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CHEM-TROL SITE  
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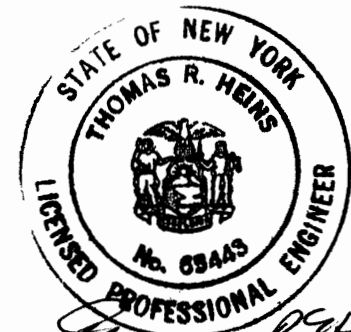
POST-REMEDIAL OPERATION  
AND MAINTENANCE PLAN,  
RECORD DRAWINGS and  
FINAL ENGINEERING REPORT

**VOLUME I**

Prepared for: SC Holdings, Inc.

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2495 Main Street  
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March 2002  
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DEC APPROVAL STAMP ON REVERSE SIDE

New York State Department of Environmental Conservation

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COMMISSIONER OF ENVIRONMENTAL CONSERVATION

*John W. P. Hyman*

Designated Representative

Date 2/20/03

**CHEM-TROL SITE  
HAMBURG, NEW YORK  
Site Code: 915015**

**POST-REMEDIAL OPERATION  
AND MAINTENANCE PLAN,  
RECORD DRAWINGS and  
FINAL ENGINEERING REPORT**

**VOLUME I**

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## **VOLUME II**

### **Appendix A: Source Control Elements Documentation**

- **Appendix A-1:** Final Record Plan
- **Appendix A-2:** Operations & Maintenance Manual.
- **Appendix A-3:** Air Emissions Testing

## **VOLUME III**

### **Appendix B: Groundwater Control Elements Documentation**

- **Appendix B-1:** Final Record Plans
- **Appendix B-2:** Operations & Maintenance Manual
- **Appendix B-3:** Effluent Limitations and Monitoring Requirements

**CHEM-TROL SITE  
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**POST-REMEDIAL OPERATION  
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FINAL ENGINEERING REPORT**

## **1.0 INTRODUCTION**

McMahon & Mann Consulting Engineers, P.C. (MMCE) prepared this report for SC Holdings, Inc., the owner of the property. It presents the record plans and operation and maintenance requirements for the remedial system constructed at the Chem-Trol site (NYSDEC ID Number 9-15-015), in the town of Hamburg, New York. The site is located on the north side of Lake Avenue, east of the village of Blasdell as shown on Figure 1.

This report is submitted in accordance with the requirements of the Order on Consent (Index #B9-0226-88-07), Section II.D.

The remaining portions of this section present site background information and a description of the remediation construction. This is followed by a description of the construction records (Section 2), a summary of the operation and maintenance requirements (Section 3), the site groundwater monitoring program (Section 4), reporting (Section 5) and conclusions (Section 6).

### **1.1 Background**

The Chem-Trol site is about 17.5 acres in size and is located on Lake Avenue in the Town of Hamburg, New York. The South Branch of Smokes Creek passes through the western portion of the site and a tributary to the creek flows through the northern part of the site. Operations at the site were limited to the elevated area south of the on-site tributary (see Figure 2).

Additional information regarding studies for the remediation of the site can be found in the following references. These documents are on file with the New York State Department of Environmental Conservation.

- Chem-Trol Phase II Investigations, Erie County, Hamburg, New York, Goldberg-Zoino Associates of New York, P.C., April 1991.
- Chem-Trol Remedial Investigation/Feasibility Study Work Plan, Hamburg, New York, GZA GeoEnvironmental of New York, March 1992.

- Citizen Participation Plan, Chem-Trol Site, Hamburg, New York, GZA GeoEnvironmental of New York, November 1992, Revised January 1993.
- Chem-Trol Site Remedial Investigation Report, Hamburg, New York, GZA GeoEnvironmental of New York, November 1994.
- Feasibility Study, Chem-Trol Site, Hamburg, New York, McMahon & Mann Consulting Engineers, P.C. March 1995.
- Record of Decision, Chem-Trol Site, Town of Hamburg, Erie County, Site Number 9-15-015, New York State Department of Environmental Conservation, March 1996.

### **1.2 Remedial Construction Requirements**

The NYSDEC selected a remedial alternative for implementation at the Chem-Trol Site as described in their Record of Decision (March 1996). The remedial construction was divided into two phases, the "Source Control Elements" and the "Groundwater Control Elements." The components of each of the construction phases are listed below.

