Superior Water Light & Power Company
Superior, Wisconsin

Remedial Design Investigation Work Plan for the Former Manufactured Gas Plant Superior, Wisconsin

WDNR BRRTs # 02-16-275446

Summit Envirosolutions, Inc.
July 2016
Summit Project No.: 2118-0001

Remedial Design Investigation Work Plan
Superior Manufactured Gas Plant
Superior, Wisconsin

July 2016

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, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, 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 / Program Manager — 8/3/16
Signature and Title — Date

CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

Summit Envirosolutions (Summit) 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 Street and East 1st Street in Superior, Wisconsin (Site). The Site location is shown in **Figure 1**. Previous investigations at the Site indicated the presence of polynuclear aromatic hydrocarbons (PAH) and volatile organic compounds (VOC) in soils, sediment, and groundwater. This work plan presents the scope of work needed to further define response actions to address all impacted media at the Site.

1.1 Background

The Superior MGP operated from 1889 to 1904 and produced carbureted water gas from coal. A Phase I environmental assessment and a series of Phase II Site investigations between 2001 and 2008 have identified areas of the Site containing volatile organic compounds (VOC) and polynuclear aromatic hydrocarbons (PAH) compounds in the soil above Wisconsin Department of Natural Resources (WDNR) Residual Contaminant Levels (RCL). Groundwater samples contained benzene, toluene, ethylbenzene, and xylene (BTEX) and several PAH compounds above the WDNR groundwater enforcement standards. A test trench excavation north of the Site building encountered a clay tile pipe oriented toward the former Superior Bay shoreline that contained tarry material. The tarry material was analyzed using "fingerprinting" techniques and appeared to be carbureted water gas tar. Laser induced fluorescence (LIF) was used to map subsurface tarry materials.

The Site is private property, except for city streets that cross the Site. Most of the Site is not fenced, thus trespassers could have potential exposure to surface soil. Groundwater is present in native red clay soil and in more permeable fill materials that were placed along the shoreline. Groundwater in the clay moves very slowly and groundwater in the fill moves toward the City of Superior's wastewater treatment plant and to Superior Bay. There are no known groundwater users in the area. SWL&P provides the area's drinking water supply via horizontal wells installed over a mile from the Site in the bed of Lake Superior. The nearest surface water body is Superior Bay. The potential for vapor intrusion has not been addressed in previous studies at the Site.

SWL&P completed two sediment investigations in the adjacent industrial boat slip in active use by Graymont (formerly CLM). The slip was built after the MGP ceased operating in 1904, and the slip has been dredged several times since then. Sediment testing by WDNR in 2000 revealed elevated concentrations of PAH and metals and the boat slip was identified as one of several "hot spots" in the Duluth – Superior harbor. Sampling and analyses by SWL&P in 2003 found lower levels of PAH in the sediment and fingerprinting analyses showed that most of the sediment contained amounts and types of PAH similar to typical urban run-off. Another investigation by SWL&P in 2010 determined that tarry materials and other MGP wastes were absent from the sediments and that native red clay was present beneath the boat slip sediments. The 2010 analytical results showed elevated PAH concentrations in recent (shallowest) boat slip sediments in deeper water. One area of focus of this work plan is to identify any on-going sources of PAH to the boat slip sediments.

In December 2008 a remediation project was conducted to remove the clay tile pipe and approximately 3000 tons of PAH and VOC-containing soils from the vicinity of the pipe. Soil excavated from the Site was disposed at Waste Management's Voyager landfill in Canyon, Minnesota. **Figure 2** shows the location of the 2008 soil excavation. Clean native clay was encountered in the bottom of the excavation, but additional impacted soils were observed in the side walls of the excavation. Cool Ox™ oxidation chemical was used for odor control and for insitu chemical oxidation for soil near the excavation. WDNR has requested additional soil removals in the vicinities of wells MW3 and MW4 to improve future groundwater quality. This work plan includes soil testing in these areas.

Groundwater monitoring has been performed on eight occasions on at least a subset of Site wells since the 2008 remediation project. The nature and extent of PAH and VOC in groundwater is well known and, for the most part, the water quality trends are stable or decreasing. However, this investigation will include deeper groundwater monitoring to ensure that the three-dimensional extent of contamination is addressed.

Prior investigations at the Site included:

- installing 22 monitoring wells and performing groundwater sampling (two of the wells have subsequently been sealed);
- installing 31 geoprobe soil borings and collecting 20 surface soil and 58 deeper soil samples for laboratory analysis and installing 26 soil borings with soil/groundwater sampling for mobile on-site laboratory analyses;
- collecting 13 sediment samples from the boat slip;
- conducting forensic chemical analyses on select soil and sediment samples;
- collecting 2 samples of storm sewer sediment;
- installing 10 test trenches;
- completing 23 membrane interface probe (MIP) direct sensing borings to delineate volatile organic compounds ("VOCs"); and
- completing 74 laser induced fluorescence (LIF) direct sensing borings to delineate tarry material.

Based on the work done to date, this remedial design investigation plan includes the following elements:

1. Hydraulic push borings to define two remaining soil hot spots near MW3 and MW4,
2. LIF borings, sonic soil borings, and well installations around the perimeter of the boat slip,
3. LIF borings and/or Darts and sediment borings to characterize sediment quality,
4. Sub-slab vapor monitoring at three locations,
5. Three additional shallow wells and one deep well installation.

1.2 Site Location and Ownership

The former Superior MGP Site is located in the vicinity of the intersection of Winter Street and East 1st Street in Superior, Wisconsin. The Site occupies a portion of the northeast quarter of the northwest quarter of Section 13, Township 49 North and Range 14 West (SW ¼, NW ¼ of Sec. 13, T49N, R14W). The Site location is depicted on **Figure** 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 Graymont. **Figure 3** is a color-coded map indicating property ownership in the vicinity of the MGP Site. Also, Lafarge North America, Inc. owns a 450-foot portion of the dock at the open end of the boat slip used by Graymont.

