SAMPLING AND ANALYSIS PLAN
SHALLOW SOILS PREDESIGN INVESTIGATION
FORMER THIRD WARD MANUFACTURED GAS PLANT SITE

Prepared For:

WISCONSIN GAS COMPANY
Milwaukee, Wisconsin

Prepared By:

REMEDIATION TECHNOLOGIES, INC.
St. Paul, Minnesota

RETEC Project No. 3-0887-203

APRIL 1995

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1.0 INTRODUCTION

1.1 Purpose of Document

Wisconsin Gas Company (Wisconsin Gas) has retained Remediation Technologies, Inc. (RETEC) to prepare this Sampling and Analysis Plan (SAP) for a shallow soils predesign investigation (SSPI) including demolition monitoring support, shallow soil investigation and groundwater sampling activities at the former Third Ward Manufactured Gas Plant (MGP) located in Milwaukee, Wisconsin (Site). Figure 1-1 shows the location of the Site.

The SAP provides a process for obtaining data of sufficient quality and quantity to satisfy data needs. The purpose of the SAP is to describe or identify the methods and procedures that will be used to complete the field investigation and sample analyses. The SAP identifies the number, types, and location of samples and the type of analyses to be conducted.

The sampling and analyses to be conducted during the SSPI were developed by reviewing the results of recent environmental investigation activities completed at the Site and developing a set of data requirements to allow evaluation of certain remedial actions. Recent environmental investigation activities conducted at the Site include the Phase III Environmental Site Investigation (Phase III ESI), the results of which are provided in the following documents:

- Phase III Environmental Site Investigation Report Former Third Ward Manufactured Gas Plant Site, April 1993 (Phase III ESI Report); and
- Addendum No.1 - Phase III Environmental Site Investigation Report Former Third Ward Manufactured Gas Plant Site - River Sediment Sampling Report, June 1994 (Addendum to Phase III ESI Report).

Wisconsin Gas has submitted the above documents to the Wisconsin Department of Natural Resources (WDNR).

The primary components of the SSPI are:

- demolition monitoring;
- shallow soil investigation; and

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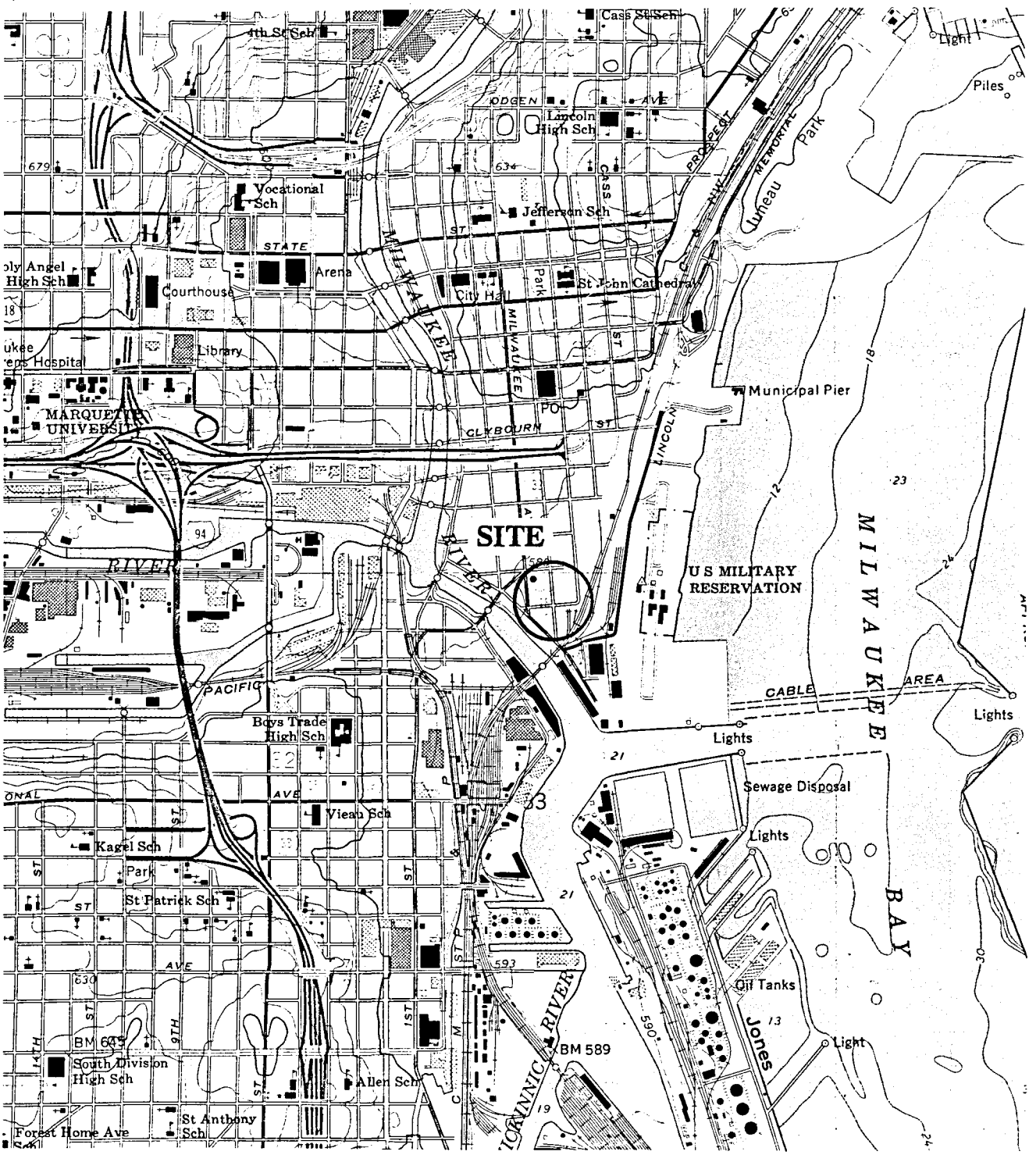


