PROPOSED REMEDIAL ACTION PLAN
1200 East Main Street
Environmental Restoration Project
City of Rochester, Monroe County, New York
Site No. B-00129-8

February 2006

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration Project

PROPOSED REMEDIAL ACTION PLAN

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the 1200 East Main Street site. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this proposed remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

As more fully described in Sections 3 and 5 of this document, past operation of the site as a gasoline filling station and automobile repair facility has resulted in the disposal of hazardous substances, including petroleum-related volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). These hazardous substances have contaminated the soil and groundwater at the site, and have resulted in:

- a threat to human health associated with potential exposure to contaminated soil and groundwater, as well as potential inhalation of contaminated indoor air at an adjacent residential building or at any future buildings at the site.

- an environmental threat associated with the impacts of contaminants to soil and groundwater.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy to allow for restricted commercial/industrial use of the site:

- A remedial design program to provide the details necessary to implement the remedial program;

- Removal and off-site disposal of free-phase product from existing groundwater monitoring wells at the site;

- Removal and off-site disposal of contaminated overburden soils in source areas at the site;

- Treatment of dissolved-phase contaminants in groundwater via a direct oxygen injection system or air sparging system;

- Installation of a soil vapor extraction system to recover contaminants that are volatilized into soil gas by the oxygen injection or air sparging system;

- Continued operation and maintenance of the existing sub-slab ventilation system in the basement of the adjacent 1214/1216 East Main Street building to prevent site-related contaminants from entering the structure;

- Development of a site management plan to address residual contamination and any use restrictions;

- Imposition of institutional controls in the form of an environmental easement;

- Periodic certification of the institutional and engineering controls; and

- An operation, maintenance, and monitoring program to track remedial progress and confirm its effectiveness.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the September 2005 “Site Investigation/Remedial Alternatives Report (SI/RAR)”, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Rochester Public Library
Sully Branch
939 Bay Street
Rochester, NY 14609
(585) 428-8208
Hours: Mon & Thu: 12 PM - 6 PM
Tue, Wed, Fri: 11 AM - 6 PM
Sat: 10 AM - 1 PM
Contact: Jean McClure

City of Rochester
Department of Environmental Services
30 Church Street, Room 300B
Rochester, NY 14614
(585) 428 - 6855
Hours: Mon-Fri: 8 AM - 5 PM
Contact: Jane Forbes (585) 428-7892

NYS Department of Environmental Conservation
Region 8 Office
6274 E. Avon-Lima Rd.
Avon, NY 14414-9519
(585) 226-5326
Hours: Mon-Fri: 8:30 AM - 4:45 PM
Contact: Gregory B. MacLean, P.E.,
Project Manager (585) 226-5356

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 13, 2006 through March 29, 2006 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 27, 2006 at the Rochester Public Library, Winton Branch, located at 611 N. Winton Rd. in Rochester beginning at 6:30 PM.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. MacLean at the above address through March 29, 2006.

The NYSDEC may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is located at 1200 East Main Street in the City of Rochester, Monroe County, near the northwest intersection of East Main and Laura Streets (see Figure 1). The site is approximately 0.52 acres in size and is currently vacant. Other than a vegetated area at the northern end of the property and the former building area, the site is covered with asphalt pavement (see Figure 2). It is located in an urban area east of downtown Rochester. The surrounding area consists of mixed commercial and residential properties. There are no surface water bodies in the vicinity of the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site was formerly improved with an approximate 1,600 square foot one-story building that was reportedly constructed in 1928. The building was demolished in January 2003 by the City of Rochester due to its state of disrepair. Historic use of this facility as an automobile service facility and filling station resulted in the disposal of hazardous substances. There are no records or reports of spills during the site's operation. However, past leakage from underground petroleum storage tanks and piping systems/filling areas is evident. Other potential sources of contamination identified at the site include a floor drainage system and subsurface vehicle lift unit in the former building. Waste oil dumping is also suspected to have occurred to the unpaved ground surface in the northern portion of the property.

3.2: Remedial History

There have been no known environmental investigations or remedial actions to address hazardous substance disposal at the site prior to the site investigation discussed in this PRAP.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. The City of Rochester will assist the state in its efforts by providing all information to the state which identifies PRPs. The City will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 5: SITE CONTAMINATION

The City of Rochester has recently completed a site investigation/remedial alternatives report (SI/RAR) to determine the nature and extent of any contamination by hazardous substances at this environmental restoration site.

5.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The SI was conducted between June 2000 and October 2004. The field activities and findings of the investigation are described in the SI report.

The following activities were conducted during the SI:

- Research of historical information;
- A magnetic locator survey to determine possible underground tank locations;
- Collection of 15 surface soil samples to identify and delineate potential contaminant exposure concerns;
- Excavation of 15 test pits and trenches for a visual and analytical evaluation of subsurface soils in suspect source areas;
- Installation and sampling of 21 soil borings and 14 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions; and
- Collection of 5 sub-slab vapor samples, 3 indoor air samples, and 2 outdoor air samples.

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC “Ambient Water Quality Standards and Guidance Values” and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC “Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".

Based on the SI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI report.

5.1.1: Site Geology and Hydrogeology

Soils identified at the site during this investigation consist of heterogeneous fill material and native glacial till to depths of 11.5 to 15.5 feet below grade, overlying Lockport Dolomite bedrock. The fill material generally consists of reworked soil (i.e., silt, sand, gravel, clay) with lesser amounts of brick, glass, concrete, wood, and metal. The glacial till primarily consists of sandy silt and clay with lesser amounts of gravel.

Groundwater was encountered at an average depth of 13 to 15 feet below the ground surface. Groundwater typically flows in a bimodal directional pattern; to the northwest in the northern portion of the site and to the southeast in the southern portion of the site (see Figure 5). The average bedrock hydraulic conductivity was calculated to be 1.338 feet/day. In June 2004, the estimated hydraulic gradient to the northwest was 0.023 feet/foot and to the southeast was 0.064 feet/foot. Using an estimated effective porosity of dolomite bedrock of 15%, groundwater velocity at the site is estimated to be 0.27 feet/day to the northwest and 0.57 feet/day to the southeast.

There is public water serving the area and groundwater is not being utilized for drinking water purposes.

5.1.2: Nature of Contamination

As described in the SI report, many soil and groundwater samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Limited instances of inorganics (metals) and polychlorinated biphenyls (PCBs) were also detected at the site in excess of SCGs.

The VOCs of concern are petroleum-related compounds, such as benzene, toluene, ethylbenzene, and xylenes. These compounds vary in their toxicity with benzene being more toxic. Benzene is also a known human carcinogen. These compounds volatilize readily into air and generally dissolve only slightly into groundwater.

The SVOCs of concern are also primarily petroleum-related and include polycyclic aromatic hydrocarbons (PAHs). Many of the PAH compounds detected at the site are carcinogenic. PAHs do not volatilize readily into air nor do they dissolve easily in water. PAHs tend to absorb onto soil particles.

The above organic compounds will biodegrade both aerobically and anaerobically (in the absence of oxygen), but generally biodegrade faster in an aqueous setting under aerobic conditions. Other factors such as advection, dispersion, sorption, and diffusion contribute to decreased concentrations with distance from source areas.

The inorganics detected at levels above SCGs at the site are arsenic, lead, mercury, and silver. The instances of these metals exceeding SCGs were infrequent and not indicative of a significant concern. Elevated levels of lead at the site may be related to its former use as an additive to gasoline. No source of the other inorganics at the site has been identified and their presence may be attributed to naturally occurring background conditions in an urban setting. These inorganics generally have limited mobility, do not readily degrade, and are persistent in the environment.

PCBs (primarily Aroclor 1242) were detected above SCGs in one off-site surface soil sample associated with the project and its detection is not considered significant.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for soil, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in soil, groundwater and air, and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Light non-aqueous phase liquid (LNAPL) was identified on top of groundwater in four monitoring wells (MW-3, MW-4, MW-7, and MW-9), which are located in the central to southeast portion of the site (see Figure 2). Laboratory analysis on samples of the LNAPL determined the product to be gasoline. The extent of the LNAPL plume has been defined, as depicted on Figure 6. The thickness of LNAPL identified in each of the 4 monitoring wells at the site is summarized as follows:

- MW-3: 0.06 to 0.56 feet;
- MW-4: 0.02 to 0.23 feet;
- MW-7: 0.79 to 1.46 feet;
- MW-9: 0.01 to 0.875 feet.

Surface Soil

A total of 15 surface soil samples were collected during this project from zero to two inches below grade. Sample locations are shown on Figure 2 with an “SU” or “SSU” designation.

Three surface soil samples (SU-17 through SU-19) were initially collected from the northern unpaved area of the site. These samples were analyzed for VOCs, SVOCs, PCBs, and inorganics. Based on elevated detections of

SVOCs in these samples, eleven additional surface soil samples (SSU-1 through SSU-11) were collected to better define the extent of these impacts, including six off-site locations on adjacent residential properties to the north and east.

The compounds detected above SCGs in surface soils are listed on Table 1 and are primarily SVOCs. The magnitude of the SVOC exceedances was up to 311 times the SCG (benzo(a)pyrene at 19 ppm in sample SSU-4 vs. the SCG of 0.061 ppm). The highest elevated detections were identified in the locations of samples SSU-4 and SSU-5 in the northeast corner of the site. Adjacent off-site sample locations SSU-10 and SSU-11 exhibited significant decreases in contaminant concentrations.

In order to assist in the evaluation of potential exposure concerns associated with SVOCs in surface soil, the data were reduced to total PAHs, carcinogenic PAHs (cPAHs), and benzo(a)pyrene (BAP) toxicity equivalents for each sample location. These data are provided on Figure 3. For comparison purposes, Rochester background surface soil data that was developed for the nearby APCO ERP project (B-00001-8) was used. These background surface soils had an average cPAH concentration of 12.346 ppm and an average BAP toxicity equivalent of 3.196 ppm. Samples for the 1200 East Main Street project with total cPAHs in excess of 12 ppm and/or BAP toxicity equivalents in excess of 3 ppm are limited to on-site surface soil locations SSU-2 through SSU-5.

Inorganics detected at levels above SCGs in surface soil samples were limited to arsenic, lead, and mercury. Arsenic was detected at a maximum concentration of 11.6 ppm (vs. the SCG of 7.5 ppm), lead was detected at a maximum concentration of 1,050 ppm (vs. the SCG of 200-500 ppm) and mercury was detected at a maximum concentration of 0.44 ppm (vs. the SCG of 0.1 ppm). These limited instances of inorganics exceeding SCGs in surface soils may be attributed to the local geology or urban setting of the site and are not considered significant.

PCBs (primarily Aroclor 1242) were detected in one off-site surface soil location (SSU-7) at a total concentration of 3.012 ppm vs. the SCG of 1.0 ppm. No other PCBs were detected in surface soil samples for the project. This single relatively low-level detection of PCBs is not considered significant.

VOCs were not detected in surface soil samples at levels above SCGs.

Subsurface Soil

A total of 47 subsurface soil samples were collected during this project and analyzed for some or all of the following analytes: VOCs, SVOCs, PCBs, inorganics and/or ethylene glycol. Sample depths ranged from approximately 1 to 14 feet below grade. Of these 47 samples, 34 were collected from excavations associated with tank pits, the pump island, test trenches, and the building foundation at the site (designated with TP, PP, TT, and F prefixes, respectively on Figure 2), and 13 were collected from soil borings (designated with an SS or GEO prefix on Figure 2).

