HYDROGEOLOGIC INVESTIGATION WORK PLAN

Richardson Hill Road Landfill Superfund Site Sidney, New York

Prepared for:

USEPA Region 2
290 Broadway
New York, NY 10017

Prepared by:

Earth Tech, Inc.
100 Corporate Parkway, Suite 341
Amherst, NY 14226

December 2007

Earth Tech Project No. 103264

TABLE OF CONTENTS

SECTION **PAGE**

List of Tables

List of Figures

1. Introduction

1.1 Work Plan Organization

The Hydrogeologic Investigation Work Plan (HIWP) is organized as follows:

- Section 1 provides investigation objectives that must be achieved.
- Section 2 describes the Hydrogeologic Investigation (investigation) field activities, including investigative tools considered essential to successfully meeting the investigation objectives presented in Section 1.
- Section 3 presents the summary reporting requirements for the Hydrogeologic Investigation.
- Section 4 provides the timeline for completion of the various steps of the investigation.
- Section 5 presents references used in the preparation of this work plan.
- Tables and figures referenced in the individual sections follow Section 5.

1.2 Investigation Objectives

Based on the findings of the 3rd quarter 2007 sampling of new groundwater monitoring wells RH-1 through RH-7, the objectives of the proposed hydrogeologic scope of work are as follows:

(Generically, the term "downgradient" will be used herein, which shall be inferred to include the inherent complexities of fractured bedrock contaminant flow and transport; i.e., migrate down basin more or less parallel to the stream and/or also be controlled by structures such as bedding plane dip, fracture orientation, and interconnectivity of vertical and horizontal fractures.)

I. Bedrock investigation objectives:

1. The principle goal of the bedrock investigation is to characterize and define the distribution of volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) in shallow bedrock east of Richardson Hill Road (RHR) Landfill and South Pond, and south of South Pond, including the principle source and downgradient limit, both laterally and vertically in the shallow to intermediate bedrock zone. The investigation shall be completed as far east and west of the Herrick Hollow Creek valley centerline as necessary to meet these objectives.
2. Additional data will be acquired using the tools listed in Section 2, and developed, as needed, to completely satisfy Objective No. 1, listed above. Using available data supplemented by these additional investigations, develop a comprehensive bedrock geological and hydrogeological report for the RHR Landfill site including, but not limited to:
    a. Clearly show the physical relation of the aquifer strata and potential water-bearing layers to open intervals in wells.
    b. Determine and provide transmissivity values for each water-bearing fracture zone.
    c. Provide drawings consisting of plan figures and appropriate number of cross-sectional figures in which suitable vertical exaggerations can be used.
    d. Provide cross-sections showing layering and orientation of bedrock aquifer, ground surface elevations, and locations of pertinent wells for both the RHR Landfill and Sidney Landfill Sites. Cross-sections should show specific lithologies to the degree that these data were characterized in the available logs. Lines interpolating strata continuity should be drawn in sections between boring columns where reasonable interpolations can be made. Any pertinent hydrologic information, such as water-bearing or high yield zones, should be

indicated. All wells that are in use at both RHR Landfill and Sidney Landfill Sites, monitoring wells, extraction wells, trench wells, and newly installed wells, should be accurately located and labeled in figures. Cross sections should show, as accurately as the data allows, the depth of the wells and the screen intervals or open bore intervals.

3. Physically determine whether bedrock groundwater beneath the RHR Landfill groundwater collection trench (the trench) is being drawn upwards into the trench, including the vertical limit of influence below the trench (i.e., determine whether the trench is capable of collecting the full vertical profile of potentially contaminated groundwater as predicted by RI well depths and newly acquired geophysical data), as well as the horizontal limit east of the trench. In addition, determine if there is overlapping influence between existing trench wells (i.e., determine if there is sufficient horizontal (i.e., north-south) influence between in-trench wells under existing conditions such that there is overlapping influence from one in-trench well to the next); that is, demonstrate that there is not a "gate" between two collection wells that might allow contaminated groundwater to flow unabated to the east beyond the capture limits of the trench.
4. Determine whether the contamination observed at the MW-12 well cluster and RH-1, RH-2, RH-3, and RH-4D has shown, or is expected to show, attenuation in direct relation to operation of the trench.
5. State how operational modifications of the trench are expected to control and capture RHR Landfill groundwater plume east and south of the trench alignment at the limits of MW-12 and RH-1, RH-2, RH-3, and RH-4D (if it is determined that contamination at those wells is not expected to attenuate as a result of inadequate groundwater capture at the collection trench).

