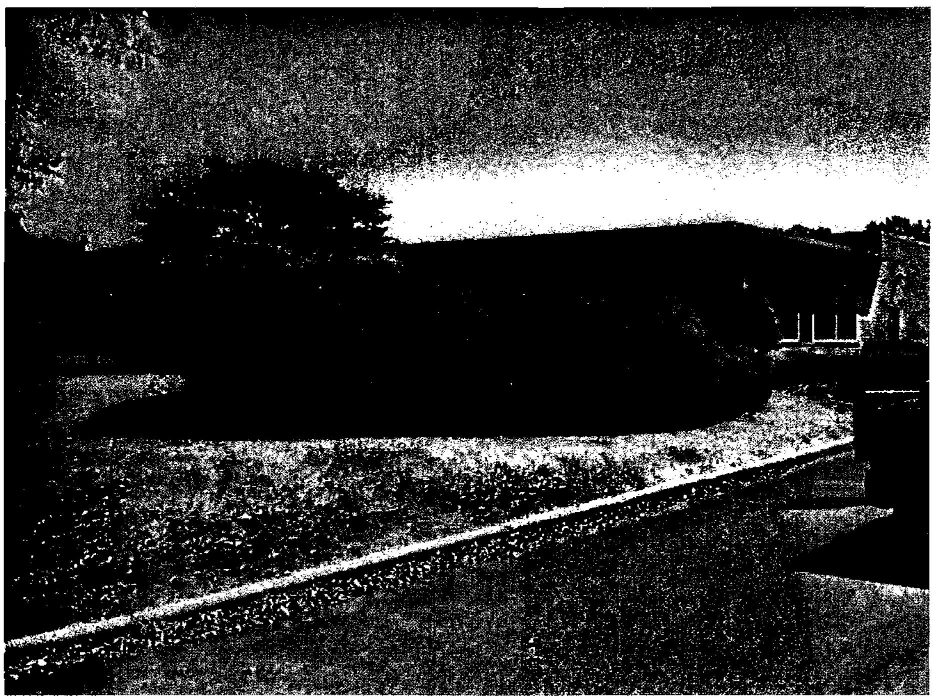
INTERIM REMEDIAL MEASURE

152034

FORMER COMPUTER CIRCUITS SUPERFUND SITE

145 Marcus Boulevard
Hauppauge
Suffolk County, New York



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P.W. GROSSER CONSULTING INC.
PROJECT No. TED0001

INTERIM REMEDIAL MEASURE
FORMER COMPUTER CIRCUITS SUPERFUND SITE

145 MARCUS BOULEVARD
HAUPPAUGE, NEW YORK

JULY, 2005

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1.0 INTRODUCTION (Removal Action Objectives)

P.W. Grosser Consulting Inc.(PWGC), was contracted by 145 Marcus Blvd. Corporation to prepare and implement a Remedial Investigation/Feasibility Study(RI/FS) at the former Computer Circuits Site, located at 145 Marcus Boulevard, Hauppauge, New York. The site was placed on the National Priorities List (NPL) effective May 10, 1999 and assigned EPA Index No. CERCLA-02-2000-2036.

The field work portion of the Remedial Investigation (RI) was conducted by PWGC from 12/17/01 to 7/24/02, in accordance with the terms and conditions as set forth in the Administrative Order on Consent (AOC), executed on September 29, 2000. A draft RI/FS report, dated January 3, 2003, was submitted to the United States Department of Environmental Protection (USEPA) on January 6, 2003 and is currently undergoing revision.

Based on the presence of trichloroethene (TCE) above New York Sate Department of Health (NYSDOH) background levels in air samples collected from the building, and the Human Health Risk Assessment, which identifies TCE as the only site-related contaminant with a potential for risk/hazards to human receptors, the Draft RI report recommended an interim remedial measure (IRM) to reduce TCE concentrations in on-site soils. Therefore, the objective of this IRM will be to remeditate residual TCE in the two source areas, as identified in the RI report and thereby eliminate a potential pathway for vapor intrusion into the building. An Administrative Order on Consent for this "Removal Action" ("Order") was executed on October 1, 2004.

The proposed IRM consists of a two-point soil vapor extraction (SVE) system. The SVE system would include a single vertical extraction well installed within the contaminated soil zone of the north industrial pool, and a single horizontal extraction well installed beneath the concrete slab of the former silk screening room. Both extraction wells would remediate impacted soils through mass transfer from the sorbed to the vapor phase.

1.1 Remedial Investigation

The RI identified TCE above USEPA and New York State Department of Environmental Conservation (NYSDEC) guidance levels in soils just beneath the concrete slab floor in the former silk screening room, located in the north end of the building, and in soils within the north leaching pool which had received discharge from a sink in this room. TCE above NYSDOH background levels was also identified in air samples taken from three locations within the building.

1.1.1 Soil Borings

During the soil boring phase of the Remedial Investigation, 48 shallow and 4 deep soil borings were advanced at the site. Results from the shallow borings revealed concentrations of TCE above guidance levels in the vicinity of the northern industrial leaching pool and beneath the concrete slab foundation in the northern portion of the building. In shallow soil, TCE was found to exceed the EPA soil screening level of 60 μg/kg in six borings: SB9 (4-6'), SB10 (4-6'), SB15 (0'-2'), SB26 (5'-7'), SB31 (0'-2'), and SB32 (0'-2')). TCE in SB15(0'-2') was reported at a concentration of 12,000 μg/kg, which was the highest VOC concentration encountered in the shallow samples, and the only shallow sample with a VOC concentration above NYSDEC Recommended Cleanup Objectives (RSCOs).

Trichloroethene was the only compound detected in excess of its NYSDEC RSCO value or EPA soil screening level from samples collected from the four deep borings. The RSCO value for TCE of 700 µg/kg was exceeded in only one deep boring sample, SDB3 (20'-22'), with a concentration of 55,000 µg/kg. The EPA soil screening level of 60 µg/kg for TCE was exceeded in two deep boring samples; SDB1 (15'-17') and SDB3 (20'-22').

The location of the shallow and deep soil borings advanced during the remedial investigation is shown in **Figure 1**. Additional information on the soil borings and the results of soil sampling is documented in the Draft RI report prepared for the site (PWGC 1/03).

1.1.2 Indoor Air Sampling

Air samples were collected on July 24, 2002 from four locations (3 interior, 1 exterior) and compared to EPA and NYSDOH background levels, EPA Region 9 Preliminary Remediation Goals and OSHA Exposure Limits to assess the ambient indoor air quality (see **Figure 2**). Samples were collected using charcoal tubes and analyzed according to EPA method TO17.VOCs detected above at least one of the guidance values referenced, included 1,1-DCA,1,1,1-TCA, 1,2-DCA, 1,2-DCE, 2-butanone, acetone, chloromethane, methylene chloride, toluene, TCE, vinyl chloride and xylenes. 1,1-DCA,1,1,1-TCA, acetone, methylene chloride, and toluene were also detected in the outdoor control sample.

The only parameter detected above OSHA exposure limits was 1,1,1-TCA at 3,500 $\mu g/m^3$ in sample AS2, located in a former office which served as the on-site laboratory during the investigation. 1,1,1-TCA was not used in the room for any purpose at any point during the investigation and soil or groundwater samples were not present in the room during air sampling. 1,1,1-TCA was also detected at elevated levels (1,800 $\mu g/m^3$) in the outdoor sample, AS4. TCE, which was the only VOC parameter detected in soil (north side of building) above NYSDEC RSCOs, was also detected above reference values in the three indoor sampling locations. The highest concentration of TCE in air was 220 $\mu g/m^3$ in AS1, located in the former silk screening room. TCE was also reported, however, in AS3, located in the office area of the building at a concentration of 47$\mu g/m^3$. Additional information on indoor air sampling is documented in the Draft RI report prepared for the site (PWGC 1/03).

2.0 SYSTEM DESIGN

2.1 System Description

A soil vapor extraction system will be used to remediate TCE-impacted soil in two identified source areas located near the north side of the building. The system will consist of two separate extraction wells connected to a single regenerative blower. The extraction point beneath the building will be a horizontal well, 4 inches in diameter and 10 feet long, installed just beneath the floor slab (see **Figure 3**). The second extraction point will be a vertical SVE well installed adjacent to the former industrial leaching pool and screened across the two depths of heaviest contaminant concentrations (see **Figure 3**). The wells will be piped together via a common PVC header system with isolation valves so that vacuum/flow to each line can be adjusted independently. Soil gases removed through the wells are drawn back to the SVE system enclosure shed. Once inside the shed the extracted soil vapors will pass through an air flow meter, a moisture separator and a particulate filter before entering the blower. As the vapor exits the blower, it will pass through a series of two carbon drums before being discharged to the atmosphere via a 2-inch diameter exhaust stack. A vacuum relief valve and high level (liquid) shut-off switch will be installed as an integral part of the moisture separator. An air-bleed valve will be located upstream of the blower to serve as a flow and vacuum control device, as well as a dilution source for the effluent stream. A series of vacuum and pressure gauges and sample ports will be installed at various locations throughout the system, to assist in monitoring and evaluating the system's operating performance.

2.2 Design Criteria

The design is predicated on theoretical equations, typical design parameters for Long Island sand formations and key assumptions involving the physical behavior of soil gases and system performance. Most design parameters have been assumed based on similar type SVE systems on Long Island. This is considered appropriate since there are no unusual geologic conditions present at the site.

The contaminated soil zone has been described as a medium grained (0.25 mm to 0.5 mm - USDA) uniform sand, based on soil borings taken at the site. Based on the observed uniformity of the soil (poorly graded, well sorted) it is assumed to be a relatively porous (i.e., a porosity around 0.30) material, and thus a good candidate for an SVE remedial system. The contaminant of concern as identified in the Order is trichloroethylene (TCE). This contaminant is a volatile organic compound which is very susceptible to removal from the vadose zone using vacuum extraction technology. Due to the chemical properties of the contaminant, the porous nature of the soil and the considerable depth to groundwater ($\approx$ 100'), SVE has been selected to remediate the identified source areas at 145 Marcus Blvd.

The Remedial Investigation identified two areas of the unsaturated zone with TCE concentrations above guidance levels; an area beneath the building's slab along the north side of the facility and an area that was formerly used as an industrial leaching pool (see **Figure 3**). The area beneath the building has a dimension of approximately 20 by 25 feet with shallow TCE impact of only a few feet below the bottom of the floor slab. Contamination within the former industrial leaching pool extends roughly from the bottom of the pool to the water table, with the greatest concentrations of contaminants occurring between 25 and 45 feet and 65 and 85 feet below grade.

