

**Limited Site Investigation
MPCA Leak #15708**

Hi-Lake Shopping Center
2100 - 2218 East Lake Street
Minneapolis, Minnesota

Professional Certification:

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Geologist under the laws of the State of Minnesota.



Richard E. Hansen, PG
Petroleum Tank Program Manager
License Number: 30658
August 17, 2004



August 17, 2004
Project BL-04-04733

Braun Intertec Corporation

BRAUN
INTERTEC

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Minneapolis, MN 55438

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August 17, 2004

Project BL-04-04733

MPCA, MAR Division
PLR/SS Section

Mr. Mark Koplitz
Mr. Bassou Oulgout
VPIC Program
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Dear Messrs. Koplitz and Oulgout:

Re: Limited Site Investigation Report; Hi-Lake Shopping Center; 2100 - 2218 East Lake Street;
Minneapolis, Minnesota. MPCA Leak #15708.

Attached is the Limited Site Investigation (LSI) Report for the referenced property (Site). Based on the data presented in this LSI Report, we are requesting that you issue Leaksite file closure.

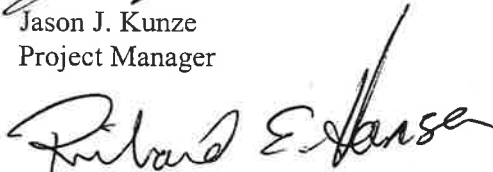
Thank you in advance for your review of this report. If you have any questions, please call Jason Kunze at (952) 995-2436 or Rich Hansen at (952) 995-2450.

Sincerely,

BRAUN INTERTEC CORPORATION



Jason J. Kunze
Project Manager



Richard E. Hansen, PG
Petroleum Tank Program Manager

c: Mr. Robert Devolve, Leonard, Street and Deinard
Mr. Steve Wellington, Wellington Management, Inc.

Attachment:
Limited Site Investigation Report

LSI Report - Hi Lake

Printed on recycled paper with soy ink.



Leaking Petroleum Storage Tanks

Minnesota Pollution Control Agency

http://www.pca.state.mn.us/programs/lust_p.html

Investigation Report Form

Guidance Document #4.06 (Old Fact Sheet #3.24)

Complete this form to document remedial investigation (RI) activities, including Limited Site Investigations (LSIs) and full RIs. Do not revise or delete any text or questions from this report form. Include any additional information that is important for making a site cleanup decision. If only a LSI is necessary, you may skip Section 6 and Section 7 of this report form.

Refer to Minnesota Pollution Control Agency (MPCA) Fact Sheet 3.1 *Leaking Underground Storage Tank Program* for the overall RI objectives, and to other MPCA Fact Sheets for details on investigation methods. When a tank has been excavated, refer to Fact Sheets 3.6 *Excavation of Petroleum-Contaminated Soil During Tank Removal* and 3.7 *Excavation Report Worksheet for Petroleum Release Sites* for reporting requirements. Document the occurrence of free product using Fact Sheet 3.3 *Free Product: Evaluation and Recover*, and Fact Sheet 3.4 *Free Product Recovery Report Worksheet*.

Braun Intertec Project No. BL-04-04733

MPCA Site ID: Leak: 00015708 Date: *August 17, 2004*

Responsible Party: *Current Property Owner – Erling E. Rice Limited Partnership*

R.P. phone #: *(952) 937-8977*

Responsible Party Address: *6255 Bury Drive* City: *Eden Prairie*

County: *Hennepin* Zip Code: *55346*

Alternate Contact (if any) for Responsible Party: phone #:

Consultant: *Braun Intertec Corp.* Consultant phone #: *(952) 995-2436*

Facility Name: *Hi-Lake Shopping Center*

Facility Address: *2100 - 2218 East Lake Street* City: *Minneapolis*

County: *Hennepin* Zip Code: *55407*

Site location: The required coordinate scheme for reporting site location is Universal Transverse Mercator (UTM), Extended Zone 15, 1983 North American Datum (NAD83). Refer to http://www.ot.state.mn.us/ot_files/handbook/standard/std17-1.html for Minnesota spatial data standards, or <http://mac.usgs.gov/mac/isb/pubs/factsheets/fs15799.html> for more information about UTM Coordinates.

X coordinate (Easting) **480909** meters

Y coordinate (Northing) **4977288** meters

What feature does the coordinate represent? (i.e. center of parcel, approximate center of source area, etc. Please describe) ***Approximate center of source area.***

What method was used to determine the coordinate? (i.e., GPS receiver, map interpolation, address matching, etc. Please describe)

Map interpolation of a 1:50,000 USGS Topographic Map, Saint Paul West, Minnesota Quadrangle and the Minnesota Department of Natural Resources Landview website.

If a paper map, digital map, aerial photo or digital orthophotoquad was used to find the site location, please provide the scale of the map or photo (i.e. 1:24,000, etc.)

1:50,000

Section 1: Emergency and High Priority Sites

1. Is an existing drinking water well impacted or likely to be impacted within a two-year travel time? Yes No
2. Are there existing vapor impacts? Yes No
3. Is there an existing surface water impact as indicated by 1) a product sheen on the surface water or 2) a product sheen or volatile organic compounds in the part per million (ppm) range in ground water in a well located close to the surface water. Yes No
4. Has the release occurred in the last 30 days? Yes No
5. Has free product been detected at the site? **If YES**, attach Fact Sheet 3.4 *Free Product Recovery Report Worksheet*. Yes No
6. Is sand or gravel aquifer impacted which is tapped by water wells within or potentially within 500 feet from the release source **or** does impacted soil overlie a geologically sensitive area? **If YES**, explain: Yes No

If you answered *YES* to any of questions 1 through 6 above describe below the actions taken to date to reduce or eliminate the risk posed by the release.

Section 2: Site and Release Information

For the purposes of this report, the term "Site" refers to the southwestern portion of the Hi-Lake Shopping Center, which is located at the northeast corner of the intersection of East Lake Street and 21st Avenue South. The Site is currently vacant, but was most recently occupied by a Burger King fast-food restaurant that was constructed in 1977 and demolished in December 2001.

In May 2000, and again in February 2004, Bay West, Inc. (Bay West) performed a Phase I environmental site assessment (Phase I ESA) of the entire Hi-Lake Shopping Center (Hi-Lake), which included the Site. Historically, according to the Bay West Phase I ESA reports, Hi-Lake was used by the Twin City Rapid Transit Company for streetcar storage from 1910 to 1955. Hi-Lake was constructed in 1957.

According to the Phase I ESA reports, City of Minneapolis records revealed that a gas station was located on the Site (southwest corner of the present Hi-Lake Shopping Center) from 1950 through 1954. Two 4,000-gallon underground storage tanks (USTs) were associated with the gas station, and according to city records were removed in 1954. A second gas station also was constructed on the Site in 1957. According to City of Minneapolis records one 560-gallon, drain-oil UST and two 6,000-gallon, gasoline USTs were located at the gas station. According to fire department files, the gasoline USTs were installed "30 feet from Lake Street sidewalk" and that the drain-oil tank was located at the southeast corner of the building. The fire department files also indicate that two pumps for the gas station were located 20 feet from the 21st Avenue sidewalk and 18 feet from the Lake Street sidewalk. According to City building permit files, the gas station was demolished in 1974. No records were found as part of the Phase I ESA report efforts that related to the removal of the USTs.

