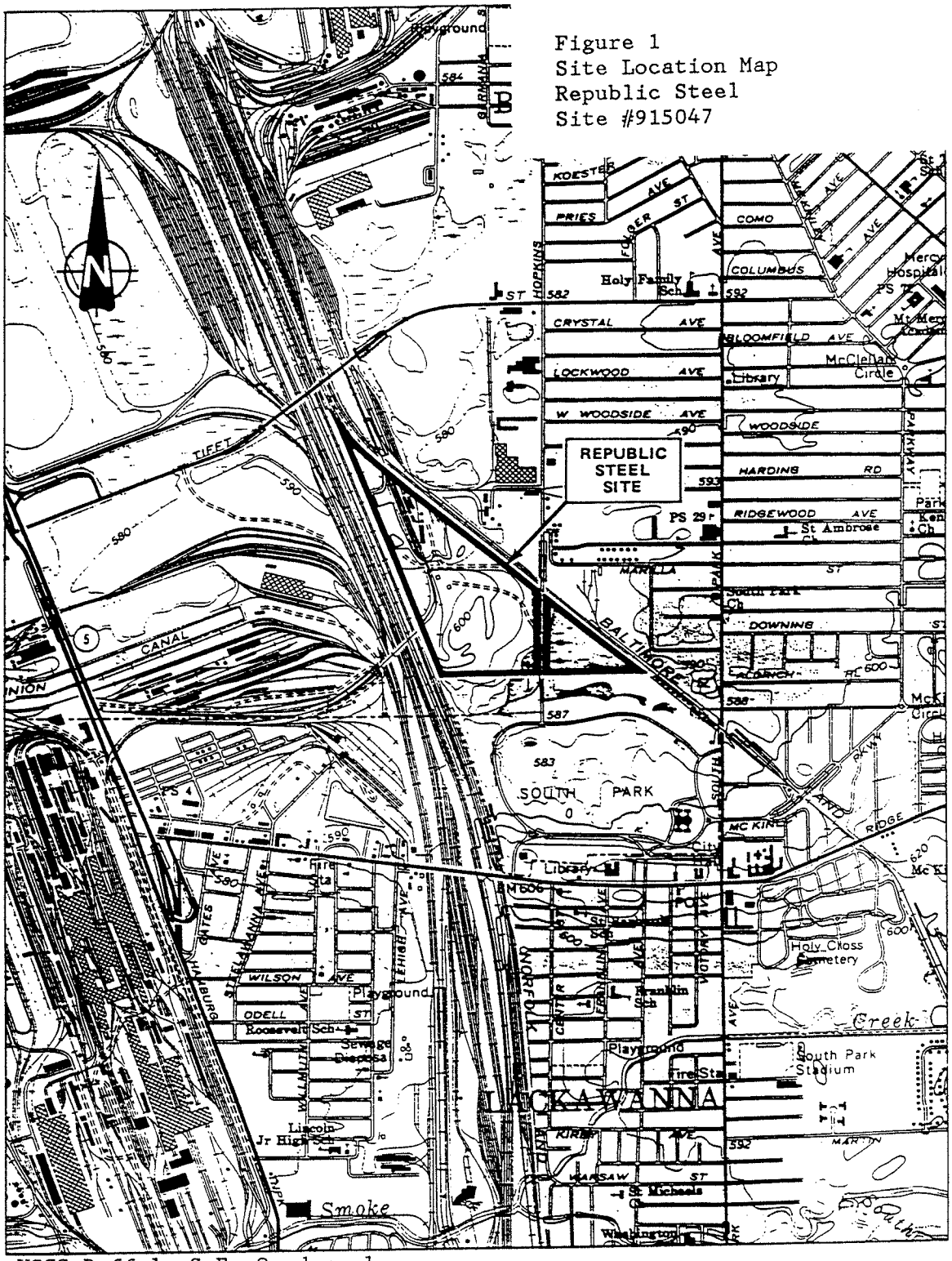
c. The following requirements as promulgated by the Division of Hazardous Waste Remediation deal with the construction of overburden and rockwells. These are entitled:

i. Guidelines for Exploratory Boring, Monitor Well Installation and Documentation of these activities.