A design flow rate of 125 cfm was selected based on the extent and type of contamination, and the porosity of the soil. Fairly low well head vacuums (on the order of 7 to 8 inches of water column) were determined to be necessary to achieve a radius of influence of approximately 30 feet (**Table 1**). A 2 hp regenerative blower with a performance of 125 cfm at 21 inches of water column was selected to meet the design criteria (**Table 2**). The blower motor will be single phase, 115 volt with an explosion proof cover.

2.2.1 Emission Rate Estimates

An estimate of the mass removal rate for each of the identified VOCs within the combined remediation areas was made for comparison to the maximum allowable emission rate potential (ERP), as specified in the NYSDEC Air Guide 1.

This was done by first calculating an average core area concentration based on an average of the highest concentration within the two target areas.The average soil concentration through the entire influence area covered by the SVE extraction wells was then estimated by applying an influence area to core area volume dilution ratio of 9 to 1 (**Table 3**). Soil gas concentrations were calculated from the average influence area soil concentration using an equation based on the Johnson-Ettinger model, as presented in ASTM E1739-95 (**Table 4**). Calculated soil gas values were then entered into the Air Guide 1 tables for comparison to annual and short-term concentration guidelines (ACG, SCG). As shown in the ERP tables provided in **Attachment A**, calculated individual VOC emissions from the SVE system will be within both ACG and SCG benchmrks.

Compliance with ACGs and SCGs will be verified by calculating emission rates from the results of discharge samples, obtained during start-up testing. Discharge samples collected for the purpose of calculating emission rates will be obtained with the system operating under non-dilution full extraction mode (air bleed valve closed).

2.3 System Details

2.3.1 SVE Blower

The SVE Blower specified is an EG&G Rotron regenerative blower, model number EN505AX58ML. This blower is capable of delivering the required 125cfm at 21" H_2O. The blower is equipped with a 2HP, single phase, 115 volt explosion proof motor. A copy of the blower's physical and performance specifications is included in **Attachment B**.

The blower will be fitted with an air filter and condensate drum and vacuum relief valve to protect the blower from damage caused by water and/or particulates. A high level float switch will be installed on the condensate drum to shut down the blower if water in the drum approaches a maximum level. Condensate liquids will be transferred to a DOT-approved 55 gallon drum for off-site disposal in accordance with the waste characterization and disposal procedures as specified in the approved RI work plan. Since the depth to ground water at the site is 100 feet, and the surface area around the extraction wells is covered (paved, building slab), condensate is not expected to accumulate in quantities approaching the capacity of the condensate drum. The position or valves, gauges and flow meters are shown in **Figure 4**.

2.3.2 Granulated Activated Carbon Units

The system is currently designed to use Granulated Activated Carbon (GAC) units to remove VOCs from the discharge air. GAC emissions treatment will be provided by two General Carbon 85 gallon Air Pollution barrels connected in series. The units contain 300 pounds of virgin vapor phase carbon each and are capable of handling a maximum air flow rate of 180 cfm. A copy of the GAC unit specifications is included in **Attachment B**. The system will include necessary piping and control valves to bypass carbon treatment of the effluent, if sampling shows that the VOC concentrations in the effluent air stream are within discharge limits, and if it can be demonstrated that there will be no impact to background and indoor TCE concentrations. An estimate of carbon usage will be made from influent samples collected during the start-up test period.

2.3.3 Piping

The system will be constructed with standard schedule 40 PVC pipe for all influent lines under vacuum. Discharge lines will be constructed with a combination of schedule 40 PVC and flexible hosing. The flexible hoses will be used to connect the GAC units with quick-disconnect couplings. This configuration will allow for easy replacement of the GAC units should they require replacement. The system piping layout is shown on **Figure 4.**

2.3.4 Electrical

Electrical power for the system will be provided from the existing building. Power will be delivered to the shed via conduit to the final location of the system building. A circuit breaker panel will be installed within the building to distribute power to the system components, lighting, and accessory outlets as needed. An electric service hour meter will be installed to record blower operation time, and an appropriately sized motor starter will be installed to provide overload protection. Electrical service, wiring and connections will be in accordance with the latest edition of the National Electric Code (NEC) and local codes.

2.3.5 System Building

The system will be housed within a pre-constructed 10 ftx10 ftx8 ft high structure. The structure will be weather tight with a minimum door size of 6'-6" high and 3'-0" wide to allow sufficient room for the system equipment. The building will be installed on a 4-inch thick concrete slab as indicated in **Figure 4**. The building will comply with local requirements for an accessory structure and will adequately shield sound so that operation of the system will meet local noise regulations..

3.0 SYSTEM STARTUP

The objectives of the commissioning and start-up phase of a remediation system are to:

- confirm that the system has been constructed as designed;
- check that the equipment operates as specified;
- facilitate modifications to the system based on observations of site conditions that are different than expected during system installation; and
- gather and evaluate initial operational data.

This section presents an overall strategy to follow in preparing a Start-Up Plan to carry out commissioning, shakedown, and start-up activities of the system.

3.1 System Shakedown and Testing

The shakedown and testing process is comprised of three primary activities:

- Pre-commissioning check;
- Functional performance tests of individual components;
- Pre-start-up, functional performance system testing of the combined components.

3.1.1 Pre-commissioning Check-out

This is an inspection to verify that all the components of the system have been properly installed. A checklist for these pre-commissioning activities will be prepared based upon the final system design. Any deficiencies must be corrected and re-tested prior to proceeding to the next phase of testing. The pre-commissioning checklist is a working document that determines if an aspect of the system meets requirements (MR), or requires further action (FA). If further action is needed, the required repairs or modifications will be performed.

3.1.2 Equipment Functional Test

The equipment functional performance tests should only commence after all the pre-commissioning checks have been performed successfully. The individual function tests would be performed on components such as the blower, condensate high level float, and the high vacuum valve. The equipment functional performance tests will be carried out in a manner to verify that the components operate correctly and within specifications.

3.1.3 Pre-startup Functional Performance System Testing

After the pre-commissioning checks and individual component testing has been successfully completed, the testing of the entire system is performed to verify integrity, prior to actual operation. Any deficiencies with the system must be corrected, and performance checks successfully completed, before the system can go into full operation. The system will be operated with both SVE extraction wells closed. The vacuum bleeder valve will be opened to keep the system vacuum within typical operating values. During this portion of the test, operation of the system as a whole can be assessed. PWGC will inspect the system for piping leaks, loose equipment, and verify that the individual components do not interfere with each other.

3.2 System Start-Up/Full-Scale Demonstration

During the start-up phase, the entire remediation system is operated and remediation actually commences. The strategy for start-up is to conduct these activities sequentially, comparing observations and test data against design and performance criteria. This will allow the system to be brought on line in a systematic and safe manner to meet the operational objectives. The sequence terminates when the design and equipment performance is documented to comply with specifications, and the system is ready for transition into the operations and maintenance phase.

The start-up procedure of the SVE system will proceed slowly with a well-planned sequence of events as follows:

Before the system is started, make a final check on the position of all valve set points. Start the SVE system without extracting soil vapor by closing the manifold valves to the SVE wells and by opening the inlet bleed valve to the ambient air. Then increase the vacuum applied to the extraction wells incrementally to start extracting small flows of soil vapor, so that periodic inspection of the entire system can be made to verify proper operation. The exhaust from the vapor treatment system will be monitored to confirm that it is operating properly.

Once the system is running at, or close to, the expected operating conditions, the entire system should be checked. Check the flows, pressures, vacuums and temperatures at all monitoring points in the system (as described in the following section). The systems may take time to stabilize, some may reach equilibrium in a few minutes while others may take a day or two. The aboveground systems will reach equilibrium much more rapidly than the subsurface systems. But as subsurface systems stabilize, aboveground systems may change too. Soon after an SVE system is started, the system will be checked for condensate accumulation.

3.2.1 System Startup Monitoring and Sampling

PWGC will conduct routine operation, monitoring and maintenance (OM&M) visits to assess the operation of the SVE system. During the initial start up phase, PWGC will initially conduct OM&M visits 3 times during the first week. Following the first week, OM&M visits will be on an alternate week basis till the end of the first month of operation, and then on a monthly schedule for the remainder of the system's operation. OM&M visits will consist of assessing the system's current condition, documenting gauge readings, taking vapor stream readings with a handheld photoionization detector (PID) and, when scheduled, collecting vapor samples for laboratory analysis. System parameters such as flow rates and gauge readings will be documented on the system monitoring form (**Attachment C**). PID readings will be taken from each of the four sampling ports to assess system performance and determine the effectiveness of the GAC vapor treatment.

During the initial start-up, air samples will be collected from the GAC influent line and from the discharge port using the carbon sorbent tube method in accordance with EPA/REAC SOP# 2103 *Charcoal Tube Sampling* and EPA/REAC SOP# 2008 *General Air Sampling Guidelines* (**Attachment D**). The carbon tubes will then be taken under chain of custody to a New York State Department of Health certified laboratory for analysis. The samples will be analyzed by EPA method TO17 for VOCs and reported in a results-only format.

Compliance with ACGs and SCGs will be verified by calculating emission rates from the results of discharge samples, obtained during start-up testing. Discharge samples collected for the purpose of calculating emission rates will be obtained with the system operating under non-dilution full extraction mode (air bleed valve closed). An estimate of carbon usage will be made from influent samples collected during the start-up test period. If the results show that the VOC concentrations in the effluent air stream are within ACGs and SCGs without impact to background and indoor TCE concentrations, the GAC vessels will be bypassed.

4.0 MONITORING AND SAMPLING PLAN

As stated in section 3.2.1, PWGC will perform operation monitoring and maintenance (OM&M) visits on a monthly basis following the initial startup phase. OM&M visits will consist of assessing the system's current condition, recording gauge readings and taking vapor stream readings with a handheld PID. The systems operating parameters will be documented on the system monitoring form (**Attachment C**). Sytem air samples for laboratory analysis will be collected from the system on a quarterly basis. System air samples will be collected from three sampling ports (system influent, between GAC and post GAC) to assess system performance and determine the effectiveness of the GAC vapor treatment. If sampling results show that the GAC units are no longer required, only one sample, the system influent, will be collected during each OM&M visit. A summary of the IRM sampling plan is provided in **Table 5.**

4.1 PID Readings

PID readings will be taken on a monthly basis from both extraction lines (horizontal well, vertical well), the GAC influent line and the discharge stack with a MiniRae 2000 detector equipped with a 10.2 electron voltage (eV) lamp. Since the ionization potential (ip)of TCE (9.45ip) is less than that of the 10.2 eV lamp, TCE ionization will occur in the PID and the gas will be detected.