The owner contact is:

David Weber
Superior Water Light and Power Company
2915 Hill Avenue
Superior, Wisconsin 54880
(715) 395-6312

1.3 Consultant and Contractor Identification

The Site investigation activities will be conducted by:

Summit Envirosolutions, Inc.
Attn: William M. Gregg
1217 Bandana Blvd. N.
St. Paul, Minnesota 55108
(651) 262-4236

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.

Lab Services

Pace Analytical, Inc.
Attn: Kabor Xiong
1800 Elm Street, SE
Minneapolis, MN 55414
612-607-6400
(WDNR Certification 999407970)

Sonic Drilling and Well Installations

Cascade Drilling
Attn: Scott Thalacker, Chad Johnson
209 Lemieur Street
Little Falls, MN 56345
320-632-6552

LIF and Soil Borings

Dakota Technologies, Inc. (Matrix)
Attn: Jim Dzubay, Dan Thompson
2201 A 12th Street North
Fargo, ND 58102
701-237-4908

Surveying

TKDA
Attn: David Szyszkoski
11 East Superior Street, Suite 340
Duluth, MN 55802
218-727-8796

2.0 OBJECTIVES AND PROJECT SCOPE

The objectives of this investigation include the following:

1. Identify and delineate the extent of possible tarry source materials near the boat slip;
2. Delineate the extent of PAH and VOC in the boat slip sediments;
3. Determine if a deeper aquifer system is present and test for PAH and VOC;
4. Delineate PAH and VOC concentrations in soil surrounding wells MW3 and MW4; and
5. Investigate vapor intrusion.

In order to accomplish the goals listed above, Summit proposes to use sonic drilling, LIF soil screening, and LIF/Dart sediment screening technologies. Based on the LIF/Darts results, Summit will select the best locations for sampling for laboratory analyses and for monitoring wells. The methodologies are described in greater detail 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: Operations currently conducted on the Site include Graymont's lime calcining business and the City of Superior's waste water treatment plant operations. Significant truck traffic is common at the site and Graymont uses the boat slip for coal deliveries approximately five or six times per year. Also, the rail road line is active and the line is posted for the use of unmanned locomotives. Storage buildings on site are infrequently occupied.

- Type and Amount of Impact: Impacts to the soil, sediment, and groundwater have not been fully characterized. However, the boat slip sediments and the soil and groundwater contain varying amounts of BTEX and/or PAH both on-site and off-site to the northeast and east. Tarry materials were found on-site at the terminus of the clay pipe and off-site to the east.

- Environmental Media Potentially Affected: Soil, sediment, soil gas, and groundwater are potentially affected.

- Other Environmental Investigations/Findings: SWL&P has investigated soil, sediment and groundwater at the Site since 2001. The USEPA and WDNR have conducted several sediment studies since the mid-1990s. The results of the previous investigations are summarized in Section 1.1.

- Potential Receptors: Groundwater discharges to Superior Bay. There are no known groundwater users in the area as there is no productive aquifer system present. The municipal drinking water supply is distributed throughout Superior and is obtained from Lake Superior via horizontal wells installed over a mile from the Site in the bed of the lake as illustrated in **Figure 4**. The nearest surface water body is Superior Bay. Since the boat slip is an active industrial facility, the only receptors are aquatic organisms.

- 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, the following potential remedial actions are being considered for each media:

    - Soil: Soil covers (capping) in areas of the site where surface soil contains chemicals above direct contact standards;
    - Sediment: Some combination of dredging, capping, and/or natural restoration will be used to maintain, if not deepen the boat slip which will continue to be used for coal deliveries and other shipping;
    - Groundwater: Monitored natural attenuation is being considered because the chemical quality in most monitoring wells is stable owing to the age of the source of contamination. Variations in water quality have resulted from disturbances such as remedial excavations, construction activities, and from well installation activities.
    - Vapor Intrusion: No occupied buildings are present at the Site. Soil and groundwater has been found to contain VOC concentrations that trigger vapor intrusion concerns for any occupied building that may be built on the Site in the future. Institutional controls are the likely remedial strategy for addressing vapor intrusion at the Site.

2.2 Sampling Strategy

The sampling strategy was developed to further delineate the nature and extent of tarry material, PAH, and VOC impacts to the soil, soil gas, sediment, and groundwater. The sampling locations were selected based on data gaps identified from previous investigations and/or to provide areal coverage in previously unexplored areas. The following Site characteristics are provided for reference.

2.2.1 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 Site is relatively flat. The area northeast of the Site slopes down

towards Lake Superior which is normally at an elevation of approximately 601.3 feet above mean sea level. The Graymont dock and City treatment plant properties are approximately five to eight feet above the lake level.

2.2.2 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 Concrete Company property. Two sanitary sewer lines run through the property. The locations of the sanitary and storm sewers are illustrated on **Figure 5**.

2.2.3 Site Hydrogeology

Site investigations indicate there are three predominant soil types encountered in the Site vicinity: red clay, brown silty sand, and fill material consisting primarily of white to dark gray lime-like material. There were also small amounts of miscellaneous fill, such as bricks, wood and slag, encountered in several locations. The thickness of the lime-like material ranged from approximately five-feet thick south of the railroad tracks to one-foot thick or less north of the rail road tracks. Underlying the lime-like material was silty sand or sand along with miscellaneous fill (slag, wood, brick, etc.) in some borings. Underlying the sand unit was red to reddish-brown high plasticity clay. The clay unit appears to slope northeast and east-northeasterly, towards Superior Bay. According to the Bedrock Geology Map of Wisconsin (Wisconsin Geological and Natural History Survey map M078, Mudrey et al., 1982) sandstone bedrock of the Bayfield Group is reported to be present beneath the unconsolidated soils. Depth to bedrock is reported to be from 30 to 90 meters (100 to 300 feet) below the ground surface.

