HOFFER & ASSOCIATES
CONSULTING HYDROGEOLOGISTS

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November 24, 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
Former Portland Street Mini Mart (B & AB Brink, Inc.)
St. Johnsbury, Vermont, SMS Site #97-2205

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 22, 1997.

Due to a significant presence of floating free product at the site, additional investigation and remedial efforts are needed at the site. We realize these additional efforts could be performed under the "expressway", but prefer to receive the Sites Management Section's input prior to proceeding. At present, we do not believe that site contamination has directly affected water supplies, indoor air quality, surface water, or other sensitive environmental receptors.

Recommended tasks and cost estimates are presented in Section 3.4 of our report. 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: William Brink

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SITE INVESTIGATION REPORT

FORMER PORTLAND STREET MINI-MART
ST. JOHNSBURY, VERMONT

NOVEMBER 1997

GROUNDWATER & ENVIRONMENTAL SERVICES

SITE INVESTIGATION REPORT

FORMER PORTLAND STREET MINI-MART
ST. JOHNSBURY, VERMONT
SMS SITE #97-2205

November 1997

Prepared for:
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EXECUTIVE SUMMARY

Hoffer & Associates (H&A) conducted an initial site investigation during October and November of 1997 at the former Portland Street Mini-Mart in St. Johnsbury, Vermont, to evaluate the degree and extent of petroleum contamination detected during the closure of underground storage tanks (USTs) in April of 1997. Field efforts have included the installation and sampling of four groundwater monitoring wells, an indoor air quality survey, and weekly site visits to recover free product from two monitoring wells.

Gasoline has been released to the subsurface in the vicinity of the former gasoline USTs and pump dispensers at the site. Up to 3.66 feet of floating free product gasoline has been found in a well installed on the periphery of the former UST bed. Dissolved BTEX constituents were detected at high concentrations in two downgradient monitoring wells. Floating free product, believed to be fuel oil, has also been detected in one of the downgradient wells (0.25 feet thick). Weekly free product bailing efforts have been implemented to recover product from monitoring wells at the site.

Groundwater is present at the site within fine-grained sediments (fine sands, silty fine sands, silt and clay), at depths ranging from 11 to 17 feet below grade. Groundwater flow direction is northward toward the Moose River, which is located about 800 feet north of the site. Although the extent of contamination has not been defined, it does not appear to have impacted surface water or water supplies. The area is served by municipal water. No evidence of petroleum vapor migration into adjacent buildings has been detected, although additional PID surveys of residences north of the site are recommended.

Additional investigation activities are recommended to facilitate product recovery, to further evaluate the extent of contamination, to further assess potential impacts on receptors, and to evaluate corrective action alternatives. Recommended tasks include continued weekly free product bailing, installation of at least one 4-inch diameter recovery well, installation of monitoring wells on and off the site property, groundwater sampling and analysis, and the preparation of a Corrective Action Feasibility Investigation workplan.

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

This report summarizes a site investigation performed at the former Portland Street Mini-Mart in St. Johnsbury, Vermont. This investigation was performed under the VTDEC Sites Management Section's "expressway" process, in response to subsurface petroleum contamination detected at the site during the removal of underground storage tanks (USTs) in April of 1997.

Three 6,000-gallon capacity USTs used for gasoline storage were excavated and removed from the Portland Street Mini Mart in April of 1997. A fourth 1,000-gallon tank was discovered during the tank closures, and this tank had been previously closed in place. The closure site assessment performed by Griffin International (Appendix A) concluded that gasoline contamination was present in soils and groundwater and that the full degree and extent of contamination was not determined. Two of the tanks were in fair condition and the third tank was in poor condition, with significant pitting and corrosion. Elevated PID readings were detected surrounding, above, and below the tanks and in the vicinity of the dispensers. Groundwater entered the excavation from a perched layer at six feet, and a heavy petroleum sheen was observed. Based on this information, the VTDEC Sites Management Section sent a letter to the site owner, B & AB Brink, Inc., dated October 3, 1997, requesting a site investigation to determine the severity of contamination at the site.

1.2 Background Information & Site Description

The Portland Street Mini-Mart operated until November of 1997. The property is owned by B & AB Brink, Inc., (Alice and Bruce Brink) of St. Johnsbury. The owner contact is William Brink.

