Natural
Resource
Technology, Inc.

N R T

WORK PLAN

PHASE II ENVIRONMENTAL INVESTIGATIONS
MANUFACTURED GAS PLANT SITES

GREEN BAY - SHEBOYGAN I - TWO RIVERS
WISCONSIN

Project No: 1043

Prepared for:

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EXECUTIVE SUMMARY

This work plan has been prepared by Natural Resource Technology, Inc. (NRT) for Wisconsin Public Service Corporation (WPSC) in support of Phase II Environmental Investigations to be conducted at the Green Bay, Sheboygan I and Two Rivers Former Manufactured Gas Plants (MGPs).

The work plan is part of WPSC's overall program for long term management of seven MGP sites. The program has included: completion of Phase I investigations at all sites to determine the presence or absence of environmental impairment; and completion of Phase II investigations at the Stevens Point and Oshkosh MGP sites to evaluate the extent and magnitude of impacts. This work plan is for Phase II investigations at three MGP sites which will be conducted concurrently in 1994.

The MGP facilities used coal as a feedstock to manufacture gas used for lighting and heating as well as producing by-products which served as feedstocks for other chemical manufacturing operations. The Green Bay MGP operated from 1871 to 1947; Sheboygan I from 1923 to 1947; and Two Rivers from 1925 to 1946. All three sites are presently owned by WPSC.

A Phase I investigation was conducted at the sites in 1985 to determine the presence or absence of MGP related chemical constituents at the sites. Media investigated included surface soils, ground water, and air. Ground water and soils at portions of all three sites exhibited impacts which may be related to the MGP operations at the facilities.

The Phase II investigation objective will expand on the results of the previous investigations and evaluate the extent and magnitude of the impacts observed during Phase I. Phase II will also complete a preliminary evaluation of remedial alternatives. To meet this objective the studies proposed in this work plan will:

- Evaluate the aerial extent of soil impacts on the former MGP property, and quantify volumes of impacted soil;
- Evaluate the potential for impacts associated with the former MGP structures;
- Define the characteristics of any source material encountered during the investigation;
- Confirm directions of ground-water flow and evaluate aquifer parameters;
- Evaluate the presence or absence of impacted ground water above NR140 standards downgradient of sources attributable to former MGP operations;

- Evaluate the presence or absence of MGP related ground-water impacts at depth in the aquifer;
- Verify that surface water and sediments are not being impacted; and
- Perform a preliminary evaluation of remedial alternatives.

A field investigation will be performed at each site which will include (depending on the site): test pits, soil borings, monitoring wells, HydroPunch™ samples, sediment and surface soil samples, and surface water samples. Following completion of field activities, laboratory analysis, and data review, a site investigation report will be prepared and submitted to the Wisconsin Department of Natural Resources (WDNR).

The project duration will be 26 weeks from WDNR approval of the work plan.

1.0 INTRODUCTION

1.1 Overview

Natural Resource Technology, Inc. (NRT) has been retained by Wisconsin Public Service Corporation (WPSC) to prepare this work plan to complete Phase II Site Investigations at the Green Bay, Sheboygan I and Two Rivers Former Manufactured Gas Plants (MGPs). This work plan is part of WPSC's overall program for long term management of seven MGP sites. The program includes several phases of evaluation for each site as follows:

- Phase I: Determine the presence or absence of environmental impairment at each site.
- Phase II: Evaluate the magnitude and extent of impacts and preliminarily identify remedial action alternatives.
- Phase III: Identify and collect data needed for engineering design and conduct feasibility analysis for remedy selection.
- Phase IV: Remedial Action.

The Current status of each of the MGP sites is as follows

Site Location	Phase I	Phase II
Green Bay	Completed	Work Plan Submitted
Marinette	In Progress	
Oshkosh	Completed	Completed
Sheboygan I	Completed	Work Plan Submitted
Sheboygan II	Completed	Work Plan Submitted
Stevens Point	Completed	Completed
Two Rivers	Completed	Work Plan Submitted

The site locations addressed in this work plan are:

Green Bay MGP:	North Adams Street Green Bay, Wisconsin
Sheboygan I MGP:	Wildwood Avenue Sheboygan, Wisconsin
Two Rivers MGP:	School Street Two Rivers, Wisconsin

The Green Bay MGP operated from 1871 to 1947; Sheboygan I from 1923 to 1947; and Two Rivers from 1925 to 1946. All three sites are presently owned by WPSC.

The work plan project principals include the following:

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In preparing this work plan, WPSC and NRT conducted a site reconnaissance survey and gathered readily available information from the Phase I investigation and WPSC files. In addition, a search was conducted of state and federal databases for sources of possible impacts surrounding the sites. The work plan has been prepared in accordance with NR716 and recommended procedures from the March, 1992 Wisconsin Department of Natural Resources (WDNR) publication SW-157-92 entitled "Guidance for Conducting Environmental Response Actions". The plan is being submitted for WDNR review and approval prior to commencing field investigative activities. Field activities are planned for implementation in the summer of 1994.

1.2 Objectives

The objective of the Phase II investigation is to obtain, compile and evaluate environmental information about the sites and surrounding area so that decisions may be made regarding management of the sites. The objectives for this investigation include the following:

- Establish the aerial extent of soil impacts on the former MGP property, and quantify volumes of impacted soil;
- Evaluate the potential for impacts associated with suspected source areas, such as the former gas holders, oil tanks, tar tanks, etc.;
- Define the characteristics of source material encountered during the investigation;
- Confirm directions of ground-water flow and evaluate aquifer parameters (to assist in determination of ground-water migration pathways and remedial options);
- Evaluate the presence or absence of impacted ground water above NR140 standards downgradient of sources attributable to former MGP operations;
- Evaluate the presence or absence of MGP related ground-water impacts at depth in the aquifer;
- Identify whether surface water and sediments are being impacted; and
- Perform a preliminary evaluation of remedial alternatives in accordance with NR722.

The investigation described in the next three sections is intended to be flexible. The program will

be modified based on field observations and with the approval of WPSC in order to meet the objectives stated above.

1.3 Background

The MGP facilities used coal as a feedstock to manufacture gas used for lighting and heating as well as producing by-products which served as feedstocks for other chemical manufacturing operations. Nationwide, over 2000 MGPs operated from 1816 to the 1950s, until natural gas became cheaper to produce than manufactured gas. The history of operation of these facilities is not always well defined. However, sufficient records exist to ascertain the nature of gas production processes used and the probable volumes of gas and other related by-products manufactured. These records also provide information on other relevant factors in evaluating the likelihood for process residuals to remain on the respective properties as well as the probable characteristics and volumes of the residuals. It is important to note that these plants operated in an era in which minimal knowledge existed on the fate and environmental effects of these residuals and thus, environmental regulation was absent or cursory, at best.

A Phase I investigation was conducted at the Green Bay, Sheboygan I, and Two Rivers sites in 1985 to determine the presence or absence of MGP related chemical constituents. The studies were submitted to the WDNR in early 1986. Media investigated included surface soils, ground water, and air. Ground water and soils at portions of all three sites exhibited impacts which may be related to the MGP operations at the facilities.

The Phase II investigation will expand on the results of the previous investigations in order to evaluate the extent and magnitude of the impacts observed during Phase I. Phase II will also complete a preliminary evaluation of remedial alternatives. The work plan organization is as follows:

- Sections 2-4: **Site Specific Information** - Provides site background, detailed summary of the Phase I results, current data collection needs, and the scope of investigation for each of the sites.

- Sections 5-7: **General Information for All Sites** - Includes supplemental field tasks, data review and analysis, report presentation and quality assurance.

- Section 8: **Project Schedule** - The investigation of all sites will be performed concurrently.

The Health and Safety plans for the sites is a separate document and is available upon request.

2.0 PHASE II WORK PLAN - GREEN BAY

2.1 Background

2.1.1 Location

The Green Bay MGP site is located in Green Bay, Wisconsin, immediately east of the WPSC corporate offices. The area of investigation encompasses approximately 13 acres bounded on the north by the Fox and East Rivers, by N. Jefferson Street on the west, N. Madison Street on the east, and Elm Street on the south. The site is located in Sections 25 and 36, T20N, R20E in Brown County, Wisconsin (Figure 2-1).

2.1.2 Site Ownership and Land Use

The Green Bay MGP was owned and operated by the Green Bay Gas Light Company until a 1922 merger which resulted in the formation of WPSC. The area of former MGP operations is owned by WPSC. The site is entirely paved and is currently used as a parking lot for WPSC employees. Parking areas for the Regency Conference Center was adjoins the site to the southeast across Madison Street. Southwest of the site, across Elm Street, is the Regency Office Building and Conference Center (Figure 2-2).

2.1.3 MGP Operations/Former Facilities

The Green Bay MGP was constructed at some point prior to 1912 and utilized the coal gas production method until carburetted water gas machines were installed in 1919 and 1922. The MGP operated until 1947. The facility was dismantled in 1950, except for one of the gas holders, which was dismantled in 1975 (EDI(1), 1986). Sanborn maps showing the facility development over time are contained in Appendix A.1.

Previously existing MGP-related structures and existing structures are shown on Figure 2-2. Former MGP-related structures at the site included the following:

- Materials storage building and a garage;
- Coal and coke storage areas;
- Boiler, relief, and condenser houses;
- Two condenser tanks;
- Three oil tanks approximately 15 feet in diameter;
- A tar well approximately 50 feet in diameter;
- Four gas holders ranging in diameter from approximately 35 to 140 feet; and,
- Three purifiers approximately 20 feet in diameter.

2.1.4 Previous Investigations

STS Consultants Ltd. (October 19, 1984) conducted initial subsurface exploration of the site consisting of 18 soil borings which evaluated the nature of fill material and preliminarily evaluated the presence of organic residues based on olfactory evidence. A Phase I investigation was performed by EDI Engineering and Science (January, 1986) consisting of the collection of surface soil and air samples, performance of two borings, and installation of four monitoring wells. All previous drilling and sampling locations are shown on Figure 2-2. The results of previous investigations are summarized below.

2.2 Phase I Investigation Results

2.2.1 Geology and Hydrogeology

Information presented in the STS (1984) and Phase I (EDI(1), 1986) reports generally indicate the site is underlain by 2 to 13 feet of variable fill overlying up to 17 feet of clay. The fill is composed of cinders, brick, sand and gravel, concrete fragments, coal, coal dust, flyash, wood, and/or slag. The glacial drift underlying the fill is reportedly fine sandy organic silt and clay.

The report does not indicate if the wood chips observed in borehole SB-2, OW-2 and OW-3 represent purifier waste. The Phase I report indicates the glacial drift to be 75 to 180 feet in thickness varying from clay to sandy clay to sand and gravel. The drift overlies Ordovician carbonate rocks with an estimated thickness of 350 to 400 feet. The Ordovician bedrock deposits are an important aquifer in the Green Bay area and are dominated by dolomite.

A water table map was presented in the Phase I report which indicates ground-water flow in a generally northeasterly direction towards the Fox and East Rivers. The hydraulic conductivity of the subsoils is unknown. The ground-water elevations shown on the EDI (1986) water table map indicate horizontal gradients on the site are extremely flat exhibiting a change in ground-water elevation of 0.4 feet over a distance of approximately 800 feet (0.0005 ft/ft). Since the water table occurs at depths of only 2 to 4 feet below the ground surface, directions of flow are likely to be affected by buried utilities (i.e. storm and sanitary sewers) as well as fluctuations in river elevations.

2.2.2 Site Impacts

The STS (1984) investigation consisted of the performance of 18 soil borings ranging from 6.5 to 14 feet in depth. Boring logs were prepared making special notation of the presence of wood and/or naphthalene odors in split-spoon samples collected every 2.5 feet. The boring locations are shown on Figure 2-2. Also shown on Figure 2-2 are the locations where wood and naphthalene odors were noted. Most of the STS borings encountered wood in the fill. However, neither the STS nor the EDI boring logs differentiate general wood debris from Prussian blue colored wood chips indicative of purifier wastes containing metal-complexed ferrocyanates.

Areas of the property where the MGP operations were conducted encountered naphthalene odors in all borings, except B-18 and B-11. Tar was found at a depth of 5 to 5.5 feet in B-14 near the former condenser tanks. In the area north of Utility Street, odors were noted in all borings adjacent to the East River. No odors were noted in borings beyond about 100 feet from the river, including B-4, B-5 and B-6, performed within the gas holder.

The Phase I investigation (EDI(1), 1986) of the site consisted of the following activities:

- Five surface soil samples collected from 0 to 2 inches below ground surface (Lab analyses for cyanide, metals and 47 priority pollutants, including PAHs);
- Five soil samples collected from 6 to 18 inches below ground surface at the same locations as the surface soil samples (Lab analyses for cyanide, metals and 47 priority pollutants);
- Two soil boreholes to a depth of 10 feet adjacent to the purifiers and between the coke storage area and the East River (No lab analysis were performed);
- Installation of four ground-water monitoring wells (Lab analyses at the water table and at depth for cyanide, nitrogen, metals, phenol, 47 priority pollutants, and VOCs); and
- Six ambient air samples, five on-site and one off-site (Lab analyses for BTX).

Air Sampling - The air samples were analyzed for BTX and no detectable concentrations were found.

Surface Soil Samples - Of the five surface soil samples collected (0 to 2 inches), one sample occurred in the immediate area of the MGP process operations. The other locations of surface soil samples occurred on the perimeter of the site along the river (SS-2, SS-4), off-site (SS-5), and adjacent to the gas holder to the north of the MGP operations (SS-3). Except for SS-3, no cyanide or PAHs were detected. Arsenic exceeded the NR720 soil quality standard (non-industrial) at all locations, including the off-site background location. No other metals occurred at elevated concentrations. Low levels of PAHs (24 ppm total) and cyanide (1.4 ppm) were observed at the 0 to 2 inch depth at SS-1, adjacent to the tar well.

Soil Sampling - Soil samples collected at the 6 to 18-inch depth interval showed PAH concentrations of 99 ppm adjacent to the tar well (SS-1) and 28 ppm adjacent to the East River (SS-2). PAH concentrations were nondetectable at the distant sampling locations adjacent to the river and the off-site sampling location. No metal or cyanide concentrations of concern were identified in these samples except for arsenic concentrations up to 1.9 ppm which represent background concentrations.

Ground-Water Sampling - Ground-water samples collected in 1986 (EDI) from monitoring wells screened from 3 to 10 feet below ground surface indicate impacts from cyanide exceeding NR140 Enforcement Standards (ESs) at wells OW-1, OW-2, and OW-3, and Preventive Action Limits (PALs) at OW-4. Cyanide concentrations were greatest in OW-3 along the East River at 16 ppm.

In general, metals do not appear to be a concern in ground water. No metal NR140 ESs were exceeded at OW-1, OW-2 or OW-3. The PAL for selenium was exceeded at OW-2 and the arsenic PAL was met at OW-3. Well OW-4 excceded the NR140 PAL for lead and mercury and the ES for cadmium. This well is located to the north, adjacent to the Fox River, and the impacts observed are unlikely related to MGP operations due to its distance from the site and the absence of similar or higher concentrations of these metals near the former MGP operations.

Ground-water samples were also analyzed for VOCs and PAHs. The most impacted well at the site was OW-1 containing 16 ppm of BETX. This well is located on the upgradient perimeter of the MGP operations adjacent to a gas holder and condenser tanks. The BETX concentrations decreased to the northeast at well OW-2 where BETX occurred at 5 ppm. Traces of BETX compounds were observed at wells OW-3 and OW-4, adjacent to the river, below NR140 PALs.

Well OW-1 was also the most highly impacted well with respect to PAHs, exhibiting 6.2 ppm of naphthalene with low levels of other PAH compounds. Tar was also observed at this location by STS. Traces of other PAH compounds were observed in the remaining monitoring wells with well OW-3 adjacent to the East river being the only well with naphthalene exceeding the NR140 PAL of 0.008 ppm.

2.2.3 Off-Site Impacts

The Environmental Risk Information and Imaging Services (ERIIS) was contracted to conduct a search of state and federal databases for sites having the potential to cause environmental impairment of the Green Bay MGP property. The search radius evaluated was variable, depending on the database, per the ASTM D-1527 standard. The ERIIS report and map of identified sites are provided in Appendix A-2.

The database search did not identify any release sites within one quarter mile of the MGP site. Two Leaking Underground Storage Tank (LUST) cases were identified potentially upgradient of the site:

WI-MI Trailways 406 N. Monroe Ave, 0.27 miles SE
Unknown quantities of leaded gas and VOCs

Harmon Glass 310 N. Monroe Ave, 0.32 miles SE
Unknown quantity of leaded gas.

The significance of these release sites to impact the MGP property is unknown at this time.

2.3 Data Collection Needs

In this section, the Phase I data is reviewed with respect to potential source areas, potential migration pathways, potential receptors, and exposure pathways. Probable site management strategies are also discussed to aid in identifying specific objectives and associated data requirements.

2.3.1 Potential Source Areas

The available analytical data for this site is limited with respect to sampling activities which were conducted during Phase I in the area where MGP process operations occurred. Two soil samples

collected at one location adjacent to the tar well and one ground-water sample from the upgradient portion of the property comprised the available information for evaluating potential source area impacts. Because of the former use of the site, using the coal gas process, the Phase II investigation will focus on additional characterization of potential source areas as well as evaluation of contaminant extent. Potential source areas which have not been previously evaluated include the smaller gas holders, oil tanks, tar well and purifiers. The depth of observed impacts below the ground surface have not been established at this time. Due to the silty clay native glacial drift underlying the fill and the probable ground-water discharge conditions adjacent to the Fox and East Rivers, the potential for significant vertical migration downward is low.

The investigation should include identifying the off-site extent of the tar and hydrocarbon observed at location OW-1. Areas to the east and south of this portion of the property are inaccessible for investigation due to current parking lot land uses.

Cyanide concentrations above NR140 ESs appeared at widely separated locations in ground water at concentrations up to 16 ppm. Because of the wide distance separating the sampling locations, a specific source of the cyanide cannot be identified at this time. Further evaluation of the wood debris observed in a number of STS borings is needed to differentiate purifier wastes from the innocuous wood fill.

The relationship of the site hydrogeology to the Fox and East Rivers should be established by installing staff gauges to evaluate the impact of fluctuating water levels in these rivers on potential alteration of ground-water flow directions. These effects are likely to be seasonal. The permeability of the fill and native clay has not been evaluated to enable evaluation of ground-water velocities.

The Department of Industry Labor and Human Relations (DILHR) should be contacted with regard to the eligibility of possible releases from the three oil tanks for PECFA reimbursement.

2.3.2 Potential Migration/Exposure Pathways

Organics and cyanide impacts to ground water have occurred which are migrating in a generally northeasterly direction toward the Fox River and the East Rivers. The horizontal hydraulic gradient is very slight and the hydraulic conductivity of naturally occurring clays is expected to be quite low. There are no municipal wells in the immediate proximity to the site that were noted in the Phase I report. Buried utilities (i.e. storm and sanitary sewers) have the potential to represent preferential pathways for ground water.

The MGP site is paved and is used as parking lot, minimizing the potential for impacted sediments to migrate with water or wind erosion. Air samples collected previously did not indicate an exposure route for volatile components. The asphalt pavement also minimizes potential for direct contact exposures.

For the reasons cited above, there would not appear to be an immediate concern for receptors and exposure pathways. An exposure pathway of potential concern at the site would be related to construction activity on the MGP site or along Utility Street which would penetrate the existing surface barriers and expose impacted soils to workers.

2.3.3 Probable Response Actions

Ground water is reported to occur at very shallow depths across the site such that the water table and/or the capillary zone likely extends to just below the ground surface. Under these conditions, the feasibility of conducting soil remediation is quite limited with respect to organics unless lowering of the water table occurs. Localized "hot spot" removal may be feasible which would also accelerate ground-water remediation.

Likely response actions for ground water would include interception trenches because it is unlikely that extraction wells would be feasible given the expected low permeability of the subsoils. The permeability of these clay soils needs to be established with baildown tests in the

monitoring wells in order to predict the volumes of ground water which might be generated in a ground-water remedial activity requiring treatment. Ground-water response actions at the site are likely to be extended in duration because of the low permeability and low horizontal hydraulic gradients.

2.4 Scope of Investigation

2.4.1 Overview

The proposed investigation of the Green Bay site will focus on definition of source areas not previously investigated and delineation of the extent of ground-water impacts. The scope of investigation to address the above data collection needs is shown on Plate I. The media to be sampled, number of samples and analytical parameters are summarized on Tables 2-1 and 2-2. The rationale for each of the sampling points is discussed below. The Green Bay MGP site has been assigned sample location numbers 400 through 499 in order to minimize the potential for sample label or reporting errors with other WPSC MGP site investigations.

2.4.2 Borings

A total of 17 borings would be performed at the site for the purpose of characterizing potential source areas not addressed in Phase I and to aid in delineating the extent of soil and ground-water impacts. The rationale for each of the borings is summarized below:

- SB-401 and SB-402: Evaluate the extent of tar and hydrocarbon impacts to the south of the MGP property. A ground-water sample will also be collected through the hollow-stem augers at these locations;

- SB-403: Evaluate the presence or absence of impacted soils at the oil tanks on site;

- SB-404: Evaluate the presence or absence of impacts in soils associated with the southern area of the former purifiers;

- SB-405, SB-406, SB-407: Evaluate the presence or absence of impacted soils at the gas holders and tar well in the central portion of the property;

- SB-408 through SB-411: Evaluate the nature of fill in previous uninvestigated areas on the north and northeast portions of the MGP property;

- SB-412 through SB-417: Evaluate the nature of fill and wood debris in the area between Utility Street and the river.

Borings will extend through the fill five feet into native soil or below the water table, whichever is greater. An average boring depth of 10 feet is assumed.

One soil sample will be collected from above the water table at each boring location for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed indicating the potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species. If coal tar or free product is observed in the field, up to three samples will be collected for analysis by IR for hydrocarbon fingerprinting. This information would be used in differentiating gasoline, fuel oil, or tar sources potentially on or off-site.

2.4.3 Monitoring Wells and Piezometers

The existing four monitoring wells on site will be abandoned. Ground-water evaluation and monitoring of the site will include the installation of thirteen additional water table wells and four piezometers. The water table wells would be used to provide additional hydraulic control on direction of ground-water flow and evaluate the areal extent of impacted ground water. The rationale for each of the monitoring wells is discussed below:

- MW-401A, B: Water table well and piezometer installed adjacent to the former condenser tanks near former well OW-1. OW-1 exhibited the highest levels of BETX and PAHs on the site. The purpose of this piezometer is to establish that significant migration of organics is not occurring vertically through the clay;

- MW-402: Water table well placed near the corner of Elm Street and N. Jefferson Street for hydraulic control and evaluate the extent of impacts from existing well OW-1 in a westerly direction;

- MW-403: Water table well at the former fuel oil tanks to evaluate the presence or absence of hydrocarbon releases;

- MW-404: Water table well on the eastern perimeter of the MGP property to establish the eastern extent of impacts;

- MW-405A, B: Water table well and piezometer installed adjacent to the former purifiers to aid in evaluating the potential for cyanide sources in this vicinity and vertical extent of impacts;

- MW-406: Water table well to replace former well OW-2 where high BETX was previously observed;

- MW-407: Water table well at the intersection of N. Jefferson Street and Utility Street for hydraulic control and to aid in evaluating the western extent of impacts observed at OW-2;

- MW-408: Water table well at Utility and Madison Streets adjacent to a former coke storage area, to establish hydraulic control and the eastern extent of impacts;

- MW-409A, B, MW-410, MW-411A, B, MW-413: Water table wells and piezometers to evaluate ground-water quality adjacent to the Fox and East Rivers, provide hydraulic control and enable evaluation of ground water/surface water relationships; and

- MW-412: Water table well for hydraulic control and to aid in evaluating the western extent of potential ground-water impacts from the site.

Water table wells will be installed through hollow stem augers with 10 foot screens to an assumed average depth of 13 feet, given the expected shallow depths to ground water. Piezometers will be installed by rotary drilling methods and driving casing to minimize vertical cross-contamination. Piezometer screens will be installed with five foot screens at depths of 30 feet or at least 20 feet into native clay soil, whichever is greater.

One soil sample will be collected from above the water table at each monitoring well location for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed suggesting the presence of purifier wastes, the soil sample will be analyzed for cyanide species.

Each of the monitoring wells will be sampled on two events and analyzed for BETX, PAHs, phenols, total cyanide, cyanide amenable to chlorination, and weak acid dissociable cyanide. Soluble metals will be analyzed from each well during the first sampling round only. If metals are detected above NR140 Standards, then selected archived soil samples will be analyzed for metals. The second sampling round will be conducted one month after the first event. The existing and proposed monitoring wells will have baildown hydraulic conductivity tests performed to establish subsurface permeabilities. One grain size analysis is also budgeted per monitoring well location.

In order to evaluate ground-water treatment options, a ground-water chemical profile will be performed which includes pH, TOC, COD, oil and grease, and chlorides. Two samples will be

collected from selected wells and analyzed for this purpose during the second round of sampling only.

2.4.4 Surface Water and Sediments

Three surface water and five sediment samples will be collected along the East and Fox Rivers. Staff gauges will also be installed at the surface water sampling locations to establish river elevations and the relationship of ground water to surface water at the site. Surface water samples will be collected concurrent with ground-water sampling. Surface water and sediment samples will be analyzed for BETX, PAHs, phenols, and cyanide species. Surface water will also be analyzed for metals and sediments for TOC. Sediment samples will be collected on one event. The second round of surface water samples will exclude metals.

3.0 PHASE II WORK PLAN - SHEBOYGAN I

3.1 Background

3.1.1 Location

The Sheboygan I MGP site (hereafter referred to as the Sheboygan MGP site) is located in Sheboygan, Wisconsin on property occupied by a WPSC district office. The area of investigation encompasses approximately 8 acres and is bounded on the west by Wildwood Avenue, on the south by Public Ave., on the east commercial property, and on the north by New Jersey Avenue. The site is approximately 1.5 miles west of Lake Michigan, 200 feet north of the Sheboygan River, and is located in Sections 27 and 28, T15N, R23E in Sheboygan County, Wisconsin (Figure 3-1).

3.1.2 Site Ownership and Land Use

The MGP area was acquired by WPSC in 1922 during a merger which resulted in the formation of WPSC, and the site is presently owned by WPSC. The site is currently occupied by an office building and warehouse, asphalt parking lots and drives, material storage areas, a gas distribution building, a pump house, and open grassy areas.

West of the site, across Wildwood Avenue, is Triangle Auto Salvage to the south, and a former City of Sheboygan incinerator ash landfill to the north. Nemschoff Chairs is located east of the site. North of site, across New Jersey Avenue, is a park.

3.1.3 MGP Operations/Former Facilities

The Sheboygan MGP was constructed sometime prior to 1923 and used a Koppers-Becker coke oven as part of a carburetted water gas production method. When propane was introduced as a fuel in 1950, coal gas production ceased and the facility was used for propane storage and

distribution. Historical Sanborn maps indicate that much of the facility was dismantled between 1950 and 1955. The Compressor/Booster building still remains on the site. In 1979 and 1980 a WPSC warehouse and office building was constructed (EDI(2), 1986). Sanborn maps showing the property from 1950 to 1966 are contained in Appendix A.2. There were no historical Sanborn maps available for the period prior to 1950.

Previously existing MGP-related structures and existing structures are shown on Figure 3-2. Former MGP-related structures at the site included the following:

- Coal storage bin;
- Coke plant with two ovens;
- Boiler, condenser, water gas generator, office, and compressor and booster buildings;
- Boiler and compressor rooms;
- Gas holder with 1.5 million cubic feet capacity;
- Tar storage tank approximately 15 feet in diameter;
- Three tar tanks approximately 5 by 20 feet;
- Decanter tank approximately 10 by 25 feet;
- Oil storage tank with 30,000 gallon capacity;
- Three purifiers approximately 25 feet in diameter; and,
- Two rectangular concrete pads.

It would appear, from the location of the tar tanks relative to the railroad tracks, that a significant amount of tar was being shipped off-site. This material was a valuable commodity at the time for use as a chemical feedstock.

3.1.4 Previous Investigations

A Phase I investigation was performed by EDI Engineering and Science (EDI(2), 1986) consisting of the collection of five surface soil and five air samples, performance of three soil

borings, and installation of three monitoring wells. All previous drilling and sampling locations are shown on Figure 3-2. The results of the previous investigation are discussed below.

3.2 Phase I Investigation Results

3.2.1 Geology and Hydrogeology

Information presented in the Phase I report (EDI(2), 1986) indicate the site is underlain by less than one foot of topsoil and up to 15 feet of fill interbedded with clay. The fill is composed of crushed limestone, cinders, coal, flyash, slag, glass, brick, muck, and peat. The fill is underlain by weathered limestone. Regional geology, based on private well logs, indicate that glacial drift, consisting of clay till interbedded with sand and gravel, underlies that area and varies in thickness from 64 to 146 feet. The drift overlies about 700 feet of Niagaran Dolomite. The bedrock is an important aquifer in eastern Wisconsin and is capable of yielding significant quantities of potable water.

A water table map presented in the Phase I report indicates ground-water flow is southeast toward the Sheboygan River. The depth to ground water across the site varies from 5 to 10 feet below ground surface. The hydraulic conductivity and vertical hydraulic gradients of the subsoils are unknown. The ground-water elevations shown on the Phase I water table map indicate horizontal gradients on the site are small exhibiting a change in ground-water elevation of 0.2 feet over a distance of approximately 220 feet (0.0009 ft/ft). The horizontal gradients are steeper closer to the Sheboygan River (approximately 0.01 ft/ft).

3.2.2 Site Impacts

The EDI Phase I site investigation consisted of field activities and lab analyses as follows:

- Five surface soil samples collected from 0 to 2 inches below ground surface (Lab analyses for cyanide, metals and 47 priority pollutants, including PAHs);

- Five soil samples collected from 6 to 18 inches below ground surface at the same locations as the surface soil samples (Lab analyses for cyanide, metals and 47 priority pollutants);

- Three soil boreholes: one on-site to 15 feet, one off-site to 15 feet, and one on-site in the gas holder to auger refusal at 5.5 feet (No lab analyses were performed);

- Installation of three monitoring wells: in the southeast and southwest corners of the site and on the north end (Lab analyses at the water table and at depth for cyanide, nitrogen, sulfate, metals, phenol, 47 priority pollutants, and VOCs); and

- Five ambient air samples (Lab analyses for BTX).

Results of the 1986 field and lab data collection are summarized below.

Air Sampling - No detectable concentrations of BTX were found.

Surface Soil Sampling - Three surface soil samples (SS-1, SS-2, SS-4) were collected in the immediate area of the MGP process operations. The other locations were across Wildwood Avenue from the southwest corner of the site (SS-5) and in the parking lot near the front door of the office building (SS-3).

At least eight heavy metals were found in all five samples. Metals ranged from 0.05 ppm to 39 ppm. There does not appear to be a correlation between proximity to the MGP operation and amount of a particular parameter; in fact the highest levels of some parameters are found at locations SS-3 and SS-5.

Cyanide at 0.29 ppm was observed in SS-1, adjacent to the purifiers. Low levels of PAHs (less than 25 ppm total) and cyanide were observed at location SS-3 and SS-4 (adjacent to the parking lot and in the ash holder which contained 'cinders' and other remnants from the MGP operation).

Soil Sampling - Soil samples collected at the 6 to 18 inch depth interval contained similar levels of metals as the surface soil samples, except for SS-4 and SS-5 which contained highly elevated levels of copper, lead, and zinc. Cyanide was detected at all locations except SS-5. Low levels of PAHs were again detected in SS-3 (1.2 ppm) and SS-4 (24 ppm).

Ground-Water Sampling - Ground-water samples were collected from water table wells screened from about 3 to 11 feet below ground surface and in temporary screened wells set from 15 to 25 feet below ground surface. Cyanide exceeded either the NR140 PAL or ES at all locations except the deep location at OW-3.

The only other NR140 exceedances at OW-1 were the PAL for xylene and the ES for benzene at both sampling depths. At OW-2 the PAL was exceeded for sulfate in the shallow well and for tetrachloroethylene in the deep sampling point. Sulfate also exceeded the ES for both depths at OW-3 and benzene exceeded the PAL in the deep sampling point.

Minor amounts of a limited number of metals were detected at all shallow and deep sampling locations. Mercury and zinc exceeded the PAL at the OW-3 shallow and deep location, respectively.

PAHs and phenol were detected in minor amounts, below NR140 standards at locations OW-2 and OW-3. Phenol was also detected in the shallow OW-1 location.

Impact Analysis - The Phase I investigation was quite limited in scope. There are wide distances between the monitoring wells and only two soil borings (with no lab analyses) and three surface soil samples are located in the immediate vicinity of the MGP operations. Therefore, it is only possible to provide a very cursory analysis of the extent and migration of impacts at the site.

Surface soil samples indicate ubiquitous metal concentrations at all sample locations. PAHs in surface soil samples are likely related to the areas from the which the samples were collected: a

parking lot and a gas holder which containing cinders. Concentrations in the parking lot may be background from car exhaust.

Few NR140 standard exceedances were found in the Phase I investigation. Benzene and toluene in excess of NR140 standards was found in a well in the southwest corner of the site, which is downgradient from an auto salvage yard. Sulfate exceedances on the north side of the property are adjacent to a conveyor and it is possible this area may have been used for coal storage during the MGP operation.

Cyanide was found in all ground-water samples, which are spread out at three corners of the 8 acre site. Because of the wide distances separating the sampling locations, the potential sources of the cyanide cannot be evaluated. Also, at this time, the fate of the oxide box wastes is unknown.

3.2.3 Off-Site Impacts

The Environmental Risk Information and Imaging Services (ERIIS) was contracted to conduct a search of state and federal databases for sites having the potential to cause environmental impairment of the Sheboygan MGP property. The search radius was variable, depending on the database, per the ASTM D-1527 standard. The ERIIS report and map of identified sites is provided in Appendix B.2.

The only release site identified within one quarter mile of the MGP site was the WPSC tank on the north end of the property. Three leaking underground storage tanks (LUSTs), potentially upgradient of the site, were identified:

Maxfield Corporation 2028 Maryland Ave., 0.36 miles NE
Unknown quantities of unleaded gas

City of Sheboygan Municipal Incinerator 507 S. Wildwood Ave., 0.37 miles NE
Unknown substances, but on list

City of Sheboygan Municipal Garage 2026 New Jersey Ave., 0.38 miles NE
Unknown substances, but on list

An auto salvage yard is located potentially upgradient (west/southwest) of the site. In addition, an incinerator ash landfill, used by the City of Sheboygan from the late 1970s to 1985, is located upgradient (northwest) of the MGP site. This monofill accepted only incinerator ash and minor amounts of brush and wood, including a remnants from a burned building (a possible source of PAHs). Nemschoff Chairs, located 0.17 miles southeast of the site, is listed as a small quantity generator of a variety of hazardous wastes.

3.3 Data Collection Needs

In this section, the Phase I data is reviewed with respect to potential source areas, potential migration and exposure pathways, and potential receptors. Probable site management strategies are also discussed to aid in identifying specific objectives and associated data requirements.

3.3.1 Potential Source Areas

As previously discussed, the available data for this site is limited with respect to sampling activities which were conducted during the Phase I investigation in the area where the MGP process operations occurred. A surface soil sample and a soil boring in the gas holder indicated cinders, slag, and a thin tar layer were present in the holder. Other potential 'source' areas have not yet been evaluated.

This was a fairly large MGP operation, as interpreted from Sanborn maps and the size of the gas holder (1.5 million ft^3). In addition there were variety of tanks, storage areas, coke ovens, and a long conveyor on the site. Given the above, and the types of residuals which may be associated with a carburetted water gas process, we recommend the Phase II investigation focus on additional characterization of potential source areas as well as defining the extent of contamination. Potential source areas which have not been previously evaluated include the

purifiers, tar tanks, oil tanks, and the coal bin/oven area.

3.3.2 Potential Migration/Exposure Pathways

Only a preliminary evaluation can be made about potential migration and exposure pathways. Such pathways may include surface soils, ground water, surface water and sediments.

Metals and cyanide impact the surface soils in minor amounts; however the site is fenced and is not readily accessible to the public. The metals are also present off-site.

Ground-water data for this site is sparse, consisting of three widely spaced monitoring wells. The direction of ground-water flow is southeast toward the Sheboygan River; at this time there is no evidence of a plume moving in that direction. This is based on the low levels or absence of organics in the well closest to the river (OW-2), which indicate that it is unlikely that significant, if any, migration has occurred to the extent that impacted ground water is discharging into the river.

The current data show localized NR140 exceedances which may be related to activities in those particular portions of the site, eg. VOCs downgradient of an auto salvage yard, and sulfate adjacent to a coal conveyor used for the MGP operation. The horizontal conductivity across the site is low and the hydraulic conductivity of the naturally occurring clays is expected to be quite low. There are no municipal wells in immediate proximity to the site that were noted in the Phase I report.

In addition, the site is paved over portions of the former MGP operations, thereby minimizing the potential for contamination to migrate with water, wind erosion, or through volatilization.

For the reasons cited above, there would not appear to be an immediate concern for receptors or exposure pathways. An exposure pathway of potential concern at the site would be related to

future construction activities which would penetrate the existing surface barriers and expose impacted soils to workers.

Additional information about surface water, sediments, ground water, and hydraulic conductivity will be collected during this investigation to build upon and verify the conclusions drawn above.

3.3.3 Probable Response Actions

Ground water is reported to occur at five to ten feet below ground surface across the site. Soil remediation, consisting of 'hot spot' removal above the ground-water table would be possible, although limited by the shallow ground-water depth. Removal of any 'hot spots' would accelerate any needed ground-water remediation.

Likely response actions for ground water would include interception trenches. It is unlikely that extraction wells would be feasible given the expected low permeability of the subsoils. The permeability of these clay soils needs to be established with baildown tests in the monitoring wells in order to predict the volumes of ground water which might be generated in a ground-water remedial activity requiring treatment. Ground-water response actions at the site are likely to be extended in duration because of the low permeability and low horizontal hydraulic gradients.

At this time, however, ground-water management does not appear to be necessary based on the minimal organic impacts observed in the existing monitoring wells downgradient of impacted areas. Data collected during this investigation will assist in further determination of appropriate response actions for the site.

3.4 Scope of Investigation

3.4.1 Overview

The proposed investigation of the Sheboygan MGP site will focus on definition of source areas not previously investigated and preliminary delineation of the extent of ground-water and soil impacts. Given the size of the site, one of the primary needs is for more laboratory and field data across the site. The scope of investigation to address the above data collection needs is shown on Plate II. The media to be sampled, number of samples, and analytical parameters are summarized on Table 2-1 and 4-1.

The rationale for each of the sampling points is discussed below. The Sheboygan MGP site has been assigned sample location numbers 500 through 599 in order to minimize the potential for sample label or reporting errors with other WPSC MGP site investigations.

3.4.2 Test Pits

Test pits provide a cost effective and efficient mechanism to evaluate source area contamination. A total of 12 test pits will be installed on the site in areas which are not covered by asphalt or landscaped. The rationale for the test pits is as follows:

- TP-501 through TP-504: Evaluate the presence or absence of impacted soils downgradient of the MGP operations;
- TP-505: Evaluate the contents of one of the purifiers;
- TP-506, TP-507: Evaluate the contents of the gas holder;
- TP-508 through TP-512: Evaluate the presence or absence of impacted soils in the area near the conveyor, coke spraying pump house, and the coke ovens.

Test pits will be performed using a back hoe. Test pits will be excavated to the water table, and will not exceed 10 feet in depth. Excavated soils will be placed on plastic next to each test pit and will be returned to the excavation upon completion. Surficial soil material removed from the pit will be isolated during excavation so it can be replaced on the ground surface upon completion of the work. Photographic documentation of each test pit will be obtained. Soil sampling for laboratory analysis will be performed using material which has been freshly obtained by the backhoe from the pit. No personnel will enter the excavation for any reason.

One soil sample will be collected from above the water table at eight locations for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed indicating the potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species. If coal tar or free product is observed in the field, two samples will be collected for analysis by IR for hydrocarbon fingerprinting. This information would be used in differentiating gasoline, fuel oil, or tar sources potentially on- or off-site.

3.4.3 Borings

A total of six soil borings will be installed on the site in areas which are not easily accessible by test pit because they are covered by asphalt or landscaped. This will also allow for soil classification and lab analyses at deeper depths than the test pits in areas where there will not be monitoring wells. The rationale for the soil borings is as follows:

- SB-501: Evaluate the soils adjacent to and downgradient of the gas holder to help determine if materials are maintained in the holder and its structure is intact;
- SB-502: Evaluate the contents of one of the tar tanks;
- SB-503, SB-504: Evaluate the presence or absence of impacted soils in areas adjacent to and downgradient of the boiler house, coal bin, and house and battery producer;

- SB-505: Evaluate the presence or absence of impacted soils in the area near the stack. This may serve as a location upgradient of the MGP activities;

- SB-506: Evaluate the area adjacent to the conveyor to assist in determining if this area was used for coal storage.

