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**Superior Water Light &
Power Company
Superior, Wisconsin**



**Phase II Investigation, Part II
Work Plan for the Superior
Manufactured Gas Plant**

WDNR BRRTs # 02-16-275446

**July 2002
Project: 09413-098**



Superior Water Light & Power Company

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July 15, 2002

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Ms. Danielle Lancour
Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
107 Sutliff Avenue
Rhineland, WI 54501

RE: Superior Manufactured Gas Plant - WDNR BRRTS # 02-16-275446

Dear Ms. Lancour:

Enclosed with this letter is the Phase II Part II work plan for the investigation of the former Manufactured Gas Plant in Superior, WI. The work plan includes the sampling of 15 soil borings and one exploratory trench. Another round of groundwater samples will be collected from the monitoring wells that were previously installed.

The objectives of the work plan are to determine the extent of the clay tile pipes found near the building formerly used for the production of manufactured gas, define the nature and extent of the PAH and BTEX around MW-7, and define the nature and extent of the apparent gasoline spill near MW-4. Chemical "fingerprinting" will be used to characterize these materials.

The investigation will be conducted by ENSR International's St. Louis Park, MN office and the "fingerprinting" analysis will be performed by the Gas Technology Institute of Des Plaines, IL.

It is anticipated that the site work will commence in mid-August. A report detailing the activities and results will be sent to the WDNR in November of 2002.

If you have any questions or would like any additional information regarding this matter, please contact me at (715) 395-6288.

Thank you.

Sincerely,

William S. Bombich
General Manager

enc

cc: Jamie Dunn, WDNR-Spooner, WI
William Gregg, ENSR International

2915 Hill Avenue, PO Box 519, Superior, WI 54880 • (715) 394-2200

Providing Superior Service

**Superior Water Light &
Power Company
Superior, Wisconsin**

**Phase II Investigation, Part II
Work Plan for the Superior
Manufactured Gas Plant**

WDNR BRRTs # 02-16-275446

**July 2002
Project: 09413-098**

Phase II Part II Investigation Work Plan
Superior Manufactured Gas Plant
Superior, Wisconsin

July 2002

CERTIFICATION - PROFESSIONAL ENGINEER

I, Scott Tarmann, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.



Scott Tarmann 7-8-2002

Seal



Phase II Part II Investigation Work Plan
Superior Manufactured Gas Plant
Superior, Wisconsin

July 2002

CERTIFICATION - HYDROGEOLOGIST

I, William Gregg, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

William M. Gregg *Project Manager*
Signature and Title

July 9, 2002
Date

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1.0 INTRODUCTION

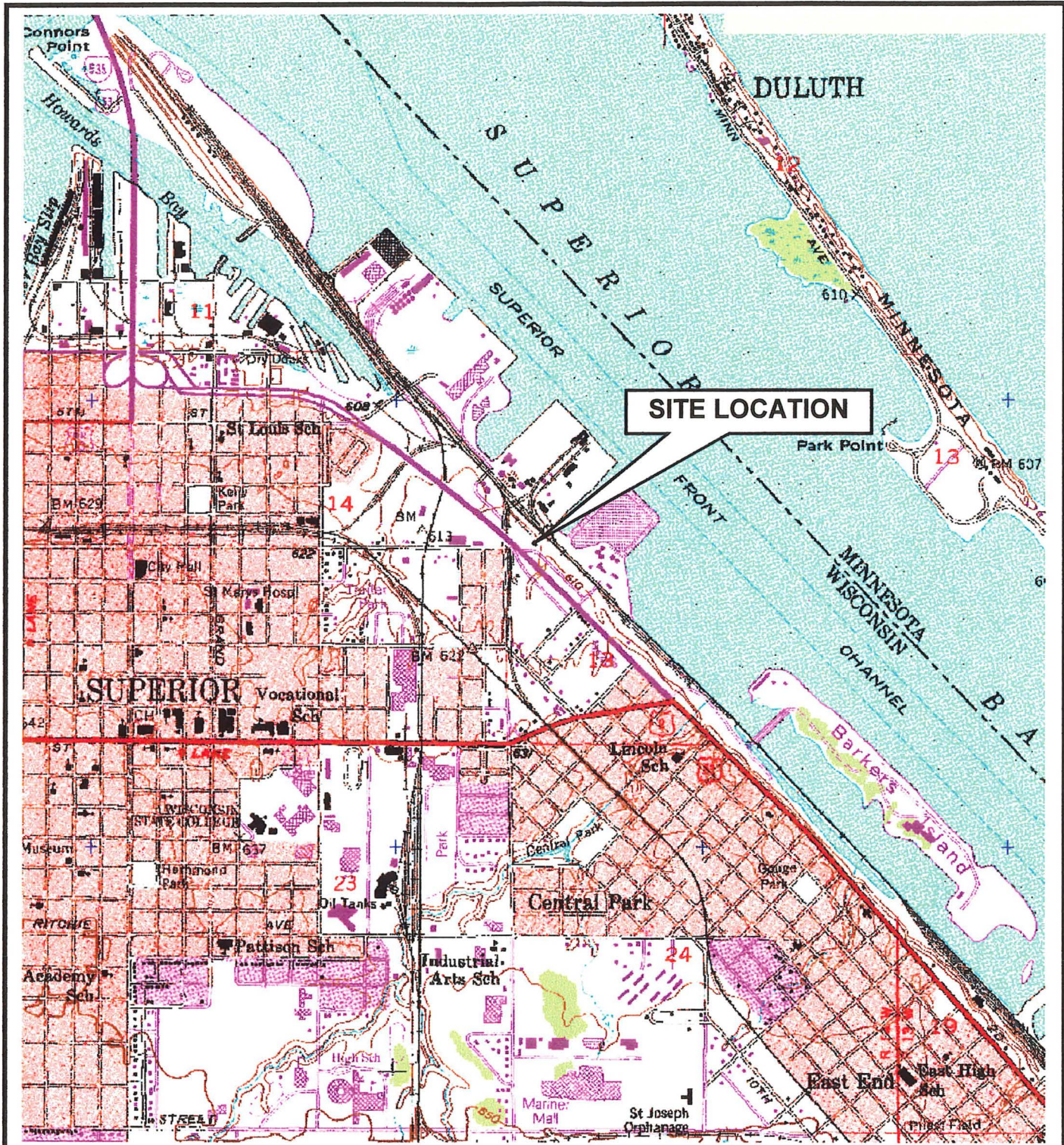
ENSR International (ENSR) has been contracted by Superior Water Light and Power Company to conduct additional subsurface investigations at the former Manufactured Gas Plant (MGP), located at the intersection of Winter and Water Street in Superior, Wisconsin (Site). The Site location is shown in Figure 1-1. ENSR completed a Phase I Site Assessment in October 2001 and an initial Phase II Site Investigation in January 2002. The prior work has indicated the presence of typical MGP chemicals in limited portions of the on-site soils and groundwater, and the presence of chemicals that may reflect a gasoline spill on or near the Site. Typical MGP chemicals found at the Site include benzene, toluene, ethyl benzene, and xylene (BTEX) and various polynuclear aromatic hydrocarbons (PAH). This work plan presents the anticipated scope of work to further define the extent of volatile organic compounds (VOC which includes BTEX) and PAH in the study area.