The compounds detected above SCGs in subsurface soils are listed on Table 1 and are primarily VOCs and SVOCs. The magnitude of the exceedances was up to 43 times the SCG for VOCs (m,p-xylene at 52 ppm in sample TT-13A vs. SCG of 1.2 ppm) and up to 39 times the SCG for SVOCs (benzo(a)pyrene at 2.4 ppm in sample TT-2 vs. SCG of 0.061 ppm). The maximum level of total VOCs was 289 ppm in sample SS-10 vs. the SCG of 10 ppm. The maximum level of total SVOCs was 207 ppm in sample F-2 vs. the SCG of 500 ppm. Sample locations exhibiting SCG exceedance for VOCs include TP-2, TP-7, TP-8, PP-9, SS-10, TT-12, TT-13A, and F-2. Sample locations exhibiting SCG exceedance for SVOCs include TP-3, TP-7, TT-2, TT-4, F-1, F-2, and F-3. These samples are all located in the vicinity of the former building, tank pits, and pump island (see Figure 4).

Inorganics detected at levels above SCGs in subsurface soil samples were limited to arsenic, lead, mercury, and silver. Arsenic was detected at a maximum concentration of 12 ppm (vs. the SCG of 7.5 ppm), lead was detected at a maximum concentration of 1,320 ppm (vs. the SCG of 200-500 ppm), and mercury was detected at a maximum concentration of 0.86 ppm (vs. the SCG of 0.1 ppm). Silver was detected in only one sample location at the site and at a concentration of 45 ppm (TP-7, 9 feet below grade). The SCG for silver is site background (SB). This single silver detection is believed to be anomalous and not indicative of a source area at the site. These limited instances of inorganics exceeding SCGs in subsurface soils may be attributed to the local geology or urban setting of the site and are not considered significant. The presence of lead in some subsurface soils at the site may also be related to its prior use as a gasoline additive.

PCBs and ethylene glycol were not detected in subsurface soil samples at levels above SCGs.

Groundwater

A total of 14 groundwater monitoring wells were installed as part of this project (designated with a MW prefix on Figure 2). Wells MW-1 through MW-4 were installed in July 2000, MW-5 through MW-12 were installed in July/August 2003, and MW-13 and MW-14 were installed in May 2004. All wells are constructed with two-inch diameter PVC and are screened at and beyond the bedrock/overburden interface. The well screens were positioned to intercept the groundwater table, which was generally encountered in the upper bedrock horizon. Screened intervals are generally in the range of 5 to 25 feet below grade.

Groundwater samples were collected from all available wells in August 2000, November 2000, September 2003, and June 2004, and were analyzed for some or all of the following analytes: VOCs, SVOCs, PCBs, inorganics, and/or ethylene glycol.

The compounds detected above SCGs in groundwater are listed on Table 1 and are primarily VOCs and SVOCs. Groundwater samples from wells MW-1 through MW-4 and MW-7 through MW-11 contained VOCs and SVOCs above SCGs in at least one of the sampling rounds. Groundwater samples from wells MW-5, MW-6, and MW-12 did not contain VOCs above SCGs, and only slight SCG exceedances for SVOCs, in any of the rounds. Groundwater samples from wells MW-13 and MW-14 did not contain VOCs or SVOCs above SCGs. The magnitude of the exceedances was up to 5,000 times the SCG for VOCs (1,2,4-trimethylbenzene at 25,000 ppb in the November 2000 sample from MW-4 vs. SCG of 5 ppb) and up to 41,500 times the SCG for SVOCs (chrysene at 83 ppb in the August 2000 sample from MW-2 vs. SCG of 0.002 ppb).

The maximum level of total VOCs was 61,600 ppb in the November 2000 sample from MW-4. The maximum level of total SVOCs was 7,900 ppb in the September 2003 sample from MW-4. There are no groundwater SCGs for total VOCs or SVOCs. Isometric contaminant contours for total VOCs are depicted on Figure 6, based on the June 2004 sampling data.

The only inorganic detected at levels above SCGs in groundwater samples was lead at a concentration of 120 ppb in the November 2000 sample from MW-4 vs. the SCG of 25 ppb. Lead was not detected in a subsequent sample collected from this well in September 2003. This single instance of lead exceeding its SCG in groundwater is not considered significant.

PCBs and ethylene glycol were not detected in groundwater samples at levels above SCGs.

Soil Gas/Sub-Slab Vapor/Air

A total of 10 sub-slab soil vapor/air samples were collected during this project and analyzed for VOCs. Five of these samples were collected of sub-slab soil vapor or from a sub-slab ventilation system, three were collected of indoor air, and two were collected of ambient outdoor air. There are no current SCGs for petroleum-related compounds in soil gas, indoor air, or outdoor air. However, the NYSDOH “Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes” dated February 2005 (Fuel Oil Study) was used as a reference for the indoor and outdoor air data.

One sub-slab soil gas sample was initially collected in the basement of the adjacent two-family residential building to the east of the site (1214/1216 East Main Street) in September 2003. This sample was collected due to the proximity of the building to the plume of contaminated groundwater at the site. In particular, the building is situated within 15 feet of MW-3, which contains LNAPL. The results of the September 2003 sample indicated moderately elevated detections of petroleum-related VOCs (e.g., m,p-xylenes at 11 $\mu g/m^3$). In addition, several chlorinated solvent compounds were detected (e.g.; tetrachloroethene at 38 $\mu g/m^3$); however, these types of compounds were not identified in any soil or groundwater samples associated with the project. The source of these chlorinated solvent compound is unknown, but could potentially be related to products formerly stored in the basement. Due to the petroleum detections and the proximity to LNAPL at the site, a sub-slab ventilation system was installed beneath the west side of the building in May 2004 to prevent contaminated soil vapors associated with the site from entering the structure (see Section 5.2).

Samples of the sub-slab ventilation system exhaust were collected in June, July, August, and September 2004. The indoor air in the basement of the building was sampled in August and October 2004. The indoor air in the first floor of the building was sampled in October 2004. Ambient outdoor air was sampled in July and October 2004.

Compounds detected at concentrations of potential concern (based on comparison to the referenced Fuel Oil Study) are listed on Table 1 for sub-slab soil-gas/ventilation system exhaust, indoor air, and ambient outdoor air samples. Toluene was generally the most elevated petroleum-related VOC and was detected at maximum concentrations of 46 $\mu g/m^3$ in the sub-slab soil gas/ventilation system exhaust, 42 $\mu g/m^3$ in indoor air, and 22 $\mu g/m^3$ in ambient outdoor air.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR.

In June 2000, five underground storage tanks (USTs) and associated piping and dispenser pumps were removed and transported off-site to a permitted disposal facility. The USTs consisted of one 3,000-gallon tank, two 4,000-gallon tanks, and two 6,000-gallon tanks and were used for the storage of gasoline and diesel fuel. Approximately 700 gallons of gasoline were also pumped from the tanks and properly disposed of off-site. The location of the excavation from which these five tanks were removed is identified on Figure 2 as “Tank Pit 1", which is located adjacent to the west of the former building. A separate excavation was completed to the south of the former building to remove the pump island and dispensers. This excavation is identified as “Pump Pit 1" on Figure 2.

Approximately 412.5 tons of grossly contaminated soils were removed from the excavations and transported off-site to a permitted waste disposal facility. Following the soil removal, surrounding soils were evaluated for evidence of contamination, including field PID screening techniques. Based on this evaluation, a total of 10 soil samples were collected from the bottom and side walls of the excavations (identified as samples TP-1 through TP-8, PP-9, and PP-10 on Figure 2). These soil sampling results are included in the discussion in Section 5.1. Evidence of petroleum release was present in many of these sampling locations.

In January 2003, the City of Rochester demolished the building at the site due to the safety hazard posed by its dilapidated condition.

In June 2003, a previously unknown 275-gallon UST was encountered during test trench activities at the site. This tank was located adjacent to the north side of the former building; identified as “Tank Pit 2" on Figure 2. Analytical results of sludge remaining in the tank indicated that it contained residual gasoline. The tank was subsequently removed and transported off-site to a permitted disposal facility. Two 55-gallon drums of sludge/rinse water that were generated as part of the removal were also properly disposed of off-site. No soils were removed from the site in association with this tank removal. Three soil samples (TT-4, TT-4A, and TT-4B) were collected from the bottom and sidewalls of the tank excavation and did not contain levels of VOCs above SCGs. One SVOC was detected at levels above SCGs in sample TT-4 from soils directly below the former tank (chrysene at 1.5 ppm vs. the SCG of 0.4 ppm).

Mitigation measures were taken at the two-family residential building located adjacent to the east of the site (1214/1216 East Main Street) to address potential human exposures (via inhalation) to volatile organic compounds associated with soil vapor intrusion. In May 2004, a radon-type sub-slab ventilation system was installed in the west side of the divided basement of the building (adjacent to the site). The system was installed in response to the presence of petroleum compounds in the September 2003 sub-slab soil gas sample and the building's proximity to MW-3, containing LNAPL (see Section 5.1). The system includes three sub-slab extraction points tied into a header that is exhausted above the building roof-line by a fully enclosed radon-type mitigation fan. The system layout is shown on Figure 6. Nearly all compounds detected in basement indoor air decreased in concentration in samples collected in October 2004 as compared to August 2004. The system is regularly inspected and maintained to ensure a negative pressure beneath the floor slab. Additional sampling of the sub-slab soil gas, basement/first floor indoor air, and ambient outdoor air will be performed at a point in the future before the system is shut down.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5.3 of the SI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There are no confirmed complete pathways that are known to exist either on-site or off-site at this time. Public water serves the area; therefore, ingestion of contaminated groundwater is unlikely. The following receptor population potentially may be exposed to site contaminants:

- Existing and future occupants of the adjacent two-family residential building to the east (1214/1216 East Main Street) should the basement ventilation system cease to operate;
- Persons in contact with contaminated surface soils identified on the northern portion of the site;
- Future site workers during excavation/construction activities; and

- Occupants of any future buildings at the site.

The primary potential pathways of exposure to site contaminants include the following:

- Inhalation of VOCs from contaminated soil and groundwater migration into indoor air;
- Direct contact or incidental ingestion of contaminated soils;
- Inhalation of contaminated dust generated during construction activities; and
- Direct contact or ingestion of contaminated groundwater.

Existing potential exposure pathways require remediation and/or controls. Since it is expected that this property will be developed for reuse, remediation and/or controls will also be required to mitigate the potential future exposure pathways.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

There are no significant environmental resources (i.e., creeks/streams, wetlands, habitats, etc.) located at or adjacent to the site. Based on the absence of any significant contamination in the downgradient monitoring wells adjacent to the site (MW-5, MW-6, MW-12, MW-13, and MW-14), off-site migration of site-related contaminants through groundwater to environmental receptors is not of concern. No pathways for environmental exposure or ecological risks have been identified. However, site contaminants have adversely impacted the groundwater resource at the site. Contaminated soils at the site may also continue to leach contaminants to the groundwater resource.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the 1200 East Main Street site is restricted commercial.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to VOCs and SVOCs in soil and groundwater;
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from subsurface soil and groundwater into indoor air through soil vapor.

Further, the remediation goals for the site include attaining to the extent practicable, SCGs for soil, groundwater, and indoor air.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the 1200 East Main Street Site were identified, screened and evaluated in the RA report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soil, groundwater and soil-gas at the site.

Alternative 1: No Further Action

Present Worth:	*$15,370*
Capital Cost:	*$0*
Annual OM&M:	*$1,000*

The No Further Action alternative recognizes remediation of the site conducted under previously completed IRMs. To evaluate the effectiveness of the remediation completed under the IRM, only continued monitoring is necessary.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Monitored Natural Attenuation (MNA)

Present Worth:	*$38,425*
Capital Cost:	*$0*
Annual OM&M:	*$2,500*

This alternative would leave the site as is and anticipates that natural attenuation of the subsurface contamination would occur over time. The approach is that natural remediation and breakdown of contaminants will occur without the implementation of engineered controls. Biodegradation, dilution/dispersion and/or adsorption may occur on site to reduce VOC and SVOC concentrations so that they are within SCGs over time.