SOURCE: MILWAUKEE 7-1/2 MINUTE TOPOGRAPHIC QUADRANGLE

SCALE 1 inch = 2,000 feet

THIRD WARD MGP SITE
SITE LOCATION MAP

FIGURE 1-1

- groundwater sampling.

During the Phase III ESI, a Quality Assurance Project Plan (QAPP) was prepared. The QAPP describes the protocols for sampling, field monitoring and laboratory analyses to be followed to ensure that the data generated during the Phase III ESI are valid and will be useful in achieving the project objectives. The field monitoring and laboratory analyses to be conducted during the SSPI will adhere to the protocols outlined in the QAPP.

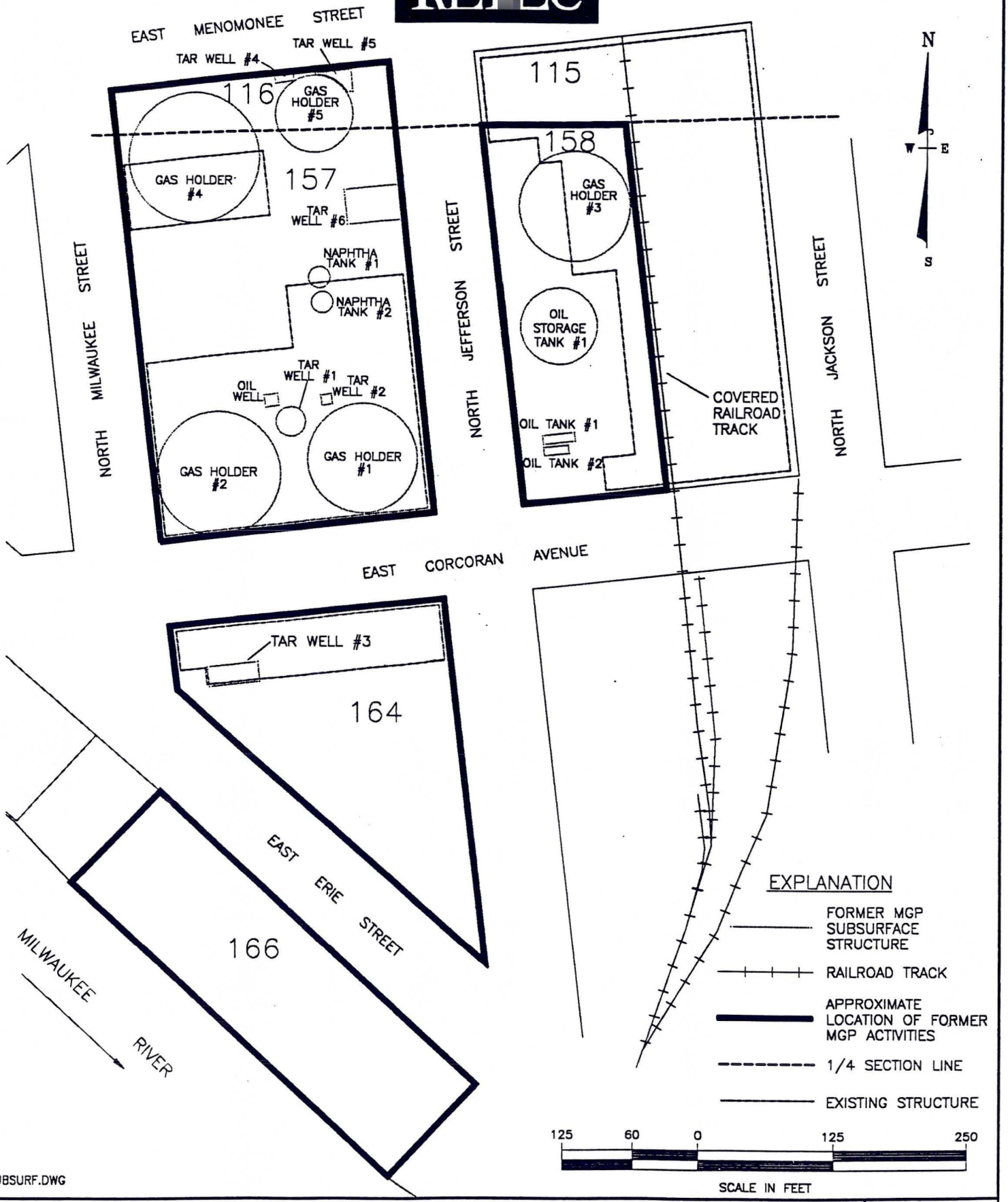
All field investigation activities will be completed according to the Site Specific Health and Safety Plan (HASP) for the Site. The HASP addresses the potential hazards at the Site and the protocols to be used by field workers to prevent or mitigate potential hazards.

