HYDROGEOLOGIC INVESTIGATION AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

INVESTIGATION

OF

PRIDE SOLVENTS
78 - 88 LAMAR STREET
WEST BABYLON, NEW YORK
SUFFOLK COUNTY
NYSDEC I.D. NUMBER 152111

JULY 1993
REVISED APRIL 1994

PREPARED FOR:

BUREAU OF HAZARDOUS WASTE PROGRAMS
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
50 WOLF ROAD
ALBANY, NEW YORK 12233

PREPARED BY:
TYREE BROTHERS ENVIRONMENTAL SERVICES, INC.
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HYDROGEOLOGIC INVESTIGATION

AT

PRIDE SOLVENTS & CHEMICAL CO., INC.

78 - 88 LAMAR STREET

WEST BABYLON, NEW YORK

JULY 1993
REVISED APRIL 1994

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BOREHOLE SOIL ANALYTICAL DATA
SURFICIAL SOIL ANALYTICAL DATA
GROUNDWATER ANALYTICAL DATA

Site specific lithologic information on the lithology of the Upper Glacial aquifer was obtained during the drilling of the monitoring wells. The thickness and percentages of sand and gravel and respective stratification within the aquifer were noted.

Split spoon samples were collected at continuous intervals down through the screened zone to the total depth respective for each well. The split spoon samples were examined and logged by the H_2M field hydrogeologist. Soil boring logs were developed which indicate that the glacial deposits are primarily composed of fine to coarse grained, well graded, dense sands and fine gravel. Copies of the drill logs and As-built well diagrams are included in Appendix B.

Grain size analysis was performed on representative aquifer soil samples from the screened interval at monitoring wells. According to this data, the aquifer is verified to consist of fine to coarse grained sands and gravel. Based upon sieve analysis data, a site specific horizontal hydraulic conductivity of approximately 113.39 feet per day was calculated for the Upper Glacial aquifer. This is lower than the estimated average of 270 feet per day reported in literature. Data on the sieve analyses and calculations are included in Appendix C.

2.3 RATE AND DIRECTION OF GROUNDWATER FLOW

The original hydrogeologic investigation was conducted during a two month period (August - September 1990). A preliminary assessment of the hydraulic gradient across the site, flow direction and groundwater flow velocity was performed. An updated survey of the well casing elevations was conducted on April 15, 1993. These elevations were tied into the Babylon landfill wells and referenced to mean sea level.

The rate of groundwater flow is a function of the hydraulic gradient, hydraulic conductivity and porosity. Based upon the hydraulic conductivity, estimation of porosity and the hydraulic gradient, the localized horizontal groundwater velocity can be calculated (Appendix C).

On April 15, 1993 all five (5) wells at the Pride facility were surveyed with respect to mean sea level (USCGS Datum) and the monitoring wells at the Babylon Landfill site by Darrel J. Kost P.E., of Kost Environmental Services, Inc. The elevation of the top of the riser pipe of the wells was surveyed to the nearest 0.01 foot. The results of this survey appear in Table 2 along with the monitoring data which was collected on April 7, 1993. Using this data and the scaled site map (derived from the plot plan drafted by N. D. Eryou Ph.D., P.E.), a hydraulic gradient of 0.0017 ft./ft. was calculated for the site.

Using a literature established value for porosity of .30 (McClymonds and Franke, 1970), a velocity of 0.19 feet per day (ft/dy) or 231.17 feet per year (ft/yr) was calculated for the localized groundwater flow. Published values for groundwater flow in the Upper Glacial aquifer (Franke and Cohen, 1972 and Pluhowski and Kantrowitz, 1964) indicate a slightly higher regional velocity (270 ft/yr). The hydraulic gradient calculated between the shallow (MW-5) and deeper monitoring well (MW-3) indicates a net downward flow, at a velocity greater than that projected regionally.

Table 2
Well Survey/ Water Table Elevation Data
Data Collected
April 7 and 15, 1993
(all measurements are in feet)

WELL	CASING ELEVATION	DEPTH TO WATER	WATER TABLE ELEVATION
MW-1	57.48	8.88	48.60
MW-2	56.61	8.04	48.57
MW-3	58.69	9.67	49.02
MW-4	57.09	8.30	48.79
MW-5	58.13	9.08	49.05

The remaining soil samples from the split spoons not selected, were containerized in a 55 gallon DOT approved drum along with all excess cuttings from the installation of the boreholes. This drum (approx. one third full) was temporarily stored onsite until laboratory analysis was received and proper disposal could be arranged. Disposal documentation appears in Appendix H.

Table 4:
Borehole Soil PID Screen Summary
for laboratory sample determination
Samples collected on April 7, 1993
(all results in ppm)

	Split Spoon Depth Interval			
BORING	0-2'	2'-4'	4'-6'	6'-8'
B-1	1.7	2.4	2.1	**10.3****
B-2	2.9	9.6	**11.4**	10.7
B-3	0.0	20.6	4.6	**15*[1]**
B-4	0.0	0.0	0.0	**7.6**

NOTE: Bold face type indicates sample selected for laboratory analysis

***** **Also served as Blind Duplicate sample**

****** **Also served as MS and MSD samples**

1 This boring was located between MW-3 (deep well) and MW-5, NYSDEC personnel designated the bottom sample over the sample with the highest PID to be submitted for lab analysis

Development of the wells was completed using a Grundfos Redi-Flo2, model MP-1 submersible pump. This pump is constructed of all stainless steel with teflon and viton seals to guard against contamination. The interior and exterior of the pump and the tygon discharge hose were decontaminated in house prior to insertion into the wells, using a microwash solution. The interior of the pump and hose was rinsed by pumping fifty-five (55) gallons of potable water through it. The exterior portion of the assembly was then steam cleaned and wrapped in new visqueen in order to protect it from contaminants prior to use.

Pumping of the wells was conducted until the well yielded a clean, sand and silt-free discharge. All effluent purge water was contained in fifty-five (55) gallon, open head, DOT approved drums and temporarily stored onsite until laboratory analysis of groundwater samples were obtained and proper disposal could be arranged. Disposal documentation appears in Appendix H.

All wells on site were developed on March 31, 1993. It should be noted that a drywell in the immediate vicinity of MW-1 was noted to nearly full of standing water prior to the development of MW-1. Following the development procedures the amount of standing water in the dry well was noted to be substantially diminished. This indicates that the drywell is not draining properly and that there is a direct connection of the water that is discharged to the dry well and the groundwater that is extracted from MW-1. This should be taken into consideration when reviewing the laboratory analytical data from MW-1.

Waste waters generated during the development and sampling of the five monitoring wells was contained, as required by NYSDEC, in fifty-five (55) gallon, DOT approved drums.

These waste waters combined with the drum of drill cuttings and excess soils from the borehole samples, were temporarily stored onsite until laboratory analytical results were received and proper disposal could be arranged. These drums were removed from the site on August 26, 1993. Copies of the manifest for these drums appears in Appendix H of this report.

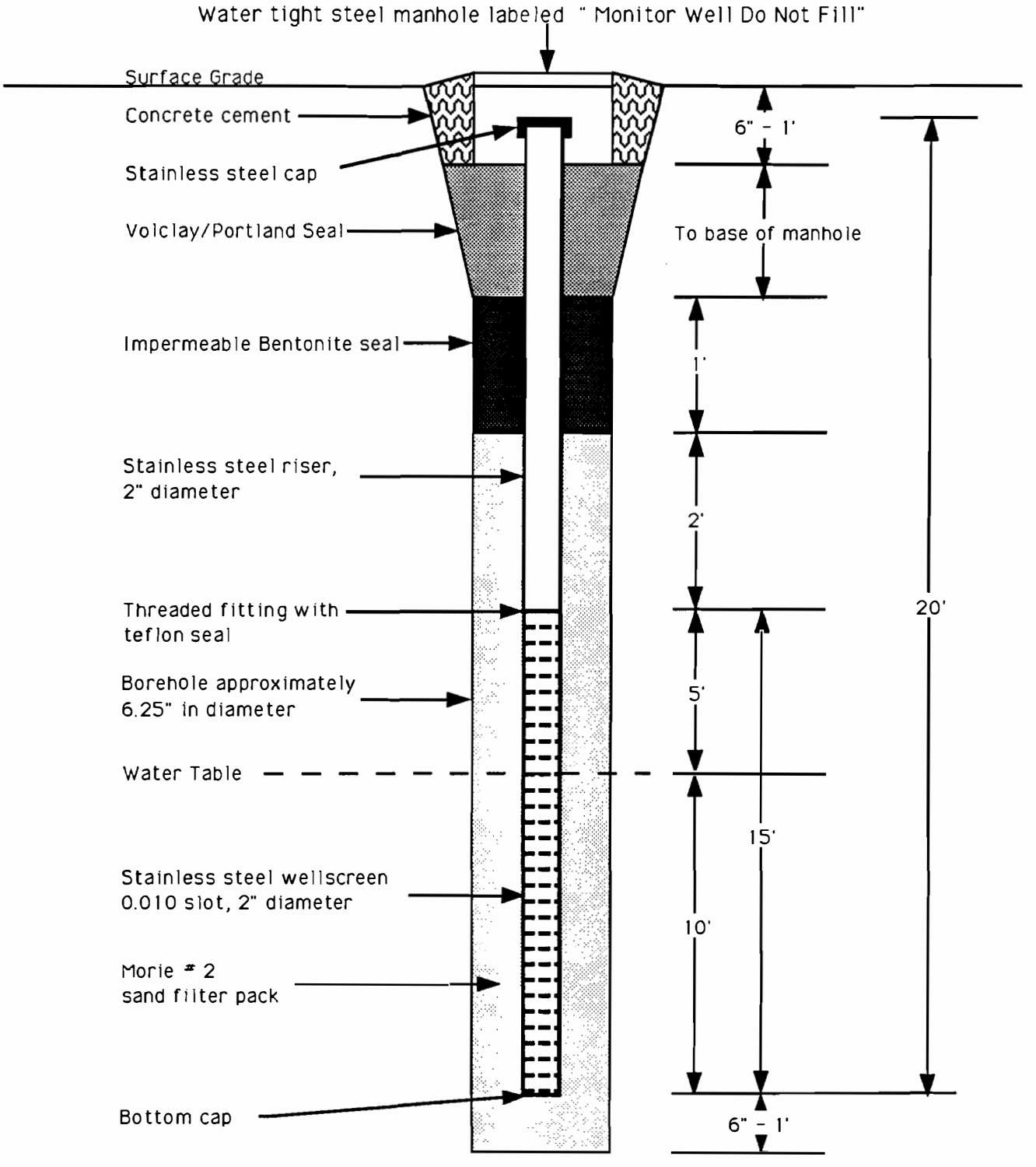
3.7 GROUNDWATER SAMPLING AND ANALYSIS

Prior to opening each manhole, a four (4) foot by four (4) foot plastic sheet was placed at grade surrounding the well. A hole was cut in the center of the sheet to allow access to the well. The well was then opened, and depth to water and total depth measurements were taken to the nearest 0.01 foot. The static well volume was calculated and multiplied by 3 to determine the minimum amount of water to be purged from the well prior to sampling. Field data sheets appear in Appendix E.

A minimum of one (1) week separated sampling activities from well development activities conducted on March 31, 1993. New, dedicated, decontaminated, stainless steel bailers with dedicated polypropylene monofilament line were used to procure groundwater samples for this investigation. A minimum of three (3) to five (5) well volumes of standing water were purged by hand from each well prior to the collection of samples. In order to expedite the field sampling and to insure that the QA/QC time restraints for the trip blanks and labware were not violated, the NYSDEC personnel onsite suggested the use of the submersible pump to purge the deep well (MW-3). The same pump assembly and procedure was used as described above in purging the required volume from this well.

A sample of the groundwater from the first bailer was placed in a clean container to measure field parameters of temperature, pH, salinity, turbidity and specific conductivity.

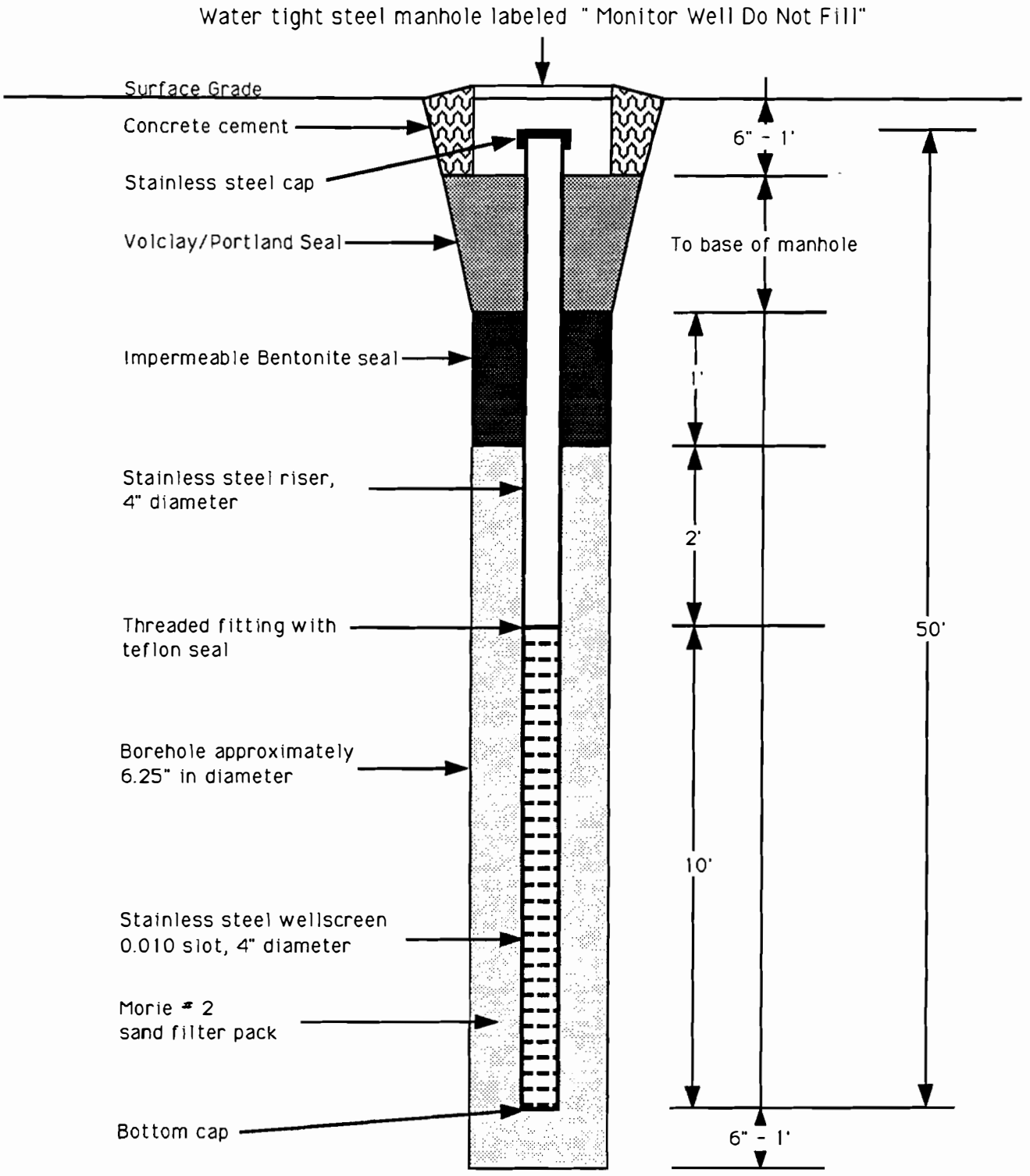
Typical Monitor Well Construction Diagram



* Based on well log information provided by H2M in their October 1991 report.

Tyree Brothers Environmental Services, Inc. 208 Route 109 Farmingdale, New York 11735	As Built Well Diagram Shallow Wells Pride Solvents 78 - 88 Lamar Street W. Babylon, NY	Drawn By: Rick Caputo Date: 4 - 26 - 94

Typical Monitor Well Construction Diagram



* Based on well log information provided by H2M in their October 1991 report.

Tyree Brothers Environmental Services, Inc. 208 Route 109 Farmingdale, New York 11735	As Built Well Diagram MW - 3 (Deep Well) Pride Solvents 78 - 88 Lamar Street W. Babylon, NY	Drawn By: Rick Caputo Date: 4 - 26 - 94

APPENDIX H

DISPOSAL MANIFEST

State of New Jersey
Department of Environmental Protection and Energy
Hazardous Waste Regulation Program
Manifest Section
CN 028, Trenton, NJ 08625-0028

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-94

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NYD05[illegible]22238 — Manifest Document No. [illegible] — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: TRIBE SOLVENTS, 88 LAMAR ST, W. BABYLON, NY 11704

4. Generator's Phone (516) 7[illegible]-0200

A. State Manifest Document Number: NJA 1773280

B. State Generator's ID: Same

5. Transporter 1 Company Name: Three Brothers Env Svcs — 6. US EPA ID Number: NYD006801243

C. State Trans. ID: NJ 17 550478

D. Transporter's Phone (516) 249-3150

7. Transporter 2 Company Name — 8. US EPA ID Number

E. State Trans. ID

F. Transporter's Phone

9. Designated Facility Name and Site Address: Si-Waste, Inc., 105 Jacobus Ave, So. Kearny, NJ. 07032 — 10. US EPA ID Number: NJD006301244

G. State Facility's ID

H. Facility's Phone 201 344-4004

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Non-Regulated Material / RCRA Non Hazardous		011	DM	00605	G	ID 72
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above: a. c. b. d.

NO ID 0708 4199105

K. Handling Codes for Wastes Listed Above: a. TC4 Blending; c.; b.; d.

15. Special Handling Instructions and Additional Information: Duke # 47577 — Emergency Contact 516-249-3150 — 01519-947 — Liquid — Manifest No. X TB # 43-242 [illegible]

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: GERALD E. NICHOLAS — Signature: [signature] — Month Day Year: 08 26 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] — Signature: [signature] — Month Day Year: 08 26 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

RECEIVED PENDING MANIFEST REVIEW & QUALITY CONTROL

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Pam Ruhrold — Signature: [signature] — Month Day Year: 08 26 93

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 1773280

APPENDIX I

CALCULATIONS

CALCULATIONS

Assume : The aquifer is isotropic and homogenious throughout

Variables :

C - Hazens coefficient
D_{10} - Effective grain size
dh - difference in head
dl - difference in length
Σ - summation
i - hydraulic gradient
K - Hydraulic conductivity
n - porosity
t - time
T - Transmissivity
v_d - darcy velocity
v_s - seepage velocity
WTE - Water Table Elevation

Formulas :

$i = dh/dl$
$v_d = Ki$
$v_s = v_d / n$
$K = C\ (D_{10})^2$

Given :

C = 100 / cm. sec.

Conversion factors :

60 seconds per minute
60 minutes per hour
24 hours per day
365 days per year
0.3937 inches per centimeter
12 inches per foot
millimeters (mm) x 0.1 = centimenters (cm)

Using the sieve size analysis provided in Appendix C for the four (4) samples collected, the D_{10} of each sample is found from the graphs. It is that diameter which corresponds to the grain size percent finer than that of the 2mm sized sieve.

Sample	Approx. D_{10}
MW - 1	0.17 mm
MW - 2	0.15 mm
B - 3	0.20 mm
MW - 4	0.30 mm
ΣD_{10}	0.82 mm

Average $D_{10} = \Sigma D_{10} / 4$

$= 0.82$ mm / 4

$= 0.20$ mm

$= (0.20$ mm$)(0.1$ cm / mm$)$

$\boxed{D_{10} = 0.02 \text{ cm}}$

Using Hazens equation and given value for the hazen constant to calculate the site hydraulic conductivity;

$K = C\ (D_{10})^2$

$= (100$ cm / sec$)\ (0.02$ cm$)^2$

$= (100$ cm / sec$)\ (0.0004$ cm$)$

$K = 0.04$ cm / sec

$= (0.04$ cm / sec$)(0.3937$ in / cm$)(60$ sec / 1 min$)(1$ft / 12 in$)$

$K = 0.078$ ft / min

$= (0.078$ ft / min$)(60$ min / 1 hr$)(24$ hr / day$)$

$\boxed{K = 113.39 \text{ ft / day}}$

CALCULATIONS

Using the measurements from the scaled site plan derived from a plot plan drafted by N.D. Eryou Ph.D, P.E. (Figure 6), survey data collected by Darrel J. Kost, P.E. of Kost Environmental Engineering and monitoring data collected and presented in the July 1993 report, the hydraulic gradient can be calculated by $i = dh / dl$. To more accurately calculate this, the values from wells which are screened at the same depths and lie most parrallel to the flow direction of the groundwater beneath the site should be used. These wells would be MW - 5 and MW - 1.

dh = (WTE; MW - 5) - (WTE; MW - 1)

= (49.05 ft) - (48.60 ft)

dh = 0.45 ft

From Figure 6 (July 1993 report);

dl between MW - 5 and MW - 1

dl = 270 ft

$i = dh / dl$

$= 0.45 \text{ ft} / 270 \text{ ft}$

$i = 0.0017$ ft / ft

The darcy velocity assumes that flow occurs through the entire crossection of the material without regard to solids and pores. In actuality, the flow is limited to only the pore space. The darcy velocity divided by the porosity of the soils will provide the seepage velocity of the water through the interstitial spaces. A literature established value of the effective porosity of the type soils found at this location is 0.30. Therefore;

$v_d = K i$

= (113.39 ft / day) (0.0017 ft / ft)

$v_d = 0.19$ ft / day

$v_s = v_d / n$

= (0.19 ft / day) / (0.30)

$v_s = 0.63$ ft / day

= (0.63 ft / day) (365 day / yr)

$v_s = 231.17$ ft / yr

Note: If the literature established value for K = 270 ft / day is used as in the original H2M report, then;

$v_d = K i$

= (270 ft / day) (0.0017 ft / ft)

$v_d = 0.46$ ft / day

$v_s = v_d / n$

= (0.46 ft / day) / (0.30)

$v_s = 1.53$ ft / day

= (1.53 ft / day) (365 day / yr)

$v_s = 559.67$ ft / yr

CALCULATION REFERENCES

Driscoll, F. G., 1986, Groundwater and Wells, sec.ed., Johnson Filtration Systems Inc., pgs. 62, 81 - 85.

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Peck, Hanson, and Thornburn, 1974, Foundation Engineering, sec.ed., John Wiley & Sons, pg. 13.

Pierce, Vesilind, and Weiner, 1988, Environmental Engineering, sec.ed., Butterworth-Heinerman, pgs. 84 - 86.

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Tyree
Environmental
Technologies

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Tyree Environmental Technologies

HYDROGEOLOGIC INVESTIGATION
AT
PRIDE SOLVENTS & CHEMICAL CO. INC.
78 - 88 LAMAR STREET
WEST BABYLON, NEW YORK

EXECUTIVE SUMMARY

A preliminary hydrogeologic investigation was conducted by Holzmacher, McLendon and Murrell, P.C. (H_2M) during July - August 1991 for Pride Solvents & Chemical Co., Inc. (Pride) at their facility located in West Babylon, New York. Further investigation was conducted in April 1993 by Tyree Brothers Environmental Services (Tyree). This hydrogeologic investigation was conducted to comply with the requirements of the Corrective Action Program and Module III of Pride's RCRA Part B Permit. It was implemented in accordance with a Hydrogeologic Investigation Work Plan approved by New York State Department of Environmental Conservation (NYSDEC) Bureau of Hazardous Waste Facility Management, Division of Hazardous Substances Regulation.

The H_2M report of October 1991 was utilized as the basis for this report. The deficiencies in the original report and responses to the NYDEC's comments have been incorporated within this text. It should be noted that groundwater, surficial soil, and borehole soil samples were recollected under supervision of NYSDEC personnel on April 7, 1993. While historical reference may be made in regards to the original 1991 sampling event and soil gas survey, the conclusions and opinions rendered herein will be based on the most recent sampling data available.