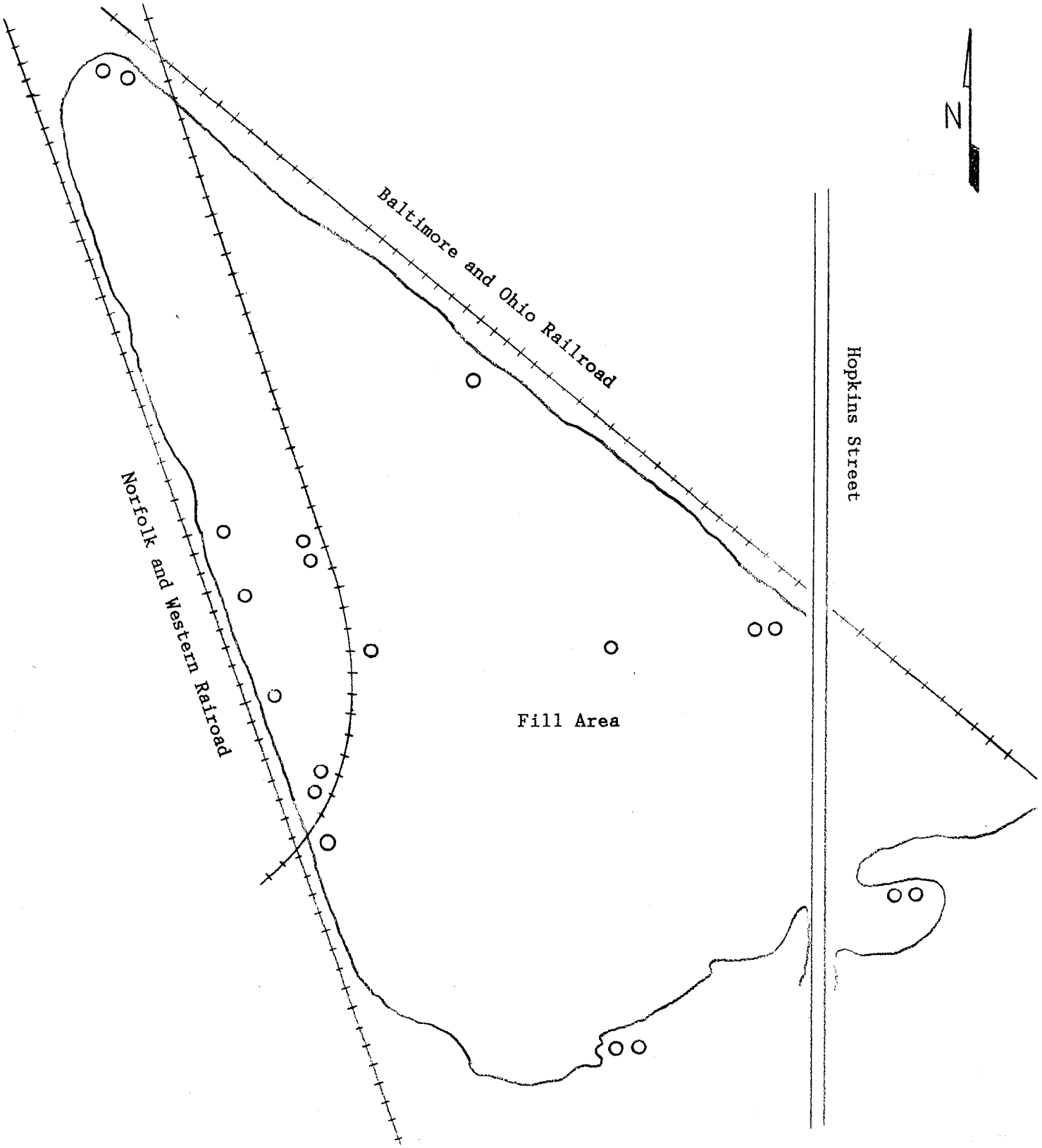
ii. Guidelines for rockwells

d. The attached Oversight Checklist (DHWR personnel) are items that DEC staff ensure will be met during their oversight of the