A long-term monitoring program would be put into place, including groundwater quality monitoring and soil boring analysis at specified intervals. Attenuation can be measured through the formulation of data trends that indicate decreases in contaminant concentrations. Byproducts of natural attenuation may be measured as well. Deviations in the chemical makeup of the site's subsurface conditions can be monitored to determine if biodegradation of contaminants is occurring.

Groundwater monitoring would be conducted on a semi-annual basis using the existing monitoring wells on site. Subsurface soil sampling would also be performed on an annual basis.

The time to design and implement this remedy is expected to be 6 to 12 months. However, the remediation goals may not be met for many years.

Alternative 3: Product Recovery

Present Worth:	*$92,850*
Capital Cost:	*$16,000*
Annual OM&M::	*$5,000*

This alternative would address the presence of free-phase product (LNAPL) at the subject parcel, determined to be weathered gasoline, occurring primarily in the bedrock aquifer. Limited LNAPL also exists in the thin overburden water table aquifer. LNAPL has been occasionally detected at MW-9, at which a seasonal overburden water table above bedrock has been detected during periods of relatively high water table. The June 2004 sampling event indicated that free product covered an area of approximately 8,200 square feet. Removal of free product can be accomplished by physical recovery employing a variety of passive product skimming methods or active vacuum recovery. Depending on the type of system, electrical service and conveyance lines may be required. Recovered product would need to be disposed off-site at a permitted facility.

The time to design and implement this remedy is expected to be 6 to 12 months. However, the remediation goals may not be met for many years. Contaminated soils and dissolved phase contaminants in groundwater would not be directly addressed.

Alternative 4: Source-Area Soils Removal

Present Worth:	*$55,000*
Capital Cost:	*$55,000*
Annual OM&M::	*$0*

This alternative would involve the excavation and off-site disposal of contaminated overburden soils in source areas at the site. This would include subsurface soils associated with the former tank pits, pump island, and building area, as well as surface soils in the northern unpaved portion of the site.

For estimating purposes, it is presumed that approximately 1,000 cubic yards (i.e., approximately 1,500 tons) of contaminated soil would be removed from the site and disposed off-site at a regulated facility (i.e., landfill) as a non-hazardous petroleum-contaminated soil waste.

Confirmatory soil samples would be collected following excavation. The cleanup goals for subsurface soils would be TAGM 4046 Recommended Soil Cleanup Objectives for VOCs and SVOCs. The cleanup goal for on-site surface soils would be 5 ppm total cPAHs.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for overburden soils would be met upon implementation; however, free product in the bedrock and dissolved contaminants in groundwater would not be addressed.

Alternative 5: Groundwater Pump & Treat

Present Worth:	*$540,100*
Capital Cost:	*$79,000*
Annual OM&M::	*$30,000*

This alternative would aid in controlling migration of the groundwater off site. Recovery of free product would be enhanced with the removal of groundwater to establish an area of hydraulic containment, with the free product collecting in a depressed water table surface (cone of depression). This alternative would require removal of groundwater for treatment and discharge and removal of free product (pump and treat technology).

A containment and recovery system would be implemented to recover groundwater from the site using a series of recovery wells and a treatment system (i.e, low profile air stripper or equivalent) to treat recovered groundwater prior to discharge. New large diameter (4-inch) recovery wells would need to be installed to effectively recover contaminated groundwater.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for groundwater may be met over time; however, contaminated overburden soils would not be addressed.

Alternative 6: Direct Oxygen Injection

Present Worth:	*$720,170*
Capital Cost:	*$90,000*
Annual OM&M::	*$41,000*

This alternative would address dissolved phase VOCs in groundwater via direct injection of oxygen into saturated subsurface areas. Injection of oxygen is a potentially effective means of treating petroleum hydrocarbons because it promotes two significant removal mechanisms – biodegradation and volatilization. Oxygen injection is intended to remediate groundwater by enhancing biodegradation through increased growth and metabolic activity of naturally occurring aerobic bacteria that are able to digest petroleum-based contaminants. Remediation via increased volatilization of compounds from groundwater to the vadose zone also occurs, but at a lesser degree than with an air sparging system (Alternative 7).

Oxygen would be delivered via an oxygen generator and piping system leading to approximately 28 injection points to be installed at the site. The injection points would be spaced at approximately 30-foot intervals and at an approximate depth of 20-feet below grade surface to provide site coverage for in-situ groundwater treatment.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for groundwater may be met in 1 to 2 years; however, contaminated overburden soils would not be addressed and free phase product in groundwater would have to be otherwise addressed.

Alternative 7: Air Sparging

Present Worth:	*$551,840*
Capital Cost:	*$60,000*
Annual OM&M:	*$32,000*

This alternative would address dissolved-phase VOCs in groundwater via direct injection of ambient air into saturated subsurface areas. Air sparging is a potentially effective means of treating petroleum hydrocarbons because it promotes two significant removal mechanisms – biodegradation and volatilization. Air sparging can remove contaminants through volatilization, either directly, by "evaporating" the adsorbed phase, or indirectly, by stripping contaminated groundwater. In addition, this approach is efficient in that increasing oxygen concentrations in the saturated zone will enhance aerobic bioremediation and can impact a greater area on a per-point basis than direct oxygen injection (Alternative 6), but not to the same concentrations.

The air sparge system would consist of an air compressor and ancillary equipment, as well as a piping system leading to approximately 28 injection points to be installed at the site. The injection points would be spaced at approximately 30-foot intervals and at an approximate depth of 20-feet below grade surface to provide site coverage for in-situ groundwater treatment.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for groundwater may be met in 1 to 2 years; however, contaminated overburden soils would not be addressed and free phase product in groundwater would have to be otherwise addressed.

Alternative 8: Soil Vapor Extraction (SVE)

Present Worth:	*$576,950*
Capital Cost:	*$39,000*
Annual OM&M:	*$35,000*

This alternative would address contaminated unsaturated subsurface soils by the vacuum removal of soil vapors and increased air flow through the subsurface. In-situ stripping of the saturated zone would also assist in reducing VOCs in the subsurface. The SVE system would operate by applying a vacuum to a series of extraction points or horizontal laterals targeted in the unsaturated zone where soil vapor contains significant VOC concentrations. Extraction points and/or subsurface trenches would need to be installed.

Pre-treatment of the vapor stream prior to discharge at the site would likely be needed and would consist of activated carbon canisters on the discharge side of the SVE blower.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for unsaturated soils may be met over time; however, contaminated groundwater and free phase product would have to be otherwise addressed.

Alternative 9: Enhanced Bioremediation

Present Worth:	*$350,920*
Capital Cost:	*$39,000*
Annual OM&M:	*$16,000*

This alternative would address contaminated groundwater by using microorganisms to degrade organic compounds in an aerobic process. An aerobic bioremediation product (i.e., Oxygen Release Compound (ORC) or equivalent) would be introduced into the subsurface using dedicated injection points.

A number of dedicated application points would be installed through the overburden and into the bedrock to deliver the ORC and affect the groundwater interface zone. Installation of points would be performed by conventional drilling methods of auguring and roller bit well drilling for casing placement. Four-inch diameter PVC risers screened at the groundwater interface would be installed.

The time to design this remedy is expected to be 6 to 12 months and it is expected to take up to 6 months to implement. Remediation goals for groundwater may be met over time; however, contaminated overburden soils would not be addressed and free phase product in groundwater would have to be otherwise addressed.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the RA report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. <u>Protection of Human Health and the Environment</u>. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. <u>Compliance with New York State Standards, Criteria, and Guidance (SCGs)</u>. Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. <u>Short-term Effectiveness</u>. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. <u>Long-term Effectiveness and Permanence</u>. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. <u>Reduction of Toxicity, Mobility or Volume</u>. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. <u>Implementability</u>. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. <u>Cost-Effectiveness</u>. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a “modifying criterion” and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/RA reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing a combination of Alternative numbers 3, 4, 6, 7, and 8 (Product Recovery, Source-Area Soils Removal, and either Direct Oxygen Injection or Air Sparging, coupled with Soil Vapor Extraction) as the remedy for this site. A decision on whether to implement direct oxygen injection or air sparging can best be made after re-evaluation of groundwater quality at the site following the removal of free-phase product and source-area soils. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the SI and the evaluation of alternatives presented in the RAR. This remedy is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2.

The proposed remedy would achieve the remediation goals for the site by removing the free-phase product and source-area soils that create the most significant threat to public health and the environment, greatly reducing the source of contamination to groundwater, and creating the conditions needed to restore groundwater quality to the extent practicable. Alternatives 5 (Pump and Treat) and 9 (Enhanced Bioremediation) would also comply with the threshold selection criteria but to a lesser degree or with lower certainty.

Because Alternatives 3 through 9 all satisfy the threshold criteria to at least some degree, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 3 through 9 all have short-term impacts which can easily be controlled. The time needed to achieve the remediation goals would be substantially reduced by the proposed combination of alternatives in comparison to implementing any one of the individual alternatives alone.

Achieving long-term effectiveness is best accomplished by removal of source material, such as free-phase product and contaminated overburden soils (Alternatives 3 and 4). Alternatives 5 through 7 and 9 address residual contamination in groundwater and Alternative 8 (Soil Vapor Extraction) addresses residual contamination in overburden soils. Alternatives 6 (Direct Oxygen Injection) and 7 (Air Sparging) would provide for a more comprehensive long-term remediation of groundwater. The long-term effectiveness of Alternatives 5 and 9 would be less certain and could take many years to achieve remediation goals.

Alternatives 3 through 9 would all result in some degree of reduced toxicity, mobility, and/or volume of the contamination present. Alternatives 3 and 4 would result in the immediate reduction of contaminant source volume at the site. The time frame for contaminant reduction at the site would likely be longest for Alternatives 5 and 9.

Alternatives 3 through 9 are all readily implementable and technically feasible at the site. Alternatives 5 and 9 would potentially involve a greater degree of uncertainty regarding administrative feasibility over the long-term.

Each of the alternatives that were evaluated for the site would have limitations in terms of the media to be remediated and the time-frame to meet cleanup objectives. The proposed remedy was selected as a combination of several of the remedial technologies to effectively address all contaminated media at the site (free-phase product, soils, groundwater, and soil vapor) in a timely manner. While each of the individuals alternatives would likely involve an indefinite period of operation, maintenance, and monitoring (30 years was used as a convention), the proposed remedy would be anticipated to significantly reduce long-term OM&M to a period of 10 years following remedy implementation.

The cost of the alternatives varies significantly. The proposed remedy would provide for an acceptable balance of cost compared to remedial benefits gained. Costs would be controlled through an effective combination of remediation approaches that would serve to reduce the overall time to achieve remediation goals and associated long-term operation, maintenance and monitoring costs.

The estimated present worth cost to implement the remedy is $621,670. The cost to construct the remedy is estimated to be $224,000 and the estimated average annual operation, maintenance, and monitoring costs for 10 years is $51,500.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Free-phase product would be removed from existing groundwater monitoring wells MW-3, MW-4, MW-7 and MW-9 via a vacuum truck. Following vacuum extraction, the recharge rate of free product in each well would be recorded. Additional rounds of vacuum extraction would be performed if significant product remains. During subsequent soil removal activities, any free product that is evident in the open excavation would be removed via vacuum extraction.

3. Excavation and off-site disposal of contaminated overburden soil would be performed in source areas at the site, including the areas of the former pump dispensers, former USTs, former building, and surface soils in the unpaved northern end of the site (see Figure 7). Confirmatory soil samples would be collected following excavation. The cleanup goals for subsurface soils would be TAGM 4046 Recommended Soil Cleanup Objectives for VOCs and SVOCs. The cleanup goal for on-site surface soils would be 5 ppm total cPAHs. Excavations would be backfilled with clean soil certified to be free of analytes in exceedance of NYSDEC TAGM 4046 soil cleanup objectives or local site background as determined by the procedure in DER 10 ("Tech Guide").