*Following the May 2000 Phase I ESA, Bay West completed a Phase II ESA at Hi-Lake to evaluate potential environmental impacts associated with the historical streetcar, petroleum retail, and other uses, the results of which were presented in a Phase II ESA report by Bay West dated September 2000. The scope of work for the Phase II ESA included conducting a geophysical survey at the Site to evaluate if USTs associated with the former gas station were present, advancement of 5 soil borings in the immediate vicinity of the Site, and collection and analyses of soil samples. The results of the geophysical survey at the Site detected numerous reflectors, two of which were possible UST locations. **

During the Bay West Phase II ESA, use of a PID revealed no elevated organic vapor concentrations in any of the soil samples collected from the 5 soil borings (GP-7 through GP-11) completed in the vicinity of the Site.

Analytical results from the Phase II ESA indicated that no concentrations of diesel-range organics (DRO), gasoline-range organics (GRO), benzene, ethylbenzene, toluene, and xylenes (BETX), or methyl tertiary butyl ether (MTBE) were detected above the laboratory reporting limits, with the exception of a soil sample collected from boring GP-8 (located near a presumed former fueling island) at a depth of 2 to 4 feet bg. In the referenced sample, DRO was detected at concentration of 21 milligrams per kilogram (mg/kg), and ethylbenzene and MTBE were both detected at a concentration of 0.083 mg/kg. In addition, a soil sample was collected from boring GP-9 (area of the presumed waste oil UST from a former filling station) at a depth of 2-4 feet bg and analyzed for volatile organic compounds (VOCs), the results of which revealed no VOCs at concentrations greater than the reporting limits in the sample.

Braun Intertec Corporation (Braun Intertec) completed a Phase II ESA at Hi-Lake, the results of which were documented in a Phase II ESA report dated May 7, 2004. In the vicinity of the Site, soil borings ST-A, ST-B, ST-C, ST-D, ST-E and test pits TP-1, TP-2, and TP-3 were completed in order to further evaluate the area for remaining USTs. The test pits were completed in possible UST areas identified by the geophysical survey completed in 2000, and as described in city records. Results of the Braun Intertec Phase II ESA for the vicinity of the Site revealed no elevated organic vapor concentrations from PID readings in any of the soil borings. However, the following indications of contamination, based on field screening, were noted in the test pits:

Test Pit	Depth (feet)	Observations
TP-1	2 – 3	Petroleum-like odor and a PID reading of 2.4 ppm
TP-2	3 – 12	Petroleum-like odor, staining, and a PID reading of 424 ppm. Contamination appeared thickest in southwest corner of test pit and thinned to the north and east.
TP-3	8 – 12	Petroleum-like odors and staining. No indications of contamination observed at 13 feet

Soil samples were collected from test pits TP-1 and TP-2 for laboratory analysis for VOCs and GRO. No sample was analyzed from test pit TP-3. GRO was detected at a concentration of 31 mg/kg in sample TP-1 at a depth of 1 foot bg and 980 mg/kg in sample TP-2 at a depth of 8 feet bg. The only VOC detected in sample TP-1 was naphthalene at a concentration of 0.063 mg/kg, just slightly above the laboratory reporting limit. Several petroleum-related VOCs were detected in sample TP-2. With the exception of 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene, none of the VOCs detected in sample TP-2 were at concentrations greater than the Residential Soil Reference Values (SRVs). However, the concentrations of these two compounds were greater than the Industrial SRVs established for those compounds. In addition, benzene, ethylbenzene, and naphthalene were detected at concentrations greater than the Soil Leaching Values (SLVs) in sample TP-2.

No soil samples were collected for laboratory analysis from the 5 soil borings completed at the Site as part of the Braun Intertec Phase II ESA.

2.1 Attach Table 1 - Tank Information. Describe the status of the other components of the tank system(s), (i.e., piping and dispensers).

The results of the geophysical survey completed at the Site in 2000 by Bay West as part of a Phase II ESA detected numerous reflectors, two of which were possible UST locations.

As part of the 2004 Phase II ESA at the Site by Braun Intertec, test pits were completed in possible UST areas identified by the geophysical survey completed in 2000, and as described in city records. Nevertheless, no indications of USTs were identified at the Site.

2.2a Describe the land use and pertinent geographic features within 1,000 feet of the site.
The Site is bordered on the north and east by the paved parking lot for Hi-Lake, with the "L"-shaped shopping-center building located beyond (two stand-alone fast-food retail buildings, Subway and Pineda Tacos, are also located east of the Site); on the south by East Lake Street, with a YWCA center located beyond; and on the west by 21st Avenue South, with the four block-long Minneapolis Pioneers & Soldiers Memorial Cemetery located beyond. The Site is located in a mixed residential, commercial, and industrialized area of Minneapolis.

Current tenants in Hi-Lake include a hardware store, a discount department store, a rental center, a branch tax-preparation firm, an auto parts store, a laundromat, and a resale building supply store.

2.2b List other potential leak sources within 500 feet of the site.

None are known to exist within 500 feet of the Site. However, please refer to Section 4.12 for a list of known petroleum leaksites within the surrounding area.

2.3 Identify and describe the source or suspected source(s) of the release.

The suspected source of the limited release is from previous underground storage tanks and/or associated piping from operations of one or more former filling station(s) at the Site.

2.4 What was the volume of the release? (if known):

Unknown

2.5 When did the release occur? (if known):

Unknown

Section 3: Excavated Soil Information

3.1 Include the Fact Sheet 3.7 *Excavation Report Worksheet* in Appendix A

3.2 Was soil excavated for off-site treatment? Yes No

Date excavated: *Not Applicable*

Total Volume removed: cubic yards

How much of the Total Volume removed was petroleum saturated: cubic yards

3.3 Indicate soil treatment type:

- land treatment
- thermal treatment
- composting/biopiling
- other ()

Name and location of treatment facility:

Section 4: Extent and Magnitude of Soil Contamination

4.1 Were soil borings conducted in or immediately adjacent to all likely sources including: YES NO

dispensers,	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
transfer areas,	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
underground storage tank basins,	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> not present
above ground storage tank areas,	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
piping,	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
remote fill pipes,	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
valves	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present
known spill areas	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input checked="" type="checkbox"/> not present

4.2 To adequately define the vertical extent of contamination, soil borings should be completed at least five feet below the water table or ten feet below the deepest measurable (field screening and visual observation) contamination, whichever is deeper. Were all soil borings completed to the required depth? YES NO

4.3 To adequately evaluate site stratigraphy complete at least one boring to 20 feet below the water table, or to 20 feet below the deepest site contamination, whichever is deeper. If a confining layer is present, drill the boring in an uncontaminated area. Was this done? YES NO

If you answered *NO* to any of the three previous questions, explain why the borings were not conducted in the required locations or to the required depths (see Fact Sheet #3.19, *Soil and Ground Water Investigations Performed During Remedial Investigations* regarding exceptions and MPCA approval for depth of drilling):

4.4 Indicate the drilling method: hollow-stem auger
 sonic drilling
 push probes
 other

Note: MPCA staff hydrologist approval is required before use of flight augers

4.5 Discuss soil borings drilled and provide rationale for their locations. Attach boring logs in Appendix D.

A total of five soil borings were completed around the presumed perimeter of the former filling station(s) at the Site. A sixth boring was completed through the presumed former underground tank basin and dispenser area where previous indications of DRO, toluene, and ethylbenzene-contaminated soil were encountered at concentrations of 21, 0.08-3, and 0.08-ppm, respectively.

4.6 Attach Table 2 - Results of Soil Headspace Screening, In Appendix C, discuss soil headspace screening method and describe any deviation from recommended and/or required methods and procedures.

