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January 15, 2008

Ms. Katherine Funk - Project Manager
Petroleum Remediation Unit 2-Remediation Division
Petroleum and Closed Landfill Section
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194



RE: Investigation Report Form Guidance Document 4-06 Completed for
Metro Transit South Garage – Hydraulic Hoist Replacement Project

Dear Ms. Funk:

Enclosed for your review is the above referenced Report. We are requesting site file closure at this time. If you have any questions or comments on this report or the project in general, please give me a call at (612) 781-2188.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dennis P. McComas".

Dennis P. McComas, P.G.
Vice President
Thatcher Engineering, Inc.

DPM:

Enclosures

Cc: Mr. Mac Sweidan, F.E. - Metro Transit - Engineering and Construction Dept.



Minnesota Pollution Control Agency

Investigation Report Form

Guidance Document 4-06

Complete this form to document site investigation activities, including Limited Site Investigations (LSIs) and full Remedial Investigations (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 an LSI is necessary, you may skip Section 6 and Section 7 of this report form.

Refer to Minnesota Pollution Control Agency (MPCA) Guidance Document 1-01 *Petroleum Remediation Program General Policy* for the overall site investigation objectives, and to other MPCA guidance document for details on investigation methods. When a tank has been excavated, refer to Guidance Documents 3-01 *Excavation of Petroleum Contaminated Soil* and 3-02 *General Excavation Report Worksheet* for reporting requirements. Document the occurrence of free product using Guidance Document 2-02 *Free Product: Evaluation and Recovery*, and Guidance Document 2-03 *Free Product Recovery Report Worksheet*.

MPCA Site ID: Leak: 00016867 Date: 1/15/2007

Responsible Party: Metro Transit R.P. phone #: 612.349.5975

Responsible Party Address: 560 - 6th Avenue North City: Minneapolis

County: Hennepin Zip Code: 55411

Alternate Contact (if any) for Responsible Party: Mac Sweidan phone #: 612.349.7761

Consultant: Thatcher Engineering Inc Consultant phone #: 612.781.2188

Facility Name: Metro Transit South Garage

Facility Address: 2100 MTC Road City: Bloomington

County: Hennepin Zip Code: 55450

Site Location Information: Complete Guidance Document 1-03a *Spatial Data Reporting Form* and include in Appendix G.

Section 1: Emergency and High Priority Sites

- 1.1 Is an existing drinking water well impacted or likely to be impacted within a two-year travel time? Yes No
- 1.2 Are there any existing field-detectable vapor impacts (OVM, explosimeter, odors, etc.)? Yes No
- 1.3 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
- 1.4 Has the release occurred in the last 30 days? Yes No
- 1.5 Has free product been detected at the site? **If YES**, attach Guidance Document 2-03 *Free Product Recovery Report Worksheet*. Yes No
- 1.6 Is a hydrogeologically sensitive aquifer impacted which is tapped by water wells within 500 feet from the release source? **If YES**, explain: Yes No
- 1.7 Has the public water supply risk assessment concluded that the site is a high priority site with respect to a public water supply well (see Guidance Document 4-18 *Public Water Supply Risk Assessment at Petroleum Remediation Sites*)? **If YES**, provide the name of the public water supply system(s) at risk. Yes No
- 1.8 Did the vapor intrusion assessment detect exceedences of soil gas action levels (see Guidance Document 4-01a *Vapor Intrusion Assessments Performed during Site Investigations*)? Yes No

If you answered **YES** to any of questions 1 through 8 above describe below the actions taken to date to reduce or eliminate the risk posed by the release.

Section 2: Site and Release Information

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

The release was from two hydraulic hoists which were replaced in June of 2007.

2.2 Describe the land use and pertinent geographic features within 1,000 feet of the site.

The area surrounding the site is predominately commercial and industrial, along with MSP airport to the northeast, and the intersection of Cedar Avenue and Interstate 494 to the southwest.

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

Several other hydraulic hoists along with fuel oil tanks exist at the garage, no other off site sources identified within 500 of the release.

2.4 Identify and describe the source(s) or suspected source(s) of the release or contamination encountered, and how the release or contamination was discovered.

Check all that apply: Piping, Tank, Dispenser, Pump/Turbine, Spill/Overfill

2.5 Identify the cause of the release (tank and/or piping).

Check all that apply: Corrosion, Loose Component, Puncture, Mechanical or Physical Damage, Unknown

2.6 Identify the method the release was detected.

Check all that apply: Removal, Line Leak Detection, Tank Leak Detection, Visual/Oilfactory, Site Assessment, Other

2.7 Has the site ever, at any point had an E-85 tank? Yes, No

2.8 What was the volume of the release? (if known): Unknown gallons

2.9 When did the release occur? (if known): Unknown

2.10 Provide aerial photos and Sanborn Maps of the area for the various time periods they are available (Section 14: Figures). Aerials from 2004 included.

Section 3: Excavated Soil Information

3.1 Include the Guidance Document 3-02 *General Excavation Report Worksheet* in Appendix A.

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

Date excavated: 6/18/07 and 6/25/07

Total Volume removed: 15 cubic yards

How much of the Total Volume removed was petroleum saturated: 1 cubic yards

3.3 Indicate soil treatment type:

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

Name and location of treatment facility:
SKB Landfill - Rosemount

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, yes no not present
- transfer areas, yes no not present
- underground storage tank basins, yes no not present
- above ground storage tank areas, yes no not present
- piping, yes no not present
- remote fill pipes, yes no not present
- valves, yes no not present
- known spill areas yes no not present

4.2 To adequately define the vertical extent of contamination, borings should be completed at least ten feet below the deepest measurable (field screening and visual observation) contamination. If the water table is encountered, the boring should be completed a minimum of five feet below the surface of the water table. 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 deepest site contamination. If the water table is encountered, the boring should be completed a minimum of 5 feet below the surface of the water table. 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 Guidance Document 4-01 *Soil and Ground Water Assessments Performed during Site 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.