Groundwater was encountered in the borings in the sand, silty sand, or fill material above the red clay. Groundwater was encountered approximately three to five-feet below the ground surface in the borings north of the railroad tracks and approximately eight to eleven-feet below ground surface in the borings south of the railroad tracks. Results of the slug tests indicate hydraulic conductivity of wells screened in silty sand ranged from 1.17×10^{-2} centimeters per second (cm/s) to 8.48×10^{-3} cm/s. The wells screened in silty sand are located downgradient and off-site, to the northeast of the Site. Results of slug tests indicated the hydraulic conductivity of the lime-like material / clay range from 3.07×10^{-3} to 7.63×10^{-5} cm/s. South of the former shoreline (on-Site area) the hydraulic gradient is approximately 0.04 feet per feet and north of the former shoreline (north of the site, downgradient) the hydraulic gradient ranges from approximately 0.001 to 0.006 feet per feet.

2.2.4 Potential Migration Pathways

Potential migration pathways include vertical migration due to the infiltration of precipitation through the unsaturated zone followed by lateral migration as influenced by local topography and anticipated groundwater flow. Potential migration pathways to boat slip sediments include MGP wastes deposited on the original bed of the bay that may migrate due to erosion into the boat slip. Storm sewer and sanitary sewer lines are present in the Site area and may serve as preferential vapor migration pathways.

3.0 INVESTIGATION SCOPE OF WORK

The Remedial Design Investigation will be conducted to provide key information needed to plan comprehensive site remediation. The scope of work includes the use of sonic drill rigs to provide large diameter continuous soil cores, LIF technology screening tools, additional well installations and soil, soil gas, sediment and groundwater sampling for laboratory analyses. All activities will be conducted in accordance with Chapter NR 716, Wis. Adm. Code.

3.1 Investigation Activities

3.1.1 LIF Investigation

Laser induced fluorescence (LIF) will be used with a direct push drilling rig to determine if tarry materials are present around the perimeter of the boat slip that could potentially serve as a source of future contamination to sediments in the boat slip. Laser induced florescence uses an instrument attached to the end of the drilling equipment to detect coal tar materials as drilling proceeds. The perimeter of the boat slip will be screened with the LIF borings to aid in the placement of wells and borings for soil and groundwater sampling. The LIF borings are anticipated to be 15 to 20 feet deep.

Figure 6 shows the estimated area where the LIF will be used to delineate tarry materials. Color logs will be produced for each boring showing the depth and relative concentration of tar constituents. A map will be produced showing the thickness, relative concentration, and extent of any tarry materials encountered. If no tarry materials are indicated by the LIF borings, the sonic borings and well installations will be placed at the approximate locations shown on **Figure 6**.

3.1.2 Vapor Intrusion Investigations

Sub slab soil gas monitoring will be conducted at the three storage buildings shown on **Figure 6**. All three buildings are less than 5000 square feet each and three locations within each building will be selected for sub slab monitoring in accordance with WDNR guidance (RR 986). Semi-permanent vapor sampling ports will be installed using stainless steel materials. The ports will be sampled at least two hours after installation using a shroud and helium tracer gas to ensure sample integrity. The samples will be collected in six liter canisters and analyzed for VOC by EPA Method TO-15. Once the data are available for review, a possible second round of vapor sampling may be conducted during winter months.

3.1.3 Soil Investigations

Sonic borings will be drilled at the seven locations shown in **Figure 6**, and at the four well locations. The locations of the borings will be moved to areas where LIF results indicate that tarry materials are present, as needed. The four to five-inch core diameter produced by the sonic drilling method will allow

a better visual inspection of the soils and potential tarry materials. Also, the correspondingly larger soil volume will aide in providing samples of the subsurface materials for laboratory analyses. The sonic borings will be approximately 20 feet deep and up to three samples from each boring will be submitted for laboratory PAH and VOC analyses.

The soil conditions in the vicinities of wells MW3 and MW4 are well known and can be effectively investigated using hydraulic push boring methods. At these locations there is approximately one foot of topsoil overlying red clay. In order to define the amount of contaminated soil to be excavated from these areas, a 10 to 20-foot grid of soil borings will be drilled to a depth of 12 feet and up to three samples from each boring will be submitted for laboratory PAH and VOC analyses. Approximately 10 borings will be installed surrounding each well. The data will be used to define the depth and extent of anticipated soil removal.

Soil cores collected from the sonic and hydraulic push borings will be logged and screened for organic vapors using a photoionization detector. The headspace screening readings will be noted on the boring logs. Upon completion the boreholes will be sealed with bentonite and the surface will be finished to match pre-drilling cover. The borings will be surveyed by a licensed surveyor for ground surface elevation and northing and easting location.

3.1.4 Sediment Investigations

The boat slip is approximately 20 to 25 feet deep with a vertical dock wall on the Graymont side and a sloped earthen berm on the City WWTP side. The head of the boat slip is only a few feet deep and the sediments are generally thicker as measured to the depth of a red clay basal layer that is present throughout the slip. As mentioned in Section 1.1, the 2010 sediment study found a general pattern that contamination was highest in the surficial sediment with decreasing concentrations with depth.

Sediment borings will be installed on an approximately 100-foot grid pattern throughout the boat slip as shown in **Figure 6**. A barge-mounted hydraulic push rig will advance each boring until the red clay stratum is encountered. Positional information will be obtained using GPS. The 23 sediment borings are anticipated to be approximately 20 feet deep, but will go deeper as needed to penetrate the full thickness of sediment above the red clay. Sediment samples will be collected for laboratory analyses of PAH and VOC at the sediment surface, at the bottom of the recent sediments (above the red clay), and at one intervening depth, if available.

3.1.5 Monitoring Well Installation

Figure 6 shows the locations of four new monitoring wells to be installed for this investigation. Three wells will monitor the water table along the west side of the boat slip and will potentially provide indications of PAH and VOC sources to boat slip sediments. The shallow well locations may be adjusted based on the results of the LIF survey in this area. Sonic drilling techniques will be used to produce soil cores for sampling and for well installation. The wells will be completed as two-inch diameter PVC wells with 10-foot screens that straddle the water table.