Results of soil headspace screening as part of this investigation revealed no indications of elevated organic vapors above 2.2 ppm in any of the soil samples screened from five of the six soil borings completed at the Site. The remaining soil boring (ST-5), had elevated organic vapor concentrations of 25.3-, 29.7-, and 19.5-ppm from sampling depths of 2.5-, 7.5-, and 35-feet, respectively.

4.7 Attach Table 3 - Analytical Results of Soil Samples. Provide analytical results in Appendix B. In Appendix C, discuss soil sampling and analytical methods used and describe any deviation from recommended and/or required methods and procedures.

4.8 Describe the vertical and horizontal extent and magnitude of soil contamination. Provide a plan-view map and two cross-sections that illustrate both soil head space and laboratory analytical results. See Section 13.

Elevated PID readings (above 2.2 ppm) were detected in soil samples collected from boring ST-5 completed in the presumed source area in shallow soils between the surface and 7.5 feet below grade (bg) and at the soil/water interface at approximately 35 feet bg. As part of the May 2004 Phase II ESA completed at the Site by Braun Intertec, a PID reading of 2.4 ppm was detected in a shallow soil sample collected from test pit TP-1, and a PID reading of 424 ppm was detected in a soil sample collected from a depth of approximately 8 feet bg from test pit TP-2.

No benzene, ethylbenzene, GRO, or DRO were detected in any of the soil samples collected as part of this LSI, with the exception of DRO detected in sample ST-5, 35' at a concentration of 32 ppm. Toluene was detected in two of the six soil samples, but at concentrations just slightly above the laboratory reporting limit. Xylenes were detected in four of the six soil samples, but also at concentrations just slightly above the laboratory reporting limit.

As part of the September 2000 Phase II ESA at the Site by Bay West, DRO, toluene, and ethylbenzene were detected at concentrations of 21-, 0.083-, and 0.083-ppm, respectively from boring GP-8 at a depth of 2 to 4 feet bg.

As part of the May 2004 Phase II ESA at the Site by Braun Intertec, GRO was detected in soil samples collected from test pits TP-1 (1'), TP-2 (8'), and TP-5 (1'), at concentrations of 31, 980, and 32 ppm, respectively. In addition, benzene, ethylbenzene, and xylenes were detected in sample TP-2 (8') at concentrations of 0.61-, 7.3-, and 30.51-ppm, respectively.

With respect to analytical results of soil samples collected as part of all the referenced subsurface investigations at the Site, none of the elevated concentrations of the identified BETX contaminants exceeded their respective Residential SRVs (where applicable).

Based on the PID screening results and the soil analytical data, the following conclusions are drawn:

- The vertical extent of soil contamination is confined to the approximate upper 8 feet of soil, with 25 feet of clean soils between the approximate depth of the soil/water interface at 35 feet bg and the deepest measured impacts.*
- The horizontal extent of soil contamination is confined to the presumed source area near boring ST-5.*
- The magnitude of soil contamination is limited DRO and GRO contamination, within the upper 8 feet of soil, at concentrations of 21 ppm and 980 ppm, respectively. The magnitude of soil contamination at the soil/groundwater interface (confined to below the presumed source area) is limited to DRO at a concentration of 32 ppm .*

4.9 Attach Table 4 - Other Contaminants Detected in Soils (Petroleum or Non-petroleum Derived). Discuss the possible sources of these compounds.

The petroleum-related VOC concentrations detected in soil samples collected from previous subsurface investigations at the Site are likely a result of activities at the former filling stations. Of the identified contaminants, only the petroleum-related constituents 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene were detected at concentrations that exceed their respective Industrial SRVs. Please refer to Table 4 for specific contaminant concentrations.

4.10 Is contaminated soil in contact with ground water? Yes No

If YES or if ground water contamination appears likely, then complete Section 5.

If NO (contaminated soil is not in contact with ground water), what is the distance separating the deepest contamination from the surface of the water table? Was this distance measured during site activities, referenced from geologic information, or estimated based on professional opinion during a site visit? ~25 feet

The distance of approximately 25 feet was measured during Site investigation activities.

4.11 Describe observations of any evidence of a fluctuating water table and a seasonal high water table (e.g., mottling). Also, from other sources of information describe the range of natural water table fluctuations in the area.

Indications of mottled soil, or other indications of a fluctuating water table and a seasonal high water table, were not observed during the LSI. The range of natural water table fluctuations is unknown.

- 4.12 In your judgment, is there a sufficient distance separating the petroleum contaminated soil (or an impacted non-aquifer) from the underlying aquifer to prevent petroleum contamination of the aquifer? Please explain in detail. In your explanation, consider the data and information of this section as well as the nature of the petroleum release (i.e., volume, when it occurred, petroleum product). Yes No

As indicated above, a separation distance of approximately 25 feet of non-impacted soil exists between surficially contaminated soils and the depth to groundwater of approximately 35 feet bg. However, groundwater in the area has known petroleum impacts, likely as a result of one or more of the following MPCA LUST facilities as identified in the 2004 Phase I ESA report completed by Bay West for the Site:

- South Minneapolis Transfer Station, 21st Avenue South 9th Street ?
- MNDOT/M&H, 2300 East Lake Street
- City of Minneapolis, 2850 20th Avenue South
- South High School, 3131 19th Avenue South
- Former Clark Service Station, Hiawatha & Lake Street
- Wentworth Aircraft, 3015 Cedar Avenue South
- Chicago-Milwaukee Corp/Rollins Oil Co., 2000-2020 East 28th Street
- Vacant Property, 2016-2100 East 28th Street

If YES, a ground water contamination assessment is not necessary as part of the LSI.

If NO, a ground water contamination assessment is necessary. Complete Section 5.

Section 5: Aquifer Characteristics/Ground Water Contamination Assessment

Complete Section 5 if groundwater has been contaminated or may become contaminated. Aquifer determination is made during the LSI. It is based upon the stratigraphy and a hydraulic conductivity measurement calculated from grain-size distribution analysis. The site stratigraphy gives the context within which the hydraulic conductivity measurement can be interpreted. Please refer to Fact Sheet 3.19, *Soil and Ground Water Investigations Performed During Remedial Investigations* for methods and requirements.

5.1 Provide an average hydraulic conductivity value (K) measured:

$K = 26.33 \text{ ft/day}$ *Averaged from the following:*
 $ST-2 = 0.026 \text{ ft/day}$
 $ST-3 = 5.488 \text{ ft/day}$
 $ST-4 = 73.477 \text{ ft/day}$

Indicate the method of measurement (i.e., Hazen, Masch and Denny, Kozeny-Carmen, etc.):
Grain-size distribution approximations by Hazen method(s).

Indicate the locations and depths of soil samples submitted for grain size analyses. Provide the results of grain size analyses and other information used for the determination of K-values in Appendix F.

Samples submitted for grain-size analysis were collected from the following boring locations and depths: ST-2, 35 feet; ST-3, 40 feet; ST-4, 45 feet.

5.2 Calculate a range for aquifer transmissivity (T) using the equation $T = Kb$, where b is the thickness of the aquifer:

$T_{\text{High}} = 1,469.54 \text{ ft}^2/\text{day}$ (boring ST-4)
 $T_{\text{Low}} = 0.52 \text{ ft}^2/\text{day}$ (boring ST-2)

Determine the aquifer thickness (b) from geologic logs of soil borings, water well logs, and available published information. Attach water well logs in Appendix D. If the transmissivity of a contaminated hydrogeologic unit is greater than $50 \text{ ft}^2/\text{day}$, it is considered an aquifer (for the purpose of the LUST program), and monitoring wells will be necessary.

The aquifer thickness was estimated to be 20 feet based on soil conditions encountered at the Hi-Lake Shopping Center as part of this LSI, the 2004 Phase II ESA completed by Braun Intertec, and well records from nearby industrial wells. Soil boring logs and well records are attached in Appendix D.

