

HOFFER & ASSOCIATES CONSULTING HYDROGEOLOGISTS

RR 4, Box 2286
Montpelier, VT 05602
(802) 229 - 1113
fax: 229 - 2780

December 17, 1997

Chuck Schwer, Supervisor
Sites Management Section
Vermont Department of Environmental Conservation
103 South Main Street/West Office
Waterbury, VT 05671-0404

Re: Site Investigation Report
Notch Brook Resort Maintenance Building,
Stowe, Vermont, SMS Site #97-2263

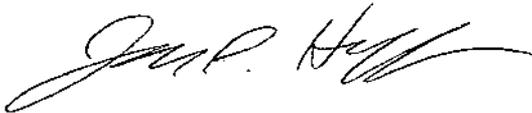
DEC 18 10 03 AM '97

Dear Chuck:

Enclosed is our site investigation report for the above-referenced site. This site investigation was performed under the "expressway" in accordance with the notification form submitted to your office on October 27, 1997.

Please call us if you wish to discuss our findings and/or recommendations concerning the site.

Sincerely,
HOFFER & ASSOCIATES



Jefferson P. Hoffer, P.G.
Principal Hydrogeologist

enc.

cc: Dan Wesson, Notch Brook Resort

GROUNDWATER & ENVIRONMENTAL SERVICES

HOFFER & ASSOCIATES

CONSULTING HYDROGEOLOGISTS

RR 4, Box 2286
Montpelier, VT 05602
(802) 229 - 1113
fax: 229 - 2780

December 17, 1997

Mr. Dan Wesson, Manager
Notch Brook Resort
1229 Notch Brook Road
Stowe, VT 05672

Re: Site Investigation Report, Notch Brook Resort Maintenance Building,
Stowe, Vermont, SMS Site # 97-2263

Dear Mr. Wesson:

In accordance with the scope of work submitted to you on November 5, 1997, Hoffer & Associates (H&A) has completed a site investigation at the Notch Brook Resort maintenance building. The purpose of this investigation was to assess the extent of soil and groundwater contamination associated with a 550-gallon underground storage tank (UST) formerly used for heating-oil storage. This UST was closed-in-place by Star Construction in October, 1997. During the cleaning of the tank, Star Construction reported finding holes in the tank and observed free-phase petroleum in soil surrounding the tank. During a preliminary site characterization effort, H&A collected soil samples with a hand-auger near the tank and found evidence of petroleum contamination. Further information on the UST closure and H&A's preliminary site characterization were provided in our October 28 letter to you.

The site investigation included the installation of three groundwater monitoring wells in the vicinity of the closed tank. Soil samples were collected during installation of the monitoring wells to characterize soil conditions and evaluate the extent of soil contamination. The monitoring wells were used to define the depth to groundwater, flow directions, and to allow sampling for laboratory analysis of groundwater samples. Other site investigation activities included the identification of potential receptors of subsurface contamination such as indoor air quality, surface water, and groundwater. The procedures and results of the site investigation are presented below.

SITE ENVIRONMENTAL SETTING

Notch Brook Resort is a multi-unit condominium development located off Route 108 in the Town of Stowe, approximately four miles west of the Village of Stowe. The development is situated on sloping and forested uplands. Figure 1 provides a site location map, and Figure 2 is a site vicinity map illustrating the layout of the Notch Brook Resort. The immediate region surrounding the Notch Brook Resort is sparsely developed, primarily with single-family residences and resort homes.

GROUNDWATER & ENVIRONMENTAL SERVICES

The maintenance building is located on the northern area of the developed portion of property. A site map is provided on Figure 3. Surface elevation at the maintenance building is approximately 1400 feet above mean sea level (MSL). Site topography slopes moderately to steeply to the southwest, toward the West Branch of the Waterbury River. On the Surficial Geologic Map of Vermont, till deposits predominate in the vicinity of the maintenance building, and kame terraces are mapped to the southwest, below an elevation of approximately 1300 feet above MSL. According to the USDA Soil Survey of Lamoille County, Vermont, soils in the vicinity of the maintenance building are mapped as Marlow very stony fine sandy loams. These soils are reported as deep, well drained and moderately well drained soils that formed in compact glacial till. A fragipan is present at depths ranging from 18 to 39 inches in these soils. Bedrock beneath the site is mapped on the Centennial Geologic Map of Vermont as the Hazens Notch formation. The Hazens Notch formation is a greenish-gray schist grading into quartzite and gneiss.

The Vermont Water Supply Division's water well database shows eight wells within 3,000 feet of the site, including the Notch Brook Resort bedrock well. The Notch Brook well is located about 250 feet from the maintenance building and is reportedly not in use (water is reportedly supplied to the development from a surface water source). The nearest downgradient well (Skeins) is located 2,000 feet from the maintenance building, on the opposite side of the West Branch. The nearest mapped surface water features are two streams which drain from the uplands to the northeast and flow southwest to the West Branch (see Figure 1). Neither of these two streams are within 500 feet of the maintenance building. The West Branch is located 1,000 feet southwest of the site, and flows to the southeast, ultimately joining the Waterbury River in the Village of Stowe.

SOIL BORINGS/MONITORING WELL INSTALLATIONS

On November 14, 1997, three monitoring wells were installed at the site by Adams Engineering, under H&A supervision. Well locations are shown on Figure 3. Due to difficult drilling conditions, solid-stem augers were utilized on the second and third borings rather than the hollow-barrel sampler specified in the scope of work.

