



AMERICAN
ENGINEERING
TESTING, INC.

CONSULTANTS
• GEOTECHNICAL
• MATERIALS
• ENVIRONMENTAL

February 11, 2002

Mr. Jim McCann
Minnesota Pollution Control Agency
520 Lafayette Road N
St. Paul, Minnesota 55155-4194

RE: Remedial Investigation Report
Old Knutson Property
Schroeder Park Drive (123rd Street), Savage, Minnesota
MPCA Leak #13674
AET Project #03-00837

Dear Mr. McCann:

Our report is attached for Remedial Investigation work performed by American Engineering Testing, Inc., at the above-referenced site in Savage, Minnesota.

In brief, the results of the Remedial Investigation indicate that petroleum contamination has largely degraded at the site since the storage tanks were removed in 2000. Therefore, we have recommended closure of the leak file for the site.

If you have any questions regarding the information presented in this report or any other aspect of the project, please contact me at 651-659-1302.

Sincerely,
American Engineering Testing, Inc.

Charles C. Tiller, P.G.
Environmental Scientist

cc: Mr. Don Stocker, Stocker Excavating

550 Cleveland Avenue North • St. Paul, MN 55114 • 651-659-9001 • Fax 651-659-1379

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Leaking Petroleum Storage Tanks

Minnesota Pollution Control Agency

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

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Investigation Report Form

Fact Sheet #3.24

AET Project No. 03-00837

MPCA, MAR Division
Petroleum & Landfill Remediation Section

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*.

MPCA Site ID: Leak: **00013674** Date: 2-4-2002

Responsible Party: **Stocker Excavating Co. R.P.** phone #: **952-890-4241**

Consultant: **American Engineering Testing, Inc.** Consultant phone #: **651-659-9001**

Facility Name: **Former Knutson Property**

Facility Address: **12336 Boone Avenue City: Savage**

County: **Scott** Zip Code: **55378**

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) **469,200** meters

Y coordinate (Northing) **4,958,300** 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**

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.)

1:24,000 USGS 7.5 minute topographic quadrangle, Eden Prairie, MN

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

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

2.2a Describe the land use and pertinent geographic features within 1,000 feet of the site. **The area is relatively level and located in the Minnesota River Valley. Land uses within 1,000 feet of the site consist of commercial businesses to the north and east, a salvage yard to the south with a wetland and residential development beyond, and a park to the west.**

2.2b List other potential leak sources within 500 feet of the site. **Commercial operations to the north and east may use USTs. A salvage/storage yard is located immediately south and east of the site.**

2.3 Identify and describe the source or suspected source(s) of the release. **The suspected source of the release is leakage or spillage from UST #1 or #2, or associated piping.**

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

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:

Volume removed: cubic yards

3.3 Indicate soil treatment type:
N/A

- 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

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

Sampling locations were biased toward the source area, upgradient and downgradient. The dispenser area lies between these locations.

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? **Site stratigraphy was adequately evaluated for the level of contamination detected.** 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 (test pits).

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. Test pits TP-1 to TP-12 were excavated to determine the magnitude and extent of impacts. MW-1 to SB-4 were located in locations where contamination was previously identified (MW-1 in the suspected source area and SB-4 slightly

upgradient). MW-2, MW-3, and SB-5 were located in the assumed downgradient direction to determine the extent of impacts.

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.

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. **When test pits were excavated and USTs removed in late 2000, the extent of soil impacts appeared limited mainly to the south part of the UST basin (TP-1, TP-11, B-2, B-4, S-9). Groundwater impacts extended slightly farther north to TP-9 and TP-12. When soil borings and monitoring wells were completed in late 2001, all indications of soil or groundwater impacts were absent.**

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

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? **Contamination was in contact with groundwater prior to the full RI, but is now absent.**

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. **The site is located in the Minnesota River Valley and is therefore expected to experience a fluctuating water table. However, we did not observe evidence of a fluctuating water table.**

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 Yes No

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).

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

If NO, a ground water contamination assessment is necessary. Complete Section 5. Refer to 4.10

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:

$$K = 49 \text{ ft/day}$$

Indicate the method of measurement (i.e., Hazen, Masch and Denny, Kozeny-Carmen, etc.):
Grain-size distribution approximations by sieve 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. **Soil samples submitted for analysis include MW-1 (7'-9'), MW-2 (4½'-6½'), and MW-3 (4½'-6½').**

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

$$T_{\text{Low}} = 2450 \text{ ft}^2/\text{day}$$
$$T_{\text{High}} = 539 \text{ ft}^2/\text{day}$$

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 ft²/day, it is considered an aquifer (for the purpose of the LUST 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 site geology consists of 2-5 feet of fill overlying course alluvium consisting mainly of fine sand. The Scott County Geologic Atlas (MGS, 1982) indicates approximately 50 feet of sandy surficial materials overlying the bedrock surface (Shakopee Dolomite).

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.

Groundwater flow was assumed to be north toward the Minnesota River. Two monitoring well sampling events indicate gradients to the northeast.

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.

Test pit sampling in late 2000 indicated groundwater impacts at the site; diminishing from 9,200 µg/L of DRO immediately south of the source area to 4,100 µg/L and 290 µg/L farther north.

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. No others detected in soil.

5.7 Laboratory certification number:
Legend Technical Services, Inc. - 1259

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.

The MPCa requested installation of monitoring wells at the site to better access risks to potential receptors.

MW-1 was drilled near the source area, where contamination was previously identified. MW-2 was drilled between the source area and a neighboring water well. MW-3 was drilled in the assumed downgradient direction from the source area.

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. **Samples were purged.**

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.

Groundwater contamination by DRO was found to have degraded between late 2000 and late 2001.

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 release? Yes No

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 contaminant plume: **0 feet**

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) = 1.8×10^{-2} cm/s by Hazen Method
Porosity (n) = 0.3 (Fetter 1980).
Average horizontal gradient (dh/dl) = 2.7×10^{-3}
Calculated GW velocity (v) = 1.6×10^{-4} cm/s = **0.4 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).

Armor Iron Co. (unique # not available). See Appendix E for further information.

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.

Contamination previously identified at two sites in late 2000 is no longer detectable.

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? **If NO**, please explain. Yes No
Refer to Appendix E 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 ½ 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 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). **One well was identified as Armor Iron located adjacent to the northeast of the site, and was assumed to be possibly at risk prior to the RI.**

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).
Telephone Yes No

Gary Larson, City of Savage Utility Services Superintendent – (952) 447-8866.

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: Wilke Regional Park unnamed wetlands.

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? _____
Plume width, (W): Yes No _____
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. **MW-3 is clean. The surface water feature is approximately 1000 ft. or greater from the site. The contamination risk potential appears minimal.**

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: Soil vapors were detected in test pits and base of UST excavation samples in late 2000.

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.

Mineral vapors were detected in soils borings/monitoring wells in late 2001. The risk appears minimal.

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.

10.5 Attach Table 15 - Results of Vapor Monitoring.

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination:
Soil contamination is no longer detectable and presents minimal risk.

11.2 Discuss the risks associated with the impacted ground water:
GW contamination is no longer detectable and presents minimal risk.

11.3 Discuss other concerns not mentioned above:

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.

Soil and groundwater impacts identified in late 2000 are no longer detectable and should present minimal risks to potential receptors.

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:

- 1. Site location map using a U.S. Geological Survey 7.5 minute quadrangle map.
- 2a+2b. One or more site map showing:
 - Structures
 - Locations and depths of on-site buried utilities
 - All past and present petroleum storage tanks, piping, and dispensers
 - 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.

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

- 3a+3b. Ground water gradient contour maps (for sites with monitoring wells) for each gauging event.
- 4. 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).
- 5. Provide at least two (2) geologic cross sections, including utilities.

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.
- Appendix G* **Monitoring Well Sampling Data Sheets.**

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.


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

Name and Title:

Signature:

Date signed:

Charles C. Tiller, P.G./
Environmental Scientist
Kathryn J. Kleiter, P.G./Principal
Hydrogeologist



2/11/02

Company and mailing address:

American Engineering Testing, Inc.

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Section 14: Tables

Table 1
Tank Information

Tank #	UST or AST	Capacity	Contents	Year Installed	Status*	Condition
1	UST	10,000	diesel	unknown	removed (12/15/00)	good to fair
2	UST	10,000	diesel	unknown	removed (12/15/00)	good
3	UST	10,000	gasoline	unknown	removed (12/15/00)	good
4	UST	10,000	diesel	unknown	removed (12/15/00)	good

*Indicate: *removed (date), abandoned in place (date), or currently used*

Notes:

Table 2

Results of Soil Headspace Screening

Depth (ft)	Test Pit (2000)												Soil Boring Monitoring Well (2001)					
	1	2	3	4	5	6	7	8	9	10	11	12	MW1	MW2	MW3	SB4	SB5	
0-2					0	0	0	0	2	0	4	0	1	0	0	0	0	0
2-4					0	0	0	0	2	0	6	0	0	0	0	0	0	0
4 ½-6 ½	80	2	0	10	0	0	0	4	2	6	0	1	0	0	0	1	0	0
7-9												1	0	0	0	0	0	0
9 ½-11 ½												1	0	0	0	0	0	0
12-14												0	0	0	0	0	0	0
14 ½-16 ½												0	0	0				0

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

Notes:

Table 3
Analytical Results of Soil Samples

Boring, Depth(ft)	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	GRO	DRO	Lab Type
TP-1(4½)	10/6/00	<0.25	<0.25	<0.25	<0.25	480	11,000	Fixed
TP-2(5)	10/6/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-3(5½)	10/6/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-4(5)	10/6/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-5(4-6)	11/1/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-8(4-6)	11/1/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-9(4-6)	11/1/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-11(4-6)	11/1/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
TP-12(4-6)	11/1/00	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
MMW-1(7-9)	11/14/01	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
MMW-1(14½-6½)	11/14/01	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
MMW-2(4½-6½)	11/13/01	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
MMW-3(4½-6½)	11/13/01	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
SB-4(4½-6½)	11/14/01	<0.025	<0.025	<0.025	<0.025	<5	<8	Fixed
SB-5(4½-6½)	11/13/01	<0.025	<0.025	<0.025	<0.025	<5	<8	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
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 5
Water Level Measurements and Depths of Water Samples Collected from Borings

	Test Pit (2000)												Soil Boring Monitoring Well (2001)				
	1	2	3	4	5	6	7	8	9	10	11	12	MW-1	MW-2	MW-3	SB-4	SBS
Static Water level depth (ft)	5	5	5	5	6	6	6	6	6	6	6	6	7.3	6.5	5.2	5.8	5.7
Sampled Depth (ft)	6½	5	5½	5	6	6	6	6	6	6	6	6	11.5	9.0	9.0	9.0	9.0

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

Notes: MW-1 sits at a higher grade level than the other sampling locations.