The fourth well will be installed to monitor the next deeper water-bearing zone below the water table, if present. To date, site investigations have only penetrated the red clay sediments to a maximum depth of approximately 30 feet below the ground surface, and no deeper water bearing zones have been identified. The location of the deep well shown in **Figure 6** was chosen to avoid the possibility of dragging shallow contamination to the deeper strata, while still being close enough to the main area of MGP contamination to provide a reasonable evaluation of the possibility that the contaminants have migrated to the deeper zone. The boring for this well will be drilled with the sonic drill rig to a maximum depth of 100 feet or to bedrock, whichever is shallower; but will terminate at the target water-bearing strata, if found. The well will be constructed with two-inch diameter PVC materials and the screen length will be determined once the zone to be monitored is identified.

Monitoring wells will be completed flush to the ground or above ground with protective bumper posts according to landowner preference. The wells will be surveyed by a licensed surveyor for top of casing elevation, ground surface elevation, and northing and easting location.

3.2 Groundwater Sampling

Groundwater samples will be collected from the new monitoring wells, after they are properly developed, and from all of the existing monitoring wells at the site. Summit will collect the samples using low-flow methods in accordance with WDNR's 1996 Groundwater Sampling Field Manual. The groundwater samples will be analyzed for PAH and VOC. Once the laboratory results are available a second confirmatory round of groundwater sampling will be conducted.

3.3 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. All down-hole equipment will be decontaminated before each sampling interval using an Alconox© or TSP© solution and rinsed in potable water (i.e., municipal tap or bottled delonized). Sampling tools (e.g., spoons, knives, spatulas, etc.) will be cleaned in a solution of Alconox© or TSP© and rinsed in potable water prior to collection of each sample. A clean pair of latex, gloves will be used during collection of each sample to minimize the potential for cross-contamination of samples
- All Site activities will be in field notes including forms for daily activities, boring and well logs, and groundwater stabilization records.
- 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.

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

- Field Duplicates One duplicate sample will be collected per twenty 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 prepared and analyzed by the laboratory per every batch of 20 samples to evaluate data precision and accuracy.

The following QA/QC samples will be collected with the groundwater samples that are submitted to a fixed laboratory. If multiple days and/or containers are used, appropriate increases in the number of QA/QC samples 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 VOC samples.

- Field Duplicates One duplicate sample will be collected per sampling event per twenty 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 prepared and analyzed by the laboratory per every batch of 20 samples to evaluate data precision and accuracy.

3.4 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 fieldwork activities. A tailgate health and safety meeting will be conducted prior to beginning field work each day.

3.5 Reporting

Upon receipt of the laboratory data, Summit will prepare a report for submittal to Wisconsin Department of Natural Resources. The report will summarize the data and provide conclusions regarding the extent and concentrations of PAH and VOC in soil, sediment, and groundwater and in vapor samples. The report will be submitted to the WDNR not later than 90 days following receipt of the laboratory reports, unless otherwise directed by SWL&P or pending further investigative activities if the objectives of the Site investigation are not met.

4.0 SCHEDULE

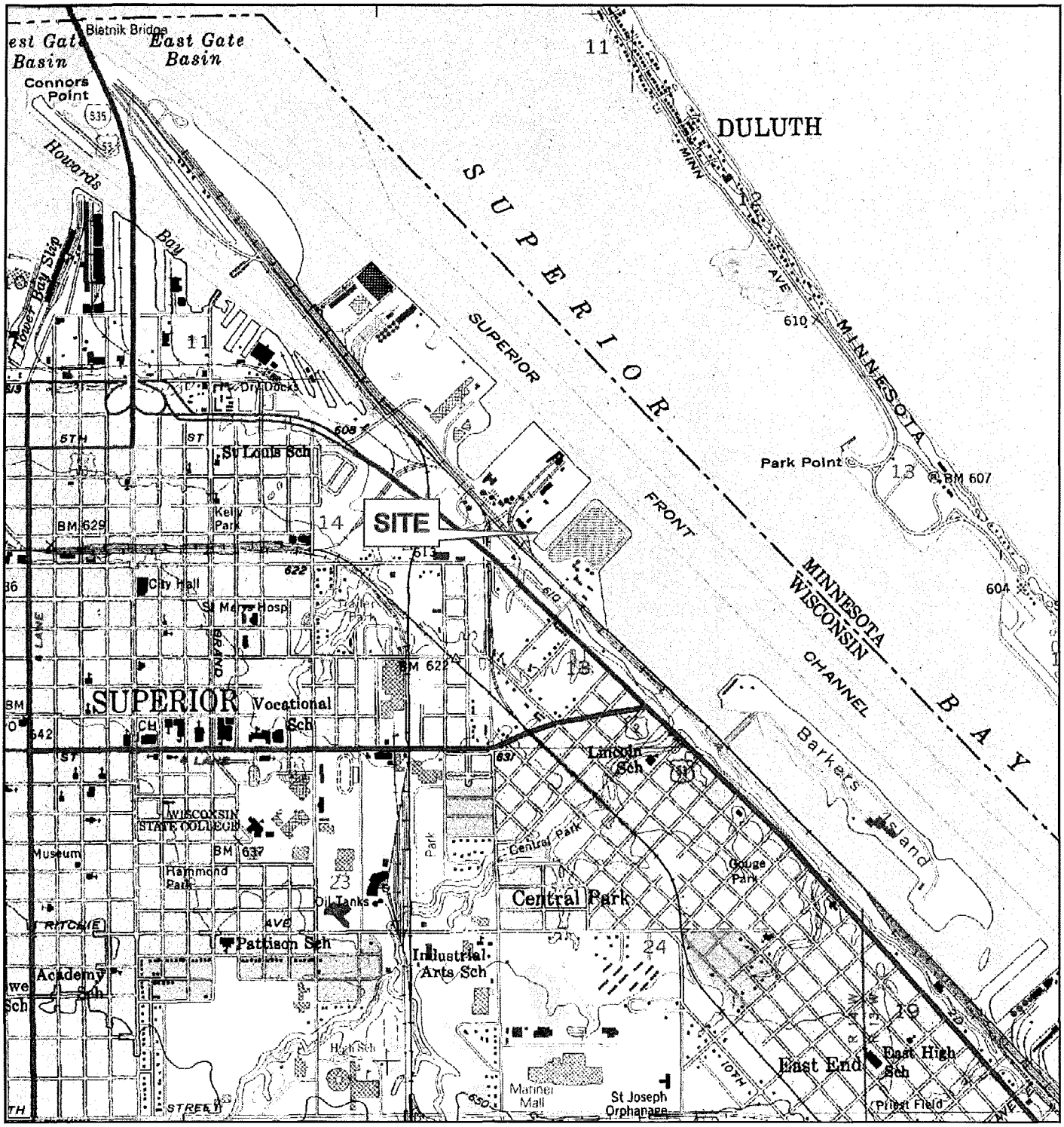
The work will be staged to allow the LIF-related screening activities to be completed and interpreted prior to boring and well installations. The fieldwork will be scheduled after appropriate access agreements are obtained from off-site property owners.

