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August 22, 2007

Mr. Anthony Karwiel
Bureau of Construction Services
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway
Albany, NY 12233-7013

Subject: RI Work Plan
Palmyra Former MGP Site
Village of Palmyra, New York
NYSDEC Site No. 8-59-022

Dear Mr. Karwiel,

In compliance with the terms of the Order on Consent Index Number D0-0002-9309, ENSR Corporation (dba The RETEC Group, Inc. [RETEC]) is submitting to you on behalf of NYSEG, two hard copies, and one electronic copy (CD ROM Disk) of the Remedial Investigation (RI) Work Plan, dated August 22, 2007, for additional investigation work at the manufactured gas plant (MGP) site located on Park Drive in the Village of Palmyra, New York. Should the Department need additional copies of the Work Plan, please contact me and additional copies will be prepared.

As we recently discussed, the final site-specific health and safety plan (HASP) for the investigation will be provided to the Department and the New York State Department of Health for review and approval prior to the start of the field activities for the RI.

If you have any questions regarding this submittal, please do not hesitate to contact either Bruce Coulombe or myself at (607) 277-5716. Please direct the Department's official comments or response to Mr. John Ruspantini, NYSEG's Project Manager for the investigation, at (607) 762-8787.

Respectfully submitted,

James H. Edwards

James H. Edwards
Geologist

JHE/mlr

Attachment

cc: Mr. John Ruspantini – NYSEG (1 hardcopy, 1 electronic copy)
Ms. Deborah McNaughton – NYSDOH (1 hardcopy)
Mr. Bruce Coulombe, P.G. – RETEC (w/o attachment)
Mr. John Finn, P.E. – RETEC (w/o attachment)
Project File: 04964-025-200

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Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Remedial Investigation Work Plan

Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

The RETEC Group, Inc.
August 22, 2007
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Merged with ENSR in 2007
RETEC

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Remedial Investigation Work Plan

Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
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James H. Edwards
Prepared By: James H. Edwards, Senior Geologist

Reviewed By: Bruce D. Coulombe, P.G. Senior Hydrogeologist

The RETEC Group, Inc.
August 22, 2007
Project No.: 04964-025

Contents

List of Appendices

List of Tables

List of Figures

1.0 Introduction

This Remedial Investigation (RI) Work Plan has been prepared for NYSEG (New York State Electric and Gas) by ENSR Corporation (dba The RETEC Group, Inc., [RETEC]) for a property located on Park Drive in the Village of Palmyra, New York. This property was the site of a former manufactured gas plant (MGP) that was operated by the Palmyra Gas Light Company in the late 1800's and early 1900's.

The investigation of the property is being conducted pursuant to a Multi-site Order on Consent between NYSEG and the New York State Department of Environmental Conservation (NYSDEC), Index # D0-0002-9309, which was executed on March 25, 1994, and in accordance with applicable guidelines of the NYSDEC, the New York State Department of Health (NYSDOH), the United States Environmental Protection Agency (U.S. EPA) and the National Contingency Plan (NCP).

This RI Work Plan provides background information regarding site conditions and describes the project objectives and outlines the strategies and methodologies that will be implemented during the investigation. Four appendices have been developed which detail the procedures and protocols outlined in this Work Plan:

- The Field Sampling and Analytical Plan (FSAP) provides information regarding field sampling methods and procedures that will be used during the investigation.
- The Quality Assurance Project Plan (QAPP) specifies the quality assurance/quality control procedures that will be implemented during the fieldwork and in the laboratory which performs the chemical analyses of the samples collected during the RI.
- A Community Air Monitoring Program (CAMP) provides information regarding the procedures to be used to monitor and control, if necessary, the potential release of airborne constituents at the downwind perimeters of the investigation work areas. Included in the CAMP are procedures regarding the control of odors that may be present as a result of the intrusive site investigation activities.
- A Site-Specific Health and Safety Plan (HASP) has been prepared to outline procedures that will be undertaken to protect site workers and visitors, and the public in the areas adjacent to the site from potential hazards that may exist as a result of the fieldwork performed at the site.

1.1 Project objectives

The objectives of the RI include the following:

- To collect additional data to more completely determine the surface and subsurface characteristics of the site;
- To more completely determine the nature and extent of MGP-related residuals that are present at the site and surrounding areas;
- To identify the potential routes of off-site migration from on-site sources of MGP-related residuals;
- To perform an exposure assessment to evaluate the pathways by which a human receptor (either on-site or off-site) may be exposed to a MGP-related residual; and
- To obtain sufficient data to facilitate the selection of remedial actions to address MGP-residuals at the site.

1.2 Work plan organization

Following this introduction, the remainder of this Work Plan describes the planned RI activities.

- **Section 2** – provides a description of the site, summary information regarding site ownership and operational history, and the results of the previous investigation and remedial work performed at the site.
- **Section 3** – presents the objectives for the investigation followed by a description of the specific tasks that will be undertaken to gather sufficient information to meet the project objectives.
- **Section 4** – describes the companion documents that are included as appendices to the Work Plan, including the FSAP, QAPP, CAMP, and HASP.
- **Section 5** – describes the Community Outreach Plan to be undertaken by NYSEG for this project.
- **Section 6** – provides the project duration and approximate schedule, with key milestones.
- **Section 7** – provides a list of the references cited in the Work Plan.

Appendices to the work plan include the following:

- Historic Sanborn Fire Insurance Maps are included in Appendix A.
- Previous investigation test pit, soil boring, and well completion logs are included in Appendix B.
- A figure and photographs showing the previous remedial work performed at the site are included in Appendix C.
- The FSAP is included as Appendix D.
- The QAPP is included as Appendix E.
- The CAMP is included as Appendix F.
- The HASP is included as Appendix G.

2.0 Site description and history

This section presents a description of the site, summary information regarding site ownership and operational history, and summarizes the results of previous investigation and remedial work performed at the site.

2.1 Site description

The site is located between Park Drive and Mill Creek in the Village of Palmyra, Wayne County, New York. The location of the site is shown on Figure 2-1.

The site layout and current features are shown on Figure 2-2. The site is comprised of one parcel of land which is currently owned by NYSEG. The parcel is identified by the Wayne County Real Property Tax Service Assessment Office as Section/Map/Lot # 64111-12-896718. The parcel covers a total land area of approximately 0.89 acres.

A natural gas regulator building is located in a grass-covered area in the western portion of the site (Figure 2-2). Most of the rest of the site is utilized as an electrical transmission and distribution substation. A perimeter fence encloses the substation area. The ground surface in the substation is predominantly covered by gravel with the exception of a grass and brush covered area in the northeast portion of the fenced area. Outside of the perimeter fence are brush-covered areas along Mill Creek and a grass-covered strip along Park Drive.

2.1.1 Adjacent properties

The site is located in an urban setting where land surrounding the site is mostly used for residential and commercial purposes. Immediately to the north of the site is Mill Creek which flows through the Village of Palmyra and into a pipe culvert beneath Main and Canal Streets and Park Drive. The pipe discharges into the open creek channel near the northwest corner of the site. The creek then flows along the site's northern boundary past several residential properties and then into the NYS Barge Canal which is located at a distance of approximately 330 feet from the site. Previous surface water and sediment sampling has been performed in the creek in the area adjacent to, and downstream of the site (discussed below). To the northeast of the creek is a NYSDEC designated wetland area. To the northwest of the site is the residential property at 111 Park Drive.

The site is bounded to the south by Park Drive. Further to the southeast is a parcel of land which contains a sanitary sewer pumping station for the Village of Palmyra. To the southwest across Park Drive is an active gasoline sales and automotive repair garage.

Immediately to the west of the site is commercial property (restaurant) located at 513 Canal Street. To the west of the restaurant property, across Canal Street, is an active gasoline sales facility which is the site of a NYSDEC-listed gasoline spill (discussed below). Contingent on obtaining access agreements, RI soil and groundwater sampling is planned for the property at 513 Canal Street.

The site is bounded to the east by the residential property located at 133 Park Drive. To the east of this property are five residential properties (201, 205, 209, 213, and 221 Park Drive) and then the NYS Barge Canal.

2.2 Site history

An extensive review of available historical information for the site was performed during a Preliminary Site Evaluation by TRC Environmental Consultants, Inc. (TRC). The results of the review were presented in the report entitled "*New York State Electric and Gas Corporation, Investigation of the Former Coal Gasification*

Site in Palmyra, New York. Task 1 Final Report, Preliminary Site Evaluation" [TRC, 1987]. Additional historical information sources were reviewed including the Sanborn Fire Insurance maps for the Village of Palmyra, and the Brown's Directory of American Gas Companies Annual Reports of gas production in New York State. A summary of the historical information obtained from these sources is presented in Table 2-1. The Brown's Directory information is summarized in Table 2-2. To show the historical features that comprised the MGP over time, the Sanborn maps for this portion of the Village of Palmyra for 1884, 1889, 1894, 1899, 1906, 1912, 1925, 1938, and 1947 have been included in Appendix A.

From the historical review, it appears that the MGP was constructed in 1856 and operated until 1910. During this period gas was manufactured using a coal gasification process by the Palmyra Gas Company until 1905, and then by the Palmyra Gas and Electric Company until 1910.

The historical research identified various former site features which could have been potential source areas for MGP residuals; as such, those areas are targeted for investigation. The current and historical features of the site are shown on Figure 2-2. The key features of the MGP which will be investigated during the RI are summarized as follows:

- The MGP Process Building was located in the southwestern area of the site. As shown on Figure 2-2, a retort and a coal storage area were present within the footprint of the building.
- A 35-foot diameter Gas Holder was present in the northeastern portion of the MGP Process Building. The foundation for the Gas Holder is still present at the site at the location shown on Figure 2-2.
- A Lime Purifier Building was located to the east of the MGP Building.
- A Shop was located to the northeast of the Gas Holder.
- A Tar Vessel is present to the east of the Gas Holder. This structure was not identified on any of the Sanborn Maps. It was found during excavation work performed at the site to build the electric transmission substation in the 1950's. Previous investigation and remedial work has been performed in this area during an expansion of the substation in 2005. The limit of the remedial excavation work performed during the expansion is summarized on Figure 2-3.

The Gas Holder continued to be used for the storage of gas until 1942. The property was developed as an electrical transmission and distribution substation in the early 1950's.

As shown on the historical Sanborn maps in Appendix A, when the MGP was constructed the site was bounded to the south by the Erie Canal. In 1915, the canal was filled in and a newer canal (the current NYS Barge Canal) was constructed approximately 330 feet to the north of the site.

2.3 Previous investigations and remedial work

The previous investigation and remedial work performed at the site is summarized below.

- Between 1986 and 1990, TRC performed fieldwork at the site that included the collection of surface soil samples, the excavation of test pits, the completion of soil borings, the installation of monitoring wells, and the analyses of soil, groundwater, surface water, air, and sediment samples [TRC, 1986, 1990a and 1990b]. The borelogs and well construction logs for the sampling performed by TRC are included in Appendix B.

- The locations of the surface soil samples collected by TRC are shown on Figure 2-4. The sample results for total benzene, toluene, ethyl benzene, and xylene (BTEX); total polycyclic aromatic hydrocarbons (TPAH); and total cyanide are summarized on Figure 2-4.

- The locations of the subsurface soil samples collected by TRC are shown on Figure 2-5. The subsurface soil sample results for total BTEX, TPAH, and total cyanide are summarized on Figure 2-5. Where a heavy coal tar stain, sheen, or non-aqueous phase liquid (NAPL) blebs were observed the sample point is highlighted in green on the figure. Where coal tar or coal tar saturated soil was observed, the sample point is highlighted in red on the figure.

- Data collected by TRC in February 1988 has been used to map the flow direction for groundwater across the site. The map is included as Figure 2-6. Groundwater flows across the site from the southwest to the northeast.

- The locations of the groundwater and surface water samples collected by TRC are shown on Figure 2-7. The sample results for total BTEX, TPAH, and total cyanide are summarized on Figure 2-7.

- To summarize the subsurface conditions observed during the TRC investigation, three figures have been prepared. Figure 2-8 is a cross-section location map. Figure 2-9 shows the subsurface conditions from the south of the site to the area north of the creek. Figure 2-10 shows the subsurface conditions from Canal Street to west to the property located at 133 Park Drive.

- The locations of the sediment samples collected by TRC are shown on Figure 2-11. The sample results for total BTEX, TPAH, and total cyanide are summarized on the Figure 2-11.

- In April 1989 TRC performed an indoor air survey in the basement of the property located at 133 Park Drive [TRC, 1989b]. Six samples were collected using the methods that were approved at that time which consisted of the pumping of air through adsorbent tubes and the analysis of the tube samples by NIOSH Method 1501. The results of the analysis indicated that BTEX and naphthalene COC were not detected in concentrations greater than the method reporting limits for any of the samples collected in the basement.

- In June 1989, Tracer Research Corporation completed a groundwater screening survey which included the installation and sampling of nine temporary groundwater sampling points [Tracer, 1989]. The sample locations and total BTEX results are shown on Figure 2-7.

- A soil quality investigation was performed in 2005 by Blasland, Bouck, and Lee, Inc. (BBL) to obtain data to support an expansion of the electrical substation. A test trench was excavated to confirm the location of the Gas Holder foundation. Borings were completed inside, and outside of the Gas Holder foundation. The locations of the test trench and the soil borings and the total BTEX, TPAH and cyanide results and are summarized on Figure 2-5. The results of the investigation were submitted to the NYSDEC in a report dated May, 27, 2005 [BBL, 2005]. The borelogs for the investigation are included in Appendix B.

- NYSEG completed excavation work to upgrade the substation in 2005. Impacted soil was excavated from the area around the northern, eastern, and western edge of the electrical transmission substation (1-foot excavation) and in the transformer area (4-foot excavation). The approximate limits of the soil excavation are shown on Figure 2-3. The results of the field activities were submitted to the NYSDEC in a Final Engineering Report, dated September 29, 2006 [NYSEG, 2006]. A figure from the report is included in Appendix C.

During the expansion of the substation, the Tar Vessel was again encountered during the excavation work at the location shown on Figure 2-2. The vessel was found to be made of bricks and wood timbers and to contain coal tar mixed with fill material. The depth of the structure is unknown. An attempt was made to pump the tar out of the vessel; however, the tar was found to be too viscous to be removed with a pump. It was decided that the cleanout of this structure would be performed during site remediation and the access cover to the foundation was re-sealed with concrete. Photographs of the Tar Vessel taken during the substation expansion are included in Appendix C.

2.4 Area-wide environmental conditions

The groundwater sampling performed during the previous investigation work found that the volatile organic compound methyl tert-butyl ether (MTBE), a gasoline additive, is present in high concentrations (up to 2,500 ug/L) in the MGP site wells. The MTBE concentrations are summarized on Figure 2-7. Since this gasoline additive has not been used at the MGP site, the presence of this compound indicates a likely up gradient, off-site source of groundwater impact. To help identify potential source(s) for the gasoline-impacted groundwater, a search of the NYSDEC Spills Database was provided by Environmental Database Resources, Inc. (EDR). The EDR report indicates that there are several up gradient spills or underground storage tank (UST) removals listed in the NYSDEC spills database that are currently being investigated or remediated. Discussions have been held with the NYSDEC regarding these spill sites and an attempt is being made to find additional information regarding the nature and extent of the up gradient spills. The background information, and the data obtained from the wells installed at up gradient locations during the RI will continue to be evaluated to determine the extent of the off-site petroleum impacts and the implications of this impact for the MGP site investigation. Hydrocarbon identification analyses may be added to the RI work scope to provide additional information regarding the potential source(s) of impacts.

2.5 Site physical characteristics

Information obtained during the previous investigations performed at the site regarding the site topography, geology and hydrogeology is summarized in the following sections.

2.5.1 Site topography and drainage

The ground surface in the area of the former MGP operations is approximately 444 feet NAVD88. From this area the ground surface slopes to the north towards Mill Creek (425 feet NAVD88), and towards a brush-covered area in the northeast corner of the site (elevation 430 feet NADV88). Mill Creek flows along the northern boundary of the site and then to the northeast to the NYS Barge Canal.

2.5.2 Site geology

Two cross-sectional views have been prepared to illustrate the subsurface conditions observed during the previous investigations performed at the site. The locations of the cross-sections are shown on Figure 2-8, and the cross-sections are included as Figure 2-9 (A-A’), and Figure 2-10 (B-B’). Four subsurface units were identified including:

- **Fill** – Fill was observed to be present in all areas of the site in thicknesses that ranged from 13 feet in the area of the former MGP operations, to approximately 10 feet in the area to the northeast of the site.
- **Sand and Gravel** – Beneath the fill is a sand and gravel unit that ranges from 4 to 10 feet thick.
- **Clayey Silt** – Beneath the sand and gravel is a clayey silt unit which is approximately 12 feet thick. It is possible that the clayey silt unit may be acting as an aquitard beneath the site, preventing vertical migration of coal tar into the shale bedrock.
- **Shale Bedrock** – Beneath the clayey silt is a shale bedrock unit.

The stream bottom of Mill Creek consists mostly of gravel, cobbles and boulders and little soft sediment is present in the area of the creek adjacent to the site.

2.6 Site hydrogeology

From water level measurements taken by TRC from the three shallow wells, the groundwater table is between 10 and 16 feet below ground surface (bgs). As shown on Figure 2-6, groundwater flows from the southwest (MW1S – 722.28 feet NAVD88) to the northeast (MW2S – 714.59 feet NAVD88). This data, taken in February 1988 is similar to several additional rounds of sampling performed by TRC and NYSEG during the period of 1988 to 1996.

3.0 RI objectives and field activities

Although investigation and remedial work has been performed at the site, data gaps remain for the characterization of the site media and impacts in the areas discussed above. The overall objectives for the RI are to complete the investigation of the site and lay the groundwork for the selection of a site remedy. The specific objectives for the RI and the activities that will be undertaken to meet these objectives are discussed below. The discussion of investigation activities has been grouped by environmental media of concern or field task in the following sections. The locations of each of the proposed RI sample points are shown in blue on the figures.

3.1 Underground utility clearance

Prior to the start of any intrusive fieldwork, clearance of underground utilities will be performed. Dig Safely New York will be contacted to arrange for the location and marking of all underground utilities in the vicinity of the proposed sample locations.

For the investigation points near the active electrical transmission distribution station equipment, additional measures will be identified and undertaken to ensure that work is safely performed in this area. These measures will be detailed in the site-specific health and safety plan. In addition, all boring locations will be hand-cleared down to a depth of approximately 5 feet bgs. The field geologist will document all utilities identified and located as a result of the mark-out activities.

3.2 Surface soil

3.2.1 Surface soil data objectives

Although several surface soil samples were collected during a previous investigation performed at the site, additional data is needed in order to assess the potential for direct exposure of on-site and off-site workers or the public to site-related residuals. The fenced area to the north of the substation will not be sampled as this area is covered by gravel and some surface soil has been removed in the area immediately around the substation equipment during the recent expansion. The RI surface soil sampling will be focused on the grass-covered and brush-covered area in the eastern portion of the substation, and in the grass-covered areas in the perimeter of the site near the gas regulator house and along Park Drive.

3.2.2 Surface soil sampling

Eight additional on-site surface soil samples will be collected during the RI at the locations shown in blue on Figure 2-4. Table 3-1 provides summary information for the surface soil samples, including the sample rationale and laboratory analyses to be performed. All samples will be collected at a depth of between 0 and 2 inches after the vegetative layer has been removed. As shown in Table 3-1, each of the surface soil samples will be analyzed for the full Target Compound List (TLC) SVOCs, PCBs, Target Analyte List (TAL) metals, and total cyanide. Additional information regarding the soil sampling methods and laboratory analyses is presented in the FSAP and QAPP.

3.3 Test pit excavation

3.3.1 Test pit objectives

Although test pits have been completed during the previous investigations performed at the site, additional sampling is needed in, and around the Tar Vessel to obtain adequate information to prepare a plan to remediate this structure and the surrounding soil, if necessary. The Tar Vessel is proximate to live substation construction. Safe conditions permitting, one test pit will be excavated in this area to attempt to confirm the size of the structure, and the soil conditions to the west of the foundation.

3.3.2 Test pit sampling

The test pit will be excavated using hand tools only since the Tar Vessel is located beneath or in close proximity to the electrical transmission substation equipment. Tools such as a shovel will be used to remove the gravel cover placed on the structure to locate the corners of the vessel so the footprint of the structure can be surveyed. Hand tools will also be used to excavate a small test pit along the western side of the vessel to confirm the construction and depth of the structure and to determine if coal tar has impacted the adjacent soils. The excavation with the hand tools may also be assisted by using vacuum excavation equipment, if it is determined that this tool can be used safely in the substation area.

Soil samples will be collected from every two-foot depth interval within the test pit (and continuously along its length) and field-screened with a photo-ionization detector (PID) for the presence of organic vapors. Up to two laboratory samples may be collected from the test pit at the discretion of the field geologist. In general, if field conditions suggest that collection and analysis of a sample would be beneficial delineating the nature and extent of MGP-residuals in this area, samples will be collected and analyzed accordingly. The final plan for the investigation of the Tar Vessel will be determined in the field, in consultation with the NYSDEC.

The test pit will be backfilled with the material that was excavated by placing the material back in the excavation in the same order as it was removed, to the extent practical. Visibly impacted material will not be left exposed at the ground surface. Gravel will be used to restore the ground surface in this area.

3.4 Subsurface soil

3.4.1 Subsurface soil objectives

Subsurface soil borings will be completed in order to obtain additional information regarding the thickness and composition of fill beneath the site; the depth to the water table, to verify if the clayey silt unit may be acting as an aquitard beneath the site; to observe and screen subsurface soil to identify conditions that may be indicative of impacts by MGP or other residuals; and to install monitoring wells. The locations of the proposed soil borings and wells are shown in blue on Figure 2-5, and for several of the proposed borings and wells the locations are also shown in blue on the cross-sections. Table 3-1 provides summary information regarding the borings and wells, including the boring or well designation, the sampling location or rationale, and the laboratory analyses to be performed.

As shown on the cross-sectional views of the site (Figures 2-9 and 2-10), with one exception, the anticipated completion depth of the borings is approximately 30 feet bgs. The boring for up gradient well MW4S will be advanced to the top of the bedrock unit to confirm the depth to bedrock at this location. The actual depth for the borings will be determined in the field based on the subsurface conditions encountered. Where impacts are observed, the borings will be advanced to a sufficient depth to delineate the vertical extent of MGP residuals. If impacts are not observed, the borings will be advanced to the top of the clayey silt unit.

3.4.2 Soil boring methods

The subsurface soil borings will be performed using several drilling methods as follows.

- For the up gradient borings and the borings along the South Park Drive right of way, a truck mounted hollow stem auger rig will be used since these areas are truck assessable and the auger drill rig is needed to obtain the deeper information at MW4S.

- A track-mounted direct-push (Geoprobe™) drilling rig will be used to perform the borings along the North Park Drive right of way and inside of the substation fence in order to complete this work as safely as possible.

- A track-mounted direct-push drilling rig will also be utilized at the off site properties to minimize the potential disruption at the properties.

- The borings for the temporary wells to the north of Mill Creek will be advanced with direct-push drilling tools driven with an electric jackhammer.

Soil samples at all locations will be collected with either direct-push Macro-Core™ samplers, or 2-inch diameter split-spoon samplers. Either method will allow for continuous soil samples to be taken from the ground surface to the bottom of the borehole for both field characterization (PID screening and observations) and for the collection of samples for chemical analyses.

The soil samples obtained by either method will be logged by a geologist recording such data as the presence of fill material or subsurface structures, the nature of each geologic unit encountered, observations regarding moisture content, the PID readings, and visual and olfactory observations regarding the presence of hydrocarbon-like residuals.

It is anticipated that one to two samples for laboratory analyses will be collected from each boring. Samples will be collected from the most impacted intervals based on the PID screening and field observations (visual and olfactory) regarding the presence of MGP-related residuals. If impacts are not encountered, a sample will be collected from the 1-foot interval immediately below the water table and possibly a second from the bottom of the boring to confirm non-impacted conditions.

Samples of grossly impacted soil containing visible tar-like or oil-like NAPL will not be sampled for laboratory analyses. These “MGP source materials” will be assumed to be impacted to the extent that remediation will be required by the NYSDEC. Information regarding the vertical extent of this material will be recorded on the borelogs by the field geologist and areas with this material will be surveyed during the survey task. Representative samples of MGP residuals may be taken for forensic analyses, so that the results can be compared with sediment results, or up gradient sources if necessary.

A minimum of two samples from the most visibly impacted materials encountered during the soil borings (or the test pit) will be collected for the analysis of hazardous characteristics.

3.5 Groundwater monitoring

3.5.1 Monitoring well installation

Monitoring wells will be installed in 11 of the RI soil borings. The monitoring well locations, shown on Figure 2-7 were selected to have a sufficient number of wells to evaluate groundwater in areas that are considered up gradient, side gradient, and down gradient of the site. In general, the groundwater monitoring wells will be installed so that the screen straddles either the most impacted interval (if any) based on the field screening, or will be screened across the water table. Actual well design will depend on site conditions encountered, such as thickness of the saturated zone, observed stratigraphy, and the presence, location, and thickness of NAPL, if any. All drilled wells will be constructed with using a 1 or 2-inch diameter Schedule 40 PVC well riser with a 0.02 inch slotted screen and a 2-foot long sump for monitoring the presence of any dense non-aqueous phase liquid (DNAPL). Three temporary well screens will also be installed to obtain groundwater data in the area to the north of Mill Creek. After the direct-push sampling is performed, a 1-inch diameter Schedule 40 PVC well screen and riser will be placed in the borehole and the well will be constructed with a sand pack, seal and stick-up protective casing. Details for monitoring well installation provided in FSAP.

3.5.2 Well development

Each of the new monitoring wells will be developed a minimum of 24 hours after their installation to evacuate fine-grained sediments that may have accumulated within the well during installation. Well development methods are presented in the FSAP.

3.5.3 Groundwater sampling

Following completion of the well development, the wells will be allowed to stabilize for at least two weeks, and then sampled. All new and existing wells will be checked for the presence of light phase non-aqueous liquids (LNAPL) or dense phase non-aqueous liquids (DNAPL). Water levels will be measured in all the new and existing wells and a groundwater flow direction map will be prepared and included in the RI Report. Table 3-1 provides summary information for the groundwater samples including the sample designations, sample rationale, and the laboratory analyses to be completed.

3.5.4 Surface water elevation monitoring

A surface water elevation reference point (SWRP1) with a known elevation above NAVD88 will be established in the Mill Creek channel. The depth-to-surface water measurements obtained at this location will be used to determine the surface water elevation at the same time as the groundwater elevation measurements are taken at the site. The surface water elevation data will be included on the groundwater flow direction maps that will be prepared for the RI Report to evaluate whether groundwater from the site may be discharging into the creek.

3.6 Sediment investigation

The field activities for the investigation of sediment quality in Mill Creek include systematic hand probing of sediments and the collection of surface sediment samples. For discussion purposes, two areas of the creek have been identified and are shown on Figure 2-11. One area is upstream of the site in the Village of Palmyra (Background Area); the other is adjacent to, and downstream of the site.

3.6.1 Sediment probing

Systematic sediment probing will be performed to determine whether visible evidence of MGP-related residuals is present in the sediments in the creek adjacent to, and downstream of the site. Transect locations will be marked out approximately 25 feet apart along the shoreline at the locations shown on Figure 2-11. A series of probe points will be established out into the creek (Figure 2-11) using a rope with measured increments. Sediments at each probe point will be probed (agitated) by hand using a threaded steel bar and/or bucket auger (if possible) to observe the sediment physical characteristics, and to look for the presence of coal tar sheen or NAPL. The bar or bucket auger will be advanced by hand as deep as possible at each probe point, with a target depth of 2-3 feet below the sediment surface. The transect locations along the stream bed will be surveyed during the survey task.

3.6.2 Surface sediment sampling

Surface sediment samples will be collected in both areas of the creek. Background samples will be collected at the approximate locations shown on Figure 2-11. The final locations will be determined in consultation with the NYSDEC. Surface samples will also be collected to determine the extent of MGP-related COC in areas considered adjacent to, and downstream of the site. The tentative locations of sediment samples are shown in blue on Figure 2-11. Note however, that if visible evidence of MGP residuals is observed during the probing task, the location of the sediment samples may be modified to delineate the extent of any residuals observed. The final location of the shallow sediment samples will be determined in consultation with the NYSDEC following completion of the probing task.

All surface sediment samples will be collected from a depth of 0 to 6 inches below sediment surface with a ponar dredge, trowel or shovel. Table 3-1 lists the samples to be obtained and the laboratory analyses to be performed. Sufficient material will be collected at each sampling point to archive a portion of the sample for possible future forensic analyses should the analyses be needed to identify potential off site sources of PAH impacts to sediments.

3.7 Site survey

A survey of the investigation sampling points and important site features will be conducted at the end of the fieldwork by NYSEG's survey crew. The survey will be used to update the base map for the site and will also be included on the borelogs and figures presented in the RI Report. All horizontal locations will be reported in the applicable NYS Zone coordinates. All vertical measurements will be reported in NAVD88.

3.8 Investigation-derived residuals management

All soil cuttings, used disposable sampling equipment, and personal protective equipment (PPE) will be containerized in drums, sampled, and properly disposed of off site at a permitted disposal facility. Decontamination and well development water will be containerized in a plastic bulk tank prior to being disposed of off site. The disposal information will be documented in the final RI Report.

3.9 Analytical program

The laboratory samples for each media and the chemical analyses to be performed, including the QA/QC samples are included in Table 3-1. These analyses are summarized below.

3.9.1 Surface soil analyses

The surface soil samples will be analyzed for the following parameters:

- SVOC compounds by U.S. EPA Method 8270C;
- PCBs by U.S. EPA Method 8082;
- TAL Metals by U.S. EPA Method 6000-7000 Series; and
- Total Cyanide by U.S. EPA Method 9012A.

3.9.2 Subsurface soil analyses

The subsurface soil samples will be analyzed for the following parameters:

- VOC compounds by U.S. EPA Method 8260B;
- SVOC compounds by U.S. EPA Method 8270C;
- PCBs by U.S. EPA Method 8082;
- TAL Metals by U.S. EPA Method 6000-7000 Series; and
- Total Cyanide by U.S. EPA Method 9012A.

3.9.3 Groundwater analyses

The groundwater samples will be analyzed for the following parameters:

- VOC compounds by U.S. EPA Method 8260B;
- SVOC compounds by U.S. EPA Method 8270C;

- PCBs by U.S. EPA Method 8082;
- TAL Metals by U.S. EPA Method 6000-7000 Series; and
- Total Cyanide by U.S. EPA Method 9012A.

Note that based on the existing data from the site for wells MW2S and MW2D, cyanide may be found in significant concentrations in groundwater (Figure 2-7). If total cyanide is detected in concentrations greater than 200 ug/L (the groundwater standard value) during the RI sampling, additional analysis may be performed for a subset of the RI wells. The analyses that may be performed include the following:

- Total Cyanide – APHA Standard Methods 4500-CN C "Total Cyanide after Distillation" and APHA Standard Methods 4500-CN E "Colorimetric Method";
- Free Cyanide – ASTM D4282-95 "Standard Test Method for Determination of Free Cyanide in Water by Microdiffusion"; and
- Metal Cyanide Complexes – by the Dinoex IC Method.

Analysis of groundwater samples for natural attenuation parameters is not included at this time in the RI, as the investigations to date have not fully identified the extent of the groundwater impacts. Analysis for parameters which may indicate intrinsic biological degradation of the COI may be added to the sampling and analysis program for a sub-set of the site wells after the groundwater plume is delineated. The analyses will include the following:

- Total Iron by U.S. EPA Method 6010;
- Ferrous Iron by Standard Method SM3500;
- Total and dissolved Manganese by U.S EPA Method 6010;
- Nitrate by U.S. EPA Method 353.2;
- Sulfate by U.S. EPA Method 375.4;
- Sulfide by U.S. EPA Method 376.1; and
- Methane by U.S. EPA Method RSK-175.

3.9.4 Sediment analyses

The sediment samples will be analyzed for the following parameters:

- SVOC compounds by U.S. EPA Method 8270C;
- Total Cyanide by U.S. EPA Method 9012A; and
- Total Organic Carbon by the Lloyd-Kahn Method.

3.9.5 Soil profiling

Two to three soil samples may be collected during the investigation and analyzed for full RCRA Hazardous Characteristics testing. The objective of the sampling will be to determine if materials exhibiting hazardous characteristics may be present at the site. These analyses may also be utilized for waste disposal profiling purposes. The samples will be chosen from the most impacted soil collected during the investigation as determined by the field geologist. The analyses to be performed include the following:

- TCLP ZHE Extraction – U.S. EPA Method 1311;

- TCLP VOC – U.S. EPA Method 8260B;
- TCLP SVOC – U.S. EPA Method 8270C;
- TCLP ICP Metals – U.S. EPA Method 6010B (Mercury 7470A);
- Corrosivity – U.S. EPA SW-846 Chapter 7;
- Ignitability – U.S. EPA SW-846 Method 1010;
- Reactive Cyanide – U.S. EPA SW-846 Chapter 7; and
- Reactive Sulfide – U.S. EPA SW-846 Chapter 7.

3.9.6 Source material sampling and possible forensic analysis

Portions of soil or sediment samples which are representative of potential sources of impact to the creek within the study area may be archived by freezing for possible future forensic analysis. This may include soil containing NAPL or high concentrations of MGP residual material from the Tar Vessel or the area to the north of the substation, sediment obtained from the creek samples, and samples of sediments found within the background sampling area in the Village of Palmyra. If necessary, these samples will be subjected to forensic analysis to distinguish sediment impacts related to MGP operations from other sources. The analyses may include the following:

- Saturated Hydrocarbon SHC/TPH via GC/FID – U.S. EPA SW-846 Method 8100 mod.; and
- Alkylated PAHs via GC/MS-SIM – U.S. EPA SW-846 Method 8270C mod.

If it is determined that soil or sediment forensic analyses are needed for the RI, discussions will be held with the NYSDEC regarding the methods for the interpretation of the data and the reporting for this task.

In addition, it may be necessary to perform forensic analysis for selected groundwater samples to distinguish potential MGP-related impacts from the up gradient, off-site gasoline sources discussed above. The following approach may be used as necessary is to provide a tiered analytical program for evaluating hydrocarbons in groundwater at the site. The objective will be to gather sufficient information to determine whether groundwater impacts are site-related (MGP residuals) or petroleum impacts (specifically, automotive gasoline).

The first tier includes a screening-level, qualitative evaluation of the whole range of potential hydrocarbon products that may be present in groundwater at the site. Up gradient spill reports have indicated the presence of waste oil underground storage tanks (USTs), kerosene USTs, and gasoline spills. The second tier evaluates specific volatile and semi-volatile hydrocarbons.

The first tier will be performed to determine the total petroleum hydrocarbons (TPH) assemblages such as petroleum distillates (gasoline and diesel range), coal-derived liquids, and combustion products using U.S EPA Method 8015M (modified from 8015).

This analysis will be used to guide the next step which will be performed to provide appropriate quantitative chemical data to develop a defensible argument for or against groundwater impacts by off-site sources of hydrocarbons, specifically gasoline. The analyses that may be performed include the following:

- Method 8260M (modified from 8260)/8270M (modified 8270);
- PIANO analysis (paraffins, isoparaffins, aromatics, napthenes, and olefins) and fuel additives; and
- Parent and alkylated PAHs, sulfur PAHs, decalines, and alkylcyclohexanes.

The interpretation of the data will be discussed with the NYSDEC, and then summarized in the final RI Report.

3.9.7 QA/QC sampling

Field and laboratory quality control samples for the investigation will be collected and analyzed to document the accuracy and precision of the samples. The QA/QC samples, summarized in Table 3-1, include trip blanks, field equipment blanks, field duplicates and matrix spikes, and matrix spike duplicates. The data quality level for the investigation will be consistent with procedures outlined in the NYSDEC Analytical Services Protocol (ASP) July 2005 methodologies. A full ASP Category B data package will be prepared by the laboratory for all samples. The data will be reviewed, and a Data Usability Summary Report (DUSR) will be prepared by a qualified chemist. Additional information is provided in the QAPP.

3.10 Soil vapor intrusion investigation

In accordance with current NYSDOH guidance, investigations of potential vapor and indoor air impacts should proceed outward from known or suspected sources until potential and current human exposures have been adequately addressed. Following this guidance, areas with MGP-related impacts, and the extent of any dissolved groundwater plume that may be related to the MGP site will be delineated. As discussed above, it appears that an off-site, up gradient source of gasoline is present that has impacted groundwater at the site and the surrounding area. The need for soil vapor sampling be discussed following completion of the work scope presented above, when a comprehensive model for the site can be developed, that includes the source areas and potential migration pathways for both the MGP-related and gasoline-related impacts.

3.11 Fish and wildlife impact assessment

The need to perform a fish and wildlife impact assessment is discussed in the NYSDEC document entitled *“Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites”*, dated October 1994. The NYSDEC requires a FWIA when there is a significant potential for fish and wildlife resources to be present at a site, and there is a significant potential for the migration of residuals to these resources. From the surface water and sediment sampling previously performed at the site, the concentrations of COC that may possibly be MGP-related appear to be low. Probing and sampling in the creek and in the background area during the RI will provide additional information regarding the extent of the MGP-related COC in sediments. If significant MGP-related impacts are identified, the need to perform a FWIA will be further discussed with the NYSDEC.

4.0 Additional work plan documents

Four companion documents have been prepared to detail the methods and procedures to be used during the RI. Each of the documents is included as an Appendix to this Work Plan.

4.1 Field sampling and analytical plan

All sampling and analyses will be conducted in accordance with the methods described in the site-specific Field Sampling and Analytical Plan (FSAP). The FSAP provides a description of the objectives and methods for each of the investigation field activities, and details concerning the project organization.

4.2 Quality assurance project plan

In addition to the FSAP, a full Quality Assurance Project Plan (QAPP) has been developed for use on this project. The QAPP identifies the quality assurance objectives for the measurement data, the QA/QC procedures to be used in the field, the sample chain-of-custody methods to be used, and the analytical procedures to be followed. The QAPP will also include a description of the manner in which each type of data is to be used.

4.3 CAMP

A Community Air Monitoring Plan (CAMP) has been developed for this project that will be followed during all invasive fieldwork (soil borings, borings for well installations, and test pitting). Included in the CAMP is a description of methods that may be used to control odors during the RI if needed.

4.4 Site-specific health and safety plan

A Site-Specific Health and Safety Plan (HASP) has been prepared to outline health and safety risks and procedures for all site workers and visitors. Included in the HASP is information regarding physical and chemical hazards at the site, emergency procedures and contact information, incident reporting procedures, and the route to the hospital. The HASP addresses the specific requirements for working in a substation area. All personnel who work in the substation area will be required to attend a substation electrical safety training session held by the NYSEG substation operations manager.

5.0 Community outreach activities

Community outreach efforts will be initiated as directed by the NYSDEC, or if interest from the public suggests the need. The outreach efforts will consist of the following:

- Preparation and maintenance of a mailing list;
- Fact sheets;
- Establishment of document repositories; and
- Participation and preparation for public meetings.

The Community Outreach Plan would be patterned to meet the needs of the community and would be modeled after other community outreach programs NYSEG has established on other projects. The plans will be shared with the NYSDEC's Regional Public Participation Specialists to refine the program, and to ensure that the NYSDEC's concerns with respect to community awareness of the project are met.

6.0 Project schedule and deliverables

6.1 Schedule

The RI fieldwork will be initiated following approval of the scope-of-work presented in this Work Plan by the NYSDEC. If approval is obtained in the late summer of 2007, it is anticipated that the investigation phase of the project will be performed in the fall of 2007, with laboratory analyses of soil and groundwater samples completed by the winter of 2007. A revised schedule with more specific dates will be submitted upon approval of the Work Plan by the NYSDEC. The initial target dates for the project milestones are as follows:

1. Mid August 2007 – RI Work Plan and attached documents submitted to the NYSDEC for review, comment and approval.

2. Late August – Early September 2007 – NYSDEC approves the RI Work Plan.

3. Late September – Early October 2007 – After the RI Work Plan is approved, the field investigation activities will be initiated.

4. Winter 2007 – The RI Report will be prepared.

5. Spring 2008 – The RI Report will be submitted to the NYSDEC for review and approval.

The milestones presented above are subject to change based on the planning and scheduling of the consulting engineer and delays caused by weather and unforeseen circumstances. However, it is intended to maintain a schedule to complete the project as expeditiously as possible.

6.2 Deliverables

6.2.1 RI report

Upon completion of the field activities, an RI Report will be prepared to document the findings of the investigations performed at the site. The report will be consistent with the specifications presented in the Draft DER-10 [NYSDEC, 2002] document and will include:

- An executive summary;
- A site description and history;
- Summary information regarding previous investigations and remedial work performed at the site;
- Descriptions of all field activities performed;
- A summary of all field observations, field measurements, and laboratory analytical data summarized in tabular format;
- Plan view and cross-section figures presenting laboratory analytical data and field observations of surface and subsurface soil and groundwater impacts;
- A qualitative risk assessment which assesses the sources of impact, on and off-site human and ecological receptors, and exposure pathways;
- An integration of field observations and measurements with laboratory analytical data to evaluate the nature and extent of impacts;
- A set of conclusions for the investigation; and

- Recommendations.

The RI Report will be reviewed and approved by a qualified senior geologist. The report and site data will be prepared and organized such that it can be used for the preparation of a feasibility study for the site. If appropriate, recommendations for additional site activities will be furnished.

7.0 References

BBL, 2005. Results of Subsurface Work at a Former Gas Holder, Palmyra Park Drive, Former Manufactured Gas Plant (MGP) Site, Village of Palmyra, Wayne County, New York. May 27, 2005.