1.2 Document Organization

Section 1.0 of the SAP provides an introduction and certain background information for the Site. Section 2.0 describes the scope of the SSPI including the specific objectives and the scoping of the field and laboratory investigation. The field and laboratory methods are described in detail in Section 3.0. Section 4.0 provides a proposed schedule for the SSPI.

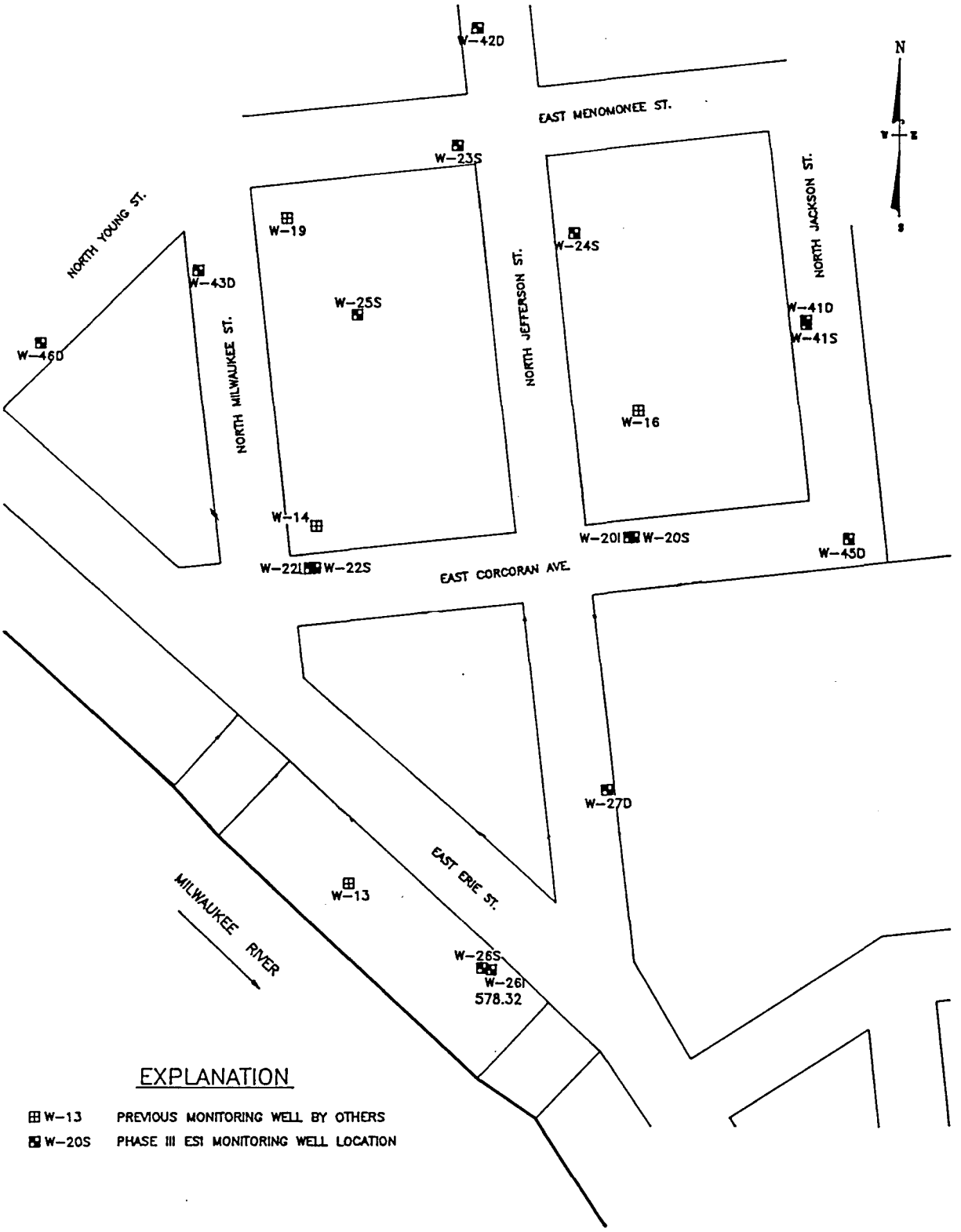
1.3 Site Background

Gas was made at the former Third Ward MGP from the 1850s to the 1950s. The methods used to manufacture gas evolved over the life of the plant and involved three different gas manufacturing processes. The three MGP processes used coal, coke and oil, and oil as feedstocks. The MGP operations were conducted on land comprising an area of approximately 5.5 acres. All of the land on which the MGP was formerly located was sold to other parties after the decommissioning and demolition of facilities in 1959. A more detailed summary of the MGP and post-MGP history of the Site is provided in the Phase III ESI Report. Figure 1-2 shows the locations of selected former MGP structures at the Site. These structures are shown in relation to the current configuration of the Site. Figure 1-3 shows the location of the existing monitoring wells at the Site.



