Proposed Fort Edward Soil Gas Investigation Work Plan

General Electric Company
Fort Edward, New York

December 3, 2004
Revised: February 11, 2005

O'BRIEN & GERE
ENGINEERS, INC.

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Fort Edward, New York

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1. Introduction

GE Energy (GE) has retained O'Brien & Gere Engineers, Inc. (O'Brien & Gere) to prepare this Soil Gas Investigation Work Plan to serve as a guide during the investigation of the potential presence of site-related chemicals in soil gas and implementation of certain ventilation activities, if necessary. This project is specifically focused on delineation and ventilation activities at properties not owned by GE and is being completed in close cooperation with the New York Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH). This document is intended to communicate elements of work to be performed and the timing and sequence of these elements.

1.1. Purpose and objectives

The purpose of this document is to communicate elements associated with the planning and execution of a program of site-specific soil gas, air and limited ground water sampling, laboratory analysis, data management and ventilation. This work is proposed to aid in confirming the presence or absence of the vapor intrusion potential attributable to contaminated ground water, with the goal of expeditiously identifying any structures that may warrant ventilation and implementing ventilation systems or other appropriate actions.

1.2. Site description and background

The GE Fort Edward facility is located at 381 Upper Broadway, Fort Edward, New York. The facility is 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 in size and is bounded on the east by Upper Broadway, on the south by Park Avenue, and on the west by the Delaware & Hudson Railroad/Allen Street as shown on Figures 1-1 and 1-2. As shown on Figure 1-2, an approximately 200 foot wide, 3.8 acre, parcel located between Allen Street and the Hudson River is also owned by GE. The Fort Edward facility has remained to present date in continuous 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.

Since 1983, GE has been operating a ground water recovery system to remediate volatile organic compound (VOC)-containing ground water present in the shallow unconsolidated deposits at the facility. This work has been completed under programs administered by NYSDEC. Ground water quality data collected in the area south of the facility indicated that VOC-containing ground water extended from the plant site south as far as Marion Street. TCE and its degradation product, 1,2-dichloroethene (1,2-DCE)[1], are the primary VOC constituents that have been detected in off-site ground water. The presence of these compounds in ground water beneath the facility and adjacent lands located south the facility has been documented and tracked through sampling, mapping and numerous reports submitted to the NYSDEC since the early 1980's.

NYSDEC recently requested that GE investigate the potential existence and extent of soil gas associated with ground water containing COCs in the vicinity of GE's Fort Edward facility. As a result, GE intends to implement an investigation and ventilation program as warranted within a planned study area where such COCs are considered to be potentially present based on available groundwater quality data.

The study area for this project includes a portion of the Village of Fort Edward and parts of the Town of Fort Edward to the south and west of the GE Fort Edward facility. As shown on Figure 1-2, the study area includes the area south of the GE Fort Edward facility where ongoing ground water monitoring and sampling has identified the presence of COCs. The southern portion of the study area is bounded on the east by Upper Broadway, on the south by Marion Street, and on the west by the Delaware & Hudson Railroad/Sullivan Parkway as shown on Figure 1-2. In addition, a small portion of the study area is located along the western side of GE's facility between Building 40 and Lower Allen Street.

1.3. Hydrogeologic setting

1.3.1. Site unconsolidated geology

With the exception of fill, unconsolidated deposits of glacial origin unconformably overlie the bedrock throughout much of the Fort Edward facility area. The glacial deposits are associated with the Hudson-Champlain Lobe of late Wisconsin Laurentide ice sheet (Cadwell et al., 1987). Five types of unconsolidated sediments have been identified at the site. These include glacial till, glacio-lacustrine silt and clay, a transitional zone, glacio-deltaic sand and gravel and artificial fill. The unconsolidated deposits are underlain by the Snake Hill Formation.

A geologic cross-section has been prepared to illustrate the relationship between the unconsolidated glacial deposits and the underlying bedrock. Figure 1-3 is a cross-section (A-A') starting at the southern portion of the GE facility, just north of Park Avenue, continuing southward to Spring #1 located south of Spring Street in the southern portion of the study area. The location of the cross-section is also shown in Figure 1-4.

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[1] TCE and its degradation/daughter products 1,2-DCE and vinyl chloride are defined herein as chemicals of concern or COC's.

Glacial till observed directly overlying bedrock at the site is composed of a poorly sorted mixture of sand, gravel, and sometimes cobbles in a matrix of fine sand and silt with occasional clay seams. The glacial till unit appears to be present across the majority of the site and ranges in thickness from 0 feet to 18.7 feet.

Glacio-lacustrine silt and clay deposits are generally observed overlying the glacial till unit. The glacio-lacustrine silt and clay unit ranges in thickness from 44.9 feet at the northeast corner of the site adjacent to Upper Broadway and thins out to 0 feet in the vicinity of the Foil Mill, the area of the former leachfield and the equalization basin where little to no glacio-lacustrine silt and clay unit is observed.

The glacio-lacustrine silt and clay unit also appears to be absent along the subsurface bedrock ridge which runs approximately N30°E along the western portion of the plant site, but is observed again along the westernmost property boundary and in the area west of Lower Allen Street.

The glacio-lacustrine silt and clay unit can best be described as dark grey silt and clay, with frequent clayey silt seams and occasional fine sand partings. Descriptions range from a dark grey to brown varved silty clay to grey clayey silt, with frequent silt and clay seams and fine sand partings. Generally this unit is brown to red at the top and gradually changes to grey over the top 1 to 2 feet of the unit.

Overlying the glacio-lacustrine silt and clay unit in the eastern and southeastern portions of the site is a sequence of light gray sand and silt interbedded with frequent seams and partings of clay and silt which become more frequent with depth. This zone has been designated the transition zone and represents a change in depositional environment from a deep water, low energy glacial lake environment to a higher energy, near-shore environment.

The transition zone ranges in thickness from 22.3 feet at well location OBG-65 in the southeast corner of the site adjacent to Upper Broadway and pinches out to the west in the vicinity of recovery well RW-1A. The transition zone is observed as a wedge shaped deposit, which appears to thicken in a southeasterly direction reaching its maximum observed thickness in the vicinity of Upper Broadway. Within the southeast onsite parking lot, the thickness varies from 1.0 to 22.3 feet, thickening quickly east of GM-27. In the central portion of the parking lot the transition zone thickness increases to a maximum observed thickness of 8.8 feet at SB-23 and then decreases again forming a lenticular shape, in a cross-sectional view.

The uppermost unconsolidated unit at the Fort Edward Plant is a 4.1 feet to 42.9 feet thick unconsolidated deposit of glacio-deltaic sand and gravel that thickens to the east and south across the study area. The glacio-deltaic sand and gravel unit is thinnest in the western portion of the site in the vicinity of the Foil Mill, equalization basin and former leachfield area and ranges from 4.1 feet to approximately 10 feet in thickness. This unit thickens considerably to the east and is observed at a thickness of 28.4 feet at well location OBG-81, located along the eastern property boundary of the site. The thickest accumulation of the sand and gravel unit is observed south of the plant site with an observed thickness of 42.9 feet at well location OBG-61, located near Griffin Avenue.

The glacio-deltaic sand and gravel unit is ubiquitous throughout the site and is best described as brown coarse to fine sand with a little fine gravel. In general, the grain size varies slightly from the northern and western portions of the facility to the southeast portion of the facility. Generally, the sand becomes coarser and the gravel component increases in the southeast portion of the facility.

Natural and artificial fill materials were observed at well locations OBG-46 and OBG-56 located in the vicinity of the equalization basin and below the foundation of the Foil Mill and main manufacturing building. The fill materials consist predominantly of sand; however, varying amounts of broken rocks, gravel and masonry were encountered mixed with the sand. In addition, where the main manufacturing building was built over old driveways and parking areas, asphalt and concrete were encountered.

1.3.2. Site bedrock geology

The Fort Edward plant site is underlain by the Snake Hill Formation, a dark grey shale of Ordovician age. Carbonate units probably belonging to the Trenton, Black River and Beekmantown Groups underlie the shale. The Trenton and Black River Groups consist of the Glens Falls and Isle la Motte limestones, with a total expected thickness of approximately 170 feet. The Beekmantown Group consists of several limestone and dolostone units estimated to be in the range of 800 to 1000 feet thick in Washington County.

1.3.3. Hydrogeology

The ground water flow in the vicinity of the GE Fort Edward facility is generally 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 black, dense shale of the Snake Hill Formation that is underlain by Ordovician age limestones. The following discussion will focus on the ground water flow within the shallow unconsolidated unit at the facility and the area south of the facility.

In accordance with the NYSDEC-approved GE Fort Edward Sampling and Analysis Plan (SAP) (O'Brien & Gere, 1997), water level measurements are obtained from the facility and off-site monitoring wells on a quarterly basis (typically in February, May, September, and November). The water level measurements obtained during the May 2003 quarterly monitoring event were used to prepare a ground water table contour map for the shallow unconsolidated unit and is presented on Figure 1-3. This representation of the ground water table contour map of the shallow unconsolidated unit is representative of historical data collected for the site.

As shown on Figure 1-3, ground water flow within the shallow unconsolidated unit at the facility is controlled by a ground water table divide which trends northeast to southwest between monitoring well locations GM-9 and GM-5 in the northwest portion of the facility. The ground water table divide continues in the southwestern portion of the facility and shifts to a roughly north-south orientation. Ground water flow in the northwest, western and southwestern portion of the facility is generally to the west towards the Hudson River. Flow in the central and southeastern portion of the facility is generally to the southeast toward Park Avenue.

As a result of site-related remedial pumping, ground water gradients and flow in the shallow unconsolidated unit have been altered in the southeastern portion of the facility. Water levels have been drawn down in the area between recovery well RW-3 and monitoring well GM-29 and indicate that ground water is being drawn inward toward the shallow ground water recovery system located along the southeastern portion of the site. The capture zone created by pumping extends across the entire southeastern portion of the facility and indicates that contaminated ground water is being captured and prevented from flowing off-site to the south.

Ground water flow within the shallow unconsolidated unit beyond the hydraulic influence of the recovery system south of Park Avenue is generally to the south. A component of flow to the southeast is evident in the area between the wastewater equalization basin and monitoring well OBG-57. The southeastern component of flow identified is most likely due to the ground water table divide, which trends north to south in the area between Sullivan Parkway and the railroad tracks.

Ground water flow in the central portion of the study area south of the site (i.e., areas west of Putnam Avenue and Ethan Allen Street) is generally to the south and shifts towards the southwest in the area west of Broadway, south of monitoring well OBG-60. In the southwestern portion of the study area, the ground water flow is controlled by the topography, which slopes downward towards the railroad tracks to the west. The unconsolidated sand deposit pinches out along the base of this slope and the ground water expresses itself as a series of surface water springs along the eastern side of the railroad tracks.

The average depth to ground water in the shallow unconsolidated hydrogeologic unit where COC constituents are identified south of the facility is approximately 13.6 feet below grade. However, the depth to ground water varies across the area. The average depth to ground water in the northern portion of the study area, near state wells SW-1 through SW-6 is 13.3 feet below grade. The average depth to ground water in the central and southern portions of the study area (i.e., area of Stevens Lane and Griffin Avenue) is approximately 14.0 feet and 21.5 feet below grade, respectively.

Water levels in the shallow unconsolidated hydrogeologic unit in the vicinity of the study area south of the facility fluctuate on a seasonal basis; these fluctuations are variable across the study area and range from approximately 5.7 feet to a low of approximately 2.7 feet (see Figure 1-4). This fluctuation corresponds to seasonal high water levels in the shallow unconsolidated unit ranging from 8.6 feet to 19.7 feet below ground surface depending upon the location within the study area. Figure 1-4 shows the water level fluctuations at wells SW-4, OBG-59 and OBG-61 from January 1995 to November 2003. These wells are located in the central region of the study area and consist of shallow unconsolidated unit wells. Shallower water levels generally occur in the late spring and early summer. Water levels begin to drop in the mid to late summer when water deficit conditions begin due to higher evapotranspiration and lower precipitation rates. Lower water levels generally occur in the late fall and winter months.

2. Historical review of the off-site remedial program

2.1. General

Since 1976 numerous hydrogeologic investigations have been conducted at and in the vicinity of the GE Fort Edward facility. The results of many of these investigations have revealed the presence of certain VOCs and PCBs in the soil and ground water at the facility. To reduce the potential impact of VOC and PCB contamination on the surrounding area, GE has implemented a number of remedial measures at the facility and surrounding area. The remedial actions that relate to the remedial programs historically implemented at the facility and surrounding areas include, but are not limited to, the following:

- Based on NYSDOH recommendations, in 1983, GE completed the installation of water mains and piping for households on Park Avenue, Stevens Lane, Ethan Allen Street, and Putnam Avenue. The structures located south of Stevens Lane have been served by public water since before 1982 (LMS, 1985).

- NYSDEC-approved on-site and off-site remedial plans were implemented pursuant to Order on Consent #T032785.

- 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 facility in 1994. To date, 36 residences and businesses in the Town of Fort Edward have agreed to be connected to public water at no charge to the owners.

- As a means of mitigating the migration of VOC-containing ground water identified in 1983, a groundwater remediation system including several shallow ground water recovery wells was installed at the site. Details regarding the installation of the wells are presented in Section 2.2.

2.2. Shallow ground water recovery systems

Hydrogeologic investigations conducted at the facility in the early to mid 1980s (Geraghty & Miller 1983; LMS 1985) revealed the presence of certain VOCs and PCBs in groundwater within the shallow unconsolidated deposits along the southern boundary of the site. To evaluate whether these constituents were migrating off-site, in 1983 the NYSDEC subsequently installed six monitoring wells (“state wells”) approximately 450 feet south of the site. The state wells are designated SW-1 through SW-6. In August 1983, a shallow ground water recovery well, RW-1, was installed as part of an NYSDEC-approved interim remedial measure. The well was installed on-site, north of Park Avenue in the southeast portion of the facility. Ground water from the well was pumped to an on-site air stripper prior to discharge to the plant wastewater treatment system. In December 1988, recovery well RW-1A was installed as a replacement for recovery well RW-1.