4. Following removal of readily recoverable free-phase product and source-area soils, groundwater quality at the site would be re-evaluated to determine the appropriate type of system to treat dissolved phase contaminants in groundwater. Depending on the findings, either a direct oxygen injection system or air sparging system would be designed and installed. Groundwater quality indicators involved in determining which type of system would be installed include contaminant concentrations, dissolved oxygen concentrations, oxygen demand, and oxidation-reduction potential. It is preliminarily anticipated that approximately 28 injection points would be installed in a grid pattern at 30-foot intervals at the site to a depth of 20 feet below grade for either oxygen injection or air sparging (see Figure 7).

5. A soil vapor extraction system would be installed to ensure that contaminants volatilized into soil gas by the oxygen injection or air sparge system are adequately captured and treated. It is preliminarily anticipated that a minimum of four soil vapor extraction wells would need to be installed at the site to effectively recover contaminant vapors in source areas (see Figure 7). Recovered vapors would be pre-treated through activated carbon canisters prior to discharge to the atmosphere.

6. The existing sub-slab ventilation system in the west side of the adjacent 1214/1216 East Main Street building would continue to be operated and maintained until such time as the remedy is completed. Following remedy completion and re-evaluation of site conditions, the sub-slab ventilation system may be evaluated for shut-down with confirmatory sub-slab soil gas and indoor air sampling.

7. Development of a site management plan to: (a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) continue the operation and maintenance of the existing sub-slab vapor extraction system in the adjacent 1214/1216 East Main Street building, including provisions for shut down (d) identify any use restrictions; (e) provide for the operation and maintenance of the components of the remedy; and (f) monitor the groundwater quality via several existing and/or additional monitoring wells as deemed necessary by the NYSDEC.

8. Imposition of an institutional control in the form of an environmental easement that would (a) require compliance with the approved site management plan; (b) limit the use and development of the property to restricted commercial or industrial uses only; (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; and (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

9. The property owner would provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls, are still in place, allow the NYSDEC access to the site, and certify that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

10. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

TABLE 1
Nature and Extent of Contamination
Sampling Dates from 2000 - 2004

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND - 22	0.224	13 of 15
	Benzo(a)pyrene	ND - 19	0.061	12 of 15
	Benzo(b)fluoranthene	ND - 17	1.1	9 of 15
	Benzo(k)fluoranthene	ND - 16	1.1	5 of 15
	Dibenz(a,h)anthracene	ND - 0.82	0.014	7 of 15
	Indeno(1,2,3-cd)pyrene	ND - 11	3.2	2 of 15
	Chrysene	ND - 20	0.4	13 of 15
	Fluoranthene	ND - 61	50.0	1 of 15
PCBs	Total PCBs	ND - 3.012	1.0	1 of 6
Inorganics	Arsenic	ND - 11.6	7.5 or SB	3 of 9
	Lead	89 - 1,050	200-500	6 of 9
	Mercury	ND - 0.44	0.1 or SB	8 of 9

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	ND – 0.3	0.2	1 of 47
	2-Butanone (MEK)	ND – 1.1	0.3	2 of 47
	1,2,4-Trimethylbenzene	ND – 140	10	6 of 25
	1,2,5-Trimethylbenzene	ND – 6.7	3.3	6 of 25
	Benzene	ND – 1.6	0.06	2 of 47
	Ethylbenzene	ND -37	5.5	5 of 47
	Isopropylbenzene	ND – 7.0	NA	NA
	Toluene	ND – 8.5	1.5	2 of 47
	M & P Xylene	ND – 52.0	1.2	2 of 47
	O-Xylene	ND – 14.0	1.2	7 of 47
	n-Propylbenzene	ND – 4.9	NA	NA
	Naphthalene	ND – 30	13	1 of 25
	Bromobenzene	ND – 7.9	NA	NA
	Methylcyclohexane	ND – 14	NA	NA

TABLE 1
Nature and Extent of Contamination (Continued)

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)anthracene	ND – 2.7	0.224	4 of 47
	Benzo(a)pyrene	ND – 2.4	0.061	6 of 47
	Benzo(b)fluoranthene	ND – 2.0	1.1	2 of 47
	Benzo(k)fluoranthene	ND – 2.0	1.1	1 of 47
	Di-n-butyl phthalate	ND – 10	8.1	1 of 47
	Dibenz(a,h)anthracene	ND – 0.21	0.014	1 of 47
	Chrysene	ND – 2.6	0.4	3 of 47
	2-Methylnapthalene	ND – 53.0	36.4	1 of 47
	Napthalene	ND – 33.0	13.0	1 of 47
Inorganics	Arsenic	ND – 12	7.5 or SB	4 of 47
	Lead	ND – 1,320	200-500	2 of 47
	Mercury	ND – 0.864	0.1 or SB	10 of 47
	Silver	ND – 45	SB	1 of 47

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND – 2,400	0.7	26 of 37
	Ethylbenzene	ND – 3,300	5	27 of 37
	Toluene	ND – 8,600	5	27 of 37
	m,p-Xylene	ND – 14,000	5	23 of 32
	o-Xylene	ND – 3,200	5	23 of 32
	Total Xylenes	ND – 17,200	5	28 of 37
	Isopropylbenzene	ND – 96	5	12 of 37
	N-Propylbenzene	ND – 2,800	5	12 of 23
	Naphthalene	ND – 6,000	10	16 of 23
	1,3,5-Trimethylbenzene	ND – 7,300	5	18 of 23
	1,2,4-Trimethylbenzene	ND – 25,000	5	18 of 23

TABLE 1
Nature and Extent of Contamination (Continued)

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
VOCs (Continued)	Sec-Butylbenzene	ND – 12	5	3 of 23
	P-Isopropyltoluene	ND – 25	5	3 of 23
	N-Butylbenzene	ND – 19	5	3 of 23
	Tert-Butylbenzene	ND – 270	5	3 of 23
	MTBE	ND – 990	10	5 of 37
	Cyclohexane	ND – 300	NA	NA
	Methylcyclohexane	ND – 160	NA	NA
Semivolatile Organic Compounds (SVOCs)	2-Methylnaphthalene	ND – 5,200	NA	NA
	Naphthalene	ND – 2,700	10	27 of 37
	Phenanthrene	ND - 12	50	1 of 37
	Acetophenone	ND – 10	NA	NA
	Chrysene	ND – 83.0	0.002	1 of 37
	Fluoranthene	ND – 180.0	50	1 of 37
	Fluorene	ND – 93.0	50	1 of 37
	Bis(2-ethylhexyl)phthalate	ND – 140	5	9 of 25
	2 Methylphenol	ND – 3.0	1	4 of 25
	4-Methylphenol	ND – 2.0	1	5 of 25
	2,4-Dimethylphenol	ND – 49.0	1	5 of 25
	Phenol	ND – 10.0	1	4 of 25
	Isophorone	ND – 130	50	1 of 25
Inorganics	Lead	ND – 120	25	1 of 22

TABLE 1
Nature and Extent of Contamination (Continued)

SUB-SLAB SOIL GAS/VENTILATION SYSTEM EXHAUST	**Contaminants of Concern**	**Concentration Range Detected (µg/m^3)[a]**	**SCG[b] (µg/m^3)[a]**	**Frequency of Exceeding SCG**
Volatile Organic Compounds (VOCs)	Acetone	18 – 1,600	NA	NA
	2-Butanone (MEK)	ND – 41.0	NA	NA
	Chloroform	ND – 26	NA	NA
	Choroethane	ND – 3.6	NA	NA
	1,4-Dichlorobenzene	ND – 11	NA	NA
	Freon 12	ND – 7.7	NA	NA
	Freon 113	ND – 8.6	NA	NA
	Cis-1,2-Dichloroethene	ND – 5.2	NA	NA
	Ethylbenzene	ND – 8.78	NA	NA
	Heptane	ND – 110	NA	NA
	Hexane	ND – 51	NA	NA
	Methylene chloride	ND – 6.3	NA	NA
	Methyl Isobutyl Ketone	ND – 7.9	NA	NA
	Tetrachloroethene	ND – 38.5	NA	NA
	Toluene	6.8 – 46	NA	NA
	Trichloroethene	ND – 12	NA	NA
	1,1,1-Trichloroethane	ND – 4.3	NA	NA
	1,2,4-Trimethylbenzene	ND – 12.4	NA	NA
	1,3,5-Trimethylbenzene	ND – 5.6	NA	NA
	Styrene	ND – 5.11	NA	NA
	o-Xylene	ND – 8.34	NA	NA
	m,p-Xylene	5.9 – 30.48	NA	NA

TABLE 1
Nature and Extent of Contamination (Continued)

INDOOR AIR	Contaminants of Concern	Concentration Range Detected (μg/m^3)[a]	SCG[b] (μg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	16 – 52	NA	NA
	Benzene	2.0 – 7.4	NA	NA
	Cyclohexane	ND – 5.5	NA	NA
	1,4-Dichlorobenzene	ND – 25	NA	NA
	Freon 12	ND – 8.2	NA	NA
	Ethylbenzene	1.6 – 3.2	NA	NA
	Heptane	1.1 – 3.5	NA	NA
	Hexane	2.9 – 20	NA	NA
	Isopropyl Alcohol	ND – 36	NA	NA
	Methylene chloride	16 – 23	NA	NA
	Methyl Isobutyl Ketone	ND – 1.2	NA	NA
	Tetrachloroethene	1.1 – 1.9	NA	NA
	Toluene	8.3 – 42	NA	NA
	1,2,4-Trimethylbenzene	ND – 7.2	NA	NA
	1,3,5-Trimethylbenzene	ND – 7.7	NA	NA
	2,2,4-Trimethylpentane	0.81 – 6.1	NA	NA
	Styrene	ND – 5.4	NA	NA
	o-Xylene	1.7 – 7.6	NA	NA
	m,p-Xylene	5.2 – 10.8	NA	NA

TABLE 1
Nature and Extent of Contamination (Continued)

AMBIENT OUTDOOR AIR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG[b] (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	26.3 – 28	NA	NA
	Benzene	ND – 3.5	NA	NA
	Cyclohexane	ND – 1.2	NA	NA
	Ethylbenzene	ND – 3.3	NA	NA
	Heptane	ND – 2.0	NA	NA
	Hexane	ND – 9.7	NA	NA
	Methylene chloride	ND – 17	NA	NA
	Toluene	13.6 – 22	NA	NA
	1,2,4-Trimethylbenzene	5.7 – 6.9	NA	NA
	1,3,5-Trimethylbenzene	ND – 1.5	NA	NA
	2,2,4-Trimethylpentane	ND – 1.3	NA	NA
	o-Xylene	ND – 4.1	NA	NA
	m,p-Xylene	7.64 – 11.1	NA	NA

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values;

SCGs for surface soil and subsurface soil samples are from TAGM 4046, January 24, 1994 or 1995 “proposed” version.

SCGs for groundwater samples are from NYSDEC TOGS 1.1.1 Class GA Standards or Guidance Values.

There are no current cleanup SCGs applicable to petroleum-related compounds in sub-slab soil gas, the ventilation system exhaust, indoor air, or ambient outdoor air.

