ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

USEPA Brownfield Grant Cleanup Project
80-100 Charlotte Street
Rochester, New York

USEPA Assistance ID No. BF9798603

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1.0 Introduction

In accordance with the May 2005 Brownfield Grant Cleanup Work Plan prepared by the City of Rochester (City) and approved by the United States Environmental Protection Agency (EPA), the City has developed this Analysis of Brownfields Cleanup Alternatives (ABCA) report for the property located at 80-100 Charlotte Street, Rochester, New York.

The cleanup of the Site includes the development and implementation of a Corrective Action Plan (CAP) to remediate the petroleum contamination attributed to a former on-site gasoline underground storage tank (UST) system and petroleum impacts from the off-site spills. The remedial measures in the CAP will be consistent with the proposed future use of the Site, and may need to be tailored to a Site-specific detailed redevelopment plan if one is identified by the City during the course of the Project. All cleanup activities will be performed under a Stipulation Agreement between the City and the New York State Department of Environmental Conservation (NYSDEC). The cleanup will be performed under the oversight of the NYSDEC Region 8 petroleum spills program. Mr. Timothy Walsh is the anticipated Project Manager for NYSDEC Region 8

In preparing the ABCA, the City considered subsurface conditions and environmental factors, various site characteristics, surrounding properties, land use restrictions, potential future uses of the Charlotte Street property, and cleanup goals. The City also reviewed the following reports and documents:

- Day Environmental Inc. (DAY) Phase I Environmental Site Assessment report, dated May 2002
- DAY Phase II Environmental Site Assessment report, dated July 2002
- DAY report entitled Analysis of Brownfields Cleanup Alternatives (ABCA), dated May 2005.
- NYSDEC Division Technical and Administrative Guidance Memorandum entitled Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 1990.

The City's ABCA report includes information regarding:

- Information about characteristics of the Charlotte Street property (Site) and the contamination previously documented on the Site (e.g., identification of contaminants, potential exposure pathways, sources of contamination, applicable or relevant and appropriate laws or standards, etc.);

- Information and analysis of several potential cleanup alternatives considered for remediating the Site, including "No-Action" as an alternative;

- A discussion of the proposed scope and factors considered in evaluating and selecting a recommended cleanup method (long and short-term effectiveness, implementability, duration, estimated costs, etc.).

- Determination whether land use restrictions, controls, or limitations (e.g., institutional controls, engineering controls) will be required.

2.0 Background

The Site is owned by the City and is located in the City's East End District (Refer to Site Location Map in Attachment 1). The Site is currently used as a surface parking lot with a perimeter fence, and consists of a single unimproved parcel zoned as vacant commercial land with a lot size of approximately 246.7 ft X 144.3 ft (~0.784 acres).

2.1 Site Land Use History

Former structures included a 18,988-square foot, one and two story steel/masonry building constructed around 1962. Previous to this structure, the site contained several residential structures and garages. Former uses of the Site include electric motor repair, warehouse, electrical contractor, and residential.

Detailed development plans for the Site have not been prepared yet. However, proposed conceptual uses of the Site include a combination of commercial and residential development, a parking lot, and landscaped areas. The City also owns several contiguous parcels to the immediate west of the Site located at 14-60 Charlotte Street. The City has completed an environmental investigation and completed corrective actions to remediate sources of contamination on this adjacent property. The City issued a Request for Proposal for the residential development of this adjacent property in April 2005. Proposed development for this off-site property includes the phased construction of approximately 25 to 30-market rate ($275,000 - $300,000) townhouses.

