FINAL WORK PLAN

Remedial Investigation/ Feasibility Study

General Electric Company
Transmission Systems
Fort Edward, New York

April 1995

O'BRIEN & GERE
ENGINEERS, INC.

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Contents

Figures

Table

1. Introduction

This work plan has been developed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on behalf of the General Electric Company (GE). The purpose of this work plan is to describe the scope of the remedial investigation/feasibility study (RI/FS) which will be conducted at the GE Fort Edward Plant. This RI/FS is being conducted pursuant to an Order on Consent #A5-0316-94-06 between the State of New York Department of Environmental Conservation (DEC) and GE. This RI/FS will be conducted in accordance with the provisions of CERCLA, as amended, the National Contingency Plan (NCP, 1990), and the State of New York's Inactive Hazardous Waste Disposal Site Law and implementing regulations. Completion of this work will also satisfy any corrective action obligations related to the facility pursuant to the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments and the New York ECL Article 27, Title 9.

1.1. Project Objectives

During the past two decades, GE, in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), has sought to address environmental issues at the Fort Edward facility. The measures implemented to address these issues have been demonstrably effective at curtailing the migration of contaminants.

At this time, a variety of factors argue in favor of expanding and completely integrating past and future investigation and remedial activities at and in the vicinity of the Fort Edward facility. To foster this broad based evaluation, implementation of a comprehensive RI/FS is proposed. The objectives for the Comprehensive RI/FS include: (1) evaluating impacts, if any, of contaminants that may have previously migrated off-site on human health and the environment, including the potential impact on the Hudson River; (2) determining if contamination continues to migrate off-site; (3) implementing interim remedial measures (IRMs) as necessary; (4) gathering engineering data required to perform a feasibility study; (5) evaluating remedial alternatives and selecting preferred remedial alternatives when appropriate; and (6) satisfying any corrective action obligations pursuant to the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments and the New York ECL Article 27, Title 9.

In particular, GE proposes to undertake the following tasks in conjunction with the comprehensive RI/FS:

- Compilation of historical site environmental information and submittal of information to NYSDEC;

- Completion of residential well sampling and public water supply connection program to minimize potential off-site ground water exposure;

- Determination of source(s) of off-site ground water contaminants and assessment of potential remedial measures;

- Completion of the on-going reassessment of off-site shallow unconsolidated aquifer plume and five year review of off-site remediation implemented in 1989;

- Determination of bedrock aquifer ground water quality at the facility and assessment of potential impact, if any, on public health and the Hudson River;

- Continued evaluation of bedrock ground water flow and quality in the shale in the vicinity of the facility. Assessment of the potential for impact to the Hudson River and off-site residential wells and assessment of potential mitigation measures;

- Further definition of ground water quality and flow in the shallow unconsolidated aquifer in the northern and western part of the site. Assessment of potential impacts, if any, to nearby residences and the Hudson River; and

- Continuation of operation and maintenance activities associated with existing remedial actions.

In addition to the above objectives, the scope of work proposed for the comprehensive RI/FS incorporates the RCRA corrective action requirements for the facility. Specifically, the scope of work addresses corrective action requirements for the following solid waste management units (SWMUs) and other areas that were identified as requiring further investigation.

- Former mineral oil tank area;
- Foil Mill;
- soil disposal area SWMU #16; and
- SWMU #20 - industry sewers.

In accordance with previous NYSDEC approvals, the integrity assessments of the sanitary wastewater treatment unit (WW-2) and the wastewater treatment unit (WW-1) will be undertaken following removal of sludge from the units. It is anticipated that the removal of sludge will be completed within 48 months of the effective date of the consent order. A work plan detailing a schedule and procedures for conducting integrity assessments of the two units will be submitted for approval to NYSDEC 180 days prior to conducting the assessment.

1.2. Brief Site History

The study area is the GE Fort Edward Plant located approximately 800 feet east of the Hudson River between the Villages of Hudson Falls to the north, and Fort Edward to the south. The facility is approximately 32 acres and bounded on the east by Broadway, on the south by Park Avenue and the Delaware & Hudson Railroad/Allen Street on the west as shown on Figure 1-1. As shown on Figure 1-1, an approximately 200 foot wide parcel located between Allen Street and the Hudson River is also owned by GE and is considered part of the study area.

As reported in the Site Remedial Investigation prepared by Lawler, Matusky & Skelly, the Fort Edward Plant has been in operation since 1942. Between 1942 and 1946 selsyn motors were manufactured for the U.S. Department of Defense; since 1946 the plant has produced small industrial capacitors. Operations related to capacitor production have included aluminum rolling, tin plating, capacitor recovery and salvage operations, polypropylene film manufacture, refining and blending of dielectric fluids, and quality control operations. Various cleaning operations to remove residues resulting from fabrication have also been conducted at the site. Among the products used in various operations were polychlorinated biphenyls (PCBs), organic solvents, and kerosene.

PCB use as a dielectric fluid at the site was discontinued in 1977. Organic solvents and kerosene based fluids use continues to the present time. However, the plant has been reducing its use of organic solvents by modifying processes and implementing waste minimization programs.

Present facilities on the Fort Edward Plant (Figure 1-2) consist of several buildings, a basin on the southwest corner of the property, and parking areas. The largest building is subdivided into four sections as follows: (1) original manufacturing building (Bldg. 23), (2) addition to manufacturing building (Bldg. 23 ext.), (3) warehouse (Bldg. 23-A), and (4) capacitor plant expansion (Bldg. 23-B). Building 23-A was subsequently expanded to include a finished goods warehouse (Bldg. 26) and a maintenance and waste storage building (Bldg. 31). The second building, the aluminum rolling mill (Bldg. 40), has been expanded several times since its original construction. The largest addition was an aluminum foil mill that occupies the northern half of the present building. Smaller buildings on the site include a pump house, a maintenance building, and the wastewater treatment facility.

Prior to construction of the wastewater treatment facility in 1976, storm water and in-plant waste water from the plant site converged at a manhole (MH004) located directly west of the southwest corner of the current Foil Mill (shown in Figure 1-3). Wastewater was discharged from MH004 directly to the Hudson River through a 30-inch vitrified clay pipe (VCP).

Sanitary wastes from the Foil Mill and the Main Plant were directed to a lift station located approximately 90 feet south of the Foil Mill and sent to an on-site septic tank/leach field system. Sanitary wastes generated at the guard house and Building 23-A (warehouse) were sent to separate septic systems.

Modifications to the GE Fort Edward wastewater system were primarily completed in 1976 and 1977 and included the replacement and rerouting of wastewater to a newly constructed wastewater collection/treatment system. A 40,000 gallons per day (gpd or gal/day) extended aeration system was installed to treat all sanitary wastes generated at the site. A 1.8 million gallon concrete equalization basin was constructed in the southwest corner of the site. Site wastewater and storm water were directed to the basin, treated at the newly constructed site treatment plant and discharged pursuant to a SPDES permit to the Hudson River through a new 6-inch line. The layout of the current wastewater treatment system is shown on Figure 1-4.

Since 1976 numerous improvements, investigations and remedial actions have been undertaken by GE at the Fort Edward Plant to reduce the potential impact of the site on the surrounding community and the Hudson River. The actions include but are not limited to the following:

- Implementation of the PCB abatement program conducted pursuant to the 1976 Agreement with the State of New York;

- Conducting a site Remedial Investigation pursuant to Order on Consent Index #T032785 (LMS, 1985);

- In accordance with New York State Department of Health Recommendations, GE paid for and caused installation of water mains and piping for households on Park Avenue, Stevens Lane, Ethan Allen Street and Putnam Avenue (NYSDEC, 1985);

- Conducting on-site and off-site feasibility studies pursuant to Order on Consent #T032785 (LMS, 1988, 1989) and preparation of on-site and off-site remedial plans (LMS, 1989; Dunn, 1990);

- Implementation of NYSDEC-approved on-site and off-site remedial plans pursuant to Order on Consent #T032785;

- Since October 1983, ground water from the shallow unconsolidated aquifer has been collected at the southern boundary of the plant. A total of five on-site and one off-site unconsolidated unit recovery wells are used to collect ground water. This ground water is pumped through an air stripper and subsequently treated at the plant waste water treatment facility. In 1993, a total of over 32 million gallons of ground water was collected and treated (O'Brien & Gere, 1994);

- In 1988, shallow bedrock ground water recovery and treatment was initiated in wells GM-8DR and GM-11D. A plan to upgrade the bedrock ground water recovery system was approved by NYSDEC and implemented in 1990;

- Since 1992, several upgrades to the Fort Edward plant waste water treatment facility have been implemented to reduce effluent loading to the Hudson River; and

- With the approval of NYSDEC and NYSDOH, GE undertook a voluntary residential well sampling and public water supply connection program in the areas south, east and west of the Fort Edward plant in 1994. As of the date of this writing, 31 homes and businesses in the Town of Fort Edward have agreed to be connected to public water at no charge to the owners.

1.3. Site Geology and Hydrogeology

1.3.1. Physiography

The GE Fort Edward Plant is located in the Hudson-Champlain lowland physiographic province. This region is characterized by open, sparsely wooded, flatlands with relatively low relief. Topographic elevations within the region are generally less than 400 feet above mean sea level. The principal drainage feature in the province is the southward flowing Hudson River from which the region derives its name. Unconsolidated glacial sediments composed of sand and clay comprise the floor throughout much of the valley. The bedrock exposures of the region are principally late Cambrian (500 mya.) and Ordovician (450 mya.) rocks with outcrops concentrated in fields and along stream cuts. The Hudson lowlands province is bounded on the west by the Adirondack Mountains and on the east by the Taconic Uplands. The long linear Hudson Valley extends for a significant distance to the south, and merges with the Champlain Valley to the North.

1.3.2. Regional Bedrock Geology

The Fort Edward Plant is underlain by the Snake Hill Formation, a dark grey shale of Ordovician age. Based on well logs for the two deep former production wells at the site, the shale is over 500 feet thick. The Snake Hill formation is found highly contorted and crumpled throughout most of Washington County. The unit is typically cut by cleavage planes and slip planes that often give it a glazed appearance. In the vicinity of Fort Edward, the Snake Hill formation is nearly horizontal and is found in a relatively undisturbed position (Cushman, 1953). The shale is underlain by limestone probably belonging to the Beekmantown Group. The Beekmantown consists of massive coarse to fine grained dolomitic limestone estimated to be in the range of 800-1000 feet thick in Washington County.

1.3.3. Glacial Geology

The Upper Hudson Valley Region of New York State was subjected to multiple glacial events during the Pleistocene Epoch. However, each glacial episode destroyed to a large degree the geologic record of the previous glaciation. Glacial deposits found in the northeastern portion of New York State were principally derived from the Late Wisconsin glaciation of the region. The Late Wisconsin or Woodfordian substage began approximately 20,000 years ago as evidenced by glacial drift on Long Island. The Laurentide ice sheet receded from New York State about 10,000 years ago. This retreat northward produced a series of proglacial lakes and recessional moranes. Landforms of New York have been reshaped only moderately by post-glacial processes, mainly along floodplains of streams and the adjacent valley walls (Cadwell et al., 1986).

The Late Wisconsin deposits in the upper Hudson-Champlain Valley are associated predominantly with the Hudson-Champlain Lobe of the Wisconsin glaciation. Glacial ice advanced generally from northeast to southwest along the bedrock structural grain (DeSimone, and LaFleur, 1985) depositing beneath it a dense layer of poorly sorted sediments and rock fragments known as lodgement till. As the Hudson-Champlain Glacial Lobe began to retreat, Glacial Lake Hudson formed in the lower Hudson Valley between the Terminal Moraine on Long Island and Staten Island and the margin of the retreating glacier (Cadwell, et al., 1986). With further retreat of the ice northward to the Hudson Highlands, this glacial lake continued to enlarge throughout the mid and upper Hudson Valley where it is known as Glacial Lake Albany (Cadwell, et al., 1986).

Further retreat of the Hudson-Champlain Lobe resulted in intervals of falling water levels coupled with six intervals of water level stability. The six stable water levels are: Lake Albany (360-380 feet and 340-350 feet), Lake Quaker Springs (300-320 feet), Lake Coveville (240-260 feet), Fort Ann I (200-220 feet), Fort Ann II (150-170 feet) and Fort Ann III (130-150 feet). It is believed that the transitions to lower lake levels were initiated by discharge through the glacial Mohawk Valley and eastern outlet channels (DeSimone and LaFleur, 1985).

1.3.4. Site Geology

Unconsolidated deposits of glacial origin unconformably overlie the bedrock throughout much of the Fort Edward Plant area. The glacial deposits are associated with the Hudson-Champlain Lobe of late

Wisconsin Laurentide ice sheet (Cadwell et al., 1987). Unconsolidated deposits consist primarily of glacio-deltaic sand overlying lacustrine clay and silts. In the northern portion of the site, sands directly overlie glacial till deposits.

1.3.5. Hydrogeology

At the Fort Edward Plant, ground water is observed in unconsolidated deposits under unconfined or water table conditions. The water table is free to rise and fall in response to ground water recharge and discharge.

Ground water flow at the facility is discussed in terms of two hydrogeologic units, the shallow unconsolidated unit and the shallow bedrock unit. The shallow unconsolidated unit is hydraulically separated from the shallow bedrock unit by a low permeability till and clay rich aquitard. The shallow unconsolidated deposit typically consists of sand with minor amounts of gravel overlying the low permeability silty clay and till. The shallow bedrock unit consists of the upper portion of the shale Snake Hill Formation.

A ground water contour map depicting ground water flow in the shallow unconsolidated unit at the site was constructed using water level data collected on January 29, 1994. As shown on Figure 1-5, a ground water divide which trends northeast to southwest underlies Building 40 between monitoring well locations GM-9 and GM-5 in the northwestern portion of the facility. Ground water flow in the northwest and western portion of the facility is generally to the west and northwest towards the Hudson River. Ground water flow in the central and southeastern portion of the facility is generally to the southeast toward Park Avenue.

Ground water flow within the shallow bedrock unit is principally through secondary porosity features such as fractures, joints and horizontal bedding planes (Dames & Moore, 1976b) (Geraghty & Miller, 1988). Based on ground water elevations in bedrock monitoring wells, ground water within the shallow bedrock unit has been interpreted to flow from west to east at the facility (Geraghty & Miller, 1988). However, based on the construction of the bedrock monitoring wells at the site, the perceived flow direction may not be indicative of the actual bedrock ground water flow conditions. Verifying true ground water flow directions at the facility, to the extent possible, is one of the objectives of this investigation.

2. Remedial Investigation Scope

The scope of work at the site is based on the investigation objectives and current understanding of site conditions. The scope and methods of investigation may be modified, in consultation with the NYSDEC, during the course of the investigation to reflect new information gathered during the site work. Because it is not possible at this time to define each and every piece of data that may be useful to acquire and all evaluations that may be helpful to make in connection with the project objectives, this work plan contains procedures for defining future data collection and evaluation details not yet susceptible of complete specification. Proposals for modification of the project scope will be presented to DEC for review and approval.

Prior to initiation of the sampling program, a detailed sampling and analysis plan (SAP) will be submitted to NYSDEC for review and approval prior to implementation. The SAP will include a Field Sampling Plan (FSP), and Quality Assurance Project Plan (QAPP). A site-specific Field Health and Safety Plan (FHSP) will also be prepared to address issues relating to worker health and safety during implementation of this Work Plan.

2.1. Compilation of Historical Data

As part of the comprehensive remedial investigation, historical site environmental information will be assembled, reviewed and summarized for submittal to NYSDEC. Available information and data on the facility background, including but not limited to information on buildings, underground tanks, utilities, known past and present solid or hazardous waste treatment or disposal areas will be summarized. Available information on the nature and extent of chemicals at the plant will be assembled along with available information on geology, hydrogeology and sampling information for the site. Remedial measures undertaken at and in the vicinity of the plant will be documented to the extent possible. Information collected will be summarized in a report to be submitted to NYSDEC.