#### **Source Control Elements**

- "Hot Spot" Soils Removal
- Site Soils Cover
- Soil Vapor Extraction System
- Access Restrictions (fencing)

#### **Groundwater Control Elements**

- Groundwater Extraction and Treatment
- Groundwater Monitoring
- Tributary Sediment Excavation /Disposal
- Institutional Controls

## **2.0 CONSTRUCTION RECORDS**

The construction documentation for the source control and groundwater control elements is described below.

### **2.1 Source Control Records**

The design plans and specifications for the source control elements are in:

"Source Control Elements, SCA, Chem-Trol Site Remedial Design, Hamburg, New York," by Rust Environment & Infrastructure, August 1998.

New York State Department of Environmental Conservation (NYSDEC) approved these design plans on September 3, 1998.

The remedial construction work for this phase took place in the Fall of 1998 and Summer of 1999. Construction records were submitted to NYSDEC on October 5, 1999. These records are attached in Appendix A.

The construction records include:

- **Appendix A-1:** "Final Record Plan Of Chem-Trol Site Remediation Project," McIntosh & McIntosh, May 13, 1999.
- **Appendix A-2:** "Chem-Trol Site Soil Vapor Extraction System Operations & Maintenance Manual," IT Corp.
- **Appendix A-3:** Letter dated April 21, 1999 from McMahon & Mann Consulting Engineers, P.C. to NYSDEC.

The drawing in Appendix A-1 depicts the extent of the site soils cover, the location of the soil vapor extraction (SVE) lateral pipes, the SVE treatment building and the chain link fence. It includes a table presenting pre-construction elevations, elevations after site preparation, the elevation of the top of site soil cover and the final elevations.

The "hot spot" soils were excavated and transported offsite for disposal at Waste Management's Model City, New York facility.

The SVE system operation and maintenance manual includes a general system description, record drawings, detailed operating procedures, basic PLC (process logic controller) operations, start-up and shutdown, alarms and troubleshooting, routine maintenance and manufactures literature for the installed components.

The letter in Appendix A-3 describes the air discharge testing that will be done during operation of the SVE system.

## **2.2 Groundwater Control Records**

The design plans and specifications for the groundwater control elements are in:

"Groundwater Control Elements, SCA, Chem-Trol Site, Remedial Design, Hamburg, New York," by Earth Tech, Inc., September 1999.

New York State Department of Environmental Conservation (NYSDEC) approved these design plans on August 17, 2000.

The remedial construction work began in the Fall of 2000 and was completed in Winter 2001. Record drawings and the groundwater control operation and maintenance manual are attached in Appendix B.

The record drawing (Appendix B-1) depicts the location of the groundwater extraction and treatment system components and the tributary sediment excavation locations.

The groundwater control operation and maintenance plan dated January 2002 is in Appendix B-2. The operation and maintenance manual includes a general description of the groundwater collection and treatment systems, groundwater treatment system effluent testing, inspection and maintenance requirements, standard operating procedures, and electrical panel drawings and manufacturer's literature for the installed equipment.

### **3.0 SUMMARY OF OPERATION AND MAINTENANCE REQUIREMENTS**

The following sections present a general description of the SVE system and the groundwater collection system followed by a brief description of the system operation and maintenance.

Detailed information on operation and maintenance procedures for the SVE and Groundwater Collection System are given in Appendices A and B respectively. A cross-reference is provided after each section heading to indicate the appropriate section in Appendix A or B for additional details.

#### **3.1 Soil Vapor Extraction System**

(See Vol II, Appendix A-1, Final Record Plan)

The soil vapor extraction system draws air through the soil beneath the Chem-Trol site removing volatile organic compounds.

The system is composed of perforated pipes buried within the soils on site. The pipes have a vacuum imposed on them by blowers contained in the Soil Vapor Extraction (SVE) building. Vapors are drawn through the piping system into the building where the vapors are passed through a tank to remove any condensate before being discharged. The system is equipped with a process logic controller (PLC) to monitor operating conditions.

##### **3.1.1 Start up**

(See Vol II, Appendix A-2, Detailed Operating Procedures, Record Drawing E-04)

The control panel within the SVE building provides switches to activate the two blower motors and a water transfer pump. Three position switches allow operation in an automatic, manual ("Hand") or off mode. Placing the switch in the "Hand" or "Auto" position energizes the system. The system may be operated with two blowers running or with either blower in operation.