Borings will extend through the fill five feet into native soil or below the water table which ever is greater. Boreholes will not exceed 25 feet in depth. The hollow stem auger drilling technique will be used; this is the preferred method because it causes minimal disturbance to the geologic formation and can be used without the introduction of drilling fluids.

One soil sample will be collected from above the water table at each boring location for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed indicating the potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species. If coal tar or free product is observed in the field, two samples will be collected for analysis by IR for hydrocarbon fingerprinting. This information would be used in differentiating gasoline, fuel oil, or tar sources potentially on- or off-site.

3.4.4 Monitoring Wells and Piezometers

The existing three monitoring wells will be abandoned. A total of nine water table wells and two piezometers will be installed to provide coverage of the hydrogeologic conditions across the site. Soils information obtained during the installation of the wells will supplement soils data collected from the soil borings and test pits discussed above. The rationale for the monitoring wells and piezometers is as follows:

- MW-501A, MW-502: Evaluate water table conditions in the downgradient or southern portion of the site to determine the presence or absence of ground-water impacts at the site boundary;

- MW-503, MW-507, MW-509: Evaluate water table conditions along the western upgradient property boundary;

- MW-504, MW-505, MW-506A: Evaluate water table conditions immediately downgradient of the tar storage tank, purifier, and tar tanks respectively;

- MW-508: Evaluate water table conditions adjacent to and downgradient of the conveyor to the coke ovens;

- MW-501B: Piezometer to evaluate ground-water conditions at depth at the southeast, downgradient site boundary;

- MW-506B: Piezometer to evaluate ground-water conditions at depth immediately downgradient of the tar tanks. The tar tanks were likely used to separate tar and water prior to beneficial reuse of the tar off-site.

The proposed monitoring well locations have been selected to define the lateral and vertical extent of impacts and target areas of previously determined or suspected to impact ground water. Shallow wells will be screened to intersect the water table which ranges in depth across the site from approximately 5 to 10 feet. The piezometers will be screened approximately 25 to 30 feet below ground surface or at least 20 feet into native soil, whichever is greater. Piezometers will be used evaluate vertical gradients and whether impacted ground water has migrated into limestone bedrock.

The hollow stem auger drilling technique will be used. However, should difficulty be encountered in using this technique to install the piezometers in crushed limestone (EDI(2), 1986), air percussion or rotary techniques will be used instead. Casing will be advanced during drilling of the deep boreholes to prevent impacted soil from being carried to depth by the drilling technique. The casing will be flushed clean when the limestone is encountered, before continuation of drilling.

One soil sample will be collected from above the water table at each monitoring well location for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed suggesting the presence of purifier wastes, the soil sample will be analyzed for cyanide species.

Each of the monitoring wells will be sampled on two events and analyzed for BETX, PAHs, phenols, total cyanide, cyanide amenable to chlorination, and weak acid dissociable cyanide. Soluble metals will be analyzed from each well during the first sampling round only. If metals are detected above NR140 Standards, then selected archived soil samples will be analyzed for metals. Sulfate will be analyzed from selected locations downgradient of the conveyor area. The second sampling round will be conducted one month after the first event. The existing and proposed monitoring wells will have baildown hydraulic conductivity tests performed to establish subsurface permeabilities. One grain size analysis is also budgeted per monitoring well location.

In order to evaluate ground-water treatment options, a ground-water chemical profile will be performed which includes pH, TOC, COD, oil and grease, and chlorides. Two samples will be collected from selected wells and analyzed for this purpose during the second round of sampling only.

3.4.5 HydroPunch™

A total of two HydroPunch™ samples are proposed to augment information collected at two key soil boring locations. The rationale for the HydroPunch™ samples is as follows:

- HP-501: Evaluate the ground-water quality at soil boring location SB-501, adjacent to and downgradient of the gas holder to help determine if materials are maintained in the holder and its structure is intact;

- HP-502: Evaluate the ground-water quality at soil boring location SB-504, adjacent to and downgradient of the coal bin, and house and battery producer.

The HydroPunch™ will be pushed from approximately 12 to 15 feet below grade to obtain a ground-water sample above the limestone. As soil boring installation proceeds and headspace analyses for soils are evaluated, additional HydroPunch™ samples may be recommended at locations SB-502 and SB-503. This would be discussed with and approved by WPSC personnel prior to collecting samples.

Each of the samples will be analyzed for BETX, PAHs, phenols, total cyanide, cyanide amenable to chlorination, weak acid dissociable cyanide, and metals.

3.4.6 Shallow Soils

A total of five surface soil samples are proposed in areas not disturbed by other portions of the site investigation. The locations are spread across the site in areas not previously sampled during the Phase I investigation. These will augment the information collected during Phase I and provide good coverage of surface soils across the site. This information will help determine the potential for surface soil to be an exposure pathway for constituents related to the MGP operation. Each of the samples will be analyzed for PAHs, and phenols. If evidence of blue wood chips are observed indicating the potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species.

Samples will be collected from 0 to 3 inches below ground surface.

3.4.7 Surface Water and Sediments

A total of two sediment and two surface water locations are proposed along the Sheboygan River. Both locations are downgradient of the site. This will allow for preliminary determination of the presence or absence of impacts along the Sheboygan River. The river is somewhat distance from the site; its closest point to a MGP related facility (boiler and condenser rooms) is 370 feet. In addition there is about 200 feet of property located between the WPSC MGP site and the river; thus it is unlikely that WPSC used this area for fill related to the MGP site. Thus, limited

sampling is recommended at this point. Grab samples of both surface water and sediment will be collected. Surface water samples will be collected concurrent with ground-water sampling. Surface water and sediment samples will be analyzed for BETX, PAHs, phenols, and cyanide species. Surface water will also be analyzed for metals and sediments for TOC. Sediment samples will be collected on one event. The second round of surface water samples will exclude metals.

4.0 PHASE II WORK PLAN - TWO RIVERS

4.1 Background

4.1.1 Location

The Two Rivers MGP site is located in Two Rivers, Wisconsin. The area of investigation encompasses approximately 5 acres and is bounded on the east by School Street, on the north and south by commercial property, and on the west by the West Twin River. The site is approximately 0.5 miles west of the East Twin River, and is located in Sections 1 and 2, T19N, R24E in Sheboygan County, Wisconsin (Figure 4-1).

4.1.2 Site Ownership and Land Use

The property was owned by WPSC during operation of the MGP and is presently owned by WPSC. A small portion of the site is fenced and contains a boiler and meter building. West of the fenced portion are two concrete beds for propane storage tanks and a concrete foundation. The majority of the site, west of the propane tanks, is a wetland. The site not currently being used by WPSC.

North of the site is an oil transfer station, and south of the site is commercial property, where drums were observed behind the main building. East of the site, across School Street are private residences.

4.1.3 MGP Operations/Former Facilities

The Two Rivers MGP was operated from 1925 to 1946 and used a carburetted water gas production method. The facility was then used for propane storage and distribution before natural gas was readily available to the Two Rivers area. The facility is now dismantled, except for a

boiler and meter building. Sanborn maps showing the property four times from 1922 to 1967 are contained in Appendix A.3.

Previously existing MGP-related structures and existing structures are shown on Figure 4-2. Former MGP-related structures at the site included the following:

- Boiler and meter building;
- Pipe shed;
- Three gas holders with capacities of 10,000 ft^3, 80,000 ft^3, and 90,000 ft^3;
- Two oil tanks approximately 10 by 30 feet;
- Two propane tanks; and
- Three warehouses and garages.

4.1.4 Previous Investigations

A Phase I investigation was performed by EDI Engineering and Science (EDI(3), 1986) consisting of the collection of five surface soil and five air samples, performance of two soil borings, and installation of five monitoring wells. All previous drilling and sampling locations are shown on Figure 4-2. The results of the previous investigation are discussed below.

4.2 Phase I Investigation Results

4.2.1 Geology and Hydrogeology

Information presented in the Phase I report (EDI(3), 1986) indicate the site is underlain directly by wetland soils or muck; and in one location by two feet of fill consisting of broken concrete, sand and topsoil. Beneath the top layer is up to approximately 20 feet of interbedded peat, marl, sand, silt, and clay; this is underlain by a thick layer of clay. Regional geology, based on private well logs, indicate that glacial drift in the area varies in thickness from 97 to 154 feet. The drift consists of clay till interbedded with sand, underlain by about 10 feet of sand and gravel at the

base. The drift overlies about 700 feet of Niagaran Dolomite. The bedrock is an important aquifer in eastern Wisconsin and is capable of yielding significant quantities of potable water.

A water table map presented in the Phase I report indicates ground-water flow is west toward the West Twin River. The depth to ground water across the site is 0 to 4 inches below ground surface. One well nest located in the wetland shows no vertical gradient. There is no other vertical hydraulic gradient information and the hydraulic conductivity of the subsoils are unknown. The ground-water elevations shown on the Phase I water table map indicate horizontal gradients on the site exhibit a change in ground-water elevation of 0.2 feet over a distance of approximately 80 feet (0.0025 ft/ft).

4.2.2 Site Impacts

The EDI Phase I site investigation consisted of field activities and lab analyses as follows:

- Five surface soil samples collected from 0 to 2 inches below ground surface (Lab analyses for cyanide, metals and 47 priority pollutants, including PAHs);
- Five soil samples collected from 6 to 18 inches below ground surface at the same locations as the surface soil samples (Lab analyses for cyanide, metals and 47 priority pollutants);
- Two soil boreholes, both to 15 feet (No lab analyses were performed);
- Installation of three monitoring wells: on the east, north, and south sides of the site, about midway across the property boundary on each side (Lab analyses at the water table and at depth for cyanide, nitrogen, sulfate, metals, phenol, 47 priority pollutants, and VOCs); and
- Five ambient air samples (Lab analyses for BTX).

Results of the 1986 field and lab data collection are summarized below.

Air Sampling - No detectable concentrations of BTX were found.

Surface Soil Sampling - Two surface soil samples (SS-2, SS-3) were collected in the immediate area of the MGP process operations. The other locations were just east of the boiler and meter building (SS-1), along School Street (SS-5) and 420 feet west of the MGP operation in the wetland area (SS-4).

At least seven heavy metals were found in all five samples. The lowest level of metals were at location SS-4. Among the other four locations, there does not appear to be a correlation between proximity to the MGP operation and amount of a particular parameter; in fact the highest levels of some parameters are found at location SS-5. Lead is elevated across the site with the highest levels at SS-3 (110 ppm) and SS-5 (76 ppm).

Total cyanide at just above the detection limit was observed in SS-1; no other cyanide was detected in the surface samples. Benzo(a)pyrene, at the laboratory detection limit, was observed in SS-3, in the 80,000 ft^3 gas holder foundation. No other priority pollutants were detected.

Soil Sampling - Soil samples collected at the 6 to 18 inch depth interval contained similar levels of metals as the surface soil samples, except for SS-2 which contained elevated levels of copper and zinc. Lead was also elevated across the site, with the highest levels at SS-2 (42 ppm) and SS-5 (71 ppm). Cyanide was detected just above the detection limit at SS-4. The SS-2 location, between the 90,000 ft^3 gas holder and the oil tanks, exhibited cyanide levels of 69 ppm and PAH levels of almost 600 ppm. PAHs were also detected at low levels at location SS-1.

Ground-Water Sampling - Ground-water samples were collected from water table wells screened from about 1 to 8 feet below ground surface (OW-2 and OW-3a) and in piezometers set from about 12 to 22 feet below ground surface (OW-1, OW-2a, and OW-3). Both the OW-3 wells exceeded the NR140 ES for cyanide and the PAL for sulfate.

Upgradient well OW-1 had detects of several parameters, but none above NR140 standards. Both wells in the OW-2 and OW-3 well nests exceeded the ES for naphthalene and benzene. In addition, both OW-2 and OW-2a exceeded the ES for benzo(a)pyrene, had detects of about 11 other PAHs, and OW-2a exceeded the PAL for xylene and ethylbenzene. OW-3a exceeded the ES for ethylbenzene and the PAL for xylene. Other VOCs were detected in minor amounts in OW-2, OW-3, and OW-3a.

Zinc and phenol were detected in minor amounts at all sampling locations. Nickel was detected in all wells but OW-1 and thallium was detected in OW-3a.

Impact Analysis - The Phase I investigation was quite limited in scope. There were only three separate ground-water sampling locations (two were nests) and only two surface soil samples are located in the immediate vicinity of the MGP operations. The borings were installed in areas where no other information was obtained, however no lab analyses were completed for those locations. Therefore, it is only possible to provide a very cursory analysis of the extent and migration of impacts at the site.

Surface soil samples indicate ubiquitous metal concentrations at all sample locations. The source of the elevated levels of lead in all samples is not known at the present time.

Downgradient well nests OW-2 and OW-3 exhibited many detects of PAHs and VOCs and several exceedances of NR140 standards, including cyanide and sulfate at the OW-3 nest. High PAHs and cyanide were detected at the soil sampling location SS-2, and it is possible that this area, where the MGP operations occurred, may provide materials which are impacting the ground water. Cyanide was detected in all ground-water samples. At this time, the fate of any oxide box wastes associated with the facility is unknown.

4.2.3 Off-Site Impacts

The Environmental Risk Information and Imaging Services (ERIIS) was contracted to conduct a search of state and federal databases for sites having the potential to cause environmental impairment of the Two Rivers MGP property. The search radius was variable, depending on the database, per the ASTM D-1527 standard. The ERIIS report and map of identified sites is provided in Appendix B.3.

One release site was identified within one-quarter mile of the MGP site, as follows::

Super America #4093 1630 22nd St., 0.25 miles NE
Unknown quantities of unleaded gas

No other release sites were identified with one-half mile of the site. Tegen Industries located 0.06 miles northeast of the site is listed as a small quantity generator of a solid waste which exhibits ignitability, and US Oil Tow Rivers Terminal 0.07 miles northeast of the site is listed as a large quantity generator of a solid waste which exhibits corrosivity. During a field visit to the site, numerous drums were seen on commercial property located just south of the MGP site. At this time the nature of the business and the contents of the drums is unknown.

4.3 Data Collection Needs

In this section, the Phase I data is reviewed with respect to potential source areas, potential migration and exposure pathways, and potential receptors. Probable site management strategies are also discussed to aid in identifying specific objectives and associated data requirements.

4.3.1 Potential Source Areas

As previously discussed, the available data for this site is limited with respect to sampling activities which were conducted during the Phase I investigation in the area where the MGP process operations occurred. Soil samples from 6 to 18 inches near the oil tanks showed high

levels of cyanide and PAHs. Further evaluation of this area is necessary to determine if this is a source area. No other possible 'source' areas have been identified.

This was a fairly small MGP operation, as interpreted from the small number of MGP process buildings, the limited amount of gas holder capacity (180,000 ft^3 total), the limited years of operation (21 years), and the small size of Two Rivers today (indicating that is was likely small in the 1930s and 1940s). There were three gas holders and two oil tanks on site which may serve as source areas; however the 90,000 ft^3 gas holder is covered with a concrete pad at the ground surface. There were no tar tanks identified on the Sanborn maps. These are typically a common source area for MGP residuals, because they were used to separate tar from water prior to beneficial reuse.

Given the above, and the types of residuals which may be associated with a carburetted water gas process, we recommend the Phase II investigation focus on additional characterization an definition of the extent of contamination, with a minor amount of focus on the potential source areas. Potential source areas which have not been fully evaluated include the 80,000 ft^3 and 10,000 ft^3 gas holders, and the two oil tanks.

4.3.2 Potential Migration/Exposure Pathways

Only a preliminary evaluation can be made about potential migration and exposure pathways. Such pathways may include surface soils, ground water, surface water and sediments.

Metals impact the surface soils in minor amounts, with the exception of lead which is found at levels higher than background at all five surface soil locations but below NR720 proposed standards.

Ground-water data for this site is sparse, consisting of five monitoring wells in three locations. The direction of ground-water flow is west toward the West Twin River. The river is 440 feet away from the closest MGP structure, and between the river and the MGP operation structures

is a wetland area which likely has standing water during parts of the year. At this time it is not known if the wetland serves as a discharge point for ground-water contamination or if an impacted ground-water plume is flowing preferentially through sand lenses and is discharging into the river. Well nest OW-3, located in the wetland, has no vertical gradient (EDI(3), 1986); however, further definition of the ground-water flow system is necessary to make this determination accurately. Given the distance between the MGP operation and the river, potential impacts to both the river and sediments are unlikely, but warrant further evaluation.

The horizontal conductivity across the site is relatively low and the hydraulic conductivity of the naturally occurring clays is expected to be quite low, especially in the thick layer beginning about 20 feet below the ground surface. There are no municipal wells in immediate proximity to the site that were noted in the Phase I report. Thus, there is limited exposure potential to either the ground water, surface water, or sediments at the site.

An exposure pathway of potential concern at the site would be related to future construction activities which would penetrate the existing surface barriers and expose impacted soils to workers.

Additional information about surface water, sediments, ground water, and hydraulic conductivity will be collected during this investigation.

4.3.3 Probable Response Actions

Ground water is reported to occur at approximately 4 inches below the ground surface (EDI(3), 1986) and was observed at the ground surface during a site visit in early spring. Under these conditions, the feasibility of conducting soil remediation is quite limited with respect to organics unless lowering of the water table occurs. Any localized 'hot spot' removal which is possible would accelerate any needed ground-water remediation.

Likely response actions for ground water would include interception trenches, pump and treat, or in situ bioremediation. A pump and treat extraction well system may not be feasible given the expected low permeability of the subsoils. The permeability of these clay soils needs to be established with baildown tests in the monitoring wells in order to predict the volumes of ground water which might be generated in a ground-water remedial activity requiring treatment. Ground-water response actions at the site are likely to be extended in duration because of the low permeability, low horizontal hydraulic gradients, and the potentially high volume of water which needs to be treated.

Data collected during this investigation will assist in further determination of appropriate response actions for the site.

4.4 Scope of Investigation

4.4.1 Overview

The proposed investigation of the Two Rivers MGP site will focus on the preliminary delineation of the extent of ground-water and soil impacts and the definition of source areas not previously investigated. Given the size of the wetland portion of the site, one of the primary needs is for more laboratory and field data in this area as well as across the entire site. The scope of investigation to address the above data collection needs is shown on Plate III. The media to be sampled, number of samples, and analytical parameters are summarized on Tables 2-1 and 4-1.

The rationale for each of the sampling points is discussed below. The Two Rivers MGP site has been assigned sample location numbers 600 through 699 in order to minimize the potential for sample label or reporting errors with other WPSC MGP site investigations.

4.4.2 Test Pits

Test pits provide a cost effective and efficient mechanism to evaluate source area contamination. A total of 15 test pits will be installed across the site, including the wetland area. The rationale for the test pits is as follows:

- TP-601 through TP-604: Evaluate the presence or absence of impacted soils up- and side-gradient of the MGP operations; and evaluate the fill or naturally occurring soils in this area;

- TP-605 through TP-608: Evaluate the presence or absence of impacted soils within the MGP operations area, including in the 80,000 ft^3 gas holder;

- TP-609, TP-610, TP-612, TP-614: Evaluate the presence or absence of impacted soils immediately downgradient of the MGP operations area;

- TP-611, TP-613, TP-615: Evaluate the presence or absence of impacted soils in the wetland.

Test pits will be performed using a back hoe, or by hand digging in wetland areas not accessible to the back hoe. Test pits will be excavated to the water table, and will not exceed 10 feet in depth. Excavated soils will be placed on plastic next to each test pit and will be returned to the excavation upon completion. Surficial soil material removed from the pit will be isolated during excavation so it can be replaced on the ground surface upon completion of the work. Photographic documentation of each test pit will be obtained. Soil sampling for laboratory analysis will be performed using material which has been freshly obtained by the backhoe from the pit. No personnel will enter the excavation for any reason.

One soil sample will be collected from above the water table at eight locations for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed indicating the

potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species. If coal tar or free product is observed in the field, two samples will be collected for analysis by IR for hydrocarbon fingerprinting. This information would be used in differentiating gasoline, fuel oil, or tar sources potentially on- or off-site.

4.4.3 Monitoring Wells and Piezometers

The existing five monitoring wells will be abandoned. A total of eight water table wells and four piezometers will be installed to provide coverage of the hydrogeologic conditions across the site. Because of the need for good hydrogeologic coverage of the site and the potential for variable ground-water conditions due to the wetland, monitoring wells will be used instead of installing soil borings alone. Soils information obtained during the installation of the wells will supplement soils data collected from the test pits discussed above. The rationale for the monitoring wells and piezometers is as follows:

- MW-601: Evaluate water table conditions upgradient of the MGP operations on site to determine the presence or absence of ground-water impacts at the eastern site boundary;

- MW-602, MW-604: Evaluate water table conditions along the northern and southern side-gradient property boundaries;

- MW-603A: Evaluate water table conditions immediately downgradient of the oil tanks;

- MW-605A, MW-607A: Evaluate water table conditions in the wetland, downgradient of the MGP operations area, and along the northern and southern property boundaries;

- MW-606: Evaluate water table conditions directly downgradient of the entire MGP operations area;

- MW-608A: Evaluate water table conditions in the wetland within 50 feet of the West Twin River;

- MW-603B: Piezometer to evaluate ground-water conditions at depth immediately downgradient of the oil tanks. The purpose of the oil tanks is unknown at present;

- MW-605B, MW-607B: Piezometer to evaluate ground-water conditions at depth in the wetland, downgradient of the MGP operations area, and along the northern and southern property boundaries. These locations are critical for vertical conductivity measurements, and to provide information about any impacts from the oil transfer station (just north of MW-605B) and the drum storage area (just south of MW-607B);

- MW-608B: Piezometer to evaluate ground-water conditions at depth in the wetland within 50 feet of the West Twin River. This will help establish the presence or absence of ground-water impacts to the river.

The proposed monitoring well locations have been selected to define the lateral and vertical extent of impacts and target areas of previously determined or suspected to impact ground water. Shallow wells will be screened to intersect the water table which ranges in depth across the site from approximately 0 to 4 inches below the ground surface. The piezometers will be screened approximately 25 to 30 feet below ground surface or at least 20 feet into native soil, whichever is greater. Piezometers will be used evaluate vertical gradients and whether impacted ground water has migrated into the thick clay layer.

The hollow stem auger drilling technique will be used, except in the wetland where hand driven point wells will be used, due to inaccessible conditions for a drill rig. Casing will be advanced

during drilling of the deep boreholes to prevent impacted soil from being carried to depth by the drilling technique. The casing will be flushed clean when the clay layer is encountered, before continuation of drilling.

One soil sample will be collected from above the water table at each monitoring well location for the analysis of BETX, PAHs, and phenols. If evidence of blue wood chips are observed suggesting the presence of purifier wastes, the soil sample will be analyzed for cyanide species.

Each of the monitoring wells will be sampled on two events and analyzed for BETX, PAHs, phenols, total cyanide, cyanide amenable to chlorination, and weak acid dissociable cyanide. Soluble metals will be analyzed from each well during the first sampling round only. If metals are detected above NR140 Standards, then selected archived soil samples will be analyzed for metals. The second sampling round will be conducted one month after the first event. The existing and proposed monitoring wells will have baildown hydraulic conductivity tests performed to establish subsurface permeabilities. One grain size analysis is also budgeted per monitoring well location.

In order to evaluate ground-water treatment options, a ground-water chemical profile will be performed which includes pH, TOC, COD, oil and grease, and chlorides. Two samples will be collected from selected wells and analyzed for this purpose during the second round of sampling only.

4.4.4 Shallow Soils

A total of three surface soil samples are proposed in areas not disturbed by other portions of the site investigation. The locations are upgradient, adjacent to School Street, side-gradient north of the MGP operations area, and in the wetland area. These will augment the information collected during Phase 1 and provide coverage of surface soils across the site.

Samples will be collected from 0 to 3 inches below ground surface. Each of the samples will be analyzed for PAHs, and phenols. If evidence of blue wood chips are observed indicating the potential presence of cyanides originating from purifier waste, a sample will be collected for analysis of cyanide species.

4.4.5 Surface Water and Sediments

A total of three sediment and two surface water locations are proposed along the West Twin River. A third surface water sampling location is within the wetland, approximately 70 feet from the river. The locations are all downgradient of the site. This will allow for preliminary determination of the presence or absence of impacts to the West Twin River. The river is somewhat distance from the site; its closest point to a MGP related facility is 440 feet. Thus, limited sampling is recommended at this point. Grab samples of both surface water and sediment will be collected. Surface water samples will be collected concurrent with ground- water sampling. Surface water and sediment samples will be analyzed for BETX, PAHs, phenols, and cyanide species. Surface water samples will also be analyzed for metals and sediments for TOC. Sediment samples will be collected on one event. The second round of surface water samples will exclude metals.

5.0 SUPPLEMENTAL TASKS

5.1 Record Search

A record search will be conducted to compile the following information:

- Results of interviews conducted by WPSC with former MGP employees;
- Locations of buried utilities on the sites;
- Locations of private and public drinking water wells within one-half mile of the sites; and
- Review other available geologic and hydrologic data not previously documented in the Phase I investigation.

Pertinent information, necessary to conduct the site investigation, will be compiled prior to initiating field activities. If appropriate, the field investigation may be modified to incorporate and address unanticipated findings. Other information will be used for data analysis and included as appendices in the report.

5.2 Access To Areas of Investigation

WPSC will obtain permission from property owners for any off-site locations to be investigated. In addition, WPSC will arrange for boring locations to be accessible at the sites during drilling activities.

5.3 Survey

All sampling and monitoring locations will be surveyed by a surveyor registered in Wisconsin to record the state plane coordinates and elevation with respect to mean sea level. This will include all sampling locations, eg. test pits, soil borings, monitoring wells, staff gauges, surface water, sediment, and HydroPunch™ sampling locations. This data will be plotted on existing property maps/drawings available in the WPSC files and other sources which will be used as base maps.

5.4 Aquifer Characteristics

Following the completion of well development in each well, the water level will be allowed to recover back to static and a hydraulic test will be performed on all new monitoring wells. Hydraulic testing will involve performing either a bail-recovery test or a slug test. If a bail-recovery test is performed, water will be removed from the well using either a well development pump or a dedicated bailer. In highly impacted wells, a slug will be used to create a head loss. The water levels during the test will be measured using an electronic water level probe (WLP) or a 10-psi pressure transducer coupled to a data logger. All water removed during the test will be collected in 55-gallon drums and handled with other wastes as discussed in Section 7.5.

Calculations of the in-site hydraulic conductivity will be made using the recovery data via the methods described by Bouwer and Rice (1976). After completion of the test, all equipment will be removed from the well and decontaminated using the procedures described in Section 7.2.

6.0 DATA ANALYSIS AND REPORT PRESENTATION

Following completion of the field investigation and receipt of analytical results, a report will be prepared which documents all of the activities conducted at the sites. The report narrative will follow the format and requirements of NR716. The major topics to be addressed include the following:

- Project Objectives
- General Site Information
- MGP Operations History
- Land Use Information
- Regional Geotechnical Information
- Investigation Results
- Preliminary Analysis of Remedial Alternatives
- Conclusions
- Recommendations

Analytical results will be summarized on tables showing the parameters detected and observed concentrations. As appropriate, these results will be compared with environmental standards such as NR140 Ground-Water Quality Standards, proposed NR720 Soil Quality Standards, etc.

Graphical presentations will be used to supplement the report narrative, to clarify complex technical narrative, and to support interpretative conclusions. Drawings will conform to those required in NR716.15(3) for preparation of a Site Investigation report and will illustrate the following:

- Topography at a scale of 1 inch equals 500 feet with a 2 foot contour interval showing the required site features (scale may vary depending on site size);
- Locations of facility boundaries, former MGP facility structures, and locations of all field sampling locations;
- Geology in cross-sections;
- Water table, elevation and flow directions;
- Areas of site impacts; and
- Isoconcentrations showing the distribution of appropriate parameters.

Other appropriate illustrations which may be appended to the report include historical aerial photographs, maps, and photographs.

All raw data from field collection activities will be included in order to document the work performed. This data will be appended to the report and will include the following:

- Boring installation and abandonment logs on WDNR required forms;
- Well construction, well development, and well abandonment logs on WDNR required forms;

- Compilation of private and public wells surrounding the site;
- Analytical laboratory reports;
- Field sampling forms including ground-water sampling, purge volumes, field measurements, and equipment calibrations;
- Photoionization detector readings and calibration logs;
- Ground-water/surface water elevation measurements;
- Monitoring well hydraulic test data;
- Documentation of all calculations such as ground-water velocity; and
- Geotechnical laboratory test results.

Appendices will also include relevant boring logs, analytical data, etc. performed in previous investigations which support interpretations or conclusions.

7.0 QUALITY ASSURANCE

7.1 Investigation Procedures

NRT has developed numerous technical Standard Practices to provide documentation of the use of widely recognized protocols and standards in the performance of field operations. The list of Standard Practices and source documents are provided in Appendix C. Copies of these standard technical practices for relevant aspects of the field investigation can be provided to the WDNR if review of these practices is necessary in approval of this work plan.

7.2 Equipment Decontamination

Equipment decontamination is addressed in NRT Standard Practice 07-04-05. The drilling subcontractor will provide a steam cleaner and a decontamination area will be established on the sites for decontamination of the drill rig, augers, and drill stem used in extending the borings. No oils, greases, or other petroleum based products will be used on any downhole equipment. Sampling equipment (including split spoon samplers, sampling spatulas, etc.) will be cleaned by washing in Alconox detergent followed by triple rinses with distilled water prior to the collection of each sample. If necessary, an isopropyl alcohol rinse will be performed to remove tar or PAH residues. Decontamination wash and alcohol rinsate will be containerized in drums for future treatment and/or disposal.

7.3 Cross-Contamination

Procedures for collecting soil and ground-water samples which minimize the potential for cross-contamination are described in NRT Standard Practice Sections 07-07 and 07-08, respectively. Sampling personnel will wear new sampling gloves between collection of each sample and utilize new bailer draw lines at each well. Care will be exercised to prevent the bailer, draw line, and sampling containers from contact with possible contamination sources. New PVC bailers will be dedicated to each well to prevent cross-contamination between wells.

7.4 Laboratory Quality Assurance

7.4.1 Laboratory Analysis

Analysis of environmental media samples will be performed by a laboratory certified by the WDNR under NR149. Analytical parameters and methods for the different media are listed on Table 2-1.

7.4.2 Sample Identification

Since the investigation is planned to include several sites concurrently, each site will have a dedicated series of sample identifiers as follows:

Green Bay:	400 through 499
Sheboygan I:	500 through 599
Two Rivers:	600 through 699

This system will assure that sample results will not be confused with other MGP sites evaluated in the WPSC program.

7.4.3 Quality Control Samples

Quality Control (QC) samples includes trip blanks, duplicates and field blanks in order to evaluate the possible introduction of contamination during the sampling process and to verify reproducibility of results. QC samples will be identified with the number series X90 through X99 at each site. One trip blank will accompany VOC sample vials submitted to the laboratory for every shipment of ground-water samples collected for each sampling event. This blank will be prepared and supplied by the laboratory along with the appropriate pre-cleaned sampling containers. The trip blank will be transported to the field and laboratory along with the ground-water samples and will be analyzed for VOCs.

Duplicate samples will be obtained for each 10 or fewer water media samples collected. Duplicate sample identification will be noted in field log books so that the laboratory cannot determine the source of the duplicate. Duplicate samples will be identified with X90 through X99 series identifiers.

Since dedicated bailers and sampling equipment will be used for collection of ground-water samples, field blanks to evaluate equipment decontamination are not necessary.

7.5 Waste Management Plan

The waste management plan will follow NRT Standard Practice 06-07 for the handling and minimization of wastes and is presented in Appendix D. Investigative waste will be containerized in DOT approved drums until disposal arrangements are made. NRT staff will segregate impacted waste based on field screening to reduce the volume of waste which must be treated or disposed of off-site.

7.6 Health and Safety Plan

NRT has developed a Health and Safety Plan for personnel working at the site during all field activities. This plan is a separate document and is available upon request if review of the document is required. Personnel will read and be familiar with the plan prior to the commencement of field work. NRT will provide subcontractors with a copy of the project Health and Safety Plan and will conduct a briefing on-site prior to commencement of work. Key elements of the Health and Safety Plan are detailed below.

Prior to any intensive investigative activities (test pits installation, drilling, etc.) public and private utilities will be located. Diggers Hotline, WPSC and the city in which the site is located will be notified to clear the proposed drilling locations. If necessary, boring locations will be slightly relocated to avoid encountering utilities.

All drilling activities will be performed under Level "D" safety procedures, which involves the wearing of a chemical protective suit, chemical resistant gloves, boot covers, steel-toed shoes, a hard hat, and safety glasses. Due to the potential hazards at these sites, the breathing space of the working area will be regularly monitored for vapors to determine the potential need for upgrading the safety procedures to Level "C". Level "C" safety equipment includes all the equipment specified in Level "D" plus a respirator.

The breathing space will be regularly monitored during intrusive activities for organic vapors using a Photovac Microtip PID with an 11.7 eV probe. In addition, the potential for explosive gases will be monitored using a combustible gas indicator, and the possible presence of hydrogen cyanide gas will be monitored continuously using a Monitex meter. Action levels for each type of monitoring are detailed in the Health and Safety Plan and include the vapor levels which mandate an upgrade to Level "C" and the levels which mandate discontinuation of work until further assessment can be performed.

During well development, hydraulic testing, and ground-water sampling activities, the well headspace will be monitored using a HNu PID immediately after opening the well. If the PID levels in the well headspace and the breathing space near the well are lower than 5 ppm, then these activities will be performed under Level "D" safety procedures. If the well headspace and breathing space concentration exceed 5 ppm, then these activities will be performed under Level "C" safety procedures.

Handling of all subsurface equipment will be performed under Level "D" conditions. Decontamination involving the use of a steam cleaner or sprayer will be performed under Level "D" protection with personal protection for splashing which includes a face shield.

8.0 SCHEDULE

The project duration will be 26 weeks from WDNR approval of the work plan (Figure 8-1). A phased approach to field activities is recommended; eg. completing test pit activities at all sites prior to proceeding with boring installations at the sites. A brief discussion of the proposed schedule follows.

Pre-mobilization activities include one on-site planning meeting which will be coordinated with the utilities clearance for subsurface investigations. Test pit excavation will be the initial field activity and will be completed in two days each at the Sheboygan and Two Rivers site. This information will be used to confirm the location of subsequent soil borings.

Drilling and monitoring well installation will take place over the following five weeks. These activities will take approximately six days at Green Bay, five days at Sheboygan, and three days at Two Rivers. Upon completion of the well installation activities, well development, hydraulic testing, and surveying will take place. Well development and hydraulic testing will take place over a period of four weeks for the three sites.

The first round of ground water, surface water, and sediment sampling will occur after development is complete. The second round of sampling will occur after the initial laboratory analytical results have been received and reviewed; approximately five weeks after the first sampling round.

Data analysis will be performed throughout the project as data are obtained. A draft report will be completed four weeks after receipt of the second round of laboratory analytical results.

9.0 REFERENCES

1. EDI Engineering & Science. January 1986. Site Investigation, Former Coal Gas Manufacturing Plant, North Adams Street, Green Bay, Wisconsin, Report No. 20403, 20 pages.

2. EDI Engineering & Science. January 1986. Site Investigation, Former Coal Gas Manufacturing Plant, Wildwood Avenue, Sheboygan, Wisconsin, Report No. 20400, 25 pages.

3. EDI Engineering & Science. January 1986. Site Investigation, Former Coal Gas Manufacturing Plant, School Street, Two Rivers, Wisconsin, Report No. 20401, 25 pages.

4. Gas Research Institute. 1987. Management of Manufactured Gas Plant Sites, Volume 1, Wastes and Chemicals of Interest, Publication GRI-87/0260.1, 82 pages.

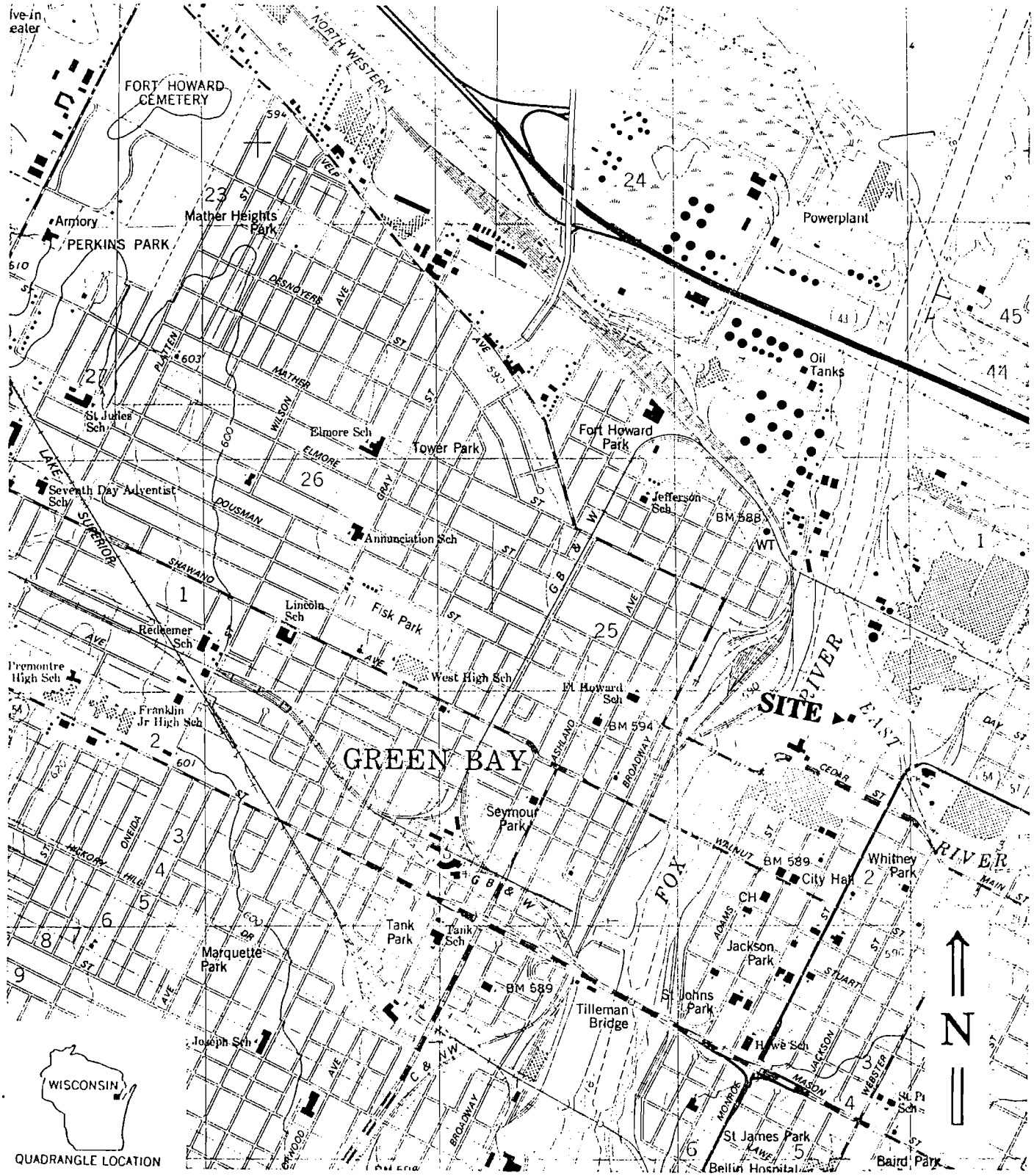
5. STS Consultants, Ltd. October 19, 1984. Subsurface Investigation, Old City Gas Plant, Green Bay, Wisconsin, STS Job 13478, 5 pages.

6. Wisconsin Department of Natural Resources. 1987. Ground-water Sampling Procedures Guidelines, Publication PUBL-WR-153-87, 91 pages.

7. Wisconsin Department of Natural Resources. 1992. Guidance for Conducting Environmental Response Actions, Publication PUBL SW-157-92, pp. 6-1 through 6-5.

