PHASE II INVESTIGATION
WORK PLAN
EMR CIRCUITS SITE
SMITHTOWN, NEW YORK

Prepared for:

Shea & Gould
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New York, New York 10020

May 11, 1989

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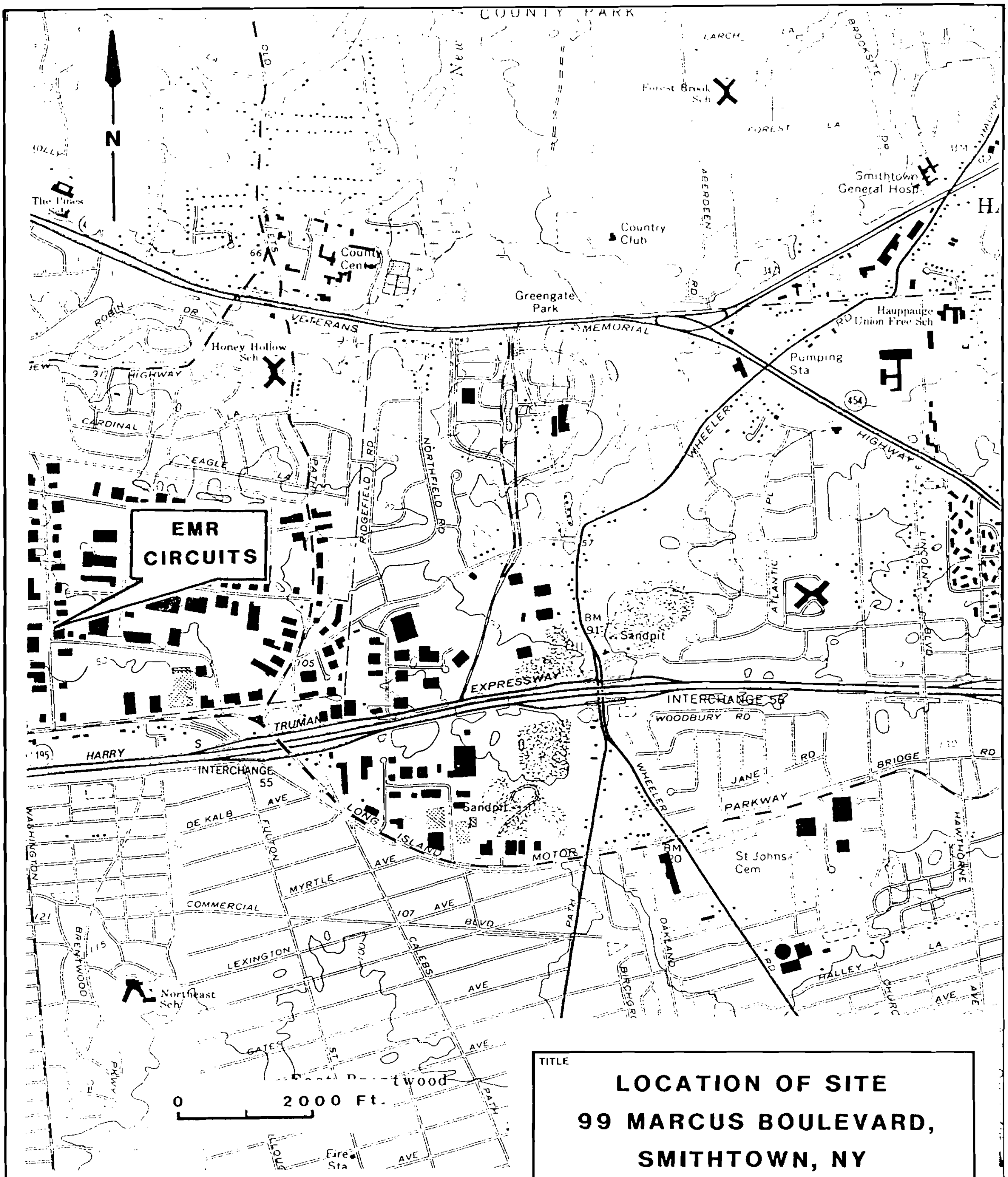
INTRODUCTION

The law firm of Shea & Gould, on behalf of its client, has retained Roux Associates Inc. to prepare a work plan for a Phase II Investigation of the EMR Circuits Site (New York ID No. 152105) located at 99 Marcus Boulevard, Smithtown, N.Y. (hereafter referred to as the "Site"). An initial work plan was previously submitted to New York State Department of Environmental Conservation (NYSDEC) on April 8, 1988 for consideratiion. The contents of this submission reflect all of NYSDEC's technical comments that were contained in its letter of August 23, 1988.

The Site (Figure 1) is an area of approximately 0.54 acres located in an industrial park situated about 2000 ft. north of the Long Island Expressway on the corner of Kennedy Drive and Marcus Boulevard, and is occupied by a one story brick building.

The Site, presently leased to Arista Lamps, is owned by Grenlein Realty Co., and managed by Finkelstein Realty, Inc. From 1981 to 1984 the Site was leased to EMR Circuits Inc. which operated a facility for the manufacture of circuit boards. During its tenancy, EMR disposed of various chemical substances in two underground leachpools (Figure 2). A list of the chemicals and solvents used at the Site during EMR's tenure (Site Specific Parameters) is shown in Table 1.



SOURCE: USGS Topo - C. Islip, NY
Quadrangle 7.5 Minute Series
(1967)