NYSDEC, 1990. Water Quality Standards and Guidance Values, September 25, 1990 (TOGS 1.1.1), Division of Water, Albany, New York.

NYSDEC, 1990. Revised TAGM – Selection of Remedial Actions at Inactive Hazardous Waste Sites, memo from Michael J. O'Toole, HWR-90-4.030, revised May 15, 1990.

NYSDEC, 1991. Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites. Prepared by: New York State Department of Environmental Conservation, Division of Fish and Wildlife, June 1991.

NYSDEC, 1994a. Division Technical and Administrative Guidance Memorandum [TAGM 4046]: Determination of Soil Cleanup Objectives and Cleanup Levels. Division of Hazardous Waste Remediation, Albany, New York, January 24, 1994.

NYSDEC, 1994b. Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA), October, 1994.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values, Division of Water Technical and Operational Guidance Series (I.I.I), October.

NYSDEC, 1998. Technical Guidance for Screening Contaminated Sediments. NYSDEC Division of Fish and Wildlife.

NYSDEC, 1999. Technical Guidance for Screening Contaminated Sediments, Division of Fish and Wildlife and Marine Resources, January 1999.

NYSDEC, 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

NYSEG, 2006. Final Engineering Report for the Expansion of the Palmyra Electrical Substation Associated With the Palmyra Former Manufactured Gas Plant Site, Village of Palmyra, Wayne County, New York. September 29, 2006.

Order on Consent, 1994. Between NYSDEC and NYSEG, Index #D0-0002-9309, May 1994.

Sanborn Maps for the Village of Palmyra for 1884, 1889, 1894, 1899, 1906, 1912, 1925, 1938, and 1947.

TRC, 1986. Task 2 Sampling Plan for the Site Investigation at the Former Palmyra Coal Gasification Plant. TRC, December 12, 1986.

TRC, 1987. New York State Electric and Gas Corporation, Investigation of the Former Coal Gasification Site in Palmyra, New York. Task 1 Final Report, Preliminary Site Evaluation. TRC, January 20, 1987.

TRC, 1989a. Task 2 Final Report, New York State Electric and Gas Corporation, Investigation of the Former Coal Gasification Site in Palmyra, New York. Task 1 Final Report, Preliminary Site Evaluation, Volume I – Technical Report, and Task 2 Final Report. TRC, April 7, 1989.

TRC, 1989b. Indoor Air Survey. New York State Electric and Gas Company. April 13-14, 1989.

TRC, 1990a. Final Task 3 Report, New York State Electric and Gas Corporation, Investigation of the Former Coal Gasification Site in Palmyra, New York. TRC, July 1990.

TRC, 1990b. Final Task 4 Report, New York State Electric and Gas Corporation, Risk Assessment for the Former Coal Gasification Site in Palmyra, New York. TRC, December 1990.

Tracer Research Corporation, 1989. Groundwater Screening Survey, NYSEG Substation, Palmyra, New York, June 1989.

U.S. EPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final EPA/g-89/004, OSWER Directive 9355.3-01, October.

U.S. EPA, 1989. Risk Assessment Guidance for Superfund, Volume I. Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response: Washington, DC, EPA 540/1-89/002.

U.S. EPA, 1992. Assessing Potential Indoor Air Impacts for Superfund Sites. United States Environmental Protection Agency, Office of Air Quality, Research Triangle Park, North Carolina. September 1992.

U.S. EPA, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504, April 1996.

Appendix A

Historic Sanborn fire insurance maps

EDR® Environmental
Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To: James H. Edwards
The RETEC Group
1001 West Seneca Street
Ithaca, NY 14850

Order Date: 4/13/2007 **Completion Date:** 4/17/2007
Inquiry #: 1902907.1s
P.O. #: NA
Site Name: NYSEG Palmyra Substation Property
Address: Park Drive/Throop Street
City/State: Village of Palmyra, NY 14522
Cross Streets:

Customer Project: NYSG2-Palmyra
1031517ERK 607-277-5716

Based on client-supplied information, fire insurance maps for the following years were identified

1884 - 1 Map
1889 - 1 Map
1894 - 1 Map
1899 - 1 Map
1906 - 1 Map
1912 - 1 Map
1925 - 1 Map
1938 - 1 Map
1947 - 1 Map

Limited Permission to Photocopy

Total Maps: 9

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Organization of Electronic Sanborn Image File

- Sanborn Map Report, listing years of coverage
- User's Guide
- Oldest Sanborn Map Image
- Most recent Sanborn Map Image

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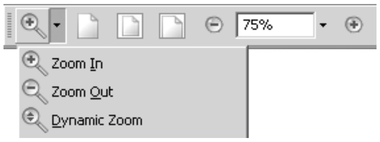
2. Identify TP (Target Property) on the most recent map.
3. Find TP on older printed images.
4. Using Acrobat® Reader®, zoom to 250% in order to view more clearly. (200-250% is the approximate equivalent scale of hardcopy Sanborn Maps.)
   A. On the menu bar, click "View" and then "Zoom to..."
   B. Or, use the magnifying tool and drag a box around the TP



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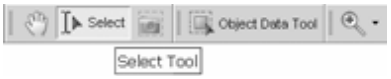
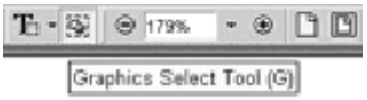
Acrobat Versions 6 and 7

1. Go to the menu bar
2. Click the "Select Tool"
3. Draw a box around the area selected
4. "Right click" on your mouse
5. Select "Copy Image to Clipboard"
6. Go to Word Processor such as Microsoft Word, paste and print.



Acrobat Version 5

1. Go to the menu bar
2. Click the "Graphics Select Tool"
3. Draw a box around the area selected
4. Go to "Menu"
5. Highlight "Edit"
6. Highlight "Copy"
7. Go to Word Processor such as Microsoft Word, paste and print.



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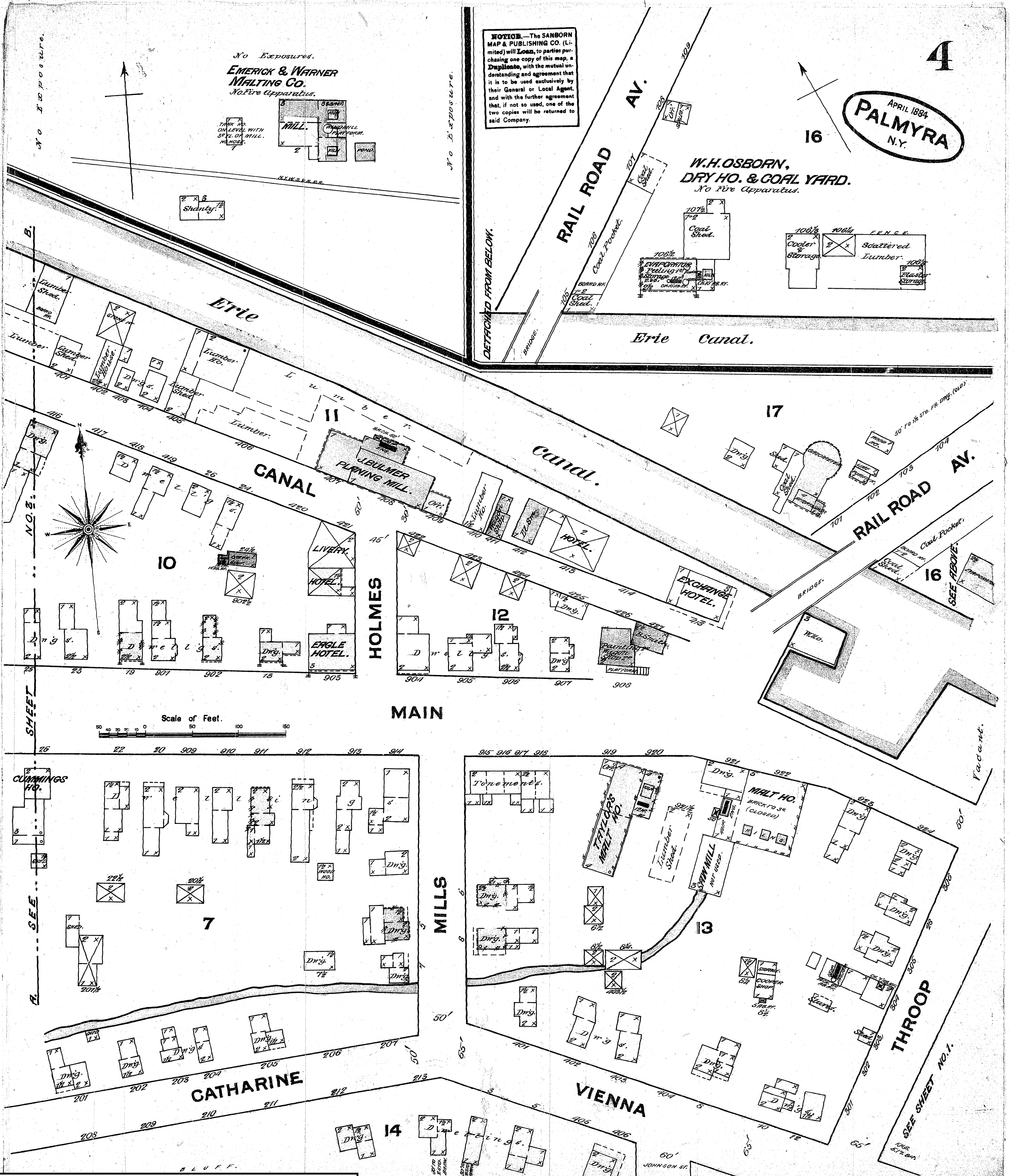

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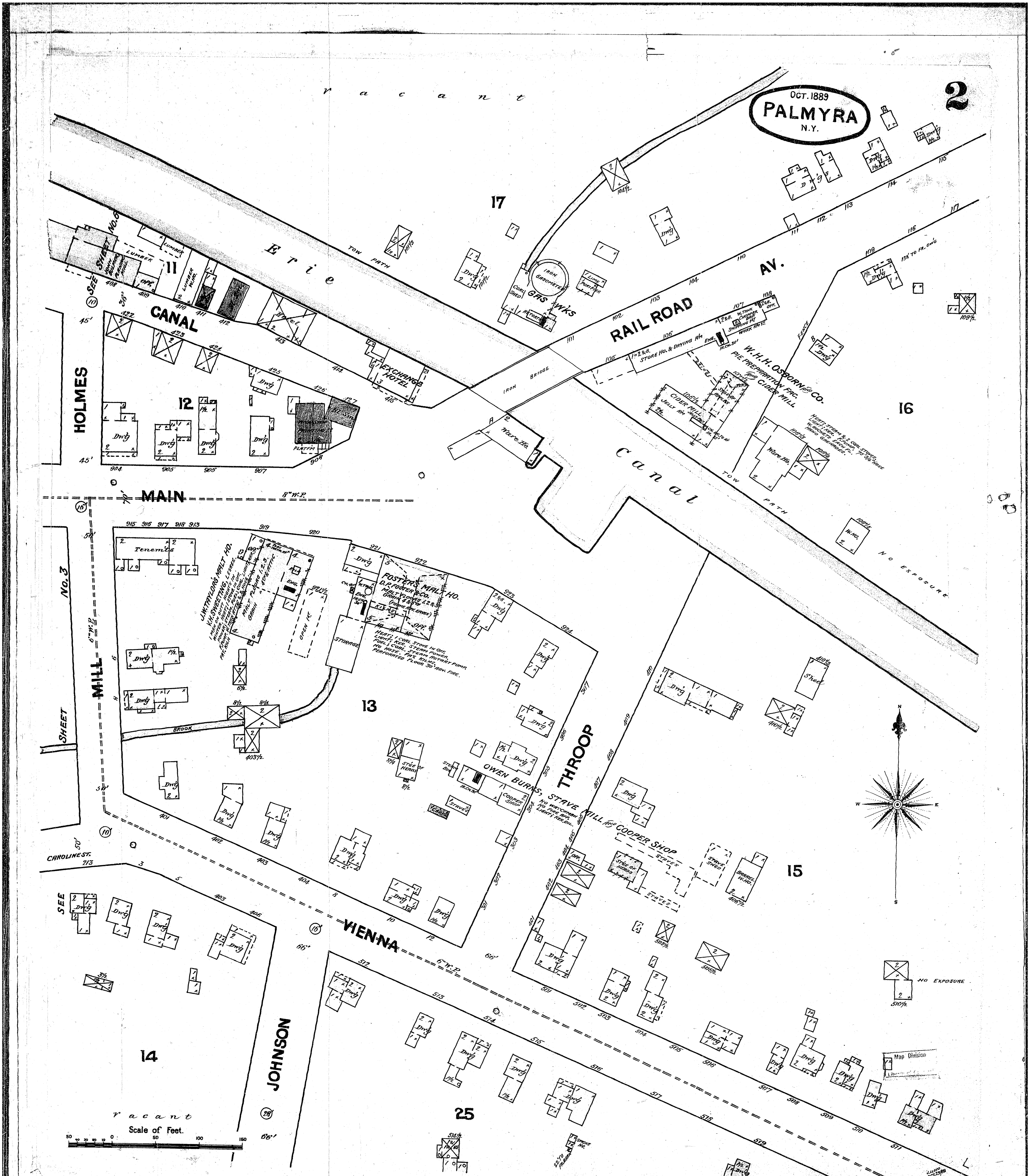

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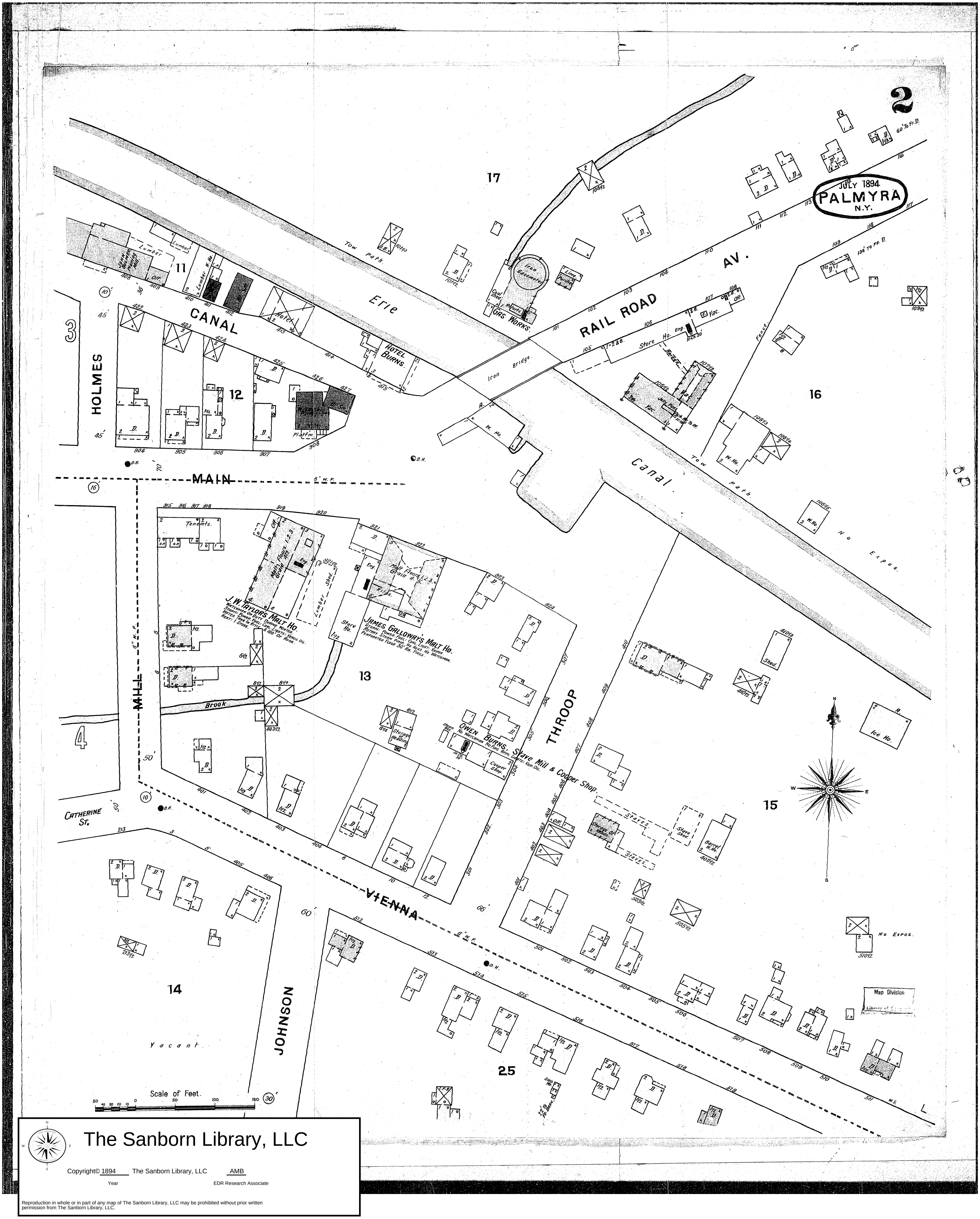

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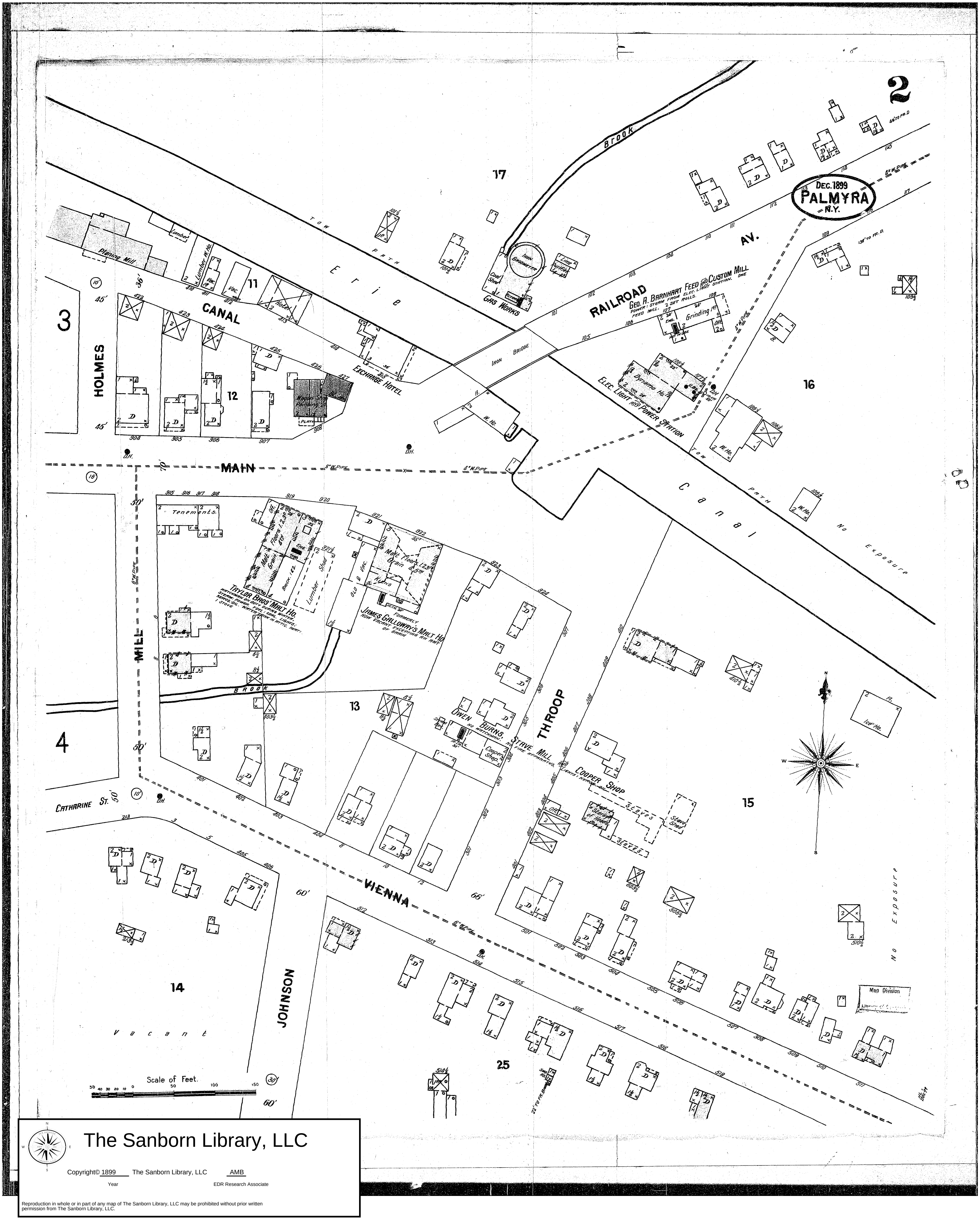
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N.Y.
Brook
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Iron Gasometer
Coal Shed
Gas Works
Lime
RAILROAD AV.
GEO. A. BARNHART FEED AND CUSTOM MILL
POWER: STEAM FROM ELEC. LIGHT STATION. ONE FEED MILL. 3 SET ROLLS.
Grinding
Eng.
Iron Bridge
Dynamo Ho.
ELEC. LIGHT AND POWER STATION
W. Ho.
16
Tow Path
Erie
Canal
No Exposure
Planing Mill
Lumber
Lumber W. Ho.
Vac.
11
Hotel
EXCHANGE HOTEL
CANAL
3
HOLMES
12
Wagon Shop Painting
Plats.
D.H.
MAIN
8" W. Pipe
4" W. Pipe
Tenements.
TAYLOR BROS' MALT HO.
Malt Floors 1.2.3.
Grain
Kilns
Lumber Shed
FORMERLY JAMES GALLOWAY'S MALT HO.
NOW VACANT EXCEPTING AN AMT. OF GRAIN
Old & Vac.
MILL
6" W. Pipe
BROOK
4
13
OWEN BURNS STAVE MILL
NO WATCHMAN
Cooper Shop
COOPER SHOP
Staves
Stave Shed
THROOP
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Ice Ho.
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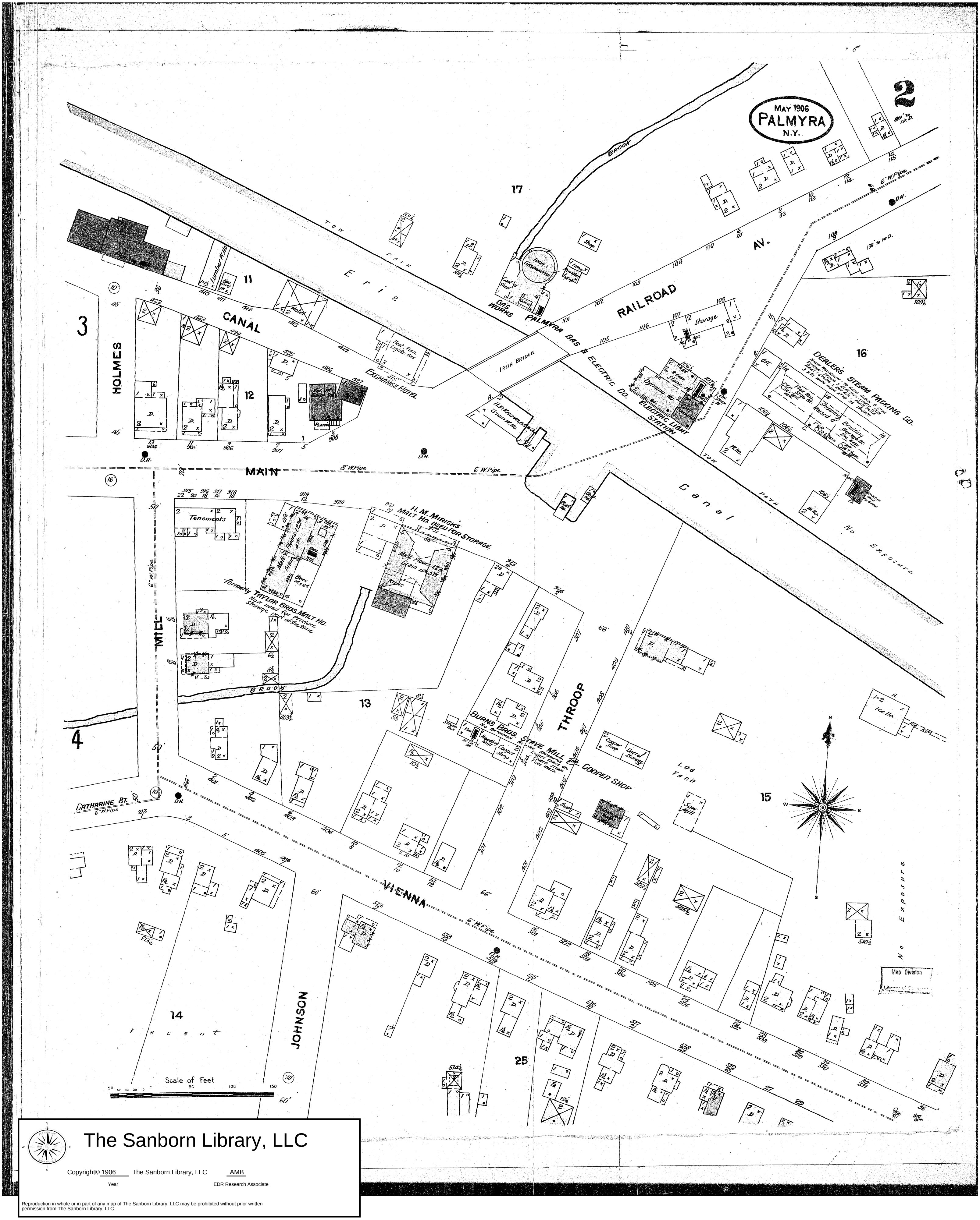

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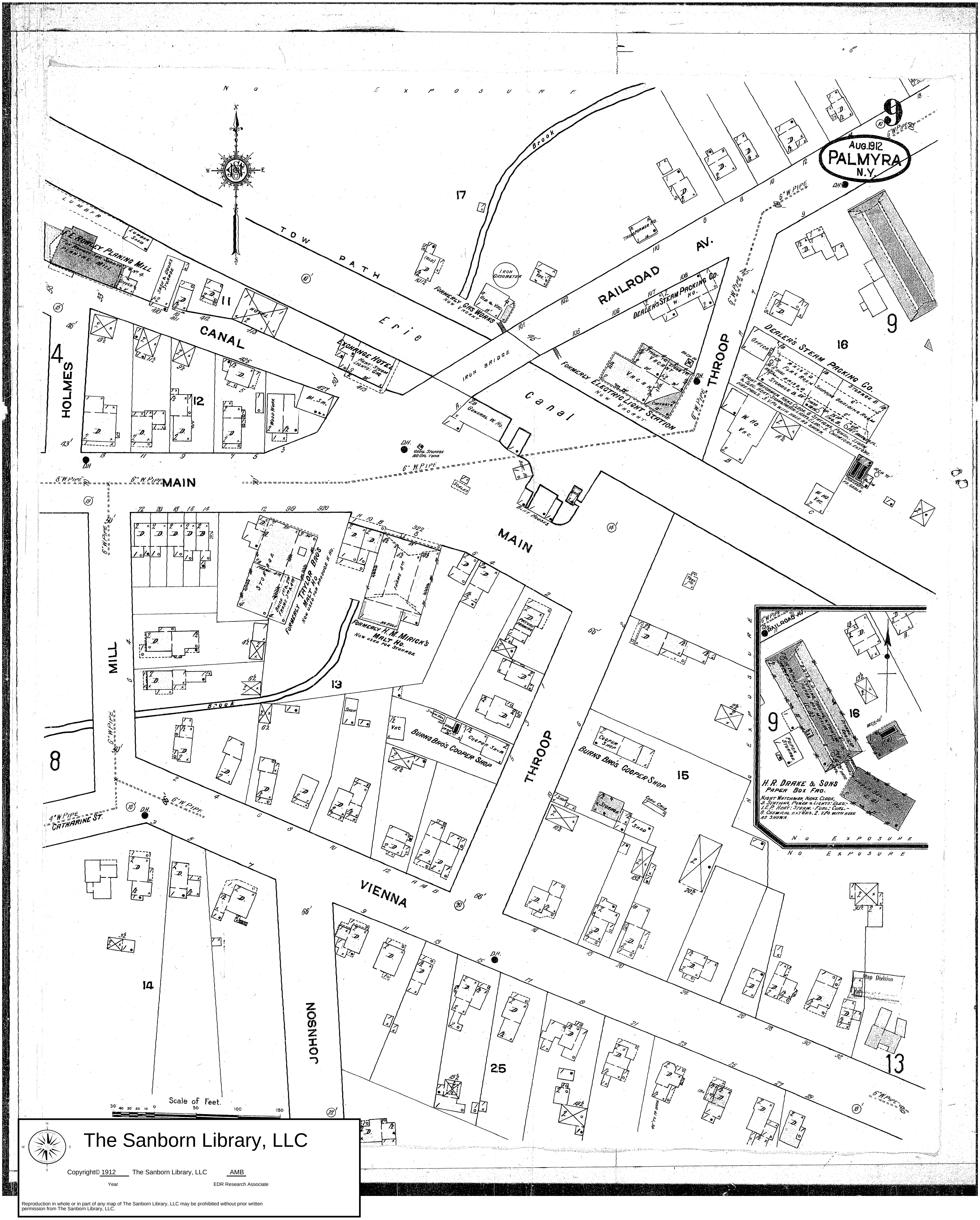
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NO EXPOSURE
TOW PATH
Erie Canal
RAILROAD AV.
CANAL
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HOLMES
MILL
THROOP
VIENNA
JOHNSON
CATHARINE ST.
Brook
IRON BRIDGE
IRON GASOMETER
FORMERLY GAS WORKS NOW VACANT
TRANSFORMER HO.
FORMERLY ELECTRIC LIGHT STATION NOW VACANT
DEALERS STEAM PACKING CO. W. HO.
E. ROWLEY PLANING MILL
LUMBER SHED
EXCHANGE HOTEL
HEAT: STEAM LIGHTS: GAS
WOOD WORK
BL. SM.
GENERAL W. HO.
SCALES
BLHY HOUSES
GASOL. STORAGE 200 GAL. TANK
DEALER'S STEAM PACKING CO.
OFFICE
RAISED FLAX ROOM
RAISED STORAGE B.
SHIPPING
BRAIDING ROOM
STORAGE B
ENG. B.
NIGHT WATCHMAN NANZ CLOCK 6 STATIONS, POWER: STEAM & ELEC. HEAT: STEAM & HOT AIR: LIGHTS ELEC.- 5. CHEMICAL EXT'G'RS. FIRE PAILS. 3. V.P'S. WITH HOSE AS SHOWN.
W. HO. VAC.
CONCRETE FR. GABLE
FORMERLY TAYLOR BROS MALT HO. NOW USED FOR PRODUCE W. HO.
STORAGE
FORMERLY H. M. MIRICK'S MALT HO. NOW USED FOR STORAGE
PICTURE FRAMING
BURNS BRO'S COOPER SHOP
COOPER SHOP
STORAGE
SHED
CORN CRIB
SHOP
H.R. DRAKE & SONS
PAPER BOX FAC.
NIGHT WATCHMAN NANZ CLOCK, 9. STATIONS, POWER & LIGHTS: ELEC.- I.E.P. HEAT: STEAM.- FUEL: COAL.- 6. CHEMICAL EXT'G'RS. 2. V.P'S WITH HOSE AS SHOWN.
PAPER STORAGE
PAPER BOX W. HO.
DYNAMO
BK. CH. 40'
6" W. PIPE
8" W. PIPE
4" W. PIPE
D.H.
4
8
11
12
13
14
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17
25
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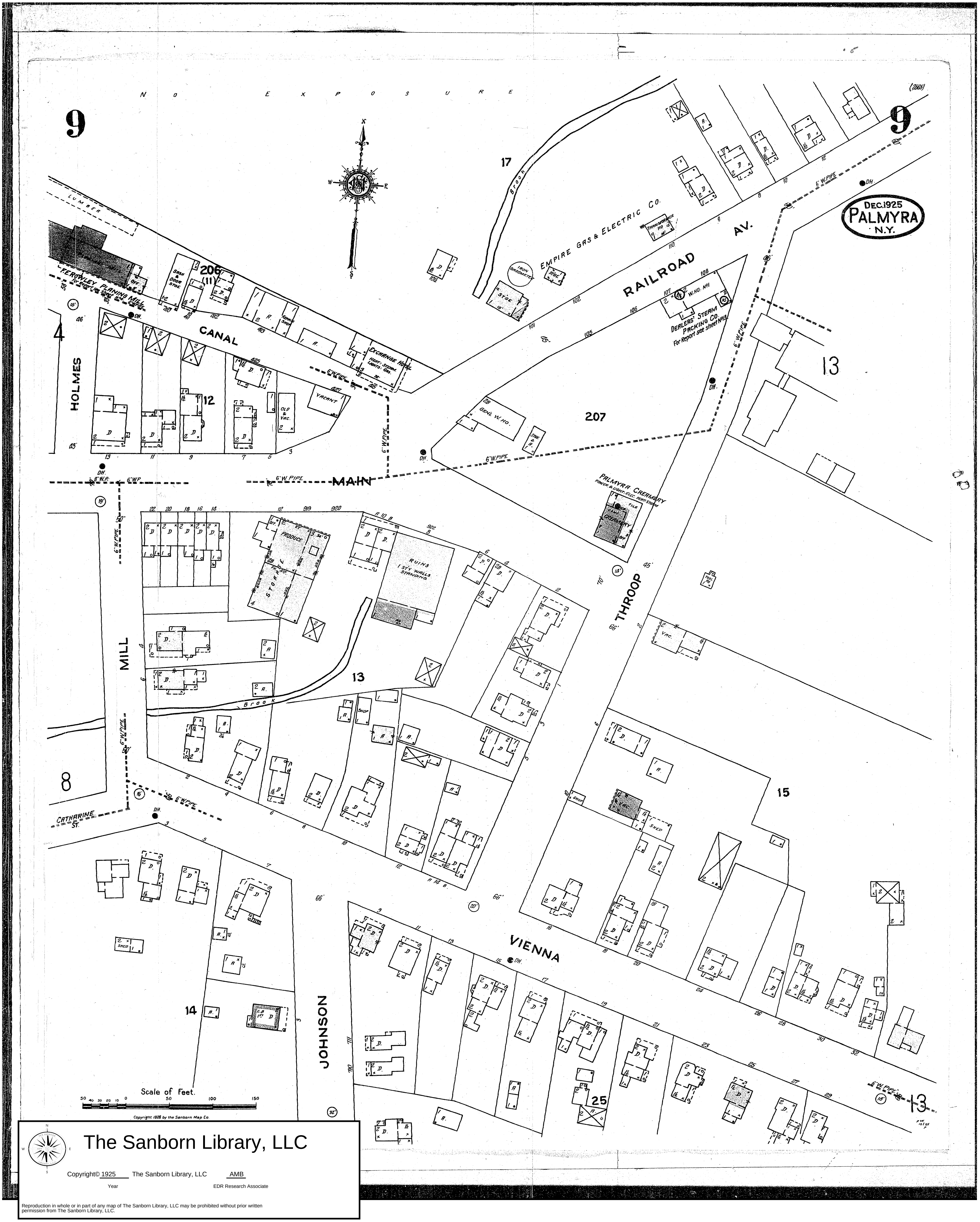
Scale of Feet.
Map Division



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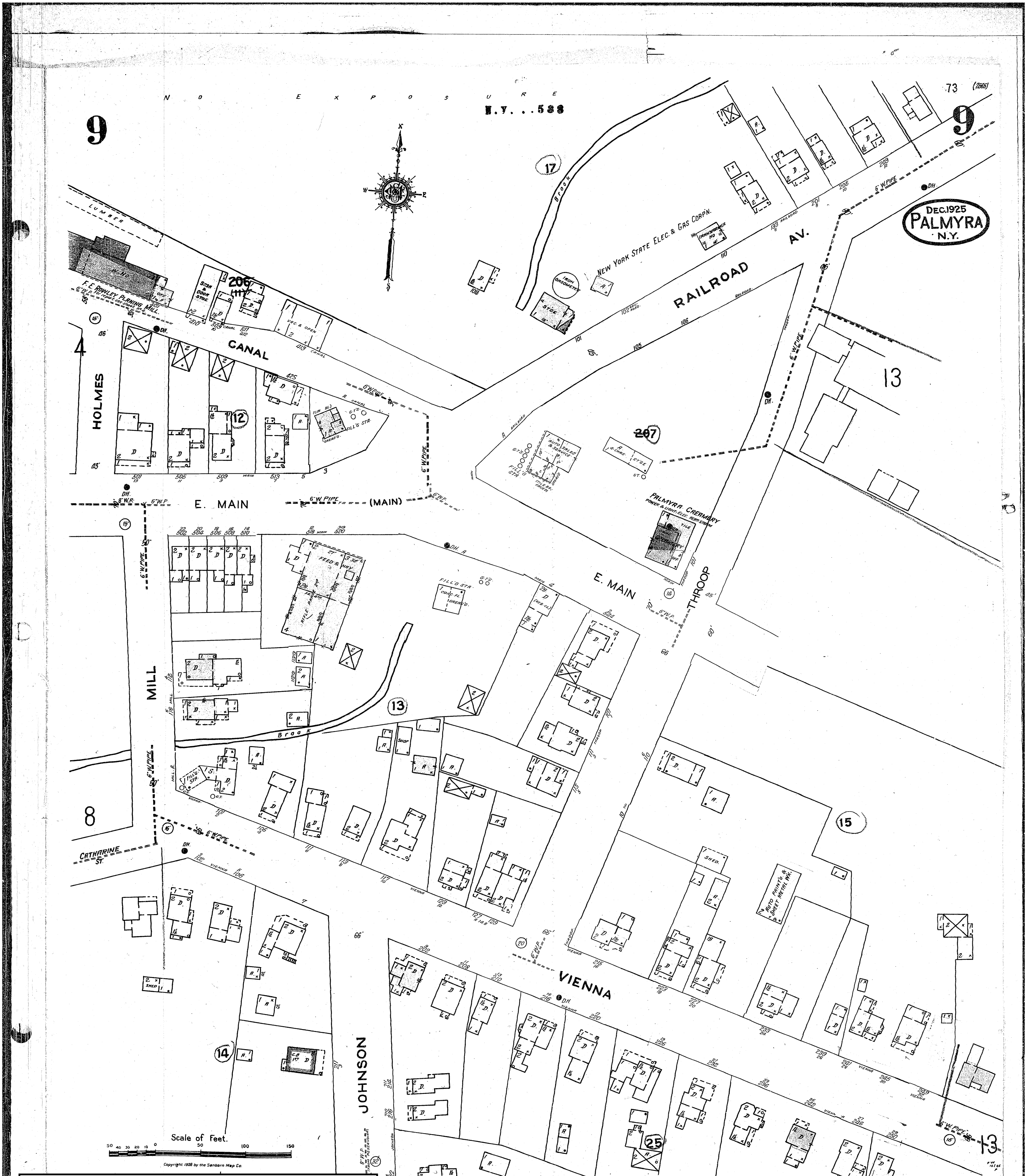

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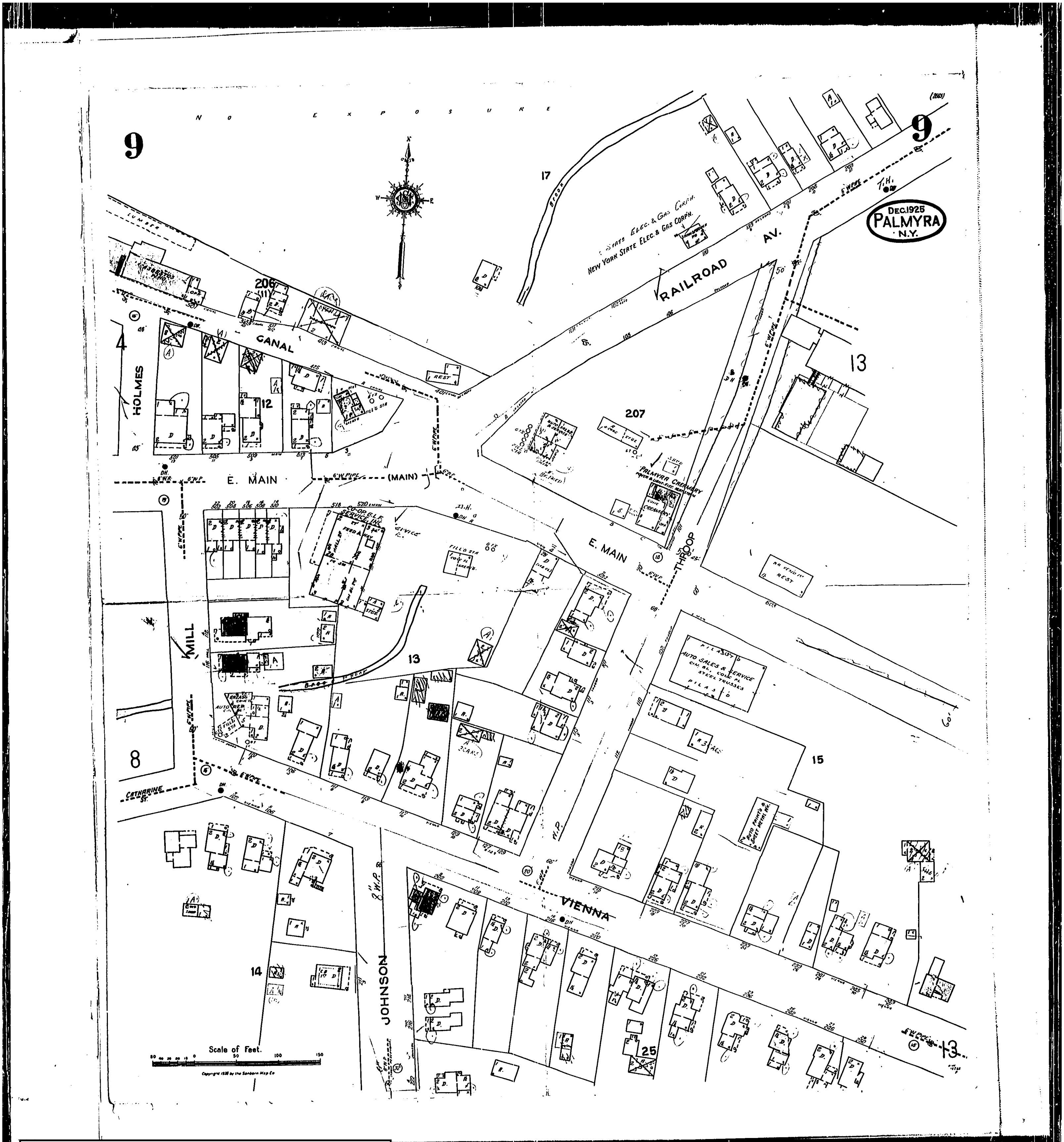

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Year EDR Research Associate

TRC Environmental Consultants, Inc. Previous investigation test pit and well construction logs

Merged with ENSR in 2007

RETEC

August 2007

RIN

PROJECT N 436-N61-14

PAGE ___ OF ___

BORING NO. 1S

PROJECT: Palmyra

CLIENT: NYSEG

LOCATION: Palmyra, NY

DRILLING CONTRACTOR: Northstar Drilling

DRILLER: Jeff Thew

TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 444.67

WELL DEPTH: 20.2'

CASING STICK UP: 2

WATER LEVEL: 12.3' below grade

DATE STARTED: 12/10/86

COMPLETED: 12/10/86

TOP OF SCREEN: 9.3

BOTTOM OF SCREEN: 20.2

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: Sand to 8', bentonite slurry seal. Surging with air compressor for 1-1/2 hours.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'	2-3-3-5	50	0.5		0-.3' Brown soil. .3-.4' Large cobbles and clay. .4-.9' Balck tar and SAND - no odor. .9-1.0' Light brown SAND and small cobbles.	
2-4'	6-10-6-6	10	0.4		0-2' Small to medium cobbles, some SILT, SAND and CLAY.	
4-6'	6-4-3-2	15	0.7		Silty SAND with very small cobbles.	
6-8'	5-4-3-3	15	0.3		Silty SAND, some small to medium cobbles. Material is dry.	