A hydraulic push rig will be mobilized first to perform the LIF survey, soil borings at wells MW3 and MW4, and install Darts in the boat slip. The LIF data will be mapped and contoured to visualize the results and select locations for the sonic borings and wells. Two rounds of groundwater monitoring are planned, with the second round following the first round by approximately 30 days.

The investigation activities at the Superior MGP are anticipated to begin September and October 2016. Laboratory results are generally provided within three weeks after sample receipt. The investigation report is anticipated to be completed within 60 days following receipt of the laboratory reports for the second groundwater monitoring round.

The anticipated overall schedule is outlined below.

Work Description	Begin Date	End Date
Investigation work plan submittal	1-May-16	5-Aug-16
Investigation work plan WDNR review & approval	5-Aug-16	15-Sep-16
Investigation field work	16-Sep-16	31-Oct-16
Groundwater monitoring - round 1	7-Nov-16	11-Nov-16
Groundwater monitoring - round 2	17-Apr-17	21-Apr-17
Investigation report	23-Apr-17	31-May-17
Remediation planning, design, and approval	2017	2018
Remediation implementation	2018	2019



Map adapted from USGS 7.5 minute topographic map(s): Superior, WI.

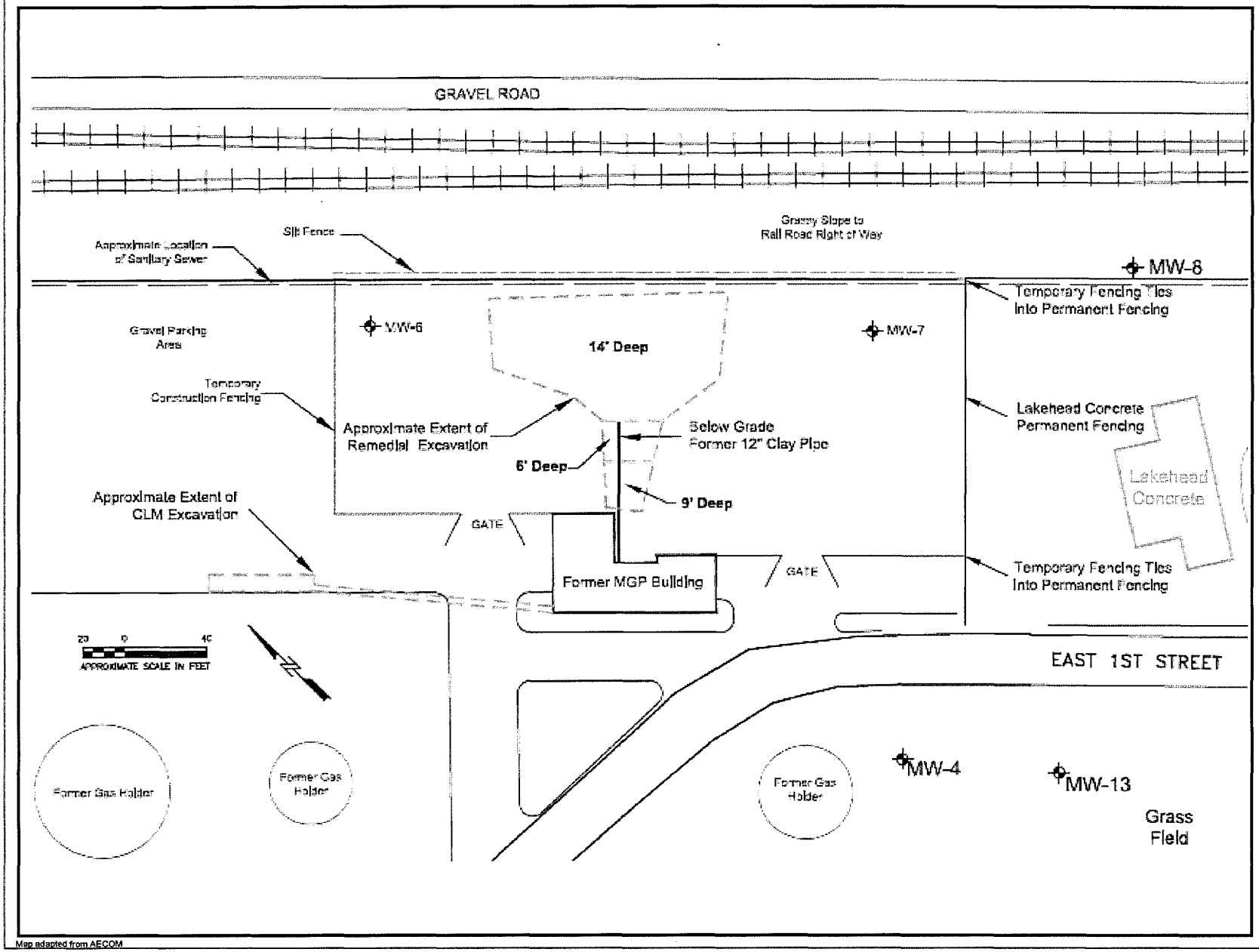
GENERAL SITE LOCATION MAP

Superior Water Light & Power MGP
Superior, Wisconsin

Summit Envirosolutions

Figure 1

File: Fig1
Summit Proj. No.: 2118-0001
Plot Date: 6/29/16
Arc Operator: KWR
Reviewed by: WMG