SELECTED FORMER MGP STRUCTURES AND BLOCK DESIGNATIONS

FIGURE 1-2



EXISTING MONITORING WELL NETWORK

REMEDIATION TECHNOLOGIES INC

DRAWN BY	DATE	CHECKED BY	DATE	SCALE	DRAWING NUMBER	REV
R.K.K.				1"=175'	FIGURE 1-3	

2.0 SCOPE OF THE SHALLOW SOILS PREDESIGN INVESTIGATION

2.1 Objectives

The overall objectives of the SSPI are as follows:

- provide data to support the demolition of building foundations on Block 158 (City Property);
- evaluate extent of impacted soils in the unsaturated zone on Blocks 116 and 157 (Peters=Johnson Property) and on the City Property;
- collect data for input to the evaluation of impacted soil management options; and
- provide additional data for groundwater and non-aqueous phase liquids (NAPL).

2.2 Data Gathering Activities

The following describes the data gathering activities for the SSPI:

- complete soil borings and collect soil samples for field screening, field analysis and laboratory analyses;
- conduct test trenching and collect soil samples for field screening, field analysis and laboratory analyses;
- conduct two more rounds of groundwater sampling at the Site;
- collect NAPL samples for physical characterization and perform NAPL recovery test; and
- collect samples for RCRA characterization and remediation parameter analyses.

In general, the scope of the SSPI includes the completion of approximately 15 soil borings, approximately 12 test trenches, and the collection of soil and groundwater samples for field and/or laboratory analyses. The exact locations of the proposed soil borings and test

trenches will be determined in the field prior to the initiation of field activities and after utility clearance activities have been completed. Section 3.0 of this SAP provides a detailed description of the field activities that will be performed during the SSPI.

2.3 Parameters of Interest

The parameters that will be evaluated during the SSPI were selected based upon the results of the Phase III ESI and upon the data required to address the objectives as described in Section 2.1. Both field analyses and laboratory analyses will be completed during the SSPI. A detailed description of the analytical program to be completed during the SSPI is provided in Section 3.0 of this SAP.

2.4 Data Quality Objectives

This section of the SAP identifies the uses of data collected during the field activities and the analytical levels needed to provide data of sufficient quality to meet the project objectives. The specific analytical levels are associated with data quality objectives (DQOs). DQOs are qualitative and quantitative statements which specify the quality of data required to support decisions during response activities. DQOs are based on the concept that different uses of data may require different data quality. Table 2-1 is a summary of the DQOs and descriptions of the associated testing to be performed. The following sections provide a summary of the analytical levels to be utilized during the course of the field activities.

2.4.1 Field Screening Data

Screening data will be used for the purposes of health and safety monitoring and preliminary media characterization efforts during the field activities. Field screening data is consistent with Analytical Level I, which provides the least stringent overall data quality and the most rapid results. For the purposes of the SSPI, the field screening includes air monitoring, headspace analyses of soil samples, and the measurement of field parameters in groundwater.

Air monitoring will be performed using a photoionization detector (PID). The HASP provides discussion of personal protective equipment (PPE) and response actions to be taken in response to certain levels of PID readings in the breathing zone.

TABLE 2-1
DATA QUALITY OBJECTIVES

ANALYTICAL LEVEL	AIR	SOIL	GROUNDWATER
Level I - Field Screening	Air screening will be performed for health and safety proposes using a PID in accordance with the HASP.	Soil screening will be performed on soil samples using a PID to identify potential impacted soil.	Groundwater screening will consist of pH, temperature, specific conductance, and dissolved oxygen.
Level I - Field Analysis	Not Applicable	Immunoassay field analysis will be performed for total PAHs on selected soil samples. Selected samples subjected to field analysis will be submitted for laboratory analysis.	Not Applicable
Level III - Laboratory Analysis	Not Applicable	Selected soil samples will be analyzed for PAHs, BTEX and cyanide.	All monitoring wells will be sampled and analyzed for PAHs, BTEX, and cyanide.

Field screening of soil samples will be performed to support the identification of samples submitted for field and laboratory analyses. Field screening will consist of visual characterization and the completion of jar headspace screening using a PID.

Field screening of groundwater will consist of measuring the field parameters of the pH, temperature, specific conductance and dissolved oxygen (DO). Among other uses, these data will be used to determine groundwater stability in the monitoring well prior to groundwater sample collection. These field tests help confirm that the sample being collected is representative of the groundwater from the surrounding formation.

2.4.2 Field Analysis

Field analysis data is also consistent with Analytical Level I. The field analysis includes the evaluation of selected soil samples for PAH compounds. Immunoassay test kits will be used to conduct the field analysis of selected soil samples. Field analyses will be conducted to support the identification of impacted soil and aid in the selection of soil samples to be submitted for laboratory analyses. The field analysis sample collection criteria for each of the data gathering activities are described in Section 3.0 of this SAP.