Figure 1
Site Location Map
Republic Steel
Site #915047



USGS Buffalo S.E. Quadrangle
latitude 42° 50' 00" N
longitude 78° 50' 00" W



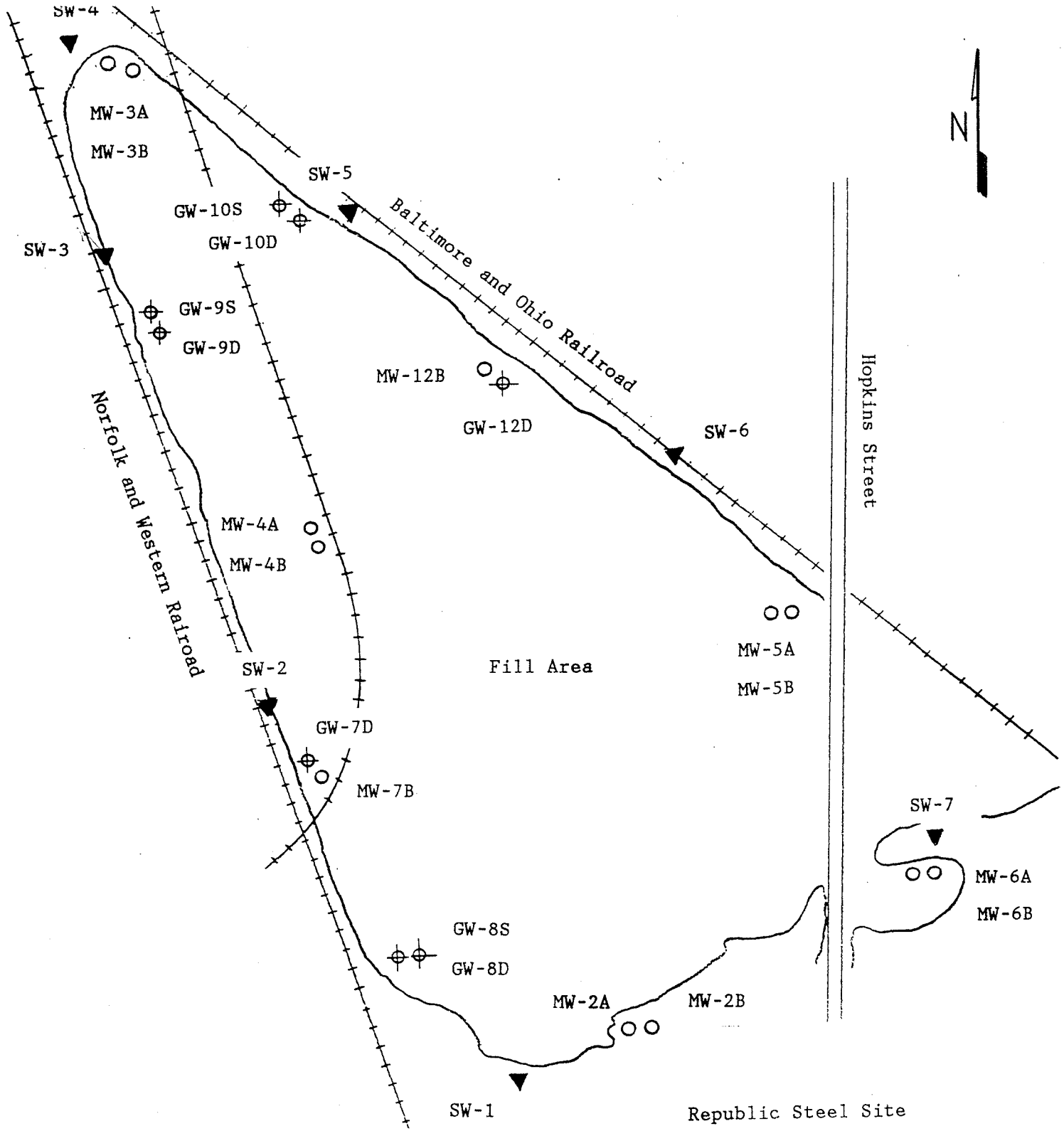
Republic Steel Site

ID No. 915047

FIGURE 2

Plot Plan

O - Existing Well



Republic Steel Site

ID No. 915047

FIGURE 3

Sample Location Plan

○ - Existing Well

⊕ - Proposed Well

▼ - Surface Water/ Sediment Sample

APPENDIX C

Table 1.

Phase II Work Plan - Task Description
Republic Steel Site

Task	Activity Description
1 - Conduct Records Search/Data	Perform a file search supplementing any existing Phase I, USEPA, or DEC preliminary assessment reports prior to beginning the field study. Summarize all file data.
2 - Site Reconnaissance	Collaborate NYSDEC information regarding the locations of possible and existing monitoring wells, access for drilling rigs, and tentative locations of sampling points. Locate drill water supply and evaluate the geophysical needs of the site.
3 - Conduct Geophysical Studies	Prepare a geophysical study for approval by the department. As a minimum the department requires an electroresistivity study to determine the stratigraphic boundaries and possible contaminant plume.
4 - Test Borings/Installation Monitoring Wells	Install eight (8) monitoring wells estimated to be 20 to 50 feet deep in the overburden. The zone to be screened will be chosen based on the well logs.
Soil samples from borings for monitoring wells	Physical Analysis (grain size and Atterburg limits) - Soil samples will be collected at five foot intervals in the unsaturated zone, continuously below the water table, and at changes in subsurface lithologies.

Table 1. Continued