Although the transmissivity of the hydrogeologic unit is greater than 50 ft²/day (if the higher estimated value is used), the limited magnitude of identified groundwater contamination is located in an urban area of known releases from numerous LUST facilities and historical industrial operations. In addition, municipal water service is supplied to the Site and surrounding area. Therefore, no further assessment of groundwater at or in the vicinity of the Site is warranted.

- 5.3 Discuss in detail the site geology and stratigraphy, including a discussion of local and regional hydrogeology, using soil boring data and cross sections, geologic logs of near-by water wells, and available published information.

According to published geologic information, the unconsolidated sedimentary deposits in the vicinity of the Site are Pleistocene Era upper-terrace deposits, which consist of sand, gravelly sand, and loamy sand overlain by thin deposits of silt, loam, or organic sediment (Meyer and Hobbs, 1989). The Site is situated on or near a division between two uppermost bedrock units: Middle Ordovician Era decorah shale and the Platteville and Glenwood Formation (Olsen and Bloomgren, 1989). The decorah shale is described as a green, calcareous shale with thin interbeds of limestone. The Platteville Formation is described as fine-grained limestone containing thin shale partings near the top and base and underlain by green, sandy shale of the Glenwood Formation, which is very thin.

According to published geologic information, the regional groundwater flow direction within the unconsolidated deposits and the uppermost bedrock aquifer in the vicinity of the Site is likely toward the east (Kanivetsky, 1989). However, based on subsurface investigations completed in the vicinity of the Site, the groundwater flow direction is toward the west.

References:

Kanivetsky, R., 1989a, Quaternary Hydrogeology, in Balban, N. H., ed., Geologic Atlas - Hennepin County, Minnesota: University of Minnesota - Minnesota Geological Survey, County Atlas Series, Atlas C-4, Plate 5, Scale 1:133,333.

Kanivetsky, R., 1989b, Bedrock Hydrogeology, in Balban, N. H., ed., Geologic Atlas - Hennepin County, Minnesota: University of Minnesota - Minnesota Geological Survey, County Atlas Series, Atlas C-4, Plate 6, Scale 1:150,000.

Meyer, G. N., and Hobbs, H. C., 1989, Surficial Geology, in Balban, N. H., ed., Geologic Atlas - Hennepin County, Minnesota: University of Minnesota - Minnesota Geological Survey, County Atlas Series, Atlas C-4, Plate 3, Scale 1:100,000.

Olsen, Bruce M., and Bloomgren, Bruce A., 1989, Bedrock Geology, in Balban, N. H., ed., Geologic Atlas - Hennepin County, Minnesota: University of Minnesota - Minnesota Geological Survey, County Atlas Series, Atlas C-4, Plate 2, Scale 1:100,000.

- 5.4 Attach Table 5 - Water Level Measurements and Depths of Water Samples Collected from Borings. Indicate the method used to measure the water levels in borings, and the depth water samples were collected from borings. Allow water levels in borings to equilibrate to static conditions, and the adjust the effective screened intervals in borings to intercept the static water table prior to water sample collection. Discuss groundwater flow direction.

Because only temporary groundwater monitoring wells were completed as part of this LSI, groundwater flow direction was not determined.

- 5.5 Attach Table 6 - Analytical Results of Water Samples Collected from Borings. Summarize the analytical results of groundwater samples collected as part of an LSI. Discuss the extent and magnitude of groundwater contamination. Also provide a discussion on QA/QC, including information on the samples collected and laboratory analyses performed.

Analytical results of groundwater samples collected from the Site as part of this LSI indicate no BETX, MTBE, GRO, or DRO concentrations above laboratory reporting limits for any of the four samples collected, with the exception of DRO concentrations of 230 micrograms per liter (ug/l) and 190 ug/l detected in borings ST-3 and ST-5, respectively. No Health Risk Limit (HRL) has been established for DRO.

- 5.6 Attach Table 7 - Other Contaminants Detected in Water Samples Collected from Borings (Petroleum or Non-petroleum Derived). Discuss the possible sources of these contaminants and provide a discussion of QA/QC information.

Bromomethane and chloromethane were detected in boring ST-4 at concentrations of 9.7 ug/l and 8.1 ug/l, respectively. The established HRL for bromomethane is 10 ug/l. No HRL has been established for chloromethane. 1,2-Dichloroethane was detected in boring ST-5 at a concentration of 52 ug/l, which exceeds the HRL of 4 ug/l. Naphthalene was also detected in boring ST-5 at a concentration of 3.5 ug/l, which is far below the HRL of 300 ug/l.

It should be noted that 1,2-Dichloroethane was also detected in two groundwater samples (ST-N and ST-P) collected from the Hi-Lake Shopping Center as part of the 2004 Phase II ESA completed by Braun Intertec. 1,2-Dichloroethane was detected at a concentration of 43 ug/l in boring ST-N and at a concentration of 27 ug/l in boring ST-P, both of which exceed the HRL of 4 ug/l. Also, borings ST-N and ST-P were located near the northeast corner of the Hi-Lake Shopping Center.

The source of the 1,2-Dichloroethane at the Site and at the Hi-Lake Shopping Center has not been defined. No indications of the contaminant were detected in any soil samples collected from the Site. Since the concentration of 1,2-Dichloroethane detected in groundwater across the Site is of the same order of magnitude, the documented history of soil and groundwater impacts and the historically industrial use of surrounding properties, and use of municipally supplied drinking water in the area, it is our professional opinion that no further groundwater investigation at the Site is warranted.

- 5.7 Laboratory certification number: 027-053-117 (Braun Intertec Corp. Laboratory)

Additional Ground Water Investigation

Complete **Section 6** only if: 1) *an aquifer has been impacted at or above Minnesota Department of Health HRLs*, 2) *an aquifer has been impacted below the HRLs, but the levels are likely to reach the HRLs*, or 3) *there is an insufficient distance separating the petroleum contaminated soil (or an impacted non- aquifer) from the underlying aquifer*. Complete **Section 7** only if remediation is anticipated. Regardless of whether you are submitting a *LSI* or a *full RI*, all sections following Section 7 must be completed.

Section 6. Extent and Magnitude of Ground Water Contamination

- 6.1 Discuss drilling and installation of wells, including the rationale for their locations. Attach boring logs in Appendix D.
- 6.2 Attach Table 8 - Monitoring Well Completion Information.
- 6.3 Attach Table 9 - Summary of Water Levels Measured in Wells.
- 6.4 Attach Table 10 - Analytical Results of Water Samples Collected from Wells. Indicate here whether samples were purged or unpurged (see Fact Sheet 3.23). If purged, indicate purging method.
- 6.5 Attach Table 11 - Other Contaminants Detected in Water Samples Collected from Wells (Petroleum or Non-Petroleum Derived). Indicate here whether samples were purged or unpurged (see Fact Sheet 3.23). If purged, indicate purging method.
- 6.6 Describe the extent and magnitude of the ground water contamination. Discuss the presence of non-petroleum compounds, if detected, and identify possible sources of these compounds. Also provide a discussion on QA/QC, including information on the samples collected and laboratory analyses performed.
- 6.7 Is there a clean or nearly clean (below HRLs) down-gradient monitoring well Yes No located along the longitudinal axis of the contaminant plume? (approximately 20 degrees plus or minus the axis)
- 6.8 Is there a worst-case well completed through the source area(s) of the Yes No release?

If you have answered *NO* to any of the above two questions, please explain why a well was not completed in the required location.