2.4.3 Laboratory Analysis

Laboratory analysis data is consistent with Analytical Level III. For the purposes of the SSPI, Analytical Level III will be used for the analyses of soil and groundwater samples to confirm the soil and groundwater conditions. The laboratory analysis sample collection criteria for each of the data gathering activities are described in Section 3.0 of this SAP.

3.0 FIELD AND LABORATORY METHODS

The field methods and procedures are described in the following subsections. Field procedures used during the SSPI will be in accordance with RETEC Standard Operating Procedures (SOPs) which are provided in the QAPP, however, Wisconsin rules will be followed, where applicable.

3.1 Mobilization and Residuals Management

RETEC, and its subcontractors, will mobilize field supplies, excavation and drilling equipment to the Site and will establish an operations base for the field activities. The operations base area will be established on the Peters=Johnson Property and will be used for equipment, material and investigation residuals storage as well as for the location of decontamination facilities.

RETEC will temporarily containerize all water/decontamination fluids generated during the SSPI. Residual fluids will be containerized in plastic tanks or in 55-gallon drums. After the completion of the field activities, residual fluids will be characterized and then discharged to the Milwaukee publicly owned treatment works (POTW).

Soil boring activities are to be completed only on the City Property. Drill cuttings generated on the City Property will be placed on the ground surface of the City Property if field observations and field analyses indicate that the soil is not impacted. Drill cuttings found to be impacted based upon field observations and field analysis will be containerized in 55-gallon drums and the drums will staged at the operations base.

Soil excavated during test trenching activities will be placed back into the trenches. Any residual soil generated during the test trenching activities completed on the Peters=Johnson Property that cannot be placed back into the trenches, due to the expansion of the soil volume, will be stockpiled in the operations base area. Residual soil generated during the test trenching activities completed on the City Property that cannot be placed back into the trenches, due to the expansion of the soil volume, will be placed on the ground surface of the City Property for subsequent management to be determined based upon the characteristics of the material and available treatment/disposal options.

3.2 Soil Borings

3.2.1 Soil Boring Procedures

As part of the demolition monitoring activities, approximately 15 soil borings will be completed on the City Property. The actual number of borings completed may vary depending on Site conditions. The exact locations of the soil borings will be determined in the field and will be based upon the location of above ground and underground utilities and will also be based upon the data requirements for the on-going demolition activities.

Soil borings will be advanced using hollow stem auger techniques. A 2-foot long, 3-inch diameter split spoon sampler, will be used for the continuous collection of soil samples and soil logging during the advancement of borings. All soil samples retrieved from the soil borings will be subjected to field screening using a PID equipped with an 11.7 eV lamp and the jar headspace technique. Field inspection of the soil boring activities will be conducted by RETEC geologists during the entire drilling program.

Field notes will be maintained by RETEC in water resistant notebooks and lithologic logs will be developed during the drilling operation. During the drilling, detailed notes will be kept regarding conditions indicating the presence of stained soils and oily films encountered in soils and water. Soil samples will be described and logged using the Unified Soil Classification System (USCS) and the Munsell Color Classification System. WDNR soil boring log forms will be completed for each of the soil borings. Upon completion of a boring, it will abandoned in accordance with applicable Wisconsin regulations. A WDNR boring abandonment form will be completed for each of the soil borings.

Twelve of the soil borings will be completed to a depth of approximately 10 feet below the ground surface and three of the soil borings will be completed to depths of approximately 30 feet below the ground surface.

Field observations will be made during the soil borings to identify the existence of low permeability units beneath the Site. Before soil borings are advanced through a low permeability unit, a field decision will be made as to the level of impact in the materials above the low permeability unit. If no field indications of impacts are observed above the low permeability unit, then the boring may be advanced through the unit. However, if certain impacts are observed above a low permeability unit, the boring will be terminated or a surficial casing will be installed prior to the advancement of the boring through the low permeability unit.

During the drilling, ambient air monitoring will be conducted for health and safety purposes. For this project, air monitoring will be conducted intermittently with a PID as required by the HASP. The drilling services will be provided by a driller licensed in the state of Wisconsin.

3.2.2 Soil Boring Sample Collection Methods

A portion of each soil sample retrieved from each split spoon sample will be placed in glass sample jars, provided by the analytical laboratory. These samples will be placed into a cooler, which contains ice, until selected samples are chosen for field and/or laboratory analyses.

Certain field quality assurance/quality control (QA/QC) samples will be collected during the soil boring program. These QA/QC samples include one duplicate sample for every ten soil samples submitted for laboratory analyses, one equipment rinse blank for each type of sample collection equipment used (i.e., stainless steel spoons, split spoons, etc.), and one trip blank for the cooler containing samples for benzene, toluene, ethylbenzene and xylenes (BTEX) analyses.