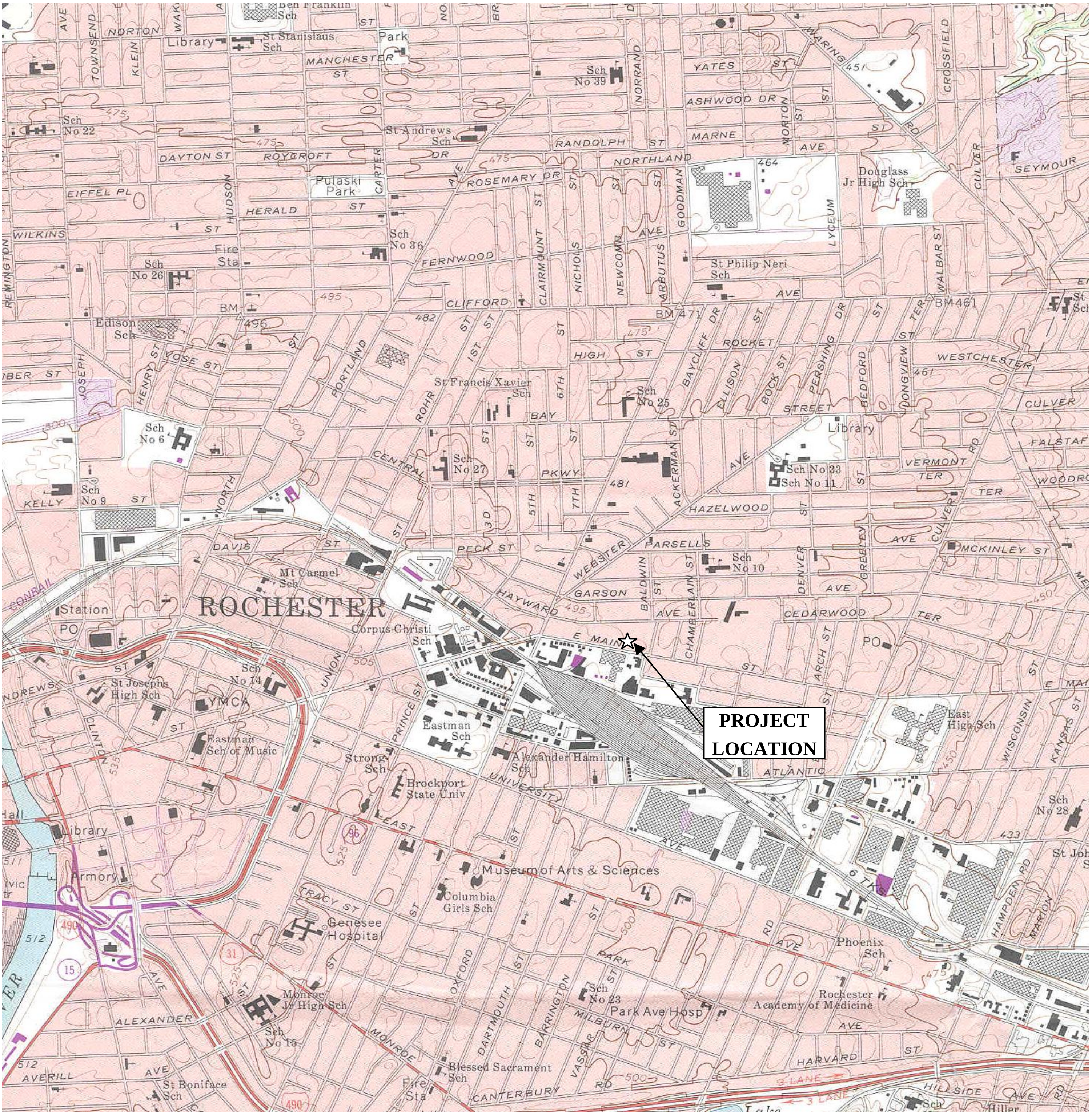
ND - Not detected above reported analytical laboratory detection limit

NA - Not Applicable

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth*
1. No Further Action	$0	$1,000	$15,370
2. Monitored Natural Attenuation	$0	$2,500	$38,425
3. Product Recovery	$16,000	$5,000	$92,850
4. Source-Area Soils Removal	$80,000	$0	$80,000
5. Groundwater Pump & Treat	$79,000	$30,000	$540,100
6. Direct Oxygen Injection	$90,000	$41,000	$720,170
7. Air Sparging	$60,000	$32,000	$551,840
8. Soil Vapor Extraction	$39,000	$35,000	$576,950
9. Enhanced Bioremediation	$105,000	$16,000	$350,920
Proposed Remedy (Combination of Alternatives 3, 4, 6, 7, and 8 above)	$224,000	$51,500	$621,670

* Total Present Worth calculations assume 30 years of OM&M for Alternatives 1 through 9, and 10 years of OM&M for the Proposed Remedy due to a reduction in the anticipated time to achieve remediation goals using a combined approach.



N

Scale 1 Inch = 2000 Feet (approximate)

EJJ

BERGMANN
associates

1200 East Main Street
City of Rochester, Monroe County, NY
Proposed Remedial Action Plan

SITE LOCATION MAP

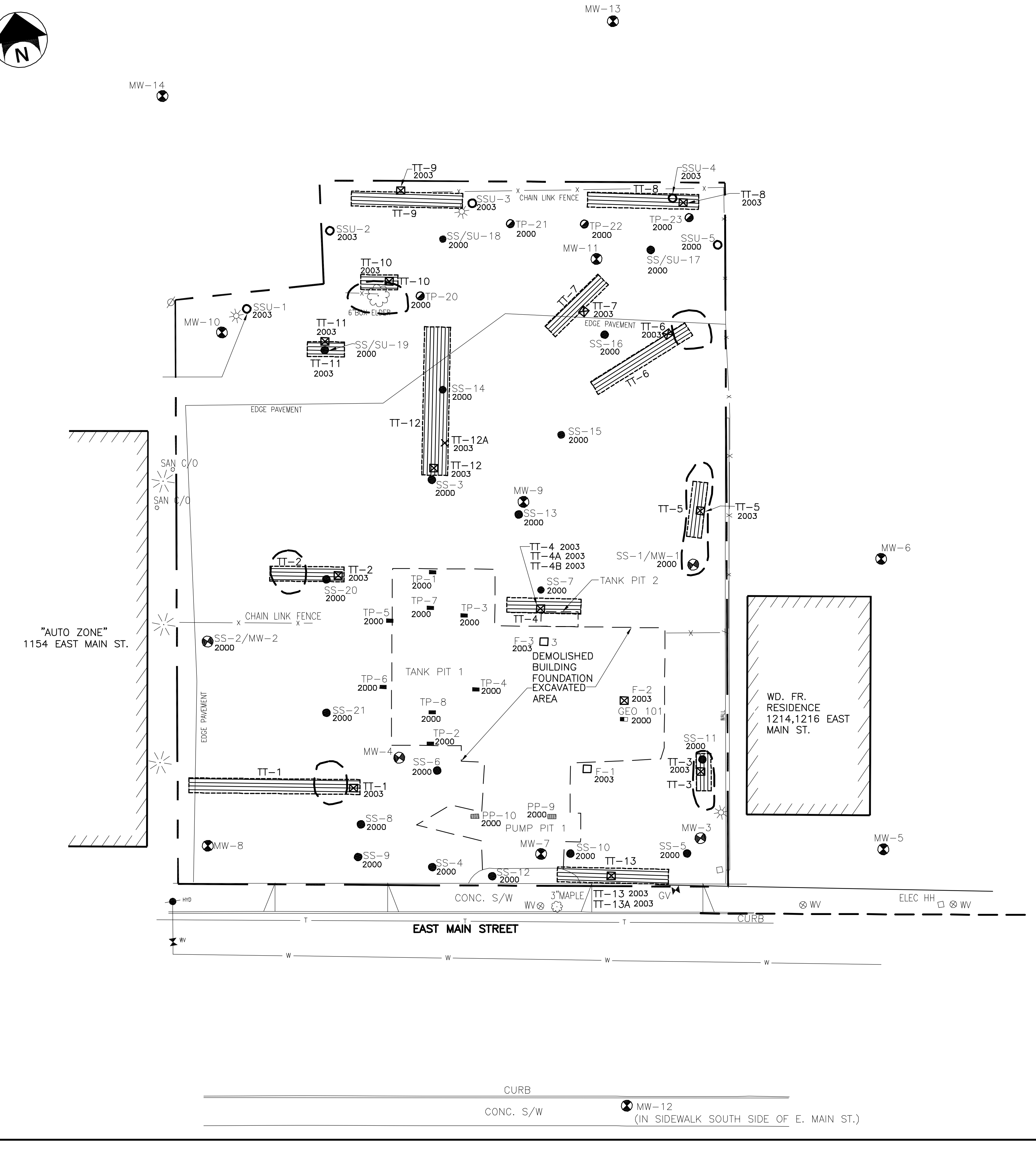
USGS 7.5 Minute Topographic Map, Rochester East, NY Quadrangle, 1978

Date
December 2005

Figure
1

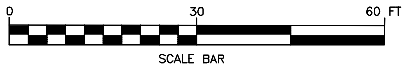
LEGEND

▬ 2000	TANK PIT SAMPLE LOCATION TP-1 THROUGH TP-8 COLLECTED IN 2000
▨ 2000	PUMP PIT SAMPLE LOCATION COLLECTED IN 2000 PP-9 AND PP-10
◧	INTERIOR BORING LOCATION GEO101 INSTALLED IN 2000
▤ TT	TEST PITS INSTALLED JUNE 2003
☒ TT-1	2003 TEST TRENCH SUBSURFACE SOIL SAMPLE FROM TEST TRENCHES
●	SOIL SAMPLE LOCATION SAMPLED IN 2000
⊗	EXISTING MONITORING WELL INSTALLED IN 2000
⊗	SUPPLEMENTAL 2" DIA. MONITORING WELL MW-5 TO MW-12 INSTALLED 2003 & 2004
◐	TEST PIT EXCAVATED IN 2000
SU	SURFACE SAMPLE-2000
SS	SUBSURFACE SAMPLE-2000
SSU-1 ○	SUPPLEMENTAL SURFACE SOIL SAMPLE LOCATIONS-2003 & 2004
⋈ GV	GAS VALVE
●	HYDRANT
⧗ WV	WATER VALVE
☼	LIGHT POLE
∅	POWER POLE
— — —	PROPERTY LINE
✳	PINE TREE
( )	SUBSURFACE METAL LOCATOR ANOMALIES SURVEY CONDUCTED 5/17/00



WELL#	NORTHING	EASTING	ELEVATION TOP OF RISER	ELEVATION GROUND
MW-1	1,153,671.4	767,732.8	495.35	492.90
MW-2	1,153,674.2	767,600.4	496.02	493.24
MW-3	1,153,598.3	767,721.6	492.02	492.26
MW-4	1,153,634.0	767,645.6	492.00	492.51
MW-5	1,153,586.6	767,769.7	492.70	493.26
MW-6	1,153,663.9	767,783.0	492.65	493.13
MW-7	1,153,601.9	767,678.5	491.70	492.14
MW-8	1,153,620.0	767,590.4	494.91	492.32
MW-9	1,153,696.2	767,690.8	492.21	492.65
MW-10	1,153,755.7	767,618.8	496.19	493.80
MW-11	1,153,757.2	767,721.8	495.95	493.66
MW-12	1,153,530.8	767,689.2	491.17	491.63
MW-13	1,153,819.5	767,737.6	490.63	491.10
MW-14	1,153,821.3	767,614.4	489.48	489.80

ELEVATION VALUES RELATIVE TO MEAN SEA LEVEL



CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

BERGMANN
associates
Engineers / Architects / Surveyors

REVISIONS

NO.	DATE	DESCRIPTION	REV.	CK'D

NOTE:

Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.