2.2 Environmental Conditions

A Phase I Environmental Site Assessment (Phase I ESA) report dated May 2002 and a Phase II Environmental Site Assessment (Phase II ESA) dated July 2002 were completed by Day Environmental, Inc. (DAY) for the Site on behalf of the City. Based on the findings of these evaluations, the following environmental conditions and concerns were identified:

- Stained Surface Soils: Several approximate three-foot diameter or fewer areas of stained surface soils, on the northwest portion of the Site, were determined to be impacted with heavy-weight total petroleum hydrocarbons (TPH) designated as lube oil and one sample contained the semi-volatile organic compound (SVOC) benzo (b)fluoranthene above the recommended soil cleanup objective (RSCO) referenced in the New York State Department of Environmental Conservation (NYSDEC) *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels* dated January 24, 1994 (TAGM 4046) as amended by the NYSDEC's Supplemental Tables dated August 22, 2001.

- Active Spills on Adjoining/Nearby Properties: Evidence of petroleum-type contamination was detected in saturated soil and groundwater on the northwest and southwest portions of

the Site. This contamination appears attributable to active spills on adjoining/nearby properties located west and northwest of the Site.

- Former On-Site Gasoline UST System: Evidence of petroleum contamination exceeding the NYSDEC RSCOs referenced in the NYSDEC TAGM 4046 as amended by the NYSDEC's Supplemental Tables dated August 22, 2001 was detected in proximity to, and hydraulically downgradient from, a former underground storage tank (UST) system used to store gasoline. The contamination is generally present in an approximate 2-foot to 4-foot layer of soil immediately above bedrock. The NYSDEC was notified regarding the petroleum contamination that was encountered, and the NYSDEC subsequently generated a spill file (NYSDEC Spill #0270474), which currently has an "active" status.

Heterogeneous fill material generally consisting of re-worked soil with lesser amounts of coal, ash, concrete, asphalt, brick, slag and wood is also present at the Site. Analytical laboratory testing results for a portion of the fill materials sampled indicate arsenic, barium, cadmium, lead or mercury were present at concentrations that slightly exceed applicable soil cleanup objectives and/or typical background ranges referenced in NYSDEC TAGM 4046. The fill materials and metals are commonly associated with construction and demolition debris, some of which was encountered at the Site, and the metals do not appear to be attributed to a specific historical manufacturing process or waste generation activity.

Subsequent to the Phase II and acquisition of the property, the City funded and directly performed pre-demolition asbestos and lead abatement, and then demolished all structures on the Site. Demolition was completed on September 22, 2003, and included the removal of the floor slabs, footers, and drains. The main sewer lateral on the Site was sealed (i.e., plugged).

2.3 Proposed Future Use of Site & Adjoining Properties

Currently, the conceptual future use of the Site includes redevelopment for a combination of commercial and residential usage with a parking lot and landscaped areas. The City is currently working on plans for contiguous vacant lots to the west addressed 14-58 Charlotte Street that adjoins the Site. The plans for this adjoining project include phased redevelopment with residential townhouses.

3.0 Analysis of Brownfields Cleanup Alternatives (ABCA)

Based on the Phase I Environmental Site Assessment and the Phase II Environmental Study, DAY prepared a report entitled Analysis of Brownfields Cleanup Alternatives (ABCA), dated May 2005 and prepared on behalf of the City. A copy of the DAY ABCA report is included in Attachment 2).

Since petroleum is the primary contaminant of concern at the Site, and since metals in soil and fill can be properly managed via soil management plans and through the use of environmental institutional and engineering controls, the DAY and City ABCA reports have focused on the cleanup of the petroleum-contaminated soil and groundwater. The DAY ABCA report was prepared in consultation with City Division of Environmental Quality (DEQ) staff, and

incorporated City DEQ comments and conclusions. The DAY ABCA report evaluated exposure pathways, applicable or Relevant and Appropriate Requirements, and provided an analysis of the following four potential cleanup alternatives:

- Alternative #1 - No Action
- Alternative #2 - Soil Removal and Off-site Disposal
- Alternative #3 - Alternative #1 Enhanced In-Situ Biodegradation
- Alternative #4 - In-Situ Air Sparging and Soil Vapor Extraction

For each of four alternatives listed above, a soil management plan and environmental institutional and engineering controls are assumed to be implemented as part of the selected cleanup alternative.