TITLE

LOCATION OF SITE
99 MARCUS BOULEVARD,
SMITHTOWN, NY

PREPARED FOR

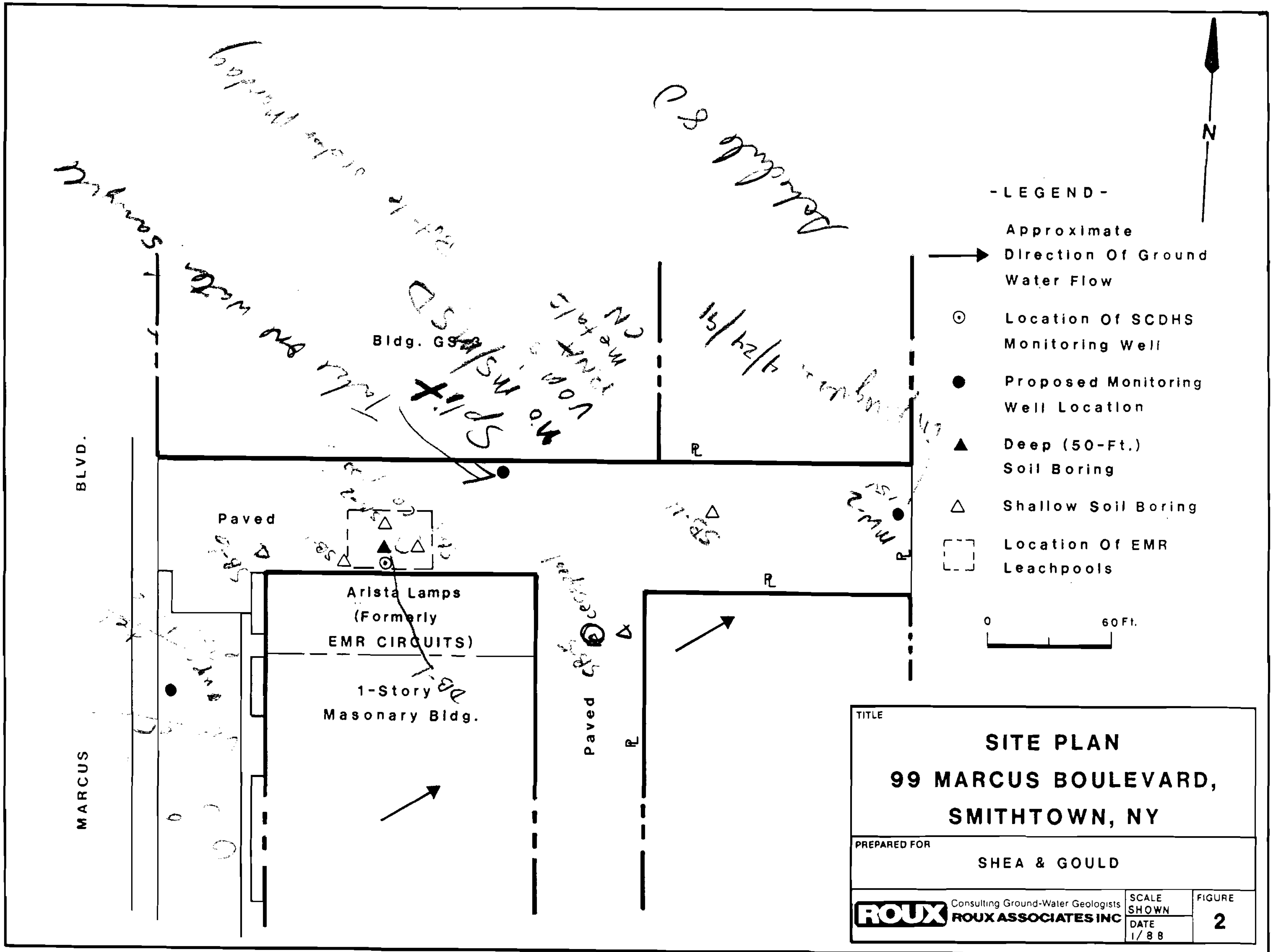
SHEA & GOULD

ROUX Consulting Ground-Water Geologists
ROUX ASSOCIATES INC

SCALE SHOWN

DATE 2/88

FIGURE 1



TITLE

SITE PLAN
99 MARCUS BOULEVARD,
SMITHTOWN, NY

PREPARED FOR
SHEA & GOULD

ROUX Consulting Ground-Water Geologists ROUX ASSOCIATES INC

SCALE SHOWN
DATE 1/88
FIGURE 2

TABLE 1

List of Chemicals and Solvents used at the Site by EMR Circuits (1981-1984)

(Site Specific Parameters)

1,1,1 Trichloroethane

1,1,2 Trichloroethylene

Tetrachloroethylene

p-ethyltoluene

1,3,5 and 1,2,5 Trimethylbenzene

Methyl Ethyl Ketone

Xylene

Copper

Lead

Nickel

Chromium

Zinc

Silver

Between November of 1983 and January of 1984, EMR had the leachpools cleaned out and filled with clean sand. When EMR vacated the premises on or about July 1984, Finkelstein Realty Inc. had the building ventilated and washed down to the satisfaction of the Suffolk County Department of Health Services ("SCDHS").

In 1985, the SCDHS installed a monitoring well adjacent to the former leach pools, (Figure 2). Analytical data for soil samples from the well boring at 60 and 120 ft indicated the presence of the following compounds: copper, iron, chromium, nickel, zinc, and silver.

Ground-water samples obtained from the well indicated the presence of iron, trace levels of other heavy metals, and 1,1,1 trichloroethane.

The objective of the proposed Phase II investigation is to evaluate the ground-water quality and conditions at the Site through the installation of monitoring wells and the collection and analysis of ground-water and soil samples. Protocols for decontamination, ground-water sampling, soil and sediment collection, and volatile organic screening of soil are included as Appendix A.

The proposed investigation will be performed by the Huntington, NY office of Roux Associates, Inc., Consulting Ground-Water Geologists and Engineers.

The proposed drilling subcontractor for this project is Delta Well and Pump, Inc., Ronkonkoma NY. The proposed analytical subcontractor, Nytest Environmental Inc., Port Washington, NY is a NYSDEC certified laboratory.

HYDROGEOLOGICAL INVESTIGATION

TASK I - Review of Existing Information

Prior to undertaking the site investigation, Roux Associates will obtain and review all available pertinent information for the area in which the Site is located, including previous Phase I work (EA Science and Technology, 2/1987) on the Site. The review will include U.S.G.S. topographic maps, State of New York geologic reports, ground-water classification maps, water-supply reports, consultants reports for other nearby sites (if they are available), drillers logs, and logs and/or reports for any nearby production wells.

This information will be analyzed and relevant portions synthesized into a comprehensive summary of the hydrogeology and ground-water quality in the vicinity of the EMR Circuits Site. The summary will include area geology, ground-water flow, ground-water availability, ground-water use, ground-water quality, and any known contamination problems in the vicinity of the Site which may affect the Site.

A site reconnaissance will be conducted to mark locations of soil borings based on an evaluation of past discharge systems (refer to Figure 2). Tentative locations of monitoring wells will be determined based on an examination of the Site, direction of ground-water flow as determined from published water-table maps, surface drainage patterns, and the locations of leaching pools used by EMR Circuits. Underground utilities (gas, electric, water, telephone) will be marked out by the utility companies on Marcus Boulevard, and underground utilities on-site will be marked out from blueprints of the property obtained from the owner.

TASK II - Site Geophysical Survey

A site survey will be conducted with a Geonics EM-31 conductivity meter to determine the existence, or absence of, buried steel drums on the premises. Data will be recorded using the inphase channel of the instrument which provides a measure of the terrain magnetic susceptibility. The ability of the EM-31 to detect drums buried at shallow depths compares favorably with magnetometers while the survey method allows for very rapid site coverage as data are collected virtually as fast as a person can walk. Furthermore, the instrument can be operated continuously while site traverses are made.

The EM-31 data are susceptible to electromagnetic interference (noise) caused by nearby structures, powerlines and atmospheric disturbances. By identifying the locations of these known factors, any data anomalies due solely to unknown factors can be identified.