##### **3.1.2 Piping/Valves/Instrumentation**

(See Vol II, Appendix A-2, Record Drawing-G-01 and M-01)

The air stream that enters the building passes through a series of pipes and valves before entering the blowers and being passed out of the discharge stack. Initially the air stream



passes by a make up valve that can be used to adjust the volume of air being moved from the soil by introducing atmospheric air into the systems pipeline.

The airflow then is passed through a “knockout” tank that is designed to remove and collect moisture trapped within the air stream. Water collected in the knockout tank can be transferred automatically or manually to a storage tank within the building for eventual removal from the site.

The air stream may be directed through either blower or both blowers by a system of gate valves that are arranged to isolate the blowers as parallel systems. This allows either blower to be isolated for maintenance as required.

The air stream exiting from the knockout tank is then piped out through the discharge stack. Discharge from the stack is monitored for compliance with NYSDEC requirements as described in Appendix A-3.

The system is equipped with flow, pressure, and temperature measurement gages to observe operating conditions.

### **3.1.3 Alarm Situations**

(See Vol II, Appendix B-2, Operation and Maintenance Manual)

The PLC is pre programmed to monitor and respond to conditions that may develop within the system. High pressure that develops within the air stream will cause the system to shut down and send an alarm notice to the site owner and engineer at a pre programmed telephone number. Similarly high water levels in either water tank will trigger high water alarms and the system will shut down.

### **3.2 Groundwater Treatment System**

(See Vol III, Appendix B-1, Final Record Plan)

The groundwater treatment system collects and treats groundwater from beneath the Chem-Trol site.

Controlled blasting was utilized to fracture bedrock beneath the site in a line from north to south. The fractured rock zone simulates a trench without having any open excavations. Groundwater tends to collect in the fractured rock. Three wells are installed into the fractured rock zone at intervals over its length.

Each well contains a pump that moves collected water to a treatment building via 2-inch high-density polyethylene (HDPE) pipes placed in an underground trench. The water enters the building, passes through a bag filter and flows into an air stripper that removes volatile organic compounds from the water. The water then passes through an “iron removal” filter. Treated water is discharged to either the sanitary sewer system located along Lake Avenue or the South Branch of Smokes Creek.

### **3.2.1 Start up**

(See Vol III, Appendix B-2, Standard Operating Procedures, Start up and Shut down Procedures)

The system is placed into operation by turning the blower switch to the "on" position. The process logic controller (PLC) is programmed to energize the variable frequency drive (VFD) pumps at pre-set speeds to deliver the required flow rate. Each pump can also be turned on or off at the control panel located adjacent to each well location.

### **3.2.2 Wells/Piping/Valves**

(See Vol III, Appendix B-2, EPG Pumps)

Each well contains a variable speed pump and pressure transducer. The pumps move the water to the treatment building at preset flow rates. Pressure transducers in the wells measure the water level in each well and send electrical signals to the treatment building for readout and data storage. The PLC in the water treatment building transforms these electrical signals into water level measurements that can be monitored from the control panel. These signals also are utilized to trigger high and low level alarms according to pre-programmed set points. The PLC will turn pumps on and/or off to adjust to high or low water levels in each well. The PLC is also programmed to call pre-programmed numbers to announce alarm conditions.

The water from each well is piped to the treatment building through a 2-inch HDPE pipe that is connected to each well by a pitless connection. The 2-inch HDPE pipes run from each well through a common trench to the treatment building. An 8-foot diameter manhole is located approximately halfway between the groundwater collection trench and the treatment building. The manhole contains cleanout ports and gate valves for each HDPE line to allow maintenance as required.

Each pipe enters the treatment building separately and flows through a ball valve, a check valve and a flow measurement transducer before entering a common header pipe. The ball and check valves allow each pipe to be closed off so that the flow meter transducers may be serviced. The three flow meters send electrical signals to a flow totalizer that computes the flow rate and total gallons pumped through the system for each well.

### **3.2.3 Treatment**

(See Vol III, Appendix B-1, Final Record Plan, Appendix B-2, Operation and Maintenance Procedures, Carbtrol Air Stripper)

Water from the header pipe is passed through a 10-micron bag filter to remove suspended solids before entering the counter flow plate stripper. A pressure gauge on the bag filter provides an indication of increased backpressure as the filter becomes clogged. Water moves from the bag filter into the top of the counter flow plate stripper. The stripper contains a blower and four plates that disperse the water and allow contact with the air stream to remove volatile organic compounds. Treated water is collected in the base of the stripper before draining by gravity to an iron removal filter. The air is discharged to the atmosphere through a stack that includes a filter to prevent water from being discharged.