Soil texture observed during the well installation effort ranged from silt loam to loamy sand. A small percentage of rock fragments were observed, and ranged in size from pebbles to cobbles. Saturation was observed in MW-1 at a depth of 4.5 feet. Soil samples from below a depth of 7.0 feet in MW-1 were mottled, and moist to dry, suggesting that the overlying saturated zone was a perched horizon. No discrete change in soil texture was noted between the saturated zone from 4.5 to 7.0 feet below grade (BG) and the underlying unsaturated soil in the MW-1 borehole. At MW-2, the hollow-barrel sampler was used from 0 to 4.5 feet BG, and exposed loamy sands with distinct mottling from 3.5 to 4.5 feet BG. The borehole of MW-2 was advanced from 5.0 to 15.0 feet BG using solid-stem augers. Soils returned on the auger flights from 5.0 to 15.0 feet BG consisted of moist to wet silt and fine sand. The borehole of MW-3 was advanced to a total depth of 20 feet BG using solid-stem augers. Soils returned on the auger flights were generally silt and sand.

Soil samples were screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). The PID used was a Photovac MicroTIP HL-2000, which was calibrated prior to use using an isobutylene standard. The instrument was set to respond to isobutylene, and readings are reported as parts per million (ppm). Soil samples were screened by placing samples into plastic zip-lock bags and monitoring the headspace with the PID. Readings only slightly above background were obtained for samples from each of the three boreholes, ranging from 1.0 ppm in MW-1 (5.0 to 10.0 feet BG) to 3.9 ppm in MW-3 (0.0 to 5.0 feet BG). Complete soil sample descriptions and PID screening results are provided on the enclosed logs.

Monitoring wells were constructed within the boreholes using a 1.5-inch diameter, factory-slotted PVC well screen (0.010-inch), and solid PVC riser pipe. MW-1 was screened from 2.0 to 7.0 feet BG across the perched zone observed from 4.5 to 7.0 feet BG. MW-2 was screened from 4.0 to 14.0 feet BG, and MW-3 was screened from 4.0 to 19.0 feet BG. The annular space outside the well screens was backfilled with commercial sand, and by the collapse of native soils. Bentonite powder was placed on top of the sandpack to provide a seal against surface water infiltration. After construction, each well was developed using a peristaltic pump. Well construction details are provided on the enclosed logs.

A PID survey was also performed in the maintenance building to determine if petroleum vapors may be entering this building. No readings above background were detected in the building.

GROUNDWATER ELEVATIONS AND FLOW DIRECTION

Groundwater levels were measured in the three monitoring wells on November 19 and December 15. Table 1 summarizes the water levels and converted groundwater elevations. Depths to groundwater ranged from one to two feet in MW-1 to over ten feet in MW-2 and MW-3. During the tank closure, Star Construction reported that groundwater was present near the base of the tank, at a depth of about six feet. Figure 4 presents a water-table map using groundwater elevations from each of the three monitoring wells, which defines a southwestward flow direction, generally consistent with the surface topography. Due to the evidence that the shallow water levels in MW-1 represent a perched zone (underlain by unsaturated and mottled soil), we are somewhat reluctant to include the MW-1 water level in the contour map. However, the gradient depicted on Figure 4 is consistent with Star Construction's observation that the depth to groundwater in the vicinity of the tank was six feet. If the water level in MW-1 represents a perched zone that is not in direct hydraulic connection with the saturated zone below ten feet observed in MW-2 and MW-3, then the gradient depicted on Figure 4 is inaccurate. Nonetheless, the flow direction in the vicinity of the tank is interpreted to be southwestward based on the water levels in MW-2 and MW-3, and the surface topography.

GROUNDWATER QUALITY

Groundwater samples were collected from the three wells on November 19 and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl-tert-butyl ether (MTBE) by EPA Method 8020. Prior to sampling, at least one volume of water was purged from the wells. Samples were obtained using dedicated PVC bailers. Quality Assurance/Quality Control samples included a trip blank, a field blank, and a blind duplicate sample, collected from MW-3 and labeled MW-A on the sample vials and the chain-of-custody form. The sampling event was recorded on a field sampling sheet and laboratory chain-of-custody form (enclosed). The analyses were performed by SCITEST, Inc., of Randolph, Vermont.

Laboratory results are summarized on Table 2. The only constituent detected was MTBE, which was quantified at 4 micrograms per liter (ug/L) in the sample collected from MW-2. Since MTBE is an additive in gasoline but not heating oil, the source for its presence in MW-2 is unknown. The concentration of MTBE detected in MW-2 is below the lowest regulatory standard for this compound (VT Primary Groundwater Quality Preventative Action Level of 20 ug/L).

The absence of BTEX compounds in either of the two downgradient wells (MW-2 and MW-3) suggests that any impact to groundwater is presently confined to the immediate vicinity of the tank. Contamination was observed in soil directly beneath the tank during closure, but has apparently not migrated to either MW-2 or MW-3 at this time.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

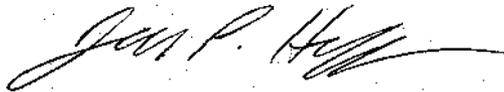
A site investigation was conducted at the Notch Brook Resort maintenance building to determine the severity of subsurface petroleum contamination associated with a heating-oil UST which was closed in place in October of 1997. Evidence of a release of heating-oil to the subsurface was observed during the cleaning of the tank, and during subsequent soil sampling. Three groundwater monitoring wells were installed and sampled. No evidence of groundwater contamination associated with the heating-oil tank was found. A trace concentration of MTBE was found in well MW-2, although this compound is associated with gasoline but not heating oil. The concentration of MTBE detected in MW-2 was low (4 ug/L) and is below regulatory standards.

At this time, subsurface petroleum contamination associated with the heating-oil UST appears to be limited to the immediate vicinity of the closed-in-place tank. Soil and groundwater sampled at locations downslope (and downgradient) of the tank showed little or no evidence of heating-oil related contamination. As presently defined, site contamination does not pose a risk to the potential receptors identified during this site investigation (mapped surface water features, bedrock water supply wells, or indoor air quality).

We recommend that one monitoring well be installed immediately downgradient of the tank. The purpose of this well will be to monitor contamination in the immediate vicinity of the release and to further evaluate groundwater conditions. The proposed location of the additional well is included on Figure 4. We propose to utilize the same method to install the well as was used to install the existing three wells. After installing the additional well, we recommend performing a round of groundwater monitoring. The monitoring should include measuring water levels in the four wells, and analyzing samples from each of the wells for BTEX compounds using EPA Method 8020. The estimated cost to install one well and perform a round of groundwater monitoring and reporting is presented on Table 3.