BORING

PROJECT NO. +36-N61-14

PAGE ___ OF ___

BORING NO. 1S

ROJECT: Palmyra

LIENT: NYSEG

OCATION: Palmyra, NY

RILLING CONTRACTOR: Northstar Drilling

RILLER: Jeff Thew

RC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 444.67

WELL DEPTH: 20.2'

CASING STICK UP: 2

WATER LEVEL: 12.3' below grade

DATE STARTED: 12/10/86

COMPLETED: 12/10/86

TOP OF SCREEN: 9.3

BOTTOM OF SCREEN: 20.2

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: Sand to 8', bentonite slurry seal. Surging with air compressor for 1-1/2 hours.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8-10'	4-3-2-2	40	0.6		0-.8' Medium brown silty SAND with cobbles of various sizes. .5-.8' Same as above with tar fragments.	Soil is saturated.
10-12'	1-1-1-1	20	24.0		0-.4' Wet silty SAND.	
12-14'	2-4-15-30	85	42.0		0-.8' Wet silty medium to fine SAND, some clay. Dry, dark red-brown densely packed peat soil. Trace organic matter. .8-1.1' matter. 1.1-1.7' Dry, dark brown, densely packed silty SAND, little red brick fragments.	Three separate samples taken for this material.
14-16'	5-8-9-8	10	9.8		Medium gravel with slight petroleum odor.	Gravel prevented sample entry into spoon.

PROJECT NO. 3436-N61-14 PAGE ___ OF ___ BORING BORING NO. 1S

PROJECT: Palmyra
CLIENT: NYSEG
LOCATION: Palmyra, NY
DRILLING CONTRACTOR: Northstar Drilling
DRILLER: Jeff Thew
TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 444.67
WELL DEPTH: 20.2'
CASING STICK UP: 2
WATER LEVEL: 12.3' below grade

DATE STARTED: 12/10/86
COMPLETED: 12/10/86
TOP OF SCREEN: 9.3
BOTTOM OF SCREEN: 20.2

DRILLING METHOD: Hollow Stem Auger
COMPLETION AND DEVELOPMENT: Sand to 8', bentonite slurry seal. Surging with air compressor for 1-1/2 hours.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
16-18'	8-15-14-17	45	7.6		0.4' Saturated silty SAND with small cobbles. Dark gray petroleum odor. .4-.8' Coarse SAND, some SILT. Dryer than above. .8-.9' Coarse SAND and SILT and CLAY. Moisture same as above.	
18-20'	15-18-22-28	50	3.2		0-.4' Medium-dark brown wet, coarse SAND and SILT with cobbles. Petroleum Odor. .4-1' Medium brown damp to wet coarse SAND and SILT. Little red and yellow hard pan fragments.	

PROJECT N 3436-N61-14

PAGE ___ OF ___

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BORING NO. 2S

PROJECT: Palmyra

CLIENT: NYSEG

LOCATION: Palmyra, NY

DRILLING CONTRACTOR: Northstar Drilling

DRILLER: Jeff Thew

TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION:

WELL DEPTH: 17'

CASING STICK UP: 2'

WATER LEVEL: 9' below grade

DATE STARTED: 12/09/86

COMPLETED: 12/10/86

TOP OF SCREEN: 6.3'

BOTTOM OF SCREEN: 17'

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: Sand filled to 5 ft bentonite pellets to 3'. Developed by suging with air compressor for 1 hour.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	(ppm) HNU/OVA	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
					See boring log 2D for sample descriptions.	

PROJECT N 436-N61-14 PAGE ___ OF ___ RIN BORING NO. 2D

PROJECT: Palmyra
CLIENT: NYSEG
LOCATION: Palmyra, NY
DRILLING CONTRACTOR: Northstar Drilling
DRILLER: Jeff Thew
TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 439.42
WELL DEPTH: 50'
CASING STICK UP: 2'
WATER LEVEL: 8.7 below grade

DATE STARTED: 12/08/86
COMPLETED: 12/09/86
TOP OF SCREEN: 33.8
BOTTOM OF SCREEN: 50'

DRILLING METHOD: Spun casing rotary bit reaming, NX coring.
COMPLETION AND DEVELOPMENT: Sand filled to 32.5 from Bentonite slurry seal above that. Surging with air compresser for 1 hour.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
0-2'	1-6-5-4	35	1.2		0-.4' Brown and black medium-coarse SAND and SILT, trace GRAVEL. .4-.6' Concrete fragments.	Spun casing drilling.
2-4'	2-2-1-1	40	0.8		0-.2' Yellow coarse SAND and GRAVEL, little brick fragments. .2-.3' Grey SILT and fine SAND. .3-.5' Black coal clinkers. .5-.8' Yellow-gray sandy fill. Fill material.	
4-6'	1-1-1/1	20	0.8		White-gray fine to coarse SAND, some gravel and brick fragments (fill material).	
6-8'	1-1-1-1	20	0.8		Same as above with little coal clinkers.	

PROJECT NO. 436-N61-14 PAGE ___ OF ___ INC BORING NO. 2D

PROJECT: Palmyra

CLIENT: NYSEG

LOCATION: Palmyra, NY

DRILLING CONTRACTOR: Northstar Drilling

DRILLER: Jeff Thew

TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 439.42

WELL DEPTH: 50'

CASING STICK UP: 2'

WATER LEVEL: 8.7 below grade

DATE STARTED: 12/08/86

COMPLETED: 12/09/86

TOP OF SCREEN: 33.8

BOTTOM OF SCREEN: 50'

DRILLING METHOD: Spun casing rotary bit reaming, NX coring.

COMPLETION AND DEVELOPMENT: Sand filled to 32.5 from Bentonite slurry seal above that. Surging with air compresser for 1 hour.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8-10'	1-1-1-1	65	1.4		0-.5' Same as 6-8' sample. .5-1.3' Light-brown to orange-brown. Silty CLAY, little fine SAND with mottling.	Could be fill.
10-12'	3-2-3-14	25	1.4		0-.45' Same as previous sample (.5-1.3' of 8-10'). Some large red brick fragments, some cobbles. .45-.50' Dark gray fine SILT and SAND, little cobbles.	At 11.5' drilling became more difficult.
12-14'	15-10-14-12	55	38.0		0-.1' Red brick fragments. .1-.4' Red-brown SILT and SAND, and dark gray SILT and SAND. .4-1.1' Gray to black-gray coarse SAND and GRAVEL little cobbles. Slight petroleum odor.	
14-16'	19-26-21-23	40	90.0		Gray to dark-gray sand and gravel. Little large cobbles. Petroleum odor.	

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PROJECT NC 36-N61-14
PAGE ___ OF ___
BORING NO. 2D

ROJECT: Palmyra
LIENT: NYSEG
OCATION: Palmyra, NY
RILLING CONTRACTOR: Northstar Drilling
RILLER: Jeff Thew
RC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 439.42
WELL DEPTH: 50'
CASING STICK UP: 2'
WATER LEVEL: 8.7 below grade

DATE STARTED: 12/08/86
COMPLETED: 12/09/86
TOP OF SCREEN: 33.8
BOTTOM OF SCREEN: 50'

DRILLING METHOD: Spun casing rotary bit reaming, NX coring.
COMPLETION AND DEVELOPMENT: Sand filled to 32.5 from Bentonite slurry seal above that. Surging with air compresser for 1 hour.

DEPTH NTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
6-18'	22-40-26-32	65	16.0		Gray SAND and GRAVEL, little shale fragments. Petroleum odor.	
18-20'	50-85-43-18	45	4.5		0-.3' Dark gray layered shale boulder. .3-.9' Dark gray sandy GRAVEL, some cobbles. No visible contamination. No petroleum odor.	Falling head when drilling water shut off.
20-22'	18-32-54-23	35	1.0		Blue-gray densely packed SILT and CLAY. Material, probably a weathered shale.	
22-23.3'	74-77-100/.3	35	4.6		Same as above sample (20-22') but more blue. No visible contamination or odor.	Drilled with rotary bit for 5 feet after spoon refusal.

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PROJECT NO. 436-N61-14

PAGE ___ OF ___

BORING NO. 2D

ROJECT: Palmyra

LIENT: NYSEG

OCATION: Palmyra, NY

RILLING CONTRACTOR: Northstar Drilling

RILLER: Jeff Thew

RC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 439.42

WELL DEPTH: 50'

CASING STICK UP: 2'

WATER LEVEL: 8.7 below grade

DATE STARTED: 12/08/86

COMPLETED: 12/09/86

TOP OF SCREEN: 33.8

BOTTOM OF SCREEN: 50'

DRILLING METHOD: Spun casing rotary bit reaming, NX coring.

COMPLETION AND DEVELOPMENT: Sand filled to 32.5 from Bentonite slurry seal above that. Surging with air compresser for 1 hour.

DEPTH NTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
5-27'	33-27-23-22	30	1.8		Same as 22-23.3' sample.	Hit soft spot 27-28'.
30-31.8'	11-14-15-100/.3	55	1.4		0-.7' Same as 25-27' sample. .7-1.1' Weathered shale grading to darker gray and denser material.	Washwater turned darker. Cleaned hole.
35-39.5	NX Core	100			Blue-gray highly weathered shale.	RQD = 100%.
39.5-44.5'	NX Core	100			Blue-gray highly weathered shale grading to darker gray and gray-black more competent rock. Trace calcite (red and white) crystallization.	RQD = 100%. Sample broken up upon dislodging from core barrel.

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PROJECT NO 36-N61-14

PAGE ___ OF ___

BORING NO. 2D

ROJECT: Palmyra

LIENT: NYSEG

OCATION: Palmyra, NY

RILLING CONTRACTOR: Northstar Drilling

RILLER: Jeff Thew

TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 439.42

WELL DEPTH: 50'

CASING STICK UP: 2'

WATER LEVEL: 8.7 below grade

DATE STARTED: 12/08/86

COMPLETED: 12/09/86

TOP OF SCREEN: 33.8

BOTTOM OF SCREEN: 50'

DRILLING METHOD: Spun casing rotary bit reaming, NX coring.

COMPLETION AND DEVELOPMENT: Sand filled to 32.5 from Bentonite slurry seal above that.
Surging with air compresser for 1 hour.

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
44.5-49.5'	NX Core	100			0-2' Dark gray shale similar to above sample, with thin bands of calcite or gypsum crystallization (also small crystal blocks). 3-5' Blue-gray highly weathered shale, similar to sample in 35-39.5'.	RQD = 100%. Sample broken upon dislodging from core barrel. Reamed hole with 4" rotor bit to enlarge from 3" core.

BORING

PROJECT NO. 436-N61-14 PAGE ___ OF ___ BORING NO. 3S

ROJECT: Palmyra

LIENT: NYSEG

OCATION: Palmyra, NY

RILLING CONTRACTOR: Northstar Drilling

RILLER: Jeff Thew

RC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 430.88

WELL DEPTH: 11.7'

CASING STICK UP: 1.4'

WATER LEVEL: 1.9' below grade

DATE STARTED: 12/10/86

COMPLETED: 12/10/86

TOP OF SCREEN: 1.0'

BOTTOM OF SCREEN: 11.7'

DRILLING METHOD: Hollow Stem Auger

COMPLETION AND DEVELOPMENT: Surging with air compressor for 2 hours.

DEPTH NTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
1-2'	2-4-9-16	45			0-.06' Topsoil. .06'-.35' Dark brown clay soil. .35'-.75' Dark-brown to red-brown clay. .75'.92' Grading to denser clay.	Tar fragments from .33'-.58'.
-4'	15-10-9-10	30			Ligh-brown to dark red-brown SAND and GRAVEL, some SILT and CLAY.	First free water at 2.7'.
1-6'	13-12-11-12	40			Medium brown SAND and GRAVEL, some SILT and CLAY.	
-8'	8-11-8-8	70			0-.5' SAND and GRAVEL (similar to 4-6'). .5-.9' Gray to brown SILT and CLAY, no cobbles. .9-1.4' Grey to light brown SAND with small cobbles, and SILT and CLAY.	

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PROJECT NO. 436-N61-14
PAGE ___ OF ___
BORING NO. 3S

PROJECT: Palmyra
CLIENT: NYSEG
LOCATION: Palmyra, NY
DRILLING CONTRACTOR: Northstar Drilling
DRILLER: Jeff Thew
TRC INSPECTOR: Richard Fox

TOP OF CASING ELEVATION: 430.88
WELL DEPTH: 11.7'
CASING STICK UP: 1.4'
WATER LEVEL: 1.9' below grade
DRILLING METHOD: Hollow Stem Auger
COMPLETION AND DEVELOPMENT: Surging with air compressor for 2 hours.

DATE STARTED: 12/10/86
COMPLETED: 12/10/86
TOP OF SCREEN: 1.0'
BOTTOM OF SCREEN: 11.7'

DEPTH INTERVAL	BLOW ON SPLIT SPOON	PERCENT RECOVERY	OVA (ppm)	SAMPLES ANALYZED	SAMPLE DESCRIPTION	REMARKS
8-8.8'	18.50/.3	35			0-.33' Light brown and gray SAND with small cobbles, SILT and CLAY. .33-.71 Darker gray SAND and GRAVEL than above with larger cobbles, and SILT and CLAY. Slight petroleum odor	Spoon refusal, then auger refusal. Drilled through 1' boulder with roatary bit.
10-12'	20-44-33-22	55			0-.4' Multicolored and angular mited cobbles. .4-1.1' Mixed cobbles and CLAY. .6' Red clay, .75' green yellow and red clay, .8-1' mostly yellow clay, fewer cobbles; petroleum odor. 1.1' Large cobbles.	Sample represents 1' boulder.

BORING LOG

BORING NO. 1S

PROJECT NO. 3436-N61

PROJECT: Palmyra

CLIENT: NYSEG

LOCATION: Palmyra, N.Y.

DRILLING CONTRACTOR: Northstar Drilling

BORING DEPTH: 20.2'

DRILLER: Jeff Thaw

TRC INSPECTOR: Richard Fox

DRILLING METHOD: Hollow Stem Auger

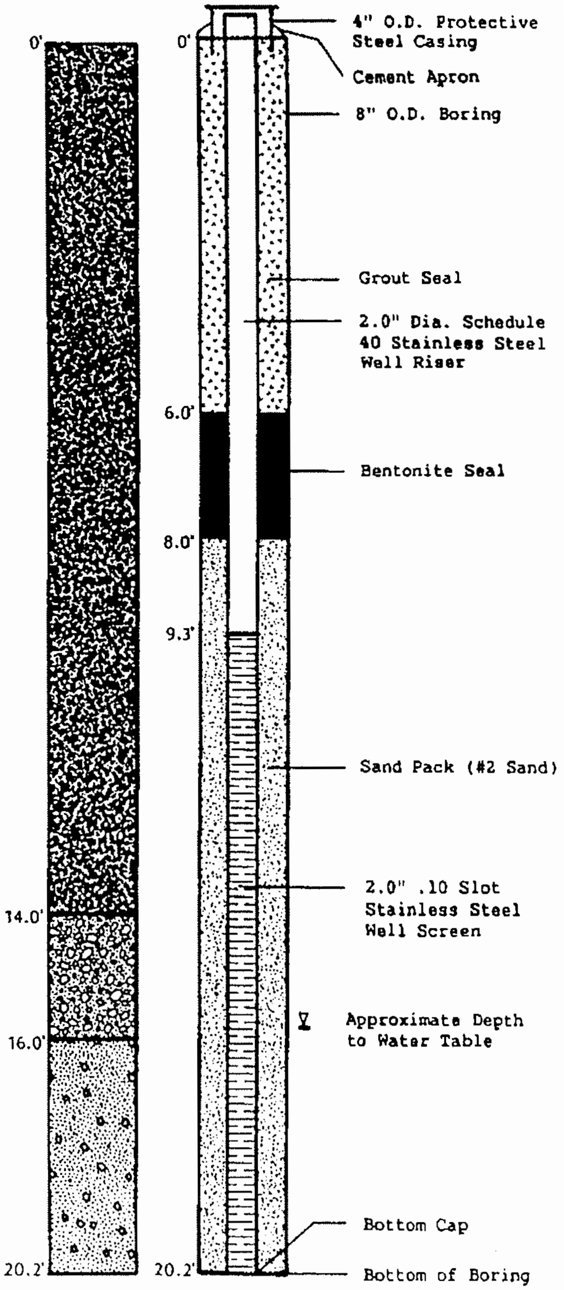
DATE STARTED: 12/10/86

DATE COMPLETED: 12/10/86

WATER TABLE ELEVATION: 427.96 (10/87)

GROUND ELEVATION: 442.47

DEPTH INTERVAL (Feet)	BLOW COUNTS	OVA (ppm)	BORING DEPTH (Feet)	SOIL DESCRIPTION
0-2'	2 3 3 5	0.5	0	Brown, SOIL, some cobbles, some clay, some blk. tar, FILL
			-	
2-4'	6 10 6 6	0.4	-	Small to medium cobbles, some silt, some sand, some clay, FILL
			-	
4-6'	6 4 3 2	0.7	-	SAND, some silt, some very small cobbles, fill
			5	
6-8'	5 4 3 3	0.3	-	SAND, some silt, some small to medium cobble, dry, FILL
			-	
8-10'	4 3 2 2	0.6	-	Brown medium SAND, some silt, some cobbles, some tar fragments, saturated, FILL
			-	
10-12'	1 1 1 1	24.0	10	Medium SAND, some silt, wet, FILL
			-	
12-14'	2 4 15 30	42.0	-	Medium SAND, some silt, wet, little red brick frags, FILL
			-	
14-16'	5 8 9 8	9.8	-	Medium GRAVEL
			15	
16-18'	8 15 14 17	7.6	-	Dark gray, coarse SAND, some silt, some clay, saturated
			-	
18-20'	15 18 22 28	3.2	-	Dark brown, coarse SAND, some silt, some cobbles, some cobbles, wet
			-	
			20	



BORING DEPTH - 20.2 FEET

BORING LOG

BORING NO. 2S

PROJECT NO. 3436-N61

DATE STARTED: 12/09/86

PROJECT: Palmyra

BORING DEPTH: 17'

DATE COMPLETED: 12/10/86

CLIENT: NYSEG

DRILLER: Jeff Thew

WATER TABLE ELEVATION: 427.46 (10/87)

LOCATION: Palmyra, N.Y.

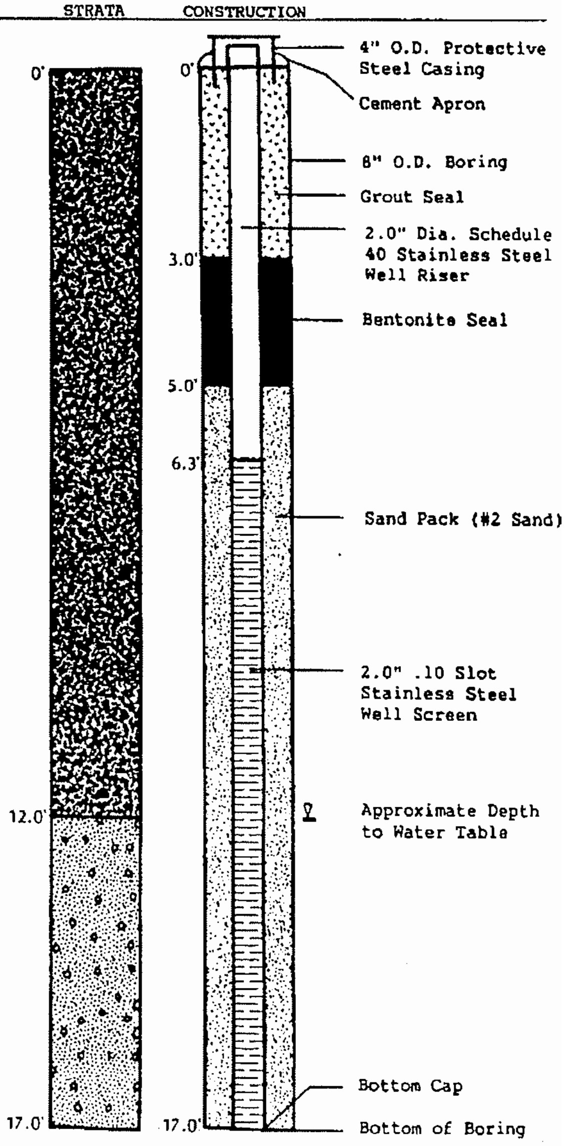
TRC INSPECTOR: Richard Fox

GROUND ELEVATION: 437.60

DRILLING CONTRACTOR: Northstar Drilling

DRILLING METHOD: Hollow Stem Auger

DEPTH INTERVAL (Feet)	BLOW COUNTS	OVA (ppm)	BORING DEPTH (Feet)	SOIL DESCRIPTION
0-2'	1 6 5 4	1.2	0	Black med-coarse SAND and SILT, trace gravel, trace concrete frags
2-4'	2 2 1 1	0.8	-	Yellow-gray SILT, SAND, and GRAVEL, some coal clinkers, some brick frags, FILL
4-6'	1 1 1/1	0.8	-	White, gray, fine to coarse, SAND, some gravel, some brick fragments, FILL
			5	
6-8'	1 1 1 1	0.8	-	Same as sample (4-6') with little coal clinkers, FILL
8-10'	1 1 1 1	1.4	-	Same as sample (6-8'), some clay
10-12'	3 2 3 14	1.4	10	Dark gray, fine, SILT and SAND, little cobbles, little brick frags, FILL
12-14'	15 10 14 12	38.0	-	Gray to dark, gray, coarse, SAND and GRAVEL, littlecobbles
14-16'	19 26 21 23	90.0	-	Same as sample (12-14')
			15	
16-17'	22 40 26 32	16.0	-	Gray SAND and GRAVEL, little shale fragments



BORING DEPTH - 17 FEET

BORING LOG

BORING NO. 2D

PROJECT NO. 3436-N61

DATE STARTED: 12/08/86

PROJECT: Palmyra

BORING DEPTH: 50'

DATE COMPLETED: 12/09/86

CLIENT: NYSEG

DRILLER: Jeff Thew

WATER TABLE ELEVATION: 427.50 (10/87)

LOCATION: Palmyra, N.Y.

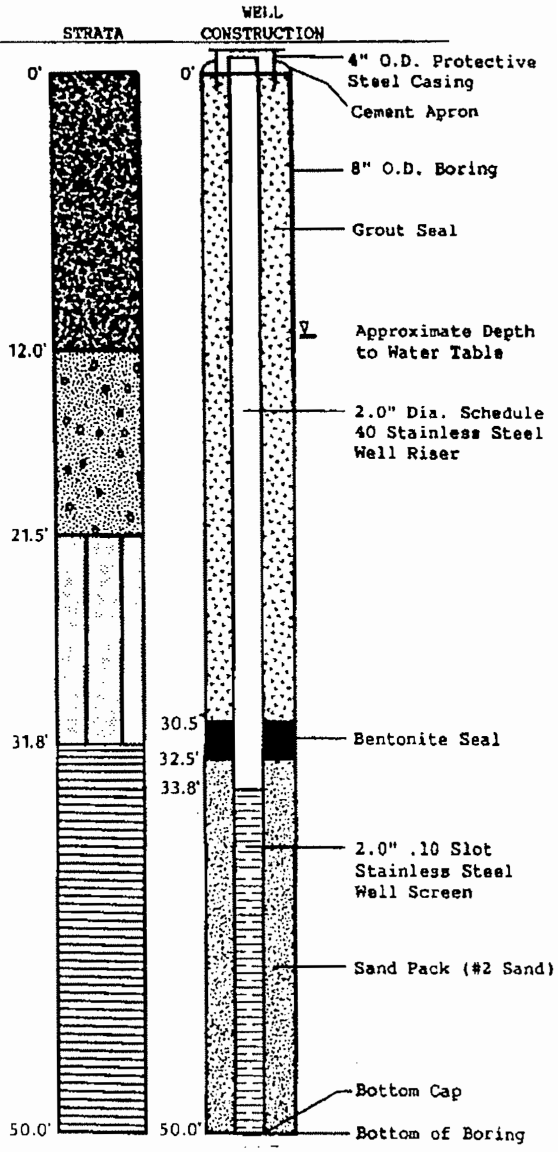
TRC INSPECTOR: Richard Fox

GROUND ELEVATION: 437.29

DRILLING CONTRACTOR: Northstar Drilling

DRILLING METHOD: Spuncasing rotary bit reaming, NX coring

DEPTH INTERVAL (Feet)	BLOW COUNTS	OVA (ppm)	BORING DEPTH (Feet)	SOIL DESCRIPTION
0-2'	1 6 5 4	1.2	0 -	Black med-coarse SAND and SILT, trace gravel, trace concrete frags, FILL
2-4'	2 2 1 1	0.8	- - -	Yellow-gray SILT, SAND, and GRAVEL, some clinkers, some brick frags, FILL
4-6'	1 1 1/1	0.8	5	White, gray, fine to coarse, SAND, some gravel, some brick frags, FILL
6-8'	1 1 1 1	0.8	- -	Same as sample 4-6' with little coal clinkers, FILL
8-10'	1 1 1 1	1.4	- -	Same as sample 6-8', some clay
10-12'	3 2 3 14	1.4	10 -	Dark gray, fine, SILT and SAND, little cobbles, little brick frags, FILL
12-14'	15 10 14 12	38.0	- -	Gray to dark gray, coarse, SAND and GRAVEL, little cobbles
14-16'	19 26 21 23	90.0	- 15	Same as sample (12-14')
16-18'	22 40 26 32	16.0	- -	Gray SAND and GRAVEL; little shale fragments
18-20'	50 85 43 18	4.5	- -	
20-22'	18 32 54 23	1.0	20 -	Blue gray densely packed SILT and CLAY
22-23.3'	74 77 100/.3	4.6	- - -	Same as sample (20-22')
25-27'	33 27 23 22	1.8	25 - - - -	Same as sample (22-23.3')
30-31.8'	11 14 15 100/.3	1.4	30 - - - - -	Same as sample (25-27')
35-39.5'	NX Core		35 - - - -	Blue-gray highly weathered SHALE
39.5-44.5'	NX Core		40 - - -	Same as sample (35-39.5')
44.5-49.5'	NX Core		45 - - - -	Same as sample (35-39.5')
			50	



BORING DEPTH - 50 FEET

BORING LOG

BORING NO. 3S

PROJECT NO. 3436-N61

PROJECT: Palmyra

CLIENT: NYSEG

LOCATION: Palmyra, N.Y.

DRILLING CONTRACTOR: Northstar Drilling

BORING DEPTH: 11.7

DRILLER: Jeff Thew

TRC INSPECTOR: Richard Fox

DRILLING METHOD: Hollow Stem Auger

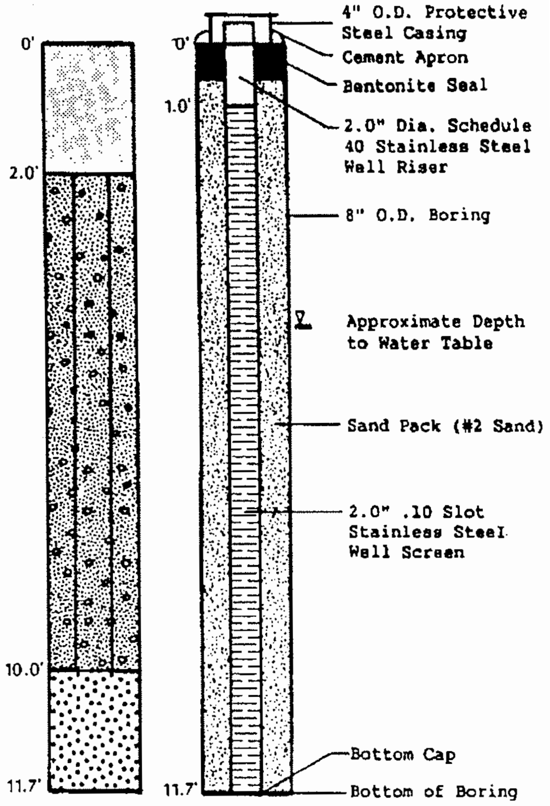
DATE STARTED: 12/10/86

DATE COMPLETED: 12/10/86

WATER TABLE ELEVATION: 426.38 (10/87)

GROUND ELEVATION: 429.50

DEPTH INTERVAL (Feet)	BLOW COUNTS	OVA (ppm)	BORING DEPTH (Feet)	SOIL DESCRIPTION
0-2'	2 9	4 16	0	Dark-brown to red-brown CLAY
			-	
2-4'	15 9	10 10	-	Light-brown to dark red-brown SAND and GRAVEL, some silt, some clay
			-	
4-6'	13 11	12 12	-	Medium brown SAND and GRAVEL, some silt, some clay
			5	
6-8'	8 8	11 8	-	Gray to light brown SAND with small cobbles, some silt, some clay
			-	
8-8.8'	18.5	1.3	-	Dark gray SAND and GRAVEL with cobbles, some silt, some clay
			-	
10-12'	20 33	44 22	10	Multicolored and angular mixed COBBLES, some clay
			-	
			-	



BORING DEPTH - 11.7 FEET

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

JECT	PROJ. NO.	BY	DATE	SHEET
NYSEG PALMYRA PARK DR.	13051.001	BRD	4/18/05	

CALCS. BY ______ ; DATE ______ CHECKED BY ______ ; DATE ______

SB-1 (0-4) REC. 1.2

0-1.2 BROWN F-M SAND TRACE F-M GRAVEL.

SB-1 (4-8) REC 1.5

0-1.5 BROWN F-M SAND TRACE F-M GRAVEL

SB-1 (8-11) REC 1.0

0-1.0 BROWN F-M SAND SOME F-M GRAVEL. BRICK | CLAY TILE ENCOUNTERED @ 10.5-11' BGS

SB-2 (4-8) PEN. REC 1.4

0 - 0.6 — D. BROWN F-M SAND. TRACE F-M GRAVEL. MOIST

0.6 - 0.7 — GREY GRAVEL.

0.7 - 1.1 — D. BROWN TO BLACK F-M SAND. TRACE F-C GRAVEL

1.1 - 1.3 - RED BRICK FRAGMENTS

1.3 - 1.4 — BROKEN MORTAR + BRICK FRAGMENTS WET.

SB-2 (0-4) REC 1.3

0-1.3 BROWN F-M SAND. SOME F-M GRAVEL. TRACE BRICK FRAGMENTS.

REC 1.4

S -2 (8-12) 0-1.4 BROWN F-M SAND. SOME F-M GRAVEL. TRACE BRICK FRAGMENTS. SLIGHT PETROLEUM ODOR.

SB-2 (12-14) REC 0.8

0-0.8' — D. BROWN F-M SAND. SOME F-M GRAVEL SLIGHT PETROLE

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ECT	PROJ. NO.	BY	DATE	SHEET

CALCS. BY ____________ ; DATE ____________ CHECKED BY ____________ ; DATE ____________

SB-3 (0-4) REC. 1.6

0-1.6 - BROWN F-M SAND, SOME F-M GRAVEL.

SB-3 (4-8)

REC. 1.7

0-1.1 BROWN F-M SAND, TRACE F-M GRAVEL.

1.1-1.7 BROWN TO D. BROWN F-M SAND, TRACE COARSE SAND. TRACE F-M GRAVEL. TRACE BRICK/TILE/CONCRE

[illegible]-3 (8-12)

REC 1,5

0-1.0 BROWN TO D-BROWN F-M SAND [illegible] SOME F-M GRAVEL. SOME BRICK FRAGMENTS PRESENT.

1.0-1.5 D BROWN F-M SAND, SOME CRS. SAND, SOME F-M GRAVEL. TRACE BRICK FRAGMENTS. SLIGHT PETROLEU ODOR. [illegible].

SB-3 (12-13) REC 0.5

0-0.5 D BROWN F-M SAND, SOME F-M GRAVEL. SLIGHT PETROLEUM ODOR.

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engineers & scientists

ECT	PROJ. NO.	BY	DATE	SHEET

CALCS. BY ______ ; DATE ______ CHECKED BY ______ ; DATE ______

SB-4 (12-12.5) BLACK ~~[illegible]~~ F-M SAND. SOME F GRAVEL
REC 0.4 STRONG PET ODOR.

SB-4 - (8-12')
REC 1.7

0 - 1.7 F-M BROWN SAND. TRACE F-GRAVEL.
1.7 SOME BLACK STAINING + PET. ODOR.

-4 (4-8')
REC 0.7

0-0.2 D BROWN TO BLACK F-M SAND. SOME SLAG/ASH, STRONG CREOSOTE ODOR
0.2-0.7 D. BROWN F-M SAND TRACE F-GRAVEL

SB-4 (0-4)
REC 1.1

0-1.1 D BROWN F-M SAND. SOME F-GRAVEL. TRACE BRICK. TRACE ASH.

JECT	PROJ. NO.	BY	DATE	SHEET

CALCS. BY ____________ ; DATE ____________ CHECKED BY ____________ ; DATE ____________

INSIDE HOLDER ABOVE FLOOR

- SAMPLE IS A COMPOSITE OF SOIL COLLECTED FROM SB-1 (10-11') AND SB-2 (7-8'). EVIDENCE FROM BOTH BORINGS INDICATE THE BOTTOM OF THE HOLDER WAS @ 11' BGS ON SB-1 AND 8' BGS ON SB-2.

INSIDE HOLDER TOP OF BEDROCK

- SAMPLE IS A COMPOSITE OF SOIL FROM SB-2 AND SB-3.
  SB-2 REFUSAL ENCOUNTERED @ ~ 14' BGS.
  SB-3 REFUSAL ENCOUNTERED @ ~ 13 BGS.

OUTSIDE HOLDER (12-12.5')

- SAMPLE IS COLLECTED FROM SB-4 OUTSIDE OF HOLDER
  SB-4 REFUSAL ENCOUNTERED @ 12.5 BGS.

OUTSIDE HOLDER (8-12')

- SAMPLE COLLECTED FROM SB-4 (8-12') INTERVAL.

OUTSIDE HOLDER (0-8')

- SAMPLE COLLECTED FROM SB-4 (0-8') INTERVAL

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-1
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/8/86
DATE COMPLETED: 12/8/86
PIT DIMENSIONS (W X L X D): (2.5' x 11.0' x 10.0')

Depth (ft)	Description
0.0-0.8	Organic-rich topsoil.
0.8-1.8	Grey ash and cinder fill. Some large cobbles up to 1 ft. diameter. A 1 in. pipe at 1.5 ft.
1.8-2.0	Black stained cobble and sand sized fill material. Brick foundation encountered at 2.4 ft. in west end of pit. Foundation extends downward to at least 6.5 ft. At 6.5 ft, black viscous tar material was encountered at eastern end of pit.
8.5-10.0	Fine sand, silt, and clay fill material with viscous tar material.

OVA response
backhoe sample from 1.8-2.0 ft. 20 ppm.
backhoe sample from 8.5-10 ft. 60 ppm.

Sample taken from 8.7 ft. for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-2
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/9/86
DATE COMPLETED: 12/9/86
PIT DIMENSIONS (W X L X D): (3' x 8' x 9.5')

Depth (ft)	Description
0.0-0.5	Organic-rich topsoil.
0.5-9.5	Fill. Cobbles, sand, silt, with some bricks. No visible contamination was observed. At 1.5 ft., a 10 in. o.d. horizontal steel pipe was encountered. It's horizontal orientation was 47° (NE-SN). A valve assembly and a "T" intersection with a vertical pipe was also observed. The vertical pipe extends downwards to a depth of at least 6.5 ft. A loose brick foundation was exposed at a depth of 1.5 ft. in the western end of the pit. A curving vertical brick wall with a cement veneer was encountered at 5.0 ft. in the eastern end of the pit. The wall trends NW-SE. Above the wall, the upper 3 ft. of the pit was cement which could not be penetrated by the backhoe.

OVA response - inside vertical pipe 1 ppm.

Composite sample collected for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-3
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/9/86
DATE COMPLETED: 12/9/86
PIT DIMENSIONS (W X L X D): (6' x 7.5' x 6')

Depth (ft)	Description
0.0-0.5	Organic rich topsoil.
0.5-6.0	Fill. Cobbles, bricks, sand, and trace silt. The loose brick is concentrated against a curving brick wall with a cement veneer that is exposed at the southern end of the pit at 0.5 ft. The wall trends 314° (NW-SE) at the southeast corner of the pit, and 328° at the southwest corner of the pit. No visible contamination was noted in the pit. A slight coal tar odor was noted, during excavation.

OVA response - 1.0 ppm (ambient).

Composite sample collected for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-4
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/9/86
DATE COMPLETED: 12/9/86
PIT DIMENSIONS (W X L X D): (3.5' x 7' x 6.8')

Depth (ft)	Description
0.0-0.5	Organic rich topsoil.
0.5-6.8	Fill. Cobbles, gravel, sand, and silt with some brick and cement block debris. A curved, vertical brick wall with a cement veneer was exposed at the western end of the pit at a depth of 1.2 ft. A 5 in. wide metal strap was attached to the wall in a vertical orientation. Some black stained fill was present in the upper 2 ft. of the pit adjacent to the wall. The water table was encountered at 6.8 ft.

OVA response - 1.0 ppm (ambient).

Composite sample taken from the pit for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-5
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/10/86
DATE COMPLETED: 12/10/86
PIT DIMENSIONS (W X L X D): (3.0' x 9.0' x 9.4')

Depth (ft)	Description
0.0-0.5	Loose ash and tar fill.
0.5-1.4	Dense, hard, solid black tar substance. Cannot be penetrated by the backhoe except in weak zones.
1.4-5.3	Crossbedded fill deposit. Discreet layers of yellow-white fine grained ash, brown coarse sand and gravel and brown ash. Crossbeds dip south.
5.3-9.4	Brown fill. Coarse-fine sand with some gravel.

OVA response - 1.0 ppm (ambient).

Sample composited from 0.5-5.3, with additional sample composited from 5.3-9.4.

TEST PIT LOG

PROJECT NO.: 3436-N61	TEST PIT NO. TP-6
PROJECT: Palmyra Gas Plant	
CLIENT: NYSEG	LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.	TRC INSPECTORS: Andrew Zlotnick Wilson Clayton
DATE STARTED: 12/9/86	DATE COMPLETED: 12/9/86

PIT DIMENSIONS (W X L X D): (6' x 10' x 7.2')

Depth (ft)	Description
0.0-7.2	Fill. Primarily gravel and sand with trace silt. No visible contamination was noted within the pit. A curving vertical brick wall with a cement veneer was exposed along the eastern wall of the pit. The wall strikes 46° (NE-SW) at the southern end of the pit, and 32° at the northern end of the pit.

OVA response - 0.2 ppm.

Sample composited from pit for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-7
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/10/86
DATE COMPLETED: 12/10/86
PIT DIMENSIONS (W X L X D): (2.5' x 7.5' x 7.4')

Depth (ft)	Description
0.0-2.0	Mixture of ash, brick, and pipe debris.
2.0-7.4	Fill. Cobbles, gravel, and coarse sand coal tar mixed with sandy fill was visible at 5.4 ft. in south end of pit. Water table encountered at 7.4 ft. A sheen was noted on the water surface.

OVA response - 1.0 ppm (ambient).