- 6.9 Provide an estimate of the longitudinal length of the dissolved feet
contaminant plume:

6.10 Calculate groundwater flow velocity (based on Darcy's Law) using the average K-value, average horizontal hydraulic gradient, and effective porosity. Provide documentation in Appendix F.

Hydraulic Conductivity (K) = Method
Porosity (n) = method/reference
Average horizontal gradient (dh/dl) =
Calculated GW velocity (v) = cm/s ft/day

6.11 Using the calculated groundwater flow velocity (above), is there a receptor within a five-year travel time? Yes No

If YES, provide the unique well number and identify the location of the receptor(s).

6.12 Were any deep monitoring wells completed at the site? Yes No

If YES, list them and indicate their depths:

Contact the MPCA project hydrologist before installing a deep monitoring well. A deep monitoring well may be necessary if: 1) Contamination exists more than 10 feet below the water table or 2) the impacted aquifer is a drinking water aquifer or is hydraulically connected to the aquifer(s) presently utilized by a water supply well located within 500 feet of the release source.

If contamination is present at depth in the aquifer or in deeper aquifers, additional deep wells may be required. Provide the following information if deep wells are installed:

Vertical Gradient (dv/dl)
Inferred GW Flow Direction

Provide the following information for the deep aquifer unit if it appears to be hydrogeologically distinct from the upper unit.

Porosity (n):
Hydraulic Conductivity (K)

Submit this RI report after completing a minimum of *two quarterly sampling events*. Groundwater monitoring should continue until MPCA response is received.

Section 7: Evaluation of Natural Attenuation

Refer to the Fact Sheet #3.21 *Assessment of Natural Attenuation at Petroleum Release Sites*. **Note:** Evaluation of natural attenuation is not required unless requested by MPCA staff.

7.1 Attach Table 12 - Natural Attenuation Parameters. Discuss the results. Specifically, compare the concentrations of the inorganic parameters inside and outside the plume.

7.2 In your judgment, is natural biodegradation occurring at this site? Please Yes No
Explain.

If active remediation is anticipated, discuss reasons why natural attenuation (including biodegradation) can not adequately remediate the contaminants to acceptable risk levels.

Section 8: Well Receptor Information/Assessment

Include in Appendix E, copies of the water supply well logs obtained from MGS, MDH, drillers, and where applicable, from County well management authorities.

8.1 Attach Table 13 - Properties Located Within 500 Feet of the Release Source. Provide a map identifying the features listed in Table 13.

8.2 Were all property owners within 500 feet of the release source successfully contacted to determine if water wells are present? Yes No
If NO, please explain.

Due to the lack of any wells identified within 500 feet of the Site in the well records review, the availability of municipally supplied water, and water utility billing information provided by the City of Minneapolis, it was not necessary to contact the property owners for further information.

8.3 Attach Table 14 - Water Supply Wells Located within 500 Feet of the Release Source and Municipal or Industrial Wells Within 1/2 Mile.

8.4 Discuss the results of the ground water receptor survey and any analytical results from sampling conducted at nearby water wells. Comment on the risks to water supply wells identified within 500 feet from the release source as well as the risk posed by or to any municipal or industrial wells found within 1/2 mile. Specifically indicate whether water supply wells identified utilize the impacted aquifer. (Note: an impacted aquifer separated from another aquifer by a clay lens may not be considered a separate aquifer).

The results of the groundwater receptor survey indicate that no water supply wells exist within 500 feet of the Site. A total of 3 industrial wells were identified on two properties located within 1/2 mile of the Site, but all 3 wells are cased to a minimum depth of 234 feet below grade. In addition, the property with 2 wells is railroad property that is a MPCA LUST facility.

8.5 Is municipal water available in the area? Yes No

8.6 Are there any plans for ground water development in the impacted aquifer within 1/2 mile of the site, or one mile down-gradient of the site if the aquifer is fractured? Please give the name, title and telephone number of the person that was contacted for this information (below). Yes No

Todd - City of Minneapolis Finance Department, Utilities Billing Telephone (612) 673-1114

Municipal water is available throughout Minneapolis. The City of Minneapolis does not use water wells. City water is drawn from the Mississippi River, which is approximately 1.3 miles east-northeast of the Site. The City water intakes are at least 1 mile upstream of the Site. The city regulates new well installation in an effort to reduce cross-contamination resulting from poor well construction and restricts the installation of wells into the shallow aquifers (i.e., surficial materials). This information is generally known to Braun Intertec employees through prior work on Minneapolis sites and is verified in Geologic Atlas, Hennepin County, Minnesota, County Atlas Series C-4, N.H. Balaban, editor. Consequently, local authorities were not contacted regarding municipal wells or groundwater development.

Section 9: Surface Water Risk Assessment

9.1 Are there any surface waters or wetlands located within 1/4 mile of the site? Yes No

If YES, list them: _____

Also list any potential pathway such as ditches, drain tiles, storm sewers, etc., that may lead to the identified surface water features.

9.2 If surface water is present down-gradient of the site, is there a clean down-gradient monitoring well (temporary or permanent) located between the site and the surface water? YES
 NO
 N/A

9.3 If you answered NO to question 9.2, we assume that contamination discharges to surface water. Therefore, complete the following information:

Name of receiving water:

Receiving water classification

ORVW?

Yes No

Plume width, (W):

feet

Plume thickness, (H):

feet

Hydraulic conductivity, (K):

gal/day/ft²

Horizontal gradient, (dh/dl):

(unitless)

Discharge, (Q) = $H*W*K*(dh/dl)/1440$

gal/min

Applicable chronic standard (7050 or 7052)

Applicable max. standard (7050 or 7052)

Applicable FAV (7050 or 7052)

Contaminant concentration in ground water

9.4 If you answered YES to question 9.2, identify the clean down-gradient boring or monitoring well, the distance to the surface water feature, and discuss the contamination risk potential.

Section 10: Vapor Risk Assessment/Survey

- 10.1 Is there a history of vapor impacts in the vicinity of the site? Yes No

If YES, describe:

- 10.2 Is there any indication that free product or contaminated ground water may be traveling off-site within the utility corridors? Yes No

If YES, utility backfill investigation is required (refer to Fact Sheet 3.19). Discuss the investigation rationale and results.

- 10.3 Discuss the potential for vapor migration/accumulation near the site. Your discussion should consider: Soil types, product type, presence and distribution of free product or high concentrations of dissolved product. Also, using cross-sections to illustrate the relationship, compare the depth of contamination with the location of underground utility lines, location and depth of storm and sanitary sewers, and location of nearby basements and sumps.

Based on PID soil screening results of soil samples collected from the Site as part of this LSI and previous subsurface investigations at the Site, organic vapors are present in soils at the Site within the presumed source area. PID readings of 25.3-, 29.7-, and 42-ppm were detected in soils within the upper 8 feet of the surface of the presumed source area.

Presently, the Site is a vacant portion of a paved parking lot for the Hi-Lake Shopping Center, and the potential risk to human health or the environment from vapor migration/accumulation is low.

Based on the horizontal and vertical definition of the release at the Site, the limited concentrations of soil and groundwater contaminants detected at the Site, and the few elevated PID readings limited to the presumed source area on the Site, the potential for vapor migration and/or accumulation is limited.

- 10.4 Conduct a vapor survey if the vapor risk assessment indicated a risk of vapor impacts to buildings or utilities. Ask occupants of nearby buildings if they have smelled petroleum odors. See Fact Sheet 3.20 *Potential Receptor Surveys and Risk Evaluation Procedures at Petroleum Release Sites*. Identify all vapor monitoring locations on an attached site map by labeling each monitoring location with a number. Tabulate the list of vapor monitoring locations in Table 15. Vapor monitoring methods, including instruments used, must be discussed in Appendix C. Provide a detailed description of each vapor monitoring location and an interpretation of the vapor monitoring results below.