Map adapted from AECOM

N
W E
S

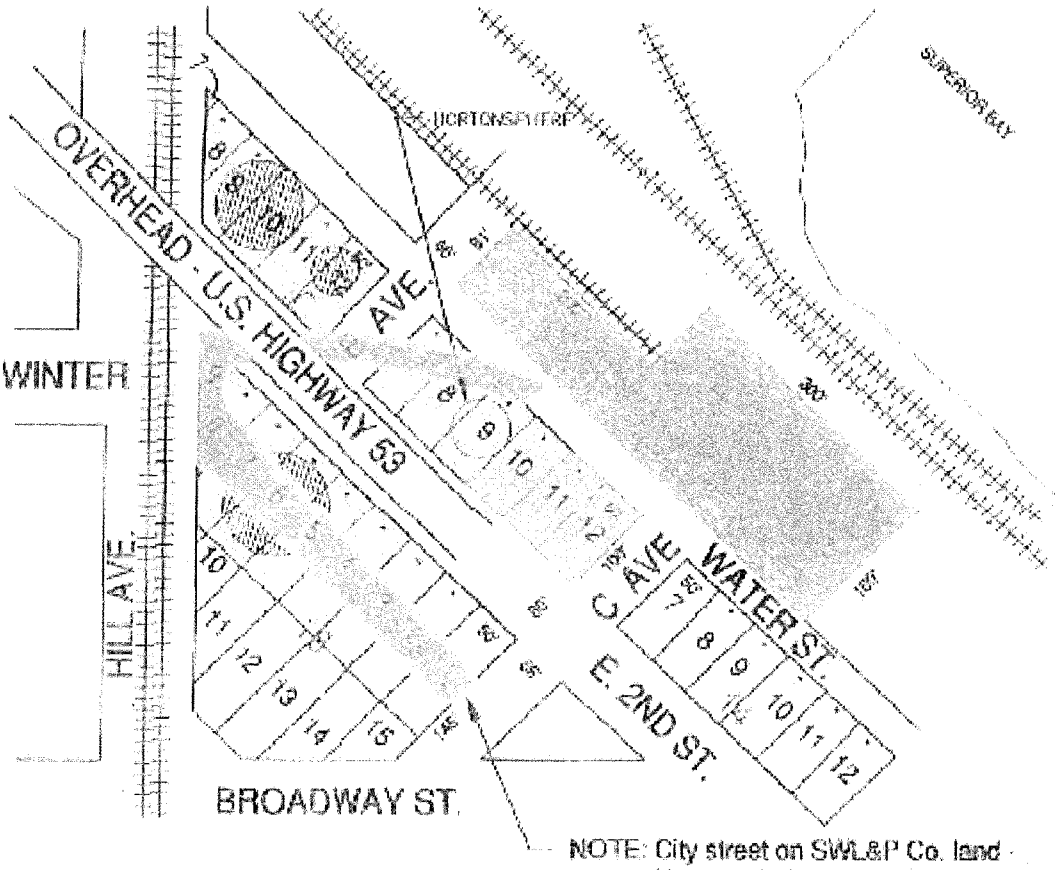
Feet
0 50 100 200
Approximate Scale

EXCAVATION AREA SITE PLAN
Superior Water Light & Power MGP
Superior, Wisconsin

Figure 2

File: 2118-0001
Summit Proj. No.: 2 118-0001
Plot Date: 6/28/16
Arc Operator: KWR
Reviewed by: WMG

Summit Envirosolutions



Map adapted from USGS 7.5 minute topographic map(s): Superior, WI.