We will forward a copy of this report to the Sites Management Section for their review and comment. In the meantime, if you have any questions concerning this report, please give us a call.

Sincerely,
HOFFER & ASSOCIATES



Jefferson P. Hoffer, P.G.
Principal Hydrogeologist

enc.

cc: Chuck Schwer, Supervisor, Sites Management Section, VT ANR.

Ami well OK.
COLLECT SOIL SAMPLES FROM
AREAS (Vicinity of P10)
ANALYSIS - 8060, 8270, TPH
WATER SAMPLES FROM ALL WELLS
ANALYSIS - 8260, 8270, TPH

TABLE 1
Groundwater elevation measurements,
Notch Brook Resort Maintenance Building, Stowe, Vermont, SMS Site # 97-2263.

DEPTH TO WATER (feet below TOC)			
<i>Well ID</i>	<i>Elevation of TOC (feet)</i>	<i>11/19/97</i>	<i>12/15/97</i>
MW-1	1400.00	1.22	2.67
MW-2	1397.74	10.60	11.51
MW-3	1398.89	10.33	11.54

GROUNDWATER ELEVATIONS (feet)			
<i>Well ID</i>	<i>Elevation of TOC (feet)</i>	<i>11/19/97</i>	<i>12/15/97</i>
MW-1	1400.00	1398.78	1397.33
MW-2	1397.74	1387.14	1386.23
MW-3	1398.89	1388.56	1387.35
Monitoring Well Drilling - 1 well			

Notes:
TOC = top of casing (PVC lip)
Elevations are in feet relative to MW-1 TOC = approx. 1400.0 feet above mean sea level.

TABLE 2
 Groundwater sampling results for November 19, 1997,
 Notch Brook Resort Maintenance Building, Stowe, Vermont, SMS Site # 97-2263.

<i>November 19, 1997 (results in ug/L)</i>					
WELL ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-1	<1	<1	<1	<1	<1
MW-2	<1	<1	<1	<1	4
MW-3 / Duplicate	<1 / <1	<1 / <1	<1 / <1	<1 / <1	<1 / <1
Field Blank	<1	<1	<1	<1	<1
Trip Blank	<1	<1	<1	<1	<1
<u>REGULATORY THRESHOLDS</u>					
VT Primary Groundwater Quality Enforcement Standard	5	1000	700	10000	40
VT Primary Groundwater Quality Preventative Action Level	0.5	500	350	5000	20

Notes:
 < 1 = below a detection level of 1
 < 1 / < 1 = sample result / field duplicate result

TABLE 3
 Cost Estimate for Additional Monitoring Well Installation and Groundwater Monitoring,
 Notch Brook Resort Maintenance Building, Stowe, Vermont, SMS Site # 97-2263.

LABOR

TASK	Staff	Hours	Rate	Amount
Project Management	SCF	0.5	\$45.00	\$22.50
Well Installation & Survey	SCF	6.0	\$45.00	\$270.00
Well Log	SCF	0.5	\$45.00	\$22.50
Groundwater Sampling	SCF	4.0	\$45.00	\$180.00
Report Preparation	SCF	8.0	\$45.00	\$360.00
Report Review	JPH	0.5	\$50.00	\$25.00