The PID shall be calibrated prior to the commencement of the days activities, with response verification checks performed if the user suspects or detects anomalies in the data being generated. The PID will be calibrated using an isobutylene standard in accordance with the manufacturer's manual specifications, and all calibration and maintenance information shall be documented. Section 8.0 of the site-specific QAPP (**Attachment E**) provides a detailed description of calibration and maintenance procedures.

4.2 System Performance Sampling

Air samples will be collected from the GAC influent line, between GAC vessels (if GAC treatment in use) and the system effluent on a quarterly basis to evaluate system performance and confirm compliance with ACGs and SCGs. Samples will be collected using the carbon sorbent tube method in accordance with EPA/REAC SOP#2103 *Charcoal Tube Sampling* and EPA/REAC SOP# 2008 *General Air Sampling Guidelines* (**Attachment D**). The carbon tubes will then be taken under chain of custody to a New York State Department of Health certified laboratory for analysis. The samples will be analyzed by EPA method TO17 for VOCs and reported in a results-only format.

Effluent results will be used to calculate mass recovery rates and to estimate a cumulative total of recovered mass. Analytical results and recovery estimates will be presented in the quarterly status reports.

4.3 Representative Soil Gas Samples

Representative soil gas samples will be collected, as necessary, to support termination of the SVE system, as detailed in the Administrative Order on Consent (AOC) for the removal action. As described in the order, representative sub-slab soil gas samples will be taken at the intake of the horizontal extraction well located beneath the building slab. Soil gas samples representative of the affected leaching pool will be taken at the intake of the vertical extraction well located adjacent to the north industrial pool.

4.4 Indoor Air Sampling

Indoor air samples will be collected to assess potential work place exposure while the building is occupied, or to support a decision to terminate operation of the SVE system as described in the AOC. When the building is occupied, samples will be collected on a quarterly basis from a location within the building as shown in **Figure 5,** considered representative of average conditions within the main work area. Samples will be collected using evacuated cannisters (SUMMA) in accordance with the procedures outlined in EPA SOP# 1704 *Summa Cannister Sampling* (**Attachment D**) and in NYSDOH *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (February 2005). Operation of the ventilation system during sample collection will be determined by the objectives of the study or a particular sampling event. In most cases this will be to evaluate the average exposure concentration for employees working in the building, under typical conditions. This will require the ventilation system to be on during sample collection.

Since the building does not have a subsurface basement or multiple stories, air quality samples will be collected from the main work area of the building within the breathing zone (3 to 5 feet above the floor) over an 8 to 24 hour period.

Analysis will be in accordance with EPA 625R-96 "Compendium of Methods for the Determination of Organic Compounds in Ambient Air", TO15. Since ASP-B procedures are not available for air samples, the samples will be collected and analyzed following QA/QC procedures similar to those detailed under ASP-B. Indoor air samples collected to support a decision of SVE system termination, building re-occupation or site closure will be submitted for third party data validation in accordance with the procedures specified in the approved RI Work Plan (PWGC, 2001).

4.4.1 Background

The purpose in collecting the indoor air samples will be to evaluate work place exposure to the building occupants from TCE originating from residually impacted soils beneath the northern part of the building. However, interpretation of the results can be complicated from the emissions of products stored or used, or from materials used in the building's construction.

As part of the preparation to perform indoor air sampling during the remedial investigation, an inventory of chemicals present in the building was completed on April 23, 2002. A variety of industrial and common household products were identified, including the following items which either contain TCE or potentially contain TCE:

- Waste TCE w/solder slag
- TCE, virgin (5 gal.)
- Oil Based paint
- Paint thinner
- Laquer thinner
- Circuit board coating resin
- Brake cleaner
- Floor adhesive
- Circuit board clear coating
- Circuit board repairing resin
- Fiberglass resin
- Spray paint

These items along, with other hazardous products, were packed into disposal containers on April 23 and 24, 2002, and removed from the premises on May 20, 2002. The indoor air sampling performed during the remedial investigation, took place on July 24, 2002.

VOCs contained in building materials and maintenance products have also been shown to off-gas and affect indoor air quality. Trichloroethylene is a commonly used compound and is present in a variety of products including:

- degreasing solvents
- adhesives, glues
- lubricants and other automotive chemicals
- paints and varnishes
- paint removers and thinners
- cleaning products, laundry aids, spot removers, rug cleaner
- correction fluids (liquid paper)
- sheet vinyl flooring
- synthetic resin
- general performance sealants

It is not known which of these products are present in the building and how recently they may have been applied. The NYSDOH recently conducted a long-term study in which a significant spike in VOC concentrations, including TCE, were observed in indoor air samples following interior remodeling work of the building under study.

The new tenant for the 145 Marcus Blvd. site is currently engaged in upgrading the building interior. This work will consist of sealing the concrete floor, painting the walls and installing new carpeting throughout the building.

The presence of TCE in many commonly used building materials and cleaners, the results of the chemical inventory which identified TCE in a variety of products stored by the previous tenant, and the remodeling work currently taking place by the new tenant, indicates that TCE, unrelated to the source under remediation, may be detected in indoor air samples.

Although the best approach to establishing background concentrations would be from samples collected before the contamination took place, this data is not available. Conversely, obtaining data from similar buildings in the same area with similar activities and product use, is not feasible, since concentrations between buildings can vary greatly. Still, background studies from other hazardous waste sites in the region, if available, could be used to help establish a background range.

A more rigorous comparison can be made from statistically valid data sets, presented in the scientific literature, which attempt to define typical background concentrations in indoor air. **Table 6** shows TCE background values in indoor air, as established by some of the more relevant studies and State programs. Although these studies come from different regions of the Country, it is clear that TCE, as a background constituent in indoor air, is a common occurrence at levels above the 10^{-6} screening level established in the Draft Indoor Air Guidance (USEPA, 2002). The results of these studies can provide an important reference in establishing a range in background values.

The Draft NYSDOH Guidance on Evaluating Vapor Intrusion in Indoor Air, uses background concentrations from four of the databases referenced in **Table 6** to evaluate indoor air results:

- NYSDOH - Study of Volatile Organic Chemicals in Air of Fuel Oil Contaminated Homes (1997-2003).
- USEPA - Building Assessment and Survey Evaluation (BASE) Database (1994-1998).
- NYSDOH - Control Home Database (1998 - 1996).
- USEPA - National Ambient Volatile Organic Compounds Database Update (1970-1988).

The NYSDOH generally uses the NYSDOH Fuel Oil Study when evaluating indoor air in residences and the USEPA BASE data when evaluating indoor air in office and commercial buildings. Additional information on the four databases referenced, is provided in Appendix C of the Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York (February 2005). In the absence of alternatives for a direct measurement approach, the collection of sub-slab vapor may be used to distinguish between TCE concentrations which originated from subsurface intrusion, and those from background sources. If employed, sub-slab vapor samples collected for background evaluation would be obtained from a vapor probe installed at a location which corresponds to an indoor air sample location. An outdoor air sample would also be collected at this time to evaluate the extent to which outdoor air may be affecting indoor air quality and sub-slab vapor.

Sub-slab vapor samples, if employed, would be collected from temporary or semi-permanent vapor probes installed through the slab. Sub-slab vapor probe installation and sampling, if utilized, will be in accordance with Section 2.7.2 *Sub-Slab Vapor* of the NYSDOH Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

Sample analysis will be in accordance with the methods referenced under **Section 4.3** of this work plan, though a higher detection limit is acceptable since indoor air concentrations should not exceed 5% of the soil gas concentration.

Information on background TCE concentrations obtained from one or more of the three methods discussed above; USEPA BASE Data, regional hazardous waste site studies and sub-slab vapor to indoor air comparison, will be considered when evaluating the indoor air sampling results.

4.5 Reporting

During the pre-operational phase, construction scheduling and progress will be presented in the monthly project status reports prepared for the site. Changes in status which occur between the monthly reports will be relayed to the EPA Project Manager and the EPA On-Scene Coordinator via email updates.

Once the system becomes operational, a written summary of the SVE system performance will be submitted to EPA on a quarterly basis, within 30 days following the receipt of laboratory data. Such progress reports shall include summaries of the data received during the previous quarter such as the results of PID monitoring and effluent air sampling, and the results of processing the data to calculate compliance with ASG and SCG guidance and mass recovery estimates.

When closure criteria are met and approved by EPA, a Final Report will be created which summarizes all of the data contained in the quarterly status reports.

5.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting Inc. (PWGC), its subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC prepared a HASP for the site as part of the RI Work Plan documents (PWGC 2001). This document was recently reviewed by PWGC and determined to be adequate for use during the implementation of this IRM. The site specific HASP has been reproduced in this document and is provided as **Attachment E**.

PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in the site HASP prepared by PWGC and must be made available to PWGC and EPA.

Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926, and the PWGC Corporate Environmental Health and Safety policy. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM).

6.0 SYSTEM SHUTDOWN

PWGC will periodically review the monthly monitoring data and quarterly sampling results, to assess the effectiveness of the SVE system. Based upon the sampling results, PWGC may make adjustments to enhance system effectiveness or performance. This may include adjustments in applied vacuum to increase or reduce air flow to a specific extraction point, to alter air exchange rates or areas of influence.

The decision process for supporting termination of the SVE program will be in accordance with the target levels as established in the AOC. A description of the decision process follows below.

When TCE concentrations from the combined SVE influent line are within 36 $\mu g/m^3$, a review will be performed to determine if the system should be shut down. This will include a review of system performance, effluent levels and mass recovery rates over time. Prior to suspending system operation, an air sample will be collected from the sub-slab extraction well to confirm that representative soil-gas concentrations are below 3.6 $\mu g/m^3$. After both criteria are met, indoor air samples will be collected as specified in Section 4.3. If the indoor air concentration is within 0.36 $\mu g/m^3$, or the indoor air background for TCE, operation of the system will continue for 6 months after which, operation of the system will be suspended.