A geophysical survey of the Site solely to obtain stratigraphic data is not necessary since three deep borings will be drilled for this investigation, and geologic logs of nearby U.S.G.S. test wells indicate relatively homogeneous sand and gravel to a depth of 160 feet below the site. Four U.S.G.S. test wells are located around the EMR Circuits Site within a radius of one mile (Figure 3). Logs of these wells are presented in Attachment C. U.S.G.S. hydrogeological reports have also determined that the water table in the vicinity of the Site is approximately 90 feet below land surface.

TASK III - Soil and Waste Sampling

Approximately seven (7) test borings (not including the monitoring well borings) will be augered around the Site. Five shallow (10-15 ft) borings and one deep (50 ft) boring will be drilled to collect soil samples to determine the vertical and horizontal extent of contamination around the assumed source area. One background boring (10-15 ft) will also be drilled.

Three borings will be augered to depths of between 10 and 15 feet and will concentrate on the area immediately adjacent to the source (refer to Figure 2). Two will be drilled in other areas to verify the presence or absence of waste. One boring (10 to 15 ft deep) will be drilled in a background area to be selected in the field jointly by Roux Associates and NYSDEC representatives. Soil samples will be collected continuously with depth at 2-foot

SOURCES: Base Map - Hagstrom Maps, Suffolk Co.(1983) Map #9
Well Locations - Donaldson & Koszalka (1979)

TITLE

LOCATIONS OF USGS TEST WELLS

PREPARED FOR

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ROUX ASSOCIATES INC — Consulting Ground-Water Geologists

SCALE	FIGURE
SHOWN	3
DATE 12/87	

increments, where a hollow stem auger rig is used, and at 1-foot increments, where a hand auger is used. One boring will be drilled to 50 feet below land surface as close as possible or within the leaching pools, with samples collected every 5 feet. All soil samples will be screened in the field for the presence of volatile organic compounds with a portable photoionization meter (Appendix A), and for non-volatile chemical wastes by visual inspection (staining, odor). The soil samples will be split and placed into separate jars. One jar will undergo the described protocol for field analysis should the screening indicate quantities of volatile organic compounds above background.

A total of eleven selected soil samples (including background samples) will be analyzed for the Site Specific Parameters listed on Table 1. Several soil samples that do not indicate volatiles based on photoionization readings will be analyzed either to define background levels or because of visual observation of staining indicating potential contamination. The total number of samples to be analyzed and the methods to be used are given on Table 2.

TASK IV - Monitoring Well Installation

Three (3) ground-water monitoring wells will be installed at the Site, two downgradient (based on data obtained from U.S.G.S. test wells located within approximately a one mile radius of the site,

Table 2. Number of Samples and Analytical Methods.

Matrix	Volatile Analysis Method #[1]	Metals Analysis Method #[1]	Base/Neutral/ Acid Extractables Method #	Pesticide/PCB Method #	Other
Ground Water	3	3	-	-	-
Soil	11	11	-	-	-
Leachate	-	-	-	-	-
Sludge	-	-	-	-	-
Air	-	-	-	-	-
Field Blanks	1	4	-	-	-
Trip Blanks	-	-	-	-	-
Duplicates	1	1	-	-	-
Laboratory QA/QC	[1]	[1]	-	-	-

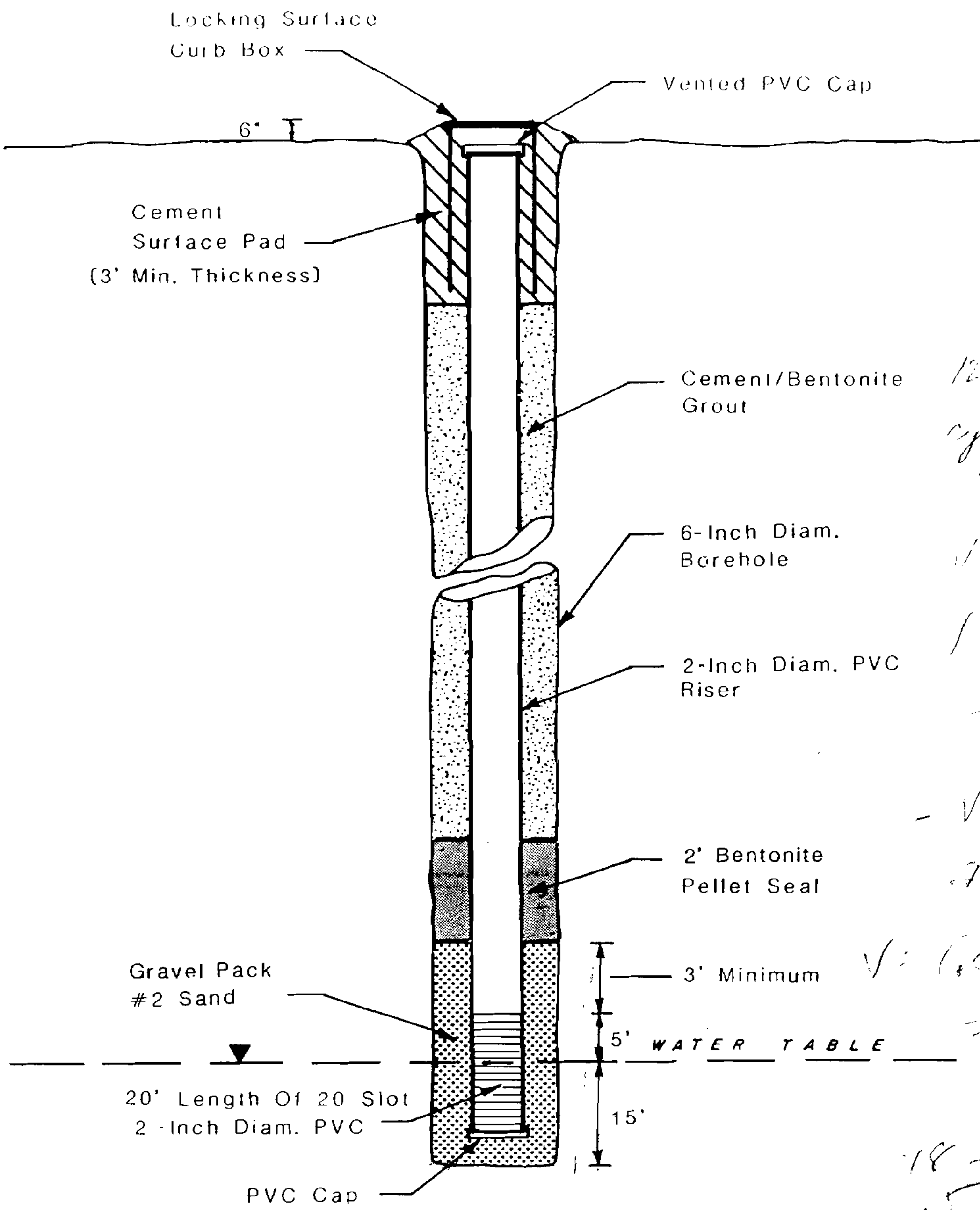
Note: [1] Labratory Methods are given in Appendix E.