If it is determined that the trench, as currently installed, cannot control and capture bedrock groundwater contamination at least as far as MW-12 and RH-1, RH-2, RH-3, and RH-4D then, based on the assessment, the PRPs shall make a recommendation for immediate action to control and capture groundwater contamination in the area of these wells.

If, however, the plume is determined to extend considerably beyond the limits of MW-12 and RH-1, RH-2, RH-3, and RH-4D, such that those existing wells cannot be used to control and capture the plume, then the PRPs must propose a means of controlling and capturing the leading edge of the groundwater plume, such as the installation of additional recovery wells, to protect potential off-site receptors.

II. The overburden characterization objectives are:

1. Determine whether the contamination observed in the new "RH-xS" series wells is a result of pre-trench conditions (i.e., "residual") or if the trench and downgradient-side barrier are not working as designed.
2. Determine if the trench has hydraulic influence at the new RH-xS series wells.
3. Determine fate of contamination observed in the new RH-xS series wells.

Available data from the RHR Landfill site and the Sidney Landfill site will be used to the extent possible.

2. Description of Hydrogeologic Investigation Field Activities

2.1 Historical Data and Records Search

The following subsections present the existing data that will be obtained during the hydrogeologic investigation to accomplish the objectives stated in Section 1.

2.1.1 Historical Data

Data will be derived from the geologic descriptions in well boring logs, a review of available bedrock cores (and outcrops, if possible), geologic field data showing strata attitude, and any physical data collected that is still available from the RHR Landfill and Sidney Landfill RI reports, as well as any supplemental investigations or reports prepared.

2.1.2 Private Well Information

A records search will be conducted to identify residential wells and a visual survey will be conducted to identify any seeps up to 1500 feet downgradient of monitoring wells RH-1, -2, and -3 at the RHR Landfill Site. A figure will be generated depicting the location of each previously and newly identified well and seep.

2.2 Field Activities

The following subsections present data and data collection techniques that will be collected during the hydrogeologic investigation to accomplish the objectives stated in Section 1. See Table 1 for Hydrogeologic Investigation Activities Flow Chart.

2.2.1 Geophysical Data

2.2.1.1 Existing Wells

Using geophysical tools appropriate for cased wells, important water bearing zones (transmissive bedding plane and/or angled fractures) will be located and correlated among boreholes from all existing shallow bedrock RHR Landfill monitoring wells and Sidney Landfill monitoring well (e.g., MW-11D).

The following tools will be used to obtain geophysical data from the existing cased (PVC/stainless steel) monitoring wells:

a. Fluid temperature / heat pulse flow meter
b. Borehole flow meter (as appropriate)
c. Natural gamma

In addition, geophysical data will be collected from the Dimatos residential well. Since the Dimatos residential well is a potable well, techniques required for entering residential wells (i.e., sterilization of tools entering the well, post treatment of well for prevention of bacteria growth, etc.) will be used. It should be noted that the Dimatos well has an open-hole construction; therefore the geophysical tools discussed in Section 2.2.1.2 will be used.

Based on the data collected during the geophysical logging of existing wells, if it is determined that a data gap exists, additional monitoring wells will be installed. The number and spacing of any additional monitoring wells will be determined based on newly collected data.

2.2.1.2 New Wells

Newly installed wells (RH-8S, -8D, -9D, -10D, and -11D as discussed in Section 2.2.3, and new wells identified to be needed as discussed in Section 2.2.1.1), important water bearing zones (transmissive bedding plane and/or angled fractures) will be located and correlated among boreholes using geophysical tools appropriate for open hole wells.