N
W E
S

0 200 Feet
Approximate Scale

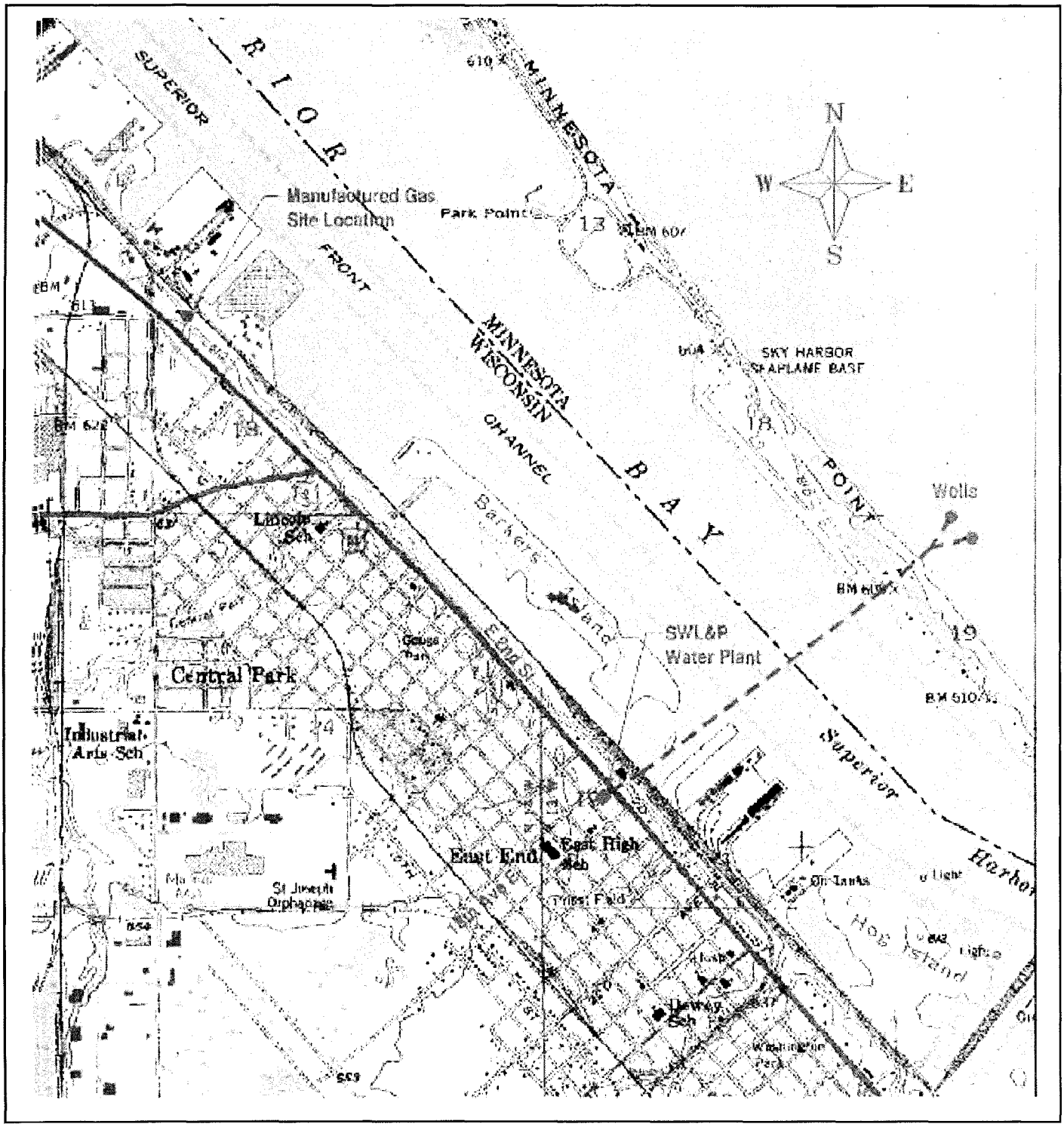
PROPERTY OWNERSHIP MAP
SUPERIOR MGP

Superior Water Light & Power MGP
Superior, Wisconsin

Summit Envirosolutions

Figure 3

File: Fig3
Summit Proj. No.: 2118-0001
Plot Date: 6/29/16
Arc Operator: KWR
Reviewed by: WMG



Map adapted from ENSR International

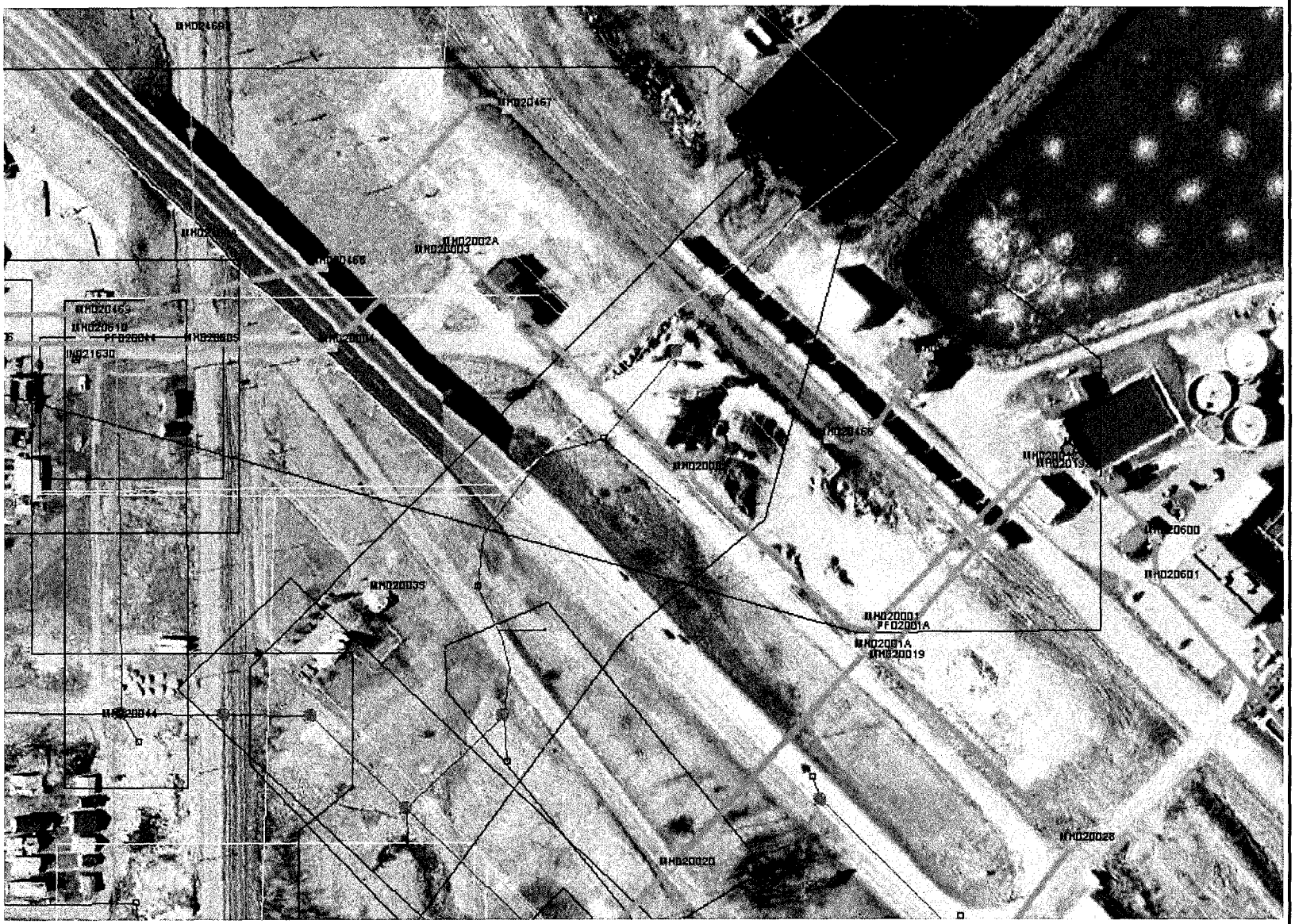
MUNICIPAL DRINKING WATER SUPPLY WELL LOCATION MAP

Superior Water Light & Power MGP
Superior, Wisconsin

Summit Envirosolutions

Figure 4

File: Fig4
Summit Proj. No.: 2118-0001
Plot Date: 6/28/16
Arc Operator: KWR
Reviewed by: WMG