(Figure 3) and one upgradient. Donaldson and Koszalka (1983), Soren (1971), and Lubke (1964) show flow in a northeasterly direction towards the Nissequogue River. The approximate direction of ground-water flow beneath the site based on the water-table contours of Donaldson and Koszalka (1983) and the proposed locations of these wells are shown on Figure 2. The exact locations of these wells may be adjusted based on site constraints and information obtained during the geophysical and soil sampling tasks. After the wells have been completed, surveyed, and sampled, the need for additional wells will be assessed. However, based on the size of the site and its proximity to the U.S.G.S. test wells, additional wells (more than three) seem unwarranted.

Since the depth to water is approximately 90 ± 5 feet below land surface, the borings will be drilled by hollow stem augering to a depth of approximately 120 feet below land surface. Split-spoon soil samples will be collected at grade, at five-foot intervals from land surface to the bottom of the boring, and at the bottom of the boring. The samples will be logged in detail by the supervising geologist. All soil samples, both above and below the water table, will be screened for the presence of volatile organic compounds with a portable photoionization instrument according to the protocols in Appendix A. Based on the screening results and visual inspection, up to four soil samples will be selected for analysis.

Upon completion of each boring, a two-inch diameter PVC flush-thread casing with a 20-foot long, 20 slot screen will be installed in the boring. The PVC casing and screen will be schedule 40 and N.S.F. approved. The screen depth will be set based on the geologic deposits encountered, exact position of the water-table, and readings obtained by the photoionization meter. If the screen is set higher than the bottom of the borehole, a mixture of clean, fine sand and clay pellets will be placed in the bottom of the borehole to seal the overdrilled portion. Auger cuttings will not be placed back into the monitoring well borings. Well completion (as built) diagrams, as shown in Figure 4, will be provided for each well as they are installed in the field.

After the well is set in the borehole, a gravel pack consisting of uniformly graded sand suitable for a 20 slot screen will be placed from one foot below the screen to at least three feet above the screen. A bentonite pellet (clay) seal at least two feet thick will be placed on top of the gravel pack and inundated with water for approximately one hour to allow proper hydration. The positions of the borehole gravel pack and clay seal will be measured with a weighted steel tape several times to ensure that hydration of the bentonite pellets has occurred. The remaining annular space will be pressure grouted with a cement/bentonite mixture (by weight, 5-10% bentonite, 15-20% cement, 70-80% water) to three feet below land surface. The grout will be placed with



18 cubic feet
- Volume of pipe
= .5 cubic ft

18
- .5
17.5 cubic feet

TITLE

PROPOSED MONITORING WELL CONSTRUCTION DETAILS

PREPARED FOR

SHEA & GOULD

ROUX — Consulting Ground-Water Geologists, ROUX ASSOCIATES INC	SCALE: None DATE: 7/86	FIGURE: 4

a tremie to ensure bridging does not take place. A protective locking surface box will then be cemented over the well flush with grade.

The split-spoon samplers will be cleaned between samples using procedures described in Appendix A. Drill rods will be hot water pressure washed or steam cleaned between holes using wash water at a minimum temperature of 212°F. A staging/decontamination area will be set up in a secure area in the unpaved (eastern) portion of the property, where soil cuttings and well development water with PID readings of 5 ppm or greater will be stored in steel, D.O.T. approved drums, and where drilling and sampling equipment will be steam cleaned between holes. Soils from borings (but not soils from monitoring well installation) will be backfilled into the boring if visual observations and readings from field monitoring equipment indicates that the soils are not contaminated.

After installation, the wells will be developed by pumping using dedicated a piston-type or submersible pumps until fine sediments have been removed from the screen zone and a good hydraulic connection exists betwen the well and the formation.
A measuring point will be designated on the PVC casing for each well that will be leveled to a common datum to a vertical precision of 0.01 feet with reference to standard U.S.G.S. or U.S. Coast and Geodetic Survey datum (feet MSL). Water levels in

the wells will be measured on at least three occasions so that a more precise assessment of the water table and direction of ground-water flow at the site can be obtained.

TASK V - Monitoring Well Sampling

After the wells have been installed they will be purged and sampled following the protocols given in Attachment A. Prior to sampling, five casing volumes will be removed from each well by bailing or through the use of a bladder pump. Samples will be collected with a bottom loading dedicated teflon or stainless steel bailers. The pH, specific conductivity and temperature of the ground water will be measured prior to purging, after each casing volume is purged, and at the time of sample collection. Samples will be collected when the three parameters have stabilized, or after five casing volumes have been removed from the well.

A chain-of-custody will be maintained between the geologist collecting the sample and the laboratory (see Appendix D). Samples will be delivered for analysis within 24 hours from the time of collection. The samples will be analyzed for the Site Specific Parameters listed on Table 1. Soil samples will be analyzed for metals using the USEPA Extraction Procedure (EP Toxicity). Ground-water samples will be analyzed for total metals (by digestion) using NYSDEC approved analytical procedures. Metal samples will be preserved and non-filtered.

TASK VI - Preparation of Final Report

Roux Associates will submit a detailed report to Shea & Gould within six weeks of completion of the field work that will include but will not be limited to the following:

- Site history
- Site base map
- Detailed descriptions of Site geology, including cross-sections describing the complete lithostratigraphy of the study area
- Detailed description of all work accomplished
- Site plan showing location of all wells
- Geologic logs and locations of all borings
- Well installation diagrams
- Site geophysical surveys
- A table of well construction data
- A water-table map
- A description of ground-water flow
- A table of analytical results of ground-water samples
- Photoionization response profiles
- A discussion of ground-water quality
- A discussion of remedial alternatives (if necessary)
- Recommendations for additional work, if warranted.

HEALTH AND SAFETY PLAN

A health and safety plan specific to the Site will be prepared prior to the start of field work. Written safety requirements will be distributed and formally discussed with all field personnel.

The health and safety plan will consider all activities required at the site and will be periodically reviewed and updated if warranted by site conditions. At a minimum, the plan will:

- Evaluate the risks associated with the field operations and with each task to be conducted;
- Identify key personnel and alternates responsible for both site and safety operations;
- Address the levels of protection to be worn by personnel during various site operations;
- Establish decontamination procedures for equipment;
- Determine the number of personnel and specific equipment needed in the work zones during initial and/or subsequent operations;
- Establish site emergency procedures, such as emergency communications and procedures for fire and/or explosions; and
- Determine the location of the nearest medical facility for emergency medical care.

Protective Clothing -

The selection or appropriate protective gear will be based on the hazards anticipated or recognized. The photoionization meter will be used to measure any potential emissions from the boreholes. Protection at the Site is anticipated to include hardhat, safety glasses (or faceshield), body covering (coveralls or pants and jacket), and gloves (level D). Omitting one item may compromise the individual's safety. Level C equipment will always be available on-site should the photoionization meter indicate borehole emissions at the work zone. All personnel working at the Site will have completed at least a 40-hour course in health and safety procedures at hazardous waste sites.