In addition to the tools listed in Section 2.2.1.1, optical televiewer and caliper logging will be used to obtain geophysical data from the open hole intervals of newly installed wells and the Dimatos residential monitoring well.

2.2.2 Groundwater Collection Trench Evaluation

This portion of the investigation is intended to determine whether the groundwater collection trench, as installed, is capable of:

- Drawing shallow bedrock groundwater immediately below the collection trench upwards into the trench (including defining the vertical limit of influence below the trench; i.e., determine whether the trench is capable of collecting the full vertical profile of potentially contaminated groundwater as predicted by RI well depths and newly acquired geophysical data).
- Drawing shallow bedrock groundwater from any distance east of the horizontal limit of the trench.
- Generating an overlapping horizontal influence between existing trench wells such that an uninterrupted capture "curtain" exists over the critical vertical profile.

The first step of the investigation activities will include the performance of a synoptic round of water levels collected from the monitoring well network listed in Table 2, at a minimum. The initial round of water levels will be collected with the trench running under normal operating conditions.

The second step of the evaluation will include a recovery/drawdown test of the trench system to determine the effect on the wells listed in Table 2. To conduct the recovery/drawdown test, the following steps will be followed:

1. With the groundwater collection trench operating under normal conditions, install pressure transducers in the wells listed in bold in Table 2 and establish baseline conditions for a minimum of 12 hours.
2. At the same time as step 1, install packer assemblies in the in-trench dual-zone wells (i.e., TMW-1, SSC-1, SSC-2, SSC-3, SSC-4, TMW-8) but do not inflate. The packer assemblies will be designed to be inflated at a later point in the test to isolate and monitor bedrock groundwater elevations, only.
3. Turn off the trench and monitor the wells listed in Table 2 for the greater of 24-hours or until static conditions are reached; i.e., until recovery curves are approximately 95 percent of static. All wells should be monitored manually at least every hour for the initial four hours of the test, and at least every four to eight hours (as determined by proximity and initial response) for the remainder of the test.
4. Turn on the trench and pump at the design pumping rate; monitor wells in Table 2 for the greater of 24-hours or until equilibrium is reached (serves as drawdown test).
5. Inflate the in-trench dual-zone well packers and focus monitoring on bedrock zone monitoring wells (i.e., RH-1, -2, -3, -4D, -5D, -6D, -7D, MW-11D, and MW-12D at a minimum). Monitor for appropriate period of time; i.e., determine when equilibrium has been achieved. Deflate packers prior to beginning next step.
6. Increase trench pumping rate in incremental steps of 12 to 24 hours until pumping rate is at treatment plant capacity to determine if increased pumping rate improves hydraulic capture at the wells listed in Table 2.

7. Return trench pumping rate to normal operating conditions. Verify that equilibrium has been established prior to moving to next step.
8. Beginning at TMW-1, install pump and packer assembly to isolate and remove bedrock groundwater, only. Inflate non-pumping well packers and establish equilibrium (recovery). [*Note: See Section 2.2.4 regarding collection of groundwater samples from the bedrock portion of the in-trench dual-zone wells prior to individual well pumping tests.*]
9. Initiate typical "step-drawdown" pumping test in TMW-1 and monitor nearby wells for influence (i.e., RH-7D, RH-6D, SSC-1, SSC-2, etc.). Conduct drawdown portion of test for minimum of 4 hours. Monitor recovery to static conditions.
10. Repeat steps 8 and 9 for the remaining in-trench dual-zone wells (i.e., SSC-1 through SSC-4, and TMW-8).

2.2.3 Additional Monitoring Wells

One new monitoring well cluster is proposed for installation at the approximate midpoint between the RH-4 cluster and the RH-5 cluster. The new well cluster, RH-8S and RH-8D, will provide additional hydraulic, geologic, and groundwater quality data east of the trench. The two new wells should be installed with the same construction as RH-4 through RH-7 clusters. Actual completion depths will be determined following review of preliminary data.

