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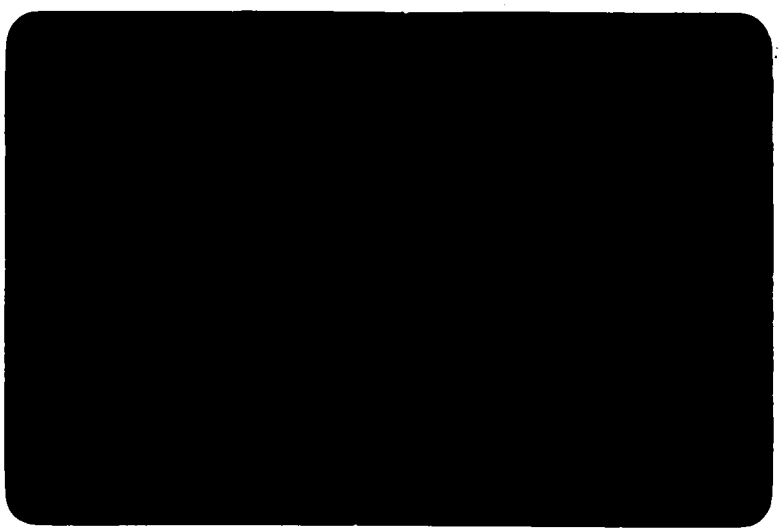

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CLOSE OUT REPORT ON THE INSTALLATION AND START UP OF AN AIR SPARGING AND SOIL VAPOR EXTRACTION SYSTEM FOR THE

MACHIAS GRAVEL PIT SITE
MACHIAS, NY

Feb 94
Final 4-29-94

PREPARED FOR:

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FEBRUARY 1994

operation

AS 1-13-94
SVE 12-22-93
2½ wk Shutdown in 7/94 Restart 9/15/94

REPORT PREPARATION AND REVIEW

The report was prepared and/or reviewed by the VAPEX personnel listed below. The undersigned certifies that project work described in this document complies with the Order[1] issued for Site #905013 and work plans[2][3] approved by the New York State Department of Environmental Conservation.

VAPEX ENVIRONMENTAL TECHNOLOGIES, INC.
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(1) Order on Consent Index No. B9-0335-90-05, New York State Department of Environmental Conservation, July 2, 1993.

(2) "Final Remedial Design/Remedial Action Workplan for Machias Gravel Pit Site Cattaraugus County, New York", Site No. 905013, prepared by Simon Hydro-Search, Golden, CO May 28, 1994.

(3) "Workplan for Proposed Soil Vapor Extraction and Air Sparging Pilot Study for the Machias Gravel Pit Site in Machias, New York" by VAPEX Environmental Technologies, Inc., May 27, 1993.

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The objective of *VAPEX*'s work was to design, install, and operate an AS/SVES at the site in order to remove source volatile organic compounds (VOCs), specifically trichloroethylene (TCE) and trichlorethane (TCA), from unsaturated and saturated zone soils at the site.

Section 1.0 of this report summarizes the design, and installation of the AS/SVES. Section 2.0 summarizes the results of the start up of the AS/SVES. Section 3.0 presents *VAPEX*'s recommendations for the continued operation of the AS/SVES and Section 4.0 presents other issues to be addressed at the site.

1.0 SVES DESIGN AND INSTALLATION

1.1 Design

With the approval of the New York State Department of Environmental Conservation (NYSDEC), *VAPEX* proceeded with the design and implementation of the air sparging and soil vapor extraction system (AS/SVES). The AS/SVES design was presented to the NYSDEC in the report titled "Air Sparging Pilot Study Summary and Design Report" and dated August 1993.

During the week of June 28, 1993, *VAPEX* conducted a short term air sparging and soil vapor extraction (AS/SVE) parameter evaluation test (PET) at the site. *VAPEX* reviewed site data from the PET and examined existing site conditions to develop a full scale AS/SVES design. Based on this design process, it was determined that approximately 16 vapor extraction wells and 41 air sparging wells were required to adequately cover the target areas. Design flow rate for the soil vapor extraction wells (SVEW) was 30 standard cubic feet per minute (scfm) per well at 8 inches of mercury vacuum. Anticipated effective radius of vacuum influence in the unsaturated zone was expected to be 25 feet. Design air sparging (AS) well flow rates were in the range of 3 to 5 scfm at approximately 23 pounds per square inch (psi) pressure. Anticipated radius of sparging influence in the saturated soils was expected to be approximately 12.5 feet.

1.2 Air Sparging, Soil Vapor Extraction and Ground Water Monitor Well Borings

From September 28 through November 6, 1993, *VAPEX* installed 38 AS wells 16 SVE wells and two monitoring wells in a total of 46 borings. After laying out the proposed 41 AS wells it was determined that 2 of the proposed AS wells were not able to be installed due to space limitations in the source area. The PET air sparging well was used as well AS 20. A site plan showing the location of all AS and SVE wells is presented in Figure 1.

All borings were completed using a combination of air rotary and standard rotary auger techniques. Typically, the well was bored using air rotary techniques to several feet below the anticipated depth of the well and then threaded 4 inch steel casing was driven to depth. The casing was removed as the well was built. With the consent of the NYSDEC, auger cuttings were spread over the ground surface. Also, two ground water monitoring wells were installed (MW22 and MW22D). Well MW22D is considered a replacement for MW3D which had been damaged previously. Boring logs for all the wells are presented in Appendix A.

1.3 Air Sparging/Soil Vapor Extraction and Ground Water Well Installation

The AS wells were constructed of 1 inch schedule 40 PVC 20 slot screen with 1 inch PVC riser. Twenty eight AS wells were set approximately 22 feet below the groundwater table.

Drilling conditions across the site were difficult due to running sands as well as unstable gravel and sand formations in the vadose zone which lead to the borehole collapsing. Ten AS wells were set at depths ranging from 17 to 37 feet below the ground water table. All of the AS wells were installed with 2 feet of 1 inch diameter screen. After the 1 inch PVC well was set, the 4 inch casing was removed while adding sand to a depth of one foot above the screen. A bentonite seal was installed above the sand pack.

AS wells were installed either individually or nested with an SVE well. In a nested well configuration, the bentonite seal was installed to 5 feet above the groundwater level and the SVE well was constructed above the bentonite seal and then backfilled with native material. In the case of individual AS wells, a 2 foot bentonite seal was

installed above the sandpack and bentonite/cement grout was added to approximately 10 feet above the ground water table. The hole was backfilled with native material to within one foot of the surface after the grout was set. Typical nested AS/SVE well and single AS well cross sections are presented in Figures 2 and 3, respectively.

The SVE wells were constructed of 2 inch schedule 40 PVC 20 slot well screen Each well was constructed with 10 feet of screen. The bottom of the screen was set approximately 5 feet above the water table and sand was added to one foot above the screen. A two foot bentonite seal was installed above the sand pack and the remainder of the borehole was backfilled with native material to within one foot of the ground surface. A typical SVE well cross section is presented in Figure 4.

Monitoring wells MW22 and MW22D were installed in accordance with specifications provided in the approved RD/RA work plan. Monitoring well MW22 was screened from 3 feet above to 7 feet below the ground water table. Ground water was measured at 47 feet below grade at the time of installation. Monitoring well MW22D was screened from 65 to 75 feet below grade. Both monitor wells were constructed of 2 inch PVC screen and riser. The wells were backfilled with a sand pack to 3 feet above the screens and 3 feet of bentonite above the sand. The remainder of the well was grouted to the surface. A 6 inch diameter protective casing was installed over each well.

1.4 Wellfield Manifold System Installation

Following the installation of the wells, during the period from November 8 through December 15, 1993, *VAPEX* installed the AS/SVE wellfield manifold piping. *VAPEX* installed approximately 1,100 linear feet of 2, 3, and 4 inch schedule 40 PVC manifold lines from the SVE wells to the equipment garage. SVE manifold lines were run above ground and supported with concrete blocks to insure that all piping sloped back to the wells to induce condensate to drain back to the wells. All SVE piping was heat traced and insulated to prevent pipeline freezing. Each SVE wellhead was installed with a 2 inch operating valve and a 1/4 inch sample port. A site plan illustrating the SVE manifold lines is presented as Figure 5.

VAPEX also installed approximately 1,800 feet of 0.5 and 1.0 inch rubber pressure hose to the AS wells on site. The AS manifold lines were run on the ground surface. The AS manifold was configured to operate in three specific groups. The perimeter area includes 14 wells on the edge of the source area, the module area refers to the 20 wells within the source area, and the defensive line refers to the five wells installed to prevent additional migration of contamination across Very Road. The AS wells are grouped as follows:

Perimeter -	AS 1, 2, 3, 4, 5, 6, 12, 18, 24, 30, 31, 32, 33 and 34
Defensive -	AS 35, 36, 37, 38 and 39
Module Area -	AS 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 25, 26, 27, 28 and 29

Within the source area, the eight movable AS lines will be used in a modular fashion to rotate between three different configurations of the 20 AS wells located within this area. These sub groups are as follows:

a - AS7, 10, 13, 14, 19, 22, 26 and 29
b - AS8, 15, 16, 17, 20, 21, 27 and 28
c - AS9, 11, 14, 20, 22, 23, 25 and 27

Each AS wellhead was installed with a 1/2 inch operating valve. A site plan illustrating all AS manifolding is presented as Figure 6.

1.5 Process System Installation

The AS/SVES process system is located in the equipment garage. The SVE unit is capable of providing 480 scfm at 10 inches of mercury (Hg) vacuum. The blower unit is a 25 HP rotary lobe type, fitted with an air/water separator with a high level water shutoff switch, an in-line particulate filter, inlet and outlet silencers, and an adjustable vacuum relief valve. A schematic of the vapor extraction system is presented in Figure 7.

The air sparging unit is capable of supplying 130 cfm of air at 30 psi. The compressor unit is a 30 HP rotary screw type, fitted with particulate and coalescing filters and a dryer assembly with a holding tank to collect moisture from the dryers.

The unit is also fitted with 3 separate regulators, solenoid valves and timers that allow for the distribution of air flow to the three separate manifold lines at varying intervals. A schematic of the AS system is presented as Figure 8.

Two 1,000 pound carbon contactors were installed in series to control VOC emissions from the SVES discharge. An air to air heat exchanger was installed prior to the carbon units in order to cool the discharge from the blower to under 100 degrees Fahrenheit and subsequently increase the efficiency of the carbon. The discharge from the second carbon unit was vented to the outside of the building through a six inch diameter PVC stack in accordance with the NYSDEC air discharge permit #045800022400001.

2.0 OPERATION AND MONITORING

2.1 SVES Start Up and Operation

The design basis for the SVES wells is predicated on achieving uniform flow from the individual wells. Prior to the SVES start up, individual well performance characteristics were determined for wellfield optimization.

Each well was individually tested at two flowrates and wellhead vacuums were recorded. From these individual well curves (assumed to be linear), individual well flow rates were estimated from the well head vacuum readings. The required wellhead vacuum is calculated by multiplying the design flowrate (30 scfm) by the high flow test ratio of vacuum divided by flow. Individual wellhead performance data is presented in Table 1.

Each wellhead valve in the field was adjusted to meet the vacuum calculated to correspond to the design flow rate. In some cases a well may not achieve the design flow rate as its performance characteristics were below the applied manifold system vacuum (i.e., the wellhead valve was left open).

The SVES was activated on December 22, 1993. Table 2 summarizes SVES discharge data through February 3, 1994. SVES vapor samples were measured with a hand-held total organic vapor meter (OVM) which utilizes a photoionization detector equipped with an 11.7eV bulb (calibrated to benzene). VOC

concentrations from the SVES have ranged from 7 to 20 parts per million on a volume basis (ppmv) as benzene. The measurements were converted from ppmv as benzene to estimated ppmv as trichloroethylene as follows: First, a vapor sample of known concentration of TCE was analyzed using the OVM calibrated to benzene in order to determine the TCE response factor to benzene. Then this response factor is multiplied by the concentrations as benzene. The product is the converted concentration as TCE. This procedure is shown in Equation (1) below.

$$C_{known} / C_{benz} = rf_{TB}$$

and

$$rf_{TB} * C_i = C_{TCE} \qquad (1)$$

where

C_{known}	=	known concentration of TCE vapor sample, (ppmv)
C_{benz}	=	concentration of TCE vapor sample as read by OVM (ppmv) calibrated to benzene,
rf_{TB}	=	response factor of TCE to benzene,
C_i	=	concentration of a given vapor sample as read by OVM calibrated to benzene, and
C_{TCE}	=	converted concentration as TCE (ppmv).

Concentrations of post carbon discharge samples have throughout the operating period remained below detection limits. Confirmatory pre- and post-carbon laboratory samples were taken at the time of start up. Laboratory results are presented in Appendix B.

System flow rate at the time of start up of the SVES was 287 scfm. This was increased to approximately 425 scfm on January 12, 1994 and has remained in this range since. Flow rates were measured using a pitot tube assembly. SVES flow data is presented in Table 2.

Total system flow is calculated as in Equation (2) below (Equation out of Omega High Accuracy Pitot Tube Operator's Manual M579/1091).

$$Q = 128.8 * K * D_i^2 * ((P * delP)/((T + 460) * S_S))^{1/2} \quad (2)$$

where:

Q	=	total flow (scfm),
K	=	flow coefficient (dependent on D_i),
D_i	=	inner diameter of manifold (inches),
P	=	static manifold pressure (psia)
	=	$(14.7 + P_m/27.7)$
where		
P_m	=	vacuum pressure ("H_2O) and is negative if under vacuum,
delP	=	differential pressure ("H_2O),
T	=	temperature in degrees Fahrenheit, and
Ss	=	specific gravity of vapor stream to air.

The SVES went through a debugging process until January 25. The original transformer was overloaded and replaced with a larger capacity unit. For the period from the startup through February 3, 1994 the system has operated for approximately 33 days and has removed approximately 89 pounds (lbs) of volatile organic compounds. This total discharge was calculated by multiplying the total time of operation of the SVE system by the VOC discharge rate. The VOC discharge rate is calculated using Equation (3).

$$DR = Q * 3.742x10^{-5} * f_P * C_V \quad (3)$$

where

DR	=	discharge rate (lbs/hr),
Q	=	total flow (ft^3/min),
fp	=	air pollution factor ((mg/m^3)/ppm-v/v))
		(This data is obtained from the Handbook of Environmental Data on Organic Chemicals, 2nd edition by Karel Verschueren, 1983.), and
C_V	=	concentration of vapor stream (ppm-v/v).

Individual SVEW data from pre- and post-SVES start up is summarized in Table 3. These data indicate that individual well head VOC concentrations ranged from 1 ppmv to 92 ppmv before start up of the system. As of February 3, 1994, wellhead concentrations range from 1 ppmv to 76 ppmv. All individual SVE wellhead concentrations have decreased since start up.

Pipeline freeze ups were encountered, requiring the installation of heat trace and insulation on all SVE pipelines. The SVES has been optimized as necessary during site checks to achieve uniform SVE well flow rates at as close to design flowrates as possible. Currently the SVES is operating on all of the SVE wells.

2.2 AS Start Up and Operation

At the time of start up of the AS system air flowrate and wellhead pressure were measured at each well in order to achieve a uniform flow of approximately 3 scfm per well over the wellfield. As the control valve on each AS well was adjusted, the system pressure changed slightly and subsequently the well flowrates also changed slightly. To compensate for this effect, two rounds of flowrates and pressures were taken to confirm that the well flows had remained close to the desired flow of 3 scfm. Table 4 summarizes the final individual well head pressures and flow rate measurements during the AS start up testing.