Treated water is allowed to flow by gravity to discharge to the Erie County sanitary sewer system. The treated water will be tested for compliance with State surface water discharge requirements. Depending on the results the treated water may be discharged directly to the South Branch of Smokes Creek.

### **3.2.4 Alarm Situations**

(See Vol III, Appendix B-2, Operation and Maintenance Manual)

A PLC monitors water levels within the counter flow air stripper and is capable of responding to pre-programmed alarm conditions. Alarms will be triggered to stop system operations if water levels within the plate stripper become too high, too low or create high backpressure in the air blower. Messages will also be sent out via phone lines to pre-programmed individuals.

### **3.2.5 Discharge Monitoring**

(See Vol III, Appendix B-1, Final Record Plan and Appendix B-3, Effluent Limitations and Monitoring)

Samples of the water treatment system effluent will be collected for analysis in accordance with the facilities Effluent Limitation and Monitoring Requirements (Appendix B-3). Samples of the air discharge will also be collected for analysis as described in the operation and maintenance plan in Appendix B-2.

## **4.0 GROUNDWATER MONITORING PROGRAM**

This section describes site conditions, on-site and off-site monitoring wells to be sampled, analytical testing procedures, sampling frequency and reporting.

Groundwater monitoring data will be submitted to NYSDEC within 30 days of receipt. Additionally, the groundwater monitoring data will be combined with the SVE system (Section 3.1.2) and groundwater treatment system data (3.2.5) into a yearly report.

### **4.1 Summary of Site Conditions**

The subsurface materials at the site include surficial soils such as topsoil and/or miscellaneous fill; glacial till soils; and weathered shale with more competent shale below. Groundwater flow generally occurs within the lower, more granular, glacial till soils, the weathered shale and to a lesser extent the competent shale. The hydraulic properties of these materials indicated by the Remedial Investigation (1994) test data are summarized below.

Material	Thickness (feet)	Hydraulic Conductivity (cm/sec)
Lower Glacial Till (coarser grained portion)	0.5 to 4.7	$9 \times 10^{-5}$
Weathered Shale	25 to 30	$3 \times 10^{-3}$
Competent Shale	65 to 130	$3 \times 10^{-5}$

Recharge to the groundwater system occurs as vertical infiltration through the surficial soils and glacial till. The amount of infiltration is limited due to the low hydraulic conductivity of these materials. It is estimated that the amount of infiltration may be about 5 to 7 inches per year based upon a water balance calculation using average rainfall data.

As the recharging infiltration reaches the lower glacial till, it flows along the top of rock to vertical fractures where it enters the more permeable weathered shale. The head measured in the lower glacial till was above the head measured in the bedrock at well couplet locations indicating that groundwater flow is from the lower glacial till into the bedrock.

Flow within the weathered shale is along fractures and bedding planes. Flow is towards the South Branch of Smokes Creek (see Figure 2). Flow in the weathered shale is believed to be the primary flow path across the site due to its relatively high permeability. It is estimated that more than 80 percent of the water that passes across the site originates as upgradient flow in the weathered shale.

The relatively low hydraulic conductivity of the underlying competent shale limits the amount of water that can pass through it. The groundwater elevations measured at the site indicate that the groundwater flow is generally upward from the competent shale into the weathered shale.

Groundwater from the weathered shale at the site discharges to the on-site tributary and to the South Branch of Smokes Creek. The tributary is cut several feet into the weathered shale. Groundwater elevations in the bedrock groundwater monitoring wells are consistently higher than the surface water elevations in the tributary. This indicates that flow is from the bedrock into the tributary.

Water level measurements made in the South Branch of Smokes Creek and the adjacent wells (MW-8R and MW-13R) indicate that flow is generally from the bedrock into the creek. However, on several occasions nearly equal head levels were measured in the South Branch of Smokes Creek, MW-8R, and MW-13R. This may result in groundwater flow from the site passing beneath the creek. As such, it appears that groundwater discharges to the creek. However, the potential exists for local groundwater flow beneath the creek during certain times of the year.

The ground surface elevation rises to the west of the site. The groundwater elevation to the west of the site is above the creek elevation and flow is toward the creek. As such, groundwater flows toward the creek from the site and from the west. Groundwater discharges into the creek and flows along the creek alignment.