8. Wisconsin Department of Natural Resources. Chapters NR140, 141, 716, Wis. Admin. Code.

FIGURES



Source: USGS 7.5 Minute, Green Bay West Quadrangle

Prepared By _____ Approved By _____ Date _____

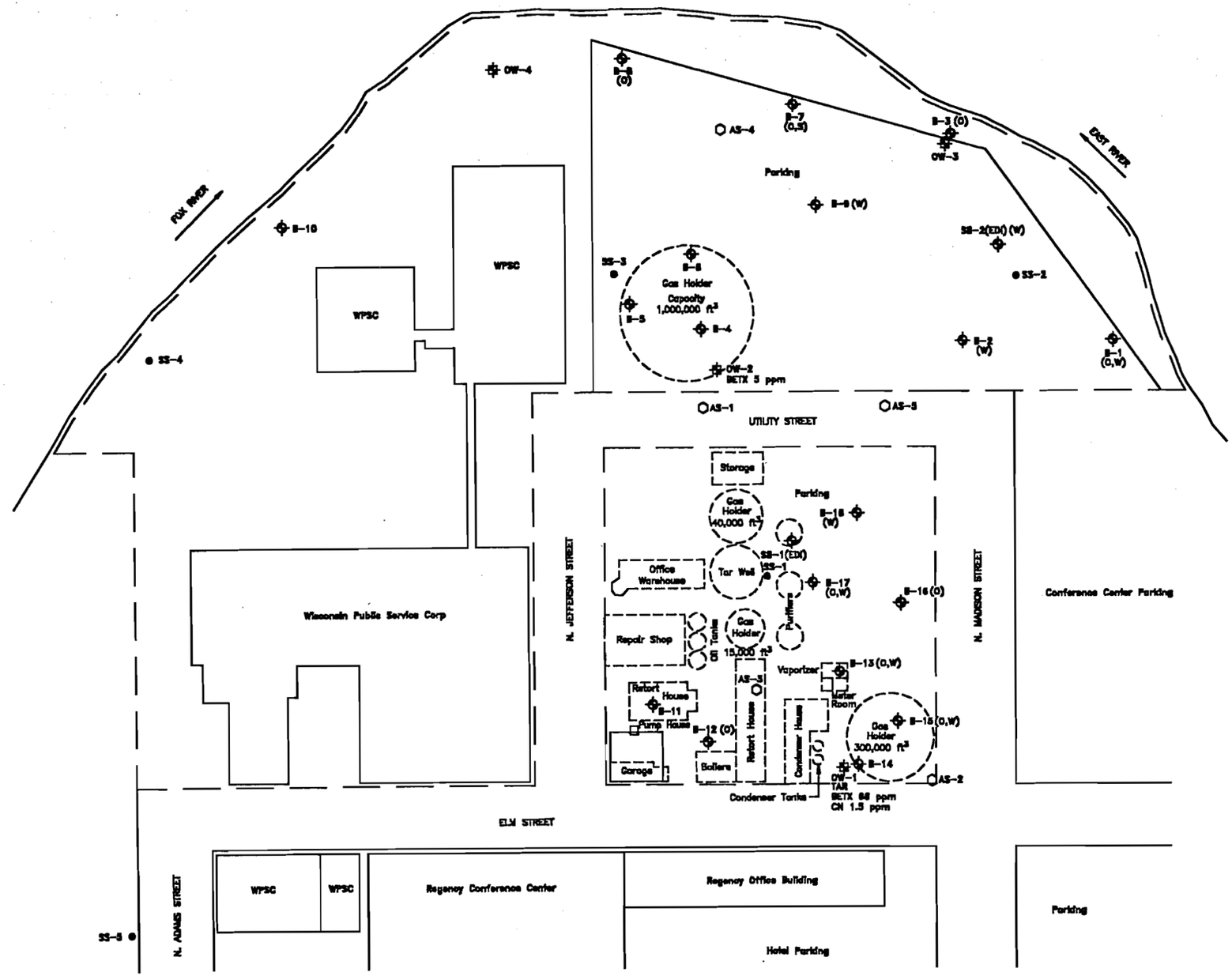
Natural Resource Technology

N R T

SITE LOCATION MAP AND TOPOGRAPHY
Green Bay Former Manufactured Gas Plant
Wisconsin Public Service Corp.

Drawing No.
1043-A1

Figure No.
2-1



LEGEND

—X—	Fence
	Former Structure
	Existing Structure
— —	Approximate Property Lines
OW-1	Monitor Well
SB-1	Soil Boring
SS-1	Surface Soil Sample
AS-1	Air Sample
(O)	Naphthalene Odors in Borehole
(W)	Wood Observed in Borehole
(S)	Petroleum Sheen Observed in Borehole

NOTE: (EDI) Refers to soil borings preformed by EDI (January 1986). Other soil borings shown preformed by STS (October 1984).

N

0 100 150 200
SCALE IN FEET

SOURCE: EDI Engineering and Science (January 1986) and Sanborn Maps

SITE PLAN

Green Bay Former Manufactured Gas Plant
Wisconsin Public Service Corporation

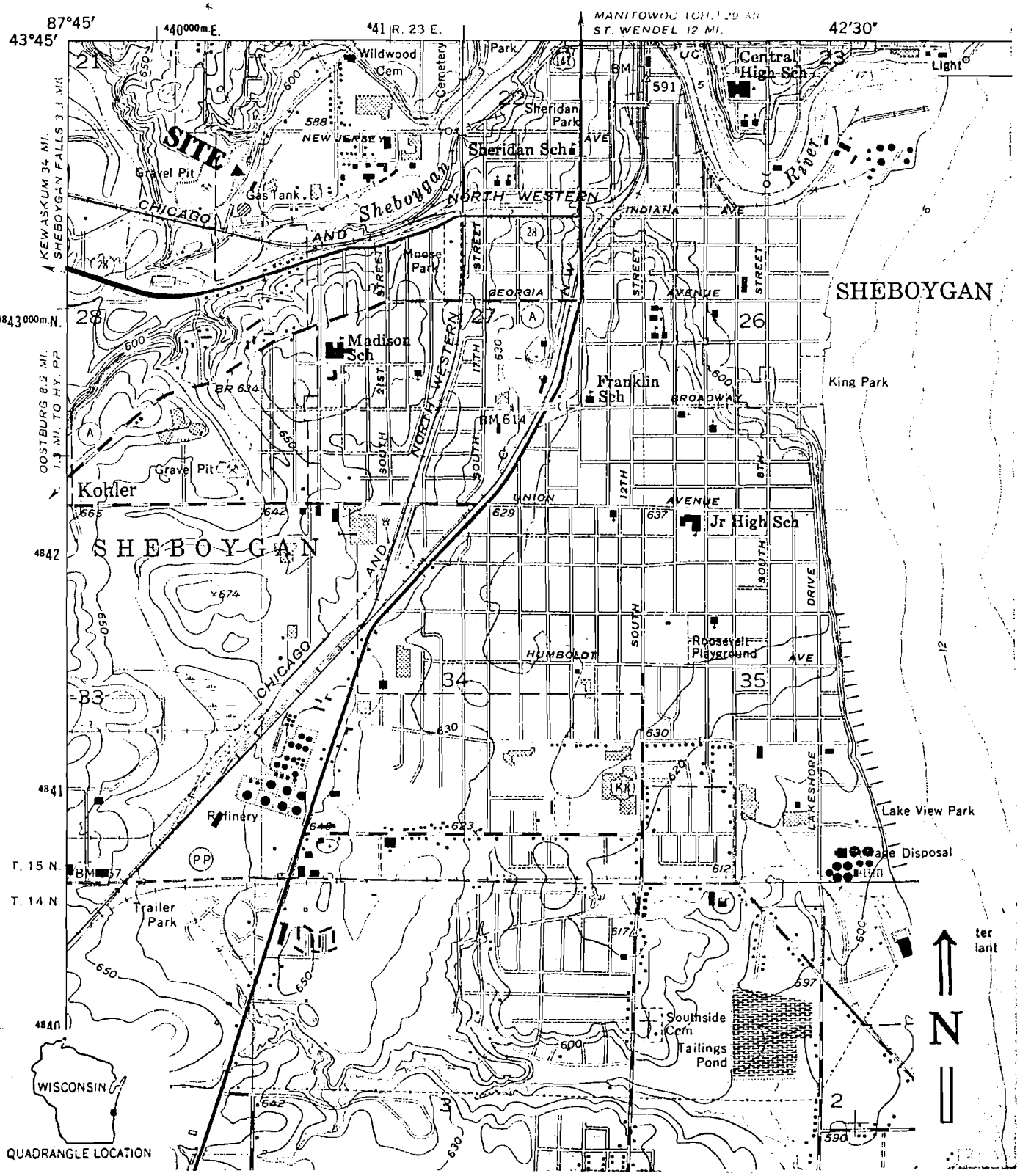
DRAWN BY: AJG	DATE: 5/20/94	AUTOCAD FILE: 1043-D1B.DWG	
CHECKED BY:	DATE:		
APPROVED BY:	DATE:		

Natural Resource Technology

PROJECT NO. 1043

DRAWING NO. 1043-D1

FIGURE NO. 2-2



Source: USGS 7.5 Minute, Sheboygan South Quadrangle

Prepared By _____ Date _____

Approved By _____

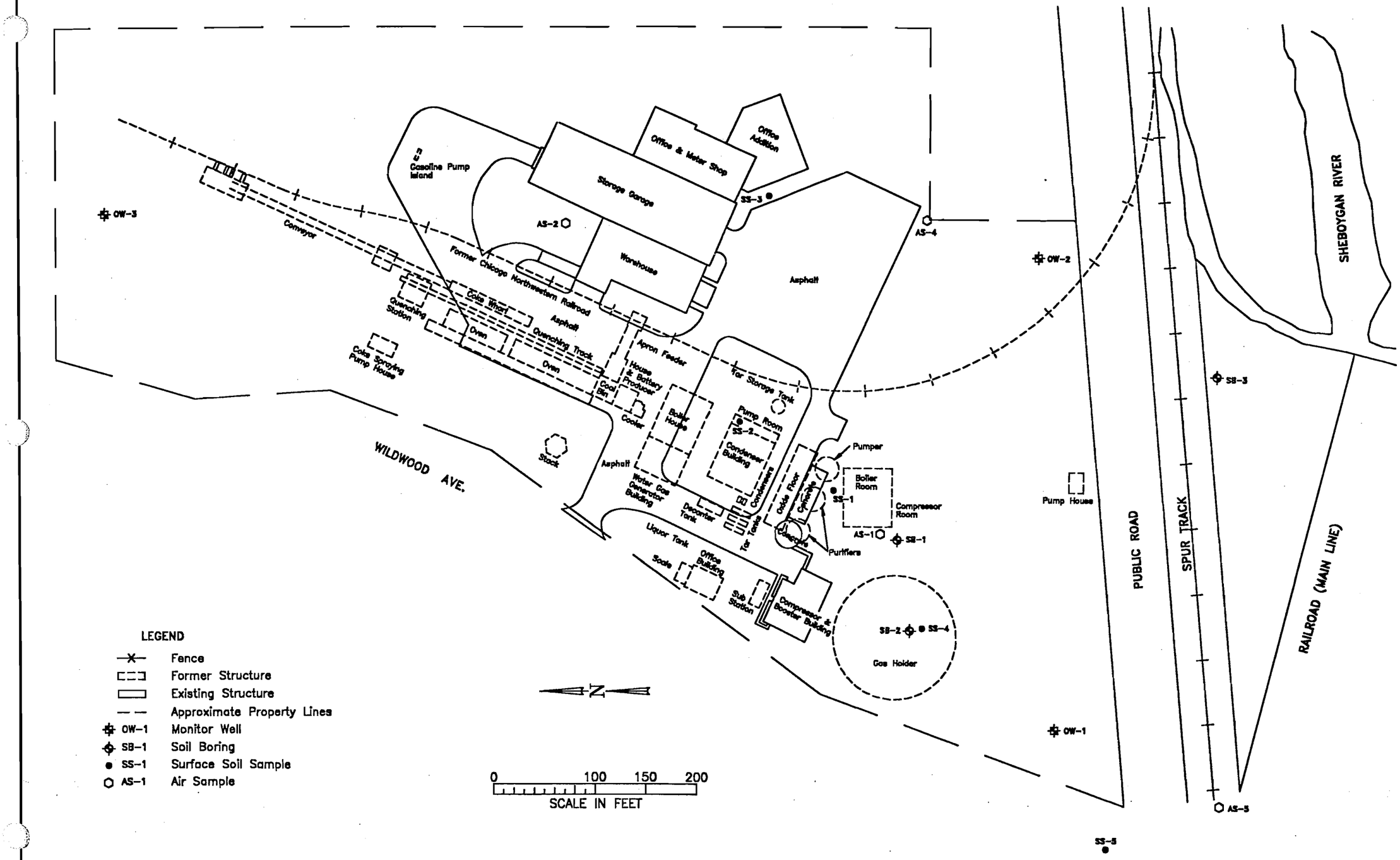
Natural Resource Technology

N R T

SITE LOCATION MAP AND TOPOGRAPHY
Sheboygan Former Manufactured Gas Plant
Wisconsin Public Service Corp.

Drawing No.
1043-A2

Figure No.
3-1



LEGEND

- Fence
- Former Structure
- Existing Structure
- Approximate Property Lines
- OW-1 Monitor Well
- SB-1 Soil Boring
- SS-1 Surface Soil Sample
- AS-1 Air Sample

SOURCE: EDI Engineering and Science (January 1986)

SITE PLAN

Sheboygan Former Manufactured Gas Plant
Wisconsin Public Service Corporation

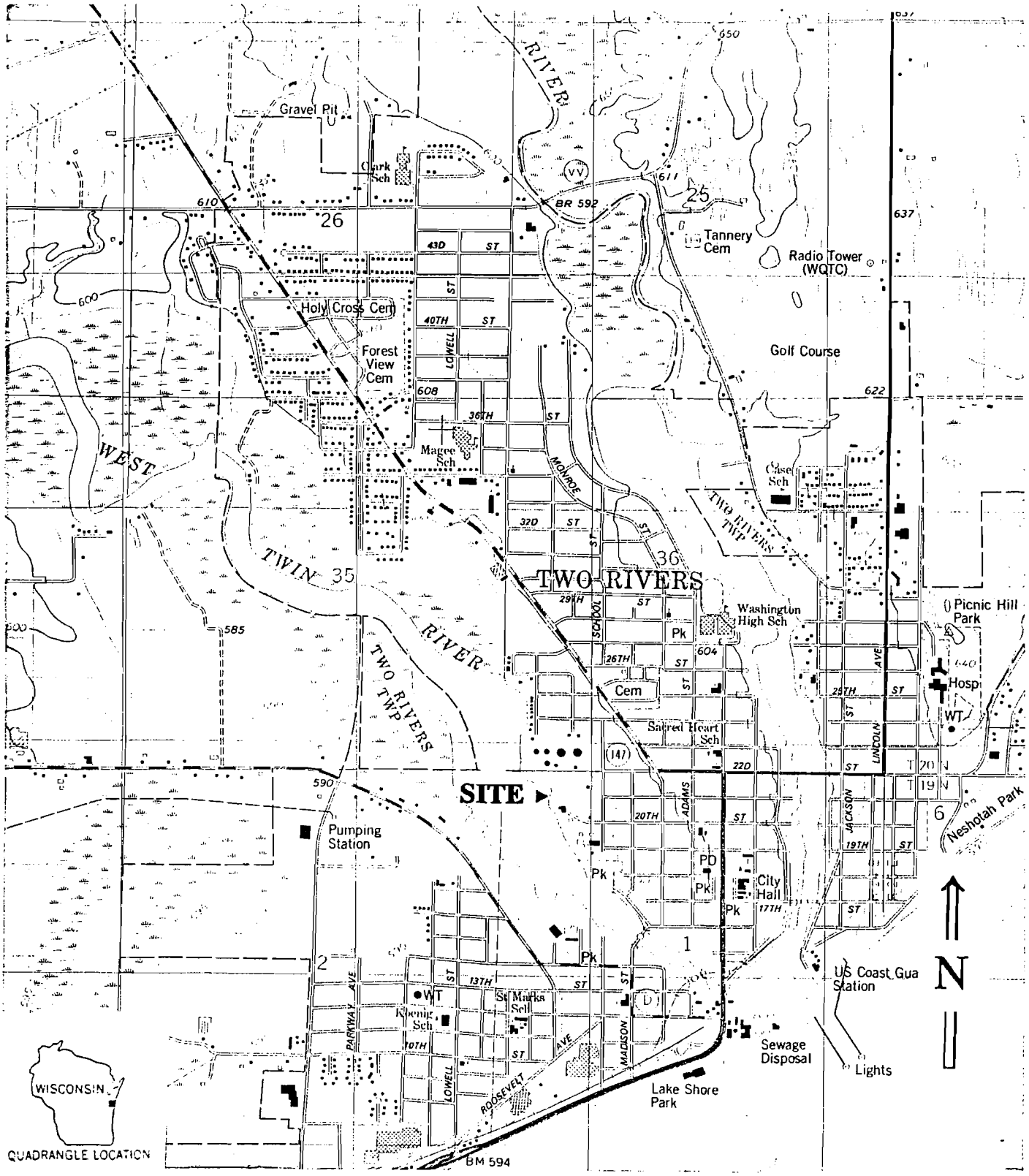
DRAWN BY: AJG	DATE: 5/18/94	
CHECKED BY:	DATE:	
APPROVED BY:	DATE:	
AUTOCAD FILE: 1043-D2.DWG		

Natural Resource Technology

PROJECT NO. 1043

DRAWING NO. 1043-D2

FIGURE NO. 3-2



Source: USGS 7.5 Minute, Two Rivers Quadrangle

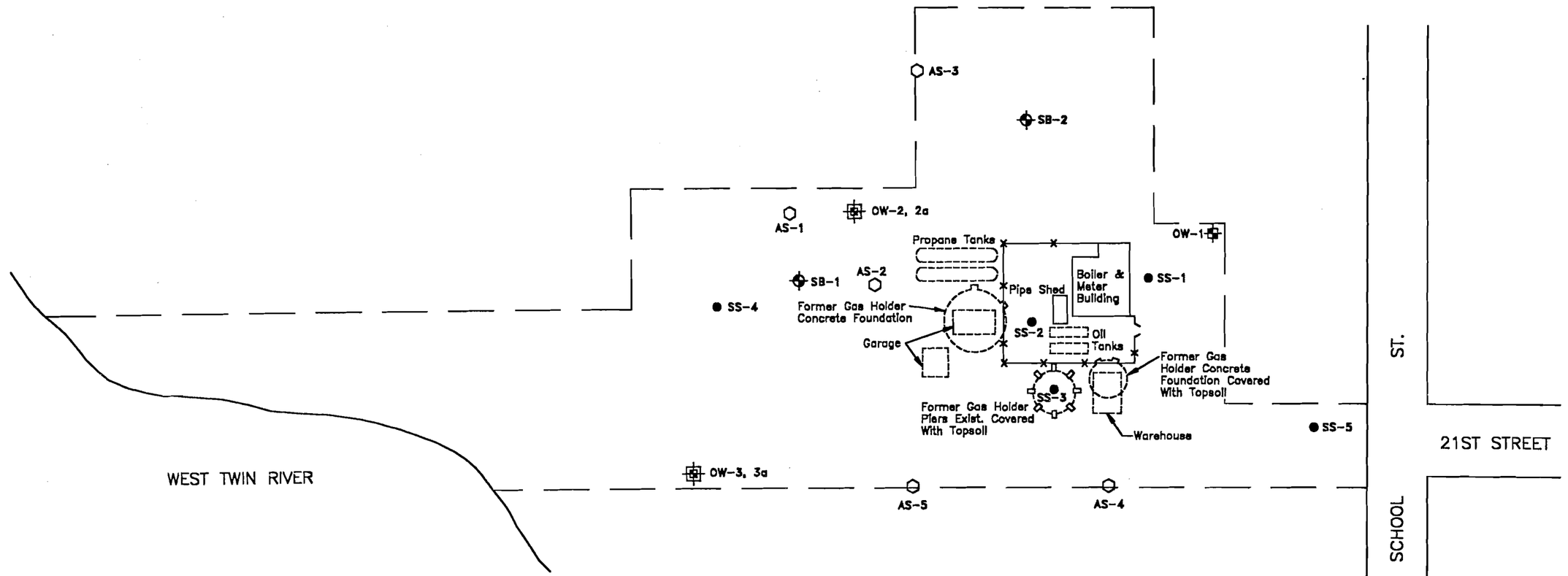
Prepared By _____ Approved By _____ Date _____

Natural Resource Technology

N R T

SITE LOCATION MAP AND TOPOGRAPHY
Two Rivers Former Manufactured Gas Plant
Wisconsin Public Service Corp.

Drawing No.
1043-A3
Figure No.
4-1



LEGEND

- Fence
- Former Structure
- Existing Structure
- Approximate Property Lines
- OW-1 Monitor Well
- OW-2,2a Nested Monitor Well / Piezometer
- SB-1 Soil Boring
- SS-1 Surface Soil Sample
- AS-1 Air Sample

0 100 150 200
SCALE IN FEET

N

SOURCE: EDI Engineering and Science (January 1986)

DRAWN BY: AJG | DATE: 5/18/94
CHECKED BY: | DATE:
APPROVED BY: | DATE:
AUTOCAD FILE: 1043-D3B.DWG

SITE PLAN

Two Rivers Former Manufactured Gas Plant
Wisconsin Public Service Corporation

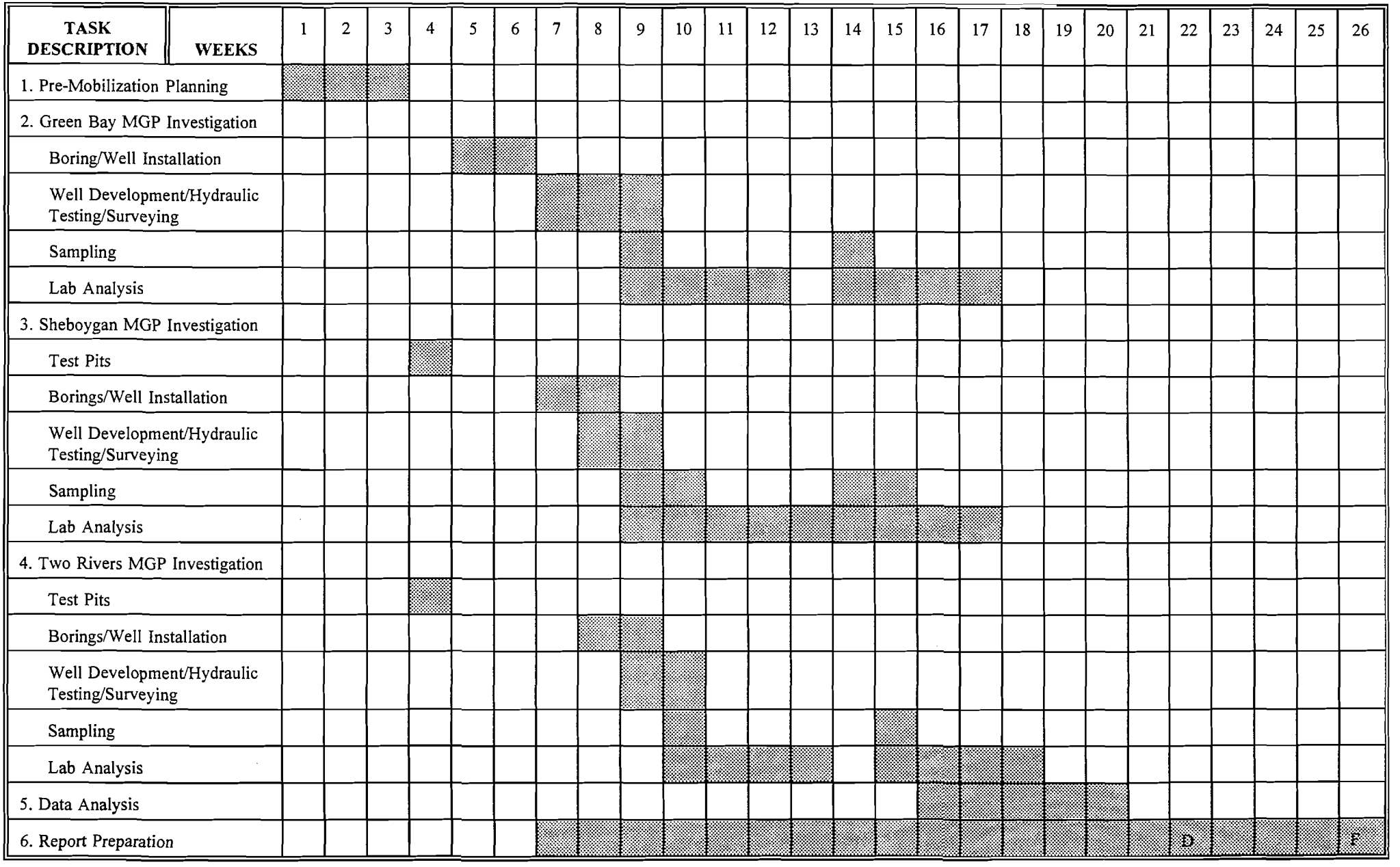
Natural Resource Technology

PROJECT NO. 1043

DRAWING NO. 1043-D3

FIGURE NO. 4-2

FIGURE 8-1. PRO[illegible]CT SCHEDULE
WPSC -- GREEN BAY, SHEBOYGAN I, AND TWO RIVERS MGP SITES



D = Draft Report to WPSC
F = Final Report to WPSC

TABLES

TABLE 2-1
ANALYTICAL PARAMETERS AND METHODS

Media	Parameter	Analytical Method	Anticipated Detection Limit
Soil	BETX [1]	USEPA 8020	100 ug/kg
	PAHs	USEPA 8270	660 ug/kg
	Total Phenol	USEPA 420.1	660 ug/kg
	Total Cyanide [2]	USEPA 9010	2,500 ug/kg
	Cyanide Amenable to Chlorination [2]	USEPA 9010	2,500 ug/kg
	Weak Acid Dissociable Cyanide [2]	USEPA 412-H	250 ug/kg
	TOC [3]	USEPA 9060	5 mg/kg
	Metals [4]	SM	0.1 to 5.0 mg/kg
	IR Analysis [5]	-	NA
	Grain Size Analysis	ASTM 0422	NA
Water	BETX	USEPA 8021	1.0 ug/L
	PAHs	USEPA 8310	0.02 to 0.5 ug/L
	Total Phenol	USEPA 420.2	10.0 ug/L
	Total CN	USEPA 335.1	5.0 ug/L
	Amenable CN	USEPA 335.2	5.0 ug/L
	Weak Acid Dissociable CN	412-H	5.0 ug/L
	Metals [6]	SM	0.2 to 100 ug/L
	pH	USEPA 150.1	0.01 s.u.
	TOC [7]	USEPA 415.2	1 mg/L
	COD [7]	USEPA 410.1	3.5 mg/L
	Oil and Grease [7]	USEPA 413.1	5 mg/L
	Chlorides [7]	USEPA 300.0	1 mg/L
	Sulfate [8]	USEPA 300.0	0.5 mg/L

(1) All soils except surface soil samples.
(2) Lab analysis will be completed for test pits, borings, monitoring wells, and surface soils only if evidence of blue wood chips are found.
(3) Sediments only.
(4) Selected samples will be analyzed if detected in ground water above NR140 standards.
(5) Lab analyses will be completed if coal tar or free product is observed.
(6) First round of sampling only.
(7) Two samples per site; second round only.
(8) Selected samples will be analyzed at Sheboygan only.

TABLE 2-2
SUMMARY OF SAMPLE LOCATIONS - GREEN BAY MGP

Media	Sample Location Type (Number of Samples)	Rounds of Sampling	Total Number of Samples
Soil	Test Pits (0)	0	0
	Borings (17)	1	17
	Water Table Wells/Piezometers (13)	1	13
	Sediments (5)	1	5
	Surface Samples (0)	0	0
Water	Water Table Wells (13)	2	26
	Piezometers (4)	2	8
	Hydro-Punch	0	0
	Surface Water (3)	2	6
	Lab Duplicate (4)	2	8

TABLE 3-1
SUMMARY OF SAMPLE LOCATIONS - SHEBOYGAN MGP

Media	Sample Location Type (Number of Samples)	Rounds of Sampling	Total Number of Samples
Soil	Test Pits (8)	1	8
	Borings (6)	1	6
	Water Table Wells/ Piezometers (9)	1	9
	Sediments (2)	1	2
	Surface Samples (5)	1	5
Water	Water Table Wells (9)	2	18
	Piezometers (2)	2	4
	Surface Water (2)	2	4
	Hydro-Punch (2)	2	4
	Lab Duplicate (3)	2	6

TABLE 4-1:
SUMMARY OF SAMPLE LOCATIONS - TWO RIVERS MGP

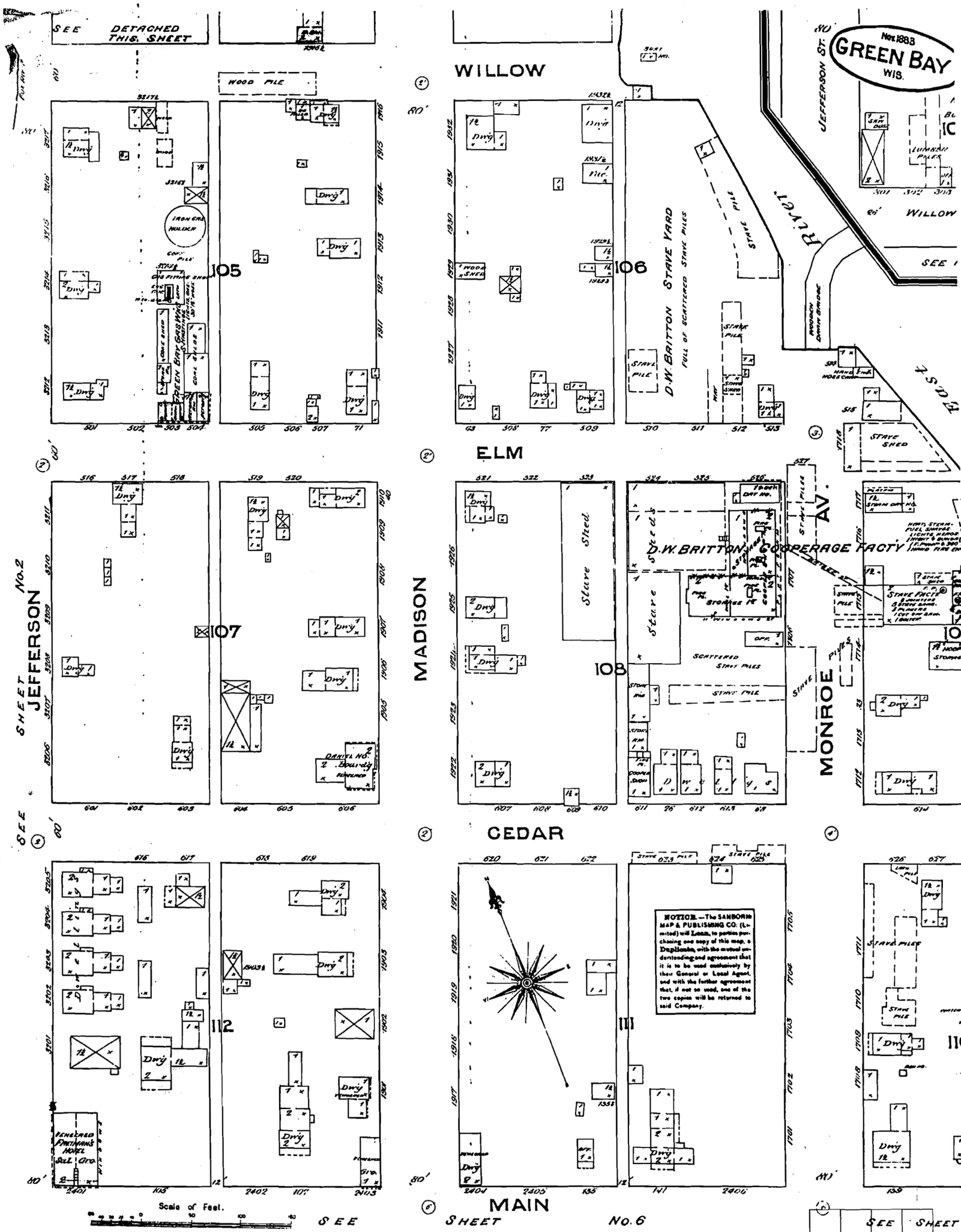
Media	Sample Location Type (Number of Samples)	Rounds of Sampling	Total Number of Samples
Soil	Test Pits (10)	1	10
	Borings (0)	0	0
	Water Table Wells/Piezometers (8)	1	8
	Sediments (3)	1	3
	Surface Samples (3)	1	3
Water	Water Table/Wells (8)	2	16
	Piezometers (4)	2	8
	Surface Water (3)	2	6
	Hydro-Punch (0)	0	0
	Lab Duplicate (3)	2	6

APPENDIX A

SANBORN HISTORICAL MAPS

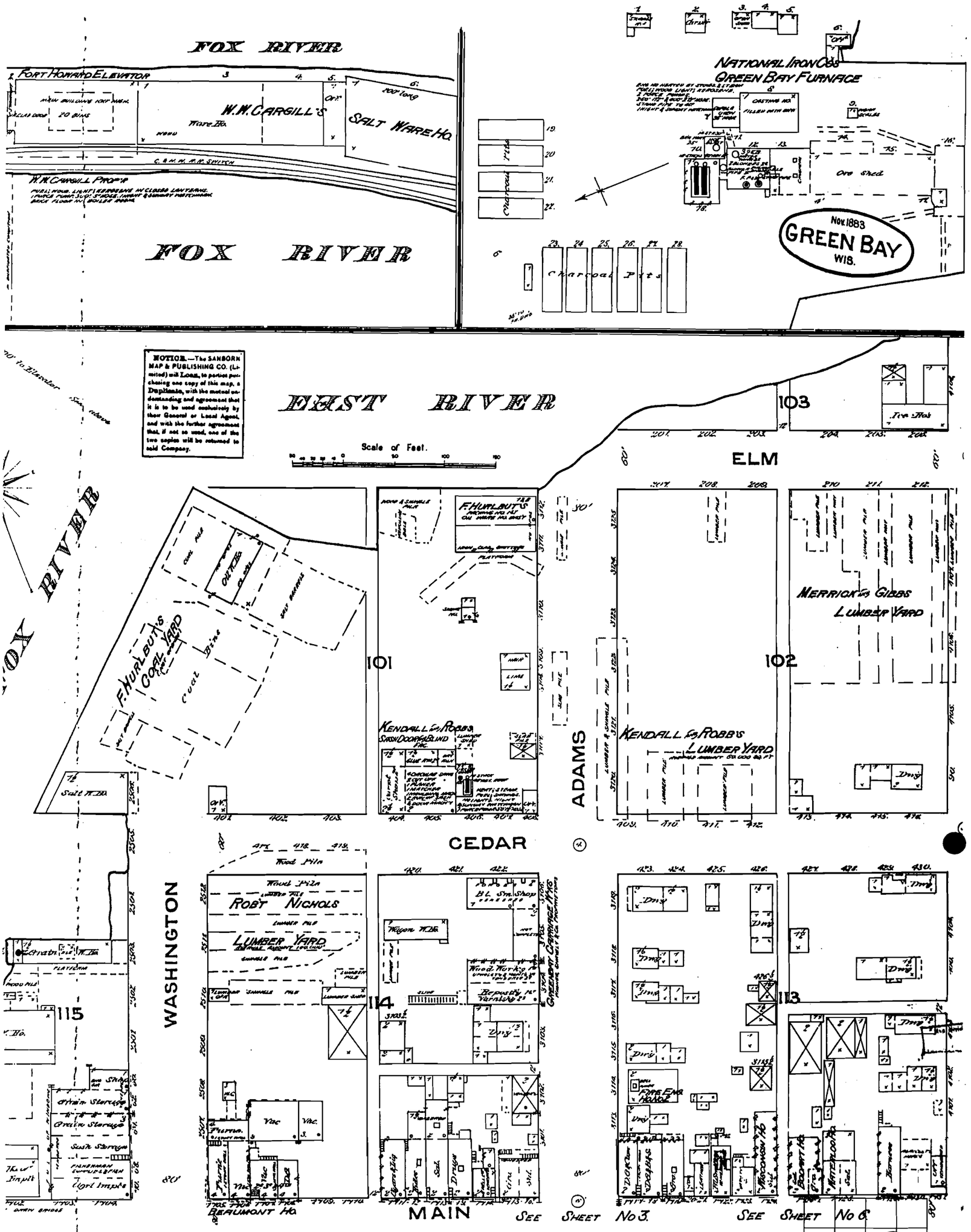
A.1 GREEN BAY

E881



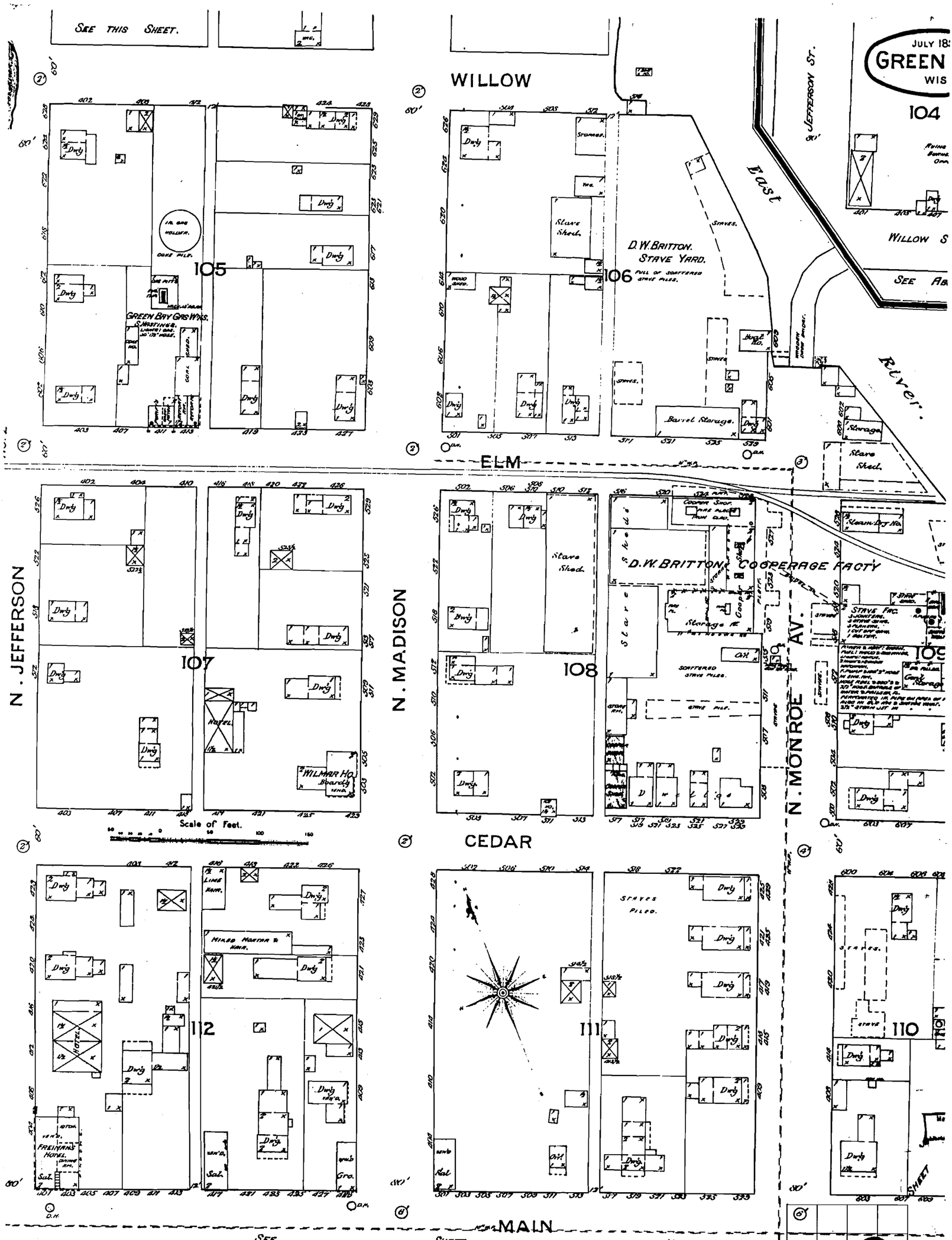
1033

E881



1883

L881



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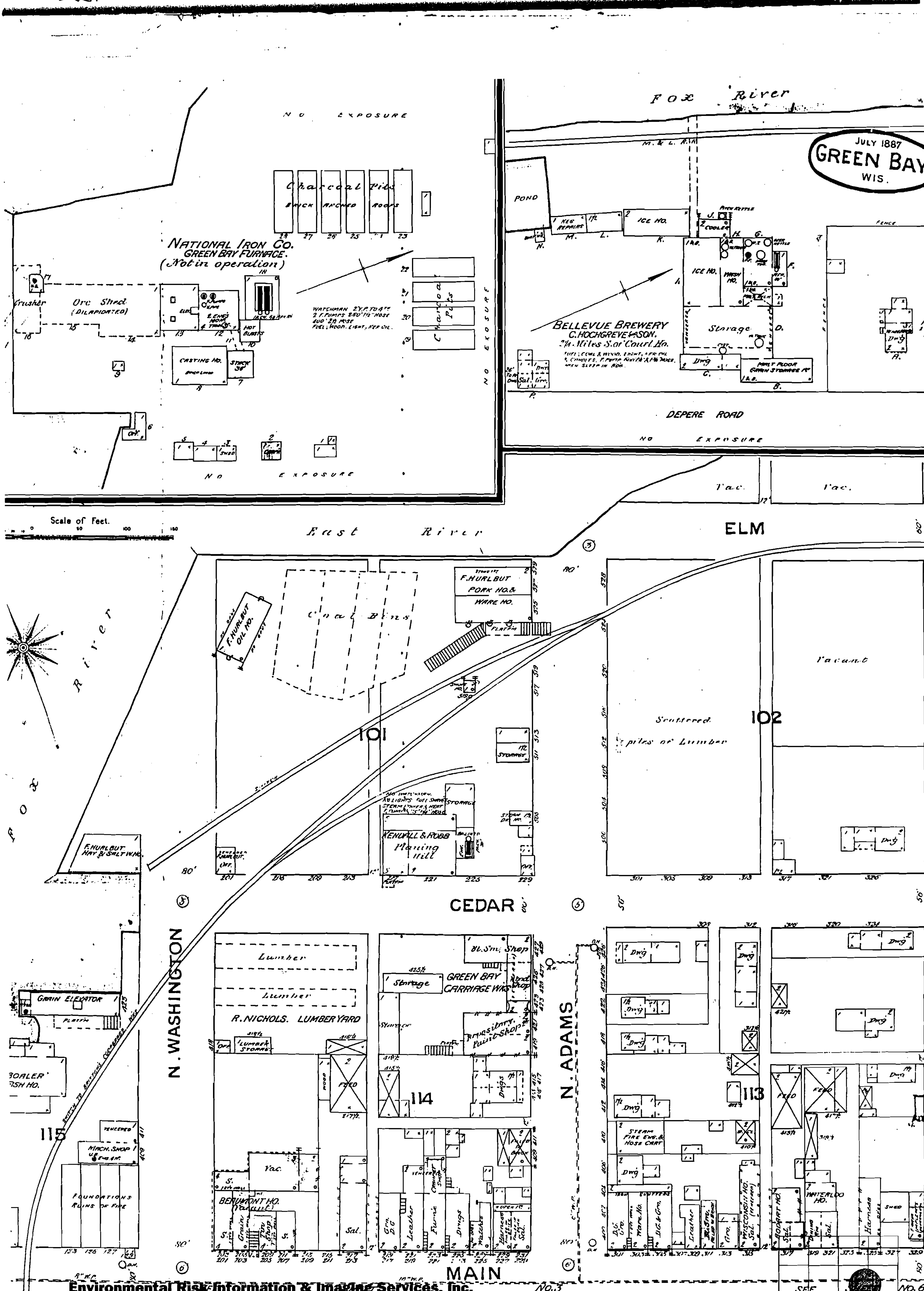