2.2. Residential Well Sampling Program

In preparation for the five-year review of the Fort Edward off-site remedial plan implemented in October 1989, a well sampling and public water connection program was initiated in June 1994 in a defined study area within the Town of Fort Edward near the GE Fort Edward Plant. The scope of the program consists of the following items:

- identifying residential and commercial wells within the study area that were used as a drinking water source;
- collection and analysis of samples from identified wells; and
- connection, at GE's expense, of residences and businesses sampled to the available public water supply at GE's expense, which the state and local health officials believe is the best, most reliable long-term source of drinking water.

Work conducted as part of this program has been performed with the review and approval of both NYSDEC and NYSDOH.

2.2.1. Identification of Wells

The initial phase of the well sampling program consisted of identifying and locating residences and businesses in the vicinity of the GE Fort Edward Plant that were not connected to the public water system or utilized ground water as their drinking water supply.

The list of residences and businesses not served by public water was developed by utilizing billing information provided by the Village and Town of Fort Edward followed by field verification of addresses and locations of homes and businesses not served by public water. This information was cross-referenced with information collected from the Washington County Real Property Tax Office to establish a comprehensive list of residences and businesses not connected to municipal water within the study area. Based on the work conducted a total of 48 residences/businesses were identified as utilizing ground water as their drinking water source.

2.2.2. Ground Water Sampling

Following the identification of residences within the study area utilizing private water supply wells, the well sampling program was conducted. Samples were collected and submitted for polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs) analyses.

The well sampling program was divided into three rounds. The initial round consisted of sampling residential wells to the south and east of the GE Fort Edward Plant, including homes in the Hudson Heights neighborhood, Lower Allen Street, Park Avenue, Gates Avenue, and Putnam Avenue. A total of 23 residences were sampled in the initial round between June 14 and June 22, 1994.

Following review of the complete list of residences previously identified, it was determined that an additional sampling round should be performed in the area east of Broadway (Route 4). Residential wells on Burgoyne Avenue and the streets east of Burgoyne (*i.e.*, Smith Street, Wolf Street, Anthony Drive, Duncan Campbell Drive and O'Brien Street) from the Union and St. Joseph's Cemeteries south to the Village of Fort Edward line were sampled. A total of 23 wells were sampled between June 23 and July 11, 1994 in this sampling round.

Following a review of preliminary analytical results, confirmatory sampling was performed on selected wells. The purpose of the confirmatory sampling was to confirm detections by the laboratory in the previous rounds by resampling those residences. The confirmatory samples were split and sent to two laboratories for analysis. Confirmatory samples were collected on June 20, June 23, June 27, July 8, July 11, July 13, July 20, and September 8, 1994. A total of 15 residences were resampled.

Water samples collected during the Well Sampling Program were analyzed for PCBs by modified EPA SW-846 Methods 8080 or Method 608 and VOCs by EPA Test Method 8240 or Method 524.2. One sample was also submitted for herbicide analysis by EPA Test Method 507.

2.2.3. Public Water Supply Connections

As part of the well sampling program, GE is offering to connect residences and businesses to public water at no charge. Of the 48 residences/businesses identified in the program, 46 were subsequently sampled. The pump in one well was inoperable and a second well was utilized as a water source for two residences. A total of 6 residences were already connected to public water but were utilizing a ground water well as their drinking water source. Of the remaining 42 residences, 30 have already been connected to the public water supply as a result of the recent program. One additional owner has agreed to be connected and will be connected when soil conditions allow digging.

2.2.4. Reporting

A report detailing the well sampling and public water connection program will be prepared and submitted to NYSDEC and NYSDOH and provided later as an appendix to this work plan. The results of the residential well sampling program will also be integrated into the remedial investigation report described in Section 3.3.

2.2.5. Additional Sampling

A confirmatory round of well sampling is proposed for the 11 residences that have not connected to the public water supply. Samples from each of the 11 residences will be collected for PCB and VOC analysis by EPA Methods 608 and 524.2, respectively. Additionally, the pump from the well located on tax parcel 163.10-1-37 will be pulled and the well resampled for PCBs. Following receipt of validated data, residents will be notified of the result of the confirmatory sampling and connection to the public water mains at no charge to the residents will again be offered.

Following receipt of the analytical results for the confirmatory sampling round and the results of the additional on-site and off-site investigation, the data will be reviewed and recommendations for continued monitoring of residential wells will be prepared and implemented as part of the site O&M activities. At a minimum, available public records will be reviewed annually to determine if new potable ground water sources have been activated within the study area. New sources of potable ground water will be sampled for PCBs and VOCs along with other residential potable water supply wells as part of site O&M activities and reported in the facility annual ground water report.

2.3. Deep Bedrock Ground Water Evaluation

The objective of the deep bedrock ground water evaluation is to characterize the ground water quality and migration pathways in the deep (carbonate) bedrock. As part of the five-year review of remedial activities, a detailed work plan to permanently decommission the former production wells PW-1, PW-2 and to characterize ground water conditions in the deep bedrock was submitted to NYSDEC and approved on March 10, 1995.

Briefly stated, the deep bedrock evaluation consists of the following items:

- Integrity assessment of former production well seals;
- Geophysical logging;
- Decommissioning PW-1 and PW-2;
- Drilling new deep bedrock corehole;
- Packer testing, ground water sampling and analysis; and
- Review of available information on potential bedrock groundwater discharge zones.

2.3.1. Integrity Assessment of Former Production Well Seals

A visual inspection of the borehole and seals on former production wells PW-1 and PW-2 was performed on October 13, 1994 utilizing down hole camera video techniques. This inspection focused on determining whether or not visible contamination is entering the borehole and possibly collecting at the top of the seals. In addition, the top of the seal was visually inspected to identify cracks, if present, or other conduits in the seals. No visible contamination or significant cracks were identified.

Hydraulic testing of the seals was also performed by adding approximately five feet of water to the PW-1 and PW-2 boreholes and monitoring the water levels for 24-hours. Following an initial period of hydration, water level measurements indicated that the seals were intact with no measurable leakage through the seals.

2.3.2. Geophysical Logging of Deep Production Well PW-1

To assist in determining the nature of bedrock at the site, geophysical logging of the former production well PW-1 borehole was performed on February 8, 1995. Access to the borehole in order to perform the geophysical logging was performed through the 2.5-inch diameter support pipe.

The following borehole geophysical methods were utilized to determine the nature of the bedrock at the site:

- Natural gamma logging;
- EM-39 conductivity logging;
- Single point resistivity log;
- Fluid resistivity log;
- Temperature log;
- Spontaneous potential log; and
- Caliper log.

The borehole geophysical logging was performed by Mid-Hudson Geosciences of New Paltz, New York, between February 6 and February 8, 1995.

The results of the borehole geophysical logging of PW-1 indicate the following:

- The top of bedrock at PW-1 is at approximately 39 feet below grade;
- The depth to water in former production well PW-1 was approximately 100 feet below grade;
- The Snake Hill Formation, a dark grey shale of Medial Ordovician age appears to be present from 39 feet below grade to approximately 240 feet below grade;
- At approximately 240 feet below grade, the lithology changes from shale to a carbonate unit. This carbonate unit appears to be the Glens Falls Limestone belonging to the Trenton Group. The Glens Falls Limestone is a thin-bedded, fine to medium grained dark gray to black limestone above and thin to medium-

bedded, medium to coarse grained, light to medium gray limestone below (Fisher, 1984). The total thickness of approximately 170 feet indicates that the Isle La Motte Limestone of the Black River Group may also be present within this section.

- The Beekmantown Group appears to start at approximately 410 feet below grade. According to published literature (Fisher, 1984), the uppermost unit within the Beekmantown Group at the Fort Edward Plant is expected to be the Fort Ann Limestone. The Fort Ann Limestone is a massive, medium to thick bedded, mottled, medium to dark gray dolomitic limestone and calcitic dolostone with buff weathering and has a reported thickness ranging from approximately 50 to 115 feet. The thickness of the entire Beekmantown is expected to be in excess of 600 feet.

2.3.3. Review of Available Information of Potential Bedrock Ground Water Discharge Zones

A review of regional geology and bedrock ground water users will be conducted to identify potential bedrock ground water discharge zones. The results of the geophysical logging, packer testing and ground water sampling will be utilized to assist in determining discharge zones.

2.3.4. Additional Activities Conducted Pursuant to the Deep Bedrock Work Plan

A deep bedrock ground water evaluation work plan was prepared and submitted to NYSDEC in March, 1995 as part of the site five-year review. The objective of the deep bedrock ground water evaluation is to permanently decommission former production wells PW-1 and PW-2 and to test deep bedrock ground water quality at the Fort Edward Plant. Briefly, the scope consists of the following items:

- Video inspection of former production wells PW-1 and PW-2;
- Drilling of a new deep bedrock borehole;
- Packer testing of discrete intervals within the bedrock borehole;
- Deep bedrock ground water sampling;
- Installation of deep bedrock monitoring well; and,

- Permanent decommissioning (closure) of former production wells PW-1 and PW-2.

The deep bedrock ground water evaluation work plan is incorporated by reference into this site comprehensive remedial investigation/feasibility study work plan.

2.4. Shallow Bedrock Investigation

The objectives of the comprehensive RI/FS are focused on evaluating and mitigating potential impact to human health and the Hudson River by the Fort Edward plant. Results of on-site monitoring and off-site well sampling indicate that the shale bedrock underlying the plant and surrounding area is a potential contaminant migration pathway. In addition to the off-site well sampling program and the on-going on-site shallow bedrock ground water recovery and treatment, significant additional bedrock characterization is proposed to better define ground water quality and flow in the shallow bedrock.

Briefly stated, the proposed shallow bedrock investigation will consist of the following:

- Bedrock fracture analysis;
- Bedrock drilling and monitoring well installation;
- Well development and water level measurements;
- Monitoring well sampling and analysis; and
- Hydraulic conductivity testing.

As a continuation of the investigation conducted by Dames & Moore and reported in their Outfall 004 Investigation Report" dated October 24, 1994, additional subsurface investigation was conducted as part of the NYSDEC approved Work Plan Addendum A for the portion of the Fort Edward Plant between Lower Allen Street and the top of the Hudson River Bank. The work plan addendum was submitted to NYSDEC on November 28, 1994 and approved on December 7, 1994. The work included drilling installation of three well clusters (OBG-44, 45 and 48) at the locations shown on Figure 2-1. Each well cluster installed consists of three wells, overburden, shallow bedrock and deeper bedrock (approx. 140 deep).

Based on the investigation of the deep wells, well GM-40D, which was completed with over 70 feet of open bedrock, will be re-completed at a shallower depth with a smaller bedrock screen. It is anticipated that due to the depth to the top of bedrock at well GM-40D, the recompleted well will be screened at a depth of approximately 120-140 feet below grade. The screened interval for the recompleted well GM-40D will be utilized to place several additional deep bedrock wells at the site.

2.4.1. Bedrock Fracture Analysis

To aid in the investigation of environmental conditions at the Fort Edward Plant site, a fracture trace analysis and field bedrock joint orientation analysis will be performed. The objective of the analysis is to determine regional trend(s) of bedrock fracturing and/or jointing which may influence the general flow of ground water and to map site-specific photo linear features of geologic origin which may influence the transport of contaminants at the site.

Several sets of air photographs covering the site and surrounding area will be examined to map site-specific photo linears of geologic control which may influence the transport of contaminants at the Fort Edward Plant site. Additionally, aerial photographs will be used to determine the regional trend(s) of bedrock fracturing or jointing, which may influence the general flow of ground water at the site.

Bedrock exposures in the area of the Fort Edward Plant will be examined to determine bedrock strike, dip, joint orientations and other fracture planes in order to evaluate the potential for preferential pathways for ground water migration through the shale bedrock underlying the site. Information on significant ground water seeps and/or springs will also be collected.

The results of the fracture-trace evaluation and field bedrock joint orientation analysis will be plotted on Rose diagrams to graphically depict the preferred direction of bedrock fracturing.

2.4.2. Shallow Bedrock Well Drilling

Following completion of the bedrock fracture analysis, the final number and locations of shallow bedrock wells will be proposed. Currently, a total of ten new bedrock monitoring wells are proposed to be drilled and installed at the locations shown on Figure 2-1, at the Fort Edward Plant. Four bedrock monitoring well pairs will be drilled at the locations shown on Figure 2-1. Deep wells in each well pair will be screened over the interval at which well GM-40D is recompleted. This will allow calculation of vertical hydraulic gradients across the site and comparison of potentiometric heads across the site with a minimum of influence from vertical hydraulic head differences from location to location. Shallow bedrock wells will also be completed with a minimum of variation in the vertical positioning of screened intervals.

In addition to the well pairs, shallow bedrock wells will be drilled and installed at the two locations shown on Figure 2-1 to provide additional bedrock water quality information.

Each boring will be advanced through the unconsolidated deposits to the overburden-bedrock interface utilizing hollow-stem auger drilling techniques. The top of bedrock will be determined by split-barrel sampler refusal and/or prolonged grinding of the augers.

Split-barrel samples will be obtained continuously down to the top of bedrock in one boring at each location according to ASTM Method D-1586 in advance of the hollow-stem augers. Test boring logs describing subsurface materials encountered in each of these borings will be prepared by the on-site geologist or hydrogeologist. Soil samples from these borings will also be screened with a portable photoionization detector (PID) for health and safety purposes.

Overburden drilling will be accomplished using 6 1/4-inch ID hollow stem augers. All shallow bedrock wells will be constructed using 4-inch diameter steel or PVC casing grouted into a rock socket prior to rock drilling and coring. The cement grout will be allowed to set overnight before core drilling is initiated. Any remaining grout inside the casing will be drilled out using a 3 7/8-inch roller bit. The shallow bedrock wells will be drilled to final depth using conventional coring methods incorporating a NX core barrel equipped with a diamond impregnated core bit.

Each newly installed bedrock monitoring well will be constructed of 2-inch ID, flush-joint, Schedule-40 PVC riser pipe with between 10 to 20 feet of 0.020-inch slot well screen. The base of each well will be equipped with threaded bottom plugs and the top of each well will be equipped with a vented, non-threaded cap.

After setting the well, sand will be introduced gradually to fill the annular space between the screen and the borehole adjacent to the screen. The sand pack will extend from the bottom of the boring to approximately one foot above the top of the screen. A Morie Grade 0 or equivalent sand will be used.

A bentonite pellet seal will be placed above the sand pack to form a seal at least 2 feet thick. A thick cement-bentonite grout will extend from the top of the bentonite pellet seal to the ground surface. The grout material will consist of Type I portland cement mixed with either a powdered or granular bentonite to a consistency deemed acceptable by the supervising geologist or hydrogeologist. The grout will be introduced via a tremie pipe lowered to just above the top of the bentonite pellet seal. As the grout is pumped into the borehole, the tremie pipe will be removed. Each well will be completed with a lockable cap.

2.4.3. Decontamination Procedures

The drilling program will also include decontamination procedures to prevent potential contaminants from being introduced into the borehole or transferred across the site. A temporary decontamination pad will be constructed near the facility equalization basin. Prior to drilling the first boring, the equipment used in drilling and well installation will be cleaned to remove possible contaminants which may have been encountered during mobilization of drilling equipment to the site. Equipment which will come into contact with the soil, as well as drill tools, augers, drill rod, hoses and the back of the drill rig, will undergo the initial cleaning process. While working at the site, the drilling equipment which becomes soiled will be decontaminated between boring/well locations. Drilling equipment will again undergo the cleaning process prior to leaving the site at the conclusion of drilling activities.

Well construction materials will be transported to the site factory sealed in plastic. In the event the well construction materials are not sealed, they will be decontaminated and sealed in plastic before beginning drilling at the first location.

The cleaning process will involve the use of a high-pressure steam cleaner. Clean, potable water will be used for all decontamination and drilling procedures. Decontamination water will be collected and treated at the facility wastewater treatment plant.

2.4.4. Monitoring Well Development

Each newly-constructed monitoring well will be developed to:

- Remove fine-grained materials from the sand pack and formation;
- Reduce the turbidity of ground water samples; and
- Increase the yield of the well to reduce the potential of the well yielding an insufficient volume of water during ground water sampling.