3.1 Exposure Pathways

The Site is currently used as a surface parking lot with a perimeter fence, and consists of a single unimproved parcel zoned as vacant commercial land with a lot size of approximately 246.7 ft X 144.3 ft (~0.784 acres). The primary source of contamination is petroleum contaminated soil and groundwater associated with the former UST system. The resulting secondary sources of contamination are also present at the Site:

- Contaminated Surface and Subsurface Soils
- Dissolved Phase Groundwater Contamination
- Contaminated Soil Gas Vapors and Odors

Potential transport mechanisms at the Site include:

- Wind and Atmospheric Dispersion
- Volatilization to Enclosed Spaces (e.g., indoor air entering future on-site buildings)
- Leaching of Contaminants to Groundwater and Transport/Migration via Groundwater

Complete or potentially complete exposure pathways and routes of exposure at the Site include:

- Soil via dermal contact or ingestion, including direct contact during the remedial work
- Air via inhalation of vapors or particulates from soil or groundwater
- Groundwater via dermal contact during the cleanup

Currently the Site contains a gravel parking lot and does not contain any buildings or structures. Based on the Site's current land use, potential receptors include site visitors that use the site to park vehicles. If the Site is developed in the future, future potential receptors include construction workers, utility workers, and depending upon the final redevelopment potential commercial and/or residential users of the Site.

Given the Site's current use a gravel-based parking lot, dermal contact with contaminated surface soils and volatilization to indoor air are not considered completed exposure pathways. Since the Site is in an urban setting and groundwater at the Site and adjacent properties are serviced by the City's municipal water supply, it is not anticipated that ingestion of groundwater is a completed exposure pathway. The potential exposure pathways and routes of exposure identified above can be mitigated and properly managed during the remedial work through the use of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP), which will be designed to protect and prevent exposures to Site workers and the public.

3.2 Applicable or Relevant and Appropriate Requirements (ARARs)

The proposed or anticipated applicable or relevant and appropriate requirements (ARARs) for the Site are identified below:

Soil ARARs: Generally, impacted soil will be remediated to the Recommended Soil Cleanup Objectives (RSCOs) referenced in the NYSDEC TAGM 4046 (as amended by the NYSDEC's Supplemental Tables dated August 22, 2001). Impacted soil or fill containing contaminants above RSCOs that are left in-place will be managed with a Site Management Plan (SMP) for potential future disturbances (e.g., utility repair work), and with environmental engineering and institutional controls (e.g., flagging the Site in the City's Building Information System).

Groundwater ARARs: Contamination in groundwater will be evaluated using NYSDEC *Technical and Operational Guidance Series 1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS 1.1.1) dated June 1998, or using an exposure assessment conducted in accordance with the provisions set forth in the *"Guidance for Petroleum Spill Site Inactivation"* (PSSI) dated February 23, 1998. Also the Risk Based Corrective Action (RBCA) Tool Kit for Chemical Releases software may be used to assist in performing the PSSI exposure assessment.

Soil Gas Vapors ARARs: Evaluation of post-remedial soil gas sampling results will be based on provisions set forth in the Human Health Risk Assessment guidelines outlined in NYSDEC DER-10 and/or the New York State Department of Health (NYSDOH) *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated February 2005.

4.0 Analysis of Brownfields Cleanup Alternatives

The ABCA focuses on remediation of petroleum-impacted soil and groundwater present at the Site. The cleanup alternatives for the Site evaluated by DAY and the City in the screening process included:

- Alternative #1 - No Action
- Alternative #2 - Soil Removal and Off-site Disposal
- Alternative #3 - Alternative #1 Enhanced In-Situ Biodegradation

- Alternative #4 - In-Situ Air Sparging and Soil Vapor Extraction

For each of the four alternatives identified above, the proposed cleanup remedy assumes that a post-cleanup soil gas survey will be completed to evaluate the requirements for institutional controls and/or engineering controls (i.e., vapor barrier and venting systems) prior to Site redevelopment. Also, the proposed remedy will include development and implementation of an environmental soil management plan in order to manage potential future disturbances of residual contamination left in-place.