3.2.3 Soil Boring Sample Analyses

As indicated in Table 3-1, approximately 15 soil samples collected during the soil boring program (i.e., one sample from each boring) will be subjected to field analysis using an immunoassay test method. The immunoassay method which RETEC will use is the ENSYS PAH RISC ™ method for total Polycyclic Aromatic Hydrocarbons (PAHs). The samples subjected to field analysis will be collected from the interval within the soil boring which exhibits impacts based upon field screening results. If no impacts are observed, the sample submitted for field analysis will be collected at or near the water table.

As indicated in Table 3-1, approximately three soil samples collected during the soil boring program will be submitted for laboratory analyses. These samples will be analyzed for PAHs, BTEX and total cyanide. All three of the samples submitted for laboratory analyses will be collected from the unsaturated zone and at least one of these samples will be co-located with a sample subjected to field analysis so as to verify the results of the field analysis. Laboratory analyses will be completed by a laboratory certified in the state of Wisconsin.

TABLE 3–1
SUMMARY OF SOIL ANALYSES
SSPI – THIRD WARD MGP SITE

FIELD ACTIVITY	PAHs (Method 8310)	BTEX (Method 8020)	TOTAL CYANIDE (Method 9010)	RCRA CHARACTERIZATION[1] (various methods)	REMEDIATION PARAMETERS[3] (various methods)	FIELD IMMUNOASSAY ANALYSIS[4]
Soil Boring Program	3	3	3	0	0	15
Test Trenching Program	10	10	10	10[2]	5[2]	30
Field QA Samples						
–Trip Blanks	0	2	0	0	0	0
–Equipment Blanks	2	2	2	0	0	0
–Duplicates	1	1	1	0	0	0
Total Analyses	16	18	16	10	5	45

(1) Ignitibility, Corrosivity, Reactivity, TCLP VOC, TCLP SVOC and TCLP Metals

(2) Composite Samples

(3) Remediation Parameters Include: Total Extractable Hydrocarbons, Alkali, Silica Oxide, Aluminum Oxide, Selected Metals, Total Organic Carbon, Moisture Content, Bulk Density, Grain Size Distribution

(4) Method 4035

3.3 Test Trenching

3.3.1 Test Trenching Procedures

A total of approximately 12 test trenches will be completed on the City Property and on the Peters=Johnson Property during the SSPI. The actual number of trenches completed may vary depending on Site conditions. The exact locations of the test trenches will be determined in the field and will be based upon the location of above ground and underground utilities and structures.

Trenches will be completed using a tire-mounted backhoe. If pavement needs to be broken, a hydraulic hammer attached to the backhoe or a jack-hammer will be used, as needed to penetrate the pavement. Trenches will be completed to depths of between 4 to 7 feet below the ground surface. Trenches completed within the limits of former subsurface structures may be extended deeper if Site conditions warrant. During trenching, excavated soil will be placed on the ground surface, no closer than two feet from the excavation.

Field inspection of the trenching operation will be conducted by a RETEC geologist. Field notes will be maintained in water resistant notebooks and test trench diagrams will be developed during the trenching operation. During the trenching, detailed notes will be kept regarding conditions indicating the presence of stained soils and oily films encountered in soils and water. Soil samples will be described and logged using the USCS and the Munsell Color Classification System.

After the test trenches have been completed, soil removed from each of the trenches will be placed back into the associated trench. The trenches completed on the Peters=Johnson Property will be backfilled with excavated materials to a depth of three feet below ground surface with periodic compaction using the backhoe bucket. Backfilling above the three foot depth will be conducted in approximately 1-foot lifts. Compaction above the three foot depth will be completed with a tamping unit. The surface of the test trenches will be covered with 6-inches of gravel imported to the Site. Some of the trenches will be patched with asphalt. Because demolition activities are on-going at the City Property, the trenches completed on the City Property may not be compacted during backfilling.

During the trenching activities, ambient air monitoring will be conducted for health and safety purposes. Air monitoring will be conducted intermittently with a PID as required by the

HASP. Site workers will not be permitted to enter any trench for any reason if the trench is greater than three feet in depth.

3.3.2 Test Trenching Sample Collection Methods

During trenching activities soil samples will be collected at approximately 20-foot intervals along the length of the trenches. If field conditions warrant, other soil samples may be collected. These samples will be used for classification purposes and selected samples will be subjected to field screening, field analysis and laboratory analyses. Approximately 10 composite soil samples will be formed from the trench samples.

A portion of each soil sample retrieved from the test trenches will be placed in glass sample jars, provided by the analytical laboratory. These samples will be placed into a cooler, which contains ice, until selected samples are chosen for field and/or laboratory analyses.

Certain field QA/QC samples will be collected during the test trenching program. These QA/QC samples include one duplicate sample for every ten soil samples submitted for laboratory analyses, one equipment rinse blank for each type of sample collection equipment used (i.e., stainless steel spoons, split spoons, etc.), and one trip blank for each cooler containing samples for BTEX.