The monitoring wells will be developed as soon as possible, but not less than 24 hours after installation.

2.4.5. Hydraulic Conductivity Testing

In-situ hydraulic conductivity tests will be performed in each newly installed bedrock monitoring well to determine the hydraulic conductivity of the screened interval. Hydraulic conductivity testing of the wells installed as part of Addendum A to the Outfall 004 Work Plan and selected pre-existing bedrock monitoring wells will also be conducted.

2.4.6. Water Level Measurements

Prior to well purging and initiation of well sampling activities, a round of water level measurements will be collected from the bedrock wells at the site. Additionally, following installation of the new bedrock monitoring wells, weekly water level measurements will be collected from site wells for a period of approximately six weeks. Depending on the results of the water level monitoring, weekly water level measurements may be extended. Additionally, continuous water level measurements may be obtained from one or more bedrock wells in the southwestern portion of the site, to determine if there is any interaction between the bedrock ground water recovery wells (GM-11D and GM-8DR) and adjacent monitoring wells.

2.4.7. Ground Water Sampling

Following installation of the new bedrock monitoring wells, the new and pre-existing bedrock wells will be sampled. Based on the historical ground water sampling results at the plant, the samples will be analyzed for volatile organic compounds by a modified EPA Test Method 8240 and PCBs by EPA Test Method 8080. Based on the results of the ground water sampling and analysis; a second round of samples will be collected from each new and selected pre-existing monitoring wells for PCB and VOC analysis.

2.5. Expanded Shallow Unconsolidated Aquifer Study

Significant on-site and off-site ground water studies and remedial actions designed to address the shallow unconsolidated aquifer have been implemented at the Fort Edward plant site. The objective of the comprehensive RI/FS is to confirm the results of previous investigations and complete the site characterization with a focus on evaluating and mitigating potential impacts to human health and the Hudson River.

Shallow unconsolidated aquifer ground water recovery at the plant was initiated in 1984. Off-site ground water recovery was initiated in October 1989 as part of the NYSDEC approved off-site remedial plan (LMS, 1989). To increase the efficiency of the shallow ground water recovery, a NYSDEC-approved multiple recovery well system was installed in June and July 1991. Presently, ground water from the shallow unconsolidated deposits is pumped from one off-site and five on-site recovery wells. Approximately 32 million gallons of ground water was pumped from the shallow unconsolidated aquifer and treated at the Fort Edward plant site in 1993.

The objective of the shallow unconsolidated aquifer study is to characterize shallow aquifer conditions, particularly with respect to potential impact, if any, on the Hudson River and the surrounding community. To achieve these objectives, additional investigation is proposed both on the plant site and in the surrounding areas.

Briefly stated, the proposed expanded shallow unconsolidated aquifer study will consist of the following:

- Ground water sampling and analysis;
- Inspection and sampling of site sewers;
- Soil Gas Sampling and Analysis;
- Soil borings and soil sampling;

- Installation of new monitoring wells;
- Hydraulic conductivity testing; and,
- Analysis of data and assessment of environmental conditions.

2.5.1. Water Level Measurements

Prior to well purging and initiation of monitoring well sampling activities, a full round of water-level measurements will be obtained from site monitoring wells with an electronic water-level indicator. The electronic water-level measurement method involves lowering a probe into a well which, upon contact with the water, completes an electric circuit. At the instant the circuit is closed, the water-level indicator provides an audible and/or visual alarm which indicates that the water surface has been contacted. The cable of the probes utilized will be graduated in 0.01 foot increments.

2.5.2. Initial Ground Water Sampling

In preparation for the site comprehensive remedial investigation, an initial round of ground water sampling was conducted in October 1994. Each existing well identified was sampled and analyzed for PCBs by EPA Test Method 608 and VOCs by modified EPA Test Method 624. The 624 analysis list of target compounds was expanded to include additional EPA SW-846 Method 8021 constituents (i.e., aromatic VOCs). A visual assessment for free phase oil was also performed. No free oil was identified in any of the site monitoring wells besides GM-27 and DGC-41. Based on the expanded parameter list it was determined that naphthalene and trichlorobenzene were detected in low concentrations in site monitoring wells and will be added to site target analytical list.

Following completion and installation of the additional monitoring wells proposed for the site, a round of ground water sampling and analysis will be conducted for the new and pre-existing overburden monitoring wells. Site monitoring wells will be sampled and analyzed for VOCs and PCBs. A visual assessment for free phase oil will also be performed. If recharge is sufficient, samples will be collected immediately following well purging. For slowly recharging wells, every effort will be made to collect samples as soon as possible and within three hours of well purging. Samples will be collected either by using bottom-filling bailers with new nylon rope, dedicated (high density polyethylene) tubing with WaTerra pump or dedicated tubing with peristaltic pump.

2.5.3. Inspection of Sewers, Manholes, and Catch Basins

As inspection of on-site sewers, manholes and catch basins will be conducted to assess the condition of these sewer components and the potential for the sewers to serve as conduits for ground water migration or as reservoirs of contaminants that could potentially be released to the environment.

Verification of Existing Sewer System Components

The initial step in the sewer system inspection will involve field verifying the existence and location of sewer system components which are depicted on various facility maps and piping plans of the Fort Edward facility. Manholes, catch basins, sewer cleanouts, and other potential sewer system access points in the study area will be identified and their location compared to available site documentation. To the extent practicable, discrepancies between maps and drawings of different vintage will be reconciled for the purpose of establishing an accurate, comprehensive field map. The field map will facilitate the subsequent sewer inspection and the selection of manhole and catch basin sampling locations.

Sewer system components identified during the field verification task will then be surveyed to define their location and surface elevation. USGS survey datums will be used to locate the top surface of the sewer manholes and catch basins; existing benchmarks at the Fort Edward Plant will be located, if possible, and used to horizontally locate each manhole and catch basins.

Visual Inspection of Manholes and Catch Basins

Manholes and catch basins in the study area will be opened and inspected after the initial verification step. The inspection process will involve an assessment of the construction and condition of the interior of each sewer access point including evidence of current waste water flows. The number, size, and elevation of inlet and outlet piping as well as the type and condition of construction materials will also be determined. Evidence of ground water infiltration, indications of plugged or abandoned sewer lines will be noted. A visual assessment for free phase oil will also be performed as an indication of kerosene or PCB accumulation.

Visual inspections of select manholes will be conducted during at least one significant rain event to verify the performance of the storm water collection system and to evaluate the effectiveness of earlier efforts to seal and isolate abandoned sewer lines.

In order to maximize the depth of vertical manhole surface visible to the inspection personnel, it may be necessary to lower the level of waste water in the sewer system by lowering the water level in the equalization basin. This would reveal more of the interior construction of the active manholes and facilitate a more detailed inspection. If standing water persists, the manhole will be pumped out and the water sent to the equalization basin for treatment.

Television Inspection of Sewers

Following visual inspection of sewer access points, select sewer lines may be inspected using a high resolution video camera placed into the exposed end of the pipe. The camera will be attached to a cable and moved through the sewer pipe by means of a manual winch to document the condition of the sewer pipes and joints and to verify connections. The degree of ground water infiltration or inflow will also be monitored. In pipe sections where use of the television inspection technique is not suitable, other methods such as dye testing or smoke testing may be employed to evaluate sewer connections.

2.5.4. Sampling Manholes and Catch Basins

In order to evaluate the extent of PCBs and VOCs in the site sewers, samples of waste water or other aqueous media observed in select manholes and catch basins will be collected and analyzed for PCBs by EPA Test Method 608 and VOCs by modified EPA Test Method 624. Free phase oil observed in the manholes or catch basins during the initial inspection or upon re-inspection will also be sampled and analyzed for PCBs and VOCs.

Samples will be collected using a decontaminated stainless steel beaker. The beaker will be held so as to capture the flow of the inlet pipe, if exposed, or lowered slowly into the standing water column to minimize agitation of the water in the manhole. Individual sample containers will be filled directly from the beaker. Special attention should be given to filling vials for VOC analysis to avoid any headspace in the vials after capping.

2.5.5. Soil Gas Survey

A soil gas survey will be performed in the vicinity of the Foil Mill to identify areas of VOC contamination and to assist in placement of new shallow unconsolidated monitoring wells at the plant.

Grid Layout and Locations

The soil gas survey will utilize a fifty (50) foot grid (as shown on Figure 2-2) spacing in order to investigate the following three locations:

- The area between Buildings 27 and 40;
- The area between Building 40 and Allen Street; and
- The area immediately south of Building 40.

Additionally, soil gas samples will be collected every 50 feet along the western property line. Prior to initiation of soil gas sampling, sampling locations will be properly located and marked in the field. Based on the results of the soil gas survey the proposed soil boring program may be modified.

In order to investigate low level VOCs observed in well GM-10, a soil gas grid will be layed out in a "spoked" pattern, with the center of the spoke being monitoring well GM-10. Three spokes will extend laterally from GM-10 in a north-northeast, an east-southeast and a southeast direction. Samples will be collected at twenty-five foot increments along these spokes to a maximum of 75 feet.

2.5.6. On-Site Soil Boring and Sampling Program

Drilling Program

The purpose of the on-site drilling program is to better define the site unconsolidated stratigraphy and to evaluate the potential for the presence of non-aqueous phase liquid (NAPL). The drilling program will focus on the areas between buildings 27 and 40, south and northwest of building 40.

Soil borings will be advanced using four and one quarter-inch hollow stem augers and continuous soil samples obtained using two-inch diameter split-spoon sample assembly. A total of 13 soil borings will be advanced at the approximate locations shown on Figure 2-3. Each boring will be advanced to the top of the low permeability glaciolacustrine clay or till layer. Drill cuttings will be drummed and disposal of these drums will be managed by the site EHS staff.

Continuous split-barrel soil samples will be collected following ASTM standard D-1586 for the split-barrel sampling method. All split-barrel samples will be logged on site and retained for additional analysis, if necessary. Soil samples will be described using the Unified Soil Classification System and the Wentworth particle size classifications. Descriptions of soil sample texture, composition, color, consistency, moisture content, and recovery will also be recorded. Test boring logs describing the subsurface materials encountered in each boring will be prepared by a qualified on-site hydrogeologist.

Analytical Soil Sampling

Samples selected for laboratory analysis will be analyzed for PCBs and TPH. Samples will be selected for laboratory analysis based on photoionization detector (PID) readings, results of the UV fluorescence and hydrophobic dye testing and visual inspection. The supervising O'Brien & Gere geologist will disassemble the split-spoon and carefully slice the sample in half along the vertical axis. The sample will then be checked for the following in this order:

- visual inspection for both TPH and NAPL;
- PID for TPH and VOCs;
- UV florescence for NAPL; and
- hydrophobic dye/soil-water shake for NAPL.

The field geologist will make the final determination as to which samples will be laboratory analyzed based on these field tests.

Soil samples for laboratory analysis will be obtained in accordance with the following procedures:

1. Perform initial field screening of sample with a PID and perform initial examination of the UV fluorescence of the sample following the procedures described in Section 2.5.8.;

2. Obtain a sufficient quantity of soil for the desired analysis. Samples collected for laboratory analysis will be obtained from the split-barrel sampler. Samples collected for the analysis of VOCs will be transferred directly to the VOA vial with minimal agitation in order to reduce the volatilization of any VOCs that may be present;

3. After collecting the sample, record the time of sampling on the sample containers and record the date and sample collection time in the field notebook; and

4. Place the sample containers in a cooler containing wet ice or ice packs for transport to the laboratory. Pack the sample containers to minimize the potential for breakage.

Soil sampling will also include one boring in the area of the former mineral oil storage tank. Continuous split-barrel soil samples will be collected from the ground surface down to the former tank's base or the top of the low permeability unit, whichever is deeper. This soil sample will be collected and analyzed by EPA Test Methods 8240, 8270 and 8080 for VOCs, semi-volatile organic compounds and PCBs, respectively.

2.5.7. Soil Grab Sample Collection

Grabs samples will be collected in the soil disposal area (SWMU #16) north of the Foil Mill. Seven soil samples will be collected from the approximate locations shown in Figure 2-3 from a depth of 12 to 24 inches below the existing soil piles. Five samples will be collected from the area of past soil disposal and two will be collected from the area of recent soil disposal.

Soil grab samples will be collected by first clearing debris and larger stones from the area to be sampled then advancing a hand auger equipped with a two-inch diameter barrel to the desired depth. Samples will be described using the Unified Soil Classification System. Descriptions of soil sample texture, composition, color, consistency, and moisture content will also be recorded.

Grabs samples will be transferred to appropriate containers and submitted for analysis of PCBs by EPA Test Method 8080 and VOCs by EPA Test Method 8240. Samples collected for analysis of VOCs will be transferred with minimal agitation to reduce the potential for volatilization of VOCs present in the sample.

2.5.8. NAPL Field Screening Procedures

The objectives of the NAPL field screening at the Foil Mill site are to evaluate the extent of impacted soil and assess whether NAPLs are present in the unconsolidated deposits at the site. Two field methods are proposed to visually detect NAPL in the soil samples; these include an examination of the UV fluorescence of the samples and/or the use of a hydrophobic dye soil-water shake test.

2.5.9. Monitoring Well Installation

Upon completion, a soil boring may be converted into a permanent monitoring well. Soil borings which are not converted into monitoring wells will be completely grouted to the surface using a cement/bentonite grout slurry. In order to better define ground water flow and quality at the facility, monitoring wells are proposed for the following locations as shown on Figure 2-4:

- the southeast corner of the Foil Mill (Building 40);
- the southwest corner of the Foil Mill;
- the northwest side of the Foil Mill near the building;
- near the midpoint of the eastern perimeter of the Foil Mill, directly adjacent to the building;
- along the southern perimeter of the Foil Mill and adjacent to building;
- between railroad tracks and Allen Street west of Well F-2;
- the south side of the equalization basin; and
- along the eastern property line between GM-15 and GM-9.

Based on the results of the soil gas survey and the soil boring program, additional soil borings may be converted into monitoring wells.

After completion of drilling and sampling, the soil borings to be converted into monitoring wells will be backfilled with moistened bentonite pellets to a depth of at least one foot below the desired monitoring well depth. A one foot layer of silica sand will then be placed on top of the bentonite to isolate the well screen from the bentonite. The remaining boring depth at each well location will be completed as a monitoring well and subsequently developed to prepare for sampling. The following procedures will be used to install and develop the monitoring wells.

Monitoring wells will be designed and installed in accordance with the following methods and specifications. Either standpipe or flush-mounted construction will be used depending on the final location of each well, site considerations, and the potential for damage. Monitoring wells will be installed according to the following specifications:

- Two-inch ID threaded PVC, flush-joint casing and screens will be used;
- Screened across contaminated zones will be identified during drilling and review of laboratory data. Screens will be a maximum of fifteen feet long and slot openings will be 0.010 inches;
- The top of the casing will extend to approximately two feet above ground surface where possible, given site-specific considerations. Otherwise, flushmount casings will be used;
- The annulus around the screens will be backfilled with an appropriate size of silica sand such as Morie #0 sand to a minimum height of two feet above the top of the screen;
- A bentonite pellet seal will be placed above the sand pack. The seal will be allowed to hydrate before placement of grout above the seal;
- The remainder of the annular space will be filled with a cement-bentonite grout to ground surface. The grout will be pumped through a tremie pipe. The grout will be mixed in the following proportions: 6.5 gallons of water to a 94-pound bag of Portland

Type I or Type III cement, and 3 to 5 pounds of powdered bentonite. The grout will be allowed to set for a minimum of 24 hours before wells are developed;

- Each monitoring well will have a vented cap and a four-inch diameter, steel casing equipped with a locking cap placed over the monitoring well. The protective casing will extend at least two feet below ground surface and be cemented in place. In some areas, it may be necessary to provide flush mounted casings;

- The cement 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;

- A weep hole will be drilled at the base of the protective standpipe casing to allow water between the inner and outer casing to drain; and

- The top of the PVC well casing and outer protective casing will be marked and surveyed to the nearest 0.01 foot and elevations will be determined relative to a fixed benchmark or datum.