Table 1 presents a summary of groundwater sample test results for several wells at the site. Samples from the monitoring wells indicate that the groundwater in the overburden and upper weathered shale have been impacted primarily by VOCs. Compounds detected

at the site included 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, toluene, benzene and chlorotoluene. Dense Non-aqueous Phase Liquid (DNAPL) was observed at one well (MW-3s, see Figure 2 for location) located within the affected area.

#### **4.2 Objective**

The goal of the groundwater extraction system is to reduce the concentrations of substances in the groundwater in the lower soil and upper 25 to 30 feet of bedrock. The groundwater extraction system is designed to intercept flow beneath the site without impacting the quantity of flow in the South Branch of Smokes Creek. The groundwater extraction and treatment system will be operated until no further improvement in water quality is observed in the groundwater monitoring.

The objective of the groundwater monitoring program is to collect data to evaluate the performance of the remedial system. Groundwater monitoring will be undertaken to observe conditions present in the upper 25 to 30 feet of bedrock and the lower soil. Monitoring will be conducted downgradient and within the affected area.

#### **4.3 Monitoring Points**

Monitoring wells were selected for inclusion in the groundwater monitoring program to:

- Monitor hydraulic impact of groundwater extraction drain on hydraulic heads, and
- Monitor groundwater quality for changes to judge improvement with time, and
- Observe the potential for offsite migration.

As such, wells were selected from areas near the source of affected groundwater to assess the impact of the system on groundwater quality. These wells are:

MW-8R  
MW-9R  
MW-3S  
MW-13R  
MW-7R (upgradient)

See Figure 2 for well locations.

Downgradient well MW-15R will also be sampled to monitor offsite conditions.

The groundwater level will be measured in selected wells to assess the impact of the groundwater extraction system on hydraulic gradients. Piezometers and monitoring wells

spaced across the site will be used for this purpose. Refer to Table 2 for a listing of the locations and a summary of the groundwater monitoring program.

#### **4.4 Schedule**

Groundwater monitoring completed during the remedial investigation is summarized in Table 1. These data will be used for comparison with data collected during operation of the remediation system.

The groundwater monitoring schedule is to collect samples from the wells on a yearly basis. Groundwater levels will be measured quarterly to assess the hydraulic containment of the system.

#### **4.5 Sample Analysis**

The groundwater samples will be analyzed for NYSDEC Target Compound List VOCs and orthochlorotoluene. Sampling and analysis quality control procedures are described in Appendix A-2, Section 6.0.

### **5.0 DATA REPORTING AND EVALUATION**

Environmental monitoring data will be submitted to NYSDEC within 30 days of receipt. The groundwater monitoring data described in Section 4 will be combined with the SVE system (Section 3.1.2) and groundwater treatment system effluent data (3.2.5) into a yearly report.

An assessment of the potential risks posed by the groundwater would be completed after about 5 years. This assessment will take into account the water usage and chemical characteristics. If these risks are found to be within acceptable ranges then groundwater will be monitored for a period of time to observe if the levels of the substances begin to increase. If no significant increase is noted, then the treatment would be permanently discontinued. If unacceptable risks are identified then alternative approaches to the remedial plan will be considered.

### **6.0 CONCLUSION**

This report describes the remedial construction at the Chem-Trol site completed between 1998 and 2001. It is MMCE's opinion that, based upon the information provided in Appendix A and B of this report and certain observations made during construction, the work was completed in general accordance with the NYSDEC approved design plans.

# ***TABLES***

**Table 1**

## Chem-Trol Site

## Summary of Groundwater Analytical Test Results

Analyte	MW-8R					MW-9R					MW-13R					
	8/16/93		6/1/94		3/10/99 & 3/11/99	Q	8/13/93		6/1/94		3/10/99 & 3/11/99	Q	5/31/94		3/10/99 & 3/11/99	Q
VOLATILE ORG. COMPOUNDS (ug/L)																
Chloroethane	26		52		76		60		39		69		22		73	
1,1-Dichloroethane	160	D	370	D	200		1000	D	860	D	470	J	6	J	240	J
1,1-Dichloroethene	30		67		25		120	D	130		66		270	D	22	
1,1,1-Trichloroethane	130		520	D	150		1300	D	2800	D	630	J	280	D	220	J
Trichloroethene	39		160		51		330	D	300	D	260	J	49		40	
Benzene							1	J					2	J		
Toluene			4	J			1	J	4	J			7	J		
o-Chlorotoluene	4200	DJ	2500	DJ	600				620	DJ	180		1700	DJ	1100	
Chlorobenzene																
cis-1,2-Dichloroethene	6	J	14		10		2	J			32		9	J	10	

Blanks indicate that the parameter was not detected.