Three borings were recommended due to having two sources and our experience with hydraulic fluid releases. This scope was confirmed with the MPCA, prior to initiating this LSI. Two of the borings were located as near to the hoists as possible for the sources, with the third being drilled in the estimated down gradient direction (to the southeast).

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.

Standard field screening methods were followed as recommended in MPCA Fact Sheet #4-01. There were no deviations from recommended methods.

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

Standard soil sampling and analytical methods and procedures were followed as stated in MPCA Fact Sheet #4-01. There were no deviations from recommended methods.

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 (Section 14).

The horizontal extent appears to be within 5 feet of the original excavations, and the vertical extent is estimated at 15 feet from grade. The magnitude of the release was determined from the samples taken during the replacement of the hoists.

4.9 Is surface soil contamination present at the site (i.e., soil in the uppermost 2 feet that is visibly stained, contaminated at greater than 10 ppm (PID) or petroleum saturated)? Yes No

If YES, attach site map identifying extent(s) of surface soil contamination (Section 14).
If borings were used to define extent, complete Table 4.

4.10 Attach Table 5 - Other Contaminants Detected in Soils (Petroleum or Non-petroleum Derived). Discuss the possible sources of these compounds.

4.11 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? ≈ 5 feet

Estimated distance between contamination and water table is based on professional opinion as well as all data collected for this project.

4.12 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.

No significant fluctuation of the water table was found.

4.13 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 in this section as well as the nature of the petroleum release (i.e., volume, when it occurred, petroleum product). Yes No

While there is only seven feet of separation between the contaminated soils and the water table, and the soils are predominately sand, the site is completely capped, and no permeable surface is within 80 feet of the release area. However, water samples were still collected, and a water table aquifer was found to be present. No detections above report limits were found in any of the tree water samples analyzed.

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 Guidance Document 4-01 *Soil and Ground Water Assessments Performed during Site Investigations* for methods and requirements.

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

$K = 157.9 \text{ ft/day}$

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

Hazen

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. GP-1 (24-26), GP-2 (32-34) and GP-3 (23-24)

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

$$T_{\text{High}} = 1262 \text{ ft}^2/\text{day}$$
$$T_{\text{Low}} = 1736 \text{ ft}^2/\text{day}$$

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 Petroleum Remediation Program), and monitoring wells will be necessary.

- 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.

The Minnesota Geological Survey (MGS) "Geologic Atlas, Hennepin County, Minnesota", Bruce A Bloomgren, Robert G. Tipping, and Timothy E. Wahl, 1989 (Geologic Atlas) and Minnesota Department of Health (MDH) well logs within one mile of the site were reviewed for this project. According to the 1993 St. Paul West, Minnesota 7.5 Min. Topographic map, the site is flat and elevation of the site is approximately 825 feet above mean sea level (MSL).

The surficial geology of the site is Middle Terrace (t2) post glacial deposits consisting of sand, gravelly sand, and loamy sediment. The first bedrock formation encountered is the Prairie Du Chien formation (opc), which lies approximately 275 below ground surface (bgs) at 550 feet MSL.

Based on the Geological Atlas, the estimated water table elevation is 800-805 feet above MSL or 20 to 25 feet bgs. The flow direction at the water table is generally towards the south-southeast according to the Geologic Atlas.

- 5.4** Attach Table 6- 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 then adjust the effective screened intervals in borings to intercept the static water table prior to water sample collection. Discuss groundwater flow direction.

The flow direction of the water table appears to the south-southeast given the data collected. The measured water level ranges from 22.15 to 22.19 feet from grade.

5.5 Attach Table 7 - 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.

All samples collected from the borings were below detection limits.

5.6 Attach Table 8 - 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.

None.

5.7 Laboratory certification number: 027-053-137

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 an 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 9 - Monitoring Well Completion Information.
- 6.3** Attach Table 10 - Summary of Water Levels Measured in Wells.
- 6.4** Attach Table 11 - Analytical Results of Water Samples Collected from Wells. Indicate here whether samples were purged or unpurged (see Guidance Document 4-05). If purged, indicate purging method.

6.5 Attach Table 12 - Other Contaminants Detected in Water Samples Collected from Wells (Petroleum or Non-Petroleum Derived). Indicate here whether samples were purged or unpurged (see Guidance Document 4-05). 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 <input type="checkbox"/> ft/day <input type="checkbox"/>

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

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 Guidance Document 4-03 *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 13 - 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 14 - Properties Located Within 500 Feet of the Release Source. The Leak Site property must be included in Table 14. Provide a map (scale of 1inch = 50 to 100 ft.) centered on the release area, identifying the boundaries of the properties listed in Table 14, and associated pertinent features such as roads, buildings, water wells, utilities and surface water.

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

8.3 Attach Table 15 - Water Supply Wells Located within 500 Feet of the Release Source and Municipal or Industrial Wells Within ½ Mile. All water wells within 500 ft. of the release source must be listed, even if construction information was not obtained or available. Any available water well logs or other construction documentation must be included in Appendix E.

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 ½ 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 water table does not appear to be impacted, so there are no significant risks to any supply wells in the area.