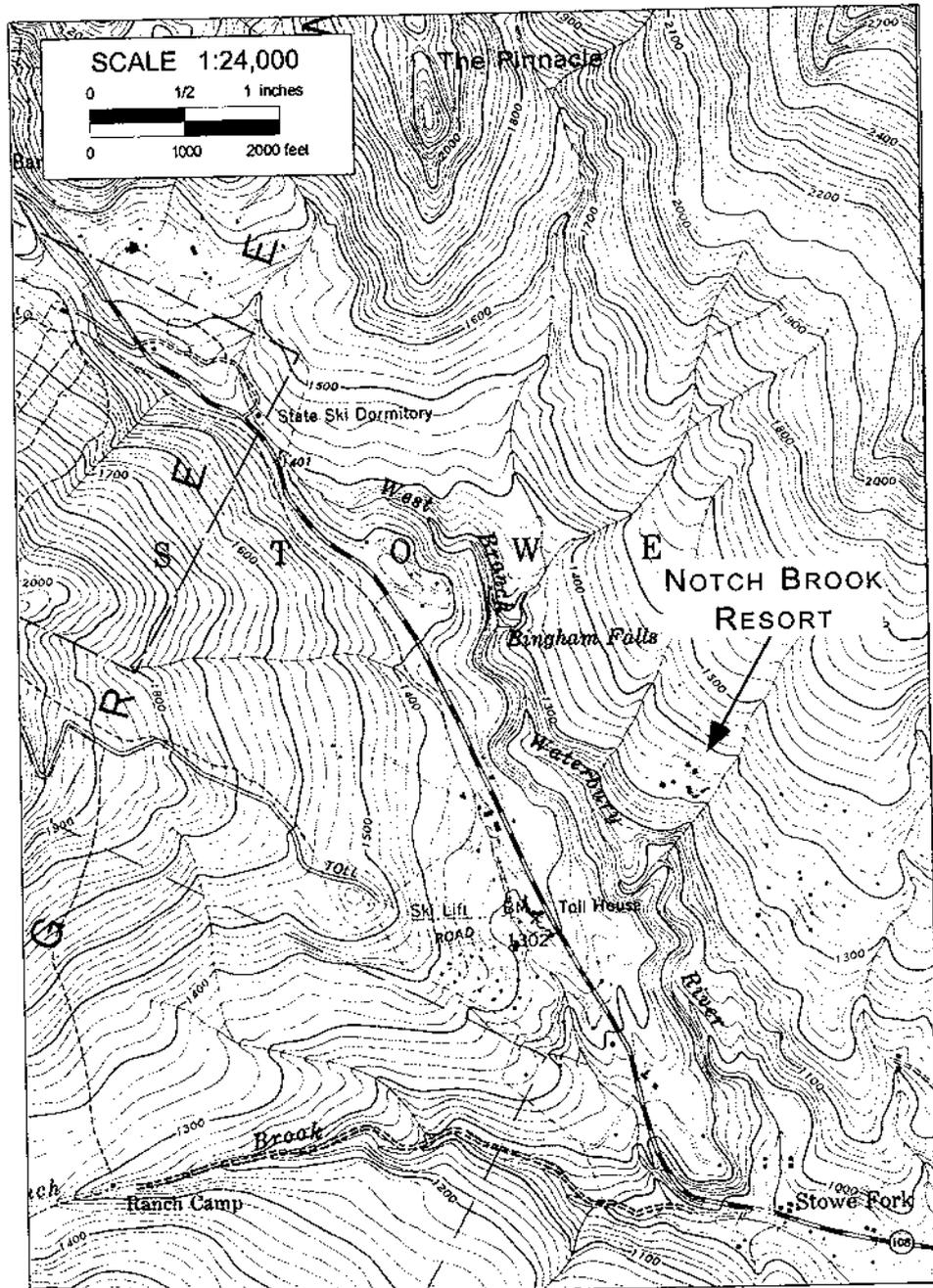
SUB-TOTAL LABOR \$880.00

EXPENSES

ITEM	Quantity	Rate	Mark Up	Amount
Mileage - 2 Trips (well install., sampling)	195	\$0.28	\$0.00	\$54.60
Survey Equipment Rental	1	\$30.00	\$0.00	\$30.00
PVC Bailer	1	\$6.00	\$0.00	\$6.00
PID Rental (well installation)	1	\$75.00	\$0.00	\$75.00
<u>Adams Engineering</u>				
Mobilization	1	\$100.00	\$0.00	\$100.00
Monitoring Well Drilling - 1 well	1	\$300.00	\$0.00	\$300.00
<u>SCITEST, Inc.</u>				
8020 analyses for BTEX (4 wells, 3 QA/QC)	7	\$55.00	\$0.00	\$385.00

SUB-TOTAL EXPENSES \$950.60

TOTAL ESTIMATED COST \$1,830.60



BASE FROM U.S. GEOLOGICAL SURVEY, 1:24,000;
MOUNT MANSFIELD, VT.

FIGURE 1
SITE LOCATION MAP,
NOTCH BROOK RESORT, STOWE, VERMONT.