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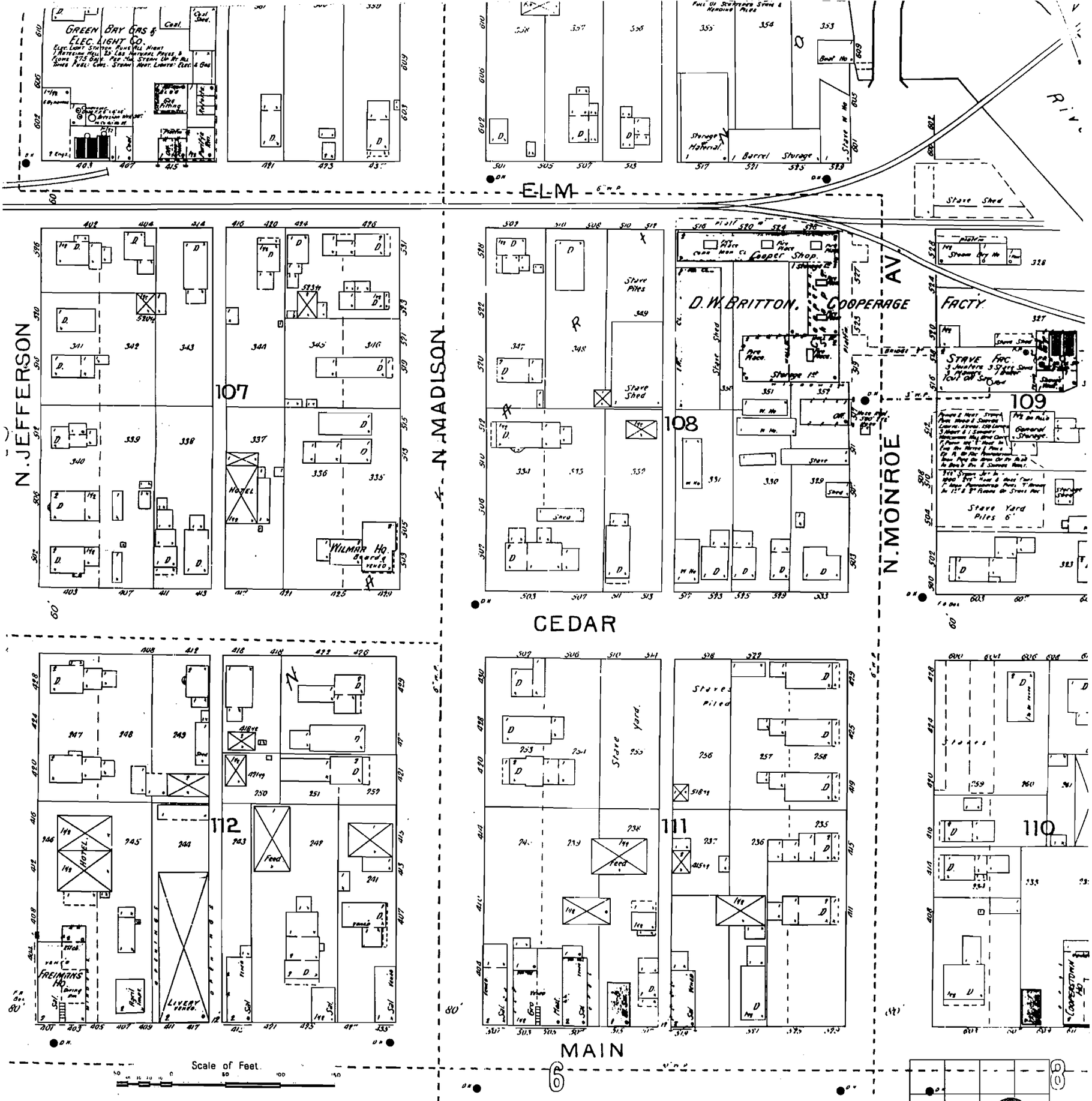
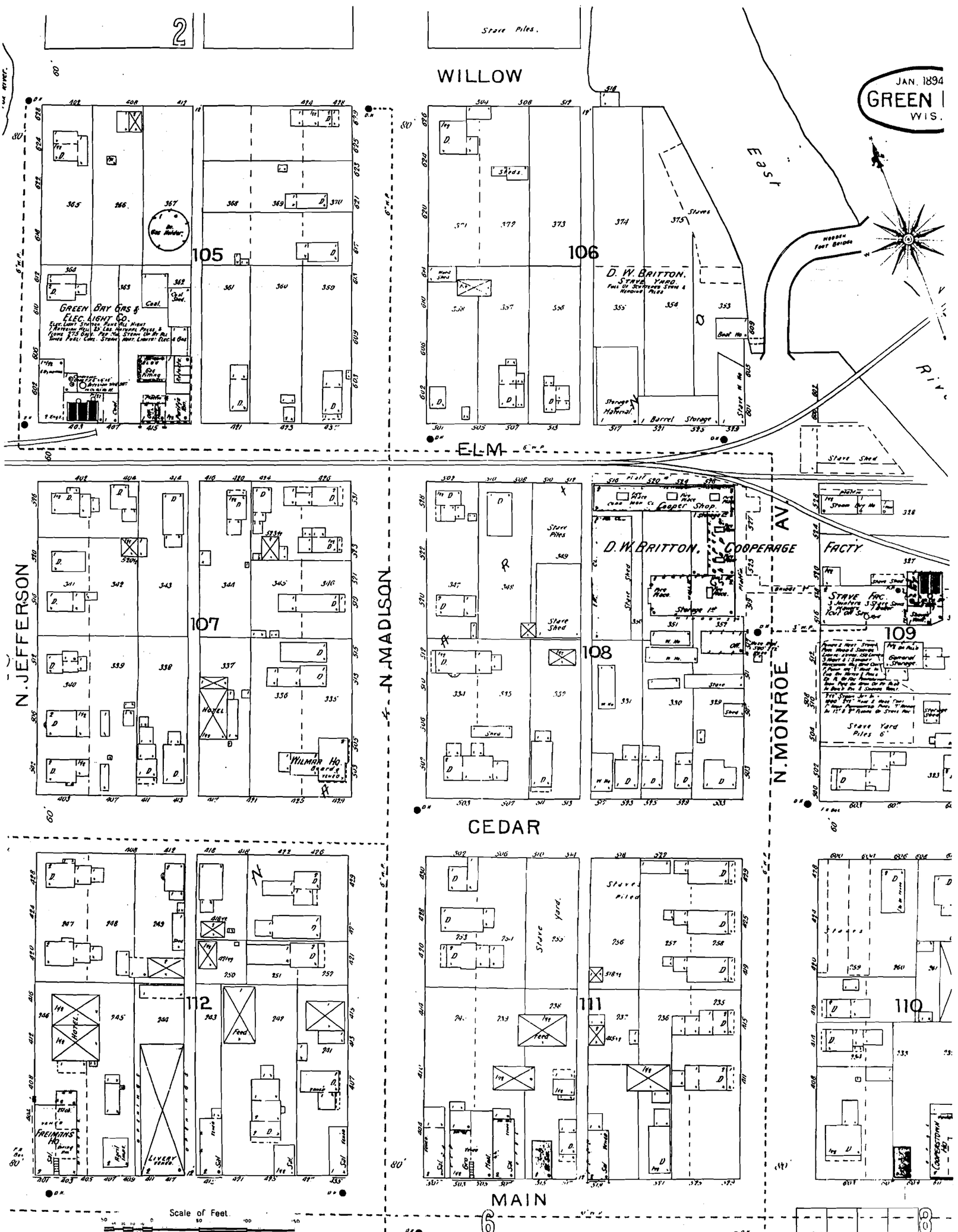


4681



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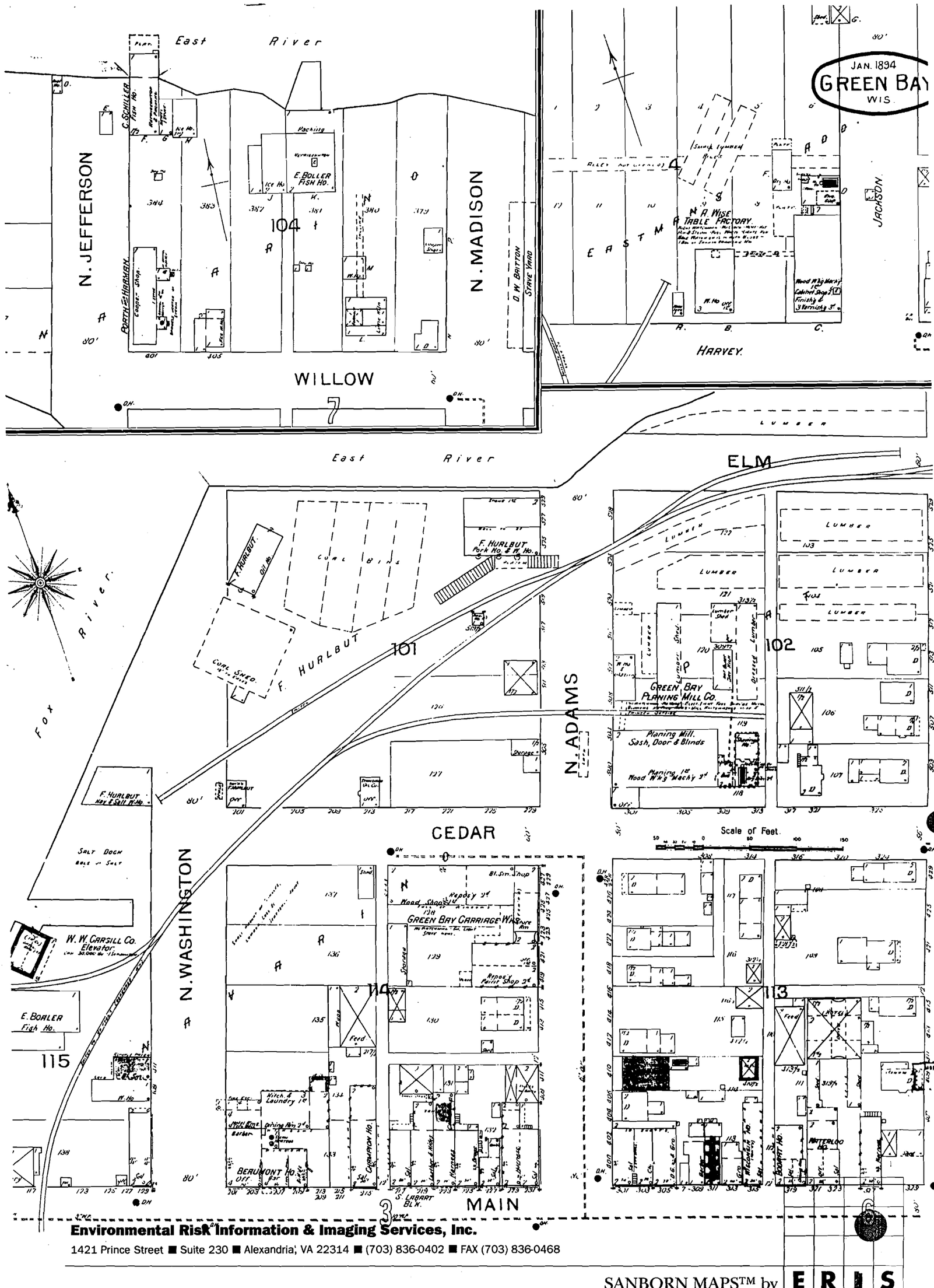
SANBORN MAPS™ by ERIS

1681



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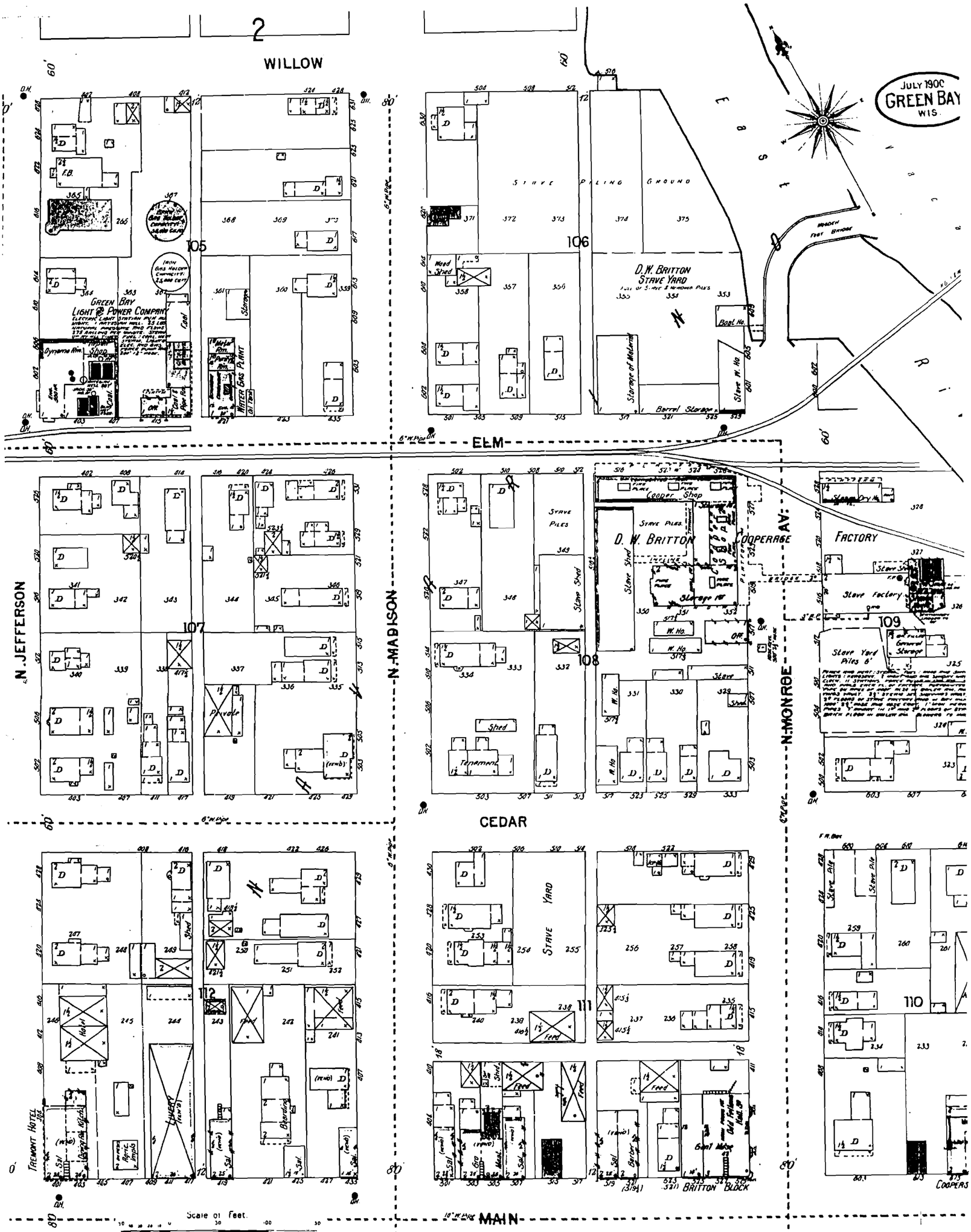

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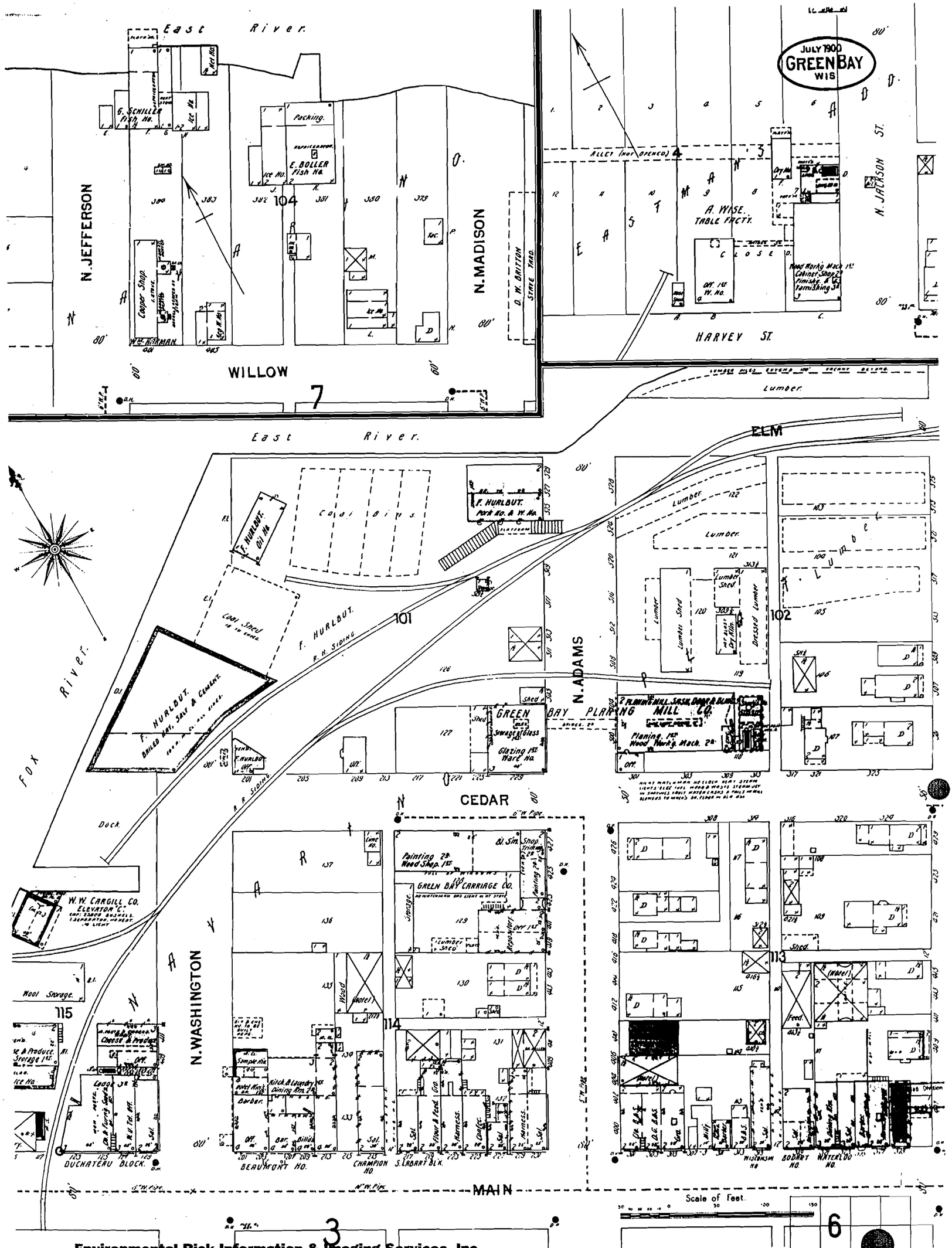

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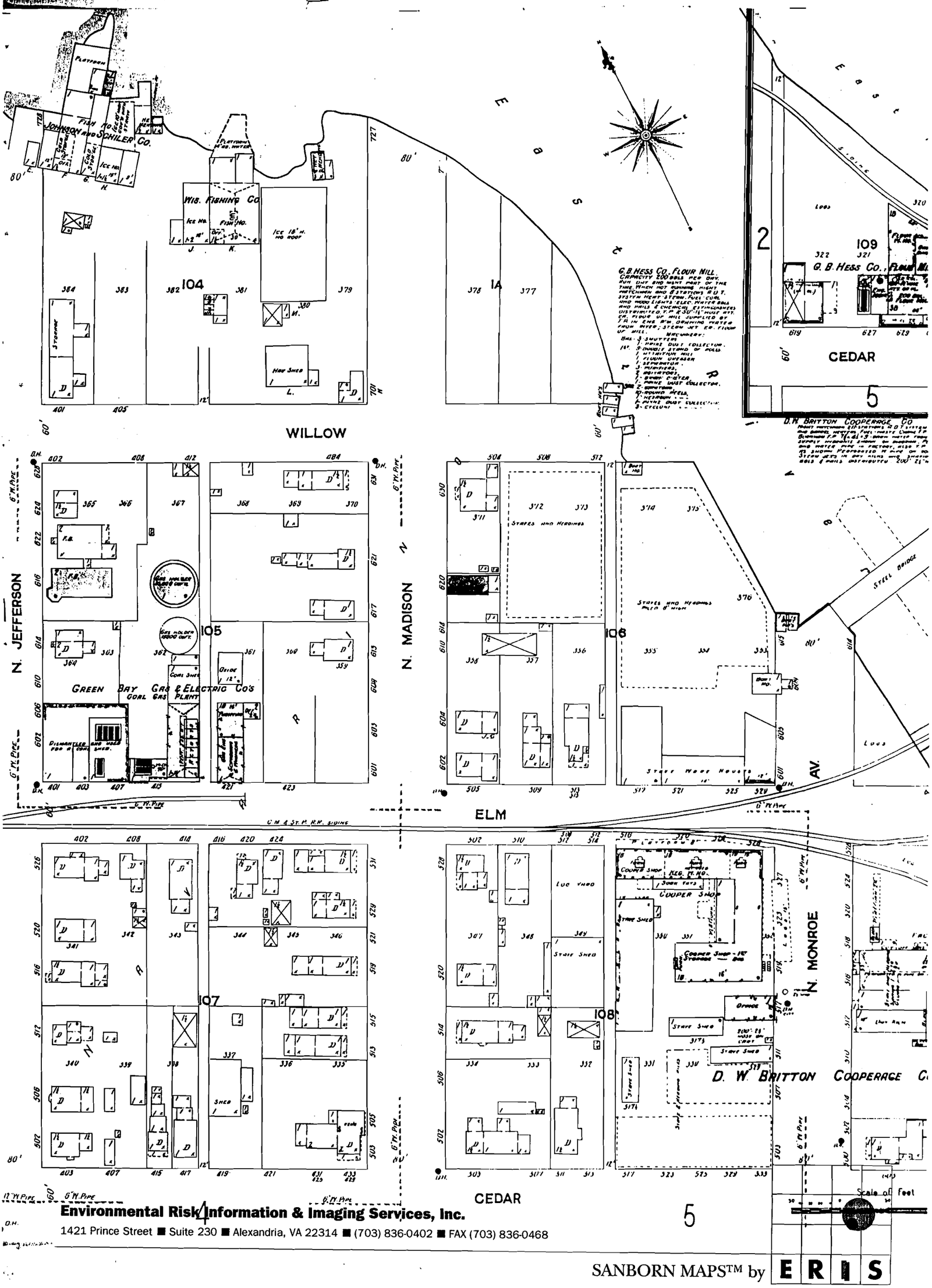

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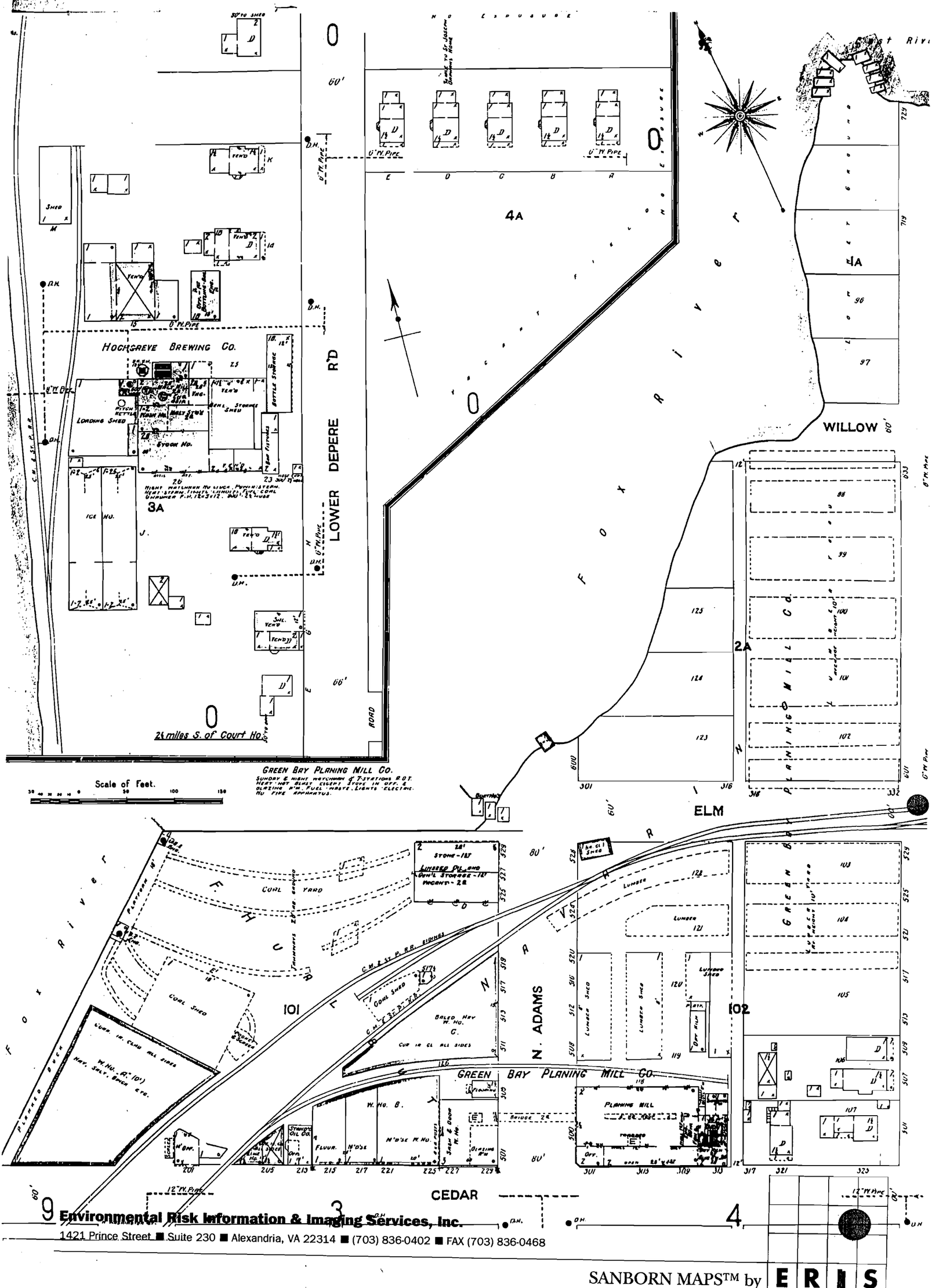
5

SANBORN MAPS™ by ERIS

1107

L061



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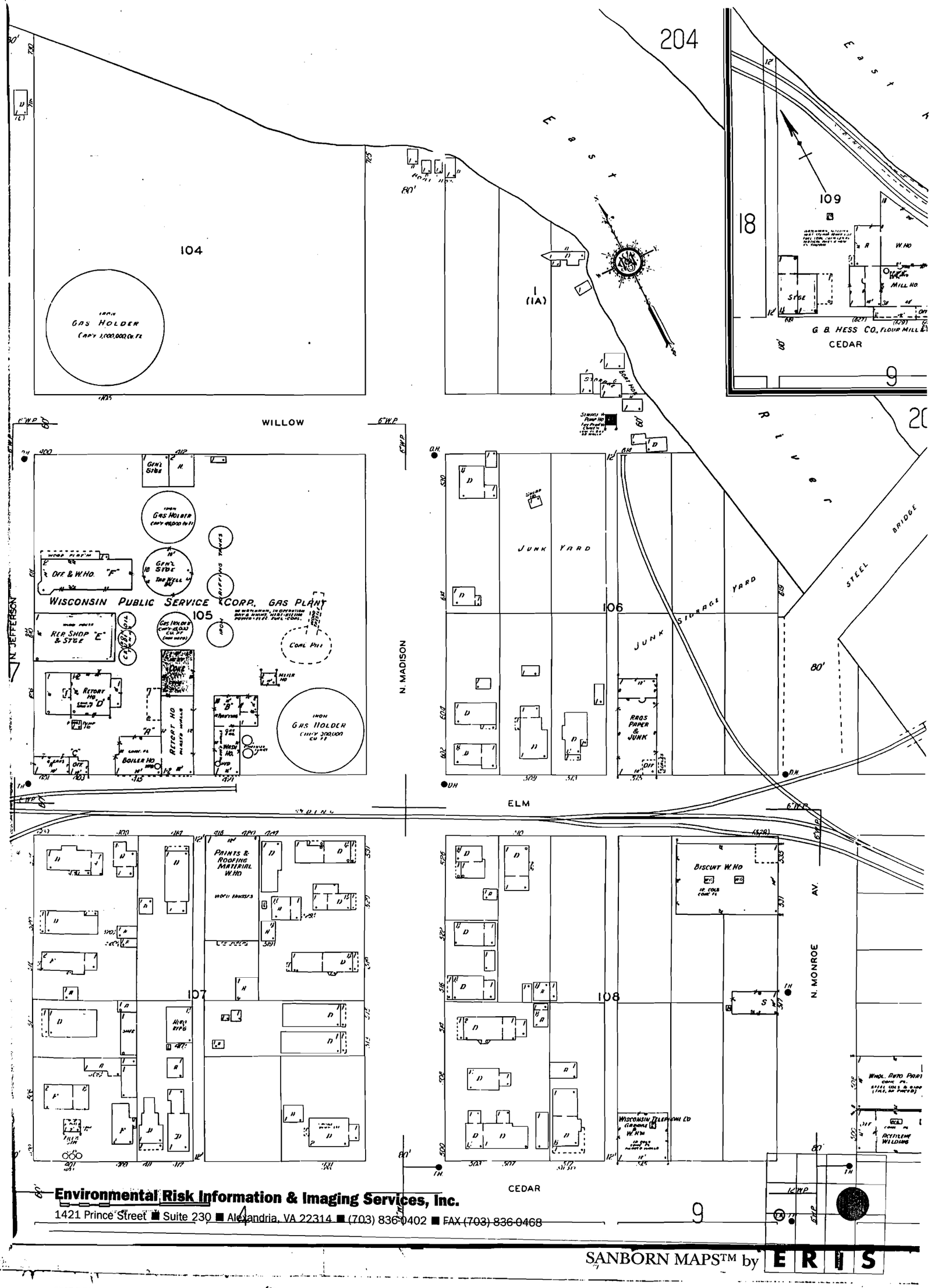

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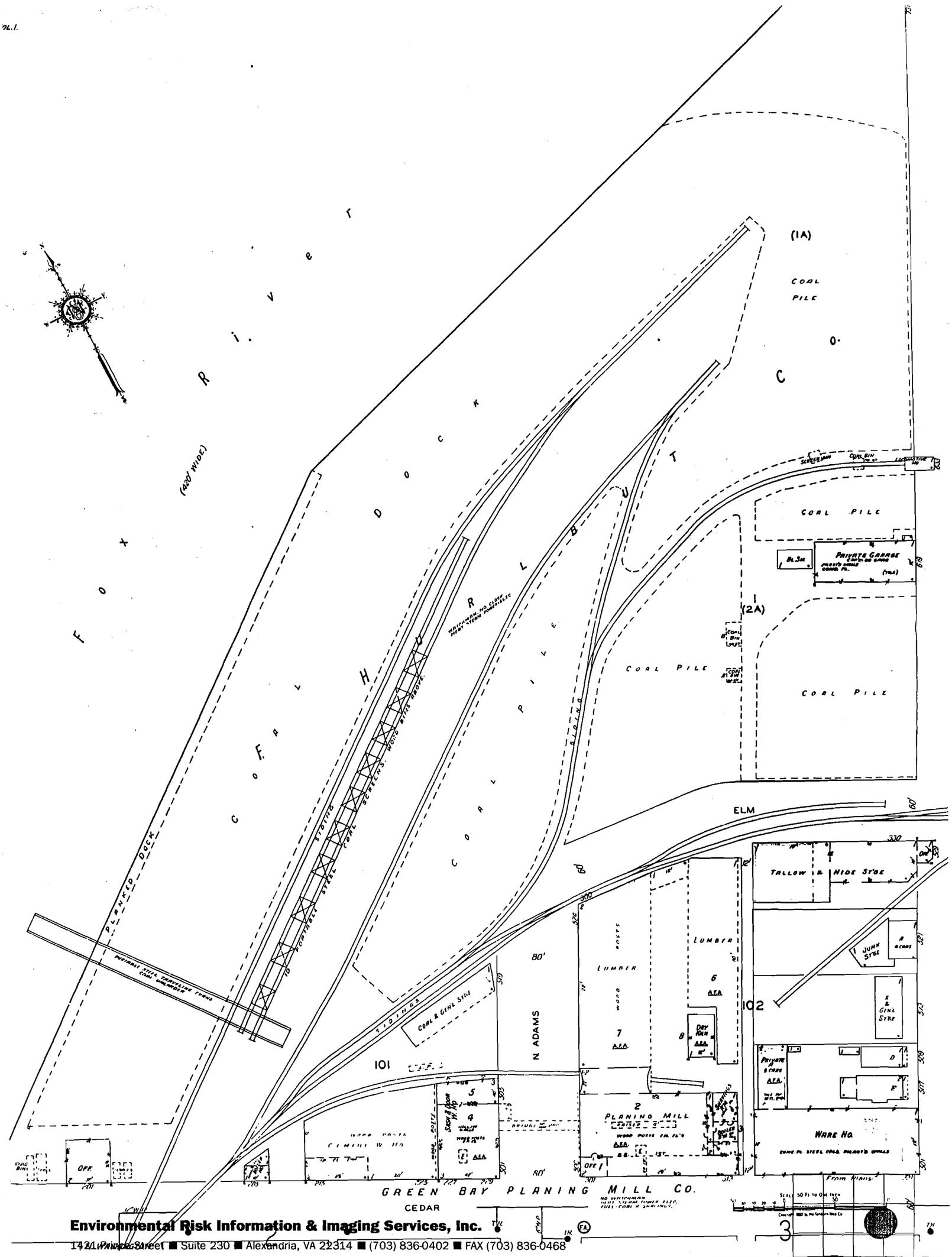

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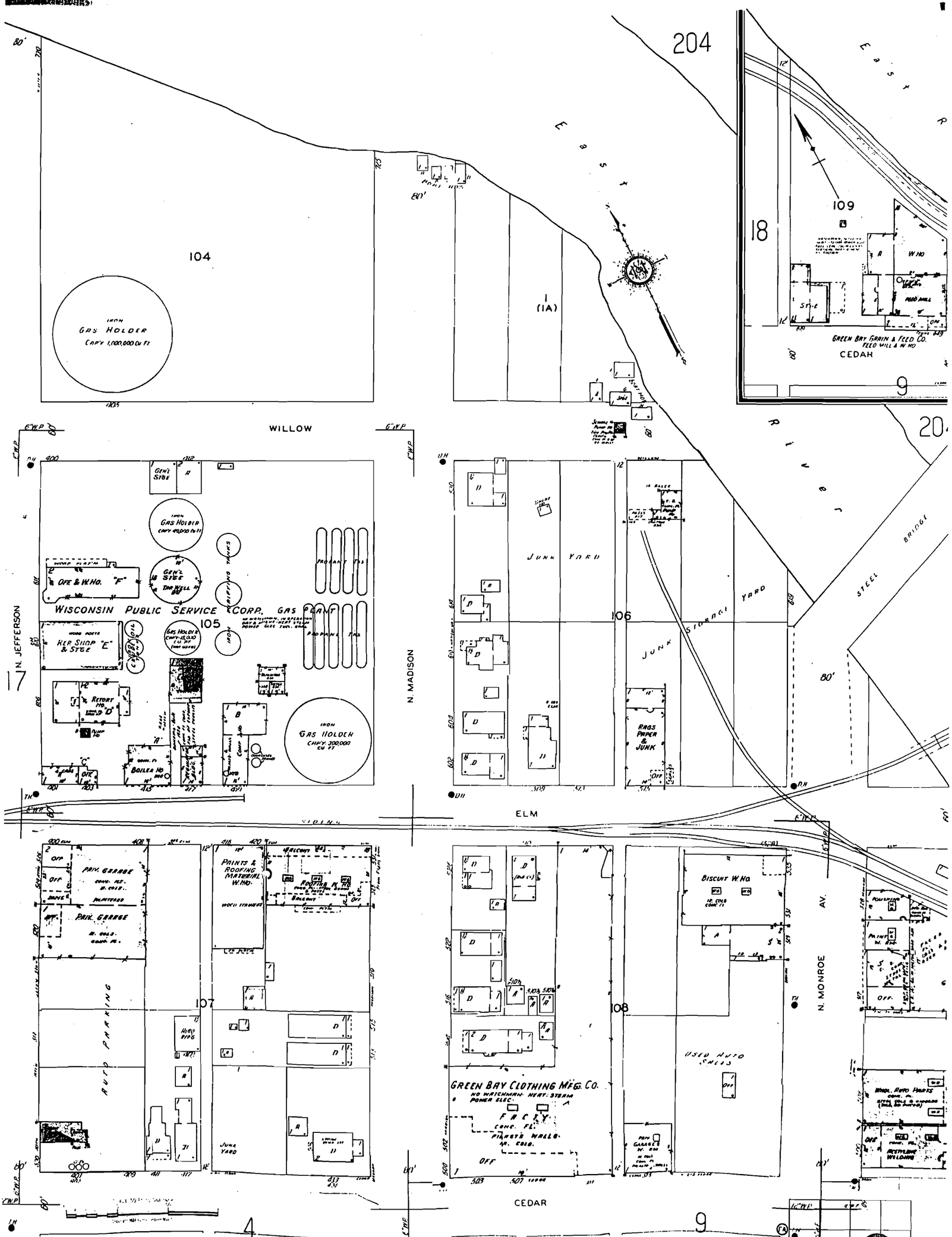

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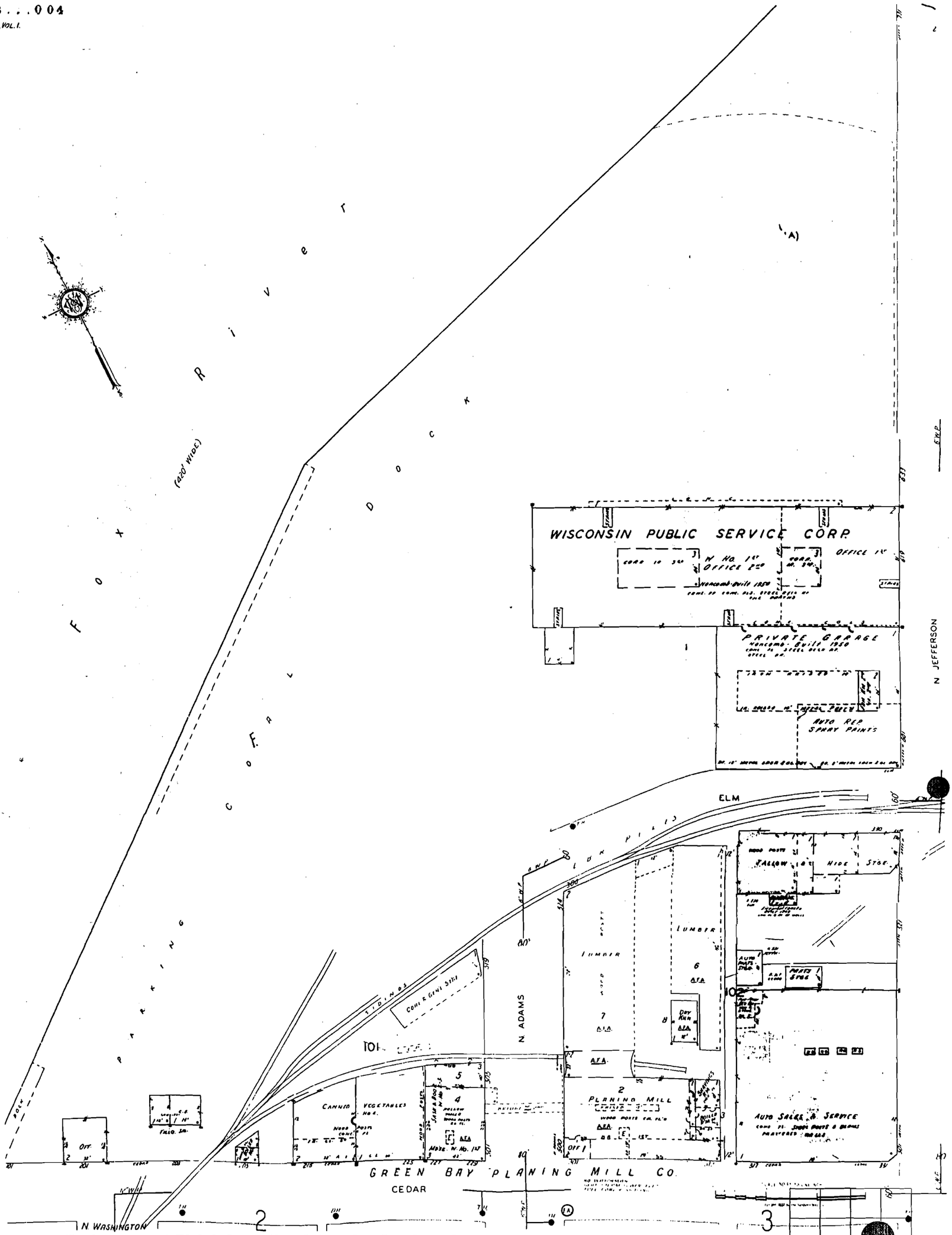
SANBORN MAPS™ by ERIS

1950

...004

VOL. I.