Grab sample taken from visible coal tar contamination at 5.4 ft. for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-8
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/10/86
DATE COMPLETED: 12/10/86
PIT DIMENSIONS (W X L X D): (3' x 8' x 11')

Depth (ft)	Description
0-1.5	Brick debris.
1.5-10.5	Alternating layers of yellowish ash and black, rock hard tar-like material. Several bottles and a teacup were encountered at 7.0 ft.
10.5-11.0	Black, fluid, viscous tar material.

OVA response - 1.0 ppm (ambient).

Sample composited from yellow ash and the black fluid tar at 10.5 - 11.0 ft. for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-9
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/10/86
DATE COMPLETED: 12/10/86
PIT DIMENSIONS (W X L X D): (3' x 7' x 11')

Depth (ft)	Description
0.0-8.0	Fill. Yellow ash and black-stained fill material. Some coal clinkers.
8.0-9.0	Black, fluid, viscous tar substance mixed with medium to coarse sand. Coal tar odor notable during excavation.
9.0-11.0	Brown sandy sediment. No visible contamination noted below 9.0 ft. It is not apparent whether this sediment is fill or is naturally in place.

OVA response - 1.0 ppm (ambient).

Two samples were collected for laboratory analysis:

i) composite of yellow ash from 0.0-8.0 ft.

ii) viscous, fluid tar at 8.0-9.0 ft.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-10
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/10/86
DATE COMPLETED: 12/10/86
PIT DIMENSIONS (W X L X D): (3' x 10.25' x 10.0')

Depth (ft)	Description
0.0-1.3	Loose black tarry fill.
1.3-2.3	Dense hard black tar material.
2.3-8.4	Mixed debris. White-brown ash, bricks, glass, and areas of white ash-like material.
8.4-9.4	Brown coarse sand. Stained red-orange - apparently by iron oxide.
9.4-10.0	Hard black tar substance.

OVA response - 0.2 ppm.

Sample collected from black tar at 9.4-10.0 ft. for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
CONTRACTOR: Villager Construction Co.
DATE STARTED: 12/11/86
PIT DIMENSIONS (W X L X D): (2.5' x 8' x 11')

TEST PIT NO. TP-11
LOCATION: Palmyra, NY
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE COMPLETED: 12/11/86

Depth (ft)	Description
0.0-3.0	Yellow ash interbedded with black stained coarse sand. Some coal clinkers.
3.0-10.0	Brick debris fill. Some right angle ceramic debris (2.5 in. thick by 10.0 in. wide) and a large piece of sheet metal was observed. Water table encountered at 10.0 ft.
10.0-11.0	Brown sand and silt with cobbles. At 11.0 ft. the backhoe operator encountered a dense, impenetrable layer.

OVA response - 1.0 ppm (ambient).

Sample collected from brown silty sand at 10.0-11.0 ft.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-12
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/11/86
DATE COMPLETED: 12/11/86
PIT DIMENSIONS (W X L X D): (3' x 7' x 11.5')

Depth (ft)	Description
0.0-2.5	Mixed debris, dense, hard tar layer (4 in. thick) encountered at 2.5 ft. at east end of pit. At west end of pit, a red - stained layer of gravelly coal tar (approx. 30 in. by 2 in. cross section) was exposed.
2.5-7.5	Yellow ash layer cross bedded with tar-stained sand and gravel layers. During excavation faint coal tar odor notable.
7.5-10.5	Brown silty sand with no visible contamination.
10.5-11.5	Black-stained sand. Very dense and hard (impenetrable by the backhoe. Faint indication of water table at 11.5 feet.

OVA response - 1.0 ppm (ambient).

Sample collected from black stained sand at 10.5-11.5 ft. for laboratory analysis.

TEST PIT LOG

PROJECT NO.: 3436-N61
TEST PIT NO. TP-13
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE STARTED: 12/11/86
DATE COMPLETED: 12/11/86
PIT DIMENSIONS (W X L X D): (3' x 7' x 9')

Depth (ft)	Description
0.0-2.5	Brick debris with scattered small coal clinkers and white ash particles.
2.5-4.5	Homogenous mixture of small coal clinders, white ash, and minor brick debris with several thin layers of white ash and black stained sediment.
4.5-6.0	Brown silty sand overlying a yellow-gray layer of ash with minor amounts of small coal clinkers.
6.0-9.0	Brown silty sand with cobbles. No visible contamination was noted. Water table encountered at 8.0 ft.

OVA response - 1.0 ppm (ambient).

Sample collected for laboratory analysis from brown silty sand (underlying yellow-gray ash) at 6.0 ft.

TEST PIT LOG

PROJECT NO.: 3436-N61	TEST PIT NO. TP-14
PROJECT: Palmyra Gas Plant	
CLIENT: NYSEG	LOCATION: Palmyra, NY
CONTRACTOR: Villager Construction Co.	TRC INSPECTORS: Andrew Zlotnick Wilson Clayton
DATE STARTED: 12/11/86	DATE COMPLETED: 12/11/86

PIT DIMENSIONS (W X L X D): (3' x 6.8' x 4')

Depth (ft)	Description
0.0-4.0	Silty sand with gravel and cobbles. The sediment is very homogenous without any indication of sedimentary bedding structures. No "A" soil horizon or plow horizon was noted, although the upper 1.0 ft. appears to be somewhat darker in color. Water table encountered at 3.0 ft. A ceramic pipe (5 in. inside diameter) was encountered at 2.3 feet. The backhoe broke out a 4.0 ft. section of the pipe at two junctions, the junctions are octagonal on the outside of the female end. The pipe strikes 237° (NE-SW) and a 1/2 in. thick tar residue was observed in the bottom of the pipe. The sediment below the pipe was stained black at both sides of the pit for an area approx. 100 in.^{2}.

OVA response - 1.0 ppm (ambient).

Sample collected for laboratory analysis from black-stained sediment at 2.4 ft.

TEST PIT LOG

PROJECT NO.: 3436-N61
PROJECT: Palmyra Gas Plant
CLIENT: NYSEG
CONTRACTOR: Villager Construction Co.
DATE STARTED: 12/11/86
PIT DIMENSIONS (W X L X D): (2.5' x 7' x 4')

TEST PIT NO. TP-15
LOCATION: Palmyra, NY
TRC INSPECTORS: Andrew Zlotnick
Wilson Clayton
DATE COMPLETED: 12/11/86

Depth (ft)	Description
0.0-1.3	Dark brown silty sand. Relatively clean. No notable "A" soil horizon or plow horizon.
1.3-4.0	Orange-brown fine to coarse sand with gravel and cobbles. Some black stain in sediment below 3.5 ft. One piece of blue and white ceramic encountered at 3.5 ft. Abundant hydrated mica was mixed with the sediment at a depth of 3.0-4.0 ft.
4.0	Medium and fine sand with well developed sedimentary bedding structures brought up by backhoe. Water table encountered at 4.0 ft.

OVA response - 1.0 ppm (ambient).

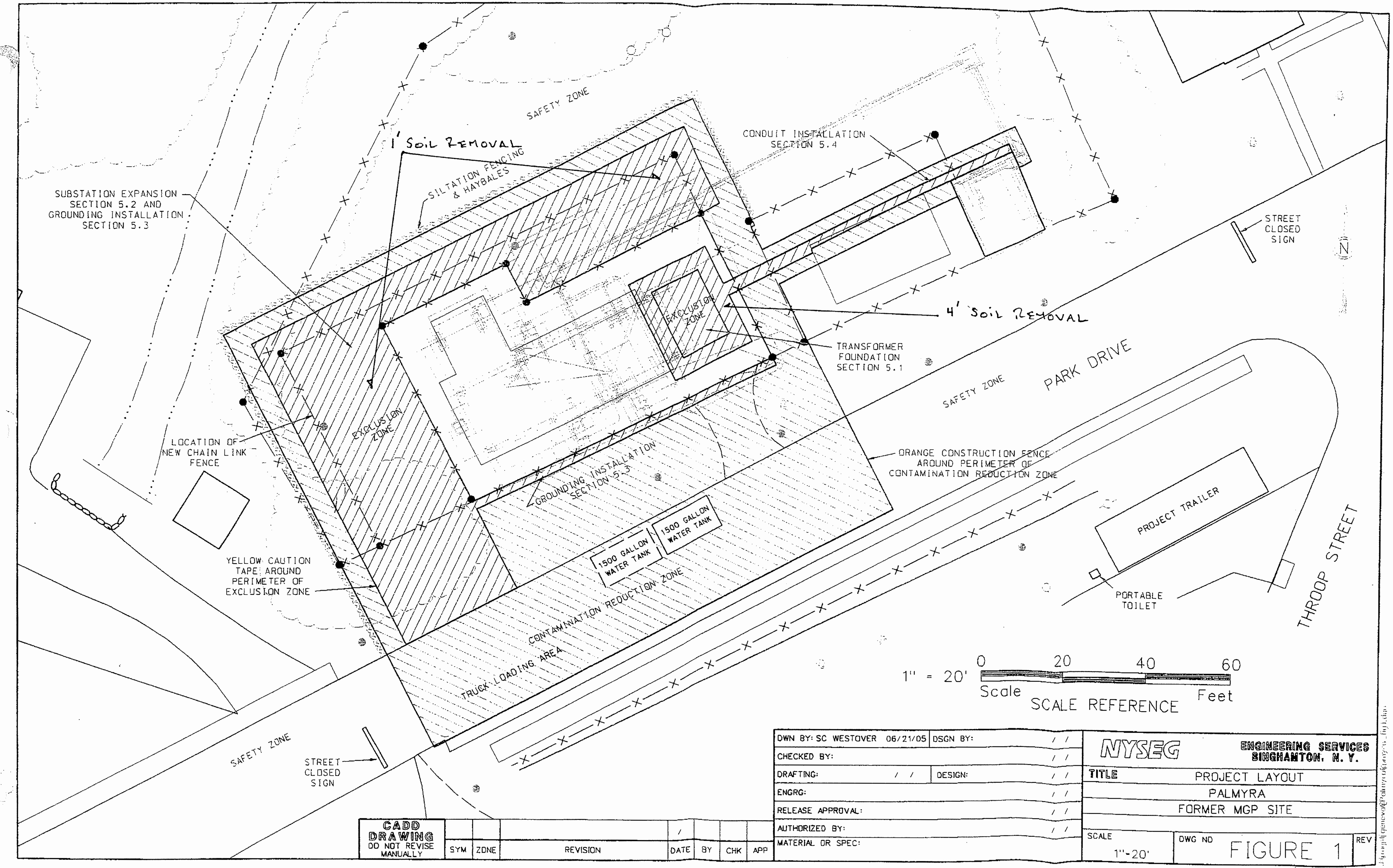
Sample collected for laboratory analysis from black-colored sediment at 3.7 ft.

CT	PROJ. NO.	BY	DATE	SHEET
PALMYRA PARK DRIVE FORMER MGP SITE				

CALCS. BY ________ ; DATE ________ CHECKED BY ________ ; DATE ________

TEST TRENCH - EXCAVATED A 4' DEEP BY 60' LONG
TRENCH ALONG THE NORTH WEST PROPERTY
FENCE. SOIL CONSISTED OF MOSTLY
ASH, SLAG + BRICK DEBRIS.

TEST PIT WITHIN HOLDER - CONSISTED OF A BROWN
F-M SAND, SOME F-C
GRAVEL, SOME COBBLES
SOIL SATURATED @ APPROX
7 FEET BGS. EXCAVATED
TO ~~AG~~ APPROX 9 FEET
BGS. NO VISUAL STAINING.
NO VISUAL SIGNS OF CONTAMINAT



CADD DRAWING
DO NOT REVISE MANUALLY

SYM	ZONE	REVISION	DATE	BY	CHK	APP
			/			

DWN BY: SC WESTOVER 06/21/05 DSGN BY: / /
CHECKED BY: / /
DRAFTING: / / DESIGN: / /
ENGRG: / /
RELEASE APPROVAL: / /
AUTHORIZED BY: / /
MATERIAL OR SPEC:

NYSEG
ENGINEERING SERVICES
BINGHAMTON, N. Y.

TITLE PROJECT LAYOUT
PALMYRA
FORMER MGP SITE

SCALE 1"-20'
DWG NO FIGURE 1
REV

Photo 1

Photo 2

Photo 3

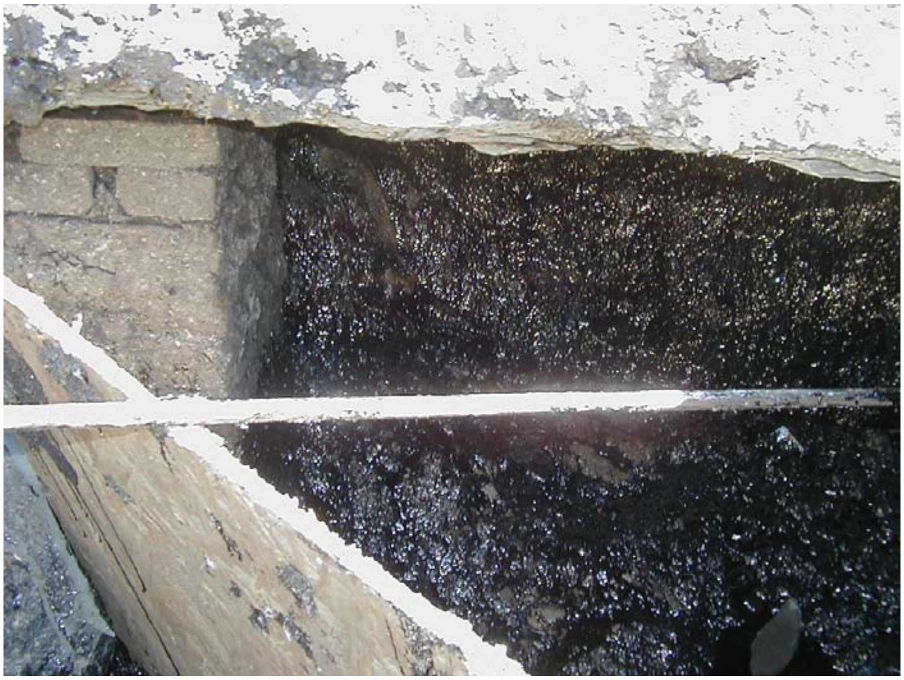


Photo 4

Photo 5

Photo 6

Photo 7

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Appendix D

Field Sampling and Analytical Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

The RETEC Group, Inc.
August 22, 2007
Project No.: 04964-025

Merged with ENSR in 2007

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Appendix D

Field Sampling and Analytical Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

James H. Edward

Prepared By: James H. Edwards, Senior Geologist

Bruce D. Coulombe

Reviewed By: Bruce D. Coulombe, P.G., Senior Hydrogeologist

The RETEC Group, Inc.
August 22, 2007
Project No.: 04964-025

Contents

List of Figures

1.0 Introduction

This Field Sampling and Analytical Plan (FSAP) presents the methods and procedures to be used for conducting the Remedial Investigation (RI) at the Palmyra former Manufacturing Gas Plant (MGP) site located on Park Street in the Village of Palmyra, New York.

1.1 Overview of field activities

The following field activities will be performed as part of the RI:

- Surface Soil Samples – 8 surface soil samples will be collected from the site.
- Test Pit Excavation – 1 test pit will be excavated at the site.
- Soil Boring Installation – There will be 33 soil borings (including 14 borings advanced for monitoring well installation) with approximately 60 soil samples collected.
- Monitoring Well Installation and Groundwater Sampling – 14 monitoring wells will be installed. Groundwater samples will be collected from the 14 new wells in addition to the 4 existing wells.
- Probing of Sediments – The sediments in Mill Creek will be probed at 42 transect locations.
- Surface Sediment Sampling – Approximately 15 surface sediment (0-6 inches) samples will be collected.
- Surveying – The locations and elevations of the RI data points and important site features will be surveyed.

2.0 General field guidelines

2.1 Site hazards

Potential on-site surface hazards, such as sharp objects, overhead power lines, energized areas, and building hazards will be identified prior to initiation of the fieldwork. Generally, potential hazards at the site will be identified during a site reconnaissance by the project team on the first day of the investigation field activities. Since invasive field activities will be performed inside the NYSEG substation, special precautions will be taken. All personnel working inside the substation will attend a mandatory training conducted by NYSEG personnel. No work will be performed inside of the substation without a NYSEG qualified site manager present. Additional safety measures to be undertaken for the work performed in the substation will be addressed in the Site-Specific Health and Safety Plan (HASP).

2.2 Underground utilities

Underground utilities, including electric lines, gas lines, storm and sanitary sewers, and communication lines will be identified prior to initiation of drilling and other subsurface work. Underground utility location will be accomplished as follows:

- All RI data points will be flagged or marked out with white paint.
- Dig Safely of New York (800) 272-4480 will be contacted to initiate the locating activities. New York State law requires that Dig Safely of New York be notified at least two working days, and not more than 10 working days, before subsurface work is conducted.
- Companies with subsurface utilities present will locate and mark out all subsurface utility lines.
- Work performed inside of the substation will be completed under the direct supervision of a NYSEG site manager.

2.3 Field log books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is developed. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Site Manager while fieldwork is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the field person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections necessary after departing the field will be made by the person who entered the original information. Corrections will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members on site and site contacts;
- Names, titles of any site visitors, as well as the date and time entering and leaving the site;
- Weather information, for example: temperature, cloud coverage, wind speed, and direction;
- Purpose of field activity;
- A detailed description of the fieldwork conducted;
- Sample media (soil, sediment, groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- All field measurements made, such as volatile organic compounds (VOCs) using a PID, pH, temperature, conductivity, water level, etc.;
- References for all maps and photographs of the sampling site(s); and
- Information pertaining to sample documentation such as:
  - Bottle lot numbers;
  - Dates and method of sample shipments;
  - Chain-of-custody (COC) record numbers; and
  - Federal Express air bill number.

3.0 Field equipment decontamination and management of investigation-derived residuals

3.1 Decontamination area

A temporary decontamination area lined with polyethylene sheeting will be constructed on site for use during decontamination of the drilling and test pitting equipment. Water collected from the decontamination of activities will be collected in 55-gallon drums and managed as described in Section 3.3.

3.2 Equipment decontamination

The following procedures will be used to decontaminate equipment used during the RI activities.

- All drilling equipment including the backhoe, bucket, and drilling rig; augers; bits; rods; tools; split-spoon samplers; and tremie pipes will be cleaned with a high-pressure, hot water pressure washing unit before beginning work.
- Tools, drill rods, and augers will be placed on polyethylene plastic sheets following pressure washing. Direct contact with the ground will be avoided.
- All augers, rods, and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the site.

3.2.1 Sampling equipment decontamination

Suggested Materials:

- Potable water;
- Phosphate-free detergent (such as Alconox™ or Simple Green™);
- Reagent-grade methanol or isopropanol;
- Distilled water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes; and
- Personal protective equipment (PPE) in accordance with the HASP.

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be washed with potable water and a phosphate-free detergent (such as Alconox™). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a de-ionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil, if necessary. At no time will washed equipment be placed directly on the ground.

- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

3.3 Management of investigation-derived residuals

3.3.1 Decontamination fluids

Hot water pressure wash and decontamination fluids will be collected in 55-gallon drums. The drums will be labeled as "pending analysis – investigation-derived residual decon water" and temporarily stored on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill cuttings

Drill cuttings will be contained in 55-gallon drums. The drums will be labeled as "pending analysis – investigation-derived residual – soil from drill cuttings" and temporarily stored on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.3 Development and purge water

All development and purge water will be contained in 55-gallon drums. The drums will be labeled as "pending analysis - investigation derived residual development and purge water" and temporarily stored on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.4 Personal protective equipment

All PPE will be placed in 55-gallon drums or roll-off containers for proper disposal.

3.3.5 Dedicated sampling equipment

All dedicated groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene line) will be placed in 55-gallon drums for disposal.

4.0 Surface and subsurface soil sampling procedures

4.1 Introduction

Surface and subsurface investigation activities to be conducted at the Palmyra former MGP site consist of:

- Surface soil sampling;
- Exploratory test pit excavation;
- Completion of soil borings;
- Installation of monitoring wells; and
- Sediment probing and sampling.

Procedures for these activities are described in the following sections.

4.2 Surface soil sampling

Surface soil samples will be collected at the locations indicated in the RI Work Plan. A one square meter area will be measured at each sample location. Five locations will be identified within the measured square meter area. A stainless steel or disposable trowel will be used to collect soil from a depth of 0 – 2 inches from each of the five locations. If vegetation is present at the locations, the vegetation layer will be removed prior to sampling. The soil from the five locations will be homogenized by mixing the soil in a stainless steel bowl. The composite sample will be analyzed for all of the parameters identified in the RI Work Plan.

All samples collected for analysis will be placed immediately into laboratory sample jars and properly stored in a cooler with ice to 4° C before transport to the laboratory.

Duplicate samples will be collected at the frequency detailed in the Quality Assurance Project Plan (QAPP) by alternately filling two sets of sample containers. Composite samples may be required to obtain a sufficient soil volume.

In addition, surface soil samples will be described by including the following information in the project field book:

- Site;
- Location number;
- Interval sampled;
- Date;
- Initials of sampling personnel;
- Soil type;
- Color;
- Moisture content;
- Texture;
- Grain size and shape;
- Relative density;

- Consistency;
- Visible evidence of residues; and
- Miscellaneous observations (including organic vapor readings).

4.3 Test pit excavation

The test pit planned for the RI will be performed using hand methods due to the close proximity of the substation equipment. The test pit will be excavated using hand-held tools such as a shovel. Vacuum equipment such as a Vactron™ may also be used. The goal of the test pit will be to identify the footprint of the tar well at the site, so the location can be surveyed, and to obtain subsurface information along the tar well's western subsurface wall, if possible. The location of the test pit is specified in the RI Work Plan, and will be finalized in the field, based on the safety protocols for working in close proximity to the substation structures.

During test pit investigation activities, personnel will stand upwind of the excavation area to the extent possible. Air monitoring and odor mitigation (if necessary) will be conducted in accordance with the Community Air Monitoring Project (CAMP) and HASP. Test pit materials will be photographed and logged for future reference. Material removed from the test pit will be placed on polyethylene sheeting. Should sampling of excavated material be performed, samples will be collected from a remote sampler. Upon completion, the materials from the test pit will be placed back in the excavation in the reverse order in which it was removed. The location and size of the test pit will be measured and described in the field logbook.

Visually clean soils, such as surface soils, will be segregated from soils that may be impacted. The visually clean soils will be used to cover the impacted soils/source materials when placed back in the excavation. At a minimum, the top 2 feet of backfilled soil will be visually clean. The test pit will be backfilled as soon as possible after completion and in general prior to the cessation of activities at the end of the day. Following restoration of the excavation, the test pit will be staked/marked to facilitate subsequent location by surveying crews.

4.4 Soil borings and subsurface soil sampling

The following methods will be used during installation of the soil borings.

Required Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Stakes, flagging and marking paint;
- Plastic bags for soil screening samples;
- Tape measure;
- Decontamination supplies;
- Water level indicator;
- PID with a 10.2 or 10.6 eV lamp;
- Camera;
- Clear tape, duct tape;
- Laboratory sample bottles;

- Coolers and ice; and
- Shipping supplies.

4.4.1 Drilling and geologic logging methods

- Soil borings will be sampled initially with a direct-push drilling method. It is likely that the hollow-stem auger method will be utilized for some of the borings installed at the off-site area site since deeper information is needed at these locations. The use of either drilling method will also allow for a more accurate determination of the depths and thicknesses of geologic units.
- Soil samples will be collected continuously from the ground surface to the bottom of the borings using 4-foot long, 2-inch diameter MacroCore™ samplers, or 2-foot long by 2-inch diameter split-spoon samplers.
- Soil samples retrieved from the borehole will be visually described for: 1) percent recovery, 2) soil type, 3) color, 4) moisture content, 5) texture, 6) grain size and shape, 7) consistency, 8) visible evidence of staining or other hydrocarbon-related impacts, and 9) any other relevant observations. The descriptions will be in accordance with the Unified Soil Classification System (USCS) and the American Society for Testing and Materials (ASTM) guidelines.
- Immediately after describing the core, a representative portion of the sample will be placed in a re-sealable plastic (e.g., “ziplock”) bag filled approximately half full. The bag will be labeled with the boring number and interval sampled.
- After allowing the bagged soil to warm the tip of the sample probe attached to the PID will be inserted into the bag to measure the headspace for organic vapors.
- Soil remaining after completion of sample description, collection, and field screening will be disposed of properly.
- All borings will be sealed with bentonite or cement/bentonite grout following completion.
- All drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.
- The field geologist will log borehole geology and headspace measurements in the field book and the Drilling Record shown in Figure 4-1, or similar form and any other observations (e.g., odors, NAPL, soil staining, etc.).

4.4.2 Soil sampling

- The number and frequency of samples to be collected from each boring and the associated analytical parameters are summarized on Table 3-1 and 3-2 in the RI Work Plan.
- Samples for Laboratory analyses will be collected directly from the acetate liners or split-spoons, placed into appropriate containers, and compacted to minimize headspace and pore space. Soil used for headspace analysis will not be used for laboratory VOC analysis.
- The sample containers will be labeled, placed in a laboratory-supplied cooler, and packed with ice. The coolers will then be shipped to the laboratory for analysis.
- If there is a delay of sample shipment due to insufficient samples to warrant overnight delivery, the samples will be stored in a cool, secure place with sufficient ice to maintain a temperature of 4° C.
- COC procedures will be followed as outlined in the QAPP.
- The sampling equipment will be decontaminated between samples in accordance with procedures described in Section 3.

- Soil remaining after completion of sample description, collection, and field screening will be disposed of properly.
- The sample locations, descriptions, and depths will be recorded on the borelogs in the field book.

4.4.3 Borehole abandonment

Boreholes for the direct-push borings will be filled with bentonite chips. All auger soil borings not used for the construction of monitoring wells will be grouted to the ground surface following the completion of the soil sampling to prevent cross-contamination of permeable zones. The borings will be filled using a cement/bentonite grout mixture with the following specifications:

- Bentonite will be powdered sodium montmorillonite furnished in moisture resistant sacks without additives.
- Cement shall be a low-alkaline Portland cement, Type I in conformance with ASTM C-150 and without additives.
- The cement/bentonite grout mixture shall be to the following proportion:
  - Three sacks (94 pounds) of Type I Portland cement;
  - 14 pounds of granular bentonite (5% mix); and
  - 25 gallons of water.

The cement will be mechanically mixed, above ground, with water from a potable water source. Bentonite will be added to ensure a lump-free consistency. The mixture will be pumped through a tremie pipe as the drill is being withdrawn.

4.5 Monitoring well installation and development

The following methods will be used for drilling, installing, and developing the monitoring wells;

Required Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Plastic bags for soil screening samples;
- Tape measure;
- Decontamination supplies;
- Electronic oil/water interface probe;
- PID;
- Camera;
- Clear tape, duct tape;
- Aluminum foil;
- Laboratory sample bottles;
- Coolers and ice;

- Shipping supplies;
- Clear polyethylene disposable bailers (NAPL confirmation);
- Polyethylene disposable bailers (development);
- Polypropylene rope (development);
- Waterra™ pump or other purge pump (development);
- Submersible electric pump (development);
- Stainless steel or glass beakers (development);
- Turbidity meter (development); and
- Temperature, conductivity, pH meter (development).

4.5.1 Monitoring well installation

Figure 4-2 illustrates the construction details for a typical groundwater monitoring well. The monitoring wells will be installed according to the following specifications:

- The monitoring well borings will be advanced with 4.25-inch inner diameter (ID) hollow-stem augers.
- Wells will be constructed with 2-inch ID, threaded, flush-joint, PVC casings and screens.
- Screens will be 10-feet long with 0.02-inch slot openings with a 2-foot DNAPL sump at the base. Alternative screen lengths up to 20’ long may be used at the discretion of the field geologist and with the approval of NYSEG and NYSDEC, based on site conditions.
- The annulus around the screens will be backfilled with clean silica sand having appropriate size (e.g., Morie No. 1) to a minimum height of 2 feet above the top of the screen. Auger flights will be withdrawn as sand is poured in a manner that will minimize hole collapse and bridging.
- A bentonite chip seal with a minimum thickness of 2 feet will be placed above the sand pack. The bentonite seal will be hydrated with clean, potable water before placement of grout above the seal layer.
- The remainder of the annular space will be filled with cement-bentonite grout to ground surface. The grout will be allowed to set for a minimum of 24 hours before wells are developed.
- Each monitoring well will be a flush-mounted installation with a locking cap.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- The top of the PVC well casing and ground surface will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on the Construction Log shown in Figure 4-3, or similar form.

4.5.2 Monitoring well development

- After a minimum of 24 hours after installation, the monitoring wells will be developed by surging and pumping. Surging will be performed periodically, across the lengths of screen in 2-foot increments prior to, at interim periods of pumping, and immediately before the final pumping. Pumping methods may include using a centrifugal, submersible, or peristaltic pump and dedicated polyethylene tubing, using a Waterra™ positive displacement pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist.

- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- The wells will be developed until the water in the well is reasonably free of visible sediment (50 NTU if possible or until pH, temperature, and specific conductivity stabilize). A portable nephelometer will be used to make the turbidity measurement.
- Development water will be contained in and properly disposed of.
- Following development, wells will be allowed to recover for at least 14 days before groundwater is purged and sampled. All monitoring well development will be performed or overseen by a field geologist and recorded in the field book.

5.0 Groundwater sampling procedures

5.1 Introduction

Procedures for obtaining samples of groundwater are described in this section. Groundwater samples will be collected using low-flow, low-stress purge and sampling methods.

5.2 Groundwater sampling

The number and frequency of the samples that will be collected for laboratory analysis from each well and the analytical parameters are listed in Table 3-1 and Table 3-2 in Section 3 of the RI Work Plan.

The following method will be used to collect groundwater samples from monitoring wells:

Required Equipment and Supplies

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Electronic oil/water interface probe;
- Disposable polyethylene bailers and low-flow sampling pump;
- Polypropylene rope;
- Temperature, conductivity, and pH meter;
- Turbidity meter;
- Flow-through cell;
- Decontamination supplies;
- Peristaltic or submersible pump capable of achieving low-flow rates (i.e., 0.5 liters per minute or less);
- Plastic tubing;
- Plastic sheeting;
- PID;
- Clear tape, duct tape;
- Coolers and ice;
- Laboratory sample bottles; and
- Federal Express labels.

5.2.1 Groundwater sampling method

Purging

- Prior to sampling, the static water level and thickness of any light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book.

- The probe will be decontaminated between uses.
- Groundwater from the well will be purged until field parameters stabilize, up to three well volumes are removed, or 1 hour of continuous purging is performed. Field parameters are considered to be stable when three consecutive readings are within the stabilization criteria for that parameter. The stabilization criteria are as follows: 10% or below 10 NTUs for turbidity, 3% for conductivity and temperature, 0.1 unit for pH, and 10 mV for ORP. Purging will be conducted using the low-flow sampling technique specified by the U.S. EPA Region 1 in its guidance document entitled “Low-Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells”.
- The flow rate measurement will be approximately 0.5 liter per minute or less.
- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required parameters are met, and sampled when it recovers sufficiently, in accordance with low-flow sampling protocol.
- Purge water will be managed and disposed of properly.

Sampling

- Samples will be collected using dedicated 1/4- or 3/8-inch polyethylene tubing and/or bailers.
- Prior to filling the sample bottles, the temperature, pH, conductivity, and oxidation reduction potential (ORP) will be measured within a flow-through cell. Turbidity will be measured with a hand-held turbidity meter. All measurements will be recorded in the field book.
- Three 40-ml VOA vials with Teflon™ lined septa and hydrochloric acid as a preservative will be filled for analysis of VOCs. The VOA vials will be filled to ensure that no bubbles are in the sample. Two 1-liter amber glass sample bottles for SVOC analysis and two 1-liter amber glass bottles for PCB analysis will then be filled followed by a 500 milliliter (mL) plastic bottle preserved with nitric acid for the total metals analysis. An opaque, 250 mL plastic bottle, with sodium hydroxide added for preservative will then be filled for the analysis of cyanide.
- The sample containers will be labeled, placed in a laboratory-supplied cooler, and packed on ice (to maintain a temperature of 4° C). The cooler will be shipped overnight or delivered to the laboratory for analysis.
- COC procedures will be followed as outlined in the QAPP.
- Well sampling data will be recorded on the Groundwater Sampling Record shown in Figure 5-1, or similar form.

6.0 Sediment investigation

6.1 Sediment probing and sampling

Sediments will be investigated by physically probing the sediment materials. Based on the findings of the probing, locations will be selected for the collection of analytical samples. These samples will be collected with a ponar dredge sampler or shovel from the top 6 inches of sediment. The procedures to be used are described below.

6.1.1 Sediment probing and sampling methods

Required Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- 300 foot tape measure;
- Stakes, flagging;
- Tape measure;
- Decontamination supplies;
- PID with a 10.2 or 10.6 eV lamp;
- Ten-foot, threaded metal rod;
- GPS unit;
- Sample jars;
- Coolers;
- Shipping supplies;
- Ziplock bags;
- Boat (if necessary);
- Dredge sampling device; and
- Camera.

6.1.2 Sediment probing

- Prior to collecting sediment samples, probing of sediments will be conducted to visually identify areas of hydrocarbon impacts.
- Probing will be conducted along a series of transects as described in the RI Work Plan. Stakes shall be installed along the shoreline at 25 foot distances to mark each transect.
- Sediment accumulations will be probed by hand along each transect with a steel bar and/or bucket auger (if possible) to observe the sediment physical characteristics, including the presence of hydrocarbon-like sheen or non-aqueous phase liquids (NAPL). If possible, sediments will be probed to a depth of 2 to 3 feet below the surface of the creek channel bottom. The probing locations will be a maximum of 5 feet apart along the transect, or as dictated by site conditions.

- All observations, including odors and sheens will be recorded in a field notebook. Photographs should be taken, when possible, to document significant findings.

6.1.3 Sediment sampling

- Based on the results of the probing, sediment sampling locations will be selected in consultation with NYSDEC.
- Where possible, shallow water areas at or near the shoreline will be sampled by walking directly into the sampling area with waders. Samples will be collected with a shovel at these locations.
- Sample locations not accessible by wading may be sampled using a boat. While collecting the sediments at each station, the boat will be anchored. The vessel will be mobilized in such a way as to minimize the potential for disturbance of the sediment and surface water.
- A GPS unit will be used to position the sampling personnel at the sample station coordinates. If obstructions such as boulders or cobbles are encountered at a specific station, the location of the station may be changed to collect fine-grained (< 4 mm) sediments required by the laboratory tests. In the case that cobbles or boulders are encountered, samples will be collected as close as possible to the specified sample location.
- Upon arrival at each sampling station a depth-to-sediment measurement will be collected to record the water depth. Measurements will be taken with the boat's navigational depth finder or a hand held depth-to-water meter. The water depth will be recorded with an accuracy of 0.1 feet.
- A ponar grab sampler (standard size) will be used for collecting sediments. The ponar grab sampler is suitable for collecting soft sediments and also for harder sediments containing significant quantities of sand, gravel, and firm clay. The sample depth for this device is from 0 to 6 inches. The ponar grab sampler will be lowered and raised from the sediment surface, by hand.
- Field personnel will record observations of the physical characteristics of the sediment encountered at each sampling station and also important observations regarding the physical characteristics of the study area. Information recorded will include: 1) sample station designation; 2) presence of fill material, coal or coke, or asphalt- or tar-like materials at the shoreline; 3) apparent depositional and erosional environment at the station; 4) presence or absence of aquatic vegetation; 5) sediment color, texture, and particle size; and 6) odor and presence of sheens or NAPL. The information will be recorded on the sediment sample log, included as Figure 6-1.
- After each sample is collected, the station will be located so that the site may be re-sampled in the future. The mapping will include the following: 1) the location (latitude and longitude) identified using a GPS receiver; 2) a hand-plotted estimate of the location on a field map of the study area; 3) where possible, significant features on the shore will be photographed as location references; and 4) notes will also be added to the field map showing any important site features that may have bearing on the sediment condition (e.g. pipe outfalls or subsurface debris). The locations of the important site features, if not previously mapped, will be located using the GPS unit.
- Sediments collected at each station will be placed into clean, laboratory-supplied glassware for analysis and archiving.
- Samples will be carefully packed to avoid breakage during shipment. The cooler will be shipped overnight or delivered to the laboratory for analysis.
- COC procedures will be followed as outlined in the QAPP.
- All measurements and observations discussed above for both the field sampling and field processing of the sediments will be recorded in a field book.

7.0 Air monitoring

7.1 Introduction

Two types of air monitoring will be performed during the site investigation: 1) work zone monitoring for protection of the workers performing the site investigation, and 2) community air monitoring at the perimeter of the work site for protection of the local community.

7.2 Breathing zone air monitoring during drilling and sampling

Monitoring of air in the breathing zone within the work site will be conducted periodically during all drilling and sampling activities.

- An organic vapor meter (OVM) equipped with a PID will be used to monitor for VOCs or other organic vapors in the breathing zone and borehole, and to screen the samples.
- Additional air monitoring may be required as specified in the site-specific HASP.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The procedure for the PID operation and calibration is included in the HASP. Note that equipment calibration will be performed as often as needed to account for changing conditions or instrument readings. The minimum frequency of calibration is specified in the HASP; more frequent calibration will be performed if spurious readings are observed or there are other problems with the instruments.

7.3 Community air monitoring

Community air monitoring requires real-time monitoring for VOCs, particulates (i.e., dust), and MGP-related odors at the downwind perimeter of each designated work area when certain activities are in progress at impacted sites. The community air monitoring is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels for community air monitoring require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, community air monitoring helps to confirm that work activities do not spread contamination off site through the air.

The procedures and action levels for community air monitoring are presented in the CAMP that has been prepared for the RI at the Palmyra MGP Site.

8.0 Field instruments and calibration

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all of the instrument manuals will be maintained on site by the Field Team Leader. All changes to instrumentation will be noted in the field log book.

The following field instruments will be used during the investigation:

- PID;
- Particulate monitors;
- pH , specific conductivity, and temperature meter; and
- Turbidity meter.

8.1 Portable photo-ionization analyzer

- The photo-ionization analyzer will be equipped with either a 10.2 or 10.6 eV lamp. The PID is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the VOCs on the U.S. EPA Target Compound List.
- Calibration must be performed at the beginning of each day of use with a standard calibration gas having a concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, more frequent or additional calibration will be required.
- All calibration data must be recorded in the project field notebooks.
- A battery check must be completed at the beginning and end of each working day.
- All changes to the PID will be noted in the field notes (such as lamp or filter cleaning or replacement or change of instrument).

8.2 pH meter

- Calibration of the pH meter must be performed at the start of each day of use, and after very high or low readings as required by this Plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0, and 10.0 standard units.
- The use of the pH calibration must be used to set the meter to display the value of the standard being checked.
- The calibration data must be recorded in the project field book.

8.3 Specific conductivity meter and temperature probe

- • Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to 10 readings or after very high or low readings as required by this Plan, according to manufacturer's instructions.

- The portable conductivity meter must be calibrated using a reference solution of 200 uohms/cm (or the manufacturer's specified concentration) on a daily basis. The date and lot number of the reference solution must be recorded. Readings must be within five percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

8.4 Turbidity meter

- The turbidity meter must be checked at the start of each day of use according to manufacturer's instructions.

9.0 Analytical program

9.1 Environmental sample analyses

The laboratory samples for each media and the chemical analyses to be performed, including the QA/QC samples are summarized in Table 3-1 of the RI Work Plan.

9.1.1 Surface soil analyses

The surface soil samples will be analyzed for the following parameters:

- Target Compound List (TCL) SVOC compounds by U.S. EPA Method 8270C;
- Target Analyte Lists (TAL) Metals by U.S. EPA Method 6010B/6020/7471A;
- PCB compounds by U.S. EPA Method 8082; and
- Total Cyanide by U.S. EPA Method 9012A.

9.1.2 Subsurface soil analyses

The subsurface soil samples will be analyzed for the following parameters:

- TCL VOC compounds by U.S. EPA Method 8260B;
- TCL SVOC compounds by U.S. EPA Method 8270C;
- PCB compounds by U.S. EPA Method 8082;
- TAL Metals by U.S. EPA Method 6010B/6020/7471A; and
- Total Cyanide by U.S. EPA Method 9012A.

9.1.3 Groundwater analyses

The groundwater samples will be analyzed for the following parameters:

- TCL VOC compounds by U.S. EPA Method 8260B;
- TCL SVOC compounds by U.S. EPA Method 8270C;
- PCB compounds by U.S. EPA Method 8082;
- TAL Metals by U.S. EPA Method 6010B/6020/7471A; and
- Total Cyanide by U.S. EPA Method 9012A.

Based on the existing data from the site, cyanide may be found in significant concentrations in groundwater. If total cyanide is detected in concentrations greater than 200 ug/L (the groundwater standard value) during the RI sampling, additional analysis may be performed for a subset of the RI wells. The analyses that may be performed include the following:

- Total Cyanide – APHA Standard Methods 4500-CN C “Total Cyanide after Distillation” and APHA Standard Methods 4500-CN E “Colorimetric Method”;
- Free Cyanide – ASTM D4282-95 “Standard Test Method for Determination of Free Cyanide in Water by Microdiffusion”; and

- Metal Cyanide Complexes – by the Dinoex IC Method.

9.1.4 Sediment analyses

Sediment samples will be analyzed for the following parameters:

- TCL SVOC compounds by U.S. EPA Method 8270C;
- Total Cyanide by U.S. EPA Method 9012A; and
- Total Organic Carbon by Lloyd-Kahn Method.