Following shutdown of the system, confirmatory indoor air samples will be taken every three months for a period of eighteen months. If the indoor air concentration for a particular round is above 0.36 $\mu g/m^3$ and site background, the results will be reviewed to check for lab/sample collection error or interference. If a problem is suspected, indoor air will be re-sampled. If the exceedance is confirmed, an appropriate action will be taken to address the problem. Actions may include: capping conduits or other passageways through the slab, sealing sections of the slab, restarting the SVE system, installing a sub-slab depressurization system or other appropriate actions as developed in consultation with the EPA Project Manager.

6.1 System De-activation and Removal

Once the determination has been made that the system may be permanently deactivated, the system will be dismantled. The main power to the system building will be disconnected and the remedial equipment will be removed from the building. The SVE extraction well will be abandoned following NYSDEC well abandonment procedures. The remaining system piping will be cut flush with grade and capped. The system building will either be left on site or removed, at the discretion of the property owner.

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TABLES

TABLES

Former Computer Circuits Site
IRM
Table 1
Soil Vapor Extraction System Design - Radius of Influence

Soil Vapor Extraction: USEPA Equation E - 5

$Q/H = \pi (k / \mu) P_w \{[1 - (P_{atm} / P_w)^2] / \ln(R_w/R_i)\}$

Q = vapor flow rate in cm^3/s	58,993.43	125 cfm	
H = length of screen in cm	1219.2	40 ft	K
k = intrinsic permeability in cm^2	4.17E-07	0.008661 " (d_{10})	0.034063 cm/s
μ = viscosity of air @ 55°F= 1.7822 E-4 g/(cm*s)	1.78E-04		(Hazen Formula)
P_w = absolute pressure at extraction well in g/(cm*s²)	991,767	7.37 "H_2O	$K = A*C*T*(d_e)^2$
P_{atm} = absolute ambient air pressure = 1.01 E+6 g/(cm*s²)	1.01E+06		A = coefficient = 0.00116
R_w = radius of vapor extraction well in cm	5.08	4 in (diam)	C = 400 + 40*(p - 26)
R_i = radius of influence of vapor extraction well in cm			p = porosity %

T = 0.7 + 0.03*t
t = water temp. in °C
d_e = effective grain dia. = d_{10} in mm

Rearranging and solving for R_i:

$R_i = R_w / e^{\{\pi (k / \mu) P_w \{[1 - (P_{atm} / P_w)^2] / (Q / H)\}\}}$

Radius of Influence

R_i = 1360.588 cm = 44.6387 ft

$k = (K * \mu)/(\rho * g)$
K = hydraulic conductivity
μ = dynamic viscosity of H_2O @ 55°F = 0.0012 N*s/m²
ρ = denisty of H_2O @ 55°F = 999.28 kg/m³
g = gravitational acceleration constant = 9.81 m/s²

Blower Selection:
Make: **EG&G Rotron**
Model: **EN 505**
Operating Point: **125 cfm, 21" H_2O**

<u>assumptions:</u>
d_{10} = 0.22 mm (fine sand - conservative)
soil assumed to be isotropic and homogeneous
Minimum ROI of 30 ft assumed based on site characterization and extent of contamination
adjusted well pressure and flow rate to achieve desired ROI
selected blower based on flow rate and well pressure plus assumed losses based on schematic/conceptual layout
substantiated blower selection with calculations in head loss spreadsheet
H (screen length) based on site characterization data and depth/intervals of contamination
groundwater and soil air temperatures assumed to be 55°F
soil porosity assumed to be 0.30 ~ typical Long Island sand formation

Design based on 40 feet of 4" diameter split screen - 20' at 25'-45' and 20' at 65'-85' BLS.
Likely additional head losses will be experienced at lower screen and thus lower screened zone to have smaller ROI.
Design based entirely on conceptual and theoretical data. No pilot test or study data/information available.

Former Computer Circuits Site
IRM
Table 2
Soil Vapor Extraction System Design - Head Losses

Q_1 = 125 cfm 2.08 cfs
Q_2 = 125 cfm 2.08 cfs
υ = 1.55E-04 ft^2/s air @ 55°F

	L_e	N_{re}	E/D	*f*	1.) h_f ft of air	h_f in H_2O	K	2.) h_f ft of air	h_f in H_2O	3.) h_f in H_2O	h in H_2O
blower											**21**
2" PVC	8.5	1.03E+05	0.00003	0.018	130.09	2.01					
union	0.45	1.03E+05	0.00003	0.018	6.89	0.11					
2" 90 bend	8.5	1.03E+05	0.00003	0.018	130.09	2.01					
air filter										1	
2" tee line	1.8	1.03E+05	0.00003	0.018	27.55	0.43					
a/w sep										1	
flow meter										1	
4x2 reducer							0.375	3.32	0.05		
4" 90 bend	13	5.13E+04	0.000015	0.021	7.25	0.11					
4" PVC	28.7	5.13E+04	0.000015	0.021	16.01	0.25					
4" 90 bend	13	5.13E+04	0.000015	0.021	7.25	0.11					
4" tee line	17	5.13E+04	0.000015	0.021	9.49	0.15					
4" 90 bend	13	5.13E+04	0.000015	0.021	7.25	0.11					
4x2 reducer							0.5625	4.98	0.08		
2" BV	21	1.03E+05	0.00003	0.018	321.40	4.98					
4x2 reducer							0.375	3.32	0.05		
4" tee branch	21	5.13E+04	0.000015	0.021	11.72	0.18					
						10.45			0.18	3	**13.63**
well head											**7.37**

$N_{Re} = D\,v^2 / \upsilon$ (Reynolds number - unitless)
E/D = relative roughness
E = specific roughness, PVC ~ 0.000005
f obtained from Moody diagram
1.) $h_f = (f\,L_e\,v^2) / (2\,D\,g)$
g = gravitational acceleration constant = 32.174 ft/s^2
2.) $h_f = (K\,v^2) / (2\,g)$
3.) h_f from manufacturer's data

assumptions: air behaves as incompressible fluid for head loss calculations
negligible temperature rise of air
ambient soil air temperature = 55°F (similar to groundwater)
suction temperature rise from blower ~ +7.5°F
pressure air temperature rise from blower ~ +9°F
total temperature rise at exhaust stack ~ +16.5°F
screen entrance losses assumed to make up the difference or remainder (i.e. vacuum at well head)

TABLE 3

Former Computer Circuits
IRM System Design

Dilution Calculation	Acetone	1,2-DCE	PCE	TCE	1,1,1-TCA	
Average Concentration in soil - core region	27.5	30	37.5	33,500	11.5	*ug/kg*
Average Concentration in soil - influence region	3.1	3.3	4.2	3,722	1.3	*ug/kg*
Volume ratio - influence : core	9	9	9	9	9	

Dilution Ratio		
core radius	10	ft
core area	314	sq ft
core height	20	ft
core volume	6,283	cu ft
influence radius	30	ft
influence area	2,827	sq ft
influence height	20	ft
influence volume	56,549	cu ft
volume ratio - influence : core	9	

TABLE 4

Former Computer Circuits

Soil Gas Concentrations Derived from Average Soil Concentrations

Input variables	Description	Acetone	1,2-DCE	PCE	TCE	1,1,1-TCA
C_t	Soil concentration (ug/kg)	5.5	6.0	7.5	6,700	2.3
p_s	Soil bulk density (kg/L)	1.85	1.85	1.85	1.85	1.85
H'	Henry's Law Constant (dimensionless)	9.00E-04	2.74E-01	9.56E-01	3.71E-01	1.16E-01
f_{oc}	fraction of organic carbon	0.0001	0.0001	0.0001	0.0001	0.0001
k_{oc}	organic carbon partition coeff.	2	59	660	130	150
k_d	soil water partion coeff. (L/kg)	2.00E-04	5.90E-03	6.60E-02	1.30E-02	1.50E-02
φ	Total Soil Porosity ($1-p_s/2.65$)	0.30	0.30	0.30	0.30	0.30
φ_w	water content	0.12	0.12	0.12	0.12	0.12
φ_a	air fill soil porosity ($\varphi-\varphi_w$)	0.18	0.18	0.18	0.18	0.18

Q	Flow rate of SVE blower (ft^3/min)	110	110	110	110	110

Output	Description	Acetone	1,2-DCE	PCE	TCE	1,1,1-TCA
C_a	Soil vapor concentration (ug/L)	7.60E-02	1.69E+01	3.20E+01	2.18E+04	2.93E+00
C_a	Soil vapor concentration (ug/m^3)	7.60E+01	1.69E+04	3.20E+04	2.18E+07	2.93E+03
C_a	Soil vapor concentration (lb/ft^3)	4.74E-09	1.05E-06	2.00E-06	1.36E-03	1.83E-07
E_r	Emission rate (lb/hr)	3.13E-05	6.95E-03	1.32E-02	8.99E+00	1.21E-03
E_r	Emission rate (lb/yr)	0.27	60.91	115.61	78736.28	10.57
E_r	Emission rate (tons/yr)	1.37E-04	3.05E-02	5.78E-02	3.94E+01	5.28E-03

Equations

$$^*C_a\ (\text{ug/L}) = \frac{C_t \times H' \times p_s}{(k_d \times p_s) + \varphi_w + (\varphi_a \times H')}$$

$$E_r\ (\text{lb/hr}) = C_a\ (\text{ug/L}) \times \frac{(1000\ \text{L})}{(\text{m3})} \times \frac{(1 \times 10^{-6}\ \text{g})}{(\text{ug})} \times \frac{(1\ \text{lb})}{(453.59\ \text{g})} \times \frac{(\text{m}^3)}{(35.31\ \text{ft3})} \times \text{flowrate}\ (\text{ft}^3/\text{min}) \times \frac{(60\ \text{min})}{(\text{hour})}$$