The AS system was activated on a continuous basis on January 13, 1994. A compressor overheating problem prevented the AS system from being activated at the same time as the SVES. As defined in Section 1.5, the AS system is divided into three separate groups. The perimeter system consists of 14 wells. The defensive system consists of 5 wells. The remaining 20 wells in the source area system are designed to be operated in subgroups of eight in a modular fashion. That is, only eight wells will be connected to the module group manifold at one time. The three subgroups *a*, *b* and *c* are defined in Section 1.5. The well configurations may be adjusted as more data is gathered on the long term effectiveness of these groupings.

Each group is controlled by an individual timer and solenoid valve. Presently the system is configured such that the perimeter wells are pulsed in one hour on, one hour off intervals on a continuous 24 hour basis. The module wells, which are

currently configured to group *a*, and the defensive wells are grouped together to operate opposite of the perimeter wells. This system allows for maximum usage of the compressor and provides a pulsing of the air sparging process. Pulsing allows the AS process to maximize the development of air pathways in the saturated zone soils which in turn allows for the maximum stripping of contaminant from the ground water. Table 5 presents a summary of the air sparging activities since start up as well as a description of the air sparging configurations.

2.3 Monitoring

The AS/SVES will continue to be monitored by *VAPEX* on a biweekly basis through March 1994. The frequency of planned site checks will be on a monthly schedule starting in March through the first year of operation. The monitoring of AS/SVES physical parameters will include SVES vacuums, SVEW wellhead vacuums, SVES flow rate, AS system pressures, AS wellhead pressures and flow rates. The monitoring of AS/SVES chemical parameters will include SVES air stream pre- and post-carbon VOC concentrations, and SVEW wellhead VOC concentrations. These data will be used to determine system operating efficiencies and to optimize the AS/SVES as necessary to maximize VOC removal rates for the site. The Operating and Maintenance Plan is presented in Appendix C. The Town has been requested to check the systems daily. Motorola will check the site weekly.

3.0 RECOMMENDATIONS FOR AS/SVES OPERATION

3.1 AS/SVE System Performance

The system, having operated from December 22, 1993 through February 11, 1994, a total of 33 days, has removed approximately 89 pounds (the equivalent of 7 gallons of TCE) of VOCs from the soil and ground water zones. The source area AS well configuration will be varied on a quarterly basis. Future monitoring and optimization of the SVE system during site checks will be performed to ensure continued efficient operation.

3.2 SVES Discharge

Monitoring of the post-carbon discharge VOC concentration verifies that the off-gas treatment unit is providing an effective means of control. The post carbon discharge will continue to be monitored and the VOC emission quantities will be

maintained below the acceptable state discharge limits and 97 percent reduction from inlet concentration levels.

3.3 AS/SVES Reporting

Future monitoring reports will briefly describe AS/SVE system configuration and performance on a quarterly basis. The next report is scheduled to be submitted approximately three months from the date of this close out report.

4.0 OTHER ISSUES

On November 9, 1993, during the plumbing of the AS/SVE system, a buried drum was encountered approximately one foot below the ground surface. The approximate location of the drum is shown on Figure 9. The drum was located essentially at the edge of the geophysical survey area investigated as part of the RI/FS.

In response to finding the buried drum, the former geophysical grid was expanded to the south and west to include areas not previously surveyed. A magnetometer survey (the gradiometer option on the instrument malfunctioned, therefore, a straight magnetometer survey was run) was performed by Simon Hydro-Search on ten-foot centers over the expanded grid area on November 16, 1993. The results of the survey are included on Figure 9. Two areas of potential buried metal anomalies were identified in addition to the initially uncovered drum.

On December 2, 1993, test pits were performed at the noted additional anomalies. Although some buried debris and metal were found, no additional drums were uncovered. The one drum that was found during the AS/SVE system installation was removed from the ground, overpacked and temporarily stored in the on-site garage until appropriate disposition is determined.

On December 8, 1993, during the installation of snow fencing around the site, a second drum was found slightly exposed in runoff rill to the northwest of the inactive gravel pit. This area was also not part of the initial geophysical survey performed as part of the RI/FS. The drum was hand excavated and determined to be intact. No other drums were found in the area. Simon Hydro-Search performed an expanded

magnetic gradiometer survey to the north and west of the gravel pit to verify that no more metal anomalies exist in the area. The results of the gradiometer survey are provided on Figure 10. Only one additional anomaly was noted. Hand excavation in the area to approximately 3 feet showed no near surface metal debris.

The noted drum found during snow fence installation was scheduled to be overpacked and sampled the week of January 17th. Due to snow storms which moved through the area, the drum was inaccessible as it was covered with 3 to 4 feet of snow. Overpacking and sampling has been rescheduled for the Spring. The NYSDEC has been notified of this delay in the Monthly Progress Report for January 1994.

TABLES

TABLE 1

SVE WELLHEAD PERFORMANCE DATA
MACHIAS GRAVEL PIT – MACHIAS, NY
VAPEX JOB NO. 93–411
FEBRUARY 1994

WELL	HIGH FLOW TEST VACUUM ("H2O)	HIGH FLOW TEST FLOW (cfm)	LOW FLOW TEST VACUUM ("H2O)	LOW FLOW TEST FLOW (cfm)	HIGH TEST RATIO ("H2O/cfm)	DESIGN WELL VAC ("H2O)
1	64	131	35	89	0.49	15
2	90	125	60	77	0.72	22
3	119	105	73	78	1.13	34
4	72	58	19	30	1.25	37
5	26	169	11.5	109	0.15	5
6	112	106	58	63	1.05	32
7	210	72	91	32	2.92	88
8	210	46	93	26	4.53	136
9	222.6	42	95	26	5.32	159
10	63	154	33	97	0.41	12
11	134	106	78	55	1.26	38
12	210	51	92	26	4.14	124
13	36	179	17	115	0.20	6
14	42	144	25	98	0.29	9
15	214.2	60	85	32	3.60	108
16	40	96	8	64	0.41	12
17	130	91	25	74	1.42	43

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NOTE: DESIGN WELL VAC IS THE WELLHEAD VACUUM REQUIRED TO ACHIEVE THE DESIGN FLOW RATE OF 30 SCFM.

TABLE 2

SVE SYSTEM OPERATION DATA
MACHIAS GRAVEL PIT – MACHIAS, NY
VAPEX JOB NO. 93–411
FEBRUARY 1994

Date,Time	Operating Time (hrs)	Total System Flow (cfm)	Influent Conc* (ppm)	Effluent Conc* (ppm)	Total TCE Discharge Rate (lbs/hr)	Total TCE Removed by SVES (lbs)	Cumulative TCE Removed by SVES (lbs)	Comments
12/22/93, 10am	0.0	287	18.9	ND	0.11	0.00	0.00	Start up.
12/29/93, 8am	164.1	0				18.16	18.16	System down due to ice buildup in lines.
12/29/93, 12n	167.0	285	16.8	ND	0.10	0.28	18.45	Final data after restarting.
1/10/94, 10:30am	452.7	0				27.97	46.41	System down due to ice buildup in lines.
1/12/94, 4pm	452.7	425	18.9	ND	0.16		46.41	Start up data winterized lines.
1/13/94,9am	469.6	405	21	ND	0.17	2.85	49.27	Site check data before optimization of SVES wells.
1/13/94,3pm	475.6	408	NM	NM	0.18	1.05	50.31	Final data after optimization of SVES wells.
1/17/94	570.7	0				16.66	66.98	System down due to overloaded transformer.
1/25/94,10:30am	570.7	390	NM	NM			66.98	System data with new transformer before optimization.
1/25/94,1:15pm	573.5	387	7.35	ND	0.06	0.16	67.14	System data after optimization of SVES wells.
2/3/94,11am	784.2	417	12.6	ND	0.10	21.80	88.94	System down due to low amp setting.
2/3/94,3pm	787.2	405	11.34	NM	0.10	0.29	89.23	System data after optimization of SVES wells.

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* Concentrations measured with a Thermo 580B OVM equipped with a photoionizations detector, reported as trichloroethylene (TCE).

ND = not detected

NM = not measured

TABLE 3

SVE WELLHEAD DATA
MACHIAS GRAVEL PIT – MACHIAS, NY
VAPEX JOB NO. 93–411
FEBRUARY 1994

	12/15/93		1/13/94		1/25/94**		2/3/94**	
WELL	WELLHEAD VACUUM ("H2O)	WELLHEAD* CONCENTRATION (ppm)	WELLHEAD VACUUM ("H2O)	WELLHEAD* CONCENTRATION (ppm)	WELLHEAD VACUUM ("H2O)	WELLHEAD* CONCENTRATION (ppm)	WELLHEAD VACUUM ("H2O)	WELLHEAD* CONCENTRATION (ppm)
1	NM	40	15	10	15	7	15	9
2	NM	52	22	33	22	22	22	26
3	NM	20	34	9	34	6	34	6
4	NM	6	37	9	37	5	37	9
5	NM	18	5	3	5	5	5	4
6	NM	21	32	10	32	9	32	7
7	NM	92	52	80	52	52	52	76
8	NM	9	58	4	59	4	59	1
9	NM	42	55	21	56	18	56	27
10	NM	8	12	7	12	6	12	5
11	NM	15	39	21	38	14	39	23
12	NM	20	51	13	54	6	52	6
13	NM	24	6	11	6	7	6	7
14	NM	4	OFF	OFF	OFF	OFF	NM	NM
15	NM	7	58	9	60	5	58	8
16	NM	1	12	1	12	3	12	1
17	NM	45	43	24	43	16	43	19

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NM = not measured at this time.

* Concentrations are reported as trichloroethylene (TCE).

** Air sparging system active.

NOTE: VW14 off due to pipeline freezing; heat trace and insulation installed 2/3/94.

TABLE 4

AS WELL OPERATION DATA
MACHIAS GRAVEL PIT – MACHIAS, NY
VAPEX JOB NO. 93–411
FEBRUARY 1994

WELL	CONFIGURATION*	FLOW (cfm)	PRESSURE (psi)
AS1	1	3	50
AS2	1	3	60
AS3	1	3	28
AS4	1	3	50
AS5	1	3	43
AS6	1	3	36
AS7	2a	4	60
AS8	2b	4	59
AS9	2c	4	60
AS10	2a	5	60
AS11	2c	3	>60
AS12	1	NM	NM
AS13	2a	4	60
AS14	2a,2c	4.5	59
AS15	2b	4.5	53
AS16	2b	5	53
AS17	2b	4.5	54
AS18	1	NM	NM
AS19	2a	6	59
AS20	2b,2c	4	60
AS21	2b	3	54
AS22	2a,2c	3	54
AS23	2c	4	54
AS24	1	3	21
AS25	2c	4	60
AS26	2a	4.5	59
AS27	2b,2c	3	54
AS28	2b	4	28
AS29	2a	3	54
AS30	1	3	20
AS31	1	3	20
AS32	1	0	20
AS33	1	3	21.5
AS34	1	0	26
AS35	3	4	49
AS36	3	3.5	49
AS37	3	5	50
AS38	3	3.5	50
AS39	3	3	50

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*Configurations are the same as noted on Table 5.

TABLE 5

AS SYSTEM OPERATION DATA
MACHIAS GRAVEL PIT – MACHIAS, NY
VAPEX JOB NO. 93–411
FEBRUARY 1994

Date, Time	Operating Time (hrs)	Operating Well Configuration*	Total Pressure (psi)	Compressor Air Outlet Temperature (deg F)	Perimeter System Pressure (psi)	Module System Pressure (psi)	Defense System Pressure (psi)	Comments
1/13/94, 1pm	0	1, 2a, 3	95	NM	55	50	50	Start up of AS system.
1/17/94	110.05	1, 2a, 3						System down due to overloaded transformer.
1/25/94, 10:30am	110.05	1, 2a, 3	90	175	60	52	50	System data with new transformer.
2/3/94,11am	323.62	1, 2a, 3	90	177	50	50	50	Site check data.

G:\DATA\PROJECT\93-411\ASOPER.WK1

* Configuration 1 consists of all Perimeter AS wells, 1,2,3,4,5,6,12,18,24,30,31,32,33&34.

Configuration 2 consists of three subgroups of the Module AS wells.

2a consists of AS7,10,13,14,19,22,26&29.

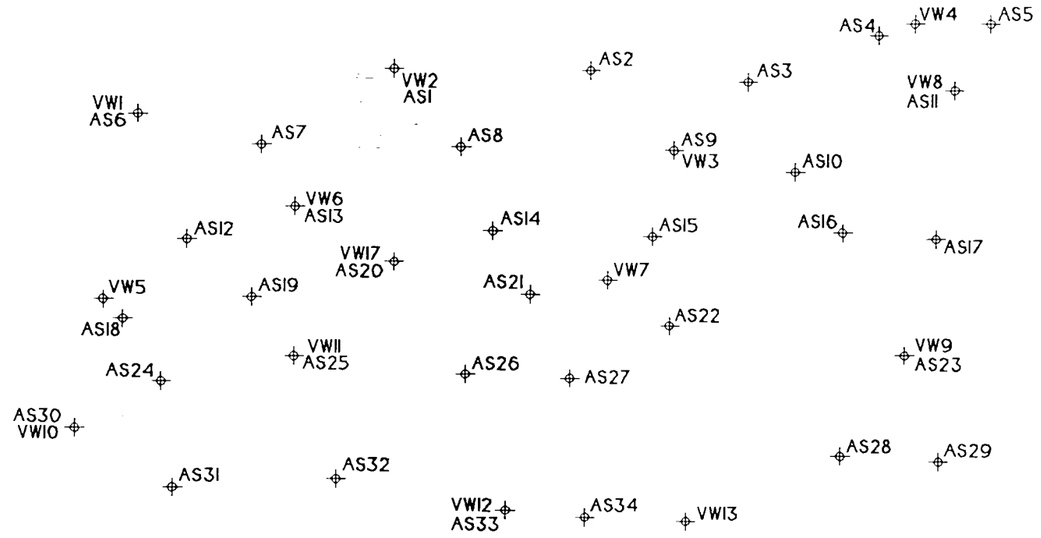
2b consists of AS8,15,16,17,20,21,27&28.

2c consists of AS9,11,14,20,22,23,25&27.

NOTE: Some of the wells in these subgroups overlap and can be reconfigured as necessary for optimization.

Configuration 3 consists of all Defense AS wells, 35,36,37,38&39.