The hydrogeologic investigation was directed at providing a preliminary site characterization with a determination of groundwater flow direction, groundwater quality and an examination of possible soil contamination. Another objective was to establish a groundwater monitoring network and protocol for monitoring groundwater at the site so as to be able to identify the impact of chemical releases to the groundwater in the unlikely event that such releases should occur. This characterization included the installation of five (5) monitoring wells and the performance of a soil gas survey (August 1991) with subsequent soil sampling and analysis.

A detailed presentation of the hydrogeologic investigation with conclusions and recommendations is presented herein.

Tyree Environmental Technologies

HYDROGEOLOGIC INVESTIGATION
AT
PRIDE SOLVENTS & CHEMICAL CO. INC.
78 - 88 LAMAR STREET
WEST BABYLON, NEW YORK

JULY 1993

1.0 INTRODUCTION

The hydrogeologic investigation was directed at providing a preliminary site characterization with a determination of groundwater flow direction, groundwater quality and an examination of possible soil contamination. Another objective was to establish a groundwater monitoring network and protocol for monitoring groundwater at the site so as to be able to identify the impact of chemical releases to the groundwater in the unlikely event that such releases should occur. This characterization included the installation of five (5) monitoring wells and the performance of a soil gas survey (August 1991) with subsequent soil sampling and analysis.

A hydrogeologic investigation was conducted by Holzmacher, McLendon and Murrell, P.C. (H_2M) during July - August 1991 and subsequently revised by Tyree Brothers Environmental Services (Tyree) in April - July 1993, for Pride Solvents & Chemical Co., Inc. (Pride) at their facility located in West Babylon, New York.

This hydrogeologic investigation was conducted to comply with the requirements of the Corrective Action Program and Module III of Pride's RCRA Part B Permit. It was implemented in accordance with a revised Work Plan dated November 1989 and Addendum document dated May 13, 1991. The work plan and addendum were approved by New York State Department of Environmental Conservation (NYSDEC) Bureau of Hazardous Waste Facility Management, Division of Hazardous Substances Regulation on May 30, 1991.

1.1 SITE DESCRIPTION AND BACKGROUND

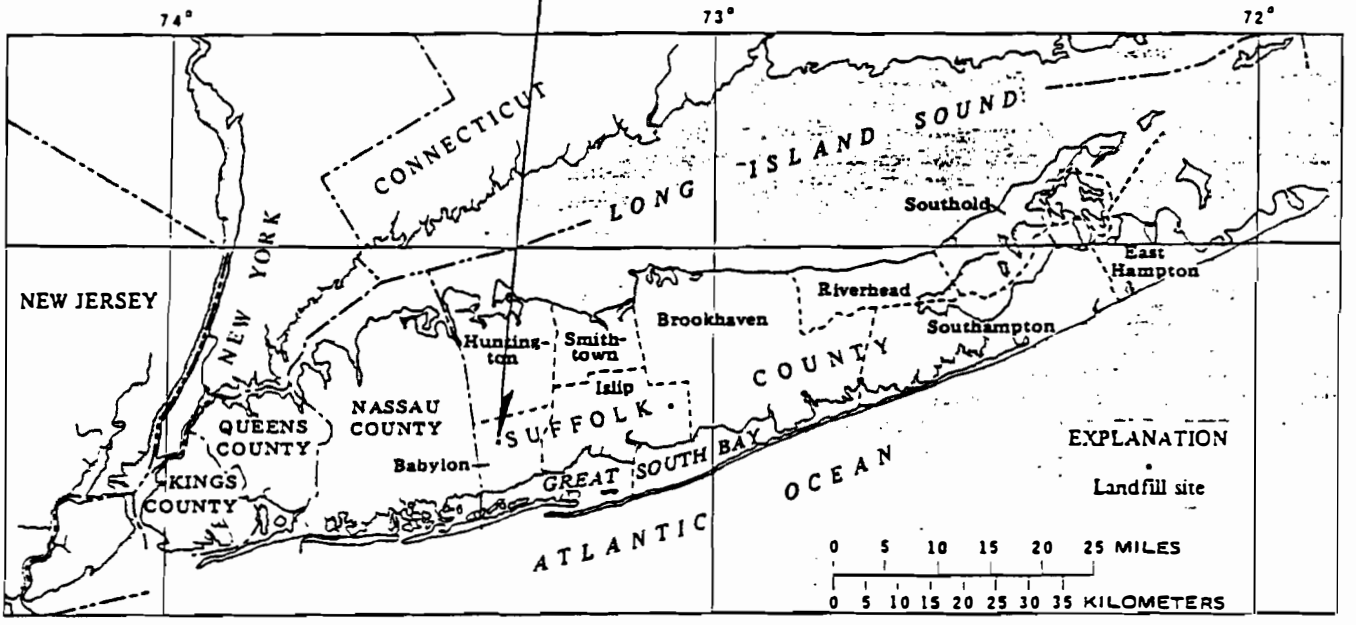
The Pride Solvents & Chemical Co., Inc. site is located in southwestern Suffolk County, approximately three miles east of the Nassau County border as seen in Figure 1. The site is located at 78-88 Lamar Street in West Babylon, New York as shown in Figure 2 and is approximately 1.3 acres in size. It has been occupied by the current owner since 1973.

The facility operates as a chemical and solvent distribution and solvent reclamation facility. It is currently regulated as a hazardous waste treatment, storage and disposal facility under a Resource Conservation and Recovery Act (RCRA) Part B Permit (EPA ID No. NYD 057722258). Historically, the facility underwent extensive modifications in accordance with construction plans approved by Suffolk County Department of Health Services (SCDHS) to ensure overall compliance with Article XII of the Suffolk County Sanitary Code. The finished facility was inspected by SCDHS and approved for operation on April 12, 1982. The facility is equipped to receive and store waste chlorinated and fluorinated solvents, then reclaim the material by a distillation process. A listing of organic solvents historically distributed and drum inventories are included in Appendix A. A description of the two different operations at the facility are given below.

78 LAMAR STREET

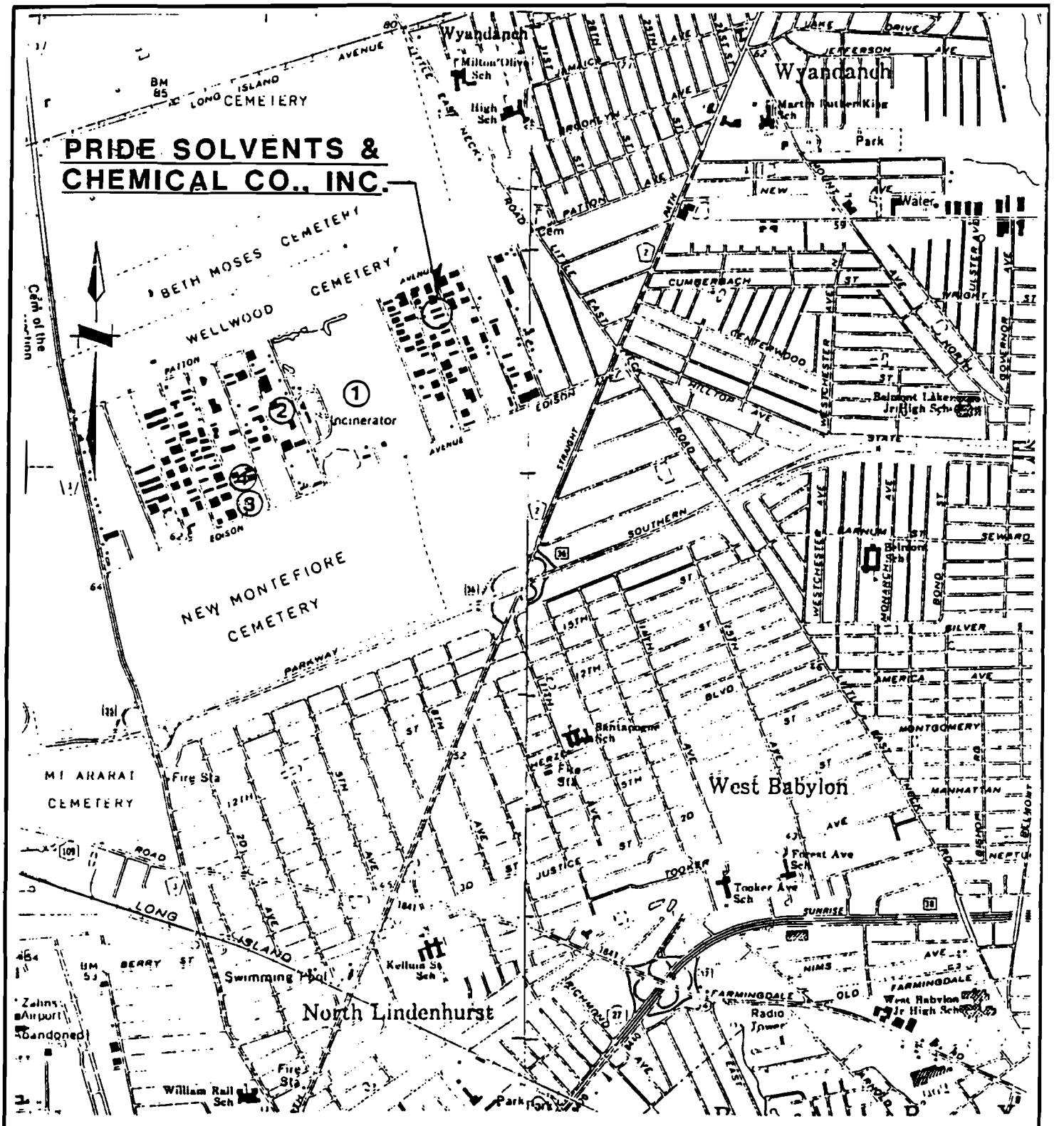
The operations at the 78 Lamar Street facility include the reclamation of chlorinated and fluorinated solvents by distillation. The reclamation area is approximately 3,300 square feet (sf) utilized primarily for drum storage with 800 sf involved in the actual reclamation and distillation process.

PRIDE SOLVENTS & CHEMICAL CO., INC.



SITE & LOCATION MAP

FIGURE 2



NYSDEC INACTIVE HAZARDOUS WASTE SITES

① BABYLON LANDFILL
② U.S. ELECTROPLATING
③ SPECTRUM FINISHING
④ NTU CIRCUITS

LOCATION MAP

SCALE: 1"=2000'

H2MGROUP
ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. FAIRFIELD, N.J.

Pride receives chlorinated solvent wastes and freons exclusively in 55-gallon drums. The wastes are stored indoors within a spill containment area which consists of an epoxy coated concrete bermed warehouse. No bulk shipment of waste solvents are accepted. Waste solvents are accepted only from customers who purchase virgin solvent products from Pride Solvents.

The 78 Lamar Street facility currently has three above ground distillation storage tanks which are used to store product for a limited time before being pumped into drums for storage and eventual shipping.

88 LAMAR STREET

Operations at the 88 Lamar Street facility are limited to bulk storage, drum packaging and distribution of non-flammable, flammable and combustible organic solvents. Prior to January 1991, the 88 Lamar Street facility contained sixteen (16) underground storage tanks.

All but four (4) of the underground tanks were removed by Tyree during December 17, 1990 to December 25, 1990 under the oversight of SCDHS representative Peter Schrammel. None of the tanks were visually observed as leaking. The scrap tank material and related appurtenances were transported and disposed of at Gershow Recycling in Medford, New York. The excavated areas were backfilled with clean fill with the permission of SCDHS. The four (4) remaining tanks were abandoned in-place by filling with concrete, as they were located under buildings.

1.2 SURROUNDING PROPERTIES

The Pride site is located within an industrial park known as the West Babylon Industrial Area which also includes some residential housing.

Numerous manufacturing and commercial facilities surround the site. These include a distribution and trucking company, photographic facility, printing operation and an industrial and office warehousing company.

The entire West Babylon Industrial area has been classified as an NYSDEC Class 2 inactive hazardous waste site. There are four (4) other NYSDEC listed inactive hazardous waste sites within a one-quarter mile radius of the Pride site as reported in the NYSDEC Division of Solid and Hazardous Waste April 1991 Annual Summary Report. These include the Babylon Landfill, U.S. Electroplating Corporation, NTU Circuits and Spectrum Finishing Corporation. The location of these sites relative to the Pride site is depicted in Figure 2. None of these sites appear to be hydraulically upgradient to the subject site.

On the basis of the history of the surrounding area, there are significant off-site sources of contamination that may have contributed to the regional degradation of groundwater quality that is known to exist in the vicinity of the Pride site. The Babylon Landfill is located approximately 500 feet to the west of the site with cemeteries located to the north and the southwest. Another cemetery is located approximately one mile to the west. This landfill has been extensively investigated and is documented as a source of groundwater contamination. Groundwater quality samples from monitoring wells in the vicinity of the landfill report contamination in the Glacial aquifer by increased concentrations of ammonia, nitrate, calcium, sodium, sulfate and chlorides (Kimmel and Braids, 1980).

These constituents are characteristic of leachate which typically emanate from a landfill. The contaminant plume from the landfill however, is not completely characteristic of the plume under the Pride site.

Additionally, NYSDEC has on record numerous chemical and petroleum spills reported in the West Babylon Industrial area. This record of spills, the close proximity of the landfill, along with numerous other commercial/industrial operations in such close proximity to the Pride facility provide a high potential for off-site contamination to effect the groundwater quality in the vicinity of the Pride facility. A further discussion of the degradation of groundwater quality surrounding the Pride site is presented in Section 2.4.

2.0 HYDROGEOLOGY

2.1 TOPOGRAPHY AND LOCATION

The Pride facility is located within the glacial outwash plain. The topography of the facility and surrounding area is nearly level with the exception of the nearby Babylon Landfill, which rises to more than 50 feet above the surrounding properties. The average on-site elevation is approximately 60 feet above mean sea level. Slopes on the site are less than 3 percent. Due to development, the majority of the area surrounding the Pride facility is paved and surface runoff is via storm water drywells. There are several surface water bodies within the near vicinity of the site. Santapoque Creek is the nearest down slope surface water body located approximately 1.7 miles to the southeast. Other surface water bodies within a three mile radius include Carlls River and Belmont Lake to the east and Elda Lake and Southards Pond to the southeast.

2.2 REGIONAL AND LOCAL HYDROGEOLOGY

This section provides an overview of the regional hydrogeology within Suffolk County as it relates to the Pride facility and vicinity. Primary information sources were the Comprehensive Public Water Supply Study prepared for Suffolk County in 1970 and the Suffolk County Comprehensive Water Resources Management Plan prepared in 1987.

REGIONAL HYDROGEOLOGY

A summary of stratigraphy and hydrogeologic units present within Suffolk County is provided in Table 1. A regional north-south geologic cross section for Western Suffolk County is presented in Figure 3. Suffolk County's groundwater resources are comprised of thick deposits of unconsolidated water bearing sediments resting on a relatively impermeable crystalline bedrock surface. These unconsolidated deposits range in depth in Suffolk County from approximately 600 feet in the northern portion to about 2,000 feet beneath the barrier islands. These deposits range in age from Cretaceous to Quaternary and rest unconformably upon the southeast sloping surface of crystalline bedrock. The unconsolidated deposits are broken down into four distinct stratigraphic units. Table 1 briefly describes the major characteristics and water-bearing properties of these units.

The bedrock is composed of a complex of igneous and metamorphic rocks. The surface of the bedrock is projected at a depth of 1500 feet below grade striking east-northeast with a slope to the southeast at about 50 to 80 feet per mile. The bedrock is relatively impermeable and thus marks the lower limit of the groundwater reservoir.

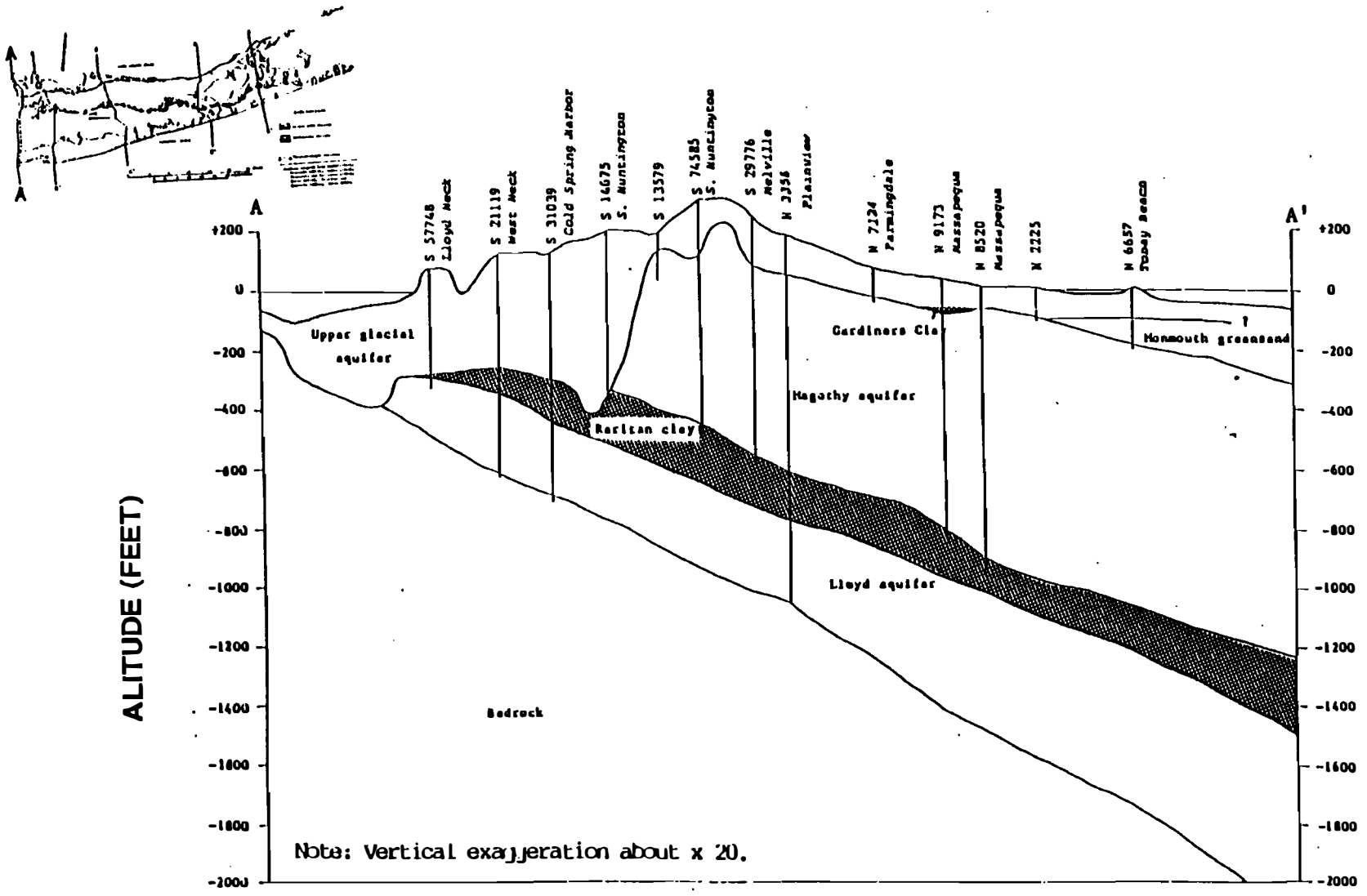
The Lloyd sand member of the Raritan formation lies nonconformably above the weathered bedrock surface and consists of fine to coarse sand and gravel interspersed with some thin layers of silt and clay. Beneath the Pride facility, the Lloyd sand member is moderately permeable, ranging from 150 to 300 feet thick and is known as the Lloyd or deep confined aquifer. This aquifer does not at present contribute significantly to the public water supply in the area.

The Raritan clay lies directly on top of the Lloyd sand member. This unit consists of clay and silt with interbedded layers of sand.

SUFFOLK COUNTY STRATIGRAPHY AND HYDROGEOLOGIC UNITS

System	Series	Geologic unit	Hydrogeologic unit	Thickness (feet)	Geologic Description
Quaternary	present Holocene 12,000 yrs	Recent shore, beach, and salt-marsh deposits	Upper glacial aquifer	0-50	Sand, gravel, clay, silt, organic mud, peat, loam, and shells. Colors: gray, brown, green, black, and yellow. Recent artificial-fill deposits of gravel, sand, clay, and rubbish.
	Pleistocene	Moraine deposits Glaciofluvial deposits Smithtown clay (informal usage)		0-700	Till composed of clay, sand, gravel and boulders; forms Harbor Hill and Ronkonkoma terminal moraines. Outwash deposits consist of quartzose sand, fine to very coarse, and gravel, pebble to boulder sized. Glaciolacustrine deposits (Smithtown clay) consist of silt, clay, and some sand and gravel layers. Colors are mainly gray, brown, and yellow. Contains shells and plant remains generally in finer grained beds.
		Unconformity			
		Gardiners Clay	Gardiners Clay	0-75	Marine deposits of clay and silt with some interbedded sand and gravel. Color, greenish-gray and gray. Foraminifera and lignite present, and also locally glauconite.
		Unconformity			
		post-Cretaceous(?) deposits	Upper glacial aquifer	0-140	Sand, fine to coarse. Color is brown. Identified as a distinct unit only on South Fork to date.
	200,000 yrs	Unconformity			
Cretaceous	60 mil yrs Upper Cretaceous	Monmouth Group	Monmouth greensand	0-700	Interbedded marine deposits of clay, silt, and sand. Color, dark greenish-gray to black. Contains much glauconite and lignite.
		Unconformity			
		Magothy Formation – Matawan Group undifferentiated	Magothy aquifer	0-1000	Sand, fine to coarse, clayey in part; interbedded with lenses and layers of light- to dark-gray clay. Basal 100-200 feet is generally composed of coarse sand and gravel beds. Sand and gravel are quartzose. Lignite and pyrite are common. Colors are gray, white, red, brown, and yellow.
		Discontinuity?			
		Raritan Formation — clay member	Raritan confing unit	0-250	Clay, solid and silty; few lenses and layers of sand; little gravel. Lignite and pyrite common. Colors are gray, red, and white, commonly variegated.
		Discontinuity			
		Raritan Formation — Lloyd Sand Member	Lloyd aquifer	0-250	Sand, fine to coarse, and gravel with intercalated beds and lenses of light- to dark-gray clay, silt, clayey and silty sand and some lignite and pyrite. Locally has gradational contact with overlying Raritan clay. Colors are yellow, gray, and white; clay is red locally.
	100 mil yrs	Unconformity			
Early Paleozoic to Precambrian(?)	400 mil yrs >550 mil yrs (?)	Bedrock	Bedrock	not known	Crystalline metamorphic and igneous rocks: muscovite-biotite schist, gneiss, and granite. Surface of bedrock is commonly highly weathered to a greenish-white residual clay.

6A



GEOLOGIC CROSS SECTION OF LONG ISLAND

FIGURE 3

The Raritan clay is relatively impermeable and, therefore, forms an effective aquiclude between the Lloyd sand and the overlying Magothy formation. The top of the Raritan clay lies approximately 800 feet below the surface of the site and it ranges in thickness from 170 to 300 feet.

The Magothy formation lies unconformably above the Raritan clay and consists of sand with silt, clay and some gravel. The upper portion of the Magothy commonly includes interbedded clay, fine to medium sand, silt and some lignite, whereas the lower portion is largely coarse sand, gravel and some clay.

The Magothy formation ranges from moderately to highly permeable and wells screened in this formation contribute significantly to the public water supplies in the area. Generally, the lower portions of this aquifer are more highly permeable and confined conditions prevail. The top of the Magothy lies about 100 feet below the surface of the site and its thickness is estimated at 600 to 700 feet. Overlying the Magothy is the Gardiners Clay Unit which is relatively impermeable.