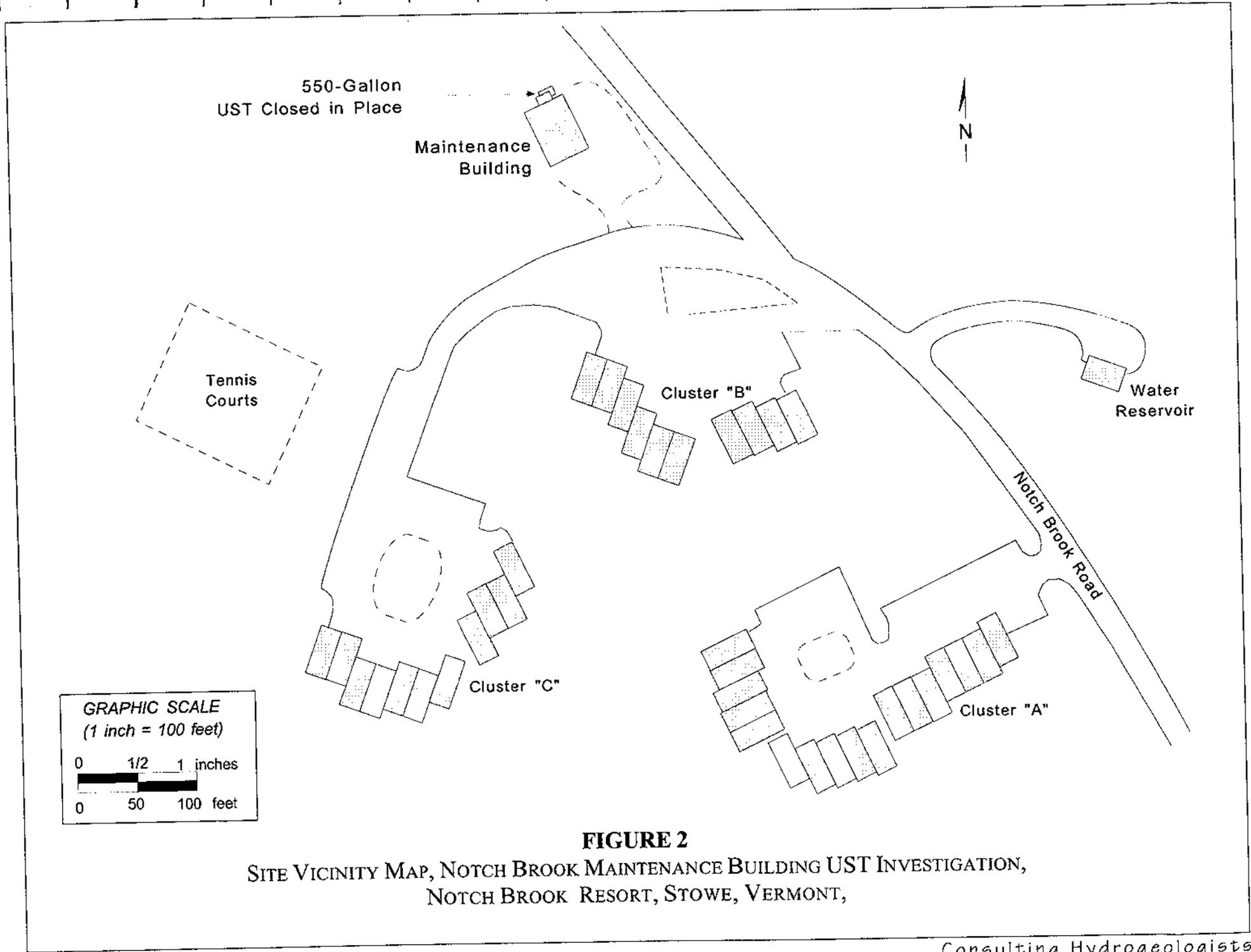


FIGURE 2
 SITE VICINITY MAP, NOTCH BROOK MAINTENANCE BUILDING UST INVESTIGATION,
 NOTCH BROOK RESORT, STOWE, VERMONT,

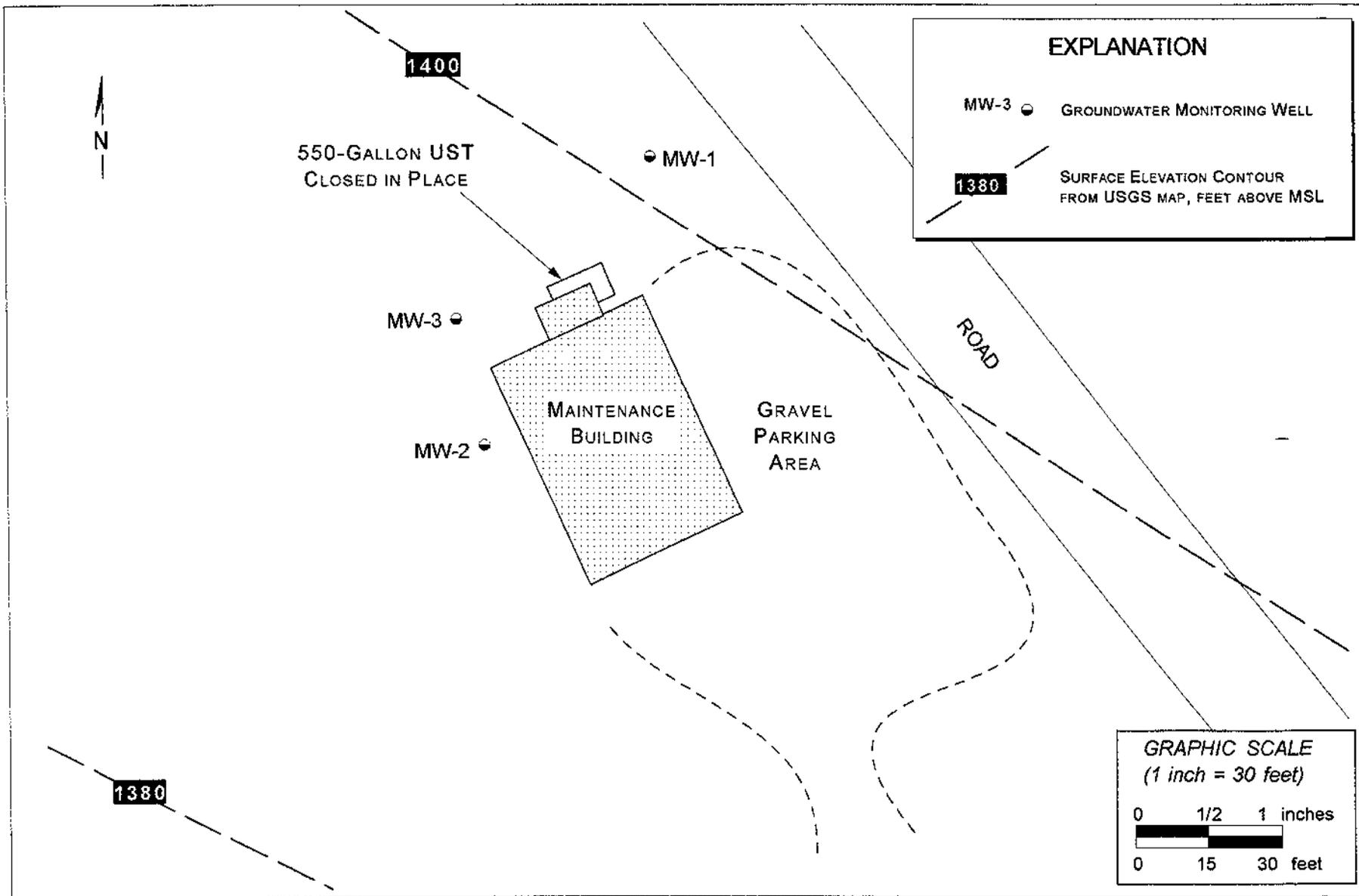


FIGURE 3
 SITE MAP, NOTCH BROOK MAINTENANCE BUILDING UST INVESTIGATION,
 NOTCH BROOK RESORT, STOWE, VERMONT.