* From ASTM E1739-95

TABLE 5
SUMMARY OF INTERIM REMEDIAL MEASURE SAMPLING PROGRAM, RATIONALE AND ANALYSES

Matrix	Location	No. of Samples / frequency	Rationale for Sampling	Laboratory Analyses
Air	Three locations on system: influent, between GAC and effluent	3 samples / quarterly	System performance and compliance with emission levels, carbon break through, support system shutdown.	VOCs by sorbent tube EPA method TO17
Air	Horizontal extraction well line, vertical extraction well line	2 samples / as necessary	Representative sub slab soil gas /leaching pool soil gas, to support system shutdown	VOCs by sorbent tube EPA method TO17
Air	Indoor air in general work area	min. of 1 / quarterly	Assess indoor air exposure and compliance with AOC target level	VOCs,by summa cannister EPA method TO15 SIM
Air	Sub slab vapor corresponding to indoor air location	min. of 1, if used / frequency as needed	Distinguish between TCE concentrations related to source or background	VOCs,by summa cannister EPA method TO15
Air	Outdoor - upwind of building	min. of 1, if used / frequency as needed	evaluate extent to which outdoor air may be affecting indoor air quality and sub-slab vapor	VOCs,by summa cannister EPA method TO15

TABLE 6

Relevant TCE Guidance Levels
Federal and State

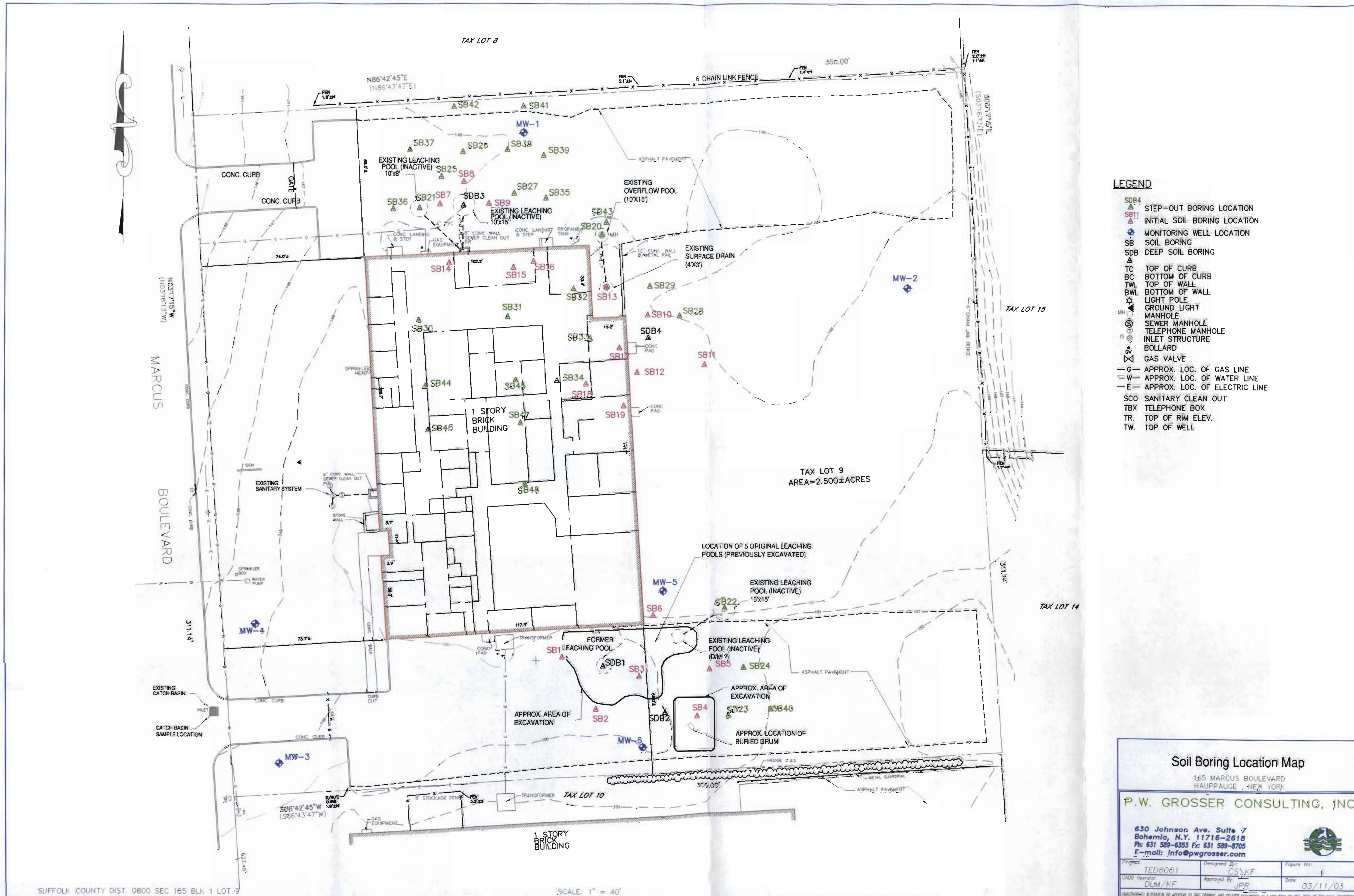
Agency	Date	Target Level ug/m^3	Action Level ug/m^3
NYSDOH	Current	Background	>5
NHDES	Current	2.7	10,700
CTDEP	2003	1	
MADEP	1995	*36.52	
Colorado DOH	2004		1.6
Michigan DEQ	2003	^58	
PADEP	2003 proposed	^0.72	
USEPA Region 1	2003	2.2	
EPA Region 10			^0.5

* 24 hr average
^Commercial/Industrial

TCE Background Values

Study	Date	Results ug/m^3
NYSDOH Homes in NYS	1997 - 2003	<0.25
USEPA Offices	1994 - 1998	<1.2 to 1.2
NYSDOH Homes in NYS	1989 - 1996	<2.7
USEPA Homes and Offices	1994 - 1998	ND to 4.5
Vermont DOH	1991 - 1992	5
NHDES based on VDOH	1991 - 1992	5
Colorado DOH	2003	0.2 to 0.5
MADEP Shah & Singh	1988	5
California ARB Sheldon *et al*	1992	0.68
USEPA Region 1	2003	2.2
Minnesota Sexton *et al*	2004	0.2 to 0.3

FIGURES


Soil Boring Location Map
145 MARCUS BOULEVARD
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Project: TED0001
Designed By: CS\KF
Figure No: 1
CADD Operator: DLM/KF
Approved By: JPR
Date: 03/11/03
LEGEND
STEP-OUT BORING LOCATION
INITIAL SOIL BORING LOCATION
MONITORING WELL LOCATION
SB SOIL BORING
SDB DEEP SOIL BORING
TC TOP OF CURB
BC BOTTOM OF CURB
TWL TOP OF WALL
BWL BOTTOM OF WALL
LIGHT POLE
GROUND LIGHT
MANHOLE
SEWER MANHOLE
TELEPHONE MANHOLE
INLET STRUCTURE
BOLLARD
GAS VALVE
—G— APPROX. LOC. OF GAS LINE
—W— APPROX. LOC. OF WATER LINE
—E— APPROX. LOC. OF ELECTRIC LINE
SCO SANITARY CLEAN OUT
TBX TELEPHONE BOX
TR. TOP OF RIM ELEV.
TW. TOP OF WELL
TAX LOT 8
TAX LOT 15
TAX LOT 14
TAX LOT 10
TAX LOT 9
AREA=2.500± ACRES
MARCUS BOULEVARD
6' CHAIN LINK FENCE
350.00'
N86°42'45"E
(N86°43'47"E)
S86°42'45"W
(S86°43'47"W)
N03°17'15"W
(N03°16'13"W)
311.14'
1 STORY BRICK BUILDING
EXISTING LEACHING POOL (INACTIVE) 10'x8'
EXISTING LEACHING POOL (INACTIVE) 10'x15'
EXISTING OVERFLOW POOL (10'X15')
EXISTING SURFACE DRAIN (4'X3')
EXISTING SANITARY SYSTEM
LOCATION OF 5 ORIGINAL LEACHING POOLS (PREVIOUSLY EXCAVATED)
EXISTING LEACHING POOL (INACTIVE) 10'x15'
FORMER LEACHING POOL
EXISTING LEACHING POOL (INACTIVE) (DIM ?)
APPROX. AREA OF EXCAVATION
APPROX. LOCATION OF BURIED DRUM
EXISTING CATCH BASIN
CATCH BASIN SAMPLE LOCATION
ASPHALT PAVEMENT
CONC. CURB
GATE
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
SDB1
SDB2
SDB3
SDB4
SB1
SB2
SB3
SB4
SB5
SB6
SB7
SB8
SB9
SB10
SB11
SB12
SB13
SB14
SB15
SB16
SB17
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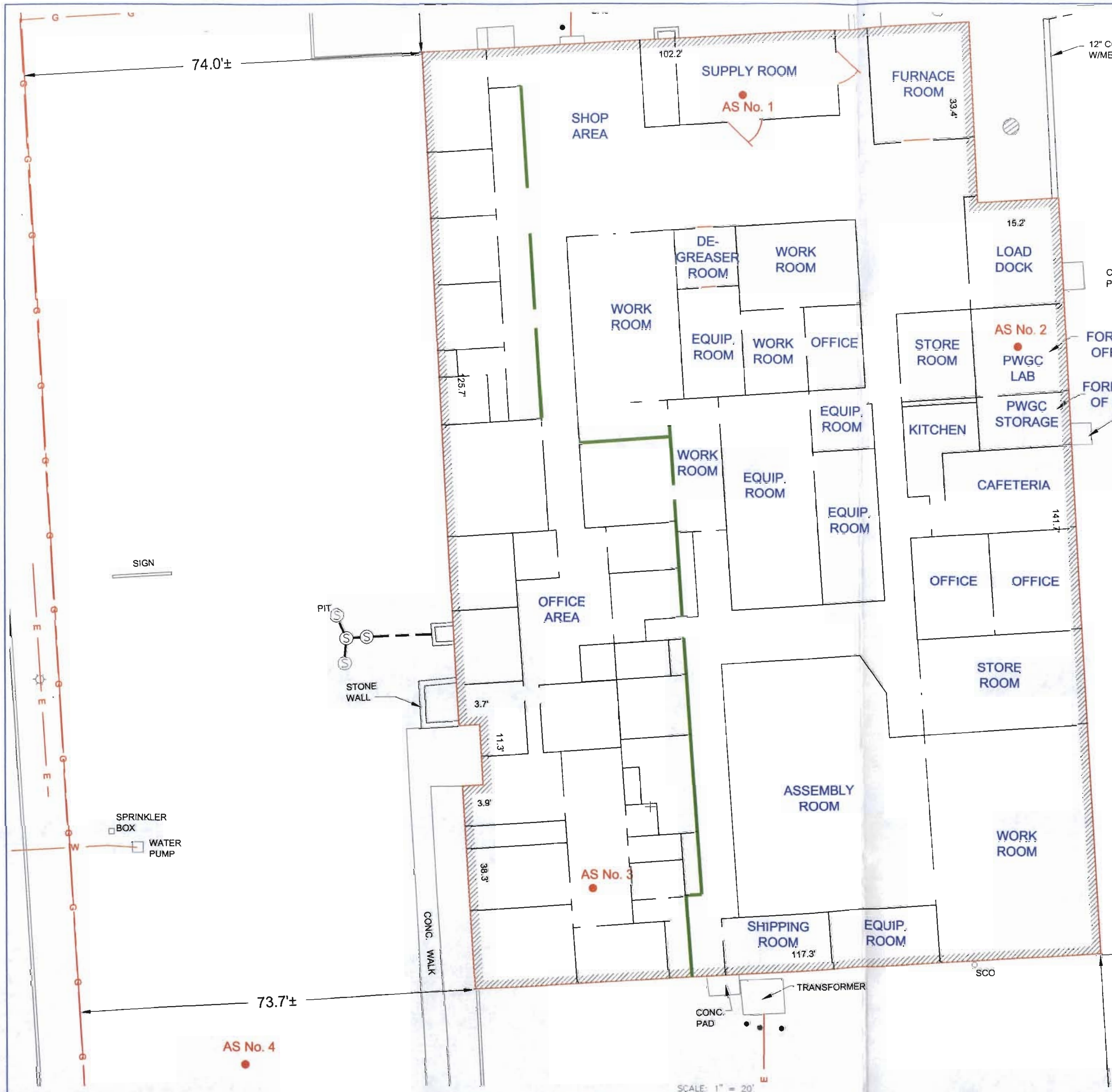
SB32
SB33
SB34
SB35
SB36
SB37
SB38
SB39
SB40
SB41
SB42
SB43
SB44
SB45
SB46
SB47
SB48
SUFFOLK COUNTY DIST. 0800 SEC 185 BLK 1 LOT 9
SCALE: 1" = 40'