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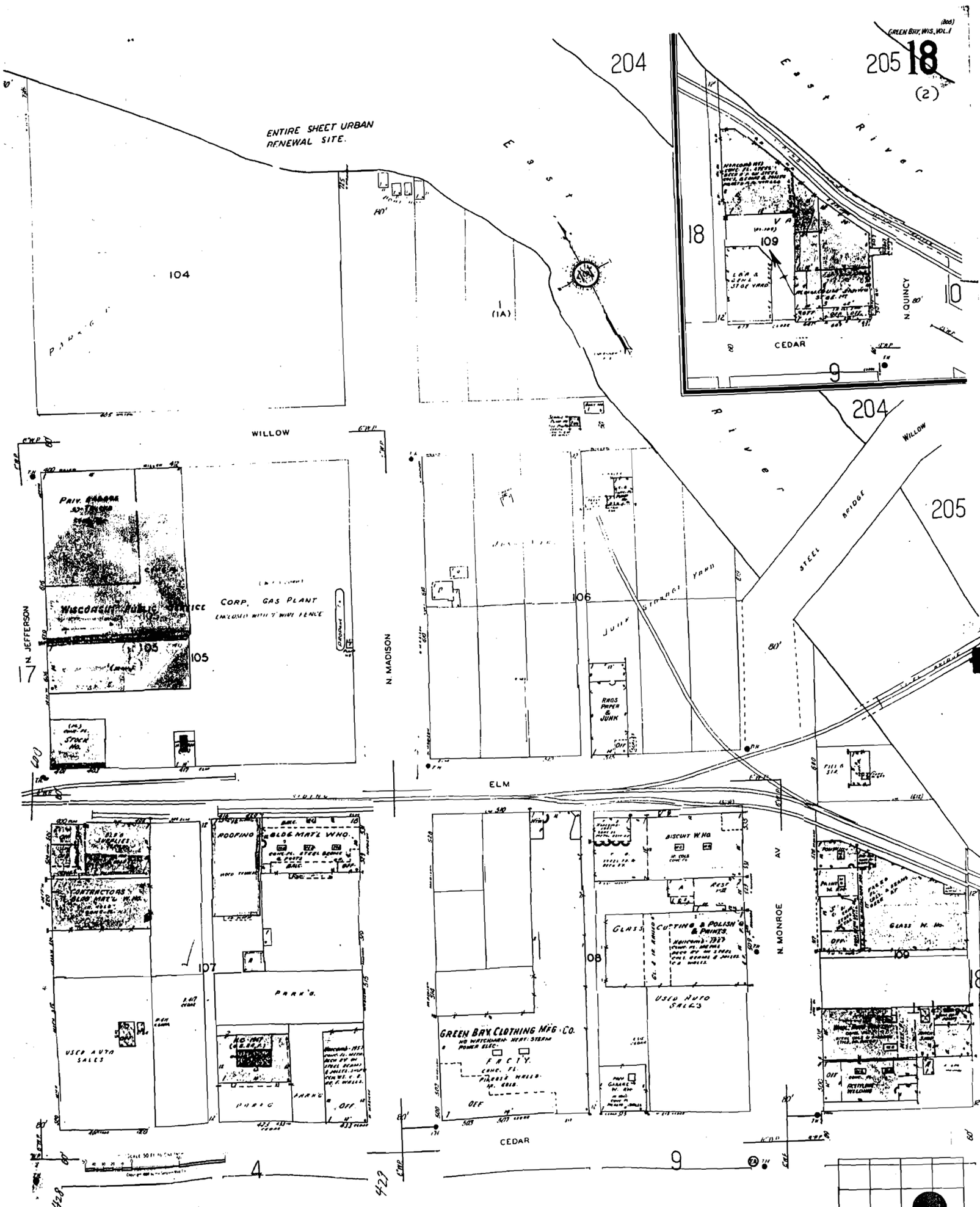

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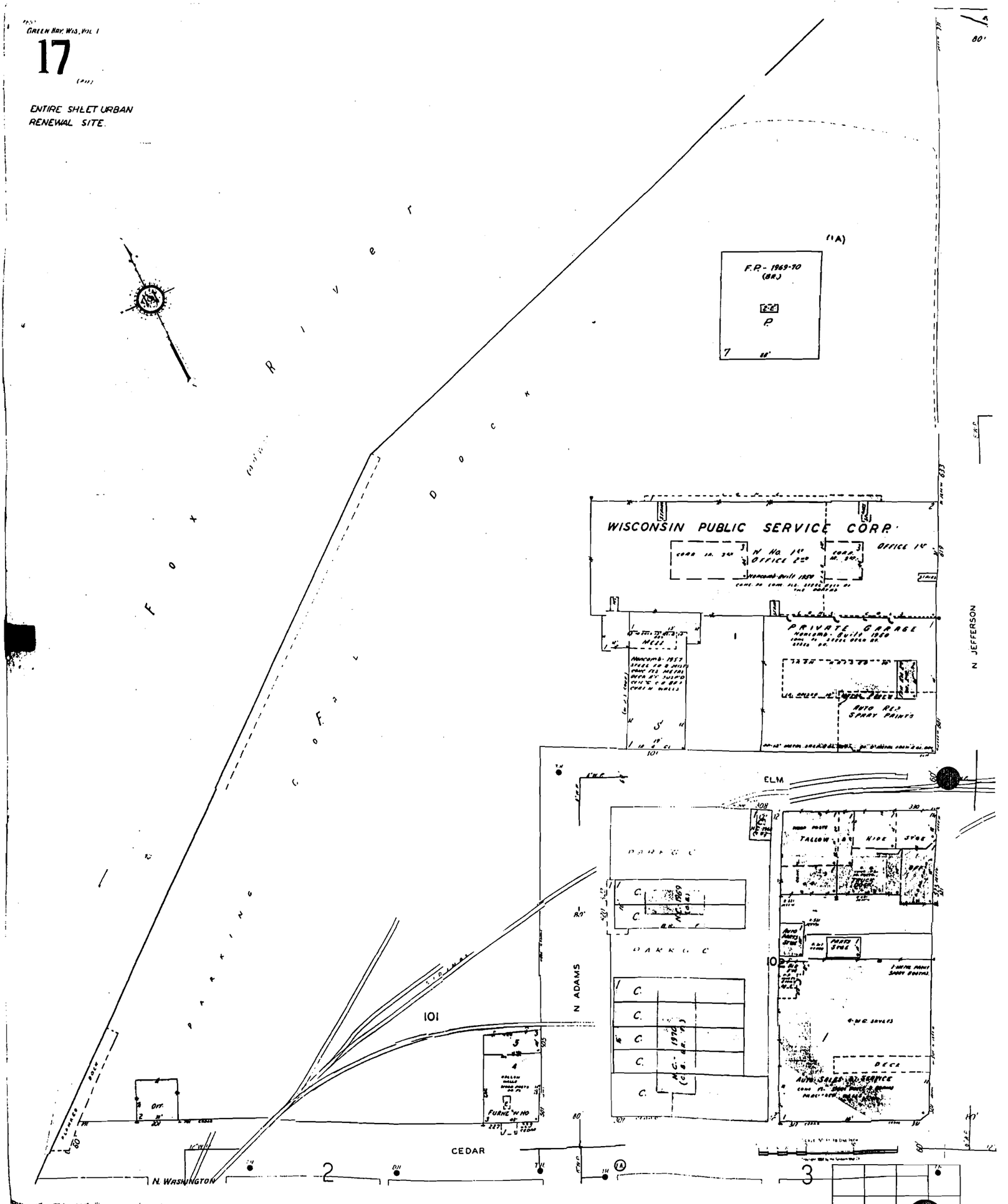
SANBORN MAPS™ by ERIS

0261

GREEN BAY, WIS., VOL. 1

17

ENTIRE SHEET URBAN RENEWAL SITE.



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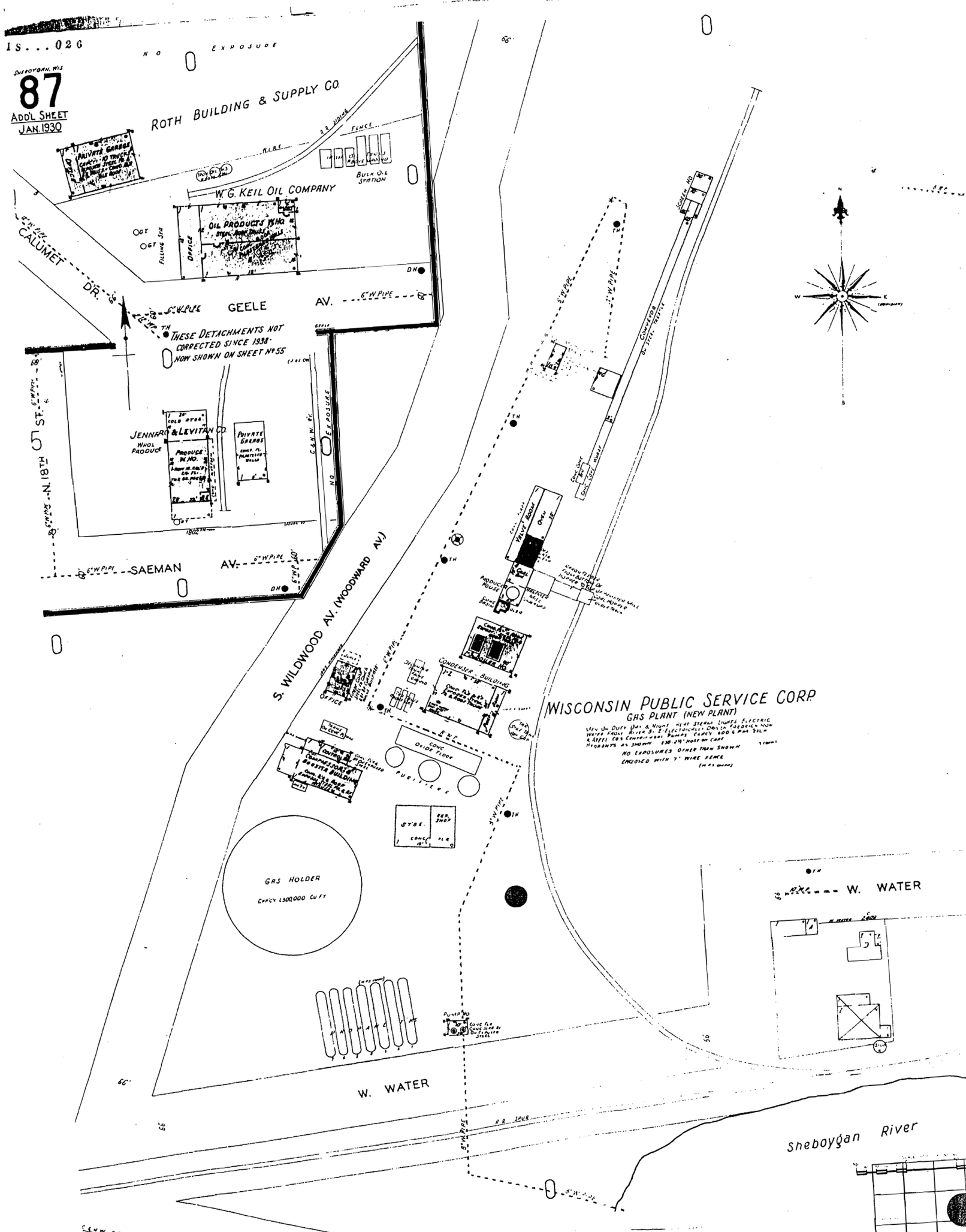
SANBORN MAPS™ by ERIS

1970

A.2 SHEBOYGAN

1950



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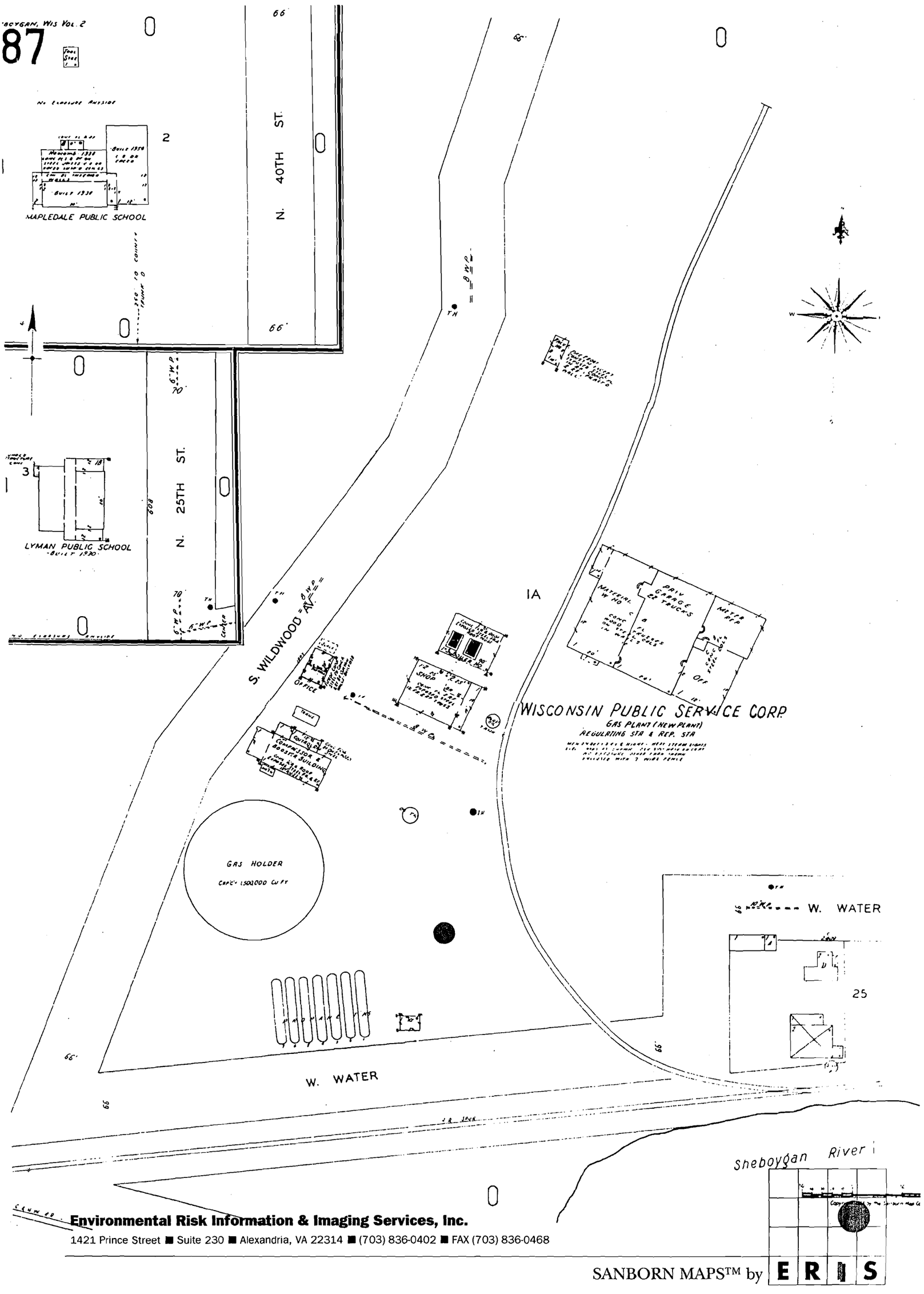

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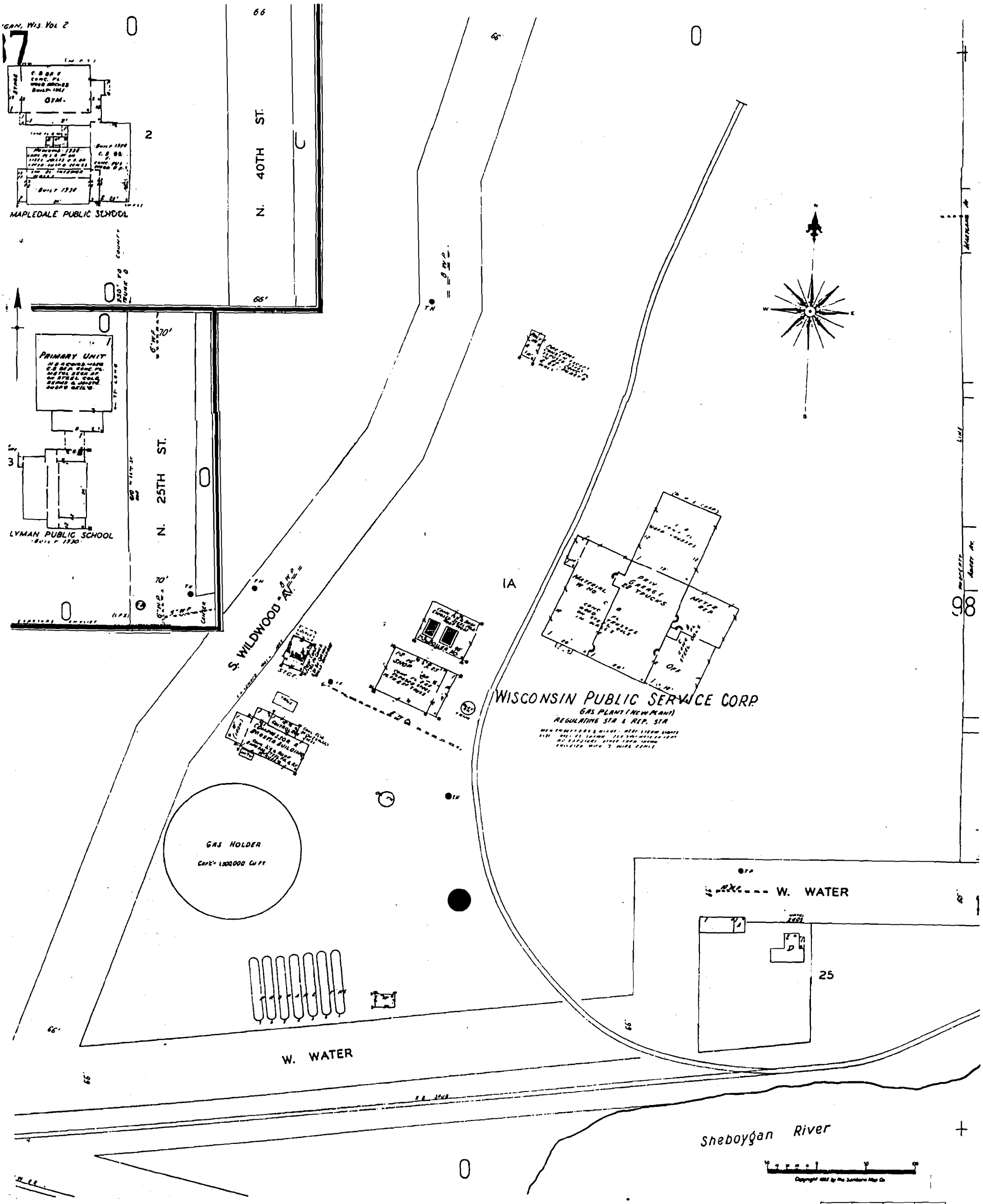
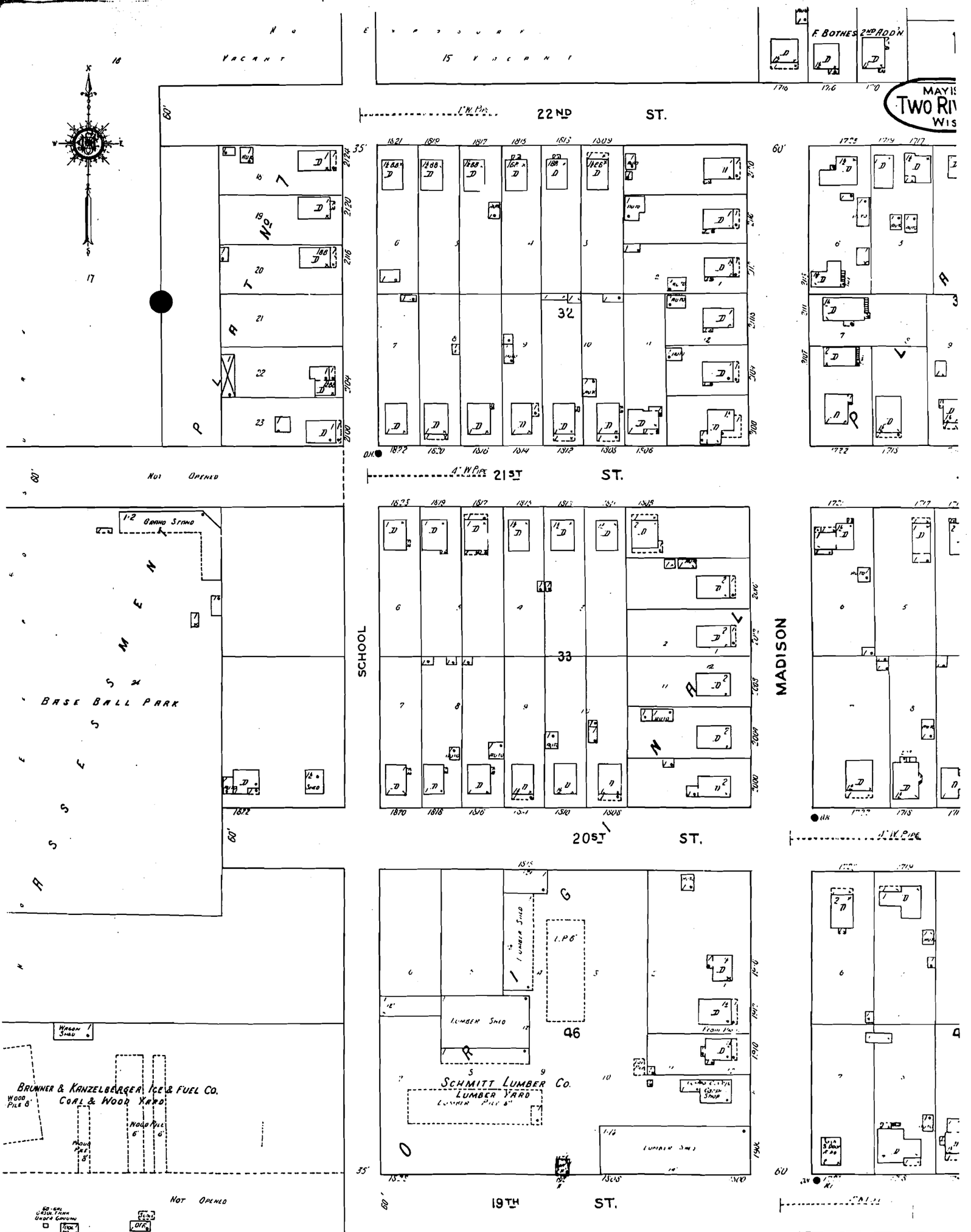


1766

A.3 TWO RIVERS



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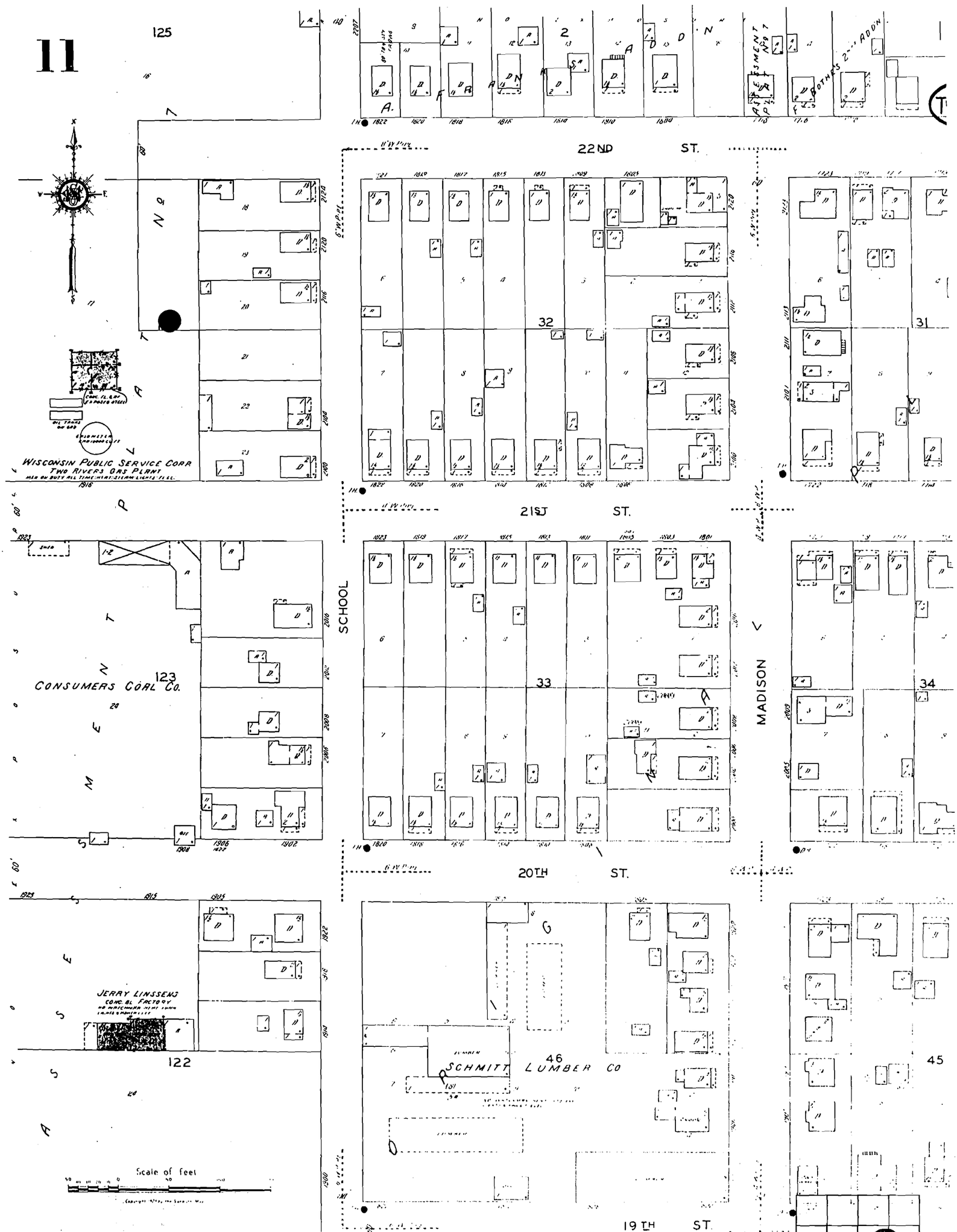
5

1902

b261



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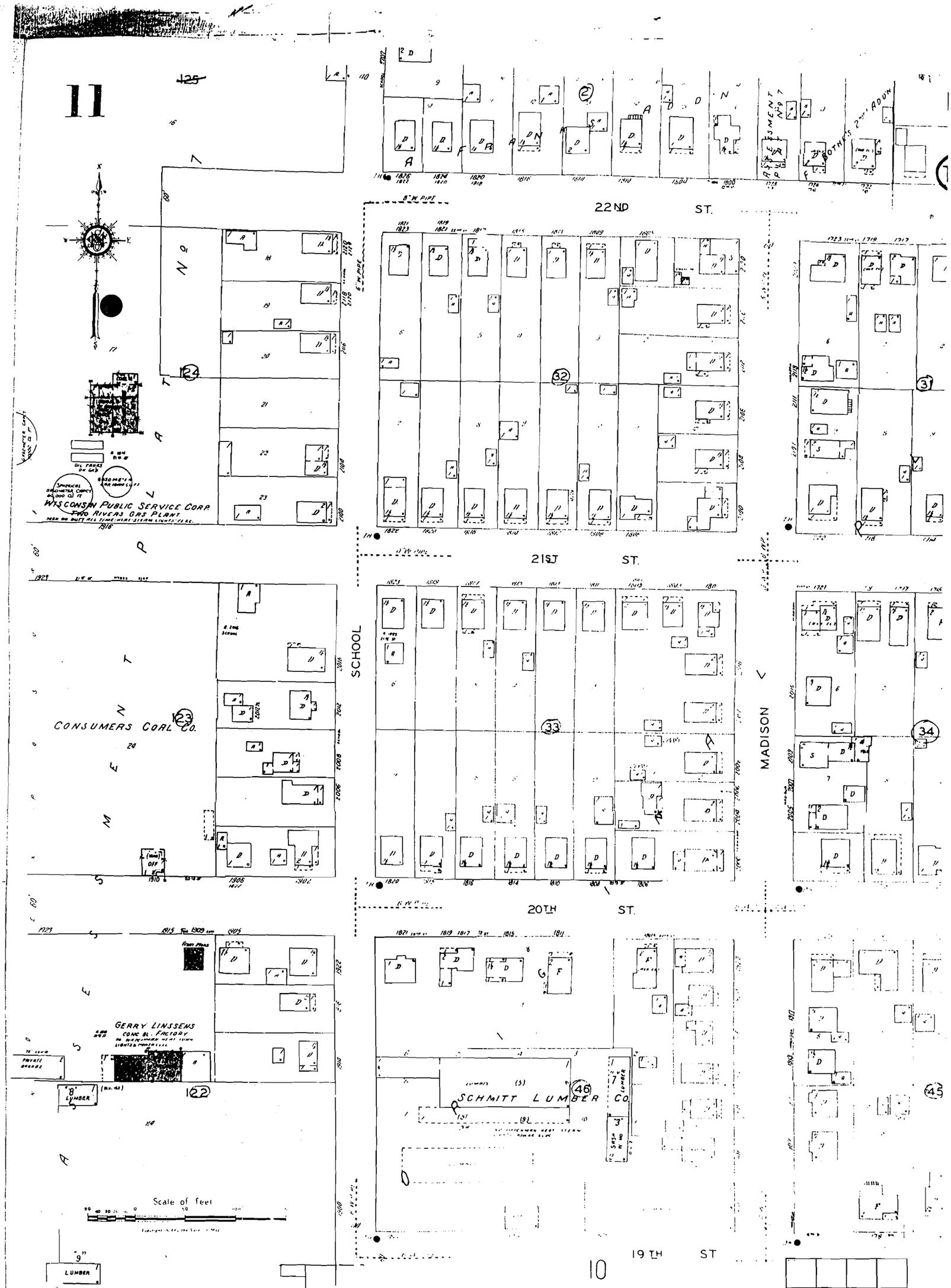
Hhbl

11



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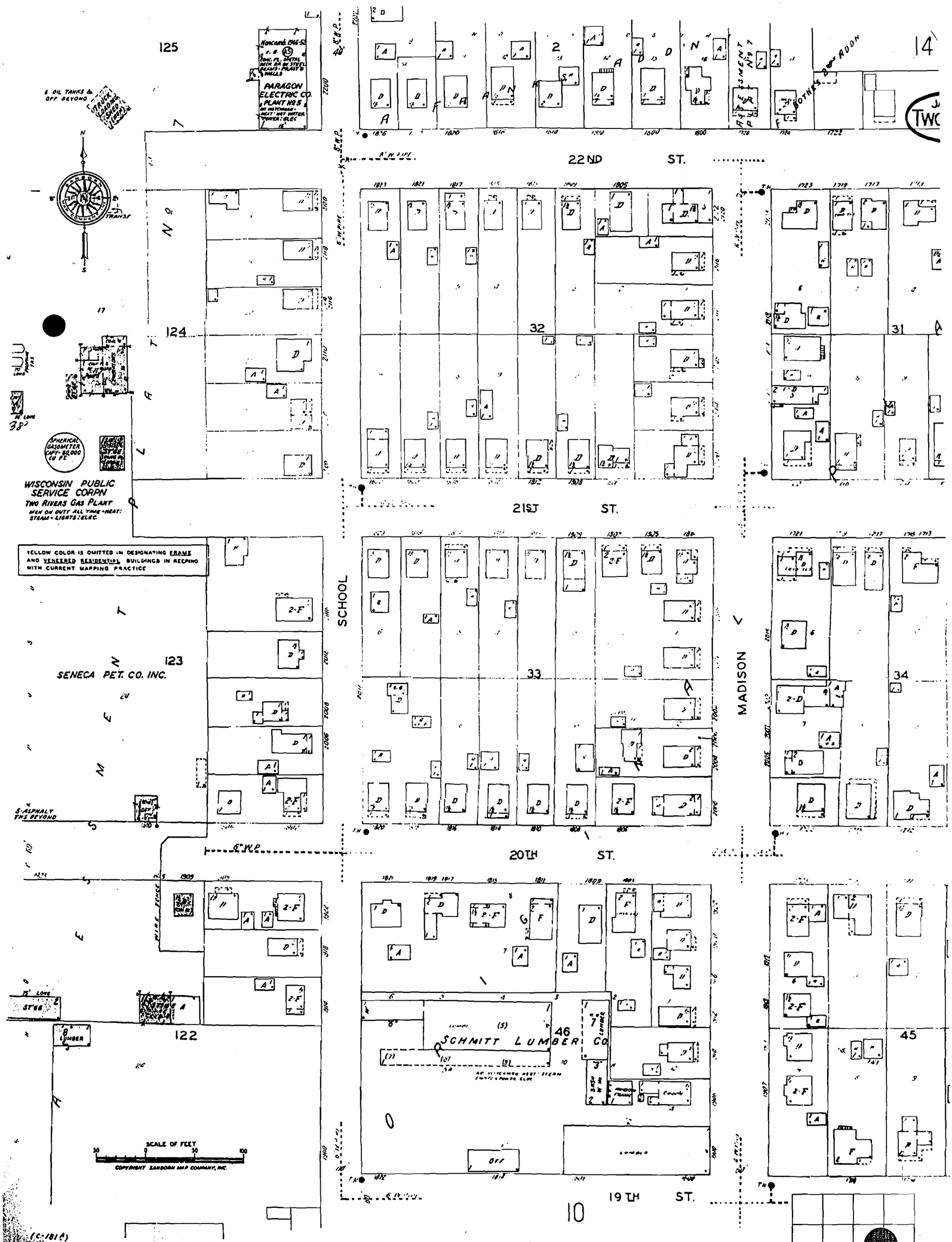
SANBORN MAPS™ by ERIS

1.14

L961

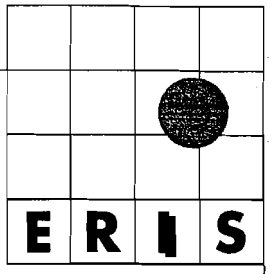


1967

APPENDIX B

ERIS REPORTS

B.1 GREEN BAY



PERTAINING TO:

GREEN BAY, WI 54301

ON BEHALF OF:

NATURAL RESOURCE TECHNOLOGY
21005 WATERTOWN RD
BROOKFIELD, WI 53008-0623

PREPARED ON:

04/15/1994

REPORT NUMBER:

45374

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ERIIS REPORT OVERVIEW

The following features are available for an ERIIS report:

* Database Report
    * Statistical Profile
    * Database Records
* Related Maps
    * Digital Custom Plotted Map
    * Sanborn Fire Insurance Map(s)
    * Topographical Map(s)

Statistical Profile

The statistical profile is an at-a-glance numeric summary of the databases searched for your ERIIS Report.

Database Records

The detailed federal and state database information indicates potential and actual environmental threats within the study radius. These records are sorted by their distance from the study site.

Digital Custom Map

The digital custom map is cross referenced with the database records. The cross-in-circle in the center of the map represents the study site. The red circles represent distances from the study site. The plottable sites in the report are distinguished on the map by symbols of different shape and color.

Sanborn Fire Insurance Maps

The ERIIS collection of historical Sanborn Fire Insurance Maps covers 14,000 cities and towns. These maps may indicate prior use of the study site. If no maps are available for the study site, a notice to that effect is included. This notice should serve as evidence of due diligence.

Topographical Map

USGS topographical maps show natural and man-made features as well as the shape and elevation of the terrain. The 7.5 minute quad maps are produced at a scale of 1:24,000, or one inch represents 2,000 feet.

If you have any questions about this report,
please contact ERIIS Customer Service at 1-800-989-0402

Database: CERCLIS **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2131
Description: Comprehensive Environmental Response, Compensation, And Liability Information System.
The CERCLIS List Is A Compilation Of Known Or Suspected Uncontrolled Or Abandoned Hazardous Waste Sites. These Sites Have Either Been Investigated, Or Are Currently Under Investigation By The EPA For The Release, Or Threatened Release Of Hazardous Substances. Once A Site Is Placed In CERCLIS, It May Be Subjected To Several Levels Of Review And Evaluation And Ultimately Placed On The National Priorities List.

Database: DOCKET **Date:** 12/28/1993
Source Agency: US Environmental Protection Agency
Office Of Enforcement
Phone: 202/260-2614
Description: The Civil Enforcement Docket Is The U.S. Environmental Protection Agency's System For Tracking Civil Judicial Cases Filed On The Agency's Behalf By The Department Of Justice. This Report Contains Information On Cases From 1972 To The Present.

Database: ERNS **Date:** 12/31/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2342
Description: Emergency Response Notification System.
ERNS Is A National Computer Database System That Is Used To Store Information On The Sudden And/Or Accidental Release Of Hazardous Substances, Including Petroleum, Into The Environment. The ERNS Reporting System Contains Preliminary Information On Specific Releases, Including The Spill Location, The Substance Released, And The Responsible Party. Please Note That The Information In The ERNS Report Pertains Only To Those Releases That Occured During 1993.