The off-site feasibility study of remedial alternatives (LMS 1988) indicated that VOC concentrations in off-site state wells SW-3, SW-4, and SW-5 observed in 1986 and 1987 had shown little change from the previous two years. Subsequent to the off-site feasibility study (LMS 1988), a second recovery well was installed approximately 450 feet south of the plant near state monitoring well SW-3 in November 1989. This recovery well was installed as part of a NYSDEC-approved off-site remedial plan (LMS 1989) to collect ground water from the area south of RW-1/1A.

Recovery well RW-1, and subsequently RW-1A, operated continuously between 1984 and 1991 with brief interruptions in operation for redevelopment and maintenance activities. The on-site ground water recovery and treatment system was enhanced in 1991 when a multiple ground water recovery well system was installed. The enhanced ground water recovery system was installed in June and July 1991 and consisted of four on-site ground water recovery wells (RW-3, RW-4, RW-5, and RW-6) in addition to RW-1A. The five on-site recovery wells are located north of Park Avenue on the southeastern boundary of the facility.

The ground water recovery well system was expanded again in 2003 to establish better hydraulic control of ground water containing VOCs and PCBs in the southeastern portion of the facility. The expanded ground water recovery well system was installed between September and December 2003 and became operational during the first quarter of 2004. As part of this expansion, existing ground water recovery wells RW-1A, RW-5 and RW-6 were replaced with three new vertical ground water recovery wells (RW-7, RW-8 and RW-9) that are screened in both the shallow unconsolidated sand & gravel unit and the transition zone. In addition, one new ground water recovery well (RW-10) was installed in the transition zone. Existing ground water recovery wells RW-2, RW-3 and RW-4 were retained as part of the expanded ground water recovery system. The locations of the existing and new ground water recovery wells are presented on Figure 1-3.

Ground water collected in the on-site recovery wells and off-site recovery well RW-2 is pumped to an on-site air stripper for pretreatment prior to discharge to the facility wastewater treatment plant. The air stripper effluent is discharged to the equalization basin where it is pumped and then filtered and further treated with activated carbon and subsequently discharged to the Hudson River under current State Pollutant Discharge Elimination System (SPDES) permit NY-0007048.

2.3. Ground water monitoring program

In accordance with the NYSDEC-approved off-site remedial plan (LMS 1989a), and the NYSDEC-approved SAP, off-site ground water quality has been routinely monitored by GE since before 1989. Current ground water and surface water monitoring points include a total of eight off-site shallow unconsolidated unit monitoring wells (SW-1, SW-2, SW-5, SW-6, OBG-57, OBG-59, OBG-60 and OBG-61), and three off-site springs (Hillview Avenue Spring, Griffin Avenue Spring and Spring #1). The off-site shallow unconsolidated unit monitoring wells and spring locations are presented on Figure 1-3.

Historically, the ground water monitoring program also included five private water supply wells (located at tax parcel numbers 163.09-2-10, 163.09-2-14, 163.13-1-5, 163.13-2-16 and 163.13-1-1), and an additional surface water sample location (Spring #3).

2.4. Summary of off-site water quality data

2.4.1. Area south of facility

This section presents the shallow unconsolidated unit ground water quality conditions in the area south of Park Avenue, specifically with respect to VOCs.

Ground water quality data collected in the area south of Park Avenue in the early 1980s indicated that COC-impacted ground water extended from the plant site south as far as Spring #2 near Griffin Avenue (LMS 1985). TCE and its degradation product, 1,2-DCE, are the primary VOC constituents that have been detected in off-site ground water. The highest concentrations of TCE have been observed in state well SW-3 and the Griffin Avenue Spring.

As specified in the revised remedial investigation report (LMS 1985), analytical data collected from 1982 to 1985 from residential wells, the state wells and springs were used to delineate the maximum extent of COC-impacted ground water. The extent of COC-impacted ground water as presented in the report (LMS 1985) included the approximate area, which contained total VOC concentrations above 100 micrograms per liter (µg/L). The area of COC-impacted ground water was narrow to the north near Park Avenue, and is bounded on the east by Upper Broadway, and extends west beyond Hillview Avenue and south to Marion Street.

The degree and lateral extent of COC-impacted ground water in the area south of the facility has decreased since it was first identified in the early

1980's. Specifically, the area of COC-impacted ground water has diminished along the south, east and northwestern sides as evidenced by the results of sampling at Spring #1, located to the south, and wells SW-1 and OBG-60, located along Upper Broadway.

In addition, based on historical ground water quality data, VOCs have consistently not been detected in ground water from the private water supply well located at tax parcel number 163.09-2-14. Based on this, it appears that COC-impacted ground water has not migrated further west in this area. Moreover, total COC concentrations in the Williams Spring have decreased from a high of 10 μg/L to non-detect in 1995, the last time this spring was sampled. In the Hillview Avenue Spring, VOC concentrations have decreased from a high of 892 μg/L detected prior to 1989 to 21 μg/L in June 2003. Total VOC concentrations detected in the Griffin Avenue Spring have decreased from a mean concentration of 1240 μg/L detected prior to 1989 to 295 μg/L in June 2003.

2.4.3. Vicinity of Building 40

This section presents the shallow unconsolidated unit ground water quality conditions in the area between the facility's western property line and Building 40, specifically with respect to VOCs.

VOCs have been detected in the immediate vicinity of Building 40. However, with the exception of wells GM-1/OBG-1A (OBG-1A is a replacement well for GM-1) and GM-10, historical ground water quality data obtained from the monitoring wells located along the western property line (F-2, F-4, GM-2, GM-7, GM-10, GM-36, GM-37, GM-38, OBG-62, OBG-69, OBG-70, and OBG-71), indicate that no VOCs have been detected in ground water along the western boundary of the Fort Edward facility.

At well location GM-1/OBG-1A, VOCs have historically been detected five times out of 28 sampling events at concentrations ranging from 1.9 to 14 μg/L. No VOCs have been detected at this location since 1996 when naphthalene, a component of kerosene, was detected at a concentration of 7 μg/L, which is below the NYSDEC Class GA ground water guidance value of 10 μg/L.

Concentrations of VOCs, 1,1-dichloroethane, chloroethane, ethylbenzene and toluene have been historically detected at monitoring well GM-10. However, since 1995, VOCs have been detected in GM-10 during only one of nine sampling events, which indicates that the historical detections of VOCs are sporadic and that VOCs are not migrating from the site to the northwest.

2.5. Previous soil gas investigations

2.5.1. Lawler, Matusky, & Skelly Engineers (1988)

Following documentation of on-site and off-site ground water conditions at and in the vicinity of the GE Fort Edward plant, on-site and off-site feasibility studies of remedial alternatives were undertaken. The Revised Off-Site Feasibility Study Report was completed in January 1988 by Lawler, Matusky, & Skelly Engineers (LMS). As part of the off-site feasibility study, an assessment of volatilization through the vadose zone was performed. The prior conclusion of the volatilization assessment was that potential exposure of area residents to TCE via volatilization is effectively prevented by the limitations of diffusion and limited induced air flow through the vadose zone.

Following the completion of this assessment, the NYSDEC and NYSDOH requested that GE confirm the results of the vadose zone volatilization assessment by obtaining field measurements near GE's site. In June 1988, LMS obtained soil gas samples at four locations in the vicinity of State wells SW-3 and SW-4, where the highest off-site VOC concentrations in ground water had been detected. The results of the field sampling indicated that low concentrations of TCE were detected in soil gas and ranged from 1.3 to 2.7 $\mu g/m^3$. These low level detections were well below the estimates reported in the feasibility study. The final conclusion of the 1988 assessment was that no unacceptable risks to human health were posed by the VOC-impacted ground water. The Off-Site Feasibility Study Report was subsequently approved by NYSDEC in 1989.

2.5.2. O'Brien & Gere Engineers (1995)

As part of the RI completed by O'Brien & Gere in 1995, a soil gas survey was performed in the vicinity of Building 40 to identify and define areas of VOC contamination and to assist in the placement of new shallow unconsolidated monitoring wells at the facility. The objectives of the soil gas survey were to investigate potential areas for the presence of trichloroethene (TCE), 1,1-dichloroethane (1,1-DCA), and kerosene in the vicinity of Building 40 and to possibly identify the source(s) of the low level 1,1-DCA and chloroethane concentrations detected in monitoring well GM-10. The soil gas survey was performed between August 2 and 10, 1995.

This section presents the results for the soil gas samples collected during the RI as they relate to the sample locations in the area west of Building 40.

As shown on Figure 2-1, a total of 119 soil gas points were installed around Building 40. The samples were screened for total VOCs using a portable PID and for chlorinated VOCs, specifically TCE and 1,1-DCA, and kerosene constituents (i.e., naphthalene and trimethylbenzenes) using a portable GC located on-site. Any sample odors that were observed were also noted. The following subsections include a description of the VOC screening results and a discussion of the distribution of VOCs in the soil gas, specifically as they relate to the area west and northwest of Building 40 and between Building 40 and Lower Allen Street.

Area between Building 40 and Lower Allen Street

Soil gas points were installed at 38 locations between Building 40 and Lower Allen Street. Kerosene was identified in 15 of the 37 soil gas sampling locations. As shown in Figure 2-1, the strongest indications of kerosene were identified in two locations; one area was in the vicinity of the former onsite mineral oil tank in the area of GM-2. The second area was located south of an onsite aboveground storage tank area on the west side of Building 40.

Concentrations of an unknown chlorinated VOC, tentatively identified as 1,1,1-trichloroethane (1,1,1-TCA), were detected at the soil gas point located in the vicinity of the northwest corner of Building 40. Three additional soil gas points were installed approximately 50 feet to the south, east, and north of the northwest corner of Building 40 to assist in the identification of the source of the 1,1,1-TCA. Greater concentrations of the tentatively identified chlorinated VOC (1,1,1-TCA) were detected in each of the additional points. The highest concentration of chlorinated VOCs was detected in the soil gas point located outside the loading dock. The area in the vicinity of the northwest corner of Building 40 with the detections of the chlorinated VOC is presented in Figure 2-1.

Area along the western boundary

Soil gas samples were collected from 12 points installed along the western property boundary. No significant VOCs or kerosene constituents were determined to be present in the soil gas samples collected from this area.

Area surrounding monitoring well GM-10

Soil gas samples were collected from 16 points installed in the vicinity of monitoring well GM-10. No 1,1-DCA or other VOCs were detected in the soil gas samples collected in this area. Therefore, the source of the 1,1-DCA detected in monitoring well GM-10 was not identified in the soil gas survey. It should be noted that although chlorinated VOCs were detected in the soil gas and ground water samples collected from wells and soil gas points southeast of monitoring well GM-10, 1,1-DCA was not identified as a soil gas or ground water constituent.

3. Action plan elements

The following overall plan of action was developed in cooperation with NYSDEC and NYSDOH, in consideration of the background information outlined above, and the objectives outlined in Section 1.1.

As an initial step, subsurface soil gas and additional grab ground water samples will be collected for laboratory analysis from soil gas sampling points and temporary piezometers located within and surrounding the boundaries of the study area. This work will be conducted to provide additional information on the areal extent of the potential COC presence in soil vapor throughout the study area. This work will be done concurrently with coordination of access to initiate the potential resultant ventilation program.

In addition, an air sampling program, consisting of the concurrent sampling of indoor air, substructure soil gas and ambient air, will be completed within the study area. The air sampling program will commence with planned sampling of residential structures and commercial/institutional structures located within the study area. Figure 3-1 shows the general distribution of the planned sample locations. The selection of which structures are to be sampled and the number of structures to be sampled will be determined recognizing technical project requirements and input from the owners/occupants. The sequence of air sampling locations will be selected on the basis of all available data including: ground water quality data, subsurface soil gas data, returned indoor air, substructure soil gas and ambient air data, property use, property access, owner/occupant requests, and other relevant data.

The action plan recognizes the potential for the design and installation of ventilation systems within structures overlying areas where COCs have been detected within the study area. Typical design and installation may consist of engineered subslab ventilation systems combined with sealing probable points of vapor entry from the subsurface (e.g., cracks and joints in concrete). This technique has been proven effective in many applications and is expected to be the primary means of any ventilation conducted based upon the results of the study. In application, a blower is used to intercept gases from the substructure soil, which creates a negative pressure condition in the subsurface. The gases are then discharged to the atmosphere. Ventilation systems of this type are applied frequently to mitigate radon intrusion and more recently have been used extensively for the purpose of vapor intrusion mitigation. Alternate ventilation options will be considered for implementation (e.g., primarily in larger commercial structures, etc.,) where the installation of the residential-type sub-slab ventilation system described above may not be practicable. The remedy selected for any particular situation will meet the criteria to effectively mitigate any gases from the subject structure.

3.1. Soil gas and grab ground water sampling program

3.1.1. General

The objective of this task is to delineate the extent of COCs in subsurface soil gas within the study area. In addition, a select number of grab ground water samples are also planned for collection within the study area to assist in fulfilling the objectives of the current investigation. To accomplish this objective, subsurface soil gas and select grab ground water samples will be collected for laboratory analysis of select VOC constituents (specifically, TCE and its corresponding degradation/daughter products cis-1,2-DCE and vinyl chloride).

The proposed soil gas sampling program involves the collection of discrete subsurface soil gas samples from a planned 17 locations within and surrounding the boundaries of the study area where existing ground water and/or soil gas data show the presence of the COCs. As shown on Figure 3-1, the proposed subsurface soil gas sampling locations are located near Park Avenue; south of the Glens Falls National Bank; and along Upper Broadway near the Fort Hudson Nursing Home property; Stevens Avenue; Hillview Avenue; Griffin Avenue; and, West Summit Street. It is planned that a majority of the sampling will be performed on public rights of way where access issues will be minimized; however, some sampling may be required on private property as well. When it is necessary to obtain a sample from private property, it is assumed herein that access to these properties will be granted. The final locations of the soil borings will be determined based on the results of the site access negotiations and/or field conditions encountered during drilling activities (i.e., occurrence of surface and/or subsurface obstructions identified during the utility clearance process).