This clay unit ranges in thickness in the area from 7 to 13 feet and acts as a barrier to vertical movement of water due to its low hydraulic conductivity (Kimmel and Braids, 1980).

The unconsolidated glacial deposits lie unconformably above the Gardiners Clay and comprise the surface deposits in this area. The glacial deposits range from 85 to 100 feet in thickness in the vicinity of the Pride facility. The saturated thickness of the deposits underlying the project site is reported to be approximately 74 feet thick at the adjacent Babylon Landfill.

This material was deposited from glacial meltwater and consists of moderately sorted to well sorted, fine to coarse sand with some gravel.

The glacial deposits underlying the site and vicinity have a high hydraulic conductivity. Water in the Glacial aquifer beneath the study area is unconfined and occurs at a depth to water from eight (8) to ten (10) feet below the ground surface in the study area. A regional groundwater hydraulic gradient of 8 feet per mile (Kimmel and Braids, 1980) has been reported with groundwater flow in a southeasterly direction.

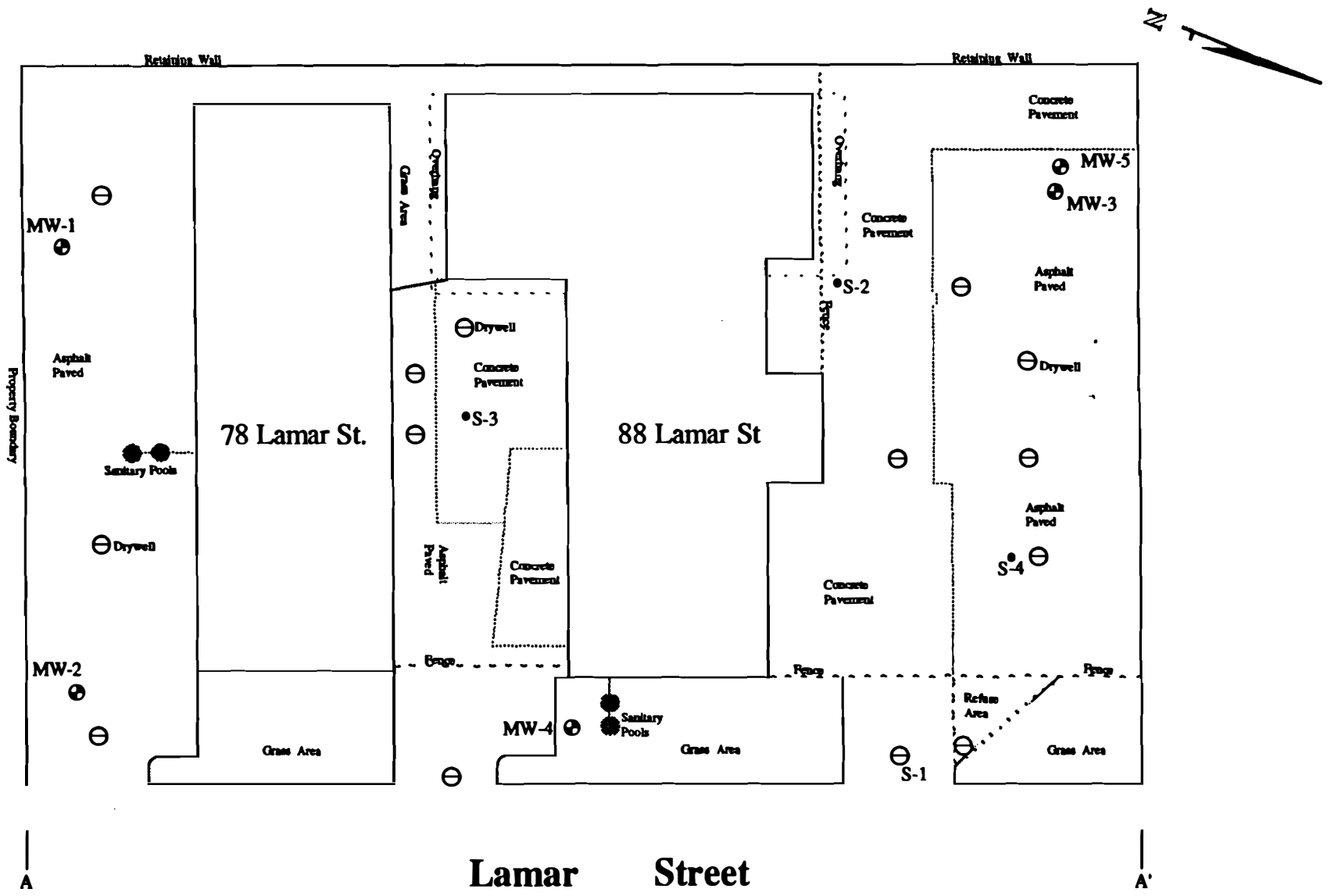
According to Geological Survey Professional Paper 627-E," Water Transmitting Properties of Aquifers on Long Island, New York", the average regional hydraulic conductivity of the Upper Glacial aquifer is approximately 2,000 gallons per day per square foot (gpd/sf) and the transmissivity is in excess of 200,000 gpd/ft.

LOCAL HYDROGEOLOGY

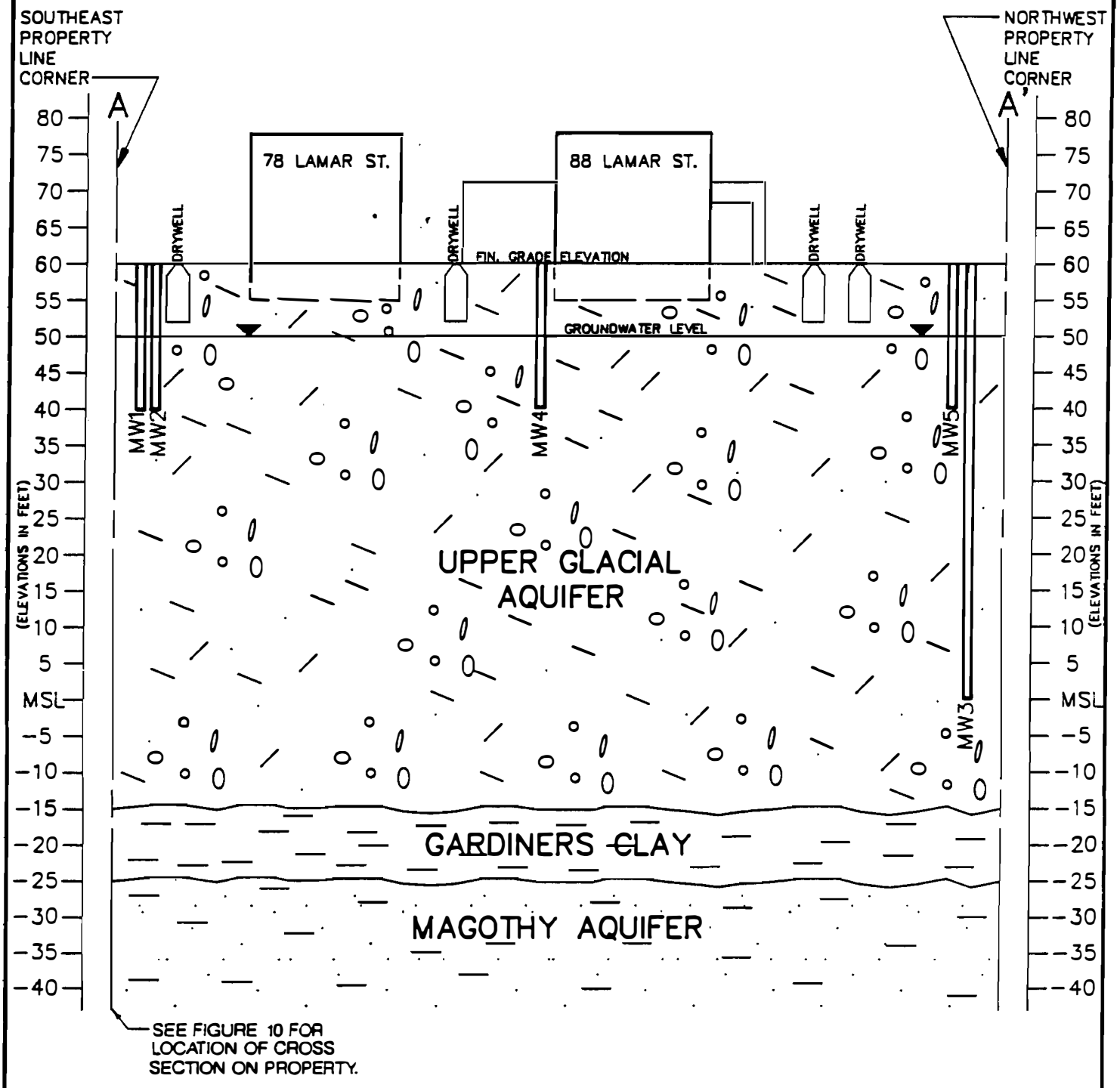
The area comprising the Pride facility is underlain by glacial deposits consisting primarily of fine to coarse grained sands with fine gravel. Depth to groundwater ranged from approximately eight (8) to ten (10) feet below grade across the site.

During the 1991 hydrogeologic investigation, five (5) monitoring wells were installed into the Upper Glacial aquifer in locations shown in Figure 4. The relationship of the buildings, drywells and monitoring wells at the facility and the underlying hydrogeology are schematically depicted in Figure 5.

Four of the five wells were installed as shallow water table wells, completed with a screened interval approximately ten (10) feet into the water table and five (5) feet above. A fifth monitoring well (MW-3) was completed as a deeper couplet to MW-5 with a ten foot screen (40' - 50').



Tyree Brothers **Environmental Services, Inc.** 208 Route 109 Farmingdale, New York 11735	**Figure 4 : Site Map** PRIDE SOLVENTS 78 - 88 Lamar Street W. Babylon, New York	Drawn By: Rick Caputo Date: 5 - 28 - 93 Scale: 1" = 40'



PRIDE SOLVENTS & CHEMICAL Co., Inc.

GENERALIZED GEOLOGIC CROSS-SECTION

OCTOBER 24, 1991

SCALES:
HORIZ. 1" = 50'
VERT. 1" = 10'

H2MGROUP ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y. TOTOWA, N.J.

OCT. 1991

PRID-91-0[illegible]

PRIDXSEC.DWG

Site specific lithologic information on the lithology of the Upper Glacial aquifer was obtained during the drilling of the monitoring wells. The thickness and percentages of sand and gravel and respective stratification within the aquifer were noted.

Split spoon samples were collected at continuous intervals down through the screened zone to the total depth respective for each well. The split spoon samples were examined and logged by the H_2M field hydrogeologist. Soil boring logs were developed which indicate that the glacial deposits are primarily composed of fine to coarse grained, well graded, dense sands and fine gravel. Copies of the drill logs are included in Appendix B.

Grain size analysis was performed on representative aquifer soil samples from the screened interval at monitoring wells. According to this data, the aquifer is verified to consist of fine to coarse grained sands and gravel. Based upon sieve analysis data, a net horizontal, and vertical hydraulic conductivity of approximately 270 feet per day was estimated for the Upper Glacial aquifer. This is within the range of 27 to 270 feet per day for the vertical and horizontal components, respectively, of hydraulic conductivity reported in literature. Data on the sieve analyses are included in Appendix C.

2.3 RATE AND DIRECTION OF GROUNDWATER FLOW

The original hydrogeologic investigation was conducted during a two month period (August - September 1990). A preliminary assessment of the hydraulic gradient across the site, flow direction and groundwater flow velocity was performed. An updated survey of the well casing elevations was conducted on April 15, 1993. These elevations were tied into the Babylon landfill wells and referenced to mean sea level.

The rate of groundwater flow is a function of the hydraulic gradient, hydraulic conductivity and porosity. Based upon an average hydraulic conductivity of 270 feet/day and an estimation of porosity and hydraulic gradient, the localized horizontal groundwater velocity can be calculated.

On April 15, 1993 all five (5) wells at the Pride facility were surveyed with respect to mean sea level (USCGS Datum) and the monitoring wells at the Babylon Landfill site by Darrel J. Kost P.E., of Kost Environmental Services, Inc. The elevation of the top of the riser pipe of the wells was surveyed to the nearest 0.01 foot. The results of this survey appear in Table 2 along with the monitoring data which was collected on April 7, 1993. An average hydraulic gradient of 0.001 ft./ft. was calculated using this data.

Using a literature established value for porosity of .30 (McClymonds and Franke, 1970), a velocity of 0.9 feet per day (ft/dy) or 328.5 feet per year (ft/yr) was calculated for the localized groundwater flow. Published values for groundwater flow in the Upper Glacial aquifer (Franke and Cohen, 1972 and Pluhowski and Kantrowitz, 1964) indicate a lower regional velocity. The hydraulic gradient calculated between the shallow (MW-5) and deeper monitoring well (MW-3) indicates a net downward flow, at a velocity greater than that projected regionally.

Table 2
Well Survey/ Water Table Elevation Data
Data Collected
April 7 and 15, 1993
(all measurements are in feet)

WELL	CASING ELEVATION	DEPTH TO WATER	WATER TABLE ELEVATION
MW-1	57.48	8.88	48.60
MW-2	56.61	8.04	48.57
MW-3	58.69	9.67	49.02
MW-4	57.09	8.30	48.79
MW-5	58.13	9.08	49.05

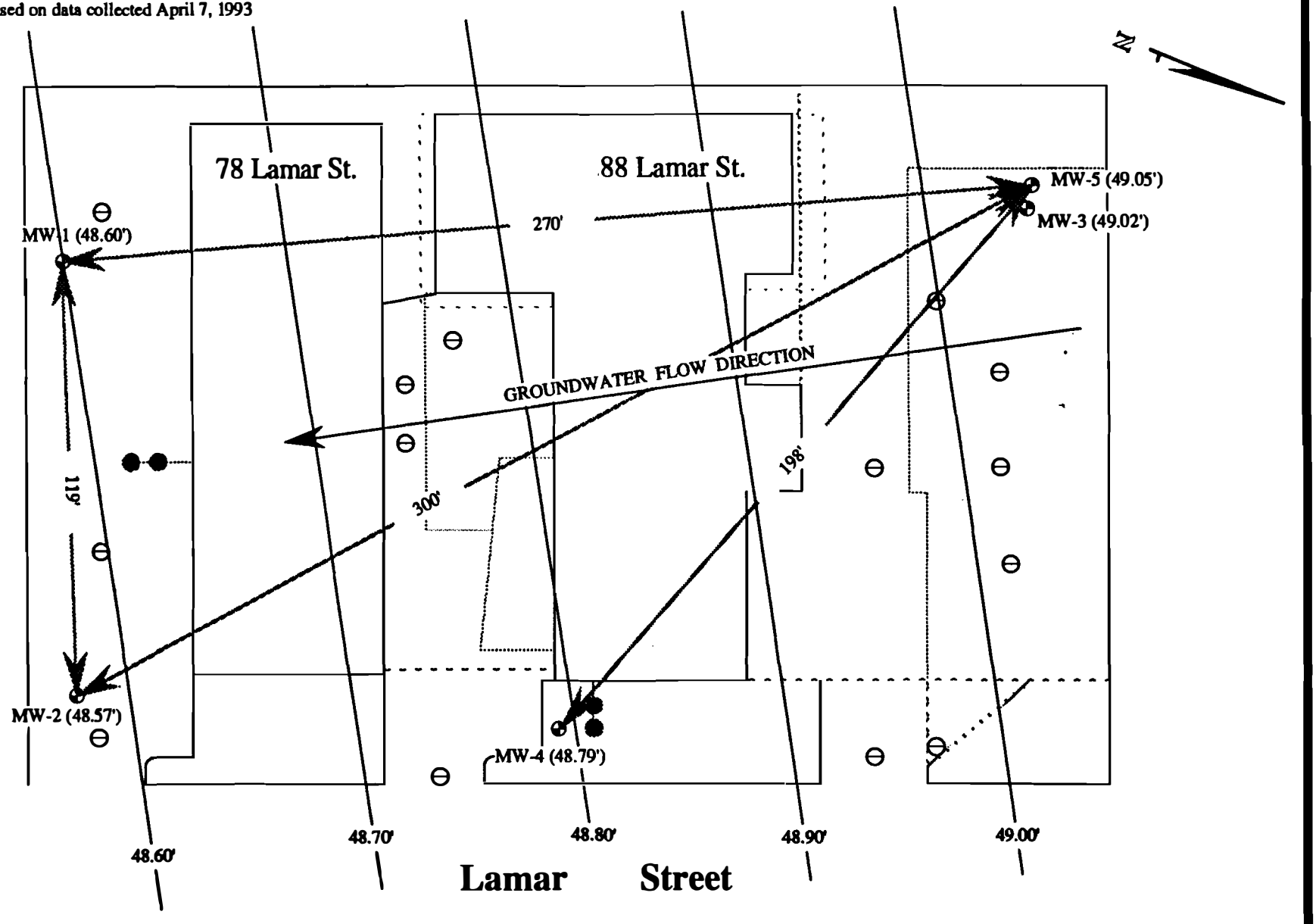
A hydraulic gradient map illustrating localized groundwater flow direction was developed and is presented as Figure 6. Within the study area, groundwater flow direction is predominantly towards the south-southeast. This is consistent with the southeasterly flow direction projected by the regional groundwater flow information.

2.4 GROUNDWATER QUALITY AND PUBLIC SUPPLY WELLS

As part of a previous assessment of water quality in the deep Glacial and the upper Magothy aquifers, data from public water supply wells in the area were obtained from the Suffolk County Department of Health Services (SCDHS). The data indicates that the Glacial aquifer is not a reliable source of good quality drinking water in the area due to two distinct groundwater contaminant plumes. One contaminant plume consisting of leachate contaminated groundwater emanating from the Babylon Landfill has been delineated by the United States Geological Survey. The other contaminant plume consists of organic chemical contamination which occurs downgradient of the industrial area located to the east of the landfill which encompasses the Pride site (SCDHS, 1973).

Groundwater quality studies of the Babylon Landfill area have been conducted and groundwater quality is still currently being examined. Groundwater quality samples obtained from monitoring wells in the vicinity of this site report contamination in the Glacial aquifer by increased concentrations of ammonia, nitrate, calcium, sodium, sulfate and chlorides (Kimmel and Braids, 1980). These constituents are characteristic of leachate emanating from a landfill.

* NOTE: Based on data collected April 7, 1993



Tyree Brothers
Environmental Services, Inc.
208 Route 109
Farmingdale, New York 11735

Figure 6 : Hydraulic Gradient Map

PRIDE SOLVENTS
78 - 88 Lamar Street
W. Babylon, New York

Drawn By: Rick Caputo
Date: 5 - 28 - 93
Scale: 1" = 40'

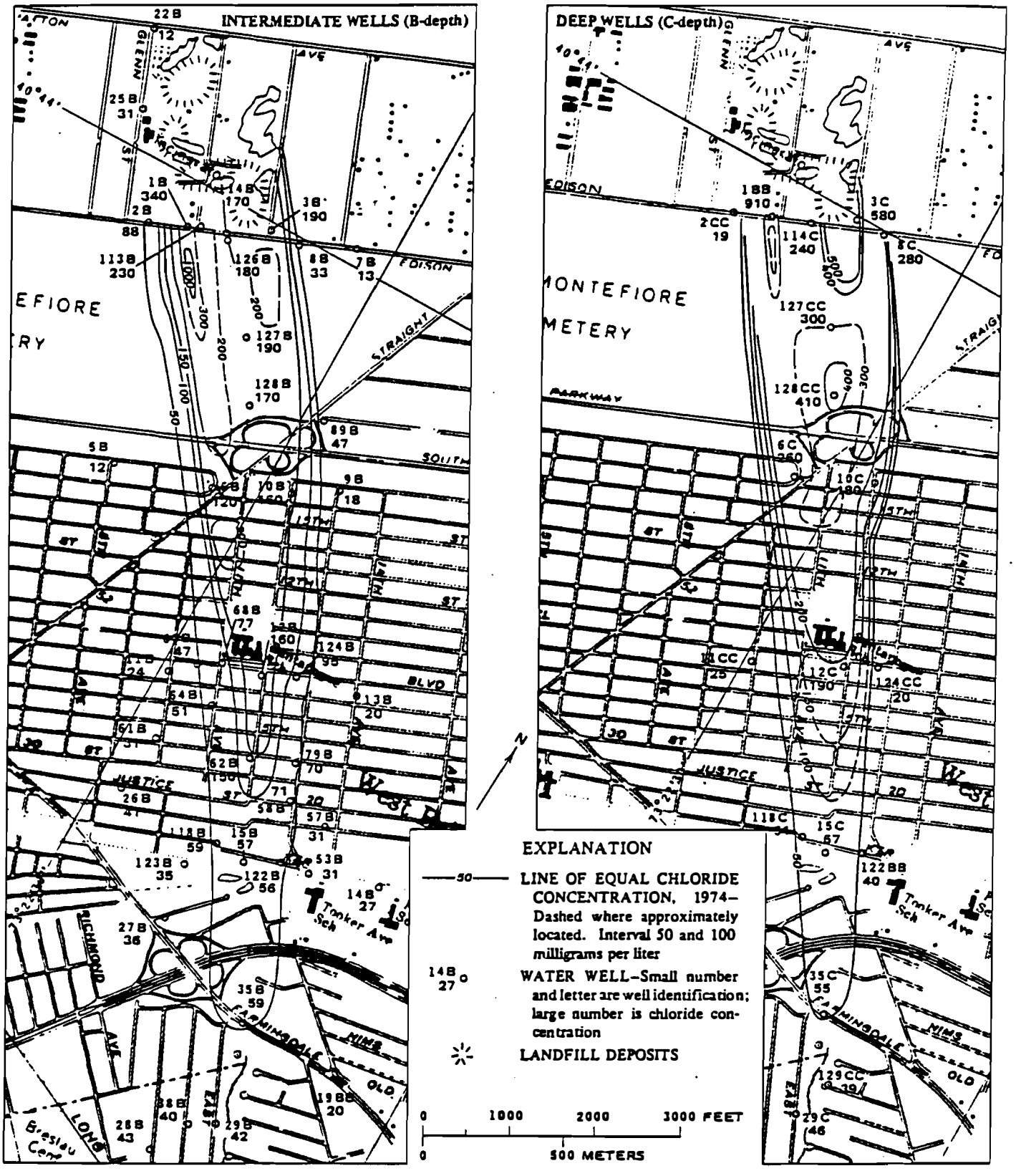
A plume of leachate contaminated groundwater emanating southeast from the Babylon Landfill was delineated by the United States Geological Survey (USGS) by concentrations of specific conductance which can be related to presence of leachate. Specific conductance ranges between 1,000 and 2,000 micromhos (umhos) in the plume; values between 200 and 400 umhos have been reported in wells outside the boundary of the plume in the vicinity of the site (Kimmel and Braids, 1980). Chloride concentrations have also been mapped and are shown in Figure 7.