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

Name: Robert J. Cockriel
Title: Utilities Superintendent
Telephone: 952-563-8777

Section 9: Surface Water Risk Assessment

9.1 Are there any surface waters or wetlands located within ¼ 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: Yes No
Receiving water classification
ORVW?
Plume width, (W): _____ feet

Plume thickness, (H):	feet
Hydraulic conductivity, (K):	gal/day/ft ²
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: Field-Detectable 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 Guidance Document 4-01).
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.

The soils at the site are predominately sand and appear similar throughout the profile of the three borings drilled as part of this LSI. This should give an even dispersion of vapors underneath the concrete slab of the building. There are several conduits directly under the concrete and also a sewer line that is adjacent to the tank basin. While these may provide preferential paths, none were found to vent directly to the inside of the building. The buildings is mostly used as a maintenance facility and the exposure to most of the chemicals found in the vapor sample are likely in similar and maybe greater concentration in the ambient air in the building

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 Guidance Document 4-02 *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 16. 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.

10.5 Attach Table 16 - Results of Vapor Monitoring.
Section 11: Soil Gas-Based Vapor Intrusion Screening Assessment

11.1 When significant contamination and receptors are present at a site, a vapor intrusion screening assessment must be conducted (See Guidance Document 4-01a *Vapor Intrusion Assessments Performed during Site Investigations*). Soil gas samples must be completed in the worst case area and at four radial points within a 100' radius. The radial points should be located near inhabited buildings, if there are four or less. If not, they should be located uniformly within the 100' radius. Was this done?
If NO, explain why.

Yes No

Based on the type of release and the likely limited nature of the release, along with the location of nearby buildings, no more than one sample was required for an initial survey.

11.2 Do any of the soil gas samples from points located near inhabited buildings exceed the action levels found in GD 4-01a?
If YES, is sub-slab vapor or indoor air sampling needed for these buildings? Describe and discuss locations needing further assessment.

Yes No
 Yes No

No need for further investigation.

11.3 Has sufficient data been collected to propose a conceptual Corrective Action Design (CAD) for buildings that are likely to be impacted by elevated soil gas levels and/or field detectable vapor impacts? *Describe your justification for corrective action and proposed conceptual CAD.*

Yes No

11.4 Do any of the soil gas samples from the non-building specific samples within the 100' radius exceed action levels?
If YES, and there are many inhabited buildings nearby, is additional building specific soil gas sampling recommended for all these buildings? Describe your proposal for additional sampling. If NO, explain.

Yes No
 Yes No

If YES, are additional soil gas samples recommended to assess the full extent of the soil gas cloud? Describe your proposal for additional sampling. If NO, explain.

Yes No

11.5 Were recommended field sampling procedures and QA/QC from Yes No

Guidance Document 4-01a followed? Were required Laboratory QA/QC objectives met?

If NO, explain why and discuss implications on data quality.

Only one sample was collected due to the scope of the project.

11.6 Include a map (Section 14) which shows locations of all soil gas samples and buildings within and at the 100' radius and locations of all soil gas samples exceeding action levels. Include other locational information that may help in evaluating the questions above.

Section 12: Discussion

12.1 Discuss the risks associated with the remaining soil contamination:

Minimal soil contamination is remaining at the site. The majority of the contaminated soils were removed, and disposed of at a landfill. Therefore, the remaining contamination presents minimal risk to human health, groundwater and the environment.

12.2 Discuss the risks associated with the impacted ground water:

All groundwater samples were below detection limits and no contamination was detected within seven feet of the groundwater. Due to the impervious cover in the area downward migration will be slow. There is no risk associated with the release to the groundwater. The likelihood of future risk associated with the remaining Hydraulic Oil is the soil is minimal.

12.3 Discuss the risks for vapor intrusion associated with any soil gas impacts detected:

The vapor sample had high levels of chemicals usually found in parts cleaner and solvents which are often used in the garage, while high, likely will have minimal impact given that the building is used as a repair garage, has sufficient air exchange, and competent concrete. No other businesses are within 100 feet of the release. Due to these factors, there is minimal risk to human health and the environment associated with the release.

12.4 Discuss other concerns not mentioned above:

None.

Section 13: Conclusions and Recommendations

13.1 Recommendation for site:

- site closure
- additional ground water monitoring
- additional field detectable vapor monitoring
- additional soil gas/vapor intrusion investigation
- corrective action

13.2 Base the recommendation above on Guidance Document 1-01 *Petroleum Remediation Program General Policy*. 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.

The magnitude, the vertical, and horizontal extent have been defined, and no significant risk is present to human health or the environment regarding any soil of vapor contamination remaining at the site. Therefore site closure is requested at this time.

13.3 If additional ground water and/or vapor monitoring is recommended, indicate the proposed monitoring schedule and frequency. Conduct quarterly monitoring until the MPCA responds to this report.

No additional work is required.

13.4 If additional soil gas/vapor intrusion investigation is recommended, indicate whether there is risk to a specific building or whether additional soil gas definition is necessary. Provide a detailed analysis of the initial soil gas and receptor information leading to these recommendations. Provide details of proposed activities such as sub-slab vapor and/or indoor air sampling, or locations of additional borings for sampling soil gas. If vapor intrusion, or conditions indicative of a high risk of vapor intrusion, has already been established, then corrective action is required. Refer to 13.5 below.