SAMPLE LOCATION MAP

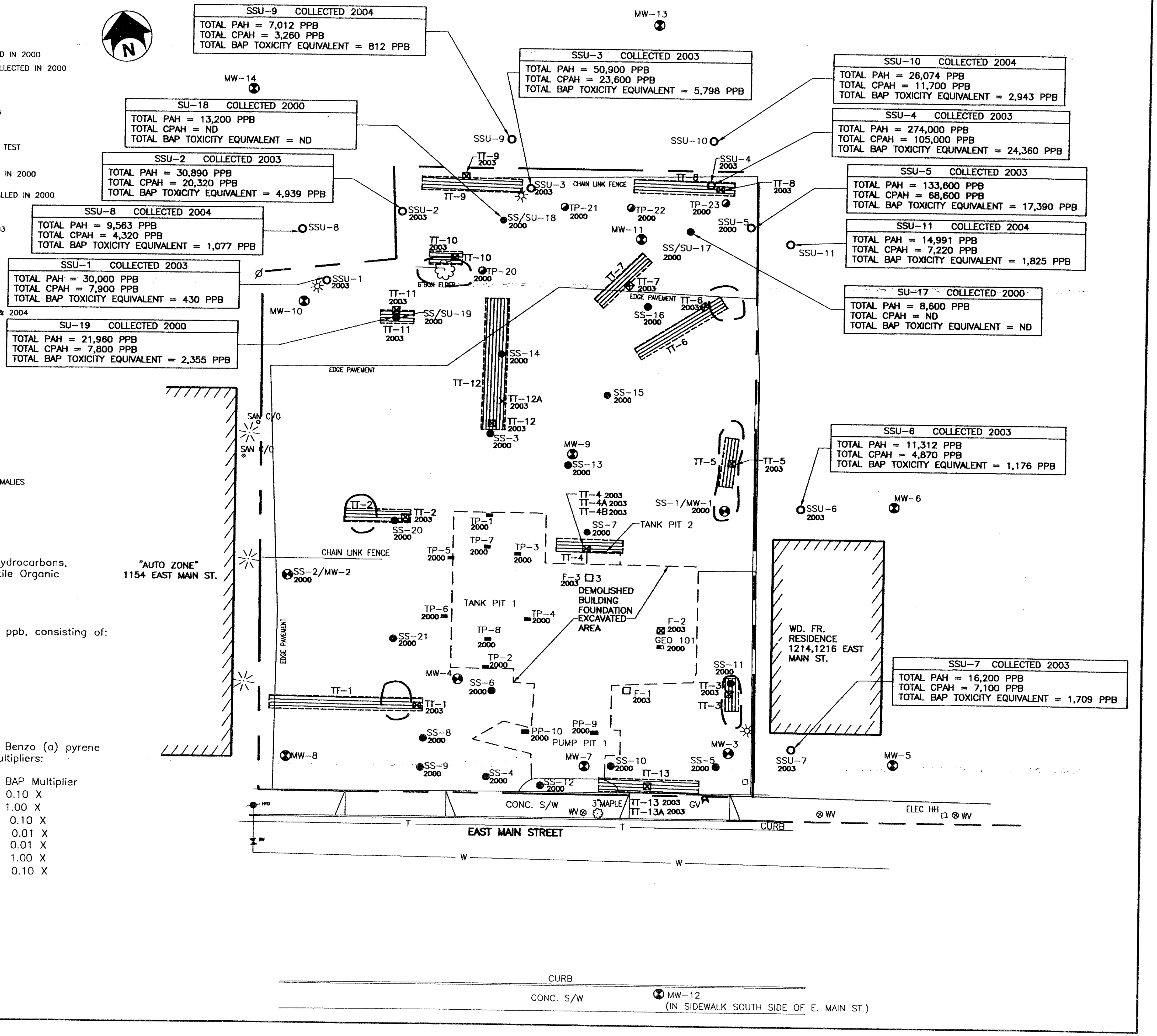
Project Manager: GF
Designed by: EFF
Drawn by: JJ
Checked by: GF
Date Issued: DECEMBER 2005
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG2_12.27.05.DWG
Drawing Number:

Figure 2

of

LEGEND

■ 2000	TANK PIT SAMPLE LOCATION TP–1 THROUGH TP–8 COLLECTED IN 2000
▨ 2000	PUMP PIT SAMPLE LOCATION COLLECTED IN 2000 PP–9 AND PP–10
◧	INTERIOR BORING LOCATION GEO101 INSTALLED IN 2000
☰ TT	TEST PITS INSTALLED JUNE 2003
☒ TT–1	2003 TEST TRENCH SUBSURFACE SOIL SAMPLE FROM TEST TRENCHES
●	SOIL SAMPLE LOCATION SAMPLED IN 2000
⊗	EXISTING MONITORING WELL INSTALLED IN 2000
⊗	SUPPLEMENTAL 2" DIA. MONITORING WELL MW–5 TO MW–12 INSTALLED 2003
◕	TEST PIT EXCAVATED IN 2000
SU	SURFACE SAMPLE–2000
SS	SUBSURFACE SAMPLE–2000
SSU–1 ○	SUPPLEMENTAL SURFACE SOIL SAMPLE LOCATIONS– 2003 & 2004
⋈ GV	GAS VALVE
–●–	HYDRANT
⧗ WV	WATER VALVE
☼	LIGHT POLE
Ø	POWER POLE
━	PROPERTY LINE
✳	PINE TREE
○	SUBSURFACE METAL LOCATOR ANOMALIES SURVEY CONDUCTED 5/17/00



SSU–9 COLLECTED 2004
TOTAL PAH = 7,012 PPB
TOTAL CPAH = 3,260 PPB
TOTAL BAP TOXICITY EQUIVALENT = 812 PPB

SSU–3 COLLECTED 2003
TOTAL PAH = 50,900 PPB
TOTAL CPAH = 23,600 PPB
TOTAL BAP TOXICITY EQUIVALENT = 5,798 PPB

SSU–10 COLLECTED 2004
TOTAL PAH = 26,074 PPB
TOTAL CPAH = 11,700 PPB
TOTAL BAP TOXICITY EQUIVALENT = 2,943 PPB

SU–18 COLLECTED 2000
TOTAL PAH = 13,200 PPB
TOTAL CPAH = ND
TOTAL BAP TOXICITY EQUIVALENT = ND

SSU–4 COLLECTED 2003
TOTAL PAH = 274,000 PPB
TOTAL CPAH = 105,000 PPB
TOTAL BAP TOXICITY EQUIVALENT = 24,360 PPB

SSU–2 COLLECTED 2003
TOTAL PAH = 30,890 PPB
TOTAL CPAH = 20,320 PPB
TOTAL BAP TOXICITY EQUIVALENT = 4,939 PPB

SSU–5 COLLECTED 2003
TOTAL PAH = 133,600 PPB
TOTAL CPAH = 68,600 PPB
TOTAL BAP TOXICITY EQUIVALENT = 17,390 PPB

SSU–8 COLLECTED 2004
TOTAL PAH = 9,563 PPB
TOTAL CPAH = 4,320 PPB
TOTAL BAP TOXICITY EQUIVALENT = 1,077 PPB

SSU–11 COLLECTED 2004
TOTAL PAH = 14,991 PPB
TOTAL CPAH = 7,220 PPB
TOTAL BAP TOXICITY EQUIVALENT = 1,825 PPB

SSU–1 COLLECTED 2003
TOTAL PAH = 30,000 PPB
TOTAL CPAH = 7,900 PPB
TOTAL BAP TOXICITY EQUIVALENT = 430 PPB

SU–17 COLLECTED 2000
TOTAL PAH = 8,600 PPB
TOTAL CPAH = ND
TOTAL BAP TOXICITY EQUIVALENT = ND

SU–19 COLLECTED 2000
TOTAL PAH = 21,960 PPB
TOTAL CPAH = 7,800 PPB
TOTAL BAP TOXICITY EQUIVALENT = 2,355 PPB

SSU–6 COLLECTED 2003
TOTAL PAH = 11,312 PPB
TOTAL CPAH = 4,870 PPB
TOTAL BAP TOXICITY EQUIVALENT = 1,176 PPB

SSU–7 COLLECTED 2003
TOTAL PAH = 16,200 PPB
TOTAL CPAH = 7,100 PPB
TOTAL BAP TOXICITY EQUIVALENT = 1,709 PPB

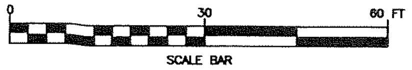
TOTAL PAH = Total Polynuclear Aromatic Hydrocarbons, EPA Method 8270 Semi Volatile Organic Compounds, ug/kg (ppb)

ND= NOT DETECTED

TOTAL CPAH = Sum of Carcinogenic PAHs, ppb, consisting of:
Benzo (a) anthracene
Benzo (a) pyrene (BAP)
Benzo (b) fluoranthrene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Indeno (1,2,3–cd) pyrene

TOTAL BAP TOXICITY EQUIVALENT = Sum of Benzo (a) pyrene toxicity equivalents, ppb, using following multipliers:

CPAH	BAP Multiplier
Benzo (a) anthracene	0.10 X
Benzo (a) pyrene (BAP)	1.00 X
Benzo (b) fluoranthrene	0.10 X
Benzo (k) fluoranthene	0.01 X
Chrysene	0.01 X
Dibenzo (a,h) anthracene	1.00 X
Indeno (1,2,3–cd) pyrene	0.10 X



CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

BERGMANN
associates
Engineers / Architects / Surveyors

REVISIONS				
NO.	DATE	DESCRIPTION	REV.	CK'D

NOTE:
Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.

SURFACE SOIL SAMPLES PAH ANALYSIS SUMMARY POSTING MAP

Project Manager: GF
Designed by: EJJ
Drawn by: JJ
Checked by: GF
Date Issued: JANUARY 2006
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG3.DWG
Drawing Number:

FIG 3

of

LEGEND

⊗	EXISTING MONITORING WELL INSTALLED IN 2000
⊗	SUPPLEMENTAL 2" DIA. MONITORING WELL MW-5 TO MW-14
SSU-1 ○	SUPPLEMENTAL SURFACE SOIL SAMPLE LOCATIONS, 2004 SSU8-SSU11
SU	SURFACE SAMPLE
SS	SUBSURFACE SAMPLE
⋈ GV	GAS VALVE
-●-	HYDRANT
⧗ WV	WATER VALVE
☼	LIGHT POLE
Ø	POWER POLE
— — —	PROPERTY LINE
✳	PINE TREE
Ⓥ₃	BASEMENT VENTILATION POINT (APPROXIMATE LOCATION)
F	EXTERNAL VENTILATION FAN, (FANTECH, MODEL HP 2190, 115 V., 0.75 AMP, 85 WATTS) ACTIVATED MAY 13, 2004 1214 EAST MAIN STREET
C_3 ●	SYSTEM COMMUNICATION POINT (APPROXIMATE LOCATION)
C_2 ●	IS POINT OF SUBSLAB SAMPLE COLLECTED ON 9/18/2003.