During 1982 and 1983, the Water Resource Bureau of SCDHS also performed an investigation in this area. This investigation identified an extensive plume of organic chemical contamination downgradient of the industrialized area located to the east of the landfill which encompasses the Pride Solvents' site (SCDHS, 1983) as shown in Figure 8. The Water Resources Bureau' s study, which included the installation of 32 profile monitoring wells indicated the following:

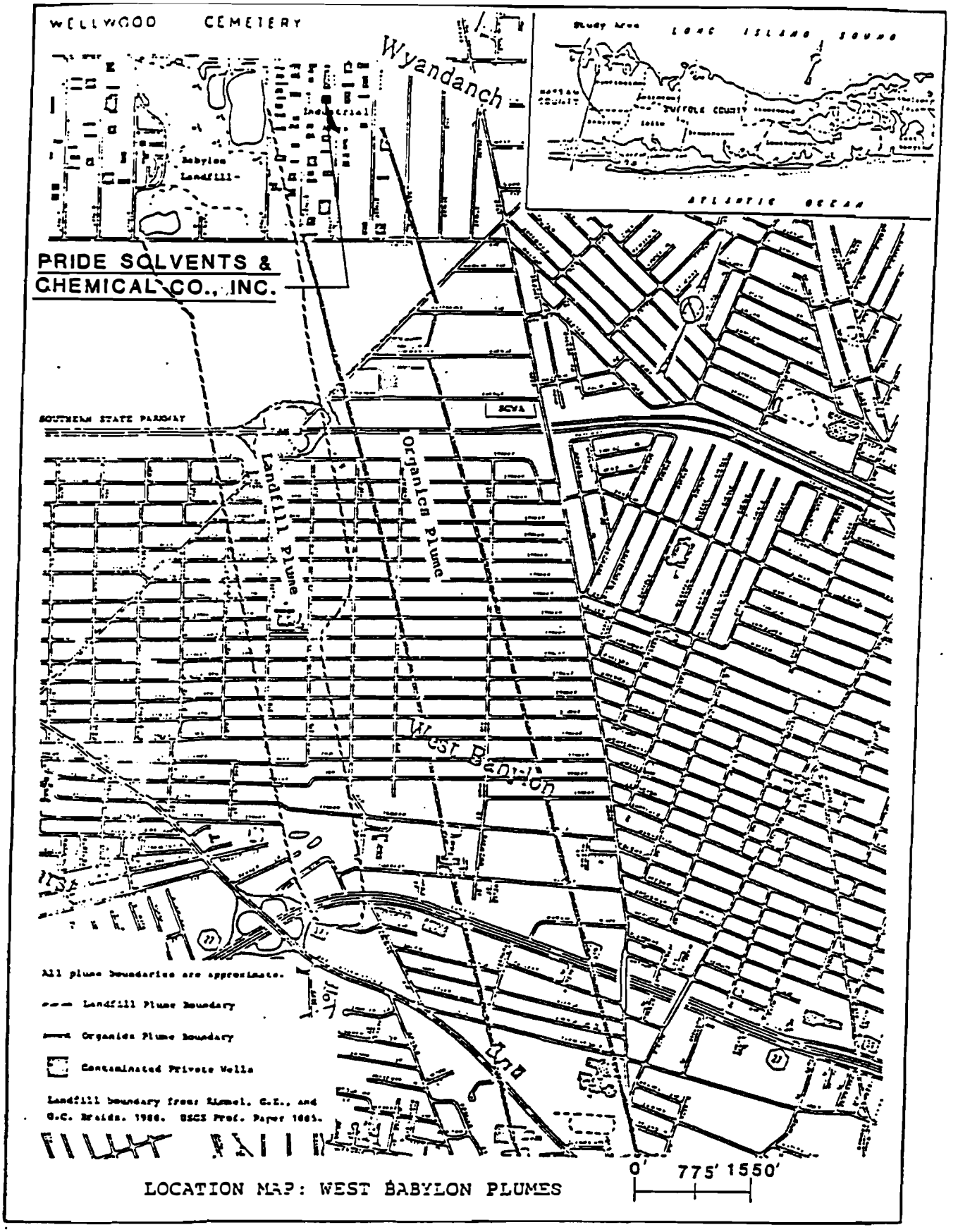
- The plume extends 2 to 3 miles downgradient to the southeast which implies that the organic chemical release occurred during a time period of 15 to 22 years ago.
- Multiple sources are implied due to the width of the plume.
- Highest concentrations are presently located along Gordon Avenue and the Southern State Parkway.

The Suffolk County Water Authority (SCWA) Well Field on Gordon Avenue has not been affected and has no apparent influence on the plume. The plume of contaminated groundwater extends at least 30 to 60 feet below the water table in most locations. The contaminated groundwater contains various industrial solvents, in particular, tetrachloroethylene, trichloroethene, trichloroethane and their breakdown byproducts, chloroform, methylene chloride, freon, and soluble components of gasoline (benzenes, toluenes and xylenes).

LEACHATE PLUMES IN GROUND WATER, BABYLON AND ISLIP LANDFILLS, LONG ISLAND, NEW YORK



-Chloride concentrations in ground water in vicinity of Babylon landfill plume.



LOCATION MAP: WEST BABYLON PLUMES

Available data on public supply wells within a three mile radius of the Pride site has been compiled are attached in Appendix D. Supply wells within a 3 mile radius of the Pride Solvent facility are used primarily for public water supply, industrial use and irrigation. The nearest supply well is approximately 800 feet away from the site. Most of the shallow upper Glacial wells have been abandoned due to the poor groundwater quality present in the shallow aquifer, as described previously.

3.0 HYDROGEOLOGIC INVESTIGATION

As required in the hydrogeologic investigation work plan, a soil gas survey was conducted at the Pride facility to select locations to conduct surficial soil sampling. Surficial soil samples were to be collected at four locations in order to assist in identifying the nature and probable extent of any surficial soil contamination, if present, as well as areas of any documented spills and in the vicinity of the container and drum storage areas. Five (5) monitoring wells were also installed to determine the quality of the groundwater aquifer underlying the site.

3.1 SOIL GAS SURVEY AND SURFICIAL SOIL SAMPLING

To identify surficial areas most likely to possess contamination, a soil gas survey was conducted across the site. A 40 foot on center reference grid was marked out over the study area as indicated on Figure 9.

Soil gas probing was also conducted where spills and other potential source areas were noted during the data collection phase. Soil gas was measured at various locations by drilling a hole using an electric drill through paved areas or inserting a rod directly in unpaved areas to a depth of approximately two (2) feet.

TABLE 3

PRIDE SOLVENTS

SOIL GAS SURVEY LOCATIONS WITH CORRESPONDING OVA AND HNu RESPONSES

AUGUST 1 AND 2, 1991

SOIL GAS LOCATIONS	OVA RESPONSE	HNu RESPONSE	SOIL GAS LOCATIONS	OVA RESPONSE	HNu RESPONSE
1	10	0.2	25	2	1.8
2	180	13.0	26	0	0
3	84	1.5	27	0	1.4
4	30	1.2	28	12.0	1.0
5	0	0	29	25.0	19.5
6	0	4	30	3.0	11.0
7	NA	NA	31	50.0	2.0
8	48	12.5	32	1.5	0
9	10.5	0	33	10.0	4.8
10	205	1.5	34	2.6	0.2
11	150	0	35	0.2	0
12	48	0	36	6.0	0
13	NA	NA	37	2.0	0.2
14	25	106.0	38	1.4	0
15	60	4.0	39	2.0	1.0
16	170	3.5	40	0.5	0
17	10	4.5	41	0.8	0
18	0	0.8	42	1.6	0
19	20	25	43	25.0	2.0
20	0.5	1.0	44	11.0	0
21	0	0.2	45	20.0	1.2
22	9.2	22.5	46	30.0	1.2
23	92	25	47	5.2	1.0
24	1.5	0			

NOTES

Background on both OVA and HNu = 0 ppm
OVA and HNu responses in ppm equivalent
NA - Soil gas point not collected

After the rod was removed, a probe was inserted and an air sample was aspirated using a 11.7 eV HNu photoionization detector (PID) and a OVA Foxboro flame ionization detector (FID) operated in the Gas Chromatograph survey mode. Instrument responses were noted which provided soil gas measurements in parts per million (ppm). A total of 47 probe locations were sampled during the soil gas survey program.

A tabulation of the results of soil gas survey are provided in Table 3. The locations of three of the four soil samples to be collected were identified prior to the conductance of the soil gas survey, by Douglas Nevel of NYSDEC.

Soil sample locations S1, S-2 and S-3 were selected based upon historic data on the site that related to previous spills that had occurred at the Pride facility. The fourth soil sampling location (S-4) was selected during the soil gas survey at the location of the maximum FID response. The NYSDEC representative, Edward Blackmer, concurred with the selection of this sample location.

Locations of elevated soil gas readings were at probe points 2, 3, 8, 10, 11, 14, 16, 23, and 31. The well couplet (MW-3 and MW-5) are in close proximity to soil gas probe points 2 and 8. Predetermined sample location S-2 was in proximity to probe point 14. Sample S-4 was centrally located near probe points 10, 11 and 16. S-3 was located by probe point 23, and MW-4 is upgradient of and in proximity to probe point 31. Based upon the aforementioned information, it is believed that NYSDEC and H_2M personnel determined a tightening of the grid pattern around the areas of elevated readings would not be necessary.

Dedicated, decontaminated, stainless steel trowels and bucket augers were used to collect the surficial soil samples in unpaved areas.

In paved areas, the surficial soil samples were collected by using a decontaminated, stainless steel split spoon assembly. Each surficial soil soil sample was collected from an approximate depth of 18-inches below the surface. Decontamination procedures utilized are detailed in Section 3.9.

These soil samples as well as all other samples collected during the April 7, 1993 sampling event, were submitted for laboratory analysis to International Technologies Corp., for Target Compounds List (TCL) volatiles, TCL semivolatiles and TCL metals as per the current statement of work (SOW 3/90). This laboratory was specified and preapproved by the NYSDEC for use on this project.

Data deliverables are equivalent to NYSDEC analytical services protocols (ASP) category B. The quality assurance/quality control (QA/QC) samples submitted included matrix spike (MS), matrix spike duplicate (MSD), blind duplicate, field and trip blanks for each sample matrix (soil/water).

All field blank vials were filled by pouring laboratory prepared distilled/deionized water over the field decontaminated equipment following sampling and collecting the runoff in the appropriate laboratory supplied vials. The trip blank samples accompanied all analytical glassware back and forth from the laboratory and the field. Copies of field sampling records and analytical summary sheets are attached in Appendix E.

3.2 SOIL SAMPLING AT MONITORING WELL LOCATIONS

Split spoon samples were recollected from within 18" of the monitoring well boreholes. Soil samples were obtained using the "Standard Method for Penetration Testing and Split-Barrel Sampling of Soils" (ASTM D1586-67).

Split spoon samples were obtained at two (2) foot intervals (continuously) throughout the installation of the borings. Since MW-5 and MW-3 are in such close proximity, split spoon samples were collected midway between the two wells (B-3). The NYSDEC personnel onsite agreed with this decision. The monitoring well boreholes were originally installed and classified by the onsite geologist during the 1991 preliminary assessment. Detailed boring logs were developed and appear in Appendix B.

All of the split spoon soil samples were opened with minimal disturbance. Two (2) samples from each spoon retrieved were immediately containerized with no headspace and placed on ice. A third representative sample from each split spoon was collected for field analysis for the presence of total volatile organic vapors. Samples for field analysis were collected and sealed in appropriate containers covered with aluminum foil, leaving a headspace of approximately one-third.

The sample container was agitated and allowed to sit in order for any trapped vapors within the soil to volatilize into the headspace in the sample container. Upon completion of each borehole the headspace was then screened with a Microtip HL2000 PID equipped with an 11.7 eV bulb. The responses noted during the field screening appears in Table 4.

The sample exhibiting the highest PID reading, or the bottom sample just above the water table, if all readings were negligible, was chosen to be submitted for laboratory analysis. On this basis, one soil sample was selected, and split with NYSDEC, for laboratory analysis from each of the borings. The soil samples were submitted for the same suite of analyses as the surficial soil samples.

The remaining soil samples from the split spoons not selected, were containerized in a 55 gallon DOT approved drum along with all excess cuttings from the installation of the boreholes. This drum was temporarily stored onsite until laboratory analysis was received and proper disposal could be arranged.

Table 4:
Borehole Soil PID Screen Summary
for laboratory sample determination
Samples collected on April 7, 1993
(all results in ppm)

	Split Spoon Depth Interval			
BORING	0-2'	2'-4'	4'-6'	6'-8'
B-1	1.7	2.4	2.1	**10.3****
B-2	2.9	9.6	**11.4**	10.7
B-3	0.0	20.6	4.6	**15*1**
B-4	0.0	0.0	0.0	**7.6**

NOTE: Bold face type indicates sample selected for laboratory analysis

***** **Also served as Blind Duplicate sample**

****** **Also served as MS and MSD samples**

1 This boring was located between MW-3 (deep well) and MW-5, NYSDEC personnel designated the bottom sample over the sample with the highest PID to be submitted for lab analysis

3.3 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

MONITORING WELL INSTALLATION

Five (5) monitoring wells were installed in 1991 at the locations shown in Figure 4. The upgradient monitoring wells (MW-3 and MW-5) are located at the northwestern corner of Pride's 88 Lamar Street building. The two primary downgradient wells are spaced approximately 119 feet apart along the southern property line. A fifth monitoring well was located in the mid line of the property, located to the east of the 88 Lamar Street facility.

The monitoring wells were constructed in accordance with the U.S. EPA Technical Enforcement Guidance Document dated September, 1986. The shallow water table wells were completed as two (2) inch I.D. Schedule 40 threaded stainless steel 304 riser with fifteen (15) feet of No. 10 slot stainless steel screen, screened five (5) feet above and ten (10) feet below the water table interface.

The deeper well (MW-3) was completed with four (4) inch I.D. Schedule 40 threaded stainless steel 304 riser with ten (10) feet of No. 10 slot stainless steel screen, from forty to fifty (40-50) feet below grade. A hollow stem auger rig operated by Tyree Environmental, a licensed monitoring well driller, was subcontracted by Pride to install the monitoring wells.

At all of the monitoring wells, the threaded joints were sealed using teflon tape. The annular space around the well screens were filled with a No. 2 grade sand pack extending from six (6) inches below the bottom of the screen to a height of two (2) feet above the top of screen.

A two (2) foot bentonite seal was placed above the sand pack. The depth to the bottom and top of each seal was measured in the borehole to the nearest tenth (0.1) of a foot using a weighted tape. The remainder of the annular borehole space was grouted to the surface using a bentonite/portland cement slurry mix. The monitoring wells were finished at grade and further sealed from surface runoff with an eight (8) inch diameter cast iron manhole with a bolt down cover, cemented in place with a one and one-half foot square pad.

3.4 HYDRAULIC CONDUCTIVITY TESTING

A slug test was performed at the deep monitoring well (MW-3) located upgradient at the Pride site according to the Bouwer and Rice method. A 4-inch I.D. PVC cylinder with a known volume was inserted in the well and the initial rise and subsequent decline in water levels were noted. During the slug test conducted on August 16, 1991, the rate of rise and subsequent decline back to equilibrium conditions was faster than the ability to monitor the water level change, indicating essentially instantaneous recovery.

The anticipated hydraulic conductivity as determined from regional studies and grain size data is consistent with a slug test that would have instantaneous recovery of water levels. On this basis, sufficient data is available to allow for an estimation of aquifer characteristics.

3.5 LNAPL and DNAPL Sampling

Prior to the first groundwater sampling round conducted on August 16, 1991, a specialized sampling program was performed to determine if Light Non-Aqueous Phase Liquids (LNAPLs) and Dense Non-Aqueous Phase Liquids (DNAPLs) were present at the monitoring well locations.

Typical LNAPLs are a floating product such as gasoline or oil. For this sampling procedure, a dedicated, laboratory decontaminated, transparent, polyethylene bailer was carefully lowered into the monitoring well just below the groundwater interface in the screened zone.

This sample was then brought up to the surface and visually examined for the presence of floating product (LNAPLs). None of the monitoring wells exhibited the presence of floating product.

A similar examination was performed for DNAPLs at each of the monitoring wells. A typical DNAPL is a dense solvent such as tetrachloroethene. A point source bailer (decontaminated between each well) was used to collect a sample of groundwater from the bottom of the well. The point source bailer is capable of collecting a discrete sample from any interval in the screened zone. None of the monitoring wells exhibited the presence of DNAPL. Similarly, on April 7, 1993, prior to sampling, the sonic interface probe was used to accomplish this same task and again, no presence was detected.

3.6 DEVELOPMENT AND PURGE WASTEWATER AND DRILL CUTTINGS

WELL DEVELOPMENT

All of the wells onsite were first monitored and then developed on March 31, 1993. Monitoring of the wells for depth to water (DTW), total depth (TD) and for the presence of any liquid phase hydrocarbons (LPH) was completed using a sonic interface probe. This probe was decontaminated prior to use and between each well using a microwash solution followed by a rinse with laboratory grade methanol and subsequently rinsed with distilled water. The depth to water was measured to the nearest 0.01 foot with respect to the top of the well casing.

Development of the wells was completed using a Grundfos Redi-Flo2, model MP-1 submersible pump. This pump is constructed of all stainless steel with teflon and viton seals to guard against contamination. The interior and exterior of the pump and the tygon discharge hose were decontaminated in house prior to insertion into the wells, using a microwash solution. The interior of the pump and hose was rinsed by pumping fifty-five (55) gallons of potable water through it. The exterior portion of the assembly was then steam cleaned and wrapped in new visqueen in order to protect it from contaminants prior to use.

Pumping of the wells was conducted until the well yielded a clean, sand and silt-free discharge. All effluent purge water was contained in fifty-five (55) gallon, open head, DOT approved drums and temporarily stored onsite until laboratory analysis of groundwater samples were obtained and proper disposal could be arranged.

All wells on site were developed on March 31, 1993. It should be noted that a drywell in the immediate vicinity of MW-1 was noted to nearly full of standing water prior to the development of MW-1. Following the development procedures the amount of standing water in the dry well was noted to be substantially diminished. This indicates that the drywell is not draining properly and that there is a direct connection of the water that is discharged to the dry well and the groundwater that is extracted from MW-1. This should be taken into consideration when reviewing the laboratory analytical data from MW-1.

Waste waters generated during the development and sampling of the five monitoring wells was contained, as required by NYSDEC, in fifty-five (55) gallon, DOT approved drums.

These waste waters were temporarily stored onsite until laboratory analytical results were received and proper disposal could be arranged. One (1) drum of drill cuttings and excess soils from the borehole samples was also generated. This drum of cuttings was also temporarily stored onsite until laboratory analytical results were received and proper disposal could be arranged.

3.7 GROUNDWATER SAMPLING AND ANALYSIS

Prior to opening each manhole, a four (4) foot by four (4) foot plastic sheet was placed at grade surrounding the well. A hole was cut in the center of the sheet to allow access to the well. The well was then opened, and depth to water and total depth measurements were taken to the nearest 0.01 foot. The static well volume was calculated and multiplied by 3 to determine the minimum amount of water to be purged from the well prior to sampling. Field data sheets appear in Appendix E.

A minimum of one (1) week separated sampling activities from well development activities conducted on March 31, 1993. New, dedicated, decontaminated, stainless steel bailers with dedicated polypropylene monofilament line were used to procure groundwater samples for this investigation. A minimum of three (3) to five (5) well volumes of standing water were purged by hand from each well prior to the collection of samples. In order to expedite the field sampling and to insure that the QA/QC time restraints for the trip blanks and labware were not violated, the NYSDEC personnel onsite suggested the use of the submersible pump to purge the deep well (MW-3). The same pump assembly and procedure was used as described above in purging the required volume from this well.

A sample of the groundwater from the first bailer was placed in a clean container to measure field parameters of temperature, pH, salinity, turbidity and specific conductivity.

These measurements were collected using a Horiba U-10 water quality meter which was calibrated according to manufacturers standards prior to use in the field. Calibration certification and the specifications on this meter appear in Appendix F. These readings were also collected following each well volume purged and after sampling each well. These field parameters are presented in Table 5.

Table 5
Water Quality Data - April 7, 1993

Well	Sample Taken	Temperature (°C)	pH	Salinity (%)	Conductivity (mS/cm)	Turbidity (NTU)
MW-1	Prepurge	10.4	6.63	0.01	.477	34
	1st vol.	10.2	6.56	0.01	.476	60
	2nd vol.	10.1	6.77	0.01	.470	78
	3rd vol.	10.2	6.76	0.01	.463	67
	Post Sample	10.1	6.95	0.01	.461	37
MW-2	Prepurge	10.4	6.06	0.0	.174	95
	1st vol.	10.2	5.49	0.0	.180	397
	2nd vol.	10.4	5.30	0.0	.155	731
	3rd vol.	10.4	5.34	0.0	.148	>999
	Post Sample	10.3	5.86	0.0	.179	547
MW-3	Prepurge	12.3	5.47	0.0	.163	3
	1st vol.	11.9	5.22	0.0	.162	1
	2nd vol.	11.9	5.42	0.0	.159	1
	3rd vol.	12.1	5.45	0.0	.158	1
	Post Sample	11.1	5.61	0.0	.158	8
MW-4	Prepurge	8.9	5.88	0.0	.149	255
	1st vol.	9.0	6.04	0.0	.160	>999
	2nd vol.	9.0	6.09	0.0	.165	>999
	3rd vol.	8.9	6.28	0.0	.159	>999
	Post Sample	8.8	6.23	0.0	.152	>999
MW-5	Prepurge	9.8	5.84	0.02	.585	140
	1st vol.	9.8	5.92	0.02	.640	379
	2nd vol.	9.9	5.94	0.02	.643	444
	3rd vol.	9.9	5.98	0.02	.643	529
	Post Sample	10.2	6.07	0.02	.617	295

It should be noted that wells MW-2, MW-4 and MW-5 exhibited readings of turbidity of 95, 255, and 140 NTU's respectively, prior to the onset of purging activities.

Following the purging of three well volumes, it was determined that the conditions beneath the site at these locations would not allow for the turbidity to be brought below 50 NTU with out generating an inordinant amount of waste water.

This obsevation was noted by the NYSDEC representatives onsite and they agreed that these wells could be sampled based on the stability of the other readings and to be able to complete the sampling in a timely and cost efficient manner.

3.8 GEOPHYSICAL LOGGING

As specified in the approved work plan for the hydrogeologic investigation, borehole geophysics were performed by H_2M in 1991, at the deeper monitoring well (MW-3). Borehole geophysics consisted of gamma, resistivity and self-potential logging for the entire depth of the borehole. The purpose of the borehole log was to evaluate the subsurface hydrogeology at the site. The log indicated that the subsurface hydrogeology primarily consists of sand and gravel with the absence of fine grained clay layers with the resistivity characteristics of a fresh water aquifer. A copy of the borehole log is included in Appendix G.

3.9 DECONTAMINATION PROCEDURES

The drilling rig and drilling equipment were decontaminated prior to mobilization and drilling with the use of a steam cleaner. Split spoon sampling equipment was decontaminated prior to use and between sampling locations using procedures described below:

* **Steam clean**
* **Scrub with a brush and microwash**
* **Distilled/deionized water rinse**
* **Thourough rinse with laboratory grade methanol**
* **Scrub with a brush and microwash**
* **Distilled/deionized water rinse**
* **Thourough rinse with laboratory grade methanol**
* **Total air dry**

This proceedure was preapproved by NYSDEC personnel before the scheduling of any field work for this investigation.

4.0 LABORATORY ANALYSIS

4.1 BOREHOLE SOIL SAMPLES

The samples from the soil borings were submitted for laboratory analysis for TCL Volatile Organics, TCL Semivolatiles and TCL Metal compounds. The borings were placed within eighteen (18) inches of the original well boreholes. The locations of the boreholes was reviewed and approved by onsite NYSDEC personnel prior to the onset of drilling activities.

Soil samples were collected from the subsurface intervals indicated on Table 4, which represent either the location of the highest PID reading as determined from the field screening or the bottom sample obtained from just above the water table if low or no readings were observed on the PID. Laboratory analysis of the soil samples from the boreholes did quantify the presence of volatile organic compounds and semivolatile compounds. Tabulations of the compounds quantified and their concentrations are provided in Tables 6 through 13.

4.2 SURFICIAL SOIL SAMPLES

The four surficial soil samples collected were submitted for laboratory analysis for TCL Volatile Organics and TCL Semivolatiles and TCL Metals. Volatile organic and semivolatile organic compounds quantified in the soil samples are summarized in Tables 14 through 17. Elevated concentrations of semivolatile compounds were also quantified.

4.3 GROUNDWATER DATA

During the sampling conducted on April 7, 1993, groundwater samples were obtained and analyzed for TCL Volatile Organics, TCL Semivolatiles Compounds and TCL Metals. Tabulations of the compounds quantified and their concentrations are provided in Tables 18 through 25. Copies of the complete analytical data package are included as a separate attachment.