As shown on Figure 3-1, 4 of the soil gas samples will be collected from sampling points located along the northwestern boundary of GE’s Fort Edward facility, between Building 40 and the railroad tracks. The northernmost point will be located north of monitoring well GM-10, and the southernmost point will be installed near the rail spur serving the main facility.

To aid in the delineation of the COCs in soil gas, limited shallow ground water sampling will also be performed in conjunction with the soil gas sampling program. As shown on Figure 3-1, the proposed program involves the installation of temporary piezometers and the collection of shallow grab ground water samples (i.e., within the upper five feet of the ground water table) at approximately six locations in the southern study area. The locations of the proposed grab ground water samples have been “paired” with selected proposed soil gas sample locations. The ground water sample locations will be drilled at a paired location approximately five feet from the associated soil gas sample location.

In addition to providing information on the extent of COCs in ground water in the study area, the temporary piezometers will be used in conjunction with existing monitoring wells to map the water table. The ground water level data will be used during the soil gas sampling point installation program to verify the correct target depth of each soil boring and provide for the collection of the soil gas samples within approximately two feet above the local shallow groundwater elevation.

Based on the results of the ground water and soil gas sample analyses, additional sample locations may be chosen to define the extent of the COCs in ground water and soil gas within the study area. As such, an iterative approach will be used where necessary to fill in data gaps as they are identified. Additional soil gas sampling may be warranted to determine the degree and extent of COCs.

3.1.2. Drilling and sample point installation program

To facilitate the installation of the temporary piezometer or soil gas sample point, a soil boring will be advanced through the unconsolidated unit to the boring's target depth using direct push soil sampling methods and/or geotechnical drilling techniques (drive casing). For portability and ease of access, we anticipate that drilling activities will be completed using an all-terrain vehicle mounted direct push drill rig (i.e., such as that manufactured by Geoprobe® or equivalent).

The target depth for each temporary piezometer where grab ground water samples shall be collected is approximately four feet below the top of the water table. For each soil gas sample point, the borings target depth is approximately two feet above the top of the observed local water table. The top of the water table is expected to range between 13 and 21 feet below grade depending on where within the study area the boring is located. The top of the water table will be determined through inspection of soil samples and/or as measured in nearby piezometers and monitoring wells.

Upon recovery, soil samples will be classified in the field by a supervising geologist using the Modified Burmister and Unified Classification Systems. In addition to logging the geologic descriptions, observations including soil sample texture, composition, color, consistency, moisture content, sample recovery, and the observance of noticeable odors or stains will be recorded by the geologist.

In addition to supervising the drilling program, the supervising geologist will be responsible for site health and safety monitoring. A site-specific Health and Safety Plan (HASP) that meets the general regulations found under 29 CRF 1910.120 for Hazardous Waste Operations and Emergency Response and the citations adopted by reference will be developed prior to initiation of field work. The HASP will document the steps to be taken to protect the health and safety of the workers and immediate community during performance of the drilling and sampling program.

The supervising geologist will also be responsible for contacting local utility companies and the Town and Village of Fort Edward to inquire about the presence of buried utilities. If buried utilities are identified, the final location of the proposed soil boring will be modified accordingly.

The final locations and elevations of the newly installed monitoring points will be surveyed and will be incorporated into the existing Site base map. The location and surface elevation of the soil gas sampling points will be surveyed using either a survey grade global positioning system or by a NYS-licensed surveyor.

3.1.3. Shallow grab ground water sampling

As discussed above, temporary piezometers will be installed at approximately six locations to document the top of the water table and allow collection of grab ground water samples as part of this study. The temporary piezometers will be constructed of 1-inch ID, flush joint, schedule 40 polyvinyl chloride (PVC) riser pipe with a five foot length of 0.010-inch slot well screen placed at the bottom of the borehole. The base of the borehole will be approximately four feet below the top of the water table such that the well screen straddles the top of the water table. The annular space at the ground surface will be sealed using bentonite paste to prevent surface water from entering the borehole.

Following placement of the PVC well screen and riser pipe, a ground water sample will be obtained for laboratory analysis. Ground water samples will be collected using either a new disposable PVC bailer or by using high-density polyethylene (HPDE) tubing equipped with a foot valve. To collect representative ground water samples, the temporary monitoring wells will be purged of three well volumes prior to sampling. Special attention will also be taken when filling vials for volatile organic analysis to ensure that representative samples are obtained. The vials will be filled in a controlled manner focused at reducing ground water contact with the air and ensuring that no headspace remains after capping. Ground water samples collected from the temporary wells will be sent to an approved laboratory for VOC analysis using USEPA Method 624. Ground water sampling information will be recorded using the ground water monitoring form provided in Exhibit A.

With the exception that detections above the method detection limit (MDL), but below the practical quantitation limit (PQL) be reported as estimated values (i.e., "J" flagged), sample handling and quality assurance/quality control (QA/QC) will be performed in accordance with the NYSDEC-approved SAP (O'Brien & Gere 1997), including preservation and holding time requirements, the use of chain-of-custody protocols, field duplicate samples, trip blanks and the collection of matrix spike (MS), and matrix spike duplicate (MSD).

After the ground water level data from each temporary piezometer has been used to determine the target depth for installation of the soil gas sampling point, and collection of the grab ground water sample has been completed, the temporary piezometers will be removed. Each boring will be backfilled to surface grade with bentonite and the area will be restored to pre-existing conditions.

3.1.4. Soil gas sampling point installation

Discrete samples of soil gas will be collected using a dedicated soil gas sampling implant. The soil gas sampling point will be installed to a depth of approximately two feet above the top of the observed water table at each sample location. Sample depths will be measured in relation to depth below ground surface to nearest 0.1 foot.

The soil gas sample point consists of a 6-inch length of double woven stainless steel wire screen with a pore diameter of 0.0057 inches (0.145 mm) attached to an appropriate length of Nalgene® 489 polyethylene tubing.

The sample point is driven to its target depth using geoprobe drive rods, as the drive rods are removed, the annular space around the sampling point will be packed with sand of an appropriate grain size to a point about six inches above the screened interval. The annular space around the sample tubing will be sealed with approximately 1-foot of a dry granular bentonite to prevent water infiltration/infilling across the sample inlet. The remainder of the borings annular space will be sealed above the sampling zone to ground surface with a minimum bentonite slurry thickness of three feet to prevent ambient air infiltration.

3.1.5. Soil gas sampling and analysis

Prior to the collection of the soil gas samples, the sampling tubing will be purged of ambient air. A minimum of one and a maximum volume of three volumes of air within the sample probe and tubing will be purged prior to sample collection. In addition, tracer gas screening will be used during sampling of the first ten soil gas probes to evaluate the adequacy of the sampling technique. Once verified, GE may request that the NYSDEC reconsider the need for continued use of the tracer gas. The tracer gas screening procedure is presented below:

- Helium tracer gas will be retained around the sample location by filling a bucket or clear plastic hopper, which is positioned over the sample location;

- The bucket will be suitably sealed to the ground surface;

- The bucket will have a valve fitting at the top to introduce helium tracer gas into the bucket and a valve fitting at the bottom to let the ambient air out while introducing the helium. The valves will be closed after the bucket has been filled with helium;

- In addition, a modified bulkhead compression fitting will also be installed at the top of the bucket to allow the sample tubing to pass through the compression fitting and exit the bucket;

- After the bucket has been filled with helium, the sample tube will be attached to a personal air-monitoring pump;

- The pump will be pre-calibrated to extract soil vapor at a rate of 0.1 liters per minute;

- A hand-held helium detector will be attached to the exit fitting on the pump to confirm there is no short circuiting of ambient air around the annular space of the borehole (e.g., the presence or absence of helium in soil gas will confirm the integrity of the borehole seal prior to sampling);

- The soil gas probe will be purged for a period of three to five minutes to screen for helium/short circuiting;

- A Mark Helium detector Model 9822 or equivalent will be used to screen the extracted vapor stream for helium. This detector is sensitive to 100 part per million by volume (ppmv);

- If helium is detected during this procedure, the soil gas sample will not be collected until the short-circuit is corrected and the sample probe is re-screened and passes;

- If helium is not detected, the sample tubing will be attached to the sampling equipment and soil gas sample collection will be initiated. Soil gas collection procedures are discussed below;

- After sample collection is complete, the bucket will be checked using the fitting on the bucket to verify helium is still present around the sample probe location;

- Finally, following the completion of sample collection, the personal monitoring pump and helium meter will be reconnected to the sample tubing to check for helium in the soil gas sample to verify that short circuiting has not occurred during sampling. If helium is not detected, the sample will be submitted to the laboratory for analysis. If helium is detected, the GE project manager will be notified and a decision will be made as to whether or not the sample will be submitted for analysis, or if an additional sample should be obtained following an evaluation of the integrity of the borehole seal.

The soil gas samples will be collected using certified-clean 6-liter stainless steel SUMMA vacuum canisters equipped with laboratory-calibrated fixed rate flow controllers. The flow controllers will be set to collect soil gas samples for a period of four hours. As such, the airflow into the SUMMA canister will not exceed 0.2 liters per minute. Sample collection will be terminated before the canister vacuum is exhausted, and the canister vacuum at the beginning and ending times of sample collection will be recorded. An example of the field form used for the sampling of soil gas is included as Exhibit A.

With the exception of the soil gas samples obtained in the northwestern area of investigation (e.g., area west of Building 40), the soil gas samples will be submitted for analysis of TCE and its degradation products (i.e., cis-1,2-DCE and vinyl chloride) by USEPA Method TO-15 with a reporting limit of 0.1 part per billion by volume (ppbv) for each compound. The soil gas samples obtained in the northwestern area of the investigation (e.g., area west of Building 40), will also be analyzed for the following additional compounds: chloroethane; 1,3-dichlorobenzene; 1,2-dichlorobenzene; naphthalene; and, 1,1,1-TCA by USEPA Method TO-15 with a reporting limit of 0.1 ppbv for each compound. All soil gas analyses will be performed by a NYSDOH-ELAP certified environmental laboratory.

It should be noted that USEPA Method TO-15 in the selective ion-monitoring (SIM) mode was considered for laboratory analysis based on its selective compound identification and its low-level detection ability. However, this analytical method was excluded in favor of the USEPA Method TO-15 because the water and carbon dioxide, commonly found in soil gas samples, can cause interference in the SIM instrumentation. In addition, potentially higher levels of COCs in soil gas samples can be harmful to the sensitive SIM instrumentation. The selected laboratory will document that the USEPA Method TO-15 will be able to achieve the data quality objectives of this study prior to initiation of the sampling program. The laboratory will calibrate the gas chromatograph/mass spectrometry (GC/MS) instrument to yield analytical results and laboratory QC analyses for the COC constituents of this study (i.e., TCE, cis-1,2-DCE and vinyl chloride).

After sample collection, the soil gas sampling points will be removed, borings backfilled to surface grade with bentonite and area restored to pre-existing conditions. In the event that the soil gas sampling points can not be retrieved, the sampling tubing will be cut, plugged, folded, and buried beneath native soil, and the ground surface restored as closely as possible to original condition.

3.2. Air sampling

Indoor air, substructure soil gas and ambient air sampling will be offered at select structures located within the study area. The air sampling program will commence with planned sampling of residential structures and commercial/institutional structures located within the study area.

Figure 3-1 shows the general distribution of the planned sample locations. The selection of which structures are to be sampled and the number of structures to be sampled will be determined recognizing technical project requirements and input from the owners/occupants. GE, NYSDEC and NYSDOH will collectively review the data generated during implementation of this program to determine any appropriate subsequent activities.

The sequence of air sampling locations will be selected on the basis of all available data including: ground water quality data, subsurface soil gas data, returned indoor air/substructures soil gas/ambient air data, property use, property access, and other relevant data.

Descriptions of specific components proposed as a part of the air sampling program are provided in the subsections to follow. In general the specific components include the following:

- Notification of property owners and occupants and access coordination/scheduling with owners/residents prior to sampling;
- Pre-sampling survey
- Indoor air sampling
- Substructure air sampling
- Ambient air sampling
- Communication with property owners/residents regarding the results of the sampling and decisions for follow-up sampling and/or ventilation activities.

Air sampling activities will consist of two separate visits to the property about 24 hours apart. The initial visit will consist of a pre-sampling survey, including an interview with the property owner(s) or resident(s) and observations of the portions of the residence where samples will be obtained (i.e., basement, crawl space, lower level of the building and/or the lowest area of a structure that has sufficient ceiling height to be habitable). The sampling team will include a two-person sampling team as well as possibly a GE representative. Indoor air, substructure soil gas, and ambient air sampling will commence at the end of this initial visit. After about 24 hours the property will be revisited to retrieve the indoor air, substructure soil gas, and ambient air samples.

The proposed protocols for the pre-sampling survey and sample collection are discussed in the following sections.

3.2.1. Pre-sampling survey

Pre-sampling survey activities will include visual observations of the portions of the residence where samples will be obtained (i.e., basement, crawl space, lower level of the building and/or the “lowest potential living area" of the residence or commercial structure, and completion of an occupant survey based on an interview with the owner/occupant providing access to the property. The inspection and occupant survey will be completed to establish/document conditions prior to sampling and to identify items or occupant activities that could contribute to a presence of target VOCs in the structure. The information will be recorded using the indoor air quality building survey form provided as Exhibit B. Photographs will be taken as necessary for additional documentation of existing conditions.

The survey will review property-specific factors that could influence VOC concentrations in indoor air including:

- Building construction characteristics such as foundation type and building materials;

- Building features such as building footprint, condition of floor in contact with soil;

- Heating and ventilation systems;

- Items/occupant activities within the lowest living area that could serve as a potential VOC source;

- Characteristics of the surrounding grounds; and

- Items/occupant activities in outside portions of the property that could serve as a potential VOC source.

