GROUNDWATER
EXTRACTION AND TREATMENT
REMEDIAL DESIGN PLAN

FORMER GENERAL CIRCUITS FACILITY
95 MT. READ BLVD.
ROCHESTER, NEW YORK
NYSDEC SITE NUMBER 8-28-085

Barton F. Kline, PE
Project Manager

Prepared For: 95 Mount Read Blvd., LLC
770 Rock Beach Road
Rochester, New York

Prepared By: Day Environmental, Inc.
40 Commercial Street
Rochester, New York 14614

Project No.: 3681R-05

Date: Dec. 3, 2007

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New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
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Alexander B. Grannis
Commissioner

December 14, 2007

Mr. Thomas Maguire
770 Rock Beach Road
Rochester, New York 14617

Dear Mr. Maguire:

RE: General Circuits Brownfield Cleanup Program Site #C828085
95 Mount Read Boulevard, Rochester, New York
Groundwater Extraction And Treatment Remedial Design Plan;
December 3, 2007

The New York State Department of Environmental Conservation (NYSDEC) has completed its review of the document entitled "Groundwater Extraction And Treatment Remedial Design Plan" dated December 3, 2007 (Remedial Design) prepared by Day Environmental, Inc. for the former General Circuits site. Based upon the information and representations given in the Remedial Design, the Remedial Design is hereby approved.

Please place a copy of the Remedial Design in the document repository. Additionally, please submit CDs containing an electronic copy of the Remedial Design to Melissa Menetti, Joe Albert, and me by January 14, 2007. Please ensure that the electronic files are in pdf format, that the text of the document is searchable, and that the entire Remedial Design is provided as one file. Additionally, a fact sheet is being prepared to inform the community of the upcoming remediation activities. The fact sheet must be sent to the community before field work can begin.

Thank you for you cooperation in this matter and please contact me (585) 226-5357 when the field activities have been scheduled.

Sincerely,

Frank Sowers

Frank Sowers, P.E.
Project Manager

cc:
Bart Kline (Day)

ec:
B. Putzig
J. Hausbeck
B. Long
M. Menetti
J. Albert

REMEDIAL DESIGN PLAN

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GROUNDWATER
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FORMER GENERAL CIRCUITS FACILITY
95 MT. READ BLVD.
ROCHESTER, NEW YORK
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1.0 INTRODUCTION

This Groundwater Extraction and Treatment Remedial Design Work Plan (Work Plan) has been developed by Day Environmental, Inc. (DAY) as a part of the Brownfield Cleanup Program (BCP) at the former General Circuits BCP Site (New York State Department of Environmental Conservation (NYSDEC) site ID #C828085) located at 95 Mt. Read Boulevard, Rochester, New York (Site). A project locus map is included as Figure 1.

The activities described in this Work Plan will be used to assist in the implementation of remedial actions described in the Record of Decision (ROD) for the Site.

1.1 Background

The original portion of the building was constructed in the 1920s and the Site was owned/operated by Rochester Lithograph Corporation until the early 1960s. General Circuits, Inc. owned/operated the Site from the early 1960s until 1990. General Circuits, Inc. closed the facility in 1991 due to bankruptcy. Shortly thereafter, the property was transferred to Maguire Properties, Inc. who owned the site until 2005, at which time it was transferred to the current owner, 95 Mt. Read Blvd., LLC. The Site is currently used for commercial and light industrial purposes, and it is anticipated that the Site will remain in use for commercial and light industrial purposes for the foreseeable future.

A Feasibility Study (FS) was completed for the Site under an Order-On-Consent with the NYSDEC. The NYSDEC approved the revised FS dated January 2005, and subsequently issued a ROD dated March 2005. The remedial work identified in the ROD is being conducted under a Brownfield Cleanup Agreement (BCA) between 95 Mt. Read Blvd, LLC. and the NYSDEC.

The remedial action identified in the ROD includes a groundwater extraction and treatment phase, which is scheduled to operate until the groundwater concentrations of chromium decrease to adequate levels for subsequent treatment via in-situ chemical reduction. Work completed to date as a part of the groundwater extraction and treatment phase of this project includes groundwater testing and flow characterization (as summarized in DAY's *Extraction Well Installation and Pilot Study Report*, dated June 2006), and treatability testing of the groundwater using several alternative treatment technologies.

1.2 Objectives

This Work Plan has been developed to consolidate information relating to the groundwater extraction and treatment phase of this project, and to provide a structure for completion of the systems design and development. The design concepts proposed to achieve the groundwater extraction and treatment objectives are summarized in Sections 2.0 and 3.0 of this Work Plan, and are presented for NYSDEC review, comment and approval. Following receipt of NYSDEC comments on these preliminary design features and concepts, the detailed design work (i.e., the Design Plan) will be completed, with additional future submittals to be made as identified in Section 4.0 of this Work Plan. The

completed design will be reviewed, approved and signed by a Professional Engineer licensed to practice in New York State.

2.0 GROUNDWATER EXTRACTION

This section reviews collected data for the Site including the nature and extent of contaminants of concern, existing monitoring wells present at the Site, and pertinent hydrogeologic conclusions from previous environmental studies. This section also presents preliminary details relating to proposed groundwater extraction system installation activities.

2.1 Nature and Extent of Contaminants of Concern in Groundwater

Based upon the findings presented in the Feasibility Study (FS) Report dated January 2001 (revised January 2005) for the Site, contaminants of concern (COCs) include chlorinated volatile organic compounds (VOCs) and the metal chromium, including hexavalent chromium (chromium VI). The chlorinated VOCs at the Site generally consist of perchloroethene (PCE) and trichloroethene (TCE), and (to a lesser extent) their breakdown products 1,2-dichloroethene (DCE) and vinyl chloride (VC). The highest concentration of total VOCs was detected in a groundwater sample collected from overburden monitoring well MW-9 (greater than 155,000 ppb total VOCs). Groundwater samples from overburden monitoring wells MW-8, MW-10 and MW-12, deep bedrock monitoring well MW-17 and the basement sump contained concentrations of total VOCs between 2,140 ppb and 20,340 ppb. VOCs were also detected at the monitoring wells positioned around the perimeter of the Site, but at lower concentrations (i.e., less than 144 ppb) than interior monitoring wells MW-8, MW-9, MW-10, MW-17 and the basement sump.

Chromium concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 groundwater standard of 50 ppb were detected in wells MW-8, MW-9, MW-12 and MW-21. With the exception of monitoring well MW-21, these monitoring wells are located beneath the building at the Site.

The vertical extent of COCs in groundwater was delineated by evaluating groundwater quality in monitoring wells sealed within the overburden and monitoring wells sealed within the bedrock. VOCs were not detected in groundwater samples collected approximately 50 feet (ft) below the ground surface (bgs). In addition, chromium was not detected at concentrations that exceed the NYSDEC groundwater standards and guidance values in bedrock groundwater monitoring wells with the exception of monitoring well MW-21. However, monitoring well MW-21 is an “open hole” well starting at 18 ft bgs; therefore, the detected chromium concentration could be indicative of shallow bedrock groundwater.

Based on the contaminant distribution described above, approximate extents for the areas of elevated COC concentrations in groundwater to be captured by groundwater extraction was delineated, and is presented on Figure 2.

2.2 Existing Groundwater Monitoring Well Field in Area of Concern

Eleven groundwater monitoring wells currently exist within and/or in close proximity to the area delineated for groundwater extraction and treatment. Two of the eleven groundwater monitoring wells (MW-17 and MW-22) are deep bedrock monitoring wells with depths of 38.3 ft bgs and 80 ft bgs, respectively. Monitoring wells, MW-30, and MW-31 and extraction well EW-1 are bedrock interface wells with a screened interval extending from 5 ft below bedrock to 5 ft above the bedrock, resulting in total depths of 20.5 ft bgs, 20.5 bgs and 19.0 ft bgs, respectively. Monitoring wells MW-8, MW-9, MW-10, MW-11, MW-12 and MW-13 are strictly overburden groundwater monitoring wells with depths of 13.39 ft bgs, 12.85 ft. bgs, 14.4 ft bgs, 14.3 ft bgs, 14.4 ft bgs and 14.5 ft bgs respectively.

2.3 Monitoring Well EW-1 Pump Test Results

On April 11, 2006, a pump test of monitoring well MW-31 was completed to evaluate the radius of influence that could be achieved at various pumping rates. Based on the results of this pump test it appeared that the two-inch monitoring well MW-31 has a localized radius of influence (less than 30 ft) on the overburden groundwater. However, monitoring well MW-31 was observed to have a larger radius of influence in regard to the overburden/bedrock groundwater (greater than 75 ft). Although the pump test data did not indicate a 75-foot radius of influence in the overburden zone, the findings of the Remedial Investigation (RI) dated July 1999 (revised December 2000) indicate that a connection between the overburden/bedrock and overburden groundwater exists. As such, with time it is anticipated that comparable radii of influences will be achieved in the overburden and overburden/bedrock zones. Furthermore, it is assumed that the fractured bedrock (the maximum depth of extraction wells) will create a uniform capture zone typical of overburden hydrogeology rather than a capture zone typical of competent bedrock.

2.4 Groundwater Extraction Well Field

Based on the data presented herein and considering the area of required treatment, it is anticipated that operating four two-inch diameter overburden/bedrock interface groundwater extraction wells continuously at a rate to create a minimum drawdown of five feet (i.e., approximately 0.4 gallons per minute per well) will effectively capture, contain and remove the COCs within the area delineated for groundwater extraction and treatment.

In addition to converting monitoring well EW-1 to an extraction well, three additional overburden/bedrock interface groundwater extraction wells will be installed in the approximate locations presented on Figure 2 as follows:

- Extraction well EW-2 will be positioned adjacent to existing overburden groundwater monitoring well MW-8 (historically the well containing the greatest dissolved chromium concentrations).

- Extraction Well EW-3 will be positioned in a hallway within the southern end of the groundwater extraction system treatment area.

- Extraction well EW-4 will be positioned at the leading edge of the COC groundwater plume located adjacent to the northeast exterior corner of the building in proximity to MW-21 to provide hydraulic control and prevent possible off-site COC migration. Extraction well EW-4 will be approximately 38 feet deep with a screened interval between 5 feet above the bedrock interface to approximately 38 feet below the ground surface.

2.5 Basement Sump Water Extraction

As stated in the March 2005 ROD for the Site, groundwater will continue to be extracted from the basement sump system. The extracted sump groundwater will be treated on-site in conjunction with the groundwater removed from the extraction wells described above.

As stated in the RI, the basement sump appears to be influencing the groundwater elevations in select overburden groundwater monitoring wells; however, the extent of vertical influence in unknown. Historical data indicates that groundwater is extracted from the basement sumps at an average rate of approximately 0.25 gallons per minute and has a radius of influence, delineated using a potentiometric contour map presented in the RI, of approximately 60 ft.

In addition to continuing to extract groundwater from the basement sump system, an airtight, non-permeable, cover will be placed over each sump pit to aid in the prevention of sub-slab vapors impacting the indoor air quality. Ventilation of the sumps will be completed in conjunction with the ventilation of the groundwater treatment system mixing and lift station tanks. A ventilation fan will be used to vent each of these sumps and tanks, drawing air out of (and thus maintaining a continuous flow of room air into) each unit. This ventilation system is designed to minimize the potential for vapor emissions to impact the indoor air at these locations. The specifications and components comprising the permanent vapor mitigation plan for the basement are defined and presented in the Design Plan (see Section 4).

2.6 Monitoring Well Field

The groundwater monitoring well field used to aid in evaluating the effectiveness of the groundwater extraction system will consist of monitoring wells located within and/or in close proximity to the area delineated for groundwater extraction and treatment. In addition to existing groundwater monitoring wells MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-17 and MW-21, three additional two-inch diameter bedrock interface groundwater monitoring wells will be installed as shown in Figure 2, and are described as follows:

- Groundwater monitoring well MW-32 will be positioned north of the groundwater extraction system treatment area adjacent to the building's north exterior wall.

- Groundwater monitoring well MW-33 will be positioned on the southeast edge of the groundwater extraction system treatment area.

- Groundwater monitoring well MW-34 will be positioned on the western edge of the extraction system treatment area.

In addition, deep groundwater monitoring well MW-22 and overburden groundwater monitoring well MW-5 will be decommissioned. Groundwater monitoring well MW-22 is approximately 80 feet deep with a cased interval from the ground surface to approximately 50 ft bgs. As such, groundwater monitoring well MW-22 cannot be converted to a groundwater monitoring well with screened interval extending from 5 feet below bedrock to 5 ft above bedrock (i.e., the zone targeted by the pump and treat remedial scheme) and therefore will be decommissioned. Groundwater monitoring MW-5 is approximately 20 feet deep and has been irreparably damaged since installation. It is anticipated that the decommissioning procedure will include backfilling the entire well volume with tremie grout beginning at the bottom of the well (i.e., approximately 80 ft bgs and 20 ft bgs for MW-22 and MW-5, respectively) and extending to the ground surface.

2.7 Extraction/Monitoring Well Installation

The precise locations of extraction wells EW-2, EW-3, and EW-4 and monitoring wells MW-32, MW-33 and MW-34 will be determined in the field, and will be dependent upon access limitations, buried utilities, etc. As stated in the March 2005 ROD, and further defined in the January 2005 revised FS, boreholes will be advanced approximately 5 ft beyond auger refusal (i.e., into fractured bedrock). With the exception of extraction well EW-4, it is anticipated that the extraction/monitoring wells will be advanced approximately 15 to 20 ft bgs. It is anticipated extraction well EW-4 will be advanced approximately 38 ft. bgs. Based on previous studies, the fractured bedrock zone at the Site appears to be the maximum depth to which the chromium contamination has migrated. Furthermore, it is assumed that this zone will be capable of producing greater quantities of groundwater than wells installed solely in the overburden, thereby creating a larger capture zone.

DAY will retain the services of a subcontractor to provide a rotary drill-rig, crew and materials to install the extraction wells for the groundwater extraction system. The wells will initially be drilled using hollow stem augers (HSA) to advance the borings, and overburden samples will be collected ahead of the augers using a split spoon sampling device driven with a 140-pound hammer free-falling 30 inches in general conformance with ASTM 1586. The borings will be sampled to auger refusal, which is expected to occur approximately 10 ft to 15 ft bgs. Subsequently, the boring will be advanced an additional approximate five feet into bedrock using H-coring equipment to achieve a final depth ranging approximately 15 ft to 20 ft bgs. [Note: Extraction well EW-4 will be advanced an additional 23-28 feet into bedrock using H-coring equipment to achieve a final depth of approximately 38 ft. bgs.]

Extraction/monitoring wells will be 2-inch diameter PVC, with 10 ft of flush-coupled No. 20 slot screen beginning at the bottom of the overburden/bedrock interface borehole with PVC risers extending to ground surface. The well screens will be surrounded by a sand pack extending 2-feet above the top of the screen. A minimum 2-foot thick bentonite seal will follow the sand pack with cement/grout above the bentonite seal extending to approximately one-foot below grade. Each extraction well will be provided with a PVC cap and lock and will be completed with flush mounted protective curb boxes sealed in-place with concrete. It is anticipated that the well pumps will be controllerless, air-operated pumps, thus eliminating the need for controllers, valves, and many operational adjustments. Drawings and diagrams showing the typical extraction well and monitoring well equipment and construction methods to be used on this project will be included with the Design Plan. The expected longer screened interval for extraction well EW-4 will be addressed with a separate well construction drawing or a note on the typical extraction well construction drawing that is to be provided in the Design Plan for the other extraction wells.

Information recorded during the advancement of extraction wells will include:

- Date, boring identification, and project identification.
- Name of individual developing the log.
- Name of drilling company.
- Drill make and model.
- Identification of any alternative drilling methods used.
- Depths recorded in feet and fractions thereof (tenths of feet) referenced to ground surface.
- The length of the sample interval and percentage of sample recovered.
- The depth of the first encountered water table, along with the method of determination, referenced to the ground surface.
- Drilling and borehole characteristics.
- Sequential stratigraphic boundaries.
- Photoionization Detector (PID) screening results of ambient headspace air above selected samples.
- Amount of water (if any) lost to borehole during coring.

A temporary decontamination pad will be constructed to decontaminate “in-hole” drilling equipment between wells by steam cleaning. The decontamination liquids will be pumped into NYSDOT-approved 55-gallon drums that are labeled and staged on-site in accordance with applicable regulations for future treatment/disposal. In addition, the soils, drilling liquids, and decontamination pad will also be containerized in NYSDOT-approved 55-gallon drums that are labeled and staged on site in accordance with applicable regulations for future treatment/disposal by 95 Mt. Read Blvd., LLC.

2.8 Extraction/Monitoring Well Development

Approximately one week after groundwater extraction well installation, overburden and/or shallow bedrock groundwater monitoring wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-

33, MW-34 and groundwater extraction wells EW-1, EW-2, EW-3 and EW-4 will be developed to remove sediment that may have accumulated during extraction well installation or over time since monitoring well installation. Well development will be performed utilizing either dedicated polyethylene bailers with dedicated cord or a centrifugal pump and dedicated tubing. No fluids will be added to the extraction/monitoring wells during development, and the equipment will be decontaminated prior to and following development of each well. The well development procedures will be as follows:

- Obtain pre-development static water level readings.
- Calculate water/sediment volume in well.
- Select development method and set up equipment depending on method used.
- Begin pumping or bailing.
- Collect initial field water quality measurements (e.g., conductance, temperature, turbidity, and PID readings). Record water quantities removed and pumping rates utilized.
- Collect field water quality measurements every five to ten gallons of water removed.
- Stop development when water quality criteria are met.
- Obtain post-development water level readings.
- Document development procedures, measurements, quantities, etc.

Well development will continue until the following criteria is achieved:

- pH, conductance, and temperature are relatively stable for three consecutive measurements, and/or
- A minimum of five well volumes have been removed.

The development water will be containerized, labeled and staged on-site in accordance with applicable regulations for treatment by 95 Mt. Read Blvd., LLC. Dependent on the volume of water introduced during the well installation, development will continue until a comparable volume of water is removed from the well. Alternatively, if the amount of water is too great, DAY may wait three to four weeks for the water to dissipate into the aquifer prior to performing well development.

2.9 Hydraulic Containment Monitoring and System Evaluation

The objective of the groundwater extraction system is to capture a portion of the dissolved contaminant plume, as identified on Figure 2. The capture zone of the groundwater extraction system will be monitored by measuring hydraulic heads and contaminant distribution in the groundwater monitoring wells within and in proximity to the groundwater extraction treatment area. Initially, the groundwater extraction system will be monitored and evaluated using the start up monitoring program described in section 2.9.5. Once the groundwater extraction system is operating consistently and achieving contaminant containment criteria, the long-term monitoring program described in section 2.9.6 will be further developed and implemented.

2.9.1 Extraction System Radius of Influence

Static groundwater measurements will be collected from each monitoring and extraction well included in the background, start-up and long term monitoring programs using an electronic groundwater level measuring device. The first set of static groundwater level measurements will be obtained as part of the background monitoring (refer to section 2.9.4). Subsequent groundwater level measurements will be obtained during extraction system start up monitoring and long-term monitoring (refer to sections 2.9.5 and 2.9.6). A comparison of each monitoring/extraction well's initial static water level (i.e., background monitoring) to the measured static water level after system start-up will assist in determining the extent to which wells are being influenced by the groundwater extraction system, and this data will aid in determining the extraction systems radius of influence. As part of the long-term monitoring program, routine monitoring of hydraulic heads will be performed to evaluate the systems effectiveness during seasonal groundwater condition fluctuations .

2.9.2 Groundwater Potentiometric Map

The top of extraction/monitoring wells casings EW-1, EW-2, EW-3, EW-4, MW-30, MW-31, MW-32, MW-33 and MW-34, as well as the floor elevation in proximity to each well location, will be surveyed relative to the assumed datum already established and used to survey the elevation of existing wells at the Site. Subsequent to the monitoring well elevation survey and collection of static water levels (described in section 2.9.1), groundwater elevations will be calculated, and groundwater potentiometric maps will be developed illustrating the approximate groundwater elevations and groundwater flow directions prior and subsequent to groundwater extraction system start-up.