The site is located at 80 Portland Street (Route 2) in St. Johnsbury, Vermont. Figure 1 is a site location map, and Figure 2 is a site vicinity map. As illustrated on Figure 3, existing structures on the 0.56-acre parcel include the former mini-mart building (presently occupied by Dad's 4-By Tools), a four-bay auto garage (Ultimate Car Care), a small shed, and a utility trailer. Both of the buildings are single-story structures constructed on concrete slabs. The auto garage floor is several feet lower than the floor the former mini-mart building, reflecting the site topography, which slopes toward the north.

The southern portion of the property along Portland Street has been recently paved, while the remaining area consists of gravel. One storm drain is present on the southwest corner of the property. Utilities at the site include overhead

electrical lines, and subsurface water, storm water, and sewer lines. The northern portion of the property is bounded by railroad tracks.

In the vicinity of the site, development along Portland Street is commercial and light industrial. Residential neighborhoods are located north of the property, on the other side of the railroad tracks. Adjacent properties include the White Supermarket to the west, and an office building to the east.

The site had been a gasoline station for many years, an automobile repair facility since the 1980's, and formerly as a bulk petroleum storage facility. According to a Phase I Environmental Site Assessment performed by Griffin International in 1997, aerial photographs from 1962 and 1983 showed the presence of six bulk petroleum storage tanks on the property. Previous owners of the property include Cray Energy (4/3/39 to 11/22/82) and Bradford Oil Company (11/22/82 to 1/26/83), who sold the property to Bruce R. and Alice T. Brink in 1983. No bulk tanks are visible on the property on a 1986 aerial photo of the site (see Figure 2). Additional bulk tanks were identified on historical aerial photographs on the property just east of the office buildings abutting the eastern site boundary, as well as on a property northeast of the site across the railroad tracks. These bulk tanks are visible on the 1986 orthophoto of the area (Figure 2). The White Supermarket was formerly a trucking terminal for the St. Johnsbury Trucking Company.

The Vermont Hazardous Waste Sites List contains the following four sites on Portland Street in St. Johnsbury.

#77-0188, Pratt-Read (Old True Timber), Portland Street.
#92-1261, C.N. Brown (Apple Gas), 51 Portland Street.
#94-1579, St. Johnsbury Trucking, 68 - 76 Portland Street.
#94-1711, 13 Portland Street.

1.3 Environmental Setting

Topographically, the site is situated on a relatively level terrace which parallels the east-to-west flowing Moose River. Elevation at the site is approximately 580 feet above mean sea level (MSL). Harris Hill, a topographic knob rising to an elevation of 900 feet above MSL, is located south of the site.

Surface water runoff along Portland Street flows into a catch basin on the southwest corner of the property, and northerly on the rest of the property. A small swale is located on the northwest corner of the property just south of the railroad tracks, which are mounded approximately 10 feet above the grade of the northern portion of the site property.

Hydrologic features in the area include the westward-flowing Moose River, which is located about 800 feet north of the site, and the southward-flowing

Passumpsic River located about 1000 feet west of the site. The confluence of the Moose and Passumpsic rivers is located about 1500 feet northwest of the site.

On the Surficial Geologic Map of Vermont (Doll, 1970), mapping units at and near the site include littoral sand and recent alluvium. Stewart and MacClintock's (1969) plot of littoral sediments of glacial Lake Hitchcock shows an elevation around 900 feet above MSL in the vicinity of St. Johnsbury. Thus during the maximum lake level of glacial Lake Hitchcock, the site was under several hundred feet of water.

Bedrock mapping by Hall (1959) indicates the site is underlain by the Devonian Gile Mountain formation, and is located just west of the contact between the Gile Mountain and the Devonian Waits River formation. Rock types of the Gile Mountain formation include quartz mica schist, micaceous quartzite, and phyllite.

1.4 Potential Receptors

Potential receptors in the vicinity of the site were preliminarily identified and are briefly discussed below.

Water Supplies

Residences and buildings in the vicinity are serviced by municipal water. A review of the VT Water Supply Division's well inventory found no logs of wells between the site and downgradient hydrologic features (Moose and Passumpsic rivers).

Indoor Air Quality

The site is located in a developed area with the potential for petroleum vapors to migrate in the subsurface to adjacent buildings and basements. Underground utilities in the area include water, sewer, and stormwater lines.