Table 6:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
B-1 (6'-8')					
VOA's					
Methylene Chloride	Z2211	98	1.0	BJ	4
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1266	342	33.3	J	120
Di-n-octyl phthalate	N1266	342	33.3	BJ	52
Metals					CONCENTRATION (ppm)
Aluminum	F30406601D	806	-	*	924
Chromium	F30406601D	806	-	-	3.3
Iron	F30406601D	806	-	*	2450
Lead	F30406601D	806	-	N*	1.2
Manganese	F30406601D	806	-	-	278
Zinc	F30406601D	806	-	-	6.9

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 7:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
B-2 (4'-6')					
VOA's					
Methylene Chloride	Z2214	106	1.0	BJ	4
1,1,1 Trichloroethane	Z2214	106	1.0	J	5
Tetrachloroethene	Z2214	106	1.0	-	17
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1267	364	33.3	BJ	76
Di-n-octyl phthalate	N1267	364	33.3	J	78
Metals					CONCENTRATION (ppm)
Aluminum	F30406604D	807	-	*	3460
Calcium	F30406604D	807	-	-	3900
Chromium	F30406604D	807	-	-	4.5
Iron	F30406604D	807	-	*	4040
Lead	F30406604D	807	-	N	6.1
Magnesium	F30406604D	807	-	-	2150
Manganese	F30406604D	807	-	N*	65.2
Zinc	F30406604D	807	-	-	11.2

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 8:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
B-3 (6'-8')					
VOA's					
Methylene Chloride	Z2215	116	1.0	BJ	9
Tetrachloroethene	Z2215	116	1.0	J	4
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1268	393	32.9	J	250
Di-n-octyl phthalate	N1268	393	32.9	BJ	73
Metals					CONCENTRATION (ppm)
Aluminum	F30406605D	808	-	*	2190
Calcium	F30406605D	808	-	-	2100
Chromium	F30406605D	808	-	-	3.7
Iron	F30406605D	808	-	*	4730
Lead	F30406605D	808	-	N	3.2
Magnesium	F30406605D	808	-	-	1420
Manganese	F30406605D	808	-	N*	90.9
Zinc	F30406605D	808	-	-	9.4

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 9:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
Blind Duplicate (B-3) (6'-8')					
VOA's					
Methylene Chloride	Z2217	134	1.0	BJ	10
Tetrachloroethene	Z2217	134	1.0		85
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1270	455	33	J	77
Di-n-octyl phthalate	N1270	455	33	BJ	48
Metals					CONCENTRATION (ppm)
Aluminum	F30406607D	810	-	*	1930
Calcium	F30406607D	810	-	-	20300
Chromium	F30406607D	810	-	-	4.1
Iron	F30406607D	810	-	*	5520
Lead	F30406607D	810	-	N	4.6
Magnesium	F30406607D	810	-	-	9660
Manganese	F30406607D	810	-	N*	92.5
Zinc	F30406607D	810	-	-	7.3

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 10:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
B-4 (6'-8')					
VOA's					
Methylene Chloride	Z2228	125	1.0	BJ	7
Toluene	Z2228	125	1.0	J	1
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1269	426	33.2	J	180
Di-n-octyl phthalate	N1269	426	33.2	BJ	110
Metals					CONCENTRATION (ppm)
Aluminum	F30406606D	809	-	*	1580
Chromium	F30406606D	809	-	-	3.2
Iron	F30406606D	809	-	*	2560
Lead	F30406606D	809	-	N	1.5
Manganese	F30406606D	809	-	N*	35.6
Zinc	F30406606D	809	-	-	10.7

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 11:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
Field Blank					
VOA's					
Chloroform	K7962	70	1.0	BJ	3
2 - Butanone	K7962	70	1.0	J	4
1,2 - Dichloropropane	K7962	70	1.0	J	2
Semi-VOA's					
Di-n-Butylphthalate	N1247	617	1.0	J	2
Bis (2-Ethylhexyl) phthalate	N1247	617	1.0	BJ	6
Di-n-octyl phthalate	N1247	426	1.0	BJ	4
Metals					CONCENTRATION (ppm)
None Reportable	F30406702D	811	-	-	-

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 12:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
Blank Soil (Laboratory Soil)					
VOA's					
Methylene Chloride	Z2210	80	1.0	BJ	3
Acetone	Z2210	80	1.0		36
Semi-VOA's					
Dimethyl Phthalate	N1279	640	33.2	J	24
Diethylphthalate	N1279	640	33.2	J	120
Di-n-Butylphthalate	N1279	640	33.2	J	60
Bis (2-Ethylhexyl) phthalate	N1279	640	33.2	J	60
Di-n-octyl phthalate	N1279	640	33.2	BJ	47
Metals					CONCENTRATION (ppm)
Not Analyzed	-	-	-	-	-

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 13:
Borehole Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
Trip Blank (Laboratory Water)					
VOA's					
1,2 - Dichloropropane	K7961	90	1.0	J	1
Semi-VOA's					
Not Analyzed	-	-	-	-	-
Metals					CONCENTRATION (ppm)
Not Analyzed	-	-	-	-	-

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 14:
Surficial Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
S-1					
VOA's					
Methylene Chloride	Z2218	143	1.0	BJ	11
Semi-VOA's					
Phenanthrene	N1271	488	33	J	60
Fluoranthene	N1271	488	33	J	78
Pyrene	N1271	488	33	J	68
Butylbenzyl-phathalate	N1271	488	33	J	39
Chrysene	N1271	488	33	J	43
Bis (2-Ethylhexyl) phthalate	N1271	488	33	J	400
Di-n-octyl phthalate	N1271	488	33	BJ	108
Metals					CONCENTRATION (ppm)
Aluminum	F30406608D	812	-	*	1180
Calcium	F30406608D	812	-	-	2350
Chromium	F30406608D	812	-	-	5.9
Copper	F30406608D	812	-	-	12
Iron	F30406608D	812	-	*	5550
Lead	F30406608D	812	-	N	38.3
Manganese	F30406608D	812	-	N*	42.1
Nickel	F30406608D	812	-	-	10.8
Zinc	F30406608D	812	-	-	74.2

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 15:
Surficial Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
S-2					
VOA's					
Methylene Chloride	Z2219	151	1.0	BJ	9
Tetrachloroethene	Z2219	151	1.0	-	99
Semi-VOA's					
Phenanthrene	N1272	526	32.9	J	35
Fluoranthene	N1272	526	32.9	J	71
Pyrene	N1272	526	32.9	J	93
Benzo(a)Anthracene	N1272	526	32.9	J	56
Chrysene	N1272	526	32.9	J	59
Bis (2-Ethylhexyl) phthalate	N1272	526	32.9	J	130
Di-n-octyl phthalate	N1272	526	32.9	BJ	57
Benzo(b)fluoranthene	N1272	526	32.9	J	38
Benzo(k)Fluoranthene	N1272	526	32.9	J	47
Benzo(a)pyrene	N1272	526	32.9	J	48
Indeno(1,2,3-cd) Pyrene	N1272	526	32.9	J	36
Benzo(g,h,i) Perylene	N1272	526	32.9	J	37
Metals					CONCENTRATION (ppm)
Aluminum	F30406609D	813	-	*	1270
Chromium	F30406609D	813	-	-	6.3
Iron	F30406609D	813	-	*	4120
Lead	F30406609D	813	-	N	1.8
Manganese	F30406609D	813	-	N*	33.3
Zinc	F30406609D	813	-	-	10.5

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 16:
Surficial Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
S-3					
VOA's					
Methylene Chloride	Z2220	160	1.0	BJ	9
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1273	564	33	J	60
Di-n-octyl phthalate	N1273	564	33	BJ	69
Metals					CONCENTRATION (ppm)
Aluminum	F30406610D	814	-	*	1200
Iron	F30406610D	814	-	*	3000
Lead	F30406610D	814	-	N	0.92
Manganese	F30406610D	814	-	N*	51.1

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 17:
Surficial Soil Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUALIFIER	CONCENTRATION (ppb)
S-4					
VOA's					
Methylene Chloride	Z2221	61	1.0	B	11
Semi-VOA's					
Bis (2-Ethylhexyl) phthalate	N1278	590	33	J	42
Di-n-octyl phthalate	N1278	590	33	BJ	48
Metals					CONCENTRATION (ppm)
Aluminum	F30406701D	815	-	*	4090
Chromium	F30406701D	815	-	-	3.9
Iron	F30406701D	815	-	*	3570
Lead	F30406701D	815	-	N	4.3
Manganese	F30406701D	815	-	N*	51.5
Zinc	F30406701D	815	-	-	7.5

Qualifiers; * - Duplicate analysis not within control limits,
N - Matrix spike sample recovery not within control limits,
B - In Blank, D - Dilution, J - Estimated

Table 18:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND[1]	CONC. (ppb)
MW-1						
VOA's						
Vinyl Chloride	K7969	65	1.0	-	2	65
Methylene Chloride	K7969	65	1.0	J	5	4
Carbon Disulfide	K7969	65	1.0	J	50	8
1,1 Dichloroethane	K7969	65	1.0	-	5	33
1,2 Dichloroethene	K8057	132	25	D	5	2400
Chloroform	K7969	65	1.0	BJ	7	3
1,1,1 Trichloroethane	K8057	132	25	D	5	540
Trichloroethene	K7969	65	1.0	J	5	8
Tetrachlorethene	K7969	65	1.0	-	5	15
Toluene	K8057	132	25	D	5	940
Chlorobenzene	K7969	65	1.0	J	5	1
Ethylbenzene	K7969	65	1.0	-	5	52
o,m,p, Xylenes	K7969	65	1.0	-	5	130
Semi-VOA's						
1,3 Dichlorobenzene	N1248	360	1.0	-	5	20
1,4 Dichlorobenzene	N1248	360	1.0	-	5	90
1,2 Dichlorobenzene	N1248	360	1.0	-	5	11
1,2,4 - Trichlorobenzene	N1248	360	1.0	-	5	140
Di-n-Butylphthalate	N1248	361	1.0	J	50	3
Bis (2-Ethylhexyl) phthalate	N1248	361	1.0	BJ	50	7
Metals						
Aluminum	F30406801E	602	-	-	-	3410
Calcium	F30406801E	602	-	-	-	25900
Chromium	F30406801E	602	-	-	50	14.2
Iron	F30406801E	602	-	-	300	31200
Lead	F30406801E	602	-	-	25	8.1
Magnesium	F30406801E	602	-	-	NA	5010
Manganese	F30406801E	602	-	-	300**	496
Sodium	F30406801E	602	-	-	20000	36600
Zinc	F30406801E	602	-	-	300	101

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 19:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND**	CONC. (ppb)
MW-2						
VOA's						
Chloroform	K7970	157	1.0	BJ	7	2
1,1,1 Trichloroethane	K7970	157	1.0	-	5	14
Tetrachlorethene	K7970	157	1.0	J	5	8
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1249	400	1.0	BJ	50	2
Metals						
Aluminum	F30406802E	603	-	-	-	26500
Arsenic	F30406802E	603	-	-	25	12.7
Calcium	F30406802E	603	-	-	-	16300
Chromium	F30406802E	603	-	-	50	32.6
Copper	F30406802E	603	-	-	200	38.8
Iron	F30406802E	603	-	-	300**	31200
Lead	F30406802E	603	-	-	25	23.8
Magnesium	F30406802E	603	-	-	NA	6450
Manganese	F30406802E	603	-	-	300**	1960
Sodium	F30406802E	603	-	-	20000	9430
Zinc	F30406802E	603	-	-	300	54.6

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 20:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND	CONC. (ppb)
MW-3						
VOA's						
Chloroform	K7966	175	1.0	BJ	7	3
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1252	419	1.0	BJ	50	9
Di - n - octyl phthalate	N1252	419	1.0	BJ	50	2
Metals						
Calcium	F30406805E	604	-	-	-	14000
Iron	F30406805E	604	-	-	300**	156
Manganese	F30406805E	604	-	-	300**	18.4
Sodium	F30406805E	604	-	-	20000	6390
Zinc	F30406805E	604	-	-	300	65.8

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 21:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND	CONC. (ppb)
MW-4						
VOA's						
Chloroform	K7984	183	1.0	BJ	7	1
Trichloroethene	K7984	183	1.0	J	5	4
Tetrachlorethene	K7984	183	1.0		5	22
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1253	442	1.0	BJ	50	2
Metals						
Aluminum	F30406806E	605	-	-	-	161000
Arsenic	F30406806E	605	-	-	25	21.5
Barium	F30406806E	605	-	-	1000	541
Beryllium	F30406806E	605	-	-	NA	9.2
Calcium	F30406806E	605	-	-	-	24800
Chromium	F30406806E	605	-	-	50	141
Cobalt	F30406806E	605	-	-	NA	107
Copper	F30406806E	605	-	-	200	308
Iron	F30406806E	605	-	-	300**	212000
Lead	F30406806E	605	-	-	25	27.5
Magnesium	F30406806E	605	-	-	-	15300
Manganese	F30406806E	605	-	-	300**	8080
Mercury	F30406806E	605	-	-	2	0.48
Nickel	F30406806E	605	-	-	NA	110
Potasium	F30406806E	605	-	-	-	11000
Sodium	F30406806E	605	-	-	20000	6360
Vanadium	F30406806E	605	-	-	NA	175
Zinc	F30406806E	605	-	-	300	285

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 22:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND	CONC. (ppb)
MW-5						
VOA's						
Chloroform	K7968	195	1.0	BJ	7	2
Tetrachlorethene	K7968	195	1.0	J	5	5
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1254	461	1.0	BJ	50	3
Di-n-octyl phthalate	N1254	461	1.0	BJ	50	1
Metals						
Aluminum	F30406807E	606	-	-	-	14200
Barium	F30406807E	606	-	-	1000	285
Calcium	F30406807E	606	-	-	-	27200
Chromium	F30406807E	606	-	-	50	110
Copper	F30406807E	606	-	-	200	29.2
Iron	F30406807E	606	-	-	300**	19000
Lead	F30406807E	606	-	-	25	16.3
Magnesium	F30406807E	606	-	-	300**	6390
Manganese	F30406807E	606	-	-	-	926
Nickel	F30406807E	606	-	-	NA	61.6
Potasium	F30406807E	606	-	-	NA	5850
Sodium	F30406807E	606	-	-	20000	87900
Zinc	F30406807E	606	-	-	300	46.6

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 23:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND	CONC. (ppb)
BLIND DUPLICATE (MW-5)						
VOA's						
Chloroform	K7963	204	1.0	BJ	7	3
Tetrachlorethene	K7963	204	1.0	J	5	6
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1255	485	1.0	BJ	50	2
Di - n - octyl phthalate	N1255	485	1.0	BJ	50	2
Metals						
Aluminum	F30406901E	600	-	-	-	12700
Barium	F30406901E	600	-	-	1000	279
Calcium	F30406901E	600	-	-	-	26300
Chromium	F30406901E	600	-	-	50	101
Copper	F30406901E	600	-	-	200	26.2
Iron	F30406901E	600	-	-	300**	16300
Lead	F30406901E	600	-	-	25	13.9
Magnesium	F30406901E	600	-	-	300**	6020
Manganese	F30406901E	600	-	-	-	823
Nickel	F30406901E	600	-	-	NA	55
Potasium	F30406901E	600	-	-	-	5840
Sodium	F30406901E	600	-	-	20000	87900
Zinc	F30406901E	600	-	-	300	42.4

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 24:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL.*	GW STAND.	CONC. (ppb)
FIELD BLANK						
VOA's						
2 - Butanone	K7960	213	1.0	J	50	4
1,2 Dichloropropane	K7960	213	1.0	J	5	2
Semi-VOA's						
Bis (2-Ethylhexyl) phthalate	N1256	505	1.0	BJ	50	8
Di - n - octyl phthalate	N1256	505	1.0	BJ	50	3
Metals						
None Reportable	F30406902E	601	-	-	-	0

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

Table 25:
Groundwater Analytical Summary
for reportable analytes detected
Samples collected on April 7, 1993
(all results in ppb)

ANALYTE	LAB FILE ID	PAGE	DILUTION FACTOR	QUAL. *	GW STAND.	CONC. (ppb)
TRIP BLANK						
VOA's						
Chloroform	K7959	222	1.0	BJ	7	1
2 - Butanone	K7959	222	1.0	J	50	4
Semi-VOA's						
Not Analyzed	-	-	-	-		-
Metals						
Not Analyzed	-	-	-	-		-

* Qualifiers; B - In Blank, D - Dilution, J - Estimated
** Iron and Manganese - 500 ppb
1 Standards for comparison; NYSDEC Title 6, Chap. X, parts 700-705 Class GA and NYDOH standards subpart 5.1

5.0 CONCLUSIONS AND RECOMMENDATIONS

For comparative purposes, the analytical data was reviewed with respect to established groundwater guidelines. The data was compared to the New York State groundwater standards and guidance values for Class GA waters and the NYS Department of Health Regulations. No standards or guidance values exist for some of the compounds detected. Additionally, a comparison of groundwater quality at the downgradient wells was made to the upgradient wells (MW-3 and MW-5).

5.1 BOREHOLE SOIL SAMPLES (Tables 5 - 12)

Volatiles:

Low levels of methylene chloride (3-9 ppb) were detected in each of the four borehole samples collected. A level of 4 ppb was also noted in the laboratory prepared soil blank, while none were detected in the field blank. Methylene chloride is widely used in laboratories for various procedures and at the low levels detected is believed to be attributed to background laboratory contamination.

Semi-Volatiles:

Samples B-1, B-2, B-3, blind dup.(B-3), B-4, field blank and blank (laboratory) soil, exhibited concentrations of bis(2-ethylhexyl)phthalate at 120, 76, 250, 77, 180, 6 and 60 ppb respectively.

Di-n-octylphthalate was also detected in each of these samples at 52, 78, 73, 48, 110, 4 and 47 ppb respectively. Phthalates are widely used in plastics and as plasticizers and are prevalent in most all sampling and laboratory procedures (gloves, teflon seals, syringes etc.). Concentrations of phthalates in samples at the 25 - 100 ppb range are not uncommon due to the use of these materials in sample collection and analysis and due to the natural decomposition.

The laboratory prepared soil blank revealed detectable levels of bis(2-ethylhexyl) and di-n-octylphthalate at 60 and 47 ppb respectively. If these levels were to be negated from those detected in the borehole samples collected, relative concentrations would be at 60, 16, 190, 17, 120, 0 and 0 ppb for bis (2-ethylhexyl), and 5, 31, 26, 1, 63, 0 and 0 ppb for di-n-octylphthalate respectively. Acceptable variations in analytical recoveries could be an explanation, or contamination due to sampling or analytical equipment can account for the difference in the effective levels of B-3 (190; 26 ppb) and the blind duplicate (17; 1 ppb) of bis(2-ethylhexyl) and di-n-octylphthalates.

It should also be noted that a limited number of other phthalates were detected in the laboratory prepared soil and the field blank samples at concentrations ranging from 2 to 120 ppb. In view of these observations it appears that the phthalate levels detected are most likely a result of procedural and laboratory operations than from a release at the site.

Metals:
Laboratory results were reviewed and compared to concentrations of metals in soils in New York State as were published in the USGS professional paper 1270, New York State Soils (1984). Comparison of the surficial soil samples from the site showed the levels to be within the ranges of those naturally occurring in New York State soils.

5.2 SURFICIAL SOILS SAMPLES (Tables 13 - 16)

Volatiles:
Low levels of methylene chloride (9-11 ppb) were detected in each of the four surficial samples collected. A level of 4 ppb was also noted in the laboratory prepared soil blank.

Methylene chloride is widely used in laboratories for various procedures and at the low levels detected is believed to be attributed to laboratory contamination rather than from the site.

In addition, concentrations of tetrachloroethene (TCE) at 99 ppb was noted in only the S-2 sample. The soil regulatory level, according to NYSDEC Spill Technology And Remediation Series (STARS) Memo #1 alternative guidance method, for TCE (unspecified organic contaminant) is 1000 ppb.

Semi-Volatiles:
Samples S-1, S-2, S-3 and S-4 exhibited concentrations of bis(2-ethylhexyl)phthalate at 400, 130, 60 and 42 ppb respectively. Di-n-octylphthalate was also detected in each of these samples at 108, 57, 69 and 48 ppb respectively. Phthalates are widely used in plastics and as plasticizers and are prevalent in most all sampling and laboratory procedures (gloves, teflon seals, syringes etc.). Concentrations of phthalates in samples at the 25 - 100 ppb range are not uncommon due to the use of these materials in sample collection and analysis and through natural decomposition of plastics.

The laboratory prepared soil blank revealed detectable levels of bis (2-ethylhexyl) and di-n-octylphthalate at 60 and 47 ppb respectively. If these levels were to be negated from those detected in the surficial samples collected, relative concentrations would be at 340, 70, 0 and 0 ppb for bis(2-ethylhexyl), and 61, 10, 22 and 1 ppb for di-n-octylphthalate respectively. In addition to these a number of other semi-volatiles were detected in samples S-1 and S-2 at concentrations ranging from 35 to 93 ppb. In view of this data it is plausible that these concentrations may have resulted from a discharge at the site, as was the NYSDEC rational for selecting these locations for sampling.

Metals:

Metals data results were reviewed and compared to concentrations of metals in soils in New York State as was published in the USGS professional paper 1270, New York State Soils (1984). Comparison of the surficial soil samples from the site showed the levels to be within the ranges of those naturally occurring in New York State soils.

5.3 GROUNDWATER ANALYTICAL DATA (Tables 16 - 24)

Volatiles:

A number of VOA constituents were detected in the groundwater sample from MW-1, ranging from 1 to 2400 ppb. Chlorobenzene was present at 1 ppb. Methylene chloride was at 4 ppb but as discussed previously is considered to have originated from the laboratory. Chloroform was detected in the trip blank and samples ranging from 1 ppb to 3 ppb and is also suspected to be laboratory contamination.

All the other volatile constituents detected from this sample have exceeded their respective groundwater standard. Levels of 1,1,1 trichloroethane (1,1,1 TCA), trichloroethene (TCE) and tetrachloroethene were variably present in most of the wells on site, with 1,1,1 TCA only present in MW-1 (540 ppb) and MW-2 (14 ppb). There were no volatiles detected in monitoring well MW-3 other than chloroform (which was addressed above).

Analysis of the sample from MW-4 revealed concentrations of TCE and tetrachloroethene at 4 and 22 ppb respectively. The samples from MW-5 and the blind duplicate (MW-5) for tetrachloroethene results (5; 6 ppb) were comparable and at or just above the groundwater standard of 5 ppb.

Semi-Volatiles:

Bis(2-ethylhexyl)phthalate was present in all samples at concentrations ranging from 2 - 9 ppb.

The field blank exhibited a concentration of 8 ppb, therefore indicating and substantiating probable sampling or laboratory contaminant levels.

Di-n-octylphthalate was only present in wells; MW-3, MW-5, blind dup. (MW-5) and the field blank, at concentrations of 2, 1, 2, and 3 ppb respectively. The highest concentration appearing in the field blank once again is indicative of sampling or laboratory contamination.

Monitoring well MW-1 also exhibited 1,2, 1,3, 1,4 dichlorobenzene and 1,2,4 trichlorobenzene at concentrations of 11, 20, 90 and 140 ppb respectively, all of which exceed the groundwater standard of 5 ppb.

Metals:
Levels of various metals were present in the different wells onsite. As many as eighteen (18) different metals were detected. The deep well (MW-3) revealed only calcium, iron, manganese, sodium and zinc , all of which were well below published groundwater standards. The results from MW-5 and the blind duplicate (MW-5) sample were nearly identical and therefore the highest concentrations will be discussed here and referred to as the results from MW-5.