Following completion of the geophysical survey described in Section 2.2.1.1, it is anticipated that three additional monitoring wells (RH-9D, -10D, and -11D) will be installed south of the alignment of RH-1, -2, and -3 (see Figure 1). The anticipated purpose of these new wells is to provide geologic logging, hydrogeologic data, and groundwater quality data south of the RH-1, -2, -3 transect (i.e., further delineate nature and extent of VOC plume observed at MW-7D, RH-1, -2, and -3). The location of these wells will be ~340 ft downgradient of the RH-1, -2, and -3 transect along an existing gravel access road.

If geophysical data obtained pursuant to Section 2.2.1.1 and/or if groundwater quality data at these three new wells warrants, additional "sentinel" wells may need to be installed to fully define nature and extent of contamination related to the RHR Landfill site.

New wells installed during this investigation will be field located after completion of the preliminary geophysical survey and discussions with property owners. Discussions with property owners and access agreements will be coordinated by USEPA as lead agency (and others, e.g., the respondents, as appropriate).

Based on recent drilling programs conducted at the site, it is anticipated that overburden drilling will be difficult. Therefore, it is anticipated that overburden drilling will be performed using water or mud rotary drilling methods. In order to be consistent with RH-1, -2, and -3 installations, a nominal 8-inch diameter boring will be advanced a minimum of 3 feet into the top of rock. A 6-inch steel casing will be cement-bentonite grouted in place to approximately 2 feet above ground surface. After allowing the grout to set a minimum of 24 hours, a nominal 4-inch diameter bedrock corehole will be advanced using wireline coring methods. Ideally, a wireline HQ-size core barrel will be used to make 10-foot core runs to the desired well completion depth. The desired well completion depth will be determined as an output of the efforts conducted from Sections 2.1 and Section 2.2.1.1.

2.2.4 Additional Water Quality Data

Prior to the in-trench well bedrock zone pumping tests (Section 2.2.2, steps 8, 9, and 10), water quality samples from the bedrock portion of the in-trench dual-zone wells will be collected to establish bedrock groundwater quality along the trench alignment. The groundwater samples will be collected during the first step of the step-drawdown test (preferably after approximately one bedrock zone well volume has been removed during minimal drawdown stage). The samples will be analyzed for volatile organic compounds (VOCs) and polychlorinated

biphenyls (PCBs) in accordance with standard analytical methods established in the site Quality Assurance Project Plan (QAPP) (Parsons, August, 2007).

Additionally, the Dimatos residential well will be incrementally tested using an inflatable packer assembly. It is anticipated that groundwater samples will be collected over approximately a 10 to 15 ft interval (intervals will be determined based on geophysical logging of this well and packer assembly dimensions). The groundwater will be sampled for VOCs and PCBs in accordance with the standard procedures (low-flow) and analytical methods established in the site QAPP.

Groundwater samples from new wells RH-8S, -8D, -9D, -10D, -11D will be collected during the 1Q 2008 RHR Landfill quarterly groundwater monitoring event. In addition to the routine VOC and PCB parameters, selected wells should also be sampled for monitored natural attenuation (MNA) parameters. The selected monitoring wells include RH-1, -2, and -3 and the newly installed wells (RH-9D, -10D, and -11D) discussed in Section 2.2.3. Refer to Section 2.6 and Table 2 for a summary of MNA sample parameters.

2.2.5 Treatment of Contaminated Groundwater

If the investigation shows that the drainage trench is functioning as designed, this would imply that landfill derived contamination is contained and the current downgradient groundwater contamination is an artifact of pre-trench conditions. However, if it is determined that the trench does not and cannot control and capture the observed contamination, then based on the assessment a proposal to reduce the concentration of VOCs in the down trench area via “most likely alternatives” such as reductive dechlorination or selective extraction will be presented to the USEPA.

2.3 Mobilization

Following authorization to proceed with the field investigation, the Underground Facilities Protection Organization (UFPO) will be contacted to clear exploration locations. Utility clearance typically requires three days notice with UFPO. Following utility clearance activity, field personnel, field equipment, and subcontractors will be mobilized to the Site.

2.4 Health and Safety

Field workers will utilize the existing Health and Safety Plan (HASP) (Parsons, 1999). The HASP will be updated to reflect any new activities not currently addressed in the HASP.