2.5.10. Monitoring Well Development

After a minimum of 24 hours after completion, the monitoring wells will be developed by either bailing, using a centrifugal pump and dedicated polyethylene tubing, or by WaTerra positive displacement foot-valve pumps and dedicated polyethylene tubing. Development water will be monitored for organic vapors with a PID. The development water will be contained and added to the on-site equalization basin for subsequent treatment at the Fort Edward plant waste water treatment facility.

Well development will proceed by repeated removal of water from the well until the discharge water is relatively sediment free. Development effectiveness will be monitored at regular intervals (after each well volume is removed) using a portable turbidity meter. In addition, pH, temperature, and conductivity measurements will be obtained during development. Measurements versus volume removed will be recorded. Well development will be discontinued either when the turbidity of the discharged water reaches the development goal of 50 Nephelometric

Turbidity Units (NTUs) or when the turbidity level stabilizes indicating that additional development will be ineffective.

Following development, wells will be allowed to recover for at least one week prior to ground water sampling. Monitoring well development will be overseen by a field geologist and recorded on well development sheets.

2.5.11. Surveying

The newly-installed soil borings and monitoring wells will be surveyed to accurately determine their locations and top-of-casing elevations. In addition, all pre-existing monitoring wells, manholes and catch basins identified in the Foil Mill area will be surveyed. The new survey will then be integrated and compared with existing site data in order to properly assess ground water elevations, gradients and flow directions.

USGS survey datums will be used to locate the wells vertically (elevation) to the one-hundredth of a foot.

2.5.12. Hydraulic Conductivity Testing

In-situ hydraulic conductivity tests will be performed on each new monitoring well to determine the hydraulic conductivity of the screened interval. These tests involve observing the recovery of water levels toward an equilibrium level after an initial perturbation. The perturbation may be either a sudden rise or fall in water level. During a slug test, either a 5-foot inert rod or a volume of deionized water will be quickly introduced into the well to cause a water level rise. During a bail test, a 5-foot inert rod or a clean sampling bailer will be rapidly removed from the well to cause a water-level drop. Procedures and equipment requirements may vary depending on the rate of the water-level recovery. Each well will be tested in accordance with the following procedures:

- Determine the type of test to be performed based on the following:
    - If the screened interval of the well straddles the water table, only use a rising head test;
    - If the screened interval of the well is submerged within water, either method may be used, preferably both;

- Record appropriate initial data in field notebook, including date of test, well identification, well construction details (i.e., screen length, screen diameter, riser diameter, depth to top of screen, sand pack length, sand pack diameter, and depth to top of sand pack), type of test and names of field personnel;

- Clean the downhole equipment (e.g., pressure transducer, associated cable and, if used, the bailer or slug and associated line) following standard decontamination procedures before initiating test(s) at each well;

- Measure and record the static water level in the well (only wells which have fully recovered to static level conditions after drilling and development should be tested);

- Connect the pressure transducer to the data logger and lower the transducer into the well 5 to 10 feet below the water surface. Secure the position of the transducer by clamping the transducer cable to the well casing using a rubber-covered clamp. If the edges of the well casing are sharp, cover them with cloth or duct tape to protect the transducer cable;

- Quickly create the water level perturbation by slugging or bailing the well. While there is no fixed requirement for the magnitude of the change in water level, it is suggested that a minimum of 20% instantaneous hydraulic head differential be created to allow collection of a suitable data base; and

- If another test is to be performed, replace the bailer or solid object and allow the well to re-equilibrate prior to performing the next test. Repeat the procedures, changing settings as appropriate.

Interpretation of water level versus time data from the hydraulic conductivity tests will be performed using the Hvorslev method. Other appropriate methods may be utilized, and if deemed necessary.

2.6. DNAPL Investigation

The objective of the DNAPL investigation is to completely characterize the extent of subsurface DNAPL at the Fort Edward facility. As part of the operation and maintenance activities undertaken at the facility in

1994, a review of the current and historical DNAPL recovery well system performance was performed. Based on the recommendations of the DNAPL Recovery Well Evaluation summary report dated October, 1994, GE implemented an investigation to verify the extent of subsurface DNAPL, as identified in the Supplemental Hydrogeologic Investigation performed by Dunn Geoscience Corporation (Dunn) in 1990. The DNAPL assessment field work was conducted by O'Brien & Gere during the period from October 20, 1994 to February 9, 1995 and consisted of the following:

- A ground penetrating radar (GPR) pilot test was performed in the central portion of the parking lot to evaluate whether GPR is effective in identifying DNAPLs in the subsurface;
- a subsequent GPR survey was performed in the eastern portion of the parking lot to help identify the depth to the top of the low permeability unit and aid in the placement of additional borings;
- Drilling and split-barrel sampling of 35 soil borings to the top of the low permeability unit;
- Installation of two DNAPL observation wells (OW-1 and OW-2);
- Surveying of observation wells OW-1 and OW-2 and new soil boring locations; and,
- Preparation of revised top of low permeability unit contour map and summary report.

The results of the soil boring program indicate that subsurface DNAPL in the southern portion of the parking lot is observed in a relatively small area in the immediate vicinity of ORW-1 and DGC-41. No evidence of DNAPLs was observed in the six borings drilled in Park Avenue (SB-3, SB-4, SB-5, SB-18, SB-21, SB-22).

In the area of oil recovery well ORW-2, five test borings showed evidence of DNAPL (SB-8, SB-12, SB-16, SB-19 and SB-30). In these soil borings, the layer of DNAPL saturated soil ranged in thickness from approximately 0.05 feet (SB-16) to approximately three feet (SB-8). The DNAPL was observed directly overlying the low permeability silt and clay deposits in soil borings SB-8, SB-12 and SB-19. In soil borings SB-16 and SB-30 the DNAPL was observed within seams of fine sand interbedded with seams of silt and clay within a transitional zone which is present in the eastern portion of the parking lot. Eight additional soil borings were drilled in the southeastern portion of the parking lot (SB-28, SB-29, SB-31, SB-32, SB-33, SB-34, SB-35 and SB-36) to the south and east of the borings where DNAPLs were observed, no additional DNAPL was observed in these borings.

In order to gain a better understanding of the distribution of DNAPL in the subsurface, the top of low permeability unit contour map that was generated as part of the Supplemental Hydrogeologic Investigation performed by Dunn in 1990 was updated in the field as soil borings were completed. A final top of low permeability unit contour map will be prepared as part of the DNAPL assessment summary report currently in preparation. Subsurface conditions observed indicate that the DNAPL observed in the vicinity of ORW-1 is separated from the area of DNAPL observed in the vicinity of ORW-2 by a ridge in the top of the low permeability unit. This ridge appears to keep the DNAPL observed in soil borings SB-8, SB-12, SB-16, SB-19 and SB-30 and wells GM-27 and ORW-2 contained to a area which extends from SB-19 located near the main plant, to SB-30 located to the southeast of ORW-2. In addition, the results of the soil boring program indicates that the top of the low permeability unit increased in depth towards the southeast of the parking lot. Additionally, a transitional zone which increases in thickness was also observed in the southeastern portion of the parking lot.

To assist in determining the nature of the bedrock and former production wells PW-1 and PW-2 boreholes, video logging was performed by O'Brien & Gere during the period from April 12 to 14, 1995. Access to the borehole in order to perform the video logging was performed through the 2.25-inch inside diameter support pipe.

The borehole video logging was performed using a Geo Vision Micro^{tm} Model #GVMICROM1 video system manufactured by Marks Products, Inc. The video system consists of a high resolution color camera mounted inside a 1⅛-inch O.D. x 13-inch stainless steel water proof housing equipped with a single bulb out-front light source. The video signal was viewed on a portable color T.V. and recorded on VCR tape. In addition, the video system provides an optical encoded footage counter which displays depth to the nearest foot.

A brief discussion of the results of the video survey are as follows.

- Former production well PW-1 consist of open borehole from approximately 26 feet BG to approximately 568 feet BG. The interval from approximately 26 to 35 feet BG consists of open borehole within the glacio-lacustrine silt and clay unit. The interval from approximately 35 to 37 feet BG appears to consist of glacial till with an open bedrock borehole extending from 37 feet to 568 feet BG. In addition, the video logging indicates potential migration of contaminants into the borehole originating from the glacial till layer. At 568 feet the borehole is obstructed by what appears to be two pieces of U-shaped metallic bars which are lodged against the side of the borehole. Attempts to dislodge these bars were unsuccessful and the nature of the borehole below this depth is unknown. Additionally, several feet of bacteria growth has accumulated on the bottom of the borehole obscuring the view beyond the obstruction.

- Former production well PW-2 consist of open borehole from approximately 45 feet BG to approximately 572.5 feet BG. The borehole walls exhibit significant growth of iron bacteria, therefore, it was difficult to assess the nature of the bedrock. However, no significant voids or fractures were observed and the sides of the borehole appeared to be relatively smooth. In addition, several feet of bacteria growth has accumulated on the bottom of the borehole, although, total depth soundings of the borehole indicate that there does not appear to be a build-up of sediment in the bottom of the borehole.

2.6.1. Additional Soil Borings - Top of Clay

In order to better understand the distribution of DNAPLs at the facility, additional soil borings are proposed in the northern portion of the parking lot and within Buildings 25 and 27 pending access limitations. As shown in Figure 2-5, four soil borings are proposed in the driveway between the parking lot and the main building, two soil borings are proposed in the existing tank farm and approximately six soil borings are proposed in the tank farm and PCB rail car off loading areas.

Soil borings will be advanced to the top of the low permeability glaciolacustrine clay or till layer. If no DNAPL is observed at the sand-clay interface then the borings will be advanced to the top of the bedrock.

Drill cuttings will be drummed and disposal of these drums will be determined at a later time by the site EHS staff.

Continuous split-barrel soil samples will be collected following ASTM standard D-1586 for the split-barrel sampling method. Split-barrel samples will be logged on site and retained for additional inspection, if necessary. Soil samples will be described using the Unified Soil Classification System and the Wentworth particle size classifications. Descriptions of soil sample texture, composition, color, consistency, moisture content, and recovery will also be recorded. Test boring logs describing the subsurface materials encountered in each boring will be prepared by the on-site hydrogeologist.

Split-barrel samples will be field screened using a photoionization detector and unaided visual inspection of the samples for the presence of DNAPL will be performed. Subsequently, examination of the fluorescence of the sample will be performed in a dark area (e.g., a UV light box, back of a field vehicle, etc.) by scanning the sample with a UV light. The sample will be left in the split-barrel sampler during the examination so that the sample interval of detected DNAPL, if any, can be determined.

If DNAPL is observed, a soil boring(s) may be converted into a 2-inch diameter PVC well to provide a mechanism for monitoring the thickness of DNAPL and the progress of DNAPL recovery operations. Soil borings which are not converted into monitoring wells will be completely grouted to the surface using a cement/bentonite grout slurry.

2.6.2. Till Zone Borings

In addition to the soil borings described in Section 2.6.1., seven additional soil borings will be drilled in the vicinity of the former leach field and former production well PW-1. The purpose of the additional soil borings is to provide information on the potential distribution of DNAPL in the glacial till layer. These soil borings will be sampled continuously through the glacial till unit following ASTM Standard D-1586. Split barrel samples will be field screened using a photoionization detector and the fluorescence of the sample, if any will be examined.

If DNAPL is observed, a soil boring(s) may be converted into a 2-inch diameter PVC well to provide a mechanism for monitoring the thickness of DNAPL. Soil borings which are not converted into monitoring wells will be completely grouted to the surface using a cement/bentonite grout slurry.

2.7. Five Year Review of Off-Site Remedial Program

In accordance with the five year review provision of the off-site remedial plan (LMS, 1989), implemented in October 1989, a five year review of the off-site remediation was proposed by GE on October 5, 1994. The scope of work was approved by NYSDEC on October 12, 1994. The objective of the review is to verify off-site ground water quality and to reevaluate the off-site ground water remedial program.

2.7.1. Monitoring Well Installation

As shown on Figure 2-7, five new shallow unconsolidated aquifer off-site monitoring wells were installed between November 22, 1994 and January 12, 1995 to better define off-site ground water quality. The wells were drilled using hollow-stem auger drilling techniques and two inch diameter PVC monitoring wells installed. The well location were selected to better define water quality and ground water elevations and flow in the shallow unconsolidated aquifer. Split barrel samples were collected and screened with a photoionization analyzer for the presence of VOCs. Following installation, each of the new wells was surveyed to determine location and elevation. Several rounds of water level measurements will be obtained to determine ground water flow directions.

2.7.2. Sampling and Analysis

As part of the reassessment, samples were collected for VOC and PCB analysis from the following locations:

- Each of the six off-site state wells (SW-1 through SW-6);
- Six springs and three samples from the unnamed brook near Marion Street to determine surface water quality; and
- Several off-site former water supply wells, including Glens Falls National Bank, Hillman, Dobroski and Hughes wells.

2.7.3. Reporting

The results of the off-site sampling will be evaluated along with the results of the residential sampling program and on-site and historical information. The results of five year review of the off-site remedial program will be represented in a report to NYSDEC and recommendations for additional work will be incorporated in this comprehensive RI/FS Work Plan.

2.8. Operations and Maintenance Activities

In accordance with Order on Consent Index T032785 and the on-site and off-site remedial plans, GE has undertaken certain operation and maintenance (O&M) activities. The obligations to implement these O&M activities is being transferred to and will continue under Order on Consent, Index #A5-0316-94-06.

2.8.1. DNAPL Recovery Well Evaluation

DNAPL recovery well system operations for 1994 and subsequent years will be documented in the annual reports of the ground water collection and treatment system and monitoring activities.

2.8.2. Ground Water Monitoring

Ground water sampling and analysis activities will continue to be conducted in accordance with the Fort Edward Facility Sampling and Analysis Plan (SAP) (RUST, 1993) during the implementation of the RI/FS. The SAP was prepared to guide data collection and evaluation procedures to be utilized during the routine monitoring activities performed at the facility in accordance with the NYSDEC approved Remedial Program. The SAP was prepared in September 1993 and subsequently approved by NYSDEC.

Briefly, the current site monitoring program consists of the following items:

- Bimonthly monitoring of ground water levels in 38 monitoring wells. Including recovery wells RW-1A, RW-2, RW-3, RW-4, RW-5 and RW-6 to more precisely monitor the drawdowns and the calculated specific capacity of these wells;

- Semi-annual monitoring of ground water levels in 14 monitoring wells;

- Semi-annual monitoring of ground water quality in the two bedrock recovery wells (i.e., GM-8DR and GM-11D);
- Quarterly monitoring of ground water quality in the six shallow unconsolidated unit recovering wells (i.e., RW-1A, RW-2, RW-3, RW-4, RW-5 and RW-6);
- Semi-annual monitoring of ground water quality in 18 on-site monitoring wells and 7 off-site springs and wells;
- Annual monitoring of ground water quality in 23 monitoring wells;
- Quarterly monitoring for presence of product in monitoring wells GM-27 and DGC-41; and
- Semi-annual monitoring for presence of product in monitoring wells GM-1, GM-5 and F-2.

The results of the ground water monitoring and operation of the ground water collection and treatment system are summarized in an annual report. The annual report is prepared in the first quarter of the following calendar year.

2.8.3. Additional Activities

The on-going O&M activities at the Fort Edward facility will continue under Order on Consent, Index #A5-0316-94-06. Should any modifications be deemed appropriate, the modifications will be submitted to NYSDEC for review and approval prior to implementation.

2.9. Addendum A - 004 Investigation

In accordance with Order-on-Consent #A5-0313-93-12, GE has conducted an investigation and implemented remedial activities associated with the former 004 outfall. These measures have included construction of an outfall diversion such that water discharges directly into the Hudson River and the excavation of pipe bedding materials. A report of the outfall 004 investigative and remedial activities was prepared by Dames & Moore and submitted to NYSDEC on October 28, 1994. A supplemental investigation was proposed by GE as Addendum A to the Work Plan. The scope of work was approved on December 7, 1994 by DEC and subsequently implemented. Following completion of a summary report, recommendations identified in the report will be implemented as part of this comprehensive RI/FS.