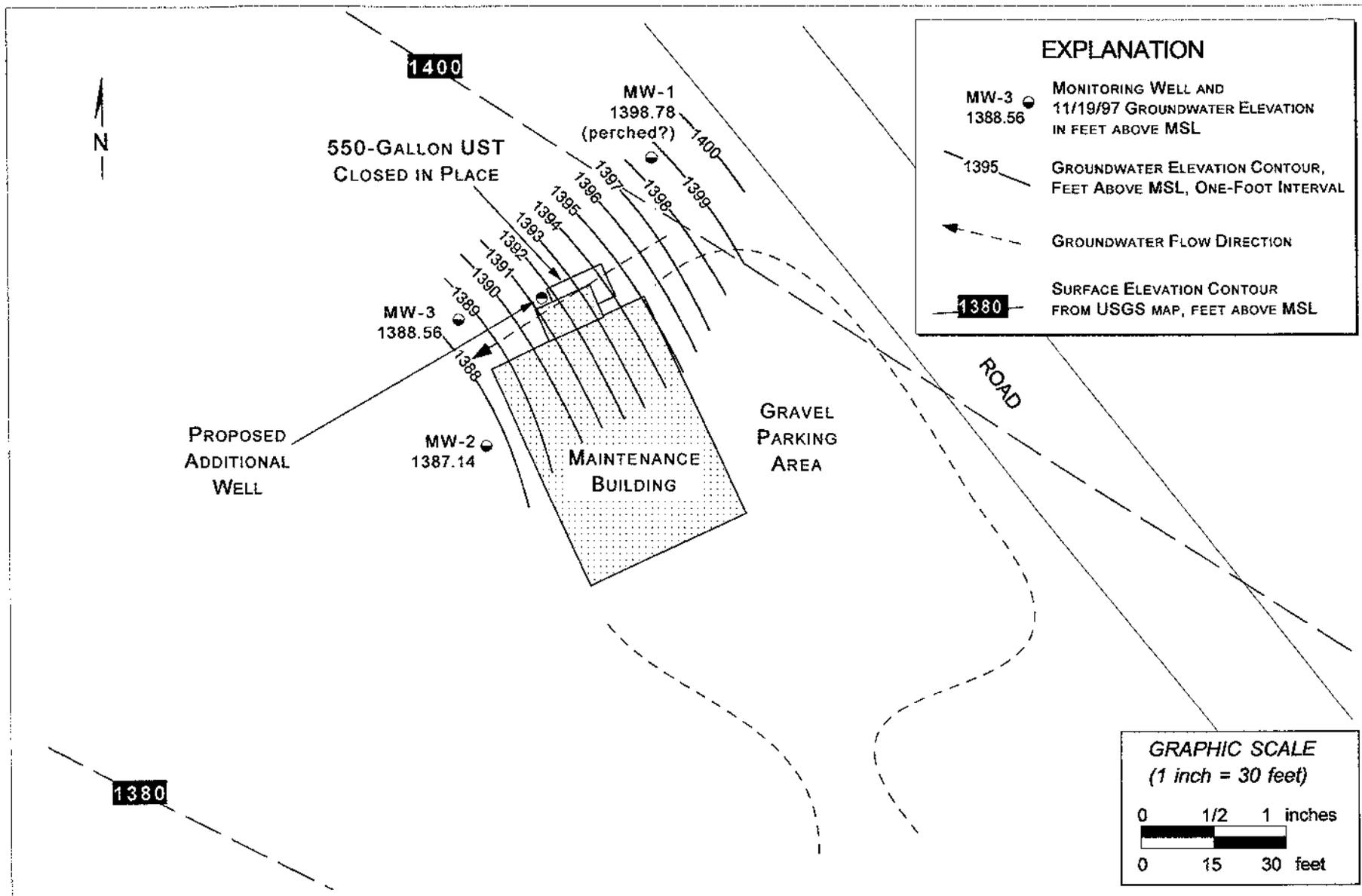


FIGURE 4
WATER-TABLE MAP FOR NOVEMBER 19, 1997,
NOTCH BROOK MAINTENANCE BUILDING UST INVESTIGATION, NOTCH BROOK RESORT, STOWE, VERMONT.



SCITEST
LABORATORY SERVICES

ANALYTICAL REPORT

P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313

Notchbrook Resort
1229 Notch Brook Road
Stowe, VT 05672

Daniel Wesson

Work Order No.: 9711-03903

Project Name: Groundwater Analysis
Customer Nos.: 070212

Date Received: 11/20/97
Date Reported: 12/01/97

Sample Desc.: Trip Blank (11/17/97)				Sample Date:	11/12/97
Sample Nos: 1				Collection Time:	12:00
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602	BPQL	ug/L	JPM	11/26/87
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Surrogate: 8020		89	% Recovery	JPM	11/26/87
***Bromofluorobenzene-8020					

Sample Desc.: MW-A				Sample Date:	11/12/97
Sample Nos: 2				Collection Time:	12:15
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602	BPQL	ug/L	JPM	11/26/87
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Surrogate: 8020		89	% Recovery	JPM	11/26/87
***Bromofluorobenzene-8020					

ANALYTICAL REPORT

Project Name: Groundwater Analysis
Project No.: 070212

Work Order No.: 9711-03903

				Sample Date:	11/12/97	
				Collection Time:	12:30	
Sample Desc.:	Method	Results	Units	Analyst	Analysis Date	
Sample Desc.: MW-1				JPM	11/26/87	
Sample Nos: 3				JPM	11/26/87	
Test Performed	EPA 8020/602	BPQL	ug/L	JPM	11/26/87	
Aromatic Volatile Organics	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Surrogate: 8020				JPM	11/26/87	
***Bromofluorobenzene-8020		93	% Recovery	JPM	11/26/87	

				Sample Date:	11/12/97	
				Collection Time:	12:45	
Sample Desc.:	Method	Results	Units	Analyst	Analysis Date	
Sample Desc.: MW-3				JPM	11/26/87	
Sample Nos: 4				JPM	11/26/87	
Test Performed	EPA 8020/602	BPQL	ug/L	JPM	11/26/87	
Aromatic Volatile Organics	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Surrogate: 8020				JPM	11/26/87	
***Bromofluorobenzene-8020		91	% Recovery	JPM	11/26/87	

				Sample Date:	11/12/97	
				Collection Time:	13:15	
Sample Desc.:	Method	Results	Units	Analyst	Analysis Date	
Sample Desc.: MW-2				JPM	11/26/87	
Sample Nos: 5				JPM	11/26/87	
Test Performed	EPA 8020/602	4	ug/L	JPM	11/26/87	
Aromatic Volatile Organics	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87	

ANALYTICAL REPORT

Project Name: Groundwater Analysis
Project No.: 070212

Work Order No.: 9711-03903

Sample Desc.:	Method	Results	Units	Analyst	Analysis Date
Sample Desc.: MW-2					
Sample Nos: 5					
Test Performed	Method	Results	Units	Analyst	Analysis Date
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Surrogate: 8020				JPM	11/26/87
***Bromofluorobenzene-8020		87	% Recovery	JPM	11/26/87

Sample Desc.:	Method	Results	Units	Analyst	Analysis Date
Sample Desc.: FB-01					
Sample Nos: 6					
Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/26/87
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/26/87
Surrogate: 8020				JPM	11/26/87
***Bromofluorobenzene-8020		90	% Recovery	JPM	11/26/87

BPQL = Below Practical Quantitation Limit; 1 ug/L

c: Hoffer and Associates

Authorized by: Rosende Lemotte

Scitest, Inc.