Database: FINDS **Date:** 06/15/1993
Source Agency: US Environmental Protection Agency
Office Of Information Resources Management
Phone: 202/260-4465
Description: Facility Index System.
The Finds Report Is A Computerized Inventory Of All Facilities That Are Regulated Or Tracked By The U.S. Environmental Protection Agency. These Facilities Are Assigned An Identification Number Which Serves As A Cross-Reference For Other Databases In The EPA's Program System. Each Finds Record Indicates The EPA Program Office That Is Responsible For The Tracking Of The Facility.

Database: NPL **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-3046
Description: National Priorities List.
The NPL Report, Also Known As The Superfund List, Is An EPA Listing Of Uncontrolled Or Abandoned Hazardous Waste Sites. The List Is Primarily Based On A Score That A Site Receives From The EPA's Hazardous Ranking System. These Sites Are Targeted For Possible Long-Term Remedial Action Under The Superfund Act.

Database: NUCLEAR **Date:** 01/01/1993
Source Agency: US Nuclear Regulatory Commission
Permits Section
Phone: 301/492-7000
Description: Nuclear Power Facilities.
The Nuclear Report Is A Comprehensive Listing Of All Licensed And Active Nuclear Power Plants In The United States.

Database: OPENDUMP **Date:** 01/01/1990
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-4687
Description: Open Dumps Report.
The Resource Conservation And Recovery Act Defines The Term "Open Dump" To Mean "...Any Facility Or Site Where Solid Waste Is Disposed Of Which Is Not A Sanitary Landfill Which Meets The Criteria Promulgated Under Section 4004 And Which Is Not A Facility For The Disposal Of Hazardous Waste." Thus, Any Facility Which Fails To Comply With Any One Element Of The Criteria Is Considered To Be An Open Dump.

Database: RCRIS_LG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Large Quantity Generators.
The RCRIS_LG Report Contains Information Pertaining To Facilities That Either Generate More Than 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_LG Report.

Database: RCRIS_SG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Small Quantity Generators.
The RCRIS_SG Report Contains Information Pertaining To Facilities That Either Generate Between 100kg And 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_SG Report.

Database: RCRIS_TS **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Treatment, Storage, And Disposal Facilities.
The RCRIS_TS Report Contains Information Pertaining To Facilities That Either Treat, Store, Or Dispose Of Hazardous Waste.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_TS Report.

Database: TRI **Date:** 12/31/1991
Source Agency: US Environmental Protection Agency
Office Of Pollution Prevention And Toxics
Phone: 202/260-3757
Description: Toxic Release Inventory System Of 1991.
The TRI Report Contains Information On The Industrial Release And/Or Transfer Of Toxic Chemicals As Reportable Under Title III Of The Superfund Amendments And Reauthorization Act Of 1986 (Sara Title III).

ERIIS DATABASE DESCRIPTIONS

Database:	LANDFILL	Date:	04/01/1992
Source Agency:	WI Dept. Of Natural Resources Division Of Solid Waste		
Phone:	608/266-1327		
Description:	The Wisconsin Licensed Landfills List Contains Summary Information Pertaining To All Permitted Solid Waste Facilities Operating In The State Of Wisconsin.		
Database:	LUST	Date:	12/01/1993
Source Agency:	WI Dept. Of Natural Resources PUBLIC INFO REQUEST-ERR SECTION SW3		
Phone:	608/264-6009		
Description:	The Wisconsin List Of Active LUST Sites Is A Comprehensive Listing Of All Reported Leaking Underground Storage Tanks Located In The State Of Wisconsin.		
Database:	SPILLS	Date:	12/16/1992
Source Agency:	WI Dept. Of Natural Resources Spills Section		
Phone:	608/266-2857		
Description:	The Wisconsin Spills List Contains Summary Information Pertaining To All Reported Spills In The State Of Wisconsin.		
Database:	UST	Date:	06/21/1993
Source Agency:	WI Safety And Buildings Division Bureau Of Petroleum Inspection		
Phone:	608/267-1384		
Description:	The Wisconsin UST List Is A Comprehensive Listing Of All Registered Underground Storage Tanks Located In The State Of Wisconsin.		

ERIIS ASTM STATISTICAL PROFILE
State: WI

ERIIS Report #45374 Apr 13, 1994

Site:

GREEN BAY, WI 54301

Latitude: 44.518908
Longitude: -88.010430

Database	Radius (Mi)	Property	Property-1/4	1/4-1/2	1/2-1	>1	TOTAL
NPL	1	NO	0	0	0		0
CERCLIS	.5	NO	0	2			2
RCRIS_TS	1	NO	0	0	0		0
RCRIS_LG	.25	NO	1				1
RCRIS_SG	.25	NO	0				0
ERNS	.005	NO	0				0
UST	.25	NO	2				2
LUST	.5	NO	0	15			15
LANDFILL		NR	NR	NR	NR	NR	0
			3	17	0	0	20

Selection of PROPERTY records requires an accurate street address in the ERIIS job order.

A blank radius count indicates that the database was not searched by this radius per client instructions.

NR in a radius count indicates that the database cannot be reported by this search criteria due to insufficient and/or inaccurate addresses reported by a federal/state agency.

Apr 13, 1994

ERIIS ID.	FACILITY ADDRESS	DATABASE	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55010066244	WISCONSIN PUBLIC SERVICE CORP 700 N ADAMS ST GREEN BAY, WI 54301-5145 COUNTY: BROWN	UST	0.063 Mi	SOUTHWEST	6244
55007000447	WISCONSIN PUBLIC SERVICE CORP 600 N ADAMS ST GREEN BAY, WI 54301-5146 COUNTY: BROWN	RCRIS_LG	0.082 Mi	SOUTHWEST	447
55010066236	WISCONSIN PUBLIC SERVICE CORP 600 N ADAMS ST GREEN BAY, WI 54301-5146 COUNTY: BROWN	UST	0.082 Mi	SOUTHWEST	6236
55001000063	JAMES RIVER CORPORATION 500 DAY STREET GREEN BAY, WI 54305 COUNTY: BROWN	CERCLIS	0.256 Mi	NORTHEAST	63
55005002989	JAMES RIVER CORP. - DAY STREET 500 DAY ST GREEN BAY, WI 54302-1055 COUNTY: BROWN	LUST	0.257 Mi	NORTHEAST	2989
55005001094	WI-MI TRAILWAYS - MONROE AVE. 406 N MONROE AVE GREEN BAY, WI 54301-4908 COUNTY: BROWN	LUST	0.270 Mi	SOUTHEAST	1094
55005005030	HARMON GLASS (FORMER GOODYEAR TIRE) 310 N MONROE AVE GREEN BAY, WI 54301-4906 COUNTY: BROWN	LUST	0.319 Mi	SOUTHEAST	5030
55005001350	LEICHT TRANSFER-DOUSMAN 128 DOUSMAN ST GREEN BAY, WI 54303-2710 COUNTY: BROWN	LUST	0.358 Mi	SOUTHWEST	1350
55005005256	WESTERN LIME & CEMENT 101 JAMES ST GREEN BAY, WI 54303-3437 COUNTY: BROWN	LUST	0.389 Mi	NORTHWEST	5256
55001000133	BAYPORT INDUSTRIAL PARK/DPW 100 NORTH JEFFERSON STREET GREEN BAY, WI 54301 COUNTY: BROWN	CERCLIS	0.403 Mi	SOUTHWEST	133
55005005038	PROCTER & GAMBLE - FOX RIVER PLANT 501 EASTMAN AVE GREEN BAY, WI 54302-1014 COUNTY: BROWN	LUST	0.408 Mi	NORTHEAST	5038
55005000185	FOX RIVER VALLEY RAILROAD 200 DOUSMAN ST GREEN BAY, WI 54303-2712 COUNTY: BROWN	LUST	0.415 Mi	NORTHWEST	185
55005000483	WI-MI TRAILWAYS - SMITH 725 SMITH ST GREEN BAY, WI 54302-1040 COUNTY: BROWN	LUST	0.416 Mi	NORTHEAST	483
55005003126	BODLEY SITE 459 N BROADWAY GREEN BAY, WI 54303-2703 COUNTY: BROWN	LUST	0.430 Mi	NORTHWEST	3126
55005002766	SCHNEIDER NATIONAL 817 MCDONALD ST GREEN BAY, WI 54303-3451 COUNTY: BROWN	LUST	0.435 Mi	NORTHWEST	2766
55005006212	AUTOMATIC MOTORS 626 N BROADWAY GREEN BAY, WI 54303-3406 COUNTY: BROWN	LUST	0.453 Mi	NORTHWEST	6212
55005005322	ROMO, INC. 139 S WASHINGTON ST GREEN BAY, WI 54301-4210 COUNTY: BROWN	LUST	0.455 Mi	SOUTHWEST	5322
55005004640	E-Z GO FOOD MART - WDOT 401 MATHER ST GREEN BAY, WI 54303-3449 COUNTY: BROWN	LUST	0.477 Mi	NORTHWEST	4640
55005004126	CHICO'S SUPER SERVICE 404 MATHER ST GREEN BAY, WI 54303-3450 COUNTY: BROWN	LUST	0.479 Mi	NORTHWEST	4126
55005004049	ALLARD MOBILE BRAKE SERV & SUPPLIES 421 MATHER ST GREEN BAY, WI 54303-3449 COUNTY: BROWN	LUST	0.486 Mi	NORTHWEST	4049

ERIIS ENVIRONMENTAL DATA REPORT
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY INFORMATION SYSTEM
(CERCLIS - RADIUS SITES)

ERIIS Report #45374 — Apr 13, 1994

ERIIS ID / EPA ID	FACILITY	FACILITY ADDRESS	NPL STATUS / INCIDENT CATEGORY	MAP ID
55001000063 WID006133060	JAMES RIVER CORPORATION DISTANCE FROM SITE: 0.256 MILES DIRECTION FROM SITE: NORTHEAST	500 DAY STREET GREEN BAY, WI 54305 COUNTY: BROWN	NOT ON THE NPL BLANK	63

SITE EVENT(S)	COMPLETE DATE	ACTION PRIORITY
DISCOVERY	06/10/91	BLANK
PRELIMINARY ASSESSMENT	12/09/91	BLANK

ERIIS ID / EPA ID	FACILITY	FACILITY ADDRESS	NPL STATUS / INCIDENT CATEGORY	MAP ID
55001000133 WID074797028	BAYPORT INDUSTRIAL PARK/DPW DISTANCE FROM SITE: 0.403 MILES DIRECTION FROM SITE: SOUTHWEST	100 NORTH JEFFERSON STREET GREEN BAY, WI 54301 COUNTY: BROWN	NOT ON THE NPL BLANK	133

SITE EVENT(S)	COMPLETE DATE	ACTION PRIORITY
DISCOVERY	03/23/88	BLANK
PRELIMINARY ASSESSMENT	02/02/89	BLANK
SCREENING SITE INSPECTION	09/30/92	BLANK

ERIIS ID / EPA ID	FACILITY ACTIVITIES / RCRA COMPLIANT (Y/N)	ADDRESS	RAATS ISSUE DATE / RAATS ACTION/STATUS / RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55007000447 WID007947435	WISCONSIN PUBLIC SERVICE CORP LG QTY GEN Y	600 N ADAMS ST GREEN BAY, WI 54301-5146 COUNTY: BROWN	FACILITY NOT REPORTED IN RAATS	0.082 MILES	SOUTHWEST	447

REPORTED WASTE CODES
D001
F001
F003
F005

ERIIS ENVIRONMENTAL DATA REPORT
WISCONSIN UNDERGROUND STORAGE TANKS
(UST - RADIUS SITES)

ERIIS Report #45374 — Apr 13, 1994

ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010066244	WISCONSIN PUBLIC SERVICE CORP DISTANCE FROM SITE: 0.063 MILES DIRECTION FROM SITE: SOUTHWEST	700 N ADAMS ST GREEN BAY, WI 54301-5145 COUNTY: BROWN	UTILITY	WISCONSIN PUBLIC SERVICE CORP	700 N ADAMS ST GREEN BAY, WI 54301 PHONE: 414/433-1140	6244

TANK ID	CAPACITY	PRODUCT
050400683	10000	UNLEADED

ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010066236	WISCONSIN PUBLIC SERVICE CORP DISTANCE FROM SITE: 0.082 MILES DIRECTION FROM SITE: SOUTHWEST	600 N ADAMS ST GREEN BAY, WI 54301-5146 COUNTY: BROWN	UTILITY	WISCONSIN PUBLIC SERVICE CORP	600 N ADAMS ST GREEN BAY, WI 54301 PHONE: 414/433-1602	6236

TANK ID	CAPACITY	PRODUCT
050401170	6000	CHEMICAL

REFNO	FACILITY	STREET	CITY	STATE	ZIP	COUNTY	MAP ID
55005002989	JAMES RIVER CORP. - DAY STREET DISTANCE FROM SITE: 0.257 MILES	500 DAY ST DIRECTION FROM SITE: NORTHEAST	GREEN BAY	WI	54302-1055	BROWN	2989
	SUBSTANCES LEADED GAS UNLEADED GAS	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			
55005001094	WI-MI TRAILWAYS - MONROE AVE. DISTANCE FROM SITE: 0.270 MILES	406 N MONROE AVE DIRECTION FROM SITE: SOUTHEAST	GREEN BAY	WI	54301-4908	BROWN	1094
	SUBSTANCES LEADED GAS VOCS	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			
55005005030	HARMON GLASS (FORMER GOODYEAR TIRE) DISTANCE FROM SITE: 0.319 MILES	310 N MONROE AVE DIRECTION FROM SITE: SOUTHEAST	GREEN BAY	WI	54301-4906	BROWN	5030
	SUBSTANCES LEADED GAS	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005001350	LEICHT TRANSFER-DOUSMAN DISTANCE FROM SITE: 0.358 MILES	128 DOUSMAN ST DIRECTION FROM SITE: SOUTHWEST	GREEN BAY	WI	54303-2710	BROWN	1350
	SUBSTANCES UNLEADED GAS	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005005256	WESTERN LIME & CEMENT DISTANCE FROM SITE: 0.389 MILES	101 JAMES ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3437	BROWN	5256
	SUBSTANCES LEADED GAS FUEL OIL	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			
55005005038	PROCTER & GAMBLE - FOX RIVER PLANT DISTANCE FROM SITE: 0.408 MILES	501 EASTMAN AVE DIRECTION FROM SITE: NORTHEAST	GREEN BAY	WI	54302-1014	BROWN	5038
	SUBSTANCES UNLEADED GAS	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005000185	FOX RIVER VALLEY RAILROAD DISTANCE FROM SITE: 0.415 MILES	200 DOUSMAN ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-2712	BROWN	185
	SUBSTANCES OTHER	QUANTITY UNKNOWN		DESCRIPTION NAPHTHALENE			
55005000483	WI-MI TRAILWAYS - SMITH DISTANCE FROM SITE: 0.416 MILES	725 SMITH ST DIRECTION FROM SITE: NORTHEAST	GREEN BAY	WI	54302-1040	BROWN	483
	SUBSTANCES UNLEADED GAS DIESEL FUEL OIL WASTE OIL	QUANTITY UNKNOWN UNKNOWN UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED NOT REPORTED NOT REPORTED			

REFNO	FACILITY	STREET	CITY	STATE	ZIP	COUNTY	MAP ID
55005003126	BODLEY SITE DISTANCE FROM SITE: 0.430 MILES	459 N BROADWAY DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-2703	BROWN	3126
	SUBSTANCES DIESEL	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005002766	SCHNEIDER NATIONAL DISTANCE FROM SITE: 0.435 MILES	817 MCDONALD ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3451	BROWN	2766
	SUBSTANCES LEADED GAS DIESEL	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			
55005006212	AUTOMATIC MOTORS DISTANCE FROM SITE: 0.453 MILES	626 N BROADWAY DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3406	BROWN	6212
	SUBSTANCES NO SUBSTANCES REPORTED!	QUANTITY NOT REPORTED		DESCRIPTION NOT REPORTED			
55005005322	ROMO, INC. DISTANCE FROM SITE: 0.455 MILES	139 S WASHINGTON ST DIRECTION FROM SITE: SOUTHWEST	GREEN BAY	WI	54301-4210	BROWN	5322
	SUBSTANCES WASTE OIL	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005004640	E-Z GO FOOD MART - WDOT DISTANCE FROM SITE: 0.477 MILES	401 MATHER ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3449	BROWN	4640
	SUBSTANCES UNLEADED GAS VOCS	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			
55005004126	CHICO'S SUPER SERVICE DISTANCE FROM SITE: 0.479 MILES	404 MATHER ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3450	BROWN	4126
	SUBSTANCES LEADED GAS	QUANTITY UNKNOWN		DESCRIPTION NOT REPORTED			
55005004049	ALLARD MOBILE BRAKE SERV & SUPPLIES DISTANCE FROM SITE: 0.486 MILES	421 MATHER ST DIRECTION FROM SITE: NORTHWEST	GREEN BAY	WI	54303-3449	BROWN	4049
	SUBSTANCES LEADED GAS DIESEL	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION NOT REPORTED NOT REPORTED			

ERIIS Radii - 1/4, 1/2, 1 Mi

ERIS
1421 Prince Street, Suite 230
Alexandria, VA 22314
(703)836-0402 (800)989-0402
FAX: (703)836-0468

SITE INFORMATION

Green Bay, WI
Brown County
Job Number: 45374
Map Plotted: Apr 14, 1994

MAP LEGEND

- Hydrography
- Railroads
- Roads
- Highways
- ★ NPL 0 Site(s)
- ● CERCLIS 2 Site(s)
- □ RCRIS_TS 0 Site(s)
- □ RCRIS_LG 1 Site(s)
- □ RCRIS_SG 0 Site(s)
- ☆ ERNS 0 Site(s)
- ◊ UST 2 Site(s)
- ✣ LUST 15 Site(s)

Miles

0 0.25 0.5

B.2 SHEBOYGAN

PERTAINING TO:

SHEBOYGAN, WI 53081

ON BEHALF OF:

NATURAL RESOURCE TECHNOLOGY
21005 WATERTOWN RD
BROOKFIELD, WI 53008-0623

PREPARED ON: 04/15/1994

REPORT NUMBER: 45373

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ERIIS REPORT OVERVIEW

The following features are available for an ERIIS report:

* Database Report
    * Statistical Profile
    * Database Records
* Related Maps
    * Digital Custom Plotted Map
    * Sanborn Fire Insurance Map(s)
    * Topographical Map(s)

Statistical Profile

The statistical profile is an at-a-glance numeric summary of the databases searched for your ERIIS Report.

Database Records

The detailed federal and state database information indicates potential and actual environmental threats within the study radius. These records are sorted by their distance from the study site.

Digital Custom Map

The digital custom map is cross referenced with the database records. The cross-in-circle in the center of the map represents the study site. The red circles represent distances from the study site. The plottable sites in the report are distinguished on the map by symbols of different shape and color.

Sanborn Fire Insurance Maps

The ERIIS collection of historical Sanborn Fire Insurance Maps covers 14,000 cities and towns. These maps may indicate prior use of the study site. If no maps are available for the study site, a notice to that effect is included. This notice should serve as evidence of due diligence.

Topographical Map

USGS topographical maps show natural and man-made features as well as the shape and elevation of the terrain. The 7.5 minute quad maps are produced at a scale of 1:24,000, or one inch represents 2,000 feet.

If you have any questions about this report,
please contact ERIIS Customer Service at 1-800-989-0402

ERIIS DATABASE DESCRIPTIONS

Database: CERCLIS **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2131
Description: Comprehensive Environmental Response, Compensation, And Liability Information System.
The CERCLIS List Is A Compilation Of Known Or Suspected Uncontrolled Or Abandoned Hazardous Waste Sites. These Sites Have Either Been Investigated, Or Are Currently Under Investigation By The EPA For The Release, Or Threatened Release Of Hazardous Substances. Once A Site Is Placed In CERCLIS, It May Be Subjected To Several Levels Of Review And Evaluation And Ultimately Placed On The National Priorities List.

Database: DOCKET **Date:** 12/28/1993
Source Agency: US Environmental Protection Agency
Office Of Enforcement
Phone: 202/260-2614
Description: The Civil Enforcement Docket Is The U.S. Environmental Protection Agency's System For Tracking Civil Judicial Cases Filed On The Agency's Behalf By The Department Of Justice. This Report Contains Information On Cases From 1972 To The Present.

Database: ERNS **Date:** 12/31/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2342
Description: Emergency Response Notification System.
ERNS Is A National Computer Database System That Is Used To Store Information On The Sudden And/Or Accidental Release Of Hazardous Substances, Including Petroleum, Into The Environment. The ERNS Reporting System Contains Preliminary Information On Specific Releases, Including The Spill Location, The Substance Released, And The Responsible Party. Please Note That The Information In The ERNS Report Pertains Only To Those Releases That Occured During 1993.

Database: FINDS **Date:** 06/15/1993
Source Agency: US Environmental Protection Agency
Office Of Information Resources Management
Phone: 202/260-4465
Description: Facility Index System.
The Finds Report Is A Computerized Inventory Of All Facilities That Are Regulated Or Tracked By The U.S. Environmental Protection Agency. These Facilities Are Assigned An Identification Number Which Serves As A Cross-Reference For Other Databases In The EPA's Program System. Each Finds Record Indicates The EPA Program Office That Is Responsible For The Tracking Of The Facility.

Database: NPL **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-3046
Description: National Priorities List.
The NPL Report, Also Known As The Superfund List, Is An EPA Listing Of Uncontrolled Or Abandoned Hazardous Waste Sites. The List Is Primarily Based On A Score That A Site Receives From The EPA's Hazardous Ranking System. These Sites Are Targeted For Possible Long-Term Remedial Action Under The Superfund Act.

Database: NUCLEAR **Date:** 01/01/1993
Source Agency: US Nuclear Regulatory Commission
Permits Section
Phone: 301/492-7000
Description: Nuclear Power Facilities.
The Nuclear Report Is A Comprehensive Listing Of All Licensed And Active Nuclear Power Plants In The United States.

Database: OPENDUMP **Date:** 01/01/1990
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-4687
Description: Open Dumps Report.
The Resource Conservation And Recovery Act Defines The Term "Open Dump" To Mean "...Any Facility Or Site Where Solid Waste Is Disposed Of Which Is Not A Sanitary Landfill Which Meets The Criteria Promulgated Under Section 4004 And Which Is Not A Facility For The Disposal Of Hazardous Waste." Thus, Any Facility Which Fails To Comply With Any One Element Of The Criteria Is Considered To Be An Open Dump.

Database: RCRIS_LG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Large Quantity Generators.
The RCRIS_LG Report Contains Information Pertaining To Facilities That Either Generate More Than 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_LG Report.

Database: RCRIS_SG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Small Quantity Generators.
The RCRIS_SG Report Contains Information Pertaining To Facilities That Either Generate Between 100kg And 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_SG Report.

Database: RCRIS_TS **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Treatment, Storage, And Disposal Facilities.
The RCRIS_TS Report Contains Information Pertaining To Facilities That Either Treat, Store, Or Dispose Of Hazardous Waste.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_TS Report.

Database: TRI **Date:** 12/31/1991
Source Agency: US Environmental Protection Agency
Office Of Pollution Prevention And Toxics
Phone: 202/260-3757
Description: Toxic Release Inventory System Of 1991.
The TRI Report Contains Information On The Industrial Release And/Or Transfer Of Toxic Chemicals As Reportable Under Title III Of The Superfund Amendments And Reauthorization Act Of 1986 (Sara Title III).

Database: LANDFILL
Date: 04/01/1992
Source Agency: WI Dept. Of Natural Resources
Division Of Solid Waste
Phone: 608/266-1327
Description: The Wisconsin Licensed Landfills List Contains Summary Information Pertaining To All Permitted Solid Waste Facilities Operating In The State Of Wisconsin.

OUT OF DATE

Database: LUST
Date: 12/01/1993
Source Agency: WI Dept. Of Natural Resources
PUBLIC INFO REQUEST-ERR SECTION SW3
Phone: 608/264-6009
Description: The Wisconsin List Of Active LUST Sites Is A Comprehensive Listing Of All Reported Leaking Underground Storage Tanks Located In The State Of Wisconsin.

Database: SPILLS
Date: 12/16/1992
Source Agency: WI Dept. Of Natural Resources
Spills Section
Phone: 608/266-2857
Description: The Wisconsin Spills List Contains Summary Information Pertaining To All Reported Spills In The State Of Wisconsin.

Database: UST
Date: 06/21/1993
Source Agency: WI Safety And Buildings Division
Bureau Of Petroleum Inspection
Phone: 608/267-1384
Description: The Wisconsin UST List Is A Comprehensive Listing Of All Registered Underground Storage Tanks Located In The State Of Wisconsin.

ERIIS ASTM STATISTICAL PROFILE
State: WI

ERIIS Report #45373 Apr 13, 1994

Site:

SHEBOYGAN, WI 53081

Latitude: 43.744727
Longitude: -87.740377

Database	Radius (Mi)	Property	Property-1/4	1/4-1/2	1/2-1	>1	TOTAL
NPL	1	NO	0	0	0		0
CERCLIS	.5	NO	0	1			1
RCRIS_TS	1	NO	0	0	0		0
RCRIS_LG	.25	NO	0				0
RCRIS_SG	.25	NO	1				1
ERNS	.005	NO	0				0
UST	.25	NO	3				3
LUST	.5	NO	1	3			4
LANDFILL		NR	NR	NR	NR	NR	0
			5	4	0	0	9

Selection of PROPERTY records requires an accurate street address in the ERIIS job order.

A blank radius count indicates that the database was not searched by this radius per client instructions.

NR in a radius count indicates that the database cannot be reported by this search criteria due to insufficient and/or inaccurate addresses reported by a federal/state agency.

ERIIS SUMMARY OF RADIUS SITES

Apr 13, 1994

ERIIS ID.	FACILITY/ADDRESS	DATABASE	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55005001068	PUBLIC SERVICE CORPORATION 933 S WILDWOOD AVE SHEBOYGAN, WI 53081-4710 COUNTY: SHEBOYGAN	LUST	0.082 Mi	NORTHEAST	1068
55010066267	WISCONSIN PUBLIC SERVICE CORP 933 S WILDWOOD AVE SHEBOYGAN, WI 53081-4710 COUNTY: ST. CROIX	UST	0.082 Mi	NORTHEAST	6267
55010056157	SHEBOYGAN HONDA 901 S TAYLOR DR SHEBOYGAN, WI 53081-4766 COUNTY: ST. CROIX	UST	0.132 Mi	NORTHEAST	6157
55008000096	NEMSCHOFF CHAIRS INC 2218 W WATER ST SHEBOYGAN, WI 53081-4721 COUNTY: SHEBOYGAN	RCRIS_SG	0.169 Mi	SOUTHEAST	96
55010014495	DONALD CRETON 923 S 22ND ST SHEBOYGAN, WI 53081-4705 COUNTY: ST. CROIX	UST	0.231 Mi	NORTHEAST	4495
55005001074	MAXFIELD CORPORATION 2028 MARYLAND AVE SHEBOYGAN, WI 53081-4759 COUNTY: SHEBOYGAN	LUST	0.362 Mi	NORTHEAST	1074
55005001163	SHBOYGAN, CITY OF, MUN INCINERATOR 507 S WILDWOOD AVE SHEBOYGAN, WI 53081-4213 COUNTY: SHEBOYGAN	LUST	0.373 Mi	NORTHEAST	1163
55001000145	SHEBOYGAN MUNI INCINERATOR CITY OF 507 S WILDWOOD SHEBOYGAN, WI 53081 COUNTY: SHEBOYGAN	CERCLIS	0.373 Mi	NORTHEAST	145
55005001109	SHEBOYGAN, CITY OF MUNICIPAL GARAGE 2026 NEW JERSEY AVE SHEBOYGAN, WI 53081 COUNTY: SHEBOYGAN	LUST	0.382 Mi	NORTHEAST	1109

ERIIS ID / EPA ID	FACILITY	FACILITY ADDRESS	NPL STATUS / INCIDENT CATEGORY	MAP ID
55001000145 WID088879218	SHEBOYGAN MUNI INCINERATOR CITY OF DISTANCE FROM SITE: 0.373 MILES DIRECTION FROM SITE: NORTHEAST	507 S WILDWOOD SHEBOYGAN, WI 53081 COUNTY: SHEBOYGAN	NOT ON THE NPL BLANK	145

SITE EVENT(S)	COMPLETE DATE	ACTION PRIORITY
SCREENING SITE INSPECTION	09/01/84	BLANK
DISCOVERY	10/01/80	BLANK
PRELIMINARY ASSESSMENT	02/01/84	BLANK

ERIIS ID / EPA ID	FACILITY ACTIVITIES / RCRA COMPLIANT (Y/N)	ADDRESS	RAATS ISSUE DATE / RAATS ACTION/STATUS / RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55008000096 WID006071104	NEMSCHOFF CHAIRS INC SM QTY GEN Y	2218 W WATER ST SHEBOYGAN, WI 53081-4721 COUNTY: SHEBOYGAN	FACILITY NOT REPORTED IN RAATS	0.169 MILES	SOUTHEAST	96

REPORTED WASTE CODES
D000
D001
D002
F002
F005
U031
U159
U161
U220
U226
U239

ERIIS ENVIRONME . DATA REPORT
WISCONSIN UNDERG..UND STORAGE TANKS
(UST - RADIUS SITES)

ERIIS Report #45373

Apr 13, 1994

ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010066267	WISCONSIN PUBLIC SERVICE CORP DISTANCE FROM SITE: 0.082 MILES DIRECTION FROM SITE: NORTHEAST	933 S WILDWOOD AVE SHEBOYGAN, WI 53081-4710 COUNTY: ST. CROIX	UTILITY	WISCONSIN PUBLIC SERVICE CORP	700 N ADAMS ST GREEN BAY, WI 54301 PHONE: 414/433-1140	6267

TANK ID	CAPACITY	PRODUCT
590100518	1000	WASTE OIL
590100519	10000	SAND/GRAVEL/SLURRY
590100520	12000	UNLEADED

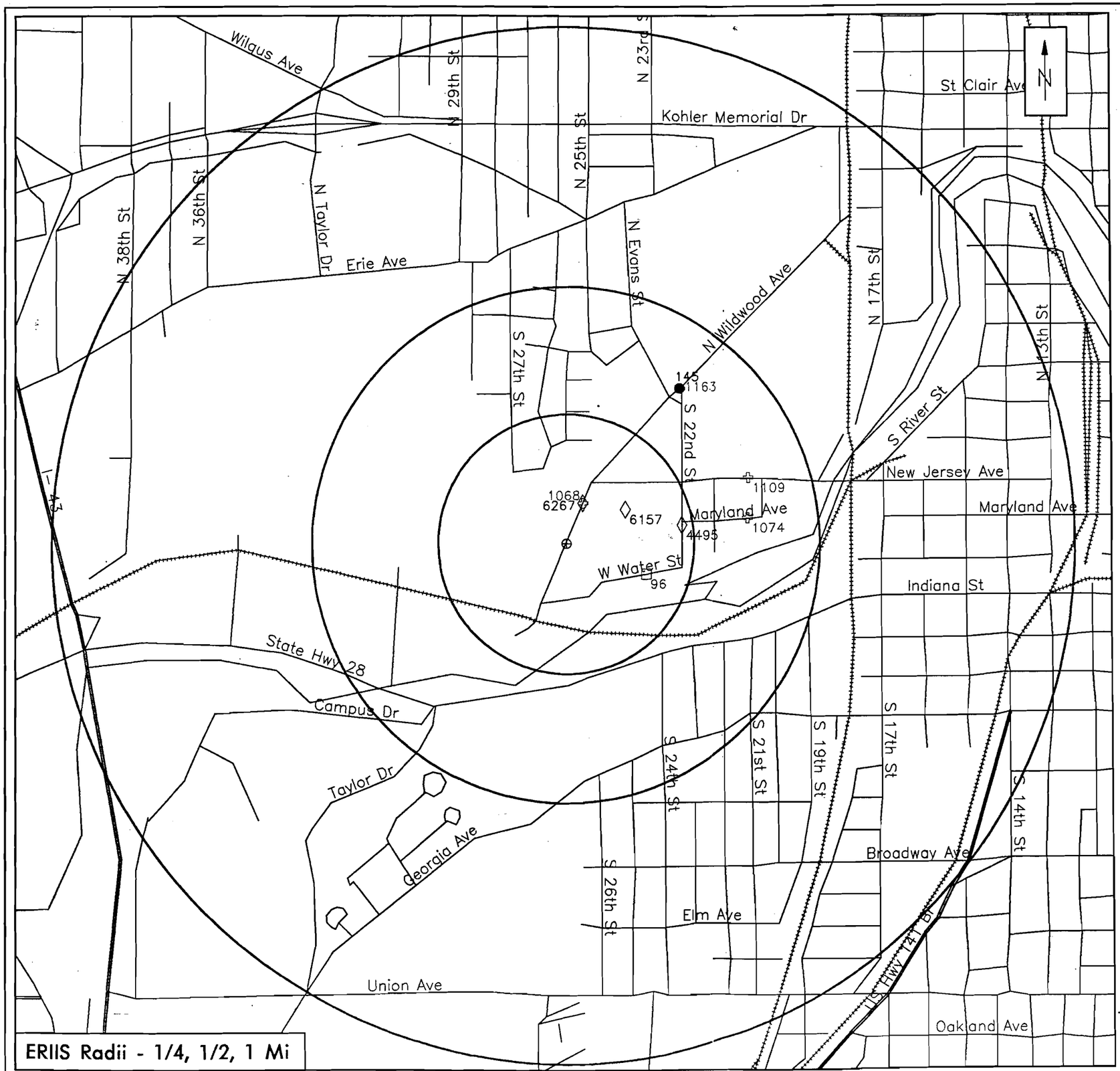
ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010056157	SHEBOYGAN HONDA DISTANCE FROM SITE: 0.132 MILES DIRECTION FROM SITE: NORTHEAST	901 S TAYLOR DR SHEBOYGAN, WI 53081-4766 COUNTY: ST. CROIX	OTHER	JIM KUMMER	901 S TAYLOR DR SHEBOYGAN, WI 53081 PHONE: 414/459-9100	6157

TANK ID	CAPACITY	PRODUCT
590100939	2000	UNLEADED

ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010014495	DONALD CRETON DISTANCE FROM SITE: 0.231 MILES DIRECTION FROM SITE: NORTHEAST	923 S 22ND ST SHEBOYGAN, WI 53081-4705 COUNTY: ST. CROIX	OTHER	DONALD CRETON	923 S 22ND ST SHEBOYGAN, WI 53081 PHONE: 414/458-2243	4495

TANK ID	CAPACITY	PRODUCT
590100224	500	UNLEADED

REFNO	FACILITY	STREET	CITY	STATE	ZIP	COUNTY	MAP ID
55005001068	PUBLIC SERVICE CORPORATION DISTANCE FROM SITE: 0.082 MILES	933 S WILDWOOD AVE DIRECTION FROM SITE: NORTHEAST	SHEBOYGAN	WI	53081-4710	SHEBOYGAN	1068
	SUBSTANCES LEADED GAS UNLEADED GAS	QUANTITY UNKNOWN UNKNOWN		DESCRIPTION LEADED GAS UNLEADED GAS			
55005001074	MAXFIELD CORPORATION DISTANCE FROM SITE: 0.362 MILES	2028 MARYLAND AVE DIRECTION FROM SITE: NORTHEAST	SHEBOYGAN	WI	53081-4759	SHEBOYGAN	1074
	SUBSTANCES UNLEADED GAS	QUANTITY UNKNOWN		DESCRIPTION LEADED GAS			
55005001163	SHBOYGAN, CITY OF, MUN INCINERATOR DISTANCE FROM SITE: 0.373 MILES	507 S WILDWOOD AVE DIRECTION FROM SITE: NORTHEAST	SHEBOYGAN	WI	53081-4213	SHEBOYGAN	1163
	SUBSTANCES NO SUBSTANCES REPORTED!	QUANTITY NOT REPORTED		DESCRIPTION NOT REPORTED			
55005001109	SHEBOYGAN, CITY OF MUNICIPAL GARAGE DISTANCE FROM SITE: 0.382 MILES	2026 NEW JERSEY AVE DIRECTION FROM SITE: NORTHEAST	SHEBOYGAN	WI	53081	SHEBOYGAN	1109
	SUBSTANCES NO SUBSTANCES REPORTED!	QUANTITY NOT REPORTED		DESCRIPTION NOT REPORTED			



E R I S

1421 Prince Street, Suite 230
Alexandria, VA 22314
(703)836-0402 (800)989-0402
FAX: (703)836-0468

SITE INFORMATION

Sheboygan, WI
Sheboygan County
Job Number: 45373
Map Plotted: Apr 14, 1994

MAP LEGEND

- Hydrography
- Railroads
- Roads
- Highways
- ★ NPL 0 Site(s)
- ● CERCLIS 1 Site(s)
- □ RCRIS_TS 0 Site(s)
- □ RCRIS_LG 0 Site(s)
- □ RCRIS_SG 1 Site(s)
- ☆ ERNS 0 Site(s)
- ◇ UST 3 Site(s)
- ✣ LUST 4 Site(s)

Miles

0 0.25 0.5

B.3 TWO RIVERS

PERTAINING TO:

TWO RIVERS, WI 54241

ON BEHALF OF:

NATURAL RESOURCE TECHNOLOGY
21005 WATERTOWN RD
BROOKFIELD, WI 53008-0623

PREPARED ON: 04/15/1994

REPORT NUMBER: 45372

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ERIIS REPORT OVERVIEW

The following features are available for an ERIIS report:

* Database Report
    * Statistical Profile
    * Database Records
* Related Maps
    * Digital Custom Plotted Map
    * Sanborn Fire Insurance Map(s)
    * Topographical Map(s)

Statistical Profile

The statistical profile is an at-a-glance numeric summary of the databases searched for your ERIIS Report.

Database Records

The detailed federal and state database information indicates potential and actual environmental threats within the study radius. These records are sorted by their distance from the study site.

Digital Custom Map

The digital custom map is cross referenced with the database records. The cross-in-circle in the center of the map represents the study site. The red circles represent distances from the study site. The plottable sites in the report are distinguished on the map by symbols of different shape and color.

Sanborn Fire Insurance Maps

The ERIIS collection of historical Sanborn Fire Insurance Maps covers 14,000 cities and towns. These maps may indicate prior use of the study site. If no maps are available for the study site, a notice to that effect is included. This notice should serve as evidence of due diligence.

Topographical Map

USGS topographical maps show natural and man-made features as well as the shape and elevation of the terrain. The 7.5 minute quad maps are produced at a scale of 1:24,000, or one inch represents 2,000 feet.

If you have any questions about this report,
please contact ERIIS Customer Service at 1-800-989-0402

Database: CERCLIS **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2131
Description: Comprehensive Environmental Response, Compensation, And Liability Information System.
The CERCLIS List Is A Compilation Of Known Or Suspected Uncontrolled Or Abandoned Hazardous Waste Sites. These Sites Have Either Been Investigated, Or Are Currently Under Investigation By The EPA For The Release, Or Threatened Release Of Hazardous Substances. Once A Site Is Placed In CERCLIS, It May Be Subjected To Several Levels Of Review And Evaluation And Ultimately Placed On The National Priorities List.

Database: DOCKET **Date:** 12/28/1993
Source Agency: US Environmental Protection Agency
Office Of Enforcement
Phone: 202/260-2614
Description: The Civil Enforcement Docket Is The U.S. Environmental Protection Agency's System For Tracking Civil Judicial Cases Filed On The Agency's Behalf By The Department Of Justice. This Report Contains Information On Cases From 1972 To The Present.

Database: ERNS **Date:** 12/31/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2342
Description: Emergency Response Notification System.
ERNS Is A National Computer Database System That Is Used To Store Information On The Sudden And/Or Accidental Release Of Hazardous Substances, Including Petroleum, Into The Environment. The ERNS Reporting System Contains Preliminary Information On Specific Releases, Including The Spill Location, The Substance Released, And The Responsible Party. Please Note That The Information In The ERNS Report Pertains Only To Those Releases That Occured During 1993.

Database: FINDS **Date:** 06/15/1993
Source Agency: US Environmental Protection Agency
Office Of Information Resources Management
Phone: 202/260-4465
Description: Facility Index System.
The Finds Report Is A Computerized Inventory Of All Facilities That Are Regulated Or Tracked By The U.S. Environmental Protection Agency. These Facilities Are Assigned An Identification Number Which Serves As A Cross-Reference For Other Databases In The EPA's Program System. Each Finds Record Indicates The EPA Program Office That Is Responsible For The Tracking Of The Facility.

Database: NPL **Date:** 01/31/1994
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-3046
Description: National Priorities List.
The NPL Report, Also Known As The Superfund List, Is An EPA Listing Of Uncontrolled Or Abandoned Hazardous Waste Sites. The List Is Primarily Based On A Score That A Site Receives From The EPA's Hazardous Ranking System. These Sites Are Targeted For Possible Long-Term Remedial Action Under The Superfund Act.