2.10. RCRA Corrective Action Requirements

The comprehensive RI/FS work plan containing work plan elements that address each of the SWMUs and other areas that are identified as requiring further investigation in the Part 373 permit. This section provides a brief summary of the scope of work designed to address each SWMUs and other areas at the Fort Edward Plant

Former Mineral Oil Tank Area

As part of the expanded shallow unconsolidated aquifer study; one boring is proposed in the area of the former mineral oil storage tank. A sample of the soil from the boring will be analyzed for PCBs, VOCs and semi-volatiles. Additional details are described in Section 2.5.6.

Foil Mill Area

The investigation of the area in the vicinity of the Foil Mill is incorporated into the work described in Section 2.5. covering the expanded shallow unconsolidated aquifer study. A significant portion of the additional characterization of the shallow unconsolidated unit at the Fort Edward plant is specifically directed towards defining subsurface conditions in the vicinity of the Foil Mill. Specifically, the following items, described in Section 2.5., are proposed:

- ground water sampling and analysis;
- inspection and sampling of sewers, manholes and catch basins;
- soil gas sampling and analysis;
- soil borings and soil sampling; and
- monitoring well installation and sampling.

- Semi-annual monitoring of ground water quality in the two bedrock recovery wells (i.e., GM-8DR and GM-11D);
- Quarterly monitoring of ground water quality in the six shallow unconsolidated unit recovering wells (i.e., RW-1A, RW-2, RW-3, RW-4, RW-5 and RW-6);
- Semi-annual monitoring of ground water quality in 18 on-site monitoring wells and 7 off-site springs and wells;
- Annual monitoring of ground water quality in 23 monitoring wells;
- Quarterly monitoring for presence of product in monitoring wells GM-27 and DGC-41; and
- Semi-annual monitoring for presence of product in monitoring wells GM-1, GM-5 and F-2.

The results of the ground water monitoring and operation of the ground water collection and treatment system are summarized in an annual report. The annual report is prepared in the first quarter of the following calendar year.

2.8.3. Additional Activities

The on-going O&M activities at the Fort Edward facility will be continued throughout the comprehensive RI/FS process. Should any modifications be deemed appropriate, the modifications will be submitted to NYSDEC for review and approval prior to implementation.

2.9. Addendum A - 004 Investigation

In accordance with Order-on-Consent #A5-0313-93-12, GE has conducted an investigation and implemented remedial activities associated with the former 004 outfall. These measures have included construction of an outfall diversion such that water discharges directly into the Hudson River and the excavation of pipe bedding materials. A report of the outfall 004 investigative and remedial activities was prepared by Dames & Moore and submitted to NYSDEC on October 28, 1994. A supplemental investigation was proposed by GE as Addendum A to the Work Plan. The scope of work was approved on December 7, 1994 by DEC and subsequently implemented. Following completion of a summary report, recommendations identified in the report will be implemented as part of this comprehensive RI/FS.

2.10. RCRA Corrective Action Requirements

The comprehensive RI/FS work plan containing work plan elements that address each of the SWMUs and other areas that are identified as requiring further investigation in the Part 373 permit. This section provides a brief summary of the scope of work designed to address each SWMUs and other areas at the Fort Edward Plant

Former Mineral Oil Tank Area

As part of the expanded shallow unconsolidated aquifer study; one boring is proposed in the area of the former mineral oil storage tank. A sample of the soil from the boring will be analyzed for PCBs, VOCs and semi-volatiles. Additional details are described in Section 2.5.6.

Foil Mill Area

The investigation of the area in the vicinity of the Foil Mill is incorporated into the work described in Section 2.5. covering the expanded shallow unconsolidated aquifer study. A significant portion of the additional characterization of the shallow unconsolidated unit at the Fort Edward plant is specifically directed towards defining subsurface conditions in the vicinity of the Foil Mill. Specifically, the following items, described in Section 2.5., are proposed:

- ground water sampling and analysis;
- inspection and sampling of sewers, manholes and catch basins;
- soil gas sampling and analysis;
- soil borings and soil sampling; and
- monitoring well installation and sampling.

SWMU #16 Soil Disposal Area

As described in Section 2.5.7., and in accordance with the Part 373 Permit, seven soil samples will be collected in the soil disposal area for PCB and VOC analysis.

SWMU #20 Industry Sewers

In accordance with the Part 373 permit, available maps, drawings and other information pertaining to the on-site sewer lines will be compiled and submitted to NYSDEC as part of the compilation of historical data described in Section 2.1. of this work plan. Additionally, inspection and sampling of selected manholes, sewers and catch basins will be performed in accordance with Sections 2.5.3. and 2.5.4. Based on the results of the above work items, additional testing may be recommended and implemented.

SWMUs #6 and 15 Wastewater Treatment Units (WW-1 and WW-2)

As specified in the draft Part 373 permit, integrity assessments of these two units will be performed following the removal of PCB solids from the units. 180 days prior to the completion of the solids removal and not later than four years after the effective date of the consent order, work plans for performing the integrity assessments will be submitted for NYSDEC review and approval. The work plans will provide details on methods, procedures and equipment to be used to perform the integrity assessments.

As specified in the draft Part 373 Permit, the following SWMUs and other areas have been identified as not requiring further investigation or corrective action:

- SWMU #2 - Bay Storage Area (CS-2)
- SWMU #3 - Bldg. 31 Hazardous Waste Storage (CS-3)
- SWMU #4 - Oil House Storage Area (CS-4)
- SWMU #7 - TCE Still (WRU-1)
- SWMU #8 - 1,1,1-TCA Still (WRU-2)
- SWMU #9 - Waste TCE Storage Tank (ST-1)
- SWMU #17 - Waste Kerosene Tank (ST-6)
- SWMU #18 - Waste Kerosene Tank
- SWMU #19 - New Waste Kerosene Storage Area (ST-8)

In 1990, soils from beneath the following SWMUs were excavated and disposed off-site:

- SWMU #5 - Closed Pyranol Unload Area (TS-1)
- SWMU #10 - Former PCB Railroad Storage Tank (ST-2)
- SWMU #12 - Former PCB Railroad Storage Tank (ST-4)

Soil beneath the capacitor manufacturing building which is immediately adjacent to the above SWMUs was not characterized due to the inaccessibility of the material. The area adjacent to the SWMUs is considered inaccessible until such time as the impediment to the investigation (e.g., building, utilities) is demolished, abandoned or altered in a manner that would allow access to the area. However, the area underneath the capacitor manufacturing building will be investigated as part of the DNAPL assessment described in Section 2.6. A total of nine borings will be advanced to the top of clay or till beneath the building. Continuous split-barrel soil samples will be collected following ASTM standard D1586. Split barrel samples will be checked for NAPL visually as well as by UV fluorescence and hydrophobic dye shake testing.

The corrective action requirements for the following SWMUs were addressed through closure of the units, as described in the Closure Plan submitted on April 1, 1991 and approved by NYSDEC on January 7, 1992, and no additional action is required:

- SWMU #11 - PCB Railroad Storage Tank (ST-3)
- SWMU #13 - PCB Railroad Storage Tank (ST-5)

The following SWMUs and other areas are being addressed by the remediation conducted pursuant to Order on Consent Index T032785 and the on-going remedial measures conducted at the plant. As described in Section 2.7, remedial operation and maintenance activities related to the following SWMUs and other areas will continue:

- SWMU #1 - Past Drum Storage Area
- SWMU #5 - Pyranol Unload Area (TS-1)
- SWMU #10 - PCB Railroad Storage Tank (ST-2)
- SWMU #12 - PCB Railroad Storage Tank (ST-4)
- SWMU #14 - Sanitary Leach Field (LF-1)
- Ground Water Contamination
- PCB Contaminated DNAPL Pools

3. Reporting

3.1. Data Compilation and Validation

Compilation of data generated by the Comprehensive Fort Edward Plant RI/FS will include laboratory and field generated data. Bound data files will be developed and will include field notes, chain of custody forms, and laboratory results. Laboratory data packages will be consistent with NYSDEC ASP Superfund requirements.

Upon receipt of the analytical data, data validation will be performed. The purpose of this validation will be to identify deficiencies, if any, in the data and to ascertain the usability of the data for meeting the data quality objectives defined in the Quality Assurance Project Plan (QAPP). Generally, these data quality objectives will be to generate data of sufficient quality to identify the nature and location of contaminant source(s) in the areas studied during this investigation. Detailed data validation procedures will be described in the QAPP.

3.2. Quality Assurance/Quality Control

The Quality Assurance/Quality Control (QA/QC) program will be consistent with guidelines established by the NYSDEC ASP, USEPA CLP, and USEPA's *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS-005/80, December 29, 1980. QA/QC samples will be collected on a predetermined ratio, as defined in the QAPP. At a minimum, a matrix spike, blind duplicate, and field equipment blank will be submitted for any block of samples which are collected during a sampling event. Sample collection procedures, sample tracking, sample handling, and chain of custody procedures will be defined in the QAPP.

3.3. Remedial Investigation Report

The Remedial Investigation Report will present the results of the Comprehensive RI. The format of the Remedial Investigation Report will include:

- Introduction;
- Investigation description;
- Physical site characteristics;
- Sampling and analysis results;
- Nature and extent of contamination;
- Recommendations for interim remedial measures, if appropriate;
- Summary and conclusions;
- References;
- Tables;
- Figures, and
- Appendices.

The delivery schedule is presented in Section 7.

4. Interim Remedial Measures

During the course of the RI/FS, Interim Remedial Measures (IRMs) may be proposed, if appropriate, based on consideration of factors set forth in TAGM HWR-92-4048 (IRM procedures, December, 1992). If GE and NYSDEC agree that an IRM may be appropriate, GE will develop an IRM implementation plan for NYSDEC review and approval. If an IRM proves sufficiently effective, an IRM(s) could be part of or constitute a final remedy for the site.

5. Risk Assessment

A "baseline" risk assessment for the Fort Edward Plant site will be performed. The risk assessment will be based on existing information and data collected at the site. The scope of work for the risk assessment including the schedule for implementation will be submitted for NYSDEC review and approval 90 days after approval of the FSP and QAPP.

6. Feasibility Study

The objectives of the Feasibility Study are to develop, screen, and evaluate potential remedial alternatives for the site. This task will develop and present sufficient information to compare alternatives and select a remedy. The FS will include the following components:

- Development of remedial alternatives;
- Screening of remedial alternatives;
- Detailed analysis of alternatives;
- Recommendations, and
- Feasibility study report.

The FS will be conducted in accordance with applicable federal and state requirements. A FS work plan, including a schedule for implementation, will be submitted for NYSDEC review and approval. The FS work plan will include the identification of standards, criteria, and guidelines potentially applicable to the site.

The FS work plan will be submitted within 90 calendar days of the effective date of the consent order. The FS will be performed upon approval by the NYSDEC of the FS work plan.

7. Project Schedule and Deliverables

7.1. Project Deliverables

Project deliverables are listed in Table 1 and include:

- Monthly progress reports;
- Field sampling plan and quality assurance project plan;
- Remedial investigation report;
- Feasibility study work plan;
- Risk assessment scope of work;
- Risk assessment report; and
- Feasibility study report.

These documents, excluding the monthly progress reports, will be submitted for NYSDEC review and approval. The monthly progress reports will be submitted by the 10th of each month as specified in the Order of Consent.

7.2. Project Schedule

A tentative project schedule for the Remedial Investigation is presented in Figure 7-1. Due to the complex nature of this investigation and potential changes to the project, the schedule may need to be modified during the course of the investigation. The completion of tasks which are subsequent to the RI, including the FS and the risk assessment, will be contingent upon the completion schedule of the RI. Proposed schedule modifications will be brought to the attention of NYSDEC.

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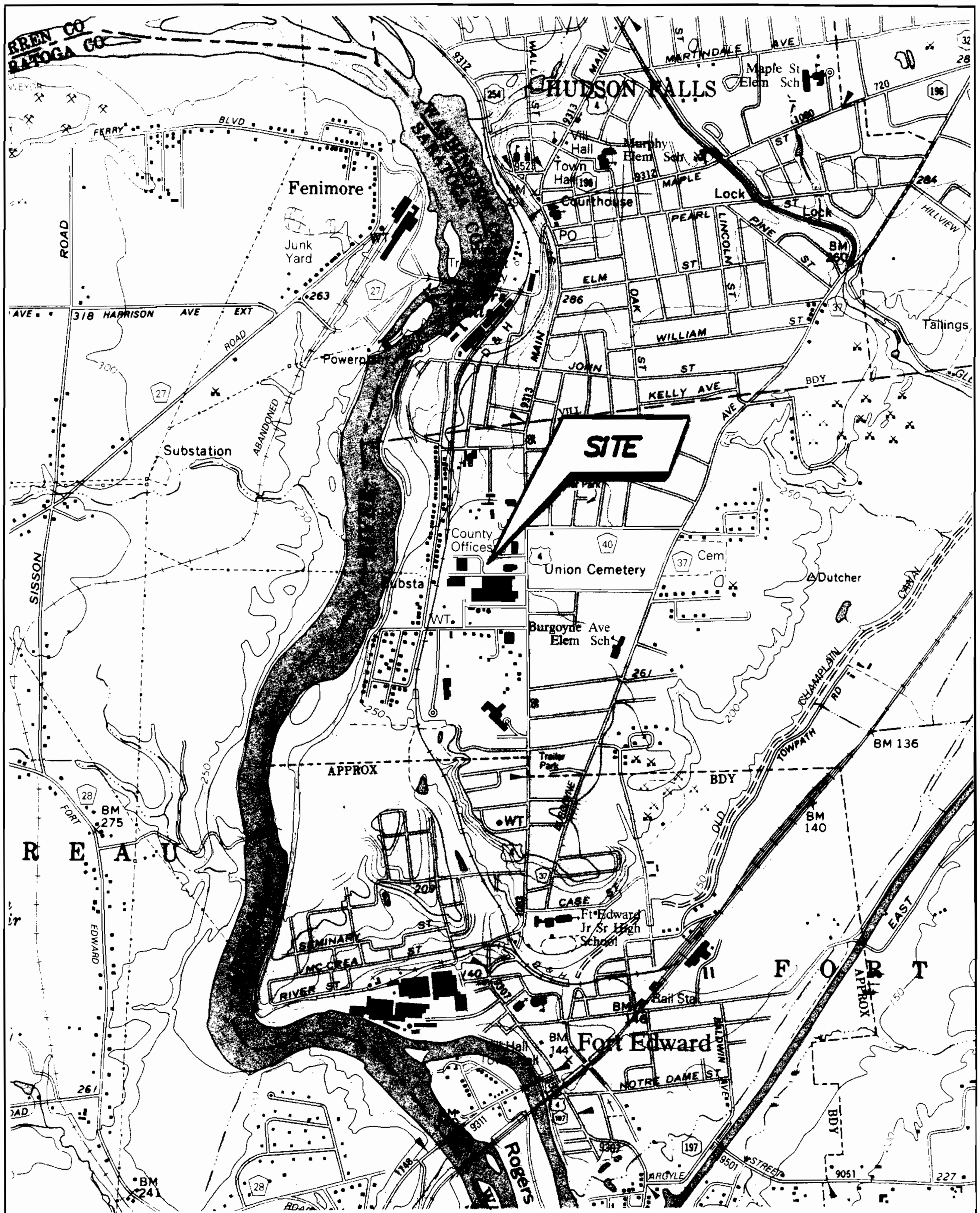
Figures

O'BRIEN & GERE
ENGINEERS, INC.



O'BRIEN & GERE ENGINEERS, INC.