Surface Water

The nearest mapped hydrologic feature is the Moose River, located about 800 feet north of the site.

Other Receptors

No other sensitive environmental receptors such as wetlands or ecological areas were identified in the immediate vicinity of the site.

2.0 SITE CHARACTERIZATION METHODS & RESULTS

2.1 Soil Boring/Monitoring Well Installations

Four groundwater monitoring wells were installed at the site on October 30, 1997. The wells were installed by Adams Engineering under the supervision of H&A geologist Tim Schmalz. Boreholes were advanced using Adams Engineering's mini-rig technique, which consists of driving (by vibration) five-foot lengths of a 2 $^{3/8}$-inch diameter hollow sampler. After each five-foot drive, soil samples were extruded from the sampler and characterized for color, moisture, and texture (USDA). Soil samples were also screened with a photoionization detector (PID) to monitor for the presence of volatile organic compounds indicative of petroleum contamination.

Well locations are included on Figure 3. One well was installed in the former gasoline UST bed, and three wells were sited as downgradient monitoring points. The borings were advanced to total depths ranging from fifteen to twenty feet below grade (BG). Monitoring wells were constructed with ten feet of factory-slotted (0.010-inch) PVC well screen (1.5-inch diameter). The well screens were positioned to straddle the water-table surface, to monitor for the presence of floating free product. The wells were developed using a peristaltic pump, although MW-2 did not contain sufficient water for development.

Logs of the borings and well construction details are provided in Appendix B.

2.1.1 Stratigraphy

MW-1 was drilled in the former tank bed, and soil samples revealed brown sand and gravel to a depth of six feet BG, underlain by silty fine sand with some fine gravel to ten feet BG. The materials to a depth of ten feet appeared to be materials backfilled after the USTs were removed. Soil below ten feet consisted of silty fine sand and silt, interpreted to be lake-bottom or river-deposited sediments. Drilling refusal was encountered at 18 feet BG in material interpreted to be till on the basis of the refusal and the content of the soil in the sampler tip. Soil samples were moist below seven feet, and were wet below 10 feet. Petroleum sheens and black staining was observed on soil samples beneath seven feet BG.

Soil samples collected at MW-2 exhibited sandy fill material to four feet BG, underlain by silty fine sands to 20 feet BG, which were wet below 13 feet. At MW-3, soil samples included sandy fill to three feet BG, underlain by gray silt and clay to a total drilled depth of 15 feet. Petroleum sheens were observed in soil from five to nine feet BG at MW-3.

Soil samples at MW-4 included two feet of sandy fill underlain by gray silt and clay, which contained small layers of sandy loam (8 to 8.5 ft BG), sand (10 to 10.5 ft BG), and angular gravel (15 to 15.5 ft BG). A small layer of organic material consisting of peat and root debris was present in the 8 to 8.5 foot layer. The total depth of MW-4 was 20 feet.

2.1.2 Soil Contamination

Soil samples were screened for volatile organic compounds using a Photovac MicroTIP HL-2000 equipped with 10.6 eV lamp. Prior to its use, the instrument was calibrated with an isobutylene standard, and was set to respond to benzene. Soil sample headspace measurements were collected by placing soil in plastic zip-lock bags and inserting the PID probe into the bags. Elevated PID readings indicative of petroleum contamination were found in soil samples from MW-1 below seven feet, and in all depth intervals for samples from MW-3 and MW-4. No elevated PID readings were found in soil samples collected during the installation of MW-2.

2.2 Groundwater Elevations, Flow Direction, and Flow Rates

Groundwater levels in the monitoring wells were measured the day after the wells were installed and approximately one week later during groundwater sampling activities. An ART interface probe was utilized to obtain water levels and measure for the presence of floating free product. On both occasions, floating free product (gasoline) was found in MW-1, and MW-2 was dry.

Fluid depths and converted elevations are given on Table 1. Depths to groundwater ranged from 11 feet in MW-1 to nearly 17 feet in MW-4. Figure 4 presents a water-table map, illustrating a northward flow direction under an overall gradient of 8.3 percent. The gradient is slightly steeper between MW-3 and MW-4 than between MW-1 and MW-3.