2.5 Survey Control

The current site map will be updated to show the locations of any new monitoring wells installed during the Hydrogeologic Investigation. A NYS licensed surveyor will be subcontracted to complete the survey and supply data in AutoCAD format to facilitate preparation of investigation report figures. Survey data will include horizontal location to the nearest 0.1 foot, and elevation data for the top of the inner and outer casings to the nearest 0.01 foot.

2.6 Field Screening, Environmental Sampling, and Analytical Laboratory Testing

Groundwater samples collected for analytical laboratory testing will be placed in laboratory provided sample containers, placed in an iced cooler, and handled in accordance with the Chain-of-Custody procedures described in the existing site QAPP (Parsons, August 2007). Groundwater samples will be collected for TCL VOCs (SW846 Method 5030B followed by 8260B) and PCB (SW846 Method 8082) analyses. Additional information regarding analytical methods and sample handling are provided in the QAPP.

Selected samples will be analyzed for MNA parameters (refer to Section 2.2.4). The MNA parameter list is presented in Table 3.

2.7 Decontamination and Handling of Investigation Derived Waste

Decontamination procedures specific to the field investigation are described in the QAPP. Personal protective equipment (PPE) and disposable sampling equipment will be placed in plastic garbage bags and will be disposed as municipal solid waste. Soil cuttings will be placed in clean, new 55-gallon drums and stored onsite for future disposal. Drums will be placed in a secure, contained area, and labeled with the contents and date of generation.

3. Hydrogeologic Reporting Requirements

A Hydrogeologic Investigation summary report will include an evaluation of remedial options for the project site dealt with during the Hydrogeologic Investigation (i.e., contamination found in new groundwater monitoring wells). The report will include, at a minimum:

- Statements project objectives;
- Summary of site investigation activities;
- Summary of bedrock data generated during the investigation, to include;
  - Characterization and definition of the distribution of VOCs in shallow bedrock.
  - Comprehensive bedrock geological and hydrogeological reports for RHR Landfill.
  - Determination of whether bedrock groundwater beneath the RHR Landfill groundwater trench is being drawn upwards into the trench along the entire length of the trench.
  - Determination of whether contamination observed at MW-12, RH-1, RH-2, RH-3 and RH-4D (and beyond, if determined during the investigation) shows or is expected to show attenuation in relation to operation of the trench, or if operation of the trench is expected to control and capture the contamination. If one of these is not demonstrated, a recommendation for immediate action to control and capture groundwater contamination in the area of these wells will be presented (i.e., installation of additional recovery wells to protect potential off-site receptors).
- Summary of overburden data generated during the investigation, to include;
  - Determination of whether contamination in the new RH-xS series wells is a result of pre-trench conditions
  - Determination of whether the trench has hydraulic influence at the new RH-xS series wells.
  - Determination of the fate of contamination observed in the new RH-xS series wells.
- Evaluation of data generated during the investigation as it relates to the nature and extent of the findings of the 3rd quarter 2007 sampling of new groundwater monitoring wells RH-1 through RH-7;
- Figures, as appropriate, summarizing site activities and data collection;
- Identification of areas of the site that will require further investigation and/or remedial actions; and,
- A preliminary evaluation of remedial technologies and recommendations for additional site activities, if warranted.

The report appendices will include boring logs, sample collection logs or field notes, and analytical data reports (electronic format).

4. Hydrogeologic Investigation Timeline

Completion of the Hydrogeologic Investigation will be completed in a timeframe that will allow for the execution of a design and completion of any necessary remedial activities no later than September 30, 2008. Data collection will be completed no later than March 31, 2008. The assessment report including a discussion of any possible remedial options will be completed not later than April 30, 2008. Any necessary remedial design will be completed and approved by May 31, 2008 to allow sufficient time for subcontracting and execution. In the event that less complicated remedial options are approved, then the PRPs may suggest an alternative schedule for the remedial design and implementation.

The PRPs and their consultants will schedule a meeting with the USEPA within two weeks of receipt of this Work Plan in the USEPA office in New York City, New York to discuss the contents and execution of this Hydrogeoloic Investigation Work Plan.