Soil samples from borings (con't)	Chemical Analysis - One sample per test boring will be collected for EP Toxicity analysis. The sample collected will be based on field observation. If visual observation of split spoon samples yield stains or PID meter readings exceed five ppm, samples will be retained for possible TCL analysis. The sample collected for TCL analysis will be one that is the most badly stained or one with the highest PID reading. No sample will be necessary for TCL analysis if the soil is not stained or the PID readings do not exceed five ppm over background levels.
In-situ permeability test	To be quoted on a contingency basis for one of the newly installed wells.
5 - Perform Sampling and Analysis	
Surficial Soil Samples	No surface soil samples are anticipated at this time.
Subsurface Soil Samples	One sample per test boring for EP Toxicity and possibly one for TCL analysis.
Groundwater samples	Twenty (20) groundwater samples will be collected utilizing dedicated clean PVC, teflon, or stainless steel bailers. Wells will be developed and evacuated prior to sampling. Samples will be analyzed for TCL parameters, and PCB/Pesticides.
Surface Water & Sediment	Seven (7) surface water and sediment samples are proposed. The locations for these samples are designated SW on Figure 3. The analytical parameters are given in Table 3.

Table 1. Continued

Leachate samples	Leachate sampling is not anticipated at this time.
Air samples	Using a photoionization detector, determine the presence of organics during on-site activities.
6 - Water Usage Survey	As part of the development of a final HRS package, the consultant will define the water usages within the specified radii.
7 - Site Assessment	A preliminary site contamination assessment will be conducted to complete the final HRS score sheets and documentation records.
8 - Report Preparation	Prepare final report containing significant Phase I type information, additional field data, final HRS package, and site assessment.
9 - Project Management	Project coordination, administration and reporting.

Table 2.