LEGEND

AS No. 2 ● INDOOR AIR SAMPLING LOCATION

DELINEATION BETWEEN OFFICE AND WORK AREA

NOTES

AIR SAMPLING INTERIOR CONFIGURATION

1. CLIMATE CONTROL SYSTEM OFF (HEAT, AC)
2. ALL OFFICES - DOORS OPEN
3. ALL STORE / SUPPLY ROOMS AND SHIPPING ROOM - DOORS OPEN
4. ALL WORK / ASSEMBLY ROOMS -DOORS OPEN
5. ALL EQUIPMENT ROOMS AND LOADING DOCK - DOORS CLOSED
6. FURNACE ROOM AND DEGREASER ROOM - DOORS CLOSED AND SEALED (TAPE)

INDOOR AIR SAMPLING LOCATIONS REMEDIAL INVESTIGATION

145 MARCUS BOULEVARD
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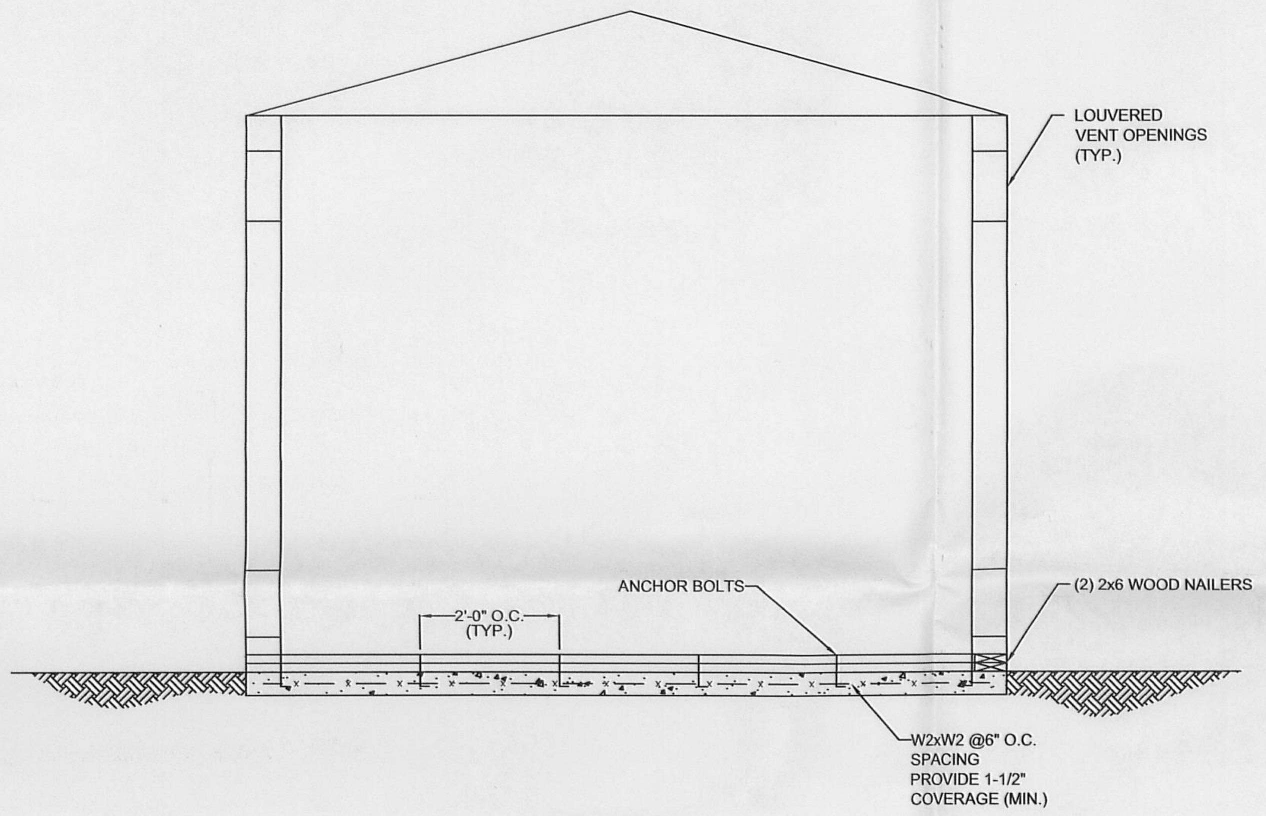
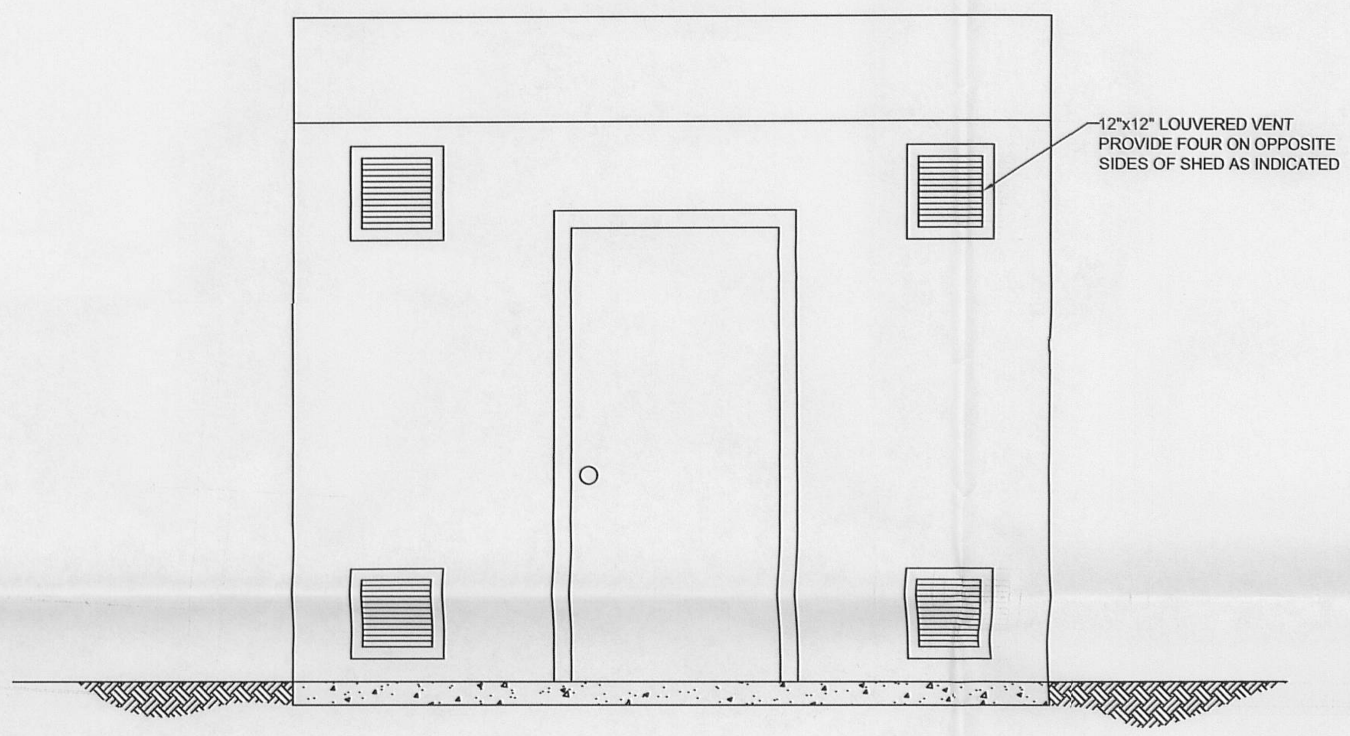
Project: TED0001	Designed By: CS	Figure No: 2
CADD Operator: TC	Approved By: PWG	Date: 10/28/04