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
TP-9	11/1/00	6	<1	<1	<1	<3	<1	<100	4,100	Fixed
TP-11	11/1/00	6	<1	<1	<1	<3	<1	<100	9,200	Fixed
TP-12	11/1/00	6	<1	<1	<1	<3	<1	<100	290	Fixed
Trip Blank										
Field Blank										
Lab Blank			<1	<1	<1	<3	<1	<100	<100	Fixed
HRL			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 9
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)
MW-1	11/21/01	9.58	0	6.90	93.99	N
	1/17/02	9.64	0	6.96	93.93	N
MW-2	11/21/01	9.11	0	6.26	93.81	N
	1/17/02	9.16	0	6.31	93.76	N
MW-3	11/21/01	7.84	0	5.01	94.02	N
	1/17/02	7.89	0	5.06	93.97	N

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

Notes:

Table 10
Analytical Results of Water Samples Collected from Wells

Well #	Date Sampled	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	GRO	DRO	Lab Type
MW-1	11/21/01	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
	1/17/02	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
MW-2	11/21/01	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
	1/17/02	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
MW-3	11/21/01	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
	1/17/02	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
MW-4									
Trip Blank	Both	<0.5	<0.5	<0.5	<1.5	<1	--	--	Fixed
Field Blank									
Lab Blank	Both	<0.5	<0.5	<0.5	<1.5	<1	<100	<100	Fixed
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 11
Other Contaminants Detected in Water Samples
Collected from Wells (Petroleum or Non-petroleum Derived)

Well Number	Date Sampled	1,2-DCA	EDB	n-Propylbenzene
MW-1	11/21/01			<0.5
	1/17/02			<0.5
MW-2	11/21/01			<0.5
	1/17/02			<0.5
MW-3	11/21/01			<0.5
	1/17/02			0.77
Field Blank				
Trip Blank	Both			<0.5
Lab Blank				<0.5
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 12
Natural Attenuation Parameters

Monitoring Well	Sample Date	Temp. °C	pH	Dissolved Oxygen (mg/L)	ORP (mV)	Specific Conductance (µmhos/cm)	(H ₂ S, HS) (mg/L)
MW-1	11/21/01	13.9	7.35	2.47	55	638	
	1/17/02	5.7	7.09	--	61	700	
MW-2	11/21/01	13.3	7.01	2.32	-39	702	
	1/17/02	6.0	6.95	--	27	670	
MW-3	11/21/01	15.0	6.91	2.04	-46	641	
	1/17/02	5.4	6.80	--	44	755	
MW-4							

In Appendix C, describe the methods and procedures used.

Notes: ORP – Oxidation Reduction Potential

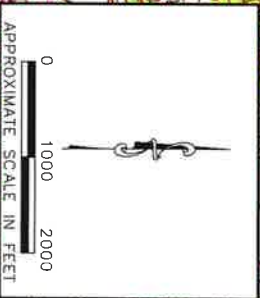
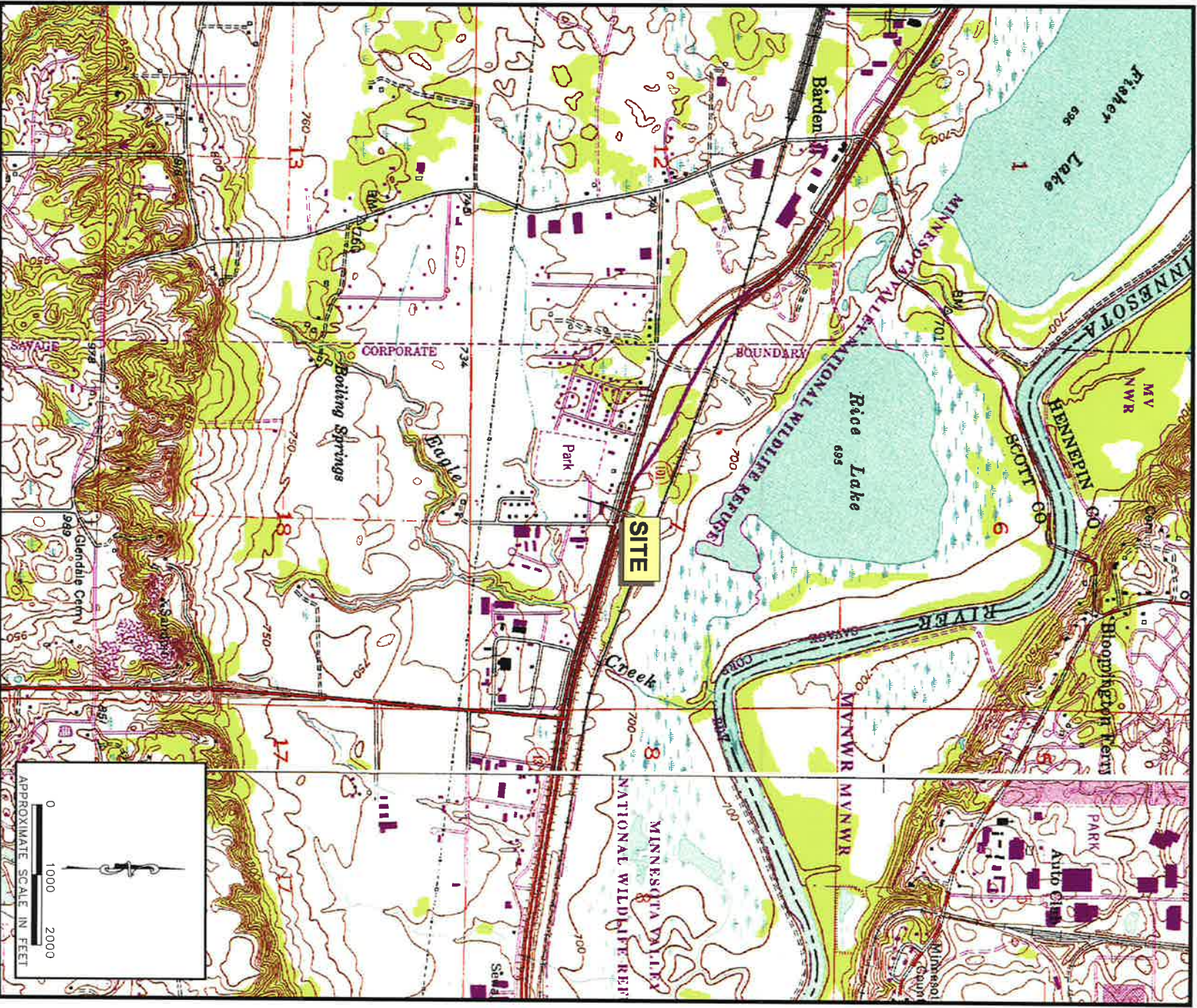
Table 13
Properties Located Within 500 Feet of the Release Source.

# (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									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

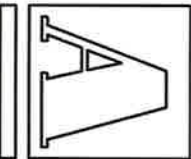
*E.g., visual observation, personal contact, telephone, returned postcard, assumed (i.e., no postcard returned).

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

See Appendix E for Groundwater Receptor Survey.

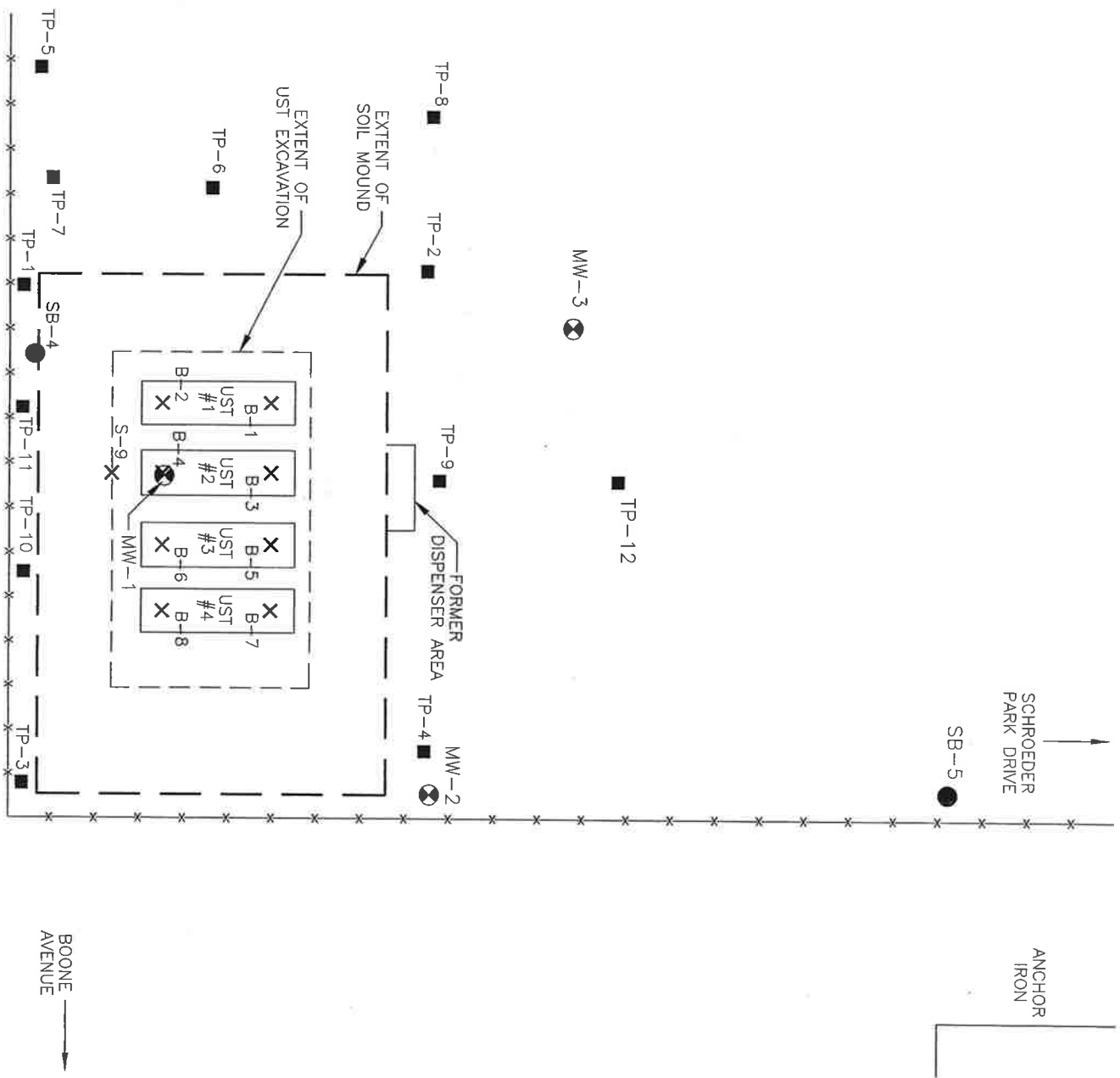


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 REVIEWED BY: DATE:

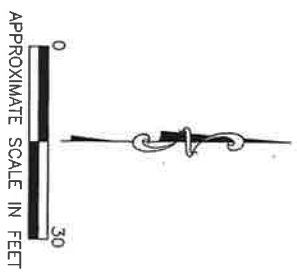


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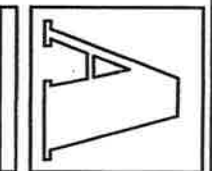
FIGURE 1
 SITE LOCATION MAP
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA



- LEGEND**
- TEST-PIT SAMPLE LOCATION (2000)
 - X UST SAMPLE LOCATION (2000)
 - SOIL BORING LOCATION (2001)
 - ⊗ MONITORING WELL LOCATION (2001)
 - X—X— FENCE

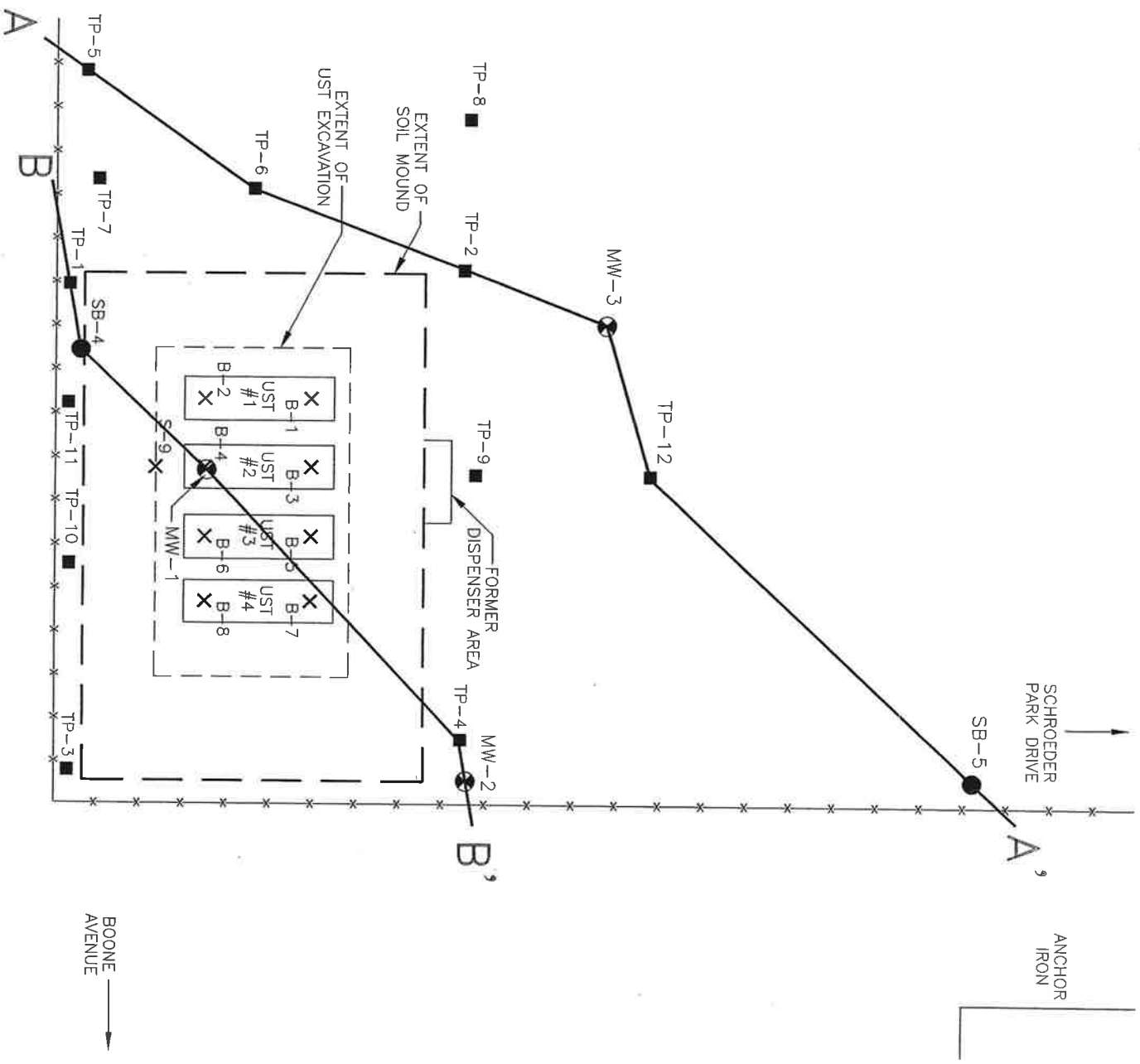


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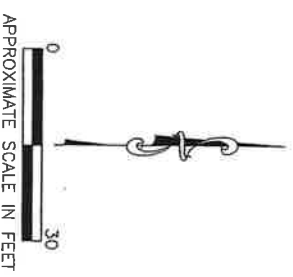


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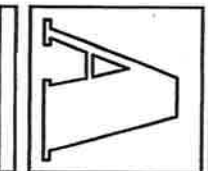
**FIGURE 2A
 SITE MAP/
 SAMPLE LOCATIONS
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA**



- LEGEND**
- TEST-PIT SAMPLE LOCATION (2000)
 - X UST SAMPLE LOCATION (2000)
 - SOIL BORING LOCATION (2001)
 - ⊗ MONITORING WELL LOCATION (2001)
 - x—x—x— FENCE

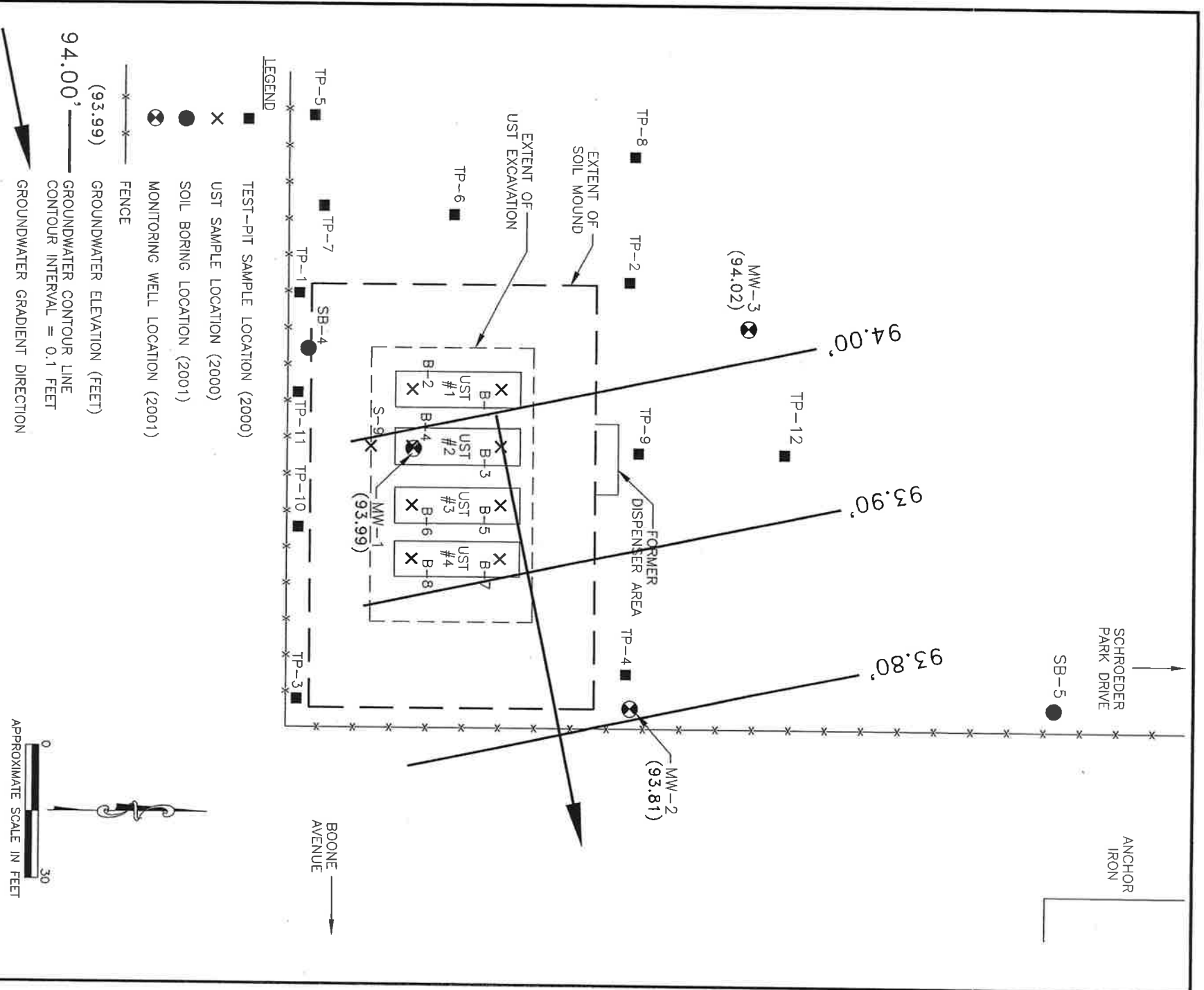


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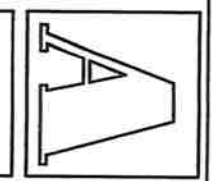


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FIGURE 2B
 LOCATIONS OF
 CROSS SECTIONS
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA

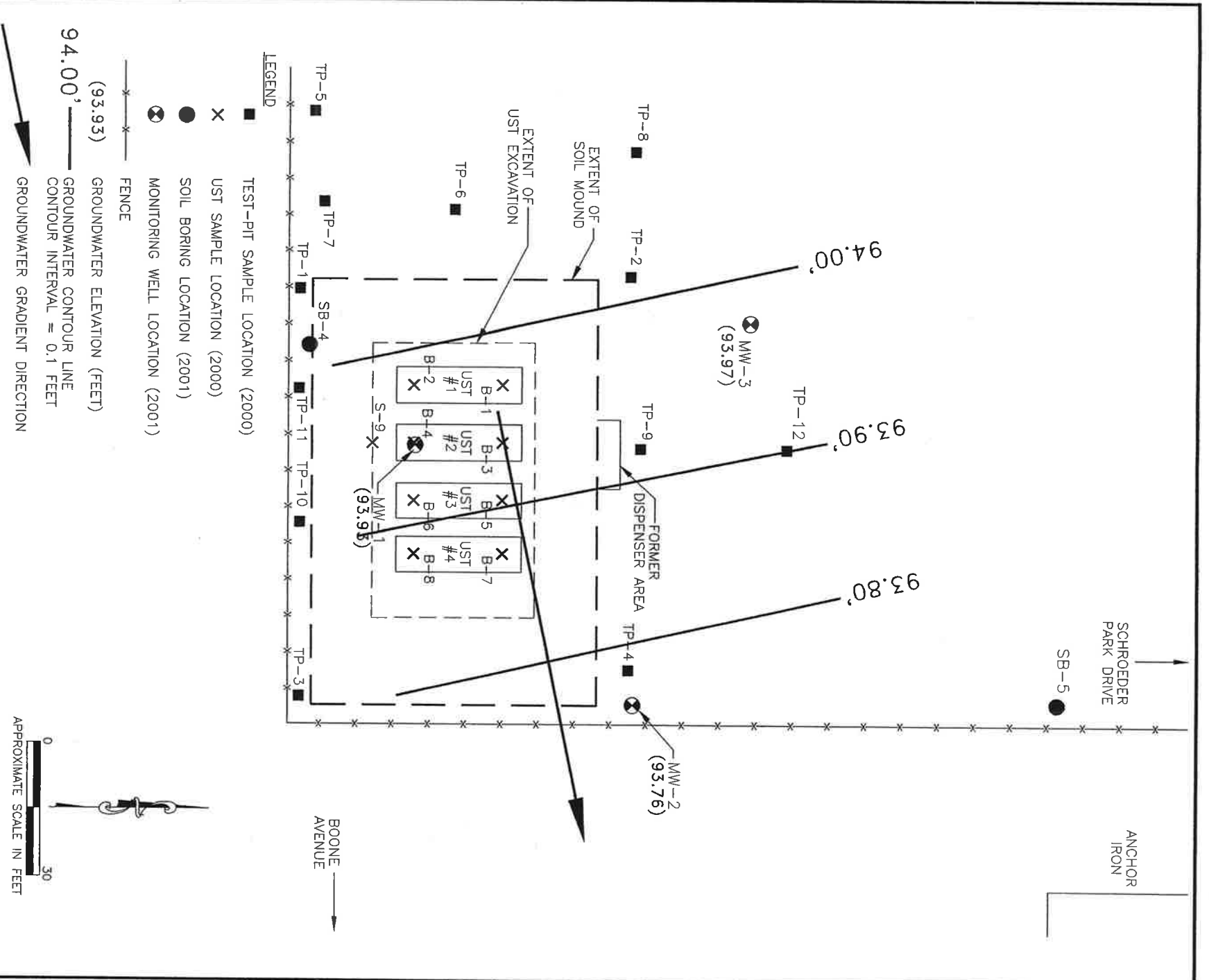


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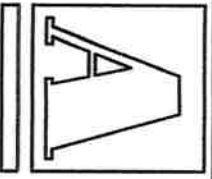


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**FIGURE 3A
 GROUNDWATER GRADIENT MAP
 NOVEMBER 21, 2001
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA**

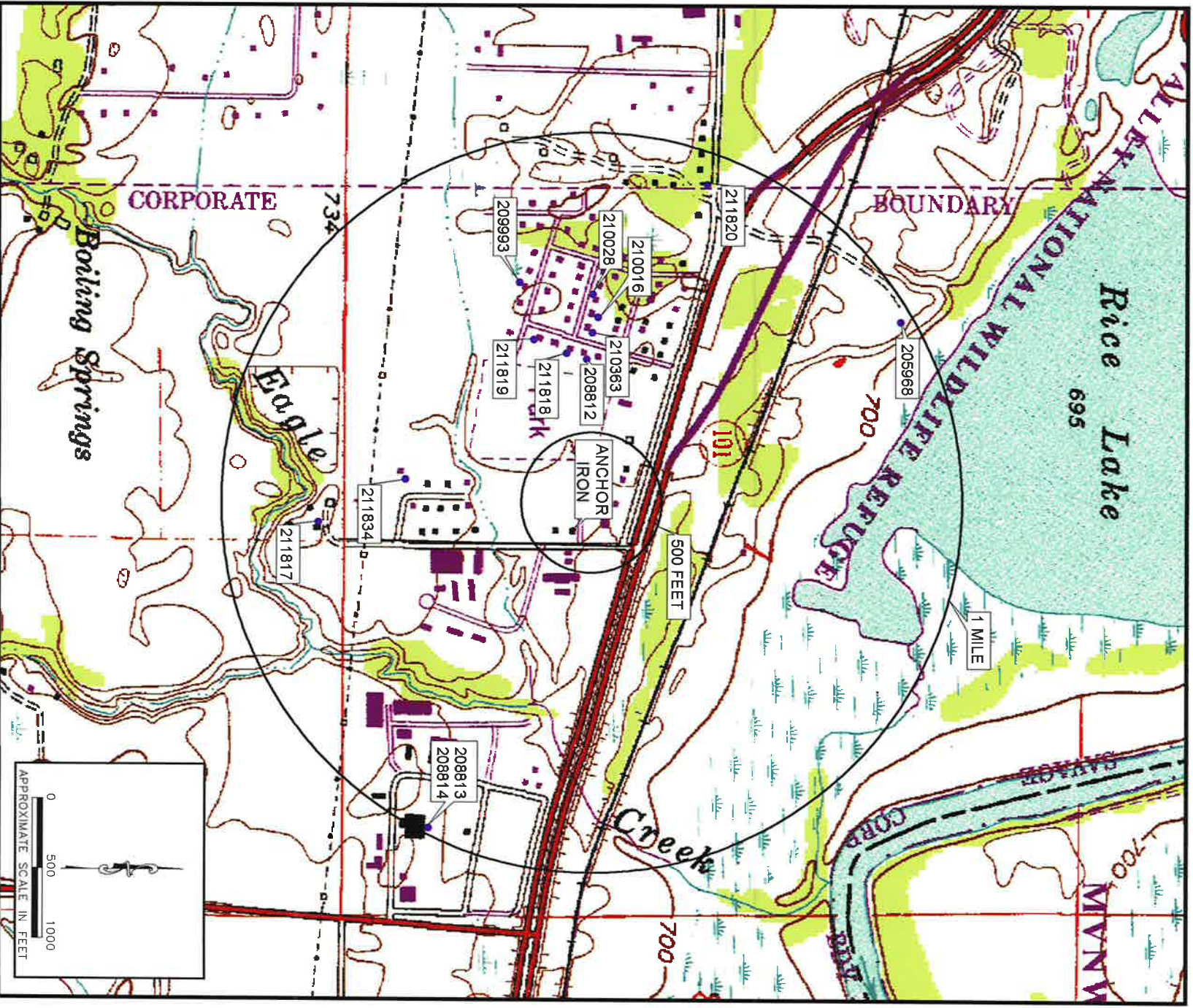


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 REVIEWED BY: DATE:

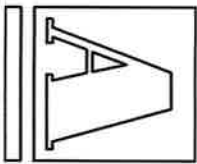


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**FIGURE 3B
 GROUNDWATER GRADIENT MAP
 JANUARY 17, 2002
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA**



JOB NO. 03-00837
 FILE NAME: TOPO-FIG4.APR
 DATE: 12/5/01
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 REVIEWED BY: DATE:



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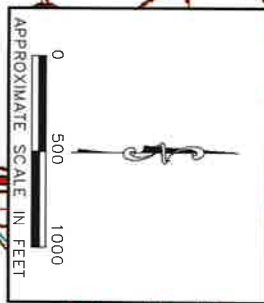


FIGURE 4
 WELL RECEPTOR
 SURVEY MAP
 STOCKER EXCAVATING
 SAVAGE, MINNESOTA

**UNDERGROUND STORAGE TANK
REMOVAL ASSESSMENT**

Old Knutson Property
Schroeder Park Drive, Savage, Minnesota

AET #03-00837

Date:

January 5, 2001

Prepared for:

Stocker Excavating Company
8247 W. 125th Street
Savage, Minnesota



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January 5, 2001

Mr. Don Stocker
Stocker Excavating Company
8247 W. 125th Street
Savage, Minnesota 55378

RE: Underground Storage Tank Removal Assessment
Old Knutson Property
Schroeder Park Drive, Savage, Minnesota
AET Project #03-00837

Dear Mr. Stocker:

The following is a report of observations and testing performed by American Engineering Testing, Inc., (AET) during removal of four Underground Storage Tanks (USTs) at the above-referenced site in Savage, Minnesota. The site location is indicated on the attached Figure 1.

This report includes testing data from twelve test pits (TP-1 to TP-12) previously completed at the site, and reported in a November 10, 2000, letter to Stocker Excavating Company. The current report is considered final.

Scope of Work

The scope of AET's services performed for this project were outlined in AET Proposal #3-00-296:

- The USTs were observed for indications of leakage prior to removal from the site.
- Residual soil samples from the UST excavation were screened with a 10.2-eV photoionization detector (PID) for the presence of organic vapors or other visual/olfactory evidence of contamination. Soil samples were collected and screened according to the "Bag Headspace Analytical Screening Procedure" recommended by the Minnesota Pollution Control Agency (MPCA). The locations of the samples, previous test pits, and other site features are indicated on the attached Figure 2.
- Eight representative soil samples were collected from the bottom of the UST excavation and submitted for laboratory analyses of Diesel Range Organics (DRO), Gasoline Range Organics (GRO), and the BETX compounds (Benzene, ethylbenzene, toluene, and xylene).

- Results are summarized in this written report, including data generated during our work to date.

Time Line of Events

Previously, on October 6 and November 1, 2000, AET observed excavation of twelve test pits in the vicinity of the USTs at the site. Results of the previous testing are discussed later in this report. Based on indications of petroleum contamination, AET recommended that a leak be reported to the State Duty Officer. It is our understanding that Mr. Stocker performed this notification.

AET performed the current scope of work on December 15, 2000, when four 10,000-gallon USTs were removed under the authority of Pump and Meter Service, Inc. USTs #1 and #2 formerly contained diesel fuel, and USTs #3 and #4 formerly contained gasoline, but they were empty at the time of removal.

UST Condition

USTs #2, #3, and #4 appeared to be in good condition with no surface staining, corrosion, or holes evident. UST #1 also appeared to be in good condition, except where minor staining and corrosion were observed at the base of the south end of the UST.

Excavation Observations/Soil Screening Results

Fill in the UST excavation consisted of native silty sand. Staining, mottling, and petroleum odors were not noted, except at the base of the south end of USTs #1 and #2. No groundwater was observed in the excavation.

Soil samples were collected from beneath the ends of each UST for screening. Screening results, presented on Table 1, indicated organic vapor concentrations ranging from less than 1 to 10 parts-per-million (ppm).