1.1 Background

ENSR completed a Phase I environmental assessment at the Site in September/October of 2001. The Phase I report identified areas that had the potential to contain MGP-related chemicals. These areas included four gas holder bases and a tar receiver tank. The tar receiver tank was located just outside the northeast wall of the building. This tank is presumed to have stored coal tar condensed from the gas manufactured prior to 1904. In addition, the Phase I identified a potential for petroleum hydrocarbons to be present in the soil or groundwater from the former 12,000-gallon aboveground oil storage tank used by the MGP. The tank was located between the building and the shoreline and was recorded on an 1892 Sanborn Map.

ENSR performed the initial Phase II site investigation work from November 2001 through February 2002. The initial Phase II work consisted of collecting soil samples from borings and test trenches and installing monitoring wells and collecting groundwater samples. One area of the Site contained exclusively BTEX compounds above Recommended Contaminant Levels (RCL) and appeared to be gasoline related, rather than MGP related (Figure 1-2, Area 1). Other areas of the Site contained BTEX and PAH compounds above RCL (Figure 1-2, Areas 2 and 3). Also, test trench excavations around the building encountered clay tile pipes oriented toward the shoreline that may have been sewers for the building. Please refer to the Phase II Site Investigation Report, dated January 2002, for the complete investigation results.

The geology on the southern half of the Site consists of a low permeability red clay beneath a thin layer of topsoil and/or fill. Closer to the shoreline the top of the clay drops in elevation and the thickness of fill increases. Three wells, MW-5, MW-6 and MW-7, installed in a line parallel to the original Superior bay shoreline encountered an average of 12 feet of fill overlying the red clay. These wells have screens that intersect both the fill and clay soil, and the wells produce ample water for purging and sampling. Four wells, MW-1 through MW-4, were screened in the red clay, and took several months to accumulate enough water to collect a groundwater sample. Groundwater is assumed to flow toward the lake.



SOURCE: USGS 7½ Minute Topographic Quadrangle from DeLorme Superior, Wisconsin, 1993