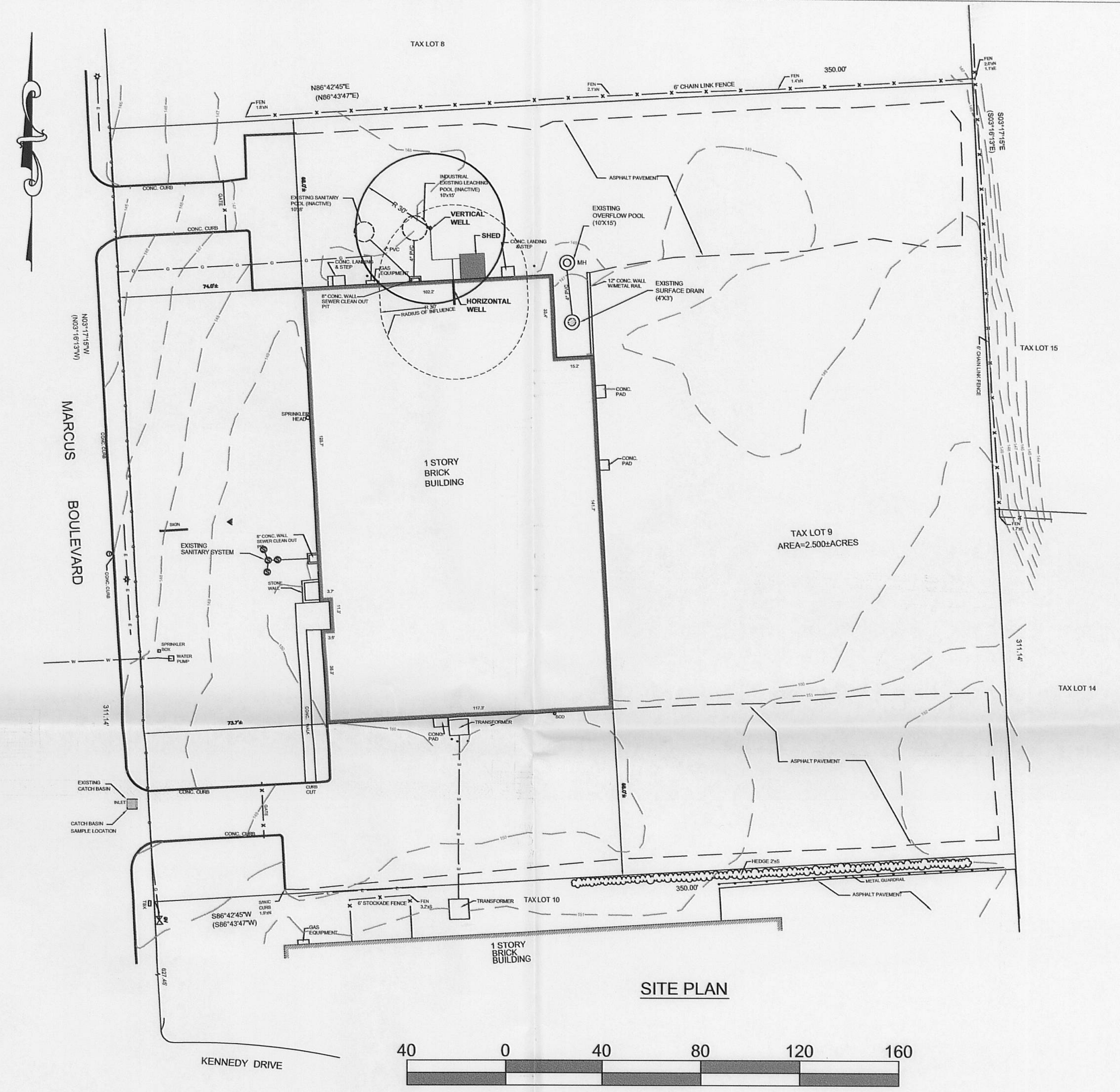
Ted\0001 \cadd\RI REPORT FIG 1-2 10-28-04\FIG 2.DWG



SHED SECTIONAL VIEW
SCALE: 1/2"=1'-0"



SHED WEST ELEVATION
SCALE: 1/2"=1'-0"



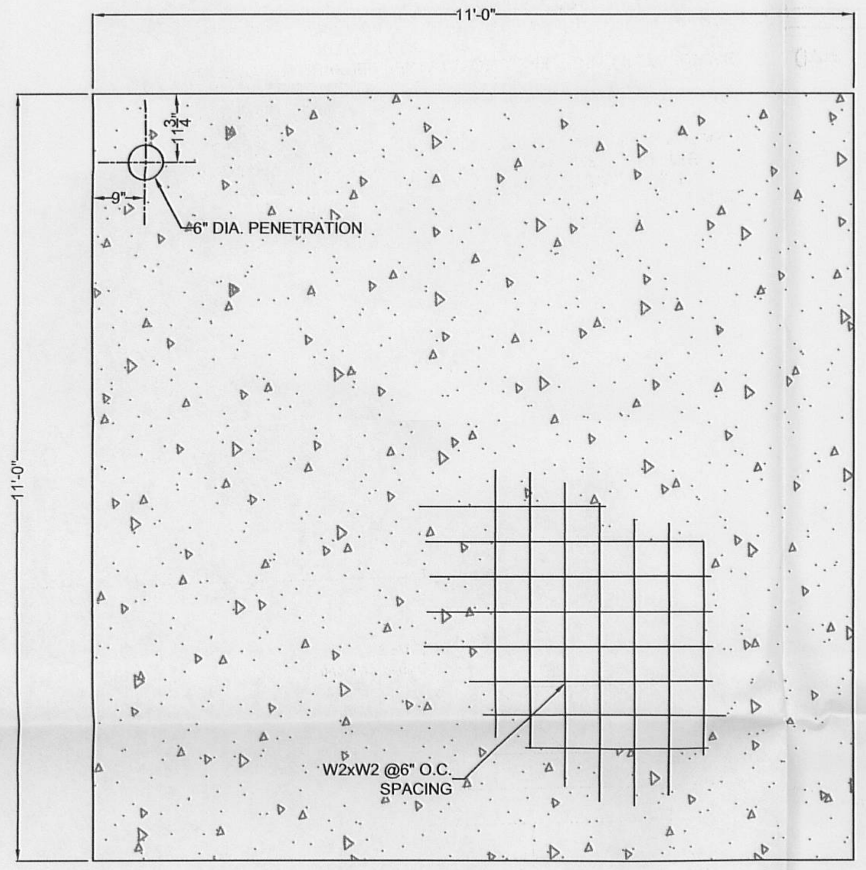
LEGEND

TC	TOP OF CURB
BC	BOTTOM OF CURB
TWL	TOP OF WALL
BWL	BOTTOM OF WALL
	LIGHT POLE
	GROUND LIGHT
MH	MANHOLE
	SEWER MANHOLE
	TELEPHONE MANHOLE
IS	INLET STRUCTURE
	BOLLARD
GV	GAS VALVE
— G —	APPROX. LOC. OF GAS LINE
— W —	APPROX. LOC. OF WATER LINE
— E —	APPROX. LOC. OF ELECTRIC LINE
SCO	SANITARY CLEAN OUT
TBX	TELEPHONE BOX
TR.	TOP OF RIM ELEV.
TW.	TOP OF WELL

SITE PLAN

40 0 40 80 120 160

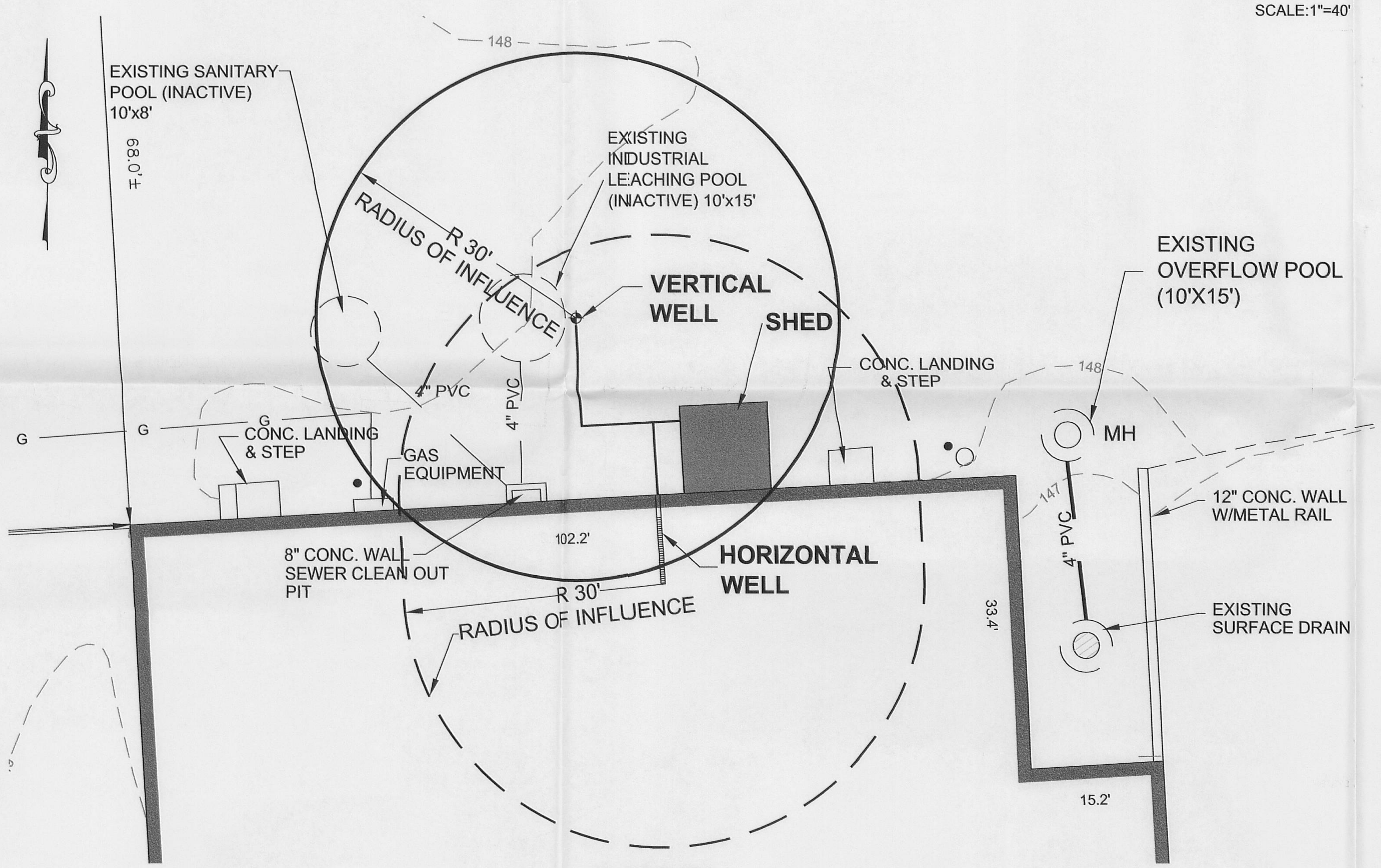
SCALE:1"=40'



SLAB PLAN
SCALE: 1/2"=1'-0"

SVE SYSTEM ENCLOSURE NOTES:

1. STRUCTURE TO BE PRE-FAB WOOD FRAME SHED WITH INTERIOR DIMENSIONS MEASURING 10'x10'x8' (HIGH) OR EQUIVALENT.
2. STRUCTURE TO BE WEATHER TIGHT AND COMPLY WITH THE TOWN OF SMITHTOWN BUILDING CODE REQUIREMENTS FOR AN ACCESSORY STRUCTURE.
3. PROVIDE ONE (1) DOOR MEASURING 6'-6" HIGH BY 3'-0" WIDE WITH EXTERIOR PADLOCK HASP.
4. PROVIDE LOUVERED VENTS ON OPPOSITE SIDES OF STRUCTURE AS SHOWN ON DRAWINGS.
5. PROVIDE 4" THICK CONCRETE SLAB WITH WOOD NAILER ANCHORING SYSTEM.
6. PROVIDE SLAB PENETRATIONS AS INDICATED ON DRAWING.