5. References

Parsons, August 1999. *Remedial Design Work Plan for the Richardson Hill Road Landfill, Sidney, NY.*

Parsons, August 2007. *Operation and Maintenance Manual for Post Construction Activities at the Richardson Hill Road Landfill, Sidney, NY.*

O'Brien & Gere Engineers, Inc., August 1995. *Remedial Investigation; Richardson Hill Road Municipal Landfill, Sidney, NY.*

TABLES

TABLE 1

Richardson Hill Road Landfill Site
Sidney, New York

HYDROGEOLOGIC INVESTIGATION ACTIVITIES FLOW CHART

Hydrogeologic Investigation Activity		Task	Reference Section	Notes/Comments
Historical Data and Records Search	Historical Data Collection	Review existing geologic well boring logs.	2.1.1	
		Review/reexamine existing bedrock cores (an outcrops, if possible).		
		Review geologic field data showing strata attitude.		
		Review RHR Landfill and Sidney RI reports for physical data that was collected.		
		Review supplemental investigations or reports for any physical data that was collected.		
	Private Well/Seep Information	Identify residential wells up to 1500 feet downgradient of monitoring wells RH-1, -2, and -3.	2.1.2	
		Visually survey for seeps up to 1500 feet downgradient of monitoring wells RH-1, -2, and -3.		
Geophysical Data	Existing Wells (cased wells)	Perform geophysical testing on existing Site wells as well as Sidney Landfill well MW-11D.	2.2.1.1	Tools: Fluid temperature/heat pulse flowmeter, natural gamma, and borehole flowmeter.
		Perform geophysical testing on Dimatos residential well (note: open hole well).		Tools: Fluid temperature/heat pulse flowmeter, natural gamma, borehole flowmeter, optical televiewer, and caliper logging.
		Determine data gaps, and if so install additional monitoring wells as needed.		Follow geophysical logging for new wells.
	New Wells (open hole wells)	Perform geophysical testing.	2.2.1.2	Tools: Fluid temperature/heat pulse flowmeter, natural gamma, borehole flowmeter, optical televiewer, and caliper logging.
Groundwater Collection Trench Evaluation	Water Level Collection	Collect round of water levels while trench is running.	2.2.2	Table 1 in Section 2.2.2 lists wells to be included in water level measurements.
	Recovery/Drawdown Test	Install pressure transducers, establish baseline conditions.		Table 1 in Section 2.2.2 lists wells in which pressure transducers will be installed.
		Conduct recovery/drawdown tests.		

TABLE 1

Richardson Hill Road Landfill Site
Sidney, New York

HYDROGEOLOGIC INVESTIGATION ACTIVITIES FLOW CHART

Hydrogeologic Investigation Activity		Task	Reference Section	Notes/Comments
Additional Monitoring Well Installations	Overburden/Shallow Bedrock Well Cluster	Install monitoring wells RH-8S/-8D.	2.2.3	
		Perform geophysical testing on shallow bedrock well RH-8D.		
		Collect groundwater quality samples.		To be collected during next quarterly monitoring event (March 2008). Depth consistent with monitoring well clusters RH-4 through RH-7, and groundwater collection trench.
	Shallow Bedrock Wells	Install monitoring wells RH-9D, -10D, -11D.		
		Perform geophysical testing on new wells.		
		Collect groundwater quality samples.		To be collected during next quarterly monitoring event (March 2008).
Additional Water Quality Data	New Monitoring Wells	Collect VOC and PCB samples from monitoring wells RH-8S and -8D.	2.2.4	To be collected during next quarterly monitoring event (March 2008).
		Collect VOC, PCB, and MNA samples from monitoring wells RH-9D, -10D, and -11D.		To be collected during next quarterly monitoring event (March 2008).
	Existing Wells	Collect VOC and PCB samples from shallow bedrock portion of in trench monitoring wells.		TMW-1, SSC-1, SSC-2, SSC-3, SSC-4, TMW-8. to be collected during trench evaluation work.
		Collect VOC and PCB samples Dimatos residential well.		To be collected during next quarterly monitoring event (March 2008).
		Collect VOC, PCB, and MNA samples from monitoring wells RH-1, -2, and -3.		To be collected during next quarterly monitoring event (March 2008).
Additional Activities	Treatment of Contaminated Groundwater	Determination of the need for reductive dechlorination or selective extraction.	2.2.5	
	Survey Control	Complete survey of any new monitoring wells installed during the Hydrogeologic Investigation.	2.5	
	IDW Handling	Dispose of PPE and disposable sampling equipment.	2.7	
		Store soil cuttings in 55-gallon drums for future disposal.		