A vapor risk assessment was completed of accessible underground utilities within 500 feet of the Site. No elevated PID readings were detected within any storm sewers within 500 feet of the Site. Based on these results, no PID readings were taken within possible basement areas within off-site commercial buildings or residences located south of East Lake Street. No basements are known to exist within the Hi-Lake Shopping Center, located adjacent to and north and east of the Site.

- 10.5 Attach Table 15 - Results of Vapor Monitoring.

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination:

Residual petroleum-impacted soil is present within the presumed source area at the Site. However, the impacted soil appears to be limited in concentration, and is present within two distinct zones: the upper 8 feet of soil (from the surface), and the soil/groundwater interface at approximately 35 feet below grade. In addition, the Site is a vacant, unused portion of a paved parking lot for the Hi-Lake Shopping Center.

11.2 Discuss the risks associated with the impacted ground water:

The Site is located in a historically heavy industrial and urban area of Minneapolis. Known petroleum leaksites with documented groundwater contamination surround the Site on all sides. Based on the current use of the Site as a vacant paved parking lot and the use of municipally supplied drinking water for the area, risks associated with impacted groundwater are low.

11.3 Discuss other concerns not mentioned above:

No other concerns were noted as part of this LSI.

Section 12: Conclusions and Recommendations

12.1 Recommendation for site:

- site closure
- additional vapor monitoring
- additional ground water monitoring
- active remediation

12.2 Base the recommendation above on Fact Sheet #3.1 *Leaking Underground Storage Tank Program*. Describe below how you applied the policy to support your recommendation. If closure is recommended, please summarize significant site investigative events and describe how site specific risk issues have been adequately addressed or minimized to acceptable low risk levels.

In completing this LSI, the horizontal and vertical definition of the release has been defined. Furthermore, based on the limited concentrations of soil and groundwater contaminants detected at the Site, the few elevated PID readings limited to the presumed source area on the Site, and the present use of the Site as a vacant, paved parking lot, the risk to human health and the environment is low.

12.3 If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency. Conduct quarterly monitoring until the MPCA responds to this report.

12.4 If active remediation is proposed, then recommend a conceptual approach by listing the remedial technologies or combination of technologies that are likely feasible. MPCA staff will review this RI report at a higher than normal priority to determine if active remediation is required. We will respond with either a request for proposal for additional monitoring or a Corrective Action Design report.

Section 13: Figures

Attach the following figures in order of discussion in the text:

- Site location map using a U.S. Geological Survey 7.5-minute quadrangle map.
- One or more site map showing:
 - Structures
 - Locations and depths of on-site buried utilities
 - All past and present petroleum storage tanks, piping, dispensers, and transfer areas.
 - Extent of soil excavation
 - Boring and well locations (including any drinking water wells on site)
 - Horizontal extent of soil contamination
 - Horizontal extent of ground water contamination
 - Location of end points for all geologic cross sections.
 - Potential pathways to surface water features within 1/4 mile of the site.

Distinguish sequential elements of investigations by dates, symbols, etc. in the key.

- Ground water gradient contour maps (for sites with monitoring wells) for each gauging event.
- Well receptor survey map showing 1/2-mile radius, 500-foot radius, water supply wells, other potential sources of contamination, using a U.S. Geological Survey 7.5-minute quadrangle.
- Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).
- Provide at least two (2) geologic cross sections, including utilities.

Section 14: Tables

Table 1
Tank Information

Tank #	UST or AST	Capacity (gallons)	Contents	Year Installed	Status*	Condition
001	UST	4,000	unknown	unknown	Removed in 1954	unknown
002	UST	4,000	unknown	unknown	Removed in 1954	unknown
003	UST	6,000	unknown	unknown	unknown	unknown
004	UST	6,000	unknown	unknown	unknown	unknown
005	UST	560	Waste oil	unknown	unknown	unknown

*Indicate: *removed (date), abandoned in place (date), or currently used, upgraded tank, installation of new tank.*

Table 2
Results of Soil Headspace Screening

Depth (ft.)	Sample Location																			
	ST-1	ST-1A	ST-2	ST-3	ST-4	ST-5	GP-7	GP-8	GP-9	GP-10	GP-11	ST-A	ST-B	ST-C	ST-D	ST-E	TP-1	TP-2	TP-3	
2.5	1.1	NR	NR	0.3	0.7	25.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	S	S	S
5	0.3	NR	NR	0.3	0.3	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	S	S	S
7.5	EOB	0.3	NR	0.0	0.0	29.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	EOB	424	S	S
10	0.7	NR	NR	0.0	0.3	0.9	0.0	0.0	0.0	EOB	EOB	0.0	0.0	0.0	0.0	0.0	S	S	S	S
12.5	0.0	NR	NR	0.3	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS	NS	NS
15	0.0	NR	NR	0.7	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	EOB	EOB	EOB	EOB
20	0.0	NR	NR	0.0	0.3	1.8	0.0	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB	EOB
25	0.0	0.3	0.3	NSR	1.3	EOB														
30	EOB	2.2	0.7	1.1	0.8															
35	0.8	0.7	NSR	19.5																
40	1.3	1.3	0.9	1.3																
45	EOB	EOB	EOB	0.9	0.3															
50				EOB	0.0															
55					1.3															

Notes: In the absence of PID readings with regard to test pits, notations are made as follows:

S = stained soil; NS = no stained soil

EOB = End Of Boring (or test pit)

NR = No PID Reading

NSR = No Sample Recovered

Green Highlight = Results obtained as part of the LSI; Other results are from previous investigations at the site.

Table 3
Analytical Results of Soil Samples

Boring, Depth(ft)	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	GRO	DRO	Lab Type
ST-1A, 25'	6/22/04	<0.027	<0.027	<0.027	0.032*	<11	<10	fixed
ST-2, 40'	6/22/04	<0.027	<0.027	<0.027	<0.027	<11	<9.3	fixed
ST-3, 35'	6/22/04	<0.026	0.039	<0.026	0.037*	<10	<9.0	fixed
ST-4, 30'	6/23/04	<0.028	<0.028	<0.028	<0.028	<11	<9.9	fixed
ST-5, 7.5'	6/23/04	<0.028	<0.028	<0.028	0.029*	<11	<9.7	fixed
ST-5, 35'	6/23/04	<0.027	0.043	<0.027	0.044*	<11	32	fixed
Trip Blank	6/23/04	<0.025	<0.025	<0.025	0.030	⊙	⊙	fixed
GP-7, 2-4'	8/23/00	ND	ND	ND	ND	ND	ND	fixed
GP-8, 2-4'	8/23/00	ND	0.083	0.083	ND	ND	21	fixed
GP-9, 2-4'	8/23/00	ND	ND	ND	ND	⊙	ND	fixed
GP-10, 2-4'	8/23/00	ND	ND	ND	ND	ND	ND	fixed
GP-11, 2-4'	8/23/00	ND	ND	ND	ND	ND	ND	fixed
ST-A	-	⊙	⊙	⊙	⊙	⊙	⊙	-
ST-B	-	⊙	⊙	⊙	⊙	⊙	⊙	-
ST-C	-	⊙	⊙	⊙	⊙	⊙	⊙	-
ST-D	-	⊙	⊙	⊙	⊙	⊙	⊙	-
ST-E	-	⊙	⊙	⊙	⊙	⊙	⊙	-
TP-1, 1'	5/10/04	<0.050	<0.050	<0.050	<0.050	31	⊙	fixed
TP-2, 8'	5/10/04	0.61	<0.1	7.3	30.51	980	⊙	fixed
TP-4, 2'	5/10/04	<0.067	<0.067	<0.067	<0.067	<10	⊙	fixed
TP-5, 1'	5/10/04	<0.050	<0.050	<0.050	<0.050	32	⊙	fixed

Report results in mg/kg. Use less than symbols to show detection limit. Indicate mobile or fixed based in the lab type column.