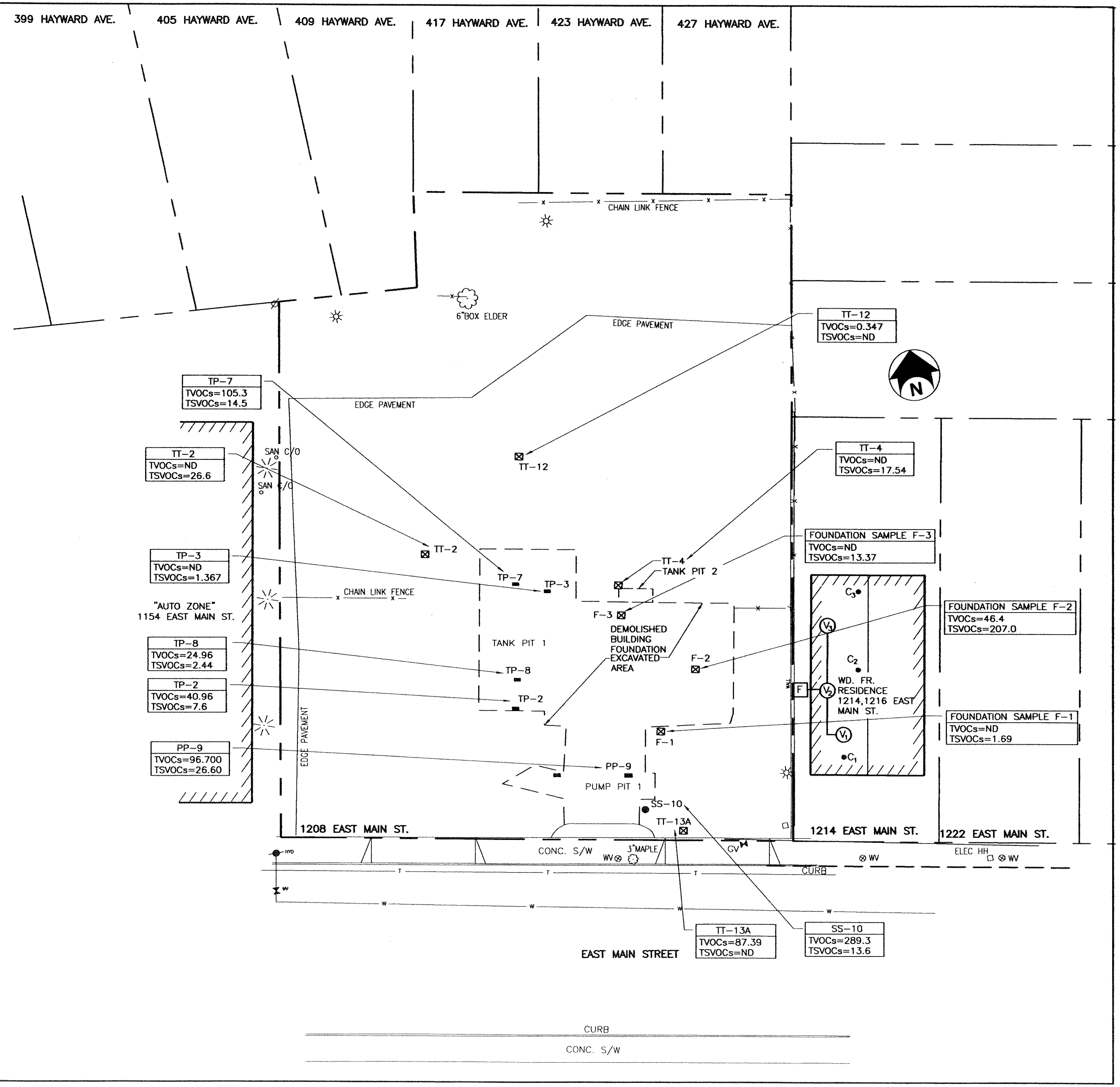
ALL RESULTS FOR SOIL SAMPLES EXPRESSED AS MILLIGRAMS PER KILOGRAM

= PARTS PER MILLION (PPM)

ND=NOT DETECTED

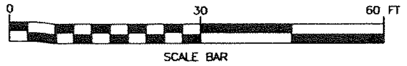
TOTAL VOCS = SUM OF ALL DETECTED VOLATILE ORGANIC COMPOUNDS

TOTAL SVOCS = SUM OF ALL DETECTED SEMI VOLATILE ORGANIC COMPOUNDS



WELL#	NORTHING	EASTING	ELEVATION TOP OF RISER	ELEVATION GROUND
MW-1	1,153,671.4	767,732.8	495.35	492.90
MW-2	1,153,674.2	767,600.4	496.02	493.24
MW-3	1,153,598.3	767,721.6	492.02	492.26
MW-4	1,153,634.0	767,645.6	492.00	492.51
MW-5	1,153,586.6	767,769.7	492.70	493.26
MW-6	1,153,663.9	767,783.0	492.65	493.13
MW-7	1,153,601.9	767,678.5	491.70	492.14
MW-8	1,153,620.0	767,590.4	494.91	492.32
MW-9	1,153,696.2	767,690.8	492.21	492.65
MW-10	1,153,755.7	767,618.8	496.19	493.80
MW-11	1,153,757.2	767,721.8	495.95	493.66
MW-12	1,153,530.8	767,689.2	491.17	491.63
MW-13	1,153,819.5	767,737.6	490.63	491.10
MW-14	1,153,821.3	767,614.4	489.48	489.80

ELEVATION VALUES RELATIVE TO MEAN SEA LEVEL



CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

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REVISIONS

NO.	DATE	DESCRIPTION	REV.	CKD

NOTE:

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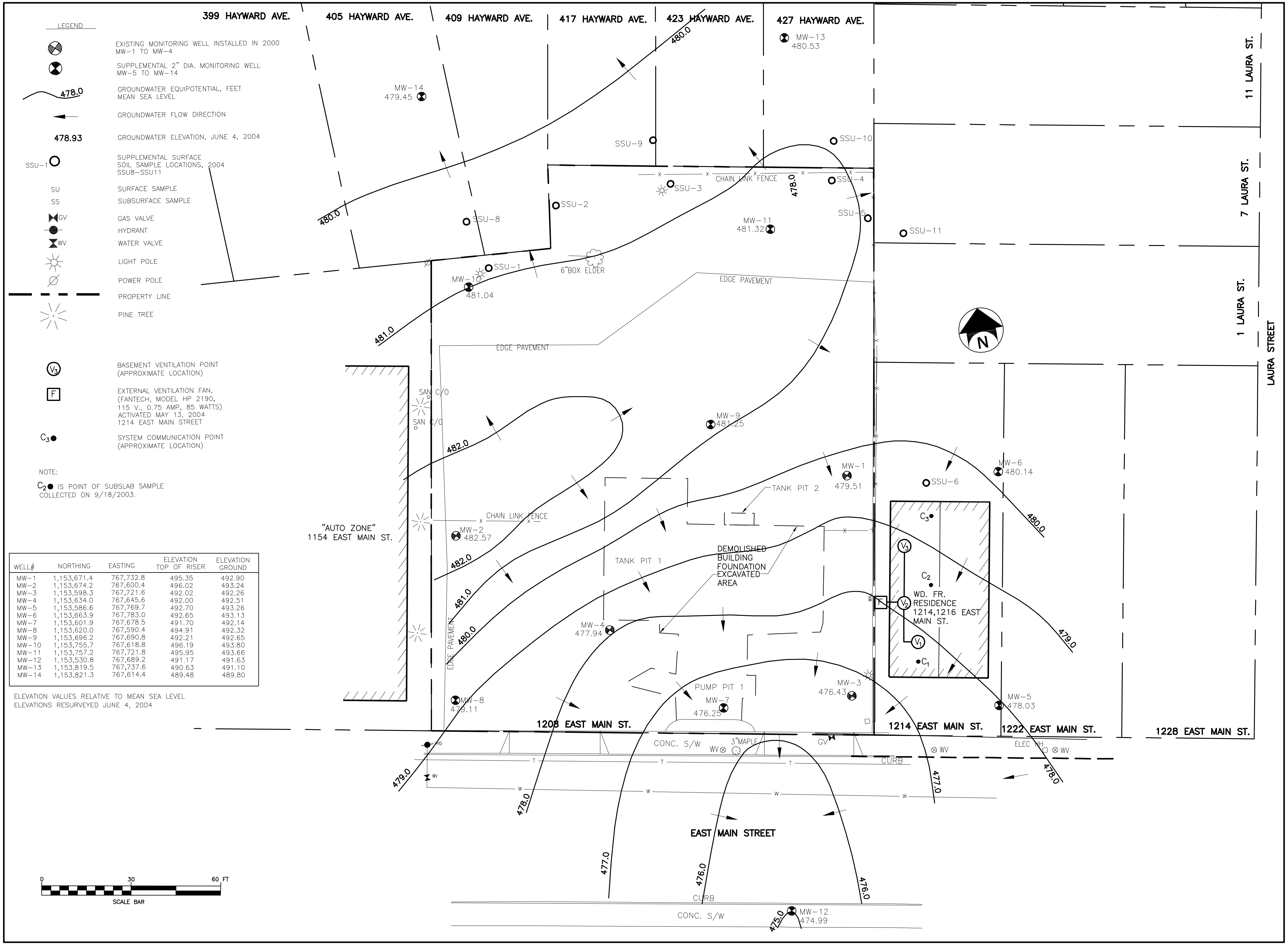
SUBSURFACE SOIL SAMPLES EXCEEDING SCG'S FOR VOC'S/SVOC'S

Project Manager: GF
Designed by: EJJ
Drawn by: JJ
Checked by: GF
Date Issued: JANUARY 2006
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG4.DWG
Drawing Number:

FIG 4

of



WELL#	NORTHING	EASTING	ELEVATION TOP OF RISER	ELEVATION GROUND
MW−1	1,153,671.4	767,732.8	495.35	492.90
MW−2	1,153,674.2	767,600.4	496.02	493.24
MW−3	1,153,598.3	767,721.6	492.02	492.26
MW−4	1,153,634.0	767,645.6	492.00	492.51
MW−5	1,153,586.6	767,769.7	492.70	493.26
MW−6	1,153,663.9	767,783.0	492.65	493.13
MW−7	1,153,601.9	767,678.5	491.70	492.14
MW−8	1,153,620.0	767,590.4	494.91	492.32
MW−9	1,153,696.2	767,690.8	492.21	492.65
MW−10	1,153,755.7	767,618.8	496.19	493.80
MW−11	1,153,757.2	767,721.8	495.95	493.66
MW−12	1,153,530.8	767,689.2	491.17	491.63
MW−13	1,153,819.5	767,737.6	490.63	491.10
MW−14	1,153,821.3	767,614.4	489.48	489.80

ELEVATION VALUES RELATIVE TO MEAN SEA LEVEL
ELEVATIONS RESURVEYED JUNE 4, 2004

CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

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NO.	DATE	DESCRIPTION	REV.	CK'D

NOTE:
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JUNE 2004 WATER TABLE SURFACE AND GROUNDWATER FLOW MAP

Project Manager: GF
Designed by: EJJ
Drawn by: TSB
Checked by: GF
Date Issued: DECEMBER 2005
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG17.DWG
Drawing Number:

Figure 5

of

LEGEND

⊗	EXISTING MONITORING WELL INSTALLED IN 2000
⊗	SUPPLEMENTAL 2" DIA. MONITORING WELL MW-5 TO MW-14
SSU-1 ○	SUPPLEMENTAL SURFACE SOIL SAMPLE LOCATIONS, 2004 SSU8-SSU11
SU	SURFACE SAMPLE
SS	SUBSURFACE SAMPLE
⋈ GV	GAS VALVE
-●-	HYDRANT
⧗ WV	WATER VALVE
☼	LIGHT POLE
∅	POWER POLE
— — —	PROPERTY LINE
✳	PINE TREE
(V3)	BASEMENT VENTILATION POINT (APPROXIMATE LOCATION)
F	EXTERNAL VENTILATION FAN, (FANTECH, MODEL HP 2190, 115 V., 0.75 AMP, 85 WATTS) ACTIVATED MAY 13, 2004 1214 EAST MAIN STREET
C_3 ●	SYSTEM COMMUNICATION POINT (APPROXIMATE LOCATION)