9.1.5 Soil profiling

Two to three soil samples may be collected during the investigation and analyzed for full RCRA Hazardous Characteristics testing. The objective of the sampling will be to determine if materials exhibiting hazardous characteristics may be present at the site. These analyses may also be utilized for waste disposal profiling purposes. The samples will be chosen from the most impacted soil collected during the investigation as determined by the field geologist. The hazardous characteristics testing will include the following analyses:

- TCLP ZHE Extraction U.S. EPA Method 1311;
- TCLP VOC U.S. EPA Method 1311/8260B;
- TCLP SVOC U.S. EPA Method 1311/8270C;
- TCLP ICP Metals U.S. EPA Method 6010B (Mercury 7470A);
- Corrosivity U.S. EPA Method Chapter 7;
- Ignitability U.S. EPA 1010;
- Reactive Cyanide U.S. EPA SW-846 Chapter 7; and
- Reactive Sulfide U.S. EPA SW-846 Chapter 7.

9.2 Field quality control samples

Field quality control samples will be collected and analyzed to document the accuracy and precision of the samples. The quality control samples, are described as follows:

- Trip Blank: One trip blank will accompany each shipment of samples for VOC analysis sent to the laboratory. The trip blank will be analyzed to test for any contaminants introduced while samples are being stored or transported to the laboratory. The trip blanks will be analyzed for volatiles only.
- Field Equipment Blanks: The purpose of the equipment blank is to detect any contamination from sampling equipment, cross-contamination from previously sampled locations, and contamination caused by conditions at sampling locations (e.g., airborne contaminants). One equipment blank will be collected for every 20 samples collected during sampling. The samples will be collected by pouring analyte-free water, prepared in the laboratory, over decontaminated sampling equipment and collecting it in sample jars. The blanks will be collected in the vicinity of a sample location. This field blank will be analyzed for VOCs, SVOCs, PCBs, total cyanide, and TAL metals. An equipment blank will not be collected if sampling is conducted with dedicated sampling equipment.
- Field Duplicates: Field duplicates are collected to determine the precision of the soil samples collected. This is achieved by compositing soil and splitting it evenly between separate sample jars. Duplicate samples will be collected and analyzed for VOC, SVOCs, PCBs, total cyanide, and TAL metals. The minimum required number of field duplicates is one for every 20 samples.

- Matrix Spikes, and Matrix Spike Duplicates: These samples are laboratory quality control samples and will be completed as part of the laboratory analytical batch quality control. These samples will be collected in the same manner as the field duplicates. Both the matrix spike and matrix spike duplicate will be collected at the same sample location.

9.3 Sample location numbering system

- Surface soil samples will be numbered consecutively beginning with SS1.
- Subsurface soil borings will be numbered consecutively beginning with SB1 (soil borings) or MW1 (monitoring well borings). Individual samples will also be designated with a depth code (see below).
- Monitoring wells will be numbered consecutively beginning with MW1.
- Sediment samples will be numbered consecutively beginning with SD1.

9.4 Sample identification

Each sample will be given a unique alphanumeric identifier in accordance with the following classification system:

SAMPLE IDENTIFICATION

LL*	NN*	N-N	LL
Sample Type	Sample Number	Depth Code	QC Identifier

	Solid	Water
Sample Type:	MW – Monitoring Well Boring	MW – Monitoring Well
	SB – Soil Boring	
	BSS – Background Surface Sediment	
	SD – Surface Sediment (0-6 inches)	
	SDC – Deeper Sediment (>6 inches)	
Sample Number:	Number referenced to a sample location map.	
Depth Code:	Depth in feet of sample interval (0-0.5, 2-4, 10-12, etc.)	
QC Identifier:	TB – Trip Blank	MS – Matrix Spike
	EB – Equipment Blank	MSD–Matrix Spike Duplicate
		MB – Matrix Blank

* L = Letter
* N = Number

Field duplicate samples will be assigned identifiers that do not allow the laboratory to distinguish them as field duplicates. Each sample container will be labeled prior to packing for shipment. The sample identifier, site name, date and time of sampling, and analytical parameters will be written on the label in waterproof ink and recorded in the field book.

9.5 Chain-of-custody

- A Chain-of-Custody (COC) record (Figure 9-1 or similar) will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field, and during return shipment to the laboratory.
- The COC will include the sample identities of each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, preservation method, the project name and number, the name of the analytical laboratory that will receive the samples, and the method of sample shipment.
- If samples are split and sent to different laboratories, such as to a specialty laboratory for fingerprint analysis, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.
- The REMARKS space will be used to indicate if the sample is a matrix spike, matrix spike duplicate, or matrix duplicate.
- Trip and field blanks will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s), and the shipper airbill number will be entered on the COC.
- Finally, a member of the sampling team will write his/her signature, the date, and time on the first RELINQUISHED BY space.
- One copy of the COC will be retained by sampling personnel. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler.
- Sample shipments will be refrigerated at 4˚C, typically by packing with bagged ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid, and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape, and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished to the shipper, typically an overnight carrier.
- The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the samples will not be analyzed until directed to do so.
- The samples must be delivered to the laboratory within 48 hours of collection.

9.6 Sample documentation

The field team leader will retain a copy of the COC, and, in addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier;
- Identification of sampled media (e.g., soil, sediment, groundwater);
- Sample location with respect to known reference point;

- Physical description of sample location;
- Field measurements, (e.g., pH, temperature, conductivity, and water levels);
- Date and time of collection;
- Sample collection method;
- Volume of groundwater purged before sampling;
- Number of sample containers;
- Analytical parameters;
- Preservatives used; and
- Shipping information:
    - Dates and method of sample shipments;
    - COC Record numbers;
    - Federal Express Air Bill numbers; and
    - Sample recipient (e.g., laboratory name).

Figures

RETEC

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(607) 277-5716 - office, (607) 277-9057 - fax

Figure 4-1

Boring/Well ID:________________

Page _______ of ________

Project Name:	Drilling Company:	Surface Comp:
Project Number:	Drilling Method:	Grout (bgs):
Date Pre-Cleared:	Rig Type:	Filter Pack (bgs):
Date Started Drilling:	Casing ID:	Riser (bgs):
Date Finished Drilling:	Water Level While Drilling (bgs):	Well Screen (bgs):
Logged By:	Total Depth of Boring (bgs):	Sump (bgs):

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:_______________________

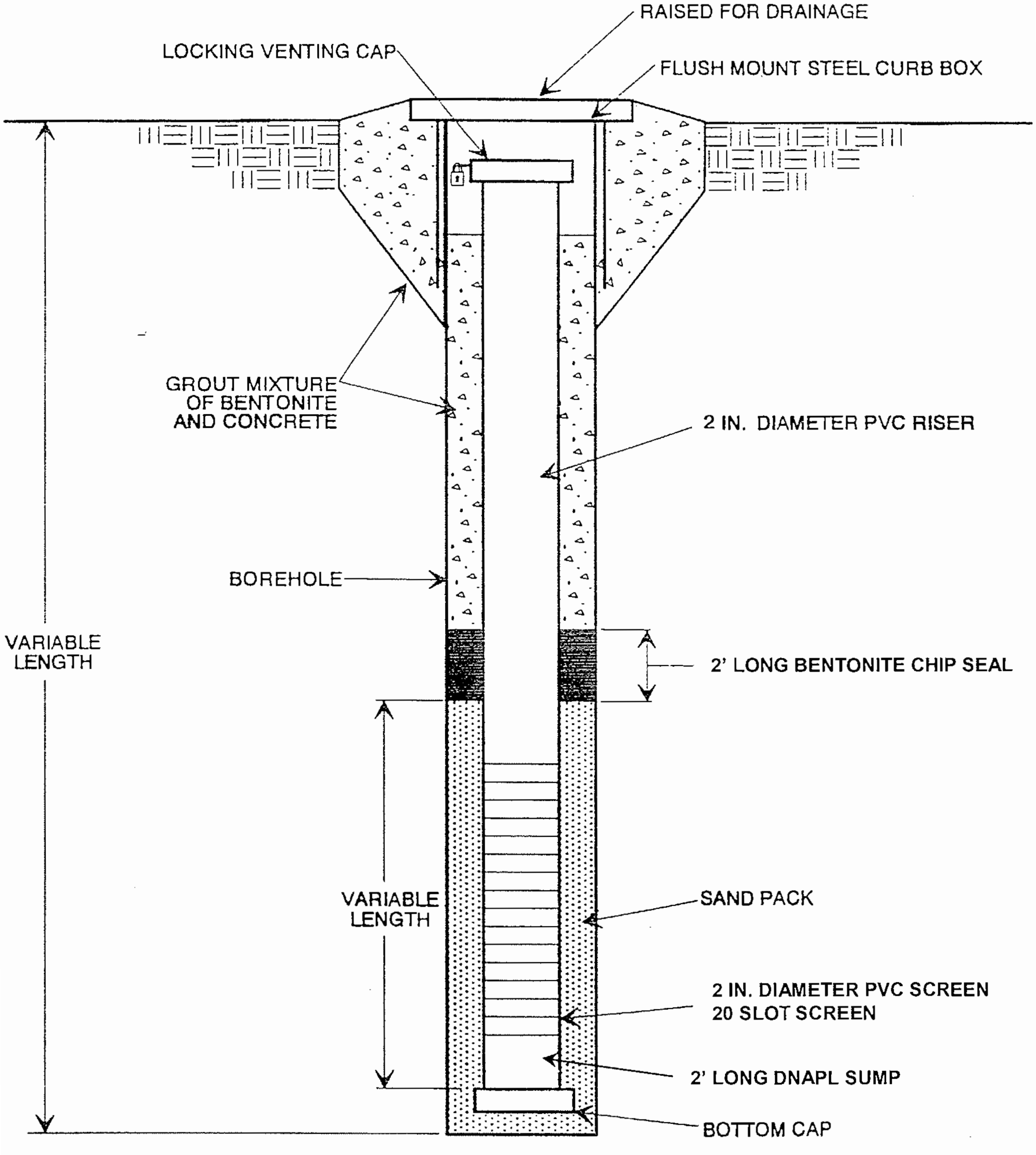
Lithology:

1.)	5.)
2.)	6.)
3.)	7.)
4.)	8.)

Comments:

FIGURE 4-2

TYPICAL MONITORING WELL CROSS SECTION



NOT TO SCALE

FIGURE 4-3

WELL CONSTRUCTION LOG

WELL NO.:
PROJ. NO.:
INSPECTOR:
DATE START:
LOCATION:

FACILITY/SITE NAME:
CLIENT:
DRILLING CONTACTOR:
DATE END:
DRILLING METHOD:

Elevation:
Height:

Elevation:
Height:

GS Elevation:

Concrete

Cement Bentonite Grout

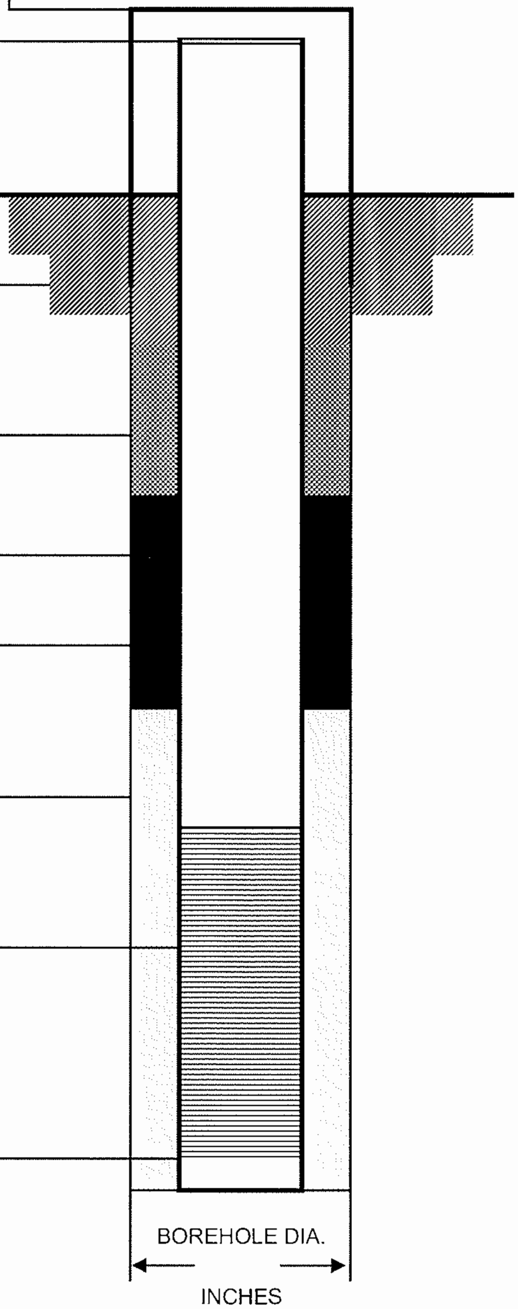
PVC Riser

Min. 1 foot Bentonite Seal

Sand Pack

PVC Well Screen

Sump



PROTECTIVE CASING

Material:
Diameter:
Depth BGS:
Water Tight Seal:
Flushmount:
Weep hole:

GUARD POSTS

Material:
No. & Size:

SURFACE PAD

Composition:
Size:

RISER PIPE

Material:
Schedule:
Joint Type:
O-ring:
Diameter:

GROUT

Amt cement:
Amt bentonite:
Amt water:
Tremied:
Interval:

SEAL

Material:
Type:
Amount Used:
Interval:

FILTER PACK

Material:
Brand Name:
Amount Used:
Grain Size Dist.:
Interval:
Tremied:

SCREEN

Material:
Diameter:
Slot Size & Type:
Interval BGS:

SUMP

Interval BGS:
Bottom Cap:

BACKFILL PLUG

Material:
Setup/Hydration Time:

Figure 5-1

LOW-STRESS GROUND WATER SAMPLING FORM

Project Number: ____________________
Project Name: ____________________
Date: ____________________
Weather: ____________________

Well ID: ____________________
Sample ID: ____________________
Permit Number: ____________________
Well Condition: ____________________

PRE-PURGE INFORMATION

Protective Casing Diameter (inch): ____________________
Inner Casing Diameter (inch): ____________________
Inner Casing Material: ____________________
Purge/Sample Method: ____________________
Pump Intake Setting* (feet): ____________________
PID/FID Reading of Well Headspace (ppm)
Before Cap Removal: ____________________
After Cap Removal: ____________________

Depth to Product* (feet): ____________________
Initial Depth to Water* (feet): ____________________
Product Thickness (feet): ____________________
Depth to Top of Screen* (feet): ____________________
Total Depth* (feet): ____________________
Water Column (feet): ____________________
Casing Volume (gal): ____________________
DTW After Pump Installed: ____________________

PURGING/SAMPLING INFORMATION

Time	Rate (gpm)	Gallons Purged	pH (SI Units)	Conductivity (μohms/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mv)	Depth to Water (ft)	Comments

Start Purge Date/Time: ____________________
End Purge Date/Time: ____________________
Total Volume Purged (gal): ____________________
Depth to Water After Purge* (feet): ____________________

Pre-Sample Depth to Water* (feet): ____________________
Start Sample Date/Time: ____________________
End Sample Date/Time: ____________________
Sampler Names: ____________________
____

Observations During Sampling (e.g. slow recharge, turbidity, odor, sheen, PID/FID readings):

____
____
____

Figure 5-1

LOW-STRESS GROUND WATER SAMPLING FORM

Sampling Sequence:

Analysis	Method	Container	Number of Bottles	Preservative	Comments
Volatile Organics					
Base/neutrals					
TPH					
Total Metals					
Dissolved Metals					
Cyanide					
Sulfate and Chloride					
Nitrate and Ammonia					
Preserved Inorganics					
Non-Preserved Inorg					
Bacteria					

Complete those analyses that apply.

Stabilization Ranges
Dissolved Oxygen: +/- 10%
Turbidity: +/- 10%
Specific Conductance: +/- 3%
Temperature: +/-3 %
pH: +/- 0.1 unit
Redox Potential: +/- 10mv

* = Measured from top of inner casing
DTW - Depth to Water
Thermo Environmental Instruments Model 580s OVM w/ 10.2 ev bulb
Water Levels Measured with an Electronic Water Level Meter
Field parameter meter calibration results are recorded in the field book.

Figure 6-1

Sediment Sampling Field Form

Sample Site:		Station Identification:	
Project Number		Sediment Sample:	
Project Name:		Time of Collection:	
Date Sample Collection:		Sampling Personnel:	
Weather:		Sampling Personnel:	

Study Area Observations:

Depositional and Erosional Areas:	
Zones of Sediment Transport:	
Currents or Tides:	
On Shore Adjacent Facilities:	
Adjacent Storm Water Outfalls:	

GPS Station Coordinates

Latitude (N):	
Longitude (W):	

Photographic Record

Photograph Description:		Photograph Description:	
Photograph Description:		Photograph Description:	

Field Measurements

Depth of Water (feet to nearest 0.1)	
Type of Sediment Sampler Used:	

Water Quality Measurements

Top Measurement (30 cm below water surface)		Bottom Measurement (30 cm above sediment)	
Temperature (Celsius)		Temperature (Celsius)	
Salinity (ppt)		Salinity (ppt)	
Dissolved Oxygen (mg/L)		Dissolved Oxygen (mg/L)	
Conductivity (uS/sec)		Conductivity (uS/sec) or (µmhos/cm)	
pH		pH	
Turbidity		ORP (mv)	

Field Instrument Calibration Completed?

Other Observations or Notes:

Figure 9-1

Chain of Custody Record

№ 0476

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

Project Name:	Project Number:
Send Report To:	Sampler (Print Name):
Address:	Sampler (Print Name):
	Shipment Method:
	Airbill Number:
Phone:	Laboratory Receiving:
Fax:	

Page _____ of _____

Purchase Order #:_______________________

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Analysis Requested											Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level			Turnaround	
Level	I	☐	Routine	☐
Level	II	☐	24 Hour	☐
Level	III	☐	1 Week	☐
Other		☐	Other ______	

Sample Receipt	
Total # Containers Received?	
COC Seals Present?	
COC Seals Intact?	
Received Containers Intact?	
Temperature?	

White: Lab Copy   Yellow: PM Copy   Pink: Field Copy   Gold: PM/QA/QC Copy

ENSR | AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix E

Quality Assurance Project Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No. 8-59-022
Index No.: D0-0002-9309

The RETEC Group, Inc.
August 22, 2007
Project No.: 04964-025

Merged with ENSR in 2007
RETEC

ENSR | AECOM

Prepared for:
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Appendix E

Quality Assurance Project Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No. 8-59-022
Index No.: D0-0002-9309

James H. Edwards
Prepared By: James Edwards, Senior Geologist

Greg Malzone mlk
Reviewed By: Greg Malzone, Project Chemist

The RETEC Group, Inc.
August 22, 2007
Project No.: 04964-025

Merged with ENSR in 2007
RETEC

Contents

List of Tables

List of Figures

1.0 Project description

This Quality Assurance Project Plan (QAPP) specifies the quality control and quality assurance procedures to ensure the generation of statistically valid data. All procedures are equivalent to those specified in the United States Environmental Protection Agency's (U.S. EPA) QA/R-5 "U.S. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," "Test Methods for Evaluating Solid Waste," U.S. EPA SW-846, Third Edition, and its promulgated updates, and New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) to be used to ensure that data from the Remedial Investigation (RI) at the Palmyra manufactured gas plant (MGP) site in Palmyra, New York are precise, accurate, representative, comparable, and complete.

1.1 Introduction

The Palmyra MGP site is approximately 0.8 acres in size and contains subsurface remnants of MGP-related structures. MGP-related residuals have been identified in the central area of the property during previous investigations performed at the site. Additional investigation is required to fully delineate the MGP-related impacts. Additional information regarding the impacts observed at the site is included in the RI Work Plan.

1.2 Scope of work

The scope of work for the RI is described in the project Work Plan. Samples will be collected from surface soil, soil borings, test trenches, groundwater monitoring wells, and sediments. The majority of these samples will be analyzed using U.S. EPA SW-846 Methods with NYSDEC ASP Category B laboratory data deliverables. Samples submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis will be analyzed using U.S. EPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition (and subsequent updates). Samples may also be analyzed for forensic purposes using non-standard methods.

1.3 Data quality objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements to ensure that data of known and appropriate quality are obtained during sampling and analysis activities. Data developed during the site investigation will be used to fulfill the overall objectives of the program.

1.3.1 Data quality levels

There are five analytical levels of data quality which may be used to accomplish these site objectives. They are typically designated as follows:

- Level I - field screening or analysis using portable instruments, calibrated to non-compound specific standards;
- Level II - field analysis using portable instruments, calibrated to specific compounds;
- Level III - non-Contract Laboratory Program (ASP-CLP) laboratory methods;
- Level IV - ASP-CLP Routine Analytical Services methods; and
- Level V - non-standard analytical methods.

To meet the specific objectives of this project, Levels I, IV and V data quality objectives will be utilized.

Level I - Field screening methods

Level I screening will be performed for health and safety purposes according to procedures provided in the site-specific health and safety plan (HASP) as well as to qualitatively assess the presence of volatile organic compounds (VOCs) in soil at the site.

Level IV - CLP/ASP methodologies

Soil, sediment, and groundwater samples will be analyzed according to the U.S. EPA SW-846 Methods following procedures specified in the most recent edition of the NYSDEC ASP (July, 2005). Analytical reports will be prepared in accordance with NYSDEC ASP Category B laboratory data deliverable specifications. This level of data quality will ensure the generation of legally, and technically defensible data for project use. Level IV data will also be provided for the hazardous characteristics testing. If available cyanide is analyzed, a CLP-equivalent data package will be prepared for this analysis.

Level V - Non-standard methodologies

Hydrocarbon “fingerprint” testing and other forensic analyses are performed using non-standard analytical methods.

2.0 Project organization

This RI will be performed for NYSEG by RETEC, an environmental consultant (the Consultant). RETEC will arrange for the drilling and analytical services and provide on-site field representative to perform the soil characterization, soil sampling, sediment, and groundwater sampling. The consultant will also perform the data interpretation and reporting tasks.

Key contacts for this project are as follows:

NYSEG Project Manager

John Ruspantini	New York State Electric and Gas James A. Carrigg Center 18 Link Drive P.O. Box 5224 Binghamton, New York 13902-5224 Telephone: (607) 762-8787 Cell: (607) 725-3801

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Laboratory Representative (STL\TestAmerica):

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STL\TestAmerica - Buffalo
10 Hazelwood Drive, Suite 106
Amherst, NY 14228
Phone: (716) 691-2600
Fax: (716) 691-7991

3.0 Quality assurance/quality control (QA/QC) objectives for measurement of data

3.1 Introduction

The quality assurance and quality control objectives for all quantitative measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in the following subsections. They are formulated to meet the requirements of the NYSDEC ASP and U.S. EPA SW-846. The analytical methods and Contract Required Quantitation Limits (CRQLs) are provided in Section 7.

3.2 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value [U.S. EPA, 1987]. Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \quad x\ 100$$

where:

RPD = Relative percent difference.

V1, V2 = The two values to be compared.

|V1 - V2| = The absolute value of the difference between the two values.

(V1 + V2)/2 = The average of the two values.

The DQOs for analytical precision, calculated as the RPD between duplicate analyses, are presented in Tables 3-1 and 3-2.

3.3 Accuracy

Accuracy is a measure of the degree of agreement between a measured value and the true or expected value of the quantity of concern [Taylor, 1987], or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R = Percent recovery.

SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Tables 3-1 and 3-2.

3.4 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program [U.S. EPA, 1987]. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Field Sampling and Analysis Plan (FSAP). Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow U.S. EPA-approved procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody (COC) procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate, and COC procedures are presented in Sections 4 and 5.

3.5 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid [U.S. EPA, 1987]. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.
V = Number of measurements judged valid.
T = Total number of measurements.

3.6 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another [U.S. EPA, 1987]. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. EPA or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4.0 Sampling program

4.1 Introduction

The sampling program was developed to provide analytical and field data that can be used to satisfy the project objectives (as outlined in Section 1.2). This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be collected, are summarized in Table 4-1. The sampling procedures are presented in the FSAP.

4.2 Sample container preparation and sample preservation

Sample containers delivered to the field will be new and certified clean by the vendor. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged, and the appropriate chemical preservatives will be added. The types of containers are shown in Tables 4-2 and 4-3.

Samples shall be preserved according to the preservation techniques listed in Tables 4-2 and 4-3. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4° ± 2° C with ice, and delivered to the laboratory within 48 hours of collection under COC. COC procedures are described in Section 5.

4.3 Sample holding times

The sample holding times for organic and inorganic parameters are listed in Tables 4-2 and 4-3 and are in accordance with the NYSDEC ASP requirements. Holding times for TCLP samples are given in Table 4-4. The NYSDEC ASP holding times must be strictly adhered to by the field and laboratory personnel.

4.4 Field QC samples

Field QC samples will consist of a series of blanks and duplicates that will be collected to assess field sampling and decontamination performance. Two types of blanks to assess the collection of field samples will be collected and submitted to the laboratory for analyses (trip and equipment blanks). In addition, the precision of the laboratory analytical procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. **Trip blanks** - A Trip Blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of one or more 40-ml VOA vials containing U.S. EPA Type 2 water, that accompanies all water sample bottles into the field and back to the laboratory. A trip blank will be included in each shipping container of water samples for volatiles analysis. The trip blank will be analyzed for VOCs to assess any contamination from sampling, storage, transport, and internal laboratory procedures.

b. **Equipment blanks** - Equipment blanks are collected to determine the effectiveness of the decontamination procedures for sampling equipment. Equipment blanks are collected by passing U.S. EPA Type 2 water provided by the laboratory through decontaminated sampling equipment. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The equipment blank will be analyzed for all of the parameters of interest.

The duplicates will consist of:

a. **Coded field duplicate** - To determine the representativeness of the sampling methods, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are duplicate samples. This will eliminate any possible bias that could arise.

b. **Matrix spike/matrix spike duplicate** - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are listed in Tables 3-1 and 3-2.

4.5 Forensic analyses

Samples may be collected, archived, and analyzed for forensic purposes to differentiate impacted areas and/or sources at the site and area-wide setting of the site. The analyses will include:

- Saturated hydrocarbon SHC/TPH by U.S. EPA SW-846 Method 8100 mod.; and
- Alkylated PAHs via GC/MS-SIM Mode by U.S. EPA SW-846 Method 8270C mod.

The PAH fingerprint target analyte list is presented in Table 4-5.

Additional analyses may be performed to evaluate hydrocarbons in groundwater at the Palmyra MGP site. The objective is to gather sufficient information to determine whether groundwater impacts are site-related (MGP residuals) or petroleum impacts (specifically automotive gasoline). These analyses may include the following:

- Method 8015M (modified from 8015);
- Method 8260M (modified from 8260)/8270M (modified 8270);
- PIANO analysis (paraffins, isoparaffins, aromatics, napthenes, and olefins) + fuel additives; and
- Parent and alkylated PAHs, sulfur PAHs, decalines, and alkylcyclohexanes.

5.0 Sample tracking and custody

5.1 Introduction

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the COC and transfer of samples will be trained on the purpose of the COC and specific procedures prior to implementation.

Evidence of sample traceability and integrity is developed by implementation of, and adherence to, the COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is presented in Figure 5-1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.2 Field sample custody

A COC record (Figure 5-2 or equivalent) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is an MS/MSD, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and equipment blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper air bill number on the top of the COC. Errors will be crossed out with a single line in ink and initialed and dated by the author.

One copy of the COC is retained by sampling personnel and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample(s) will not be analyzed.

5.3 Laboratory sample custody

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or description errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming COC procedure.
- The samples will be stored in a secured area and, if required, stored at a temperature of 4°± 2° C.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis and final storage for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

6.0 Calibration procedures

6.1 Field instruments

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the FSAP. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader in a notebook. Copies of all the instrument manuals will be maintained on site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photo-ionization detector and explosimeter) are provided in the Health and Safety Plan. More frequent calibration may be needed depending on conditions encountered in the field.

6.2 Laboratory instruments

The laboratory will follow all calibration procedures and schedules as specified in the sections of the U.S. EPA SW-846 and NYSDEC ASP and subsequent updates as they apply to the instruments used for the analytical methods listed in Section 7.

7.0 Analytical procedures

7.1 Introduction

Samples will be analyzed according to methods approved by the NYSDEC Analytical Services Protocol (ASP) program or U.S. EPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition and subsequent updates. The methods to be used for the laboratory analysis of water and soil samples are listed in Table 4-1. These methods were selected because they attain the DQOs required for the project, and the quantitation limits that are listed in Tables 7-1 and 7-2.

Should an analytical method be required that is outside the scope to the references cited above, the method used will be published by a nationally recognized authority (e.g., U. S. EPA, API) and approved for use by the regulatory agency.

The Project Manager shall ensure that laboratories (primary or subcontracted) generating data in support of NYSEG remediation and investigative projects maintain the relevant state and federal government regulatory accreditations, certifications, and/or registrations to perform the required analyses.

8.0 Data reduction, assessment, and reporting

8.1 Data reduction

Data collected during the field investigation will be reduced in accordance with NYSDEC ASP protocols. The procedures for identification and quantification of the analytes will be specified in the NYSDEC ASP or U.S. EPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition and subsequent updates and peer reviewed by laboratory supervising personnel.

8.2 Data quality assessment

NYSDEC generally recommends two levels of data review for data collected during site investigations. The basic review is a Data Usability Summary Report (DUSR). Current NYSDEC policy is to require a DUSR for data collected during investigations on most sites. The more rigorous full data validation procedure is called for at sites where the data will be used in litigation. The laboratory deliverables (i.e., NYSDEC ASP Category B) are the same in both cases, and a DUSR can be upgraded to full validation at a later time if necessary. For this investigation a DUSR will be generated.

Based on the results of data assessment, the validated analytical results reported by the laboratory will be assigned one of the following usability flags by the data validator:

- U The analyte was analyzed for, but was not detected above the level of the reported samples quantitation limit.
- UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximated and may be inaccurate or imprecise.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J- (Inorganics) The result is an estimated quantity, likely to be biased low. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ (Inorganics) The result is an estimated quantity, likely to be biased high. The associated numerical value is the approximate concentration of the analyte in the sample.
- N Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling events.
- NJ Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
- R The data are unusable. The sample results are rejected due to serious deficiencies in the ability to meet quality control criteria. The presence or absence of the analyte cannot be verified.

Trained and experienced data assessors, who meet NYSDEC approval criteria, will perform the data assessment. Resumes of people performing data assessments and generating DUSRs will be provided to NYSDEC for review and approval.

8.2.1 Data usability summary report (DUSR)

Data for this investigation will be evaluated in accordance with the “U.S. EPA National Functional Guidelines for Organic Data Review,” October 1999 and “U.S. EPA Validation Functional Guidelines for Inorganic Data Review,” October 2004. A DUSR will be generated in accordance with U.S. EPA Region II guidelines.

A DUSR will be prepared which will include a review and an evaluation of all the analytical results. To ensure compliance with the analytical method protocols the following will be reviewed:

- COC forms;
- Holding times;
- Initial and continuing calibrations;
- Blanks;
- Laboratory control standards and matrix spikes;
- Surrogate recoveries;
- Matrix interference checks;
- Field and laboratory duplicates; and
- Sample data.

The DUSR will contain a description of the samples and parameters reviewed. Any deficiencies identified during the review will be noted and the effect on the generated data will be discussed. Any re-sampling or re-analysis recommendations will then be made to the investigation’s Project Manager. The results of the evaluation will be incorporated into the final investigative report.

8.2.2 Data validation

The determination to validate data will be made based on the presence of data anomalies, suspect data, or laboratory issues. Data will be validated in accordance with the “U.S. EPA National Functional Guidelines for Organic Data Review,” October 1999 and “U.S. EPA Validation Functional Guidelines for Inorganic Data Review,” October 2004. If applicable, a data validation report will be prepared and reviewed by the Quality Assurance Officer (QAO) before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Field duplicate results;
- Target compound identification;
- Result calculations;
- Pesticide cleanup (if applicable);

- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix spike(s);
- Furnace atomic absorption analysis QC;
- ICP serial dilutions;
- Results verification and reported detection limits; and
- Result calculations.

8.3 Data reporting

The data package provided by the laboratory will contain all items discussed above in a “CLP-equivalent” format. Data quality issues will be discussed in a case narrative included with the data report. The completed copies of the COC records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

Two copies of the analytical data packages and an electronic disk deliverable will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the disk deliverable, will be used to generate summary tables. These tables will form the database for the assessment of the extent of the MGP-related impacts at the site.

The electronic deliverable format required is usually an ASCII comma-delimited file with the fields and character lengths summarized in Table 8-1. Alternatively, a comma-delimited MS Excel file may be issued. The final electronic deliverable format for each project will be determined in consultation with the NYSDEC Project Manager.

9.0 Internal quality control checks and frequency

9.1 Quality assurance batching

Each set of up to 20 samples submitted to the laboratory will be analyzed concurrently with associated calibration standards, method blanks, MS/MSD or laboratory duplicates, and QC check samples (if required by the protocol). Note that the MS/MSD samples will be provided with the field samples and identified by the field personnel.

9.2 Calibration standards and surrogates

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the U.S. EPA or NIST, or other similar nationally-recognized program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard working solutions are replaced monthly or more frequently, based upon data indicating deterioration. No stock or working standard will be used past the manufacturer's expiration date.

9.3 Organic blanks and matrix spike

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing KMnO4. The matrix spike is generated by addition of analyte and surrogate standards to a designated field sample.

9.4 Trip and field blanks

Trip blanks and equipment blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross-contamination of the samples.

10.0 Quality assurance performance audits and system audits

10.1 Introduction

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the project quality assurance officer (QAO). These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate QA management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 System audits

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory QC procedures and associated documentation may be audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

10.3 Performance audits

The laboratory is required to perform periodic analyses of Performance Evaluation (PE) samples to maintain NELAP accreditation and/or state regulatory certifications. PE samples obtained from a U.S. EPA-approved vendor or a state agency must be analyzed by the laboratory at least semi-annually.

10.4 Formal audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that QA requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be out of compliance shall be identified at exit interviews conducted with the involved management. Compliance deviation will be logged, and documented through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within 15 days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

11.0 Preventive maintenance procedures and schedules

11.1 Preventive maintenance procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce downtime, if any. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 Schedules

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 Records

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

12.0 Corrective action

12.1 Introduction

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 Procedure description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader, and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When QA requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by U.S. EPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with QA requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to QA functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12-1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions were implemented and effective, documented, and approved.

13.0 References

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan.

U.S. EPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986 and subsequent updates. U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7B U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA, 2001. CLP Organics Data Review and Preliminary Review based on CLP/SOW OLM04.2. SOP No. HW-6, Revision 12 dated September 2005. U.S. EPA Region II.

U.S. EPA, 2005. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW - ILM05.3. SOP No. HW-2, Revision 13, dated January 1992. U.S. EPA Region II.

Tables

Table 3-1
Quality Control Limits for Water Samples

Laboratory Accuracy and Precision

Analytical Parameters	Analytical Method [(a)]	Matrix Spike (MS) Compounds	MS/MSD [(b)] % Recovery	MS/MSD RPD [(c)]	LCS [(d)] % Recovery	Surrogate Compounds	Surrogate % Recovery
VOCs (e)	8260B	1,1-Dichloroethane	65-142	16	65-142	Toluene-d8	76-122
		Trichloroethene	71-120	16	71-120	p-Bromofluorobenzene	73-120
		Benzene	67-126	13	67-126	1,2-Dichloroethane-d4	72-143
		Toluene	69-120	18	69-120		
		Chlorobenzene	73-120	19	73-120		
SVOCs (f)	8270C	Phenol	30-120	39	30-120	Nitrobenzene-d5	46-120
		2-Chlorophenol	47-120	33	47-120	2-Fluorobiphenyl	44-120
		1,4-Dichlorobenzene	30-120	35	30-120	p-Terphenyl-d14	23-143
		N-Nitroso-di-n-propylamine	56-120	38	56-120	Phenol-d5	10-120
		1,2,4-Trichlorobenzene	38-120	35	38-120	2-Fluorophenol	20-120
		4-Chloro-3-methylphenol	57-126	25	57-126	2,4,6-Tribromophenol	59-136
		Acenaphthene	57-120	23	57-120		
		4-Nitrophenol	30-120	30	30-120		
		2,4-Dinitrotoluene	58-121	20	58-121		
		Pentachlorophenol	34-157	27	34-157		
		Pyrene	58-136	25	58-136		
PCBs	8082	Aroclor-1016	29–123	50	29–123	Tetrachloro-m-xylene	36-153
		Aroclor-1260	50-122	50	50-122	Decachlorobiphenyl	28-132
Inorganics (i)	6010B/6020 7470A (metals)	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
	9012 A (total cyanide)		75-125 (j)	20 (k)	80-120	NA	NA
			75-125 (j)	25 (k)	85-115	NA	NA
	Total Cyanide – 9013A - APHA Standard Methods 4500-CN C "and 4500-CN E "		80-120	20	80-120	NA	NA
	Free Cyanide – ASTM D4282-95 by Microdiffusion"; and		80-120	20	80-120	NA	NA
	Metal Cyanide Complexes – by the Dinoex IC Method.		85-115	20	85-115	NA	NA

(a) Analytical Methods: NYSDEC ASP-CLP Methods with Category B data deliverables, NYSDEC, 2000 and U.S. EPA SW-846, 3rd edition, Revision 1, November 1990.
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semi-volatile Organic Compounds
(g) Limits are advisory only

(i) Target Analyte List Inorganics (metals and cyanide
(j) Matrix spike only
(k) Laboratory duplicate RPD
NA - Not Applicable

Table 3-2
Quality Control Limits for Soil Samples

		Laboratory Accuracy and Precision					
Analytical Parameter	**Analytical Method (a)**	**Matrix Spike (MS) Compounds**	**MS/MSD (b) % Recovery**	**MS/MSD RPD (c)**	**LCS (d) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260B	1,1-Dichloroethane	70-142	22	70-142	Toluene-d8	71-125
		Trichloroethene	79-121	24	79-121	p-Bromofluorobenzene	72-126
		Benzene	78-122	25	78-122	1,2-Dichloroethane-d4	64-126
		Toluene	74-123	25	74-123		
		Chlorobenzene	79-118	25	79-118		
SVOCs (f)	8270C	Phenol	36-110	25	36-110	Nitrobenzene-d5	35-113
		2-Chlorophenol	38-104	26	38-104	2-Fluorobiphenyl	43-119
		1,4-Dichlorobenzene	34-120	30	34-120	p-Terphenyl-d14	51-125
		N-Nitroso-di-n-propylamine	46-120	20	46-120	Phenol-d5	36-116
		1,2,4-Trichlorobenzene	39-105	24	39-105	2-Fluorophenol	30-107
		4-Chloro-3-methylphenol	49-125	20	49-125	2,4,6-Tribromophenol	46-129
		Acenaphthene	53-119	16	53-119		
		4-Nitrophenol	44-137	25	44-137		
		2,4-Dinitrotoluene	55-125	19	55-125		
		Pentachlorophenol	33-136	27	33-136		
		Pyrene	51-133	25	51-133		
PCBs	8082	Aroclor-1016	39 – 129	50	39 – 129	Tetrachloro-m-xylene	32-148
		Aroclor-1260	41 - 139	50	41 - 139	Decachlorobiphenyl	36-153
Inorganics (i)	6010B and 7471A (metals)	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
	9012 A (total cyanide)		75-125 (j)	20 (k)	80-120	NA	NA

(a) Analytical Methods: NYSDEC ASP-CLP Methods with Category B data deliverables, NYSDEC, 2000 and U.S. EPA SW-846, 3rd edition, Revision 1, November 1990,

(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semi-volatile Organic Compounds
(g) Limits are advisory only

(h) Target Analyte List Inorganics (metals and cyanide)
(i) Matrix spike only
(j) Laboratory duplicate RPD
NA - Not Applicable

Table 4-1
Summary of Sampling and Analytical Program

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks		Total
			Field Samples	Field Duplicate	MS/MSD(a) (Total)	Sub-Total	Trip Blank	Equip-ment Blank	
Surface Soil Samples*	SVOCs	U.S. EPA SW 8270C	8	1	1	10	NA	1	11
	PCBs	U.S. EPA SW 8082	8	1	1	10	NA	1	11
	Total Cyanide	U.S. EPA SW 9012A	8	1	1	10	NA	1	11
	TAL Metals	U.S. EPA SW 6010B/6020/7471A	8	1	1	10	NA	1	11
Soil Boring and Test Pit Samples (approximate maximum total)	VOCs	U.S. EPA SW 8260B	66	2	2	70	NA	2	72
	SVOCs	U.S. EPA SW 8270C	66	2	2	70	NA	2	72
	PCBs	U.S. EPA SW 8082	66	2	2	70	NA	2	72
	Total Cyanide	U.S. EPA SW 9012A	66	2	2	70	NA	2	72
	TAL Metals	U.S. EPA SW 6010B/6020/7471A	66	2	2	70	NA	2	72
Groundwater Samples	VOCs	U.S. EPA SW 8260B	18	1	1	20	2	1	23
	SVOCs	U.S. EPA SW 8270C	18	1	1	20	2	1	23
	PCBs	U.S. EPA SW 8082	18	1	1	20	2	1	23
	Total Cyanide	U.S. EPA SW 9012A	18	1	1	20	2	1	23
	TAL Metals	U.S. EPA SW 6010B/6020/7471A	18	1	1	20	2	1	23
	Cyanide Analyses	(Note 1)	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Sediment Samples	SVOCs	U.S. EPA SW 8270C	15	1	1	17	NA	1	18
	Total Cyanide	U.S. EPA SW 9013/9012A	15	1	1	17	NA	1	18
	TOC	Lloyd Kahn	15	1	1	17	NA	1	18
Hazardous Characterization (soils)	TCLP Extraction	U.S. EPA Method 1311	2	NA	NA	2	NA	NA	2
	TCLP VOCs	U.S. EPA SW 1311/8260B	2	NA	NA	2	NA	NA	2
	TCLP SVOCs	U.S. EPA SW 1311/8270C	2	NA	NA	2	NA	NA	2
	TCLP Metals	U.S. EPA SW 1311/6010B/7470A	2	NA	NA	2	NA	NA	2
	Corrosivity	U.S. EPA SW-846 Chapter 7	2	NA	NA	2	NA	NA	2
	Ignitability	U.S. EPA 1010	2	NA	NA	2	NA	NA	2
	Reactive Cyanide	U.S. EPA SW-846 Chapter 7	2	NA	NA	2	NA	NA	2
	Reactive Sulfide	U.S. EPA SW-846 Chapter 7	2	NA	NA	2	NA	NA	2

(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis.