Enforcement of Safety Procedures -

It will be the responsibility of the on-site geologist to enforce the established procedures. All Site workers, including all subcontractors who will be on the Site, will be given complete written and oral instructions regarding site health and safety procedures. The on-site geologist will be authorized to stop work any time unsafe conditions arise.

REFERENCES

Donaldson, C.D. and Koszalka, E.J., 1979, Water Table on Long Island, New York, March 1979, U.S.G.S. Open-file Report 82-163.

Lubke, E.R., 1964, Hydrogeology of the Huntington - Smithtown Area, Suffolk County, NY, Geological Survey Water-Supply Paper 1669D.

Soren, J, 1971, Results of Subsurface Exploration in the Mid-Island Area of Western Suffolk County, Long Island, New York, LIWR Bulletin No. 1.

EA Science and Technology, Phase I Investigation: EMR Circuits, New York I.D. No. 152105, September 1986.

Added as the change from June to October Workplan submittal (6 pages)

APPENDIX A

Standard Operating Procedures

Collection of Soil Samples for Laboratory Analyses

1.0 Applicability

This Standard Operating Procedure (SOP) is concerned with the collection of valid soil samples to be analyzed by a laboratory.

2.0 Responsibilities

The project hydrogeologist is responsible for the collection of valid and representative soil samples. Also, to ensure that all field personnel are fully aware of the protocols and procedures in this SOP in accordance with project specifications.

3.0 Materials

- split spoon/hand auger
- plastic sheeting
- stainless steel spatula
- disposable vinyl/rubber gloves
- laboratory clean sample containers
- cooler
- distilled water
- acetone
- brushes

4.0 Procedure

4.1 Split-spoon core samplers or stainless steel bucket type hand augers are used to collect sediment samples.

4.2 Prior to collection of the soil sample, all sampling equipment is thoroughly pre-cleaned according to standard decontamination protocols.

4.3 Once the sample is collected it is placed on a clean plastic sheet and logged in detail by the geologist as quickly as possible to reduce the potential for the loss of volatile organics.

4.4 Using disposable vinyl gloves and pre-cleaned stainless steel spoons the sample is then placed in appropriate (EPA-approved) laboratory supplied, pre-cleaned containers.

4.5 The sample containers are then labeled with the following information:

a Name of person(s) collecting soil sample
b Sample location
c Time and date of sample collection
d Sample designation

4.6. Samples are then placed immediately on ice to maintain a temperature of 4° C.

4.7. A chain-of-custody form is completed for each sample collected.

4.8. At the end of each day samples are delivered or shipped to the laboratory for analysis.

Continuous Sediment Sampling Protocols

(1) Split-spoon core samplers are used to collect continuous sediment samples. A hollow stem auger or mud rotary rig is generally used. The split-spoon samplers are driven 1.5 or 2 feet at a time into undisturbed sediments by a standard 140-lb. weight. The geologist records the number of blows per six inches of penetration.

(2) The geologist opens the spoon on a plastic sheet, measures the recovery, logs the core in detail, separates the wash from the true sample and removes the sample from the split-spoon using disposable vinyl gloves and plastic spoons.

(3) The sample jar is labelled with all pertinent information. In addition, the geologist will ensure that:

* samples are taken at appropriate depths;
* unrepresentative protions of the sample are discarded properly;
* that the sampler is decontaminated properly between use; and

* the driller uses proper methods during sample collection and does not use oil or grease on tools entering the borehole.

(4) The sample is placed in a pre-cleaned laboratory supplied EPA-approved jar or vial (whichever is appropriate for compounds being analyzed for) and placed on ice.

(5) Cross contamination is avoided by using as many split-spoon samplers as possible and by thoroughly decontaminating each between samples.

(6) After the 0-2 foot interval sample is collected, a boring is advanced to two feet below land surface. The 2 to 4-foot interval is then sampled by split-spoon. Cross contamination is minimized as samples are collected ahead of the drilled hole.

APPENDIX A

Standard Operating Procedures

PROTOCOL FOR VOLATILE ORGANIC SCREENING OF SOIL SAMPLES

1. Open the split-spoon sampler, measure the recovery, separate the wash or cuttings from the true sample by using a dedicated spatula.

2. Split the sample and immediately place in two 8-ounce glass jars. Fill one jar half way and place an aluminium foil seal between the glass and metal cap. This jar will be used for volatile organic screening. The other jar will be saved for laboratory analysis if the field screening indicates quantities of volatile organics above background.

3. Jars will be labeled with the boring number, depth of sample, date of collection and blow counts. In addition, the hydrogeologist will:

   - take samples at the appropriate depths
   - properly discard unrepresentative portions of the sample
   - decontaminate the sampler between use
   - direct the driller to use proper methods during sample collection and not to use oil or grease on tools entering the borehole.

4. Place the jar without the aluminum foil on ice for possible future analyses.

5. Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, layering and mineralogy).

6. heat the sample with the aluminum foil cover using a Bunsen burner or similar heating device to approximately 80° over a two minute period.

7. Pierce the aluminum foil seal with the extension probe from the photoionization meter and measure relative concentration of volatiles in headspace of the soil sample.

8. Any sedimentary material not representative of the interval sampled will be placed in a pile with the other cuttings from the borehole.

9. The split-spoon core barrels will be cleaned in a plastic bucket by using a scrub brush, detergent and clean potable water. The spoon will then be rinsed with distilled and deionized water, assembled and placed on a plastic sheet for reuse.

SAMPLING EQUIPMENT DECONTAMINATION PROCEDURE

a. Wash in laboratory detergent (Micro);

b. rinse with deionized water;

c. rinse with hexane;

e. rinse with deionized water;

f. rinse in dilute nitric acid;

g. final rinse with deionized water; or

h. air dry.

GROUND-WATER SAMPLING PROCEDURE - VOLATILE ORGANICS COMPOUNDS

(1) Identify the well and enter presampling information in the field notebook and on the sampling form. Fill out other items on sampling form.

(2) Inspect protective casing and note any items of concern such as missing lock or bent casing.

(3) Cut a slit in one corner of a dedicated plastic sheet and slip it over and around the well or place near the well, creating a clean surface onto which the sampling equipment can be positioned. Do not kick, transfer, drop or in any way let soil or other material fallonto this sheet unless it comes from inside the well. Do not place any meters, tools, equipment, etc., on the sheet unless they have been cleaned with a clean rag to remove any sediments.

(4) Clean the top of the well off with a clean rag and remove the cap or plug, placing it on the plastic sheet.

(5) Clean the steel tape according to NYSDEC approved protocol and measure the depth to water. Record this and compute the volume of water in the well.

(6) Wells will be purged by bailing a minimum three to five casing volumes if the recharge rate is adequate to accomplish this within a reasonable amount of time. Hand bailers will be decontaminated prior to use in accordance with NYSDEC approved protocol.