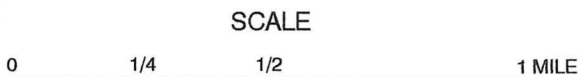
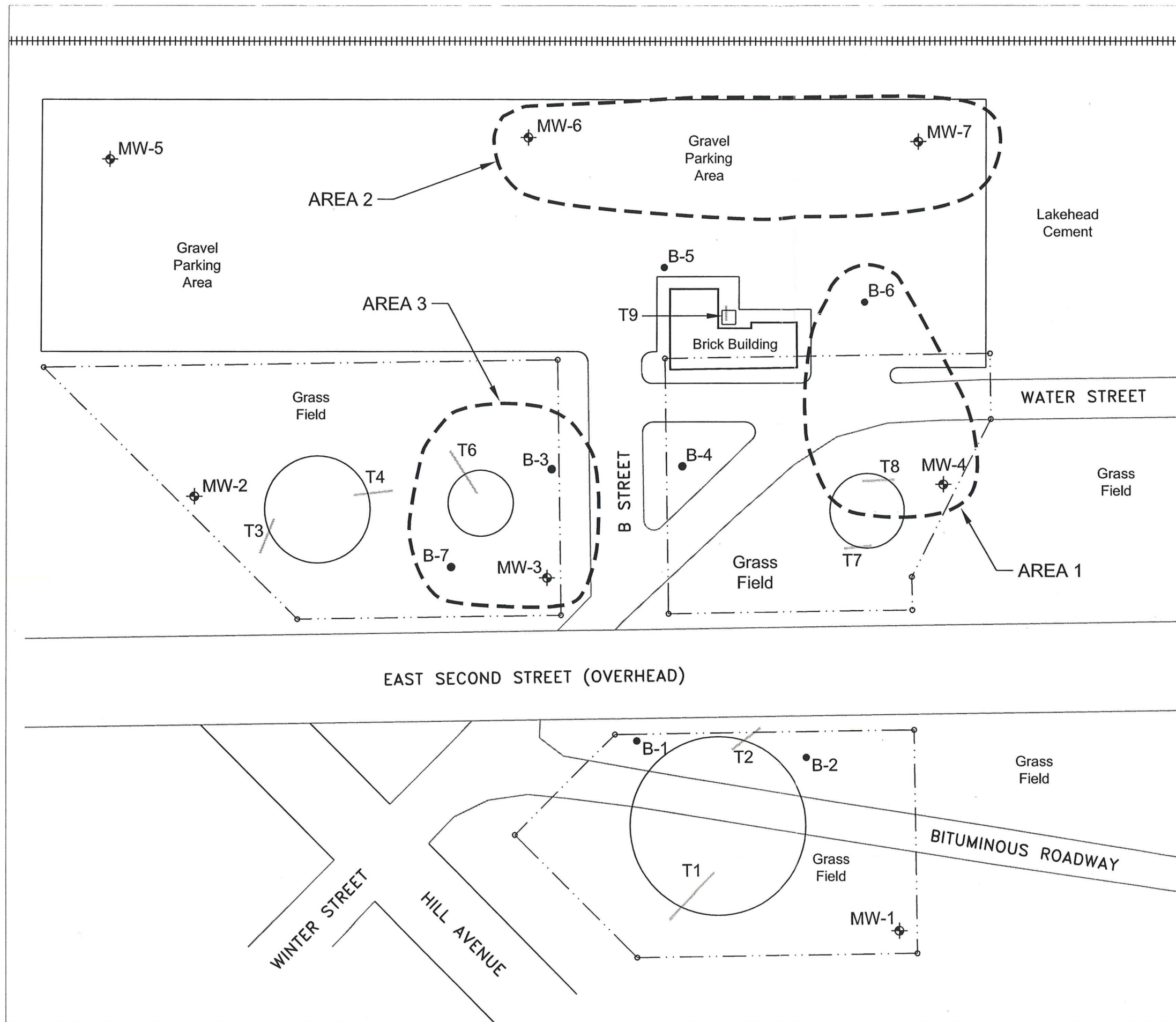


Figure 1-1
SITE LOCATION MAP
 Superior Water Light & Power Former MGP
 Superior, Wisconsin

PREPARED BY: CMB	DATE: Dec 2001	PROJECT NO: 09413-098	REV: 0
FILE NO.: FIG1-1.doc	CHECKED: WMG		



- EXPLANATION:**
- +++++ Railroad Tracks
 - SWL&P Property Boundary
 - Boundaries of Areas 1, 2 and 3 as discussed in the Phase II Report
 - ⊕ MW-1 Monitoring Well Location
 - B-2 Geoprobe Soil Boring Location
 - / T3 Test Trench Location
 - Former Gas Holder

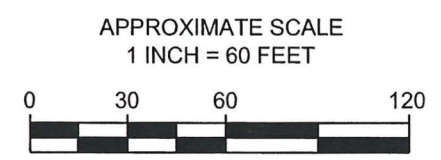


Figure 1-2
AREAS WITH RCL EXCEEDANCES
 Superior Water Light & Power
 Former MGP
 Superior, Wisconsin

DRAWN: CMB/5802	DATE: Dec. 2001	ENSR INTERNATIONAL
FILE No.: Fig 1-2.dwg	PROJECT: 09413-098	

1.2 Site Location and Ownership

The former Superior MGP Site is located in the vicinity of the intersection of Winter and Water Streets in Superior, Wisconsin. The Site occupies a portion of the northeast quarter of the northwest quarter of Section 9, Township 49 North and Range 14 West (SW ¼, NW ¼ of Sec. 13, T49N, R14W). The Site location is depicted on Figure 1-1.

Portions of the former MGP property are now owned by Superior Water Light & Power (SWL&P), the City of Superior, the U.S. Department of Transportation, and CLM, Inc. Figure 1-3 is a color-coded map indicating property ownership in the vicinity of the MGP Site.

The owner contact is:

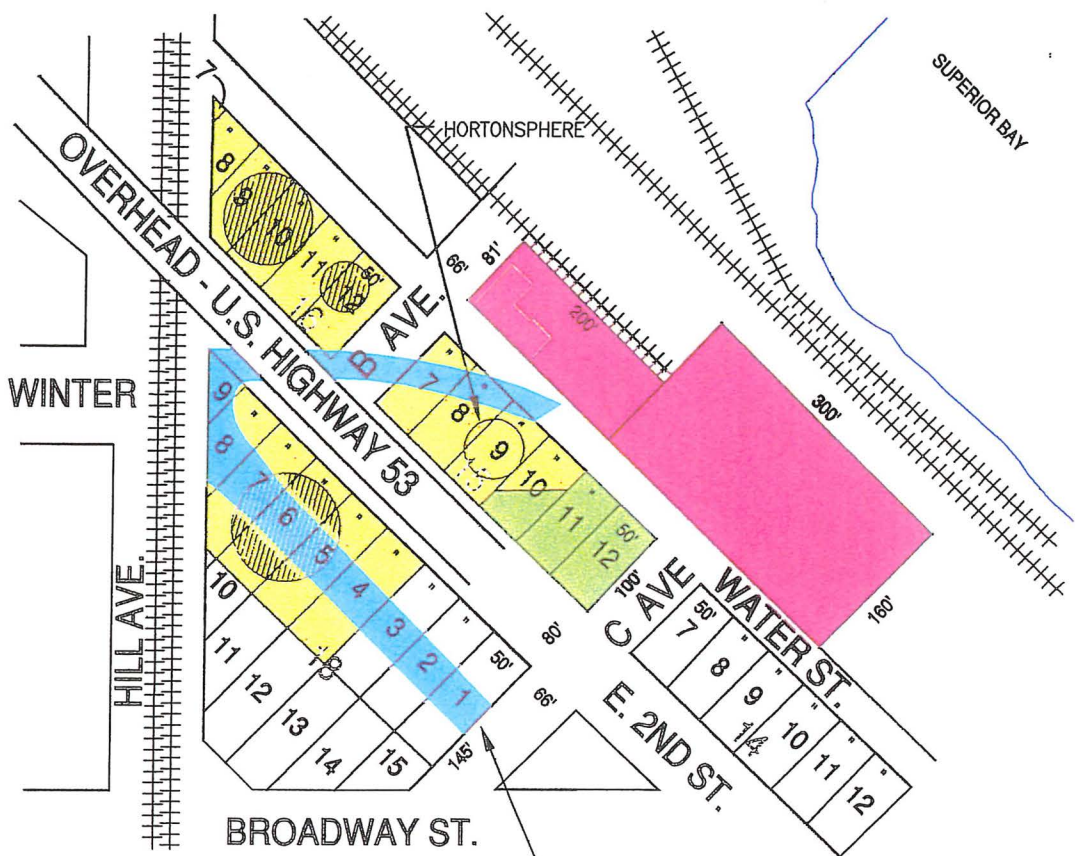
Bill Bombich
Superior Water Light and Power Company
2915 Hill Avenue
Superior, Wisconsin 54880
(715) 395-6288

1.3 Consultant and Contractor Identification

The Site investigation activities will be conducted by:

ENSR International
Attn: William M. Gregg
4500 Park Glen Road, Suite 210
St. Louis Park, MN 55416
(952) 924-0117 - phone
(952) 924-0317 – fax

Subcontractors anticipated to provide services for this project are identified below. The subcontractors selected to conduct the work may change due to availability or changes in the scope of work.



NOTE: City street on SWL&P Co. land -
No recorded easement as of 1/2/81

ROY'S ADDITION TO THE
CITY OF SUPERIOR



- DEEDED TO STATE
- OWNED BY SWL&P CO.
- OWNED BY CLM



PROPERTY OWNED BY
SUPERIOR WATER, LIGHT & POWER
SUPERIOR, WI

APPROXIMATE SCALE

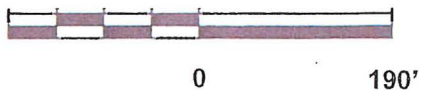


FIGURE 1-3
PROPERTY OWNERSHIP MAP
SUPERIOR MGP

Source: SWL&P Co. Records

PREPARED BY: AJT	DATE: SEP 2001	PROJECT NO: 9413-098	REV: 0
FILE NO.: Property.DOC	CHECKED: WMG		

PAH and VOC Lab Services

EnChem, Inc.
Attn: Laurie Woelfel
1795 Industrial Dr.
Green Bay, WI 54302
(800) 736-2436 – phone
(414) 469-8827 – fax
(WDNR Certification 405132750)

“Finger Printing” Lab Services

Gas Technology Institute
Attn: Diane Saber
1700 South Mount Prospect Road
Des Plaines, Illinois 60018-1864
(847) 768-0500 - phone
(847) 768-0501 - fax

Trenching and Boring

Thein Well Company
Attn: Will Greeley
PO Box 429
Clara City, MN 56222
(320) 847-3207 – phone
(320) 847-3459 – fax

Surveying

Salo Engineering
Attn: Dale Berntsen
15 East First Street
Duluth, MN 55802
(218) 727-8796 – phone
(218) 727-0216 – fax

2.0 OBJECTIVES AND PROJECT SCOPE

The objectives of this investigation include the following:

1. Define the nature and extent of the apparent gasoline spill near well MW-4 (Area 1).
2. Define the nature and extent of the PAH and BTEX impact around well MW-7 and the former shoreline of Superior Bay (Area 2).
3. Determine the extent of the clay tile pipes found in test trench T-9 near the building.
4. Additionally, perform "fingerprinting" analysis on samples from each of the above three areas to characterize these materials.

The investigation will consist of the completion of 15 borings installed using a Geoprobe® or other hydraulic push drilling method and the installation of a test trench along the length of the clay tile pipe using a backhoe. Soil samples will be collected and analyzed for parameters of concern, as described in Section 3 of this work plan. Groundwater samples will be collected from all the monitoring wells for analysis of VOC and PAH. Upon receipt of the sample results, the data will be evaluated and, if required, recommendations for further actions at the Site will be made. The methodologies to be utilized during the investigation are described in Section 3.