TABLE 2

Richardson Hill Road Landfill Site
Sidney, New York

MONITORING WELLS FOR HYDRAULIC MONITORING

RH-1	**RH-5D**	**TMW-2**	**TMW-5**	**MW-12D**	MW-11D (SL)
RH-2	**RH-6S**	**SSC-1**	**SSC-4**	MW-12DD	South Pond
RH-3	**RH-6D**	**TMW-3**	**TMW-6**	MW-18S	
RH-4S	**RH-7S**	**SSC-2**	**TMW-8**	MW-18D	
RH-4D	**RH-7D**	**TMW-4**	**TMW-7**	MW-18DD	
RH-5S	**TMW-1**	**SSC-3**	MW-12S	MW-11S (SL)	

Notes:
SL – Sidney Landfill Well
1. Pressure transducers will be installed in wells listed in bold.

TABLE 3

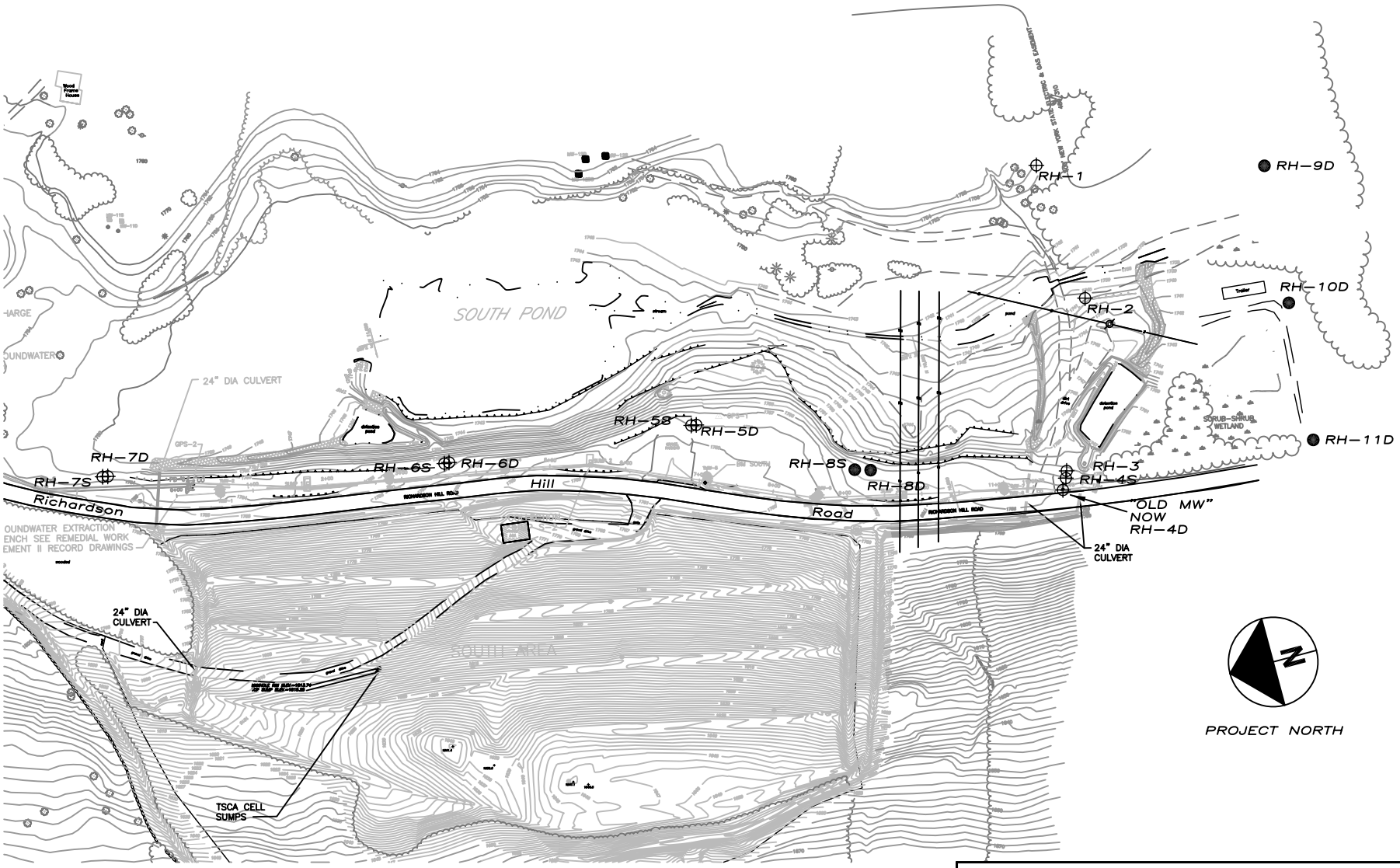
Richardson Hill Road Landfill Site
Sidney, New York