FIGURES



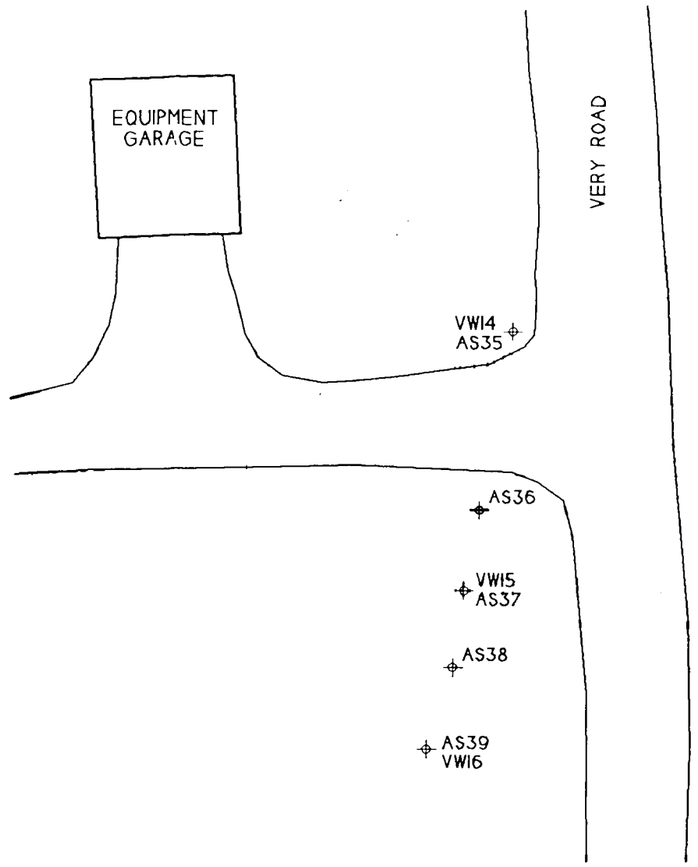


FIGURE 1

ALL INFORMATION ON THIS DRAWING IS APPROXIMATE

SITE: MACHIAS GRAVEL PIT MACHIAS. N.Y.			TITLE: SITE PLAN WITH APPROXIMATE WELL LOCATIONS
JOB#: 93-411	DRAWING#: 411-2		VAPEX® Environmental Technologies
DATE: 2/11/94	DRAWN: DAF		
SCALE: APPROX.	CHECKED:		

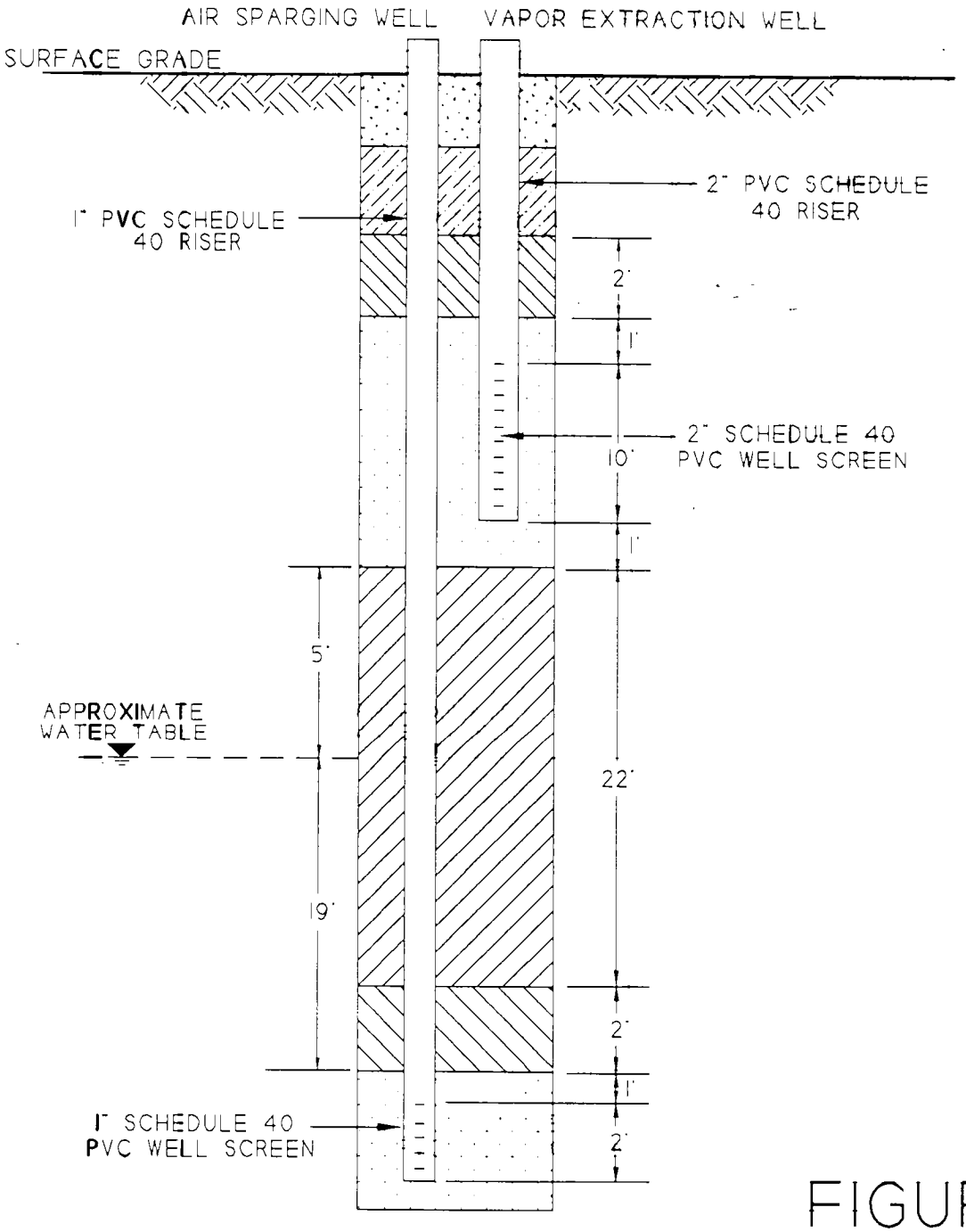


FIGURE 2

LEGEND

- CONCRETE
- NATIVE FILL
- BENTONITE
- SAND
- BENTONITE OR CEMENT/ BENTONITE GROUT

JOB#: 93-411	TITLE: TYPICAL NESTED SVE/AS WELL INSTALLATION DETAIL
DATE: 2/11/94	SITE: MACHIAS GRAVEL PIT MACHIAS, N.Y.
SCALE: NTS	DRAWING#: 411-5
DRAWN: DAF	
CHECKED:	

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Tel. 617 821-5560 Fax 617 821-4967

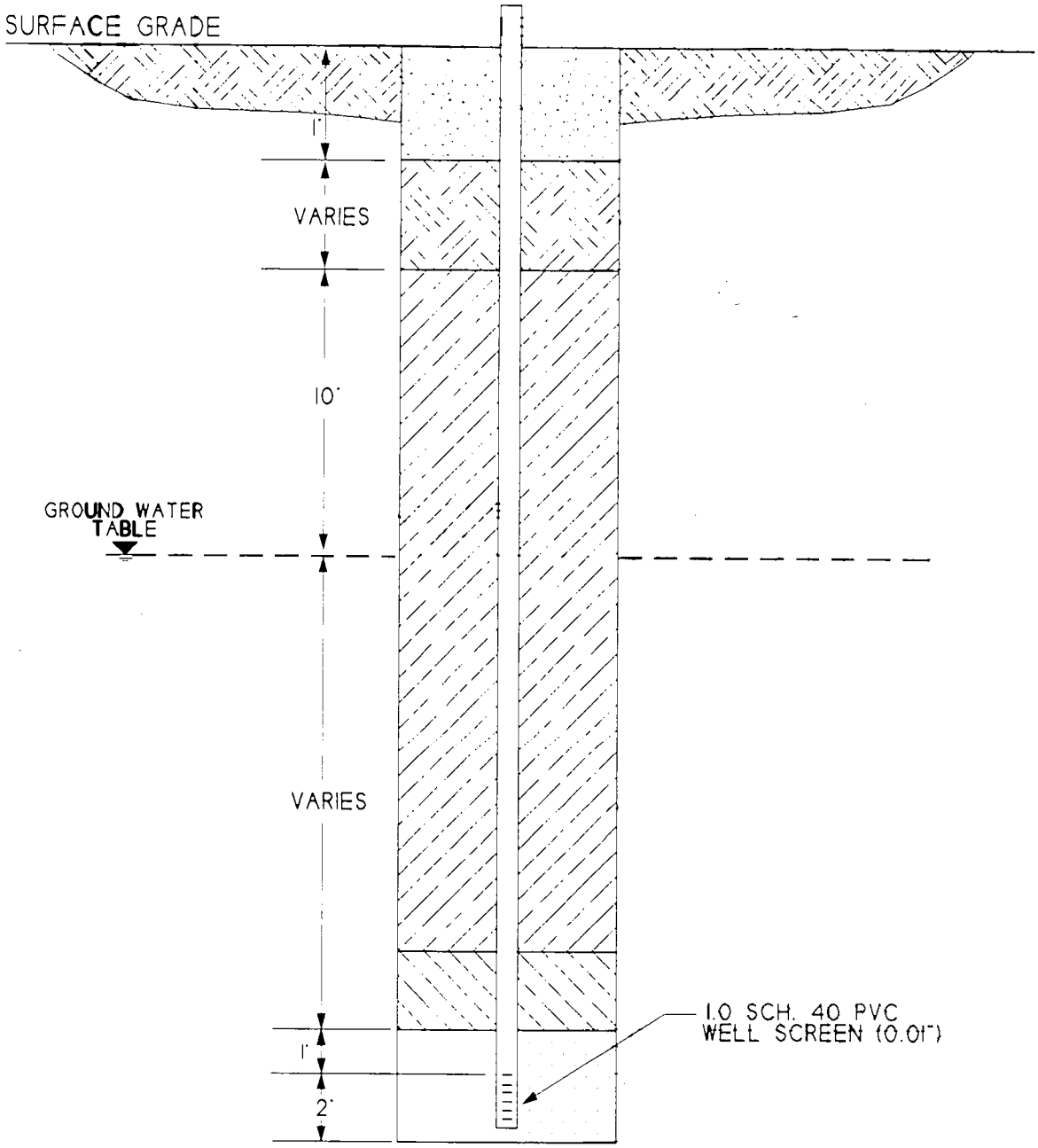

FIGURE 3

LEGEND

- NATIVE
- CONCRETE
- BENTONITE GROUT
- BENTONITE
- SAND

JOB#: 93-411	TITLE: TYPICAL AIR INJECTION WELL
DATE: 2/11/94	SITE: MACHIAS GRAVEL PIT MACHIAS, N.Y.
SCALE: NTS	DRAWING#: 411-6
DRAWN: DAF	
CHECKED:	

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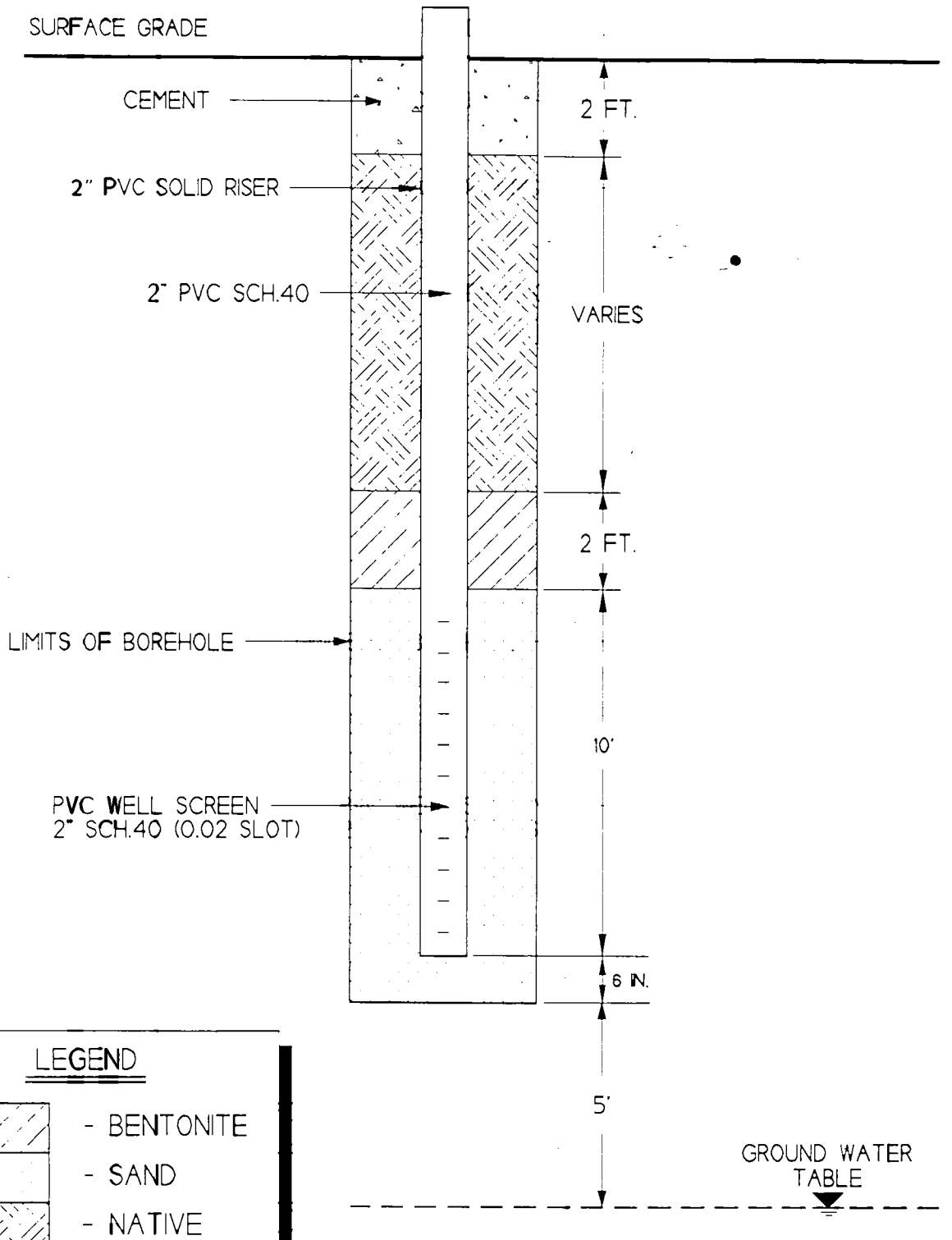

FIGURE 4

SITE:	MACHIAS GRAVEL PIT MACHIAS, N.Y.	TITLE:	TYPICAL VAPOR EXTRACTION WELL
JOB#:	93-411	DRAWING#:	411-4
DATE:	2/11/94	DRAWN:	DAF
SCALE:	NTS	CHECKED:	