P.O. Box 339
 Route 66 Professional Center, Randolph, VT 05060
 Phone: (802)728-6313 Fax: (802)728-6044
 Client: Jefferson P. Hoffer & Associates
 Address RR 4 Box 2286, Cornstock Road
 Montpelier, VT 05602

Sample Logged in By: [Signature]
 Anomaly Sheet: Y N V
 Contact: Tony French
 Phone No:

Notchbrook

Preservative Check: no bubbles
 Temperature Check: 0520
 Date requested: per Tony French 11/17/97
 Date shipped: to be picked up 11/17
 Date scheduled:

CHAIN OF CUSTODY

Sampled by:*	Date	Time	Print Name Here:*	Date	Time
<u>[Signature]</u>			STRATTON FRENCH		
Relinquished by: <u>[Signature]</u>	11/19/97	14:00	Accepted by:		
Relinquished by:			Received by Scitest: <u>[Signature]</u>	11/20/97	8:15

Sample No.	Sample Description	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
1	Trip Blank TB-01	11/19/97	12:00	<u>WA</u> GW	HCl	Glass	40 mL	2	EPA 8020
2	MW-A	.	12:15	GW	HCl	Glass	40 mL	2	EPA 8020
3	MW-1	.	12:30	GW	HCl	Glass	40 mL	2	EPA 8020
4	MW-3	.	12:45	GW	HCl	Glass	40 mL	2	EPA 8020
5	MW-2	.	13:15	GW	HCl	Glass	40 mL	2	EPA 8020
6	FB-01 (11/17/97)	.	13:40	<u>WA</u> GW	HCl	Glass	40 mL	2	EPA 8020
7	.	.	.	GW	HCl	Glass	40 mL	2	EPA 8020

NOTE: ONCE LOGGED IN, PLEASE FAX AND A COPY OF THIS FORM. Thanks - SLT

SAMPLES MUST REACH THE LAB within _____ of sampling time to meet all holding times.	Parameters are correct as listed Please fill in ALL areas marked with an asterisk (*). Thank you. Additional instruction if applicable are attached.	Client Initial: _____ Scitest Work Order: _____
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SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-1

<i>Client / Site:</i>	Notchbrook/Maintenance Shed
<i>Location:</i>	Stowe, Vermont
<i>Project Number:</i>	76-01
<i>Driller:</i>	Gerry Adams - Adams Engineering
<i>Drilling Method:</i>	2 3/8" Sampler (vibratory)
<i>Geologist:</i>	Jeff Hoffer
<i>Sampling Method:</i>	continuous samples
<i>Date:</i>	11/14/97
<i>Weather:</i>	Snow, 30 degrees
<i>Boring Location:</i>	15 feet from former UST

Well Construction Information	
<i>Total Depth Drilled:</i>	10.0' BGS
<i>Screen Type/Interval:</i>	1.5" sch. 40, 10-slot PVC / 7.0 to 2.0' BGS
<i>Riser Type/Interval:</i>	1.5" sch. 40 PVC / 2.0' - 0.5' BGS
<i>Sandpack Type/Interval:</i>	m/c sand & natural pack / 10.0' - 1.0' BGS
<i>Seal Type/Interval:</i>	Bentonite powder / 1.0' - 0.5' BGS
<i>Depth to Water/Date:</i>	1.22' BTOC, 11/19/97
<i>Elevation Ground:</i>	
<i>Elevation TOC:</i>	assumed 1400.0 feet above msl (from USGS)
<i>Other:</i>	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Depth (feet BGS)	Sample Description (color, texture, moisture, etc.)	USDA Soil Texture	PID Reading* (ppm)
0 to 5	5.0 / 1.0	?	?	brown fine sand with silt, 5-10% rounded gravel, dry moist in sampler tip	loamy sand	0.2
5 to 10	5.0 / 5.0	2.0	5 - 7	olive-brown fine sand (75%) and silt (25%), saturated	loamy sand	1.0
		3.0	7 - 10	olive-brown fine sand (75%) and silt (25%), < 5% gravel moist/dry, some mottling	loamy sand	1.0

Generalized Geologic Log and Other Observations:

0 to 10 feet, fine sand and silt (loamy sand), saturated (perched) between 4.5 to 7.0 feet

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, with 10.6 eV lamp, calibrated with & set to respond to isobutylene.
 BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-2

<i>Client / Site:</i>	Notchbrook/Maintenance Shed
<i>Location:</i>	Stowe, Vermont
<i>Project Number:</i>	76-01
<i>Driller:</i>	Gerry Adams - Adams Engineering
<i>Drilling Method:</i>	2 3/8" Sampler (vibratory), solid-stem augers
<i>Geologist:</i>	Jeff Hoffer/Tim Schmalz
<i>Sampling Method:</i>	continuous samples, auger flights
<i>Date:</i>	11/14/97
<i>Weather:</i>	Snow, 30 degrees
<i>Boring Location:</i>	Behind Maint. Shed