Screening of the building area proposed for indoor air sampling will be conducted using a photoionization detector (PID) and a flame ionization detector (FID) as a general check for a gross presence of VOC vapors in advance of sampling. The screening will focus on the breathing zone height and the proximity of potential sources of VOCs (consumer product containers, gasoline-powered equipment, etc.), and floor penetrations or cracks in contact with soil. Although many consumer products may not contain the target VOCs, the presence of other vapors will alter detection limits and analytical resolution. The screening results will be recorded on the indoor air quality building survey form included as Exhibit B.

During the pre-sampling survey the owner/occupant may be asked to remove probable sources of VOCs as indicated by PID and FID screening. The sampling may be rescheduled for at least 24 hours following the removal of probable sources. Items constituting potential sources of VOCs but not probable sources through screening will remain but will be noted on the survey form and photo-documented with permission of the owner or occupant.

As noted on the vapor intrusion sampling form, we propose to record weather conditions at the time of the visits. We propose that sampling proceed regardless of the weather conditions as long as the property is accessible. Certain weather conditions such as barometric fluctuations and precipitation conditions could influence vapor intrusion potential; the actual effect is not readily predictable and would likely be influenced by other variables such as building conditions and ground cover, and other more latent factors. Daily climatic data regarding barometric pressure, precipitation and temperature will be obtained from the Glens Falls Airport, in Glens Falls, New York on a daily basis during the investigation.

3.2.2. Indoor air sampling

Collection of indoor air samples will be completed in general accordance with the following protocols. The samples will be collected over a 24-hour period from the basement and the lowest area of a structure that has sufficient ceiling height to be habitable. For residential structures, one set of indoor air samples will be collected. For larger commercial/institutional buildings, we anticipate that additional sets of air samples may need to be collected to be representative of the area. For the larger commercial/institutional buildings, the actual number of samples and sample locations will be based on the number of slabs, foundation types and the size of the structure. Prior to the pre-sampling survey, the owner/occupant of each structure will be provided a set of instructions to follow during the air sampling program. A copy of these instructions is provided in Exhibit C.

The sample canister will be deployed at the end of the pre-sampling survey and will be retrieved approximately 24 hours later. Indoor air samples will be collected using certified-clean stainless-steel 6-liter pre-evacuated SUMMA canisters. SUMMA canister intake will be placed at breathing zone height of approximately three to five feet above the floor by affixing to wall/ceiling support with nylon rope or placement on a stable surface. As practical based on building features, the canister will be placed in a central location away from outside windows and doors.

The soil gas samples will be collected using certified-clean 6-liter stainless steel SUMMA vacuum canisters equipped with laboratory-calibrated fixed rate flow controllers. Flow controllers will be calibrated to collect the sample over a 24-hour period to account for daily building activities that might influence COC concentrations in indoor air. As such, the airflow into the SUMMA canister will not exceed 0.2 liters per minute. Sample collection will be terminated before the canister vacuum is exhausted, and the canister vacuum at the beginning and ending times of sample collection will be recorded. The sampling location will also be screened for possible organic vapors using a portable PID during the air sampling activities. Sample identifications, SUMMA canister identification numbers, flow controller identification numbers, initial and final vacuum readings, time of sample collection, and PID readings will be documented for each air sample. Chain-of-custody documentation will be maintained throughout sample collection and analysis. An example of the field form used for the air sampling is included as Exhibit A.

Digital photos will be taken of the SUMMA canister and the surrounding area. At the time of retrieval, any noticeable changes in the condition of the sampling area, such as open windows and doors, changes in the operation of the heating/ventilation system or the condition or location of items in proximity to the canister will be noted.

3.2.3. Substructure soil gas sampling

A sample of substructure soil gas will be collected over a 24-hour period, concurrent with collection of indoor and ambient air samples in the selected structures within the study area. Substructure soil gas samples will consist of one of the following:

- A sample of soil gas obtained through a temporary or permanent sampling port through an apparent vapor barrier (such as a concrete floor slab or plastic liner); or

- An air sample obtained from a crawl space or basement with an earthen floor and without an apparent vapor barrier.

For residential structures, one substructure sample will be collected. For larger commercial/institutional buildings, we anticipate that additional samples may need to be collected to be representative of the area. The actual number of samples and sample locations will be based on the number of slabs, foundation types and the size of the structure.

For air samples obtained from a crawl space or basement with an earthen floor and without an apparent vapor barrier the procedures employed for indoor air sample collection will be used.

Substructure soil gas samples will be collected by installing a temporary sealed sampling port through the concrete floor slab. The following procedures for substructure soil gas sample collection are based on the building being a slab-on-grade construction. The steps provided below should be considered a general guidance on the collection of substructure soil gas samples for each location. The actual sequence may need to be modified based on site conditions and sample location access at the time of sample collection.

- A ⅜-inch diameter hole is drilled through the concrete slab using an electric hammer drill. The hole will be extended about three inches into the substructure material using either the drill bit or a steel probe rod.

- A section of ¼-inch O.D. Teflon tubing will be inserted into the bottom of the floor slab. The annular space between the ⅜-inch hole and ¼-inch tubing will be sealed using a hydrated bentonite slurry or 100% beeswax seal.

- The ¼-inch Teflon tubing will be purged using a polyethylene 60 cubic centimeter (cc) syringe. The ¼-inch Teflon tubing will then be connected to a SUMMA canister. Care will be taken not to discharge the air/soil vapor syringe into indoor air. For duplicate sample locations, a second canister will be connected by installing a ¼-inch stainless steel "tee" fitting between the probe discharge tubing and the SUMMA canisters. Additional lengths of **¼-inch** Teflon tubing will then be connected from each end of the tee fitting to the SUMMA canisters.

- A sample of substructure soil gas will be collected over a 24-hour period, concurrent with collection of indoor and ambient air samples utilizing certified-clean stainless-steel 6-liter pre-evacuated SUMMA canisters. The required sampling rate will be maintained by laboratory-calibrated constant-differential low volume flow controllers. Vacuum readings on the SUMMA canisters will be obtained and documented prior to sample collection and upon completion of sampling. Sample identifications, SUMMA canister identification numbers, flow controller identification numbers, initial and final vacuum readings, time of sample collection, and PID readings will be documented for each soil vapor sample. Chain-of-custody documentation will be maintained throughout sample collection and analysis.

3.2.4. Ambient air sampling

Ambient (outdoor) air samples will be collected concurrently with indoor air and substructure soil gas sampling within the study area using the procedure outlined below. The ambient air samples will be collected starting after completion of the indoor air building survey and before the start of indoor air sampling. Ambient air sample collection will be terminated before the end of indoor sampling.

The intent of the ambient air sampling is to obtain data that is likely to be representative of the ambient condition in the vicinity of the structure concurrently with collection of indoor air and substructure soil gas samples. As a general goal, ambient air samples will be collected at each of the properties where indoor air is sampled. However, ambient air samples may be batched such that one ambient air sample is obtained in the general vicinity of several structures in a neighborhood.

The ambient air samples will be collected at a height of approximately five feet above the ground surface, the approximate mid-point of the ground story level of the building. To the extent allowed by site features, the air samples will be collected about five to 15 feet upwind from the building, or from several structures being sampled concurrently. Sample locations will be away from "wind breaks" such as bushes or fences; and potential "point sources" of VOCs such as fuel oil storage tanks, gasoline (e.g., such as from a motor vehicle) or paint storage. In the event that it is not practicable to collect an ambient air sample due to severe weather conditions or concern for security of the sampling device, the results of the nearest (temporally and spatially) ambient sample will be used for comparison with the indoor air and substructure sampling results.

3.2.5. Air sample analysis

With the exception of the air samples obtained in the northwestern area of investigation (e.g., area west of Building 40), the substructure, indoor and ambient air samples will be submitted to a ELAP certified environmental laboratory for analysis of TCE and its degradation products (i.e., cis-1,2-DCE and vinyl chloride) by USEPA Method TO-15 with a reporting limit of 0.1 ppbv for each compound. The air samples obtained in the northwestern area of the investigation (e.g., area west of Building 40), will also be analyzed for the following additional compounds: chloroethane; 1,3-dichlorobenzene; 1,2-dichlorobenzene; naphthalene; and, 1,1,1-TCA by USEPA Method TO-15 with a reporting limit of 0.1 ppbv for each compound. Note that reporting limits may be higher for some samples where dilution of the sample is required to obtain results within the instrument’s calibration range

3.3. Soil gas quality assurance/quality control

Quality Assurance/Quality Control (QA/QC) measures implemented during field sampling activities will include but not be limited to:

- Documentation of sample container vacuum/pressure before and after sample collection;
- Equipment blanks accompanying empty SUMMA canisters to the field, and filled sample containers back to the laboratory; and
- Collection of field duplicate samples.

The SUMMA canisters used for subsurface and substructure soil gas sampling will be either individually or batch “certified clean” by the analytical laboratory for TO-15 analysis to a limit of less than 0.1 ppbv for each compound, and confirmation of the presence of the certification seal or label for each container will be noted on sampling documentation.

The SUMMA canisters used for indoor and ambient air sampling will be individually “certified clean” by the analytical laboratory for TO-15 analysis to a limit of less than 0.1 ppbv for each compound, and confirmation of the presence of the certification seal or label for each container will be noted on sampling documentation.

For the collection of the soil gas samples, the 4-hour flow metering valves will be cleaned and the flow rate will be pre-set by the analytical laboratory and will be labeled certifying the sampling flow rate calibration. For the collection of the substructure, indoor and ambient air samples, the 24-hour flow metering valves will be cleaned and the flow rate will be pre-set by the analytical laboratory and will be labeled certifying the sampling flow rate calibration. The vacuum/pressure of the canisters will be noted and recorded before and after the collection of samples.

Soil gas and air samples will be collected following the methods and procedures described in this Work Plan and pursuant to equipment suppliers/manufacturers and the analytical laboratory. Equipment blanks ("field blanks") will accompany sample containers (empty) to the field, and collected samples back to the lab. Equipment blanks will be collected at the frequency of one per 20 environmental samples per parameter. These equipment blanks will consist of a clean SUMMA canister filled with zero air or nitrogen (not ambient outdoor air), and will not be opened during the course of its transport. The equipment blanks should not contain any target analyte at a concentration greater than its corresponding reporting limit, or other non-target compounds that may interfere with the analysis of a target analyte.

Duplicate samples will be collected simultaneously (i.e., over the same time interval) and from the same sample point at the frequency of one per 10 environmental samples per parameter. For duplicate sample locations, a second canister will be connected by installing a ¼-inch stainless steel "tee" fitting between the probe discharge tubing and the SUMMA canisters. Additional lengths of ¼-inch Teflon tubing will then be connected from each end of the tee fitting to the SUMMA canisters.

3.4. Decontamination procedures

The field sampling program will include decontamination procedures to ensure that potential contaminants are not introduced into each sample location or transferred across the study area. All equipment which will come into contact with the soil, as well as drill tools, drill casing, drill rod, hoses and the back of the drill rig will undergo an initial cleaning process. While working within the study area, the drilling equipment that comes into contact with the soil will be decontaminated between monitoring point locations to prevent cross-contamination. Drilling equipment will again undergo the cleaning process prior to leaving the study area at the conclusion of drilling activities.

For large equipment, such as the direct push drill rig, the initial and final cleaning process will involve the use of a high-pressure steam cleaner. Potable water will be used for all decontamination procedures. Smaller pieces of drilling equipment and/or sampling tools will be hand washed in small buckets using an Alconox and tap water wash and a tap water rinse. Decontamination water will be collected and transferred to the GE Fort Edward facility for subsequent characterization and disposal by GE.

3.5. Handling of investigation derived materials

Investigation derived materials (IDM) resulting from performance of the field program will require appropriate management. This IDM includes the following:

- Drill cuttings and debris generated during subslab sampling within structures;
- Ground water resulting from sampling activities;
- Sediments which settle out of ground water produced during the above;
- Decontamination fluids and sediments which may settle out of such fluids; and
- Personnel protective equipment (PPE), disposable sampling supplies, and associated debris resulting from the execution of field activities.

These materials will be segregated and placed in 55-gallon drums and transported to the GE Fort Edward facility for subsequent characterization and disposal by GE in accordance with applicable regulations.

3.6. Sampling documentation

The collection of air, soil gas and ground water samples will be documented with the use of Field Sampling Summary Forms. Examples of these forms are included in Exhibit A. Information included on the these forms will include:

- identification of sample;
- date and time of sample collection;
- identity of sample collector(s);
- description of location of sample collection;

- weather conditions at the time of sample collection;
- sampling equipment and sample containers (e.g., type, serial number) used;
- starting and ending vacuums of SUMMA canisters; and
- depth of sample collection below ground.

In addition to the information included on the Field Sampling Summary Forms, thorough representative photo documentation will be obtained during the sampling program.

The collection, transfer of custody, and shipping/transport of the samples to the analytical laboratory will be documented using chain-of-custody forms. Information included on the chain-of-custody form will include:

- sample identification;
- date and time of sample collection;
- identity of sample collector(s);
- requested analyses; and
- additional notes or comments pertinent to analysis of the samples.

3.7. Data validation and usability assessment

The analytical data generated during the investigation will be validated, and the usability of the data for assessing the extent of COC's and the possible need for ventilation will be assessed. A Data Usability Summary Report (DUSR) will be prepared by an independent third party data validation subcontractor. The DUSR will be completed in accordance with the NYSDEC DUSR guidance and/or USEPA data validation documents and the specified method. The purpose of this data assessment is to provide information to determine the uncertainty and bias in the data as considerations for decision-making.

3.8. Data management

Data management procedures are established to effectively process the data generated during the investigation such that the relevant data descriptions (sample numbers, methods, procedures, etc.) are readily accessible and accurately maintained. Data will be collected and recorded in a variety of ways during this project. These include standard field forms (such as field data sheets, chain-of-custody forms, and soil boring logs) and laboratory generated data. Each of these original forms will be kept in a file maintained by O'Brien & Gere throughout the project. Data which lends itself to computerization, such as analytical data, will be placed in a data storage system. The computerized system will be capable of basic data reduction, manipulation, and reporting functions. In addition, laboratory analytical data will be provided to the NYSDEC in EQUIS electronic data deliverable format.

