

ADDITIONAL INVESTIGATION RESULTS
UNDERGROUND STORAGE TANK RELEASE
FORMER MOBIL SERVICE STATION
4201 HIAWATHA AVENUE
MINNEAPOLIS, MINNESOTA
MPCA SITE ID #LEAK00001485

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1.0 INTRODUCTION

1.1 PURPOSE

Peer Environmental & Engineering Resources, Inc. (PEER) was retained by Agate Properties to perform additional investigation activities at the Former Mobil Service Station site located at 4201 Hiawatha Avenue, Minneapolis, Minnesota. The services were performed in accordance with PEER's Cost Estimates dated April 16 and September 21, 1993.

The purpose of the additional investigation was to further define the extent of ground water impacts at the site which resulted from a petroleum release from former underground storage tanks and associated lines and pump islands. The additional investigation was requested by the Minnesota Pollution Control Agency in letters dated March 30, April 6, and August 16, 1993.

1.2 SCOPE OF SERVICES

The Scope of Services performed by PEER as part of this additional investigation included:

- Installation of one monitoring well.
- Headspace analysis of soil samples from the monitoring well boring.
- Collection and analytical testing of two rounds of ground water samples for petroleum constituents.
- Preparation of this report presenting the results of the additional investigation.

1.3 BACKGROUND

The site location is shown on Figure 1. The locations of previously completed soil borings and monitoring wells are shown on Figure 2.

The results of previous investigation and ground water monitoring completed at the site are presented in the following reports which were prepared by PEER:

- Remedial Investigation, Former Mobil Service Station, 4201 Hiawatha Avenue, Minneapolis, Minnesota, MPCA Leak Number 1485, March 20, 1992.
- Annual Progress Report, Ground Water Monitoring, Former Mobil Service Station, 4201 Hiawatha Avenue, Minneapolis, Minnesota, MPCA Site ID#: LEAK00001485, February 11, 1993.

2.0 METHODS AND PROCEDURES

2.1 FIELD INVESTIGATION

2.1.1 General

Field investigation activities included installation of one monitoring well (MW-4), and sampling and analytical testing of ground water samples from the well on two occasions. Drilling services were provided by Bergerson-Caswell, Inc. of Maple Plain, Minnesota. A detailed description of field investigation methods and procedures is provided in Appendix A. The following is an overview of the activities performed. The location of the completed monitoring well is shown on Figure 2.

2.1.2 Monitoring Well

The monitoring well boring MW-4 was completed from April 19-21, 1993, using a truck-mounted drill rig equipped with hollow stem augers. The boring was completed to a depth of 37 feet. Split-barrel soil samples were collected at five foot intervals for soil classification purposes and soil headspace analysis. None of the soil samples were submitted for analytical testing. A geologic log of the boring is included in Appendix B.

Upon completion of the boring, a 2 inch I.D. (inside diameter) monitoring well (MW-4) was installed. The well consists of a 10 foot, Schedule 40 PVC screen and flush-threaded Schedule 40 PVC riser pipe. The monitoring well was screened to intersect the water table and was finished at-grade due to its proximity in the paved parking/drive area. The monitoring well construction diagram and Minnesota Department of Health Well Log are included in Appendix B.

The monitoring well was developed on April 21, 1993, using a disposable polyethylene bailer. The well was developed until a relatively sediment free discharge was observed. Development data, including the volume of water removed and observations of the discharge are summarized in the following table.

MONITORING WELL DEVELOPMENT DATA	
ITEM	MW-4
Cumulative Bailing Time (minutes)	80
Total Volume of Water Removed (gallons)	30
Estimated Volume of Water in Well Casing (gallons)	1.3
Approximate Well Unit Volumes Removed	23
Date Developed	4/21/93

Monitoring well MW-4 was purged and ground water samples were collected with disposable polyethylene bailers on September 14 and 30, 1993, following MPCA guidelines. The monitoring well sampling data forms are presented in Appendix C. Existing monitoring wells (MW-1 through MW-3) were not sampled.

At the time of sampling, water level measurements were obtained using an electronic water level meter from all site monitoring wells.

2.2 ANALYTICAL TESTING

The ground water samples were submitted for analytical testing to Horizon Laboratories, Inc. of Fridley, Minnesota. The samples were analyzed for the following parameters:

- Gasoline Range Organics (GRO).
- Diesel Range Organics (DRO).
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX).

These parameters were requested by the MPCA in their letter dated August 16, 1993.