(7) Record the physical appearance of the water on the field data form (color, odor, turbidity, etc.) as it is bailed.

(8) Prepare the bottles for receiving their samples (labels, place on ice, etc.).

(9) After the well has been purged and developed, a teflon or stainless steel bailer will be used to collect the ground-water sample. This bailer will have been thoroughly pre-cleaned. Immediately prior to lowering the bailer in the well, rinse three volumes of distilled water through the bailer. In addition, the first three bailer volumes obtained

from the well should be discarded. Use non-absorbent polypropylene cord to lower the bailer into the well. This cord will be discarded after use in the well.

(10) Lower the bailer into the well gently, making certain to only submerge it far enough to fill it completely.

(11) Standard 40 ml, pre-cleaned, volatile organic sample bottles with teflon caps are required. Fill the bottles to the top creating a convex surface with no air bubbles. Place the cap on tightly. Gently turn the bottle over and tap lightly on the soft surface to insure that no air bubbles are present.

(12) Fill the other containers provided by the laboratory according to directions.

(13) Label the bottle with location number, date and other pertinent information. Record all information on the sampling data form. Cool the sample immediately on ice. Maintain the samples in a secure area and deliver to the laboratory within 24 hours.

(14) After the last sample is collected, measure and record the temperature, conductivity, pH, and the physical appearance of the water.

(15) Replace the well cap and cover the well, locking the protective cap.

(15) Rinse out the bailer and/or pump with clean water.

(16) Discard the cord, rags, gloves, and plastic sheeting in an appropriate manner.

(17) Complete sampling data form.

APPENDIX B

Logs of U.S.G.S. Test Wells

Notes

According to U.S. Geological Survey files, wells S24771 and S24774 were installed along with other wells of varying depths at each site. As a result, geologic logs are available for only the deep well at each site. With regard to the attached logs, S24769 and S24772 correspond to S24771 and S24774, respectively.

Sources: Long Island Water Resources Bulletin No. 1, Results of Subsurface Exploration in the Mid-Island Area of Western Suffolk County, Julian Soren, 1971 (Well Nos. S24769, S24772)

Correspondence with Ernest Rossano, Hydrologic Technician, Water Resources Division, U.S.G.S. - Syosset, NY, November 13, 1986 (Well No. S36140)

Correspondence with Edward Olson, Bureau of Ground-water Resources, Suffolk County Dept. of Health Services, Hauppauge, NY, November 19, 1986 (Well No. S45594)

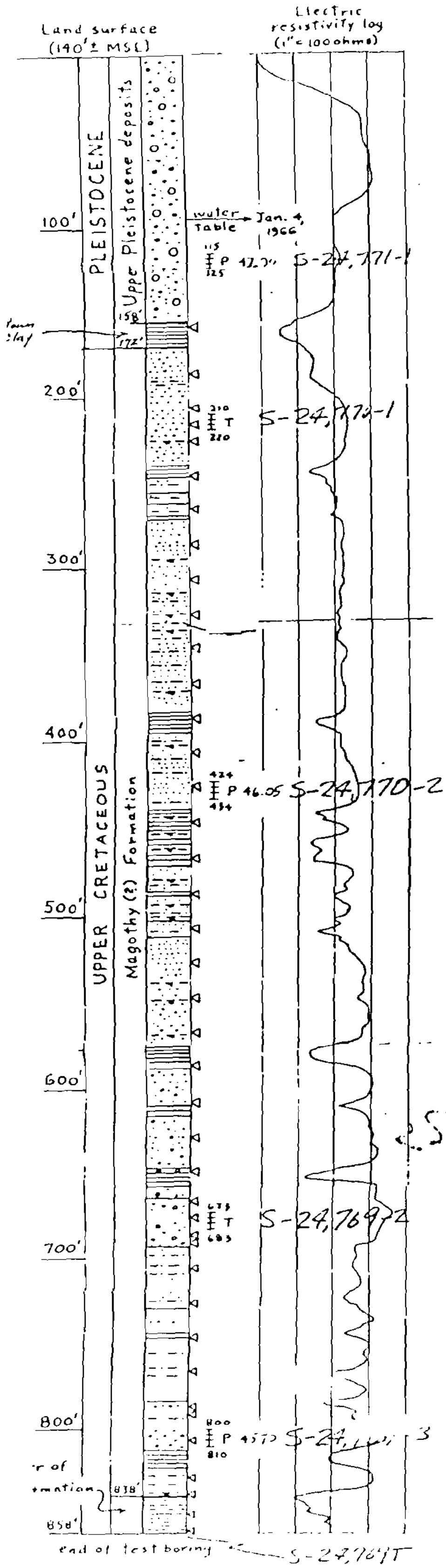
S24772. U.S. Geological Survey test well, at southwest corner, intersection of Vanderbilt Motor Parkway and Islip Avenue (Calebs Path), 65 feet south of centerline of Vanderbilt Motor Parkway, and 200 feet west of centerline of Islip Avenue, lat 40°48'13" N, long 73° 13' 56" W, Brentwood, N. Y. Standard rotary hole drilled by C. W. Lauman & Co., Inc., Aug. 1965. Altitude of land surface about 120 feet above mean sea level. Log based on examination of core samples, flume (mud-ditch) samples driller's log, and electric resistivity and gamma-ray logs.