The City evaluated each of the four alternatives based on established criteria, including the following:

- Technical feasibility, constructability, and implementability
- Short-term and long-term effectiveness
- Reduction in toxicity, mobility, and volume
- Compliance with ARARs
- Protection of human health and the environment
- Duration
- Estimated cost

Additional details regarding the technical scope of each cleanup alternative are included in the DAY ABCA report. Listed below is a summary of each of the four alternatives evaluated.

4.1 Cleanup Alternative #1 - No Action

The No Action alternative does not include any active remedial actions, and leaves the Site in its current condition. This alternative does not significantly reduce toxicity, mobility or volume of contamination, would not meet ARARs, and therefore would not be protective of the environmental or human health if the Site is disturbed or redeveloped. Under this alternative, some limited natural attenuation of contamination may occur in portions of the Site to reduce contaminant concentrations over very long periods of time; however, the timeframe, degree and extent of natural attenuation would be unknown and difficult to quantify.

Under this alternative, any redevelopment of the Site would encounter contamination above ARARs, and thus have the potential to expose construction workers and the public to contaminants. If remedial actions and/or institutional and engineering controls are not developed and properly implemented, potential migration of contaminants off-site may occur under this alternative. In conclusion, while the No Action alternative is the least costly alternative, it does not appear to be protective of human health or the environment, will not meet ARARs, and will limit or restrict redevelopment and use of the Site.

4.2 Cleanup Alternative #2 - Soil Removal and Off-site Disposal

The Soil Removal and Disposal alternative includes the excavation of two to four-foot thick seam

of petroleum-contaminated soil and fill materials that exceeds ARARs, generating approximately 1,000 to 1,500 tons of petroleum-impacted soil from an area approximately 8,000 square feet located in the vicinity of the former gasoline UST system (i.e., Primary Source). Due to the relatively small size of the Site and close proximity of off-site receptors, on-site treatment of contaminated soil was determined to be impractical and cost prohibited. If groundwater is encountered during soil removal activities, dewatering of the excavation will be conducted as necessary, which would assist in remediating contaminated groundwater in the Primary Source area. Post-removal confirmatory soil samples would be collected in order to ensure that the soil removal has adequately meet ARARs, and to evaluate concentrations of contaminants left in-place. During the soil removal work, air monitoring would be performed as specified in a HASP and a CAMP to ensure that off-site receptors will not be impacted by vapors, odors, or particulates.

Under this alternative, the removal of the primary source of contamination leaching to groundwater should result in a significant improvement in groundwater quality. After the removal of the primary source area, monitoring of Site groundwater will be conducted in order to evaluate and track trends in groundwater quality over time. This alternative includes the installation of several groundwater monitoring wells and four rounds of sampling over a period of one year. Based on the laboratory results of the post source removal groundwater sampling, groundwater remediation may be recommended. Since some petroleum-impacted soil and groundwater will likely be left in-place, this alternative includes post-removal soil gas sampling. This sampling will be used to evaluate the need for engineering controls (e.g., passive soil gas venting systems and vapor mitigation systems) for any potential buildings constructed on-site. Total costs for the Excavation and Off-site Disposal alternative are estimated to be approximately $220,000 to $250,000.

In conclusion, Excavation and Off-site Disposal is a well-established cleanup alternative for petroleum-impacted soils. This alternative is easily implemented, permanently removes the greatest amount of contaminant volume and mass, reduces toxicity and mobility of contaminants, can be completed in a relatively short period of time, and is cost competitive with other remedial alternatives. This alternative is also protective of human health and the environment, and facilitates the redevelopment and reuse of the Site in a timely manner.