2.9.3 Analytical Laboratory Testing

Prior to collecting representative groundwater samples for laboratory analysis, the depth to static water within each monitoring well will be measured, and a Heron Oil/Water Interface Meter (or equivalent) will be used to assess the presence of dense non-aqueous phase liquids (DNAPL) within each well to be sampled.

Each well will be purged prior to sampling by removing a minimum of three well casing volumes of water or to dryness. In general, the wells will be allowed to recharge to a minimum of 90% of their static water level prior to sampling; however, regardless of recharge rate, the wells will be sampled within 24 hours of purging. Each well will be sampled using new, dedicated disposable bailers with dedicated cord. In addition to collecting analytical laboratory samples, additional samples will be obtained at each well to evaluate field parameters. Field parameters will include pH, specific conductivity, temperature and turbidity. The field parameters will be presented on monitoring well sampling logs.

The analytical laboratory groundwater samples will be placed in pre-cleaned laboratory containers, labeled and preserved with ice. The samples will be transported under chain-of custody control to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory, and will be tested for the following parameters:

- United States Environmental Protection Agency (USEPA) target compound list (TCL) and NYSDEC Spill Technology and Remediation Series (STARS)-list volatile organic compounds (VOCs), using USEPA Method 8260; and

- total and hexavalent chromium using ASP Method CLP-M

2.9.4 Background Monitoring

Static water levels will be measured weekly beginning 3 weeks before start-up of the groundwater extraction and treatment system. Static water levels will be measured using an electronic groundwater level monitoring devise. Static water levels will be measured in the following wells:

Monitoring wells: MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33 and MW-34
Extraction wells: EW-1, EW-2, EW-3 and EW-4

These measurements will establish background static water levels to which post system start up static water level measurements will be compared.

During the initial background monitoring event the total depth of the wells will be measured and recorded in conjunction with collecting static water levels. This data will aid in determining the amount of sediment accumulated since well development described in section 2.8. If excessive amounts of sediment are observed, the sediments will be removed and the monitoring/extraction well will be inspected for significant sediment accumulation during subsequent static water level monitoring events. If an extraction/monitoring well routinely accumulates sediments at rates that appear to be inhibiting the wells operation the need to install an additional well in proximity to the sediment impacted well will be evaluated.

During the final background monitoring event, groundwater samples will be collected for subsequent analytical testing from the following monitoring wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33, MW-34. Groundwater samples will be collected and analyzed for VOCs and chromium using the procedures outlined in Section 2.9.3. The background monitoring program may be modified following consultation with NYSDEC.

2.9.5 Start-Up Monitoring

During the initial week of groundwater extraction system operation, static water levels in monitoring/extraction wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33, MW-34, EW-1, EW-2, EW-3 and EW-4 will be measured and recorded on a daily basis. The water level elevation data to be collected during this 3-month to 6-month Start-Up Monitoring period will be used to assess the preliminary performance of the groundwater extraction system and to identify conditions that might need to be addressed to ensure the effectiveness of the system. For example, the groundwater removal rate for an extraction well would be decreased if water level measurements indicate that a groundwater extraction well is dry or that the elevation of the water table in an extraction well is more than 10 feet deeper than the average previously measured background static water level in that well. Conversely, the groundwater removal rate for an extraction well would be increased if water table elevation data indicate that the elevation of the water table in an extraction well is less than 5 feet deeper than the average background static water level.

In conjunction with monitoring static water levels and associated groundwater removal rates, all hardware associated with groundwater extraction wells (i.e., piping, valves, gauges, etc) will be visually inspected for proper operation, stress indicators (i.e., excessive bending, material discoloration, etc) and leaking. If equipment malfunction is evident, the affected component will be replaced by a similar compatible component with greater capability/capacity. By evaluating other extraction wells components, it will be determined if the equipment malfunction is specific to a groundwater extraction well or universal to the groundwater extraction system. If the component malfunction is universal to the groundwater extraction system all components will be replaced independent of individual component status. If the component malfunction is specific to an extraction well, the failing component will be replaced in that well only.

Subsequent to the initial week of system start-up, if the groundwater extraction system appears to be approaching steady state and significant alterations and/or component failures were not encountered, system monitoring (i.e., static water levels, equipment inspection well depth, etc.) will be completed twice a week for approximately 3 weeks.

Subsequent to the initial month of system start-up the perimeter capture zone groundwater monitoring wells including MW-8, MW-11, MW-31, MW-32, MW-33 and MW-34 will be incorporated into the start-up monitoring program. In addition to collecting field parameters, groundwater samples will be collected for subsequent analytical testing from monitoring wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33 and MW-34. In the event field observations/measurements indicate drawdown in the perimeter capture zone groundwater monitoring wells is less than 0.5 foot, the groundwater removal rate in the extraction wells in proximity to

the monitoring well will be increased if aquifer conditions permit (i.e., groundwater extraction wells are not dry and the extraction well drawdown is not greater than 10 feet). This start-up system optimization procedure will continue for an additional 2 to 5 months. Start-up monitoring will be discontinued once modifications to groundwater removal rates, if any, appear to be due to natural aquifer fluctuations that are independent of the groundwater extraction system (e.g., recharge events). Prior to concluding the start-up monitoring program, groundwater samples will be collected for subsequent analytical testing from monitoring wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33 and MW-34. The start-up monitoring program may be modified in consultation with NYSDEC following review of the initial system operational data.

2.9.6 Long-Term Monitoring

Once the groundwater extraction system has approached steady state and significant system modifications are infrequent, a long-term monitoring program will be implemented. The objectives of the long-term monitoring program are as follows:

- To evaluate the long-term effectiveness of the groundwater extraction system using the water level and groundwater quality data to be collected during the long-term monitoring program.
- To identify and confirm proper operation and maintenance requirements.
- To identify methods that could be used to optimize system performance. These system optimization methods could include additional extraction wells, changes to the groundwater extraction system equipment or other changes to the operation of the system.

Initially the long-term monitoring program will be conducted on a monthly basis. As part of the first long-term monitoring event, samples will be collected for subsequent analytical testing from monitoring wells MW-1, MW-4, MW-8, MW-11, MW-12, MW-13, MW-14, MW-15, MW-18, MW-21, MW-30, MW-31, MW-32, MW-33 and MW-34 using the procedures outlined in Section 2.9.3. It is anticipated that groundwater samples will not be collected from monitoring wells MW-1, MW-4, MW-15 and MW-18 during each long term monitoring sampling event. Alternatively, these wells will be sampled on a less frequent basis (i.e., biannually or annually). Once the groundwater extraction system demonstrates that it is consistently achieving the objectives of the long-term monitoring program, subsequent long-term monitoring events will be conducted quarterly. In addition to continued extraction well component inspections, the long-term monitoring will evaluate and monitor the systems effectiveness, thereby allowing system optimization to continue. Specifically, if drawdown in the capture zone perimeter wells is less than 0.5 feet of the previously established background static water level, the need for additional wells, equipment changes and or system modifications will be evaluated. System modifications would also be evaluated if

contaminant concentrations at Site perimeter wells indicate possible off-site migration of contaminants at levels of regulatory concern. This long-term monitoring plan will form an integral part of the Site Management Plan (SMP), and modifications to the long-term monitoring plan will be made as needed based on conditions encountered during the system start-up monitoring period described in Section 2.9.5.

2.10 Effectiveness Monitoring Concepts

The effectiveness of the groundwater extraction systems will be evaluated by comparing the pre-groundwater extraction system measurements to the post-groundwater extraction system measurements. Specifically, pre-extraction system hydraulic heads, groundwater flow direction and contaminant distribution will be compared to the post-extraction system hydraulic heads, groundwater flow direction and contaminant distribution. [Note: Due to the adsorbed fraction of contaminants on the soil and the possible presence of DNAPL at the Site, the contaminant concentrations may not be observed to initially decrease with time.] Based on previous studies, it is anticipated that: (i) the systems radius of influence will be beyond the extent of the groundwater extraction treatment area presented on Figure 2; (ii) the potentiometric maps will indicate that groundwater is flowing radially towards the extraction well field; and (iii) the contaminant concentrations will be observed to decrease with time. If the extraction system does not appear to be capturing the entire target treatment area, adjustments may be made to increase the systems effectiveness, including system modifications, equipment changes and/or the addition of more extraction wells, if necessary.

Independent of the comparison results, following one year of data collection, DAY will review the data with the NYSDEC and address concerns regarding the extraction systems capture zone.

3.0 GROUNDWATER TREATMENT

This section presents information relating to the basis for design of the groundwater treatment system, evaluation of technologies and processes considered for use as a part of the groundwater treatment system, and preliminary design information relating to the selected proposed groundwater treatment system technologies and processes.

3.1 Influent Groundwater Characteristics and Loadings

Based upon pump and hydraulic conductivity test results provided in the *Extraction Well Installation and Pilot Study Report*, the total groundwater flow rate to be generated by the four proposed groundwater extraction wells and the basement sump is estimated at approximately 3.5 gallons per minute (GPM). To accommodate potential variability in flowrates between wells, the groundwater treatment system processes and equipment will be designed with a minimum initial treatment capacity of 5 GPM. Additionally, to accommodate the potential future need for additional groundwater extraction wells, the groundwater treatment system processes and equipment shall be readily upgradeable to handle continuous flowrates of up to 10 GPM.

As discussed in Section 2.1, the contaminants of concern are chromium and VOC's (primarily PCE and TCE). Based upon review of analytical data for groundwater samples collected from the proposed groundwater capture area, it is anticipated that the influent groundwater to the groundwater treatment system will initially average 20 mg/l chromium and 45 mg/l total VOC's. These concentrations are expected to slowly decline over time, with the chromium concentration averaging only 10 mg/l over the full (estimated five-year) groundwater treatment system operating period.

3.2 Groundwater Discharge

This site currently has an existing sewer discharge permit from Monroe County for discharge of the basement sump water into the sanitary sewer system. Monroe County has indicated that this permit may be modified to also include discharges from the groundwater extraction wells. In accordance with Monroe County's sewer use ordinance for the primary parameters of interest, the following discharge limits will apply:

Total Chromium:	3.0 mg/l
Total VOC's:	2.13 mg/l
pH:	5.5 – 10.0

Groundwater concentrations of other Monroe County regulated parameters are expected to be well within applicable sewer discharge limits.

3.3 Evaluation of Treatment Technologies

As the groundwater characteristics do not comply with the applicable sewer discharge limitations, a groundwater pretreatment system is required to reduce chromium and VOC concentrations down to acceptable discharge levels. Evaluation and selection of the groundwater treatment process is described below.

3.3.1 Technical Evaluation

The following four groundwater treatment technologies were identified as technically proven or potentially appropriate for use at this site:

Conventional Precipitation: This is the most readily established and commonly used technology for chromium removal, and involves chemical reduction of the hexavalent chromium into its relatively insoluble trivalent (chromium hydroxide) form. The insoluble chromium is then removed from the groundwater using chemical coagulants and polymers to settle out the metals solids in a clarifier, and the settled solids are then filtered through a filter press for dewatering. The dewatered solids are hauled off-site for disposal. Skid-mounted systems are commercially available with all the necessary equipment and controls for this process. Following removal of the metals, the groundwater would then be treated through an air stripper and an aqueous carbon filter polish to remove VOC's down to permitted discharge levels. For purposes of this analysis, it is assumed that air pollution control would not be required on the stripper air discharge.

Conventional Precipitation with Bag Filtration: This approach is identical to that described above, with the exception that bag filters are used to remove the insoluble trivalent chromium in lieu of the chemical coagulation, clarification and press filtration processes. The bag filtration approach is seldom used for removal of metal hydroxides due to the characteristics of the metal solids, which quickly blind standard bag filters; however, in low-flow, low-loading applications, it is significantly cheaper to remove the solids in this manner, and this method has been successfully used by DAY for removal of metals in other low-flow applications. Once spent, the filter bags are hauled off-site for disposal. Similar to the conventional precipitation process, following removal of the metals, the groundwater would then be treated through an air stripper and an aqueous carbon filter polish to remove VOC's down to permitted discharge levels. For purposes of this analysis, it is assumed that air pollution control would not be required on the stripper air discharge.

Ion Exchange: The ion exchange process utilizes columns filled with anionic resin beads to remove the negatively charged hexavalent chromium molecules. Once the resins have reached their anion absorption capacity, the columns are changed out, with the spent columns being sent off-site for regeneration. The use of the ion exchange process for chromium removal would also necessitate the use of a pH adjustment stage (the ion exchange process does alter the pH of the groundwater),

as well as filtration for removal of small amounts of trivalent chromium that would not be removed by the anionic resins. Treatment through an air stripper and an aqueous carbon filter polish would be necessary to remove VOC's down to permitted discharge levels, and would be performed prior to flow through the ion exchange columns to keep VOC's from fouling the resins. For purposes of this analysis, it is assumed that air pollution control would not be required on the stripper air discharge.

Although readily established with a successful history of use for metals removal from groundwater, ion exchange does present some complications when used in groundwater possessing high dissolved solids concentrations, as the anionic resins are not selective in their attraction to large/strong anions, and relatively high concentrations of sulfates and other large anions will significantly reduce the serviceable life of the resin columns. Cationic resins do not pose the same difficulties, as there are far fewer competing cations of the size and strength of chromium; however, ion exchange is not typically appropriate for use with reduced trivalent (cationic) chromium because of the low solubility of the trivalent chromium (precipitates relatively quickly).

Terrenew Absorption: A new metals removal process patented at Cornell University utilizes an organic absorption media ("MetalMaster") processed from tree barks to absorb metals. This material possesses ionically charged receptor sites, and actually adsorbs metals onto the media. Terrenew, LLC has the marketing rights to this product, and provided laboratory-scale information that indicated this could potentially be cost-effective for removal of chromium from groundwater. The chromium would need to be chemically reduced and pH-adjusted prior to flow through the MetalMaster media. An advantage of the Terrenew absorption process is that, unlike conventional ion exchange, it can operate on the reduced (cationic) trivalent chromium, with the ability to handle a small degree of precipitation without plugging and fouling the media.

VOC's would then be removed utilizing carbon filters (Terrenew's "Carphene" product is a high-absorbance carbon filter media marketed for use in conjunction with the MetalMaster media). Spent MetalMaster and Carphene drums would be rotated out of service when spent, and exchanged by Terrenew for new filters as needed. While carbon is readily established for use in removal of VOC's, the MetalMaster media has not been utilized to date for any full-scale, commercial applications, and thus required further treatability testing to confirm applicability for use at this site.

3.3.2 Treatability Testing

The precipitation and ion exchange processes have a well-established and successful history of use for metals removal from groundwater treatment systems. As a new product, MetalMaster does not have an extensive history of successful commercial use for groundwater treatment, and thus treatability testing was completed on this media. Several gallons of wastewater collected from the site were chemically treated to reduce the chromium. Following pH-adjustment to a

pH of 6.7 to 7.0, this water was processed through a test column of the MetalMaster media. Given a 20-to-30 minute detention time, the influent concentration of 35 to 40 mg/l chromium was consistently reduced to an effluent concentration of less than 1 mg/l chromium in this test.

The MetalMaster media exhibited a high absorbance capacity for the chromium, with the media absorbing approximately 3% to 4% of its own dry weight in chromium prior to breakthrough occurring. This treatability test was performed using a single column, and thus even higher absorbance capacities may be observed in full-scale operation with use of multiple filters in series.

Upon completion of the treatability testing, the spent MetalMaster media was analyzed for waste disposal characterization. Initial test results indicate that the spent MetalMaster solids are non-hazardous, as the product passed a toxicity characteristic leaching procedure, or TCLP, test.

3.3.3 Economic Evaluation

Upon successful completion of the treatability testing, it was concluded that all four treatment options identified in Section 3.3.1 are technically viable options, and the cost-effectiveness of each option was evaluated through the development of cost estimates for systems procurement, installation, and operation. Costs estimated in this manner are attached as Appendix A, and are summarized as follows:

Treatment Process	Capital Cost	Annual O&M Cost	Total 5-Yr Cost
Conventional Precipitation	$185,000	$60,000	$485,000
Conventional Precipitation with Bag Filtration	$135,000	$48,000	$375,000
Ion Exchange	$105,000	$85,000	$530,000
Terrenew Absorption	$100,000	$44,000	$320,000

These estimates represent costs associated with groundwater treatment only, and do not include costs for groundwater extraction and conveyance (i.e. monitoring wells, well pumps, conveyance piping, etc.) Capital costs include estimated costs for materials, equipment, installation, engineering, start-up and contingency. Annual costs include estimated costs for annual operations and maintenance, including chemicals and other consumable materials, waste disposal, electricity, labor, parts replacement, and contingency. The total 5-year cost represents the total cost of the system over a five-year operating period (the anticipated timeframe required prior to systems shutdown and initiation of the in-situ treatment phase of the project).

3.3.4 Process Selection

Based upon the technical and economic evaluations, the Terrenew absorption process was selected as the most cost-effective, technically viable treatment option. Two distinct advantages of the Terrenew process are the modularity of the system, and the availability of a local exchange service.

The Terrenew systems are modular in that absorbance of both chromium and VOC's will be completed in portable, drummed filter units. As such, increasing systems treatment capacity is as simple as adding more filter drums to the treatment process. This helps keep the overall systems cost down, as it's not necessary to procure and install a system that is larger than needed simply to accommodate future contingencies.

Local exchange service is a major benefit in that the filter drums can be serviced and refilled locally in western New York, minimizing transportation costs and delays, as well as minimizing the amount of systems maintenance that must be performed onsite.

3.4 Conceptual Design

A preliminary process and instrumentation schematic has been developed for the proposed groundwater treatment system (see Figure 3) based upon the Terrenew absorption processes. A description of the unit process and design basis for each treatment stage is provided below.

3.4.1 Chromium Reduction

Groundwater from the monitoring wells and basement sump will be pumped directly to the chromium reduction reactor. The vast majority of the chromium present in the groundwater is in the soluble, hexavalent form. Hexavalent chromium (Cr^{+6}) forms an anionic chromate complex, and must be reduced to a cationic trivalent (Cr^{+3}) state for removal. This will be accomplished in the chromium reduction reactor by reaction of the hexavalent chromium with a reducing agent, sodium bisulfite, and sulfuric acid to promote the following reaction:

$$3NaHSO_3 + 2H_2CrO_4 + 3\ H_2SO_4 \longrightarrow Cr_2(SO_4)_3 + 5H_2O + 3NaHSO_4$$

A pH controller will be used to control the addition of the sulfuric acid (H_2SO_4) to maintain the chromium reduction reactor within the optimum chromium reduction range of pH 2.0 to 3.0. An oxidation-reduction potential (ORP) controller will be used to feed the sodium bisulfite to maintain a reducing environment. The reactor tank will be sized to provide a minimum hydraulic retention time of ten minutes for reaction completion, and this chemical reduction process is expected to produce an effluent with less than 0.1 mg/l hexavalent chromium.

3.4.2 Equalization Lift Station

The equalization lift station is proposed to allow equalization of the groundwaters from the various locations, thus providing more uniform groundwater characteristics (i.e. chromium and VOC concentrations) for subsequent treatment stages. An air diaphragm pump (P-1) will be used to provide maximum flexibility with respect to system feed flow rates. A needle valve and pressure regulator on the air supply will allow fine tuning the pump P-1 flow rate to closely match that of the influent groundwater flowrate, which in turn will maximize the hydraulic retention times and removal efficiencies through the remaining treatment stages. The air diaphragm pump also allows variability in pressure to overcome potential plugging of the filters over time, and as a positive displacement pump, will provide a constant, non-varying rate of flow regardless of any minor pressure buildup in the filters. A high level float switch will be used as a high-level alarm, and will be interlocked with the monitoring well feed pumps and basement sump pump to prevent an overflow of the lift station. A pulsation dampener will be installed on the outlet of pump P-1 to minimize the flow pulses, and provide a more uniform flow through the subsequent treatment stages.