Notes: * = Xylenes were also detected in a sample container trip blank (labeled MeOH Blank).

ND = None Detected; "⊙" = Not Analyzed

Table 4
Other Contaminants Detected in Soils

Compound/Parameter	Sample Identifier										Residential Soil Reference Value (mg/kg)	Industrial Soil Reference Value (mg/kg)
	GP-7, 2-4' 8/23/2000	GP-8, 2-4' 8/23/2000	GP-9, 2-4' 8/23/2000	GP-10, 2-4' 8/23/2000	GP-11, 2-4' 8/23/2000	TP-1 (1) 5/10/2004	TP-2 (8') 5/10/2004	TP-4 (2') 5/10/2004	TP-5 (1') 5/10/2004			
Volatile Organic Compounds (mg/kg)												
Isopropylbenzene (cumene)	⊙	⊙	ND	⊙	⊙	< 0.050	1.5	< 0.067	< 0.050	30	87	
p-Isopropyltoluene	⊙	⊙	ND	⊙	⊙	< 0.050	0.83	< 0.067	0.061	NI ²	NI ²	
Naphthalene	⊙	⊙	ND	⊙	⊙	0.063	8.7	< 0.067	0.27	10	28	
n-Propylbenzene	⊙	⊙	ND	⊙	⊙	< 0.050	5.2	< 0.067	< 0.050	30	93	
1,3-Trimethylbenzene	⊙	⊙	ND	⊙	⊙	< 0.050	14	< 0.067	0.065	5	5	
1,2,4-Trimethylbenzene	⊙	⊙	ND	⊙	⊙	< 0.050	48	< 0.067	0.27	4	10	
Semi-Volatile Organic Compounds (mg/kg)												
Total SVOCs	⊙	⊙	⊙	⊙	⊙	⊙	⊙	ND	ND	1,200	5,260	
Metals (mg/kg)												
Arsenic, Total	⊙	⊙	3.21	⊙	⊙	⊙	⊙	⊙	⊙	10	25	
Barium, Total	⊙	⊙	78.8	⊙	⊙	⊙	⊙	⊙	⊙	1,200	12,500	
Cadmium, Total	⊙	⊙	0.08	⊙	⊙	⊙	⊙	⊙	⊙	35	250	
Chromium, Total	⊙	⊙	14.9	⊙	⊙	⊙	⊙	⊙	⊙	71*	425 *	
Lead, Total	18.7	92	3.4	206	9.67	7.4	15	< 3.7	< 3.7	400	700	
Selenium, Total	⊙	⊙	0.37	⊙	⊙	⊙	⊙	⊙	⊙	170	1,250	
Silver, Total	⊙	⊙	ND	⊙	⊙	⊙	⊙	⊙	⊙	170	1,250	
Mercury, Total	⊙	⊙	0.025	⊙	⊙	⊙	⊙	⊙	⊙	0.7	2	

Notes:

mg/kg = Milligrams per kilogram.

< - Compound/parameter was not detected above the laboratory reporting limit indicated.

BOLD = Compound/parameter was detected above the minimum laboratory reporting limit.

NI² = Not Established

ND = Not Detected.

⊙ = Not Analyzed

SRV - 1999 Soil Reference Value established by the Minnesota Pollution Control Agency.

Green Highlight = Concentration exceeds the Industrial SRV.

* Standard for hexavalent chromium is provided

Table 5
Water Level Measurements and Depths of Water Samples
Collected from Borings

	Soil Boring			
	ST-2	ST-3	ST-4	ST-5
Static Water level depth (ft)	33	38.2	31.3	39.7
Sampled Depth (ft)	33	38.2	31.3	39.7

Describe in Appendix C, the methods and procedures used to measure water levels in borings.

Table 6
Analytical Results of Water Samples Collected from Borings

Boring Number	Date Sampled	Sampled Depth	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	GRO	DRO	Lab Type
ST-2	6/22/04	33'	<2.0	<2.0	<2.0	<2.0	<2.0	<200	<160	fixed
ST-3	6/22/04	38.2'	<2.0	<2.0	<2.0	<2.0	<2.0	<200	230	fixed
ST-4	6/23/04	31.3'	<2.0	<2.0	<2.0	<2.0	<2.0	<100	<110	fixed
ST-5	6/23/04	39.7'	<2.0	<2.0	<2.0	<2.0	<2.0	<200	190	fixed
ST-K	5/12/04	29.0'	<2.0	<2.0	<2.0	<2.0	<2.0	⊙	⊙	fixed
ST-N	5/12/04	29.0'	<2.0	<2.0	<2.0	<2.0	<2.0	⊙	⊙	fixed
ST-P	5/11/04	23.0'	<2.0	<2.0	<2.0	<2.0	<2.0	⊙	⊙	fixed
HRL	NA	NA	10	1000	700	10000	NE	NE	NE	fixed

Report results in ug/L. Use less than symbols to show detection limit. Indicate mobile or fixed based in the lab type column.

Notes: NE=Not Established; NA=Not Applicable; HRL=Health Risk Limit; "⊙" = Not Analyzed

**Table 7
 Other Contaminants Detected in Water Samples
 Collected from Borings (Petroleum or Non-petroleum Derived)**

Boring Number	Date Sampled	1,2-Dichloroethane	Bromomethane	Chloromethane	Naphthalene
ST-2	6/22/04	<2.0	<2.0	<2.0	<2.0
ST-3	6/22/04	<2.0	<2.0	<2.0	<2.0
ST-4	6/23/04	<2.0	9.7	8.1	<2.0
ST-5	6/23/04	52*	<2.0	<2.0	3.5
ST-K	5/12/04	<2.0	<2.0	<2.0	<2.0
ST-N	5/12/04	43*	<2.0	<2.0	<2.0
ST-P	5/11/04	27*	<2.0	<2.0	<2.0
HRL	NA	4	10	NE	300

Report results in ug/L. Indicate other contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes.

*Notes: * = value exceeds the HRL (Health Risk Limit); NA = Not Applicable; NE = Not Established.*

**Table 8
 Monitoring Well Completion Information**

Not Applicable

**Table 9
 Water Level Measurements in Wells**

Not Applicable

**Table 10
 Analytical Results of Water Samples Collected from Wells**

Not Applicable

Table 11
Other Contaminants Detected in Water Samples
Collected from Wells (Petroleum or Non-petroleum Derived)

Not Applicable

Table 12
Natural Attenuation Parameters

Not Applicable

Table 13
Properties Located Within 500 Feet of the Release Source.

# (From Map)	Property Address	Water Well (Y or N)	How Determined*	Well Use**	Public Water Supply (Y or N)	Confirmed By City (Y or N)	Basement Or Sumps (Y or N)	Possible Petroleum Sources (Y or N)	Comments (including property use)
1	2019 E. Lake St.	N	telephone	NA	Y	Y	unknown	unknown	commercial
2	2121 E. Lake St.	N	telephone	NA	Y	Y	unknown	unknown	commercial
3	2225 E. Lake St.	N	telephone	NA	Y	Y	unknown	unknown	commercial
4	2100 - 2218 E. Lake St.	N	telephone	NA	Y	Y	N	unknown	commercial
5	3012 21 st Ave. N.	N	telephone	NA	Y	Y	unknown	unknown	residential
6	3016 21 st Ave. N.	N	telephone	NA	Y	Y	unknown	unknown	residential

*E.g., visual observation, personal contact, telephone, returned postcard, assumed (i.e., no postcard returned).