2.1 Project Scoping

To the extent practical, the scope of the project was defined in consideration of the criteria listed in NR 716.07, as follows:

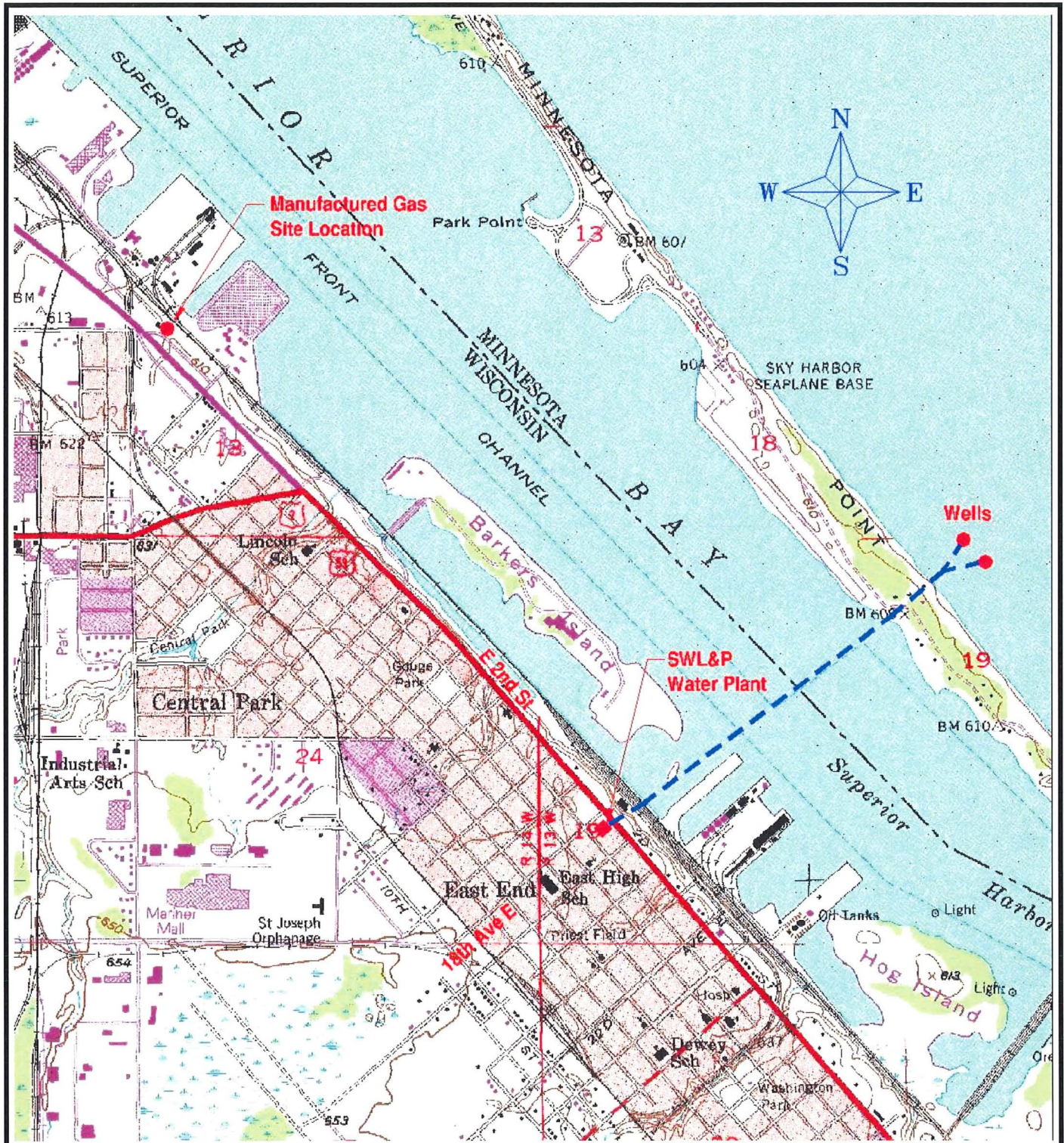
- Site Use: The only operations currently conducted on the Site are associated with the brick building owned by CLM, Inc. According to Mr. Dana Stone, Vice President of Operations, for CLM, Inc., the building is only used for storage. One of the three rooms in the building at the subject property is being leased by Lakehead Cement Co, and is used for storage of sand, lime, cement, and miscellaneous materials related to Lakehead's adjacent ready-mix plant. This Site investigation will focus on areas that contained relatively high concentrations of BTEX and/or PAH, as determined by the previous Phase II investigation.
- Type and Amount of Impact: Impacts to the soil and groundwater have not been fully identified, however three areas of impact were identified in the Phase II investigation with varying amounts of BTEX and/or PAH.

- Environmental Media Potentially Affected: Soil and groundwater are affected.
- Other Environmental Investigations/Findings: ENSR performed a Phase I and Phase II environmental assessments previously at the Site. These studies are summarized in Section 1.1.
- Potential Receptors: Groundwater discharges to Superior Bay, and there are no known groundwater users in the area. The municipal drinking water supply is obtained from Lake Superior via horizontal wells installed in the bed of the lake as illustrated in Figure 2-1. The nearest surface water body is Superior Bay.
- Significant Resources: Any impacts identified at the Site will be evaluated with respect to threatened or endangered species, sensitive habitats, wetlands and/or resource waters.
- Potential Remedial Actions: At this time, an evaluation of potential remedial actions to address potentially impacted media on the Property is premature. The information needed to determine the most appropriate remedial response, if any, includes the lateral and vertical boundaries of potential groundwater and soil impacts, and the location of any source materials at the Site.

2.2 Sampling Strategy

The sampling strategy was developed to further delineate the nature and extent of the PAH and BTEX impacts to the soil and groundwater found during the initial Phase II investigation. The sampling locations were selected based on historical Site information. The following Site characteristics are provided for reference.