Daily progress reports will be made by telephone from the field team to O'Brien & Gere's Project Manager or designee during the field investigation portions of the project. OBG will provide daily telephone and/or email updates to GE during all phases of the effort.

Frequent data reduction and reporting may be necessary throughout the project in order to maintain communication between involved parties. To fulfill this need, informal meetings and conference calls may be arranged between and within O'Brien & Gere and GE.

The NYSDEC and NYSDOH will be kept apprised of the progress and results of the investigation through informal weekly progress reports and, as appropriate, via telephone calls. In addition, it is anticipated that GE and O'Brien & Gere may schedule and conduct one or more meetings with the NYSDEC and NYSDOH during the course of this project.

3.9. Data analysis and review

Preliminary analytical results will be obtained from the laboratory within 10 business days of verified time of sample receipt at the laboratory. Following the receipt of the preliminary analytical results from the laboratory, the results will be provided to GE and concurrently reviewed by O'Brien & Gere.

Once the preliminary analytical results have been reviewed by O'Brien & Gere and GE, results will be promptly communicated to Agency staff and next steps will be identified.

Upon receipt of the final analytical data packages, the analytical results will be validated, reviewed and final summary tables will be prepared and submitted to GE. Copies of analytical data packages and summaries will be prepared and provided to the NYSDOH and NYSDEC. It is understood that the NYSDOH will transmit copies of laboratory results to occupants of residential and commercial structures following notice to and discussion with GE.

As discussed in Section 3.2.1, based on the results of the sampling effort, additional sample locations may be necessary to define the extent of the COCs and satisfy project objectives within the study area. The delineation objective is to obtain non-detectable concentrations of COCs at or above a reporting limit of 0.1 ppbv.

4. Ventilation and post ventilation

Appropriate ventilation of structures will occur as warranted for the structures located over the zone where detectable concentrations of COCs are identified within the study area. GE reserves the right to evaluate ventilation plans depending upon the outcome of the sampling effort. GE, NYSDEC and NYSDOH will collectively review the data generated during implementation of this program to determine any appropriate subsequent activities.

For the purposes of this program, installation of an engineered sub-slab ventilation/depressurization system combined with either sealing probable points of vapor entry through a foundation slab (e.g., cracks and joints in concrete), or placement of an impermeable liner over the earthen subgrade (for structures without foundation slabs) will be performed. Alternate ventilation options will be considered for implementation (e.g., primarily in larger commercial structures, etc.,) where the installation of the residential-type sub-slab ventilation system described above may not be practicable. The remedy selected for any particular situation will meet the criteria to effectively mitigate any gases from the subject structure.

Each sub-slab/membrane depressurization system will be designed and installed as a permanent, integral addition to the building. The system incorporates design features to lower the sub-slab/membrane pressure, limit energy usage, avoid compromising moisture and temperature controls, and limit noise. The sub-slab/membrane depressurization system creates a negative pressure field directly under the building and around the foundation. This negative pressure field becomes a collection “sink” for gases present in the vicinity of the building. Intercepted gases are piped to a discharge point to the atmosphere. Sub-slab/membrane depressurization systems are proven effective means for intercepting subsurface vapors that may potentially infiltrate a structure. Similar systems have been installed and operated in residential, commercial, and school buildings throughout the United States.

For any structures where a ventilation system is deemed appropriate and assuming the owner authorizes the installation of a sub-slab ventilation system, ventilation and post-ventilation activities are currently anticipated to include the following four general steps:

1. Ventilation system design: A construction contractor will visit the site to review property-specific design considerations such as the location and type of construction of extraction points, possible discharge piping routes, and exhaust fan locations. This step will include diagnostic tests to support siting of extraction points, and sizing of the exhaust fan and piping (likely to be a

low pressure/high flow system for most structures). Given the soil conditions that are likely to be present, most of the systems for small structures would likely involve installation of low pressure and high flow centrifugal fans. Present groundwater conditions are not expected to limit application of this technology. During this step possible extraction point locations, piping routes, and exhaust fan locations will be reviewed with the owner. An attempt will be made to the extent practicable to locate exposed piping on the rear of the structure or some other location where the exposed piping does not present a negative aesthetic appearance.

2. Ventilation system installation: The ventilation system will be installed at a time scheduled between the ventilation contractor and the property owner. Electrical hardwiring will be conducted either at the same time, if possible, or a short time after installation. The ventilation system installation will be completed by a qualified ventilation contractor guided by a project-specific performance specification. In some instances (e.g., for larger structures), a building-specific design may be required.

3. Ventilation system commissioning: The subslab depressurization system will be activated by the ventilation contractor. Pressure and innocuous smoke testing will be performed to demonstrate effective operation and no negative impacts such as back-drafting of heating systems, etc. During this step, the contractor will instruct the property owner/occupant in how to check that the system is operational via reading of the manometer and what to do in the event of a shutdown. Appropriate literature/information on the proper operation of the unit will be supplied to all owner/occupants. Diagnostic and post-installation operations testing will be documented on appropriate report forms. A fact sheet/notice, including contact information in the event of a question/concern, will be provided to the property owner and occupants to describe the normal system operation and provide direction in the event of a shutdown.

4. Ventilation system operation and maintenance: The building occupant/owner will assume primary responsibility for verifying that the ventilation system is functioning properly. GE will provide for the O&M of the ventilation systems while the systems are deemed appropriate for the purpose of addressing a vapor intrusion potential attributable to contaminated ground water. GE will assume responsibility for the following:

- Reimbursement to property owners for the systems' energy usage.

- Providing a telephone number for reporting problems with the ventilation systems, and a contractor who can repair nonfunctioning ventilation systems within a practicable time frame.

- Annual notification for five years to owner/occupants of the buildings with ventilation systems that they should confirm that the system is functioning properly, and an offer to have a contractor do so if the owner/occupant cannot.

- Annual notification/offer for five years to owner/occupants of buildings where ventilation systems are recommended (based on established criteria) but have not been installed (e.g., due to owner/occupant previously declined to have one installed). The letter will state a standing offer for GE to install ventilation systems at no cost to the owner/occupant. Installation of a system should occur within a reasonable time frame (60 days) when, subsequent to the letter, a system is requested.

- Tracking of property ownership changes for five years to allow for continued communication with owners. GE will communicate with officials in the Town and Village of Fort Edward and Washington County on an on-going basis to identify where ownership changes have taken place. The O&M Contractor will contact the new owners to verify the change and to inform them of their system, its operation and the ongoing O&M program. The new ownership information will be added to the maintenance folder and program mailing lists.

GE reserves the right to evaluate the foregoing program at any point based on new information. In addition, GE and NYSDEC shall review the efficacy and appropriateness of the program at five-year intervals to address subjects such as the value of continuation, modifications and technical approach, etc.

5. Project organization and management

It is currently anticipated that the project will be managed by GE, with assistance from its technical consultant O'Brien & Gere. NYSDEC/NYSDOH will serve in an oversight role. This section outlines our present understanding of the principal roles and responsibilities among these parties and subcontractors who will provide assistance in completion portions of the work.

5.1. State of New York Departments of Environmental Conservation and Health

The soil gas project defined in the prior text is being undertaken by GE in close cooperation with the NYSDEC as the prime State Agency that administers GE's efforts and the NYSDOH. As such, progress reports and data submittals will be directed to the NYSDEC. We understand that the NYSDOH is to serve in an advisory capacity to the NYSDEC and to the public on matters pertaining to public health. The primary contact for the NYSDOH will be Ms. Deanna Ripstein. We understand that NYSDEC staff from the central office in Albany will serve as points of public contact. Mr. Kevin Farrar of NYSDEC will serve as project manager for NYSDEC. It is understood that NYSDEC and NYSDOH will take a primary/leading role in community relations efforts.

5.2. GE Energy

Individuals from GE Energy will serve as primary contacts between the Agencies and the GE team. It is currently anticipated that Mr. David L. West will serve as GE's project manager. We understand that GE or its designee will be responsible for:

- Communicating to property owners and tenants regarding scheduling of sampling and ventilation; and

- Acquisition of access agreements from property owners where necessary to complete the sampling and ventilation work. It is understood that property owners have no obligation to provide access and hence GE can make no guarantees in this regard and cannot be responsible for such withholding of permission. If needed, GE may solicit support from the NYSDEC and/or NYSDOH to assist in gaining property access for sampling and/or any subsequent response actions.

5.3. Community relations

GE will be assisted in community relations by a consultant experienced in similar projects. GE and its consultant, Behan Communications, are presently working closely with NYSDOH and NYSDEC in the development of a community relations plan that, together with this work plan will provide ample opportunity for public participation on this project.

5.4. O'Brien & Gere

It is currently anticipated that O'Brien & Gere will serve as the lead technical consultant in the execution of the field investigation and testing programs, data management, and reporting.

In addition, GE currently intends to utilize the services of O'Brien & Gere as the construction management company to complete construction of ventilation systems. O'Brien & Gere is highly experienced in the design and application of ventilation systems.

For work including field soil gas survey, analytical laboratory analysis, data validation and usability assessment, and ventilation system construction management O'Brien & Gere will be assisted by the subcontractors outlined below.

5.5. Subcontractors

5.5.1. Drilling contractor

O'Brien & Gere propose to use the services of a licensed drilling subcontractor to complete installation of the soil gas sampling points. Drilling will be completed using an ATV or truck-mounted direct push drilling techniques.

5.5.2. Analytical laboratories

We propose to utilize the services of a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified environmental laboratory for the analysis of the air, soil gas and ground water samples.

5.5.3. Data validation and usability assessment

Data validation services will be provided by an independent third party data validation subcontractor. We propose to use the services of Judy Harry of Data Validation Services located in North Creek, New York.

6. Schedule

A tentative implementation schedule for the off-site soil gas investigation and potential resultant ventilation program is shown in Figure 5-1. The schedule was derived based on our present estimate of the general sequencing and duration of tasks. It should be recognized that in application, the work will require cooperation among the GE/O'Brien & Gere team, the NYSDEC/NYSDOH and the public and will be contingent on weather conditions and the availability of materials and other factors beyond our direct control.

In addition, as shown on Figure 6-1, we have projected that it will take about one week to complete the installation of a ventilation system at a given property following a decision to do so. The schedule allows two weeks for scheduling and obtaining access permission to complete the work, about one week to complete the construction and a follow-up visit by O'Brien & Gere to verify operation of the ventilation system. The actual time will depend on the extent of property owner cooperation, the availability of contractors and other factors.

7. References

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Geraghty & Miller, Inc., 1983. Hydrogeology of the General Electric Company Capacitor Plant, Fort Edward, New York, January 1983.

Lawler, Matusky & Skelly Engineers, 1985. Revised Remedial Investigation Report, GE Capacitor Plant, Fort Edward, New York, December 1985.

Lawler, Matusky & Skelly Engineers, 1988. Feasibility Study Off-Site Shallow Aquifer, GE Capacitor Plant, Fort Edward, New York, January 1988.

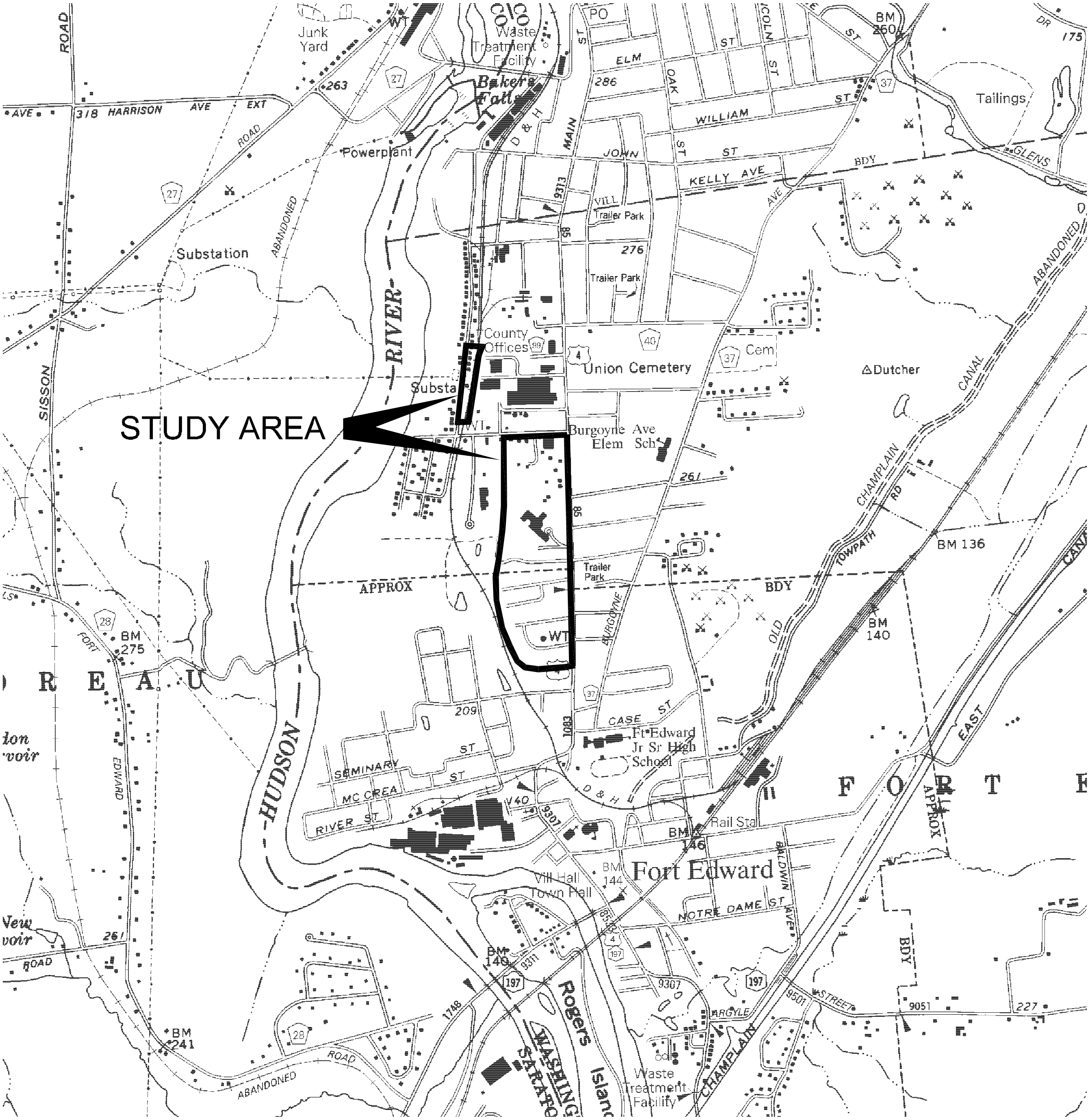
Lawler, Matusky & Skelly Engineers, 1989. Off-Site Remedial Plan, GE Capacitor Plant, Fort Edward, New York, May 1989.