Well Construction Information	
<i>Total Depth Drilled:</i>	15.0'
<i>Screen Type/Interval:</i>	1.5" sch. 40, 10-slot PVC /14.0' to 4.0' BGS
<i>Riser Type/Interval:</i>	1.5" sch. 40 PVC /4.0' - 0.3' BGS
<i>Sandpack Type/Interval:</i>	m/c sand & natural pack / 14.0' - 2.5' BGS
<i>Seal Type/Interval:</i>	Bentonite powder / 2.5' - 1.0' BGS
<i>Depth to Water/Date:</i>	10.60' BTOC, 11/19/97
<i>Elevation Ground:</i>	
<i>Elevation TOC:</i>	1397.74 feet above MSL (MW-1 TOC assumed = 1400.0 feet)
<i>Other:</i>	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Depth (feet BGS)	Sample Description (color, texture, moisture, etc.)	USDA Soil Texture	PID Reading* (ppm)
0 to 4.5	4.5 / 4.5	0.5	0 - 0.5	fill		
		0.5	0.5 - 1.0	red-brown fine sand topsoil	sand	
		3.5	1.0 - 4.5	brown and olive-brown fine sand, some silt, some f. gravel distinct mottling 3.5 to 4.5'	loamy sand	3.0' = 0.4
5 to 15	(augered)			brown to brownish gray, stiff, moist, to wet silt and fine sand	silt loam	0.0

Generalized Geologic Log and Other Observations:

First location - couldn't drive sampler beyond 4.5 feet, moved two feet away
 Couldn't drive sampler beyond 4.5 feet, used solid-stem augers to advance borehole
 0 to 15 feet, fine sand and silty fine sand

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, with 10.6 eV lamp, calibrated with & set to respond to isobutylene.
 BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-3

<i>Client / Site:</i>	Notchbrook/Maintenance Shed
<i>Location:</i>	Stowe, Vermont
<i>Project Number:</i>	76-01
<i>Driller:</i>	Gerry Adams - Adams Engineering
<i>Drilling Method:</i>	solid-stem augers
<i>Geologist:</i>	Tim Schmalz
<i>Sampling Method:</i>	samples returned on auger flights
<i>Date:</i>	11/14/97
<i>Weather:</i>	Snow, 30 degrees
<i>Boring Location:</i>	beneath hemlock tree, west end of shed

Well Construction Information	
<i>Total Depth Drilled:</i>	20.0'
<i>Screen Type/Interval:</i>	1.5" sch. 40, 10-slot PVC /19.0' to 4.0' BGS
<i>Riser Type/Interval:</i>	1.5" sch. 40 PVC /4.0' - 0.3' BGS
<i>Sandpack Type/Interval:</i>	m/c sand & natural pack / 19.0' - 3.0' BGS
<i>Seal Type/Interval:</i>	Bentonite powder / 3.0' - 1.0' BGS
<i>Depth to Water/Date:</i>	10.33' BTOC, 11/19/97
<i>Elevation Ground:</i>	
<i>Elevation TOC:</i>	1398.89 feet above MSL (MW-1 TOC assumed = 1400.0 feet)
<i>Other:</i>	Developed with peristaltic pump

Sample Interval (feet BGS)	Total Driven / Recovery (feet)	Recovered Interval (feet)	Approximate Depth (feet BGS)	Sample Description (color, texture, moisture, etc.)	USDA Soil Texture	PID Reading* (ppm)
0 - 12	augered			brown silt and sand, slightly moist	loam to sandy loam	0-5'=3.9 5-10'=3.5 10-12'=0.0
12 - 15	augered			gray-green dry silt and angular sand, augered through rock from 12 - 13.5'	sandy loam	2.4
15 - 20	augered			brown silt and sand		0.0

Generalized Geologic Log and Other Observations:

0 - 12 feet, brown silt and sand
 12 - 15 feet, gray green silt and sand
 15 - 20 feet, brown silt and sand

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, with 10.6 eV lamp, calibrated with & set to respond to isobutylene.
 BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

ADAMS ENGINEERING

Gerard Adams

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November 16, 1997

Mr. Tony French

Well logs: Notchbrook Condominium

Nine inch auger hole for manway drilled to -1', with 4" pilot to -2'. Soils sampled in open borehole with 2 3/5" OD X 2 3/8" ID X 5' NQ, the sampler brought to the surface, and the sample contained in the liner vibrated out for examination. Monitor well with a slip cap or point at the bottom that is larger in OD than well screen to create an annulus, is placed in the open borehole left by sampling down to top of "collapsed native soils", the borehole annulus partially filled with pack sand, the well with some pack sand vibrated to depth creating a partial sand pack enhancing natural development, the open annulus refilled with sand pack above well screen "complete sand pack", a bentonite slurry seal is then placed in the open annulus, and a 7" manway cemented in place. Well developed with peristaltic pump using dedicated polyethylene suction tubing.

11/14, 97 MW #1

SOILS WELL

- G Manway packed in place, TS.
- .3' Top well 1.5" solid riser, test plug.
- 0 > -5.0' Soft silty sand & few stones, water -4'
- 1' Top of bentonite powder.
- 1.8' Bottom bentonite - top complete sand pack placed in open annulus.
- 2.0' Top well screen 1-5' X 1.5" X .010" slot Monoflex, typ.
- 4.5' Bottom complete sand pack-top native collapse partial sand pack & natural development.
- 5 > 10.0' Very silty sandy gravel // (over) slightly silty sand & gravel, did not appear to be saturated.
- 5.0' Bottom well screen, slip cap.

Well developed: moderate flow, clean.

MW #2 Two tries with NQ sampler. 4" solid auger. Typically slightly silty sand, gravel, & cobbles.

- G. Manway packed in place, TS.
- 1' Top bentonite slurry.
- 2.5' Top sand pack.
- 4.0' Top well screen 2-5'.
- 10' Bottom complete sand pack top native collapse partial sand pack & natural development.
- 14.0' Bottom well, point.

MW #3 Typically slightly silty sand, gravel, & cobbles. Pulled augers from -15' dry, augered to -20'.

- G. Manway packed in place, TS.
- 1' Top bentonite slurry.
- 2.5' Top sand pack.
- 4.0' Top well screen 3-5'.
- 19' Bottom complete sand pack top native collapse partial sand pack & natural

development.
-14.0' Bottom well, point.

G. Adams

G Adams