13.5 If corrective action is recommended, provide a conceptual approach by completing Guidance Document 4-19 *Conceptual Corrective Action Design Worksheet* and include it as Appendix H. See Guidance Document 4-10 *Elements of the Corrective Action Design* for more information on the corrective action design process and other requirements. (Note: MPCA staff will review this report at a higher-than-normal priority to determine if corrective action is required.)

Section 14: 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 maps 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
- Extent of surface soil contamination
- Soil gas sampling locations and extent of the soil gas cloud
- 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.
- Potential receptor map (scale 1 inch = 50 to 100 ft), showing property boundaries and roads, and potential receptors such as buildings, water wells, utilities (distinguish between water, storm sewer and sanitary sewer), surface waters, ditches and any other pertinent items within 500 ft of the release source.
- Vapor survey map showing utilities and buildings with basements and monitoring locations within 500 feet (if a survey was required).
- Provide at least two (2) geologic cross sections, including utilities.
- Vapor intrusion assessment map showing all soil gas boring locations and buildings within and at a 100 feet radius of the worst case soil gas boring
- Aerial photos and Sanborn Maps of the immediate area.

Section 15: Tables

**Table 1
Tank Information**

Tank #	Tank ** Material	UST or AST	Capacity (gallons)	Contents (product type)	Year installed	Tank Status*	Condition of Tank
001	Steel	UST	10	Hydraulic Oil	Unknown	Replaced	Poor
002	Steel	UST	10	Hydraulic Oil	Unknown	Replaced	Poor

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

Notes:

Piping Material (check all that apply): Steel, Fiberglass, Flexible Plastic

List instruments used and discuss field methods and procedures in Appendix C.

Notes:

Table 2
Results of Soil Headspace Screening

Depth (ft)	Soil Boring								
	1	2	3	4	5	6	7	8	9
2-4	0	0	0						
4-6	0	0	0						
6-8	0	0	0						
8-10	0	0	0						
10-12	0	0	0						
12-14	0	0	0						
14-16	0	0	0						
16-18	0	0	0						
18-20	0	0	0						
20-22	0	0	0						
22-24	0	0	0						
24-26	0	0							
26-28	0	0							
30-32	0								
34-36	0								
38-40	0								

Table 3
Analytical Results of Soil Samples

Boring, Depth(ft)	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	GRO	DRO	Lab Type
GP-1(22-24)	11/7/07	<0.053	<0.053	<0.053	<0.16	-----	<5.8	FIXED
GP-2(14-16)	11/7/07	<0.051	<0.051	<0.051	<0.15	-----	<5.9	FIXED
GP-2(22-24)	11/7/07	<0.059	<0.059	<0.059	<0.18	-----	<6.1	FIXED
GP-3(22-24)	11/7/07	<0.056	<0.056	<0.056	<0.17	-----	<5.7	FIXED
TRIP BLANK		<0.050	<0.050	<0.050	<0.15			FIXED
LAB BLANK		<0.050	<0.050	<0.050	<0.15			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:

**Table 4
Surface Soil Assessment**

Sample #	Headspace > 10 ppm (Y/N)	Petroleum Saturated (Y/N)

Notes:

**Table 5
Other Contaminants Detected in Soils (Petroleum or Non-petroleum Derived)**

Boring, Depth (ft)	Date Sampled																		Lab Type

Report results in mg/kg. Indicate other contaminants (either petroleum or non-petroleum derived) detected in soil collected from borings.

Notes:

**Table 6
Water Level Measurements and Depths of Water Samples Collected from Borings**

	Soil Boring									
	1	2	3	4	5	6	7	8	9	10
Static Water level depth (ft)	22.15	22.16	22.19							
Sampled Depth (ft)	20-25	20-25	19-24							

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

Notes:

**Table 7
Analytical Results of Water Samples Collected from Borings**

Boring Number	Date Sampled	Sampled Depth	Benzene	Toluene	Ethyl benzene	Xylenes	GRO	DRO	Lab Type

GP-1	11/7/07	21-26	<1.0	<1.0	<1.0	<3.0	----	<0.12	FIXED
GP-2	11/7/07	21-26	<1.0	<1.0	<1.0	<3.0	----	<0.12	FIXED
GP-3	11/7/07	19-24	<1.0	<1.0	<1.0	<3.0	----	<0.12	FIXED
Trip Blank			<1.0	<1.0	<1.0	<3.0	----	----	FIXED
Lab Blank			<1.0	<1.0	<1.0	<3.0	----	----	FIXED
HRL			5	1000	700	10000			

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

Notes:

**Table 8
Other Contaminants Detected in Water Samples
Collected from Borings (Petroleum or Non-petroleum Derived)**

Boring Number	Date Sampled	1,2 DCA	EDB						
Trip Blank									
Field Blank									
Lab Blank									
HRL (ug/L)		4	0.004						

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:

**Table 9
Monitoring Well Completion Information**

Well Number	Unique Well Number	Date Installed	Surface Elevation	Top of Riser Elevation	Bottom of Well (Elevation)	Screen Interval (Elev. - Elev.)