We estimate the hydraulic conductivity (K) of the saturated zone is in the range of 1×10^{-5} to 1×10^{-4} cm/sec (0.028 to 0.28 ft/day). This estimate is based on published literature values for similar soil types (Freeze & Cherry, 1979, and Fetter, 1988), and the observed recovery of fluid levels in MW-1 and MW-4 after bailing (see below) which indicate a hydraulic conductivity of 5×10^{-5} cm/sec (0.14 feet/day). Using these values, the measured hydraulic gradient of 0.083, and an effective porosity (n_e) estimate of 0.20, the average linear velocity (V_x) can be calculated from the equation $V_x = KI/n_e$, which indicates a range from 4.2 to 42 feet/year. Using the 5×10^{-5} cm/sec hydraulic conductivity value derived from MW-1 and MW-5 recovery data, the average linear velocity is 21 feet/year.

2.3 Groundwater Quality

Groundwater sampling was conducted on November 3, 1997. Samples were collected from MW-3 and MW-4. MW-1 was not sampled due to the presence of 0.59 feet of floating product, and MW-2 was dry. Prior to sampling, water levels were measured to calculate the volume of standing water in the wells. The monitoring wells were purged and sampled with dedicated PVC bailers. While the target purge volume was three volume, both MW-3 and MW-4 went dry after purging only one volume, and samples were retrieved as the wells recharged. Samples were transferred from the bailers into 40-mL glass vials provided by the laboratory, and two vials were filled for each sample location. The vials contained hydrochloric acid for sample preservation. The sample vials were labeled with the sampling location, date, and time. After sample collection, the vials were placed into a cooler with ice for storage and transport to the laboratory. Quality Assurance/Quality Control samples included a trip blank, a field blank, and a field duplicate. The trip blank consisted of two sealed vials provided by the laboratory which remained in the sample cooler during the sampling event. The field blank was prepared by pouring deionized water into two sample vials at the site at the conclusion of the sampling effort. For the duplicate, four sample vials were filled from well MW-3. Two of the vials were labeled MW-3, and two of the vials were labeled MW-20 and were given a fictitious sampling time. In addition to the laboratory chain-of-custody (C-O-C), a sampling data sheet was used to document the sampling event. The data sheet and C-O-C are in included with the laboratory report in Appendix C.

The samples were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl-tert-butyl-ether (MTBE) using EPA Method 8020. The analyses were performed by SCITEST, Inc., of Randolph, Vermont.

The analytical results are given on Table 2. High concentrations of dissolved BTEX constituents were detected in both MW-3 and MW-4. BTEX concentrations were in the 1,000 microgram per liter (ug/L) range in MW-4, and the 100 ug/L range in MW-3. Vermont Groundwater Enforcement Standards (GES) for benzene were exceeded in both MW-3 and MW-4. Concentrations of toluene, ethylbenzene, and xylenes in MW-4 also exceeded GES values for these compounds. MTBE was not detected in MW-3 above a detection limit of 5 ug/L, nor in MW-4 above a detection limit of 200 ug/L. No contaminants were detected in either the field or trip blanks, and the results for the MW-3 duplicate (MW-20) were similar to the MW-3 sample results.

2.4 Free Product Measurement/Recovery

An ART interface probe has been utilized to measure product thickness in monitoring wells at the site. Table 3 summarizes product thickness and bailing records. Floating free product (inferred to be gasoline) was initially found in MW-1 one day after the well was installed (0.56 feet thick). A similar thickness of product was found in MW-1 during the sampling event on November 3. During a subsequent site visit to bail product from MW-1 on November 11, floating free product was also found in MW-4 (0.26 feet thick). The product found in MW-4 is believed to be fuel oil.

A thickness of 3.66 feet of free product was found in MW-1 on November 19, 1997. The well was bailed to dryness, and fluid-level recovery measurements were taken. A similar bail-down test was performed on MW-4. Table 4 presents fluid-level recovery rates for both wells.

2.5 Indoor Air Quality

As part of the groundwater sampling event on November 3, a survey of indoor air quality was performed with a PID in structures near the site. The PID used was a Photovac 2020, equipped with a 10.6 eV lamp, and calibrated and set to respond to isobutylene.

The structures surveyed included the former Portland Street Mini-Mart building (no basement), the Sherwin Williams Paint Store located across Portland Street (no basement), the basement of the White Supermarket, and the office building east of the site. No PID readings indicative of petroleum vapors were detected in any of the buildings. In addition, none of the occupants or employees interviewed during the surveys indicated that they had ever detected gasoline odors in the buildings.