3.0 RESULTS

3.1 HYDROGEOLOGY

Water level data from September 14 and 30, 1993 are summarized in Table 1. The data was evaluated to determine the current water table configuration and hydraulic gradient. The water table configuration based on the September 30, 1993 data is presented in Figure 3. Based on this data, ground water flow is currently southwesterly, and the hydraulic gradient is 0.001. This ground water flow interpretation and the calculated hydraulic gradient are generally consistent with the September 14, 1993 data and previous data from 1991-1992.

3.2 SOIL HEADSPACE ANALYSIS

Soil headspace results from monitoring well boring MW-4 are presented on the geologic log included in Appendix B.

3.3 ANALYTICAL TESTING

The analytical testing results for the two rounds of ground water sampling from MW-4 are summarized in Table 2. Table 2 also includes a summary of applicable Minnesota Department of Health Recommended Allowable Limits (RALs) for Drinking Water Contaminants and the cleanup goals previously established by the MPCA for the site in their April 6, 1993 letter.

4.0 CONCLUSIONS AND RECOMMENDATIONS

- Based on the current and previous water level data, the additional monitoring well (MW-4) installed at the site is located immediately downgradient of the former UST basins and pump islands.
- The ground water cleanup goals assigned by the MPCA for the site are 100 times the RALs for the detected contaminants. The results of the two rounds of sampling indicate that benzene, ethyl benzene, toluene and total xylenes (BETX), were detected at concentrations below the assigned cleanup goals.
- Gasoline Range Organics were detected in MW-4 at concentrations of 12,000 and 13,000 micrograms per liter (ug/L). Diesel Range Organics were detected at concentrations of 2,500 and 2,900 ug/L. No RALs are established for these parameters.
- Since the contaminant concentrations do not exceed the assigned cleanup goals, it appears the MPCA's requirements for site closure specified in their August 16, 1993 letter have been satisfied.
- Once formal site closure has been provided by the MPCA, it is recommended that the existing monitoring wells be abandoned in accordance with Minnesota Department of Health regulations.

**TABLE 1
WATER LEVEL MEASUREMENT DATA**

Well	Date	Elevation of TOR	Water Level Below TOR	Water Level Elevation
MW-1	9/14/93	839.87	29.94	809.93
	9/30/93		29.76	810.11
MW-2	9/14/93	837.26	27.21	810.05
	9/30/93		27.06	810.20
MW-3	9/14/94	840.34	30.32	810.02
	9/30/93		30.15	810.19
MW-4	9/14/93	837.11	27.21	809.90
	9/30/93		27.06	810.05

NOTES:

No free product detected in any of the monitoring wells.
 TOR = Top of Riser.
 Elevations referenced to NGVD.