Notes: (location and elevation of benchmark)

Table 10
Water Level Measurements in Wells

Well Number	Date Sampled	Depth of Water from Top of Riser	Product Thickness	Depth of Water Below Grade	Relative Groundwater Elevation	Water Level Above Screen (Y/N)

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

Notes:

Table 11
Analytical Results of Water Samples Collected from Wells

Well #	Date Sampled	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	GRO	DRO	Lab Type
MW-1									
MW-2									
MW-3									
MW-4									
Trip Blank									
Field Blank									
Lab Blank									
HRL(ug/L)		10	1000	700	10000				

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

Notes:

Table 12
Other Contaminants Detected in Water Samples
Collected from Wells (Petroleum or Non-petroleum Derived)

Well Number	Date Sampled	1,2 DCA	EDB				
MW-1							
MW-2							
MW-3							
Field Blank							
Trip Blank							
Lab Blank							
HRL (ug/L)		4	0.004				

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:

Table 13
Natural Attenuation Parameters

Monitorin g Well	Sample Date	Temp. °C	pH	Dissolved Oxygen (mg/L)	Nitrate (mg/L)	(Fe II) (mg/L)	(H ₂ S, HS) (mg/L)
MW-1							
MW-2							
MW-3							
MW-4							

In Appendix C, describe the methods and procedures used.

Notes:

**Table 14
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 Utilized (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									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

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

**E.g., domestic, industrial, municipal, livestock, lawn/gardening, irrigation. → no wells found within the criteria search distances.

Table 15
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

Notes: → no wells found within the criteria search distances.

Table 16
Results of Field Instrumented Vapor Monitoring

Location # and description	Date	PID reading (ppm)	Percent of the LEL

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.).
 Notes:

Table 17
Results of Soil Gas Sampling for Vapor Intrusion Screening

Sample Location	Worst Case VP-1	ACTION LEVEL
Date	11/07/07	Source: HRV,
Depth (feet)	4	

COMPOUNDS	Result	Report Limit	Result	Report Limit	Result	Report Limit	ug/m ³	ISC, or RfC
Benzene	2.2	0.87					4.5	HRV
1,3 Butadiene	ND	0.60					0.4	HRV
MEK	2.9	0.80					5,000	RfC
Ethylbenzene	5.2	1.2					1000	RfC
Tetrachloroethene	375	37.5					100	HRV
Toluene	79.8	1.0					400	HRV
1,2,4 trimethylbenzene	9.8	3.4					6	RfC
1,3,5 trimethylbenzene	ND	3.4					6	RfC
mp-xylene	16.5	2.4					100	RfC
o-xylene	5.3	1.2					100	RfC
Total Xylene	21.8	3.6					100	RfC

Report results in ug/m³. The Action Level should be indicated along with the source. When selecting the Action Level, keep in mind the priority of sources we have requested you use.

Section 16: Appendices

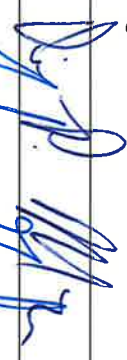

Attach the following appendices.

- Appendix A* Guidance Document 3-02 *General Excavation Report Worksheet.*
- Appendix B* Laboratory Analytical Reports for Soil, Soil Gas/Sub-slab Vapor/Indoor Air/Ambient Air, and Ground Water. Include laboratory QA/QC data, Chromatograms, and laboratory certification number.
- Appendix C* Methodologies and Procedures, Including Field Screening of Soil, Other Field Analyses, Soil Boring, Soil Sampling, Soil Gas/Sub-Slab/Indoor air/Ambient Air 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.
- Appendix G* Guidance Document 1-03a *Spatial Data Reporting Form.*
- Appendix H* Guidance Document 2-05 Release Information Worksheet

Section 17: 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.

MPCA staff are instructed to reject unsigned investigation reports or if the report form has been altered.

Name and Title:	Signature:	Date signed:
Dennis P. McComas, P.G.		1/15/08
Joshua P. Goplin, P.E.		1/15/08

Company and mailing address:
Thatcher Engineering, Inc.
3055 Old Highway 8, Suite 103
Minneapolis, MN 55418