3.0 DISCUSSION OF RESULTS

3.1 Hydrogeologic Setting

Figure 5 is a cross section which illustrates the hydrogeologic setting. The site is underlain by a surficial layer of sandy fill material, generally a few feet deep, but up to ten feet in the vicinity of the former UST excavation. These fill materials are underlain by native fine-grained sediments. The fine-grained sediments consist of silty fine sand, silt, and clay, interpreted as lacustrine or alluvial deposits. At MW-1, refusal was encountered at a depth of 18 feet, believed to be till on the basis of the refusal and the content of the soil in the sampler tip. At MW-4, the fine-grained sediments in the unsaturated zone were interlayered with coarser-grained horizons including fine sand (1.5 feet thick), sandy loam (0.5 feet thick), and angular gravel (0.5 feet thick). A small layer of organic material, consisting of peat and root debris, was also present at a depth of 8 to 8.5 feet BG at MW-4. Bedrock was not encountered during monitoring well drilling.

The water-table surface occurs at depths ranging from 11 to 17 feet below grade, within fine-grained sediments. As illustrated on Figure 6, soil texture below the water table becomes more fine to the north (from silty fine sand and silt near MW-1 to clay at MW-4). Groundwater elevations define a northward flow direction, under an overall gradient of 8.3%, which is slightly steeper in the finer-grained soils to the north. The average linear flow velocity of groundwater at the site is estimated to be approximately 20 feet/year.

3.2 Degree, Extent, and Source of Contamination

The full extent of subsurface petroleum contamination at the site has not been defined. Installation and sampling of the four monitoring wells indicates that significant petroleum contamination is present in site soils and groundwater. A considerable amount of free-phase gasoline is present near the former USTs, as indicated by the accumulation of up to 3.66 feet of floating free product in MW-1, which was installed on the periphery of the former UST bed. Free-phase petroleum was also observed in soils collected during the installation of MW-3, although no free product has accumulated in this well. Free product has been found in MW-4, and is believed to be fuel oil.

Elevated PID readings indicative of petroleum contamination were found in soil samples collected during the installation of three of the four monitoring wells, both above and below the water table. Laboratory analyses of groundwater from MW-3 and MW-4 detected high concentrations of dissolved

BTEX compounds, with higher concentrations detected in MW-4, the furthest downgradient well at the site.

Three USTs formerly used for gasoline storage were excavated and removed from the site in April 1994. According to Griffin International's site assessment report (Appendix A), two of the tanks were in fair condition and the third tank was in poor condition, with significant pitting and corrosion. Elevated PID readings were detected surrounding, above, and below the tanks and in the vicinity of the dispensers. Groundwater entered the excavation from a perched layer at six feet, and a heavy petroleum sheen was observed. Since no holes were reported in the tanks or piping, the exact source of the release is unknown. Thus the entire former UST and pump dispenser locations are considered a source area for releases of gasoline. The source of product detected in MW-4, believed to be fuel oil, is not known, although it may be related to historical bulk storage at the site.

3.3 Potential Receptors

Contamination is present at the site as free-phase petroleum (floating on the water-table surface and adsorbed to soil), vapor phase, and dissolved in groundwater.

Although the downgradient extent of the groundwater contaminant plume has not been defined, dissolved contamination does not appear likely to threaten the nearest downgradient surface water feature, the Moose River. Due to the distance between the site and the river (800 feet), and the relatively low permeability of the fine-grained sediments, it appears unlikely that the contaminant plume within the unconsolidated sediments extends to the Moose River. Bedrock was not encountered during monitoring well drilling, therefore the potential impact to bedrock aquifers or potential transport through bedrock to surface water is unknown.

Site contamination does not appear to threaten water supplies since the region is served by municipal water and no private wells were identified between the site and downgradient groundwater discharge zone (Moose & Passumpsic rivers).

A preliminary indoor air quality survey did not identify petroleum vapors in adjacent buildings, although additional PID surveys of residences north of the site are recommended.