- Site Topography: Based on the USGS Superior, Wisconsin 7.5-minute topographic map (1993), the Site is located at approximately 613 feet above mean sea level in an area of gently sloping topography. The topography in the area of the subject property is relatively flat.
- Surface Water Drainage: Storm water runoff is generally sheet-flow across the Site toward Superior Bay. No known storm sewer system exists at the Site. A storm sewer grate was observed near boring B-3 during the previous Phase II, however, it did not appear to be maintained. The nearest storm sewer runs southeast of the Site through the Lakehead Cement Company property. Two sanitary sewer lines run through the property. The locations of the sanitary and storm sewers are illustrated on Figure 2-2.



SOURCE: USGS 7½ Minute Topographic Quadrangle from DeLorme Superior, Wisconsin, 1993, and SLW&P Well Location Maps

SCALE

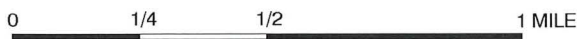


Figure 2-1
MUNICIPAL DRINKING WATER SUPPLY WELL
LOCATION MAP
Superior, Wisconsin

PREPARED BY: CMB

DATE: July 2002

PROJECT NO:

REV

FILE NO.: FIG 2-1.doc

CHECKED: WMG

09413-098

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Explanation:

- Green Lines are Sanitary Sewer Lines
- Red Lines are Storm Water Lines

SOURCE: Aerial Photograph with sewer locations supplied by the City of Superior.

APPROXIMATE SCALE
1 INCH = 250 FEET

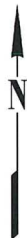


Figure 2-2
STORM AND SANITARY SEWER LINE
LOCATION MAP
Superior, Wisconsin

PREPARED BY: CMB	DATE: July 2002	PROJECT NO:	REV:
FILE NO.: FIG 2-2.doc	CHECKED: WMG	09413-098	0

- Site Geology: Based on Site investigation data from prior studies, soils at the Site consist predominantly of native red clay with varying amounts of fill. Sandstone bedrock (Keweenaw Formation) is encountered beneath the unconsolidated soils. Depth to bedrock is estimated to be from 100 to 200 feet below ground surface. Based on the proximity to Lake Superior (elevation approximately 601 feet above mean sea level) groundwater is assumed to flow north towards the lake. Groundwater is approximately 10 feet below ground surface.
- Potential Migration Pathways: Potential migration pathways include vertical migration through the unsaturated zone with percolating precipitation and lateral migration with local topography and anticipated groundwater flow.

3.0 INVESTIGATION SCOPE OF WORK

This Supplemental Site Investigation will be conducted to further delineate MGP and potential gasoline impacts in soil and/or groundwater. The scope will include the completion of 15 borings installed using a Geoprobe® or other hydraulic push drilling method and the installation of one or more test trenches using a backhoe. All activities will be conducted in accordance with the WDNR WAC Chapters NR 716. Figure 3-1 presents the anticipated boring and test trench locations for this investigation.