Laboratory Analytical Results

The soil samples from beneath the ends of the USTs were analyzed for DRO, GRO, and the BETX compounds. These results are presented on Table 1. The laboratory report is also included.

DRO, GRO, and BETX compounds were not detected in any of the samples, except for DRO in samples B-2 (8,600 mg/kg) and B-4 (550 mg/kg) from the south end of USTs #1 and #2, and minor benzene and xylene in sample B-1 from the north end of UST #1. The detected concentrations of DRO exceeded the MPCA standard of 50 to 100 mg/kg of total petroleum hydrocarbons in soils associated with storage tanks.

Discussion of Present and Previous Results

The results of the current scope of work are consistent with a petroleum release from the USTs, as previously reported to the State. The previous testing results are presented on Table 2. The work to date indicates soil contamination near the south end of UST #1 (in test pit TP-1 and excavation samples B-2 and B-4). Previous testing indicated groundwater contamination near the south end of UST #1 (in test pit TP-11) and decreasing downgradient (in test pits TP-9 and TP-12).

Conclusions

Based on the results summarized above, we conclude the following:

- The removed USTs appeared to be in good condition with no evidence of leakage, except for staining and corrosion near the south end of UST #1.
- Field and laboratory testing results indicated diesel fuel contamination of soils near the south end of USTs #1 and #2.
- Results of the current scope of work and previous AET testing indicate that the extent of soil and groundwater contamination appears limited mainly to the vicinity of the USTs removed from the site.

Recommendations

Based on our conclusions above, we recommend this report be forwarded to the MPCA with a request for leak file closure.

Closure

The services performed by AET for this project have been conducted in a manner consistent with that level of skill and care ordinarily exercised by other members of the profession currently practicing in this area, under similar budgetary and time constraints.

Stocker Excavating Company
Re: AET Project #03-00837
January 5, 2001

Page 4

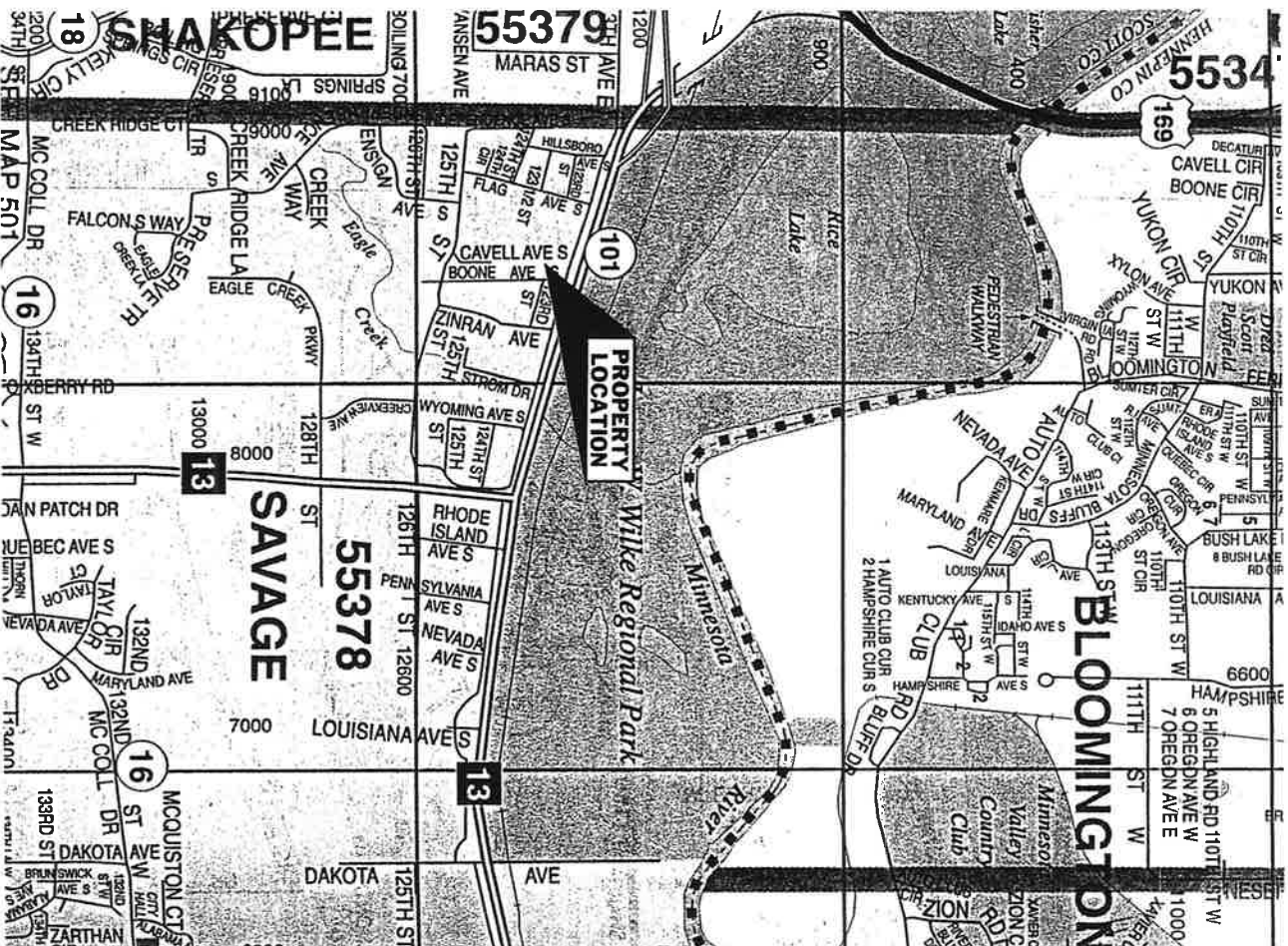
We appreciate the opportunity to have been of service to you on this project. If you have any questions regarding the information presented in this report, or if we can be of additional service, please contact me at 651-659-1302.

Sincerely,
American Engineering Testing, Inc.



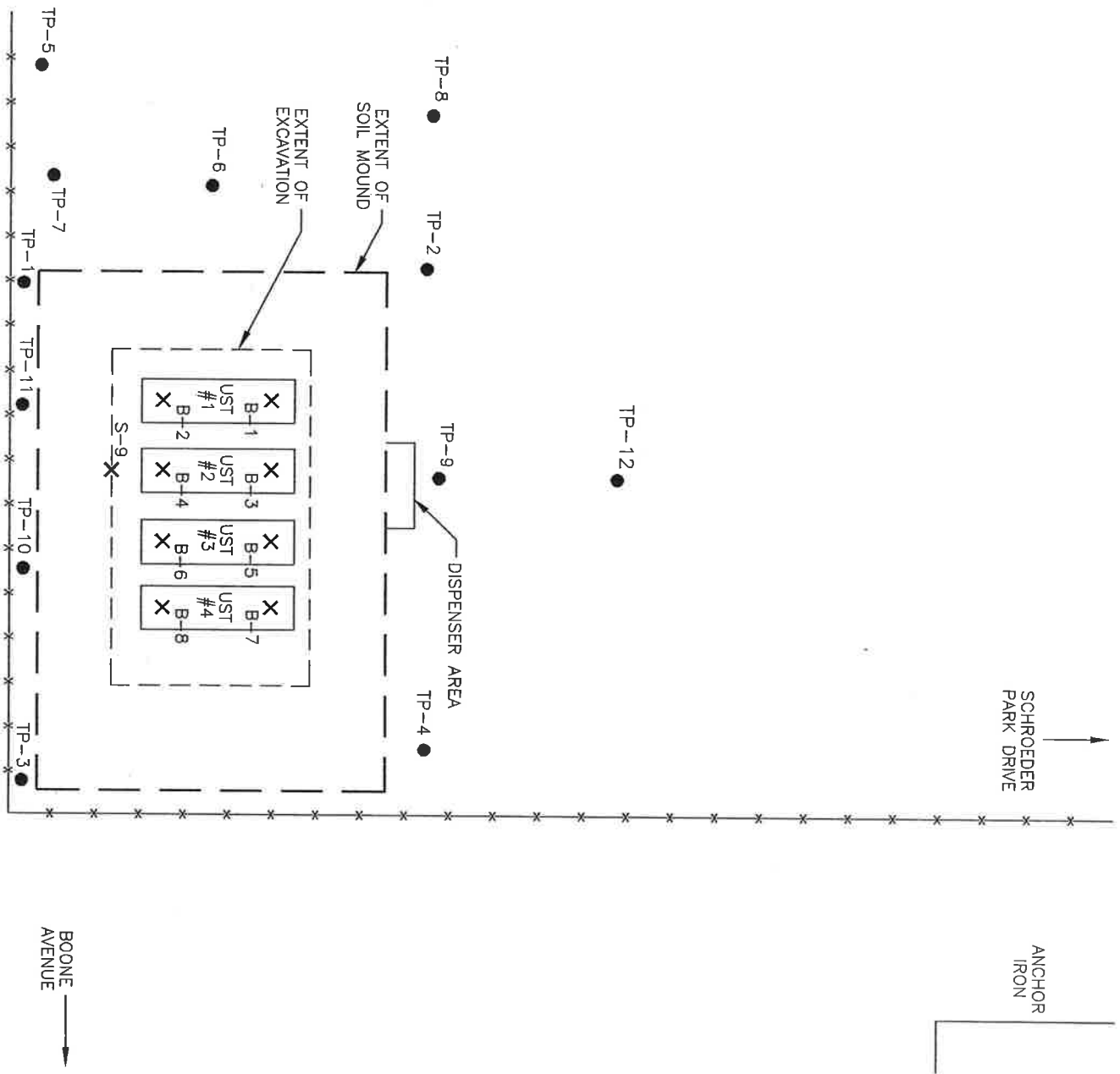
Charles C. Tiller, P.G.
Environmental Scientist

Attachments: Figure 1 - Site Location Map
Figure 2 - Site Map/Sampling Locations
Table 1 - Soil Analytical Results
Table 2 - Previous Analytical Results
Legend Analytical Report (final data but not signed yet)



PROJECT	Old Knutson Property, Savage, Minnesota	AET #03-00837
SUBJECT	SITE LOCATION MAP	DATE 10/2000
SCALE	1" = 2500'	
DRAWN BY		
CHECKED BY		
		FIGURE 1

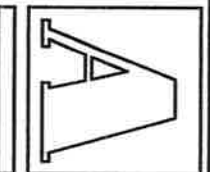
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- LEGEND**
- TEST-PIT SAMPLE LOCATION
 - X UST SAMPLE LOCATION
 - x—x— FENCE



JOB NO. 03-00837
 FILE NAME: KNUJTSON_2
 DATE: 1/5/01
 PREPARED BY: POINTMAP
 REVIEWED BY: DATE:



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FIGURE 2
 SITE MAP/
 SAMPLE LOCATIONS
 OLD KNUJTSON PROPERTY
 SAVAGE, MINNESOTA

Table 1 - Soil Analytical Results*
Underground Storage Tank Removal Assessment
Former Knutson Property, Shakopee, Minnesota
AET Project #-03-00837

	B-1[4']	B-2[4']	B-3[4']	B-4[4']	B-5[4']	B-6[4']	B-7[4']	B-8[4']	S-9[4']	**Reg. Std.
Field PID Reading (in ppm)	<1	9	<1	2	<1	2	<1	<1	10	AL=10
Diesel Range Organics (DRO)	<8	<u>8,600</u>	<8	<u>550</u>	<8	<8	<8	<8	--	AL=50-100
Gasoline Range Organics (GRO)	<5	<5	<5	<5	<5	<5	<5	<5	--	AL=50-100
Benzene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	--	4
Ethyl benzene	0.073	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	--	200
Toluene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	--	305
Xylenes	0.22	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	--	248

*Key to Results: Results are in mg/kg, except as indicated above; -- = No Analysis Performed.