Telephone: (612) 781-2188 Fax: (612) 781-2241

Web pages and phone numbers

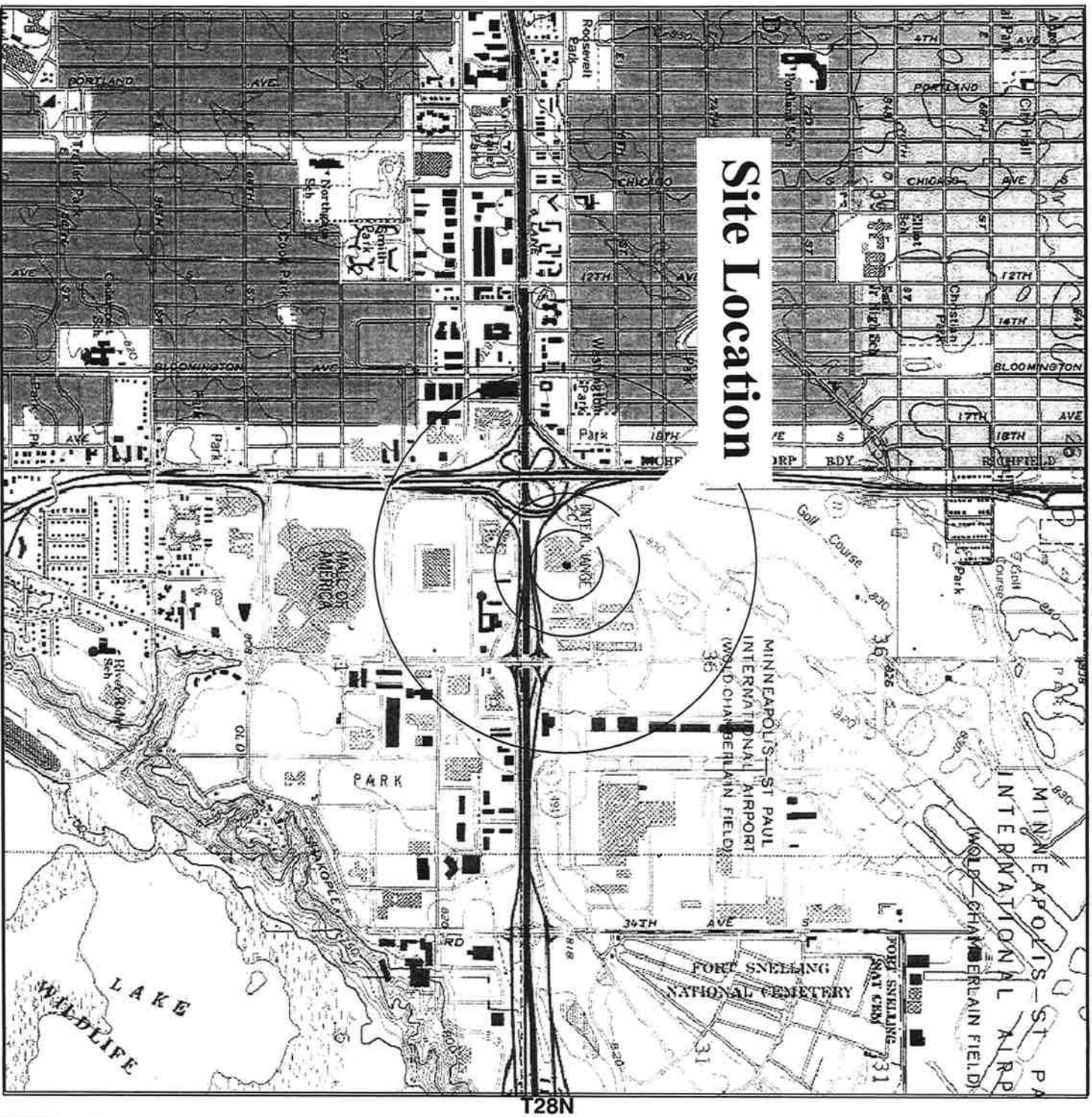
MPCA staff	http://pca.state.mn.us/pca/staff/index.cfm
MPCA toll free	1-800-657-3864
Petroleum Remediation Program web page	http://www.pca.state.mn.us/about/infrequest.html
MPCA Infor. Request	http://www.pca.state.mn.us/programs/inst_p.html
MPCA Petroleum Brownfields Program	http://www.pca.state.mn.us/cgi-bin/portal/mn/jsp/content.do?tid=536881377&agency=Commerce
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FIGURE 1

SITE LOCATION MAP

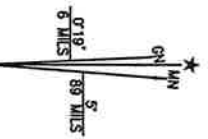


Site Location

R24W

128N

Magnetic North



USGS 7.5 Min Quadrangle: St. Paul Southwest, Minnesota

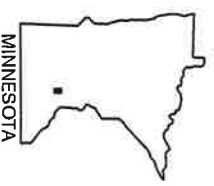
Quad Location

Site Location: SE 1/4 of SW 1/4 of SW 1/4 of Section 36
SCALE 1:24000

Latitude: 44°d 51' 49"
Longitude: 93° 14' 34"



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL



Matchner

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FIGURE:

1

PROJECT TITLE: MTC South Garage

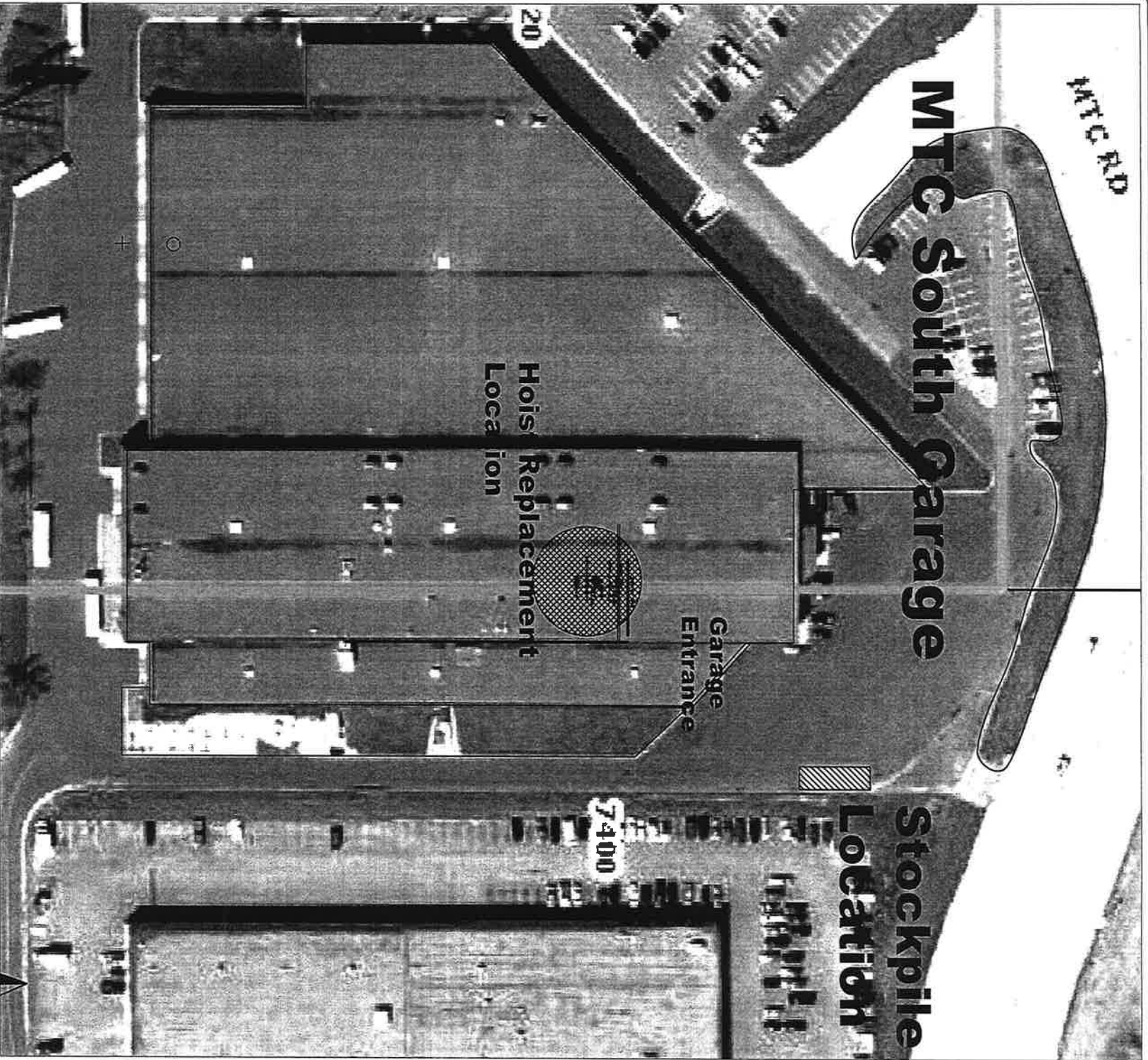
DRAWING TITLE: Site Location Map

PROJECT LOCATION: Bloomington, MN

Project #: 585 SCALE: 1"=200'
DRAWN BY: EMS

FIGURE 2

SITE LAYOUT



- Legend**
-  Stockpile Location
 -  Hoist Replacement Location

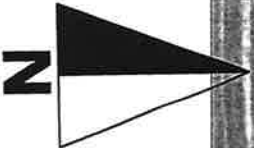


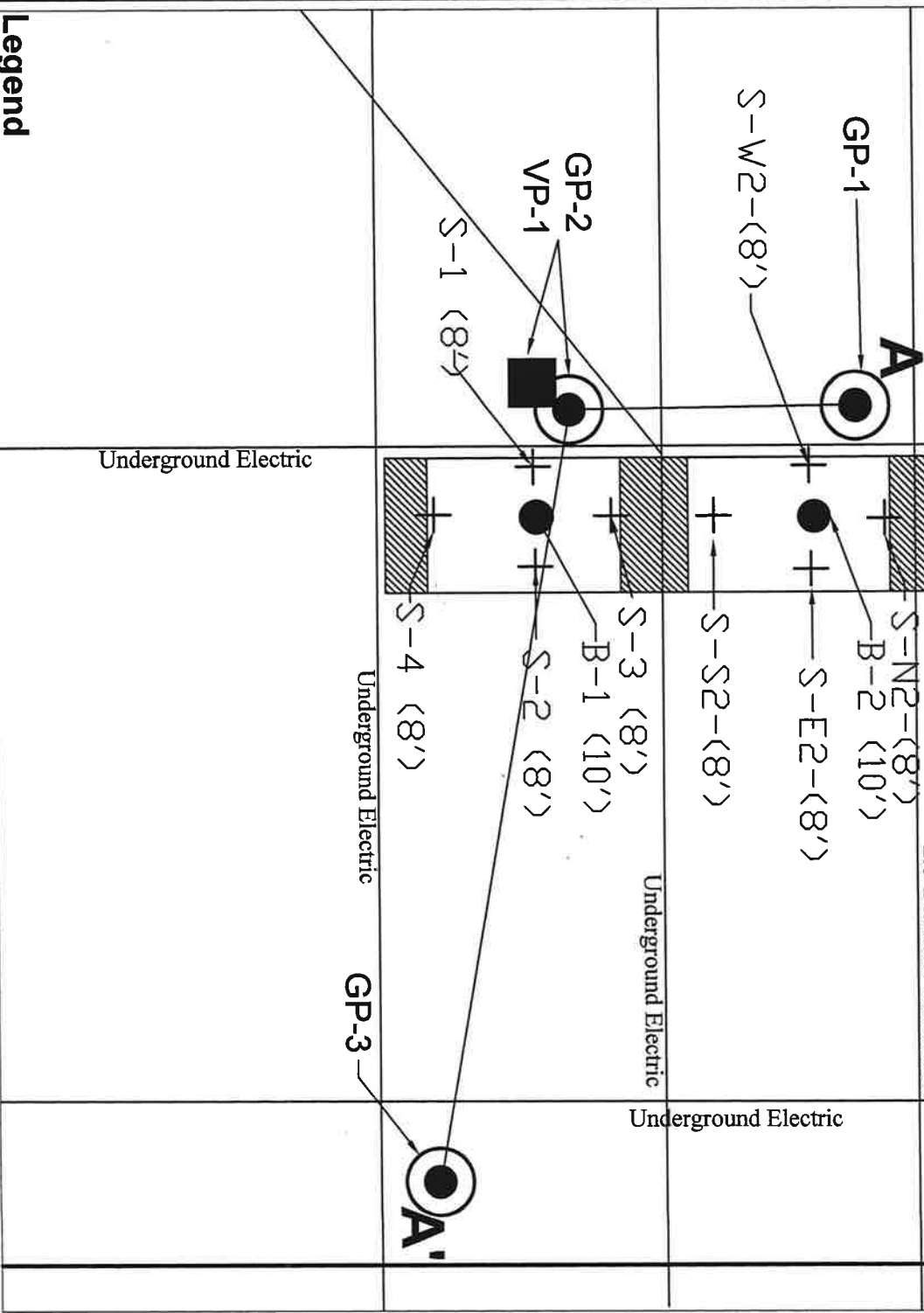
FIGURE 3

LSI SITE MAP

Interior Wall

Sewer Pipe

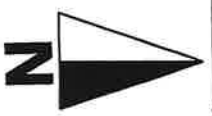
2.6' Diameter Concrete Sewer



Legend

- + Closure Sample Locations (6/18/07 & 6/25/07)
- Replaced Hoist Location
- Vapor Boring 11/7/07
- ⊙ Soil Boring 11/7/07