3.4 Conclusions and Recommendations

Releases of petroleum have impacted subsurface soil and groundwater at the former Portland Street Mini-Mart site in St. Johnsbury, Vermont. Free-phase gasoline is present in sufficient quantities to accumulate up to 3.66 feet of floating product in a monitoring well installed on the periphery of the former gasoline UST bed (MW-1). Free-phase product, believed to be fuel oil, was found in MW-4 (0.26 feet), the furthest downgradient well on the property. Elevated PID readings indicative of petroleum contamination were detected in soil samples throughout the site, both above and below the water table. A plume of dissolved BTEX constituents is migrating northward across the property, and likely extends beyond the northern property boundary.

Groundwater occurs at depths ranging from 11 to 17 feet BG within fine-grained sediments consisting of silty fine sand, silt, and clay. Groundwater elevations define a northward flow direction, under an overall gradient of 8.3%, which is slightly steeper in the finer-grained soils to the north. The average linear flow velocity of groundwater at the site is estimated to be approximately 20 feet/year.

Additional investigation activities are recommended to facilitate product recovery, to further evaluate the extent of contamination, to further assess potential impacts on receptors, and to evaluate corrective action alternatives. Recommended tasks include continued weekly free product bailing, installation of at least one 4-inch diameter recovery well, installation of monitoring wells on and off the site property, groundwater sampling and analysis, and the preparation of a Corrective Action Feasibility Investigation workplan. Specific tasks are presented below.

- Review files on nearby VT Hazardous Waste Sites.
- Obtain historical aerial photographs of site to document the presence and location of former petroleum bulk storage tanks.
- Install a four-inch diameter recovery well near MW-1 to facilitate product recovery efforts and to permit pilot testing of automated recovery systems.
- Install up to four monitoring wells on the property (Figure 6) and three downgradient wells (Figure 7) on residential properties north of the railroad tracks. Utilize Adams Engineering's "mini-rig" procedures to install the off-property wells. Utilize hollow-stem auger techniques to install the two-inch monitoring wells on the site.

- Continue to perform weekly gauging and recovery of free product.
- Perform a site wide groundwater monitoring event, analyzing groundwater samples for BTEX/MTBE (EPA Method 8020) and performing fingerprint analyses on free product samples (mod. EPA Method 8100) to positively identify product.
- Perform an indoor air quality survey of all adjacent structures including residences located north of the property.
- Prepare summary report including a workplan for a Corrective Action Feasibility Investigation to include pilot testing of product recovery systems, and assessment of other potential remedial approaches.

The estimated costs to perform these activities are presented on Table 5.

REFERENCES

Doll, C.G. (editor), 1970, *Surficial Geologic Map of Vermont*, Office of the State Geologist.

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Hall, L.M., 1959, *The Geology of the St. Johnsbury Quadrangle, Vermont and New Hampshire*, Vermont Geological Survey, Bulletin No. 13.

Stewart, D.P., and P. MacClintock, 1969, *The Surficial Geology and Pleistocene History of Vermont*, Vermont Geological Survey, Bulletin No. 31.

TABLE 1

Groundwater elevation measurements,
former Portland Street Mini-Mart Site,
St. Johnsbury, Vermont, SMS Site # 97-2205.

DEPTH TO WATER (feet below TOC)

Well ID	*Elevation of TOC (feet)*	*10/31/97*	*11/3/97*
MW-1	98.98	11.19 (10.63)	11.20 (10.61)
MW-2	100.00	> 16.55	> 16.55
MW-3	94.44	11.40	11.36
MW-4	93.61	16.66	16.68

GROUNDWATER ELEVATIONS (feet)

Well ID	*Elevation of TOC (feet)*	*10/31/97*	*11/3/97*
MW-1	98.98	88.27*	88.29*
MW-2	100.00	< 83.45	< 83.45
MW-3	94.44	83.04	83.08
MW-4	93.61	76.95	76.93

Notes:

TOC = top of casing (PVC lip)

Elevations are in feet relative to MW-2 TOC = 100.00 feet

11.19 (10.63) = depth to water (depth to free product)

* corrected for free product thickness (sp. grav. = 0.86)

TABLE 2

Groundwater sampling results for November 3, 1997,
former Portland Street Mini-Mart Site,
St. Johnsbury, Vermont, SMS Site # 97-2205.