SITE PLAN DETAIL

10 0 10 20 30 40

SCALE:1"=10'

REVISIONS	DATE	INITIAL	COMMENTS

COMPUTER CIRCUITS
HAUPPAUGE, NY
SVE SYSTEM PLANS

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Project: TED0001	Approved By: CS	Figure No: 3
Designed By: PKB	Date: 11/11/02	
Drawn By: TC	Scale: AS NOTED	

J:ALL/TED/0001/CAD/IRM DESIGN/SVE DESIGN/SCHEMATIC PLAN/ Layout 1


ESTIMATED MIN. RADIUS OF INFLUENCE 30' @ 125 CFM MIN. WELL HEAD VACUUM 7.4" H2O
VERTICAL SVE WELL 4" SCH 40 PVC (SEE DETAIL THIS SHEET)
VERTICAL WELL HEAD VAULT (SEE DETAIL THIS SHEET)
4" DIA. SCH 40 PVC
SVE SYSTEM SHED (WOOD FRAME)
AIR/WATER SEPARATOR MAKE: EG&G ROTRON MODEL: MS350B
AIR FLOW METER MAKE: EG&G ROTRON MODEL:FM20A175Q
REGENERATIVE BLOWER MAKE: EG&G ROTRON MODEL: EN505AX58ML 2.0 HP, 1PH, 125 CFM @ 21" H2O
INLINE AIR FILTER MAKE: EG&G ROTRON MODEL: 515254
2" PVC AIR BLEED VALVE
VRV
AF
2" DIA. SCH 40 PVC
A/W SEP
DRAIN
BLOWER
4" DIA. SCH 40 PVC
2'-0" MIN.
SECTIONAL VIEW OF SVE SYSTEM LAYOUT SCALE: 1/2"=1'-0"
A 2
2'-0" ABOVE TOP OF BLDG. ROOF LINE (MIN.)
2" SCH 40 PVC STACK WITH RAIN CAP
AIR PURIFICATION UNITS MAKE: GENERAL CARBON CORP. MODEL: THE GENERAL AIR POLLUTION CONTROL BARREL (85 GALLON)
8'-0"
CARBON
CARBON
BLOWER
SECTIONAL VIEW OF SVE SYSTEM LAYOUT SCALE: 1/2"=1'-0"
B 2
RESTORE DISTURBED PAVEMENT. MATCH EXISTING CONDITIONS. SEAL JOINTS.
3" 24" 3"
24" CAST IRON MANHOLE FRAME AND COVER. GROUT TO TOP OF COLLAR
ASPHALT
CRUSHED STONE
SAND & GRAVEL
LOCKING PLUG
4" DIA. SCH. 40 PVC
2" DIA. SCH. 40 PVC BALL VALVE
4"x4" SCH 40 PVC TEE
4"DIA. SCH. 40 PVC
4"x2" REDUCING BUSHING
BENTONITE GROUT
FINE SAND SEAL
4" DIA. SCH. 40 PVC COUPLING
GRAVEL PACK (MORIE #2)
4" DIA. SCH. 40 PVC No. 20 SLOT SIZE WELL SCREEN
4" DIA. SCH. 40 PVC COUPLING
FINE SAND SEAL
4" DIA. SCH. 40 PVC BLANK
BENTONITE PELLETS
FINE SAND SEAL
4" DIA. SCH. 40 PVC COUPLING
GRAVEL PACK (MORIE #2)
4" DIA. SCH. 40 PVC No. 20 SLOT SIZE WELL SCREEN
4" DIA. SCH. 40 PVC END CAP
6" 2'-0" 22'-8" 2'-0" 20'-0" ±85'-0" 2'-0" 20'-0" 2'-0" 20'-0" 8"
VERTICAL SOIL VAPOR EXTRACTION WELL CONSTRUCTION DETAIL N.T.S.
BRASS SAMPLE PORT
CONCRETE COLLAR
4" DIA. SCH. 40 PVC
4"x2" REDUCING BUSHING
LOCKING PLUG
PLAN VIEW
10'-0"
LSH
VRV
A/W SEP
AF
BLOWER
CARBON
CARBON
DISCHARGE STACK
BLOWER MOTOR STARTER MAKE: EG&G ROTRON MODEL: MC115M1 PART: 529336 HEATER: 529353
MAIN CIRCUIT/BREAKER POWER PANEL
MOTOR STARTER
HORIZONTAL WELL HEAD VAULT (SEE DETAIL THIS SHEET)
4" DIA. SCH 40 PVC
PLAN VIEW (SCHEMATIC) OF SVE SYSTEM LAYOUT SCALE: 1/2"=1'-0"
1'-0" MIN. 2'-0" MAX.
HORIZONTAL SVE WELL 4" DIA. SCH 40 PVC 20 SLOT (SEE DETAIL THIS SHEET)
10'-0"
4" SCH 40 PVC END POINT
6" MIN. CORE DRILLED HOLE
MECHANICAL SEAL MAKE: LINK-SEAL MODEL: LS-300
24" CAST IRON MANHOLE FRAME AND COVER. GROUT TO TOP OF COLLAR
24" I.D. PRE-CAST CONCRETE COLLAR
1'-0" MIN. 2'-0" MAX.
4"SCH 40 PVC
4" SCH 40 PVC END POINT
10'-0"
NOTES:
1. INSTALL HORIZONTAL SVE WELL USING DIRECTIONAL DRILLING METHOD
2. CORE BORE THROUGH FOUNDATION WALL
3. SEAL ANNULUS IN WALL AROUND WELL USING MECHANICAL SEAL
4. FOOTING AND FOUNDATION WALL SHOWN IN DETAIL ARE APPROXIMATE. FIELD VERIFY CONDITIONS AT TIME OF CONSTRUCTION.
HORIZONTAL SVE WELL DETAIL SCALE: 1/2"=1'-0"
FROM EXISTING BUILDING
1Ø, 240V
MAIN C.B. 150 AMP, 2P 120/240V
TO VARIOUS ELECTRICAL LOADS
POWER PANEL 150 AMP MAIN C.B. WITH VARIOUS 1P & 2P C.B.'s, 20 AMP TRIP SETTINGS
SINGLE LINE RISER DIAGRAM N.T.S.
ELECTRICAL NOTES:
1. OBTAIN POWER FROM EXISTING BUILDING
2. BRING ELECTRIC SERVICE TO SHED VIA EITHER OVERHEAD OR THROUGH WALL.
3. INSTALL ELECTRICAL SERVICE IN ACCORDANCE WITH N.E.C. LATEST EDITION AND LOCAL CODES.
4. PROVIDE TWO (2) OVERHEAD INTERIOR INCANDESCENT LIGHTING FIXTURES TO BE SWITCH OPERATED. LOCATE SWITCH 48" A.F.F. ADJACENT TO DOOR AS SHOWN ON PLAN.
5. INSTALL HOUR METER/COUNTER TO SVE BLOWER TO RECORD OPERATION TIME.
6. SYSTEM TO SHUT DOWN WHEN HIGH LEVEL SWITCH/SENSOR IN AIR/WATER SEPARATOR IS ACTIVATED.
LEGEND
4"x2" SCH 40 PVC REDUCER
2" DIA. AIR FLOW METER
VACUUM GAUGE
PRESSURE GAUGE
VACUUM RELIEF VALVE
2" DIA. SCH 40 PVC BALL VALVE
BRASS SAMPLE TAP
AIR FILTER
UNION OR QUICK CONNECT
SVE WELL
FLOW DIRECTION
WALL SWITCH/RECEPTACLE
HIGH LEVEL SWITCH/SENSOR
REVISIONS DATE INITIAL COMMENTS
COMPUTER CIRCUITS HAUPPAUGE, NY SVE SYSTEM DETAILS
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J:ALL/TED/0001/CAD/IRM DESIGN/SVE DESIGN/SCHEMATIC PLANS

LEGEND

AS 1 ● INDOOR AIR SAMPLING LOCATION

DELINEATION BETWEEN OFFICE AND WORK AREA

NOTES

AIR SAMPLING INTERIOR CONFIGURATION

1. CLIMATE CONTROL SYSTEM ON (HEAT, AC)
2. ALL OFFICES - DOORS OPEN
3. ALL STORE / SUPPLY ROOMS AND SHIPPING ROOM - DOORS OPEN
4. ALL WORK / ASSEMBLY ROOMS -DOORS CLOSED
5. ALL EQUIPMENT ROOMS AND LOADING DOCK - DOORS CLOSED
6. FURNACE ROOM AND DEGREASER ROOM - DOORS CLOSED AND SEALED (TAPE)

SCALE: 1" = 20'

J:\Projects S-Z\Ted - Ted Firelog\0001 COMPUTER CIRCUITS RI-FS \cadd\IRM\FIGURE 5 7-21-05.DWG

INDOOR AIR COMPLIANCE SAMPLING LOCATION IRM PROGRAM

145 MARCUS BOULEVARD
HAUPPAUGE, NEW YORK

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Project: TED0001	Designed By: CS	Figure No: 5
CADD Operator: TC	Approved By: PWG	Date: 10/28/04