3.4.3 pH Adjustment

As the groundwater in the equalization lift station will be in the range of pH 2.0 to 3.0, pH adjustment is necessary to raise the pH to the optimum range of pH 6.7 to 7.0 for absorbance of the chromium in the MetalMaster media filters. Trivalent chromium is also known to precipitate and form insoluble chromium hydroxide at this pH range, thus it is critical to adjust the pH immediately prior to flow through the MetalMaster media filters. This will allow most of the chromium to be absorbed before the precipitate can form. Inline pH adjustment will be performed using an inline static mixer in conjunction with a pH controller and sodium hydroxide metering pump to adjust the pH immediately prior to flow through the MetalMaster filters.

3.4.4 MetalMaster Chromium Removal

The organic MetalMaster media will predominantly provide removal of the cationic trivalent chromium through absorbance onto the negatively charged receptor sites on the media, although some basic filtration will also be provided for any chromium hydroxide precipitate that may form before absorbance is completed. A hydraulic detention time of 20 to 30 minutes is required for optimum chromium removal, and this will be provided through the use of two parallel trains of MetalMaster filtration units, with each train containing four filter units operated in series. At an anticipated flowrate of 2.5 GPM or less through each train, each filter unit will provide a minimum estimated hydraulic retention time of 8 minutes, and thus each train of four filter units will provide an estimated hydraulic retention time of 32 minutes or more. Flow control valves and flow meters will be used to provide equal rates of flow to each train of MetalMaster filters.

Pressure drop across the first filter unit in each series will be monitored, and sample ports located between each filter unit will allow monitoring of chromium concentration and chromium breakthrough. Once the first filter in each series is determined to be spent, this filter unit will be taken offline and removed, with each of the successive filter units moved up one place in the series, and a filter unit with new, fresh media will placed at the end of each series for polishing. When operated in parallel, the filter units are estimated to have an average service life of approximately two weeks in this application, although the actual service life will likely be somewhat less than this at systems start-up, and somewhat longer than this toward the end of the anticipated five-year operating period.

Spent filter units will be drained to remove as much water as possible, with the drained fluids being returned to the head of the treatment system for reprocessing. Spent filters will be rotated offsite in batches of four or six filters, with the filter manufacturer providing media changeout and disposal for each.

3.4.5 Lift Station

Effluent from the MetalMaster filters will openly drain into a second lift station tank. The second lift station is required to isolate the subsequent cartridge and carbon filters from the chromium removal stage. As with the first lift station, an air diaphragm pump (P-2) will be used to provide maximum flexibility with respect to system feed flow rates. A needle valve and pressure regulator on the air supply will allow fine tuning the pump P-2 flow rate to closely match that of P-1, which in turn will maximize the hydraulic retention times and removal efficiencies through the remaining treatment stages. The air diaphragm pump also allows variability in pressure to overcome potential plugging of the filters over time, and as a positive displacement pump, will provide a constant, non-varying rate of flow regardless of minor pressure buildup in the filters. A high level float switch will be used as a high-level alarm, and will be interlocked with pump P-1 to prevent an overflow of the lift station. A pulsation dampener will be installed on the outlet of pump P-2 to minimize the flow pulses, and provide a more uniform flow through the subsequent treatment stages.

3.4.6 Cartridge Filtration

The Carphene carbon media is very fine, and thus filtration of the groundwater is required prior to flow through the Carphene media to prevent the Carphene filters from plugging. A minimum of two different size cartridge filters will be used. The first filter, CF1, will be a coarse prefilter (5-10 micron), and the second, CF2, will be a fine filter (0.5-1.0 micron). Dependent upon the service life provided by these filters, a second, parallel bank of filters may be warranted, but this will likely not be determined until time of systems start-up and testing.

3.4.7 Carphene Carbon VOC Removal

The final treatment stage will be a carbon filtration stage for removal of VOC's. Carphene is a patented high surface area, high reactivity processed carbon. It is a powderized form of carbon that is impregnated on sheets, and the sheets loaded into filter units for use in flow-through systems. A hydraulic detention time of 5 minutes or less is typically required for VOC removal through carbon, although higher detention times and operation of the filters in series typically provide enhanced removals. For this application, two parallel trains of Carphene filtration units will be used, with each train containing three filter units operated in series for increased capacity and effectiveness. At an anticipated flowrate of 2.5 GPM or less through each train, each filter unit will provide a minimum estimated hydraulic retention time of 10 minutes or more, and thus each train of three filter units will provide an estimated hydraulic retention time of 30 minutes or more. Flow control valves and flow meters will be used to provide equal rates of flow to each train of Carphene filters.

Pressure drop across the first filter unit in each series will be monitored, and sample ports located between each filter unit will allow monitoring of VOC concentration and VOC breakthrough. Once the first filter in each series is determined to be spent, this filter unit will be taken offline and removed, with each of the successive filter units moved up one place in the series, and a filter unit with new, fresh media will placed at the end of each series for polishing.

Spent filter units will be drained to remove as much water as possible, with the drained fluids being returned to the head of the treatment system for reprocessing. Spent filters will be rotated offsite in batches of two or four filters, with the filter manufacturer providing media changeout and disposal for each. Carphene has a manufacturer's-reported TCE and PCE absorbance capacity of 40 times its own weight. When operated in parallel, the manufacturer reports an anticipated service life of three to four months in this application.

3.5 Operations and Maintenance

A detailed Groundwater Treatment Operations and Maintenance (O&M) manual will be prepared as a part of the Site Management Plan upon completion of the groundwater treatment system installation and start-up. Although subject to change based upon future site conditions and observations, the anticipated start-up and long-term monitoring procedures for this system are as detailed below.

3.5.1 Start-Up Monitoring

During the initial start-up operating period, the groundwater treatment system will be checked daily. Treatment system hardware, equipment and controls will be visually checked for integrity and leaks, the ventilation system will be checked for positive airflow, and the following treatment system parameters will be logged:

- Chromium reduction reactor pH and ORP
- MetalMaster inlet pH
- Flow rates into each MetalMaster train
- Pressure at inlet and outlet of first MetalMaster drum on each train
- Pressure drop across each cartridge filter
- Flow rates into each Carphene carbon train
- Pressure at inlet and outlet of first Carphene drum on each train
- pH at effluent discharge (to be measured with handheld pH meter)
- Totalized flow from totalizer at end of treatment system
- Cycle counter readings from each of the well pump cycle counters (for calculation of daily flows from each well)

The groundwater treatment system will be monitored in this manner on a daily basis by DAY personnel for a minimum period of one week, or longer until the stability of the system has been established. Subsequent to the initial week of system start-up, if the groundwater treatment system appears to be functioning smoothly with little or no operator involvement, the daily operation and monitoring of the groundwater treatment system will be turned over to local maintenance personnel, with DAY checking in to review systems logs and test filter performance at a frequency of no less than once per week. This will continue for a minimum period of two months, or until such time as a serviceable life can be determined for the MetalMaster and Carphene media filters.

The serviceable life for each of the filter medias will be determined through review of pressure drop data and by onsite and/or laboratory analyses of water samples collected from the filter trains. Water sampling locations and frequencies will be at the discretion of the DAY licensed engineer overseeing the treatment system operations as needed for this purpose, but at a minimum will include:

- Chromium in effluent from first MetalMaster filter in each treatment train: to be sampled and analyzed minimum of three times each over first week of operation, and minimum of once per week over first month of operation;
- VOC's in effluent from first Carphene filter in each treatment train: to be sampled and analyzed minimum of once during first week of operation, and minimum of once more during remainder of first month of operation; and
- Chromium and VOC's in final effluent being discharged to sewer: to be sampled and analyzed minimum of once during first week of operation, and minimum of once more during remainder of first month of operation.

The presence of multiple filter units in each train will allow each filter at the start of the train to be used beyond initial breakthrough and until each is fully spent, while the cleaner downstream filters will polish the water and ensure that discharge limits are continuously met. DAY will supervise the initial filter change-outs of the MetalMaster and Carphene media; however, once the typical

filter service life and parameters have been established, it is expected that this service will be performed by local maintenance personnel. Local personnel will not be utilized for service and/or maintenance of the chemical treatment systems (chromium reduction and pH adjustment systems). Only DAY's trained operators will perform service upon the chemical treatment systems, and DAY's operators will review the associated hazards with local personnel prior to turnover of the daily monitoring and non-hazardous duties to local personnel.

3.5.2 Long-Term Monitoring

Long term monitoring will be done for the same parameters as identified for the short-term monitoring; however, this list and the frequencies of monitoring may be modified pending findings of the start-up operating period. Day-to-day operations and monitoring will be performed by local maintenance personnel, with DAY checking in to review the logs and operations at a minimum frequency of once per month, or more frequently as necessary to service the chemical treatment and handling systems. DAY's monthly groundwater treatment systems and operations checks will be scheduled to coincide with the long-term monitoring requirements of the groundwater extraction system.

4.0 SUBMITTALS

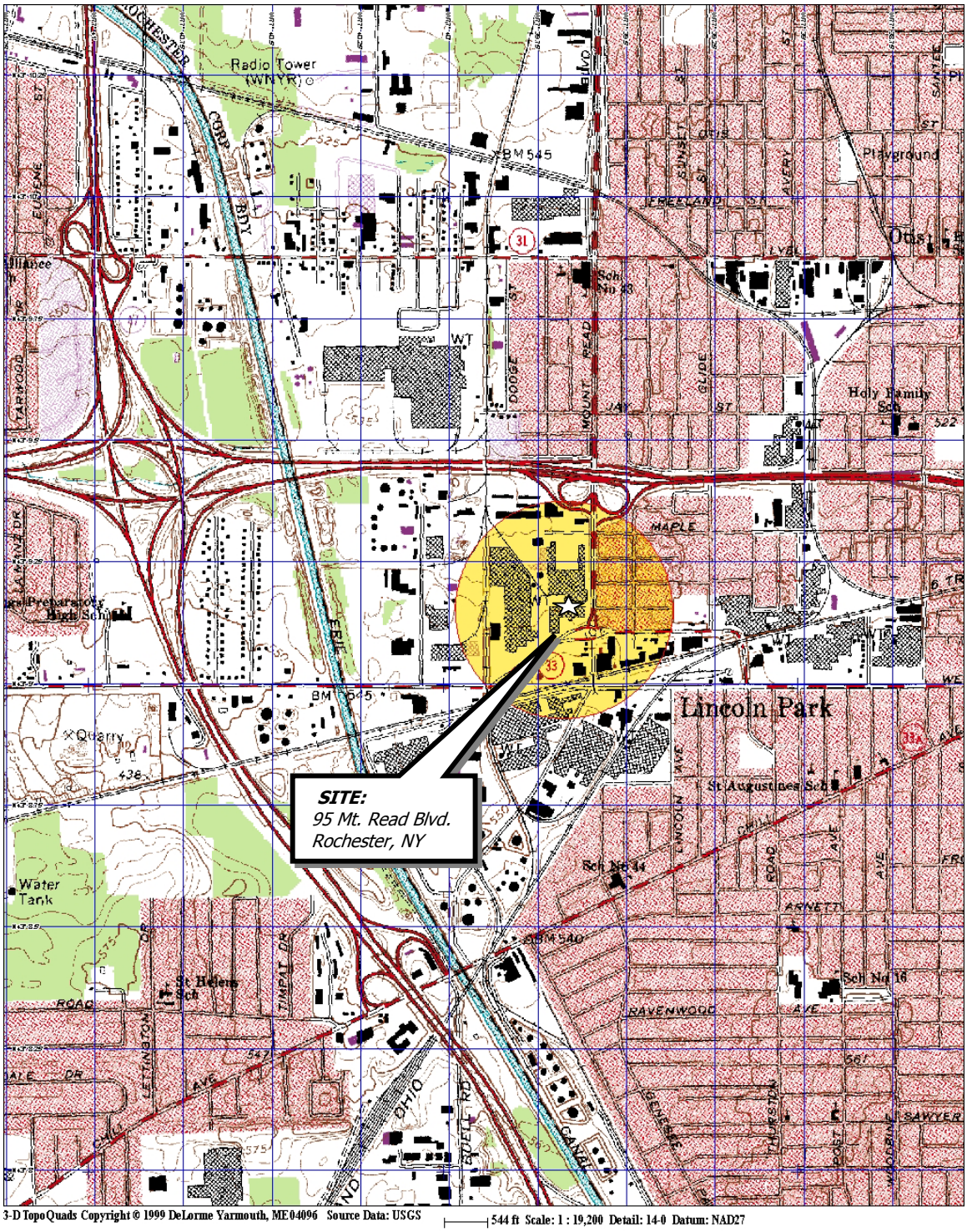
This Work Plan is an integral part of the Site's Remedial Design Plan. Associated submittals that are also part of the Remedial Design Plan include the following:

- Design Plan drawings;
- Health and Safety Plan;
- Community Air Monitoring Plan (specific to construction and start-up activities);
- Quality Assurance/Quality Control Plan (for sampling, analysis and construction);
- Monroe County Pure Waters discharge permit;
- "Transform the Past….Build for the Future" sign; and
- BCP fact sheets (to be sent out prior to start of construction and prior to approval of Extraction and Treatment final Engineering Report).

Following the installation of the groundwater extraction and treatment system and approximately 6 months of performance monitoring, Volume 1 of the Final Engineering Report (FER) will be prepared and subsequently submitted to the NYSDEC. Volume 1 of the FER will cover the extraction and treatment activities, and will consist of the following:

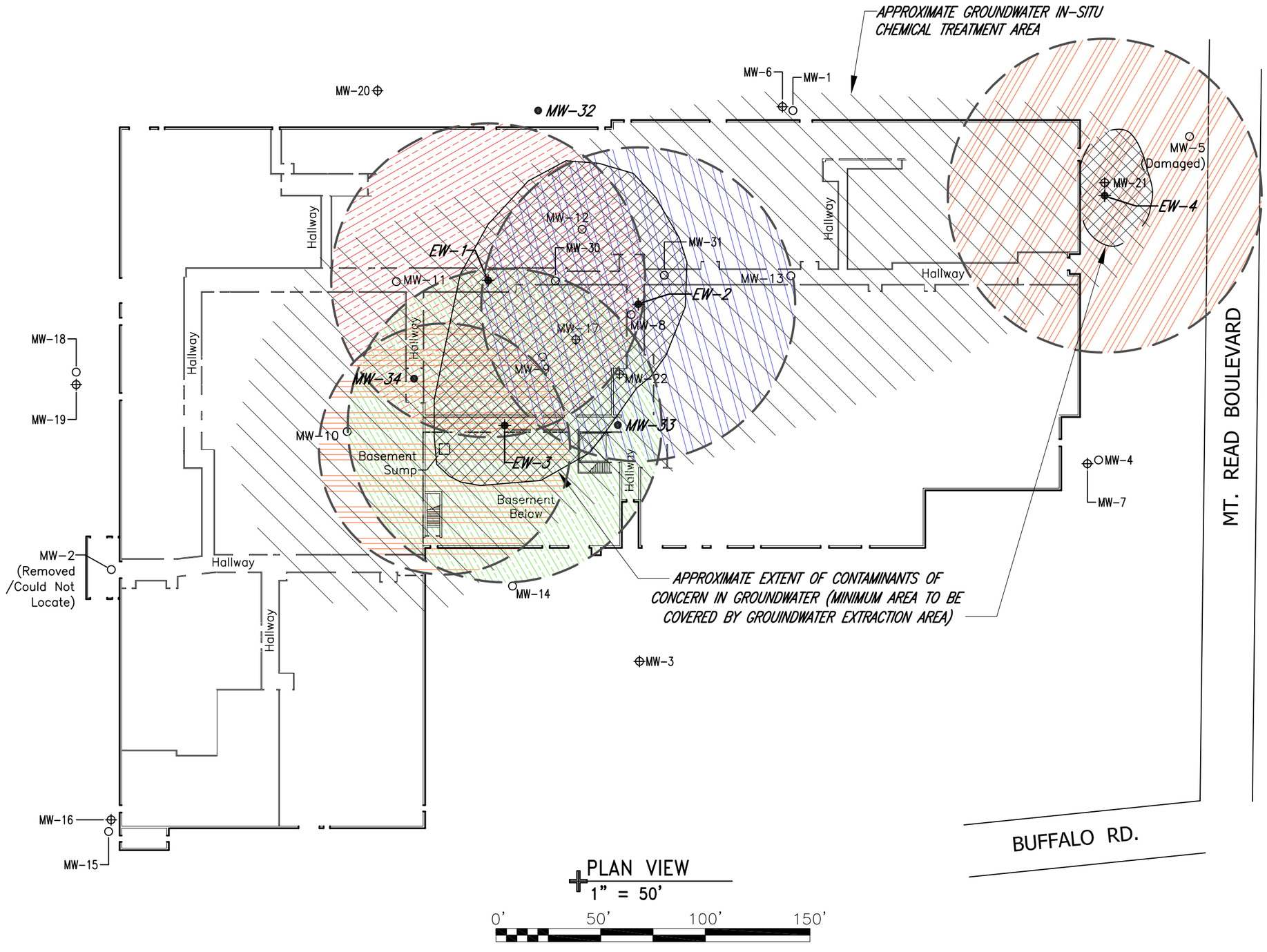
- As-built Remedial Design Plan drawings (including site boundaries);
- A description of the work completed (including discussion of any variation from the approved Design Plan);
- A description of the institutional controls being used, including mechanisms to implement, maintain, monitor and enforce these controls;
- Performance monitoring results; and
- Site Management Plan (SMP), including an updated long-term monitoring program based on the observations made during start-up monitoring. The SMP will address the long-term operation, maintenance and monitoring program for the groundwater extraction and treatment systems. The SMP will be updated as groundwater extraction and treatment system modifications are implemented and/or site aquifer conditions change.

FIGURES



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester West (NY) 1995. Site Lat/Long: N43d-09.15' – W77d-39.67'

DATE **1-12-2006** DRAWN BY **RJM** SCALE **1" = 2000'**	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **95 MT. READ BOULEVARD ROCHESTER, NEW YORK** **GROUNDWATER EXTRACTION AND TREATMENT WORK PLAN** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **3681R-05** **FIGURE 1**



NOTE:

1. Drawing produced from a drawing by The ERM Group, entitled "Figure 3-1; PCB, Asbestos & Sediment/Residue Sampling Locations", dated 11/20/1990; A blueline print by Miller-Anderson Architects, entitled "1st Floor Plan Details", date issued 3-3-2000; and from notes of site visits by representatives of Day Environmental, Inc.
2. Bedrock Well MW-2 has been abandoned due to new construction. Overburden Well MW-5 is damaged.

FIELD VERIFIED BY	NES
DATE	11-2006
DRAWN BY	RJM/Tw
DATE DRAWN	11-08-2006
SCALE	As Noted
DATE ISSUED	03-27-2007

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NY

GROUNDWATER EXTRACTION SYSTEM

DRAWING TITLE
Well Location Plan

PROJECT NO.
3681R-05

FIGURE 2

LEGEND

Check Valve	Y Strainer	Level Switch	Pump
Valve	Metering Pump	Level Alarm High	Filter/Regulator
Ball Valve	Pressure Gauge	pH Sensor/Controller	
Solenoid Valve	Flow Meter	ORP Sensor/Controller	
Reducer	Flow Totalizer		

Groundwater (From Extraction Wells)

MP1 — Sodium Bisulfite

MP2 — Sulfuric Acid

MP3 — Sodium Hydroxide

Vent

Mixer

ORP

pH

Chromium Reduction Reactor

2" PVC

Lift Station #1

LAH

LS

LS1

LS2

Well Pumps Stop/ Sump Pump Divert

1" PVC

Feed Pump P-1

PD

Pulsation Dampener

Static Mixer

Sample Port, Typ.