Six (6) of the metals detected in the remaining wells (MW-1, MW-2, MW-4, MW-5) have exceeded groundwater standards. The highest concentrations of five of these six metals appeared in MW-4. The locations, metal and respective concentrations are as follows;

Chromium was detected in wells MW-4 and MW-5 at 141 and 110 ppb respectively.

Copper was present in MW-4 at 308 ppb.

Iron was present in wells MW-1, MW-2, MW-4 and MW-5 at concentrations of 31200, 31200, 212000 and 19000 ppb.

Lead in MW-4 at 27.5 ppb.

Manganese in MW-1, MW-2, MW-4 and MW-5 at 496, 1960, 8080 and 6390 ppb respectively.

Sodium was present in MW-1 and MW-5 at 36600 and 87900 ppb

Iron was detected in high to excessive concentrations in most of the samples collected. Iron in the shallow aquifer can have local sources such as cesspools, sanitary landfills and salvage yards. Large concentrations of iron (>300 ppb) in the groundwater are not toxic, however they can cause water as well as beverages and foods prepared with it to have an unpleasant taste and is therefore considered a nuisance contaminant.

Manganese is also a common constituent of groundwater on Long Island with its origins similar to those of iron. In high concentrations manganese is also undesirable for the same reasons as iron. The lead and copper concentrations are most likely originating from lead plumbing solder and copper piping utilized in the buildings plumbing.

High concentrations of iron and manganese and sodium are commonly associated with leachates from landfills. Although banned at present in the town of Babylon, historical applications of large amounts of road salt during winter months can also be partially accountable for a large portion of sodium contamination. On site usage of salts in the parking lot and walks to remove ice may also be a contributory cause of the high sodium content detected.

Chromium is not naturally occurring in soils or groundwater and is believed to seep into groundwater largely from surface disposal of leakage of industrial wastes. Chromium was detected in wells MW-1, MW-2, MW-4 and MW-5 at concentrations of 14.2, 32.6, 141 and 110 ppb respectively. The concentrations at MW-4 and MW-5 are comparable within reasonable sample variation ranges. Chromium is not utilized by Pride nor is its presence consistent with the past and current usage of the property. The presence of higher concentrations of chromium in the upgradient and mid site locations at 88 Lamar (virgin materials building) seem to indicate that it is migrating onsite from another upgradient source.

5.4 RECOMMENDATIONS

The NYSDEC Division of Hazardous Waste Remediation has conducted an investigation (Sept. 1992) of the volatile organic plume in the vicinity of the Babylon Landfill which has identified several possible sources of VOC contamination in the area. Pride Solvents was identified as one possible source based on the information derived from the October 1991 hydrogeological report (H_2M). The report was reviewed by the NYSDEC Division of Hazardous Substances Regulation and The USEPA Hazardous Waste Facilities Branch. These agencies found that the conclusions drawn were not supported by the information provided and that QA/QC for most of the analytical data was of poor quality. The laboratory data from this report was deemed inaccurate and unacceptable.

Sites located at 69 - 71 Kean Street have been identified in the Babylon Plume Tracking Report, based on a Suffolk County Department of Health Services report, as having contributed 1,1,1 - TCA and 1,1 - DCA into a sanitary pool. This site is located immediately adjacent to the Pride site at the southwest corner.

Monitoring well MW-1 contained the majority of the contaminants and the highest levels of same. This well as discussed earlier, is in the immediate vicinity of a drywell which receives surface water runoff from the parking lot. It is also downgradient of heating fuel oil underground storage tanks which are located along the southern wall of 78 Lamar Street.

While laboratory data from this investigation indicates that there are levels of contaminants present beneath the site, it is not readily discernible what portion, if any, was contributed by Pride. Further Phase II investigatory work would be necessary in order to identify point sources of these contaminants. It is also recommended that the onsite sanitary pools and drywells be sampled and, if warranted, be properly cleaned out.

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APPENDIX A

BULK MATERIAL AND DRUM STORAGE

Tyree Environmental Technologies

BULK MATERIAL

Tyree Environmental Technologies

TANK NO. & PRODUCT		GALLONS
1	XYLOL (dimethylbenzene) (a)	3000 (1)
2	VM&P (naptha)	3000 (1)
3	LAKTANE (mixture C7-Cg) (A)	3000 (1)
4	VARSOL 3 (stoddard solvent) (C)	3000 (1)
5	METHANOL (methyl alcohol) (A)	3000 (1)
6	AROMATIC 100 (C)	3000 (1)
7	EMPTY	3000 (1)
8	DIESEL FUEL (C)	3000 (1)
9	GASOLINE (A)	3000 (1)
10	LOPS (aliphatic solvent) (C)	5000 (1)
11	TOLUOL (methyl benzene) (A)	6000 (1)
12	ACETONE (dimethyl ketone) (A)	6000 (1)
13	150 ALCOHOL (isopropyl alcohol) (A)	6000 (1)
14	MEK (methyl ethyl ketone) (A)	6000 (1)
15	VARSOL #18 (stoddard solvent) (C)	6000 (1)
16	VARSOL #1 (stoddard solvent) (C)	6000 (1)
17	RECLAIMED CYCLOTHANE (1,1,1-trichloroethane) (B)	5000 (2)
18	METHYLENE CHLORIDE (B)	5000 (2)
19	PERCHLOROETHYLENE (Tetrachloroethylene) (B)	5000 (2)
20	TRICHLOROETHYLENE (B)	5000 (2)
21	CHLORO-SM (1,1,1-trichloroethane) (B)	5000 (2)
22	RECLAIMED (1,1,1-trichloroethane) (B)	5000 (2)
23	RECLAIMED (trichloroethylene) (B)	5000 (2)
24	DOW DM (methyl carbitol diethylene glycol methyl ether) (C)	5000 (2)
25	FREON (fluorinated solvent) (B)	5500 (2)

NOTES: (A) flammable (B) non-flammable (C) Combustible
(1) Outside storage, below grade (2) Inside storage, above grade

DRUM STORAGE

Tyree Environmental Technologies

CHEMICAL	DRUMS
Acetone	11
1,1,1-Trichloroethane	25
Anti-freeze	4
Aromatic 150	4
NButyl Acetate	1
Sec.Butyl Alcohol	0
Carbon Tetrachloride	0
Diacetone Alcohol	0
Dibutyl Phthalate	0
Diethanolamine	3
Diethylene Glycol	1
Diethylene Triamine	0
Diisopropanolamine	0
Dioctylyphthalate	1
Dipropylene Glycol	10
Dowanol PM	3
Dowanol EB	3
Versene 100 Liquid	3
EE Acetate	4
Ethyl Acetate 99	7

APPENDIX B

DRILL LOGS

Tyree Environmental Technologies

E2M GEOLOGIC LOG

JOB NO. _____

WELL DATA: HOLE DIAM.: 6 1/4 TD 20' SCREEN SETTING: 20'-10' SLOT .10
CASING DIAM. 2" LENGTH 20 WELL STATUS COMPLETE

Borehole Location: MW-1
Contractor: TYREE BROS. ENVIRONMENT
Driller: MARK BECK
Elevation: _____ Ref Point: _____

Completion Depth: 20'
Date Started: 8/8/91 Finished: 8/8/91
Weather: SUNNY + HOT
Logged by: M. GENTILS Checked by: _____

Type of Rig: Truck X Trailer Mounted ___ Tripod ___ Other ___
Drilling Method: HOLLOW STEM Bit type: CARBIDE
Sampler Hammer Weight: 140 (lbs).
Average Hammer Fall (inches): 30

Depth to Groundwater: 10.8' Date: 8/8/91 Time: ____ Aquifer: UPPER GLACIAL

Sample Depth	No	Blows 6"	Env Res	Color	Recov (in)	Sample Description	Lithology
.5							
1							
1.5							
2.0	(1)	24	0 RAW	TAN	17"	MED. DENSE; MED TO	
2.5			0 HEATED	BROWN		FINE; POORLY GRADED	SP
3.0						SAND AND FILL; MOIST	
3.5							
4.0	(2)	17	0 RAW	TAN	18"	MED. DENSE; TAN,	
4.5			0 HEATED			MED. TO FINE POORLY	SP
5.0						GRADED SAND. W/	
5.5						TRACE FINE SAND	SW
6.0	(3)	34	0 RAW	TAN	14"	MED. DENSE; TAN	
6.5			0 HEAT	BROWN		BROWN; COARSE TO	
7.0						FINE; WELL GRADED	SW
7.5						SANDS; MOIST	
8.0	(4)	26	0 RAW	TAN	FULL	MED. DENSE; COARSE	
8.5			0 HEATED	BROWN		TO FINE. TAN BROWN	
9.0						SAND; W/ SOME	
9.5						FINE GRAVEL	
10.0						SATURATED	

SIGNATURE: Michael N. Gentils DATE: 8/8/91

H2M GEOLOGIC LOG JOB NO. PRID

WELL DATA: HOLE DIAM.: 6 1/4 TD 22' SCREEN SETTING: 20'-10' SLOT .10
CASING DIAM. 2" LENGTH 20' WELL STATUS COMPLETE

Borehole Location: MW-2
Contractor: TYREE BROS. ENVIRONMENTAL
Driller: MARK BECK
Elevation: ____ Ref Point: ____

Completion Depth: 20 FT.
Date Started: 8/8/91 Finished: 8/8/91
Weather: SUNNY + HOT
Logged by: M. N. GENTILS Checked by: ____

Type of Rig: Truck X Trailer Mounted ___ Tripod ___ Other ___
Drilling Method: HOLLOW STEM Bit type: Carbide
Sampler Hammer Weight: 140 (lbs).
Average Hammer Fall (inches): 30

Depth to Groundwater: 11.0' Date: 8/8/91 Time: ____ Aquifer: UPPER GLACIAL

Sample Depth	No	Blows 6"	Hnu Res	Color	Recov (in)	Sample Description	Lithology
.5							
1							
1.5							
2.0	(1)	8	0 RAW	DARK	17"	VERY LOOSE; DARK	
2.5			0 HEAT	BROWN		BROWN; MED TO FINE	FILL
3.0						SAND; MOIST (FILL)	
3.5							
4.0	(2)	11	0 RAW	TAN	16"	LOOSE; TAN BROWN	
4.5			0 HEAT	BEIGE		COARSE TO FINE;	SW
5.0						WELL GRADED SAND;	
5.5						W/SOME FINE GRAVEL	
6.0	(3)	28	0 RAW	TAN	14"	MED. DENSE; TAN	
6.5			0 HEAT	BROWN		BROWN; COARSE TO	SW
7.0						FINE GRAVELLY	
7.5						SAND; MOIST	
8.0	(4)	16	0 RAW	TAN	15"	MED. DENSE; TAN	
8.5			0 HEAT	BROWN		TO BROWN; COARSE TO	SW
9.0						FINE GRAVELLY	
9.5						SAND; SATURATED	
10.0							

SIGNATURE: Michael N. Gentils DATE: 8/8/91

H2M GEOLOGIC LOG

JOB NO. _____

WELL DATA: HOLE DIAM.: 6 1/4" TD 56' SCREEN SETTING: 50'-40' SLOT .10
CASING DIAM. 4" LENGTH 50' WELL STATUS COMPLETE

Borehole Location: MW-3
Contractor: Tyree Bros. Environmental
Driller: MARK BECK
Elevation: _____ Ref Point: _____

Completion Depth: 50'
Date Started: 8/5/91 Finished: 8/6/91
Weather: SUNNY + HOT LOW 90's
Logged by: M. GENTILS Checked by: _____

Type of Rig: Truck X Trailer Mounted ___ Tripod ___ Other ___
Drilling Method: HOLLOW STEM Bit type: CARBIDE
Sampler Hammer Weight: 130 (lbs).
Average Hammer Fall (inches): 30

Depth to Groundwater: 12' Date: 8/5/91 Time: 1500 Aquifer: UPPER GLACIAL

Sample Depth	No	Blows 6"	Env Res	Color	Recov (in)	Sample Description	Lithology
.5							
1							
1.5							
2.0	(1)	23	0 (RAW)	YELLOW	14"	MED. DENSE; YELLOW	SW
2.5			14.5 (Head)	BROWN		BROWN; WELL GRADED	
3.0						COARSE TO FINE SAND	
3.5						WITH SOME FINE GRAVEL	
4.0	(2)	21	0 (RAW)	YELLOW	15"	MED DENSE; YELLOW TAN	
4.5			13.5 (Head)	TAN		WELL GRADED; COARSE	SW
5.0						TO FINE SAND w/ SOME	
5.5						FINE GRAVEL; DRY	
6.0	(3)	23	0 (RAW)	YELLOW	13"	MED. DENSE; YELLOW	
6.5			14.5 (Heated)	BROWN		BROWN; COARSE TO FINE	SW
7.0						WELL GRADED SANDS w/	
7.5						SOME FINE + TRACE MED GRAVEL	
8.0	(4)	17	6 (RAW)	BROWNISH	7"	LOOSE; BROWNISH TAN	
8.5			16 (Heated)	TAN		MED. TO FINE, SAND	SW
9.0						w/ SOME FINE GRAVEL	
9.5						DRY.	
10.0							

SIGNATURE: Michael N. Gentils DATE: 8/5/91

PAGE 2 of 2 — H2M GEOLOGIC LOG (CONTINUED) — JOB NO. PRID

Borehole Location: MW-3 — Completion Depth: 50'
Elevation: _____ Ref Point: _____ — Logged by: M. GENTILS — Checked by: _____

Depth to Groundwater: 12' — Date: 8/5/91 — Time: _____ — Aquifer: UPPER GLACIAL

Sample Depth	Sampl No.	Blows 6"	Hnu Res	Recov (in)	Sample Description	Lithology
10 FT.	(5)	24	12 (RAW)	18"	MED. DENSE; YELLOW BROWN; COARSE	SW
11 FT.			50 (Heated)		TO MED. SAND; WITH SOME MED.	
12 FT.					AND FINE GRAVELS. MOIST	
13 FT.	(6)	36	N/R	14"	MED. DENSE; TAN BROWN COARSE TO	WATER TABLE
14 FT.			SATURATED		FINE GRAVELLY SAND; SATURATED	
20 FT					SPLIT SPOONS COLLECTED	
22 FT					AT 10 FOOT INTERVALS (SATURATED)	
24 FT	(7)	24		19"	MED. DENSE; COARSE TO FINE;	
26 FT.					EXTREMELY WELL GRADED GRAVELLY	SW
28 FT.					SANDS; SATURATED.	
30 FT						
32 FT						
34 FT	(8)	32		18"	MED. DENSE; COARSE TO FINE;	
36 FT.					WELL GRADED YELLOW TAN. GRAVELLY	SW
38 FT					SANDS. SATURATED.	
40 FT.						
42 FT.						
44 FT.	(9)	34		16"	MED. DENSE; COARSE TO FINE; WELL	
46 FT					GRADED YELLOW TAN; GRAVELLY	SW
48 FT					SANDS; SATURATED	
50 FT						
52 FT						BOTTOM WELL
54 FT	(10)	27		15	MED. DENSE; MED. TO FINE;	
56 FT					YELLOW TAN; SATURATED; GRAVELLY	SW
58 FT.					SANDS.	

SIGNATURE: Michael M. Gentils — DATE: 8/5/91

H2M GEOLOGIC LOG

JOB NO. _____

WELL DATA: HOLE DIAM.: 6¼" TD 22' SCREEN SETTING: 20'-10' SLOT .10
CASING DIAM. 2" LENGTH 20' WELL STATUS COMPLETE

Borehole Location: MW-4
Contractor: TYREE BROS. ENVIRONMENTAL
Driller: MARK BECK
Elevation: _____ Ref Point: _____

Completion Depth: 20'
Date Started: 8/7/91 Finished: 7/7/91
Weather: SUNNY + HOT
Logged by: M.N. GENTILS Checked by: _____

Type of Rig: Truck X Trailer Mounted ___ Tripod ___ Other ___
Drilling Method: HOLLOW STEM Bit type: CARBIDE
Sampler Hammer Weight: 130 (lbs).
Average Hammer Fall (inches): 30

Depth to Groundwater: 10.5' Date: 8/7/91 Time: ___ Aquifer: UPPER GLACIAL

Sample Depth	No	Blows 6"	Hnu Res	Color	Recov (in)	Sample Description	Lithology
.5							
1							
1.5							
2.0	(1)	10	0 (RAW)	YELLOW	12"	LOOSE; COARSE TO	FILL
2.5			.7 (Heated)	TAN		FINE WELL GRADED	
3.0						SAND AND GRAVEL	SW
3.5						.4 INCH OF FILL, DRY	
4.0	(2)	32	0 (RAW)	TAN	13"	MED. DENSE; COARSE	
4.5			2.5 (Heated)			TO FINE. TAN GRAVEL-	SW
5.0						LY SANDS; MOIST	
5.5							
6.0	(3)	29	0 (RAW)	TAN	17"	MED. DENSE; COARSE TO	
6.5			9 (Heated)	BROWN		FINE TAN BROWN SANDS	SW
7.0						MOIST; TRACE FINE	
7.5						GRAVEL	
8.0	(4)	29	0 (RAW)	TAN	15"	MED-DENSE; COARSE	
8.5			8 (Heated)	BROWN		TO FINE TAN BROWN	
9.0						GRAVELLY SAND	SW
9.5						SATURATED	
10.0							

SIGNATURE: Michael N Gentils DATE: 8/7/91

APPENDIX C

SIEVE ANALYSIS

Tyree Environmental Technologies

Environmental Testing Laboratories, Inc.
208 Route 109, Farmingdale, NY 11735 · Fax: 516-249-8344 · Phone: 516-249-1456

ANALYSIS REPORT - SIEVE ANALYSIS

09/19/91
Reviewed by: K. Kaan

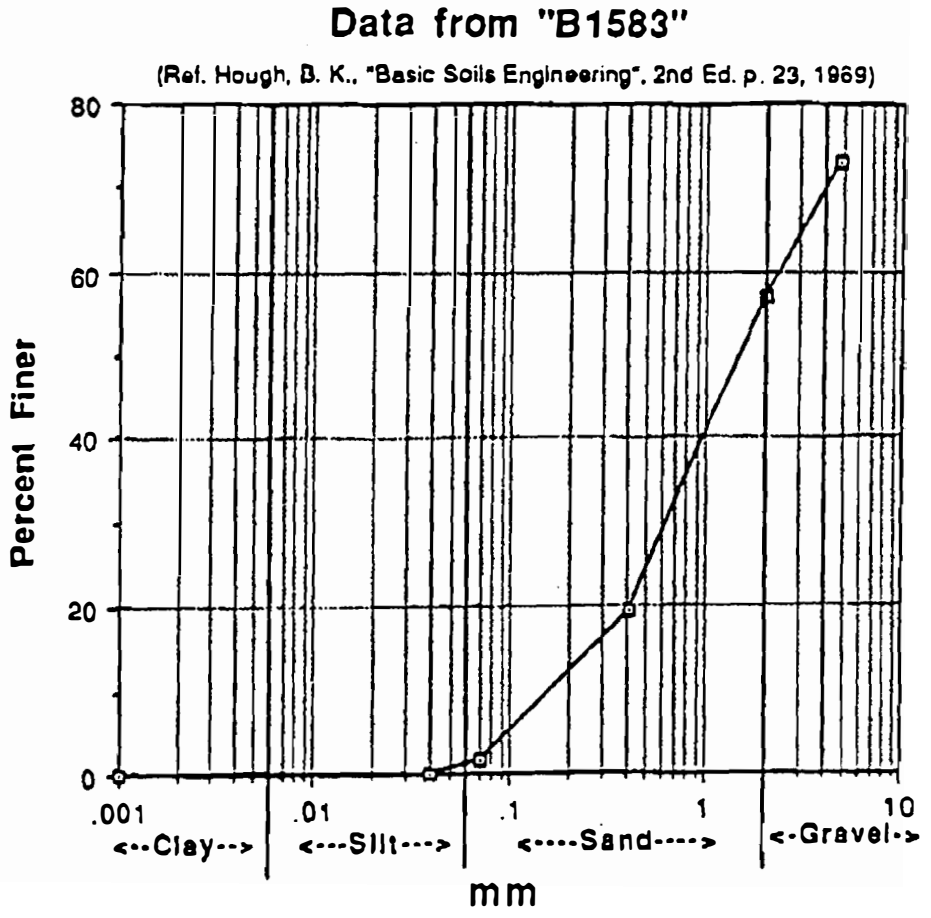
Client
Pride Solvents
78-88 Lamar St.
West Babylon, New York
Sampled by:

Dates
Collected: 09/5/91-9/8/91
Received: 09/13/91
Analyzed: 09/16/91

Sample ID Location	Sieve Size	Weight Retained	% of Total Weight	% Finer
B158301.....MW-1 8-10	4=.1870 inches, 4.75 mm	26.27	26.91	73.09
Sample phase: Soil	10=.0787 inches, 2.00 mm	15.64	16.02	57.07
Remarks: 2.38% Moisture	40=.0164 inches, 0.42 mm	36.71	37.60	19.47
	200=.0029 inches, .073 mm	17.31	17.73	1.73
	400=.0015 inches, .038 mm	1.09	1.12	0.62
B158302.....MW-2 8-10	4=.1870 inches, 4.75 mm	18.26	18.60	81.4
Sample phase: Soil	10=.0787 inches, 2.00 mm	18.94	19.30	62.1
Remarks: 1.85% Moisture	40=.0164 inches, 0.42 mm	39.91	40.66	21.44
	200=.0029 inches, .073 mm	20.33	20.71	0.73
	400=.0015 inches, .038 mm	.48	.49	0.24
B158303.....B-3 12-14	4=.1870 inches, 4.75 mm	26.73	28.70	71.3
Sample phase: Soil	10=.0787 inches, 2.00 mm	23.33	25.05	46.25
Remarks: 6.88% Moisture	40=.0164 inches, 0.42 mm	29.74	31.94	14.31
	200=.0029 inches, .073 mm	11.50	12.35	1.96
	400=.0015 inches, .038 mm	1.37	1.45	0.51
B158304.....MW-4 8-10	4=.1870 inches, 4.75 mm	29.50	31.06	68.94
Sample phase: Soil	10=.0787 inches, 2.00 mm	19.26	20.28	48.66
Remarks: 5.02% Moisture	40=.0164 inches, 0.42 mm	35.37	37.24	11.42
	200=.0029 inches, .073 mm	9.60	10.11	1.31
	400=.0015 inches, .038 mm	.85	0.89	0.42

Environmental Testing Laboratories, Inc.
208 Route 109, Farmingdale, NY 11735 · Fax: 516-249-8344 · Phone: 516-249-1456