3.1 Summary of Sampling Activities

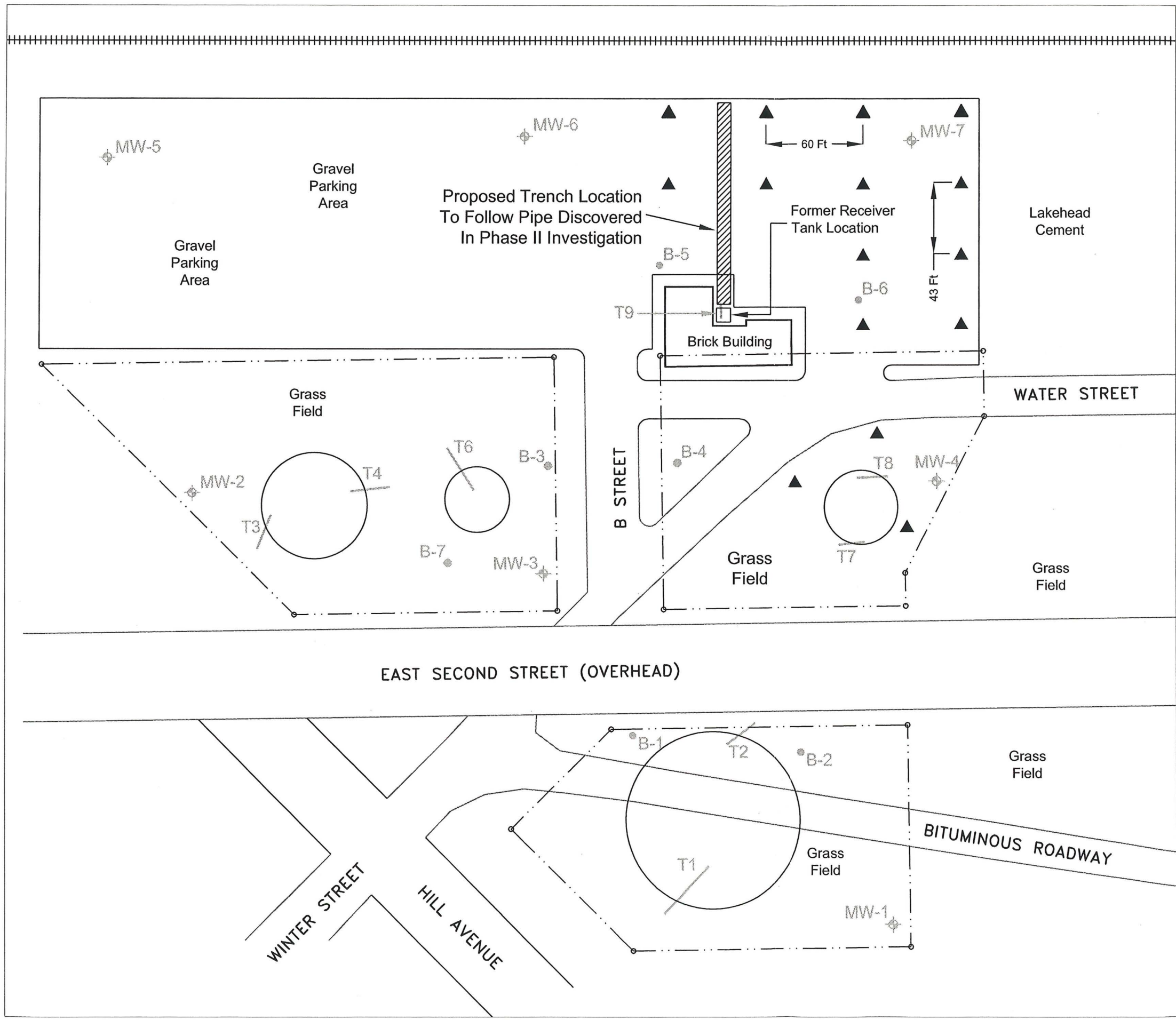
3.1.1 Geoprobe Soil Borings

Fifteen soil borings will be installed to a depth of approximately 20 feet below ground surface using a Geoprobe or other hydraulic push drilling method. The soil borings will be continuously sampled and all soil samples will be field screened with a PID using a headspace screening technique. The locations/depths of the samples submitted for laboratory analysis will be selected based on field observations and PID field screening results. A subset of the samples will be taken from 1 to 4 feet below grade in order to have data for direct contact/human health risk assessment. Soil samples will be transferred directly from the Geoprobe sample sleeve into laboratory supplied containers. The samples will be placed in an ice filled cooler and shipped overnight under chain-of-custody to the laboratory. One or more samples will be collected from each boring, at the discretion of the field geologist. The 15 borings are expected to yield approximately 25 samples, including QA/QC samples.


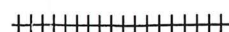




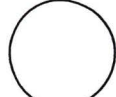
Three borings will be advanced in the vicinity of test trench T8 in Area 1 to help delineate the extent of the BTEX impact and to "fingerprint" the source of the BTEX. Soil samples will be submitted for VOC analysis by EnChem and for PIANO (Paraffins, Isoparaffins, Aromatics, Naphthalene, and Olefins) analysis by Gas Technology Institute. The PIANO analysis is by modified EPA method 8260, and will be used to help characterize the source of the BTEX impact.

Twelve soil borings will be installed between Water Street and the railroad tracks to delineate the nature and extent of the PAH and BTEX impact around well MW-7 and the former shoreline of Superior Bay. In addition, the borings will help delineate the extent of the fill material along the former shoreline. Soil samples will be analyzed for PAH and VOC by EnChem, Inc., and for various fingerprinting analyses by Gas Technology Institute.

After completing each boring and collecting the soil sample, the boring will be properly abandoned with granular or chipped bentonite to near surface, then topped off with asphalt or concrete patch, if needed.



EXPLANATION:

-  Proposed Boring Location
-  Railroad Tracks
-  SWL&P Property Boundary
-  MW-1 Existing Monitoring Well Location
-  B-2 Completed Geoprobe Soil Boring Location
-  T3 Completed Test Trench Location
-  Former Gas Holder

SOURCE:

- Survey of SWL&P Property performed by Salo Engineering, dated 12/13/01.
- ENSR field observations.

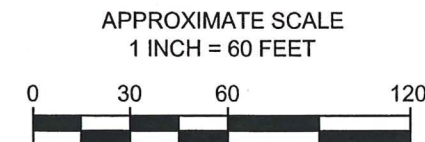
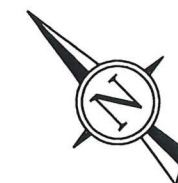


Figure 3-1
PROPOSED SAMPLE LOCATIONS FOR
PHASE II, PART II
 Superior Water Light & Power
 Former MGP
 Superior, Wisconsin

DRAWN: CMB/5802

DATE: July 2002

FILE No.: Fig 3-1.dwg

PROJECT: 09413-098



3.1.2 Test Trench

A backhoe will be used to excavate the extent of the pipe discovered in the initial Phase II investigation. The pipe, which appears to originate from the building and heads towards Lake Superior, will be followed to the furthest extent possible within the existing study area. Soil samples will be collected from the trench as needed. Samples will be transferred directly from the backhoe bucket into laboratory supplied containers. The number of soil samples will be determined by the field geologist, and the samples will be analyzed for PAH and VOC by EnChem.

Whenever feasible, the interior of the pipe will be examined for signs of residual MGP wastes. Residual wastes and/or soil samples will be collected for "finger printing" analysis by Gas Technology Institute. The analysis consists of analyzing for an extended list of PAH and alkylated PAH compounds using a modified 8270 method and TPH by modified method 8015. The results of the "finger printing" will help characterize these materials.

3.1.3 Groundwater Sampling

Groundwater samples will be collected from all the monitoring wells MW-1 through MW-7 as part of this investigation. An interface probe will be used to check for the presence of non-aqueous phase liquids and to measure the depth to groundwater prior to beginning the sampling activities. A low flow sampling technique, using a peristaltic pump, will be used to purge the wells and collect groundwater samples. Water quality measurements will be collected with a water quality meter and flow through cell for the following parameters: pH, specific conductivity, temperature, oxidation-reduction potential, and dissolved oxygen. Groundwater samples will be transferred directly from the new clean tubing into laboratory supplied containers and then will be placed into an ice filled cooler. The samples will be transported overnight under chain-of-custody to EnChem for VOC and PAH analysis.