Legend

-Green Lines are Sanitary Lines

-Red Lines are Storm Water Lines

N
W E
S

Feet
0 50 100 200
Approximate Scale

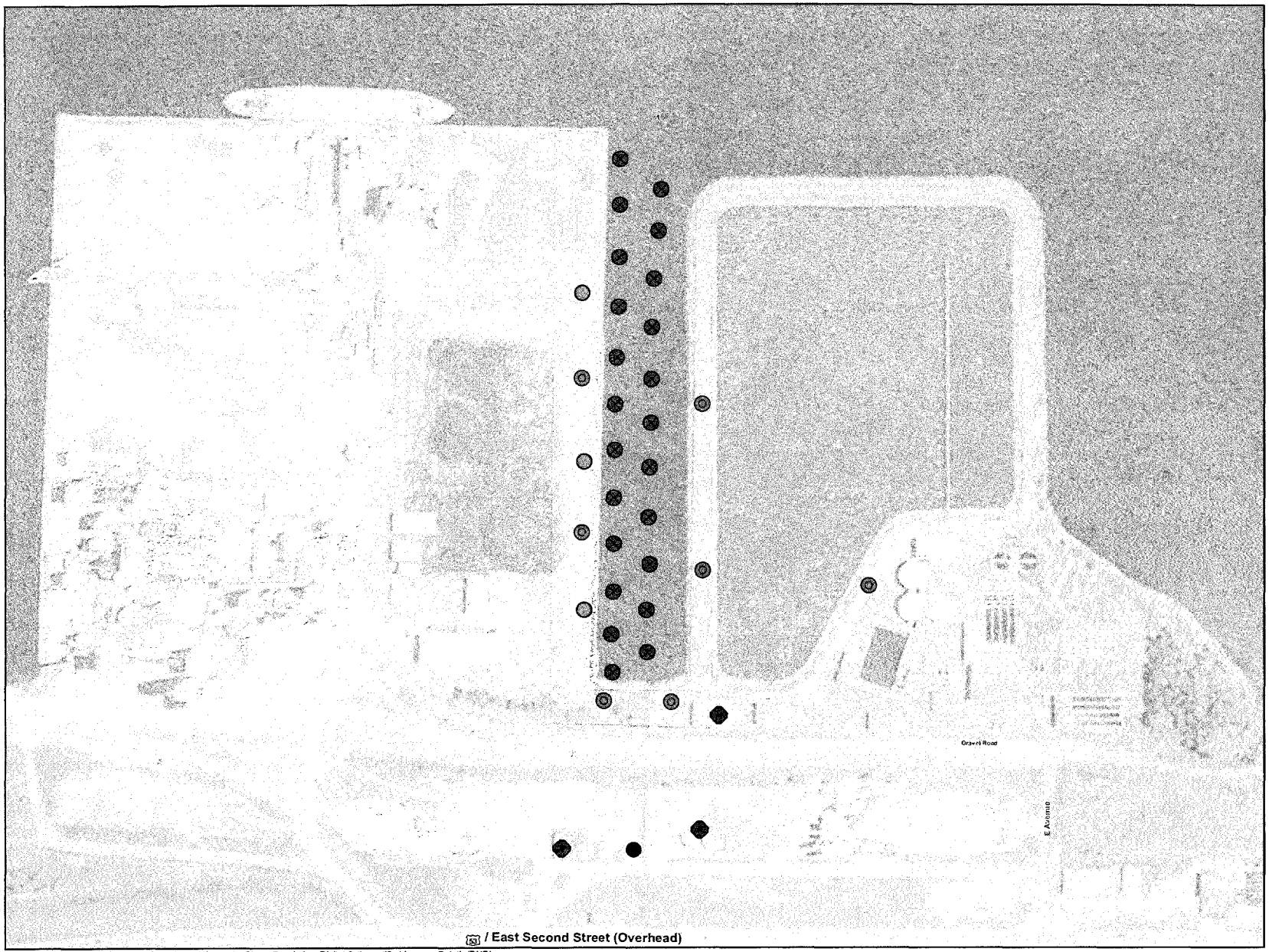
STORM AND SANITARY SEWER LINE LOCATION MAP
Superior Water Light & Power MGP
Superior, Wisconsin

Figure 5

File: 2118-0001
Summit Proj. No.: 2 118-0001
Plot Date: 6/28/16
Arc Operator: KWR
Reviewed by: WMG

Summit Envirosolutions

Map adapted from ENSR International



Map adapted from LMIC WMS:2009 Northeast Minnesota, 50-cm Resolution, Digital Orthorectified Images, Duluth (DNR)

Legend

Sample Locations

- Borings
- Sonic Borings
- Vapor Intrusion Sample
- Deep Wells
- Shallow Wells
- LIF Investigation Area

N

0 150 300 Feet

1 inch = 200 feet

Investigation Elements

Superior Water Light & Power MGP
Superior, Wisconsin

Figure 6

File: Fig6_Investigations
Summit Proj. No.: 2118-0001
Plot Date: 7/19/16
Arc Operator: KWR
Reviewed by: WMG

Summit Envirosolutions