**Regulatory Standards: SRV=Tier 2 Industrial Soil Reference Value (1999Version); AL=Action Level.

Table 2 - Previous Analytical Results*
Underground Storage Tank Removal Assessment
Former Knutson Property, Shakopee, Minnesota
AET Project #-03-00837

	Soil Results (mg/kg)										Groundwater Results (µg/L)			
	TP-1 [5']	TP-2 [4.5']	TP-3 [5.5']	TP-4 [5']	TP-5 [4'-6']	TP-8 [4'-6']	TP-9 [4'-6']	TP-11 [4'-6']	TP-12 [4'-6']	**Reg. Std.	TP-9	TP-11	TP-12	**Reg. Std.
Field PID Reading (in ppm)	80	<1	<1	10	<1	<1	4	6	<1	AL=10	--	--	--	NA
Diesel Range Organics (DRO)	<u>11,000</u>	<8	<8	<8	<8	<8	<8	<8	<8	AL=50	<u>4,100</u>	<u>9,200</u>	<u>290</u>	200
Gasoline Range Organics (GRO)	<u>480</u>	<5	<5	<5	<5	<5	<5	<5	<5	AL=50	<100	<100	<100	200
Benzene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	4	<1	<1	<1	10
Ethyl benzene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	200	<1	<1	<1	700
Toluene	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	305	<1	<1	<1	1,000
Xylenes	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	248	<3	<3	<3	10,000

*Key to Results: -- = No Analysis Performed; NA = Standard Not Assigned.

**Regulatory Standards: AL=Action Level; Soil standard is SRV = Tier 2 Industrial Soil Reference Value (1999Version); Groundwater standard is HRL = Health Risk Limit (1996 Version).

LEGEND TECHNICAL SERVICES, INC.
 LEGEND PROJECT # 00-4847
 AMERICAN ENGINEERING TESTING, INC
 ANALYTICAL RESULTS

Laboratory ID	00-187277	00-187278	00-187279	00-187280	00-187281	PQL
B-1 4'	B-2 4'	B-3 4'	B-4 4'	B-5 4'	PQL	
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
<5.0	<5.0	<5.0	<5.0	<5.0	5.0	
Benzene	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Toluene	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Ethyl benzene	0.073	<0.025	<0.025	<0.025	<0.025	0.025
Total xylenes	0.22	<0.025	<0.025	<0.025	<0.025	0.025
Surrogate recovery %	91.7	88.0	95.8	93.3	97.5	
Date analyzed	12/28/00	12/28/00	12/28/00	12/28/00	12/28/00	
Diesel range organics	<8.0	8.600	<8.0	550	<8.0	8.0
Date Preserved	12/15/00	12/15/00	12/15/00	12/15/00	12/15/00	
Date Extracted	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	
Date Analyzed	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	
Percent Solids	93	93	92	94	92	

Laboratory ID	00-187282	00-187283	00-187284	00-187285	Method Blank	PQL
B-6 4'	B-7 4'	B-8 4'	Methanol Trip Blank	Method Blank	PQL	
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
<5.0	<5.0	<5.0	<5.0	<5.0	5.0	
Benzene	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Toluene	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Ethyl benzene	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Total xylenes	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Surrogate recovery %	101	100	90.9	96.9		
Date analyzed	12/28/00	12/28/00	12/28/00	12/28/00	12/28/00	
Diesel range organics	<8.0	<8.0	<8.0	NA	<8.0	8.0
Date Preserved	12/15/00	12/15/00	12/15/00			
Date Extracted	12/18/00	12/18/00	12/18/00			
Date Analyzed	12/19/00	12/19/00	12/19/00			
Percent Solids	91	92	96			

mg/kg is equal to parts per million (dry weight basis)

<=Less than value shown

PQL=Practical quantitation limit

Misc modified DRO

Misc modified GRO

EPA SW 846 method 8021B

EPA SW 846 method 7421



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **03-00837**

LOG OF BORING NO. **MW-1 (p. 1 of 1)**

PROJECT: **Boone Avenue; Savage, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC. IN.	FIELD & LABORATORY TESTS							
							PID (ppm)	DEN	LL	PL	% 200			
1 -			4	M	SS	12	1.0							
2 -	Fill, mostly silty sand with some crushed limestone and a little gravel, brown and dark brown	FILL	6	M	SS	20	0.0							
3 -														
4 -														
5 -	Fill, mostly crushed limestone, brown		4	M	SS	20	1.0							
6 -	Sand, fine grained, brown, moist, very loose (SP)													
7 -														
8 -	Sand, fine grained, light gray, moist to about 7.5' then waterbearing, very loose, a few lenses of lean clay above about 8.5' (SP)													
9 -														
10 -														
11 -														
12 -		COARSE ALLUVIUM	1	W	SS	18	1.0							
13 -			2	W	SS	16	0.0							
14 -	Sand, fine to medium grained, light gray, waterbearing, very loose (SP)		3	W	SS	18	0.0							
15 -														
16 -														
END OF BORING														
DEPTH: DRILLING METHOD														
WATER LEVEL MEASUREMENTS														
0-15'	4.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG					
14½-15'	RD w/Water	11/14/01	9:45	9.0	7.0	7.0	--	None						
BORING COMPLETED: 11/14/01		11/14/01	9:50	11.5	9.5	8.5	--	7.3						
CC: LB CA: BL Rig: 33R														



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **03-00837**

LOG OF BORING NO. **MW-2 (p. 1 of 1)**

PROJECT: **Boone Avenue; Savage, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC. IN.	FIELD & LABORATORY TESTS																																																																		
							PID (ppm)	DEN	LL	PL % 200																																																															
1	Fill, mostly organic clay, black and a little gray	FILL	6	M	SS	18	0.0																																																																		
2	Silty sand, a few roots, fine grained, dark brown, moist, loose (SM) (May be fill)	TOPSOIL OR FILL	7	M	SS	20	0.0																																																																		
3	Silty sand, fine grained, brown mottled, moist, loose (SM)																																																																								
4																																																																									
5																																																																									
6	Sand, fine grained, brown mottled, moist to about 6.5' then waterbearing, very loose (SP)										4																																																														
7																																																																									
8	Sand, medium to fine grained, gray, waterbearing, very loose (SP)																																																																								
9																																																																									
10		COARSE ALLOVIUM																																																																							
11			3	W	SS	18	0.0																																																																		
12																																																																									
13	Sand, fine to medium grained, light gray, waterbearing, very loose (SP)																																																																								
14																																																																									
15			2	W	SS	16	0.0																																																																		
16																																																																									
END OF BORING																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DEPTH: DRILLING METHOD</th> <th colspan="6">WATER LEVEL MEASUREMENTS</th> <th colspan="4">NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG</th> </tr> <tr> <th>DEPTH</th> <th>DRILLING METHOD</th> <th>DATE</th> <th>TIME</th> <th>SAMPLED DEPTH</th> <th>CASING DEPTH</th> <th>CAVE-IN DEPTH</th> <th>DRILLING FLUID LEVEL</th> <th>WATER LEVEL</th> <th colspan="4"></th> </tr> </thead> <tbody> <tr> <td>0-14 1/2'</td> <td>4.25" HSA</td> <td>11/13/01</td> <td>12:45</td> <td>9.0</td> <td>7.0</td> <td>7.0</td> <td>--</td> <td>6.5</td> <td colspan="4"></td> </tr> <tr> <td colspan="12">BORING COMPLETED: 11/13/01</td> </tr> <tr> <td colspan="12">CC: LB CA: BL Rig: 33R</td> </tr> </tbody> </table>												DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG				DEPTH	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL					0-14 1/2'	4.25" HSA	11/13/01	12:45	9.0	7.0	7.0	--	6.5					BORING COMPLETED: 11/13/01												CC: LB CA: BL Rig: 33R											
DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG																																																																	
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0-14 1/2'	4.25" HSA	11/13/01	12:45	9.0	7.0	7.0	--	6.5																																																																	
BORING COMPLETED: 11/13/01																																																																									
CC: LB CA: BL Rig: 33R																																																																									



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SUBSURFACE BORING LOG

AET JOB NO: **03-00837**

LOG OF BORING NO. **MW-3 (p. 1 of 1)**

PROJECT: **Boone Avenue; Savage, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC. IN.	FIELD & LABORATORY TESTS			
							PID (ppm)	DEN	LL	PL % 200
1	Fill, mixture of sandy lean clay and silty sand with a little gravel, a few roots, gray, brown and a little black, a layer of silty sand and crushed limestone at the surface	FILL	18	M	SS	20	0.0			
2			20	M	SS	20	0.0			
3										
4	Sand, fine grained, brown mottled, moist, medium dense to loose (SP)									
5										
6	Sand, fine grained, light gray, waterbearing, very loose, a lens of lean clay at about 6' (SP)									
7										
8	Sand, fine to medium grained, light gray, waterbearing, very loose (SP)	COARSE ALLUVIUM								
9										
10	Sand, fine grained, light gray, waterbearing, loose to very loose (SP)									
11										
12	Sand, fine grained, light gray, waterbearing, loose to very loose (SP)									
13										
14	END OF BORING									

DEPTH: DRILLING METHOD

WATER LEVEL MEASUREMENTS

NOTE: REFER TO

DEPTH:	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-14'	4.25" HSA	11/13/01	2:45	6.0	4.5	4.5	--	None
12-14'	RD w/Water	11/13/01	3:00	9.0	7.0	7.2	--	5.2
BORING COMPLETED: 11/13/01								
CC: LB CA: BL Rig: 33R								

THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **03-00837**

LOG OF BORING NO. **SB-4 (p. 1 of 1)**

PROJECT: **Boone Avenue; Savage, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC. IN.	FIELD & LABORATORY TESTS			
							PID (ppm)	DEN	LL	PL % 200
1-	Fill, mostly silty sand with a little gravel, dark brown and brown	FILL	3	M	SS	16	0.0			
2-	Fill, mostly clayey sand, dark brow and black, traces of organic material		5	M	SS	20	0.0			
3-	Fill, mixture of silty sand and sand with a little gravel, dark brown and brown									
4-	Sand, fine grained, light brown and brown, moist, loose (SP)									
5-	Sand, fine grained, brown, moist to about 6' then waterbearing, very loose (SP)									
6-										
7-										
8-	Silty sand, fine grained, light gray, waterbearing, very loose, a lens of lean clay at about 7' (SM)									
9-	Sand, fine grained, light gray, waterbearing, very loose (SP)	COARSE ALLUVIUM								
10-										
11-										
12-	Sand, fine to medium grained, light gray, waterbearing, very loose (SP)									
13-										
14-	END OF BORING									

NOTE: REFER TO

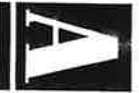
THE ATTACHED
SHEETS FOR AN
EXPLANATION OF
TERMINOLOGY
ON THIS LOG

WATER LEVEL MEASUREMENTS

DEPTH:	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-12'	3.25" HSA	11/14/01	12:20	6.5	4.5	4.5	--	None
		11/14/01	12:25	9.0	7.0	6.8	--	5.8

BORING COMPLETED: 11/14/01

CC: LB CA: BL Rig: 33R



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SUBSURFACE BORING LOG

AET JOB NO: **03-00837**

LOG OF BORING NO. **SB-5 (p. 1 of 1)**

PROJECT: **Boone Avenue; Savage, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC. IN.	FIELD & LABORATORY TESTS			
							PID (ppm)	DEN	LL	PL
1	Silty sand with roots, fine grained, brown and black; moist, very loose (SM) (May be fill)	TOPSOIL OR FILL	3	M	SS	18	0.0			
2	Silty sand, fine grained, dark brown to brown mottled, moist, very loose (SM)									
3	Sand with silt, fine grained, brown, moist, loose (SP-SM)		5	M	SS	20	0.0			
4										
5	Sand, fine grained, light brown to brown mottled, moist to about 5.5' then waterbearing, loose to very loose (SP)									
6										
7		COARSE ALLUVIUM								
8	Sand with a little gravel, fine to medium grained, light gray, waterbearing, very loose (SP)		3	W	SS	20	0.0			
9										
10										
11			2	W	SS	18	0.0			
12	Sand, fine grained, light gray, waterbearing, very loose (SP)									
13			2	W	SS	18	0.0			
14	END OF BORING									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	
0-12'	3.25" HSA	11/13/01	11:30	6.5	4.5	4.5	--	None
		11/13/01	11:35	9.0	7.0	6.5	--	5.7
		11/13/01	11:50	--	--	4.5	--	--

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
B, H, N:	Size of flush-joint casing
BX:	BX double tube core barrel
AC:	At completion of boring
CA:	Crew assistant
CAS:	Pipe casing, number indicates nominal diameter in inches
CC:	Crew chief
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DS:	Disturbed sample from auger flights
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow-stem auger; number indicates inside diameter in inches
JW:	Jetting water
MC:	Column used to describe moisture condition of samples and for the ground water level symbol
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RD:	Rotary drilling with fluid and roller or drag bit
REC:	In split-spoon (see notes) and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
REV:	Revert drilling fluid
SS:	Standard split-spoon sampler (steel; 1½" is inside diameter; 2" outside diameter); unless indicated otherwise
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after "falling" through drilling fluid
WAT:	Water
WH:	Sampler advanced by static weight of drill rod and 140-pound hammer
WR:	Sampler advanced by static weight of drill rod
94 mm:	94 millimeter wireline core barrel
▼:	Water level indicated in boring

TEST SYMBOLS

Symbol	Definition
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressurometer Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid limit, %
LP:	Pressurometer Limit Pressure, tsf
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic limit, %
q _p :	Pocket penetrometer strength, tsf
q _s :	Static cone bearing pressure, tsf
q _u :	Unconfined compressive strength, psf
R:	Electrical resistivity, ohm-cms
RQD:	Rock Quality Designator in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VS:	Vane shear strength (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES

The standard penetration test consists of driving the sampler with a 140-pound hammer and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM:D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest tenth of a foot below the slash.

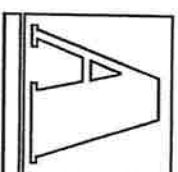
The length of sample recovered, as shown on the "REC" column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM:D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

**GENERAL TERMINOLOGY NOTES FOR
SOIL IDENTIFICATION AND DESCRIPTION**

<u>GRAIN SIZE</u>		<u>GRAVEL PERCENTAGES</u>	
<u>Term</u>	<u>ASTM</u>	<u>Term</u>	<u>Percent</u>
Boulders	Over 304.8mm	A Little Gravel	3%-15%
Cobbles	76.2mm to 304.8mm	With Gravel	15%-30%
Gravel	#4 sieve to 76.2mm	Gravelly	30%-50%
Sand	#200 to #4 sieve		
Fines (silt & clay)	Pass #200 sieve		
<u>CONSISTENCY OF PLASTIC SOILS</u>		<u>RELATIVE DENSITY OF NON-PLASTIC SOILS</u>	
<u>Term</u>	<u>N-Value, BPF</u>	<u>Term</u>	<u>N-Value, BPF</u>
Very Soft	less than 2	Very Loose	0-4
Soft	2-4	Loose	5-10
Medium	5-8	Medium Dense	11-30
Stiff	9-15	Dense	31-50
Very Stiff	16-30	Very Dense	Greater than 50
Hard	Greater than 30		
<u>MOISTURE/FROST CONDITION</u> (MC Column)		<u>LAYERING NOTES</u>	
D (Dry):	Absence of moisture, dusty, dry to touch.	Laminations:	Layers less than ½" thick of differing material or color
M (Moist):	Damp, although free water not visible. Soil may still have a high water content (over "optimum").	Lenses:	Pockets or layers greater than ½" thick of differing material or color
W (Wet/ Waterbearing):	Free water visible. Intended to describe non-plastic soils.		
F (Frozen):	Soil frozen.		
<u>FIBER CONTENT OF PEAT</u>		<u>ORGANIC DESCRIPTION</u>	
<u>Term</u>	<u>Fiber Content (Visual Estimate)</u>	Non-peat soils are described as organic, if soil is judged to have sufficient organic content to influence the soil properties.	
Fibric:	Greater than 67%		
Hemic:	33-67%		
Sapric:	Less than 33%		

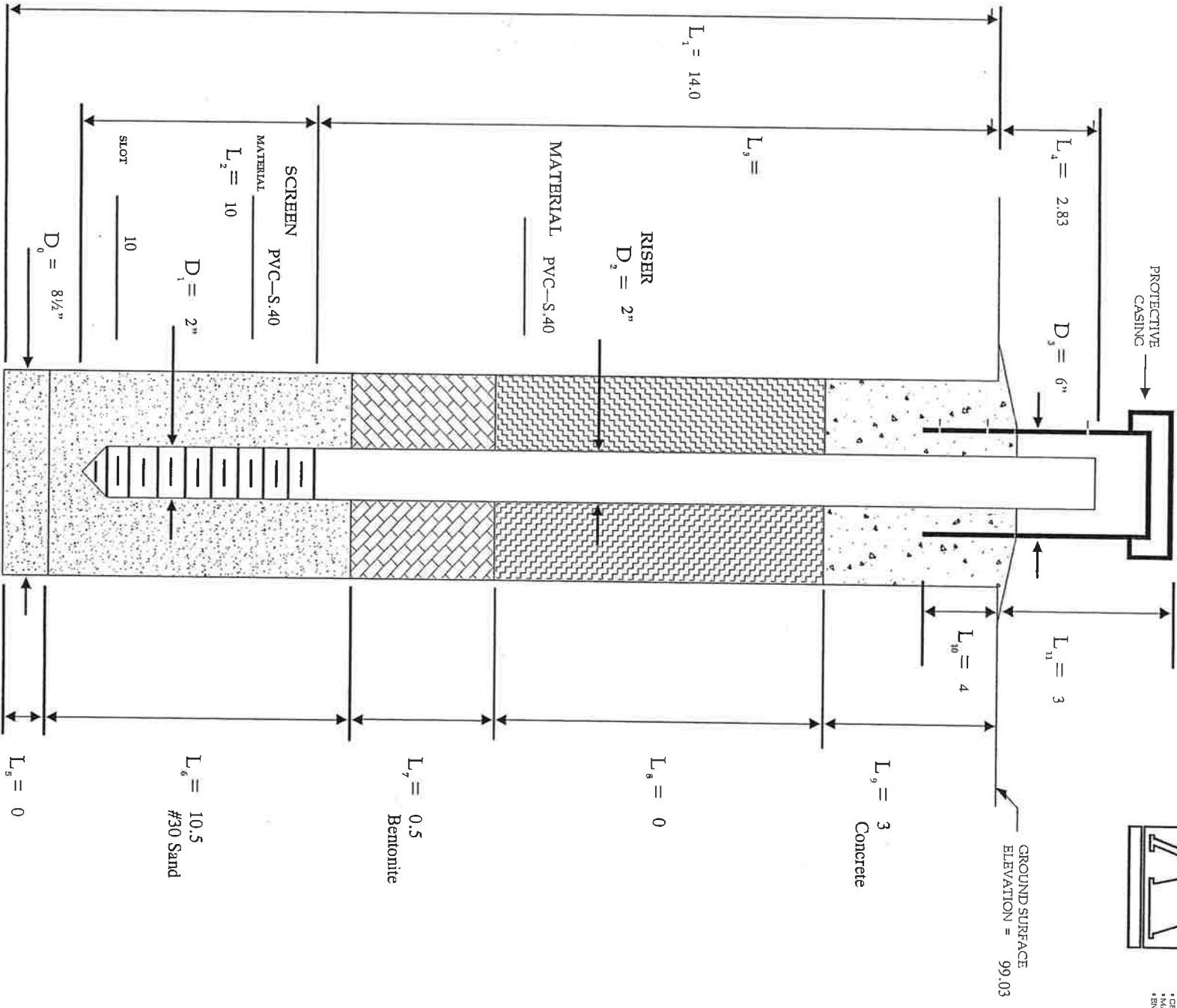
MONITORING WELL / PIEZOMETER LOG

TOP OF RISER ELEVATION = 101.86



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CONSULTANTS
• GEOTECHNICAL
• MATERIALS
• ENVIRONMENTAL



PROTECTIVE CASING
MATERIAL: Steel protop

PROTECTIVE POSTS
NUMBER INSTALLED: ..
MATERIAL: ..