O'Brien & Gere Engineers, Inc., 1997. GE Fort Edward Sampling and Analysis Plan. April 1997.

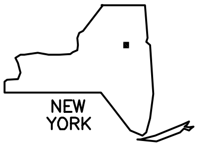
Figures

I:\ALBANY\PROJECTS\50\05371\34559\RPTS\1999-ANNUAL\FIGURES\2003_1-1.DWG

FIGURE 1-1



NYSDOT 7.5 MIN quad., HUDSON FALLS, NEW YORK



QUADRANGLE LOCATION
N43° 17'06", W73° 35'24"

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

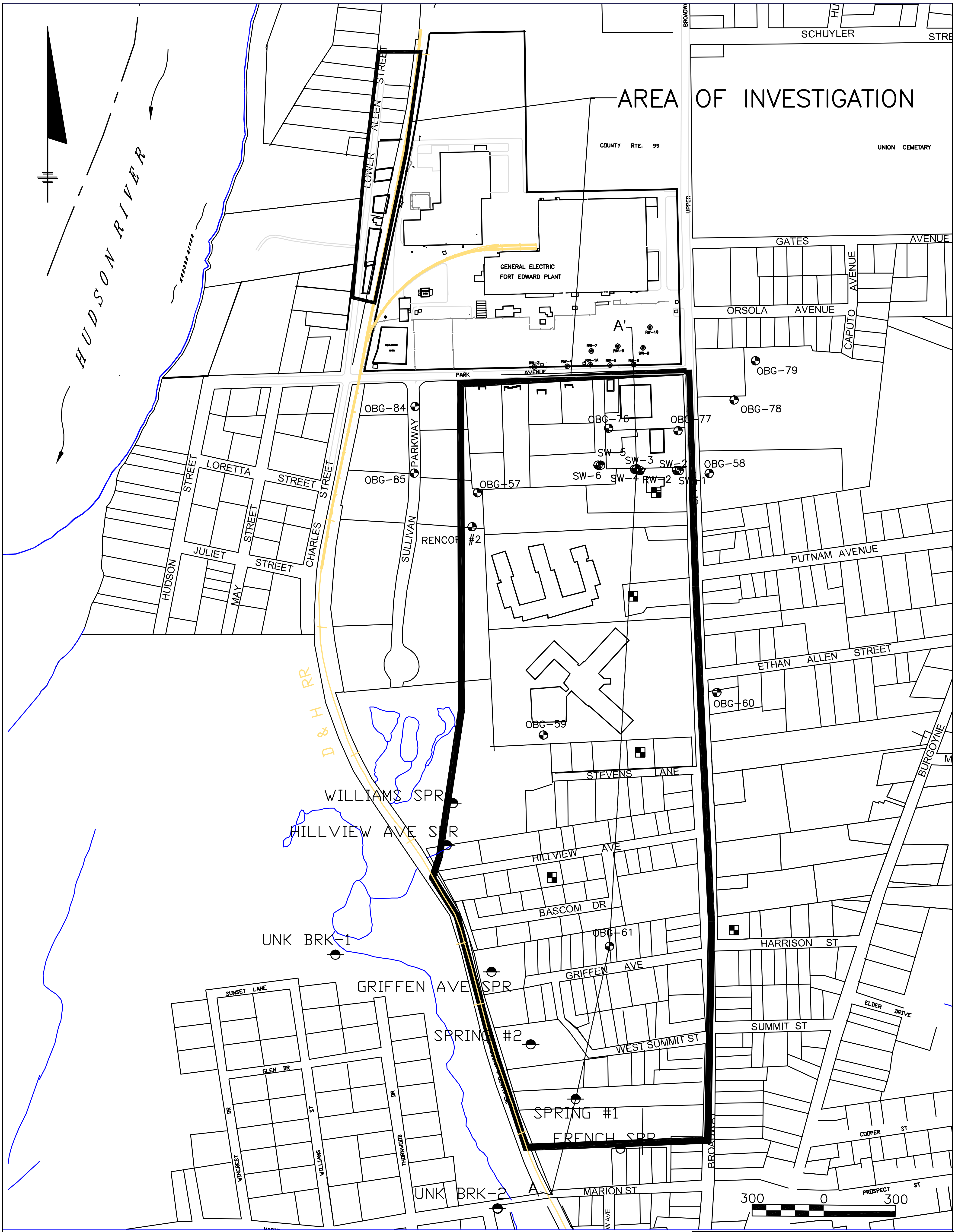
STUDY AREA LOCATION MAP

600 0 600

35012
NOVEMBER 2004

11/10/04

O'BRIEN & GERE ENGINEERS INC.



LEGEND

SPRING #3 ●	LOCATION OF SURFACE WATER SAMPLE
— — —	GE PROPERTY LINE
SW-2 ●	LOCATION OF NYS MONITORING WELL PAIR
OBG-60 ●	LOCATION OF UNCONSOLIDATED UNIT MONITORING WELL
A A'	LOCATION OF CROSS-SECTION A-A'

O'BRIEN & GERE
ENGINEERS, INC.

GENERAL ELECTRIC COMPANY

STUDY AREA MAP

TOWN OF FORT EDWARD
NEW YORK

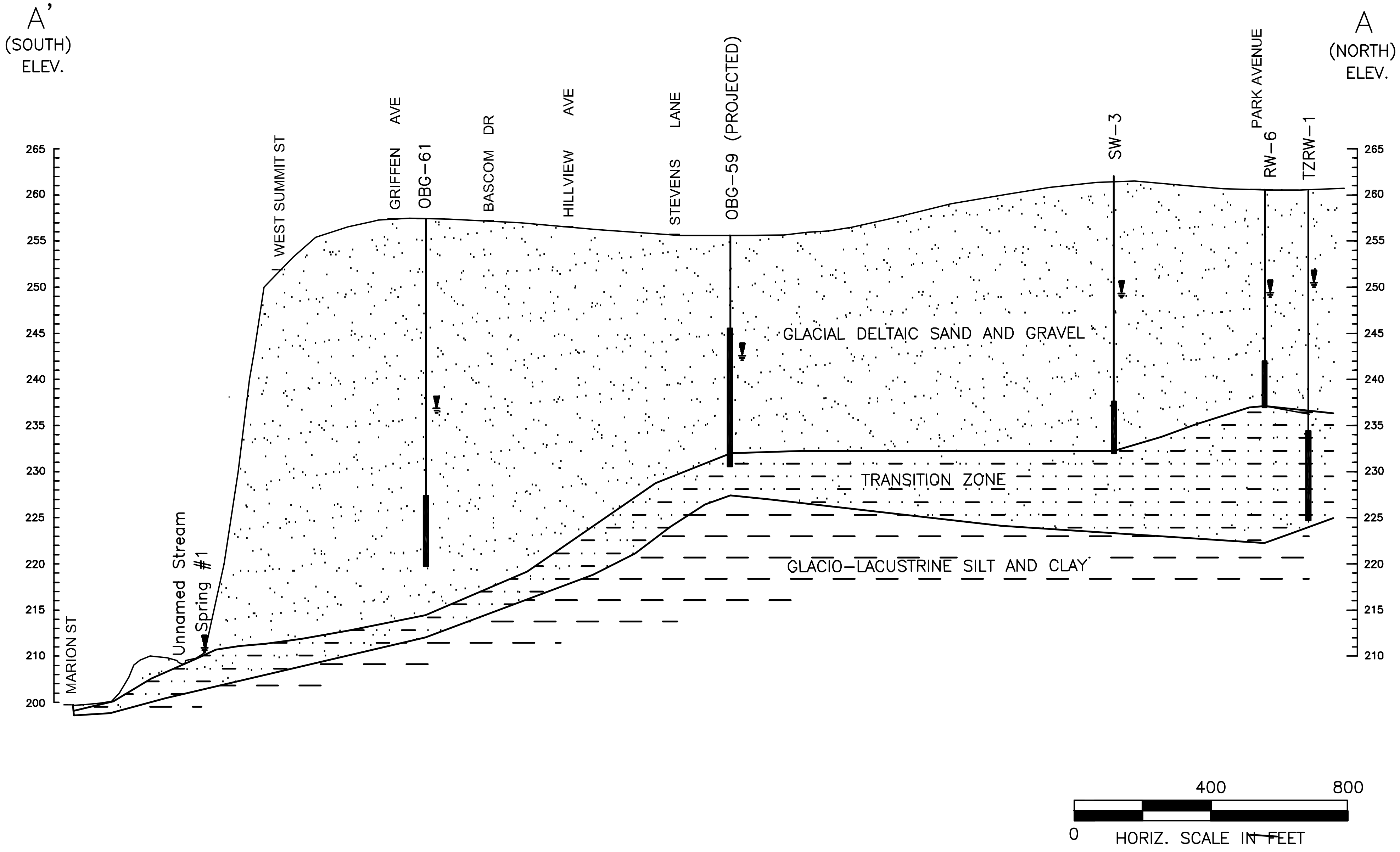
In charge of__________
Designed by______Checked by______
Made by________

FILE NO.
35012

DATE
NOVEMBER 2004

FIGURE
1-2

FIGURE 1–3



LEGEND

RW–6 ← MONITORING WELL ID

| ← CASED SECTION OF BOREHOLE

▼ ← WATER LEVEL ELEVATION ON MAY 27, 2003

▌ ← OPEN/SCREENED SECTION OF BOREHOLE

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

CROSS–SECTION A–A'

O'BRIEN & GERE
ENGINEERS INC.

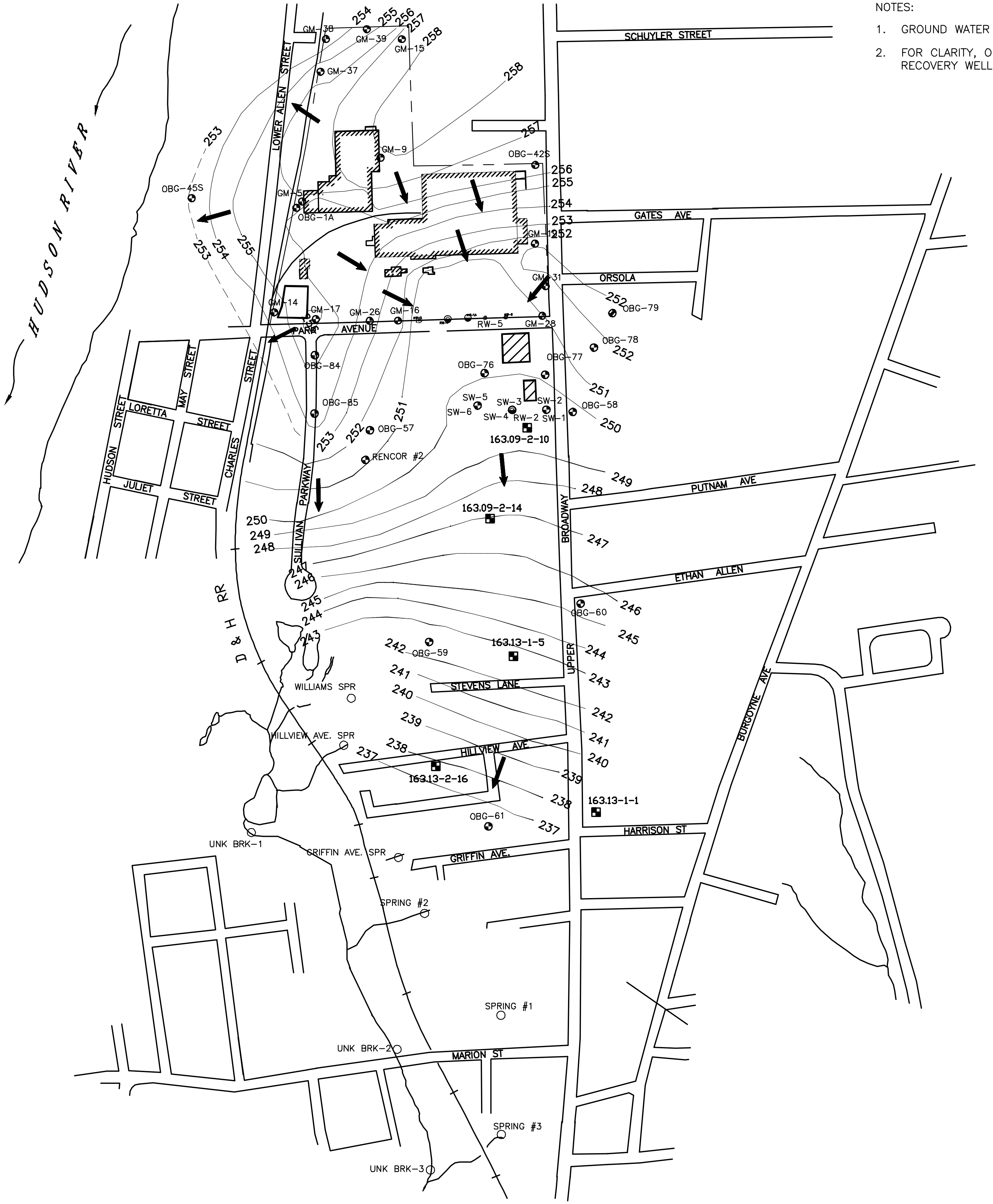
1–28–05

I:ALBANY\PROJECTS\5731\35012\Rpts\F1-3.DWG SF 1:600

FIGURE 1-4

NOTES:

1. GROUND WATER ELEVATION CONTOURS IN FEET ABOVE MEAN SEA LEVEL.
2. FOR CLARITY, ONLY THE 248 & 244 FOOT CONTOUR LINES AROUND RECOVERY WELL RW-2 ARE SHOWN.