4.3 Cleanup Alternative #3 - Enhanced In-Situ Biodegradation

The Enhanced In-Situ Biodegradation alternative includes the injection of patented materials into the subsurface to enhance and accelerate in-situ biological processes which result in the degradation the petroleum contamination into inert compounds. The oxygen release compounds (ORC) are delivered through a series of injection points or wells installed in the petroleum-impacted plume. Multiple injections of ORC over time will likely be required to adequately degrade the petroleum contamination over an approximate 8,000 square-foot area. Monitoring of the groundwater would be conducted in order to evaluate the effects of the remedial work on the concentrations of contaminants in the groundwater similar to Alternative #2 listed above. The estimated cost range to implement this alternative is approximately $210,000 to $275,000.

While Enhanced In-Situ Biodegradation is an established cleanup alternative for remediating petroleum contamination in soil and groundwater, there are several factors that would limit the

applicability and effectiveness of the process. This process will require a longer timeframe than the Soil Removal and Disposal alternative, taking at least one or two years and likely requiring re-applications of ORC. In addition, the effectiveness of ORC to treat source area contamination in the unsaturated zone may be limited due to the difficulty of uniformly delivering ORC in areas where heterogenous fill materials are present in the subsurface. This scenario potentially leaves portions of the unsaturated untreated, which would likely result in pockets of contamination left in-place which do not meet ARARs and may not be protective of human health and the environment. Under this alternative, there is a slow and gradual reduction of contaminant volume, toxicity and mobility, and contamination that is left untreated has the potential to leach of groundwater and continue to migrate.

4.4 In-Situ Air Sparging and Soil Vapor Extraction

The In-Situ Air Sparging and Soil Vapor Extraction (AS/SVE) alternative is a proven cleanup alterative used at petroleum-contaminated sites to remediate soil, and to a lesser degree, groundwater impacted with petroleum contamination. This alternative involves the construction of an air sparging system to inject atmospheric air under pressure to volatilize or strip volatile organic compounds (VOCs) present in petroleum-contaminated soil. The soil vapor extraction system SVE system contains a series of perforated pipes connected to a blower and operating under a vacuum to collect or extract the VOCs and vapors from the contaminated subsurface media. The system would consist of a series of air injection and vapor extraction wells throughout the petroleum-impacted area and would be operated for several years until asymptotic conditions are documented. Monitoring of the groundwater would be conducted in order to evaluate the effects of the remedial work on the concentrations of contaminants in the groundwater similar to Alternative #2 listed above. The estimated cost range to implement this alternative is approximately $180,000 to $225,000.

At the Charlotte Street Site, several factors would limit the applicability, effectiveness, and desirability of this alterative. Site soils contain relatively low permeability glacial till and some of the contamination is present in or near the saturated zone. These conditions will likely limit the overall effectiveness of AS/SVE process (i.e., reduction in the radius of influence) and may not result in a decrease in leaching of contamination to groundwater. Heterogeneous fill materials at the Site (i.e., fill materials/debris, potential former residential basements, etc.) may lead to channeling of the AS/SVE (i.e., preferential pathways), which may result in contamination left in-place that will not meet ARARs. SVE systems require the discharge or emission of VOCs to atmospheric air, which can produce nuisance odors and noise from the SVE equipment. Some SVE systems require costly treatment of emissions prior to discharge. This process would require a longer timeframe than Alternative #1 (Soil Removal and Disposal). Redevelopment of the property would be possible while the AS/SVE system is operating; however, redevelopment may be limited in certain areas since the AS/SVE system requires a small building or sheds to house the working components of the AS/SVE system. Access to the Site would be required for periodic operation, maintenance and monitoring throughout the cleanup process, which may impede or limit redevelopment options.

5.0 RECOMMENDED CLEANUP ALTERNATIVE

In conclusion Alternative #1 (No Action) will not remediate contamination at the Site, will not meet ARARs, and will limit or prohibit redevelopment activities.