SITE LOCATION MAP

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO.	5731.009
DATE.	APR 1995
FIGURE 1-1	

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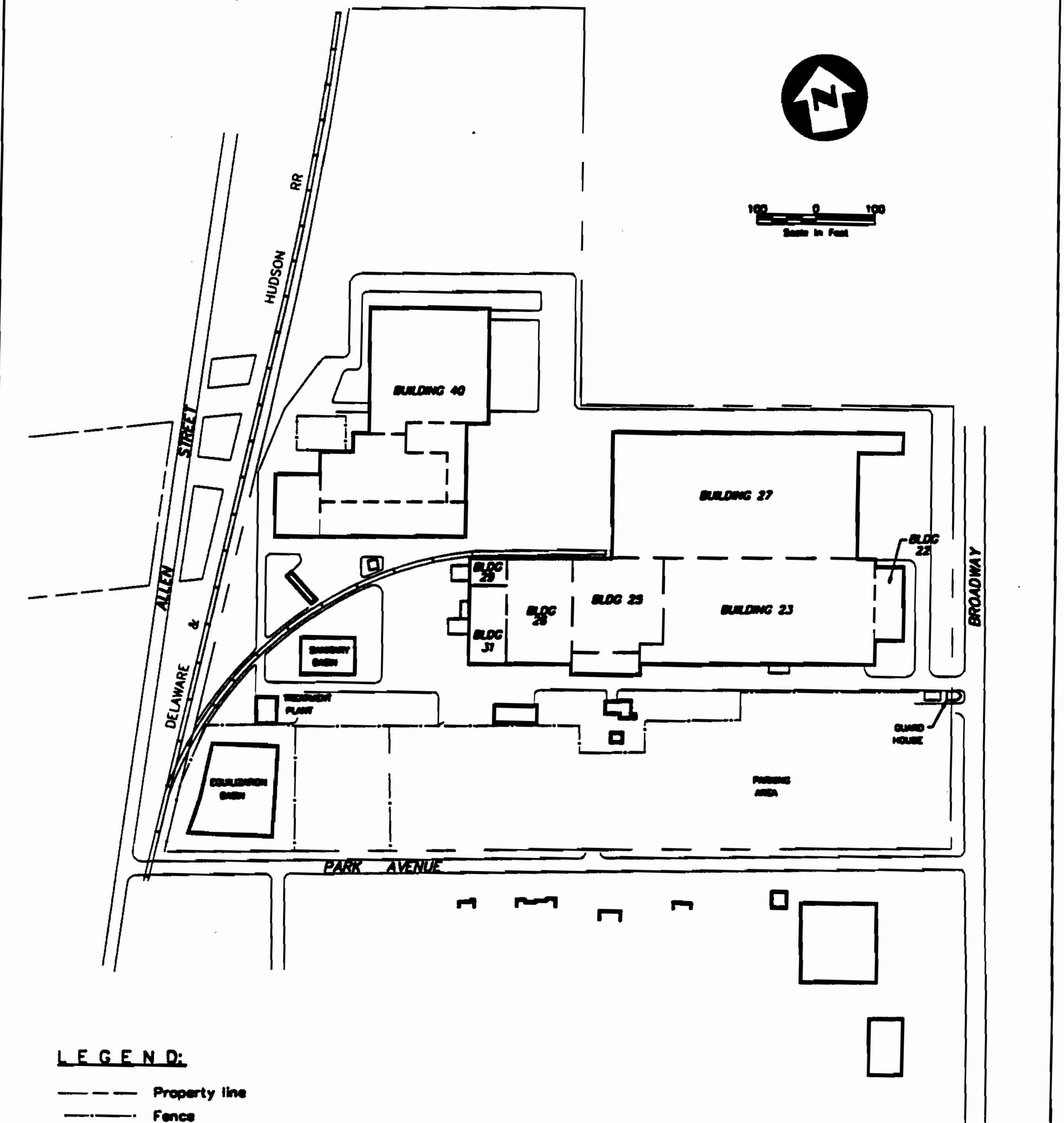

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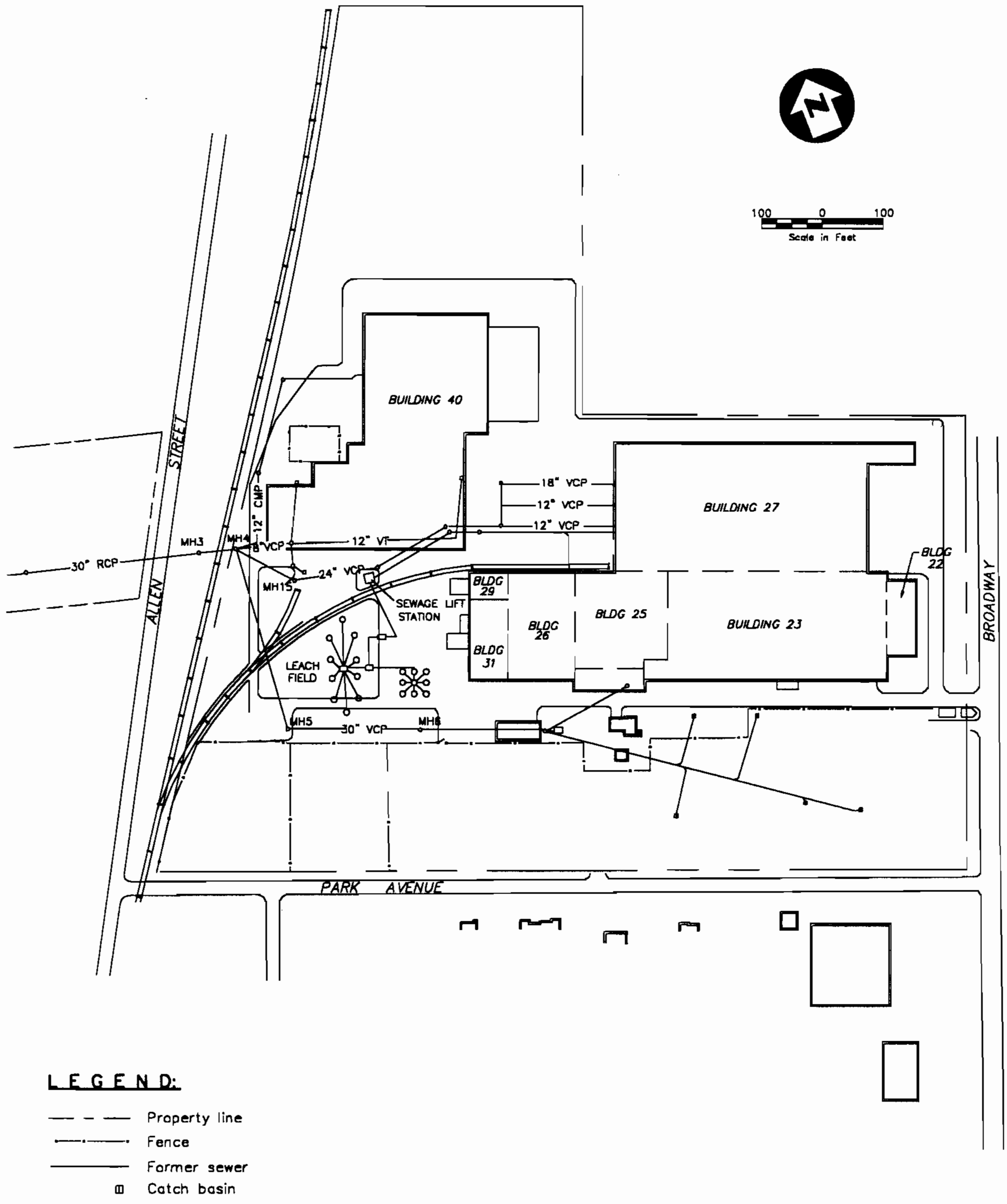
O'BRIEN & GERE ENGINEERS, INC.

SITE PLAN

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO.	5731.009
DATE.	SEP 1994
FIGURE 1-2	



O'BRIEN & GERE ENGINEERS, INC.	PRE–1976 WASTE WATER MANAGEMENT GENERAL ELECTRIC COMPANY FORT EDWARD, NEW YORK	FILE NO. 5731.009 DATE. SEP 1994 FIGURE 1–3

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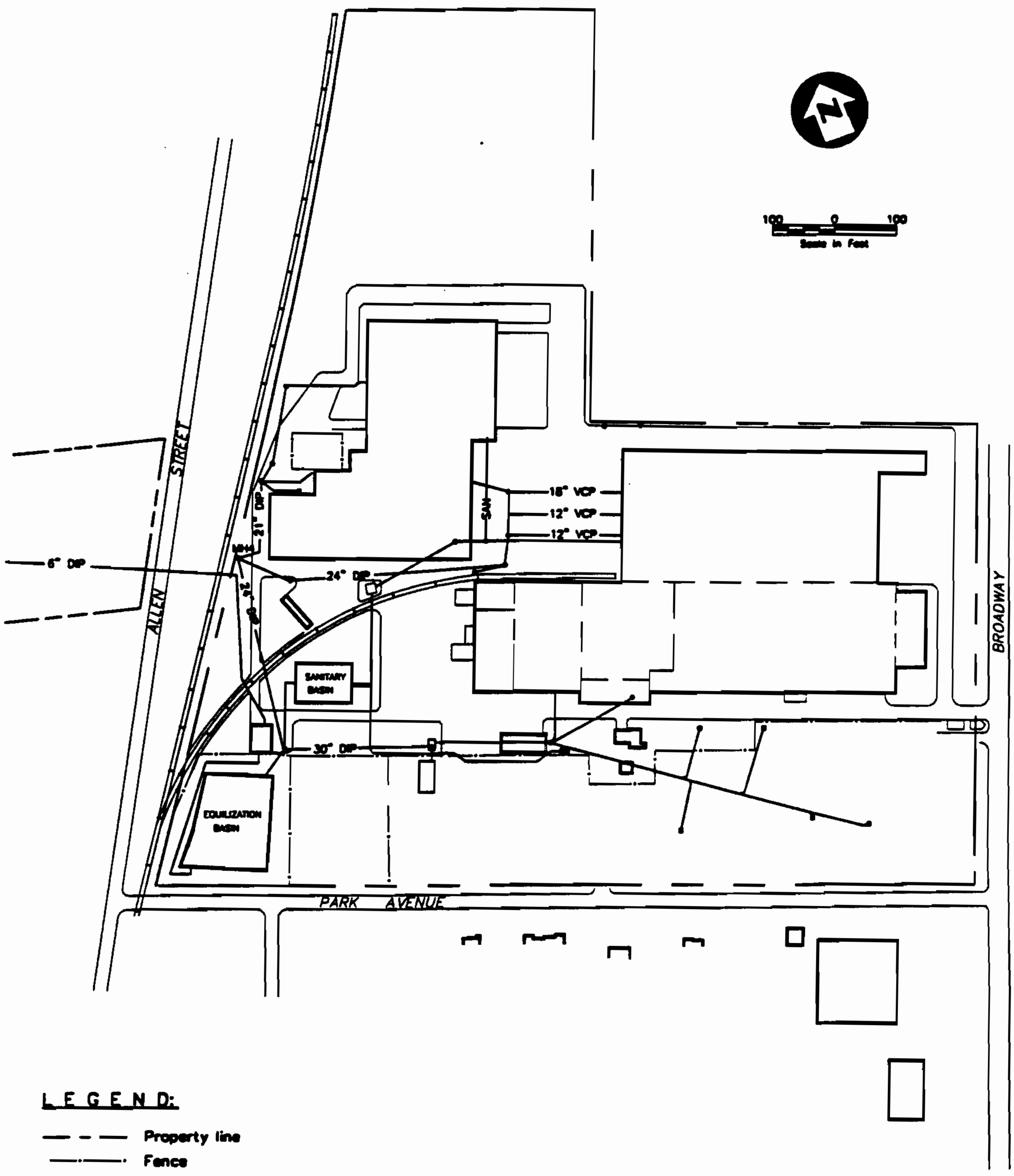


LEGEND:

- Property line
- Fence
- Present sewer
- Catch basin

O'BRIEN & GERE ENGINEERS, INC.

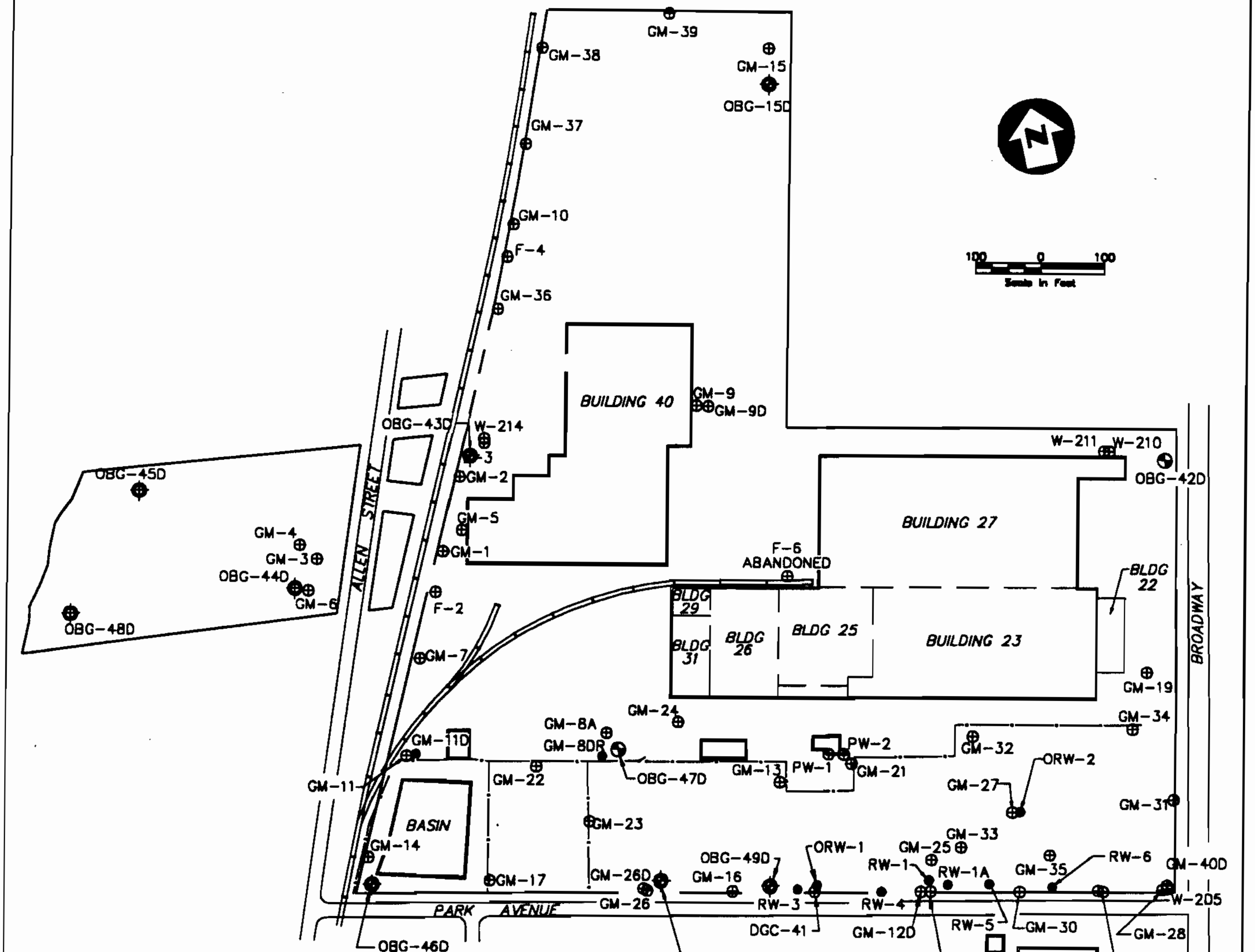
PRESENT WASTE WATER MANAGEMENT

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. SEP 1994

FIGURE 1-4



LEGEND:

GM-23 ⊕	Location of existing shallow unconsolidated unit well
GM-12D ⊕	Location of existing shallow bedrock monitoring well
RW-4 ●	Location of existing ground water or oil recovery well
OBG-45D	Location of recently installed bedrock well pair (12/94 to 1/95)
OBG-46D	Location of proposed bedrock well pair
OBG-47D	Location of proposed shallow bedrock well
— — —	Property line

O'BRIEN & GERE ENGINEERS, INC.