Description	Thickness (feet)	Depth (feet)
Holocene		
Fill (various earth materials and concrete fragments).	6	6
Pleistocene		
Upper Pleistocene deposits:		
Sand, very fine to very coarse, mostly medium to coarse, brown, and granule to large-pebble gravel.	157	163
Smithtown clay(?):		
Clay, dark-olive-gray and medium-olive-brown.	7	170
Upper Cretaceous.		
Matawan Group-Magothy Formation, undifferentiated:		
Sand, very fine, silty, light-gray; some thin laminae of lignitic silt in upper part.	31	201
Sand, very fine to coarse, mostly fine to medium, light-gray; traces of clay and silt, some thin laminae of lignitic silt in middle part.	47	248
Sand, very fine to fine, silty, light-gray; some thin laminae of light- to dark-gray clay, many traces of clay and silt.	47	295
Sand, very fine to coarse, mostly fine to medium, light-yellowish-gray and light-brownish-gray; many traces of clay and silt, some thin laminae of lignitic silt in middle part.	61	356
Sand, very fine to fine, light-gray, light-yellowish-gray, and light-brownish-gray; traces of clay and silt, some thin laminae of clay and lignitic silt.	61	417
Sand, very fine to medium, light-yellowish-gray; traces of clay and silt; some thin clay laminae.	13	430
Sand, very fine to very coarse, mostly fine to medium, light-gray; traces of silt and clay, some thin laminae of clay.	37	467
Sand, very fine, silty, light-gray; much interstitial clay, many thin laminae of lignitic silt.	30	497
Sand, very fine to coarse, mostly fine, light-gray; traces of clay and much interstitial silt, some thin laminae of lignitic silt.	55	552
Clay and silty clay, light-medium-gray and light-gray; some thin laminae of lignitic silt.	31	583
Sand, very fine to coarse, light-gray, traces of clay and silt; many thin laminae of lignitic silt.	56	639
Sand, very fine to fine, light-gray; traces of clay and silt.	5	644
Sand, very fine to very coarse, mostly fine to coarse, light-gray; traces of clay and silt, a few thin clay laminae.	77	721
Clay, light- to dark-gray, some embedded granule to medium-pebble gravel in lower part.	13	734
Sand, fine to very coarse, mostly coarse, light-gray, and granule to medium-pebble gravel, many laminae and some thin beds of clay.	45	779
Clay, silty and sandy, light-gray.	17	796
Sand, fine to very coarse, mostly coarse, light-gray; many traces of clay and silt.	11	807
Clay, and sandy clay, light-gray.	8	815
Sand, fine to very coarse, mostly coarse, light-gray, and granule to medium-pebble gravel; many thin beds of sandy clay.	71	886
Raritan Formation		
Clay member		
Clay, and silty clay, light- to medium-gray, some sandy silt, some thin laminae of lignitic silt.	43	929
Sand, very fine to medium, some coarse sand, light- to medium-gray, much interstitial clay and silt, a few laminae of lignitic silt near bottom.	18	947
Clay, light- to medium-gray, light-pinkish-gray, and light-yellowish-brown.	19	966

S45594 Suffolk County Dept. of Health Services observation well, 500 feet east of centerline of Pine Hollow Road, 7 feet south of centerline of New Highway, lat 40°49'20"N, long 73°15'09"W, Hauppauge, NY. Cable tool drilled. Completed October 1972. Altitude of land surface about 104 feet above MSL.

Description	Depth (feet)
Fine to coarse tan sand w/ grit	5
Fine to coarse tan sand w/ grit and gravel	10
Fine tan sand w/ grit, gravel, and some light brown clay	15
Fine to coarse tan sand w/ grit and some gravel	20
Fine tan sand w/ some gravel and light brown clay	25
Fine to coarse tan sand w/ grit, gravel, and some brown clay	30
Fine to coarse tan sand w/ grit, gravel and some brown clay	35
Fine to coarse tan sand w/ grit, gravel and some brown clay	40
Fine to coarse tan sand w/ grit, gravel and some brown clay	45
Fine to coarse tan sand w/ grit, gravel and some brown clay	50
Fine to coarse tan sand w/ gravel and and some clay	55
Fine to coarse tan sand w/ grit and chunk gravel	60
Fine to coarse tan sand w/ grit and chunk gravel	65
Fine to coarse tan sand w/ grit and chunk gravel	70
Fine to coarse tan sand w/ grit and gravel	75
Fine to coarse tan sand w/ grit and gravel	80
Fine to coarse tan sand w/ grit and gravel	85
Fine to coarse tan sand w/ grit and gravel	90

SITE 4,
TEST BORING S-24,769
AND WELL-SCREEN SETTINGS



EXPLANATIC

gravel, medium to large-

gravel, granule to sma

sand, course to very

sand, mediu

sand, very-fine to fin

clayey silt, sandy clay, and silt

clay and silty clay

lignitic silt

core sample

geologic contac

424 P 46.05 434

screen setting

numbers at top and bo of symbol are depths feet from land surfa letter T or P indica temporary or perma screen setting, respe number at right is hydraulic head in th fer, in feet above m level datum, at scree on Jan. 4, 1966, at 11 E.S.T.

Location of test boring in Enclosures 1 and

S36140

U.S. Geological Survey files state that from 0 ft. to 62 ft. samples consisted of coarse sand and pebbles. The well, therefore, was screened from 38 ft. to 41 ft. below land surface. No additional data was available.

APPENDIX C

Quality Assurance and Quality Control

APPENDIX C - TABLE 1

Data Quality Requirements and Assessments

Parameter	Sample Matrix	Detection Limit[1]	Estimated Accuracy[2]	Accuracy Protocol[3]	Estimated Precision[3]	Precision Protocol[3]
Purgeables	Ground Water	1.6-7.2 ppb				
Purgeables	Soil	1.6-7.2 ppb				
Metals	Ground Water	?	*			
Metals	Soil	?	*			

Notes:

1. Detection Limit varies by individual compound.
2. Accuracy is based on analytical method.
3. *EPA SW 846 "TEST METHODS FOR EVALUATION OF SOLID WASTE".

Quality Assurance and Quality Control

Project Organization and Responsibility

Over Project Coordination: Mr. William Sarni
Overall QA: Ms. Tess Byler
Sampling Operations: Ms. Ellen Beacon
Sampling QC: Ms. Tess Byler
Laboratory Analysis: Mr. John Gaspari, NYTest Environmental, Inc.
Laboratory QC: Mr. John Gaspari, Nytest Environmental, Inc.
Data Processing Activities: Mr. John Gaspari, Nytest Environmental, Inc.
Data Processing QC: Mr. John Gaspari, NYTest Environmental, Inc.
Performance Auditing: Mr. John Gaspari, NYTest Environmental, Inc.
System Auditing: Mr. John Gaspari, NYTest Environmental, Inc.
Data Quality Review: Ms. Tess Byler

Contract

A subcontract will be entered into between NYTest Environmental, Inc. and Roux Associates, Inc. The subcontract will be submitted to the NYSDEC for their review prior to being signed by the parties.

* Since NYTest is a NYSDEC approved analytical laboratory, specific analytical procedures and laboratory QA/QC descriptions are not included in this Work Plan. Contract Laboratory Protocols (CLP) November 1987, will be followed for all analytical work performed on this project (see Appendix E).

Data Quality Requirements and Assessments*

Data quality requirements and assessments are provided in Table 1. The number of samples to be collected, matrices, analytical protocols to be used and anticipated QA/QC samples to be collected and analyzed are given in Table 2. All water samples collected for volatile halocarbons will be analyzed within seven days of receipt by NYTest.

1. Data Comparability - All data will be presented in the units designated by the methods specified by NYTest Environmental Inc. (which is a state approved laboratory). In addition, sample locations, collection procedures and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

2. Data Completeness - The acceptability of less than 90% complete data will be evaluated on a case-by-case basis.

Sample Custody Procedures*

NYTest Environmental, Inc. is a State approved laboratory meeting requirements for cleaning and handling analytical equipment. Analytical methods are given in Attachment E.

Calibration Procedures and Preventative Maintenance*

The following information/equipment will be maintained:

1. Field and laboratory equipment checklists which will contain records of usage, maintenance, calibration and repairs.

2. A schedule of preventive maintenance tasks that will be carried out to minimize downtime of the measurement equipment.