1A 2A 3A 4A

1B 2B 3B 4B

Metal-Master Chromium Removal Stage

1/4" Air Hose

Needle Valve

SV1

F/R

SV5

To Existing Sump Treatment System

(To Be Used Only In Event Of Primary Wastewater Treatment System Failure)

SV4

Floor Sump

3/8" Air Hose

Discharge To Sewer

FT

Final Effluent Sample Port

1C 1B 1A

2C 2B 2A

Carphene (Carbon) VOC Removal Stage

1/2" Steel

Air Compressor

SV3

1/2" Air Hose

Well Pumps

3/8" Air Hose

CF 2

CF 1

Cartridge Filtration

Pulsation Dampener

Feed Pump P-2

SV2

1/4" Air Hose

Needle Valve

1" PVC

P-1 Stop

LS3

LS4

Lift Station #2

DESIGNED BY	BFK
DRAWN BY	RJM
SCALE	No Scale
DATE	11-2006
DATE DRAWN	11-8-2006
DATE ISSUED	09-10-2007

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

GROUNDWATER TREATMENT SYSTEM

DRAWING TITLE
Process And Instrumentation Schematic

PROJECT NO.
3681R-05

FIGURE 3

APPENDIX A

GROUNDWATER TREATMENT COST ESTIMATES

Technology	Capital Eqpt Cost	Annual O&M Cost	Total 5-yr Cost
Conventional Precipitation	$185,000	$60,000	$485,000
Terrenew Treatment	$100,000	$44,000	$320,000
Ion Exchange	$105,000	$85,000	$530,000
Precip + Bag Filtration	$135,000	$48,000	$375,000

Conventional Precipitation

Capital Costs	Skid unit		$105,000
	Carbon		$5,000
	Air Stripper		$15,000
	Compressor & Lift Station		$10,000
	Misc. & Installation		$15,000
	Engineering & Start-Up		$15,000
	Contingency		$20,000
		TOTAL ANNUAL	$185,000
Operating Costs ($/yr totals)	NaOH	$1,500	
	H2SO4	$2,000	
	Bisulfite	$5,500	
	Polymer	$5,500	
	Alum/Other	$7,500	
	Total Chemicals		$22,000
	Labor (hr)	400	$24,000
	Carbon	2 drums/yr	$1,700
	Disposal	4 tons sludge	$2,000
		2 drums carbon	$500
	Electricity		$2,000
	Misc/Parts/Contingency		$7,800
		TOTAL ANNUAL	$60,000

Terrenew Treatment

Capital Costs	Filter Vessels (20)		$15,000
	Cr Reduction/pH adjustment		$15,000
	Carbon		$5,000
	Compressor/Lift Stations		$15,000
	Misc. & Installation		$15,000
	Engineering & Start-Up		$25,000
	Contingency		$10,000
		TOTAL ANNUAL	$100,000
Operating Costs ($/yr totals)	NaOH	$1,500	
	H2SO4	$2,000	
	Bisulfite	$5,500	
	Total Chemicals		$9,000
	Labor (hr)	200	$12,000
	MM Exchange	50 drums/yr	$12,000
	Carbon Exchange	6 drums/yr	$4,000
	Electricity		$800
	Misc/Parts/Contingency		$6,200
		TOTAL ANNUAL	$44,000

0.4 lb/d Cr, ~150 lb Cr/yr
3% min. absorbance
5000 lb metal master media/yr

Ion Exchange

Capital Costs	Columns (4)		$6,000
	pH adjustment		$10,000
	Bag Filtration		$12,000
	Carbon		$5,000
	Air Stripper		$15,000
	Compressor/Lift Stations		$10,000
	Misc. & Installation		$15,000
	Engineering & Start-Up		$20,000
	Contingency		$12,000
		TOTAL ANNUAL	$105,000
Operating Costs ($/yr totals)	NaOH		$1,500
	Labor (hr)	200	$12,000
	IX Exchange	100 columns	$55,000
	Disposal	Bag Filters	$2,500
		Carbon	$500
	Carbon	2 drums/yr	$1,700
	Electricity		$2,000
	Misc/Parts/Contingency		$9,800
		TOTAL ANNUAL	$85,000

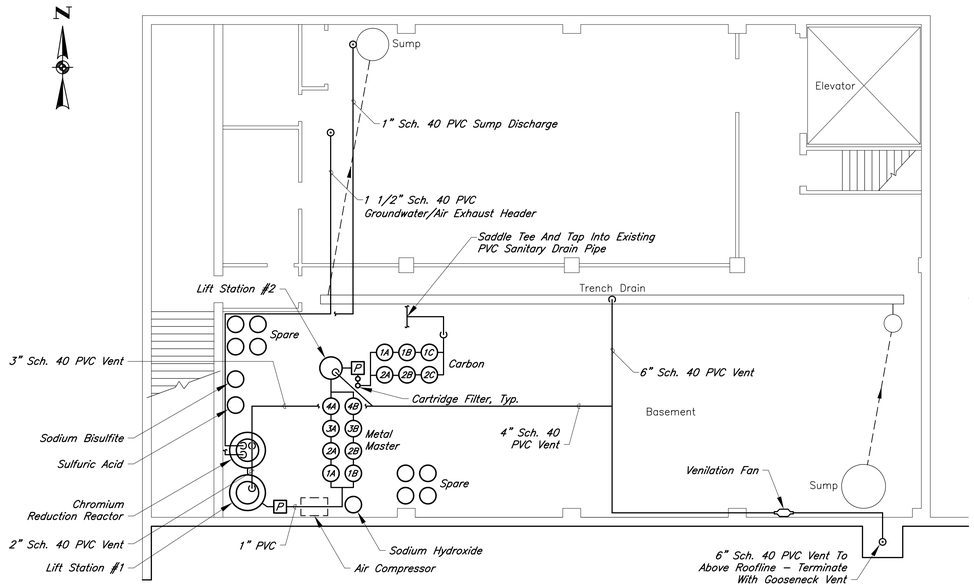
assumed Cr to be 75% hex cr
assumed Cr to be 10% of anions in gw (sulfate est'd @ 50 - 100 mg/l)
0.3 lb/d hex cr, 3 lb/d total anions
3 lb/d/ft3 anion removal
1 ft3/d resin use
3.5 days/column resin use
~100 columns/yr use

0.1 lb/d tri Cr

Precip + Bag Filtration

Capital Costs	Cr Reduction			$10,000
	pH adjustment			$10,000
	Bag Filtration	(8 units)		$22,000
	Carbon			$5,000
	Air Stripper			$15,000
	Compressor/Lift Stations			$15,000
	Misc. & Installation			$20,000
	Engineering & Start-Up			$25,000
	Contingency			$13,000
		TOTAL ANNUAL		$135,000
Operating Costs ($/yr totals)	NaOH		$1,500	
	H2SO4		$2,000	
	Bisulfite		$5,500	
	Total Chemicals			$9,000
	Labor (hr)	300		$18,000
	Bag Filters	200		$8,000
	Carbon	2 drums/yr		$1,700
	Disposal - filters	6 drums/yr		$1,500
	Disposal - carbon	2 drums/yr		$500
	Electricity			$2,200
	Misc/Parts/Contingency			$7,100
		TOTAL ANNUAL		$48,000

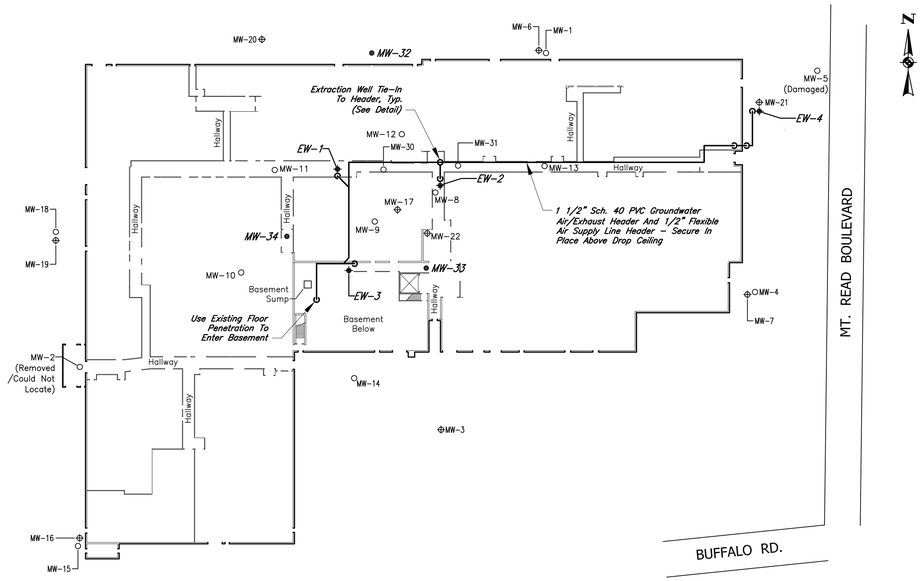
0.4 lb/d Cr, ~150 lb Cr/yr
prefilter = $30/lb Cr
post filter = $40/3 lb Cr



Note: All Locations Approximate, Subject to Change At Time Of Installation Based Upon Site Condtions.

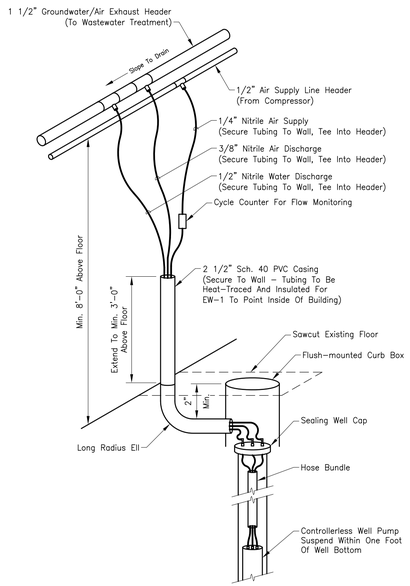
BASEMENT PLAN VIEW
1/8" = 1'-0"

0' 8' 16' 24'

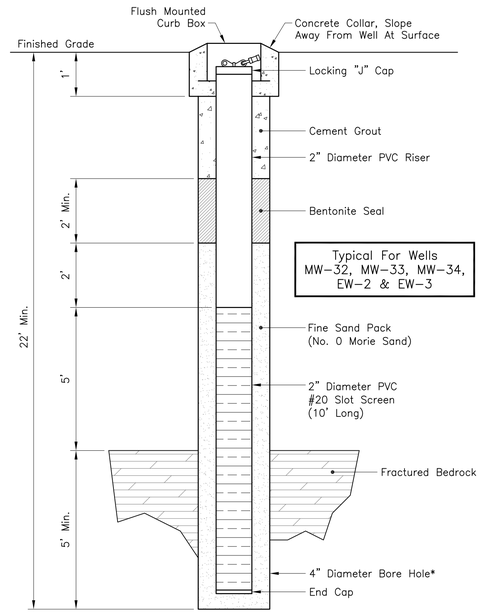


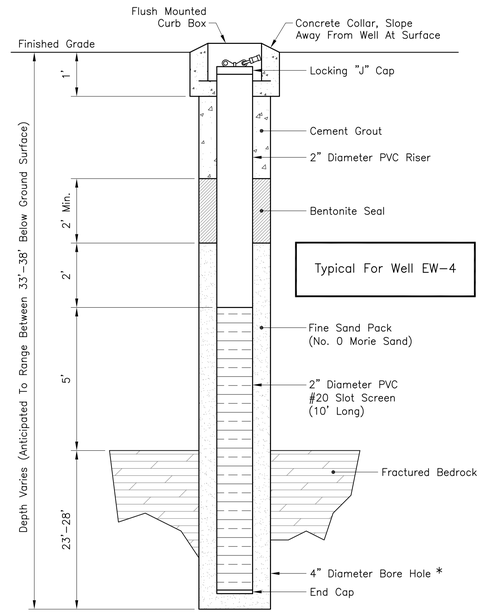
SITE PLAN
1" = 50'

0' 50' 100' 150'



DETAIL – WELL PUMP
NOT TO SCALE





* Note: 4" Diameter Bore Hole Will Be Extended Into Bedrock To Point Of Refusal, Following Which 2" Boring (Unscreened) Will Be Used To Reach Total Indicated Depth.

TYPICAL MONITORING WELL DIAGRAM
NOT TO SCALE

Reference Files Attached:

REF1: 3681R-Basement Plan	REF6:
REF2: 3681R-Plan	REF7:
REF3: 3681R-Well Pump	REF8:
REF4: Well Detail	REF9:
REF5:	REF10:

File Name: Map\A_3681R\3681R-Sheet 1.dwg
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ANSI "D" (22x34)
DayEnv_AnsiD

PROJECT MANAGER	BFK
DRAWN BY	RJM
CHECKED BY	BFK
APPROVED BY	BFK
SCALE	As Noted
DATE	09-2007
DATE DRAWN	09-10-2007
DATE	09-10-2007
DATE	09-10-2007
DATE ISSUED	09-10-2007

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DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK: (585) 546-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

GROUNDWATER EXTRACTION & TREATMENT SYSTEM

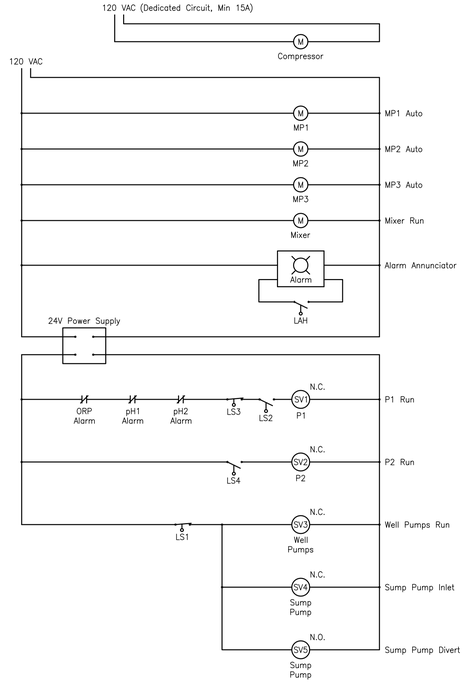
DRAWING TITLE
Plan Views And Details

PROJECT NO.
3681R-05

FIGURE NO.
C-1

SYSTEM	ITEM	DESCRIPTION	MFR	MODEL
Chromium	Tank	150-gal polyethylene tank (31"D x 48"H) with cover	Chem-Tainer	---
Reduction	Tank Stand	steel mixer support floor stand	Chem-Tainer	---
	Mixer	1/3 HP; min 32"L, 1/2" dia. shaft; clamp-mount	Neptune	---
	pH Controller	on-off dual pH/ORP controller; min. 2 SPDT relays	Rosemount	1055-01-11-22-32
	pH Probe	pH sensor with 25-ft cable	Rosemount	396P-01-10-55
	pH Cartridge	ORP sensor with 25-ft cable	Rosemount	396P-01-12-55
	Acid Metering Pump	14 GPD; 100:1 turndown; manual control	LMI	AA141-353SP
	Bisulfite Metering Pump	18 GPD; 100:1 turndown; manual control	LMI	AA181-393BI
Lift	Tank	150-gal polyethylene tank (31"D x 48"H) with cover	Chem-Tainer	---
Station #1	Float Switches	3-wire polypropylene float, 10A, 20' cord	Conery	---
	Pump	1/2" PP diaphragm pump; 13 GPM max; viton seals	ARO	666053-333
	Pulsation Dampener	PP dampener; 85% pulsation reduction @ 60 psi, 5 GPM	ARO	SB10P-APS-A
pH Adjustment	Static Mixer	1" PVC static mixer	---	---
	Caustic Metering Pump	24 GPD; 1000:1 turndown; 4-20mA control; remote on-off	LMI	AA951-393BI
	pH Controller	proportional pH controller	LMI	DP5000
	pH Probe	pH probe	Sensorex	S650CD
	pH Cartridge	pH probe cable assembly; 10'L	Sensorex	S653TC-10-BNC
Metal Master	Flowmeters	1.0 to 10.0 GPM; 1" FNPT ends	Blue White	F-400N
Filtration	Chromium Filters	Chromium Removal Media Drums	Terrenew	MetalMaster
Lift	Tank	100-gal polyethylene tank (28"D x 42"H) with cover	Chem-Tainer	---
Station #2	Float Switches	3-wire polypropylene float, 10A, 20' cord	Conery	---
	Pump	1/2" PP diaphragm pump; 13 GPM max; viton seals	ARO	666053-333
	Pulsation Dampener	PP dampener; 85% pulsation reduction @ 60 psi, 5 GPM	ARO	SB10P-APS-A
Cartridge	Filter Housings	4.5" x 20" filter housing; 1" FNPT ends	---	---
Filtration	Cartridge Filters	4.5" x 20" filter; 50-micron	---	---
	Cartridge Filters	4.5" x 20" filter; 5-micron	---	---
Carbon	Flowmeters	1.0 to 10.0 GPM; 1" FNPT ends	Blue White	F-400N
Filtration	Carbon Filter	High-surface area carbon media drums	Terrenew	Carphene
	Flow Totalizer	5/8" x 3/4"; 0.5 to 20 GPM; totalizer in gallons	Neptune	---
Well	EW-1 thru EW-3	2.0 GPM max; bottom inlet; 20" activation level	QED	AP2B (short)
Pumps	EW-4	2.3 GPM max; bottom inlet; 35" activation level	QED	AP2B (long)
	Cycle Counters	digital display	QED	---
	Well Cap	vacuum sealing cap with tubing adapters	QED	---
Compressed	Compressor	Oilless; 1.6 HP; 6.0 CFM @ 90 psi	Porter-Cable	C3151
Air System	Filter / Regulator	compact 5-micron filter, 0-125 psi regulator; 1/2" NPT ends	Wilkerson	B18-04-FK00
Alarm	Hi Level Alarm	float w/ 10' cord; panel w/ alarm light, 85 dB horn, test + silence	Conery	LA10H

EQUIPMENT LIST
NOT TO SCALE



ELECTRICAL SCHEMATIC
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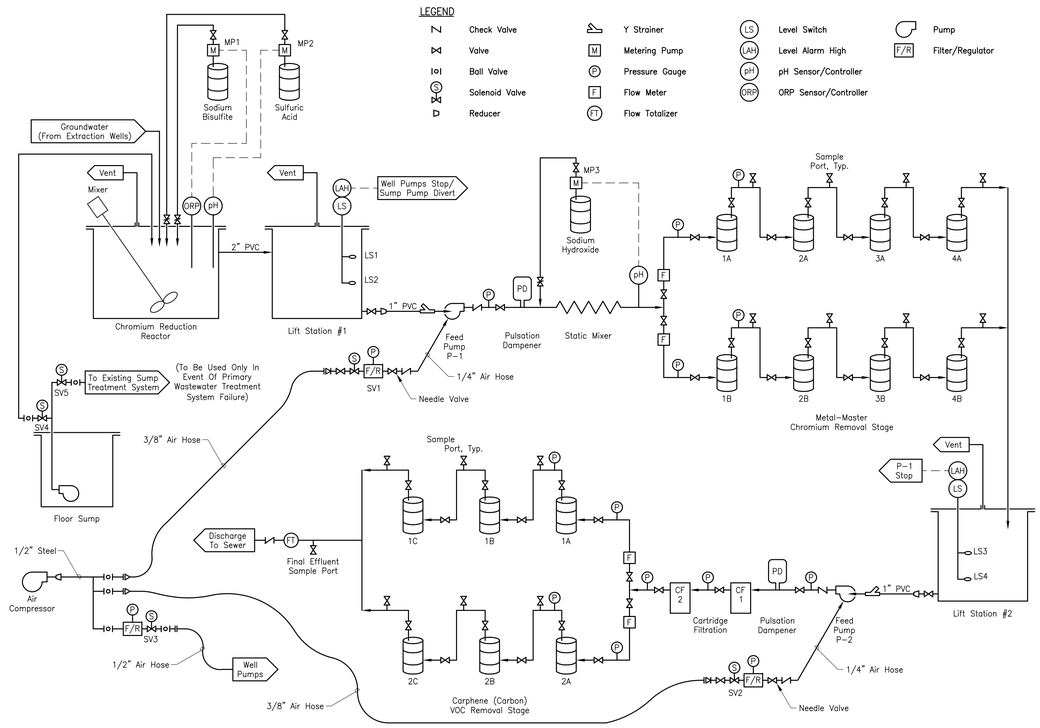

PROCESS & INSTRUMENTATION SCHEMATIC
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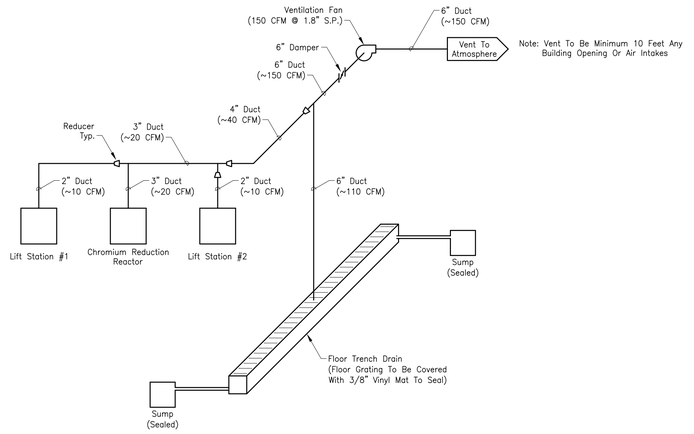

VENTILATION SCHEMATIC
NOT TO SCALE

Reference Files Attached:
REF1: 3681R-Electrical Schematic
REF2: 3681R-Equipment List
REF3: 3681R-Schematic
REF4: 3681R-Ventilation
REF5:
REF6:
REF7:
REF8:
REF9:
REF10:

File Name: Mapuh\3681R\3681R-Sheet 1.dwg
Layout Name: Sheet 1
Time Plotted: Mon Sept 10 15:16 2007
Pen Setting File: 80dpsf-uncolor.ctb

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DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
95 MT. READ BOULEVARD
ROCHESTER, NEW YORK

GROUNDWATER EXTRACTION & TREATMENT SYSTEM

DRAWING TITLE
Equipment List And Schematics

PROJECT NO.
3681R-05

FIGURE NO.
C-2

HEALTH AND SAFETY PLAN
FOR INSTALLATION OF
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
NYSDEC SITE CODE #828085

Prepared by: Day Environmental, Inc.
40 Commercial Street
Rochester, NY, 14614

Approved by: Nick Harding
Health and Safety Specialist

Project No.: 3681R-05

Date: June 2007

TABLE OF CONTENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed by Day Environmental, Inc. (DAY) as part of the Brownfield Cleanup Program (BCP) remedial activities at the former General Circuits Site (New York State Department of Environmental Conservation (NYSDEC) Site ID #C828085) located at 95 Mount Read Boulevard, Rochester, New York (Site). Figure 1 presents the location of the Site.