* The number of duplicates, MS/MSD, and field QC samples can be reduced if these samples are obtained in conjunction with the sampling of other media during the sampling event.

\+ Rinse blanks not required if dedicated sampling equipment is used.

(Note 1) Cyanide analyses including Total Cyanide – APHA Standard Methods 4500-CN C “Total Cyanide after Distillation” and APHA Standard Methods 4500-CN E “Colorimetric Method”; Free Cyanide – ASTM D4282-95 “Standard Test Method for Determination of Free Cyanide in Water by Microdiffusion”; and Metal Cyanide Complexes – by the Dinoex IC Method may be analyzed if significant concentrations of Total Cyanide are detected.

TBD To be determined

Table 4-2
Water Sample Containerization, Preservation, and Holding Times

Analysis (b)	Bottle Type	Preservation (a)	Holding Time (b)
Volatile Organic Compounds (VOCs)	3-40 mL glass vial w/ Teflon septum	Cool to 4 °C	14 days
Semi-volatile Organics Compounds (SVOCs)	2-1000 mL glass w/	Cool to 4 °C	7 days to extraction 40 days to analysis
	Teflon lined cap		
PCBs	1-1000 mL glass w/	Cool to 4 °C	7 days to extraction 40 days to analysis
TAL Metals	1000 mL plastic bottle	Nitric Acid to pH < 2 Cool to 4 °C	6 months, except mercury (26 days)
Total Cyanide	500 mL plastic bottle	NaOH to pH > 12 Cool to 4 °C	14 days

Total Cyanide – APHA Standard Methods 4500-CN C “Total Cyanide after Distillation” and APHA Standard Methods 4500-CN E “Colorimetric Method”;

Free Cyanide – ASTM D4282-95 “Standard Test Method for Determination of Free Cyanide in Water by Microdiffusion”; and

Metal Cyanide Complexes – by the Dinoex IC Method.
Available Cyanide

(a) All samples to be preserved in ice during collection and transport.

(b) Days from date of sample collection.

Table 4-3
Soil and Hazardous Characteristics
Sample Containerization and Holding Times

Analysis (b)	Bottle Type	Preservation (a)	Holding Time(b)
Volatile Organic Compounds (VOCs)	Wide-mouth glass w/ teflon lined cap	Cool to 4°±2 °C	14 days
Semi-Volatile Organic Compounds (SVOCs)	Wide-mouth glass w/ teflon lined cap	Cool to 4°±2 °C	7 days to extraction 40 days to analysis
PCB (Aroclors)	Wide-mouth glass w/ teflon lined cap	Cool to 4°±2 °C	7 days to extraction 40 days to analysis
TAL Metals	Wide-mouth glass	Cool to 4°±2 °C	6 months, except mercury (26 days)
Total Cyanide	Wide-mouth glass	Cool to 4°±2 °C	14 days
TCLP Organic Compounds	Wide-mouth glass w/ teflon lined cap	Cool to 4°±2 °C	See Table 4-4
TCLP Metals	Wide-mouth glass	Cool to 4°±2 °C	See Table 4-4
Corrosivity	Wide-mouth glass	Cool to 4°±2 °C	2 days
Ignitability	Wide-mouth glass	Cool to 4°±2 °C	NA
Reactive Cyanide	Wide-mouth glass	Cool to 4°±2 °C	14 days
Reactive Sulfide	Wide-mouth glass	Cool to 4°±2 °C	7 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from date of sample collection.

NA Not Applicable

Table 4-4
TCLP[a] Sample Holding Times

Analytical Parameter	From: Sample Collection To: TCLP Extraction*	From: TCLP Extraction To: Preparative Extraction	From: Preparative Extraction To: Determinative Analysis
Volatiles	7 days	NA	7 days
Semi-volatiles	5 days	7 days	40 days
Mercury	5 days	NA	28 days
Metals (except Mercury)	180 days	NA	180 days

(a) Toxicity Characteristic Leaching Procedure

NA - Not Applicable

*Times shown are from verified time of sample receipt.

Table 4-5
PAH Fingerprinting Target Analyte List [1]

Compound	Compound
*Naphthalene (N)	Naphthobenzothiophene (NBT)
C_1-Naphthalenes (N1)	C_1-Naphthobenzothiophenes (NBT1)
C_2-Naphthalenes (N2)	C_2-Naphthobenzothiophenes (NBT2)
C_3-Naphthalenes (N3)	C_3-Naphthobenzothiophenes (NBT3)
C_4-Naphthalenes (N4)	
	*Fluoranthene (FL)
Benzothiophene (BT)	*Pyrene (PY)
C_1-Benzothiophenes (BT1)	C_1-Fluoranthenes/Pyrenes (FP1)
	C_2-Fluoranthenes/Pyrenes (FP2)
Biphenyl (BP)	C_3-Fluoranthenes/Pyrenes (FP3)
*Acenaphthylene (ACY)	
*Acenaphthene (ACE)	*Benz(a)anthracene (BAA)
	*Chrysene (C)
Dibenzofuran (DBF)	C_1-Chrysenes/Benz(a)anthracenes (C1)
	C_2-Chrysenes/Benz(a)anthracenes (C2)
Carbazole (CZ)	C_3-Chrysenes/Benz(a)anthracenes (C3)
	C_4-Chrysenes/Benz(a)anthracenes (C4)
*Fluorene (F)	
C_1-Fluorenes (F1)	*Benzo(b)fluoranthene (BBF)
C_2-Fluorenes (F2)	
C_3-Fluorenes (F3)	*Benzo(k)fluoranthene (BKF)
Dibenzothiophene (D)	Benzo(e)pyrene (BEP)
C_1-Dibenzothiophenes (D1)	
C_2-Dibenzothiophenes (D2)	*Benzo(a)pyrene (BAP)
C_3-Dibenzothiophenes (D3)	
	*Indeno(1,2,3-c,d)pyrene (INDP)
*Anthracene (A)	
*Phenanthrene (P)	*Dibenzo(a,h)anthracene (DAHA)
C_1-Phenanthrenes/Anthracenes (P1)	
C_2-Phenanthrenes/Anthracenes (P2)	*Benzo(g,h,i)perylene (BGHI)
C_3-Phenanthrenes/Anthracenes (P3)	
C_4-Phenanthrenes/Anthracenes (P4)	Perylene (PER)

[1] *C_1, C_2, C_3, C_4 refer to number of alkyl carbon substitutes on the parent compound.*

* *Priority pollutant PAHs*

Table 7-1
Project Quantitation Limits

		Quantitation Limits		State of New York Standards or Guidance Values	
Analysis/Compound	**Method**	**Water (ug/L)**	**Soil (ug/Kg)**	**Water (ug/L) (a)**	**Soil (ug/Kg) (b)**
Volatile Organics					
1,1,1-Trichloroethane	8260B	1	5	5	680
1,1,2,2-Tetrachloroethane	8260B	1	5	5	
1,1,2-Trichloroethane	8260B	1	5	1	
1,1-Dichloroethane	8260B	1	5	5	270
1,1-Dichloroethene	8260B	1	5	5	330
1,2-Dichloroethane	8260B	1	5	0.6	
1,2-Dichloroethene(total)	8260B	1	5	5	
1,2-Dichloropropane	8260B	1	5	1	
2-Butanone (MEK)	8260B	10	20		120
2-Hexanone	8260B	10	20		
4-Methyl-2-pentanone(MIBK)	8260B	5	20		
Acetone	8260B	10	20		50
Benzene	8260B	1	5	1	60
Bromodichloromethane	8260B	1	5		
Bromoform	8260B	1	5		
Bromomethane	8260B	2	10	5	
Carbon Disulfide	8260B	1	5		
Carbon Tetrachloride	8260B	1	5	5	760
Chlorobenzene	8260B	1	5	5	1100
Chloroethane	8260B	2	10	5	
Chloroform	8260B	1	5	7	370
Chloromethane	8260B	2	10	5	
cis-1,3-Dichloropropene	8260B	1	5	0.4	
Dibromochloromethane	8260B	1	5	5	
Ethyl Benzene	8260B	1	5	5	1000
Methylene Chloride	8260B	1	5	5	50
Styrene	8260B	1	5	5	
Tetrachloroethene	8260B	1	5	5	1300
Toluene	8260B	1	5	5	700
trans-1,3-Dichloropropene	8260B	1	5	0.4	
Trichloroethene	8260B	1	5	5	470
Vinyl Chloride	8260B	2	10	2	20
Xylenes(total)	8260B	1	5	5	260

		Quantitation Limits		State of New York Standards or Guidance Values	
Analysis/Compound	Method	Water (ug/L)	Soil (ug/kg)	Water (ug/L)	Soil (ug/kg)
Semivolatile Organics					
1,2,4-Trichlorobenzene	8270C	10	330	5	
1,2-Dichlorobenzene	8270C	10	330	3	
1,3-Dichlorobenzene	8270C	10	330	3	
1,4-Dichlorobenzene	8270C	10	330	3	
2,2'-oxybis(1-chloropropane)	8270C	10	330	5	
2,4,5-Trichlorophenol	8270C	25	330	1	
2,4,6-Trichlorophenol	8270C	10	330	1	
2,4-Dichlorophenol	8270C	10	330	1	
2,4-Dimethylphenol	8270C	10	330	1	
2,4-Dinitrophenol	8270C	25	330	1	
2,4-Dinitrotoluene	8270C	10	330	5	
2,6-Dinitrotoluene	8270C	10	330	5	
2-Chloronaphthalene	8270C	10	330		
2-Chlorophenol	8270C	10	330	1	
2-methyl-4,6-Dinitrophenol	8270C	25	330		
2-Methylnaphthalene	8270C	10	330		
2-Methylphenol	8270C	10	330	1	330
2-Nitrolaniline	8270C	25	330	5	
2-Nitrophenol	8270C	10	330	1	
3,3'-Dichlorobenzidine	8270C	10	330	5	
3-Nitroaniline	8270C	25	330	5	
4-Bromophenyl-phenyl ether	8270C	10	330		
4-Chloro-3-methylphenol	8270C	10	330		
4-Chloroaniline	8270C	10	330	5	
4-Chlorophenyl-phenyl ether	8270C	10	330		
4-Methylphenol	8270C	10	330	1	330
4-Nitroaniline	8270C	25	330	5	
4-Nitrophenol	8270C	25	330	1	
Acenaphthene	8270C	10	330		20000
Acenaphthylene	8270C	10	330		100000
Anthracene	8270C	10	330		100000
Benzo(a)anthracene	8270C	10	330		
Benzo(a)pyrene	8270C	10	330		1000
Benzo(b)fluoranthene	8270C	10	330		1000
Benzo(g,h,i)perylene	8270C	10	330		100000
Benzo(k)fluoranthene	8270C	10	330		800
bis(2-Chloroethoxy) methane	8270C	10	330	5	
bis(2-Chloroethyl) ether	8270C	10	330	1	
bis(2-ethylhexyl)phthalate	8270C	10	330	5	
Butylbenzylphthalate	8270C	10	330		
Carbazole	8270C	10	330		
Chrysene	8270C	10	330		1000
Di-n-butylphthalate	8270C	10	330	50	
Di-n-octylphthalate	8270C	10	330		
Dibenz(a,h)anthracene	8270C	10	330		330
Dibenzofuran	8270C	10	330		7000
Diethylphthalate	8270C	10	330		
Dimethylphthalate	8270C	10	330		
Fluoranthene	8270C	10	330		100000
Fluorene	8270C	10	330		30000
Hexachlorobenzene	8270C	NA (8081A)	330		330
Hexachlorobutadiene	8270C	10	330	0.5	
Hexachlorocyclopentadiene	8270C	10	330	5	
Hexachloroethane	8270C	10	330	5	
Indeno(1,2,3-cd)pyrene	8270C	10	330		500
Isophorone	8270C	10	330		
N-Nitroso-di-n-propylamine	8270C	10	330		
N-nitrosodiphenylamine	8270C	10	330		
Naphthalene	8270C	10	330		12000
Nitrobenzene	8270C	10	330	0.4	
Pentachlorophenol	8270C	25	330	1	800
Phenanthrene	8270C	10	330		100000
Phenol	8270C	10	330	1	330
Pyrene	8270C	10	330		100000

Analysis/Compound	Method	Quantitation Limits Water (ug/L)	Soil (ug/Kg)	State of New York Standards or Guidance Values Water (ug/L) [(a)]	Soil (ug/Kg) [(b)]
PCBs (Aroclors)					
Aroclor-1016	8082	0.50	16.7		
Aroclor-1221	8082	0.50	16.7		
Aroclor-1232	8082	0.50	16.7		
Aroclor-1242	8082	0.50	16.7		
Aroclor-1248	8082	0.50	16.7		
Aroclor-1254	8082	0.50	16.7		
Aroclor-1260	8082	0.50	16.7		

Analysis/Compound	Method	Estimated Quantitation Limits Water (mg/L)	Soil (mg/kg)	State of New York Standards or Guidance Values Water (mg/L)	Soil (mg/kg)
Metals					
Antimony	6010B	0.006	15	0.003	
Arsenic	6010B	0.01	2.0	0.025	13000
Barium	6010B	0.01	0.50	1	350000
Beryllium	6010B	0.005	0.20	0.003	7200
Cadmium	6010B	0.005	0.20	0.005	2500
Chromium	6010B	0.01	0.50	0.05	30000
Copper	6010B	0.03	1.0	0.2	50000
Lead	6010B	0.01	1.0	0.025	63000
Mercury	7470A/7471A	0.0002	0.02	0.0007	180
Nickel	6010B	0.04	0.50	0.1	30000
Selenium	6010B	0.01	4.0	0.01	30000
Silver	6010B	0.01	0.50	0.05	2000
Thallium	6010B	0.006	6.0	0.0005	
Zinc	6010B	0.02	2.0	2	109000
Vanadium	6010B	0.05	0.50	0.0005	
Cobalt	6010B	0.05	0.50		
Aluminum	6010B	0.20	10		
Calcium	6010B	5.0	50		
Iron	6010B	0.10	10	0.3	
Magnesium	6010B	5.0	20	35	
Manganese	6010B	0.015	0.20	0.3	
Potassium	6010B	5.0	30		
Sodium	6010B	5.0	140	20	
Cyanide	9012A	0.010	1.0	200	27000

Notes:
N/A - Not Applicable
(a) - Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC, October 1993
(b) - Determination of Soil Cleanup Objectives - NYSDEC Part 375-6, Remedial Program, December 14, 2006

Table 7-2
TCLP
Practical Quantitation Limits (PQLs)

TCLP VOLATILE	SW-846 Analysis	Water (ug/L)
Benzene	8260B	5
Carbon Tetrachloride	8260B	5
Chloroform	8260B	5
1,2-Dichlorethane	8260B	5
1,1-Dichloroethene	8260B	5
2-Butanone	8260B	100
Tetrachloroethene	8260B	5
Trichloroethene	8260B	5
Vinyl Chloride	8260B	100

TCLP SEMIVOLATILE	SW-846 Analysis	Water (ug/L)
2-Methylphenol	3510 / 8270C	10
3 & 4-Methylphenol	3510 / 8270C	10
1,4-Dichlorobenzene	3510 / 8270C	10
2,4-Dinitrotoluene	3510 / 8270C	10
Hexachlorobutadiene	3510 / 8270C	10
Hexachloroethane	3510 / 8270C	10
Hexachlorobenzene	3510 / 8270C	10
Nitrobenzene	3510 / 8270C	10
Pentachlorophenol	3510 / 8270C	50
Pyridine	3510 / 8270C	ND
2,4,5-Trichlorophenol	3510 / 8270C	10
2,4,6-Trichlorophenol	3510 / 8270C	10

TCLP METALS	SW-846 Analysis	Water (mg/L)
Arsenic	3010 / 6010	0.05
Barium	3010 / 6010	0.002
Cadmium	3010 / 6010	0.004
Chromium	3010 / 6010	0.007
Lead	3010 / 6010	0.04
Selenium	3010 / 6010	0.07
Silver	7760 / 6010	0.007
Mercury	7470	0.0002

ND - Not Determined

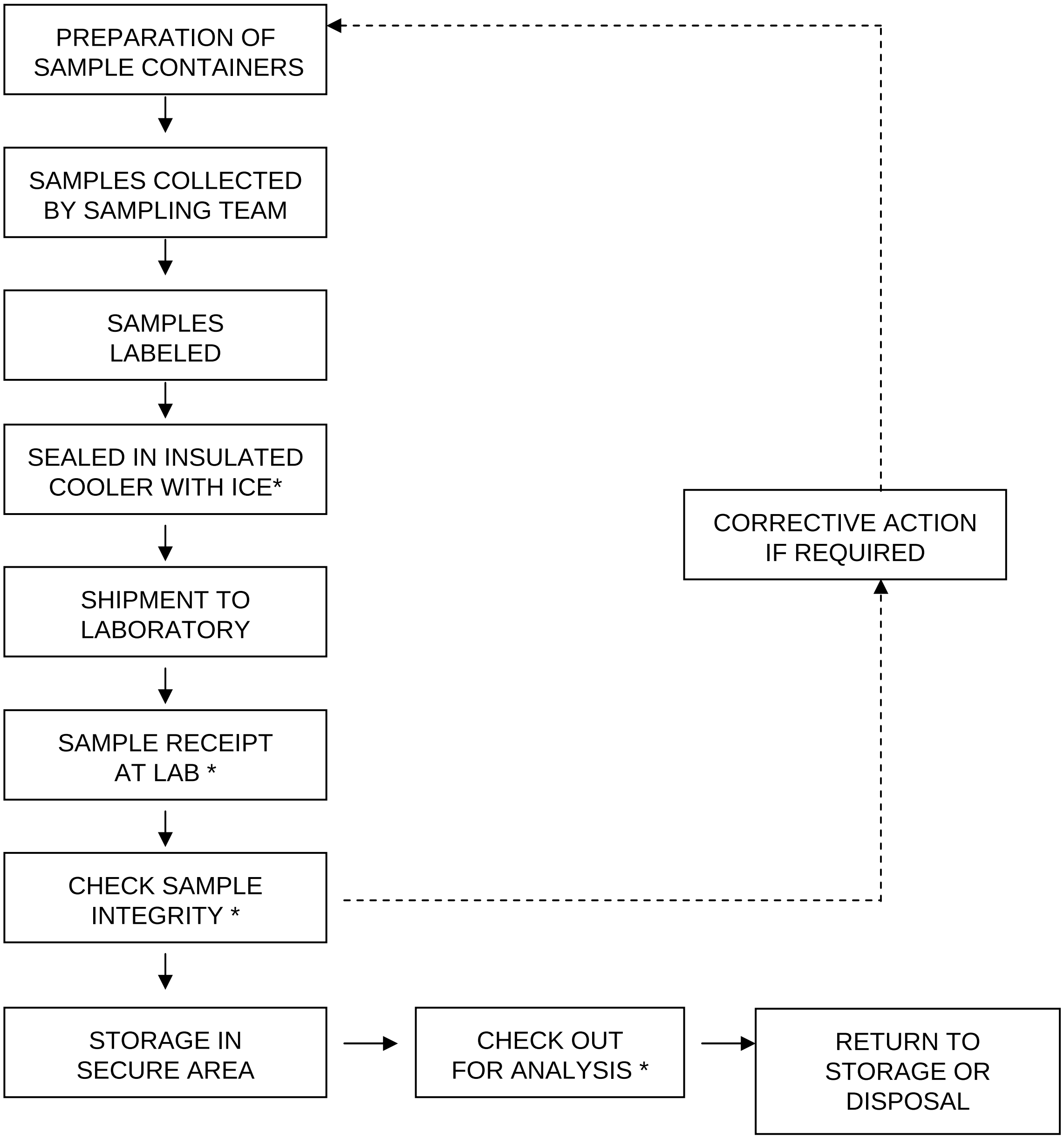
Table 8-1
Field and Character Lengths for Disk Deliverable

Description	Length	Format
Field Sample ID (as shown on COC)	15	Character
CAS. No. (including -'s)	10	Character
Parameter Name	31	Character
Concentration	13	Numeric
Qualifier	4	Character
Units	8	Character
SDG	8	Character
Lab Sample ID	15	Character
Date Sampled (from COC)	D	Date
Matrix (soil/water/air)	5	Character
Method Detection Limit	13	Numeric
Method Code	8	Character
Lab Code	6	Character

Figures

Figure 5-1

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5-2

Chain of Custody Record

№ 0476

The RETEC Group, Inc.
1001 W. Seneca Street, Suite 204 • Ithaca, NY 14850-3342
(607) 277-5716 Phone • (607) 277-9057 Fax
www.retec.com

RETEC

Project Name:	Project Number:
Send Report To:	Sampler (Print Name):
Address:	Sampler (Print Name):
	Shipment Method:
	Airbill Number:
Phone:	Laboratory Receiving:
Fax:	

Page ____ of ____

Purchase Order #:______________________

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Analysis Requested											Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround
Level I ☐	Routine ☐
Level II ☐	24 Hour ☐
Level III ☐	1 Week ☐
Other ☐	Other ______

Sample Receipt	
Total # Containers Received?	
COC Seals Present?	
COC Seals Intact?	
Received Containers Intact?	
Temperature?	

White: Lab Copy   Yellow: PM Copy   Pink: Field Copy   Gold: PM/QA/QC Copy

Figure 12-1 Corrective Action Request

CORRECTIVE ACTION REQUEST

Number: ___________________________ Date: _____________

TO: ____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _______________

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

___________	______	___________	_________	____________	_________
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: ______________________________ DATE:______________

ENSR | AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix F

Community Air Monitoring Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

The RETEC Group, Inc.
August 22, 2007
Document No.: 04964-025

Merged with ENSR in 2007
RETEC

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix F

Community Air Monitoring Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

James H. Edwards
Prepared By: James H. Edwards, Geologist

Bruce D. Coulombe
Reviewed By: Bruce D. Coulombe, P.G., Senior Hydrogeologist

The RETEC Group, Inc.
August 22, 2007
Document No.: 04964-025

Contents

List of Appendices

List of Tables

List of Figures

1.0 Introduction

This document presents the Community Air Monitoring Plan (CAMP) that will be implemented during the Remedial Investigation (RI) of the New York State Electric and Gas Corporation (NYSEG) former manufactured gas plant (MGP) site, located on Park Street in the Village of Palmyra, New York. The location and layout of the site is shown on Figure 1.

The Palmyra former MGP site is located in a commercial and residential neighborhood. This CAMP presents methods and procedures that will be used to provide protection to potential receptors by assuring that the investigation work activities do not spread constituents off site through the air.

This CAMP specifically applies to the RI phase of work for the Palmyra MGP site. The RI fieldwork is scheduled to be performed in the fall of 2007, as described in the document "*Remedial Investigation Work Plan, Palmyra MGP Site, Village of Palmyra, New York*", dated August 21, 2007.

The RI fieldwork involves the completion of test trenches, subsurface soil borings, the installation of monitoring wells, the collection of soil and groundwater samples, and the hand probing and collection of sediments in an adjacent creek.

The objectives of this CAMP are to:

- Ensure that the airborne concentrations of constituents of concern (COC) are minimized to protect human health and the environment;
- Provide an early warning system so that potential emissions can be controlled on site at the source; and
- Measure and document the concentrations of airborne COC to confirm compliance with regulatory limits.

The community air monitoring will be performed around the site perimeter, and will measure the concentrations of organic vapors and dust during all ground-intrusive activities (test trenching and soil boring and well installations).

This CAMP is a companion document to RETEC's site-specific Health and Safety Plan (HASP). The HASP is a separate document and is directed primarily toward protection of on-site workers within the designated work zones.

2.0 Constituents of concern and action levels

The Palmyra former MGP site is known to have tar impacts dating from the site's historical use as a MGP. As such, the COC are volatile and semi-volatile organic compounds (VOCs and SVOCs). The primary VOCs of concern are benzene, ethylbenzene, toluene, and xylene (the BTEX compounds). VOCs are more volatile than SVOCs and are generally of greater concern when monitoring the air quality during MGP site investigations.

Airborne dust is also a concern and must be monitored and controlled due to its ability to co-transport adsorbed constituents and because of its nuisance properties.

Odors, though not necessarily indicative of high constituent concentrations, could create a nuisance and will be monitored and controlled to the extent practicable.

State and federal regulatory agencies have provided action levels for many of these constituents. The action levels are the allowable airborne concentrations above which respiratory protection or other health and safety controls are required. For work at the Palmyra former MGP site, the following levels should not be exceeded for more than 15 consecutive minutes at the downwind perimeter of the site:

Benzene	1 part per million (ppm).
Total VOCs	5 ppm.
Dust	150 micrograms per cubic meter ($\mu g/m^3$).

The action levels cited here are above (in addition to) the background ambient (upwind) concentration.

3.0 Air monitoring equipment and methods

Air quality monitoring will be performed for total VOCs, benzene, and dust as outlined below.

Two perimeter locations will be established each day and an air monitoring technician will check the instrumentation at each of these locations frequently during the work. Typically there will be monitoring locations at one upwind site perimeter location and one downwind perimeter location. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Field personnel will be prepared to monitor multiple locations in the event that there is little wind or if the wind direction changes frequently.

The monitoring instruments will be calibrated at the start of each workday, and again during the day if the performance of an instrument is in question.

3.1 VOC and Benzene monitoring

3.1.1 Ambient air monitoring

VOC monitoring will be performed using three field photo-ionization detectors (PIDs) (RAE Systems MiniRAE(TM) or equivalent). The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. The PIDs will be equipped with an audible alarm to indicate an exceedance of the action level.

If requested by the New York State Department of Environmental Conservation (NYSDEC) on-site, 15-minute running average concentrations may be calculated, which can then be compared to the action levels. If real-time measurements of total VOCs indicate that the action level is exceeded, then the benzene concentration will also be determined at that location using benzene-specific colorimetric tubes.

PID measurements will be made at one upwind and one downwind location around the work area. The locations of the instruments may be changed during the day to adapt to changing wind directions.

3.2 Particulate (dust) monitoring

Particulate (dust) monitoring will be performed during any drilling activity at the site. Two particulate monitors (TSI DustTrak(TM) or equivalent) will be used for continuous real-time dust monitoring. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. If requested by the on-site NYSDEC representative, a 15-minute average concentration may be determined.

In addition, fugitive dust migration will be visually assessed during all work activities, and the observations recorded.

Measurements will be made at one upwind and one downwind location around the work area. The locations of the instruments may be changed during the day to adapt to changing wind directions.

4.0 Emission control plan

4.1 Ambient air

Odor, vapor, and dust control will be required for this project due to the close proximity to residential and commercial buildings, public roadways, and sidewalks. The attached Table 1 provides a response chart for the monitoring and control of vapor emissions. Table 2 provides a list of emergency contacts.

If the concentration of total VOCs at the site perimeter exceeds 5 ppm (or the benzene level exceeds 1 ppm) above background over a 15-minute period, then work activities will be temporarily halted. If the total VOC level then decreases below 5 ppm (and the benzene level drops below 1 ppm) over background, work activities will resume. If the total VOC levels at the site perimeter persist at levels in excess of 5 ppm (or the benzene level persists over 1 ppm) over background, work activities will be halted, the source of the vapors identified, and corrective actions taken to abate the emissions until the concentrations drop below the action levels.

Site perimeter dust concentrations will also be monitored continuously. In addition, dust migration will be visually assessed during all work activities. If the downwind dust level is 150 $\mu g/m^3$ greater than the background level for a 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind dust levels do not exceed 150 $\mu g/m^3$ above the background level and provided that no visible dust is migrating from the work area.

Typical emission control measures may include:

- Apply water for dust suppression;
- Relocate operations, if applicable; and
- Reassess the existing control measures.

Table 1 Vapor emission response chart

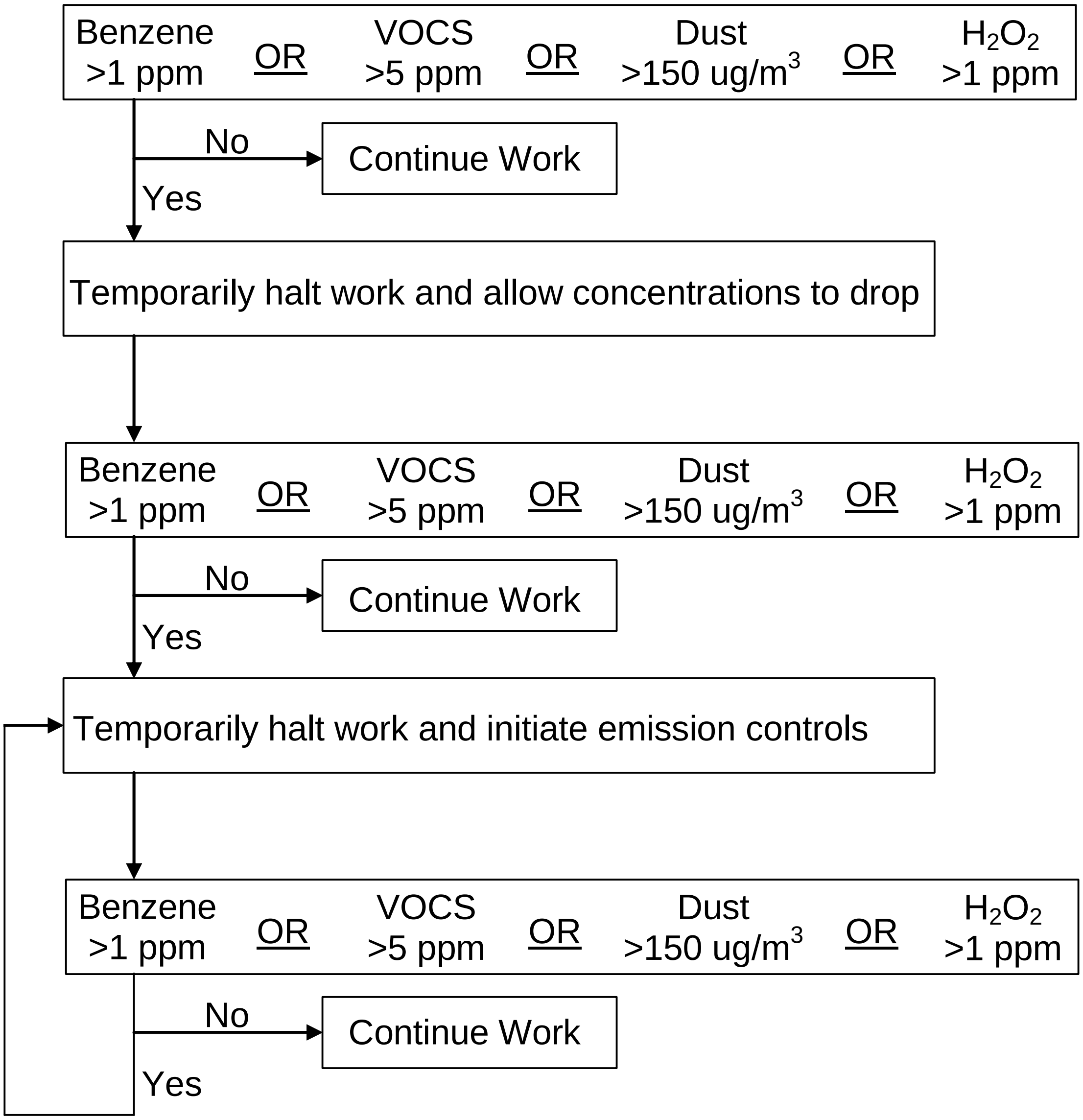


Table 2 Emergency contacts and telephone numbers

Fire:	911	
Police:	911	
Ambulance:	911	
ENSR/RETEC Contacts	James Edwards Bruce Coulombe Jesse Lloyd	(607) 351-2316 (cellular) (607) 351-9545 (cellular) (607) 351-9543 (cellular)
NYSEG Contact	John Ruspantini	(607) 762-8787

5.0 Odor control procedures

This section outlines the procedures to be used to control odors that may be generated during the RI field activities. The investigation program will be conducted using two principal remedial investigation techniques that may generate odors: test pit excavations and subsurface soil borings. The remainder of this section is intended to provide site managers, representatives of NYSDEC and NYSDOH, and the public with information summarizing typical odor control options, and to provide some guidance for their implementation. A description of potential sources of odors and methods to be used for odor control is presented in the following sections.

5.1 Potential sources of odors

Generally, the residuals encountered at former MGP sites are well defined. They are related to residual coal tar-like materials and petroleum, and principally contain VOCs, polynuclear aromatic hydrocarbons (PAHs), and a number of inorganic constituents, including metal-complexed cyanide compounds, and metals. Constituents of MGP tar or petroleum products can produce odor emissions during investigation activities when they are unearthed during backhoe test pits and soil borings. When this occurs, VOCs and light-end SVOCs can volatilize into the ambient air. Some MGP residuals can cause distinctive odors that are similar to mothballs, roofing tar, or asphalt driveway sealer. However, the constituent concentrations generally associated with these odors are typically significantly less than levels that might pose a potential health risk. It is important to note that the CAMP will provide for continual monitoring of VOCs and dust during the fieldwork to monitor for any potential release of constituents which may pose a threat to health.

5.2 Odor monitoring

The field investigation personnel will record observations of odors generated during the implementation of the Work Plan. When odors attributable to the uncovering of impacted media are generated in the work area during intrusive activities such as soil borings or excavation of test pits, observations will also be made at the down-wind limit of the MGP site, in order to assess the potential for off-site odors. The down-wind odor monitoring will be performed in conjunction with the PID and dust monitoring program described in this CAMP.

Upon detection of odors at the site perimeter, site controls, starting in the work area, will be implemented. The site controls described in the following sections will be used to assist with odor mitigation. Note that the goal of the Odor Mitigation Plan is to minimize and to prevent, where practicable, the off-site migration of odors. Due to the short distances between any work area at the site and the property line, site controls will be implemented proactively when odors are detected in the breathing zone at any work area.

5.3 General site controls

Several general excavation or drilling procedure site controls that will be implemented include:

- Every effort will be made to minimize the amount of time that impacted material is exposed to ambient air at the site.
- For the test pit excavations, it may be possible to move some amount of soil around within the footprint of the test pit excavation in order to minimize the amount of soil removal and subsequent stockpiling of impacted soil at the ground surface. The use of in-excavation stockpiling of test pit soil will be evaluated on a case-by-case basis, and will only be performed with the approval of the NYSDEC field representative, and will be completed only if it does not impede the collection of subsurface soils or the full delineation of the subsurface features being investigated.

- Drill cuttings from the hollow-stem auger borings will be containerized as soon as possible during completion of each soil boring.
- Loading of excavated debris or soil that has been found by the site manager to be unsuitable material to return to test pits may generate odors. Every effort will be made to complete this work as quickly as possible and to keep these materials covered at all times.
- Meteorological conditions are also a factor in the generation and migration of odors. Some site activities may be limited to times when specific meteorological conditions prevail, such as when winds are blowing away from a specific receptor.

5.4 Secondary site controls

If substantial odors still present an issue following implementation of the above procedures, secondary controls will be enacted. The site manager will work through the applicable list of secondary controls until the perimeter odor issues are resolved. The site manager will work closely with NYSEG and NYSDEC during this task. Final selection of controls will be dependent on field conditions encountered. Secondary controls include the following:

- For stockpiled impacted soil, temporary tarps or polyethylene covers will be used to control odors.
- The placement of portable barriers close to small active source areas (test pits) can elevate the discharge point of emissions to facilitate dispersion and minimize the effect on downwind receptors. The barriers can be constructed using materials such as plastic “Jersey barriers”, or fence poles and visual barrier fabric/plastic. The barriers are placed as temporary two or three-sided structures around active test pit or other intrusive investigation areas, oriented such that the barriers are placed on the upwind and downwind sides of the source. If only one side of the source can be accessed, then the barrier should be placed on the downwind side.
- Two agents that can be sprayed over impacted soil have been determined to be effective in controlling emissions. They include odor suppressant solution (BioSolve™), and hydro mulch. These agents may be used where tarps cannot be effectively deployed over the source material, or where tarps are ineffective in controlling odors:
    - BioSolve™ can provide immediate, localized control of odor emissions. Information regarding the preparation and use of BioSolve™ is provided in Appendix A.
    - Hydromulch - Although it is unlikely that it will be necessary, modified hydromulch slurry may be used to cover inactive sources for extended periods of time (up to several days). The hydromulch, typically cellulose fibers (HydroSeal®) is modified by mixing a tackifier (glue) with the mulch and water to form a slurry. It is applied using a standard hydroseed applicator to a thickness of ¼ inch. The material forms a sticky, cohesive, and somewhat flexible cover. Reapplication may be necessary if the applied layer becomes desiccated or begins to crack.

5.5 Record keeping and communication

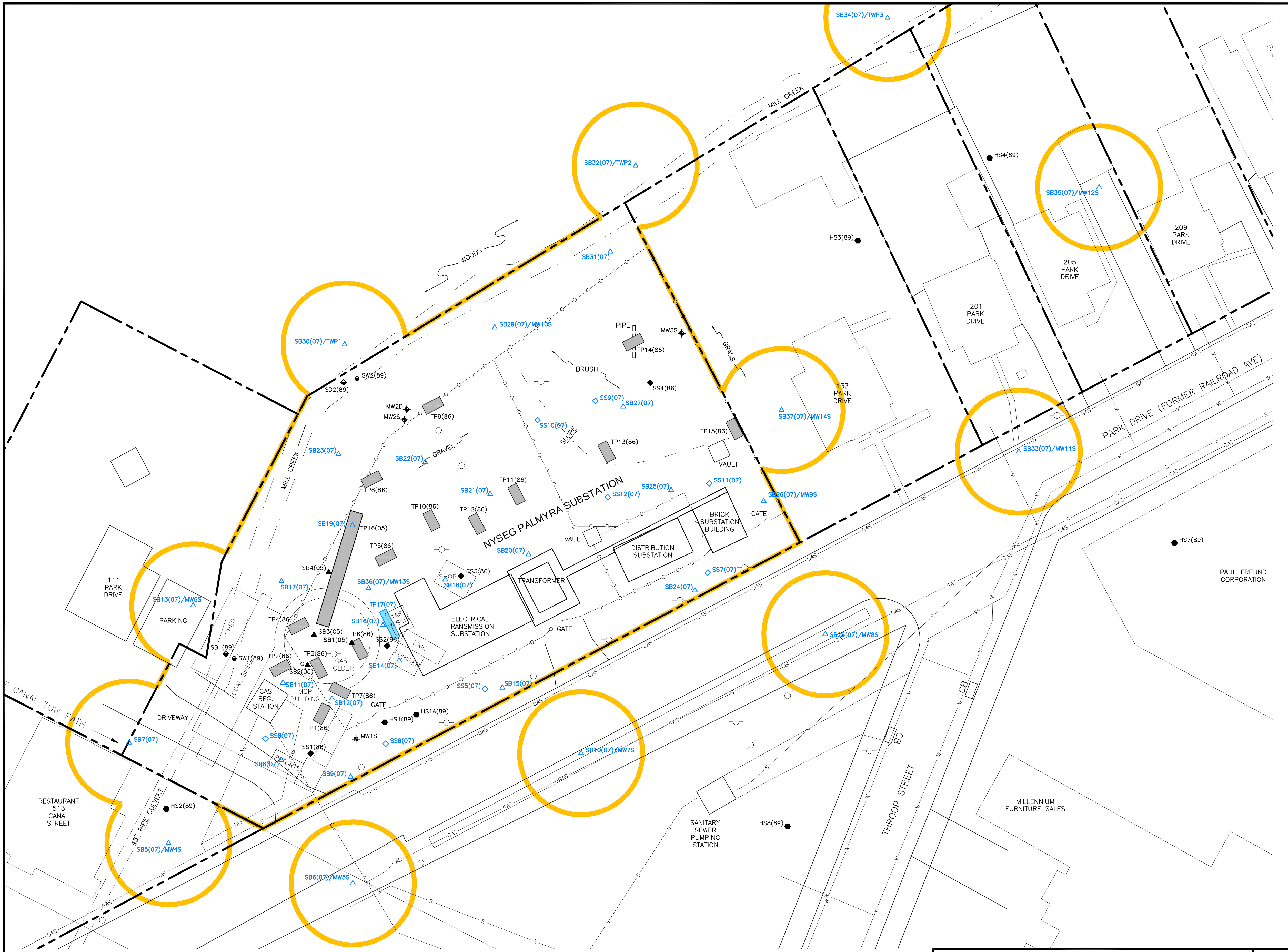
Similar to readings recorded during the monitoring specified in the CAMP, all odor monitoring results will be recorded in the field log book or other air monitoring forms, and be available for review by the agencies.

The site supervisor will also provide information on odor monitoring and odor management to residents of the neighborhood should they inquire. In the event that odors persist after these efforts, work will be temporarily discontinued until a mutually agreeable solution with NYSEG, NYSDEC, and NYSDOH staff can be worked out which allows the work to be completed while minimizing the off-site transport of nuisance odors.