The effectiveness of Alternative #3 (Enhanced In-Situ Biodegradation) and Alternative #4 (Air Sparging / Soil Vapor Extraction) are limited by subsurface conditions at the Site, including soil permeability and heterogeneous fill materials. While these two cleanup alternatives may meet ARARs for portions of the Site; pockets of contamination are likely to be left in-place which do not meet ARARs. In addition, the cleanup timeframe for the AS/SVE and Enhanced In-Situ Bioremediation alternatives take longer to implement, and may limit or restrict redevelopment on portions of the Site.

In conclusion, Alternative #2 - Excavation and Off-site Disposal is a proven remedial option and is protective of human health and the environment. This alternative permanently removes the greatest amount of contaminant mass and volume, which in turn will immediately reduce contaminant toxicity and mobility. Soil Excavation and Disposal can be implemented in a relatively short period of time which will facilitate the timely redevelopment and reuse of the Site. The Removal and Off-site Disposal alternative effectively physically removes the primary source of contamination leaching to groundwater, and will ultimately assist in attenuation of contaminants in groundwater, and has the greatest potential to meet both soil and groundwater ARARs.

Any remaining residual contaminants will be monitored via a long-term groundwater monitoring and soil gas sampling program. The cost to implement the Soil Removal and Disposal alternative is similar to Alternative #3 (Enhanced In-Situ Biodegradation) and Alternative #4 (Air Sparging / Soil Vapor Extraction).

The City recommends Alternative #2 - Soil Removal and Off-site Disposal as the preferred environmental cleanup alternative for the 80-100 Charlotte Street Site. This alternative will also include the development of a soil management plan, environmental institutional controls, and environmental engineering controls will be utilized to address any residual contamination left in-place after the cleanup is complete.

If deemed necessary as based on groundwater monitoring and confirmatory soil sampling results obtained during the source removal excavation, groundwater remediation may be warranted.

TABLE 5

80-100 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF TOTAL PETROLEUM HYDROCARBONS (TPH) IN SOIL SAMPLES

RESULTS IN MG/KG OR PARTS PER MILLION (PPM)

SAMPLE DESIGNATION AND LOCATION	TPH TEST RESULTS	
	CONCENTRATION	HYDROCARBON WEIGHT
2957-01 / SS-1	5940	HW (lube oil)
2957-02 / SS-2	5450	HW (lube oil)
2957-11 / TB-8 @ 7.0'	ND	
2957-12 / TB-27 @ 8.5'	ND	
2957-13 / TB-3 @ (7.0-8.0)'	213	MW (kerosene)
2957-14 / TB-4 @ 2.5'	ND	
2957-15 / TB-2 @ (7.5-8.0)'	22.7	LW (gasoline)
2957-16 / TB-24 @ (8.0-10.0)'	34	LW (gasoline)
2957-17 / TB-17 @ 9.0'	ND	
2957-18 / TB-23 @ 9.0'	57.2	MW (kerosene)
2957-19 / TB-18 @ (9.0-11.0)'	48	MW (kerosene)
2957-20 / TB-14 @ 8.0'	2110	MW (kerosene)

LW = Light Weight hydrocarbons (e.g., gasoline)
MW = Medium Weight hydrocarbons (e.g., kerosene)
HW = Heavy Weight hydrocarbons (e.g., lube oil)
ND = Not detected above reported analytical laboratory detection limits
Note = Regulatory cleanup criteria for TPH is not available

TABLE 6

80-100 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES

RESULTS REPORTED IN UG/KG OR PARTS PER BILLION (PPB)