LEGEND

SPRING #3 ○	LOCATION OF SURFACE WATER SAMPLE
HUGHES ■	LOCATION OF RESIDENTIAL WELL SAMPLE
———	GE PROPERTY LINE
SW-2 ●	LOCATION OF NYS MONITORING WELL PAIR
OBG-60 ● (245.86)	LOCATION OF UNCONSOLIDATED UNIT MONITORING WELL (ELEVATION OF WATER SURFACE SHOWN IN PARENTHESES)
249	SHALLOW UNCONSOLIDATED UNIT GROUND WATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
↖	DIRECTION OF GROUND WATER FLOW

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

REGIONAL UNCONSOLIDATED UNIT GROUND WATER TABLE CONTOUR MAP FOR MAY 27, 2003

0 600 1200
SCALE IN FEET

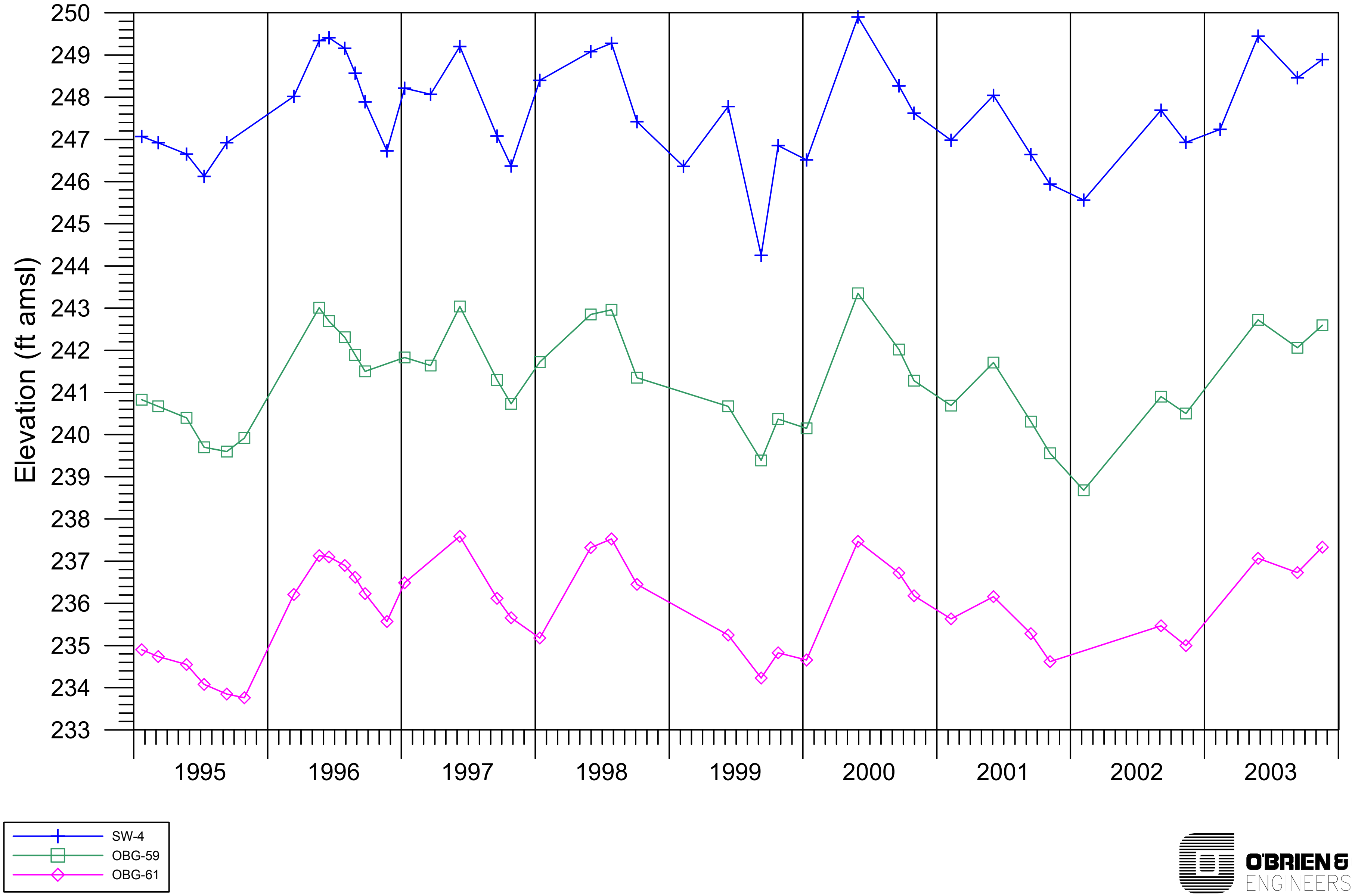
NOVEMBER 2004
FILE NO. 35012

O'BRIEN & GERE
ENGINEERS INC.

PLOT DATE: 2/1/05

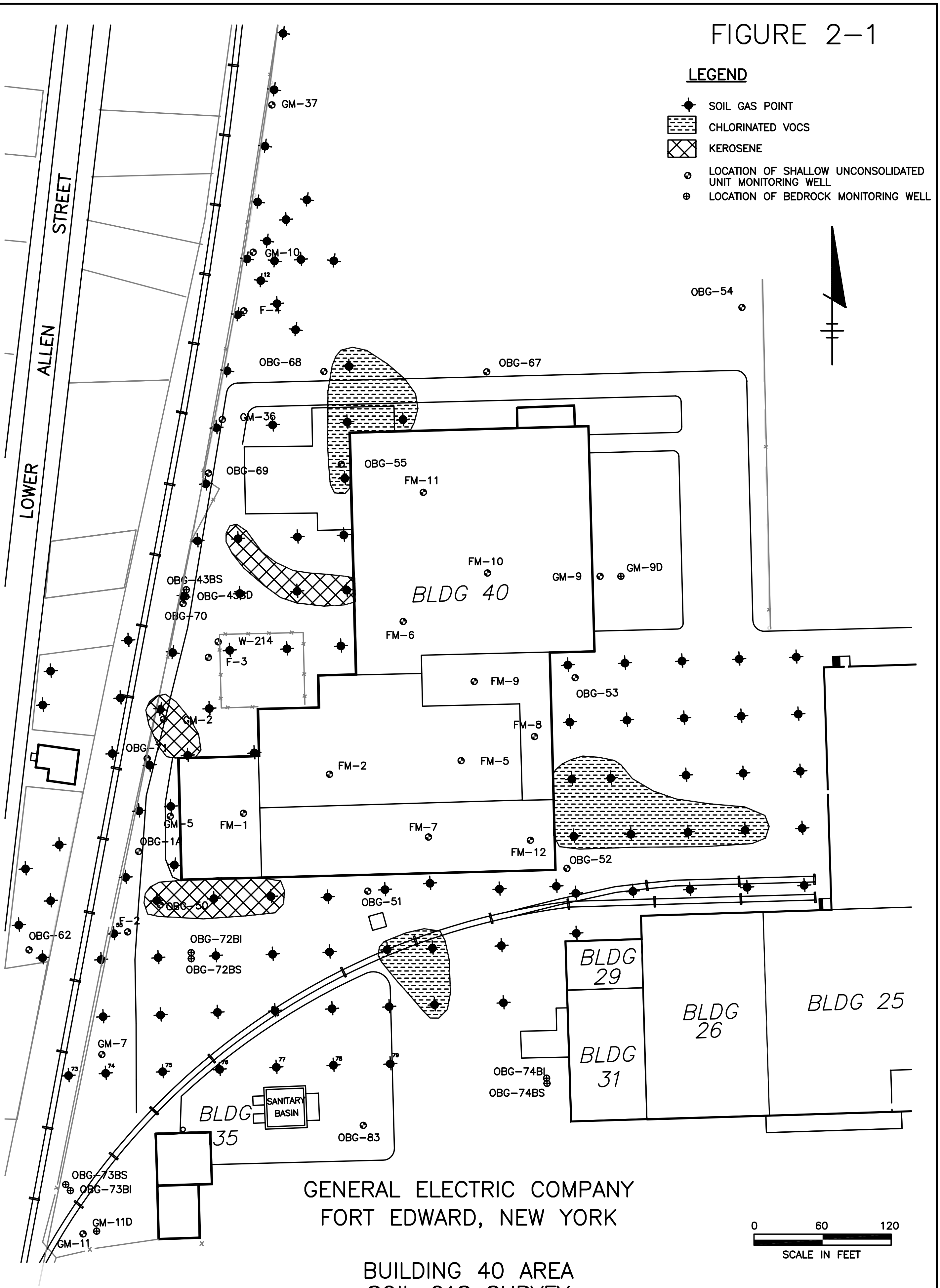
FIGURE 1-5
WATER LEVEL ELEVATION DATA FOR OFF-SITE WELLS SW-4, OBG-59 AND OBG-61

General Electric Company
Fort Edward, New York



O'BRIEN & GERE ENGINEERS, INC.

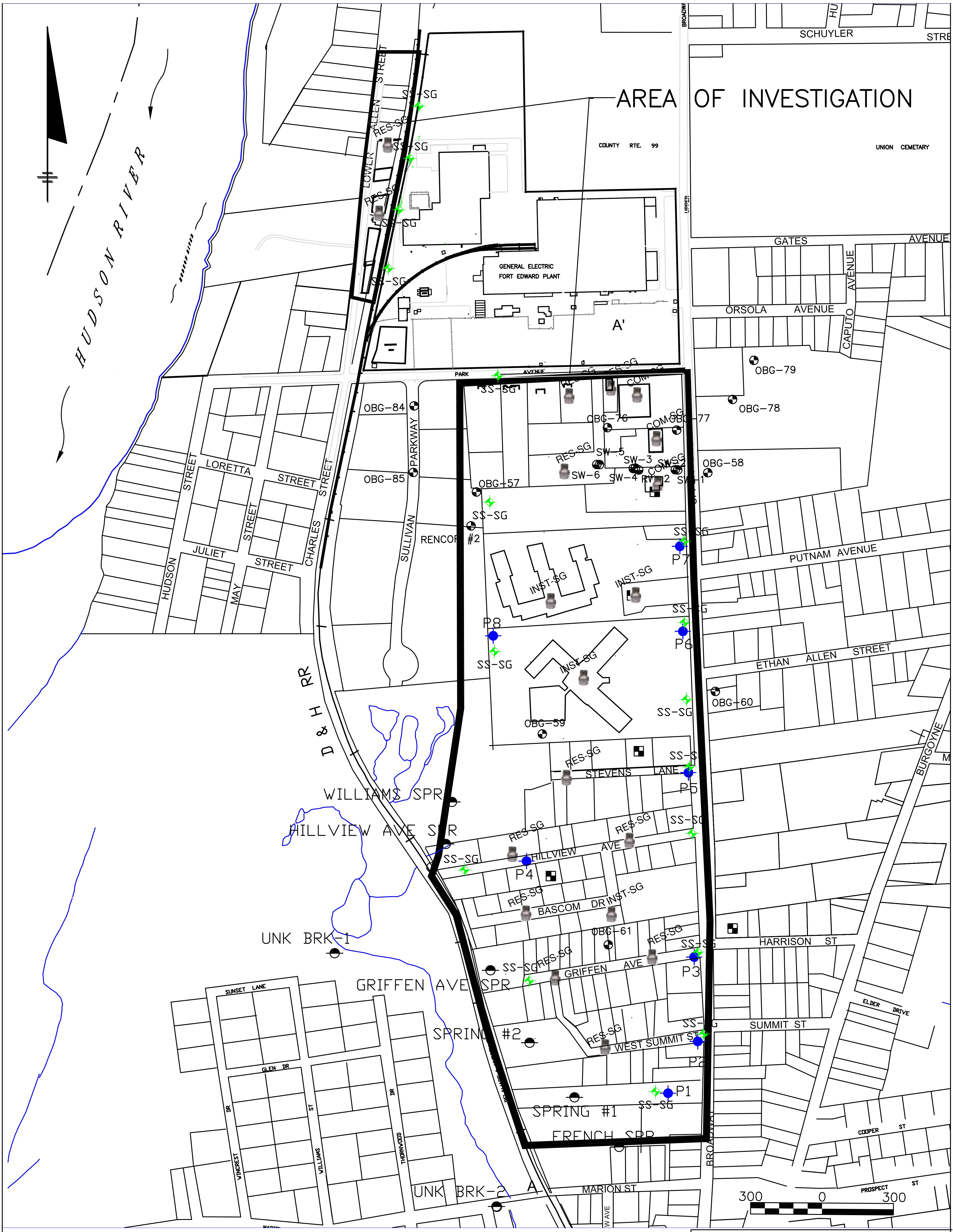
FIGURE 2-1



GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK

BUILDING 40 AREA
SOIL GAS SURVEY
SAMPLE LOCATION MAP

O'BRIEN & GERE
ENGINEERS, INC.



LEGEND

SPRING #3	LOCATION OF SURFACE WATER SAMPLE
— — —	GE PROPERTY LINE
SW-2	LOCATION OF NYS MONITORING WELL PAIR
OBG-60	LOCATION OF UNCONSOLIDATED UNIT MONITORING WELL
P3	LOCATION OF PROPOSED TEMPORARY PIEZOMETER/GROUND WATER SAMPLE POINT
SS-SG	LOCATION OF PROPOSED TEMPORARY SUBSURFACE SOIL GAS SAMPLE POINT
	TENTATIVE LOCATION OF PROPOSED TEMPORARY SUBSTRUCTURE/INDOOR AIR SAMPLE POINT

O'BRIEN & GERE ENGINEERS, INC.