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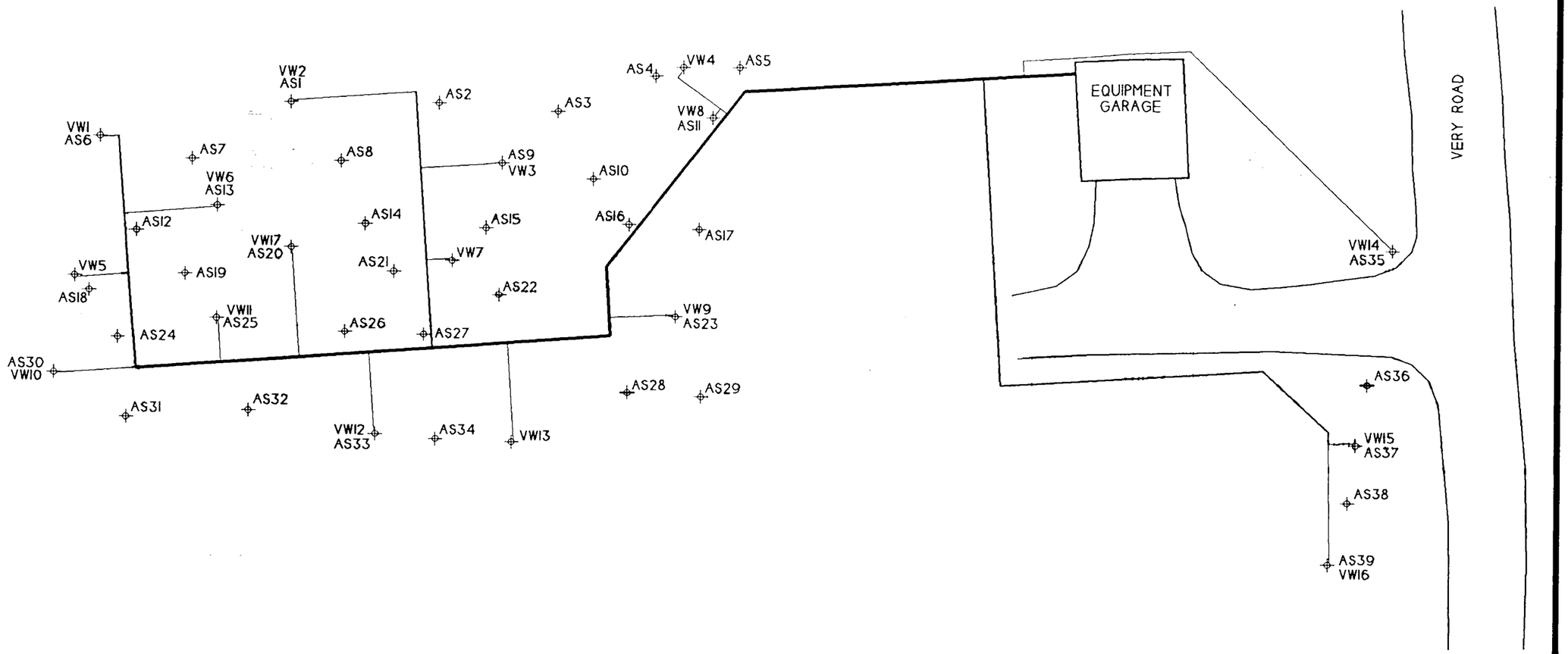


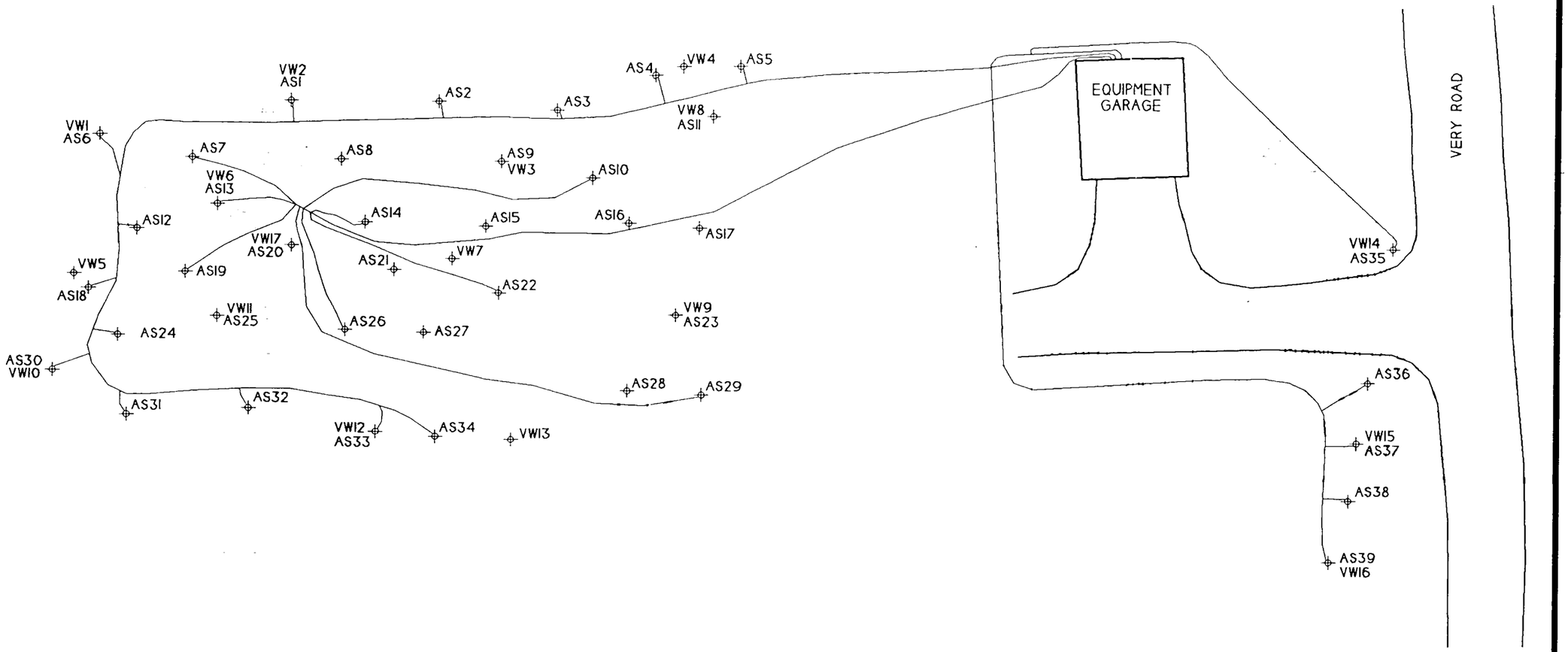
N

- 2" PVC MANIFOLD LINE
- 3" PVC MANIFOLD LINE
- 4" PVC MANIFOLD LINE

2) ALL INFORMATION ON THIS DRAWING IS APPROXIMATE

FIGURE 5

SITE: MACHIAS GRAVEL PIT MACHIAS. N.Y.			TITLE: SITE PLAN WITH SVE MANIFOLD LAYOUT
JOB#: 93-411	DRAWING#: 411-2		VAPEX® Environmental Technologies
DATE: 2/11/94	DRAWN: DAF		
SCALE: APPROX.	CHECKED:		

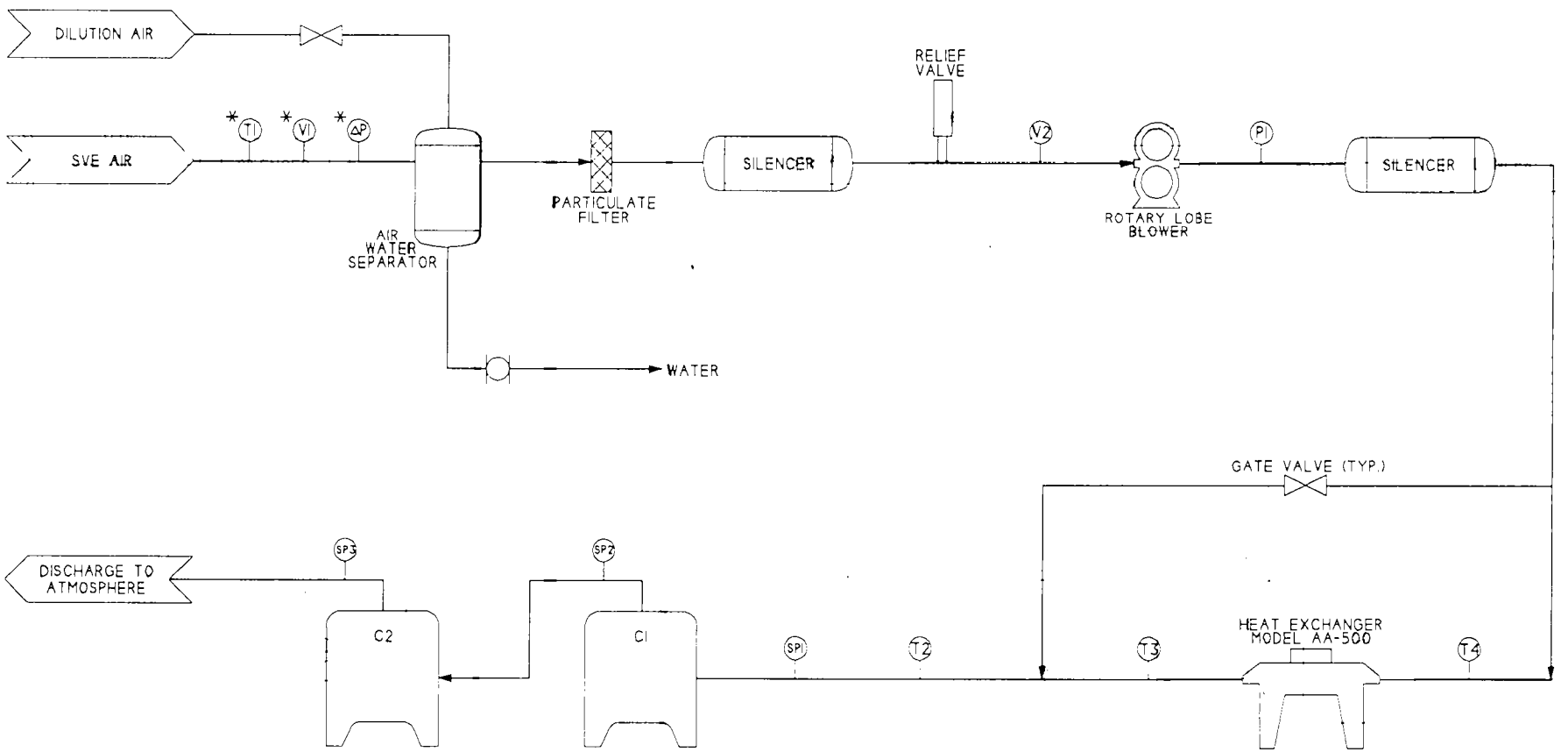


NOTE - 1) MODULE WELLS ARE NOT PERMANENTLY FIXED TO A.S. MANIFOLD AND WILL BE RECONFIGURED ON A REGULAR BASIS TO INCLUDE ALL TWENTY MODULE WELLS.

2) ALL INFORMATION ON THIS DRAWING IS APPROXIMATE

FIGURE 6

SITE: MACHIAS GRAVEL PIT MACHIAS. N.Y.			TITLE: SITE PLAN WITH A.S. MANIFOLD LAYOUT
JOB#: 93-411	DRAWING#: 411-2		VAPEX® Environmental Technologies
DATE: 2/11/94	DRAWN: DAF		
SCALE: APPROX.	CHECKED:		



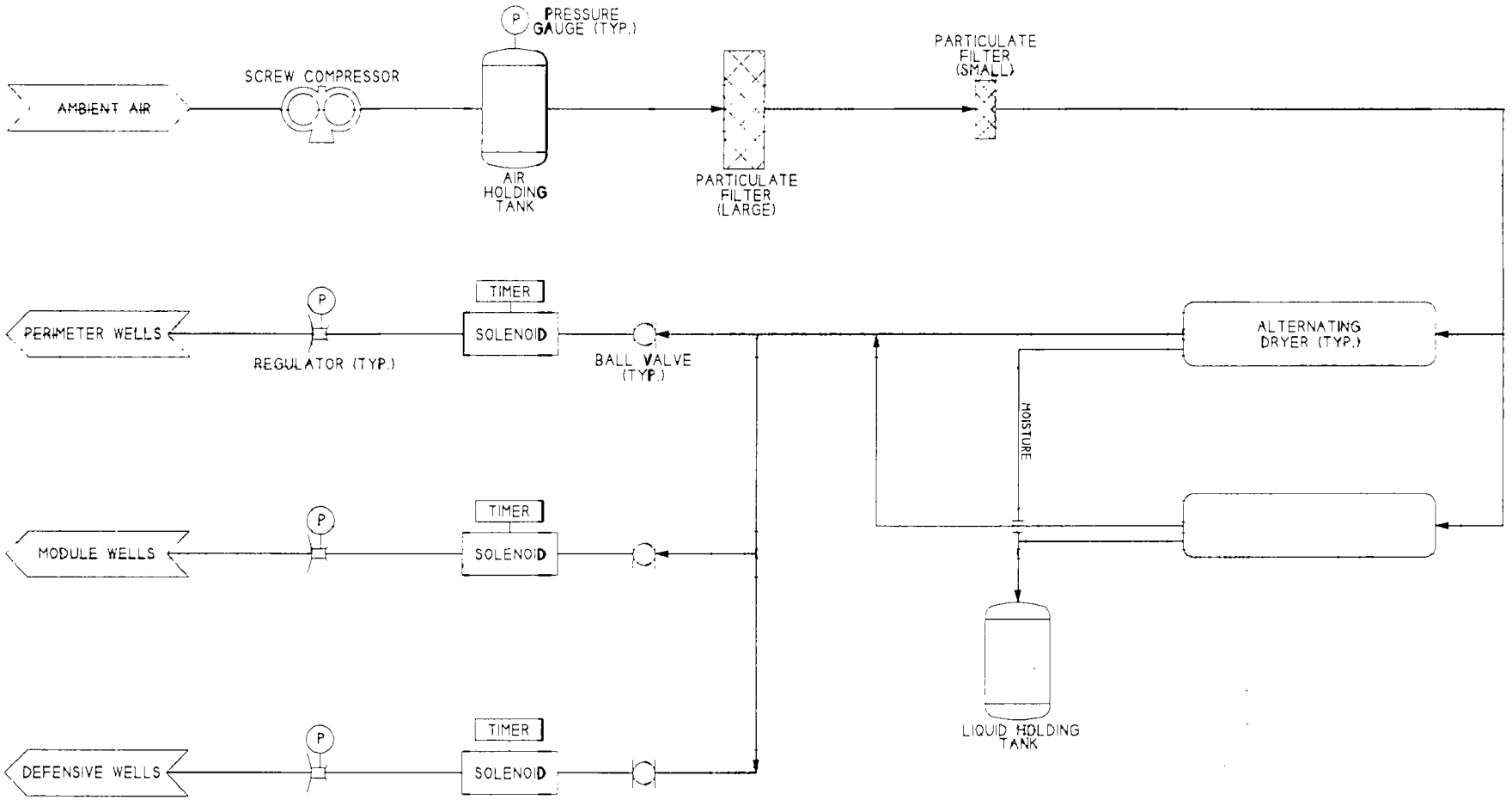
* - MONITORING POINTS LOCATED OUTSIDE OF BUILDING.