DETECTED COMPOUDS	RECOMMENDED SOIL CLEANUP OBJECTIVES (1)	2957-01 / SS-1	2957-12 / TB-27 @ 8.5'	2957-13 / TB-3 @ (7.0-8.0)'	2957-14 / TB-4 @ 2.5'	2957-16 / TB-24 @ (8.0-10.0)'	2638-18 / TB-23 @ 9.0'
Naphthalene	13000	ND	ND	531	ND	ND	2530
Benzo (b) flouranthene	1100	**3460**	ND	ND	ND	ND	ND
Flouranthene	50000	5550	ND	ND	ND	ND	ND
Phenanthrene	50000	3150	ND	ND	ND	ND	ND
Pyrene	50000	5700	ND	ND	ND	ND	ND
Total SVOC's	500000	17860	0	531	0	0	2530

(1) = Recommended soil cleanup objectives as referenced in January 1994, Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels as amended by the NYSDSEC Table 1 dated December 2000.

ND = Not Detected above reported analytical laboratory detection limits

Bolded and underlined denotes exceedance of the NYSDEC recommended soil cleanup objective.

TABLE 8

80 – 100 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES

RESULTS REPORTED IN UG/KG OR PARTS PER BILLION (PPB)

DETECTED COMPOUNDS	RECOMMENDED SOIL CLEANUP OBJECTIVES (1)	2957-11/ TB-8 (7')	2957-12/ TB-27 (8.5')	2957-13/ TB-3 (7-8')	2957-14/ TB-4 (7.5')	2957-15/ TB-2 (7.5-8')	2957-16/ TB-24 (8-10')	2957-18/ TB-23 (9')	2957-20/ TB-14 (8')
Ethylbenzene	5500	ND	ND	275	13.8	ND	ND	5440	**34600**
tert- Butylbenzene	10000	ND	ND	ND	ND	ND	ND	ND	**20800**
Total Xylenes	1200	ND	ND	955	27.7	ND	ND	**25130**	**99400**
Isopropylbenzene	2300	ND	ND	205	ND	ND	ND	1720	**9030**
n-Propylbenzene	3700	ND	ND	784	ND	ND	ND	**8480***	**40800**
1,3,5-Trimethylbenzene	3300	10.6	ND	2020	ND	ND	ND	**13200***	**60500**
1,2,4-Trimethylbenzene	10000	44.9	20.5	5460	52.7	ND	ND	**42500***	**217000**
sec-Butylbenzene	10000	ND	ND	88.7	ND	ND	ND	1200	5730
p-Isopropyltoluene	10000	ND	ND	312	ND	ND	16.2	2940	**13800**
Naphthalene	13000	ND	ND	ND	ND	ND	ND	323	ND
Total TICS	NA	497.2	171.8	NT	1491.5	4072.5	4706	NT	NT
Total VOC's	10000	552.7	192.3	**10099.7**	1585.7	4072.5	4722.2	**100933**	**501660**

(1) = Recommended soil cleanup objectives as referenced in the January 1994, Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels as amended by NYSDEC Table 1 dated December, 2000.

* = Denotes estimated value. Sample concentration exceeds calibration range.

NA = Not Available

NT = Not Tested

ND = Not detected above reported analytical laboratory detection limits

Bolded and underlined denotes exceedance of the NYSDEC recommended soil cleanup objective.

TABLE 9

80-100 CHARLOTTE STREET
ROCHESTER, NEW YORK

SUMMARY OF TOTAL PETROLEUM HYDROCARBONS (TPH)
IN GROUNDWATER SAMPLES

RESULTS IN UG/L OR PARTS PER BILLION (PPB)

SAMPLE DESIGNATION AND LOCATION	TPH TEST RESULTS	
	TOTAL CONCENTRATION	HYDROCARBON WEIGHT
2957-MW-1	ND	
2957-MW-2	1140	LW (gasoline)
2957-MW-3	376	LW (gasoline)
2957-MW-4	10400	LW (gasoline)

LW = Light Weight hydrocarbons (e.g., gasoline)
ND = Not detected above reported analytical laboratory detection limits
Note = Recommended cleanup criteria not available