HYDROGEOLOGIC INVESTIGATION
ANALYTICAL PARAMETER SUMMARY FOR GROUNDWATER SAMPLES[4]

Well Type	Shallow Bedrock Portion of in-trench Monitoring Wells	Existing Monitoring Wells	New Monitoring Wells	New Monitoring Wells	Residential Well
Well Identifications	**(TMW-1, SSC-1, SSC-2, SSC-3, SSC-4, TMW-8)**	**(RH-1, -2, -3)**	**(RH-8S, -8D)**	**(RH-9D, -10D, -11D)**	**Dimatos**
ANALYTE					
VOCs [1]	X	X	X	X	X
PCBs [2]	X	X	X	X	X
MNA Parameters [3]					
Dissolved Oxygen	NA	X	NA	X	NA
Biological Oxygen Demand	NA	X	NA	X	NA
Chemical Oxygen Demand	NA	X	NA	X	NA
Total Organic Carbon	NA	X	NA	X	NA
Nitrate	NA	X	NA	X	NA
Sulfate	NA	X	NA	X	NA
Total Iron	NA	X	NA	X	NA
Ferrous Iron	NA	X	NA	X	NA
Total Manganese	NA	X	NA	X	NA
Dissolved Manganese	NA	X	NA	X	NA
Magnesium	NA	X	NA	X	NA
Alkalinity	NA	X	NA	X	NA
Methane	NA	X	NA	X	NA
Chloride	NA	X	NA	X	NA
Carbon Dioxide	NA	X	NA	X	NA
Ethane	NA	X	NA	X	NA
Ethene	NA	X	NA	X	NA

Notes:
VOC - Volatile Organic Compounds
PCB - Polychlorinated Biphenyls
MNA - Monitored Natural Attenuation
NA - Not Analyzed
1. All VOC analyses by SW-846 Method 5030B followed by 8260B.
2. All PCB analyses by SW-846 Method 8082.
3. During sampling field parameters will be collected. As part of MNA sampling, oxidation reduction potential, pH, temperature, and specific conductance readings will be collected.
4. All samples to be collected during next quarterly sampling event (March 2008), except for the in-trench shallow bedrock groundwater samples, which will be completed during the trench investigation activities.

FIGURES



200 0 200

APPROX. SCALE IN FEET

LEGEND

- PROPOSED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION

PROPOSED MONITORING WELL LOCATIONS

RICHARDSON HILL ROAD LANDFILL SITE
SIDNEY, NEW YORK

Date 12-07	EarthTech	Figure
Project No. 103264	A tyco International Ltd. Company	1

L:\work\CAD\103264\103264 Prop Wells.DWG 12/28/07 3:41 PM nancy.wilzbacher