TDS Elm

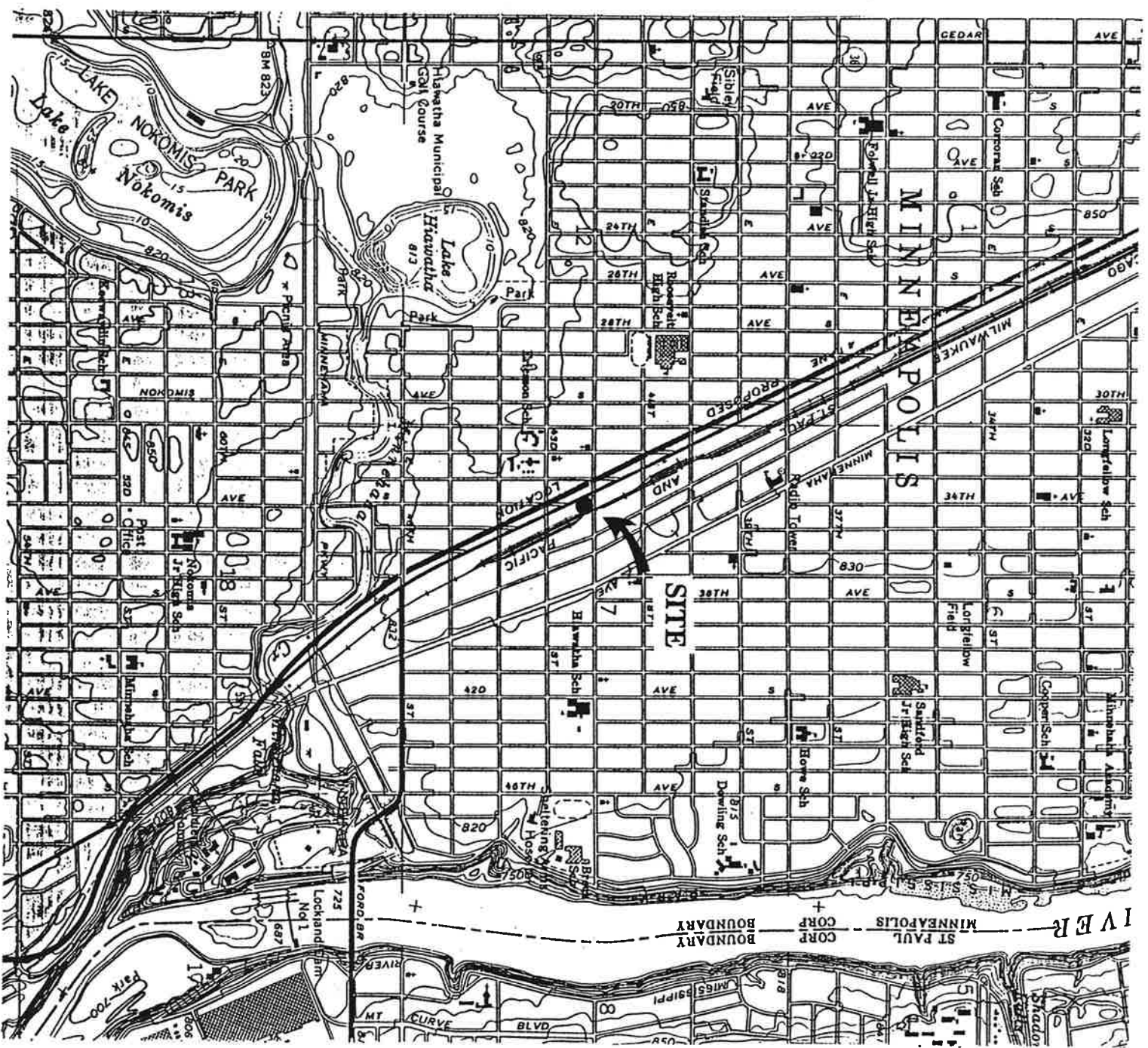
810, b1

**TABLE 2
ANALYTICAL TESTING RESULTS - GROUND WATER SAMPLES**

Compound/Parameter	MW-4		RAL	Cleanup Goal*
	9/14/93	9/30/93		
Benzene	510	550	10	1,000
Ethyl Benzene	520	560	700	70,000
Toluene	1,300	1,400	1,000	100,000
Total Xylenes	1,800	2,000	10,000	1,000,000
Gasoline Range Organics (GRO)	12,000	13,000	NE	N/A
Diesel Range Organics (DRO)	2,500	2,900	NE	N/A

NOTES:

All units reported in micrograms per liter (ug/L).
 RAL = Minnesota Department of Health Recommended Allowable Limit for Drinking Water Contaminants.
 NE = Not established.
 N/A = Not applicable.
 * = Cleanup goal is 100 times the respective RALs.



SCALE IN MILES



0 .5 1



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Site Location Map
Former Mobil Service Station
4201 Hiawatha Avenue
Minneapolis, Minnesota

Oct. 93

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EAST 42ND AVENUE

CONCRETE CURB/GUTTER

BITUMINUS CURB

Excavation E-1

MW-1

B-4

T-3

T-2

B-5

Fuel Oil UST

MW-2

MW-4

B-3

B-2

T-1

P-2

Overhead Power Lines

Site Building

P-1

Vent pipes

B-6

MW-3

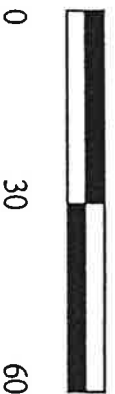
MEDIAN

HIAWATHA AVENUE

LEGEND

- ▲ Monitoring Well
- Soil Boring (4/90)
- Soil Boring (12/91)
- Pump Island
- ┌─┐ Test Trench (10/91)
- - - Piping

SCALE IN FEET



CMI-CRONSTROMS BUILDING
(4225 HIAWATHA AVENUE)

Peer Environmental &
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Minneapolis, Minnesota

Site Map
Former Mobil Service Station
4201 Hiawatha Avenue
Minneapolis, Minnesota