3. Critical spare parts that will be on hand to minimize equipment downtime.

Documentation, Data Reduction and Reporting*

NYTest Environmental, Inc. is a State approved laboratory meeting requirements for documentation, data reduction and reporting. In addition to the NYTest standard data package, the forms included in Appendix D will be completed and included in the project report. Form 1 is the chain of custody completed by both Roux Associates, Inc. and NYTest. Forms 2 and 3 are to be completed by Roux Associates, Inc. Forms 4 through 10 will be completed by

NYTest.

Data Validation

NYTest Environmental, Inc. is a State approved laboratory meeting requirements for data validation.

Corrective Action*

NYTest Environmental, Inc. is a State approved laboratory meeting requirements for corrective action protocols. Analytical cleanup will be employed where necessary to alleviate matrix interferences (following SW846 protocols).

Field Management Procedures

Field management procedures will follow Roux Associates, Inc. standard operating protocol. These field management protocols include following proper chain-of-custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required), maintaining a Field Log Book, and preparing Sample Information Record Forms. A discussion of each of these procedures follows:

Chain of Custody

After a sample has been collected, a Chain of Custody Form (see Attachment F) will be completed and signed by the person collecting the sample. The original of the form will remain with the sample and will be signed each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler will keep one copy and a copy will be retained for the project file. The sample bottle will be labeled, at a minimum, with the following:

- Firm name
- Sample number
- Analysis to be performed
- Date
- Time of collection

Split Samples

If samples are to be split with NYSDEC, a Receipt for Samples Form will be completed and signed. A copy of the Chain of Custody Form will accompany this form.

Field Log Book and Sample Information Record

The Field Log Book will be a bound document of consecutively numbered pages maintained for each project. The first page of this log will contain the following information:

- o Project name and address
- o Name, address and phone number of field contact
- o Type of site/process (if known) generating waste
- o Type of waste

Daily entries will be made in the Field Log Book and on the Sample Information Record Form, where appropriate, for the following information:

- o Purpose of sampling
- o Location of sampling point
- o Type(s), Number(s) and volume(s) of sample(s) taken
- o Description of sampling point and sampling methodology
- o Date and time of collection
- o Collector's sample identification number(s)
- o Sample distribution and method of storage and transportation
- o References such as maps of the sampling site or photographs of sample collection

- o Field observations, including results of field analyses (e.g.: organic vapor measurement, pH, temperature, specific conductance), water levels, drilling logs, etc.
- o Signature of personnel responsible for completing log/form entries

Deviations

Prior to any deviations from the above protocols, the designated DEC QA/QC officer will be notified.

APPENDIX D

Example Documentation Forms

ROUX ASSOCIATES

CHAIN OF CUSTODY RECORD

Project No. ______________

Project Title ____

Sample Source ____

Collectors Name ______________________ / ______________________
print signature

Field Information ____

Method Of Shipping ____

Relinquished By:

sign ______________________

for ______________________

Date/Time ______________________

Received By:

sign ______________________

for ______________________

Date/Time ______________________

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers

Comments:

Client/Project ______________________ Page _____ of _____

Project no. __________

SAMPLE INFORMATION RECORD

SITE ______________ SAMPLE CREW ______________

SAMPLE LOCATION/WELL NO. ______________

FIELD SAMPLE I.D. NUMBER ______________ DATE ______________

TIME __________ WEATHER ______________ TEMPERATURE __________

SAMPLE TYPE:

GROUND WATER ______________ SEDIMENT ______________

SURFACE WATER/STREAM ______________ AIR ______________

SOIL ______________ OTHER (Describe, i.e., leachate) ______________

WELL INFORMATION (fill out for groundwater samples)

DEPTH TO WATER __________ MEASUREMENT METHOD ______________

DEPTH OF WELL __________ MEASUREMENT METHOD ______________

VOLUME REMOVED __________ REMOVAL METHOD ______________

FIELD TEST RESULTS

COLOR __________ pH __________ ODOR __________

TEMPERATURE (°F) __________ SPECIFIC CONDUCTANCE (umhos/cm) __________

OTHER (OVA, Methane meter, etc.) ______________

____

CONSTITUENTS SAMPLED:

__________ __________ __________ __________

__________ __________ __________ __________

REMARKS: ______________________________

____

____

WELL CASING VOLUMES

GAL/FT				
	1-¼" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.10	2-½" = 0.24	3-½" = 0.50	6" = 1.46

Consulting Ground-Water Geologists
ROUX ASSOCIATES INC

RECEIPT FOR SAMPLES

PROJECT NAME: ______________________ FIELD LOG BOOK REFERENCE NUMBER: ______________

PROJECT ADDRESS: ______________________ SAMPLED BY: ______________________

PROJECT NUMBER: ______________________ SPLIT WITH: ______________________

SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CON-TAINERS	REMARKS

Transferred by *(Signature)*		Received by *(Signature)*		Telephone
Date	Time	Title	Date	Time

FORM 3

FORM 4

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements*					
		*VOA GC/MS	*BNA GC/MS	*VOA GC	*PEST PCB	*METALS	*OTHER

* Check Appropriate Boxes

* CLP, Non-CLP (PLEASE INDICATE YEAR OF PROTOCOL)
* HSL, Priority Pollutant

FORM 5

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
B/N-A
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

FORM 6

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

ORGANIC ANALYSES

SAMPLE ID	MATRIX	ANALYTICAL PROTOCOL	EXTRACTION METHOD	AUXILARY CLEAN UP	DIL/CONC FACTOR

FORM 7

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOA
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

FORM 8

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

FORM 9

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

INORGANIC ANALYSES

SAMPLE ID	MATRIX	METALS REQUESTED	DATE RECEIVED	DATE DIGESTED	DATE ANALYZED

FORM 10

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

INORGANIC ANALYSES

LABORATORY SAMPLE CODE	MATRIX	ANALYTICAL PROTOCOL	DIGESTION PROCEDURE	MATRIX MODIFIER	DIL/CONC FACTOR

APPENDIX E

Nytest Environmental Analytical Methods

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT
NEI nytest environmental inc.

QUOTATION
#1817B

To: Roux Associates, Inc.
Attention: Mr. Paul Roux

Page: 2
Date: 5/11/89

Analytical Methods:

All analyses will be conducted in accordance with the NYSDEC Contract Laboratory Protocol dated November 1987**

Parameter	Volume Number
Volatile Organics	Vol I Part II Exhibit D
EP Toxicity plus Metals	Vol II Part VII & IX Exhibit D
Metals	Vol III Part XIV Exhibit D

** The detection limits, precision, accuracy and QA/QC will be defined by the individual methodology.

QA/QC samples (ex. MS, MSD, etc.) will be performed as part of the protocol, but they may not be performed on site specific samples (unless directed to do so by Roux Associates). If they are performed on site specific samples, they will be billed as samples.

box 1518 □ 60 seaview blvd., port washington, ny 11050 □ (516) 625-5500