The Site is classified as a Class 2 Inactive Hazardous Waste Site by the NYSDEC. This HASP documents the policies and procedures for the protection of the workers and public from potential construction/monitoring hazards posed by the remedial activities at the Site. Project activities will be conducted in a manner that minimizes the probability of injury, accident, or incident occurrence. The HASP Acknowledgement (Attachment A) will be signed by those who actively participate on this project.

The HASP focuses on the specific remedial construction/monitoring activities planned for the Site, however, the HASP is flexible enough to encompass the variable nature of remedial work. Conditions may change and unforeseen situations may arise that require deviations from the original remedial construction/monitoring plan. This flexibility allows modification by DAY personnel, and health and safety officials.

NOTE: The requirements of the HASP shall apply to all employees, subcontractors and agents of DAY performing work on the Site in regards to the installation of the groundwater and extraction treatment system. Additionally, the Site Safety Officer may require compliance with appropriate requirements of this HASP for individuals who may be present or visiting the Site. Individuals who are unable or unwilling to meet the requirements of this HASP may be excluded from the project Site. In the event of a conflict between this HASP and NYSDEC Standards or a HASP developed by subcontractors, the more stringent shall apply.

1.1 Site History and Previous Studies

The Site consists of approximately 3.5 acres of land improved primarily by a single story 120,000 square foot building. The facility is located in a predominantly industrial area of the City of Rochester, and the Site and surrounding properties are serviced by public water. The original portion of the building was constructed in the 1920s and the Site was owned/operated by Rochester Lithograph Corporation until the early 1960s. General Circuits, Inc. owned/operated the Site from the early 1960s until 1990. General Circuits, Inc. closed the facility in 1991 due to bankruptcy. Shortly thereafter, the property was transferred to Maguire Properties, Inc. who owned the site until 2005, at which time it was transferred to 95 Mt. Read Blvd., LLC. The current owner of the Site is 95 Mt. Read Blvd., LLC. The building has been subdivided and leased by several small light-industrial and commercial businesses.

1.2 Nature and Extent of Contamination

Based upon the findings presented in the Feasibility Study (FS) Report dated January 2001 (revised January 2005) for the Site, contaminants of concern (COCs) include chlorinated volatile organic compounds (VOCs) and the metal chromium, including hexavalent chromium (chromium VI). The chlorinated VOCs at the Site generally consist of perchloroethene (PCE) and trichloroethene (TCE), and (to a lesser extent) their breakdown products 1,2-dichloroethene (DCE) and vinyl chloride (VC). The highest concentration of total VOCs was detected in a groundwater sample collected from overburden monitoring well MW-9 (greater than 155,000 ppb total VOCs). Groundwater samples from overburden monitoring wells MW-8, MW-10 and MW-12, deep bedrock monitoring well MW-17 and the basement sump contained concentrations of total VOCs between 2,140 ppb and 20,340 ppb. VOCs were also detected at the monitoring wells positioned around the perimeter of the Site, but at lower concentrations (i.e., less than 144 ppb) than interior monitoring wells MW-8, MW-9, MW-10, MW-17 and the basement sump.

The highest concentration of total and hexavalent chromium was detected in the soil samples collected from inside a former shipping room. The results of one soil sample indicated that at least some of the soils in the unsaturated zone beneath the former shipping room exceed the USEPA TCLP regulatory level for chromium, and that these soils would be considered a characteristic hazardous waste if removed for disposal. Based on the analytical data obtained, the former "Shipping Room" area appeared to be the source of the contamination at the Site. Limited remediation was performed to address the chromium contamination at the site. The work included: removing the glass-lined floor drains within the former shipping room, and any sediments within the drains; removing a limited amount of chromium-impacted soil; and disposing of the removed materials in accordance with applicable regulations.

Chromium concentrations above the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 groundwater standard of 50 ppb were detected in wells MW-8, MW-9, MW-12 and MW-21. With the exception of monitoring well MW-21, these monitoring wells are located beneath the building at the Site. However, monitoring well MW-21 is an “open hole” well starting at 18 feet (ft) below the ground surface (bgs); therefore, the detected chromium concentration could be indicative of shallow bedrock groundwater.

The vertical extent of COCs in groundwater was delineated by evaluating groundwater quality in monitoring wells sealed within the overburden and monitoring wells sealed within the bedrock. VOCs were not detected in groundwater samples collected approximately 50 ft bgs. In addition, chromium was not detected at concentrations that exceed the NYSDEC groundwater standards and guidance values in bedrock groundwater monitoring wells with the exception of monitoring well MW-21.

1.3 Proposed Scope Of Work

The following field activities will be performed as part of the groundwater extraction and treatment system installation and subsequent systems monitoring:

1. Advancement of split spoon sampling equipment at the Site and collection of associated soil samples for visual observation and field screening.

2. Installation of bedrock interface wells at the Site using rotary drilling equipment.

3. Collection of groundwater data and analytical laboratory samples from select monitoring wells.

4. Installation of pumps, tubing and associated controls within the groundwater extraction wells.

5. Decontamination procedures (decon) of site workers and equipment. The decon water and disposable personal protective equipment (PPE) will be containerized in New York State Department of Transportation (NYSDOT) 55-gallon drums.

6. Installation of a groundwater treatment system that will include chemical metering and reaction tanks, mechanical pumps and mixing equipment, filtration equipment, piping and controls, etc.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Health and Safety Specialist (HSS) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP during remedial construction/monitoring activities.

2.1 Designated Heath and Safety Specialist

The designated health and safety specialist is responsible for: (i) the contents of the HASP and (ii) ensuring the HASP complies with federal, state and local health and safety requirements. If necessary, the HSS will modify the HASP to adjust for on-site changes that affect safety. The HSS will coordinate with the SSO on modifications to the HASP and will be available for consultation when required.

2.2 Project Manager

The PM has overall responsibility for the project and assures that the goals of the remedial construction/monitoring activities are attained in a manner consistent with the HASP requirements. The PM coordinates efforts with the SS and the SSO.

2.3 Site Safety Officer

The SSO is responsible for administering the HASP relative to Site activities, and will be present at all times while Site activities are in progress. The SSO's operational responsibilities include monitoring (personal and environmental), ensuring personal protective equipment maintenance, and assigning protection levels. The SSO is the primary contact in an on-site emergency situation. The SSO will direct field activities involved with safety and be responsible for stopping work when unacceptable health or safety risks exist. In addition, the SSO is responsible for ensuring that on-site personnel understand and comply with safety requirements.

2.4 Site Supervisor

The SS is responsible for field implementation of the HASP. The SS will establish and ensure compliance with site control areas and procedures, and coordinate these supervisory responsibilities with the site SSO. [Note: For the purpose of this remedial construction/monitoring program, the aforementioned responsibilities of the SSO and SS may be performed by the same DAY representative.]

2.5 Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SS.

2.6 OSHA Records

Required records are maintained at DAY's Rochester, New York office.

2.7 Key Safety Personnel

The following individuals share responsibility for health and safety at the site.

Health and Safety Specialist	Nick J. Harding
Project Manager	Barton F. Kline, P.E.
Site Supervisor/Site Safety Officer	Matt Dickinson, or Dave Gnage, or Nathan Simon

3.0 JOB HAZARD ANALYSIS

3.1 Chemical Hazards

Preventing exposure to toxic chemicals is a primary concern during remedial construction/monitoring activities. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or injection (i.e., puncture wound).

Based on results of previous soil and groundwater sampling at the Site, potential contaminants to be encountered are known to include VOCs (e.g., chlorinated solvents), trivalent chromium, and hexavalent chromium. A list of site-specific constituents previously detected in soil and/or groundwater, and/or known to have been used at the Site, are provided below.

3.1.1 List of Potential Chemical Hazards

CONSTITUENT	ESTABLISHED EXPOSURE LIMITS	IDLH	TARGET ORGANS
trichloroethene	100 ppm PEL	1000 ppm	eyes, skin, respiratory system, heart, liver, CNS
chloroform	50 ppm TLV	500 ppm	liver, kidneys, heart, eyes, skin, CNS
1,2-dichloropropane (propylene dichloride)	75 ppm PEL	400 ppm	eyes, skin, respiratory system, kidneys, CNS
tetrachloroethene	100 ppm PEL	150 ppm	eyes, skin, respiratory system, liver, kidneys, CNS
methylene chloride	500 ppm PEL 50 ppm TLV	2300 ppm	eyes, skin, cardiovascular system, CNS, suspect human carcinogen (lung)
acetone	1000 ppm PEL	2500 ppm (LEL)	eyes, skin, respiratory system, CNS
carbon disulfide	20 ppm PEL	500 ppm	CNS, eyes, kidneys, liver skin, reproduction system, peripheral nervous system, cardiovascular system
1,1-dichloroethene (vinyldene chloride)	5 ppm TLV	3000 ppm	eyes, skin, respiratory system, CNS, liver, kidneys
1,1-dichloroethane	100 ppm PEL	3000 ppm	skin liver, kidneys, lungs, CNS
1,2-dichloroethene (total)	200 ppm PEL	1000 ppm	eyes, respiratory system, CNS
2-butanone (MEK)	200 ppm PEL	3000 ppm	eyes, skin, respiratory system, CNS
benzene	1 ppm PEL	500 ppm	leukemia, eyes, skin, respiratory system, blood, CNS, bone marrow
toluene	200 ppm PEL	500 ppm	eyes, skin, respiratory system, CNS, liver, kidneys
ethylbenzene	100 ppm PEL	800 ppm	eyes, skin, respiratory system, CNS
xylene (total)	100 ppm PEL	900 ppm	kidneys, eyes, skin, respiratory system, CNS, GI tract, blood, liver
vinyl chloride	1 ppm PEL	Not determined	liver, CNS, blood, respiratory system, lymphatic system, liver cancer
chromic acid and chromates	0.05 mg/m^3 TLV	15 mg/m^3	blood, respiratory system, liver, kidneys, eyes, skin, lung cancer

Notes:

PEL	=	OSHA Permissible Exposure Limits (TWA for 8-hour day)
TLV	=	ACGIH Threshold Limit Value (8-hour TWA concentration)
IDLH	=	Immediately Dangerous to Life or Health Concentrations
LEL	=	Lower Explosive Limit in air
CNS	=	Central Nervous System

Established Exposure Limits = Published by: American Congress of Governmental Industrial Hygiene (ACGIH), and Occupational Safety and Health Administration (OSHA).

The potential routes of exposure for these chemicals include:

- inhalation,
- ingestion,
- injection,
- skin absorption, and
- skin/eye contact.

The probable routes of exposure for the remedial construction/monitoring activities to be conducted on site include inhalation and skin contact. The activities most likely to result in potential exposure of workers to contaminants would include:

- advancement of spilt spoon overburden boreholes;
- installation of bedrock wells; and
- soil and groundwater sampling.

The primary contaminants of concern (COCs) are anticipated to be VOCs and chromium in soil and groundwater. The VOCs detected at the highest concentration in groundwater at the site are trichloroethene (TCE) and tetrachloroethene (also known as perchloroethene, or PCE). Many of the other halogenated VOCs detected at the Site are degradation products of these two VOCs. During fieldwork activities, the worker's breathing zone will be monitored using a Flame Ionization Detector (FID) or photoionization detector (PID) with a 10.6 eV lamp. [Note: TCE and PCE have ionization potentials of 10.6 eV or less; however, some of their degradation products (e.g., 1,1,-dichloroethane) have ionization potentials of 10.6 eV or greater.] The PID and FID readings will determine the level of personal protective equipment (PPE) required (refer to Section 5.0).

Based on analytical laboratory data, should other contaminants be encountered during the implementation of the proposed activities, this HASP will be modified to include these additional contaminants as needed.

3.2 Physical Hazards

The following text outlines physical hazards associated with this project and associated preventative measures:

- Small Quantity Flammable Liquids - Small quantities of flammable liquids will be stored in "safety" cans and labeled according to contents.

- Slip/Trip/Fall Hazards – Some areas have wet surfaces that greatly increase the possibility slips, trips and falls. Exercise caution when using steps and stairs that may be slippery. Good housekeeping practices are essential to minimize trip hazards.

- Electrical Hazards – De-energize electrical devices and equipment prior to working near them. Keep extension cords out of water, protected from crushing, and inspect them regularly to ensure structural integrity. Protect temporary electrical circuits with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Do not operate heavy equipment (e.g., drill rig) within 10 feet of high voltage lines.

- Noise - Work around large equipment often creates excessive noise. If high noise areas (by perception) are encountered, don hearing protection. If employees are subjected to noise exceeding an 8-hour time weighted average sound level of 90 dB(A) (decibels on the A-weighted scale), feasible administrative or engineering controls must be implemented. In addition, whenever employee noise exposures equal to or exceed an 8-hour time weighted average level of 85 dB(A), employers must administer hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

- Heavy Equipment – Prior to shift start-up, heavy equipment will be inspected by the operator to ensure safety equipment and devices are operational and ready for immediate use.

- Subsurface and Overhead Hazards - Prior to drilling, excavation or well installation, efforts will be made to determine underground utility locations (if any) and potential overhead hazards that may be encountered. Underground utility clearance will be obtained prior to subsurface work.

3.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants pose a hazard when performing outdoor tasks. The SSO and SS will evaluate and address these hazards as they arise.

3.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Site workers are encouraged to increase consumption of water and electrolyte-containing beverages (e.g., Gatorade) when the potential for heat stress exists. In addition, workers are encouraged to take frequent breaks.

3.3.2 Exposure to Cold

With outdoor work in the winter months, the potential for hypothermia and frostbite exists. Protective clothing greatly reduces the possibility of hypothermia affecting workers. Personnel should wear warm clothing and stop work to obtain additional clothing if they become cold. Employees should change into dry clothes if their clothing becomes wet.

4.0 SITE CONTROLS

Work areas and personal protective equipment will be clearly specified prior to beginning operations in order to minimize contamination. To the extent possible DAY will designate work areas or zones as suggested by the NIOSH/OSHA/ USCG/EPA's document entitled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities". Each work area will be divided into three zones follows:

- An Exclusion or "hot" Zone (EZ)
- A Contamination-Reduction Zone (CRZ)
- A Support Zone (SZ)

4.1 Exclusion Zone (EZ)

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. During the remedial construction/monitoring, the EZ will be considered the area where intrusive activities are conducted (i.e., advancement of boreholes and/or wells, soil and groundwater sampling). Personnel entering the area must wear the identified level of protection for the area. Different levels of protection may be required based on the tasks and monitoring performed within the EZ zone.

4.2 Contamination-Reduction Zone (CRZ)

A CRZ will be established between the EZ and SZ. Personnel will begin the sequential decontamination process required to exit the EZ in this area. Personnel will enter and exit the EZ through the CRZ to prevent off-site migration of contamination via tracking and for personnel accountability.

4.3 Support Zone (SZ)

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment, or clothing are not allowed in the SZ. The support facilities should be located upwind of Site activities, if possible. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored by the SSO and the SS to ensure proper safety protocols are followed.

4.4 General

The following controls are required to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the Site.

- Do not eat, drink, chew gum or tobacco, smoke in the EZ and CRZ.
- Wash hands and face when leaving the EZ.
- Use a buddy system in the EZ. Establish and use hand signals to maintain communication.
- Each worker should consider himself a safety backup to his partner.

- Maintain visual contact between buddies on site when performing hazardous duties.
- No personnel will be admitted into the EZ without the proper safety equipment, training, and medical surveillance certification.
- Personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.
- Follow proper decontamination procedures before leaving the Site (see Section 6.0).

5.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) that may be required at the Site. DAY personnel and subcontracted personnel, if warranted, will be certified in the use of the anticipated PPE to be utilized (see Section 9.0).

5.1 Anticipated Protection Levels

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	D	
Site prep/construction of engineering controls	D	
Extrusive Investigative Methods (e.g., collecting measurement, etc.)	D	
Intrusive Investigative Methods (e.g., test boring advancement/well installation, static water level measurements, soil and groundwater sampling, etc.)	C, or Modified Level D	Based on air monitoring, and CIH, SSO or SS discretion
Support zone	D	
Site breakdown and demobilization	D, or Modified Level D	

5.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level. Modification to these requirements will be noted in the Sites dedicated field book.

5.2.1 Level D

Level D:

- Safety glasses (with side shields)
- Hard hat
- Steel-toed foot wear
- Work clothing as prescribed by weather

5.2.2 Modified Level D

Modified Level D:

- Safety glasses (with side shields)
- Hard hat
- Steel-toed foot wear
- Nitrile, neoprene, or PVC overboots or vinyl booties
- Outer nitrile, neoprene, or PVC gloves over latex gloves
- Face shield (when projectiles or splashes pose a hazard)
- Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to contaminated liquids or sludges].

5.2.3 Level C

Level C:

- Air-purifying respirator with appropriate cartridges
- Hooded Tyvek coveralls and/or Tyveks (Sarans) (PVC acid gear will be required when workers have a potential to be exposed to contaminated liquids or sludges)
- Hard hat
- Steel-toed foot wear
- Hooded Chemical Resistant Clothing
- Nitrile, neoprene, or PVC overboots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

5.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. Level B PPE is not anticipated to be required during the remedial construction/monitoring activities.

5.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during the remedial construction/monitoring activities.

5.3 Air-Purifying Respirators

Employees will be fit tested according to OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134) prior to donning respirator. Any respirators used will meet the requirements of OSHA 29 CPR 1910.134.

Air purifying respirators will not be worn under the following conditions:

- Oxygen deficiency
- IDLH concentrations
- High relative humidity
- If contaminant levels exceed designated use concentrations

5.4 Respirator Cartridges

The crew members working in Level C will wear respirators equipped with compatible air-purifying cartridges. The cartridge will be approved/rated for:

- Organic vapors <1,000 ppm
- Dusts, fumes and mists with a TWA <0.05 mg/m^3
- Asbestos-containing dusts and mists
- Radon
- Radionuclides

5.5 Cartridge Changes

Cartridge change out will occur when personnel begin to experience increased inhalation resistance or the wearer experiences breakthrough of a chemical warning property.

5.6 Inspection and Cleaning

Respirators will be checked periodically by a qualified individual, and inspected before each use by the wearer. Respirators and associated equipment will be properly decontaminated and cleaned after each use.

5.7 Fit Testing

Annual respirator fit tests are required of personnel wearing negative-pressure respirators. The fit test must be for the style and size of the respirator to be used by the individual.