Phase II Work Plan - Sampling Summary
Republic Steel Site, ID No.915047

Designation	Location/Rationale	Aquifer Screened	Approx. Depth (ft)	Screen Length (ft)
Groundwater				
MW-2A	Downgradient	Overburden	40	10
MW-2B	Downgradient	Overburden	40	10
MW-6A	Downgradient	Overburden	20	10
MW-6B	Downgradient	Overburden	40	10
MW-5A	Downgradient	Overburden	20	10
MW-5B	Downgradient	Overburden	40	10
GW-12D (new)	Up-Downgradient	Overburden	40	10
MW-12B	Up-Downgradient	Overburden	26	
GW-10S (new)	Up-Downgradient	Overburden	25	10
GW-10D (new)	Up-Downgradient	Overburden	40	10
MW-3A	Upgradient	Overburden		
MW-3B	Upgradient	Overburden	5	
GW-9S (new)	Downgradient	Overburden	20	10
GW-9D (new)	Downgradient	Overburden	50	10
MW-4A	Downgradient	Overburden		
MW-4B	Downgradient	Overburden	11	
GW-7D (new)	Downgradient	Overburden	42	10
MW-7B	Downgradient	Overburden	29	
GW-8S (new)	Downgradient	Overburden	20	10
GW-8D (new)	Downgradient	Overburden	40	10

Surface Water and Sediment		
SW-1	Downgradient	From the pond at the south corner of the site.
SW-2	Downgradient	From the drainage west of the site near the railroad track intersection
SW-3	Downgradient	From the drainage west of the site near the north end
SW-4	Downgradient	Target of opportunity north of the site
SW-5	Downgradient	From the drainage area on the northeast side of the site near GW-10

Table 2. Continued

SW-6	Downgradient	From the northeast side, west of Hopkins Street
SW-7	Upgradient	From the pond at the south end of the portion of the site east of Hopkins Street

Note: The number and location of surface water and sediment samples will be reviewed in the field to ensure adequate sampling to assess the impact of the landfill on adjacent Otis Creek (see figure 1 for location of Otis Creek).

Soil

Surficial Soil - No surficial soil sampling is anticipated.

Subsurface Soil - One or two samples per test boring based on field observation.

Leachate Samples

No leachate sampling is anticipated.

Table 3.

Phase II Investigation, Analytic Parameters
Republic Steel Site

Sample ID	TCL[1] Analytic Parameters					EP Toxicity
	VOA	Semi-VOA (B/N/A)	PCB/ Pesticide	Inorganics (Metals)	Cyanides	
GROUNDWATER SAMPLES						
MW-2A	x	x	x	x	x	
MW-2B	x	x	x	x	x	
MW-6A	x	x	x	x	x	
MW-6B	x	x	x	x	x	
MW-5A	x	x	x	x	x	
MW-5B	x	x	x	x	x	
GW-12D	x	x	x	x	x	
MW-12B	x	x	x	x	x	
GW-10S	x	x	x	x	x	
GW-10D	x	x	x	x	x	
MW-3A	x	x	x	x	x	
MW-3B	x	x	x	x	x	
GW-9S	x	x	x	x	x	
GW-9D	x	x	x	x	x	
MW-4A	x	x	x	x	x	
MW-4B	x	x	x	x	x	
GW-7D	x	x	x	x	x	
MW-7B	x	x	x	x	x	
GW-8S	x	x	x	x	x	
GW-8D	x	x	x	x	x	
SURFACE WATER and SEDIMENT SAMPLES						
SW-1	x	x	x	x	x	
SW-2	x	x	x	x	x	
SW-3	x	x	x	x	x	
SW-4	x	x	x	x	x	
SW-5	x	x	x	x	x	
SW-6	x	x	x	x	x	
SW-7	x	x	x	x	x	

SOIL SAMPLES (SURFACE & SUBSURFACE)[2]

Surficial soil - The need for surficial sampling is not anticipated at this site.

Test pits - The need for test pits is not anticipated at this site.

Table 3. Continued

LEACHATE SAMPLES

The need for leachate sampling is not anticipated at this time.

Notes: 1 - TCL represents the Target Compound List. All analyses will be performed by Contract Laboratory Protocol (CLP).
2 - One subsurface soil sample from each test boring will be taken and sampled for EP Toxicity. Based on visual inspection and PID meter readings, analysis for full TCL parameters may be necessary on one sample per test boring also. For details, see section "Test Borings and Well Installation" and Table 1.