6.0 Documentation and reporting

Data generated during perimeter air monitoring will be recorded in field logs and summarized daily in spreadsheets. The electronic measurements from the PIDs and dust meters will be downloaded each day, reviewed, and archived. Exceedances of the action levels, if any, and the actions to be taken to mitigate the situations, will be discussed immediately with the on-site representatives. Summaries of all air monitoring data will be provided to the NYSDEC or the NYSDOH as requested.

Figures



LEGEND

━━━	CURRENT STRUCTURE
- - - -	APPROXIMATE HISTORIC STRUCTURE
━ ━ ━	APPROXIMATE PROPERTY LINE
-o-o-o-	FENCE
—GAS—	APPROXIMATE GAS LINE
—W—	APPROXIMATE WATER LINE
—S—	APPROXIMATE SEWER LINE
▭ TP8(86)	PREVIOUS TEST PIT LOCATION
⬢ HS1(89)	PREVIOUS GROUNDWATER SCREENING SAMPLE LOCATION
▲ SB1(05)	PREVIOUS SOIL BORING LOCATION
⌖ MW2S	EXISTING MONITORING WELL LOCATION
● SW2(89)	PREVIOUS SURFACE WATER SAMPLE LOCATION
◆ SS3(86)	PREVIOUS SURFACE SOIL SAMPLE
◆ SD2(89)	PREVIOUS SEDIMENT SAMPLE LOCATION
△ SB26(07)/MW9S	PROPOSED SOIL BORING WITH MONITORING WELL LOCATION
△ SB9(07)	PROPOSED SOIL BORING LOCATION
◇ SS7(07)	PROPOSED SURFACE SOIL SAMPLE LOCATION
🟦 TP17(07)	PROPOSED TEST PIT LOCATION
━━━	INVESTIGATION WORK ZONE FOR CAMP MONITORING

20 0 40

1"=40'

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NOTE:
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PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

SITE MAP AND WORK AREAS

DATE: 8/14/07
DRWN: MAW/BIL

FIGURE 1

File: J:\04964025\CAM_PLAN.dwg Layout: ANSL_BI-LJ User: mwilliamson Plotted: Aug 14, 2007 - 10:34am Xref's:

Appendix A

Vapor suppression information

...Is Making A Difference!

VAPOR SUPPRESSION / ODOR CONTROL

BioSolve® offers a relatively simple and cost effective method of suppressing Odors and VOC release from soils, during excavation, loading, stockpiling, etc. The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% BSW solution (1 part **BioSolve**® concentrate to 33 parts water) will be adequate to keep vapor emissions within acceptable limits and control fugitive odor problems on contact. Although, some sites may only require a 2% solution, up to a 6% solution may be recommended on sites with elevated levels or particularly difficult/ mixed stream contaminants are present.

The **BioSolve**® solution should be applied evenly to the soil surface in sufficient quantity to saturate the surface area. As a general rule, use 1-3 litres of **BioSolve**® solution to 1 square metre of surface area. (1 gallon of **BioSolve**® per solution will cover approximately 4-sq. yd. of soil surface area) **BioSolve**® is a water-based surfactant that will apply like water.

BioSolve®, in its concentrated form, is a viscous liquid material that must be diluted with water. A fluorescent red tracing dye is present in the formula allowing **BioSolve**® to be detected during application. Once diluted, **BioSolve**® can be applied with virtually any equipment that can spray water. **BioSolve**® will not harm equipment or clog pipes. For large sites, applicators such as water truck, portable agricultural sprayers, foam inductors & pressure sprayers can be used. For smaller jobs, garden sprayers, water extinguishers or a garden hose with a fertiliser attachment on the nozzle can be used effectively. This characteristic makes **BioSolve**® very adaptable and much most convenient to use in almost any situation. **BioSolve**® is equally effective when used with all types of water (soft, hard, salt or potable).

On stockpiled soil or other soil that will be left undisturbed, a single application of **BioSolve**® to the exposed surfaces may last up to 10 to 14 days or more (depending on environmental conditions). **BioSolve®,** when applied, will form a "cap" of clean soil. If the soil is not disturbed, via weather, movement, etc. this "cap" will remain functional. During excavation, loading or other movement of the soil, it may be required to spray an additional amount of **BioSolve®** to the freshly exposed surface area to keep emissions at an acceptable level.

In case of an extremely high level of emissions, or if the soil is heavily contaminated, it may be necessary to increase the strength of the **BioSolve®** solution or apply more solution per square metre to reduce emissions adequately. It is important that the site be monitored regularly and that the **BioSolve**® solution be reapplied if and when necessary to insure that VOC emissions and odors remain under control.

BioSolve® is packaged and readily available in 55 gallon (208 liter) drums, 5 gallon (19 liter) pails and in 4X1 gallon (3.8 liter X 4) cases. Contact The Westford Chemical Corporation® Toll Free @ 1-800-225-3909, via e-mail at info@biosolve.com or your Local BioSolve distributor for pricing.

BioSolve® should only be used in accordance with all regulatory rules and regulations.

This material is made available or use by professionals or persons having technical skill to be used at the own discretion and risk. These protocols are guidelines only and may need to be modified to site specific conditions. Nothing included herein is a warrantee or to be taken as a license to use **BioSolve** without the proper permits, approvals, etc. of the appropriate regulatory agencies, nor are the protocols provided as instructions for any specific application of **BioSolve**.

SOIL VAPOR SUPPRESSION UTILIZING BIOSOLVE

BioSolve is being utilized by numerous environmental consultants, response contractors, and fire departments to suppress VOC's & LEL's as well as problem odors. BioSolve encapsulates the source of the vapor rather than temporarily blanketing it like a foam or other physical barrier. Vapor reduction is so fast and effective that BioSolve is used to comply with the tough emission standards regulated by each State.

BioSolve offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling… The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% solution of BioSolve will be adequate to keep vapor emissions within acceptable limits. Dilute BioSolve concentrate with water at a ratio of 1 part BioSolve to 33 parts water to make a 3% solution.

The BioSolve solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well, (as a general rule, 1 gallon of BioSolve solution will cover approximately 4 sq. yd. of soil surface area). BioSolve is not a foam, it is a surfactant based product that will apply like water. The solution may be applied with a hand sprayer, high pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the BioSolve solution (6%) or apply more per sq. yd. to reduce emissions adequately. On stockpiled soil or other soil that will be undisturbed, a single application of BioSolve to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable levels.It is important that the site be monitored regularly and the BioSolve solution be reapplied if/when necessary to insure that vapor emissions remain at or below acceptable standards.

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION®
P.O. Box 798
Westford, Massachusetts 01886 USA

Ref. No.: 2001
Date: 1/1/2002

Phone: (978) 392-0689
Phone: (508) 878-5895
Emergency Phone-24 Hours: 1-800-225-3909

Fax: (978) 692-3487
Web Site: http://www.BioSolve.com
E-Mail: info@BioSolve.com

SECTION I - IDENTITY

Name:	**BioSolve®**
CAS #:	138757-63-8
Formula:	Proprietary
Chemical Family:	Water Based, Biodegradable, Wetting Agents & Surfactants
HMIS Code:	Health 1, Fire 0, Reactivity 0
HMIS Key:	4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant

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SECTION II - HAZARDOUS INGREDIENTS

Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000 require listing of hazardous ingredients.

This product does not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California's Prop. 65.

SECTION III - PHYSICAL - CHEMICAL CHARACTERISTICS

Boiling Point	: 265°F	Specific Gravity	: 1.00 +/-.01
Melting Point	: 32°F	Vapor Pressure mm/Hg	: Not Applicable
Surface Tension- 6% Solution	: 29.1 Dyne/cm at 25°C	Vapor Density Air = 1	: Not Applicable
Reactivity with Water	: No	Viscosity - Concentrate	: 490 Centipoise
Evaporation Rate	: >1 as compared to Water	Viscosity - 6% Solution	: 15 Centipoise
Appearance	: Clear Liquid unless Dyed	Solubility in Water	: Complete
Odor	: Pleasant Fragrance	pH	: 9.1+/-.3
Pounds per Gallon	: 8.38		

SECTION IV - FIRE AND EXPLOSION DATA

Special Fire Fighting Procedures	: None	Flammable Limit	: None
Unusual Fire and Explosion Hazards	: None	Auto Ignite Temperature	: None
Solvent for Clean-Up	: Water	Fire Extinguisher Media	: Not Applicable
Flash Point	: None		

SECTION V - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -
Small spills, in an undiluted form, contain. Soak up with absorbent materials.
Large spills, in an undiluted form, dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.
Waste Disposal Procedures -
Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

SECTION VI - HEALTH HAZARDS

Threshold Limit Values: Not applicable
Signs and Symptoms of Over Exposure-
Acute : Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.
Medical Conditions Generally Aggravated by Exposure: Unknown
Carcinogen: No
Emergency First Aid Procedures -
Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.
Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion: Get medical attention.
Inhalation: None considered necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection	: Not necessary	Local Exhaust Required	: No
Ventilation Required	: Normal	Protective Clothing	: Gloves, safety glasses Wash clothing before reuse.

SECTION VIII - PHYSICAL HAZARDS

Stability	: Stable	Incompatible Substances	: None Known
Polymerization	: No	Hazardous Decomposition Products	: None Known

---

SECTION IX - TRANSPORT & STORAGE

DOT Class	: Not Regulated/Non Hazardous		
Freeze Temperature	: 28°F	Storage	: 35°F-120°F
Freeze Harm	: None (thaw & stir)	Shelf Life	: Unlimited Unopened

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SECTION X - REGULATORY INFORMATION

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application, which is not described on the Product label or in this Material Safety Data Sheet, is the sole responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation and Massachusetts Right to Know Law.

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Appendix G

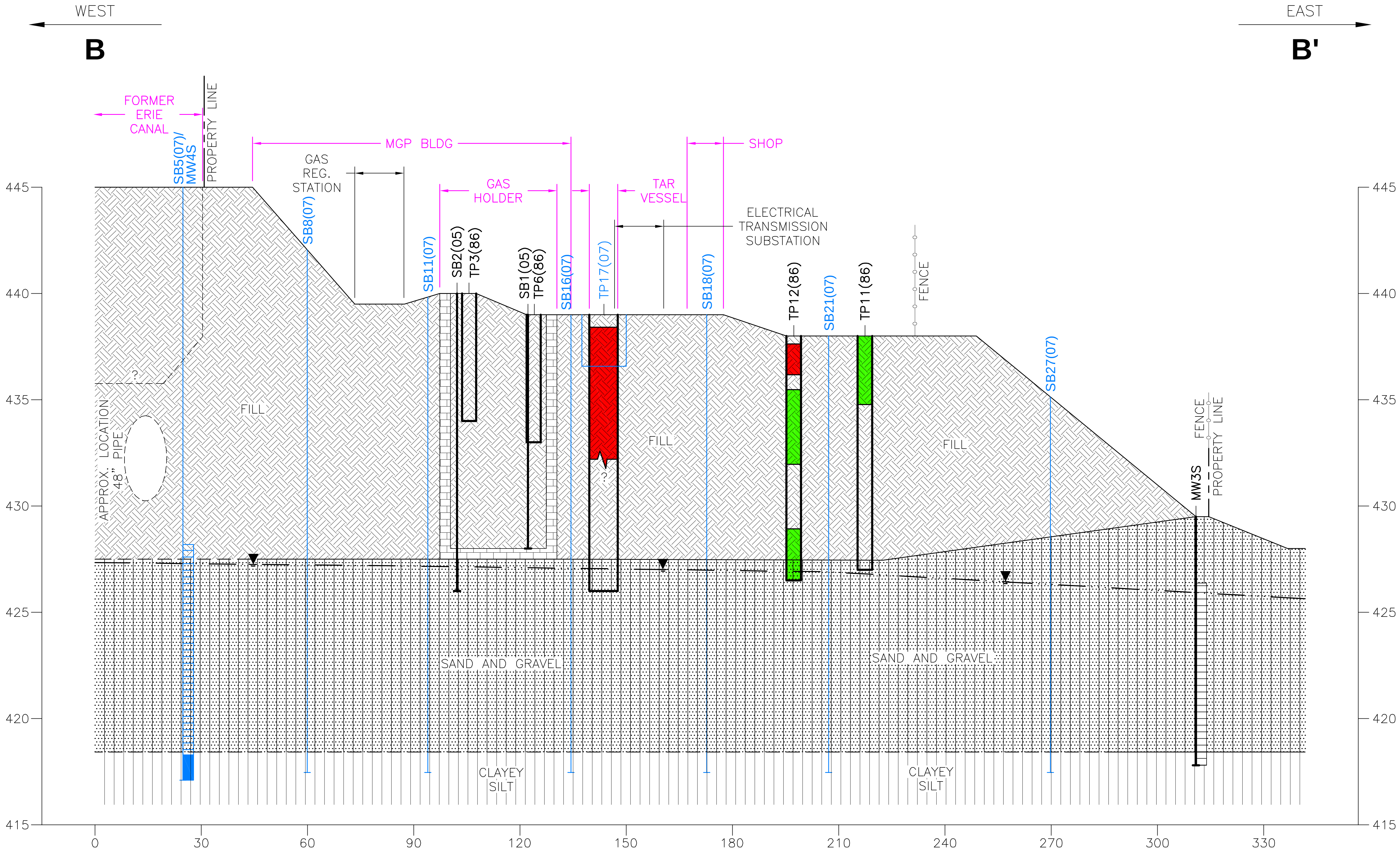
Site-Specific Health and Safety Plan

Remedial Investigation
Palmyra Former MGP Site
Palmyra, New York
NYSDEC Site No.: 8-59-022
Index #: D0-0002-9309

NOTE: HASP to be submitted to agencies prior to initiation of RI fieldwork.

The RETEC Group, Inc.
Document No.: 04964-025

Merged with ENSR in 2007
RETEC



LEGEND

OBSERVED
HYDROCARBON
IMPACTS

🟩 HEAVY COAL TAR STAIN, SHEEN OR NAPL BLEBS

🟥 COAL TAR OR COAL TAR/ NAPL SATURATED SOIL

▨ FILL

▯ CLAYEY SILT

░ SAND AND GRAVEL

| PREVIOUS SOIL BORING

| PROPOSED SUMP

| PROPOSED WELL

| PROPOSED SOIL BORING

|—| FORMER STRUCTURE LOCATION

—— DIRECT CONTACT

– – – INFERRED CONTACT

—▼— GROUNDWATER ELEVATION

▯ MONITORING WELL SCREEN

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=5'

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.

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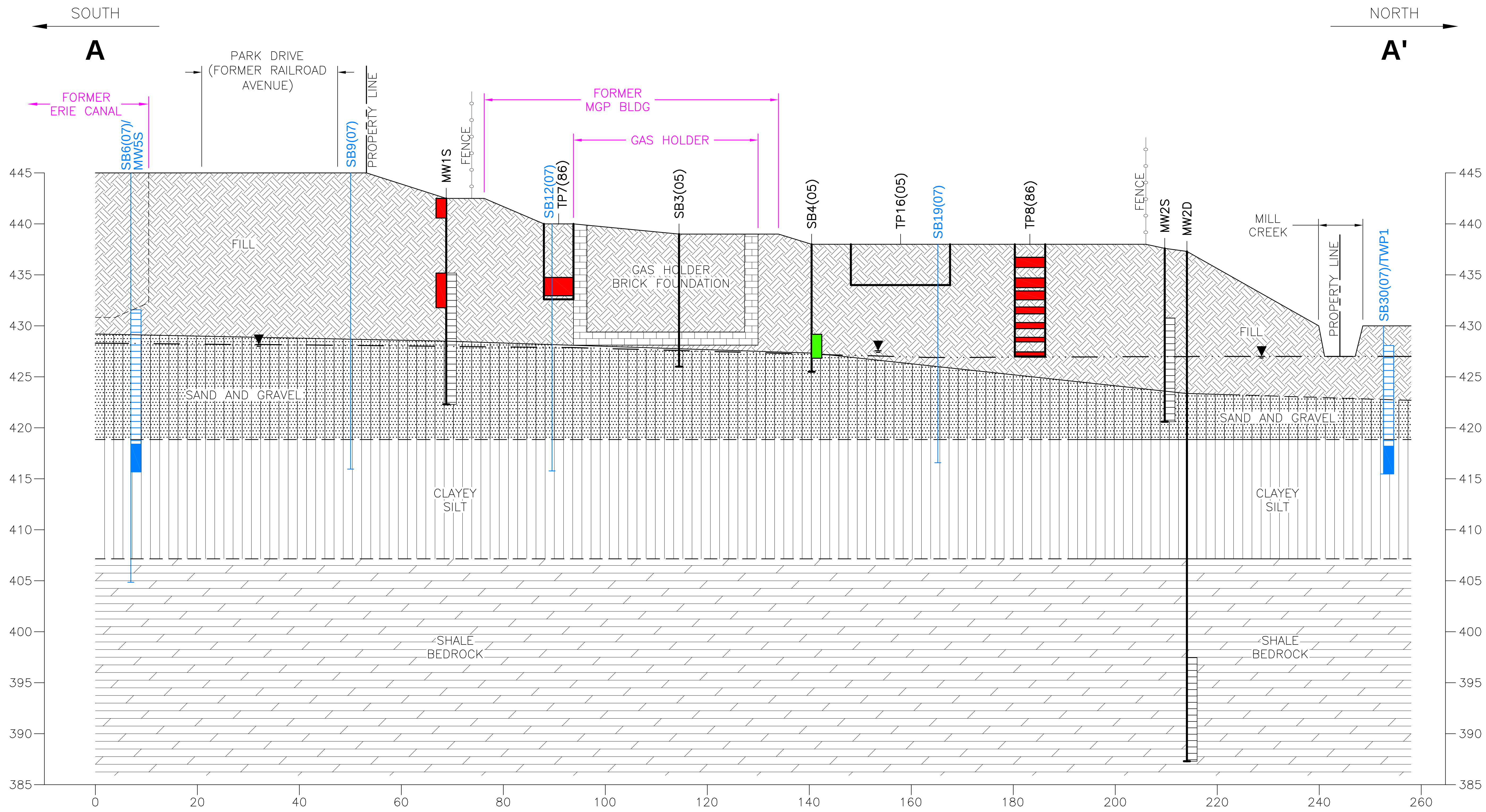
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

CROSS-SECTION B-B'

DATE: 8/09/07 DRWN: MAW/BIL

FIGURE 2-10

File: J:\04964025\SECTB-B.dwg Layout: ANSI_BI-LJ User: mwilliamson Plotted: Aug 09, 2007 - 3:57pm Xref's:



HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=10'

LEGEND

OBSERVED HYDROCARBON IMPACTS

- 🟩 HEAVY COAL TAR STAIN, SHEEN OR NAPL BLEBS
- 🟥 COAL TAR OR COAL TAR/ NAPL SATURATED SOIL
- ▼ GROUNDWATER ELEVATION
- MONITORING WELL SCREEN
- ▨ FILL
- CLAYEY SILT
- SAND AND GRAVEL
- PREVIOUS SOIL BORING
- PROPOSED SUMP
- PROPOSED WELL
- PROPOSED SOIL BORING
- FORMER STRUCTURE LOCATION
- DIRECT CONTACT
- INFERRED CONTACT

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.

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RETEC

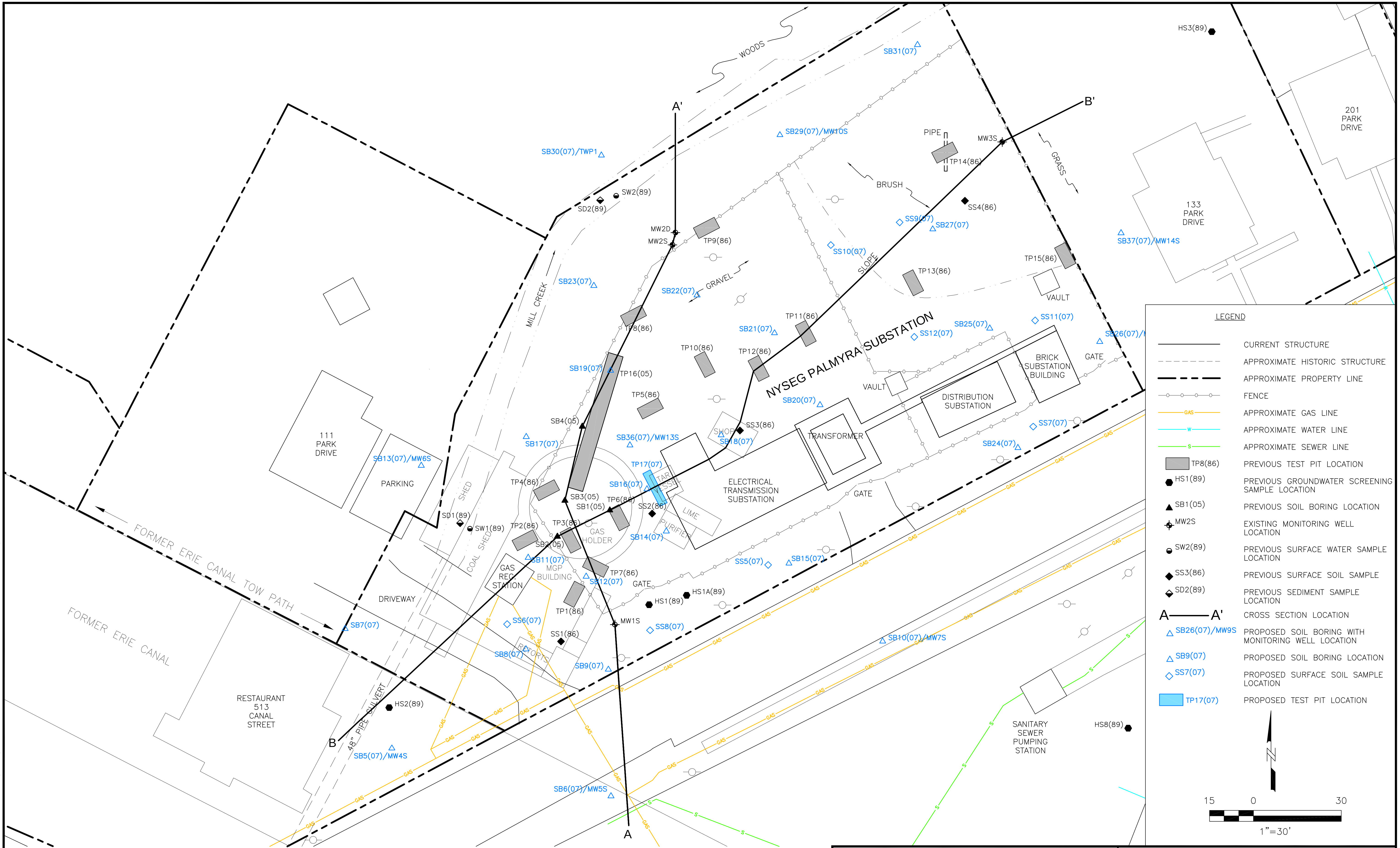
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

CROSS-SECTION A-A'

DATE: 08/07/07
DRWN: MAW/BIL

FIGURE 2-9

File: J:\04964025\SECTA-A.dwg Layout: ANSI_BI-LJ User: mwilliamson Plotted: Aug 09, 2007 - 3:54pm Xref's:



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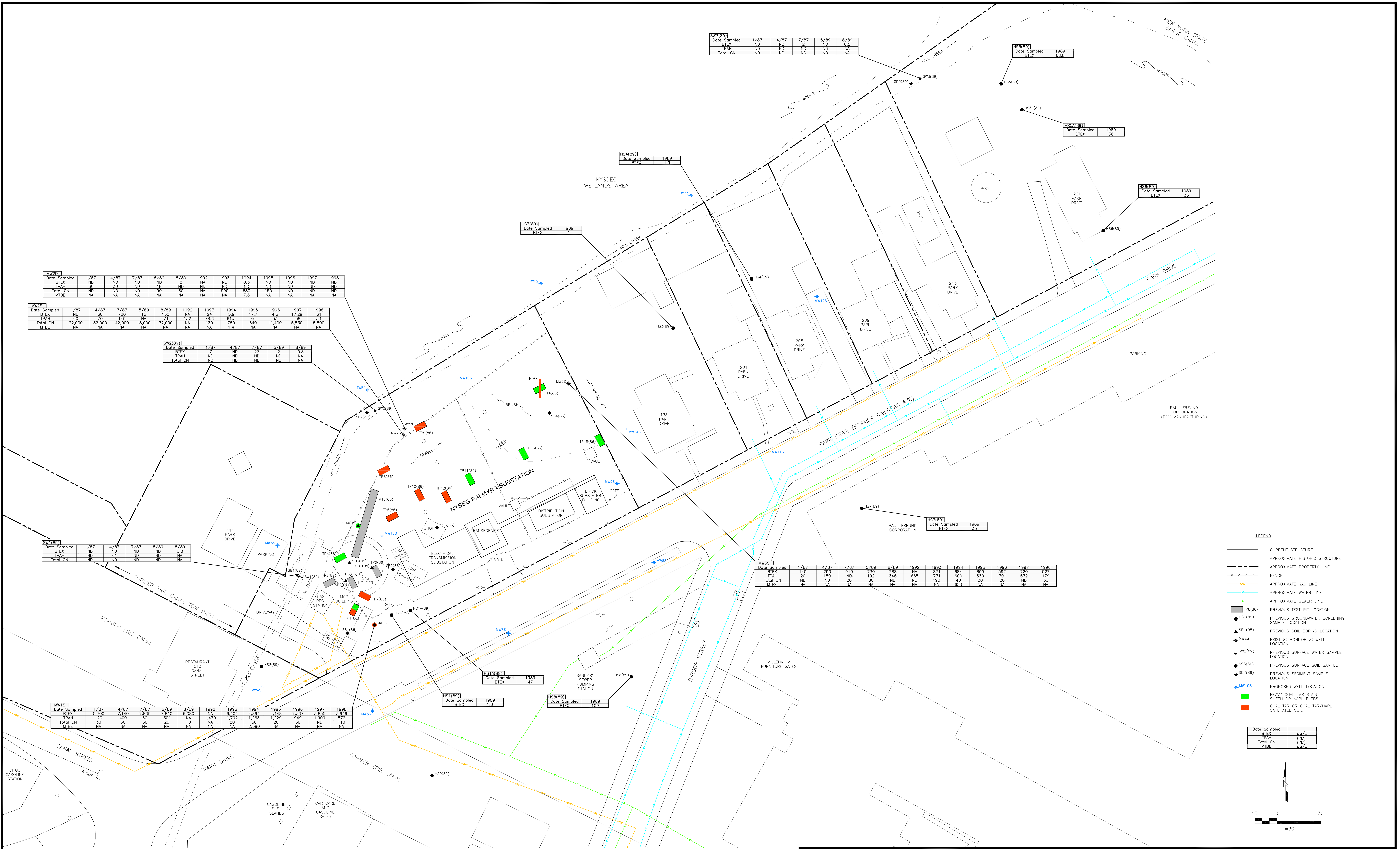
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

CROSS-SECTION LOCATION MAP

DATE: 8/09/07
DRWN: MAW/BIL

FIGURE 2-8



SW3(89)

Date Sampled	1/87	4/87	7/87	5/89	8/89
BTEX	ND	ND	2	ND	0.5
TPAH	ND	ND	ND	ND	NA
Total CN	ND	ND	ND	ND	NA

HS5(89)

Date Sampled	1989
BTEX	68.8

HS5A(89)

Date Sampled	1989
BTEX	36

HS4(89)

Date Sampled	1989
BTEX	1.9

HS6(89)

Date Sampled	1989
BTEX	36

HS3(89)

Date Sampled	1989
BTEX	1

MW2D

Date Sampled	1/87	4/87	7/87	5/89	8/89	1992	1993	1994	1995	1996	1997	1998
BTEX	ND	ND	ND	ND	8	NA	ND	0.5	ND	ND	ND	ND
TPAH	30	30	ND	18	ND	ND	ND	ND	ND	ND	ND	ND
Total CN	ND	ND	ND	90	80	NA	990	680	150	ND	ND	ND
MTBE	NA	NA	NA	NA	NA	NA	NA	7.6	NA	NA	NA	NA

MW2S

Date Sampled	1/87	4/87	7/87	5/89	8/89	1992	1993	1994	1995	1996	1997	1998
BTEX	ND	60	720	15	130	NA	24	5.9	17.7	4.5	1,129	61
TPAH	60	70	140	NA	71	132	78.6	61.3	46	33	138	33
Total CN	22,000	32,000	42,000	18,000	32,000	NA	130	750	640	11,400	5,530	5,800
MTBE	NA	NA	NA	NA	NA	NA	NA	1.4	NA	NA	NA	NA

SW2(89)

Date Sampled	1/87	4/87	7/87	5/89	8/89
BTEX	7	ND	23	2	0.3
TPAH	ND	ND	ND	ND	NA
Total CN	ND	ND	ND	ND	NA

HS7(89)

Date Sampled	1989
BTEX	35

SW1(89)

Date Sampled	1/87	4/87	7/87	5/89	8/89
BTEX	ND	ND	ND	ND	0.8
TPAH	ND	61	ND	ND	NA
Total CN	ND	ND	ND	ND	NA

MW3S

Date Sampled	1/87	4/87	7/87	5/89	8/89	1992	1993	1994	1995	1996	1997	1998
BTEX	140	290	910	730	288	NA	871	684	809	592	720	527
TPAH	20	150	ND	192	346	665	771	600	530	301	572	179
Total CN	ND	ND	20	80	ND	ND	190	40	30	20	ND	30
MTBE	NA	NA	NA	NA	NA	NA	NA	653	NA	NA	NA	NA

HS1A(89)

Date Sampled	1989
BTEX	47

HS1(89)

Date Sampled	1989
BTEX	1.0

HS8(89)

Date Sampled	1989
BTEX	109

MW1S

Date Sampled	1/87	4/87	7/87	5/89	8/89	1992	1993	1994	1995	1996	1997	1998
BTEX	5,700	7,140	7,800	7,810	6,080	NA	6,404	4,894	4,448	7,307	3,835	3,949
TPAH	120	400	60	301	NA	1,479	1,792	1,263	1,229	949	1,909	572
Total CN	30	60	30	20	10	NA	20	30	20	30	ND	110
MTBE	NA	NA	NA	NA	NA	NA	NA	2,390	NA	NA	NA	NA

LEGEND

──	CURRENT STRUCTURE
– – – –	APPROXIMATE HISTORIC STRUCTURE
━ ━ ━	APPROXIMATE PROPERTY LINE
─o─o─o─	FENCE
── GAS ──	APPROXIMATE GAS LINE
── W ──	APPROXIMATE WATER LINE
── S ──	APPROXIMATE SEWER LINE
▨ TP8(86)	PREVIOUS TEST PIT LOCATION
⬢ HS1(89)	PREVIOUS GROUNDWATER SCREENING SAMPLE LOCATION
▲ SB1(05)	PREVIOUS SOIL BORING LOCATION
⊕ MW2S	EXISTING MONITORING WELL LOCATION
◒ SW2(89)	PREVIOUS SURFACE WATER SAMPLE LOCATION
◆ SS3(86)	PREVIOUS SURFACE SOIL SAMPLE
⬙ SD2(89)	PREVIOUS SEDIMENT SAMPLE LOCATION
⊕ MW10S	PROPOSED WELL LOCATION
🟩	HEAVY COAL TAR STAIN, SHEEN OR NAPL BLEBS
🟥	COAL TAR OR COAL TAR/NAPL SATURATED SOIL

Date Sampled	
BTEX	µg/L
TPAH	µg/L
Total CN	µg/L
MTBE	µg/L

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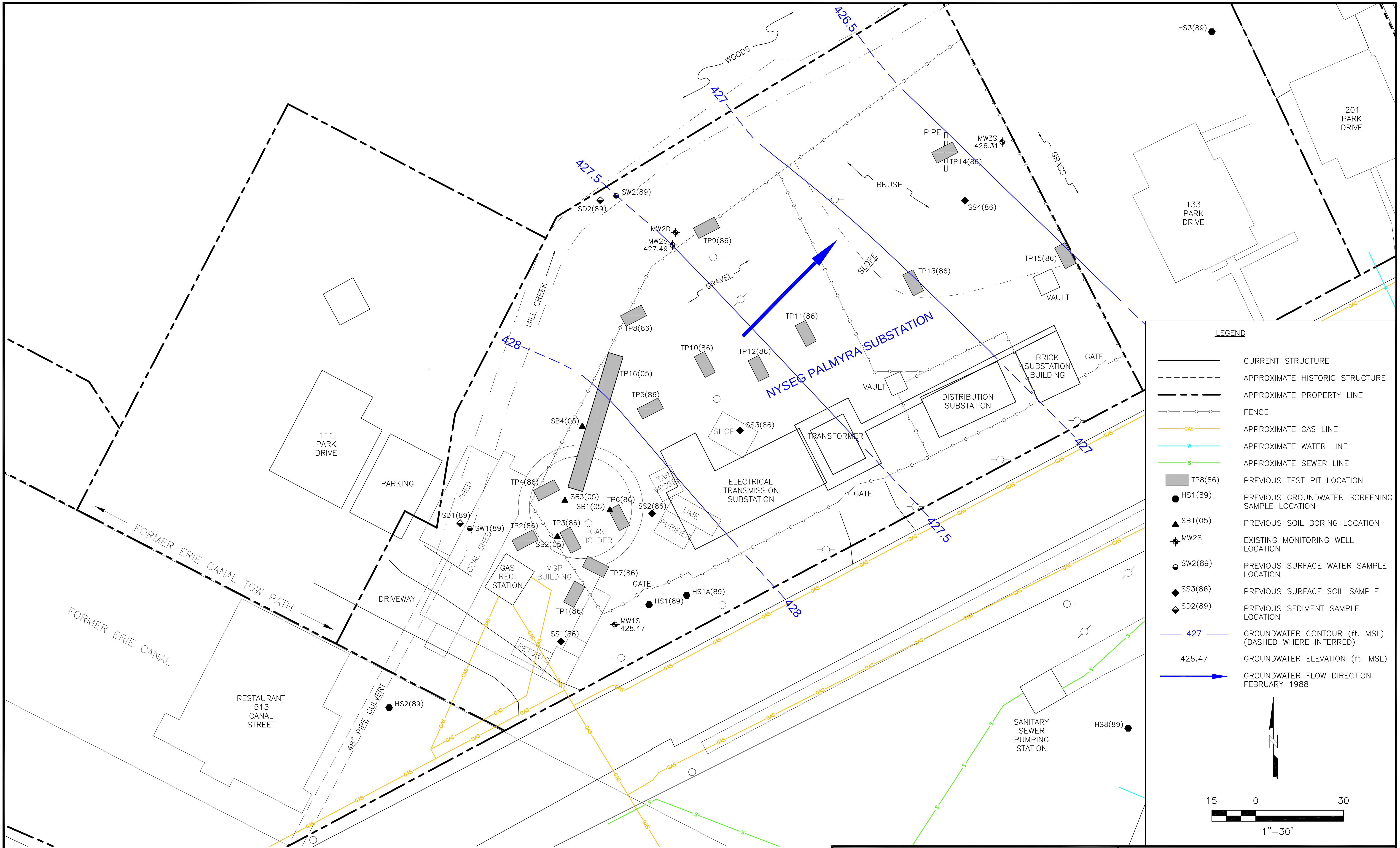
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/09/07
DRWN: MAW/BIL

PREVIOUS INVESTIGATION GROUNDWATER AND SURFACE WATER RESULTS AND PROPOSED RI MONITORING WELL LOCATIONS

FIGURE 2-7

File: J:\04964025\SURF_WATER_SAMP.dwg Layout: ANSI_BI-LJ User: mwilliamson Plotted: Aug 09, 2007 – 3:58pm Xref's:



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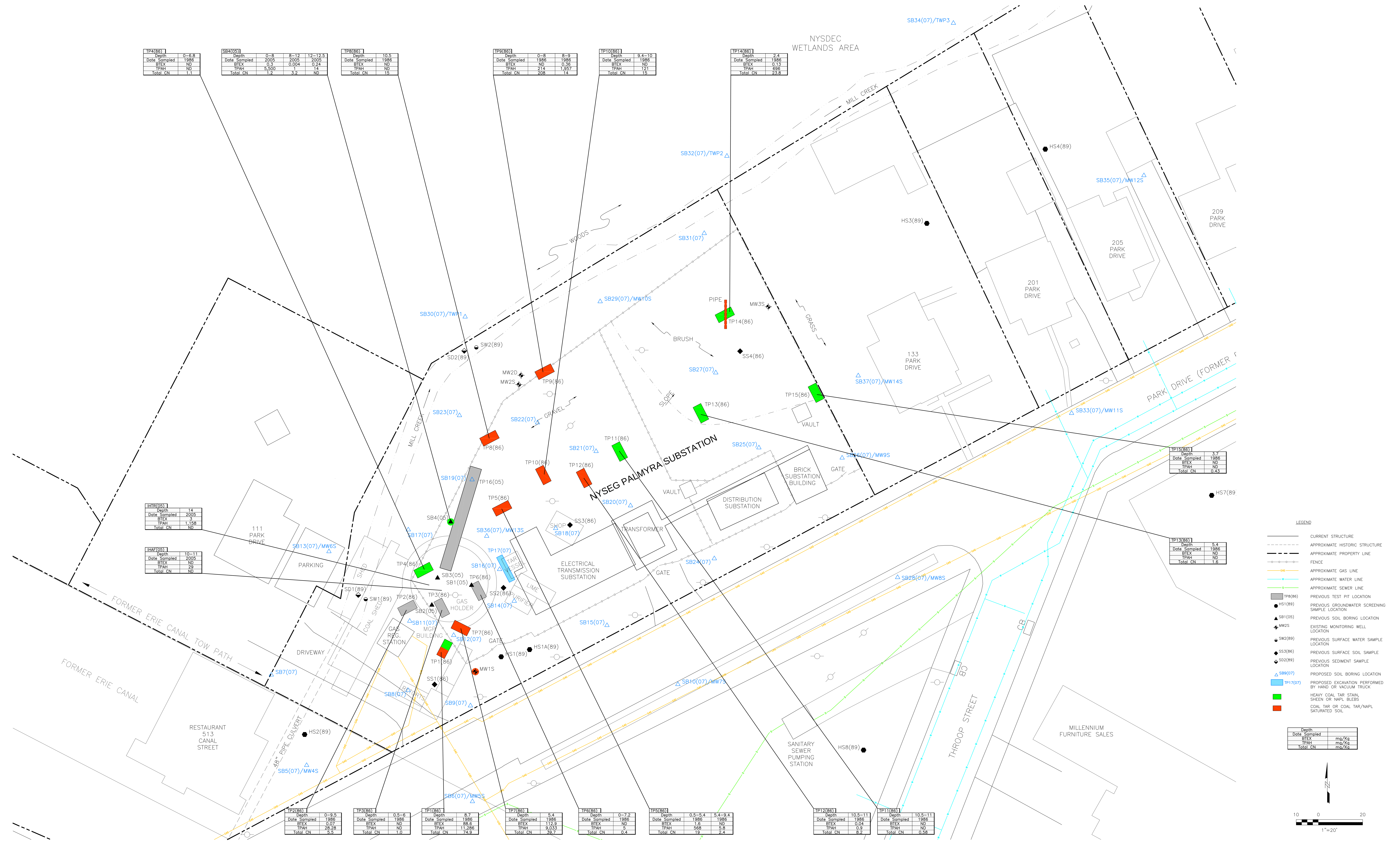
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/09/07
DRWN: MAW/BIL

GROUNDWATER FLOW DIRECTION MAP

FIGURE 2-6

File: J:\04964025\GW8_89.dwg Layout: ANSI_B1-LJ User: mwilliamson Plotted: Aug 09, 2007 - 3:56pm Xref's:



TP4(86)	
Depth	0–6.8
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	1.1

SB4(05)			
Depth	0–8	8–12	12–12.5
Date Sampled	2005	2005	2005
BTEX	0.3	0.004	0.24
TPAH	5,500	1	14
Total CN	1.2	3.2	ND

TP8(86)	
Depth	10.5
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	15

TP9(86)		
Depth	0–8	8–9
Date Sampled	1986	1986
BTEX	ND	0.36
TPAH	214	1,957
Total CN	208	14

TP10(86)	
Depth	9.4–10
Date Sampled	1986
BTEX	ND
TPAH	121
Total CN	15

TP14(86)	
Depth	2.4
Date Sampled	1986
BTEX	0.13
TPAH	696
Total CN	23.8

IHTR(05)	
Depth	14
Date Sampled	2005
BTEX	3
TPAH	1,158
Total CN	ND

IHAF(05)	
Depth	10–11
Date Sampled	2005
BTEX	ND
TPAH	29
Total CN	ND

TP15(86)	
Depth	3.7
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	0.43

TP13(86)	
Depth	5.4
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	1.6

TP2(86)	
Depth	0–9.5
Date Sampled	1986
BTEX	0.07
TPAH	28.28
Total CN	5.5

TP3(86)	
Depth	0.5–6
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	1.0

TP1(86)	
Depth	8.7
Date Sampled	1986
BTEX	88.6
TPAH	11,286
Total CN	74.9

TP7(86)	
Depth	5.4
Date Sampled	1986
BTEX	112.9
TPAH	9,033
Total CN	39.7

TP6(86)	
Depth	0–7.2
Date Sampled	1986
BTEX	ND
TPAH	5
Total CN	0.4

TP5(86)		
Depth	0.5–5.4	5.4–9.4
Date Sampled	1986	1986
BTEX	1.6	ND
TPAH	568	5.8
Total CN	19	2.4