3.2 Decontamination Procedures

Drilling and sampling equipment will be decontaminated before and between sampling events to prevent potential cross contamination between soil boring locations, soil sampling intervals, and monitoring wells. Drilling equipment and the backhoe bucket will be steam cleaned prior to use at each location. Sampling equipment, including Geoprobe sampler spoon and interface probe, will be decontaminated prior to each use with a detergent wash followed by a potable water rinse. A clean pair of latex gloves will be used during collection of each sample to minimize the potential for cross-contamination of samples.

3.3 Elevation Survey

The locations and elevations of the soil borings and the test trench will be measured by a licensed surveyor (Salo Engineering).

3.4 Laboratory Analyses

3.4.1 Soils

Soil samples will be submitted for analysis of PAH using SW-846 Method 8270 and/or VOC using SW-846 Method 8260 by EnChem, Inc, a certified Wisconsin laboratory.

In addition, several samples will be submitted to Gas Technology Institute for "finger printing" using the PIANO and/or PAH, alkylated PAH and TPH analysis. State-of-the-art analytical methods and rigorous quality control will be used for the following:

- GC/FID fingerprinting (EPA method 8100, ASTM D 3328-90)
- PIANO and other comprehensive petroleum analyses (modified EPA method 8260)
- PAH, alkylated PAH, and petroleum biomarkers (modified EPA method 8270, ASTM D 5739-95)

3.4.2 Groundwater

Groundwater samples will be analyzed by EnChem for PAH using SW-846 Method 8270 and BETX using SW-846 Method 8260.

3.5 Quality Assurance/Quality Control Methods

The following quality assurance/quality control measures will be implemented during the Site investigation activities:

- Decontamination procedures and measures to minimize the potential for cross-contamination of samples will be followed as specified in Section 3.2 above.
- All Site activities will be recorded in a bound field notebook (Section 3.5.1).
- Stringent chain-of-custody procedures will be followed (Section 3.5.2).

- Sample duplicates and blanks will be collected and analyzed (Section 3.5.3).

3.5.1 Field Documentation

All Site activities will be documented in a bound field notebook. Included in the daily documentation are:

- Procedures for sampling and other routine activities associated with the Site investigation;
- Personnel working on the Site; and
- Chronological log of Site activities.

3.5.2 Chain of Custody Procedures

Chain-of-custody forms will be completed to the extent possible prior to sample shipment. Included on the form will be the sample identification (sample location identification, depth of sample and date of sample collection), sample type, sample container (type and number of containers), analytical method to be performed, preservatives, and name of sampler. The forms will be filled out in a legible manner, using blue or black waterproof ink.

A chain-of-custody document will accompany each sample shipment. The sampler will relinquish custody of the samples to the courier, retaining one copy of the record for the project file. Samples will be transported to the laboratory in containers that meet applicable state and federal standards for safe shipment.

3.5.3 Duplicate and Field/Trip Blank Samples

The following QA/QC samples will be submitted with the soil samples. If multiple days and/or containers are used, appropriate increases in the number of blanks will be made.

- Methanol blanks A methanol sample will be collected in the same manner as the soil samples with methanol preservation without placing soil into the container. One blank will be collected per sampling event per 20 samples (or fraction thereof).
- Field Duplicates One duplicate sample will be collected per sampling event per ten samples (or fraction thereof) and submitted for analysis of all parameters analyzed in the original sample.
- Matrix Spike/Matrix Spike Duplicates One Matrix Spike/Matrix Spike Duplicate sample will be collected and analyzed by the laboratory per every batch of 20 samples to evaluate data precision and accuracy.

The following QA/QC samples will be submitted with the groundwater samples. If multiple days and/or containers are used, appropriate increases in the number of blanks will be made.

- Trip blanks The trip blank(s) will be prepared by the laboratory and transported with the sample jars. One trip blank per day per shipping container containing BETX samples.
- Field Duplicates One duplicate sample will be collected per sampling event per ten samples (or fraction thereof) and submitted for analysis of all parameters analyzed in the original sample.
- Matrix Spike/Matrix Spike Duplicates One Matrix Spike/Matrix Spike Duplicate sample will be collected and analyzed by the laboratory per every batch of 20 samples to evaluate data precision and accuracy.

3.6 Site Health and Safety

The protection of Site personnel and the general public is a primary concern. All reasonable measures will be taken to protect the health and safety of the project personnel and general public. A Site Health and Safety Plan that meets or exceeds the standards found in 29 CFR 1910.120 has been prepared and is available for review. A copy will be on-Site during all Phase II activities. A tailgate health and safety meeting will be conducted prior to beginning field work each day.

3.7 Reporting

Upon receipt of the laboratory reports, a report detailing the investigative activities and results will be prepared. The report will be submitted to the WDNR not later than 60 days following receipt of the laboratory reports, unless otherwise directed by the WDNR or pending further investigative activities if the objectives of the Site investigation are not met.

4.0 SCHEDULE

The investigation activities at the Superior MGP are anticipated to commence during the month of August 2002. Laboratory results are generally provided within three weeks after sample receipt. The draft investigation report is anticipated to be completed within 60 days following receipt of the laboratory reports.