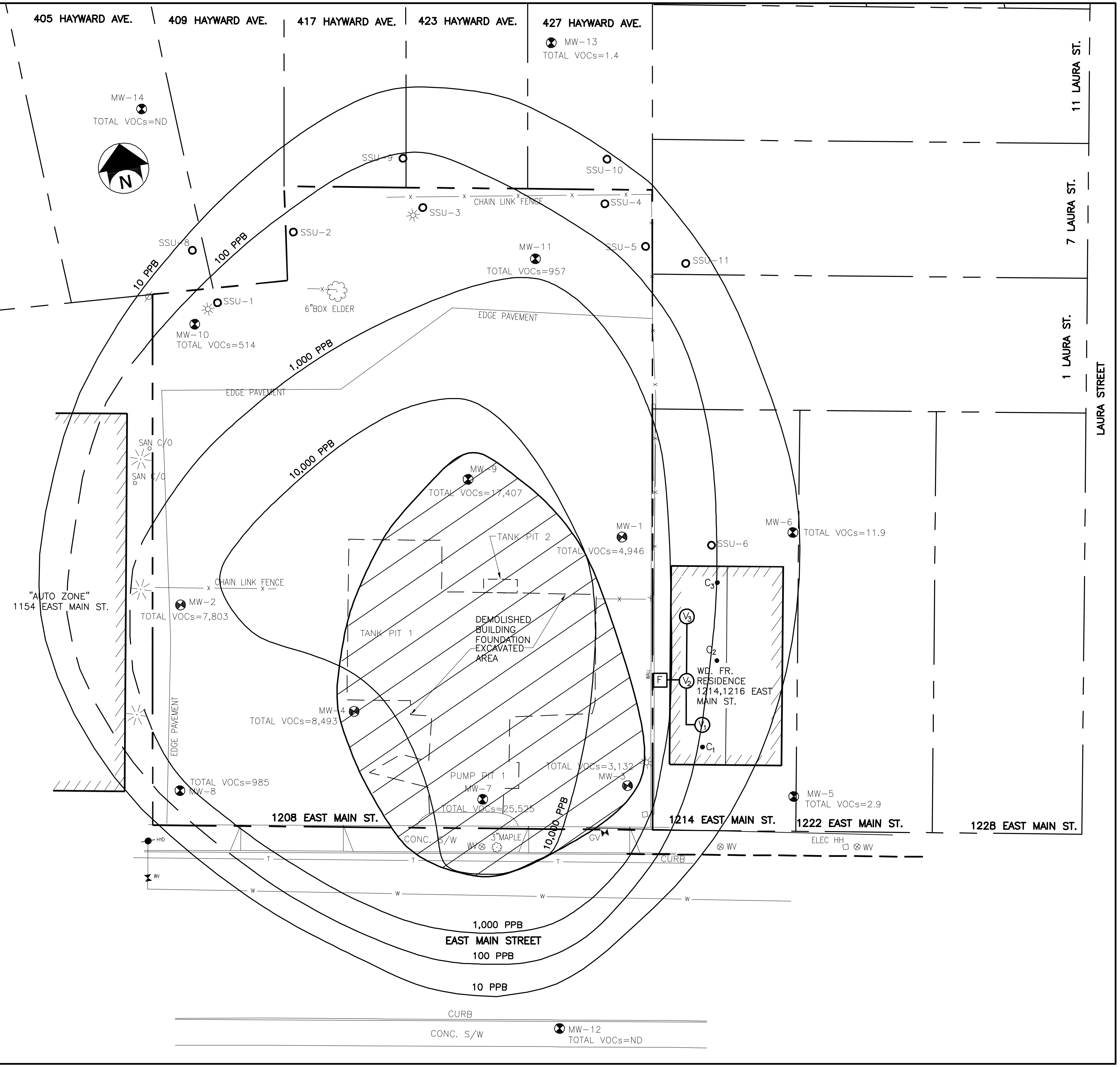
NOTE:

C_2 ● IS POINT OF SUBSLAB SAMPLE COLLECTED ON 9/18/2003.

100 PPB	ISOPLETH OF TOTAL VOLATILE ORGANIC COMPOUNDS IN GROUND WATER, JUNE 2004 PARTS PER BILLION (PPB) DASHED WHERE INFERRED
▨	APPROXIMATE EXTENT OF LIGHT NON-AQUEOUS FREE PHASE PRODUCT (GASOLINE)

WELL#	NORTHING	EASTING	ELEVATION TOP OF RISER	ELEVATION GROUND
MW-1	1,153,671.4	767,732.8	495.35	492.90
MW-2	1,153,674.2	767,600.4	496.02	493.24
MW-3	1,153,598.3	767,721.6	492.02	492.26
MW-4	1,153,634.0	767,645.6	492.00	492.51
MW-5	1,153,586.6	767,769.7	492.70	493.26
MW-6	1,153,663.9	767,783.0	492.65	493.13
MW-7	1,153,601.9	767,678.5	491.70	492.14
MW-8	1,153,620.0	767,590.4	494.91	492.32
MW-9	1,153,696.2	767,690.8	492.21	492.65
MW-10	1,153,755.7	767,618.8	496.19	493.80
MW-11	1,153,757.2	767,721.8	495.95	493.66
MW-12	1,153,530.8	767,689.2	491.17	491.63
MW-13	1,153,819.5	767,737.6	490.63	491.10
MW-14	1,153,821.3	767,614.4	489.48	489.80

ELEVATION VALUES RELATIVE TO MEAN SEA LEVEL



0 30 60 FT

SCALE BAR

CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

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REVISIONS				
NO.	DATE	DESCRIPTION	REV.	CK'D

NOTE:

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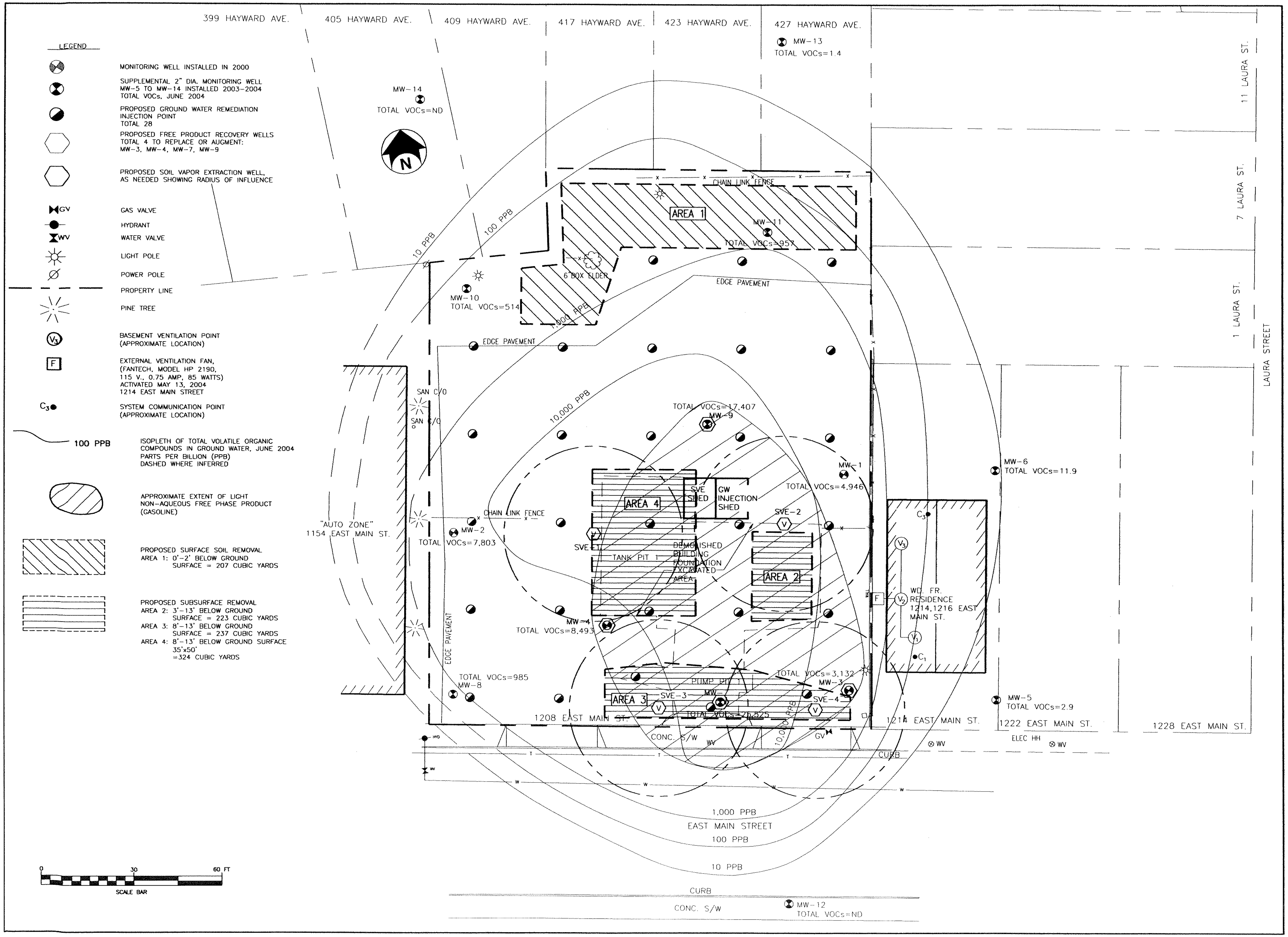
2004 GROUNDWATER ISOPLETH

Project Manager: GF
Designed by: EJJ
Drawn by: JJ
Checked by: GF
Date Issued: DECEMBER 2005
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG6_12.27.05.DWG
Drawing Number:

Figure 6

of



LEGEND

MONITORING WELL INSTALLED IN 2000

SUPPLEMENTAL 2" DIA. MONITORING WELL
MW-5 TO MW-14 INSTALLED 2003-2004
TOTAL VOCs, JUNE 2004

PROPOSED GROUND WATER REMEDIATION
INJECTION POINT
TOTAL 28

PROPOSED FREE PRODUCT RECOVERY WELLS
TOTAL 4 TO REPLACE OR AUGMENT:
MW-3, MW-4, MW-7, MW-9

PROPOSED SOIL VAPOR EXTRACTION WELL,
AS NEEDED SHOWING RADIUS OF INFLUENCE

GV GAS VALVE

HYDRANT

WV WATER VALVE

LIGHT POLE

POWER POLE

PROPERTY LINE

PINE TREE

BASEMENT VENTILATION POINT
(APPROXIMATE LOCATION)

F EXTERNAL VENTILATION FAN,
(FANTECH, MODEL HP 2190,
115 V., 0.75 AMP, 85 WATTS)
ACTIVATED MAY 13, 2004
1214 EAST MAIN STREET

C3 SYSTEM COMMUNICATION POINT
(APPROXIMATE LOCATION)

100 PPB ISOPLETH OF TOTAL VOLATILE ORGANIC
COMPOUNDS IN GROUND WATER, JUNE 2004
PARTS PER BILLION (PPB)
DASHED WHERE INFERRED

APPROXIMATE EXTENT OF LIGHT
NON-AQUEOUS FREE PHASE PRODUCT
(GASOLINE)

PROPOSED SURFACE SOIL REMOVAL
AREA 1: 0'-2' BELOW GROUND
SURFACE = 207 CUBIC YARDS

PROPOSED SUBSURFACE REMOVAL
AREA 2: 3'-13' BELOW GROUND
SURFACE = 223 CUBIC YARDS
AREA 3: 8'-13' BELOW GROUND
SURFACE = 237 CUBIC YARDS
AREA 4: 8'-13' BELOW GROUND SURFACE
35'x50'
=324 CUBIC YARDS

CITY OF ROCHESTER

1200 EAST MAIN ST.
ROCHESTER, NY
14614

PROPOSED REMEDIAL ACTION PLAN

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REVISIONS

NO.	DATE	DESCRIPTION	REV.	CK'D

NOTE:
Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.

PROPOSED REMEDIAL ACTION ELEMENTS

Project Manager: GF
Designed by: EJJ
Drawn by: JJ
Checked by: GF
Date Issued: DECEMBER 2005
Scale: AS SHOWN
Date
Project Number: 4453.03
File Name: I:\SUR\ENV\EMAIN\FIG\FIG7_12.27.05.DWG
Drawing Number:

Figure 7

of