5.8 Facial Hair

Personnel with facial hair that interferes with the respirator's sealing surface will not be permitted to wear a respirator, and will not be permitted to work in areas requiring respirator use.

5.9 Corrective Lenses

Normal eyeglasses will not be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. Workers requiring corrective lenses will don spectacles designed for use with respirators.

5.10 Medical Certification

Respirators will be issued only to personnel who have been certified by a physician as being physically capable of wearing a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respirator protection. Employees must receive a written physicians opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f)(7).

5.11 Site Specific Respiratory Protection Program

The primary objective of respiratory protection is to prevent exposure to the workers. When engineering measures to control exposure are not feasible, or while they are being implemented, respiratory protection will be used.

The criteria for determining respirator need are presented in Section 7.0 of this HASP. The respirator cartridges to be used at the Site (if necessary) will protect employees from the hazardous substances specific to the Site. Respirator users are OSHA trained in proper respirator use and will monitor air levels of contaminants to ensure that respiratory protection is sufficient.

6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the Site.

6.1 Personnel Decontamination

Decontamination procedures will ensure that material workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the Site. The sequence below describes the general decontamination procedure. The specific stages will vary depending on the Site, the task, the protection level, etc.

1. Go to end of EZ
2. Wash outer boots and gloves in detergent solution
3. Rinse outer boots and gloves in clean water
4. Remove outer boots and let dry
5. Remove outer gloves and let dry
6. Cross into CRZ
7. Remove booties and discard
8. Remove Tyvek suit and discard
9. Remove and wash respirator
10. Rinse respirator and hang to dry
11. Remove sample gloves and discard

NOTE: These decontamination procedures may be modified based on recommendations from the SSO or SS.

6.1.1 Personal Hygiene

Wash hands, arms, neck and face before any eating, smoking, or drinking,.

6.2 Equipment Decontamination

Contaminated equipment must be decontaminated before leaving the Site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steam cleaning. Personnel performing this task will wear the proper PPE as prescribed by the SSO.

6.3 Disposal

Liquids and disposable clothing will be treated as contaminated waste and disposed of in accordance with applicable regulations.

7.0 AIR MONITORING

Air monitoring will be conducted to determine airborne contaminant levels. This determination will verify that respiratory protection is adequate to protect personnel against the chemicals being encountered and may indicate whether chemical contaminants are migrating off-site. The following air monitoring efforts will be taken at the Site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the direct reading instrumentation that will be utilized, the action levels and appropriate actions.

Monitoring Device	Action Level	Action
LEL/0_2 - Gastec 1939OX	>10% LEL <19.5% 0_2	Evacuate area, ventilate, upgrade to Level B if necessary, continue to monitor
PID - Photovac MicroTip HL-2000 with 10.6 eV lamp FID - Century OVA Model 128GC	1-19 ppm unknowns	Workers in Level C and monitor air for vinyl chloride, chromic acid, hydrochloric acid and phosgene gas using Draeger Indicator Tubes. Depending upon monitoring results, continue with Level C or downgrade to Modified Level D.
	1-500 ppm unknowns	Level C
	500-1000 ppm unknowns	Level B
	>1000 ppm unknowns	Level A

7.1 Lower Explosive Limit/Oxygen (LEL/0_2) Meter

The installation of the groundwater treatment system and associated piping may involve welding or other high heat-producing activities. If high heat-producing equipment is used during the extraction/treatment system installation, a potential exists for the decomposition of existing chlorinated solvent vapors. This decomposition can produce potentially toxic levels of hydrochloric acid or phosgene gas. In order to reduce the potential exposure to these decomposition products, solvent vapor monitoring will be conducted prior to any heat-producing activities. If solvent vapor concentrations greater than 1.0 ppm are detected prior to heat-producing activities, monitoring for hydrochloric acid and phosgene gas will be conducted using Draeger Indicator Tubes. In addition, prior to performing high heat-producing operations where flammable or combustible vapors may be present, LEL/0_2 measurements will be taken and recorded.

7.2 On-site Air Monitoring Program

A PID and/or FID will be used to monitor VOCs in the air. The SSO will take measurements in multiple areas to determine background levels of VOCs. Levels of VOCs will be measured in the EZ at least once every hour, and at the support zone once every hour when levels are detected above background in the EZ.

In order to determine a protection level from PID/FID data for known contaminants, the SSO will multiply the TLV of the known compound times the PID/FID reading. If PID/FID readings exceed 25 times the TLV, Level B protection will be required. [Note: PID and FID readings do not always indicate the actual air concentration of a compound. Consult users manual or the HSS for clarification.] Also, Draeger Tubes, if available, will be used to monitor for select chemicals with PELs of 1 ppm or lower.

7.3 Community Air Monitoring Program

The purpose of the Community Air Monitoring Program is to protect the general public from exposure to volatile organic compounds and/or particulates. The interior test borings and monitoring wells will be installed on the weekends, during off-business hours, or in areas of the buildings where tenants are not working in order to minimize the potential for VOCs to impact building tenants

7.3.1 Vapor Emission Response Plan

VOCs will be monitored at the downwind perimeter of the work area. For interior work, VOCs will be monitored continuously at the EZ and CRZ. For exterior work, VOCs will be monitored in two-hour intervals at the EZ and CRZ.

Work Area	Action Level	Action
Inside	5ppm above background	Stop work, continue monitoring. If levels decrease below 5 ppm below background, resume work.
	5 ppm above background but below 25 ppm above background	Ventilate work area to reduce VOC vapor levels.
	25 ppm above background	Stop work activities, implement engineering controls.
Outside	5ppm above background	Stop work, continue monitoring. If levels decrease below 5 ppm below background, resume work
	5 ppm above background but below 25 ppm above background	Monitor 200 ft downwind of the work area or half the distance to then nearest residential or commercial structure, which ever is less. If level decrease below 5 ppm above background, resume work.
	25 ppm above background	Stop work activities, implement engineering controls.

If work shutdown occurs, implement downwind air monitoring as directed by the SSO to ensure the VOC emissions do not impact the building tenants or the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission (Section 7.3.2) described below.

7.3.2 Major Vapor Emission

If any VOC levels greater than 5 ppm above background are identified 200 feet downwind from the work area, half the distance to the nearest residential or commercial structure, or in areas in the immediate vicinity where tenants may be exposed, work activities will be discontinued. If VOC levels persist above 5 ppm above background following work stoppage, the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone), or in areas in the immediate vicinity where tenants are working. Efforts will be made to stop emissions. If efforts to abate the emission source are unsuccessful, and if VOC levels of 5 ppm above background or greater persist for more than 30 minutes in the 20 foot zone, then the Major Emission Response Plan described below will be in effect. If VOC vapor levels greater than 10 ppm above background are measured 200 feet downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is less, the Major Emission Response Plan will be in effect.

7.3.3 Major Emission Response Plan

Upon activation, by condition described above, the following activities will be undertaken:

1. All personnel will mobilize to an upwind location.

2. Local police and medical response personnel will be contacted by the SSO and will be advised of the situation.

3. Air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, the air monitoring may be halted or modified by the SSO.

7.3.4 Particulate Monitoring

Major excavation activities that could result in particulate releases will not be performed as part of the remedial construction/monitoring, so particulate monitoring is not anticipated at this time. However, if major excavation activities become required, or if noticeable particulate/dust generation is observed, real-time air monitoring for particulates will be initiated in accordance with the Community Air Monitoring Program developed for the Site.

7.4 Integrated Air Sampling

Integrated air sampling is not scheduled to be performed during this project, however, it may be performed based on Site conditions as designated by the SSO and SS.

7.5 Air Monitoring Log

Air-monitoring data will be logged in a waterproof, bound fieldbook. Data will include instrument used, wind direction, work process, instrument readings, calibration, etc.

7.6 Calibration Requirements

The PID, FID, LEL/O_2 meter, and any sampling pumps required with fixed-media air sampling will be calibrated daily prior to use. The information detailing the date, time span, gas or other standard, and name of person performing the calibration, will be recorded in the air monitoring log.

7.7 Air Monitoring Results

Air monitoring results may be discussed during morning safety meetings.

8.0 EMERGENCY RESPONSE

The SS and SSO will plan emergency egress routes and discuss them with field personnel prior to field activities.

8.1 Emergency Services

A rapid and clear distress communication system will be developed prior to project startup. Concise, clear directions and accessible transportation to local emergency services will be provided to Site personnel.

The following emergency equipment will be maintained on the Site:

- Fire extinguishers
- First-aid kit
- Eye wash bottles

8.2 Communication

Each member of the site entry team must be able to communicate with at least one other entry team member at all times. The following methods of communication are acceptable:

- Sound (air horn)
- Electronic (radio, bull horn)
- Visual (hand signals)

The following hand signals must be understood by personnel regardless of other means of communication:

- Hand gripping throat--**Out of air, cannot breath**
- Hands on top of head--**Need assistance**
- Thumbs up--**OK, I'm alright, I understand**
- Thumbs down--**No, negative**
- Gripping partner's wrist, or gripping both hands on wrist--**Leave area immediately**

8.3 Emergency Evacuation From Exclusion and Contamination-Reduction Zones

Any personnel requiring emergency medical attention will be evacuated immediately from EZ and CRZ. Personnel will not enter the area to attempt to rescue if their well-being is threatened. The SS and SSO decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the injury and the nature of the contaminant.

If decontamination cannot be performed because it may aggravate the injury or delay life-saving treatment, the emergency response personnel will:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel and emergency vehicles.
- Alert emergency and medical personnel of potential contamination; instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident to the hospital with the victim.

8.4 First Aid

Only qualified personnel will administer first aid and stabilize an individual needing assistance. Obtain professional medical assistance will be at the earliest possible opportunity.

To provide first-line assistance to field personnel in the case of illness or injury, the following items will be made immediately available:

- First-aid kit
- Portable emergency eye wash
- Supply of clean water

8.5 Emergency Actions

If actual or suspected serious injury occurs, these steps will be followed:

- Check area before entering.
- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given.
- Obtain transport to local hospital.
- Other personnel in the work area will be evacuated to a safe distance until the site supervisor determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work will not commence until all hazard-control issues are resolved.
- Notify client of incident.

8.6 General Evacuation Plan

In general case of a large fire, explosion, or toxic vapor release will follow these steps:

- Sound the agreed upon alarm and advise client representative.

- Evaluate the immediate situation and downwind direction. Personnel will evacuate in the upwind direction.

8.7 Emergency Telephone Numbers

The following telephone numbers will be posted at the site before work begins:

Fire Department:	911 (428-6739)
Police Department:	911 (428-6501)
Poison Control Center:	275-5151
NYSDEC Spills:	226-2466
NYSDOH:	
Melissa Menetti	(518) 402-7860
MCDOH:	
Joseph Albert	274-6904
After Hours	529-0756
Hospital:	Strong Memorial Hospital 601 Elmwood Ave. Phone 911 or 275-2100
Emergency Dept.	275-4551

Directions to the Hospital:

- Turn north on Mt. Read Boulevard;
- Merge onto I-390 South;
- Left onto NY-383/Scottsville Road;
- Stay straight onto Elmwood Ave.
- Hospital is on right (South) side of road

9.0 TRAINING REQUIREMENTS

As a prerequisite to employment at DAY, field employees are required to complete a 40-hour training class. This training covers personal protective equipment, toxicological effects of various chemicals, handling of unknown tanks and drums, confined-space entry procedures, and electrical safety. This course is in compliance with OSHA requirements in 29 CFR 1910.120. In addition, employees receive annual 8-hour refresher training, and supervisory personnel receive an additional 8-hour training in handling hazardous waste operations.

Personnel entering the exclusion zone will be trained in the provisions of this HASP and be required to sign the HASP Acknowledgement in Attachment A.

10.0 MEDICAL SURVEILLANCE PROGRAM

DAY personnel participate in a medical and health-monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of DAY's worker medical profile is shown below. This program was developed in conjunction with a consultant physician. Other medical consultants are retained when additional expertise is required.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120(f).

TABLE 10.1

WORKER MEDICAL PROFILE

ITEM	INITIAL	ANNUAL
Medical History	X	X
Work History	X	X
Visual Acuity	X	*
Pulmonary Function Tests	X	X
Physical Examination	X	X
Audiometry Tests	X	*
Chest X-Ray	X	*
Complete Blood Counts	X	X
Blood Chem. (SSAC-23 or equivalent)	X	X
Urinalysis ("Dip" Only)	X	X
Dermatology Examination (As part of exam; not by a specialist)	X	X
Electrocardiogram/Stress Test	X	*

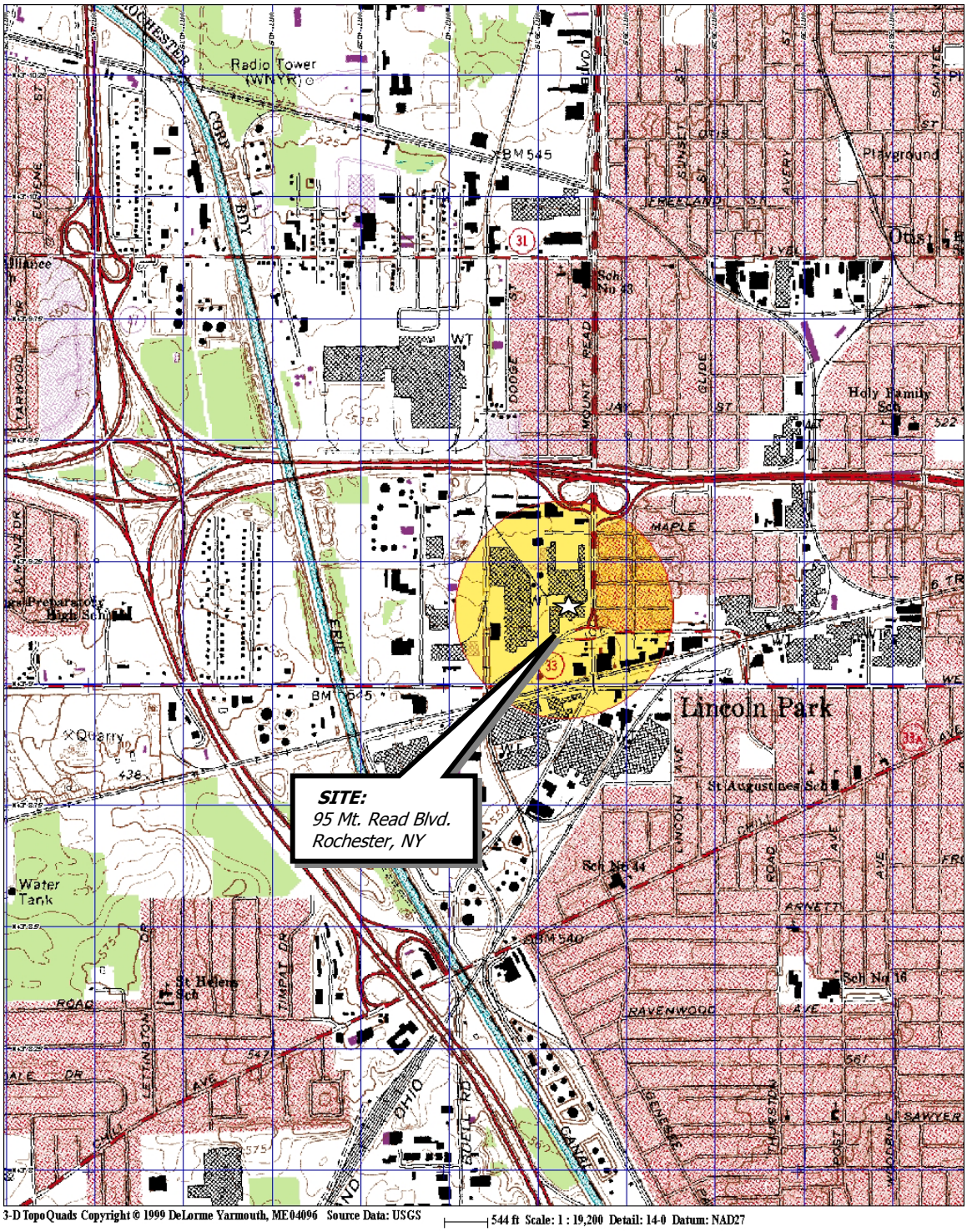
*Recommended every 3 years unless medically required.

10.1 Examination Schedule

Employees are examined initially upon start of employment, annually thereafter, and may be examined upon termination of employment. Unscheduled medical examinations are conducted:

- At employee request after known or suspected exposure to toxic or hazardous materials.
- At the discretion of the client, the HSS, SSO, or occupational physician after known or suspected exposure to toxic or hazardous materials.
- At the discretion of the occupational physician.

Nonscheduled medical examinations will include, as a minimum, all items specified above for periodic surveillance examination, with the exception of the chest X-ray, which will be conducted at the discretion of the occupational physician performing the examination.



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester West (NY) 1995. Site Lat/Long: N43d-09.15' – W77d-39.67'

DATE **1-12-2006** DRAWN BY **RJM** SCALE **1" = 2000'**	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **95 MT. READ BOULEVARD ROCHESTER, NEW YORK** **GROUNDWATER EXTRACTION AND TREATMENT WORK PLAN** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **3681R-05** **FIGURE 1**

HEALTH & SAFETY PLAN ACKNOWLEDGEMENT

I, the undersigned, have received and read a copy of the document entitled, "Groundwater Extraction and Treatment System Installation, Health and Safety Plan, 95 Mt. Read Boulevard, Rochester, New York, NYSDEC Site Code #828085", and fully understand and agree to follow the requirements of this HASP.

Signature	Date

COMMUNITY AIR MONITORING PROGRAM

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
NYSDEC SITE CODE #828085

Prepared by: Day Environmental, Inc.
40 Commercial Street
Rochester, NY, 14614

Project No.: 3681R-05

Date: June 2007

1.0 Community Air Monitoring Plan

This Community Air Monitoring Plan (CAMP) has been developed by Day Environmental Inc. (DAY) as part of the Brownfield Cleanup Program (BCP) remedial activities at the former General Circuits Site (New York State Department of Conservation (NYSDEC) site ID #C828085) located at 95 Mount Read Boulevard, Rochester, New York (Site). Figure 1 presents the location of the Site.

Airborne dust and/or vapors released during remedial construction/monitoring activities at the Site (e.g., test boring advancement, well installation, etc.) have the potential to contain site-related constituents. The purpose of this CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and business and on-site workers not directly associated with the remedial construction work activities) from any potential adverse impacts associated with the aforementioned airborne dust and vapors.

This CAMP is designed to monitor the concentration of dust and volatile organic compounds vapors (VOCs) at the boundary of the Site during significant ground intrusive activities of the remedial action, and to document compliance with NYSDEC requirements for dust suppression and monitoring. Periodic monitoring for VOCs will also be conducted during less-intrusive activities. The air quality information collected during the implementation of this CAMP will be immediately available to on-site workers and supervisors and will be used to evaluate the need for modifications to work practices to reduce dust and vapor levels to protect off-site air quality. Any such work practice modifications that are implemented to protect off-site areas will be detailed in the Final Engineering Report for the Site.

The activities outlined in this CAMP may be modified during the course of work based on Site and work conditions. Proposals to modify this CAMP would be submitted to the NYSDEC and would not be implemented without the prior approval of the NYSDEC.

1.1 Community Air Monitoring Plan Procedures

Remedial construction activities have the potential to release dust and vapors containing site-related constituents into the ambient air in areas adjacent to the Site. Construction practices will be modified as necessary to prevent the release of unacceptable levels of dust and vapors to off-site receptors. The procedures to be implemented as part of the CAMP will provide the real time data needed to effectively monitor ambient air quality and to evaluate the need for modification to construction methods.

1.1.1 Monitoring Parameters and Equipment

Dust and vapors in ambient air at the Site boundary will be monitored using field instruments in accordance with this CAMP. Information on the parameters to be monitored (i.e., dust and vapors) and the field equipment to be used to measure these parameters is provided below. Wind direction (i.e., upwind or downwind) will be

determined using a windsock or fluorescent orange ribbons suspended at least 20 feet above the ground surface.