PROPOSED BEDROCK MONITORING WELLS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-1

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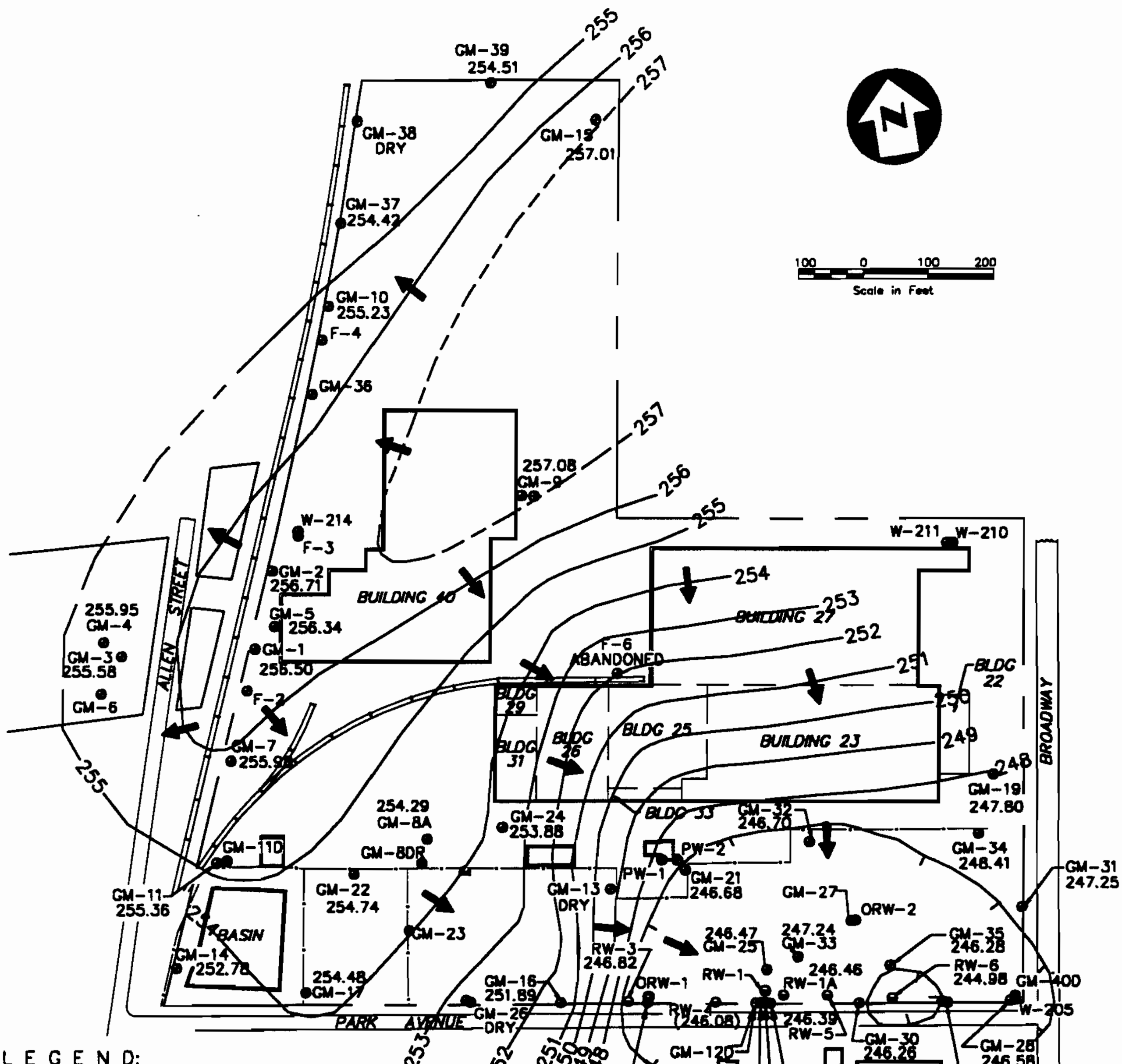


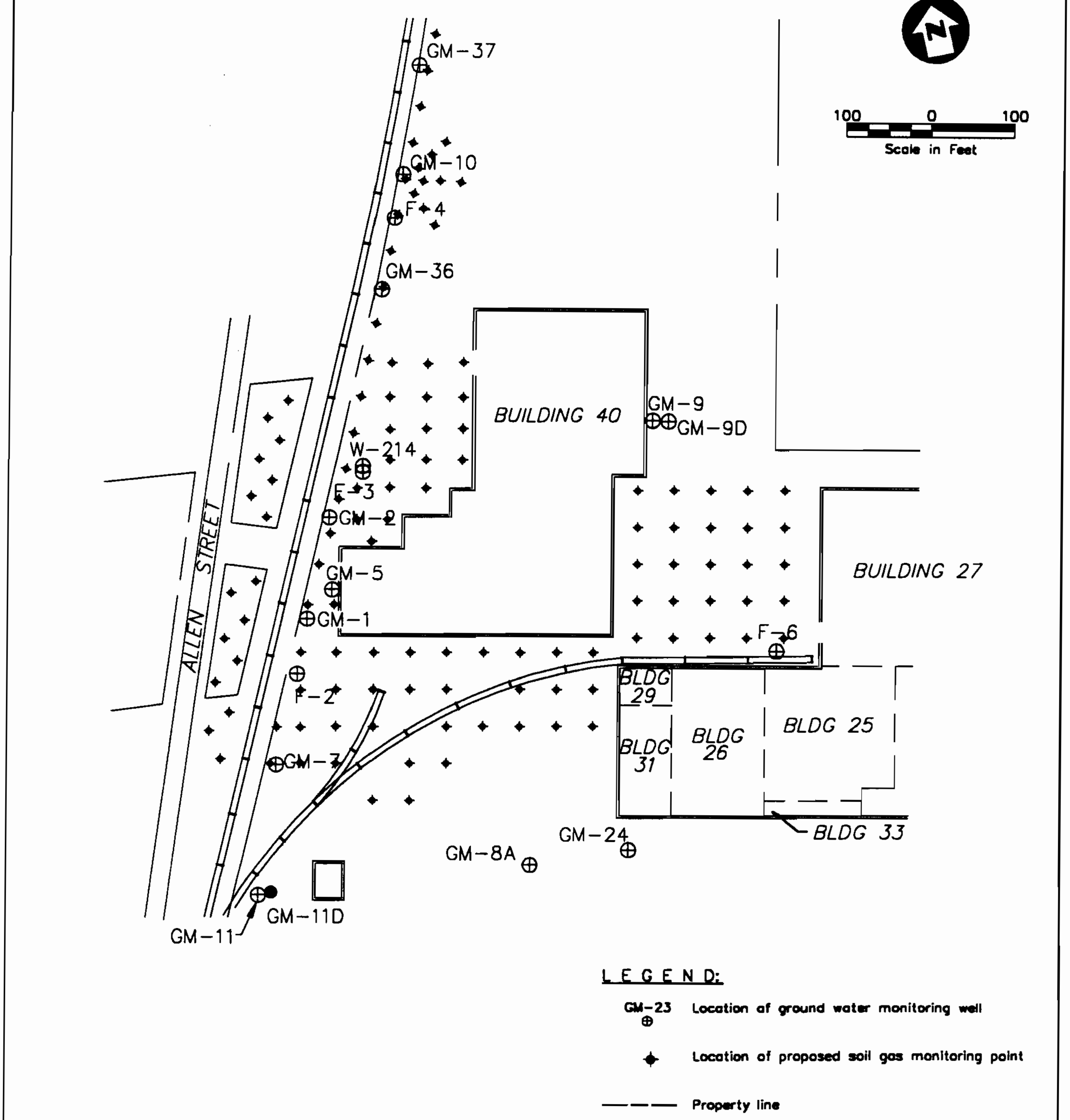
LEGEND:

GM-23 254.14	Location of shallow unconsolidated unit well with water table elevation.
GM-12D	Location of shallow bedrock monitoring well
RW-4 246.18	Location of shallow unconsolidated unit recovery well
GM-8DR	Location of shallow bedrock recovery well
ORW-1	Location of oil recovery well
———	Property line
—255—	Shallow unconsolidated unit groundwater table contour (dashed where inferred)

O'BRIEN & GERE ENGINEERS, INC.

SHALLOW UNCONSOLIDATED UNIT GROUND WATER TABLE CONTOUR MAP FOR JANUARY 21, 1994
GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.011
DATE FEB 1995
DWG. NO. FIGURE 1-5



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O'BRIEN & GERE ENGINEERS, INC.

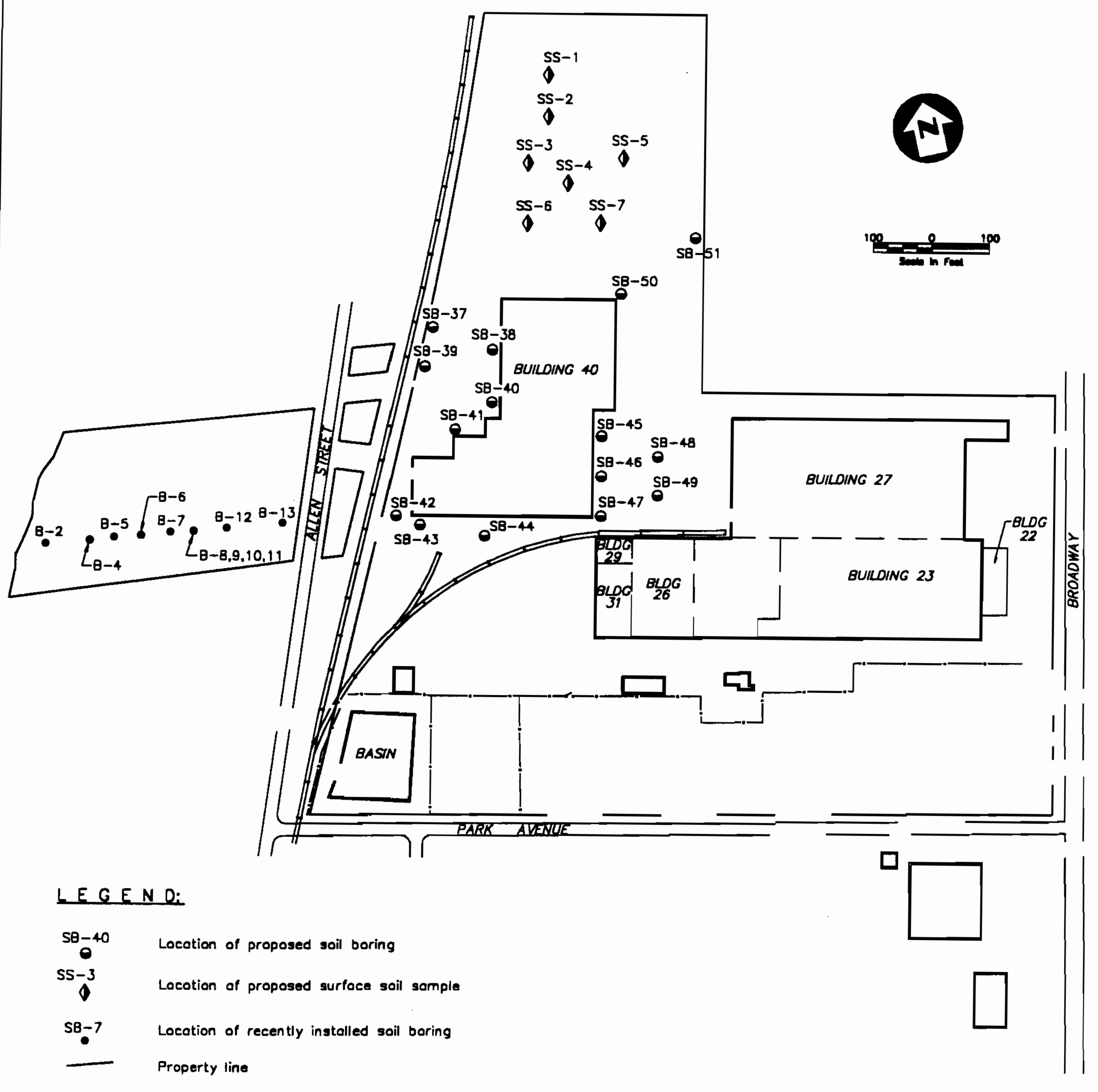
PROPOSED SOIL GAS SAMPLING LOCATIONS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-2



O'BRIEN & GERE ENGINEERS, INC.

PROPOSED SOIL BORING LOCATIONS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-3

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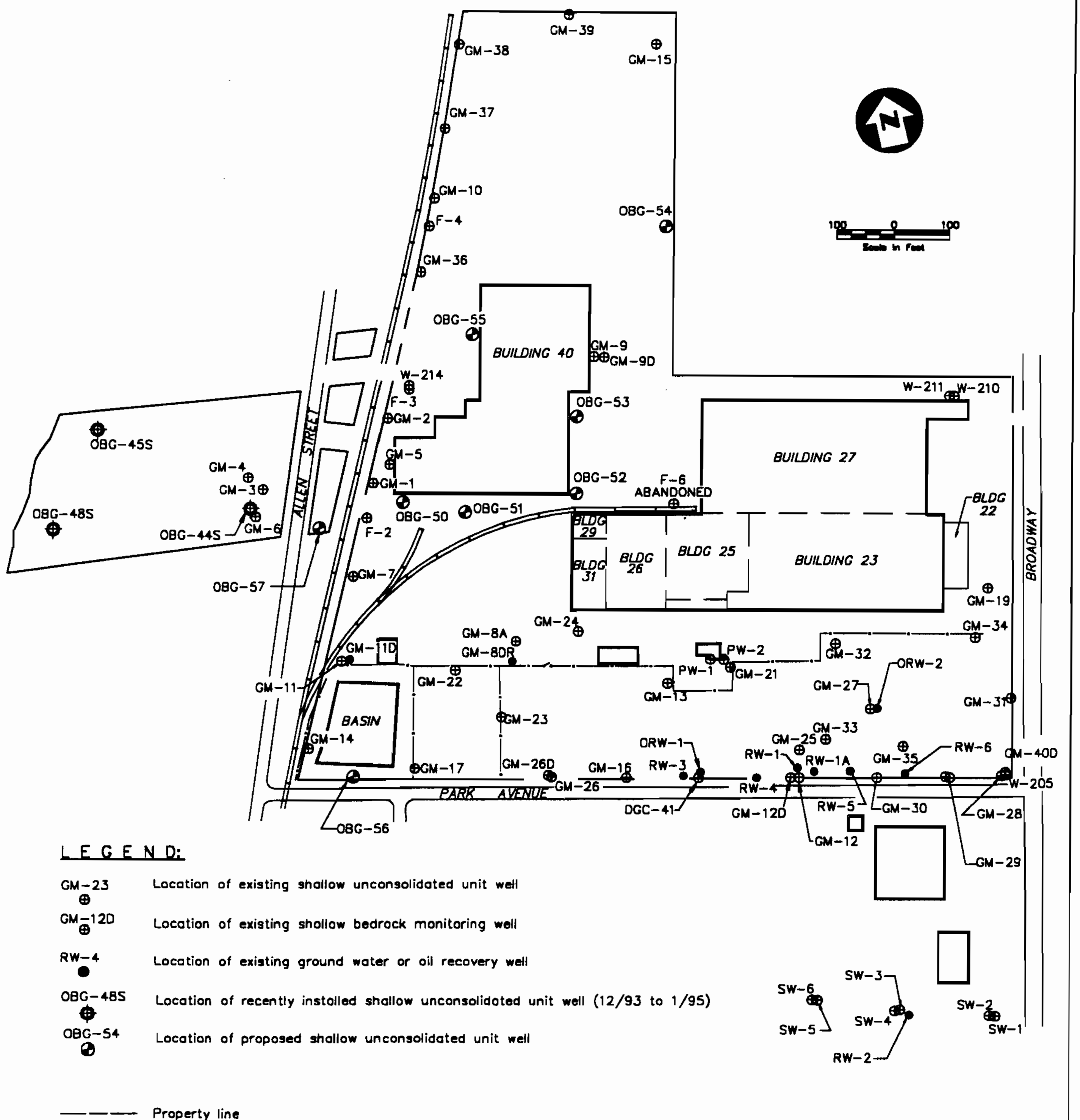


C:\1\FTED\RIFS\WELLS.DWG (WELLS-SHALLOW)

O'BRIEN & GERE ENGINEERS, INC.