TP12(86)	
Depth	10.5–11
Date Sampled	1986
BTEX	0.04
TPAH	0.9
Total CN	8.2

TP11(86)	
Depth	10.5–11
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	0.58

LEGEND

———	CURRENT STRUCTURE
– – – –	APPROXIMATE HISTORIC STRUCTURE
— – – —	APPROXIMATE PROPERTY LINE
—o—o—o—	FENCE
—GAS—	APPROXIMATE GAS LINE
—W—	APPROXIMATE WATER LINE
—S—	APPROXIMATE SEWER LINE
▨ TP8(86)	PREVIOUS TEST PIT LOCATION
⬢ HS1(89)	PREVIOUS GROUNDWATER SCREENING SAMPLE LOCATION
▲ SB1(05)	PREVIOUS SOIL BORING LOCATION
⌖ MW2S	EXISTING MONITORING WELL LOCATION
◒ SW2(89)	PREVIOUS SURFACE WATER SAMPLE LOCATION
◆ SS3(86)	PREVIOUS SURFACE SOIL SAMPLE
⬙ SD2(89)	PREVIOUS SEDIMENT SAMPLE LOCATION
△ SB9(07)	PROPOSED SOIL BORING LOCATION
🟦 TP17(07)	PROPOSED EXCAVATION PERFORMED BY HAND OR VACUUM TRUCK
🟩	HEAVY COAL TAR STAIN, SHEEN OR NAPL BLEBS
🟥	COAL TAR OR COAL TAR/NAPL SATURATED SOIL

Depth	
Date Sampled	
BTEX	mg/Kg
TPAH	mg/Kg
Total CN	mg/Kg

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PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

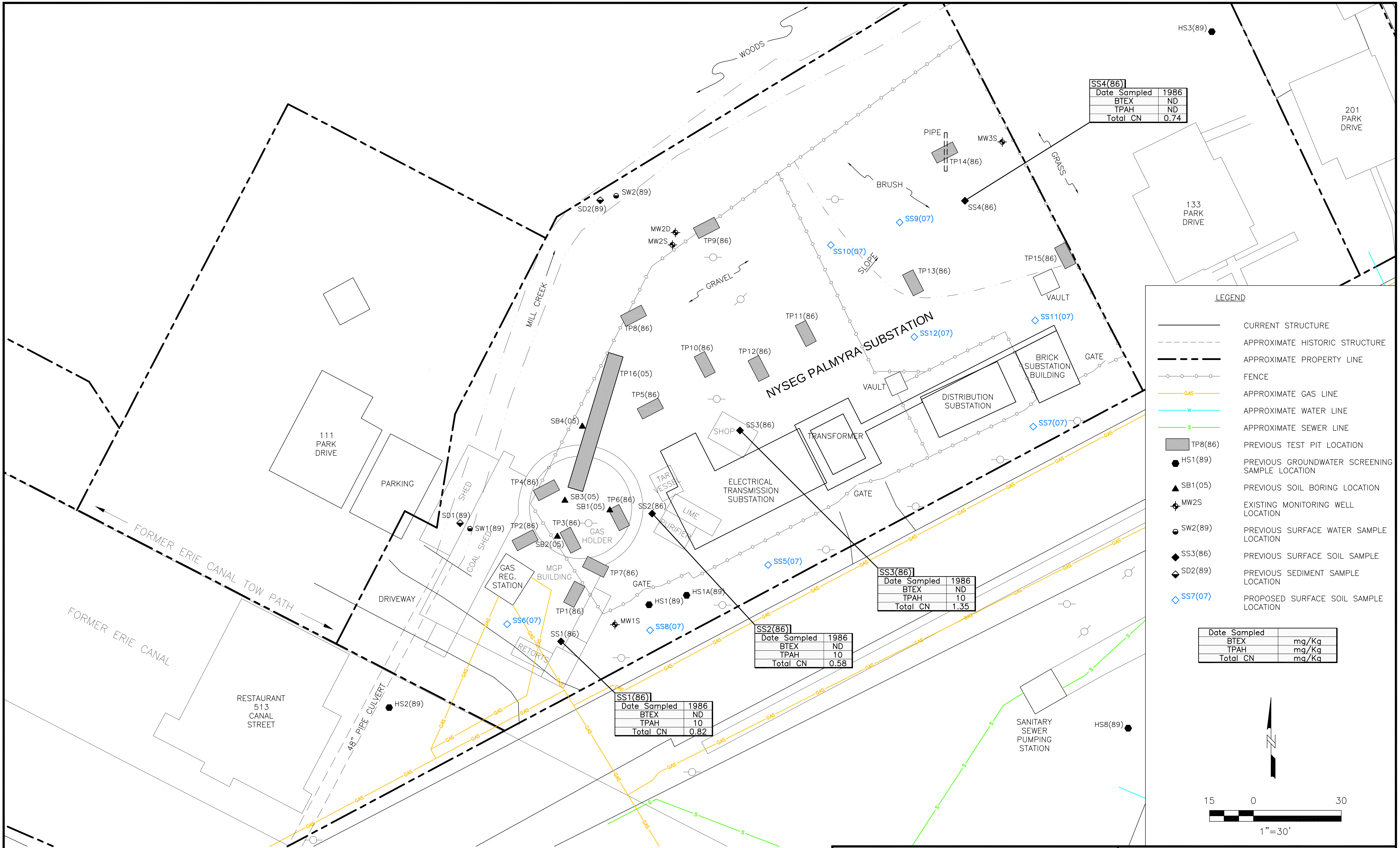
DATE: 8/09/07
DRWN: MAW/BIL

PREVIOUS SUBSURFACE SOIL SAMPLE RESULTS AND PROPOSED RI SAMPLE LOCATIONS

FIGURE 2-5

File: J:\04964025\SUBSURF_SOILS.dwg Layout: ANSI_BI-LJ User: mwilliamson Plotted: Aug 09, 2007 – 3:58pm Xref's:

File: J:\04964025\SURF_SOILS.dwg Layout: ANSI_B1-LJ User: mwilliamson Plotted: Aug 09, 2007 - 3:58pm Xref's:



SS4(86)	
Date Sampled	1986
BTEX	ND
TPAH	ND
Total CN	0.74

SS3(86)	
Date Sampled	1986
BTEX	ND
TPAH	10
Total CN	1.35

SS2(86)	
Date Sampled	1986
BTEX	ND
TPAH	10
Total CN	0.58

SS1(86)	
Date Sampled	1986
BTEX	ND
TPAH	10
Total CN	0.82

Date Sampled	
BTEX	mg/Kg
TPAH	mg/Kg
Total CN	mg/Kg

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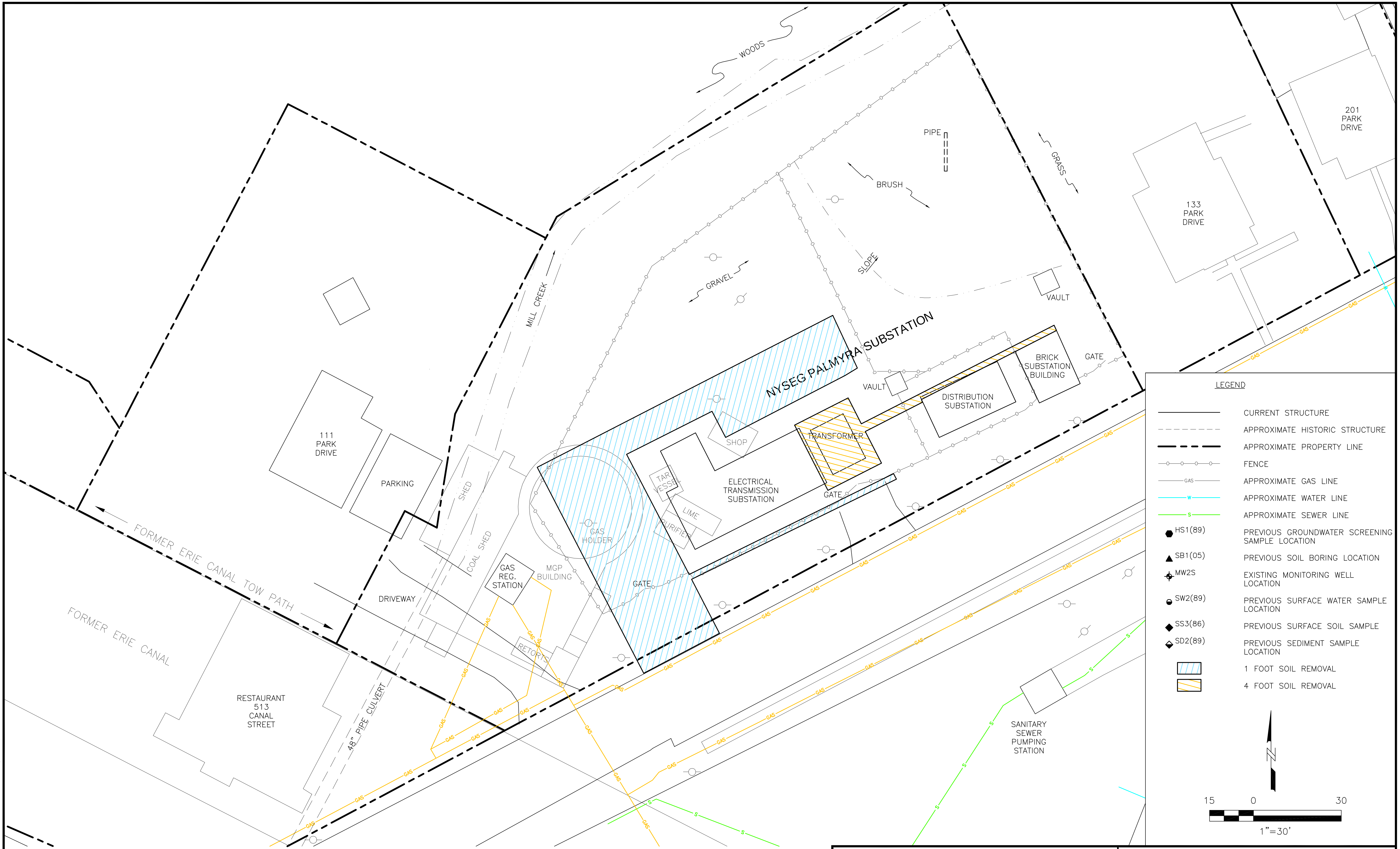
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/09/07
DRWN: MAW/BIL

PREVIOUS SURFACE SOIL SAMPLE RESULTS AND PROPOSED RI SAMPLE LOCATIONS

FIGURE 2-4



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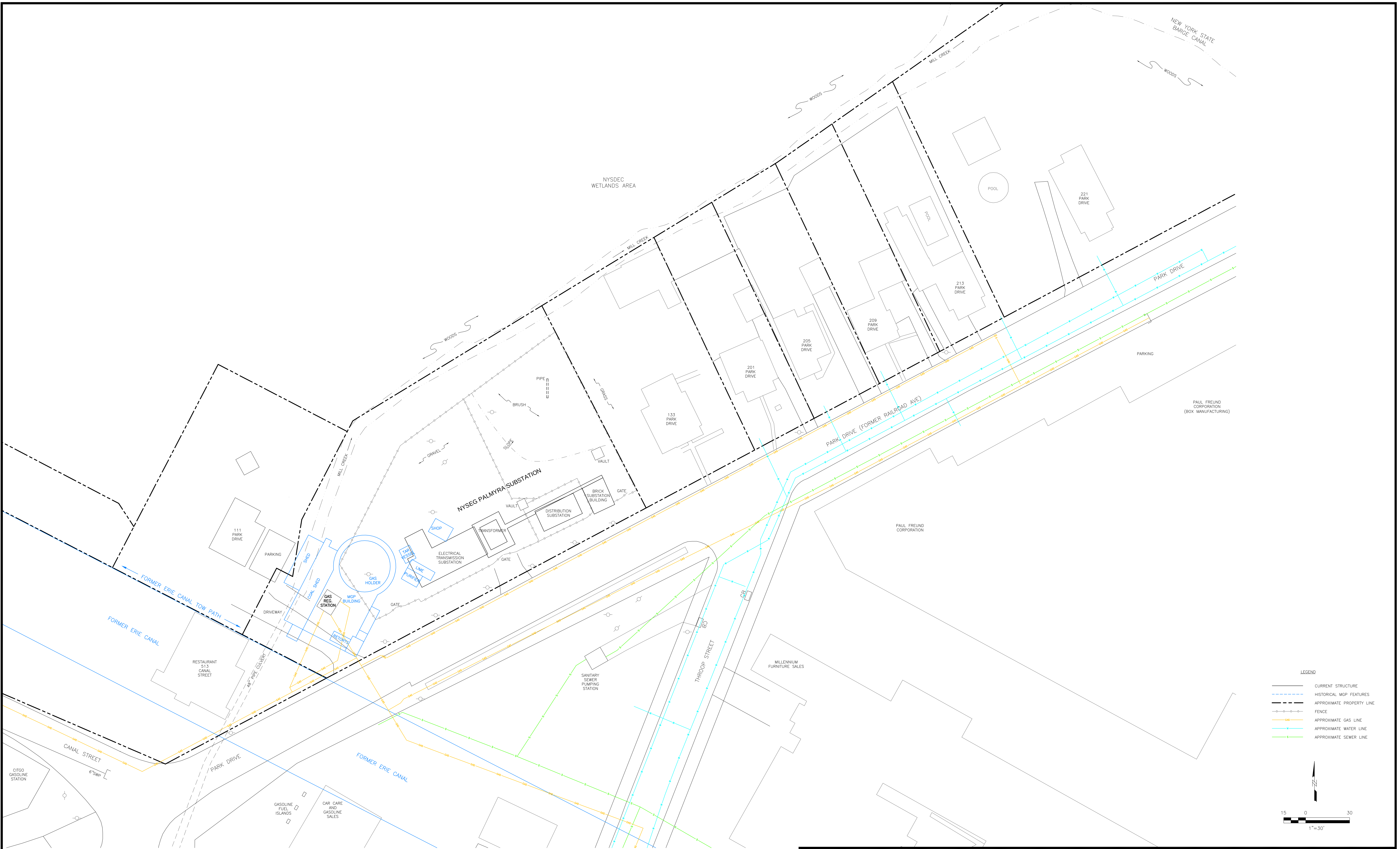
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/22/07
DRWN: MAW/BIL

2005 SOIL REMOVAL AREAS

FIGURE 2-3



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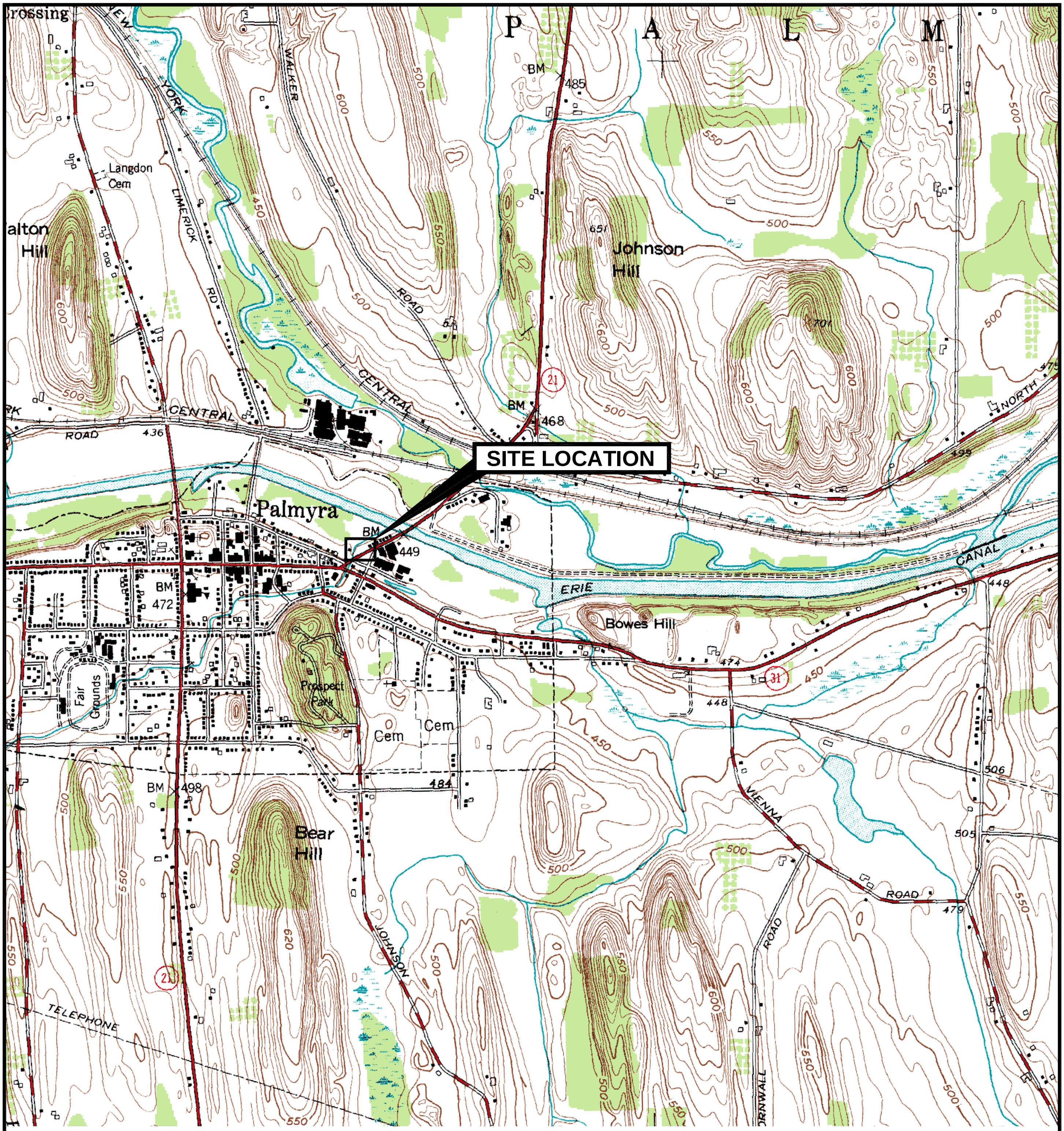
PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/08/07
DRWN: MAW/BIL

HISTORICAL FEATURES AND CURRENT SITE CONDITIONS

FIGURE 2-2



UNITED STATES GEOLOGIC SURVEY
PALMYRA QUADRANGLE
NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHY)

PALMYRA, N.Y.
1952

SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

N

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PALMYRA FORMER
MGP SITE

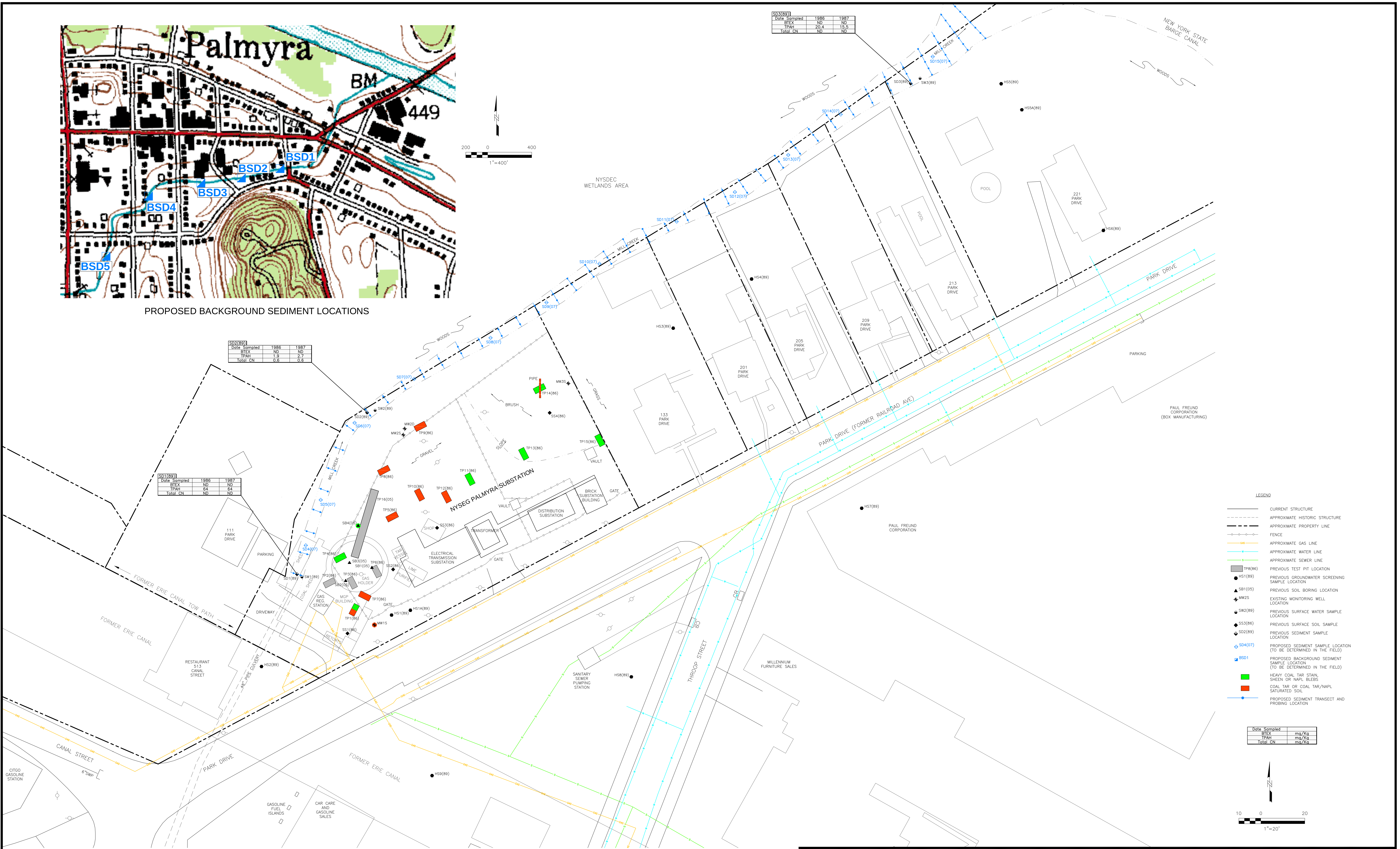
VILLAGE OF PALMYRA, NEW YORK

SITE LOCATION MAP

DATE: 8/07/07 DRWN: MAW/BIL

FIGURE 2-1

File: J:\04964025\SITE_LOC.dwg Layout: ANSI_AVI-LJ User: mwilliamson Plotted: Aug 09, 2007 – 3:55pm Xref's:



PROPOSED BACKGROUND SEDIMENT LOCATIONS

SD3(89)

Date Sampled	1986	1987
BTEX	ND	ND
TPAH	20.4	15.5
Total CN	ND	ND

SD2(89)

Date Sampled	1986	1987
BTEX	ND	ND
TPAH	1.9	2.7
Total CN	0.6	0.6

SD1(89)

Date Sampled	1986	1987
BTEX	ND	ND
TPAH	64	64
Total CN	ND	ND

LEGEND

———	CURRENT STRUCTURE
- - - -	APPROXIMATE HISTORIC STRUCTURE
— - - —	APPROXIMATE PROPERTY LINE
—o—o—	FENCE
—GAS—	APPROXIMATE GAS LINE
—W—	APPROXIMATE WATER LINE
—S—	APPROXIMATE SEWER LINE
▨ TP8(86)	PREVIOUS TEST PIT LOCATION
⬢ HS1(89)	PREVIOUS GROUNDWATER SCREENING SAMPLE LOCATION
▲ SB1(05)	PREVIOUS SOIL BORING LOCATION
⌖ MW2S	EXISTING MONITORING WELL LOCATION
◒ SW2(89)	PREVIOUS SURFACE WATER SAMPLE LOCATION
◆ SS3(86)	PREVIOUS SURFACE SOIL SAMPLE
⬙ SD2(89)	PREVIOUS SEDIMENT SAMPLE LOCATION
◇ SD4(07)	PROPOSED SEDIMENT SAMPLE LOCATION (TO BE DETERMINED IN THE FIELD)
◪ BSD1	PROPOSED BACKGROUND SEDIMENT SAMPLE LOCATION (TO BE DETERMINED IN THE FIELD)
🟩	HEAVY COAL TAR STAIN, SHEEN OR NAPL BLEBS
🟥	COAL TAR OR COAL TAR/NAPL SATURATED SOIL
—●—	PROPOSED SEDIMENT TRANSECT AND PROBING LOCATION

Date Sampled	
BTEX	mg/Kg
TPAH	mg/Kg
Total CN	mg/Kg

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PALMYRA FORMER
MGP SITE
VILLAGE OF PALMYRA, NEW YORK

DATE: 8/08/07
DRWN: MAW/BIL

PREVIOUS SEDIMENT SAMPLE RESULTS AND PROPOSED RI SEDIMENT SAMPLE LOCATIONS

FIGURE 2-11

Table 2-2
Brown's Directory Summary
Palmyra Former MGP Site

Year	Company Name	Process	Annual Gas Production (cf)	Gas Holder Capacity (cf)	Byproducts Made/Sold	Service Area Population	Operating Information	Holding and Operating Companies	Other Brown's Information	Reference Page(s)
1887	Palmyra Gas Light Co.	Coal				3,000				41
1888	Not available in RETEC's library									
1889	Palmyra Gas Light Co.	Coal				3,000				51
1890	Palmyra Gas Light Co.	Coal	1,500,000			3,000				82
1891	Palmyra Gas Light Co.	Coal	1,500,000			3,000				75
1892	Palmyra Gas Light Co.	Coal	1,500,000			3,000				81
1893	Palmyra Gas Light Co.	Coal	1,500,000			3,000				84
1894	Palmyra Gas Light Co.	Coal				3,000				89
1895-1898	Not available in RETEC's library									
1899	Palmyra Gas Light Co.	Coal	3,000,000			2,300				84
1900	Palmyra Gas Light Co.	Coal	2,000,000			2,000				94
1901	Palmyra Gas Light Co.	Coal	2,000,000			2,000				97
1902	Palmyra Gas Light Co.	Coal	2,000,000			2,000				102
1903	Palmyra Gas Light Co.	Coal	2,000,000			2,000				108
1904	Palmyra Gas Light Co.	Coal	2,000,000			2,000				114
1905	Palmyra Gas and Electric Co	Coal	3,000,000			3,000		Successor to Palmyra Gas Light Co.		118
1906	Palmyra Gas and Electric Co	Coal	3,000,000			3,000		Successor to Palmyra Gas Light Co.		124
1907	Palmyra Gas and Electric Co	Coal	4,000,000			3,000				126
1908	Palmyra Gas and Electric Co	Coal	4,000,000			3,000				131-132
1909	Palmyra Gas and Electric Co	Coal	3,500,000	30,000		3,000				145
1910	Palmyra Gas and Electric Co	Coal	3,500,000	Total capacity: 30,000		3,000				161
1911	Palmyra Gas and Electric Co							This company has been merged into the Wayne County Gas & Electric Co., NY		190
1912	No Listing									
1913	No Listing									
1914	No Listing									
1915	No Listing									
1916	No Listing									
1917	Empire Gas & Electric Co.			17,500		2,469	Gas purchased from Empire Coke Co. (9,600,000 cf) Max. day's send out: 35,000 cf	Controlled by Empire Coke Co., Geneva, NY		230
1918	Empire Gas & Electric Co.		Sales: 9,559,100	18,000		2,469	Gas purchased from Empire Coke Co. (12,127,000 cf) Max. day's send out: 55,000 cf	Controlled by Empire Coke Co., Geneva, NY	Supplies Palmyra	230
1919	Empire Gas & Electric Co.		Sales: 11,000,000	16,000		2,800	Gas purchased from Empire Coke Co. (12,650,100 cf) Max. day's send out: 40,000 cf	Controlled by Empire Coke Co., Geneva, NY	Supplies Palmyra	327-328
1920	Empire Gas & Electric Co.		Sales: 12,000,000	16,000		2,800	Gas purchased from Empire Coke Co. (13,018,400 cf) Max. day's send out: 50,000 cf	Controlled by Empire Coke Co., Geneva, NY	Supplies Palmyra	580
1921	Empire Gas & Electric Co.		Sales: 14,400,000	16,000		3,200	Gas purchased from Empire Coke Co. (16,000,000 cf) Max. day's send out: 60,000 cf	Controlled by Empire Coke Co., Geneva, NY	Supplies Palmyra	619
1922	Empire Gas & Electric Co.		Sales: 11,791,700	16,000		3,200	Gas received (13,615,200 cf)	Controlled by Empire Coke Co., Geneva, NY	Supplies Palmyra	588
1923	Empire Gas & Electric Co.		Sales: 11,600,000	16,000		3,200	Gas received (13,234,630 cf)	Controlled by Empire Gas & Electric Co., Geneva, NY	Supplies Palmyra	589
1924	Empire Gas & Electric Co.		Sales: 13,660,900	16,000		3,200	Gas received (15,434,800 cf)	Controlled by Empire Gas & Electric Co., Geneva, NY	Supplies Palmyra	594
1925	Empire Gas & Electric Co.		Sales: 16,134,300	16,000		3,200	Gas received (18,605,600 cf)		Supplies Palmyra	596
1926	Empire Gas & Electric Co.								See Geneva for operating detail	579
1927	Empire Gas & Electric Co.								See Geneva for operating detail	585
1928	Empire Gas & Electric Co.								See Geneva for operating detail	582
1929	Empire Gas & Electric Co.		Sales: 21,043,000	18,000				Max. day's send out: 80,000 cf	See Geneva for operating detail	118
1930	Empire Gas & Electric Co.		Sales: 22,902,000	17,800				Max. day's send out: 80,000 cf	See Geneva for operating detail	111
1931	Empire Gas & Electric Co.								See Geneva for operating detail	231
1932	No Listing									
1933	No Listing									
1934	No Listing									
1935	No Listing									
1936	No Listing									
1937	No Listing									
1938	No Listing									
1939	No Listing									
1940	No Listing									
1941	No Listing									
1942	No Listing									
1943-1944	No Listing									
1944-1945	No Listing									
1945-1946	No Listing									
1946-1947	No Listing									
1947-1948	No Listing									
1948-1949	No Listing									
1949-1950	No Listing									
1950-1951	No Listing									
1951-1952	No Listing									
1952-1953	Not available in RETEC's library									
1953-1954	No Listing									
1954-1955	No Listing									
1955-1956	No Listing									
1956-1957	No Listing									

Table 2-1
Historical Information Summary
Palmyra Former MGP Site

Year(s)	Source of Information	Comments
1856	TRC 1987 Report	Palmyra Gas Light Company incorporated in 1856.
1857	TRC 1987 Report	Gas plant constructed, with production starting in September.
1861	TRC 1987 Report	Fire occurres at the plant and plant rebuilt.
1874	TRC 1987 Report; 1874 Atlas Map of Wayne County	MGP located on northwestern area of the present NYSEG property. The complete gas plant located to the north of the Erie Canal.
1884	Sanborn Map	First Sanborn map of the area shows the Store House, the Lime Purifier, the Coal Shed and the MGP Process Building with attached Gas Holder.
1887	Brown's Directory	First Brown's Directory listing. Process is listed as coal gas process, plant serves 3,000 customers.
Late 1890s	TRC 1987 Report	Erie Canal to the south of the site enlarged.
1905	TRC 1987 Report; Brown's Directory	Construction began for the new Barge Canal to the north of the site. Palmyra Gas Light Company merged with the Palmyra Electric and Power Company to form Palmyra Gas and Electric Company.
1910	TRC 1987 Report; Brown's Directory	Cessation of gas plant operations, gas holder retained to store gas. Palmyra Gas and Electric merges with four other gas companies to form Wayne County Electric and Gas Company. Last listing in the Brown's Directory with annual gas production listed as 3,500,000 cubic feet. Gas holder capacity listed as 30,000 cubic feet.
1912	Sanborn Map	The Sanborn Map indicates that the Gas Holder is still present at the site and that the MGP Building is vacant.
1915	TRC 1987 Report, Cook 1930	Barge Canal began operations.
1930-1942	TRC 1987 Report	Gas holder remains at the site to distribute gas; holder dismantled by 1942.
1947	Sanborn Map	The last Sanborn Map for the area shows that the Gas Holder and MGP Building were no longer present at the site by this time.
1956	TRC 1987 Report	New substation built. Tar Vessel encountered.
2006	NYSEG Construction Completion Report	Soil excavation performed by NYSEG for the expansion of the electrical substation. Tar Vessel investigated.

Sources:
TRC, 1987. New York State Electric and Gas Corporation, Investigation of the Former Coal Gasification Site in Palmyra, New York. Task 1 Final Report, Preliminary Site Evaluation. TRC, January 20, 1987.
Brown's Directory of Gas Production
Sanborn Maps for 1884, 1889, 1894, 1899, 1906, 1912, 1925, 1938, and 1947
NYSEG, 2006. Construction Completion Report for the Palmyra Substation Expansion.

Table 3-1
RI Sample Summary
Palmyra Former MGP Site

Sample Designation Analyses Method QA/QC Requirements	Sample Location and/or Rationale	Soil Analyses					Groundwater Analyses					Groundwater Cyanide Analyses			Groundwater	Sediment Analyses			Sediment	Solid\Soil
		VOC 8260B ASP B	SVOC 8270C ASP B	PCB 8082 ASP B	TAL Metals 6000-7000 ASP B	Total CN 9012A ASP B	VOC 8260B ASP B	SVOC 8270C ASP B	PCB 8082 ASP B	TAL Metals 6000-7000 ASP B	Total CN 9012A ASP B	Total CN APHA 4500 CN C Note 1	Free Cyanide ASTM D4282-95 Note 1	Metal CN Complexes Dinoex IC Note 1	Hydrocarbon Identification Note 1, Note 2	SVOC 8270C ASP B	Total CN 9012A ASP B	TOC Lloyd Kahn Note 1	Hydrocarbon Identification Note 1, Note 2	Hazardous Characteristics SW846 Note 1
Surface Soil Samples																				
SS5(07)	Park Drive ROW, soil conditions at perimeter of site		1	1	1	1														
SS6(07)	Adjacent to Gas Regulator Station house, soil conditions in grassy area		1	1	1	1														
SS7(07)	Park Drive ROW, soil conditions at perimeter of site		1	1	1	1														
SS8(07)	Park Drive ROW, soil conditions at perimeter of site		1	1	1	1														
SS9(07)	Brush-covered section in northeast area of site, general coverage for soil conditions		1	1	1	1														
SS10(07)	Grass-covered section in eastern area of site, general coverage for soil conditions		1	1	1	1														
SS11(07)	Grass-covered section in eastern area of site, general coverage for soil conditions		1	1	1	1														
SS12(07)	Grass-covered section in eastern area of site, general coverage for soil conditions		1	1	1	1														
Test Trench																				
TP17(07)	Footprint of Tar Vessel, construction of structure and adjacent soil conditions	1-2	1-2	1-2	1-2	1-2														
Subsurface Soil Borings																				
SB5(07)/MW4S	Determine upgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB6(07)/MW5S	Determine upgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB7(07)	Determine upgradient soil conditions	1-2	1-2	1-2	1-2	1-2														
SB8(07)	Soil conditions in the Retorts	1-2	1-2	1-2	1-2	1-2														
SB9(07)	Determine extent of tar observed at MW1S	1-2	1-2	1-2	1-2	1-2														
SB10(07)/MW7S	Determine cross gradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB11(07)	Determine soil conditions adjacent to Gas Holder	1-2	1-2	1-2	1-2	1-2														
SB12(07)	Determine deep soil conditions adjacent to TP1 and TP7	1-2	1-2	1-2	1-2	1-2														
SB13(07)/MW6S	Determine cross gradient soil and groundwater conditions at off site property	1-2	1-2	1-2	1-2	1-2														
SB14(07)	Determine soil conditions in the Lime Purifier Building area	1-2	1-2	1-2	1-2	1-2														
SB15(07)	Determine soil conditions along site southern boundary	1-2	1-2	1-2	1-2	1-2														
SB16(07)	Determine deep soil conditions adjacent to the Gas Holder and Tar Vessel	1-2	1-2	1-2	1-2	1-2														
SB17(07)	Determine soil conditions to the north of the Gas Holder	1-2	1-2	1-2	1-2	1-2														
SB18(07)	Determine soil conditions in the Shop area	1-2	1-2	1-2	1-2	1-2														
SB19(07)	Determine deep soil conditions near TP5 and TP8	1-2	1-2	1-2	1-2	1-2														
SB20(07)	Determine deep soil conditions near TP12	1-2	1-2	1-2	1-2	1-2														
SB21(07)	Determine deep soil conditions near TP12 and TP11	1-2	1-2	1-2	1-2	1-2														
SB22(07)	Determine deep soil conditions near TP8 and TP9	1-2	1-2	1-2	1-2	1-2														
SB23(07)	Determine deep soil conditions between TP8 and Mill Creek	1-2	1-2	1-2	1-2	1-2														
SB24(07)	Determine soil conditions along site southern boundary	1-2	1-2	1-2	1-2	1-2														
SB25(07)	Determine deep soil conditions near TP13 and TP15	1-2	1-2	1-2	1-2	1-2														
SB26(07)/MW9S	Determine downgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB27(07)	Determine deep soil conditions near TP13 and TP14	1-2	1-2	1-2	1-2	1-2														
SB28(07)/MW8S	Determine cross gradient soil and groundwater conditions in Village ROW	1-2	1-2	1-2	1-2	1-2														
SB29(07)/MW10S	Determine downgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB30(07)/TWP1	Determine cross gradient soil and groundwater conditions at off site property	1-2	1-2	1-2	1-2	1-2														
SB31(07)	Determine deep soil conditions between TP14 and Mill Creek	1-2	1-2	1-2	1-2	1-2														
SB32(07)/TWP2	Determine downgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB33(07)/MW11S	Determine downgradient soil and groundwater conditions at Village ROW	1-2	1-2	1-2	1-2	1-2														
SB34(07)/TWP3	Determine downgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB35(07)/MW12S	Determine downgradient soil and groundwater conditions	1-2	1-2	1-2	1-2	1-2														
SB36(07)/MW13S	Determine soil and groundwater conditions adjacent to Tar Vessel and Holder	1-2	1-2	1-2	1-2	1-2														
SB37(07)/MW14S	Determine downgradient soil and groundwater conditions at off-site property	1-2	1-2	1-2	1-2	1-2														
Soil QA/QC																				
Duplicates	QA/QC Sample	2	2	2	2	2														
MS (Matrix Spike Samples)	QA/QC Sample	2	2	2	2	2														
MSD (Matrix Spike Duplicate Samples)	QA/QC Sample	2	2	2	2	2														
Equipment Blank	QA/QC Sample						1	1	1	1	1									
Trip Blank	QA/QC Sample						1													
Groundwater																				
Existing Site Wells																				
MW1S	Delineate groundwater adjacent to the MGP Building						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW2S	Delineate shallow groundwater at downgradient location						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW2D	Delineate bedrock groundwater conditions at downgradient location						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW3S	Delineate shallow groundwater conditions at downgradient location						1	1	1	1	1	TBD	TBD	TBD	TBD					
RI Wells																				
MW4S	Upgradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW5S	Upgradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW6S	Cross gradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW7S	Cross gradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW8S	Cross gradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW9S	Downgradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW10S	Downgradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW11S	Downgradient groundwater conditions						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW12S	Downgradient groundwater conditions at off site property						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW13S	Groundwater conditions adjacent to the Tar Vessel and Holder						1	1	1	1	1	TBD	TBD	TBD	TBD					
MW14S	Groundwater conditions at off-site adjacent property						1	1	1	1	1	TBD	TBD	TBD	TBD					
TWP1	Cross gradient groundwater conditions at off site property						1	1	1	1	1	TBD	TBD	TBD	TBD					
TWP2	Downgradient groundwater conditions at off site property						1	1	1	1	1	TBD	TBD	TBD	TBD					
TWP3	Downgradient groundwater conditions at off site property						1	1	1	1	1	TBD	TBD	TBD	TBD					
Groundwater QA/QC																				
Duplicate	QA/QC Sample						1	1	1	1	1									
MS (Matrix Spike Sample)	QA/QC Sample						1	1	1	1	1									
MSD (Matrix Spike Duplicate Sample)	QA/QC Sample						1	1	1	1	1									
Equipment Blank	QA/QC Sample						1	1	1	1	1									
Trip Blank	QA/QC Sample						1													
Sediment Investigation																				
Background																				
BSS1 - BSS5	Surface (0-0.5 ft bgs) samples for background															5	5	5	TBD	
Adjacent and Downstream of Site																				
SD4 - SD15	Surface (0-0.5 ft bgs) samples adjacent to and downstream of the site															10	10	10	TBD	
Sediment QA/QC																				
Duplicates	QA/QC Sample															1	1	1		
Sediment Matrix Spikes	QA/QC Sample															1	1	1		
Sediment Matrix Spike Duplicates	QA/QC Sample															1	1	1		
Equipment Blank	QA/QC Sample						1	1	1	1	1									
Hydrocarbon Identification																				
Sediment Hydrocarbon Identification	Determined based on field observations and surface sediment analyses																		TBD	
Groundwater Hydrocarbon Identification	Determined based on field observations and groundwater analyses														TBD					
Hazardous Characteristics	Determined in field - most impacted material observed																			2
Total		**40-74**	**48-82**	**48-82**	**48-82**	**48-82**	**26**	**24**	**24**	**24**	**24**	**TBD**	**TBD**	**TBD**	**TBD**	**18**	**18**	**18**	**TBD**	**2**

TBD - To Be Determined
NA - Not Applicable
Note 1 - A CLP-like data package will be prepared for the analyses
Note 2 - Refer to the RI Work Plan for the possible forensic analyses to be performed