Database: NUCLEAR **Date:** 01/01/1993
Source Agency: US Nuclear Regulatory Commission
Permits Section
Phone: 301/492-7000
Description: Nuclear Power Facilities.
The Nuclear Report Is A Comprehensive Listing Of All Licensed And Active Nuclear Power Plants In The United States.

Database: OPENDUMP **Date:** 01/01/1990
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-4687
Description: Open Dumps Report.
The Resource Conservation And Recovery Act Defines The Term "Open Dump" To Mean "...Any Facility Or Site Where Solid Waste Is Disposed Of Which Is Not A Sanitary Landfill Which Meets The Criteria Promulgated Under Section 4004 And Which Is Not A Facility For The Disposal Of Hazardous Waste." Thus, Any Facility Which Fails To Comply With Any One Element Of The Criteria Is Considered To Be An Open Dump.

Database: RCRIS_LG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Large Quantity Generators.
The RCRIS_LG Report Contains Information Pertaining To Facilities That Either Generate More Than 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_LG Report.

Database: RCRIS_SG **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Small Quantity Generators.
The RCRIS_SG Report Contains Information Pertaining To Facilities That Either Generate Between 100kg And 1000kg Of Hazardous Waste Per Month Or Meet Other Applicable Requirements Of The Resource Conservation And Recovery Act.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_SG Report.

Database: RCRIS_TS **Date:** 08/03/1993
Source Agency: US Environmental Protection Agency
Office Of Solid Waste And Emergency Response
Phone: 202/260-2603
Description: Resource Conservation And Recovery Information System - Treatment, Storage, And Disposal Facilities.
The RCRIS_TS Report Contains Information Pertaining To Facilities That Either Treat, Store, Or Dispose Of Hazardous Waste.
Information Pertaining To The Status Of Facilities Tracked By The RCRA Administrative Action Tracking System (RAATS) Is Included In The RCRIS_TS Report.

Database: TRI **Date:** 12/31/1991
Source Agency: US Environmental Protection Agency
Office Of Pollution Prevention And Toxics
Phone: 202/260-3757
Description: Toxic Release Inventory System Of 1991.
The TRI Report Contains Information On The Industrial Release And/Or Transfer Of Toxic Chemicals As Reportable Under Title III Of The Superfund Amendments And Reauthorization Act Of 1986 (Sara Title III).

ERIIS DATABASE DESCRIPTIONS

Database: LANDFILL
Date: 04/01/1992
Source Agency: WI Dept. Of Natural Resources
Division Of Solid Waste
Phone: 608/266-1327
Description: The Wisconsin Licensed Landfills List Contains Summary Information Pertaining To All Permitted Solid Waste Facilities Operating In The State Of Wisconsin.

Database: LUST
Date: 12/01/1993
Source Agency: WI Dept. Of Natural Resources
PUBLIC INFO REQUEST-ERR SECTION SW3
Phone: 608/264-6009
Description: The Wisconsin List Of Active LUST Sites Is A Comprehensive Listing Of All Reported Leaking Underground Storage Tanks Located In The State Of Wisconsin.

Database: SPILLS
Date: 12/16/1992
Source Agency: WI Dept. Of Natural Resources
Spills Section
Phone: 608/266-2857
Description: The Wisconsin Spills List Contains Summary Information Pertaining To All Reported Spills In The State Of Wisconsin.

Database: UST
Date: 06/21/1993
Source Agency: WI Safety And Buildings Division
Bureau Of Petroleum Inspection
Phone: 608/267-1384
Description: The Wisconsin UST List Is A Comprehensive Listing Of All Registered Underground Storage Tanks Located In The State Of Wisconsin.

ERIIS ASTM STATISTICAL PROFILE
State: WI

ERIIS Report #45372 Apr 13, 1994

Site:

TWO RIVERS, WI 54241

Latitude: 44.152968
Longitude: -87.575409

Database	Radius (Mi)	Property	Property-1/4	1/4-1/2	1/2-1	>1	TOTAL
NPL	1	NO	0	0	0		0
CERCLIS	.5	NO	0	0			0
RCRIS_TS	1	NO	0	0	0		0
RCRIS_LG	.25	NO	1				1
RCRIS_SG	.25	NO	1				1
ERNS	.005	NO	0				0
UST	.25	NO	1				1
LUST	.5	NO	0	1			1
LANDFILL		NR	NR	NR	NR	NR	0
			3	1	0	0	4

Selection of PROPERTY records requires an accurate street address in the ERIIS job order.

A blank radius count indicates that the database was not searched by this radius per client instructions.

NR in a radius count indicates that the database cannot be reported by this search criteria due to insufficient and/or inaccurate addresses reported by a federal/state agency.

ERIIS SUMMARY OF RADIUS SITES

Apr 13, 1994

ERIIS ID.	FACILITY/ADDRESS	DATABASE	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55008002217	TEGEN INDUSTRIES LTD 1902 22ND ST TWO RIVERS, WI 54241-2519 COUNTY: MANITOWOC	RCRIS_SG	0.058 Mi	NORTHEAST	2217
55007001562	US OIL TOW RIVERS TERMINAL 2212 SCHOOL ST TWO RIVERS, WI 54241-1902 COUNTY: MANITOWOC	RCRIS_LG	0.071 Mi	NORTHEAST	1562
55010055456	SCHMITT LBR CO 1900 SCHOOL ST TWO RIVERS, WI 54241-2533 COUNTY: MANITOWOC	UST	0.169 Mi	SOUTHEAST	5456
55005000453	SUPER AMERICA #4093 1630 22ND ST TWO RIVERS, WI 54241-2545 COUNTY: MANITOWOC	LUST	0.254 Mi	NORTHEAST	453

ERIIS ID EPA ID	FACILITY ACTIVITIES RCRA COMPLIANT (Y/N)	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55007001562 WID988603494	US OIL TOW RIVERS TERMINAL LG QTY GEN Y	2212 SCHOOL ST TWO RIVERS, WI 54241-1902 COUNTY: MANITOWOC	FACILITY NOT REPORTED IN RAATS	0.071 MILES	NORTHEAST	1562

REPORTED WASTE CODES
D002

ERIIS ID / EPA ID	FACILITY / ACTIVITIES / RCRA COMPLIANT (Y/N)	ADDRESS	RAATS ISSUE DATE / RAATS ACTION/STATUS / RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
55008002217 WID982218661	TEGEN INDUSTRIES LTD SM QTY GEN Y	1902 22ND ST TWO RIVERS, WI 54241-2519 COUNTY: MANITOWOC	FACILITY NOT REPORTED IN RAATS	0.058 MILES	NORTHEAST	2217

REPORTED WASTE CODES
D001

ERIIS ENVIRONME . DATA REPORT
WISCONSIN UNDERGROUND STORAGE TANKS
(UST - RADIUS SITES)

ERIIS Report #45372

Apr 13, 1994

ERIIS ID	FACILITY	FACILITY ADDRESS	TYPE OF USER	OWNER	OWNER ADDRESS	MAP ID
55010055456	SCHMITT LBR CO DISTANCE FROM SITE: 0.169 MILES DIRECTION FROM SITE: SOUTHEAST	1900 SCHOOL ST TWO RIVERS, WI 54241-2533 COUNTY: MANITOWOC	BULK STORAGE	SCHMITT LBR CO	1900 SCHOOL ST TWO RIVERS, WI 54241 PHONE: 414/793-1972	5456

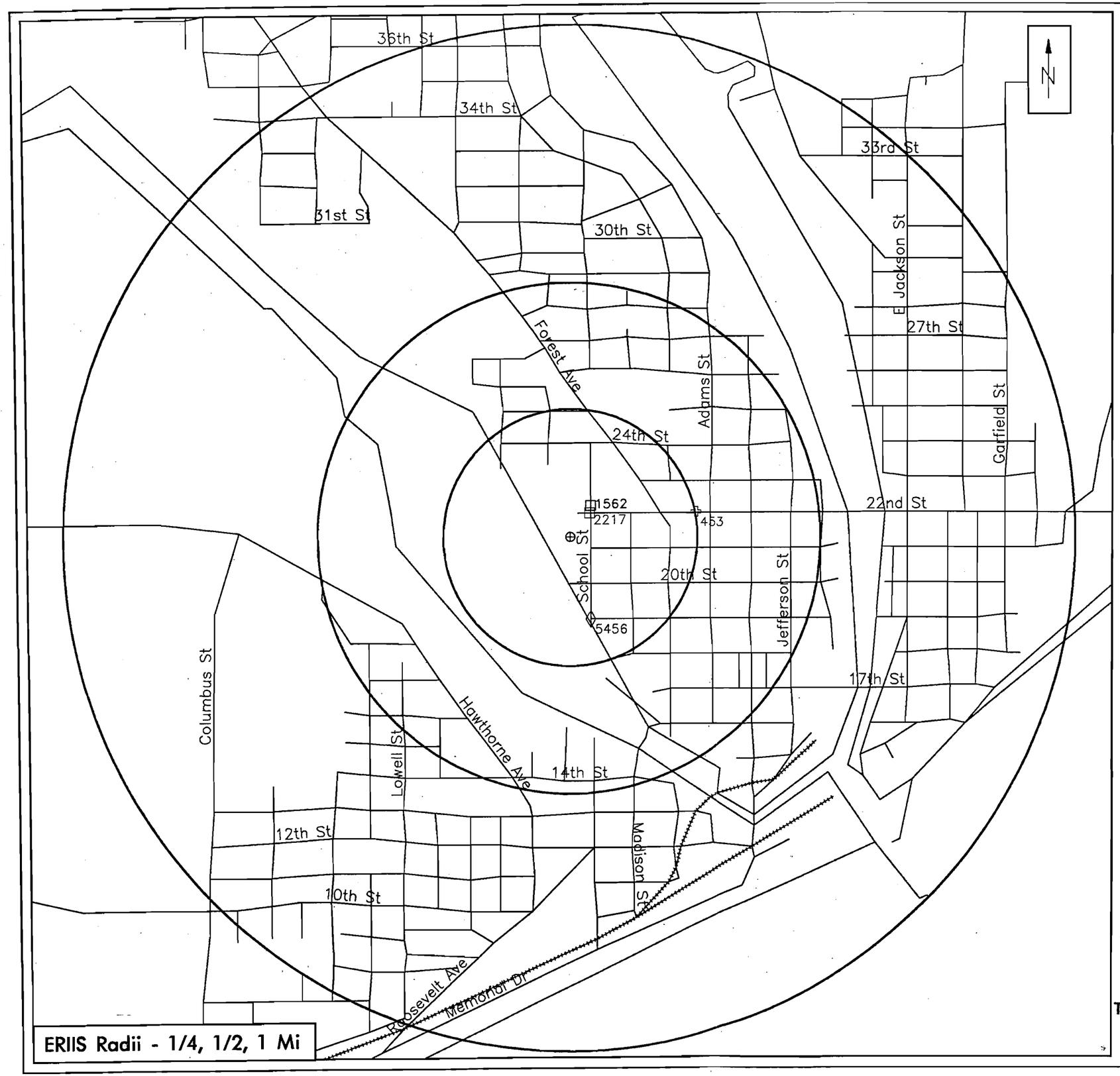
TANK ID	CAPACITY	PRODUCT
361800112	500	LEADED

ERIIS ENVIRONMENTAL DATA REPORT
WISCONSIN LEAKING UNDERGROUND STORAGE TANKS
(LUST - RADIUS SITES)

ERIIS Report #45372 — Apr 13, 1994

REFNO	FACILITY	STREET	CITY	STATE	ZIP	COUNTY	MAP ID
55005000453	SUPER AMERICA #4093 DISTANCE FROM SITE: 0.254 MILES	1630 22ND ST DIRECTION FROM SITE: NORTHEAST	TWO RIVERS	WI	54241-2545	MANITOWOC	453

SUBSTANCES	QUANTITY	DESCRIPTION
UNLEADED GAS	UNKNOWN	NOT REPORTED



ERIIS
1421 Prince Street, Suite 230
Alexandria, VA 22314
(703)836-0402 (800)989-0402
FAX: (703)836-0468

SITE INFORMATION

Two Rivers, WI
Manitowoc County
Job Number: 45372
Map Plotted: Apr 14, 1994

MAP LEGEND

- Hydrography
- Railroads
- Roads
- Highways
- ★ NPL 0 Site(s)
- ● CERCLIS 0 Site(s)
- □ RCRIS_TS 0 Site(s)
- □ RCRIS_LG 1 Site(s)
- □ RCRIS_SG 1 Site(s)
- ☆ ERNS 0 Site(s)
- ◇ UST 1 Site(s)
- ✣ LUST 1 Site(s)

Miles

0 0.25 0.5

APPENDIX C

NRT STANDARD PRACTICES - #07-00 TABLE OF CONTENTS

TABLE OF CONTENTS

PRACTICE TITLE **REFERENCE DOCUMENTS**

07-06 SUBSURFACE EXPLORATION METHODS (Cont'd)

07-07 SOIL SAMPLING AND MEASUREMENT PROCEDURES

07-08 GROUND-WATER SAMPLING AND MEASUREMENT PROCEDURES

PRACTICE TITLE **REFERENCE DOCUMENTS**

07-08 GROUND-WATER SAMPLING AND MEASUREMENT PROCEDURES

07-09 SURFACE WATER/SEDIMENT SAMPLING AND MEASUREMENT PROCEDURES

PRACTICE TITLE **REFERENCE DOCUMENTS**

07-10 AIR SAMPLING PROCEDURES

07-11 WASTE SAMPLING 1, 2

07-12 WASTEWATER SAMPLING AND MEASUREMENT PROCEDURES 1, 2

07-13 FIELD ANALYTICAL PROCEDURES

07-14 FIELD PHYSICAL MESUREMENTS

07-15 LABORATORY ANALYTICAL PROCEDURES

PRACTICE TITLE **REFERENCE DOCUMENTS**

07-15 LABORATORY ANALYTICAL PROCEDURES (Cont'd)

07-16 GEOPHYSICAL SURVEYS

07-17 GROUND-WATER MODELING

07-18 DATA ANALYSIS, REDUCTION AND VALIDATION

REFERENCE DOCUMENTS

1. Natural Resource Technology, Inc., 1994.

2. Modified from: U.S.EPA Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual, February 1, 1991 (ECBSOPQAM).

3. Modified from: U.S.EPA, Performance of Remedial Response Activities at Uncontrolled Hazardous Waste Sites (REM II), U.S.EPA Contract No. 68-01-6939, 1984.

4. American Society for Testing and Materials, 1994 Annual Book of ASTM Standards, Vols. 4.08 and 4.09

5. Wisconsin Department of Natural Resources, Groundwater Sampling Procedures, Publ-WR-168 87, September 1987.

6. Wisconsin Department of Natural Resources, Chapter NR 141, W.A.C.

7. Wisconsin Department of Natural Resources, Leaking Underground Storage Tank Program, Field Screening Procedures, Publ-SW-176-92.

8. Wisconsin Department of Natural Resources, General Interim Guidelines for the Management of Investigative Wastes, January 14, 1993

9. Personal Communication, Layne-Northwest Co., Pewaukee, WI

10. Cole-Parmer Model 01481-61 Conductivity Meter Manual

11. Photovac Microtip IS-3000 User's Manual

12. Cole-Parmer Models 5996-50,60,70,80 pH Meter Instruction Manual

13. American Society for Testing and Materials, Proposed Standard Guide, W. Teasdale, February 5, 1994

14. AMS Vapor Probe Instruction Manual

15. Bouwer and Rice, 1976. "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells". Water Resources Research, Vol.12, No.3.

16. U.S.EPA, Laboratory Data Validation-Functional Guidelines for Evaluating Organics Analyses, February 1, 1988.

17. Solinist Water Level Indicator Instruction Manual

APPENDIX D

STANDARD PRACTICES - WASTE MANAGEMENT

WASTE MANAGEMENT

1.0 PURPOSE

This section outline procedures for minimizing the generation of liquid and solid wastes (particularly hazardous wastes) by all NRT field sampling activities, and for responsibly managing any wastes whose generation cannot be avoided.

2.0 DISCUSSION

NRT Corporate Policy prevents NRT, any staff person or subcontractor to accept responsibility for disposal of hazardous materials generated during the ordinary course of project activities. By contract agreement, NRT clients retain this responsibility.

This section describes the key elements of NRT's Waste Management Program for investigative wastes and wastes which may be generated through remedial activities and/or field screening analyses and defines the personnel who are responsible for its implementation. Supplementary to this Operating Practice is a copy of the Wisconsin Department of Natural Resource's (WDNR) guidance for handling of investigative wastes (Attachment 1) which should be followed and addressed in the project Quality Assurance Plan where work plans are submitted to WDNR prior to commencement of field activities.

3.0 RESPONSIBILITIES

3.1 Corporate Director of Health and Safety (CDHS)

The CDHS is responsible for:

- Tracking changes in legislative requirements (particularly at the federal level) concerning waste handling and disposal, and for communicating those changes to the affected managers;

- Maintaining a Corporate Waste Management Program that is responsive to those requirements;

- Working with NRT managers at all levels in the company to promote the Program and solicit suggestions for its improvements;

- Performing periodic audits of NRT operations to ensure compliance with applicable regulations and Program guidelines;

- Maintain an awareness of current *state and local* requirements for the management of wastes, particularly those which have more stringent handling or reporting requirements than U.S. EPA guidelines (which, in general, are the basis for NRT's Corporate Program guidelines); and,

- Peer review waste reports in response to applicable federal, state, and/or local laws; and,

3.2 Project Director (PD)

Project Director responsibilities include:

- Maintaining a properly designed waste accumulation and storage area, including associated safety equipment, for project wastes;
- Ensuring controlled access to waste accumulation and storage areas;
- Ensuring that wastes are segregated, labeled and stored correctly, based on information provided by the generators of the wastes;
- Ensuring that all wastes are sent to permitted TSD facilities, consistent with Corporate Program guidelines;
- Completing all required paperwork (e.g., manifests for shipped wastes, waste storage area inspection logs) and maintaining these records for the specified time;
- Submitting required waste reports to federal, state, and local agencies.
- Helping clients and managers to identify the safest and most cost effective means of waste disposal;

- Providing training sessions for any NRT staff involved in handling or disposing wastes.

3.3 Project Managers (PMs)

Project Managers will:

- See that all reasonable steps are taken on their project to avoid generating wastes or having NRT take custody of client-generated wastes (e.g., process stream samples);

- Provide adequate funding to dispose of those waste in a safe, legal and timely manner in those cases where NRT must take custody of wastes (i.e. investigative samples); and,

- See that all waste management activities that are carried out at project or field sites are conducted in accordance with Program guidelines by a person who is properly trained to handle those duties.

3.4 Staff

Each NRT staff will:

- Be aware of and implement the appropriate waste minimization procedures to his or her work area;

- Be aware of and follow all regulations and Corporate Program guidelines that apply to managing wastes in his or her work areas or projects;

- Consult with the PM/PD, as needed, to ensure that proper procedures for dealing with any new or unfamiliar waste materials are implemented; and

- Provide the client/PM/PD with all required compositional information when delivering waste materials to the designated accumulation/storage area.

4.0 WASTE MANAGEMENT PROGRAM ELEMENTS (WORK PRACTICES)

4.1 Waste Minimization

The cornerstone of NRT's Waste Management Program is waste minimization. All NRT staff have a responsibility to minimize the generation of wastes and to maximize the reuse of materials in all aspects of their jobs. At NRT, we also have a responsibility to manage both client and corporate resources wisely. These principles, together with the economic realities of rapidly escalating waste disposal costs, provide strong incentives to put into place an effective waste minimization program.

Opportunities to reduce consumption rates of raw materials/manufactured goods or to reuse materials to meet "lower quality" needs abound in all aspects of our lives. Finding those opportunities at NRT is largely a matter of common sense and taking the time to look for them. Table 06-07.1 provides a listing of some commonly used techniques for minimizing waste generation rates, reusing materials, and/or reducing waste disposal costs in laboratory and field operations.

Table 06-07.1 Techniques for Minimizing Waste

Type of Material	Technique
Reagents	When purchasing reagents, consider both usage and shelf life (time to expiration), Don't fall victim to the "false economy" of volume purchasing if you will wind up with expired reagents to dispose of later.
Sample Custody	After analysis, return all samples (and sample containers, if appropriate) to the site from which they were obtained. Clients frequently have processing facilities to effectively recycle or detoxify waste materials. In cases where it is not cost effective to return "used" samples to clients, be sure that the contract contains provisions for charging the client for sample disposal.
Empty Containers	Crush empty containers and/or use a trash compactor. Many waste disposal firms charge by the volume of the waste container rather than by weight.
Non-hazardous	Materials that are non-hazardous (e.g., soil or groundwater samples that are shown by analysis to be "clean") should not be mixed and co-disposed with materials that are hazardous.
Empty Glass	Crush empty glass sample bottles that cannot be reused and take them to a glass recycling center.
Lab or Field	Provide appropriate containers at field sites for collecting and segregating wastes. Hazardous waste must be properly labeled and disposed of within 90 days; non-hazardous wastes (e.g., crushed glass sample bottles) should be similarly labeled but can be held for longer periods.
Acid/Caustic Wastes	Neutralize acidic/caustic wastes that do not contain other constituents (e.g., heavy metals) that would make them hazardous.

All NRT managers are expected to work with their staff to promote an awareness of the principles of waste minimization. All staff are expected to look for opportunities to minimize the quantities of wastes they generate by carefully examining their work practices at the point of waste generation.

4.2 Hazard Identification

A waste material must first be identified for it to be properly and safely segregated and disposed of. Information necessary to make this identification may be obtained from the following:

- Clients (owners/operators of facilities generating the waste);
- Project/field personnel; and
- Lab personnel (analytical results).

In many cases, it will be necessary to contact some combination of these people. Using the information available, the waste should be labeled with pertinent descriptive and compositional data. When staff are unsure about how or what to label a particular waste, they should confer with the PD or CDHS, after first getting all of the information they can about the source and characteristics of the material.

4.3 Sample Expiration

All environmental samples not processed in an analytical laboratory will be disposed of within three months after the completion of analytical testing, unless special arrangements are made in

advance. For periods of storage longer than four months, we generally charge our clients a storage fee.

4.4 Labeling and Packaging

All NRT wastes must be labeled and packaged in accordance with 40 CFR (EPA) and 49 CFR (DOT) regulations. This includes materials put in waste storage areas. The CDHS should be consulted to determine these requirements.

4.5 Waste Treatment

Generally speaking, NRT does not generate large enough quantities of wastes to justify on-site treatment to either reduce waste volumes or to detoxify wastes. In special circumstances, however, where it is clearly cost effective and where on-site treatment can be done safely and in compliance with all applicable environmental regulations and safe work practices, NRT will consider treating wastes or waste on site.

Such treatment procedures will:

- Be implemented on a lab- or work area-specific basis;
- Apply only to specified waste streams; and
- Be implemented only after a thorough environmental and health and safety review by the CDHS.

4.6 Storage

Wastes will be stored in segregated areas based on hazard class in a properly designed and maintained storage facility. Only labeled, legibly marked containers accompanied by any pertinent paperwork will be allowed in the waste storage area. The maximum period for interim storage of hazardous wastes is generally 90 days. Only in unusual circumstances will extensions be granted by the EPA or EPA-approved state agencies.

4.7 Reporting

A manifest will be written for each waste shipment. All reports will be prepared by the PM/PD for that project but will be signed by the client as owner of the waste material. Under no circumstances shall NRT staff report NRT as the owner of the waste being shipped.

4.8 Safety

Personnel protective equipment is required when transferring hazardous waste. Goggles and gloves will be worn. In addition, an air purifying respirator with appropriate cartridges eyewash and safety shower may be necessary. Spill control equipment will also be available in any areas where waste is collected and/or stored on NRT facilities.

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: January 14, 1993 FILE REF:

TO: District Solid and Hazardous Waste Program Supervisors and Bureau Section Chiefs (SW, HW & ERR)

FROM: Paul Didier - SW/3 Paul

SUBJECT: General Interim Guidelines for the Management of Investigative Waste

Contents

I. Purpose

The purpose of this memo is to provide you with general interim guidelines for making decisions regarding the management of investigative waste (IW), produced at sites regulated by our various program authorities. The ERR program formed an investigative waste committee earlier, and some of the recommendations and materials they developed are considered in these guidelines and the attachments. It is my understanding that Mark Giesfeldt, Barb Zellmer and Lakshmi Sridharan will form a second workgroup, including District staff, to develop more specific guidance on this topic, as needed. I would like the Districts to try to implement the guidelines for a 1 year period and then provide comments to this second workgroup. If you would like

to provide comments before the workgroup is formed, please send them to Gary Edelstein - SW/3.

II. Investigative Waste - Definition

For the purposes of these guidelines, IW (or investigation-derived waste) is defined to include any solid waste, including any contaminated media (soil, rock or ground water) generated as a result of typical investigative activities. This includes, but is not limited to: drill cuttings from boring or monitoring well installations, decontamination fluids from cleaning investigative equipment (i.e., drill rigs, backhoes, sampling equipment such as bailers and pumps), spoils from backhoe pits, development water, purge water, water from pump tests, excess samples and dirty personal protective equipment and clothing intended to be thrown away. For purposes of these guidelines, IW does not include any wastes from activities generated as a result of remediation activities. Remediation wastes include wastes from petroleum tank/piping excavations, petroleum tank bottoms/sludges and other wastes that are picked up, treated and returned to the site. Also, the term does not include wastes used for treatability studies, including off-site bench scale tests and on-site pilot tests. We expect to develop separate guidelines in the future addressing the management of wastes generated as a result of remedial action, treatability and pilot test activities. Some of the principles outline in these guidelines may be found to be appropriate for those wastes.

III. General Management Principles

Whenever making decisions regarding the management of IW, the following general principles should be followed:

A. General - IW management methods should be protective of human health and the environment and comply, to the extent practicable, with all applicable laws and rules, including wastewater, solid waste and hazardous waste laws and rules. As a general rule, it will be necessary to use best professional judgement, in light of the site specific conditions, to determine if a management option is protective of human health and the environment. In some instances, a variance, waiver or exemption may be available to allow certain on-site management methods, including redisposal of IW back on the site, that normally would not be allowed under the solid or hazardous waste laws and rules. In other instances, managers may make enforcement discretion decisions. This is discussed in more detail under the next section - Complying with Requirements and Obtaining Approvals.

B. Minimization - The amount of IW produced should be minimized as much as possible. Work plans for investigations should outline drilling and sampling techniques that minimize the generation of IW. Non-intrusive investigation methods may be used, when such methods are considered appropriate for the site. The potential problems of managing IW should be a factor in choosing investigative methods. For additional specific suggestions for IW minimization methods, please refer to page 5 of the attached (appendix B) U.S. EPA Superfund fact sheet, under the title "IDW Minimization".

C. In-State/On-Site Policy - Management of hazardous IW should be in accordance with our "Interim Policy for Promoting the In-State and On-Site Management of Hazardous Waste in Wisconsin", dated March 14, 1991.

D. Liquid IW - Contaminated liquids should generally not be disposed of on the ground or back onto waste at a site. Aqueous wastes may be collected, properly characterized for possible treatment or incorporation into on-site remediation, such as for ground water or leachate, or collected for management at a permitted waste water treatment plant willing to accept these wastes, and having the appropriate approvals to do so. The preferred method for managing contaminated pump test discharges or other large volumes of aqueous wastes with low levels of contamination is to provide any necessary treatment to meet Waste Water program requirements and discharge them to surface wasters in accordance with those program requirements. It may be necessary to provide a temporary treatment unit for such discharges. Liquids generated from areas known to be free of contamination need not be handled as IW, but should not be disposed of over areas known to be contaminated or over waste, to avoid the leaching of additional contaminants into the environment.

E. Management as Part of Remedial Action - For sites where it is known that some sort of remedial action will be conducted in the future, secure on-site storage (see the long-term storage guidelines, attachment 3) and subsequent management of the IW through incorporation into the remedial action is preferred to off-site management, where possible. This will avoid the need for separate treatment and/or disposal arrangements. IW (with the exception of non-indigenous IW) generated during the course of an investigation can be considered part of the site and managed with other wastes from the site, consistent with a final remedy.

F. Field Screening - Where appropriate, field screening methods may be used to help determine if IW contains contaminants of concern, in lieu of laboratory testing. Staff project managers should decide if field screening is an appropriate method for making this determination on a site specific basis. In many instances, field screening might be used to help reduce the number of samples requiring laboratory analysis.

IV. Complying with Requirements and Obtaining Approvals

A. Description of Requirements - Attachment 1 describes the solid waste, hazardous waste, wastewater and air management requirements that may apply to IW. Whenever IW is produced, appropriate steps need to be taken to characterize the waste to determine whether it should be handled as a hazardous waste, and to determine the options available for both the short term and long term management of that IW.

B. Variances, Waivers and Enforcement Discretion - For activities requiring a hazardous waste license, it may be possible to obtain

a variance from that licensing requirement. In addition, in an emergency situation a waiver from any of the hazardous waste requirements may be possible (limited to 90 days in duration). For activities requiring a solid waste license, a written exemption may be possible. **In other situations, a decision may be made to use discretion and not enforce certain solid and/or hazardous waste program requirements.** Each situation must be reviewed and considered individually regarding the appropriate course of action. The following criteria should be considered when making such decisions:

1. The contaminants, their concentrations, and total volume of IW;

2. Media potentially affected (e.g., groundwater, soil) under management options;

3. Location of nearest population(s) and the likelihood and/or degree of site access;

4. Potential exposure to workers; and

5. Potential for environmental impacts.

C. Responsibilities - If a project manager is assigned to and is actively overseeing a project, then that person is responsible for assuring that steps are taken to properly characterize the IW, that a plan is in place for the management of those wastes, and that appropriate approvals are obtained. In all cases I expect the District Program Supervisor to be responsible for determinations on whether, for example, a license is required for a specific waste management activity, along with the other applicable requirements, and whether a variance, waiver or exemption from that licensing requirement is appropriate and possible, or whether discretion is proposed to be used to not enforce certain requirements. In cases where hazardous investigative wastes or large volumes of solid investigative wastes are to be managed or unusual or unique management principles are involved, the determination should be made in writing along with the basis for the determination.

V. Specific Management Principles

A. Decontamination - Equipment decontamination should occur on a pad that is lined and designed to prevent surface water from running on to the pad and to prevent contaminated liquids from running off. Generally, these pads are sloped to drain to a sump that can be pumped out into a storage tank. Often, the pads are constructed of concrete with sealed joints or with a geomembrane covered with a geotextile and gravel. At many sites, it may be necessary to construct such a pad before the investigation begins. It may be necessary to decontaminate and/or manage as waste any contaminated material from the pad once it is decommissioned.

B. Sampling, Testing and Short-Term Storage - Guidelines for sampling, testing and short-term storage of IW are outlined in attachment 2. Where appropriate, field screening methods may be used to help determine if IW contains contaminants of concern, in lieu of laboratory testing. ERR staff project managers should decide if field screening is an appropriate method for making this determination on a site-specific basis.

C. Long-term Storage - Guidelines for long-term storage are outlined in attachment 3. For hazardous IW, a storage facility licence may be required for long-term storage.

D. Test-Pits -- Test pit spoils returned to the same excavation immediately (generally on the same day), where returning the spoils does not pose an increased threat to human health or the environment has been allowed in the past without meeting all approval/licensing requirements using enforcement discretion, and this should be allowed to continue.

VI. Working Group

I expect that the working group formed to develop the specific guidance on this issue will provide direction for which circumstances it is appropriate to use the various authorities to approve the management of investigative waste, and that guidance will provide the direction staff need to assure that we are being consistent state wide on this issue. I also anticipate that this group will develop the specific procedures to use in making decisions regarding the management of investigative waste.

I hope that the working group can be formed and develop the specific guidance on this topic in the next several months. In the mean time please use the general guidelines I have laid out in this memo, as you and your staff address IW management issues.

Attachs.

GAE:BJZ:MFG

cc: Solid & Hazardous Waste Program Unit Leaders, District & Central Office
Darsi Foss - SW/3
Linda Meyer, Patti Hanz, Deb Johnson, & Pete Flaherty - LC/5

ATTACHMENT 1

REGULATORY REQUIREMENTS AND POLICIES AFFECTING INVESTIGATIVE WASTE (IW) MANAGEMENT

Solid Waste Program, Ch. 144, Stats. and Chs. NR 500-520, Wis. Adm. Code

The Solid Waste Program has no regulations or guidance aimed specifically at IW. Under that program's rules and statutes, any material or media from an investigation, even if it is uncontaminated, that is generated and is to be discarded is a solid waste, because the statutory definition of solid waste (s. 144.01(15), Stats.) is very broad. The definition of disposal is also very broad and includes the replacement of solid waste in a closed landfill or other site under investigation. Chapters NR 500-520, Wis. Adm. Code, require persons to obtain a license and meet operating and design standards in order to dispose of solid waste. However, there are exemptions in the rule for the disposal of clean media in s. NR 500.08, Wis. Adm. Code, and wastewater facilities for liquid wastes are also exempt from the rule. Therefore, under the statute and rules, any on-site management of IW consisting of contaminated media or any other material must be in a licenced solid waste facility that meets all operating and design standards or, for liquid wastes, in an exempt wastewater facility. Therefore, re-disposal of such wastes in a closed landfill or disposal area is not allowed without meeting standards and obtaining a license. However, the engineering unit leaders in the program have indicated that there is no site they're aware of where excavated waste from a solid (non-hazardous) waste landfill wasn't allowed to be redisposed of. The program does have a policy (no specific policy memo, although letters and plan approvals may have mentioned it) concerning the re-disposal of solid waste at closed, covered sites. The program will generally allow waste within the site to be moved around on the site, within licenced acreage, for the purposes of grading for site drainage or cover improvement, provided the total waste volume (called design capacity) is not exceeded. Written exemptions from any program requirement, including licensing, may be granted if a written application is submitted and the applicant can show the activity will not cause environmental pollution.

State Hazardous Waste Program, S. 144.60-144.64, Stats. and Chs. NR 600-685, Wis. Adm. Code

The Hazardous Waste Program has no regulations aimed specifically at IW. The only policy memo relating to them is a 4/28/89 memo from Barb Zellmer to the District SW Coordinators specifying who makes determinations on whether a remedial action waste is hazardous. Again, there is a policy on the re-disposal of waste. This policy was documented in the September 29, 1989 closure and long-term plan approval for the Omega Hills North Landfill (appendix A). In summary, the policy generally prohibits the re-disposal of hazardous waste in closed facilities, however, the Program can review such re-disposal proposals on case-by-case basis for each remedial action or investigation proposal, accounting for the latest U. S. EPA guidance (see Superfund, below for the U. S. EPA guidance and regulations discussion).

Although not specifically aimed at IW, the Program has some important requirements that affect its management:

-The definitions of hazardous waste (HW) and solid waste. The IW must be a solid waste to be a HW. The definition of solid waste comes from the solid waste program statutes (s. 144.01(15), Stats.), so any material from an investigation is a solid waste. How a solid waste is identified as hazardous is complicated, but there is considerable guidance available on the subject from both the Program and U. S. EPA. For quick reference, one of the better guidelines is the Superfund Program's land disposal restriction (LDR) fact sheet #5. This discusses how a HW determination is made for waste managed in sites before the HW regulations took effect. There are some exceptions, but for the most part, the state HW rules identify HW the same way the federal rules do. The most notable exceptions are the state F027 and F500 waste listings and the federal TCLP rule, discussed in the next section. The F027 listing is broader than U. S. EPA's, the F500 listing only exists in the state rules and the state rules do not yet have the TCLP test.

-Generator requirements apply to IW that is hazardous. An EPA ID number must be obtained, the manifest system used and the waste must be managed at an approved HW facility. Licenced HW transporters must haul any waste if taken off-site. On-site temporary tank and container storage standards apply to waste as it is generated. Generators who fall under small quantity generator categories must comply with rules less extensive than large quantity generators (it is expected that at most remedial action sites, the amount of IW waste generated would exceed the small quantity generator amounts of 100 and 1000 kg. generated per month).

-Licencing and facility operating and design standards apply to units where HW is treated, stored or disposed of. Large quantity generators must utilize a licensed storage facility for wastes held for more than 90 days. Under a strict interpretation of the rules, any on-site management of hazardous IW (if the quantity is over 100 kg. per month) must be in a licenced HW facility that meets all operating and design standards (under certain circumstances, wastes from generators who produce <100 kg. per month may also be disposed of at a solid waste landfill approved for such disposal by the Department). Therefore, under this interpretation, re-disposal of such wastes in a closed landfill or disposal area is not allowed. Exemptions from the facility design and operating standards (but not licensing) are allowed if the applicant can show equivalent protection. Variances from licensing are allowed for up to 5 years if a hardship to any person exists, and an application is submitted showing how the facility design and operating standards will be met. The variance section has been revised, as part of the NR 600 renumbering revisions, to allow certain types of land disposal. Waivers from any requirement may be granted if an emergency condition exists. As part of the recent revisions, the waiver provision is being expanded to allow waivers for HW management as part of an immediate response to a discharge.

Federal Hazardous Waste Program

Wisconsin is authorized to implement the HW program in lieu of U. S. EPA. However, there are 2 aspects of the federal program that affect IW management that are not yet part of Wisconsin's program. These are the LDR's and the TCLP characteristic.

The LDR's apply to HW that is land disposed. Usually, the waste must be treated before disposal occurs. The requirements are complex, but guidance is available. For quick reference, the Superfund LDR fact sheet series is recommended. Again, under a strict interpretation, re-disposal of IW on-site would trigger the LDR restrictions. There is no LDR guidance that specifically addresses IW. U. S. EPA may grant several types of variances from the LDR's. For Superfund soil and debris, a treatability variance will be normally be granted if a remedy is selected that will not meet LDR treatment levels. However, even under the variance, a certain level of treatment would still be required.

The recently promulgated TCLP test brings many more solid wastes into the HW program. The leach procedure allows wastes that contain certain organics to become characteristic HW, based on the amount of organics that leach out of the waste under the test. Certain contaminated media from the federal underground storage tank program are temporarily excluded. Many IW's that would not be listed HW under the rules are now hazardous under TCLP. There is no TCLP guidance that specifically addresses IW.

Federal Superfund Program

The Superfund Program has no regulations specifically addressing the procedures for managing IW. However, this program has developed general policies on the issue. There is discussion in the proposed (53 FR 51442, 12/21/88) and final (55 FR 8755, 3/8/90) National Contingency NCP preambles on the program's policies for IW. There is a statement that all state and federal standards (applicable or relevant and appropriate requirements - ARARs) should be met for IW management, but for on-site management, "best management practices" are the rule, and compliance is only required to "the extent practicable". U. S. EPA's position is that all investigations (apparently including preremedial site inspections) are conducted pursuant to the CERCLA removal authority, and strict compliance with all standards is not required for a removal (It is important to note that Wisconsin has no equivalent authority under any of the response programs.). Under the federal policy, if IW is managed off-site, however, the facility must be approved for the waste, and in compliance with the Superfund off-site facility policy.

IW managed as part of a Superfund remedial action entirely on-site fall under the on-site permit exemption in §121(e) of CERCLA. Such actions must comply with the substantive technical requirements that are applicable or relevant and appropriate to a management method, but no federal, state or local approvals, permits or licenses are required for the on-site action.

The proposed NCP discussion gives only 2 extreme examples of how to manage IW. The first is that if the IW is from an area with significant dioxin contamination, it will be containerized, tested and managed in accordance with all ARARs. It then mentions that it is standard practice to leave IW on-site until the remedial action commences. The second example is offered as a contrast to the first, stating that the routine testing and containerization

of large volumes of drilling muds and purge waters not suspected to contain hazardous substances may be unnecessary.

In January, 1992, the Superfund Program issued a quick reference fact sheet that apparently only applies to the remedial program (copy attached).

The federal preremedial program has developed a more extensive draft guidance manual addressing IW management. The draft manual has information on regulatory requirements, identification of the specific types of IW, and specific guidelines on how to manage the waste in specific situations. It is generally written to allow flexibility for investigators, consistent with the NCP preamble policies discussed above. Most importantly, it states that:

-Non-hazardous IW, including liquids, may be re-disposed of on-site, regardless of its hazard or the concentration of hazardous constituents in the waste.

-Hazardous IW may be re-disposed of on-site if it poses no immediate threat to human health and the environment, considering the potential for community relations problems with residents in the area. Hazardous organic decontamination fluids may be evaporated (small amounts), or should be disposed of off-site.

Wastewater Program

Liquid IW that is to be discharged to a surface water or sewage treatment plant (POTW) must meet this program's requirements. It should be noted that such discharges are, for the most part, exempt from regulation under the solid or hazardous waste programs.

For surface water discharges, the Wastewater program normally requires a WPDES permit be obtained and specific discharge standards be met, including standards for toxics. It is possible, following future revisions to the Department's general permit that fluids containing very low concentrations of regulated substances may be discharged without treatment or a specific permit. If the concentrations of these substances are above levels of concern, treatment will be required under the general permit, or under a specific permit for more long-term or high volume discharges, such as certain pump tests. However, a short form application for discharge is required. Any person may be issued a general permit if its requirements are met. The program has allowed "on-site" wastewater discharges that are part of a federal Superfund site remedial action to only meet the substantive requirements of a permit, and has not required specific permits for those discharges.