- ▨ Denotes cut in the concrete with soils not excavated.

1" = 10'



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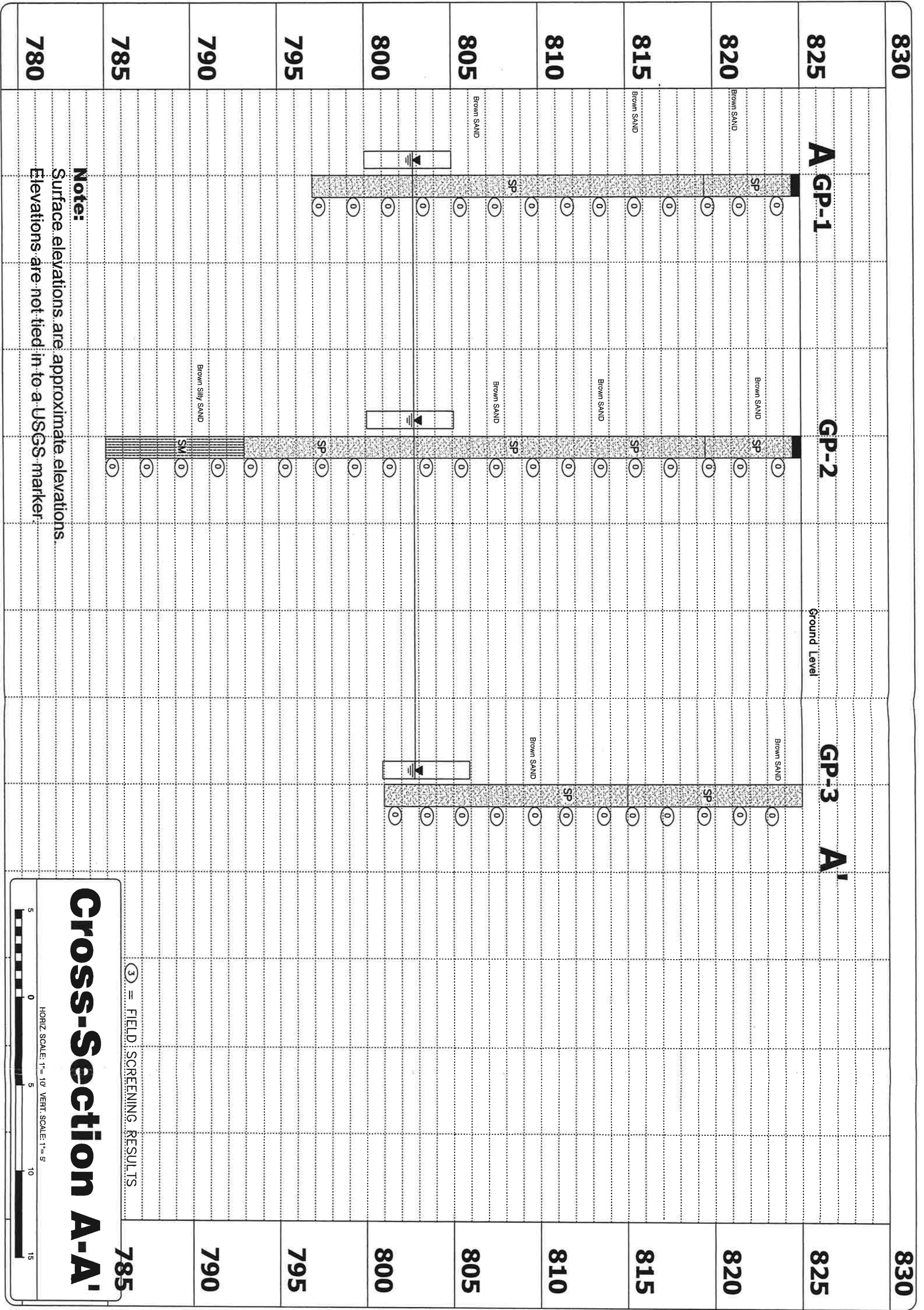
FIGURE:

3

PROJECT TITLE: MTC South Garage
DRAWING TITLE: LSI Site Map
PROJECT LOCATION: Bloomington, MN
LEAK #: 00016867 SCALE: 1" = 10'
DRAWN BY: JFG

FIGURE 4

CROSS SECTION A - A'



Note:
 Surface elevations are approximate elevations.
 Elevations are not tied in to a USGS marker.

③ = FIELD SCREENING RESULTS

Cross-Section A-A'



FIGURE: 4	PROJECT TITLE: MTC South Garage
	DRAWING TITLE: Cross-Section A-A'
	PROJECT LOCATION: Bloomington, MN
	VIC # 00016867
	SCALE: DRAWN BY: JPG