Fugitive Dust

There is a considerable variation in the size (i.e., average diameter) and type of particulate matter found in ambient air associated with construction activities. Large diameter particulate matter is generally not inhaled and, as a result, potential human health risks from dusts are limited to small diameter particulate matter. Particulate matter less than 10 microns in diameter (PM_{10}) can be inhaled and is referred to as "respirable particulate" matter. Respirable particulate matter, (i.e., fugitive dust) can exist as discrete particles, liquid droplets or solids.

A portable, hand-held, real-time aerosol monitor will be used to measure the concentrations of respirable particulate matter (PM_{10}) in ambient air at the boundary of the Site. This equipment will be capable of measuring particulates (i.e., dust, mists and aerosols) ranging in diameter from less than 0.1 microns to 10 microns. The monitoring equipment will include hardware required to integrate respirable particulate readings for monitoring periods ranging from instantaneous to 15 minutes.

Volatile Organic Compound Vapors

Volatile organic compounds (VOCs) are present within the Site's subsurface soil and groundwater and may be released into ambient air during remedial actions that disturb the soil/groundwater. The concentrations of site-related VOCs that may be released to ambient air during remedial actions will be monitored using a photoionization detector (PID) or flameionization detector (FID). These VOC monitors are portable, hand-held devices capable of providing instantaneous measurements of cumulative VOC concentrations.

Monitoring Locations: Site Boundary

The air quality monitoring devices will measure ambient air respirable particulate and VOC concentrations at locations along the Site boundary. Monitoring will be performed at the following Site boundary locations during each air monitoring event:

- Western Boundary: west parking lot, adjacent to developed property
- Northern Boundary: ally, adjacent to developed property
- Eastern Boundary: east parking lot, adjacent to Mt. Read Boulevard
- Southern Boundary: south parking lot, adjacent to Buffalo Road

All monitoring will be performed on-site, immediately adjacent to the property boundary.

1.2 Air Monitoring Action Levels

The potential for Site-related chemicals to be released into the atmosphere during remedial work activities will be monitored by measuring respirable particulate and cumulative VOC concentrations in ambient air at the Site boundaries. Air monitoring results will be compared to action levels for each respective parameter to: (1) determine whether corrective actions are needed; and (2) measure the effectiveness of any corrective actions that may be implemented.

[Note: In situations where action levels are defined as the difference between the downwind versus the upwind concentration, it is assumed the downwind concentration would be greater than the upwind concentration. Therefore, the action level is to be calculated as the downwind concentration less the upwind concentration. Negative results (i.e., upwind concentrations are greater than downwind concentrations) would not be considered to exceed the action level since the Site would not be considered the source of any upwind contaminants. The downwind and upwind air monitoring locations will be identified based on the prevailing wind direction as measured by meteorological monitoring performed immediately prior to recording real time monitoring measurements.]

1.2.1 Respirable Particulate Action Levels

During implementation of remedial activities where contaminated materials may be disturbed, air monitoring will include real-time monitoring for particulates using a real time aerosol monitor particulate meter at the perimeter of the work zone in accordance with the 1989 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031 entitled, "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites." The TAGM uses a not-to-exceed action level of 150 ug/m^3 over an integrated period of 15 minutes.

- If downwind PM_{10} particulate levels are at or above 100 ug/m^3 greater than background (upwind perimeter) for the 15-minute time weighted average or if airborne dust is observed leaving the work area, then dust suppression techniques must be implemented. Work may continue with dust suppression techniques provided that downwind PM_{10} particulate levels do not exceed 150 ug/m^3 greater than background, and provided that visible dust is not migrating from the Site.

- If after implementation of dust suppression techniques, downwind PM_{10} particulate levels are at or above 150 ug/m^3 greater than background, work must be stopped and a re-evaluation of activities initiated. Work may resume provided that dust suppression measures and other controls are successful in reducing downwind PM_{10} particulate concentration to within 150 ug/m^3 or less of background, and provided that visible dust is not migrating off-site.

VOC Action Levels

The real time air monitoring action level for VOCs is established as 5 ppm measured as the difference between downwind and upwind (background) concentrations.

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

- If total VOC vapor levels at downwind perimeter work area locations or the exclusion zone persist at levels greater than 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, and corrective actions will be implemented to abate the emissions. Subsequent to these actions, work activities can resume with continued monitoring provided the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm of background level for the 15-minute time weighted average.

- If the VOC vapor level reaches 25 ppm or greater at the perimeter of the work area, work activities will be immediately shutdown.

1.3 Air Monitoring Frequency

Continuous community air monitoring of VOC's will be performed during test boring advancement and well installation procedures. These remedial activities do not typically generate significant dust or airborne particulate matter; however, if noticeable particulate/dust generation is observed, real-time air monitoring for particulates will also be performed. A field technician will be assigned to perform air monitoring at the Site boundary during each day of on-site activities. Air monitoring will focus on the downwind boundary areas, which are to be defined by the windsock or fluorescent orange ribbons suspended at least 20 feet above the ground surface. Air monitoring will also be performed intermittently throughout the day at the upwind boundaries of the Site.

1.4 Air Monitoring Personnel

Responsibility for executing this CAMP will be assigned to the Site Safety Officer (SSO). The SSO will be assisted by a field technician who will perform the Site boundary air monitoring. The CAMP air monitoring results obtained during the remedial construction activities will be documented and recorded in a log book. The Site boundary air monitoring technician will report to the SSO immediately if any readings are observed to exceed the action levels described herein. The SSO will have the necessary authority to

implement any necessary corrective actions, and/or to stop remedial construction activities, as needed based upon the air monitoring results.

1.5 Calibration Procedures

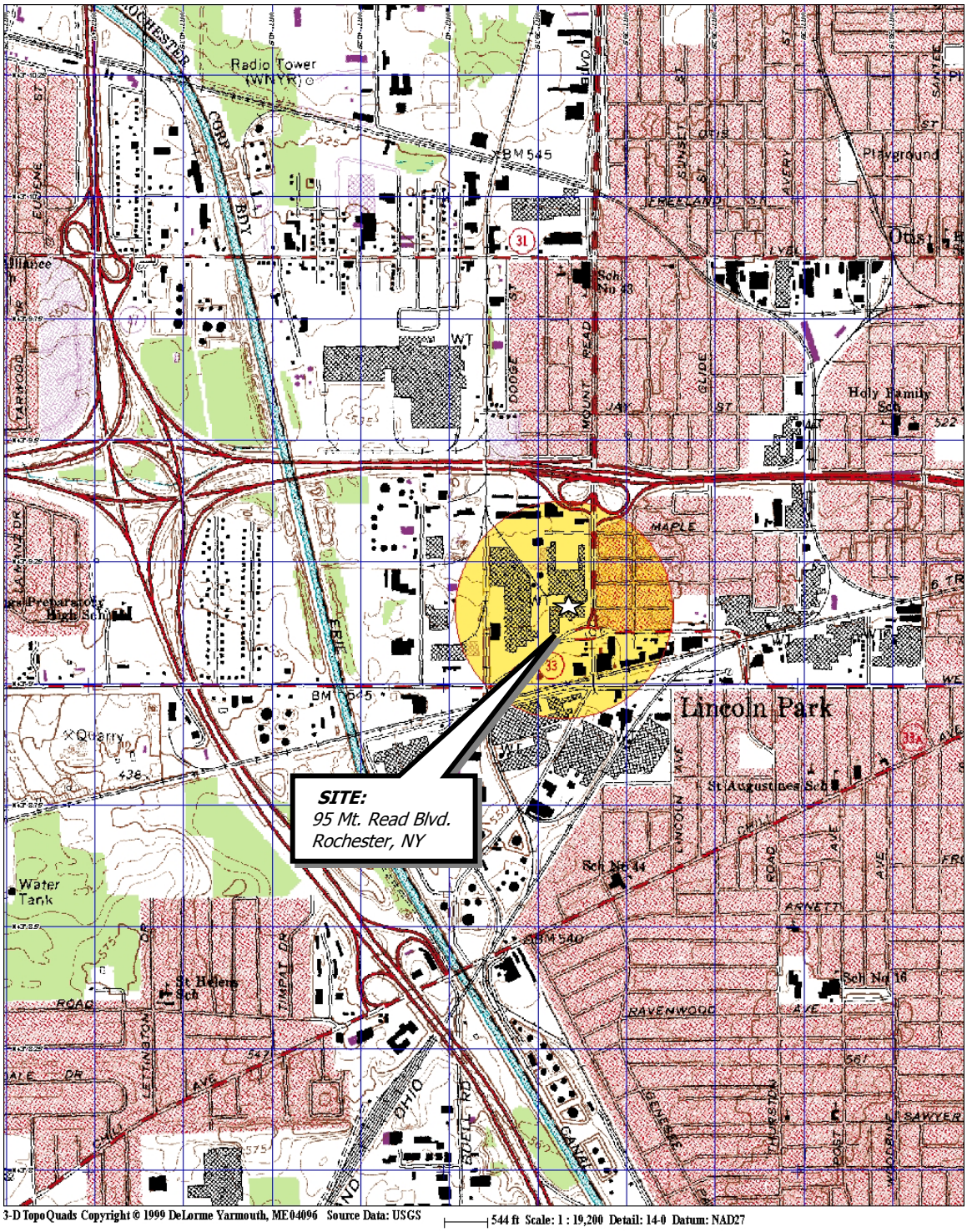
Real time (direct reading) instruments will be re-calibrated by authorized personnel in accordance with the manufactures recommendations. Documentation of all calibration, including periodic instrument calibration, operator training and daily instrument performance checks, will be maintained onsite.

1.6 Record Keeping

A logbook will be used to file and record all data collected as part of this CAMP. The logbook will be maintained at the Site for the duration of the remedial action construction activities. Respirable particulate and VOC monitoring readings and wind direction observations will be recorded daily.

1.7 Related HASP Monitoring

This CAMP is designed to prevent the off-site release of unacceptable levels of dust and vapors by monitoring air quality at the boundary of the Site. Similar air monitoring will also be performed at onsite work areas in accordance with the Health and Safety Plan (HASP) developed for the Site specific remedial action construction activities. The HASP air monitoring, however, is designed to protect on-site workers implementing the remedial action and does not directly address potential off-site releases of dust and/or vapors. As such, the HASP action levels and modification to work practices differ from the action levels and work modifications described in this CAMP. HASP air monitoring does provide an indirect measure of potential air quality at the Site boundary and will be used to determine whether additional Site boundary air monitoring should be performed.



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester West (NY) 1995. Site Lat/Long: N43d-09.15' – W77d-39.67'

DATE **1-12-2006** DRAWN BY **RJM** SCALE **1" = 2000'**	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **95 MT. READ BOULEVARD ROCHESTER, NEW YORK** **GROUNDWATER EXTRACTION AND TREATMENT WORK PLAN** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **3681R-05** **FIGURE 1**

QUALITY ASURANCE / QUALITY CONTROL PLAN

95 MT. READ BOULEVARD
ROCHESTER, NEW YORK
NYSDEC SITE CODE #828085

Prepared by: Day Environmental, Inc.
40 Commercial Street
Rochester, NY, 14614

Project No.: 3681R-05

Date: June 2007

Quality Assurance/Quality Control

This Quality Assurance and Quality Control (QA/QC) Program has been developed by Day Environmental, Inc. (DAY) as part of the Brownfield Cleanup Program (BCP) remedial activities at the former General Circuits Site (New York State Department of Conservation (NYSDEC) site ID #C828085 located at 95 Mount Read Boulevard, Rochester, New York (Site). Figure 1 presents the location of the Site.

The purpose of this QA/QC program is to ensure that suitable and verifiable data are obtained from sampling and analysis. This QA/QC program plan describes the protocols and procedures that will be followed during implementation of the remedial actions at the Site. Adherence to the QA/QC program will ensure that quality and usable data will be obtained during and subsequent to the remedial design implementation.

Operation and Calibration of On-Site Monitoring Equipment

Volatile vapor monitoring will be conducted using a photoionization detector (PID) or Flameionization detector (FID). The PID/FID will be calibrated in accordance with the manufacturer's specifications using an isobutylene gas standard or methane gas standard prior to use of the PID/FID. Measurements will be collected in accordance with the protocols outlined in the site-specific Health and Safety Plan (HASP) and Community Air Monitoring Program (CAMP).

Particulate monitoring will be conducted using a real time particulate meter. The particulate meter will be calibrated prior to use and as necessary during fieldwork in accordance with the manufacture's specifications. Measurements will be collected in accordance with protocols outlined in the HASP and CAMP.

Additional miscellaneous field equipment that may be used during this project include:

- An electronic static water level indicator;
- Survey equipment;
- An oil/water interface meter;
- A particulate meter; and
- A Horiba U-22 water quality meter (or similar instrument).

These meters will be calibrated, operated and maintained in accordance with the manufacture's recommendations.

Record Keeping

DAY will document project activities in a bond field book on a daily basis. Information that will be recorded in the field book will include:

- Date and time work is performed;
- Details on work being performed;
- Details on field equipment used;

- Visual and olfactory observations during remedial activities;
- PID/FID meter and particulate meter measurements collected during monitoring activities;
- Personnel and equipment on-site;
- Weather conditions; and
- Other pertinent information as warranted.

In addition, DAY will record information from test borings and groundwater monitoring wells on designated logs. Well development data and well sampling data will also be recorded on well development and sampling logs.

Sampling and Laboratory Analysis Protocol

During sampling activities, personnel will wear disposable latex gloves. Between collection of environmental samples, personnel performing sampling will discard used latex gloves and don new gloves to prevent sample cross-contamination.

New laboratory-grade sample containers will be used to collect soil and groundwater samples. Sufficient volume (i.e., as specified by the analytical laboratory) will be collected to ensure that the laboratory has adequate sample volume to perform the specified analysis.

Samples will be preserved as specified by the analytical laboratory for the type of parameters and matrices being tested. Sample holding times and preservation protocols will be adhered to during this project. Analytical laboratories will analyze the samples using the lowest practical quantitation limits (PQLs) possible.

Samples collected for subsequent analytical testing will be handled using standard chain-of-custody (COC) control. COC documentation will accompany samples from their inception to their analysis, and copies of COC documentation will be included with the analytical laboratory's report. The COC will include the date and time the sample was collected, the sample identity, sampling location, and requested analysis.

The analytical laboratory results for groundwater monitoring samples will be reported in NYSDEC ASP Category B deliverable reports. The analytical laboratory that performs the ASP analysis will provide internal (QA/QC) data required by the NYSDEC ASP protocol, including analyses performed on method blanks, and surrogate recovery results.

In order to provide control over the collection, analysis, review and interpretation of analytical data, the following QA/QC samples will be included as part of this project.

- One trip blank will be included per 10 liquid samples or per shipment if less than 10 samples. [Note: This only applies for shipments containing liquid field samples (i.e., groundwater samples) that are to be analyzed for VOCs.] The trip blanks will be analyzed for VOCs.

- One matrix spike/matrix spike duplicate (MS/MSD) will be analyzed during the during each groundwater sampling event. Specific parameters that MS/MSD samples will be tested for will be dependent upon the test parameters of the samples being analyzed.

- One field blank (i.e., rinsate sample) will be collected from reusable groundwater sampling equipment. It is anticipated that this equipment rinsate will be tested for the same parameters as the environmental samples.

Decontamination Procedures

To reduce the potential for sample cross-contamination during this project, the following procedures will be implemented to ensure that the data collected (primarily the laboratory data) is acceptable.

It is anticipated that most of the materials used to assist in obtaining samples will be disposable one-use materials (e.g., sampling containers, bailers, rope, pump tubing, latex gloves, etc.). When equipment must be re-used (e.g., static water level indicator, oil/water interface meter, drilling equipment, etc.), it will be decontaminated using one or more of the following methods:

- Steam clean the equipment; or
- Rough wash in tap water; wash in mixture of tap water and alconox-type soap; double rinse with deionized or distilled water; air dried and/or dried with clean paper towel.

Split spoons and other re-usable equipment will be decontaminated between each use. When deemed necessary, a temporary decontamination pad will be constructed for decontamination of equipment. Any decontamination liquids and disposable equipment and personal protective equipment (PPE) will be containerized in NYSDOT-approved 55-gallon drums and staged on-site. Once a proper disposal method is determined, these materials will be disposed of in accordance with applicable regulations.

Remedial Designer

DAY will serve as the remedial designer during the remedial action construction. Design support during remedial construction will be provided by a team of engineers, scientists, and/or technicians. DAY will maintain at least one person on-site full time during the completion of remedial construction activities. If the need arises (e.g., several major construction activities taking place simultaneously) additional Day representatives will be mobilized to the Site. The responsibilities of the remedial designer during remedial action construction include:

- Prepare an agenda for, officiate at, and record project meeting minutes, including construction and meetings, substantial completion, or other meetings as necessary;

- Monitor and coordinate the remedial action contractor's work in relation to the schedule and conformance with the contract documents;

- Receive and review shop drawings and other material submittals from the remedial action contractor and submit to the owner's representative, if required, for review. Coordinate with the remedial action contractor to incorporate the remedial designer review comments;

- Schedule and coordinate quality assurance (QA) monitoring activities with the Quality Assurance Official (QAO);

- Review all proposed design and specification changes;

- Provide clarifications to the contract drawings and technical specifications;

- Be present for on-site monitoring of remedial action construction activities;

- If appropriate, stop the project in the absence of the owner's representative or his designee;

- Maintain on-site project record drawings and project file for storing copies of reports generated during remedial action construction.

Design and specification changes will be transmitted form the remedial action contractor for subsequent review and approval by the remedial designer. Materials and construction changes proposed during construction will be evaluated for compliance with the intent of the contract drawings and technical specifications.

Quality Assurance Official

The QAO will be responsible for overseeing and implementing the Construction Quality Assurance (CQA) program on a full-time basis and will report directly to the remedial designer. The QAO will be responsible for reviewing each stage of construction activities and will have authority to reject materials and workmanship provided by the remedial contractor that are not in compliance with the contract documents. Responsibilities of the QAO include the following:

- Review of the contract drawings, technical specifications, and related work plans to verify compliance with project requirements;

- Coordinate construction activity status, schedule, progress, details and requirements with the remedial designer and the remedial contractor;

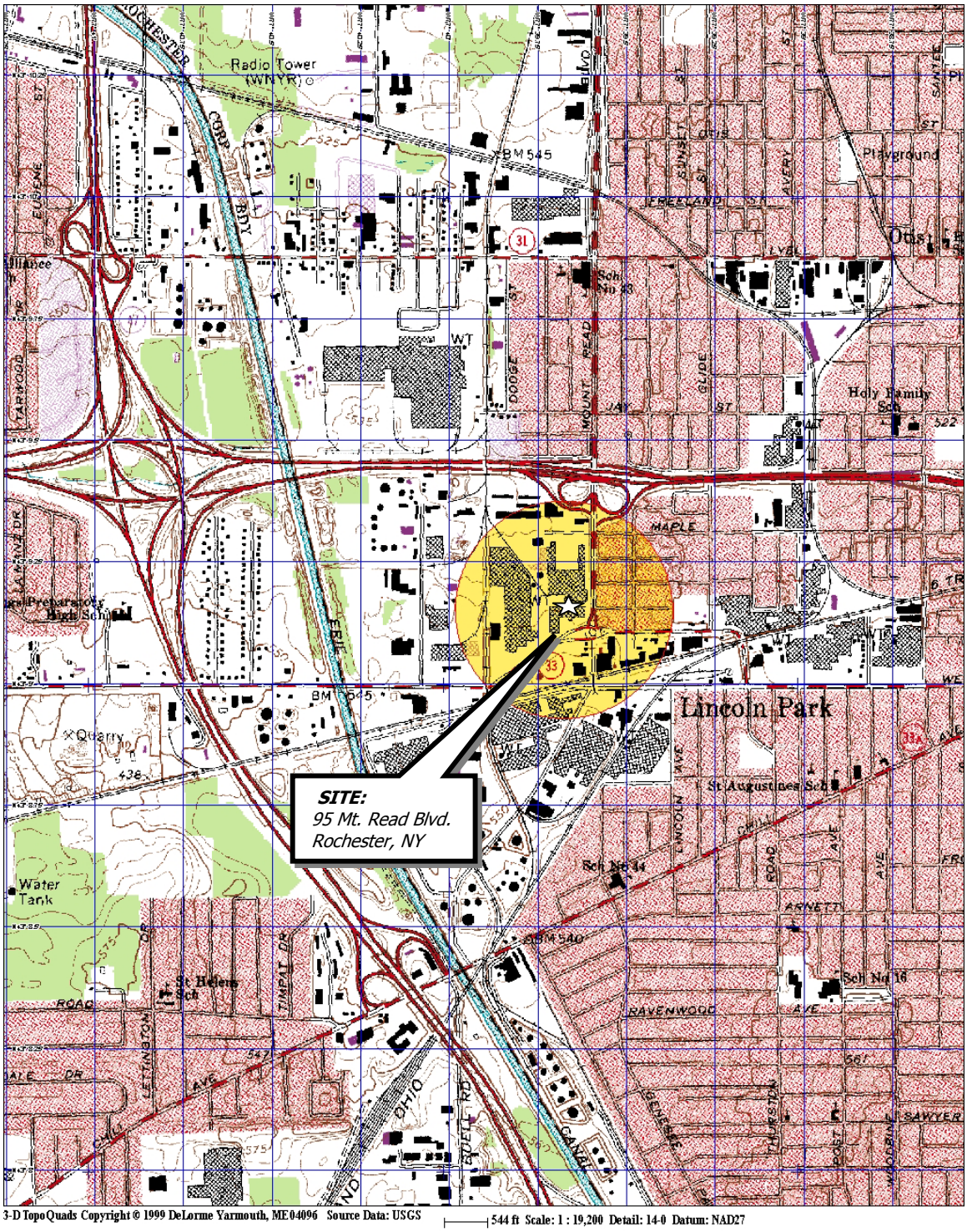
- Review, in conjunction with the remedial designer, corrective measures to be implemented during construction when deviations from the remedial action construction plan occur;

- Monitor and document test boring advancement and well installation;

- Work with the remedial designer to determine that testing equipment used and tests performed are in accordance with the technical specifications and industry standards;

- Observe, document, and report on tests performed;

- Report any identified deficiencies that are not satisfactorily corrected to the remedial designer.