**E.g., domestic, industrial, municipal, livestock, lawn/gardening, irrigation.

Table 14
Water Supply Wells Located Within 500 Feet of the
Release Source and Municipal or Industrial Wells Within 1/2 Mile

Unique Well #	Ground Elevation	Total Depth (ft)	Base of Casing (ft)	Static Elevation	Aquifer	Use	Owner	Distance & Direction from source
201086	845	700	234	?	FR	Ind'l.	C.M.ST.P. RR Co.	~1/4 mile NE
201087	845	995	512	55	?	Ind'l.	C.M.ST.P. RR Co.	~1/4 mile NE
201088	840	427	256	?	STL	Ind'l.	Mpls. Moline	~1/8 mile NE

Notes: FR = Franconia, STL = St. Lawrence

Table 15
Results of Vapor Monitoring

Location # and description	Date	PID reading (ppm)	Percent of the LEL
1 (storm sewer)	6/23/04	0.0	0.0
2 (storm sewer)	6/23/04	0.0	0.0
3 (storm sewer)	6/23/04	0.0	0.0
4 (storm sewer)	6/23/04	0.0	0.0
5 (storm sewer)	6/23/04	0.0	0.0

Notes: Location numbers must match locations on the site map. Provide a brief description of the monitoring point (e.g., sump, basement corner, sanitary sewer manhole, storm sewer basin, etc.).

Section 15: Appendices

Attach the following appendices.

- Appendix A* Excavation Report Worksheet for Petroleum Release Sites.
- Appendix B* Laboratory Analytical Reports for Soil and Ground Water. Include laboratory QA/QC data and laboratory certification number.
- Appendix C* Methodologies and Procedures, Including Field Screening of Soil, Other Field Analyses, Soil Boring, Soil Sampling, Well Installation, and Water Sampling.
- Appendix D* Geologic Logs of Soil Borings, Including Construction Diagrams of Temporary and Permanent Wells, and Copies of the Minnesota Department of Health Well Record.
- Appendix E* Copies of Water Supply Well Logs With Legible Unique Numbers.
- Appendix F* Grain-Size Analysis, Hydraulic Conductivity Measurements, and Other Calculations.

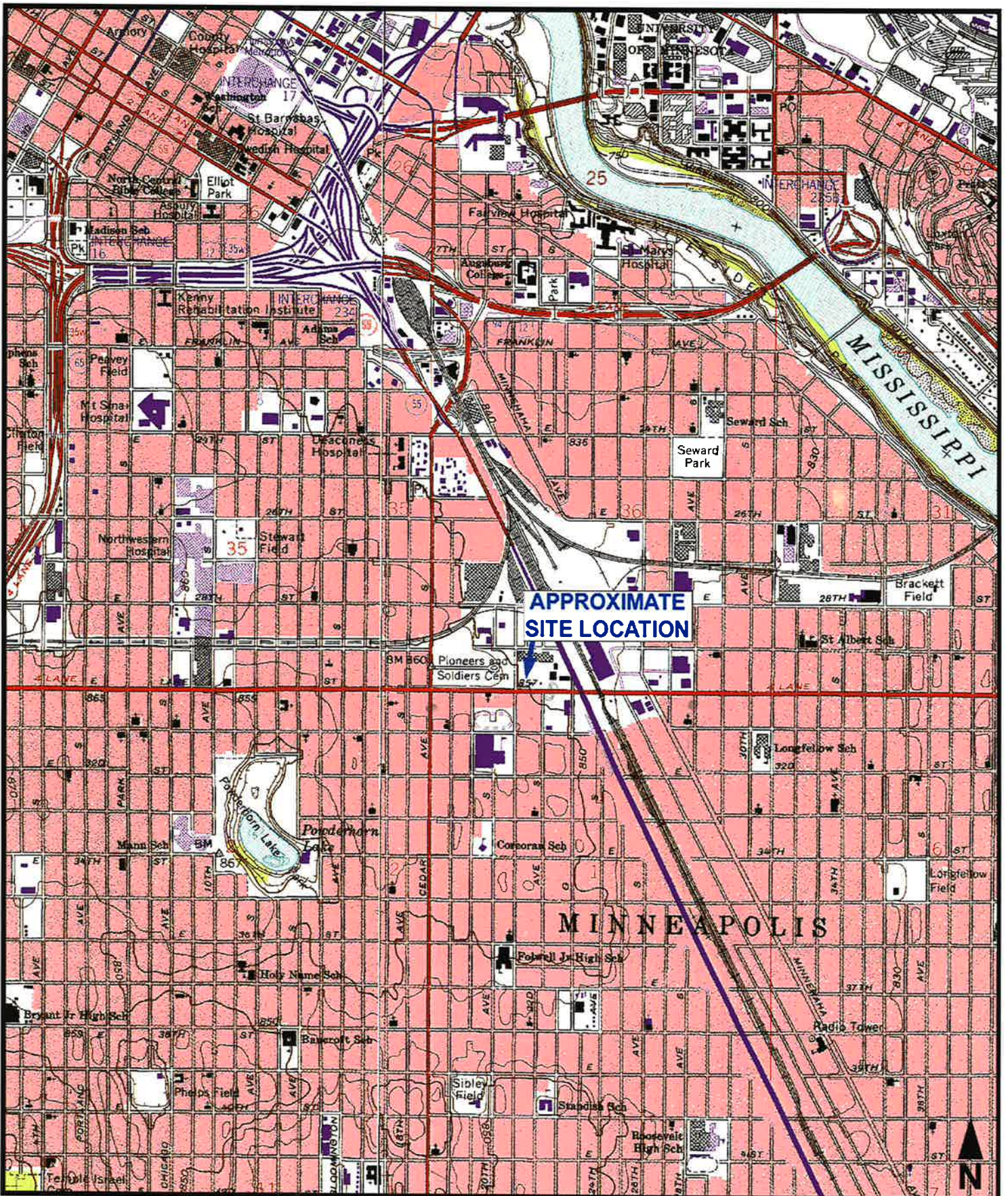
Section 16: Consultant (or other) Information

By signing this document, I/we acknowledge that we are submitting this document on behalf of and as agents of the responsible person or volunteer for this leak site. I/we acknowledge that if information in this document is inaccurate or incomplete, it will delay the completion of remediation and may harm the environment and may result in reduction of reimbursement awards. In addition, I/we acknowledge on behalf of the responsible person or volunteer for this leak site that if this document is determined to contain a false material statement, representation, or certification, or if it omits material information, the responsible person or volunteer may be found to be in violation of Minn. Stat. § 115.075 (1994) or Minn. R. 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.

Name and Title:	Signature:	Date signed:
<u>Jason J. Kunze Project Manager</u>	<u></u>	<u>8-17-04</u>
<u>Richard E. Hansen, PG Petroleum Tank Program Manager</u>	<u></u>	<u>8/17/04</u>

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BRAUN
INTERTEC

Site Location Map
 Hi-Lake Shopping Center
 Minneapolis, Minnesota

USGS TOPOGRAPHIC MAP
 ST. PAUL WEST, MINNESOTA

DATE:	7/12/04	
JOB NO:	BL-04-04733	
SCALE:	1 : 24,000	FIGURE NO:
DRAWN BY:	JJC	1