SVE SYSTEM

FIGURE 7

SITE:	MACHIAS GRAVEL PIT MACHIAS, N.Y.	TITLE:	SVE SYSTEM
JOB#:	93-411	DRAWING#	411-3
DATE:	1/6/93	DRAWN:	DAF
SCALE:	NTS	CHECKED:	

VAPEX® Environmental Technologies



AS SYSTEM

FIGURE 8

SITE:	MACHIAS GRAVEL PIT MACHIAS, N.Y.	TITLE:	AS SYSTEM
JOB#:	93-411	DRAWING#:	411-1
DATE:	1/6/93	DRAWN:	DAF
SCALE:	NTS	CHECKED:	

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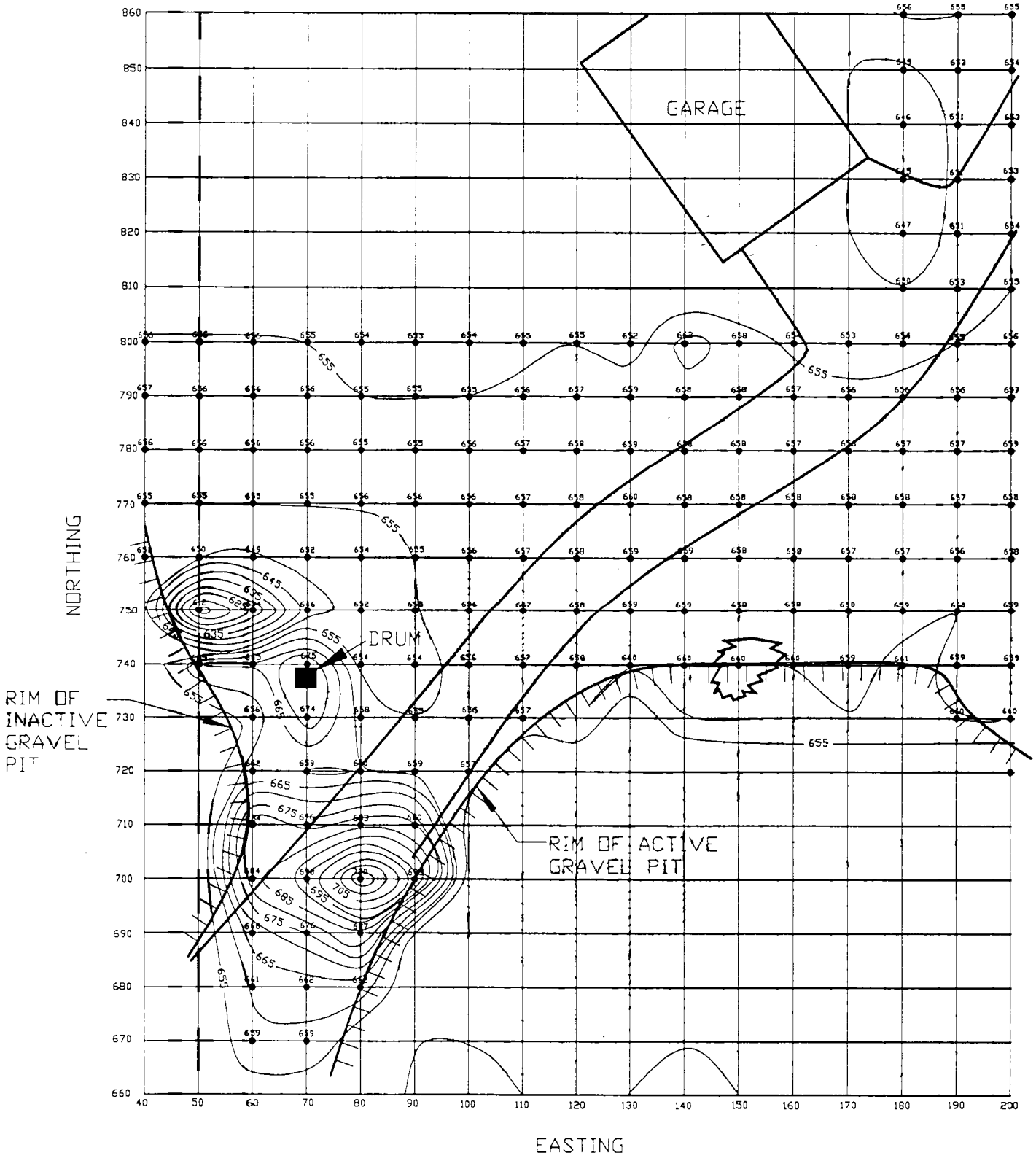
Environmental Technologies

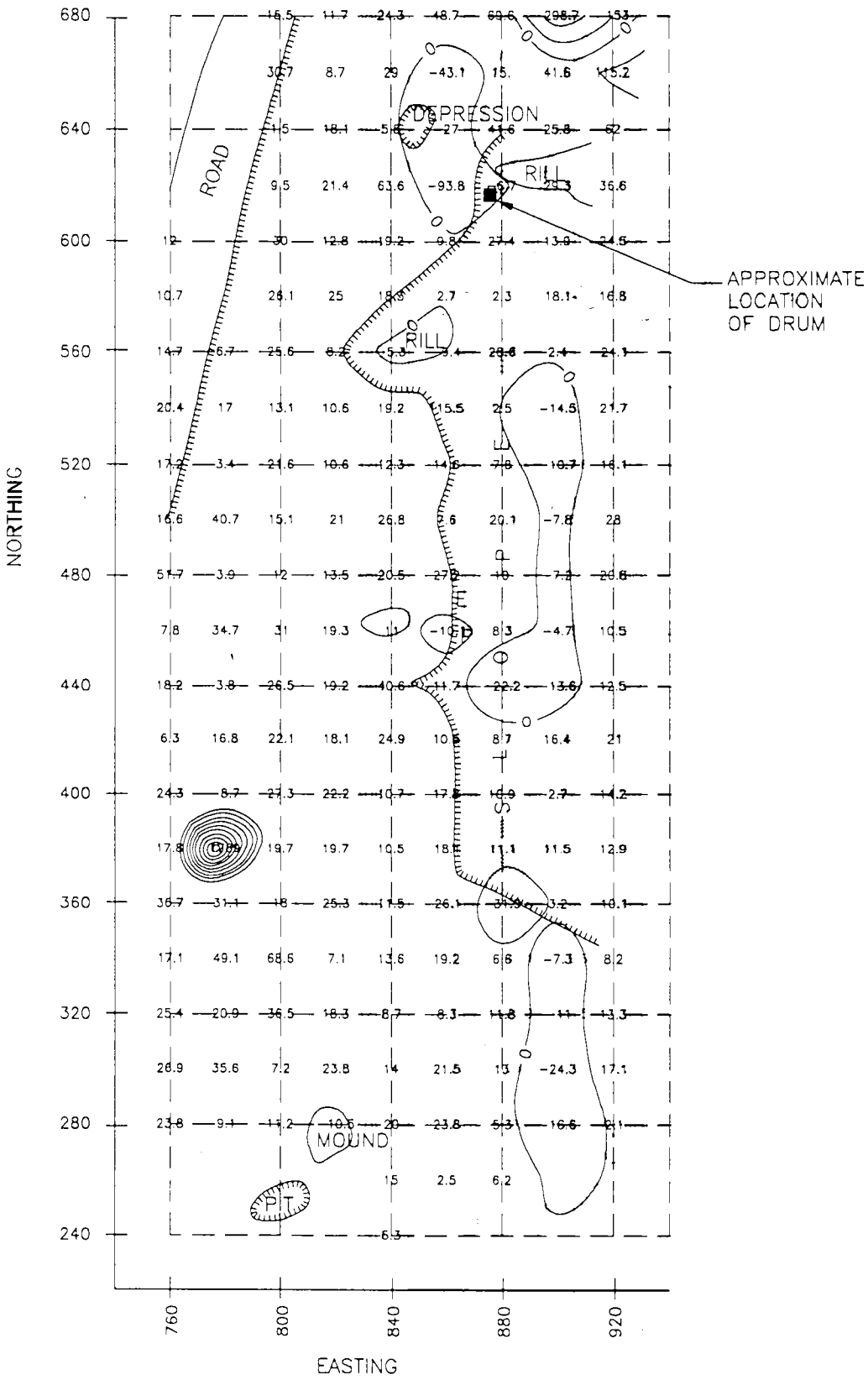


SIMON HYDRO-SEARCH
350 Indiana Street
Suite 300
Golden, Colorado 80401

MACHIAS GRAVEL PIT

RESULTS OF
MAGNETOMETER SURVEY

Dsgn. by:	Chk. by:	Apprv. by:		
PROJECT:	DATE:		DRAWING:	FIGURE: 9



SIMON HYDRO-SEARCH 350 Indiana Street Suite 300 Golden, Colorado 80401			MOTOROLA MACHIAS MAGNETIC GRADIOMETER SURVEY
Dsgn. by:	Chk. by:	Apprv. by:	
PROJECT:	DATE:	DRAWING:	FIGURE: 10

APPENDIX A

APPENDIX A

BORING LOGS

GENERAL OVERVIEW OF SITE GEOLOGY AND WELL CONSTRUCTION

Site geology consists of intermittent strata of small to large gravel, fine sands and silty sands. Generally the sands and gravel exist to a depth of approximately 40 to 45 feet below grade and are underlain by silt and silty sands with occasional layers of courser materials. Ground water depths range from approximately 40 to 55 feet below grade across the site.

Air sparging wells were constructed with two feet of screen and one foot of sand pack above the top of the screen. Wells were installed such that the depth of the top of the sand pack was approximately 20 feet below the groundwater.

Soil vapor extraction wells were constructed with 10 feet of screen and a sand pack that extended to approximately one foot above the screen. The bottom of the screen was set approximately 5 feet above the groundwater level.

START: ____ FINISH: ____
DATE: 10/1/93 DATE: 10/4/93
SHEET: 1 OF: 2

VAPEX®

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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS/MW 2
DEPTH: 67'
CLIMATE: ____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: ____
DESCRIPTION: ____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5													5
10													10
15													15
20													20
25													25
30													
35													
40												2" MW set @ 39' w/10' Screen	39

METHOD OF INVESTIGATION: ____
INSTALLATION COMMENTS: ____
FIELD ANALYSIS EQUIPMENT: ____
INSPECTOR: ____

START: _____ FINISH: _____
DATE: 12/1/93 DATE: 12/4/93
SHEET: 2 OF: 2

VAPEX®

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BORING AND INSTALATION LOG
HOLE NO.: AS1VW2
DEPTH: 67'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45							▽			45
50										50
55										55
60										60
65					backfill/native sand		bentonite grout			63.25 / 65
70									1" AS set @ 67' w/ 2' screen	67 / 70
										75

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: ____ FINISH: ____
DATE: 2 DATE: ____
SHEET: 1 OF: 1

VAPEX®

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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS2
DEPTH: 66'
CLIMATE: ____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: ____
DESCRIPTION: ____

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
10													10
20													20
30													30
40													40
50												backfill/ native / grout / running sands w/ some gravel sand	50
60													60
70												1" AS @ 66' w/ 2' screen	70
80													80

METHOD OF INVESTIGATION: ____
INSTALLATION COMMENTS: ____
FIELD ANALYSIS EQUIPMENT: ____
INSPECTOR: ____

START: _____ FINISH: _____
DATE: 10/7/93 DATE: 10/7/93
SHEET: 1 OF: 1

VAPEX

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BORING AND INSTALATION LOG
HOLE NO.: AS3
DEPTH: 67.7'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	SAMPLE PEN | REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
10										10
20										20
30										30
40										40
50									5 bag Sand [illegible]	50
60										60
70									1" AS @ 67.7' w/ 2' screen	67.7 70
80										80

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: _____ FINISH: _____
DATE: 10-12-93 DATE: 10-12-93
SHEET: 1 OF: 3

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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 4
DEPTH: 82'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: SINGLE AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN / REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
									5
									10
									15
									20
									25
									30
									35
									40

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ HOLLOW STEM AUGER
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-12-93 DATE: 10-12-93
SHEET: 2 OF: 3

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BORING AND INSTALATION LOG
HOLE NO.: AS 4
DEPTH: 82'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: SINGLE AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ HOLLOW STEM AUGER
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-12-93 DATE: 10-13-93
SHEET: 3 OF: 3

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BORING AND INSTALATION LOG
HOLE NO.: AS 4
DEPTH: 82'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: SINGLE AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													85
													90
								NATIVE MATL.	SAND	BENT.	GROUT		

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ HOLLOW STEM AUGER
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-12-93 DATE: 10-13-93
SHEET: 1 OF: 2

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BORING AND INSTALATION LOG
HOLE NO.: AS5
DEPTH: 80'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL (1")

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGER
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-12-93 DATE: 10-12-93
SHEET: 2 OF: 2

VAPEX

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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS-5
DEPTH: 80'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL (1")

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										45
										50
							▽			55
										60
										65
										70
										75
										80

NATIVE SAND BENT GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10/4/93 DATE: 10/4/93

SHEET: 1 OF: 2

VAPEX

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BORING AND INSTALATION LOG
HOLE NO.: AS6 VW1
DEPTH: 67'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo

BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5									5
10									10
15									15
20									20
25									22 25
30									30
35									35
40								2" VW set @ 37' w/ 10' screen	40

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: ____ FINISH: ____
DATE: 10/4/93 DATE: 10/4/93

SHEET: 2 OF: 2

VAPEX

Environmental Technologies, Inc.
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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS6UW1
DEPTH: 67'
CLIMATE: ____

PROJECT: 93-411
DRILLER: Buffalo

BORING LOCATION: ____
DESCRIPTION: ____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45													45
50													50
55													55
60													60
62													62
65								backfill native sand	bentonite	grout			65
70												1" AS set @ 67' w/ 2' screen	70

METHOD OF INVESTIGATION: ____
INSTALLATION COMMENTS: ____
FIELD ANALYSIS EQUIPMENT: ____
INSPECTOR: ____

START: _____ FINISH: _____
DATE: 10/6/93 DATE: 10/6/93
SHEET: 1 OF: 1

VAPEX®
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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 7
DEPTH: 68.4'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo

BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
10										10
20										20
30										30
40										40
44										44
50					backfill/ native	sand	bent.	grout		50
60										60
70									1" AS set @ 68.4' w/ 2' screen	70
80										80

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: ___ FINISH: ___
DATE: 10-6-93 DATE: 10-11-93
SHEET: 1 OF: 2

VAPEX®
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Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: A58
DEPTH: 67'
CLIMATE: ___

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-6-93 DATE: 10-11-93
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS8
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45													
50													
55													
60													
65													
70												NATIVE MATERIAL / SAND / BENT / GROUT	
75													
80													

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: _____ DATE: _____
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW3/AS9
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: _____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5													5
10													10
15													15
20													20
25													25
30													30
35													35
40													40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW3/AS9
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: ____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45						▽			45
50									50
55									55
60									60
65				NATIVE BACKFILL	SAND	BENTONITE	GROUT	1" AS SET @ 67 w/ 2' SCREEN	65
70									70
75									75
80									

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 10
DEPTH: 69'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
								NATIVE MAT'L.	SAND	BENT.	GROUT		30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: "

SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 10
DEPTH: 69'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										▽			45
													50
													55
													60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: _____ DATE: 10/14/93
SHEET: 1 OF: 3

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW8/AS11
DEPTH: 82'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: _____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: _____ DATE: 10/14/93
SHEET: 2 OF: 3

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW8/AS11
DEPTH: 82'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: _____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: _____ DATE: 10/14/93
SHEET: 3 OF: 3

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW8/AS11
DEPTH: 82'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: _____
DESCRIPTION: NESTED VE AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												85
							NATIVE BACKFILL	SAND	BENTONITE	GROUT	1" AS WELL SET @ 67' W/ 2' SCREEN	90
												95

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-20-93 DATE: 10-20-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 12
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												5
												10
												15
												20
												25
												30
												35
												40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-20-93 DATE: ____
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 12
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

NATIVE MATERIAL
SAND
BENT
GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW6/AS 13
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: ____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5										5
10										10
15										15
20										20
25										25
30										30
35										35
40										40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW6/AS13
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: ____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45						▽			45
50									50
55									55
60									60
65				NATIVE BACKFILL	SAND	BENTONITE	GROUT		65
70								1" AS SET @ 67 w/ 2' SCREEN	70
75									75
80									

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-21-93 DATE: 10-21-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 14
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-21-93 DATE: 10-21-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 14
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45													
50													
55													
60													
65													
70								NATIVE MATERIAL	SAND	BENT	GROUT		
75													
80													