B1583-01



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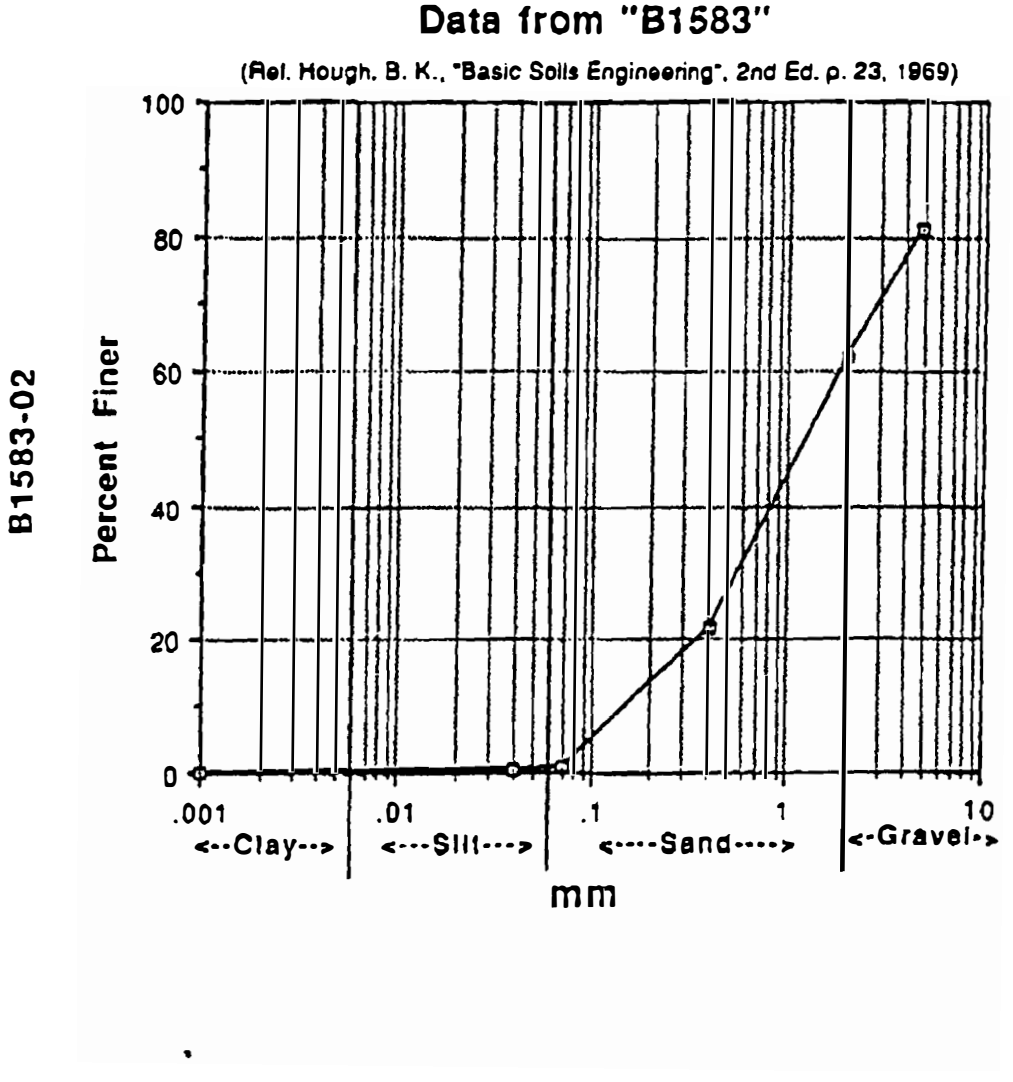

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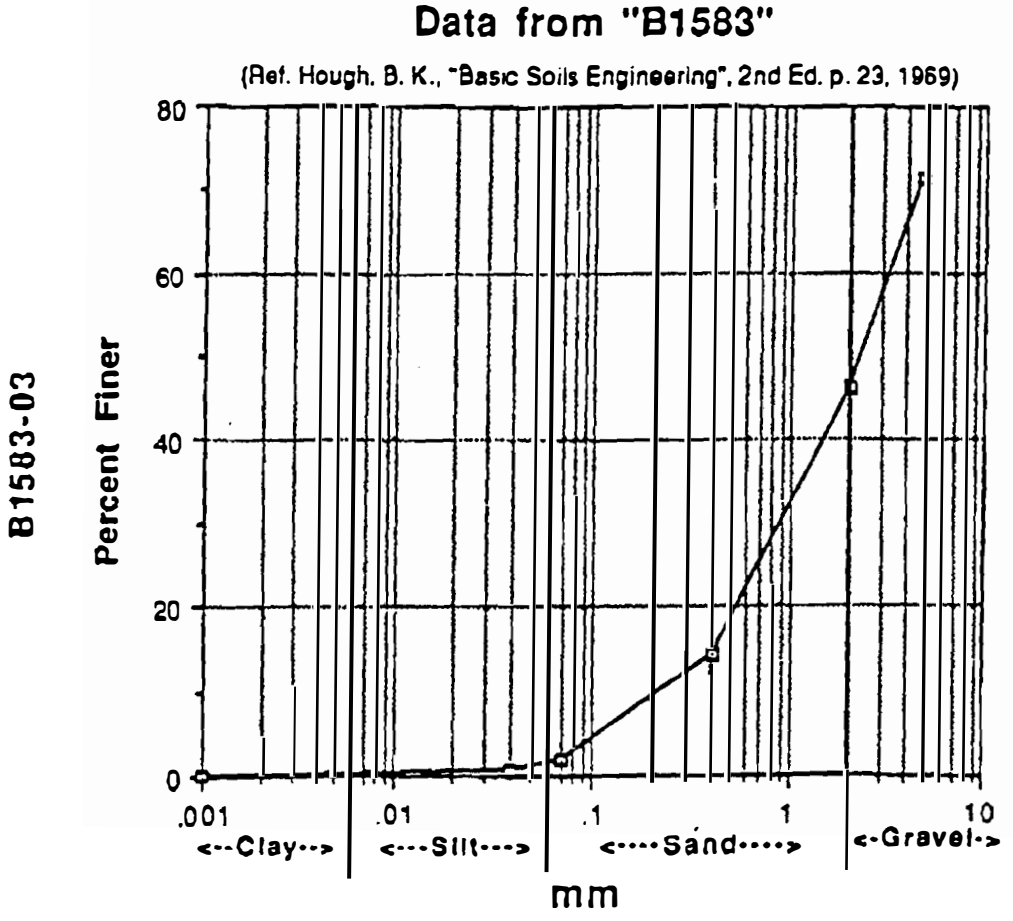

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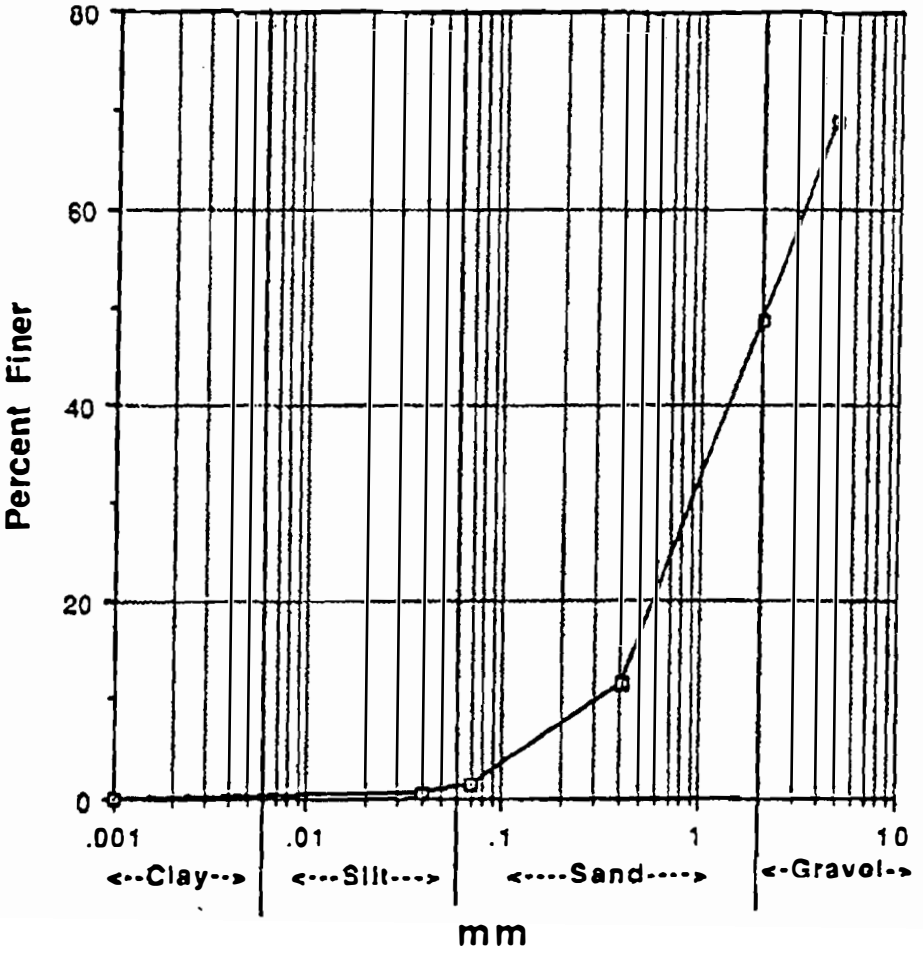
Data from "B1583"

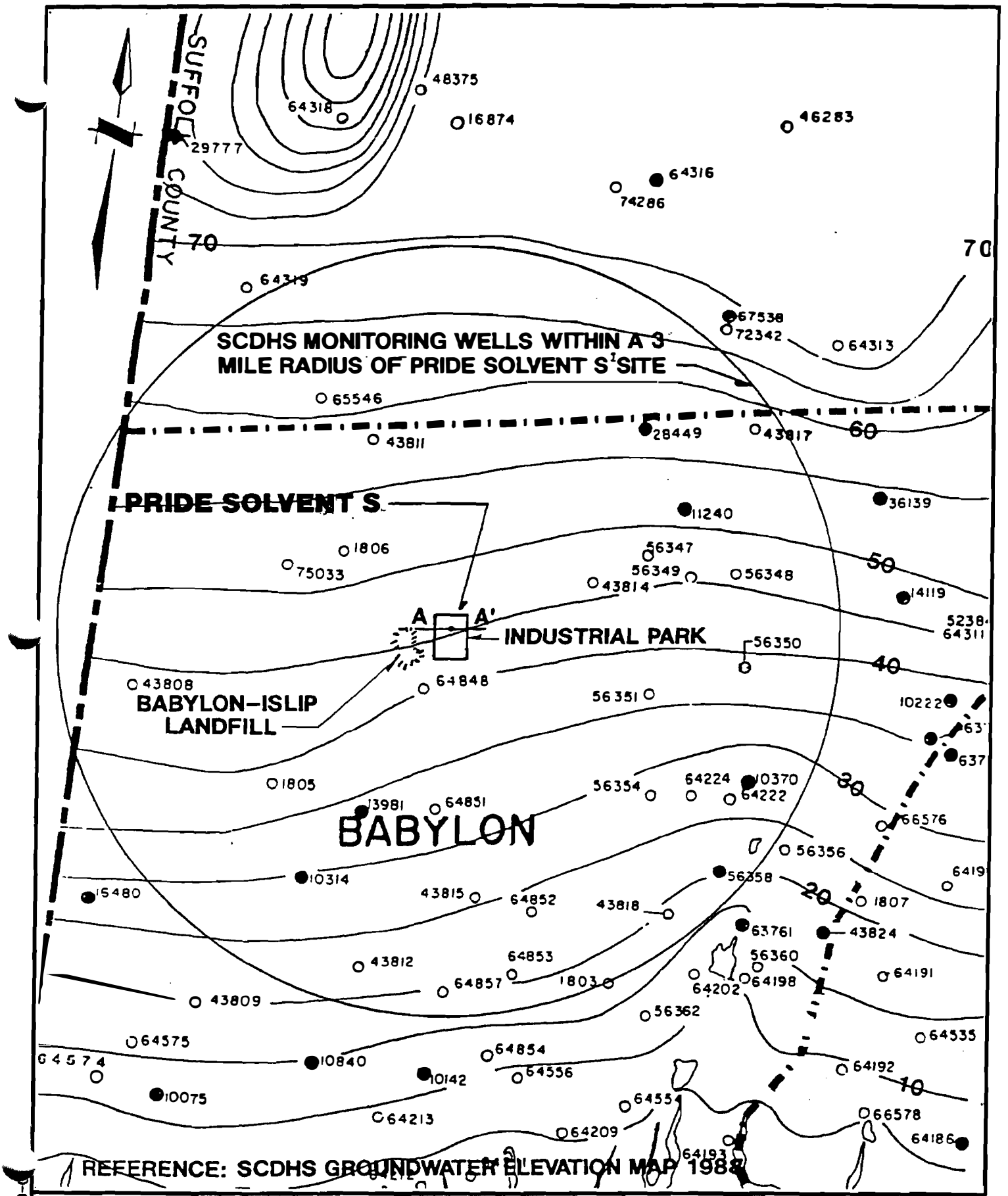
(Ref. Hough, B. K., "Basic Soils Engineering", 2nd Ed. p. 23, 1969)



APPENDIX D

PUBLIC SUPPLY WELL DATA

Tyree Environmental Technologies



H2MGROUP ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. FAIRFIELD, N.J.

PRID 89-0

H2M GROUP
HOLZMACHER, MCLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Scientists, Planners

JOB PRID8801 WP
SHEET NO. 1 OF 4
CALCULATED BY KJC DATE 11/13/89
CHECKED BY — DATE —
SCALE —

Albany Avenue Well Field
Location: Northeast corner of Albany Avenue & 45th st, North Amityville
# of wells: 6

Well #	Depth	Status	Pumping Rate (GPM) (Actual Rated Capacity)
S-12016	84'-3"	Out of Service	– (water levels only)
S-14218	85'-0"	"	"
S-15499	84'-0"	"	– (was 900)
S-34595	482'-2"	Permanent	1200
S-47886	508'-7¼"	"	1300
S-63205	419'-0"	"	1300

Albin Avenue Well Field
Location: S/S of Albin Avenue & W/O LIRR, West Babylon
# of wells: 11

S-1350	58'-3"	Out of Service	– (were 700 & 900)
S-1660	59'-10"	"	"
S-1661	60'-9"	"	"
S-1662	57'-8"	"	"
S-1663	58'-4"	"	"
S-1664	59'-8"	"	"
S-14975	64'-6 5/16"	"	"
S-14976	66'-2 5/16"	"	"
S-20955	627'-7½"	Permanent	1000
S-31038	528'-6¼"	"	1200
S-66657	550'-7"	"	1300

H2M GROUP
HOLZMACHER, MCLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Scientists, Planners

JOB PRID8801WP
SHEET NO. 2 OF 4
CALCULATED BY KJC DATE 11/13/89
CHECKED BY — DATE —
SCALE —

Smith Street Well Field

Location: East end of Smith Street, Village of Babylon
# of wells: 8

S-4830	50"	Retired	—
S-13477	60'-2 3/4"	"	—
S-4831	50'	"	—
S-13478	60'-1 3/4"	"	—
S-10641	59'	Permanent	700
S-21375	500'	"	1000
S-36748	336'	"	1100
S-46840	314'-7"	"	1400

August Road Well Field

Location: N/s of August Rd, W/o Deer Park Ave, N. Babylon
# of wells: 4

S-12710	70'-1 3/8"	Retired	-(was 1000)
S-16256	600'	Permanent	1000
S-20635	627'-4 7/8"	"	1200
S-37861	636'-1 3/8"	"	1000

Sawyer Avenue Well Field

Location: S/s of Sawyer Ave, 406.56' E/o Norton Avenue, West Babylon
# of wells: 4

S-15505	80'	Out of Service	- (was 900)
S-18003	669'	Permanent	1000
S-40498	746'-6"	"	1200
S-51673	759'-8"	"	2100

H2M GROUP
HOLZMACHER, MCLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Scientists, Planners

JOB PRID8801WP
SHEET NO. 3 OF 4
CALCULATED BY KJC DATE 11/13/89
CHECKED BY — DATE —
SCALE —

Tenety Avenue Well Field
Location: SW corner of Tenety Ave & Fuestal St, N. Lindenhurst
# of wells: 3

S-19554	100'	Out of Service	-(was 1000)
S-20460	494'-7 3/4"	Permanent	800
S-37681	573'-7 7/8"	"	1100

Twelfth Street Well Field:
Location: N/S of Twelfth Street, W/O Twelfth Avenue, W. Babylon
# of wells: 4

S-19585	93'-2 1/2"	Out of Service	-(was 1000)
S-21487	337'-4 3/16"	Permanent	1200
S-40330	328'-4 1/4"	"	1000
S-51457	624'-11 1/2"	"	1400

Prospect Avenue Well Field
Location: S/S of Prospect Avenue, & E/S of Lafyette Rd, N. Babylon
# of wells: 3

S-28503	675'-6 1/2"	Permanent	1200
S-33005	673'-10"	"	1200
S-47435	441'-2"	"	1400

North Fifth Street Well Field
Location: E/S of North Fifth St., 350' N/O W. John St, Lindenhurst
# of wells: 1

S-29491	498'-8 5/8"	Permanent	1200

H2M GROUP
HOLZMACHER, MCLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Scientists, Planners

JOB PRID 8801 WP
SHEET NO. 4 OF 4
CALCULATED BY KJC DATE 11/13/89
CHECKED BY — DATE —
SCALE —

Gordon Avenue Well Field
Location: South side of Gordon Avenue, 100 Feet west of Little East Neck Rd, Wyandanch
# of wells: 2

S-51298	652'-4 3/8"	Permanent	1400
S-65505	660'-1 1/4"	"	1400

APPENDIX E

FIELD SAMPLING DATA SHEETS

Tyree Environmental Technologies

GROUNDWATER SAMPLING DATA SHEET

CLIENT: Pride Solvents & Chemical Co., Inc.
LOCATION: 78-88 Lamar Street
West Babylon, NY 11704

SAMPLE LOCATION: MW-1
DATE: 4-7-93
SAMPLERS: J Terrana / C. Migliore
WEATHER: Sunny 40°

20.28 TOTAL WELL DEPTH (ft.)
- 8.88 DEPTH TO WATER (ft.)
11.4 STATIC WATER LEVEL (ft.)
x .163 WELL FACTOR (2"= 0.163 4"= 0.653)
1.86 STATIC VOLUME (gals.)
x 3 MINIMUM VOLUMES TO BE PURGED
5.58 MIN. VOLUME TO BE REMOVED (gals.)
_____ TOTAL VOLUME PURGED (gals.)

EVACUATION METHOD:
☐ SUBMERSIBLE PUMP
☐ CENTRIFUGAL PUMP
☐ BLADDER PUMP
☒ BAILER 2" Stainless Steel
☐ OTHER _____
FLOW RATE (GPM) —

METHOD OF DISPOSAL (WATER):
☐ DISCHARGE ON SITE
☒ CONTAIN IN ___ DRUMS (55gal.)
☐ OTHER _____

Comments: Sampled well AT 12:40
Split w/ DEC - John Petiet - Albany
Samp. Analysis - 3 VOA's, 1 semi-voa, 1-mercury, 1-metals

TIME	DTW (ft)	TEMP. (°C)	pH	SAL. (%)	COND. (mS/cm)	TURB. (NTU)	COMMENTS
12:04	9.82	10.4	6.63	0.01	.477	24	Inc Pump
12:15		10.2	6.56	0.01	.471	60	1st Vol
12:30		10.1	6.77	0.01	.470	78	2nd Vol
12:35		10.2	6.72	0.01	.463	65	3rd Vol
12:56		10.1	6.95	0.01	.461	37	Post Samp

TYREE BROTHERS
ENVIRONMENTAL SERVICES, INC.
208 ROUTE 109 • FARMINGDALE • NEW YORK 11735

GROUNDWATER SAMPLING DATA SHEET

CLIENT: Pride Solvents & Chemical Co., Inc.
LOCATION: 78-88 Lamar Street
West Babylon, NY 11704

SAMPLE LOCATION: MW-2
DATE: 4-7-93
SAMPLERS: J Terrana / C Migliore
WEATHER: Sunny / 40°

20.30 TOTAL WELL DEPTH (ft.)
- 8.04 DEPTH TO WATER (ft.)
12.26 STATIC WATER LEVEL (ft.)
x .163 WELL FACTOR (2"= 0.163 4"= 0.653)
2.00 STATIC VOLUME (gals.)
x 3 MINIMUM VOLUMES TO BE PURGED
6.0 MIN. VOLUME TO BE REMOVED (gals.)
_____ TOTAL VOLUME PURGED (gals.)

EVACUATION METHOD:
☐ SUBMERSIBLE PUMP
☐ CENTRIFUGAL PUMP
☐ BLADDER PUMP
☒ BAILER 2" Stainless Steel
☐ OTHER _____
FLOW RATE (GPM) _____

METHOD OF DISPOSAL (WATER):
☐ DISCHARGE ON SITE
☒ CONTAIN IN 1 DRUMS (55gal.)
☐ OTHER _____

Comments: DEC [redacted] on site. John Petiet, Katy Murphy
Sampled well at 1100. Split w/ DEC
Samp Analysis - 3 voa's 1-Semi voa, 1-mercury 1 metals
MS/MSD Sample taken

TIME	DTW (ft)	TEMP. (°C)	pH	SAL. (%)	COND. (mS/cm)	TURB. (NTU)	COMMENTS
1007	8.04	10.4	6.00	0.0	.174	95	Pre Purge
1015		10.2	5.49	0.0	.180	397	1st Vol
1025		10.4	5.30	0.0	.155	731	2nd Vol
1031		10.4	5.34	0.0	.145	7999	3rd Vol
1150		10.3	5.80	0.0	.179	547	Post Sample

TYREE BROTHERS ENVIRONMENTAL SERVICES, INC.
208 ROUTE 109 • FARMINGDALE • NEW YORK 11735

GROUNDWATER SAMPLING DATA SHEET

CLIENT: Pride Solvents & Chemical Co., Inc.

LOCATION: 78-88 Lamar Street
West Babylon, NY 11704

SAMPLE LOCATION: MW-3

DATE: 4-7-93

SAMPLERS: J. Terrana / C. Migliore

WEATHER: 40° Sunny

50.23 TOTAL WELL DEPTH (ft.)
- 9.67 DEPTH TO WATER (ft.)
40.56 STATIC WATER LEVEL (ft.)
x .653 WELL FACTOR (2"= 0.163 4"= 0.653)
26.49 STATIC VOLUME (gals.)
x 3 MINIMUM VOLUMES TO BE PURGED
79.47 MIN. VOLUME TO BE REMOVED (gals.)
_____ TOTAL VOLUME PURGED (gals.)

EVACUATION METHOD:
☒ SUBMERSIBLE PUMP 2" Grundfos to purge
☐ CENTRIFUGAL PUMP
☐ BLADDER PUMP
☒ BAILER 2" Stainless Steel (Sample)
☐ OTHER _____
FLOW RATE (GPM) 5

METHOD OF DISPOSAL (WATER):
☐ DISCHARGE ON SITE
☒ CONTAIN IN 2 DRUMS (55gal.)
☐ OTHER _____

Comments: Sample @ 1700
Equip-Blank taken from this bailer
3-Vol's, 1-mercury & semi vol's, 1-metals

TIME	DTW (ft)	TEMP. (°C)	pH	SAL. (%)	COND. (mS/cm)	TURB. (NTU)	COMMENTS
1622	9.67	12.3	5.47	0.0	.163	3	Pre Purge
1628		11.9	5.22	0.0	.162	1	1ST Vol
1634		11.9	5.40	0.0	.159	1	2ND Vol
1640		12.1	5.45	0.0	.158	1	3RD Vol
1713		11.1	5.61	0.0	.158	5	Post Sam

TYREE BROTHERS
ENVIRONMENTAL SERVICES, INC.
208 ROUTE 109 • FARMINGDALE • NEW YORK 11735

GROUNDWATER SAMPLING DATA SHEET

CLIENT: Pride Solvents & Chemical Co., Inc.

LOCATION: 78-88 Lamar Street
West Babylon, NY 11704

SAMPLE LOCATION: MW-4

DATE: 4-7-93

SAMPLERS: J. Terrana / C. Migliore

WEATHER: 40° Sunny

20.85 TOTAL WELL DEPTH (ft.)
- 8.30 DEPTH TO WATER (ft.)
12.55 STATIC WATER LEVEL (ft.)
x .163 WELL FACTOR (2"= 0.163 4"= 0.653)
2.05 STATIC VOLUME (gals.)
x 3 MINIMUM VOLUMES TO BE PURGED
6.15 MIN. VOLUME TO BE REMOVED (gals.)
_____ TOTAL VOLUME PURGED (gals.)