GENERAL ELECTRIC COMPANY

PROPOSED SAMPLE LOCATION MAP

TOWN OF FORT EDWARD
NEW YORK

In charge of__________
Designed by______Checked by______
Made by__________

FILE NO.
35012

DATE
NOVEMBER 2004

FIGURE
3-1

Figure 6-1
Tentative Implementation Schedule
Fort Edward Soil Gas Investigation
General Electric Company
Fort Edward, New York

ID	Task Name		
1	**PROJECT PLANNING**		
2	Revised Fort Edward Soil Gas Investigation Work Plan to NYS Ag	2/3	
3	NYSDEC/NYSDOH Review	2/4	2/17
4	NYSDEC/NYSDOH Approval of Work Plan	2/17	
5	**COMMUNITY RELATIONS**		
6	Fact Sheets to Citizens and Interested Parties	2/21	
7	Public Informational Meeting	2/24	
8	Posting of Project Information to Document Repository	2/25	
9	Scheduling/Coordination of Sampling and Mitigation	2/22	3/7
10	**SOIL GAS AND GRAB GROUND WATER SAMPLING PROGRAM**		
11	Utility Clearance	2/21	2/25
12	Property Access Negotiations	2/25	3/7
13	**Soil Gas Survey**		
14	Installation of Soil Vapor & GW Sample Points	2/28	3/4
15	Sample Collection Period	3/1	3/7
16	**Post Sampling Activities**		
17	Laboratory Analysis (15 day TAT)	3/2	3/29
18	Data Validation	3/23	4/5
19	Reporting	3/31	4/13
20	**INDOOR AIR INVESTIGATION**		
21	Scheduling/Coordination	2/25	3/3
22	**Example Sequence**		
23	**Sampling Visit**		
24	Pre-Sampling Survey	3/4	3/4
25	Subslab Point Installation	3/4	3/4
26	Deployment of Indoor Air and Ambient Air Cannisters	3/4	3/4
27	Sample Collection Period	3/4	3/4
28	Collect Subslab, Indoor Air and Ambient Air Canisters	3/4	3/4
29	**Post-Sampling Activities**		
30	Laboratory Analysis (15 day TAT)	3/8	3/28
31	Data Validation	3/31	4/6
32	Reporting	4/5	4/18
33	Ongoing Sampling and Laboratory Analysis	3/4	4/7
34	**Data Management & Evaluation**		
35	**Example Sequence**		
36	Input of Field Sampling and Mitigation Data	3/8	3/14
37	Input Preliminary Analytical Data	3/9	3/22
38	Input Final Analytical Data	4/7	4/13
39	Generate Summary Tables for Progress Reporting	4/7	4/8
40	**Ongoing Data Management and Evaluation**	3/23	5/24

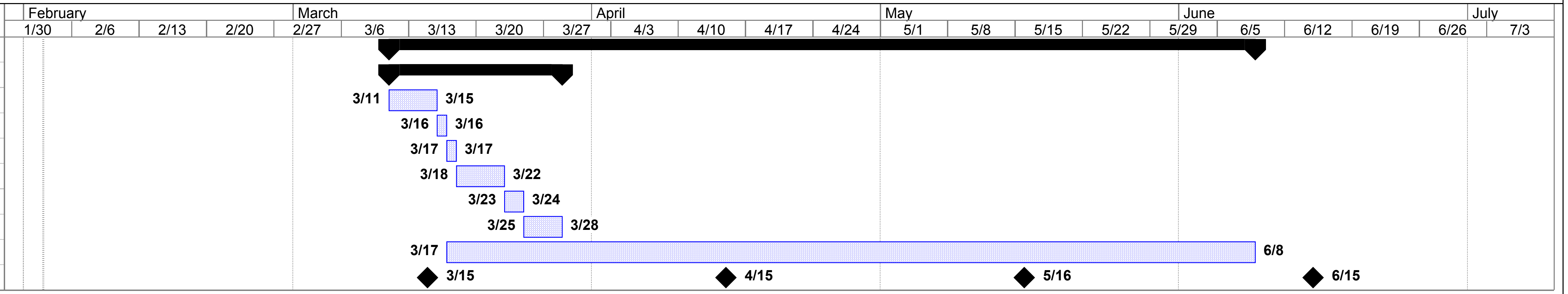
Project: VI WP Schedule_rev1
Date: Thu 2/3/05

Task	▨	Progress	▬	Summary	▬	External Tasks	▨	Deadline	⇩
Split	┈┈┈	Milestone	◆	Project Summary	▬	External Milestone	◆		

Preliminary - Subject to revision pending results of access negotiations, etc.

Figure 6-1
Tentative Implementation Schedule
Fort Edward Soil Gas Investigation
General Electric Company
Fort Edward, New York

ID		Task Name
41		**Ventilation Program**
42		**Example Sequence**
43		Property Access Negotiations
44		Visual Inspection/Building Survey
45		Diagnostic (communication) Testing
46		Preliminary and Final Design
47		Ventilation System Commissioning
48		Post-Ventilation Operation Review
49		**Ongoing Ventilation Program**
50	↻	**Progress Reporting**



Project: VI WP Schedule_rev1
Date: Thu 2/3/05

Task	▨	Progress	▬	Summary	▬	External Tasks	▬	Deadline	⇩
Split	┈	Milestone	◆	Project Summary	▬	External Milestone	◆		

Preliminary - Subject to revision pending results of access negotiations, etc.

O'BRIEN & GERE ENGINEERS, INC.

Exhibit A

Sampling Forms

Ground Water Monitoring

General

Well No.: __________
Field Personnel: __________
Weather Conditions: __________
Physical Condition of Well: __________
Equipment used: __________

Purging Information

Date: __________
Purging Time: Start: __________
Stop: __________
Volume to be Purged (3 Vol) __________ gal.
Volume Purged: __________ gal.
Purging Method: __________

Measuring Point Elevation: __________ ft. amsl
Well Diame eter: __________ in.
Total Depth of Well Installed: __________ ft.
Total Depth of Well Measured: __________ ft.
Depth to Water: __________ ft.
1 Well Volume: __________ gal.

Purge Water Disposal Method: __________

Purge Water Characteristics

Color: __________
Odor: __________
Turbidity: __________

Presence of NAPL: __________
Other: __________

Sampling Information

Date of Sample Collected: __________
Time of Sample Collected: __________
Sample Indentification: __________
Method of Sample Collection: __________
Sample Description: __________
Filter Method: __________
Type of Perservation if any: __________
Analytical Method Requested: __________
____

Notes

____
____
____
____

O'BRIEN & GERE

Air/Soil Gas Sampling Form

Project # ______________________ Date ______________________

Project Name ______________________ Collector ______________________

Type of sample: (Circle one) Indoor air Substructure soil gas Ambient air Soil gas

Sample Location

____

____

____

____

Canister Record

Canister ID ______________________

Flow controller ID ______________________

Sample duration ______________________

Sampling rate ______________________

Sample ID ______________________

Date/Time start ______________________ Start pressure ______________________

Date/Time end ______________________ End pressure ______________________

Complete all that apply:

Air temperature (^oF) ______________________

Barometric pressure ______________________

PID reading (ppmv) ______________________

FID reading (ppmv) ______________________

PID meter ID ______________________

FID meter ID ______________________

Gas analyzer ID ______________________

Ft. tubing used ______________________

% O_2 ______________________

% CO_2 ______________________

% CH_4 ______________________

For indoor location:

Noticeable odor ______________________

Floor slab depth ______________________

Intake height above floor (ft) ______________________

Intake depth below floor (ft) ______________________

Ground surface type ______________________

Potential vapor entry points observed ______________________

Room ______________________

Story/level ______________________

For outdoor location:

Noticeable odor ______________________

Distance to road (ft) ______________________

Direction to closest building (degrees) ______________________

Distance to closest building (ft) ______________________

Intake height above ground level (ft) ______________________

Intake depth below ground level (ft) ______________________

Soil type ______________________

Comments: ______________________

____

____

____

____

Analytical method required ______________________

Laboratory used ______________________

Exhibit B

Example of a Indoor Air Quality Building Survey Form

O'BRIEN & GERE

Indoor Air Quality Building Survey

Date ____________________
Collector ____________________
Affiliation ____________________

Access Contact ____________________
Phone ____________________
Best time to contact ____________________

Address ____________________
____
____

Owner ☐ Renter ☐ Other ☐

Access Agreement Signed ____________

Date built ____________
Yrs. of residence ____________
No. of occupants ____________

Building type:
Residential ☐ School ☐ Industrial ☐
Commercial ☐ Church ☐ Other ____________

Check all that apply:

Ranch ☐ Raised Ranch ☐ 2-Family ☐ Apartments ☐
Cape ☐ Colonial ☐ Duplex ☐ Condominium ☐
3-Family ☐ Mobile Home ☐ Other (specify) ____________________

Above grade building construction

Wood frame ☐ Poured concrete ☐ Stone ☐
Brick ☐ Concrete block ☐ Other ____________

Foundation construction

Fieldstone ☐ Solid top concrete block ☐ Slab on grade ☐
Poured concrete ☐ Open top concrete block ☐ Other ____________

Is the owner aware of any additions made to the original design of the structure? (please specify)

____
____

Utilities

Sewer:
Public ☐
Private ☐
Other ____________

Water:
Public ☐
Private ☐
Other ____________
Spring ☐
Well ☐

Hot water heater type:
Gas ☐ Electric ☐
Oil ☐ Other ____________

Heating, ventilation, and air conditioning systems

Primary heat type:
Hot air ☐
Hot water ☐
Steam radiator ☐
Electric ☐
Solar ☐
Other ____________

Fuel type (heat):
Natural gas ☐
Fuel oil ☐
Electric ☐
Wood ☐
Other ____________

Secondary heat type:
Kerosene ☐
Wood stove ☐
Electric ☐
Propane ☐
Other ____________

Ventilation types:
Attic fan ☐
Kitchen hood ☐
Bathroom fan ☐
Other ____________

Ceiling fan ☐
Air filtration ☐
Induced fireplace ☐
Other ____________

Air conditioning:
Window units ☐
Furnance unit ☐
Electric ☐
Other ____________

Basement type

None ☐
Full ☐
Half ☐
Slab on grade ☐
Vented crawlspace ☐
Unvented crawlspace ☐
Other ______
______

If slab on grade, is there a garage with occupied space above? ______

Basement depth below grade (feet)

Front ______ Rear ______ Side 1 ______ Side 2 ______

Basement characteristics

General:
No. of rooms ☐
Bathroom ☐
Basement use ______
______
______

Floor:
Earth ☐
Concrete ☐
Tile ☐
Carpet ☐
Other ______

Walls:
Finished ☐
Unfinished ☐
Painted ☐
Sheetrock ☐
Other ______

Paneling ☐
Tile ☐
Insulated ☐
Uninsulated ☐

Check if present:
Fireplace ☐
Sump pump ☐
Floor drains ☐
Interior walls ☐

Elevator ☐
Ash cleanout ☐
Water damage ☐
Jacuzzi/hot tub ☐

French drain ☐
Floor cracks ☐
Wall cracks ☐
Other ______

Does the basement have a moisture problem? ______
Does the basement ever flood? (specify frequency) ______
Does the basement have a radon system installed? ______
Has there been recent purchases of furnishings (carpets, rugs, linoleum, tile, or funiture) or remodeling (new construction,roofing, or floor stripping? (please specify) ______
______

Chemical usage, exposure and storage

Identify occupant hobbies:
Painting ☐
Stained glass ☐
Jewelry making ☐

Electronics ☐
Woodworking ☐
Furniture refinishing ☐

Model making ☐
Auto repair ☐
Other ______

Where in the structure are these hobbies conducted? ______
Does the occupants' job require chemical exposure? ______
If so, where are the occupants clothes cleaned? ______

Has the structure been fumigated in the last year? ______
If so, is fumigation regularly performed? (how often) ______
Are pesticides frequently applied to lawn or garden? ______
If so, are they stored on the property? ______

Identify chemicals stored in the basement/1st floor living space, or garage if structure is slab on grade (include fuels, solvents, cleaners, etc.) Use separate inventory sheet for each area surveyed

Brand	Product	Amount stored

Comments

Is there any other information about the structural features of this building, the habits of its occupants or potential sources for chemical contaminents to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building?

Identify photographs taken as additional documentation of existing conditions.

Photo ID	Description of photo

Sketch lot and sample location layout (if applicable)

Exhibit C

Instructions for Owners/Occupants

Instructions for Owners/Occupants

(To be followed starting at least 48 hours prior to and during the sampling event)

There are numerous household products and activities that can result in ernitting a variety of volatile organic compounds (VOCs) into indoor air. VOC emissions due to indoor sources may impede testing. Please refrain from the household activities and using household products identified below at least 48 hours prior to and during the indoor air sampling. Following the instructions listed below will improve the testing. The data will ultimately be reviewed in conjunction with the New York State Department of Health.

Please Ensure You Follow These Instructions

- **Do** not open windows, fireplace openings or vents.
- Do not keep doors open.
- Do not operate ventilation fans or air conditioning.
- Do not use air fresheners or odor eliminators.
- Do not smoke in the building.
- Do not use wood stoves, fireplace or auxiliary heating equipment (e.g., kerosene heater).
- Do not use paints or varnishes.
- Do not use cleaning products (e.g., bathroom cleaners, furniture polish, appliance cleaners, all-purpose cleaners, floor cleaners).
- Do not use cosmetics, including hair spray, nail polish remover, perfume, etc.
- Do not partake in indoor activities that use solvents.
- Do not apply pesticides.
- Do not store containers of gasoline, oil or petroleum-based or other solvents within the building or attached garage (except for fuel oil tanks).
- Do not operate or store automobiles or other gasoline-powered equipment/vehicles in an attached garage.
- Verify that containers of paints/varnishes, cleaning products, and solvents stored inside the building are securely and properly sealed.