3.3.3 Test Trench Sample Analyses

As indicated in Table 3-1, approximately 30 soil samples collected during the test trenching program will be subjected to field analysis using an immunoassay test method. The immunoassay method which RETEC will use is the ENSYS PAH RISC ™ method for total PAHs. Each sample subjected to field analysis will be collected from an area determined to be representative of certain environmental conditions within the unsaturated zone or within a subsurface structure. The samples subjected to field analysis will also be selected to provide an adequate areal coverage of data points.

As indicated in Table 3-1, approximately 10 discrete soil samples collected during the test trenching program will be submitted for laboratory analyses. These samples will be analyzed for PAHs, BTEX and total cyanide. Approximately four of these samples will be collected from within the limits of subsurface structures and the remainder will be collected from the unsaturated zone of the Peters=Johnson and City Property. Most of the samples submitted

for PAH, BTEX and cyanide analyses will be co-located with a sample subjected to field analysis so as to verify the results of the field analysis.

As indicated in Table 3-1, approximately 10 composite soil samples collected during the test trenching program will be submitted for hazardous waste characterization analyses. The composites will be created to provide samples representative of certain site features (e.g., within unsaturated portion of structures or areas of visible impacts). At least three of the composite samples for hazardous waste characterization analyses will be formed from samples collected on the City Property.

As indicated in Table 3-1, approximately 5 composite soil samples collected during the test trenching program will be submitted for the analyses of a group of remediation parameters. The composites will be created to provide samples representative of certain site features (e.g., within unsaturated portion of structures or areas where visible impacts exist outside of structures). At least two of the composite samples for remediation parameter analyses will be created from samples collected on the City Property.

The exact determination of where samples will be collected, and the selection of samples for discrete and composite analyses will be accomplished in the field before the start of excavation activities, during excavation activities and after excavation activities are completed. Sufficient samples will be collected so that laboratory samples can be selected after the review of field screening and field analysis results. Laboratory analyses will be completed by a laboratory certified in the state of Wisconsin.

3.4 Groundwater Sampling

3.4.1 Monitoring Well Inspection

Prior to conducting groundwater sampling activities at the Site, an inspection will be conducted to determine the condition of the wells at the Site. Well repairs will be made, as appropriate, based upon the results of the inspection.

3.4.2 Groundwater Sample Collection Methods

Groundwater sampling will be conducted at the Site during the SSPI. The sixteen monitoring wells installed during the Phase III ESI will be sampled along with four of the wells installed prior to the Phase III ESI. Two of the previously installed wells to be sampled (i.e., wells W-19 and W-14) were not sampled during the Phase III ESI. These wells are completed within the limits of subsurface structures. Monitoring well W-19 is completed within the subsurface portion of a former gas holder. Well W-14 is also completed within the subsurface portion of a former gas holder.

Prior to sampling, water level and total depth measurements will be recorded for all monitoring wells as described in the QAPP. If found to be necessary, selected monitoring wells may be checked with an interface probe, or other measurement devices, to determine the possible presence and thickness of NAPL. As part of the Site-wide water level measurement activities, measurements will be collected of the water surface of Milwaukee River at two surveyed locations.

In order to obtain a representative sample, standing water in each well will be purged using a low-flow pump. The field parameters of temperature, conductivity, pH and dissolved oxygen will be measured during well purging using portable field instruments. These measurements will be recorded on a groundwater sampling form. Wells which yield water continuously during purging will be considered sufficiently purged when at least three well volumes of water have been removed and when the field parameters have stabilized, or when up to five well volumes of water have been removed. The stabilization of field parameters is defined as a change of 10 percent or less from the previous reading of a field parameter. Wells evacuated completely during purging will be allowed to recharge prior to sampling.

Groundwater samples, except those for BTEX analyses, will be collected using a low flow pump. Samples for BTEX analyses will be collected with a disposable polyethylene bailer after the tubing for the low-flow pump is removed from the well. During the sample collection, care will be taken to minimize groundwater agitation and sediment entrainment. Samples collected for PAH, and cyanide analyses will be filtered in the field using an in-line 0.45 micron filter. All pump tubing, filters and bailers will be discarded between wells to ensure sample quality.

Certain field QA/QC samples will be collected during the groundwater sampling program. These QA/QC samples include one duplicate sample for every ten groundwater

samples submitted for laboratory analyses, one equipment rinse blank sample and one trip blank for each cooler containing samples for BTEX.

3.4.3 Groundwater Sample Analyses

Groundwater samples collected will be submitted for chemical analysis of the parameters as shown in Table 3-2. As is indicated in Table 3-2, selected groundwater samples will be submitted for nutrient and microbial enumeration analyses. These samples may be discrete samples or they may be composite samples.

3.5 NAPL Characterization

Selected NAPL characterization activities will be conducted at the Site during the SSPI. These NAPL characterization activities will be conducted for NAPL in at least one well at the Site (e.g., W-20I, W-43D or W-16). NAPL characterization activities will be conducted as follows:

- measure the thickness of NAPL in the well;
- collect samples of the NAPL for physical characterization analyses including viscosity, density and interfacial tension analyses; and
- perform a preliminary NAPL recovery test by pumping the NAPL with a peristaltic pump and monitoring the response of the water/NAPL interface and monitoring the volume of NAPL recovered over time.