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 1 FINISH:
DATE: 10-21-93 DATE: 10-21-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 15
DEPTH: 67'
CLIMATE:

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-21-93 DATE: 10-21-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 15
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
								NATIVE MATERIAL	SAND	BENT	GROUT		70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-13-93 DATE: 10-13-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS16
DEPTH: 80'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL (1")

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE: PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGER
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

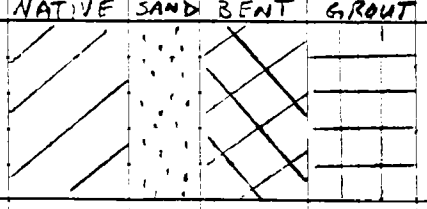
VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS16
DEPTH: 80'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL (1")

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
									45
									50
									55
									60
									65
									70
									75
									80



METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 825a DATE: 26 Oct 93
FINISH: 12N DATE: 26 Oct 93
DEPTH: 70' OF: 77'
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS 17
DEPTH: 77'
CLIMATE:

PROJECT: Motorola, Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 17
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST LOG
5'											
10'											
15'											
20'											
25'							native/backfill; grout; bentonite				
30'							sand; screen				
35'											
40'											

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC sch 40 20 Slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 825a FINISH: 26 Oct 93
FINISH: 12N DATE: 26 Oct 93
DEPTH: 77 OF: 77'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS17
DEPTH: 77'
CLIMATE:

PROJECT: Motorola, Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 17
DESCRIPTION: AS well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														
75'														
80'														77'

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: _____ FINISH: _____
DATE: _____ DATE: _____
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 18
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 18
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

NATIVE MATERIAL
SAND
BENT
GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-22-93 DATE: 10-22-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS19
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												5
												10
												15
												20
												25
												30
												35
												40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-22-93 DATE: 10-22-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS17
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

NATIVE MATERIAL
SAND
BENT
GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-22 DATE: 10-22
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS21
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
											5
											10
											15
											20
											25
											30
											35
											40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 10-22-93 DATE: 10-22-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 21
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
								NATIVE MATERIAL	SAND	BENT	GROUT		70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 12N DATE: 29 Oct 93
FINISH: 230P DATE: 29 Oct 93
DEPTH: 40 OF: 67'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS22
DEPTH: 67'
CLIMATE:

PROJECT: Motorola, Machias NY
DRILLER: Buffalo Drilling

BORING LOCATION: AS22
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN / REC	COMMENTS	INST LOG
5'										
10'										
15'										
20'										
25'										
30'										
35'										
40'										

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC 40 sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 2N FINISH: 290 of 93
FINISH: 2302 DATE: 29 Oct 93
DEPTH: 107' OF: 67'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS22
DEPTH: 67'
CLIMATE:

PROJECT: Motorola Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 22
DESCRIPTION: AS well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														67'
75'														
80'														

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 215p DATE: 25Oct93
FINISH: 520p DATE: 25Oct93
DEPTH: 40' OF: 77'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS23
DEPTH: 77'
CLIMATE: cool, clear 50s

PROJECT: Motorola, Machias, NY
DRILLER: Buffalo Drilling

BORING LOCATION: AS23
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST LOG
5'														
10'														
15'														
20'														
25'										native/backfill; grout; bentonite				
30'										sand; screen				
35'														
40'														

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC 40 Sch
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 215p FINISH: 250ct 93
FINISH: 520p DATE: 25Oct 93
DEPTH: 77' OF: 77'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS23
DEPTH: 77'
CLIMATE: Cool, clear

PROJECT: Motorola, Machias, NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 23
DESCRIPTION: AS well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														
75'														
80'														

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: _____ FINISH: _____
DATE: 10-15 DATE: 10-15-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS24
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
									5
									10
									15
									20
									25
									30
									35
									40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-15-93 DATE: 10-15-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS24
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
								NATIVE MATERIAL	SAND	BENT	GROUT		70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 25 Oct 93 DATE: 930a
FINISH: 25 Oct 93 DATE: 145p
DEPTH: 40' OF: 67'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS25 VW 11
DEPTH: 67'
CLIMATE: cool, clear
50s

PROJECT: Motorola, Mach 1 AS IV4
DRILLER: Buffalo Drilling

BORING LOCATION: AS25 VW11
DESCRIPTION: nested SVE/AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN / REC	COMMENTS	INST LOG
5'										
10'										
15'										
20'										
25'										
30'							bentonite / sand			27'
35'							backfill, native / screen			
40'										38'

METHOD OF INVESTIGATION: Air rotary, 4" casing
INSTALLATION COMMENTS: AS 1" PVC, SVE 2" PVC 40 sch
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 25 Oct 93 DATE FINISH: 930A
FINISH: 25 Oct 93 DATE: 140p
DEPTH: 67' OF: 67'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS25 VW11
DEPTH: 67'
CLIMATE: cool, clear

PROJECT: Motorola, Machias, NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS25 VW11
DESCRIPTION: nested AS/SVE well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'											
50'											
55'											
60'											
65'											
70'											65' 67'
75'											
80'											

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: ____ FINISH: ____
DATE: 11-4-94 DATE: 11-5-94
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS26
DEPTH: 74'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
								NATIVE MAT'L.	SAND	BENT.	GROUT		30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 11-4-94 DATE: 11-5-94
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 26
DEPTH: 74'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										▽			45
													50
													55
												NOTE: CASING STUCK AT 70'.	60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 11-1-93 DATE: 11-1-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS27
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	SAMPLE PEN | REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										5
										10
										15
										20
										25
										30
										35
										40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 11-1-93 DATE: 11-1-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS27
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
								NATIVE MATERIAL	SAND	BENT	GROUT		70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 11-2-93 DATE: 11-2-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS28
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-111
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 11-2-93 DATE: 11-2-93
SHEET: 2 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS28
DEPTH: 67'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
								NATIVE MATERIAL	SAND	BENT	GROUT		70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 1230p DATE: 26 Oct 93
FINISH: 420p DATE: 26 Oct 93
DEPTH: 40' OF: 77'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS29
DEPTH: 77'
CLIMATE:

PROJECT: Motorola, Mathias, NY
DRILLER: Buffalo Drilling

BORING LOCATION: AS 29
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST LOG
5'											
10'											
15'											
20'											
25'											
30'							native/ backfill; grout; bentonite				
35'							sand; screen				
40'											

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 4" PVC 40 Sch 20 Slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Anne-e Lee

START: 1230p FINISH: 26Oct93
FINISH: 420p DATE: 26Oct93
DEPTH: 77' OF: 77'
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS29
DEPTH: 77'
CLIMATE:

PROJECT: Motorola, Mechias, NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 29
DESCRIPTION: AS well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														
75'														
80'														

77'

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: _____ FINISH: _____
DATE: 9/29/93 DATE: 9/30/93
SHEET: 1 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS30WN10
DEPTH: 67'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5										5
10										10
15										15
20										20
25										25
30										30
35										35
40									2" VW @ 36' w/10' screen	40

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: DATE: 9/29/93 FINISH: DATE: 9/30/93

SHEET: 2 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG

HOLE NO.: AS80 VW10

DEPTH: 67'

CLIMATE:

PROJECT: 93-411

DRILLER: Buffalo

BORING LOCATION:

DESCRIPTION:

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45													45
50													50
55													55
60													60
65								backfill native sand bentonite grout					63' 65
70												1" AS @ 67' w/ 2' screen	70
75													75
80													80

METHOD OF INVESTIGATION:

INSTALLATION COMMENTS:

FIELD ANALYSIS EQUIPMENT:

INSPECTOR:

START: ____ FINISH: ____
DATE: 10/18 DATE: 10/18
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS31
DEPTH: 68'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												5
												10
												15
												20
												25
												30
												35
												40

NATIVE MAT'L. SAND BENT. GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 31
DEPTH: 68'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 32
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										5
										10
										15
										20
										25
										30
										35
										40

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4¼" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 32
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										45
										50
										55
										60
										65
					NATIVE MATERIAL	SAND	BENT	GROUT		70
										75
										80

METHOD OF INVESTIGATION: 4" AIR ROTARY WITH 4 1/4" ID HOLLOW STEM
INSTALLATION COMMENTS: SINGLE WELL
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW12/AS33
DEPTH: 67'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: ____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE RECIRED	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
5									5
10									10
15									15
20									20
25									25
30									30
35									35
40									40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 2 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW12/AS33
DEPTH: 67'
CLIMATE: ____

PROJECT: MAC 41AS 93-411
DRILLER: BUFFALO
BORING LOCATION: ____
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN / REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
45						▽			45
50									50
55									55
60									60
65				NATIVE BACKFILL	SAND	BENTONITE	GROUT	1" AS SET @ 67 w/ 2' SCREEN	65
70									70
75									75
80									

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

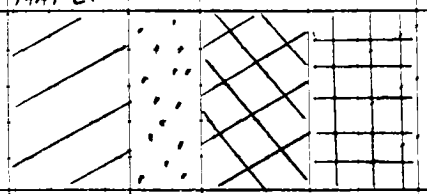
START: _____ FINISH: _____
DATE: 10-19-94 DATE: 10-19-94
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: AS 34
DEPTH: 62'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												5
												10
												15
												20
												25
												30
												35
												40



METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 10-19-94 DATE: 10-19-94

SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: A534
DEPTH: 62'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA
DESCRIPTION: AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
										▽			50
													55
													60
													65
													70
													75
													80

METHOD OF INVESTIGATION: 4" AIR ROTARY W/ 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 1" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: ____ DATE: ____
SHEET: 1 OF: 2

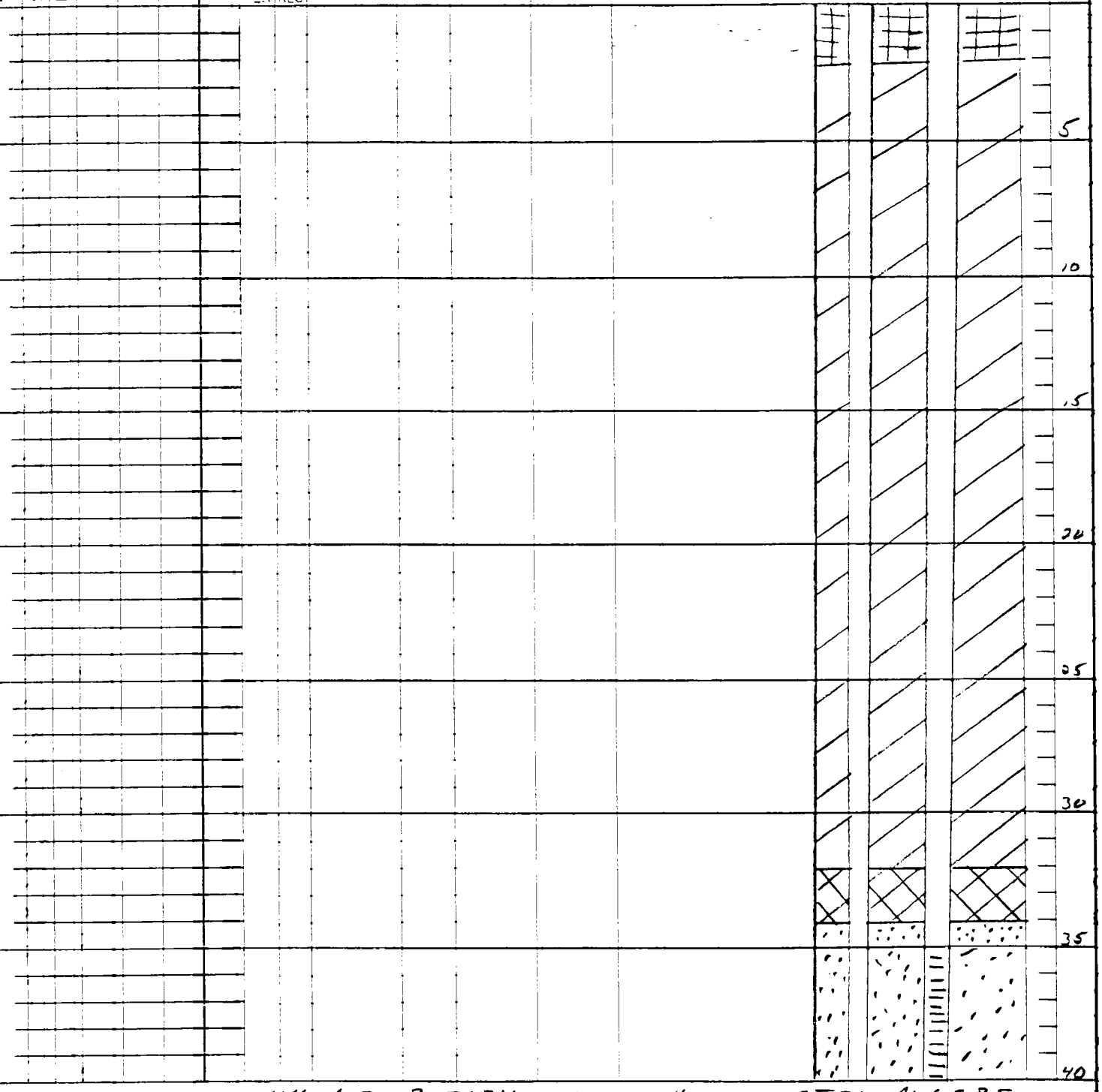
VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VWM/A535
DEPTH: 76'
CLIMATE: ____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: DEFENSIVE LINE
DESCRIPTION: NESTED VE/AS

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG



METHOD OF INVESTIGATION: 4" AIR ROTARY WITH HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: _____ DATE: _____
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VN14/A535
DEPTH: 76'
CLIMATE: _____

PROJECT: MACHIAS 93-411
DRILLER: BUFFALO
BORING LOCATION: DEFENSIVE LINE
DESCRIPTION: NESTED VE/AS WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													45
													50
													55
													60
													65
													70
													75
													80

NATIVE MATERIAL
SAND
BENT
GROUT

METHOD OF INVESTIGATION: 4" AIR ROTARY W 4¼" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: NESTED
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 8am DATE: 9/10 of 93
FINISH: 1130 DATE:
DEPTH: TD OF: 76.5'
SHEET: 1 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS36
DEPTH: 76.5'
CLIMATE:

PROJECT: Motorola Machias NY
DRILLER: Buffalo Drilling

BORING LOCATION: AS36
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN/REC	COMMENTS	INST LOG
5'										
10'										
15'										
20'										
25'										
30'										
35'										
40'										

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC 40 sch 20 Slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 8a FINISH: 27 Oct 93
FINISH: 1130a DATE:
DEPTH: 76.5 OF: 76.5'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS36
DEPTH: 76.5'
CLIMATE:

PROJECT: Motorola Mashies N4
DRILLER: Buffalo Drilling

BORING LOCATION: AS36
DESCRIPTION: AS Well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														
75'														
80'														

76.5

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 12N DATE: 29 Oct 93
FINISH: 1445 DATE: 29 Oct 93
DEPTH: HD OF: 76
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS37VW15
DEPTH: 76'
CLIMATE:

PROJECT: Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS37VW15
DESCRIPTION: nested w/ 3 SVE well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN/REC	COMMENTS	INST LOG
5'										
10'										
15'										
20'										
25'										
30'										
35'										34'
40'										