D - Analysis of diluted sample.

J - Estimated test result.



**Table 2**

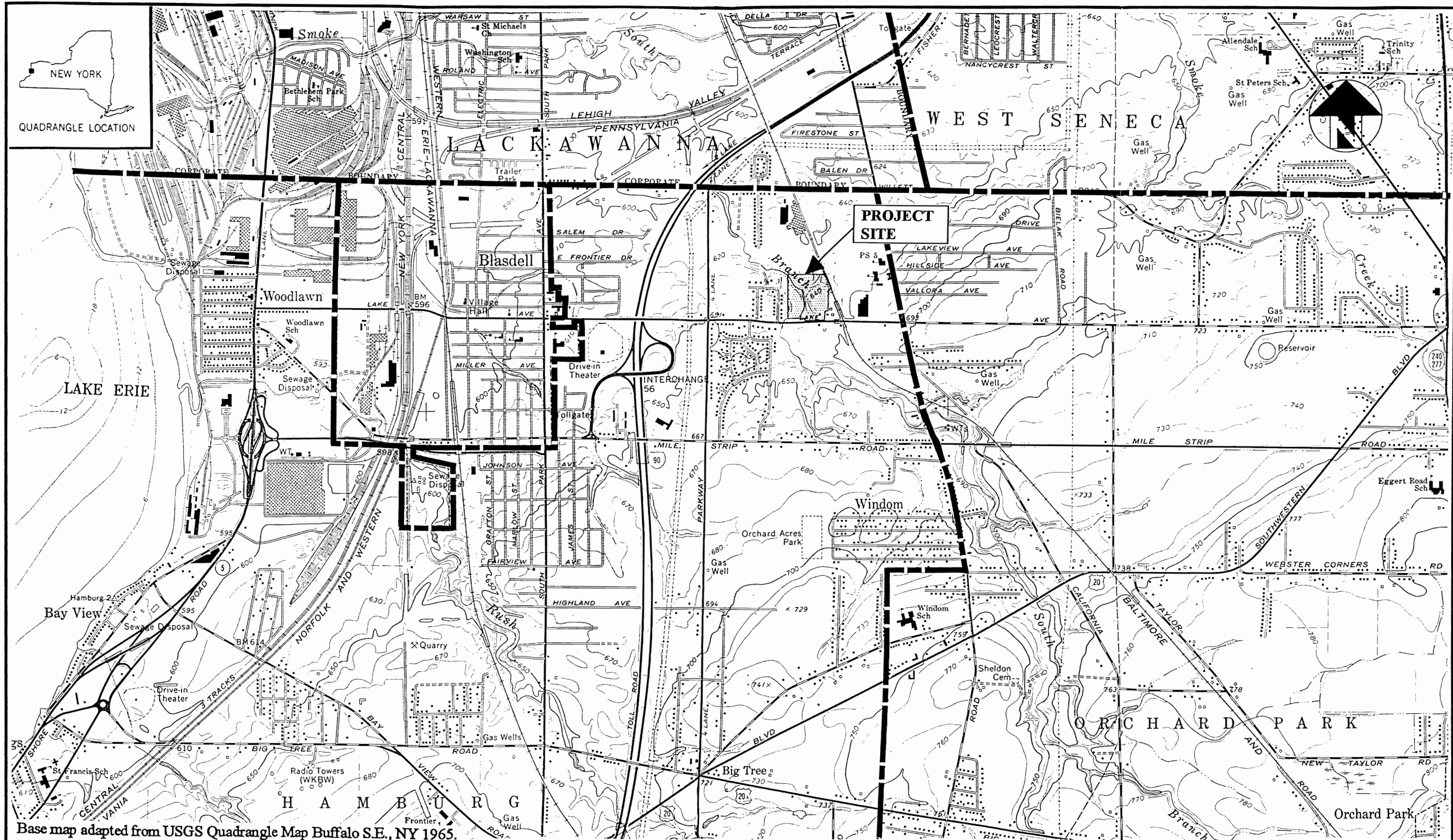
Chem-Trol Site

Summary of Groundwater Monitoring Program

Monitoring Well/ Piezometer	Sample Yearly for TCL VOC Analysis	Measure Groundwater Elevation Quarterly
P98-1		X
P98-2		X
P98-3		X
P98-4		X
P98-5		X
P-3S		X
P-3R		X
MW-1S		X
MW-1R		X
MW-3S	X	X
MW-4S		X
MW-4R		X
MW-6S		X
MW-6R		X
MW-7S		X
MW-7R	X	X
MW-8R	X	X
MW-8S		X
MW-9R	X	X
MW-9S		X
MW-9RD		X
MW-10S		X
MW-10R		X
MW-11R		X
MW-12S		X
MW-12R		X
MW-13R	X	X
MW-14R		X
MW-15R	X	X
MW-16R		X

TCL VOC- NYSDEC Target Compound List volatile organic compounds  
and orthochlorotoluene.