UNIQUE WELL # 610246
DATE INSTALLED: 11/13/01

REMARKS
4 1/4" HSA
Benchmark is top of hydrant at
Boone Ave. and 123rd Street

WELL # MW-3
JOB # 03-00837

PROJECT NAME:
Stocker Excavating
Savage, Minnesota

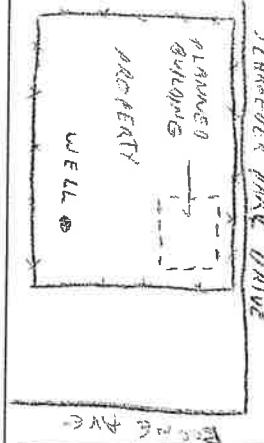
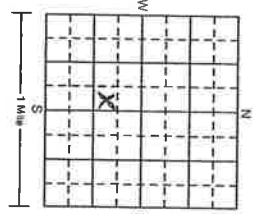
WELL LOCATION
County Name Scott
Township Name 115 Range No. 21 Section No. 7

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO.
610244

House Number, Street Name, City, and Zip Code of Well Location
12336 Boone Avenue, Savage 55378
Fraction SE 1/4 NE SW 1/4
or Fire Number

Show exact location of well in section grid with "X".
Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNERS NAME
Stacker Excavating
Property owner's mailing address if different than well location address indicated above.
8247 W. 125th Street
Savage, MN 55378

WELL OWNER'S NAME
Stacker
Well owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
<u>Fill - silty sand</u>	<u>brown</u>	<u>Loose</u>	<u>0</u>	<u>5</u>
<u>Comp. Alluvium - sand</u>	<u>brown to gray</u>	<u>Very Loose</u>	<u>5</u>	<u>16.5</u>

REMARKS, ELEVATION, SOURCE OF DATA, etc.

AFT # 03-00833
MU-1
PM: TILLER
IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY **610244**

WELL DEPTH (completed) 15.3' Date Work Completed 11/14/2001

DRILLING METHOD
 Cable Tool
 Auger
 Driven
 Rotary
 Dug
 Jetted

DRILLING FLUID
NONE
WELL HYDROFRACTURED? YES NO

USE
 Domestic
 Irrigation
 Test Well
 Monitoring
 Community PWS
 Noncommunity PWS
 Healing/Cooling
 Industrial/Commercial
 Remedial
 Dewatering

CASING
 Steel
 Plastic
Drive Shoe? Yes No
 Threaded
 Welded
HOLE DIAM.
ft. to _____ ft.

CASING DIAMETER
2 in. to 5.3 ft.
WEIGHT
lbs./ft. _____
in. to _____ ft.
SCREEN
Make _____
Type PVC
Slot/Gauge 10 Length 10 feet
Set between 5.3 ft. and 15.3 ft. FITTINGS: Flush Thread

STATIC WATER LEVEL
7.3 ft. below above land surface Date measured 11/14/01
PUMPING LEVEL (below land surface)
ft. after _____ hrs. pumping _____ g.p.m.

WELL HEAD COMPLETION
 Pillar adapter manufacturer _____ Model _____
 Casing Protection Sheet Piletop 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? Yes No
Grout Material Neat cement Bentonite Concrete High Solids Bentonite
Concrete from 0 to 4 ft. yds. bags
Groutite from 4 to 9.5 ft. yds. bags

NEAREST KNOWN SOURCE OF CONTAMINATION
Well disinfected upon completion? Yes No
_____ direction perforation type

PUMP
 Not installed Date installed _____
Manufacturer's name _____ HP _____ Volts _____
Model number _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet _____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No

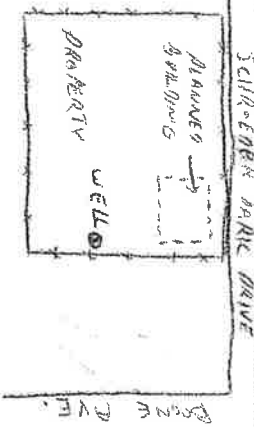
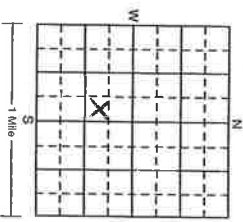
WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.
AET, INC. M0171
Licensee Business Name Lic. or Reg. No.
Kathryn Plester 11/29/01
Authorized Representative Signature Date
Kyle Babender
Name of Driller

WELL LOCATION
County Name Scott
Township Name 115 Range No. 21 Section No. 7 Fraction SE 1/4, 1/4, 3/4 or Five Number

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO.
610245

House Number, Street Name, City, and Zip Code of Well Location
12316 Boone Avenue, Savage, MN 55378
Show exact location of well in section grid with "X".
Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME
Stocker Excavating
Property owner's mailing address if different than well location address indicated above.
8247 W. 123rd Street
Savage, MN 55378

WELL OWNERS NAME
Savage
Well owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
<u>Fill - 3/4" sand & clay</u>	<u>brown + black</u>	<u>Loose</u>	<u>0</u>	<u>3</u>
<u>Coarse Alluvium - sand</u>	<u>brown + gray</u>	<u>very loose</u>	<u>3</u>	<u>16.5</u>

REMARKS, ELEVATION, SOURCE OF DATA, etc.

AFT # 03-00833
MW-2
PM: Tiller
IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY **610245**

WELL DEPTH (completed) 14.4 ft. Date Work Completed 11/13/01
DRILLING METHOD
 Cable Tool Driven
 Auger Rotary
 HSA Jetted

DRILLING FLUID NONE WELL HYDROFRACTURED? YES NO
USE
 Domestic Monitoring
 Irrigation Community PWS
 Test Well Noncommunity PWS
 Dewatering Remedial

CASING Steel Drive Shoe? Yes No
 Plastic Threaded Welded
HOLE DIAM. FROM _____ ft. to _____ ft.

CASING DIAMETER 2 in. to 4.4 ft. WEIGHT 84 lbs./ft. to 16 1/2 lbs./ft.
SCREEN Make PVC Type 10 Slot/Gauge 10 ft. Length 10 ft. FITTINGS: FR. JLT 76/290

STATIC WATER LEVEL 6.5 ft. below above land surface Date measured 11/13/01
PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping _____ g.p.m.

WELL HEAD COMPLETION
 Piless adapter manufacturer
 Casing Protection Steel Piletop Model _____
 At-grade (Environmental Wells and Borings ONLY) 12 in. above grade

GROUTING INFORMATION
Well grouted? Yes No
Grout Material Neat cement Bentonite Concrete High Solids Bentonite
Concrete from 0 to 1.5 ft. yds. bags
betonite from 1.5 to 2 ft. yds. bags

NEAREST KNOWN SOURCE OF CONTAMINATION 75 feet SW direction petroleum type

WELL CONTRACTOR CERTIFICATION
PUMP Not installed Date installed _____
Manufacturer's name _____ HP _____ Volts _____
Model number _____ Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet _____
ABANDONED WELLS Does property have any not in use and not sealed well(s)? Yes No

VARIANCE Was a variance granted from the MDH for this well? Yes No
WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

AET, INC. Licensee Business Name M0171 Lic. or Reg. No.
Kathleen Q Klester Authorized Representative Signature 11/29/01 Date
Lyle Brubaker Name of Driller HE-01205-06 (Rev. 9/96) Date

WELL LOCATION

County Name Scott

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO.

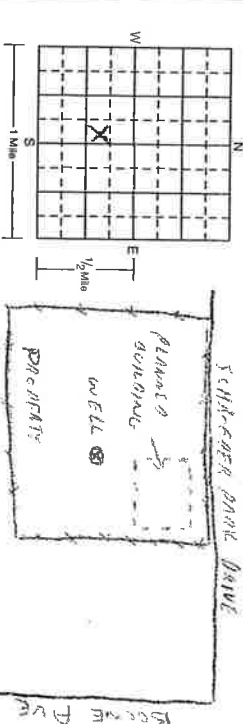
610246

Township Name N15 Range No. 21 Section No. 7 Fraction SE 1/4, NE 1/4, SW 1/4 or Fire Number

WELL DEPTH (completed) 14 ft. Date Work Completed 11/13/2001

House Number, Street Name, City, and Zip Code of Well Location
12336 Boone Avenue Savage MN 55378

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted



PROPERTY OWNER'S NAME

Stocker Excavating

Property owner's mailing address if different than well location address indicated above.

8247 W. 125th Street
Savage, MN 55378

WELL OWNER'S NAME

Same

Well owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
<u>Fill - silt/sand/clay</u>	<u>brown + black</u>	<u>Medium dense</u>	<u>0</u>	<u>3</u>
<u>Coarse Medium-Sand</u>	<u>brown + gray</u>	<u>Var. Loose</u>	<u>3</u>	<u>14</u>

REMARKS. ELEVATION, SOURCE OF DATA, etc.

AET #03-00833

M-3

PM-Tiller

IMPORTANT - FILE WITH PROPERTY PAPERS
WELL OWNER COPY

610246

DRILLING FLUID NONE WELL HYDROFRACTURED? YES NO

USE
 Domestic Monitoring Heating/Cooling
 Irrigation Community PWS Industry/Commercial
 Test Well Noncommunity PWS Remedial
 Dewatering _____

CASING Steel Drive Shoe? Yes No Welded
 Plastic Threaded _____

CASING DIAMETER 2 in. to 4 ft. WEIGHT 84 lbs./ft. 14 in. to 14 ft.

SCREEN Make PVC Type 10 Slot/Gauge 4 ft. and 14 ft. FITTINGS: Flt. with thread

STATIC WATER LEVEL 5.2 ft. below above land surface Date measured 11/13/01

PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping _____ g.p.m.

WELL HEAD COMPLETION
 Pileless adapter manufacturer _____ Model _____
 Casing Protection Steel Bxtp 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY)

GROUTING INFORMATION
Well grouted? Yes No
Grout Material Neat cement Bentonite Concrete High Solids Bentonite
concrete from 0 to 3 ft. 2.5 yds. bags
separators from 3 to 3.5 ft. 1.5 yds. bags
from _____ to _____ ft. _____ yds. bags

NEAREST KNOWN SOURCE OF CONTAMINATION
Well disinfected upon completion? Yes No direction northern type

PUMP Not installed Date installed _____
Manufacturer's name _____ HP _____ Volts _____
Model number _____ Length of drop pipe _____ ft. Capacity _____ g.p.m.

Type: Submersible L.S. Turbine Reciprocating Jet _____

ABANDONED WELLS Does property have any not in use and not sealed well(s)? Yes No

VARIANCE Was a variance granted from the MDH for this well? Yes No

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Licensee Business Name AET, INC. Lic. or Reg. No. M0171
Authorized Representative Signature Kathryn Kleider Date 11/29/01
Name of Driller Lyle Brubaker Date _____

HE-01205-06 (Rev. 9/96)