For POTW discharge, the state requirements are usually minimal for these types of wastes. Ch. NR 211, Wis. Adm. Code, prohibits discharges that interfere with or pass through a POTW as well as discharges that exhibit certain characteristics, i. e., explosive, corrosive, fire hazard or could cause a sewer blockage. However, the local authority that operates the facility must give permission for the discharge, and will impose pretreatment requirements, which can vary, depending on the local pretreatment ordinance, and the

potential for the discharge to interfere with the POTW's operation. The local pretreatment requirements can include specific numeric limits for specific contaminants.

Air Management Program

Very briefly, this program regulates air emissions above certain amounts. In some cases it may be advantageous to evaporate certain IW's, such as organic decontamination liquids. This may be done without controls if the emissions do not exceed certain amounts.

documents will be responded to under separate cover. A meeting was held on September 14, 1989 to discuss certain technical issues related to the draft determination. WMI submitted additional comments related to the statistical test used for groundwater monitoring on September 14, 1989, through its attorneys. WMI submitted additional comments on the final use plan issue and a copy of an August 13, 1976 soil documentation report prepared by STS Engineers, Inc. on September 19, 1989. WMI submitted information on a site in Pennsylvania on September 26, 1989. Department staff had additional conversations with WMI staff regarding statistical analysis issues on September 28, 1989. The Department's response to all the comments, submittals (except the legal documents) and the meeting are outlined below.

Condition No. 4

This condition sets out the requirements relating to the re-disposal of wastes in the landfill that are generated from on-site remedial actions and investigations, herein referred to as the "re-disposal issue". This issue involves both Department and U. S. EPA regulations and policies. U. S. EPA's policies relating to this issue are still evolving. To give a clear response to the comments, it is helpful to briefly describe both the Department's and U. S. EPA's regulations and policies.

Under s. NR 181.44(1), Wis. Adm. Code, a landfill may not operate (i. e. accept hazardous waste for disposal) without having an operating or interim license or waiver issued under ch. NR 181, Wis. Adm. Code (variances aren't available to landfills under s. NR 181.55(10), Wis. Adm. Code). In accordance with the Chapter, hazardous waste can be generated from on-site remedial or investigative activities at the landfill. Under the "derived-from" and "mixture" rules, s. NR 181.12(1)(b)4. and 2., Wis. Adm. Code, material removed from the landfill, once removed for management, are hazardous wastes if they are contaminated by hazardous constituents from the past disposal of listed hazardous wastes. A closed landfill which doesn't have an operating or interim license may not accept such material for disposal, even if the material originated there, without violating the rule. The Department has, as a matter of policy, allowed closing landfills that formerly accepted hazardous waste (the Department may allow a closing hazardous waste landfill to continue to operate and accept solid waste under s. NR 181.44(12)(a), Wis. Adm. Code) and still have open hazardous waste units to continue to accept remedial waste generated on-site without a license or waiver, but only until the open hazardous waste unit closes.

U. S. EPA's regulations are similar and require a landfill to have a permit or interim status to continue to accept hazardous waste, and also require a landfill to close within 180 days after ceasing to accept hazardous waste (U. S. EPA is proposing regulations that would allow disposal facilities to continue to accept non-hazardous solid wastes without closing). It's regulations also include the "derived-from" and "mixture" rules. In addition, U. S. EPA has developed a "contained in" policy for non-solid waste media, such as soil or groundwater that is contaminated by hazardous wastes. Such contaminated media must be managed as a hazardous waste until all the contamination is removed, if contaminated by listed waste, or until the contaminated media no longer displays a characteristic, if contaminated by characteristic waste. U. S. EPA has been petitioned to develop a "deminimus"

rule setting specific concentration levels for hazardous constituents in media below which it would no longer be regulated as a hazardous waste. Until such a rule is promulgated, U. S. EPA and the states may look at each situation involving potentially contaminated media on a case by case basis.

U. S. EPA has developed additional policy and guidance related to the application of the HSWA land disposal restrictions for on-site actions at sites remediated under a federal Superfund project. The Department understands that U. S. EPA intends that this policy apply to RCRA hazardous waste facilities. WMI's comments referred to some of this guidance, as related to Superfund sites. In summary, this guidance describes how to determine when a RCRA waste is being managed and when a disposal activity takes place on-site that triggers the land disposal restrictions. A new term, "placement", was developed to help determine when disposal occurs that cause the land disposal restrictions to apply. This term does not appear in the federal regulations. However, the Department understands that U. S. EPA plans to codify the policy in the future. In short, "placement", and hence disposal, takes place if waste is managed in a different unit than it came from, or in the same unit it came from if it is first managed in an intervening treatment or storage unit. If the waste is moved around or consolidated in the same unit or "area of contamination", consolidated without being managed in an intervening unit, then "placement" does not occur.

The Department has not yet incorporated the land disposal prohibitions into ch. NR 181, Wis. Adm. Code, but intends to do so in the future. Once those rules are adopted, the Department will consider adopting the U. S. EPA policies and guidance related to them. In the meantime, the Department can consider, on a case by case basis, U. S. EPA's policies when formulating its own policies on the re-disposal issue.

WMI has requested that the Department regulate wastes removed from the landfill differently. Specifically, WMI has requested that:

1. Material removed from the landfill that has "clearly been significantly contaminated by demonstrable mixing and are removed for placement at a different management unit..." would be the only material managed as a hazardous waste in accordance with the condition.

2. The Department grant a treatability variance for soil and debris from the landfill and allow removed waste to replaced in the existing fill or disposed of at Parkview Landfill.

3. That leachate from the landfill be assigned the hazardous waste number for all the hazardous wastes known to be accepted at the landfill.

In response to request 1, limiting the requirements to material that has "clearly been significantly contaminated by demonstrable mixing" would not meet the intent of the "derived-from" and "mixture" rules under ch. NR 181, Wis. Adm. Code. In addition, such a limit would be contrary to U. S. EPA's regulations; we are not aware of any federal policy that limits these two rules as this proposed language would. Finally, it is not clear who would make such a demonstration. Any material from the landfill that has the potential to be contaminated by hazardous constituents must be managed as a hazardous waste. However, in response to the submitted comments and the

September 14 meeting discussion, the Department can further refine the condition to more clearly indicate that if soil, including cover soil, and groundwater is demonstrated by WMI to not be contaminated, then it would not be regulated as a hazardous waste in accordance with the condition. This was the condition's original intent. Until a "deminimus" rule is in place, the Department has latitude in judging if a demonstration method is adequate. Generally, the Department's policy is to require testing of the material, and field screening methods can be considered, depending on the hazardous constituents of concern (i. e., if VOC's are of concern, an Hnu or OVA screening method may be appropriate). Also, Department field staff may determine, on a case by case basis, that certain materials are not considered contaminated based on field observations.

Request 1 also has language further limiting the requirements only to material "removed for placement in a different management unit". This limitation would defeat the purpose of the condition and would generally allow re-disposal on site without limits. This would be in clear violation of ch. NR 181. Wis. Adm. Code, as outlined in the second paragraph of the response to the Condition No. 4 comments, above. We also note this would be in conflict with the Closure and Long-Term Care plan, page 2-10. The Department does not intend to grant a "blanket" approval to the re-disposal of waste in the landfill during the entire long-term care period. Therefore, the condition will not be revised to conform with this request. However, in light of U. S. EPA's policies, as discussed above, the Department is willing to consider, on a case by case basis, requests for re-disposal of wastes associated with remedial actions and investigations, with <u>each separate</u> remedial action or investigation proposal. That will allow the Department to take into account any changes in U. S. EPA guidance or policy, the kinds of wastes being generated, any testing requirements, and the portion of the landfill the wastes are being re-disposed of in. The Department will not approve such proposals unless they conform with any U. S. EPA guidance, policy or regulations in effect at the time.

Request 2 refers to a variance authority under the HSWA land disposal prohibitions, which are not contained in ch. NR 181, Wis. Adm. Code at this time. Therefore, the Department does not have the authority to consider such a variance, so the condition can't be changed in response. In addition, it is not clear that U. S. EPA will grant this variance authority to a state as part of the authorization process.

Request 3 refers to a letter regarding a leachate pretreatment pilot facility that has since closed at the landfill. The Department has no objection to the suggested waste code designation. The proper procedure to formally notify the Department and U. S. EPA of a waste code designation is through specific correspondence and a revised notification form. However, it should be noted that if such material (or any other material from the site covered by this condition) is manifested, a specific waste code or code(s) will be needed on the manifest form. Questions on this issue should be directed to the Department's Southeast district hazardous waste staff. No revision to the determination appears to be necessary to respond to the request.

BEFORE THE
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

CONDITIONAL CLOSURE AND
LONG-TERM CARE PLAN APPROVAL (MODIFICATION)
OMEGA HILLS NORTH LANDFILL
EPA ID# WID000808568

CONDITIONAL CLOSURE AND LONG-TERM CARE PLAN
APPROVAL (MODIFICATION)

The Department hereby approves the Closure and Long-Term Care Plan for the landfill, subject to the following conditions which hereby modify the plan:

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4. All wastes, liquids, contaminated groundwater, contaminated soils or other materials removed from the landfill as a result of any construction, remediation or investigation shall be managed as a hazardous waste at a facility licensed, permitted or approved to accept such wastes, in accordance with s. NR 181.21(4), Wis. Adm. Code, regardless of where the material originates. The Department shall consider specific requests by WMI, on a case by case basis, on whether soil or groundwater to be removed from the landfill is contaminated and therefore subject to this condition. The Department shall consider specific requests by WMI, on a case by case basis, on whether material removed as part of a particular remedial action or investigation may be managed in an different fashion than set out in this condition, but only when such requests accompany the particular remedial action or investigation proposal.

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication: 9345.3-03FS January 1992

EPA

Guide to Management of Investigation-Derived Wastes

Office of Emergency and Remedial Response
Hazardous Site Control Division OS-220W

Quick Reference Fact Sheet

CERCLA field investigation activities (e.g., remedial investigation/feasibility studies and remedial designs) may result in the generation of waste materials that may pose a risk to human health and the environment. These investigation-derived wastes (IDW) may include drilling muds, cuttings, and purge water from test pit and well installation; purge water, soil, and other materials from collection of samples; residues (e.g., ash, spent carbon, well development purge water) from testing of treatment technologies and pump and treat systems; contaminated personal protective equipment (PPE); and solutions (aqueous or otherwise) used to decontaminate non-disposable protective clothing and equipment. The management of IDW must ensure protection of human health and the environment and comply with (or waive) regulatory requirements that are applicable or relevant and appropriate requirements (ARAR). This fact sheet presents an overview of possible IDW management options, discusses the protectiveness requirements and ARARs associated with these options, and outlines general objectives established for IDW management under Superfund.[1]

The general options for managing IDW (see Highlight 1) are collection and either (1) immediate disposal or (2) some type of interim management. Interim management may include storage or other temporary measures. As discussed below, the specific option selected will depend on the type of waste produced, its relative threat to human health and the environment, and other site-specific factors.

IDW MANAGEMENT REQUIREMENTS

When managing IDW, site managers are required to choose an option that: (1) is protective of human health and the environment and (2) complies with (or waives) ARARs, as described below.

Protectiveness

In determining if a particular management/disposal option is protective, site managers should consider the following:

- The contaminants, their concentrations, and total volume of IDW;
- Media potentially affected (e.g., ground water, soil) under management options;
- Location of the nearest population(s) and the likelihood and/or degree of site access;
- Potential exposures to workers; and
- Potential for environmental impacts.

As a general rule, it will be necessary to use best professional judgment, in light of the site-specific conditions, to determine whether an option is protective of human health and the environment. For example, a site manager may determine that storing IDW temporarily until the final action or returning IDW to its source is protective, based on knowledge that the material poses low risk and/or that the final action will address any risks posed by the wastes and there will be no unacceptable risks in the interim.

Alternatively, if the site includes or is near residential areas, the site is unsecured, and/or contaminants appear to be present at unacceptable levels, it may not be protective to return excavated soil to the source. Storing IDW in containers in an on-site, secure location, or sending it off site immediately may be more appropriate.

Site managers also need to consider the potential effects of IDW management-related activities on environmental media. For example, pouring contaminated purge water on the ground around a well may not be prudent, because such an action could mobilize any hazardous constituents present in the soil or introduce contaminants into clean soil.

Compliance with ARARs

Remedial Investigation/Feasibility Study (RI/FS) and Remedial Design (RD) actions must comply with ARARs "to the extent practicable, considering the exigencies of the situation" (NCP, 55 FR 8756, emphasis added); therefore, it generally will not be necessary to obtain a waiver if an ARAR cannot be attained during these actions. If a site manager determines that, based on site-specific factors, compliance with an ARAR is practicable but an ARAR waiver is warranted for an RI/FS or RD action, an interim action waiver may be available if the final remedy will attain the ARAR. An action memorandum should be prepared for the waiver, the state given an opportunity to comment, and the decision document placed in the administrative record.

[1] Management of treatability study and treatment pilot wastes is discussed in Guide for Conducting Treatability Studies Under CERCLA, Interim Final, December 1989, EPA/540/2-89/058. Information on management of IDW generated during Preliminary Assessments and Site Investigations is provided in Management of Investigation-Derived Waste During Site Investigations, May 1990, EPA/540/G-91/009.

Highlight 1: IDW MANAGEMENT OPTIONS

Type of IDW	Generation Processes*	Management Options
Soil	• Well/test pit installation • Borehole drilling • Soil sampling	• Return to boring, pit, or source immediately after generation • Spread around boring, pit, or source within the AOC* • Consolidate in a pit (within the AOC) • Send to on-site TDU* • Send to TDU off site immediately • Store for future treatment and/or disposal
Sludges/sediment	• Sludge pit/sediment sampling	• Return to boring, pit, or source immediately after generation • Send to on-site TDU • Send to TDU off site immediately • Store for future treatment and/or disposal
Aqueous liquids (ground water, surface water, drilling fluids, other wastewaters)	• Well installation/development • Well purging during sampling • Ground water discharge during pump tests • Surface water sampling	• Discharge to surface water • Pour onto ground close to well (non-hazardous waste) • Send to on-site TDU • Send to off-site commercial treatment unit • Send to POTW* • Store for future treatment and/or disposal
Decontamination fluids	• Decontamination of PPE* and equipment	• Send to on-site TDU • Evaporate (for small amounts of low contamination organic fluids) • Send to TDU off site immediately • Store for future treatment and/or disposal
Disposable PPE	• Sampling procedures or other on-site activities	• Send to on-site TDU • Place in on-site industrial dumpster • Send to TDU off site immediately • Store for future treatment and/or disposal

* The generation processes listed here are provided as examples. IDW may also be produced as a result of activities not listed here.

* AOC: Area of Contamination (AOCs at a site may not yet have been identified at the time of the RI/FS); TDU: Treatment/disposal Unit; POTW: Publicly Owned Treatment Works; PPE: Personal Protective Equipment

Potential ARARs for IDW at CERCLA sites include regulations under the Resource Conservation and Recovery Act (RCRA) (including both Federal and State underground injection control (UIC) regulations), the Clean Water Act (CWA), the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), and other State environmental laws. How these various requirements may direct or influence IDW management decisions is described below.

Resource Conservation and Recovery Act (RCRA). Certain sections of the RCRA Subtitle C hazardous waste regulations (e.g., land disposal restrictions and storage restrictions) may be ARARs for IDW should RCRA hazardous waste be identified at a site. (Note that RCRA may be relevant and appropriate even if the IDW is not a RCRA hazardous waste.) A waste is hazardous under RCRA if it is listed as such in 40 CFR 261.31 - 261.33 or if it exhibits one of four characteristics: ignitability, corrosivity, reactivity, or toxicity.

Site managers should not assume that a waste considered to pose a potential risk at a CERCLA site is a listed or characteristic RCRA hazardous waste. Until there is positive evidence (records, test results, other knowledge of waste properties) that the IDW is a RCRA hazardous waste, site managers should manage it in a protective manner (but not necessarily in accordance with Subtitle C requirements). Business records or facility processes should be examined to determine whether RCRA listed wastes were generated and are present in the IDW. For characteristic wastes, site managers should rely on testing results or on knowledge of the material's properties. If best professional judgment and available information indicate that, for protectiveness reasons (or because RCRA requirements are relevant and appropriate), IDW is best managed as a "hazardous waste," management in accordance with Subtitle C requirements is prudent, regardless of whether it is known to be a RCRA waste.

If aqueous liquid IDW is considered a RCRA hazardous waste, the site manager should determine whether the Domestic Sewage Exclusion (DSE) applies to the discharge of that IDW to a POTW. The RCRA DSE exempts domestic sewage and any mixture of domestic sewage and other wastes that passes through a sewer system to a POTW for treatment from classification as a solid waste and, therefore, as a RCRA hazardous waste (40 CFR 261.4).

- Land Disposal Restrictions

If IDW is determined to be a RCRA hazardous waste and subject to the land disposal restrictions (LDRs), "land disposal" of the IDW will be prohibited unless specified treatment standards are met (see Superfund LDR Guides #5 and #7, Determining When LDRs Are Applicable to CERCLA Response Actions and Determining When LDRs Are Relevant and Appropriate to CERCLA Response Actions, OSWER Directive 9347.3-05FS and 9347.3-06FS, June 1989 and December 1989 and the NCP, 55 FR 8759, March 8, 1990). "Land disposal" occurs when wastes from different AOCs are consolidated into one AOC; when wastes are moved outside an AOC (for treatment or storage) and returned to the same or a different AOC; or when wastes are excavated, placed in a separate hazardous waste management unit such as an incinerator or tank within the AOC, and then redeposited into the AOC.

Storing IDW in a container ("a portable device in which a material is stored, transported, treated, disposed of, or otherwise handled" (40 CFR 260.10)) within the AOC and then returning it to its source, however, is allowable without meeting the specified LDR treatment standards. Under the definition of "hazardous waste management unit" (40 CFR 260.10), EPA states that "a container alone does not constitute a unit; the unit includes the containers and the land or pad upon which they are placed." Therefore, returning IDW that has been stored in containers (not tanks or other RCRA-regulated units) within the AOC to its source does not constitute land disposal, as long as containers are not managed in such a manner as to constitute a RCRA storage unit as defined in 40 CFR 260.10. In addition, sampling and direct replacement of wastes within an AOC do not constitute land disposal.

- Storage

Subtitle C outlines the storage requirements for RCRA hazardous wastes. Under RCRA, "storage" is defined as "the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (40 CFR 260.10).

On-site Superfund actions are only required to comply with the substantive standards of other laws (see 40 CFR 300.5, definitions of applicable or relevant and appropriate requirements). Superfund sites are also exempt from permit requirements under CERCLA §121(e). Therefore, site managers are not required to comply with administrative requirements triggered by RCRA storage deadlines (e.g., contingency planning, inspections, recordkeeping). Generally equivalent administrative activities are undertaken at Superfund sites, however, under existing Superfund management practices.

Site managers storing known RCRA hazardous waste must comply with the substantive, technical requirements of 40 CFR Parts 264 and 265 Subparts I (containers), J (tanks), and L (waste piles), to the extent practicable. (See Highlight 2 for a summary of these technical requirements for each type of unit). In addition, the ground-water monitoring requirements of 40 CFR Parts 264 and 265 Subpart F are potential ARARs, and to the extent they are determined to be ARARs at a site, they should be attained to the extent practicable (or waived). (In many cases, ground-water monitoring conducted during the RI/FS will provide protection equivalent to the Subpart F requirements.)

[NOTE: Under the LDRs, restricted RCRA hazardous waste may not be stored at a site unless the storage is solely for the purpose of accumulating sufficient quantities of the waste to facilitate proper disposal, treatment, or recovery (see 40 CFR 268.50). Generally, storing IDW until a final disposal option is selected in a Record of Decision (ROD) and implemented during the remedial action is allowable storage under the RCRA LDR storage prohibition.]

- Recordkeeping and Manifesting

If hazardous wastes are sent off site, the site manager must comply with both administrative and substantive elements of the RCRA generator requirements of 40 CFR Part 262 and LDR notification and certification requirements of Part 268. (For example, a site manager must prepare an LDR notification and certification when restricted wastes are sent off site to a land disposal facility.) These standards include requirements such as manifests for shipping waste that list all hazardous waste listings and characteristics applicable to the waste (see 40 CFR 262.11), packaging and transport requirements, and recordkeeping requirements.

If the LDRs are applicable, the following information should be collected and available before the removal of wastes to an off-site disposal facility: EPA hazardous waste number, LDR treatment

Highlight 2:
EXAMPLES OF RCRA TECHNICAL STORAGE REQUIREMENTS*

RCRA storage requirements, applicable to both less-than-90-days generators and permitted or interim status storage facilities, may include the following substantive requirements:

Containers 40 CFR 264 Subpart I and 265 Subpart I

- Containers must be in good condition
- Wastes must be compatible with container
- Container must be closed during storage
- Container storage areas must have a containment system that can contain 10 percent of the volume of containers or of the largest container
- Spilled or leaked waste must be removed from the collection area as necessary to prevent overflow

Tanks 40 CFR 264 Subpart J and 265 Subpart J

- Tanks must have a secondary containment system that includes a liner, a vault, a double-walled tank, or an equivalent device (applies only to certain tanks)

Waste Piles 40 CFR 264 Subpart L and 265 Subpart L

- Waste piles must have a liner and a leachate collection and removal system
- Owners/operators must have a run-on control system to prevent flow onto the active portion of the pile during peak discharge from at least a 25-year storm
- Owners/operators must have a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm

* This is a partial list of substantive requirements. For more detail, see 40 CFR Part 264 and 265.

standards, manifest number for the waste shipment, and waste analysis data.

- Underground Injection Control (UIC) Program

Under the UIC regulations, RCRA hazardous wastes may be injected into Class I permitted wells. In some cases, hazardous liquids, such as extracted ground water from pump and treat operations, may be injected into a Class IV UIC well. For example, ground water contaminated with RCRA hazardous wastes may be injected into Class IV permitted wells if it is part of a CERCLA response action or a RCRA corrective action and if it has been treated to "substantially reduce hazardous constituents prior to such injection." (RCRA § 3020(b)). (See Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection, OSWER Directive #9234.1-06, December 1989.)

- Non-RCRA Hazardous Wastes

Some non-RCRA hazardous waste may be subject to management requirements under Subtitle D of RCRA as solid wastes. Subtitle D regulates disposal of solid waste in facilities such as municipal landfills. Therefore, non-RCRA hazardous IDW, such as decontaminated PPE or equipment, may need to be disposed of in a Subtitle D facility (depending on State requirements).

Clean Water Act (CWA). Discharges of aqueous IDW to surface water and publicly owned treatment works (POTWs) may be required to comply with CWA Federal, State, and local requirements. Requirements to be met may include water quality criteria, pre-treatment standards, State water quality standards, and NPDES permit conditions. Direct discharges to on-site waters are subject only to substantive requirements, while discharges to POTWs and other off-site discharges must comply with both substantive and administrative CWA requirements (including permitting requirements). (See Guide to Discharging CERCLA Aqueous Wastes to POTWs, June 1991 and CERCLA Compliance with the CWA and SDWA, #9234.2-06FS, January 1991.)

Toxic Substances Control Act (TSCA). If IDW contains PCBs, TSCA treatment and/or disposal requirements may apply during its management. TSCA requirements regulate the disposal of material contaminated with PCBs at concentrations of 50 ppm or greater as found on site (i.e., based on sample analysis and not the PCB concentration of the source material (e.g., transformer fluid)). (See PCB Guidance Manual, EPA/540/G-90/007, August 1990.) In addition, TSCA storage requirements may apply that limit the time that PCBs may be stored to one year. Furthermore, if PCB materials are mixed with a RCRA hazardous waste, they may be regulated by the LDR California list prohibitions. (See RCRA sections 3004(d)(2)(D) and (E).)

Department of Transportation (DOT) requirements. Where IDW will be disposed of off site or transported on public roads to a site, DOT requirements for containerizing, labeling, and transporting hazardous materials and substances may apply.

State requirements. Promulgated State regulations that are legally enforceable, timely identified, and more stringent than Federal regulations may be potential ARARs for IDW managed on site. Substantive requirements of State law that may be ARARs for IDW management include State water quality standards, direct discharge limits, and RCRA requirements (including underground injection control regulations) promulgated in a State with an authorized RCRA hazardous waste management program (as well as programs authorized by State laws). Off-site, substantive and administrative requirements of State law may apply.

Off-Site Policy. In addition to complying with requirements of Federal and State laws, all off-site disposal of wastes must comply with CERCLA section 121(d)(3) and the CERCLA Off-Site Policy (OSWER Directive No. 9834.11 (November 13, 1987)). The Off-Site Policy establishes criteria for selecting an appropriate treatment, storage, or disposal facility (TSDF), including release criteria for all facilities that receive wastes from CERCLA-authorized or funded response actions. In addition, receiving facilities must be in compliance with all "applicable laws."

Before shipping wastes off site, approval should be obtained for the proposed disposal facility from EPA's Regional Off-Site Policy Coordinator. In addition, EPA has adopted a policy for Superfund wastes shipped out of State that written notification should be provided to receiving States (OSWER Directive 9330.2-07, September 14, 1989).

GENERAL OBJECTIVES FOR IDW MANAGEMENT

In addition to the two requirements of protectiveness and compliance with ARARs to the extent practicable (on site) or

compliance with applicable law (off site), EPA has identified two general objectives that Superfund site managers should consider when managing IDW: (1) minimization of IDW generation; and (2) management of IDW consistent with the final remedy for the site. The extent to which these objectives can be achieved is highly dependent on site-specific circumstances.

IDW Minimization

Site managers should strive to minimize the generation of IDW to reduce the need for special storage or disposal requirements that may result in substantial additional costs yet provide little or no reduction in site risks relative to the final remedial action. Generation of IDW can be minimized through proper planning of all remedial activities that may generate IDW, as well as through use of screening information from the site inspection. The potential problems of managing IDW should be a factor in choosing an investigative method. Site managers may wish to consider techniques such as replacing solvent-based cleaners with aqueous-based cleaners for decontamination of equipment, reuse of equipment (where it can be decontaminated), limitation of traffic between clean and hot zones, and drilling methods and sampling techniques that generate little waste. Examples of such techniques include using gridding techniques to minimize the number of test pits or using soil borings instead of test pits. Alternative drilling and subsurface sampling methods may include the use of small diameter boreholes, as well as borehole testing methods such as a cone penetrometer instead of coring. Site managers should also be careful to keep hazardous wastes separate from nonhazardous wastes.

Management Consistent with Final Remedy

Most IDW (with the exception of non-indigenous IDW) generated during the course of an investigation are intrinsic elements of the site. If possible, IDW should be considered part of the site and should be managed with other wastes from the site, consistent with the final remedy. This will avoid the need for separate treatment and/or disposal arrangements.

Because early planning for IDW management can prevent unnecessary costs and the use of treatment or disposal capacity, IDW management should be considered as early as possible during the remedial process. A key decision to be made is whether the waste will best be treated/disposed of immediately or addressed with the final remedy. If addressed with the final remedy, IDW volumes should be considered in the FS. In addition, when IDW is stored on site, it should be managed as part of the first remedial action/operable unit that addresses the affected media.

SELECTION OF IDW DISPOSAL OPTIONS

The following sections present the Agency's presumptions for IDW management that have been established based on the above considerations. The actual option selected should be based upon best professional judgment and should take into account the following factors:

- The type and quantity of IDW generated (sludge/soil, aqueous liquid, non-indigenous IDW);
- Risk posed by managing the IDW on site (e.g., based on site access controls, contaminant concentrations);
- Compliance with ARARs, to the extent practicable (on site);
- IDW minimization; and
- Whether the final remedy is anticipated to be an off-site or on-site remedy (or this information is unknown) and whether IDW can be managed consistent with the final remedy.

Off-site Final Remedies

If a site manager believes that the final remedy will involve off-site disposal of wastes, EPA's presumption is to manage the IDW as part of the remedial action addressing the waste/medium. Thus, until the final action, the IDW may be stored (e.g., drummed, covered waste pile) or returned to its source. However, the management option selected should also take into account any protectiveness concerns, ARARs, and other relevant site-specific factors (e.g., weather, storage space, and public concern/perceptions).

There are several potential reasons why it may be advisable to store IDW until the final action. First, because wastes at the site will be shipped off site eventually, returning IDW (especially sludges and soil) to its source would require that it be excavated again. Thus, site managers may consider it practical to containerize IDW as soon as it is generated. Second, storing IDW in containers may be more protective than returning it to its source. Third, because off-site actions may trigger such requirements as the LDRs, temporary storage will eliminate the need to meet these additional requirements until the final remedy.

In some cases, circumstances may lead site managers to choose to return the IDW to its source. This may be appropriate if it is determined that returning IDW to the source is protective and that storage at the site is not possible or practicable (i.e., given State or community concerns). In other cases, long-term storage may not be protective, and immediate off-site disposal may be a better option.

> Example: A site involves volatile organic RCRA hazardous wastes that will likely be sent off site for final treatment and disposal. Site conditions are such that temporary storage of IDW is considered protective until the remedial action begins. Because off-site disposal will trigger RCRA disposal requirements such as the LDRs and immediate containerization would be more protective than redepositing into the source area at the time of sampling, the site manager decides to containerize the IDW (and comply with RCRA substantive technical tank and container standards) until the final action is initiated.

On-site Final Remedies (or Final Management in an Unknown Location)

When final management of wastes is likely to occur on site, the management presumptions vary depending on the type of IDW produced.

Sludge/soil

Generally, the Agency expects sludge or soil IDW will be returned to its source if short-term protectiveness is not an issue. The reason behind this presumption is that IDW that may pose a risk to human health and the environment in the long term will be addressed by the final action. Storage of RCRA hazardous IDW in containers within the AOC prior to returning it to the source will not trigger the LDRs, as long as the containers are not managed in such a way as to constitute a RCRA storage unit as

defined in 40 CFR 261.1(c). Therefore, it may be possible to store IDW temporarily before redisposing of it. However, EPA believes that, in many cases, returning sludges and soils to their source immediately will be protective and will avoid potentially increased costs and requirements associated with storage. Site-specific decisions on how to manage sludge and soil IDW may ultimately vary from the presumption based on protectiveness, ARARs, and/or community concerns.

Example 1: The soil at a site contains wastes that are expected to be stabilized on site during the final remedial action. The site manager determines that sending soil IDW off site is not cost-effective, because off-site disposal would involve testing and transport costs for a relatively small amount of waste. Instead, knowing that the site is secure and that redisposing the waste at the source will not increase site risk or violate ARARs, the site manager decides to return soil IDW to the source area from which it originated.

Example 2: A site manager determines that returning highly contaminated PCB wastes to the ground at a site is not protective because of the potential risks associated with the material; instead, the site manager chooses to drum the waste and send it off site (in compliance with TSCA). (Off-site disposal may occur immediately or at a later date.)

Example 3: Soil IDW contaminated with a RCRA hazardous waste is generated from a soil boring. The site manager decides to put the IDW back into the borehole immediately after generation, but ensures that site risks will not be increased (e.g., the contaminated soil will not be replaced at a greater depth than where it was originally so that it will not contaminate "clean" areas) and that the contamination will be addressed in the final remedy.

Aqueous liquids

EPA has not established a presumption for the management of aqueous liquid IDW (e.g., ground water). Site managers should determine the most appropriate disposal option for aqueous liquids on a site-specific basis. Parameters to consider, especially in making the protectiveness decision, include the volume of IDW, the contaminants present in the ground water, the presence of contaminants in the soil at the site, whether the ground or surface water is a drinking water supply, and whether the ground-water plume is contained or moving. Special disposal/handling may be needed for drilling fluids because they may contain significant solid components. Examples of aqueous liquid management decisions considering these factors are presented in the following box.

Example 1: A site manager has large volumes of ground water IDW and does not know if it is contaminated. Pouring this IDW on the ground would not be protective, because it may contaminate previously uncontaminated soil or may mobilize contaminants that are present in the soil. Therefore, the site manager stores the water in a mobile tank until a determination is made as to whether the water and soil are contaminated or until the final action.

Example 2: IDW is generated from the sampling of background, upgradient wells. Because there are no community concerns or evidence of any soil contamination from other sources, the site manager decides to pour this presumably uncontaminated IDW on the ground around the well.

Example 3: Purge water from a deep aquifer is known to be contaminated with a RCRA hazardous waste. At this site, if this water were poured on the ground, it could contaminate a previously uncontaminated shallow aquifer that is a potential drinking water source and would have to comply with the LDRs. The site manager decides to containerize the water within the AOC and store it until the final remedy.

Non-Indigenous IDW

Non-indigenous IDW (e.g., sampling materials, disposable PPE, decontamination fluids) should be stored until the final remedy or disposed of immediately. If contaminated, such waste may not be disposed of onto the ground because such an action would add contamination that was not present when activities began at the site (e.g., solvents used for decontamination). If non-indigenous IDW is contaminated with RCRA hazardous waste, it must be managed in accordance with RCRA Subtitle C requirements. Otherwise, site managers may generally dispose of it in an on-site dumpster (for PPE).

Example 1: Disposable PPE (e.g., gloves, shoe covers) becomes contaminated with RCRA hazardous waste during the field investigation. The site manager containerizes and disposes of this IDW in compliance with RCRA Subtitle C requirements.

Example 2: Disposable equipment becomes contaminated during a field investigation. The site manager decontaminates them and sends them to a Subtitle D facility.

COMMUNITY CONCERNS

Residents of communities near a CERCLA site, local governments, or States may have concerns about certain disposal methods or long-term storage of IDW at the site. As with all CERCLA activities, site managers should evaluate community concerns regarding disposal of IDW in deciding what action to take. For example, if a community is concerned about the direct discharge of IDW water to surface water on site, site managers may want to consider sending the water to a POTW, if one is located nearby. In some instances, it may be appropriate to prepare fact sheets, include options in other community relations documents, or explain IDW management decisions at public meetings prior to actions.

ATTACHMENT 3

LONG-TERM ON-SITE STORAGE OF INVESTIGATIVE WASTES (IW)

General

Storage of IW should be in above ground tanks or containers. Examples of tanks include large metal or fiberglass tanks and trailer tanks for hauling liquids on roads. Examples of containers are 55-gallon drums, rolloff boxes (also called "luggers") and U. S. DOT approved boxes for solids. Storage should not be in underground tanks, in-ground pits, surface impoundments, trenches or lagoons. The tanks or containers should be water tight and compatible with the IW being stored. Permanent labels that indicate the source of the wastes and their descriptions should be attached to all containers.

Containers or tanks should be stored in area with limited access, such as a fenced area or a building. If vandalism is a potential concern, consideration should be given to storing the IW in a building. Temporary buildings can be constructed for this purpose. For liquids, and especially highly contaminated liquids, consideration should be given to providing secondary containment for spills and leaks in accordance with the hazardous waste regulations (see below). For outdoor secondary containment, precipitation run on and run off control should be provided in accordance with those regulations.

Stored IW should be periodically inspected, with records kept. Deteriorating containers or tanks should be immediately replaced. Deteriorating 55-gallon drums can be overpacked. If a container label has deteriorated, it should also be replaced.

Hazardous IW Storage

Storage of hazardous IW should be in accordance with the Hazardous Waste Program regulation technical standards. The standards for containers are outlined in ss. NR 640.08 - 640.15. The standards for tanks are outlined in ss. NR 645.08 - 645.15.

ATTACHMENT 2

SAMPLING AND TESTING OF INVESTIGATIVE WASTES

During the installation of monitoring wells and soil borings the amount of waste material generated in the form of drilling fluids and soil cuttings should be minimized. Waste materials generated from these activities will require containerization and sampling in order to determine proper disposal or treatment options. The following is a discussion of ways to not only minimize the amount of materials accumulated and thereby minimize the number of samples which have to be collected and analyzed, but also how to sample these wastes in order to best obtain representative results.

An attempt should be made to identify the exact depth within the formation where the soil cuttings originated or, in the case of drilling fluids, were in contact with the formation, if possible. When borings are extended into or below the water table it is advisable to segregate materials from a point approximately 10 feet above the top of the water table from those collected below the water table. In that way you can potentially minimize the amount of materials which may need to be sampled and characterized because they were in contact with contaminated groundwater.

When drilling off-site, or away from the area where a release occurred, an assumption can be made that soils above the water table do not contain contaminants, and therefore do not need to be containerized or sampled. This may not be true in those situations where soil gas migration may have carried contaminants off-site to adjacent properties. Field screening equipment, such as an OVM or PID, can be used to help isolate contaminated materials from 'clean' soils and cuttings for the contaminants in question, when appropriate.

Materials collected as the result of drilling or soil boring activities which require containerization should be collected and stored in 55 gallon drums, roll-off containers, or similar containers which can be closed or covered watertight and are compatible with the wastes being stored in them. These drums or containers should be marked such that they can be clearly identified as to the exact location and depths the materials came from. These drums or containers should also be stored in a secured location, if possible, and labelled as special waste materials until an exact determination can be made.

If soil samples are being analyzed from a soil boring or well location, the results from those analyses must be directly tied back to the material collected and the container it was placed in. In certain cases, you may be analyzing specific samples based upon elevated readings from field screening devices. This is why very precise labelling and identification of containers is necessary. Should the samples be too widely distributed or should you be unable to field screen for elevated readings, such as with pesticide contamination, all samples will need to be analyzed for the contaminants of concern.

Samples should be taken such that they are representative of the waste material to be analyzed. For material stored in 55 gallon drums, if field readings do not detect a hot spot or area from the boring, a representative sample should be collected for every 5-55 gallon drums or portion thereof. This sample should be a discrete sample taken from approximately the middle of

one of the 5 drums. If the drum contains both liquid and solid fractions, these should be sampled and analyzed separately. This assumes that soil formations for the material collected in the 5 drums are consistent in their unified soil classification system (USCS) rating and there was no visual or other indications of contamination present. Where visual observations or field readings detect elevated readings, the sample should be collected from that depth or from the container where those specific materials were placed. Standard sampling methods and procedures should be followed to ensure that the results are representative of the materials in question.

If materials are being stored in a large container, such as a covered rolloff, a minimum of two samples should be collected from opposite ends of the soil pile. Two additional samples should be collected for every additional 100 cubic yards of material being collected and stored. These should be discrete samples and should be taken from at least 18 inches below the surface of the soil pile. An attempt should be made to identify those areas of a soil pile which may contain elevated concentrations or hot spots and these areas should be segregated out and sampled individually.

Liquids collected as part of well installation or development should be segregated from soils as much as possible. If the area is served by a sanitary sewerage system, permission should be obtained from it's operator as well as the local District wastewater engineer for permission to directly discharge these liquids into that system. In most cases an analysis of the liquids will be required by the sewage treatment plant if information is not available on what contaminants are present.

All analyses should be performed using a method listed in EPA SW-846 designed to detect the target compounds. The method chosen should be one which gives an acceptable detection limit and will allow for characterization of the materials as hazardous or non-hazardous waste. Based upon these results, a determination will need to be made as to proper disposal or treatment options.

ATTACHMENT 3

LONG-TERM ON-SITE STORAGE OF INVESTIGATIVE WASTES (IW)

General

Storage of IW should be in above ground tanks or containers. Examples of tanks include large metal or fiberglass tanks and trailer tanks for hauling liquids on roads. Examples of containers are 55-gallon drums, rolloff boxes (also called "luggers") and U. S. DOT approved boxes for solids. Storage should not be in underground tanks, in-ground pits, surface impoundments, trenches or lagoons. The tanks or containers should be water tight and compatible with the IW being stored. Permanent labels that indicate the source of the wastes and their descriptions should be attached to all containers.

Containers or tanks should be stored in area with limited access, such as a fenced area or a building. If vandalism is a potential concern, consideration should be given to storing the IW in a building. Temporary buildings can be constructed for this purpose. For liquids, and especially highly contaminated liquids, consideration should be given to providing secondary containment for spills and leaks in accordance with the hazardous waste regulations (see below). For outdoor secondary containment, precipitation run on and run off control should be provided in accordance with those regulations.

Stored IW should be periodically inspected, with records kept. Deteriorating containers or tanks should be immediately replaced. Deteriorating 55-gallon drums can be overpacked. If a container label has deteriorated, it should also be replaced.

Hazardous IW Storage

Storage of hazardous IW should be in accordance with the Hazardous Waste Program regulation technical standards. The standards for containers are outlined in ss. NR 640.08 - 640.15. The standards for tanks are outlined in ss. NR 645.08 - 645.15.

PLATES

PLATE I

SAMPLING LOCATION MAP - GREEN BAY

PLATE II

SAMPLING LOCATION MAP - SHEBOYGAN

PLATE III

SAMPLING LOCATION MAP - TWO RIVERS