## ***FIGURES***

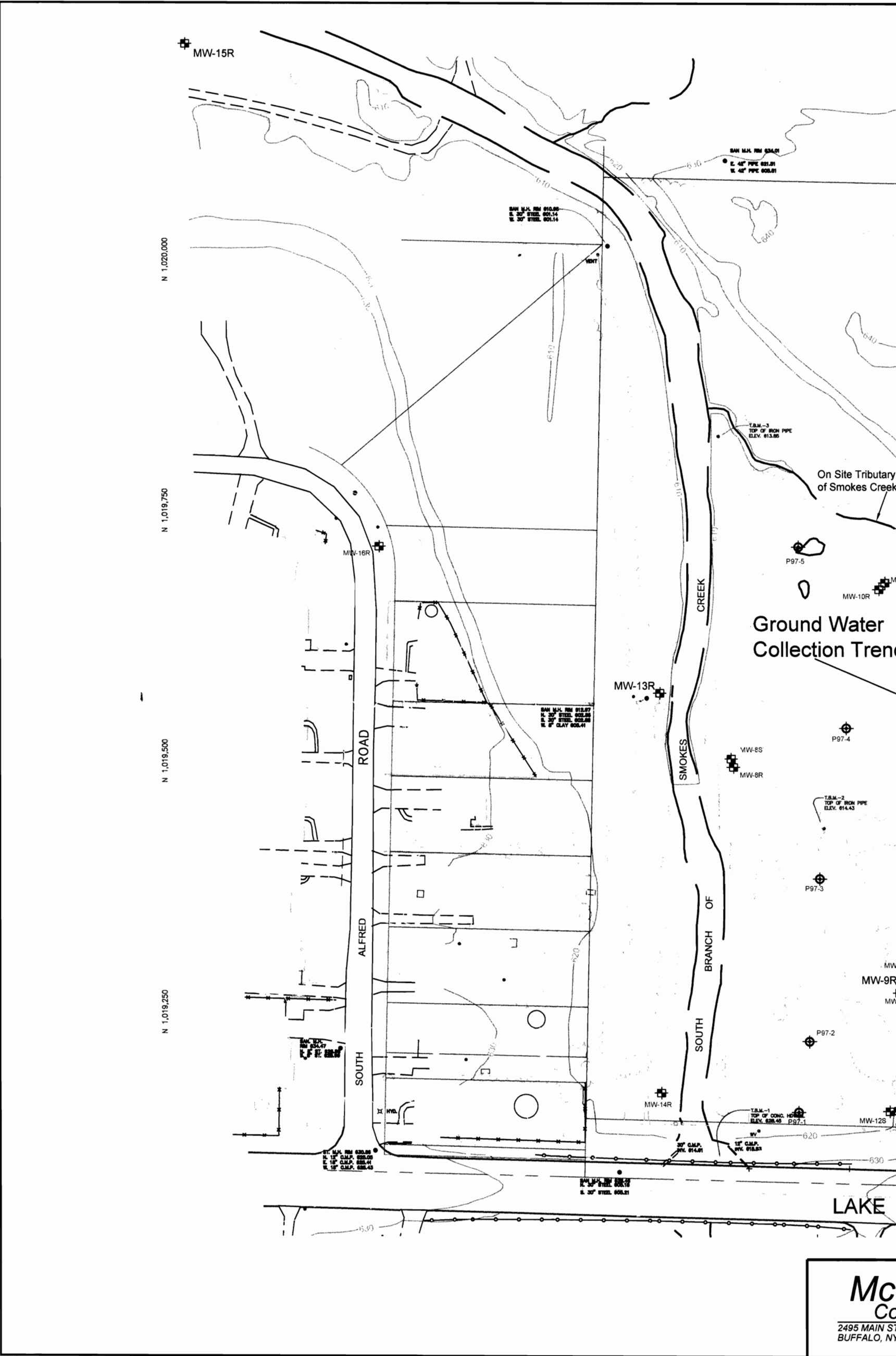


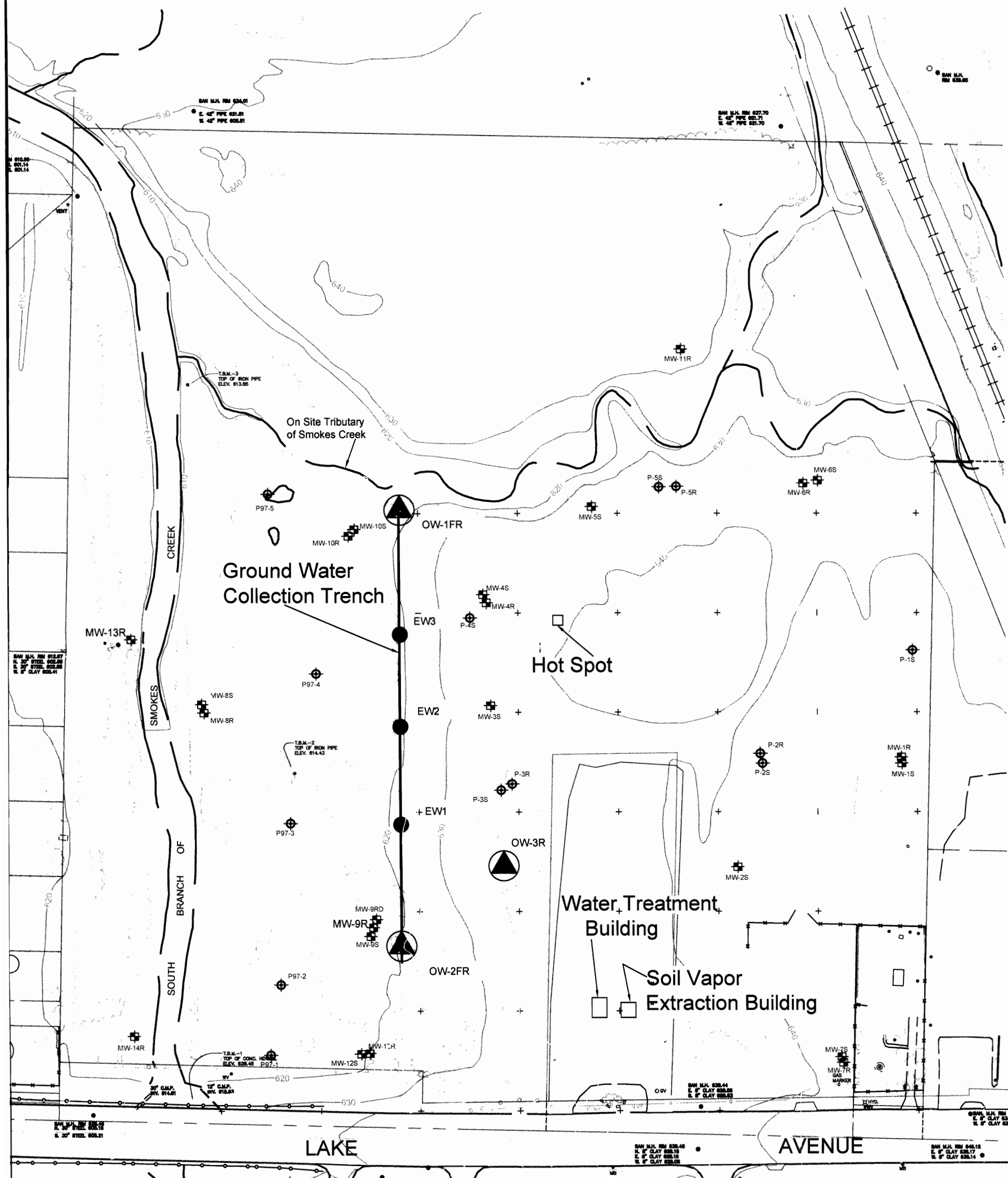
Base map adapted from USGS Quadrangle Map Buffalo S.E., NY 1965.

Legend:  
Corporate Boundary

<p><b>McMahon &amp; Mann</b> Consulting Engineers, P.C.</p>	<p><b>CHEM-TROL SITE HAMBURG, NEW YORK</b></p>	<p><b>LOCATION PLAN</b></p>
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Figure 1





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