EVACUATION METHOD:
- ☐ SUBMERSIBLE PUMP
- ☐ CENTRIFUGAL PUMP
- ☐ BLADDER PUMP
- ☒ BAILER 2" Stainless Steel
- ☐ OTHER _____

FLOW RATE (GPM) _____

METHOD OF DISPOSAL (WATER):
- ☐ DISCHARGE ON SITE
- ☒ CONTAIN IN ___ DRUMS (55gal.)
- ☐ OTHER _____

Comments: Samp time 1355
Split w/DEC - John Pethot - Albany
3 voa's 1 semi-voa, 1 mercury, 1 metals

TIME	DTW (ft)	TEMP. (°C)	pH	SAL. (%)	COND. (mS/cm)	TURB. (NTU)	COMMENTS
1330	8.30	8.9	5.88	0.0	.149	255	Pre Purge
1336		9.0	6.04	0.0	.160	>999	1st Vol
1342		9.0	6.09	0.0	.165	799	2nd Vol
1350		8.9	6.28	0.0	.159	>999	3rd Vol
1405		8.8	6.23	0.0	.152	749	Post

TYREE BROTHERS
ENVIRONMENTAL SERVICES, INC.
208 ROUTE 109 • FARMINGDALE • NEW YORK 11735

GROUNDWATER SAMPLING DATA SHEET

CLIENT: Pride Solvents & Chemical Co., Inc.

LOCATION: 78-88 Lamar Street
West Babylon, NY 11704

SAMPLE LOCATION: MW-5

DATE: 4-7-93

SAMPLERS: J. Tecoras / C. Migliore

WEATHER: 40° Sunny

20.19 TOTAL WELL DEPTH (ft.)
- 9.08 DEPTH TO WATER (ft.)
11.11 STATIC WATER LEVEL (ft.)
x .163 WELL FACTOR (2"= 0.163 4"= 0.653)
1.81 STATIC VOLUME (gals.)
x 3 MINIMUM VOLUMES TO BE PURGED
5.43 MIN. VOLUME TO BE REMOVED (gals.)
_____ TOTAL VOLUME PURGED (gals.)

EVACUATION METHOD:
- ☐ SUBMERSIBLE PUMP
- ☐ CENTRIFUGAL PUMP
- ☐ BLADDER PUMP
- ☒ BAILER 2" Stainless Steel
- ☐ OTHER _____

FLOW RATE (GPM) _____

METHOD OF DISPOSAL (WATER):
- ☐ DISCHARGE ON SITE
- ☒ CONTAIN IN 1 DRUMS (55gal.)
- ☐ OTHER _____

Comments: Samples AT 1500hrs. Split w/DEC - John Petiet - Albany
3-voa's, 1 semi-voa, 1-mercury, 1-metals
Blind Dupe taken

TIME	DTW (ft)	TEMP. (°C)	pH	SAL. (%)	COND. (mS/cm)	TURB. (NTU)	COMMENTS
1430	9.08	9.8	6.84	0.02	.585	140	Pre Purge
1440		9.8	5.92	0.02	.640	374	1st volume
1445		9.9	5.94	0.02	.643	444	2ND Vol
1450		9.9	5.95	0.02	.643	529	3RD Vol
1520		10.2	6.07	0.02	.617	225	Post

TYREE BROTHERS ENVIRONMENTAL SERVICES, INC.
208 ROUTE 109 • FARMINGDALE • NEW YORK 11735

APPENDIX F

WATER QUALITY METER SPECIFICATIONS

Tyree Environmental Technologies

HAZCO

Check List for
Horiba U-10 Water Quality Checker

Contract #: 321360 **Date Shipped:** 4/05

HAZCO Ser al #: 3505 **Date Returned:** _____

HAZCO use only

Shipped	Returned
✓	✓
✓	

2 meter cable
Manual

Purchased Support Accessories

R-HOR1004	Auto Calibration Solution	_____
R-HOR1003	KCI pH Solution	_____
R-HOR1005	Calibration Beaker	_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____
_____		_____

QC Operational Check: Yes KB

QC Cal Check: _____ _____

Special Instructions: _____

_____

QC/QA Tech: KB

Shipping Tech: _____

Receiving Tech: _____

HORIBA Worldwide Marketing Locations

HORIBA INSTRUMENTS INCORPORATED

Irvine Facility
17671 Armstrong Ave., Irvine,
Calif. 92714, U.S.A.
Phone: (1) 714-250-4811
Telex: (23) 425494
Fax: (1) 714-250-0924

Ann Arbor Facility
3901 Varsity Drive, Ann Arbor,
Mich. 48104, U.S.A.
Phone: (1) 313-973-2171
Telex: (23) 0230176
Fax: (1) 313-973-7868

Silicone Valley Office
1080E Duane Ave., Suite J,
Sunnyvale, Calif. 94086, U.S.A.
Phone: (1) 408-730-4772
Fax: (1) 408-730-8975

HORIBA ASIA/PACIFIC REPRESENTATIVE OFFICE

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Fax: (65) 3452930

HORIBA KOREA SALES Co.,Ltd.

112-6 Sogong-Dong, Choong-ku
Seoul, Korea
Phone: (82) 2-753-7911~7912
Fax: (82) 2-756-4972

HORIBA EUROPE GmbH

Industriestrasse 8, D-6374 Steinbach,
Germany
Phone: (49) 8171-7755~7758
Telex: (41) 410829
Fax: (49) 8171-8044

HORIBA FRANCE
Rue L. et A. Lumière Technoparc
01630 ST-GENIS-POUILLY, France
Phone: (33) 50-42-27-83
Telex: (42) 385-054
Fax: (33) 50-42-07-74

HORIBA AUSTRIA
Kaplanstraße 5, A-3430 Tulln,
Phone: (43) 2272-5225
Telex: (47) 136482
Fax: (43) 2272-5230

HORIBA SWITZERLAND
Av. des Baumettes 11-13
CH-1020 Renens, Switzerland
Phone: (41) 21-635-77-41
Telex: (45) 455-354
Fax: (41) 21-635-40-82

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Northampton, NN4 OEB England
Phone: (44) 604-785171
Telex: (51) 311869
Fax: (44) 604-765175

HORIBA Ltd.

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Telex: (54) 22130
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Tokyo Sales Office
2-12-5 Iwamoto-cho, Chiyoda-ku,
Tokyo, Japan
Phone: (81) 3-3861-8231
Fax: (81) 3-3861-8259

Select the parameter you want shown on the readout of the measured data

SELECT

All six parameters are automatically measured at once. Use the SELECT Key to toggle the upper cursor to the parameter you want.

pH : pH
COND : Conductivity
TURB : Turbidity
DO : Dissolved oxygen
TEMP : Temperature
SAL : Salinity

To get a uniform reading, slowly move the probe up and down to circulate the water through it. (Move it 1 foot (30 cm) per sec.) Then wait for the readout to stabilize while doing this.

Expanded readout

EXP

Use the EXP readout mode when you wish to see the results with one additional decimal place of accuracy. The EXP Key toggles the readout back and forth between standard to expanded display. The table below shows the result of using the EXP readout mode for each of the six parameters.

Table 1. Accuracy of expanded readout

Parameter	Range of measurement	Accuracy	
		Standard readout	Expanded readout
pH	0-14 pH	0.1 pH	0.01 pH
COND	0-1 mS/cm	0.01 mS/cm	0.001 mS/cm
	1-10 mS/cm	0.1 mS/cm	0.01 mS/cm
	10-100 mS/cm	1 mS/cm	0.1 mS/cm
TURB	0-800 NTU	10 NTU	1 NTU
DO	0-19.9 mg/l	0.1 mg/l	0.01 mg/l
TEMP	0-50°C	1°C	0.1°C
SAL	0-4%	0.1%	0.01%

Note that the salinity parameter is the only value not measured directly with its own sensor. The U-10 obtains salinity by converting the conductivity value. If large amounts of conductive ions other than salt-water components are present in the sample, an error may occur. Be cautious when interpreting the salinity results.

In pH meters a readout of this voltage between the two terminals is obtained by increasing it with an amplifier. In actual practice, the pH meter is first calibrated using a standard reference solution of known pH, then the pH of the sample liquid is measured.

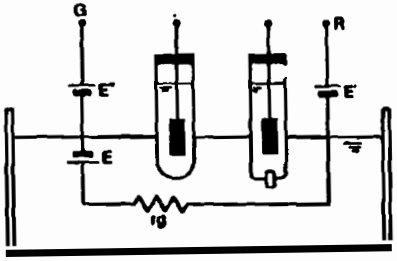


Fig. 5 Principle for Measuring pH

Specifications

pH

Principle	Glass electrode
Range	pH0-14
Resolution	Standard : 0.1pH
	Expanded : 0.01pH
Repeatability	±0.05pH
Temperature compensation	0°-50°C
Readout	LCD
Calibration	1-point auto (Zero)
	Manual 2-point

Temperature

Principle	Thermistor
Range	0°-50°C
Resolution	Standard : 1°C
	Expanded : 0.1°C
Repeatability	±0.3°C
Temperature compensation	—
Readout	LCD
Calibration	—

DO

Principle	Membrane galvanic cell
Range	0-19.9mg/*l*
Resolution	Standard : 0.1mg/*l*
	Expanded : 0.01mg/*l*
Repeatability	±0.1mg/*l*
Temperature compensation	0°-40°C
Readout	LCD
Calibration	1-point auto (Span)
	Manual 2-point

Conductivity

Principle	4-electrode
Range	0-100ms/cm
Resolution	Standard: 0-1mS/cm : 0.01mS/cm 0-10mS/cm : 0.1mS/cm 10-100mS/cm : 1mS/cm Expanded: 0-1mS/cm : 0.01mS/cm 0-10mS/cm : 0.1mS/cm 10-100mS/cm : 1mS/cm
Repeatability	±1%/F.S. within each measurement range
Temperature compensation	0°-50°C
Readout	LCD
Calibration	1-point auto (Span) Manual 2-point

Turbidity

Principle	Scattered/Transmitted light
Range	0-800 NTU
Resolution	Standard : 10 NTU Expanded : 1 NTU
Repeatability	±3%/F.S.
Temperature compensation	—
Readout	LCD
Calibration	1-point auto (Zero) Manual 2-point

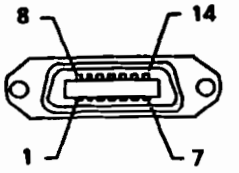
Salinity

Principle	Conversion based on conductivity
Range	0-4%
Resolution	Standard : 0.1% Expanded : 0.01%
Repeatability	±0.1%
Temperature compensation	0°-30°C
Readout	LCD
Calibration	—

Common specification

Data storage	Max. 20 samples
Printer output	Centronics specs.
Power	Battery 9V, with auto power-off function
Operating temperature	0°-45°C
Weight	Main unit: Approx. 400g Probe, with 2-m cable: Approx. 800g

- Output connector pin layout



Pin No.	Name	Pin No.	Name
1	STB	8	DB_8
2	DB_6	9	DB_7
3	DB_1	10	Not used
4	DB_3	11	BUSY
5	DB_5	12	Not used
6	DB_4	13	Not used
7	DB_2	14	GND

APPENDIX G

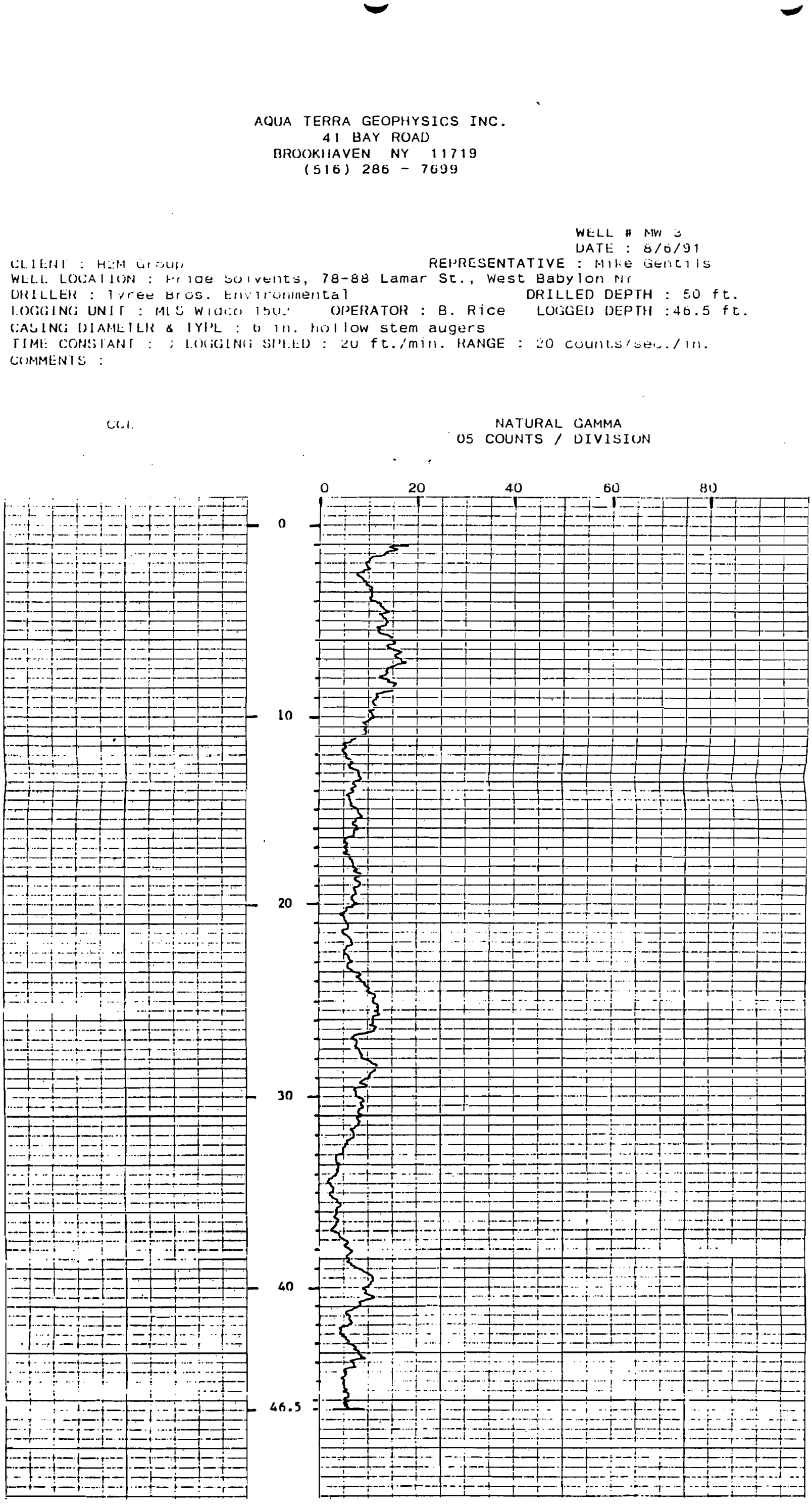
GEOPHYSICAL LOGGING

Tyree Environmental Technologies

AQUA TERRA GEOPHYSICS INC.
41 BAY ROAD
BROOKHAVEN NY 11719
(516) 286 - 7699

WELL # MW 3
DATE : 8/6/91

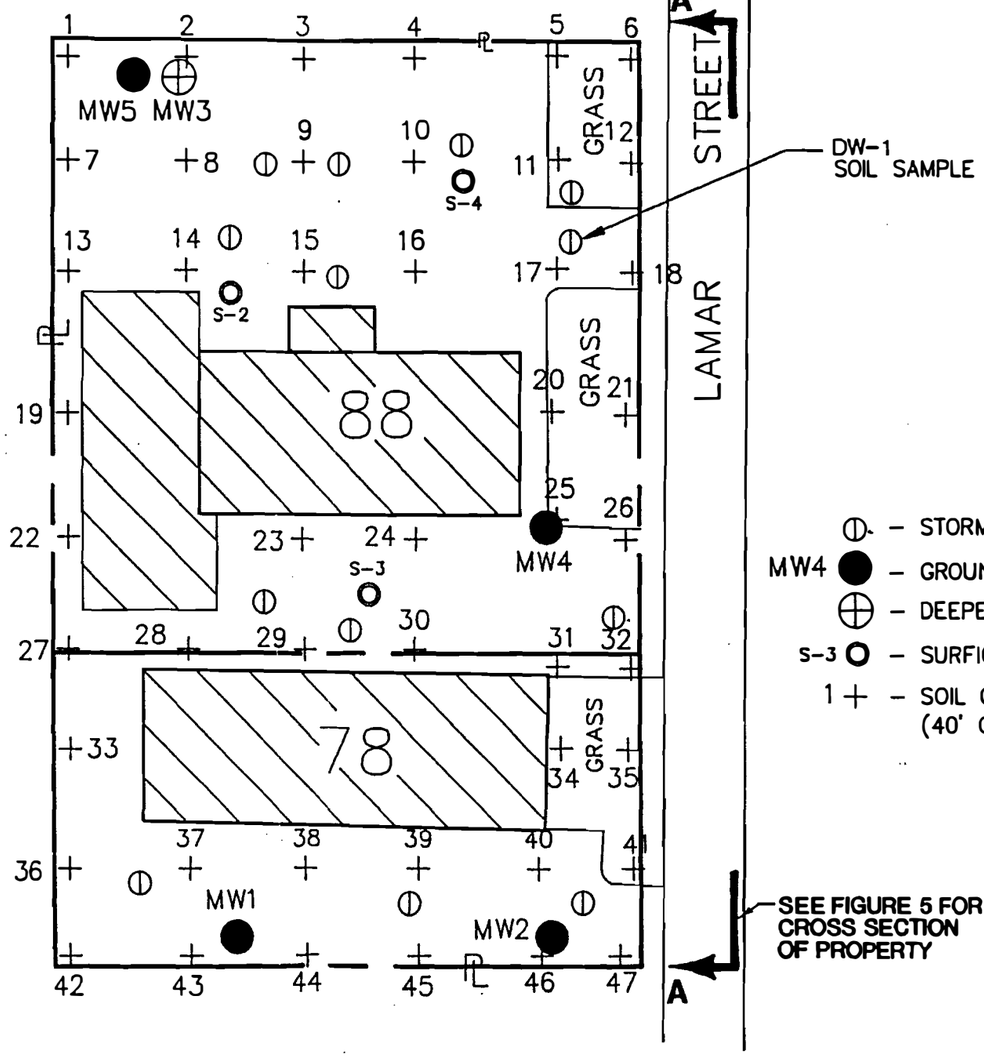
CLIENT : H2M Group REPRESENTATIVE : Mike Gentils
WELL LOCATION : Pride Solvents, 78-88 Lamar St., West Babylon NY
DRILLER : Tyree Bros. Environmental DRILLED DEPTH : 50 ft.
LOGGING UNIT : MLS Widco 150/ OPERATOR : B. Rice LOGGED DEPTH :46.5 ft.
CASING DIAMETER & TYPE : 6 in. hollow stem augers
TIME CONSTANT : 3 LOGGING SPEED : 20 ft./min. RANGE : 20 counts/sec./in.
COMMENTS :



H2MGROUP ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS
MELVILLE, N.Y. TOTOWA, N.J.

FIGURE 9

KEAN STREET



PRIDE SOLVENTS & CHEMICAL CO., INC.

LEGEND

- ⊕ – STORMWATER DRYWELL (TYP.)(Revised 11/89)
- MW4 ● – GROUNDWATER MONITORING WELL
- ⊕ – DEEPER WELL OF COUPLET
- S-3 O – SURFICIAL SOIL SAMPLING LOCATIONS
- 1 + – SOIL GAS PROBING LOCATIONS (40' ON CENTER GRID)

SOIL GAS SURVEY AND SOIL SAMPLING LOCATION GRID

0 50 100

SCALE IN FEET

PRID8901

AQUA TERRA GEOPHYSICS
41 BAY RD.
BROOKHAVEN NY 11719
(516) 286-7699

WELL # MW 3
DATE : 8/6/91

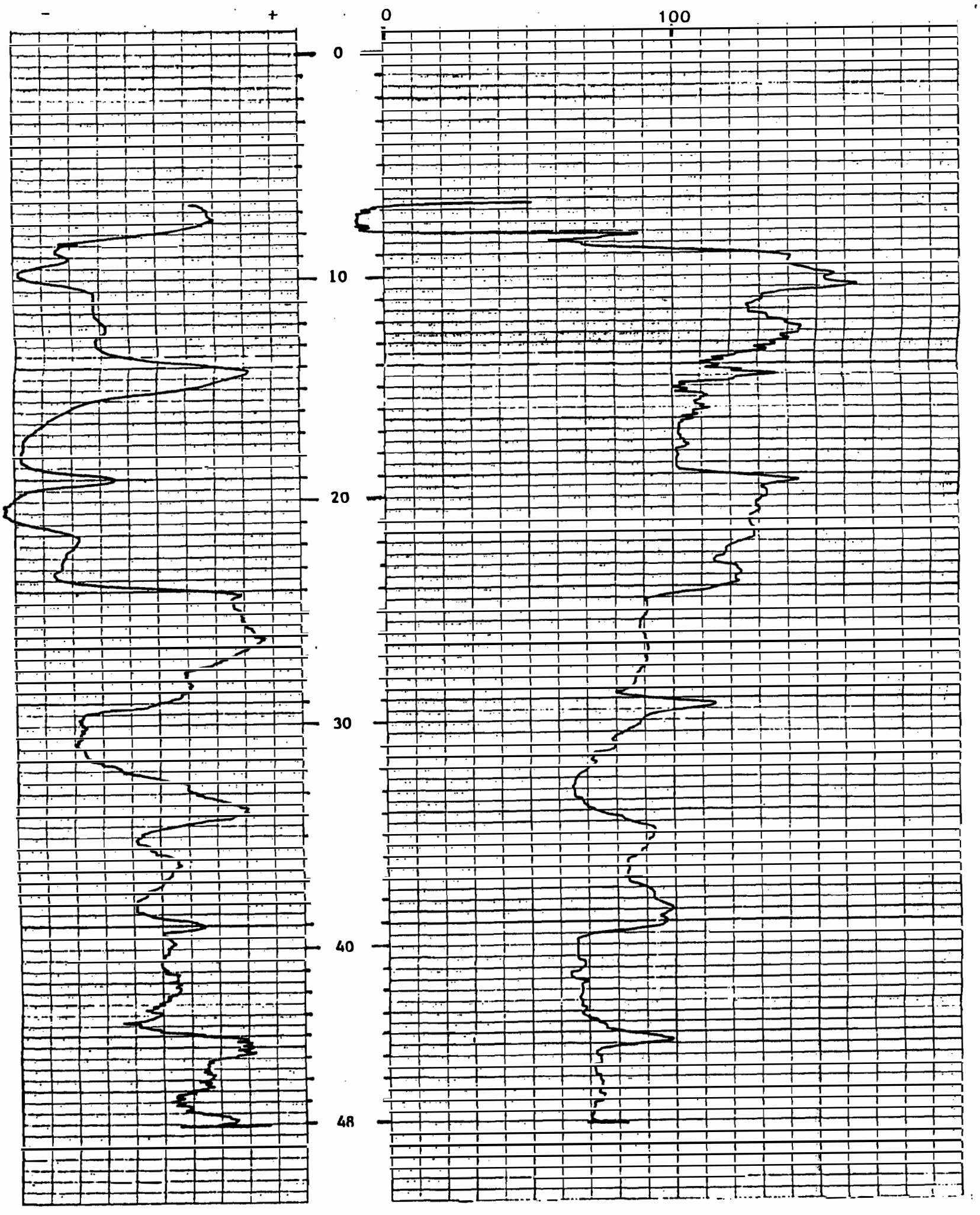
CLIENT : H2M Group REPRESENTATIVE : Mike Gentils
WELL LOCATION : Pride Solvents, 78-88 Lamar St., West Babylon NY
DRILLER : Tyree Bros. Environmental DRILLED DEPTH : 50 ft.
LOGGING UNIT : MLS Widco 1502 OPERATOR : B. Rice LOGGED DEPTH : 48 ft.
DRILLING FLUID : Water DRILLING FLUID LEVEL : 9 ft.
COMMENTS :

SPONTANEOUS POTENTIAL

20 MV / DIV

RESISTIVITY

10 OHMS / DIV



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