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EAST 42ND AVENUE

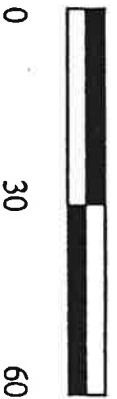
HIAWATHA AVENUE



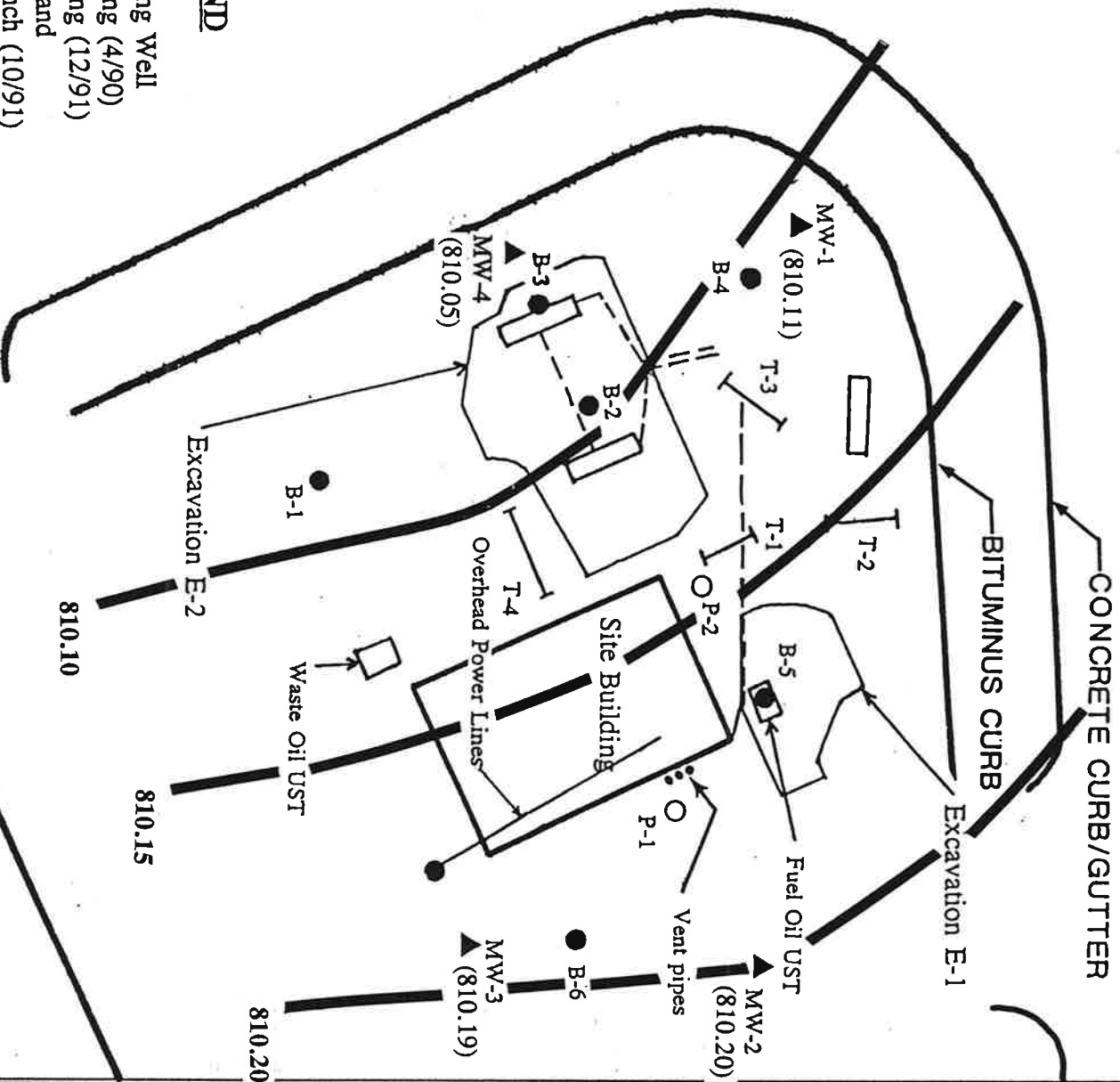
MEDIAN

LEGEND

- ▲ Monitoring Well
 - Soil Boring (4/90)
 - Soil Boring (12/91)
 - Pump Island
 - ┌─┐ Test Trench (10/91)
 - Piping
 - Water Table Contour (810.05)
 - Water Table Configuration (810.05)
- SCALE IN FEET



CMI-CRONSTROMS BUILDING
(4225 HIAWATHA AVENUE)



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Minneapolis, Minnesota

Water Table Configuration - 9/30/93
Former Mobil Service Station
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