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: AS 1" PVC SVE 2" PVC 40 Sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 2N	FINISH: 8/00/93	
FINISH: 445p	DATE:	
DEPTH: 76	OF: 76	
SHEET: 2	OF: 2	

VAPEX®

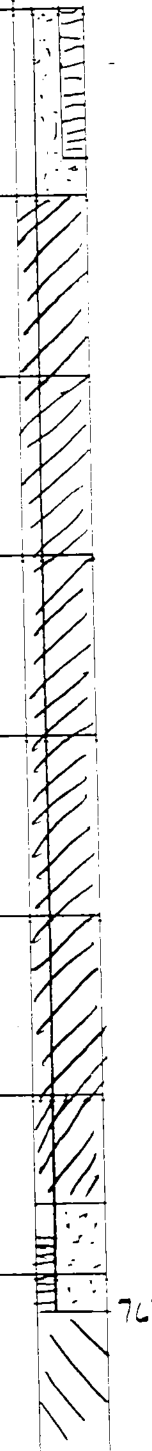
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS37VW15
DEPTH: 76'
CLIMATE:

PROJECT: Motorola, Machias NY
DRILLER: Buffalo Drilling

BORING LOCATION: AS37VW15
DESCRIPTION: nested AS & SVE well

DEPTH	SAMPLE	NO.	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	REC	COMMENTS	INST. LOG.
45'															
50'															
55'															
60'															
65'															
70'															
75'															
80'															



METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 8a DATE: 28Oct93
FINISH: 1:30p DATE: 28Oct93
DEPTH: 40 OF: 77
SHEET: 1 OF: 2

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS38
DEPTH: 77'
CLIMATE:

PROJECT: Motorola Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS38
DESCRIPTION: AS Well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PENT/REC	COMMENTS	INST LOG
5'										
10'										
15'										
20'										
25'										
30'										
35'										
40'										

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC 40 sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 8a FINISH: 1130a
FINISH: [illegible] DATE: 8 Oct 93
DEPTH: 77 OF: 77'
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS38
DEPTH: 77'
CLIMATE:

PROJECT: Motorola Machias NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS38
DESCRIPTION: AS well

DEPTH	SAMPLE	NO.	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	REC	COMMENTS	INST. LOG.
45'															
50'															
55'															
60'															
65'															
70'															
75'															
80'															

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 12N DATE: 27 Oct 93
FINISH: ~~2300~~ 12 DATE: 27 Oct 93
DEPTH: 40 OF: 77'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: AS 39
DEPTH: 77'
CLIMATE:

PROJECT: Motorola Mechanic, NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 39
DESCRIPTION: AS well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN/REC	COMMENTS	INST LOG
5'										
10'										
15'							native/ backfill grout bentonite			
20'							sand screen			
25'							~25' casing broke off			
30'							casing between 25 & 71'			
35'										
40'										

METHOD OF INVESTIGATION: air rotary 4" casing
INSTALLATION COMMENTS: 1" PVC 10 sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 12N FINISH: 27 Oct 93
FINISH: 2300 DATE: 27 Oct 93
DEPTH: 77' OF: 77'
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: AS39
DEPTH: 77
CLIMATE:

PROJECT: Motorola, Macdonald NY
DRILLER: Buffalo Drilling
BORING LOCATION: AS 39
DESCRIPTION: AS well

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														
50'														
55'														
60'														
65'														
70'														
75'										casing to 71'				
80'														

77

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: ______ FINISH: ______

DATE: 9-28-93 DATE: 9-28-93

SHEET: 1 OF: 1

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG

HOLE NO.: VW 4

DEPTH: 40'

CLIMATE: ______

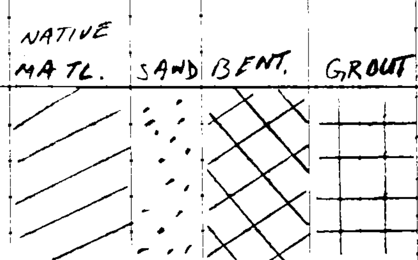
PROJECT: MACHIAS - 93-411

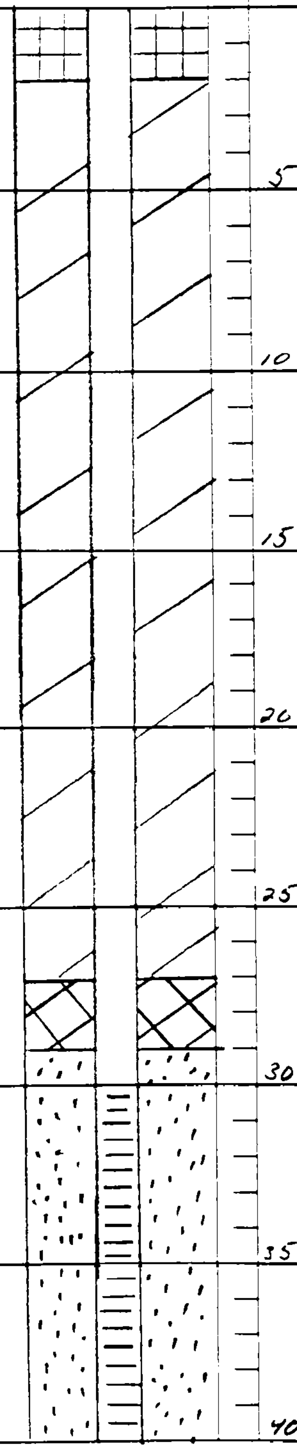
DRILLER: BUFFALO

BORING LOCATION: SOURCE AREA

DESCRIPTION: VAPOR WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG





METHOD OF INVESTIGATION: 4¼" ID HOLLOW STEM AUGERS

INSTALLATION COMMENTS: 2" PVC 20 SLOT SCREEN

FIELD ANALYSIS EQUIPMENT: NO SAMPLING

INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 9-30-93 DATE: 10-13-93
SHEET: 1 OF: 1

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW 5
DEPTH: 40'
CLIMATE: _____

PROJECT: MACHIAS - 93-411
DRILLER: BUFFALO
BORING LOCATION: SOURCE AREA
DESCRIPTION: VAPOR WELL

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
								NATIVE MATL.	SAND	BENT.	GROUT		30
													35
													40

METHOD OF INVESTIGATION: 4 1/4" ID HOLLOW STEM AUGERS
INSTALLATION COMMENTS: 2" PVC 20 SLOT SCREEN
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: 8a DATE: 27 Oct 93
FINISH: 1102 DATE: 27 Oct 93
DEPTH: 40 OF: 40
SHEET: 1 OF: 1

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: VW 7
DEPTH: 40'
CLIMATE:

PROJECT: Motorola, Mechias, NY
DRILLER: Buffalo Drilling
BORING LOCATION: VW 7
DESCRIPTION: SVE well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST LOG
5'											
10'											
15'											
20'											
25'											
30'							native/backfill; grout; bentonite				29'
35'							Sand; screen				
40'											40'

METHOD OF INVESTIGATION: 4 1/2" augers
INSTALLATION COMMENTS: 2" PVC 40 sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: _____ FINISH: _____
DATE: 9/29/93 DATE: 9/29/93

SHEET: 1 OF: 1

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW9
DEPTH: 54'
CLIMATE: _____

PROJECT: 93-411
DRILLER: Buffalo

BORING LOCATION: _____
DESCRIPTION: _____

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
10													10
20													20
30													30
40													40
50													41 43 44 50
60										approx ▽		2" VW @ 54' W/10' SCREEN	54 60
70												backfill native bent sand grout	70
80													80

METHOD OF INVESTIGATION: _____
INSTALLATION COMMENTS: _____
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: _____

START: ____ FINISH: ____
DATE: 10/5/93 DATE: 10/5/93
SHEET: 1 OF: 1

VAPEX

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: VW13
DEPTH: 50'
CLIMATE: ____

PROJECT: 93-411
DRILLER: Buffalo
BORING LOCATION: ____
DESCRIPTION: ____

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
10													10
20													20
30													30
40													38 40
50								backfill/ native	sand	bentonite	grout	2" PW set @ 50' w/10' screen	50
60													
70													
80													

METHOD OF INVESTIGATION: ____
INSTALLATION COMMENTS: ____
FIELD ANALYSIS EQUIPMENT: ____
INSPECTOR: ____

START: 1230 DATE: 27Oct93
FINISH: 1p DATE: 27Oct93
DEPTH: 46 OF: 44'
SHEET: 1 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #1
HOLE NO.: VW 16
DEPTH: 44'
CLIMATE:

PROJECT: Motorola, Machias, NY
DRILLER: Buffalo Drilling

BORING LOCATION: VW16
DESCRIPTION: SVE well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6 / 12 / 18 / 24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST LOG
5'											
10'											
15'											
20'											
25'							native/ backfill; grout bentonite				
30'							sand; screen				
35'											
40'											

34

METHOD OF INVESTIGATION: 4 1/4" augers
INSTALLATION COMMENTS: 2" PVC 40 sch 20 slot
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: 230 FINISH: 270ct 93
FINISH: 6p DATE: 270ct 93
DEPTH: 44 OF: 44
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

DRILL FORM #2
HOLE NO.: VW16
DEPTH: 44'
CLIMATE:

PROJECT: Motorola, Machias, NY
DRILLER: Buffalo Drilling
BORING LOCATION: VW16
DESCRIPTION: SVE well

DEPTH	SAMPLE NO.	BLOWS 6" PENETRATION 6	12	18	24	LAB SAMPLE ID	HSP ppm	STRATA CHANGE ELEV.	MOISTURE CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	SAMPLE PEN	SAMPLE REC	COMMENTS	INST. LOG.
45'														44'
50'														
55'														
60'														
65'														
70'														
75'														
80'														

METHOD OF INVESTIGATION:
INSTALLATION COMMENTS:
FIELD ANALYSIS EQUIPMENT:
INSPECTOR: Annette Lee

START: _____ FINISH: _____
DATE: 11-5-93 DATE: 11-5-93

SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: MW35
DEPTH: 54'
CLIMATE: _____

PROJECT: MACHIAS
DRILLER: BUFFALO

BORING LOCATION: BEYOND DEFENSIVE
DESCRIPTION: SHALLOW

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HSA
INSTALLATION COMMENTS: PER SIMON HYDRO-SEARCH
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 11-5-93 DATE: 11-5-93
SHEET: 2 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: MW35
DEPTH: 54'
CLIMATE: ____

PROJECT: MACHIAS
DRILLER: BUFFALO
BORING LOCATION: BEYOND DEFENSIVE
DESCRIPTION: SHALLOW

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6 | 12 | 18 | 24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
										45
							▽ 47'			50
										55
										60
					SAND		BENT	GROUT		65
										70
										75
										80

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HSA
INSTALLATION COMMENTS: PER SIMON HYDRO-SEARCH
FIELD ANALYSIS EQUIPMENT: NO SAMPLING
INSPECTOR: S. MAGEE

START: ____ FINISH: ____
DATE: 11-1-93 DATE: 11-1-93
SHEET: 1 OF: 2

VAPEX®
Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: MW3D
DEPTH: 75'
CLIMATE: ____

PROJECT: MACHIAS
DRILLER: BUFFALO
BORING LOCATION: BEYOND DEFENSIVE
DESCRIPTION: DEEP MONITORING WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN	SAMPLE REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
													5
													10
													15
													20
													25
													30
													35
													40

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HSA
INSTALLATION COMMENTS: ____
FIELD ANALYSIS EQUIPMENT: ____
INSPECTOR: S. MAGEE

START: _____ FINISH: _____
DATE: 11-1-93 DATE: 11-1-93
SHEET: 2 OF: 2

VAPEX®

Environmental Technologies, Inc.
480 Neponset Street
Canton, MA 02021

BORING AND INSTALATION LOG
HOLE NO.: MW3D
DEPTH: 75'
CLIMATE: _____

PROJECT: MACHIAS
DRILLER: BUFFALO

BORING LOCATION: BEYOND DEFENSIVE
DESCRIPTION: DEEP MONITORING WELL

DEPTH	SAMPLE NO	BLOWS 6" PENETRATION 6	12	18	24	SAMPLE PEN/REC	LAB SAMPLE ID	HSP ppm	MOISTURE CHANGE ELEV.	STRATA CHANGE ELEV.	SOIL IDENTIFICATION COLOR, GRADATION, TYPE, PHYSICAL OBSERVATIONS, VISUAL OBSERVATIONS	INST LOG
												45
									▽ 47'			50
												55
												60
											NATIVE SAND BENT. GROUT	65
												70
												75
												80

METHOD OF INVESTIGATION: 4" AIR ROTARY AND 4" ID HSA
INSTALLATION COMMENTS: 2" PVC SCREEN AND RISER
FIELD ANALYSIS EQUIPMENT: _____
INSPECTOR: S. MAGEE

APPENDIX B

APPENDIX B

LAB DATA

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **VAPEX ENVIRONMENTAL TECHNOLOGIES, INC.**

Site: Machias, NY
Sample: Air - Influent

Report Date: 01/31/94
Sampling By: Client
Date Received: 12/23/93
Analysis Date: 01/06/94
Lab Log No: 9312382

NYSDOH 311-2 Air Sample Analysis (Instrument Tuning Conforming with EPA 8240 Criteria)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	730	ND
75-25-2	bromoform	730	ND
74-83-9	bromomethane	1460	ND
56-23-5	carbon tetrachloride	730	ND
108-90-7	chlorobenzene	730	ND
75-00-3	chloroethane	1460	ND
100-75-8	2-chloroethylvinylether	1460	ND
67-66-3	chloroform	730	ND
74-87-3	chloromethane	1460	ND
124-38-1	dibromochloromethane	730	ND
95-50-1	1,2-dichlorobenzene	730	ND
541-73-1	1,3-dichlorobenzene	730	ND
106-46-7	1,4-dichlorobenzene	730	ND
75-71-8	dichlorodifluoromethane	730	ND
75-34-3	1,1-dichloroethane	730	ND
75-35-4	1,1-dichloroethene	730	ND
107-06-2	1,2-dichloroethane	730	ND
156-60-5	trans-1,2-dichloroethene	730	ND
78-87-5	1,2-dichloropropane	730	ND
10061-01-5	cis-1,3-dichloropropene	730	ND
10061-02-6	trans-1,3-dichloropropene	730	ND
75-09-2	methylene chloride	730	ND
79-34-5	1,1,2,2-tetrachloroethane	730	ND
127-18-4	tetrachloroethene	730	ND
71-55-6	1,1,1-trichloroethane	730	27,800
79-00-5	1,1,2-trichloroethane	730	ND
79-01-6	trichloroethene	730	70,000
75-69-4	trichlorofluoromethane	730	ND
75-01-4	vinyl chloride	1460	ND

Continued on Page 2

BUCK ENVIRONMENTAL LABORATORIES INC.
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3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
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LABORATORY REPORT

Client: **VAPEX ENVIRONMENTAL TECHNOLOGIES, INC.**

Site: Machias, NY
Sample: Air - Influent

Report Date: 01/31/94
Sampling By: Client
Date Received: 12/23/93
Analysis Date: 01/06/94
Lab Log No: 9312382

NYSDOH 311-2 Air Sample Analysis (Instrument Tuning Conforming with EPA 8240 Criteria)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	730	ND
100-41-1	ethylbenzene	730	ND
108-88-3	toluene	730	ND
1330-20-7	xylenes (m, o, & p)	730	ND

All concentrations are reported as ug/m3. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