NAPL pumped from the wells during the NAPL recovery test will be containerized in drums and will be temporarily stored in the operations base area. Containerized NAPL will be managed subsequently based upon the characteristics of the material and available treatment/disposal options

3.6 Sample Handling Procedures

Personnel participating in the sampling activities will have training and experience in proper sampling procedures and will be briefed on the objectives and types of documentation necessary for this particular sampling activity. Record keeping for the sampling activities will

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TABLE 3–2
SUMMARY OF GROUNDWATER ANALYSES
SSPI – THIRD WARD MGP SITE

SAMPLING ACTIVITY	PAH (8310)	BTEX (8020)	TOTAL CYANIDE (9010)	WEAK ACID DISSOCIABLE CYANIDE[1] (9010)	NAPL[2] CHARACTERISTICS	NUTRIENTS AND MICROBIAL ENUMERATIONS
1995 Round	20	20	20	20	2	10
Field QA Analyses						
–Trip Blanks	0	3	0	0	0	0
–Equipment Blanks	1	1	1	1	0	0
–Duplicates	2	2	2	2	0	0
Total	23	26	23	23	2	10

(1) Weak acid dissociable cyanide, will only be run if total cyanide is detected

(2) Includes density, viscosity, and interfacial tension

involve the collection of notes in dedicated field logbooks or on appropriate field forms. In addition, a photographic record will be kept of certain sampling activities. Chain-of-custody forms will be maintained for all samples collected and will be included as part of the laboratory data package. All original forms, data, and other documentation will be placed in the project files.

The sample handling procedures are described in the following sections. These procedures will be used to ensure quality control during the field work.

3.6.1 Sample Containers and Preservation

The sample containers will be supplied by the analytical laboratory and will be prepared by the laboratory or by qualified field personnel with the appropriate preservatives according to standard EPA sampling methods. Samples will be placed in the appropriate containers, as defined by the analytical methods, at the time of sample collection and will be placed in a cooler, which contains ice, while in the field.

3.6.2 Sample Identification

Each sample container will be clearly labeled with labels affixed to the sample container using clear waterproof tape. At a minimum, each label will contain the following information:

- Site name;
- date and time of collection;
- sample identification number;
- sample location;
- parameter(s) requested; and
- initials of collector.

3.6.3 Sample Transportation and Chain-of-Custody

A chain-of-custody form will accompany the samples, enclosed in a waterproof plastic bag inside the cooler, for shipment to the analytical laboratory. Chain-of-custody procedures are described in detail in the QAPP. Each cooler will contain sufficient ice to ensure that proper

temperature is maintained and will be packed in a manner to prevent damage to sample bottles during shipment. Samples will be shipped to the selected analytical laboratory by overnight express mail for delivery the following day. The shipping will be conducted in accordance with applicable U.S. Department of Transportation regulations and commercial carrier procedures.

3.7 Decontamination

Sampling equipment will be decontaminated prior to each use. Down-hole drilling tools and, as necessary, the drill rig will be decontaminated by steam cleaning prior to beginning work and between each soil boring. In general, decontamination of sampling equipment will consist of the following activities:

- remove gross contamination;
- alconox solution wash;
- distilled water rinse;
- citrikleen solution wash (if needed); and
- distilled water rinse.

Decontamination methods may be modified based upon field conditions.

3.8 Surveying

After completion of the field activities, the soil borings, the endpoints of the test trenches and the locations of the test trench samples will be surveyed. The vertical and horizontal position of each of the soil borings and test trench endpoints will be measured. Vertical measurements will be made to the nearest 0.01 foot and horizontal measurements will be made to the nearest one foot.

4.0 FIELD INVESTIGATION SCHEDULE

The following is a generalized description of the proposed schedule for the field activities. This schedule may be changed due to conditions encountered at the Site, weather, or other factors. The schedule is a guide for the general order in which activities will be conducted during the field investigation. Modifications to the order may also occur, if conditions warrant.

Day 1

- site safety and project meeting;
- complete utility clearances;
- inspect existing monitoring wells and identify if repairs are needed;
- mark locations of proposed soil boring locations;
- mark locations of proposed test trenches; and
- construct decontamination area and set up operations base.

Day 2

- site safety and project meeting;
- begin soil boring activities;
- begin field screening and field analysis activities; and
- conduct well repair activities, if needed.

Day 3

- site safety and project meeting;
- continue drilling activities;
- begin test trenching activities; and
- continue field screening and field analysis activities.

Day 4

- site safety and project meeting; and
- complete drilling activities;
- continue test trenching activities; and
- continue field screening and field analysis activities.

Day 5

- site safety and project meeting;
- complete test trenching activities;
- complete field screening and field analysis activities; and
- collect complete round of groundwater/river level measurements.

Days 6 through 8

- site safety and project meeting;
- management and staging of investigation residuals; and
- demobilize drilling and test trenching subcontractors; and
- begin groundwater sampling.

Day 9

- site safety and project meeting;
- complete groundwater sampling;
- conduct NAPL characterization activities; and
- demobilize.