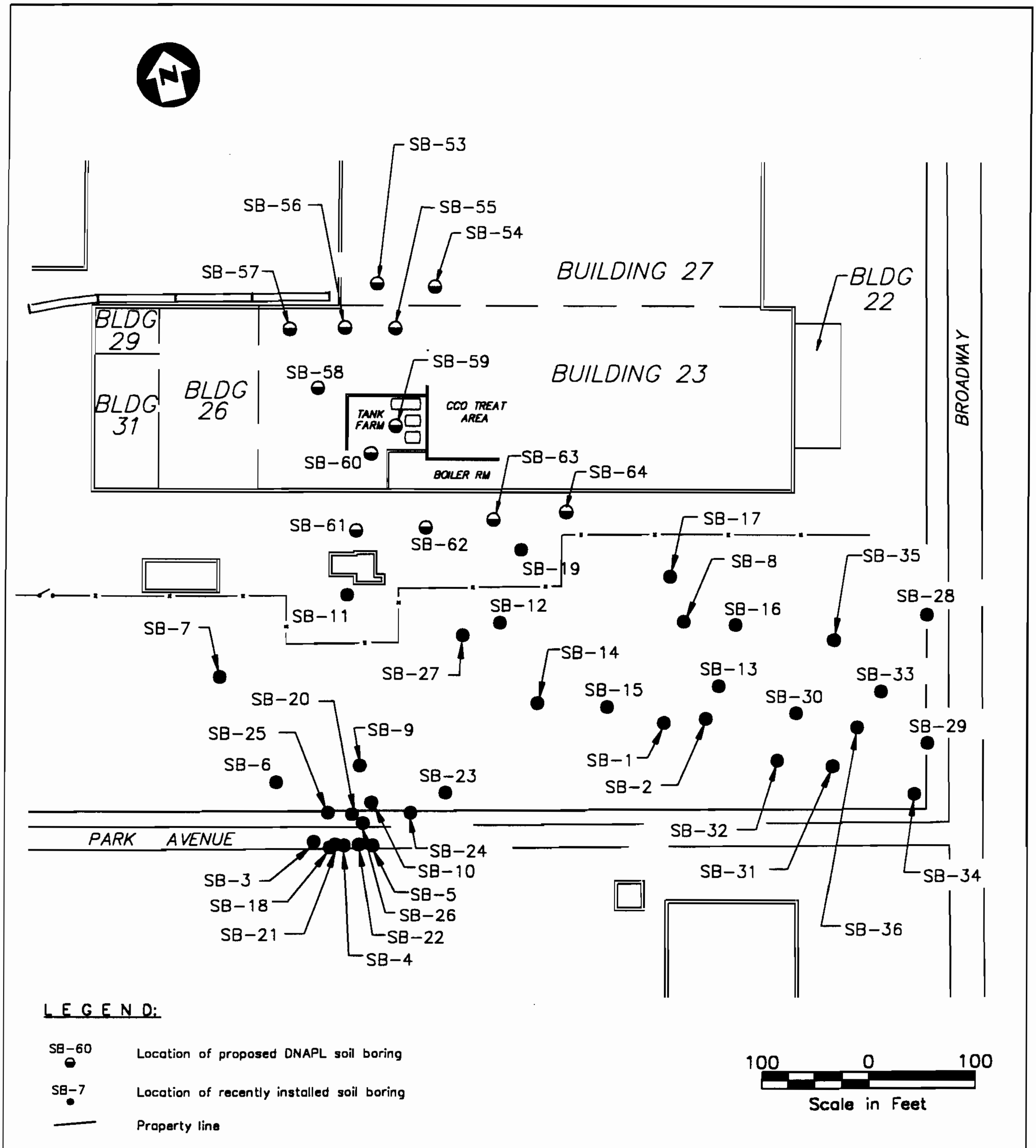
PROPOSED SHALLOW UNCONSOLIDATED UNIT MONITORING WELL LOCATIONS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-4



O'BRIEN & GERE ENGINEERS, INC.

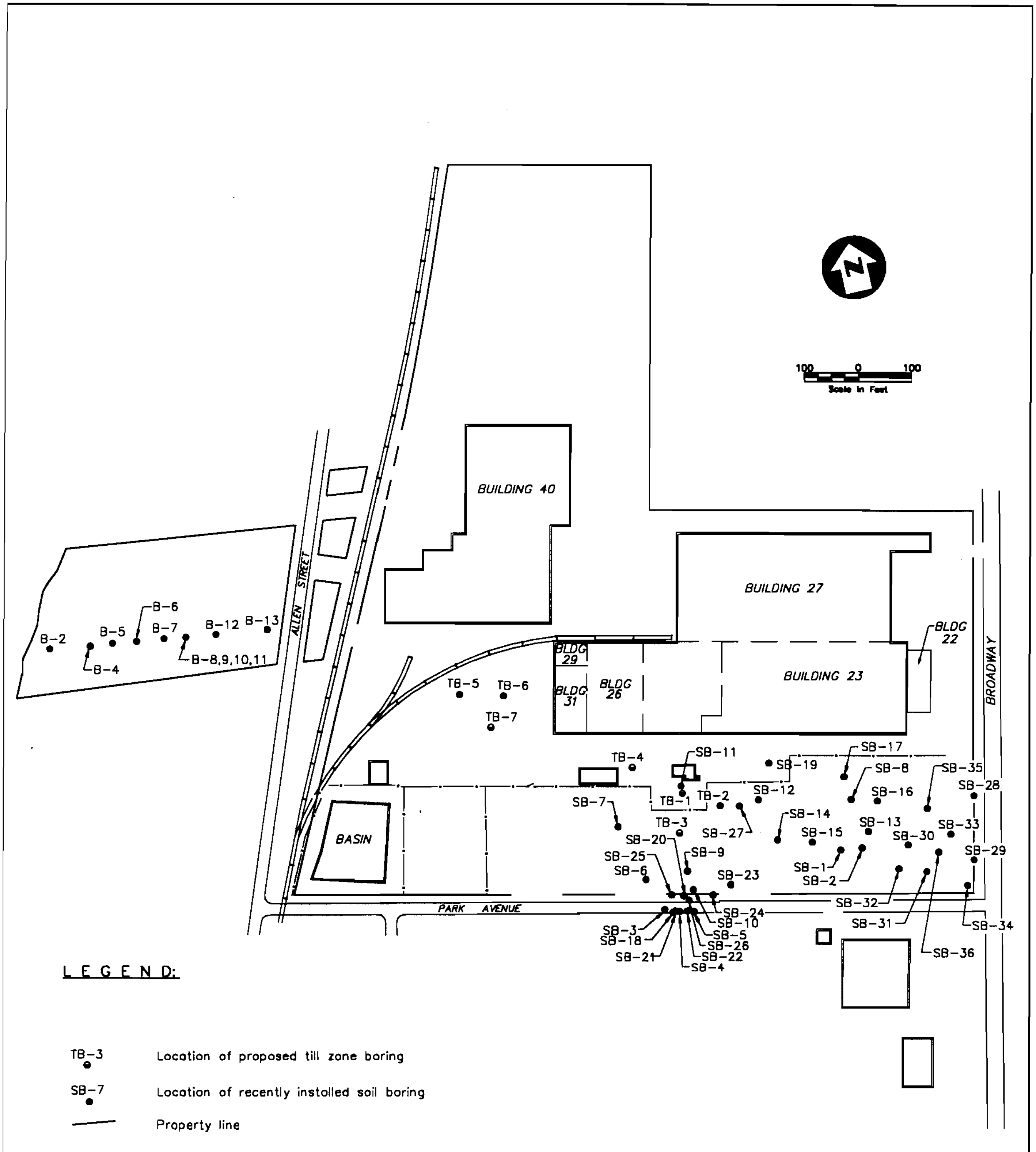
PROPOSED DNAPL SOIL BORING LOCATIONS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-5



O'BRIEN & GERE ENGINEERS, INC.

PROPOSED TILL ZONE DNAPL BORING LOCATION

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

FILE NO. 5731.009

DATE. APR 1995

FIGURE 2-6

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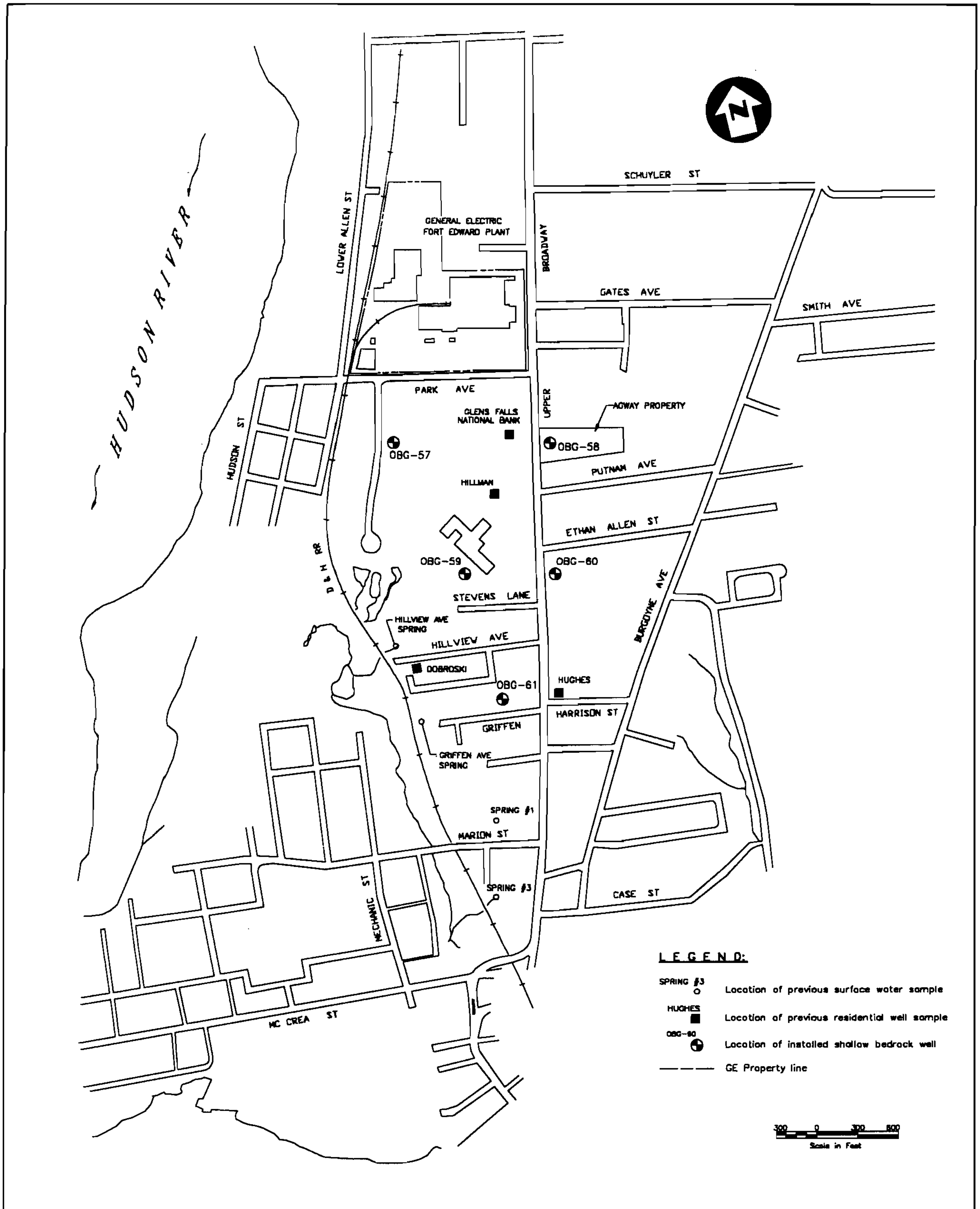

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O'BRIEN & GERE ENGINEERS, INC.

INSTALLED OFF-SITE MONITORING WELLS

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

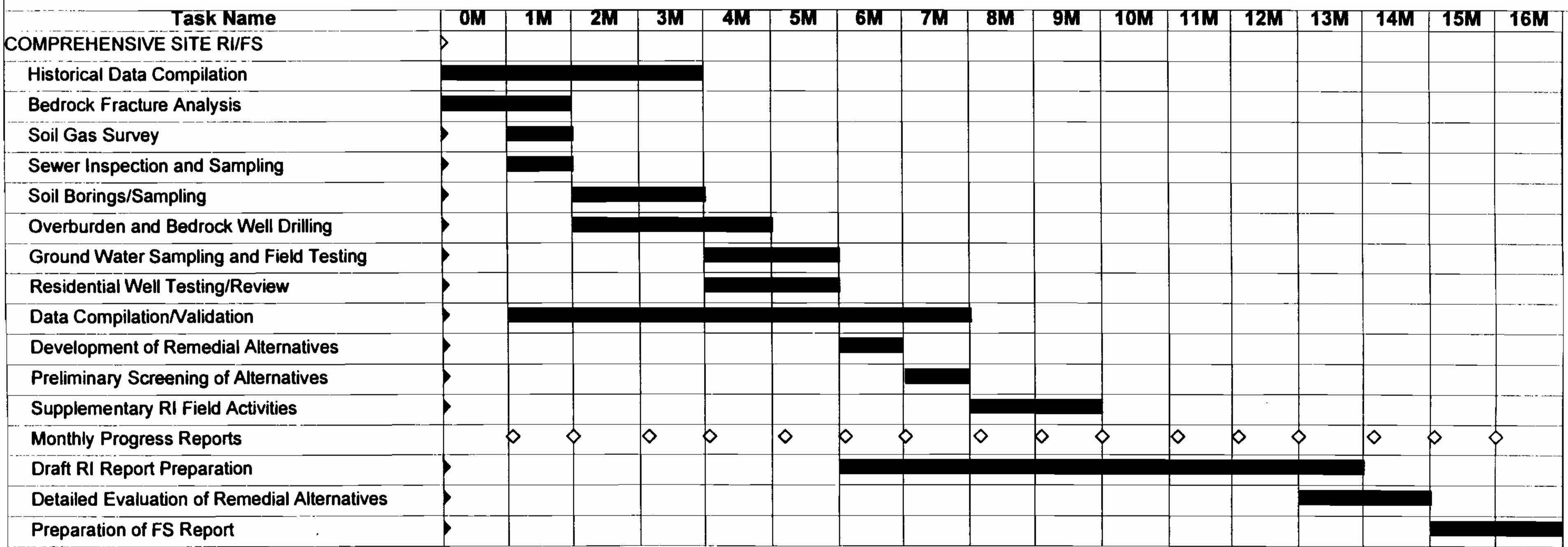
FILE NO. 5731.009

DATE. FEB 1995

FIGURE 2-7

FIGURE 7-1. PROJECT SCHEDULE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AT THE GE FORT EDWARD PLANT

General Electric Company
Fort Edward, New York



Project Schedule Shown in Months From Start Date.

OBRIEN & GERE ENGINEERS, INC.

Tables

O'BRIEN & GERE ENGINEERS, INC.

TABLE 1

GENERAL ELECTRIC COMPANY
FORT EDWARD REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DELIVERABLES

DELIVERABLE	DUE DATE
1. Monthly Progress Reports	10th of each month
2. Field Sampling Plan and QAPP	21 calendar days after effective date of consent order
3. Remedial Investigation Report	240 days after approval of FSP and QAPP
4. Feasibility Study Work Plan	75 calendar days after effective date of the consent order
5. Risk Assessment Scope of Work	90 days after approval of FSP and QAPP
6. Risk Assessment Report	As specified in risk assessment scope of work
7. Feasibility Study Report	As specified in FS scope of work

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