John H. Buck, P.E.
Laboratory Director

BUCK ENVIRONMENTAL LABORATORIES INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **VAPEX ENVIRONMENTAL TECHNOLOGIES, INC.**

Site: Machias, NY
Sample: Air - Effluent

Report Date: 01/31/94
Sampling By: Client
Date Received: 12/23/93
Analysis Date: 01/06/94
Lab Log No: 9312382

NYSDOH 311-2 Air Sample Analysis
(Instrument Tuning Conforming with EPA 8240 Criteria)

CAS No.	Compound	DL	RESULT
75-27-4	bromodichloromethane	775	ND
75-25-2	bromoform	775	ND
74-83-9	bromomethane	1550	ND
56-23-5	carbon tetrachloride	775	ND
108-90-7	chlorobenzene	775	ND
75-00-3	chloroethane	1550	ND
100-75-8	2-chloroethylvinylether	1550	ND
67-66-3	chloroform	775	ND
74-87-3	chloromethane	1550	ND
124-38-1	dibromochloromethane	775	ND
95-50-1	1,2-dichlorobenzene	775	ND
541-73-1	1,3-dichlorobenzene	775	ND
106-46-7	1,4-dichlorobenzene	775	ND
75-71-8	dichlorodifluoromethane	775	ND
75-34-3	1,1-dichloroethane	775	ND
75-35-4	1,1-dichloroethene	775	ND
107-06-2	1,2-dichloroethane	775	ND
156-60-5	trans-1,2-dichloroethene	775	ND
78-87-5	1,2-dichloropropane	775	ND
10061-01-5	cis-1,3-dichloropropene	775	ND
10061-02-6	trans-1,3-dichloropropene	775	ND
75-09-2	methylene chloride	775	ND
79-34-5	1,1,2,2-tetrachloroethane	775	ND
127-18-4	tetrachloroethene	775	ND
71-55-6	1,1,1-trichloroethane	775	ND
79-00-5	1,1,2-trichloroethane	775	ND
79-01-6	trichloroethene	775	ND
75-69-4	trichlorofluoromethane	775	ND
75-01-4	vinyl chloride	1550	ND

Continued on Page 2

BUCK ENVIRONMENTAL LABORATORIES, INC.
ACCREDITED ENVIRONMENTAL ANALYSIS
3845 ROUTE 11 SOUTH, CORTLAND, N.Y. 13045
P.O. BOX 5150 607-753-3403

LABORATORY REPORT

Client: **VAPEX ENVIRONMENTAL TECHNOLOGIES, INC.**

Site: Machias, NY
Sample: Air - Effluent

Report Date: 01/31/94
Sampling By: Client
Date Received: 12/23/93
Analysis Date: 01/06/94
Lab Log No: 9312382

NYSDOH 311-2 Air Sample Analysis (Instrument Tuning Conforming with EPA 8240 Criteria)

CAS No.	Compound	DL	RESULT
71-43-2	benzene	775	ND
100-41-1	ethylbenzene	775	ND
108-88-3	toluene	775	ND
1330-20-7	xylenes (m, o, & p)	775	ND

All concentrations are reported as ug/m3. ND indicates that no amount greater than the detection limit (DL) was detected.

These analyses are certified as conforming to generally accepted laboratory practices, the analytical method cited, requirements of the New York State Health Department ELAP program, and the New York State Department of Environmental Conservation.

John H. Buck, P.E.
Laboratory Director

APPENDIX C

APPENDIX C

OPERATION AND MAINTENANCE PLAN

OPERATION AND MAINTENANCE PLAN
MACHIAS, NY

1.0 OPERATION

1.1 The Soil Vapor Extraction System

The objective of the SVE system is to extract available VOCs from the unsaturated zone. A blower system supplies a vacuum atmosphere to the vapor extraction wells delivering the vapors through manifold to a carbon bed.

A general optimization of the SVE system will be performed throughout the life of the project to maintain a uniform venting across the site as defined by the design parameters specified in the close-out report. In addition, optimization of specific SVE wells associated with the current configuration of sparging AS wells will be conducted for efficient VOC removal.

1.2 The Air Sparging System

The objective of the AS system is to remove VOCs from the saturated zone. A compressor system supplies air through sparging lines to the AS wells to provide a vehicle for VOCs from the saturated zone to the unsaturated zone.

The air is supplied to the site through three distinct lines, the perimeter, the defensive, and the module, as defined in the close-out report. Optimization or reconfiguration occurs every three months of the operational year providing remediation in a modular fashion with consistent flows to individual AS wells. The perimeter and defensive groups will operate throughout the year while the module group will alternate between subgroups as defined in the close-out report on a quarterly basis. For optimization in the final quarter, in addition to the operation of the perimeter and defensive groups, data from the previous quarters will be analyzed in order to reconfigure, if necessary, the module subgroups to provide remediation where most effective.

2.0 MONITORING

2.1 The Soil Vapor Extraction System

Total SVE system flow measurements, elapsed time, temperature data, load on the blower, and total VOC concentrations will be recorded on every site visit as well as vapor extraction wellhead measurements including wellhead vacuums and wellhead VOC concentrations.

Flow measurements are taken on the main 4" PVC manifold line located just outside of the building where a temperature gauge, a vacuum port and a Pitot tube port are mounted. The vacuum is measured using a 0-150 "H_2O Magnehelic pressure gauge. The differential pressure is measured using an Omega High Accuracy Pitot Tube connected to a 0-5 "H_2O Magnehelic differential pressure gauge.

Temperature data is recorded for the air temperatures entering and exiting the heat exchanger, and entering the carbon beds using mounted temperature gauges. A 0-30 "Hg vacuum gauge is mounted directly before and a 0-6 psi pressure gauge is mounted directly after the blower to measure its load.

Total system VOC concentrations are measured in three locations on SVE system, the inlet to the first carbon bed, between the first and second carbon beds, and after the second carbon bed. The measurements are taken with an organic vapor meter (OVM) equipped with a photoionization detector which utilizes a 10.6 eV bulb.

Each of the SVE wells is equipped with a sample port at which the well vacuum and VOC concentration is measured using the same equipment as described above for the total system vacuum and the VOC concentrations, respectively. A listing of all the SVE wells and sampling frequency is attached in Table C1.

2.2 The Air Sparging System

The AS system monitoring includes data collection of the compressor air temperature, elapsed time, perimeter system pressure, module system pressure, defensive system pressure and AS well measurements including well pressure and well flow rates.

Compressor air temperature is read directly off of the gauge located on the compressor control panel. The perimeter, module, and defensive system pressures are read from the mounted pressure gauges located just before the solenoid valve on each line.

Individual well pressure and flow rates are measured and adjusted using a 0-60 psi pressure gauge and a 0-10 cfm in-line flowmeter at the time of each reconfiguration. This equipment is assembled with the same quick-connect connections as the air sparging manifold and therefore can be connected in line with each of the wells. A listing of all AS wells is attached in Table C1.

Representatives of either the Town or Motorola will also check on the site between *VAPEX* site visits. A logbook is located on the compressor unit in which the representative will log the date and time of the visit. The operation hours of both systems, the blower vacuum and pressure, and the temperature of the air entering the first carbon bed will also be recorded. A site check form and a system log sheet is attached to this plan.

2.3 Groundwater Monitoring Wells

Wells selected for groundwater monitoring, analytical parameters, EPA test methods, frequency of sampling and target cleanup levels for the Machias Gravel Pit groundwater monitoring wells are provided in the report entitled "Final Remedial Design/Remedial Action Work Plan For Machias Gravel Pit Site" by Simon-Hydrosearch, 1993.

3.0 MAINTENANCE

3.1 The Soil Vapor Extraction System

In addition to regular monitoring, the SVE system is shut down on each visit in order to check the oil level in the blower. After each 1000 hours of operation the oil must be changed. The liquid level in the water knockout tank is checked. Should the knockout tank require draining, the liquid will be drummed, analyzed and disposed of properly. The belts are checked for significant wear and deterioration also at this time.

SVE and AS manifold lines will be inspected for any leaks or stresses during each site check. Heat tape, insulation, and pipe supports will also be inspected and repaired as necessary to maintain operational integrity as well as physical appearance.

3.2 The Air Sparging System

The AS system is also shut down on each visit in order to check the oil level in the compressor. After each 1000 hours of operation a sample of the oil must be analyzed for decomposition, and the air filter and the oil filter must be changed. The liquid level in the liquid holding tank is also checked. Should the holding tank require draining, the water will be disposed of as a non-hazardous substance.

3.3 Groundwater Monitoring Wells

As part of the ongoing monitoring program, the physical condition of each well (i.e., the integrity of locks, PVC casing, protective casing, and concrete collars) will be noted in the designated field notebook. Any wells identified as needing repair will be scheduled and repaired by a local drilling contractor. Any wells damaged beyond repair will be abandoned in accordance with the NYSDEC protocol for well abandonment.

In addition to noting the physical condition of each well, the total depth of each well will be recorded during each sampling event. This will help to monitor silting levels at the bottom of the well over time.

4.0 SITE CHECKS AND REPORTING

VAPEX will monitor the AS/SVE system on a regular basis, biweekly through March 1994 and then monthly through the first year of operation. A list of emergency contacts and phone numbers immediately follows. Future monitoring reports will be submitted on a quarterly basis.

EMERGENCY CONTACTS AND PHONE NUMBERS

COMPANY	CONTACT	PHONE NUMBER
VAPEX	STEVE MAGEE ANNETTE LEE BRUCE CLIFF	(617) 821-5560
SIMON/HSI	RICH GNAT PHIL MOYER	(800) 544-5528
TOWN OF MACHIAS	DICK DASH	(716) 353-8851

TABLE C1
WELL SAMPLING INFORMATION

WELL	PURPOSE	SAMPLING FREQUENCY			PARAMETER	METHOD
		weeks 1–4	5–8	9–52		
VW1	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW2	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW3	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW4	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW5	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW6	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW7	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW8	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW9	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW10	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW11	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW12	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW13	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW14	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW15	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW16	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
VW17	SVE	Weekly	Biweekly	Monthly	Total VOCs	OVM
AS1	AS	NA	NA	NA	NA	NA
AS2	AS	NA	NA	NA	NA	NA
AS3	AS	NA	NA	NA	NA	NA
AS4	AS	NA	NA	NA	NA	NA
AS5	AS	NA	NA	NA	NA	NA
AS6	AS	NA	NA	NA	NA	NA
AS7	AS	NA	NA	NA	NA	NA
AS8	AS	NA	NA	NA	NA	NA
AS9	AS	NA	NA	NA	NA	NA
AS10	AS	NA	NA	NA	NA	NA
AS11	AS	NA	NA	NA	NA	NA
AS12	AS	NA	NA	NA	NA	NA
AS13	AS	NA	NA	NA	NA	NA
AS14	AS	NA	NA	NA	NA	NA
AS15	AS	NA	NA	NA	NA	NA
AS16	AS	NA	NA	NA	NA	NA
AS17	AS	NA	NA	NA	NA	NA
AS18	AS	NA	NA	NA	NA	NA
AS19	AS	NA	NA	NA	NA	NA
AS20	AS	NA	NA	NA	NA	NA
AS21	AS	NA	NA	NA	NA	NA
AS22	AS	NA	NA	NA	NA	NA
AS23	AS	NA	NA	NA	NA	NA
AS24	AS	NA	NA	NA	NA	NA
AS25	AS	NA	NA	NA	NA	NA
AS26	AS	NA	NA	NA	NA	NA
AS27	AS	NA	NA	NA	NA	NA
AS28	AS	NA	NA	NA	NA	NA
AS29	AS	NA	NA	NA	NA	NA
AS30	AS	NA	NA	NA	NA	NA
AS31	AS	NA	NA	NA	NA	NA
AS32	AS	NA	NA	NA	NA	NA
AS33	AS	NA	NA	NA	NA	NA
AS34	AS	NA	NA	NA	NA	NA
AS35	AS	NA	NA	NA	NA	NA
AS36	AS	NA	NA	NA	NA	NA
AS37	AS	NA	NA	NA	NA	NA
AS38	AS	NA	NA	NA	NA	NA
AS39	AS	NA	NA	NA	NA	NA

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SVE — Soil vapor extraction well
AS — Air sparging well
NA — not applicable
Total VOCs — Total volatile organic compounds as measured by the OVM
OVM — Organic vapor meter, equipped with a photoionization detector which utilizes a 10.6 eV bulb.

NOTES:

(1) The air sparging wells inject ambient air into the saturated zone. Therefore, no sampling is involved. On a quarterly basis, the wells are monitored for flows.

(2) All groundwater monitoring, analytical parameters, EPA test methods, frequency of sampling and target cleanup levels for the Machias Gravel Pit groundwater monitoring wells are provided in the report entitled "Final Remedial Design/Remedial Action Work Plan For Machias Gravel Pit Site" by Simon–Hydrosearch, 1993.

VAPEX FIELD DATA SHEET, MACHIAS, NY

DATE _____

INSPECTOR _____

SYSTEM STATUS:

Total Operation Hours of Blower (hours)
Pressure after Blower (psi)
Vacuum @ Blower Inlet ("Hg)
Temperature @ Carbon Inlet (degrees F)
Temperature prior to Xchanger (degrees F)
Temperature after Xchanger (degrees F)
Ambient Temperature (degrees F)

FLOW MEASUREMENTS:

	Time	Temperature (degrees F)	Static Vacuum ("H2O or "Hg)	Delta P ("H2O)	Calc Flow (cfm)
Initial					
Final					

PID DATA: (ppm)

Effluent	Influent	Between Carbon

VAPOR EXTRACTION WELLHEAD MEASUREMENTS:

WELL	INITIAL VACUUM (" H2O)	FINAL VACUUM (" H2O)	WELLHEAD CONC (ppm)
VW1			
VW2			
VW3			
VW4			
VW5			
VW6			
VW7			
VW8			
VW9			
VW10			
VW11			
VW12			
VW13			
VW14			
VW15			
VW16			
VW17			

OIL CHECK:

	Level OK	Oil Added	Amt. Added	Oil Changed
Blower				
Compressor				

VAPEX FIELD DATA SHEET, MACHIAS, NY

DATE _____

INSPECTOR _____

Total Operation Hours of Compressor (hours)					
Compressor Air Temperature (degrees F)					
Perimeter System Pressure (psi)					
Module System Pressure (psi)					
Defensive System Pressure (psi)					
WELL	OPEN	CLOSED	PRESSURE (psi)	FLOW (cfm)	COMMENTS
AS1					
AS2					
AS3					
AS4					
AS5					
AS6					
AS7					
AS8					
AS9					
AS10					
AS11					
AS12					
AS13					
AS14					
AS15					
AS16					
AS17					
AS18					
AS19					
AS20					
AS21					
AS22					
AS23					
AS24					
AS25					
AS26					
AS27					
AS28					
AS29					
AS30					
AS31					
AS32					
AS33					
AS34					
AS35					
AS36					
AS37					
AS38					
AS39					

SYSTEM LOG
MOTOROLA SITE – MACHIAS, NY
VAPEX JOB NO. 93–411

INITIALS	DATE	TIME	IS THE BLOWER RUNNING?	BLOWER OPERATION HOURS	GAGE #1 VAC@BLOWER ("Hg)	GAGE #2 PRES@BLOWER (gage is located under table) (psi)	THERMO #1 (thermometer is located on PVC pipe) (degrees F)	IS THE COMPRESSOR RUNNING?	COMPRESSOR OPERATION HOURS

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