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SEWER USE DISCHARGE PERMIT

Note: The sewer use discharge permit shown on the following pages has been renewed continuously since time of issuance, and remains open and valid. As this discharge permit already covers discharge of pretreated groundwater, Monroe County has stated that no new discharge permit will be necessary, and that discharges from the new groundwater treatment system will be covered under this existing permit.

INITIAL INDUSTRIAL SEWER USE PERMIT

County of Monroe Pure Waters District No. 8520

Water account #(s): _____

Permit No. 692

Expires: 8/31/92

Fee: 40.00

W/C expires: 2/13/92

Firm Name: THOMAS MAGUIRE

Address: 95 Mt. Read Boulevard MAILING ADDRESS: 770 Rock Beach Road

Rochester, NY 14611 Rochester, NY 14617

Type of Business or Service: Metal Finishing

I. The above-named applicant is permitted to discharge wastes into the Pure Waters Sewer System or Tributary thereto as applied for by an application dated 7/3/91 and verified by the applicant except the Director of Pure Waters requires the following terms and conditions to govern the permitted discharge:

A. _____

B. _____

C. _____

II. The applicant further agrees to:

1. Accept and abide by all provisions of the Sewer Use Law of Monroe County and of all pertinent rules or regulations now in force or shall be adopted in the future.

2. Notify the Director of Pure Waters in writing of any revision to the plant sewer system or any change in industrial wastes discharge to the public sewers listed in Exhibit "B". The latter encompasses either (1) an increase or decrease in average daily volume or strength of wastes listed in Exhibit "B" or (2) new wastes that were not listed in Exhibit "B

3. Furnish the Director of Pure Waters upon request any additional information relating to the installation or use of sewer or drain for which this permit is sought.

4. Operate and maintain any waste pretreatment facilities, as may be required as a condition of the acceptance into the public sewer of the industrial wastes involved, in an efficient manner at all times, and at no expense to the County.

5. Cooperate with the Director of Pure Waters or his representatives in their inspecting, sampling, and study of wastes, or the facilities provided for pretreatment.

6. Notify the Director of Pure Waters immediately of any accident, negligence, breakdown of pretreating equipment, or other occurrence that occasions discharge to the public sewers of any wastes or process waters not covered by this permit.

Type or print: Thomas Maguire Phone No. (716) 338-2269

Applicant's Signature & Title: x Thomas E Maguire Date: x 7/3/91

Name of person to be contacted for inspection or emergency purposes:

x Dennis Maguire John E Jackson PE Phone No. (716) 338-2269

Date: AUG 30 1991

COUNTY OF MONROE
SEWER USE PERMIT ENCLOSURE 1992

THOMAS MAGUIRE
95 Mt. Read Boulevard
Rochester, N.Y. 14617

PERMIT NUMBER: 692
DISTRICT NUMBER: 8520

TYPE OF BUSINESS: Groundwater Remediation
SIC CODE: N/A
LAST INSPECTION DATE: N/A
PROJECTED 1992 FLOW: no greater than 1 gpm
SAMPLE POINT: sample port - downstream of second carbon column

---

REQUIRED MONITORING

SELF MONITORING FREQUENCY:

Initial :	The first ten (10) batches shall be sampled and tested before approval to discharge to sewer is allowed.
Intermediate :	Every tenth batch will be sampled and tested. Discharge can be continuous from treatment operation
Long Term :	After intermediate operation has been completed, quarterly monitoring of the discharge shall commence.

SAMPLING PROTOCOL: Sampling and analysis shall be performed in accordance with the techniques prescribed in 40CFR part 136 and amendments thereto. A grab sample, collected from the above noted sample point shall be analyzed for the following:

Purgeable Aromatics, EPA Method 601
Purgeable Halocarbons, EPA Method 602
Acetone

DISCHARGE LIMITATIONS : The summation of purgeable aromatics and purgeable halocarbons shall not exceed 2.1 ppm. Acetone shall not exceed an action level of 20ppm.

NOTE: In addition to the parameters / limits outlined above, total facility discharge shall meet all the concentration values as described in Article II, Section 10e of the Monroe County Pure Waters Districts, Rules and Regulations-Sewer Use Law of the County of Monroe. Pursuant to Article VIII, Section 8.4k, the permittee shall immediately contact the District when a discharge known to be in violation of any permit requirement has occurred. This notification shall be directed to the Industrial Waste Section during normal

Brownfield Cleanup Program

Former General Circuits Facility
Site #C828085
95 Mount Read Blvd., LLC

Eliot Spitzer, Governor
Alexander B Grannis, Commissioner
Robert J. Duffy, Mayor

Transform the Past…. Build for the Future

New York State Department of Environmental Conservation

FACT SHEET

Brownfield Cleanup Program

Former General Circuits, Inc. **January 2008**
Rochester, NY
C828085

Remedial Action to Address Brownfield Site Contamination to Begin

Construction is about to begin at the former General Circuits facility located at 95 Mount Read Boulevard in the City of Rochester in Monroe County (Site) under New York State's Brownfield Cleanup Program (BCP). See map for the location of the site. 95 Mt. Read Blvd., LLC will soon begin remedial activities to address contamination at the site with oversight provided by the New York State Department of Environmental Conservation (NYSDEC).

NYSDEC previously accepted an application submitted by 95 Mt. Read Blvd., LLC to participate in the BCP. The application proposes that the site will be used for commercial/industrial purposes.

Highlights of the Upcoming Site Remedial Activities

The upcoming remedial activities have several goals:

1) remediate groundwater contamination at the site, and
2) account for the intended or reasonably anticipated future use of the site.

"Remedial activities" and *"remediation"* refer to the necessary actions to address any known or suspected contamination associated with the site.

In the upcoming months, 95 Mt. Read Blvd., LLC will be implementing a remedial action (clean up) as stipulated in the Record of Decision (ROD) dated March 2005. The ROD specifies remediation of both soils and groundwater at the site. The construction necessary for the next phase of the cleanup will take place on-site (i.e., within and in proximity to the on-site building), and will address contaminated groundwater. Groundwater remediation will be performed using an extraction (pump) and treatment system designed to contain the contaminant plume (i.e. prevent contaminants from moving off of the site), and to remove the contaminants from the groundwater. The components of the groundwater extraction and treatment system include:

Brownfield Cleanup Program: New York's Brownfield Cleanup Program (BCP) encourages the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and redeveloped. These uses include recreation, housing and business.

A **brownfield** is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination.

For more information about the BCP, visit:
http://www.dec.ny.gov/chemical/brownfields.html

- Installation of four groundwater extraction wells on-site. Three of the extraction wells will be located inside the building to focus on the most contaminated areas. The fourth extraction well will be placed outside of the building, adjacent to the building's northeast exterior wall. The purpose of this exterior well is to prevent groundwater contaminants from moving off-site. Pumps installed in each extraction well will continuously withdraw groundwater for treatment. Groundwater will also be extracted from the basement sump

system. Installation of the groundwater extraction wells is anticipated to begin by March of 2008.

- Installation of four new on-site groundwater monitoring wells. The monitoring wells will be periodically tested to determine if the extraction and treatment system is successfully cleaning up the groundwater.

- Installation of an on-site groundwater treatment system to remove contaminants from the extracted groundwater prior to discharging it to the Monroe County sanitary sewer system. The groundwater treatment system will handle an estimated flow of 3.5 gallons per minute and will be located in the basement. Testing will be performed to verify that the treatment system successfully reduces contaminants to levels compliant with the site's sanitary sewer discharge permit.

The construction work described herein will be completed on-site, with the majority of the work being completed indoors, in an area that is primarily industrial in nature. Impacts upon the general public are anticipated to be minor, consisting primarily of some noise being generated during installation of the groundwater wells. Impacts upon current tenants of the building will include general construction noise and site access limitations during construction, the most significant of which will be temporarily blocked hallways and other site areas. To minimize these impacts, some construction activities will be scheduled for completion during off-hours (nights and weekends), as feasible. Site activities will be monitored in accordance with the project's Health and Safety Plan and Community Air Monitoring Plan to minimize potential exposures.

Next Steps

95 Mt. Read Blvd., LLC is expected to begin groundwater remedial activities at the site by March of 2008. The construction activities are expected to take two to three months to complete. The groundwater extraction and treatment system will operate for 5 to 10 years, or until chromium concentrations are reduced to levels that will not interfere with other planned groundwater remediation activities. NYSDEC will oversee the remedial activities.

The construction of the groundwater extraction and treatment system represents one part of the overall cleanup plan for the former General Circuits site. Sub-slab depressurization systems and air purifiers were previously installed at the site to limit human exposures to contaminant vapors. These systems are tested to verify that they are effective and corrective measures are taken as needed. Other parts of the cleanup plan that will be completed in the future include:

- removal and off-site disposal of chromium contaminated soils from the area of greatest contamination located underneath a portion of the building;

- *in-situ* (in place) chemical reduction of the contaminated groundwater;

- development of a Site Management Plan;

- implementation of an institutional control in the form of an environmental easement; and

- periodic certification that the remedy remains effective.

Upon completing all remedial activities, 95 Mt. Read Blvd., LLC must submit to NYSDEC a Final Engineering Report (FER). The FER will describe the remedial activities completed and certify that remediation requirements have been achieved or will be achieved.

Once NYSDEC is satisfied that remediation requirements have been achieved or will be achieved for the Site, it will approve the FER. NYSDEC will then issue a Certificate of Completion to 95 Mt. Read Blvd., LLC. Upon issuance of a Certificate of Completion, 95 Mt. Read Blvd., LLC:

- has no liability to the State for contamination at or coming from the site, subject to certain conditions; and

- is eligible for tax credits to offset the costs of performing remedial activities and for redevelopment of the site.

A fact sheet will be sent to the site contact list that describes the content of the FER. The fact sheet will identify any institutional controls (for example, an environmental easement) or engineering controls (for example, a site cap) necessary at the site in relation to the issuance of the Certificate of Completion.

Background

The site consists of approximately 3.5 acres of land which is zoned industrial/commercial and which has been improved with a single story 108,000 square-foot building with a partial basement. The original portion of the building was constructed in 1920 and was reportedly owned and operated by Rochester Lithograph Corporation, which used the site as a printing facility. General Circuits became the owner/operator in the early 1960's and manufactured printed copper circuit boards using chromic acid as an etching agent. As a result of bankruptcy, General Circuits closed the facility in 1990.

Environmental investigations of the property were performed in 1990 as part of the property transfer procedure. The results indicated that groundwater beneath the building was contaminated with various volatile organic compounds (VOCs), including the chlorinated VOCs trichloroethene (TCE) and perchloroethene (PCE). TCE and PCE are commonly used in industrial processes for removing grease from parts. Maguire Properties Inc. (MPI) purchased the site in 1991, and subdivided and leased the building to small light industrial and commercial businesses. In 1992 a groundwater treatment system was installed to treat the basement sump effluent to meet Monroe County Pure Waters permit requirements for discharge to the sanitary sewer system.

Additional investigation activities were performed between 1992 and 1995. The results from these investigations indicated that chromium was also present at elevated concentrations in soil and groundwater. The highest concentrations were located within a former shipping room that was identified as the likely source area. In 1996, a removal action was conducted in the chromium source area. The removal action included the excavation and removal of floor drains, soil and an underground sump in the former shipping room. At the conclusion of the removal efforts, elevated chromium concentrations remained in the subsurface soil.

In 1998, MPI signed an Order-on-Consent, with NYSDEC. The agreement required MPI to conduct a formal Remedial Investigation (RI) to assess the environmental contamination associated with the site and subsequently complete a Feasibility Study (FS) to evaluate options for cleanup. The RI was completed in several phases between 1998 and 2004. The RI results confirmed that soil and groundwater beneath portions of the building were contaminated with chromium and VOCs; however, the surrounding properties did not appear to be impacted. The results also indicated that TCE and PCE were present as vapors beneath select portions of the building. To address the TCE and PCE vapors, a sub-slab depressurization system was installed to extract vapors from underneath the building and vent it to the outside air via roof penetrating pipes. In addition, activated carbon air purifiers were also installed in the building in areas where it was determined the sub-slab depressurization system had no effect. The effectiveness of these measures is being evaluated.

The FS was completed in January 2005. Based on the results of the RI/FS, NYSDEC issued a ROD dated March 2005 in which soil removal and groundwater extraction and treatment followed by *in-situ* chemical reduction was selected as the remedy.

MPI transferred the property to the current owner, 95 Mt. Read LLC, in 2005. Subsequently, 95 Mt. Read Blvd., LLC submitted a BCP application that was accepted in June 2005. The remedial work identified in the March 2005 ROD will be conducted under a Brownfield Cleanup Agreement between 95 Mt. Read Blvd. LLC and NYSDEC. Documents associated with the RI, FS, ROD, and BCP application are available for review at the document repositories listed below.

FOR MORE INFORMATION

Document Repository
Local document repositories have been established at the following locations to help the public review important project documents. These documents include the Remedial Design Work Plan for the groundwater extraction and treatment system and the application to participate in the BCP accepted by NYSDEC:

Arnett Branch Library
310 Arnett Boulevard
Rochester, New York
(585) 428-8214
Hours:
Mon & Wed: 12-6
Tues: 10-8
Thurs: 11-8
Fri: 12-5
Sat: 12-4
Sun: Closed

NYS Department of Environmental Conservation
Region 8 Office
6274 E. Avon-Lima Rd.
Avon, NY 14414-9519
Hours: Monday – Friday 8:30-4:45
(585) 226-5326
(Contact Lisa A. LoMaestro Silvestri for an appointment)

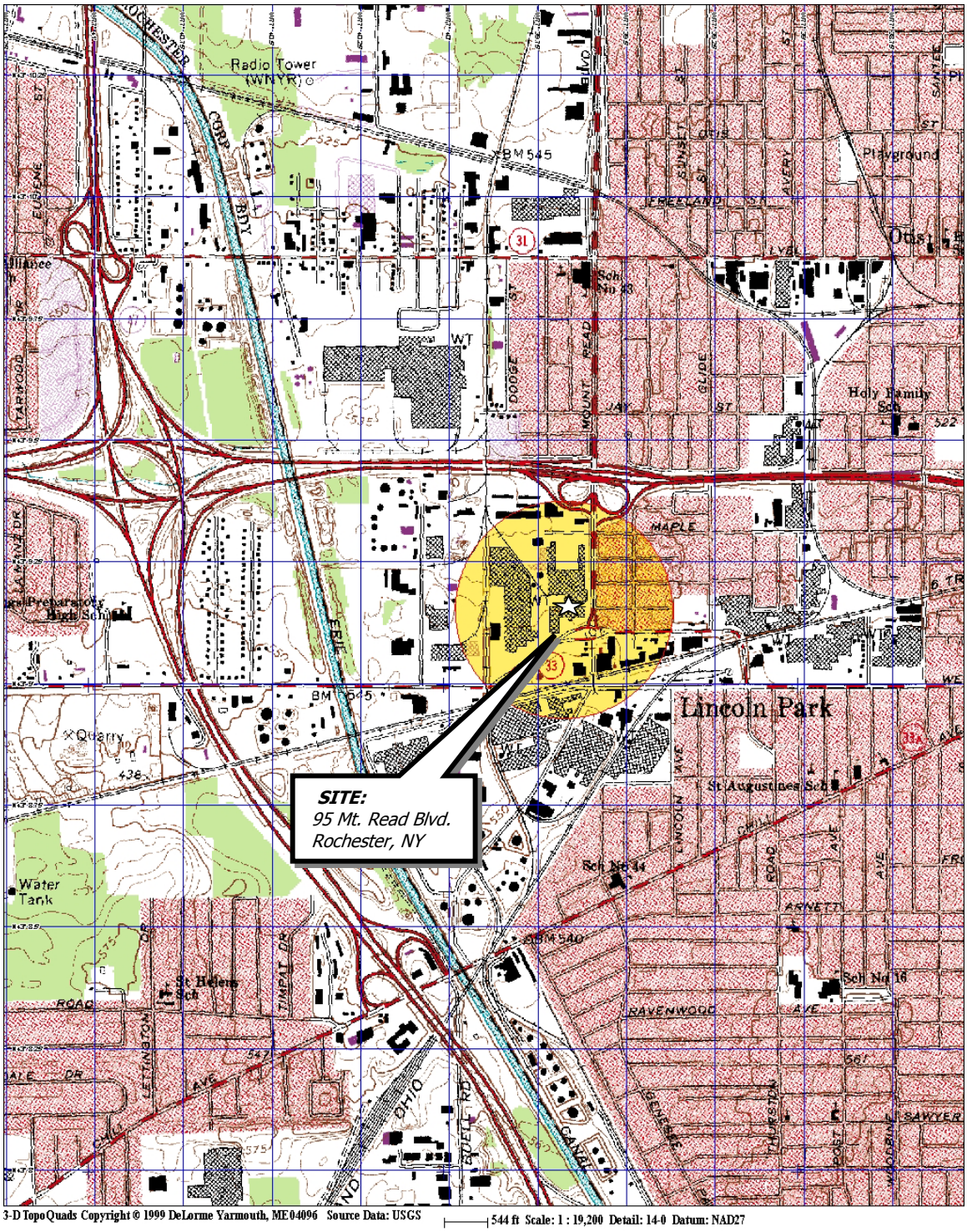
Who to Contact
Comments and questions are always welcome and should be directed as follows:

<u>Project Related Questions</u>
Frank Sowers P.E., Project Manager
(585) 226-5357
Lisa A. LoMaestro Silvestri,
Citizen Participation Specialist
(585) 226-5326
New York State Department of Environmental Conservation
6247 East Avon-Lima Road
Avon, NY 14414-9519

<u>Site-Related Health Related Questions</u>
Melissa Menetti
New York State Department of Health
Flanigan Square
547 River Street
Troy, NY 12180
(518) 402-7860
1-800-458-1158 ext. 27870

Joseph Albert
Monroe County Health Department
111 Westfall Road - PO Box 92832
Rochester NY 14692
(585) 753-5904

If you know someone who would like to be added to the project mailing list, have them contact the NYSDEC project manager above. We encourage you to share this fact sheet with neighbors and tenants, and/or post this fact sheet in a prominent area of your building for others to see.



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