	May 5, 1997 (results in ug/L)				
WELL ID	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**MTBE**
MW-3 / Duplicate	209 / 214	56 / 58	82 / 85	238 / 244	< 5 / < 5
MW-4	1,990	4,660	1,420	7,370	< 200
Field Blank	< 1	< 1	< 1	< 1	< 1
Trip Blank	< 1	< 1	< 1	< 1	< 1
REGULATORY THRESHOLDS					
Vermont Groundwater Enforcement Standard	5	2420	680	400	-
Vermont Preventative Action Limit	0.5	1210	340	200	-
Vermont Health Advisory	1	-	-	-	40
USEPA Maximum Contaminant Level (Drinking Water)	5	1000	700	10000	-

Notes:

< 1 = below a detection level of 1

9 / 8 = sample result / field duplicate result

MW-1 not sampled due to 0.59 feet of free product, MW-2 was dry

TABLE 3

Free Product Thickness and Recovered Volumes,
former Portland Street Mini-Mart Site,
St. Johnsbury, Vermont, SMS Site # 97-2205.

MW-1					
Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Total Bailed	Product Recovered
10/31/97	10.63	11.19	0.56		
11/3/97	10.61	11.20	0.59		
11/11/97	10.06	10.82	0.76	1.00	0.31
11/19/97	9.15	12.81	3.66	1.00	0.35
11/24/97					
			TOTAL	2.00	0.66

MW-4					
Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Total Bailed	Product Recovered
10/31/97		16.88			
11/3/97		16.68			
11/11/97	16.05	16.31	0.26	0.50	0.13
11/19/97	15.92	16.12	0.20	0.50	0.13
11/24/97					
			TOTAL	1.00	0.25

NOTES:
MW-1 (gasoline)
MW-4 (fuel oil)

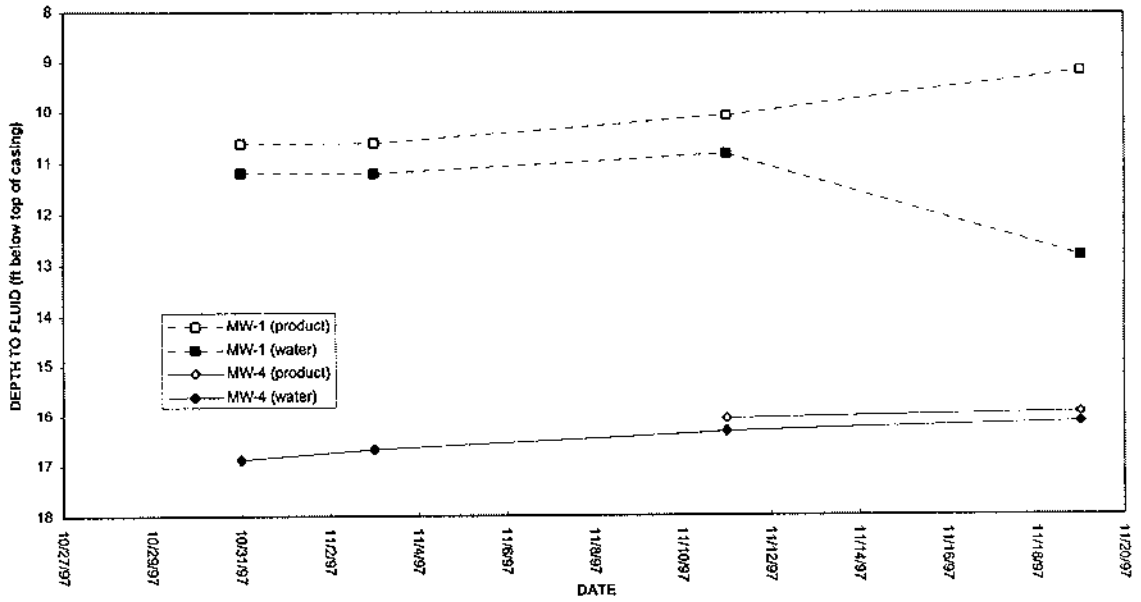


TABLE 4

Bail-down data for MW-1 and MW-4, November 19, 1997,
former Portland Street Mini-Mart Site,
St. Johnsbury, Vermont, SMS Site # 97-2205.

	MW-1			MW-4		
Recovery Time (min)	Depth to Product (ft)	Depth to Water (ft)	Free Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Free Product Thickness (ft)
pre-bail	9.15	12.81	3.66	15.92	16.12	0.20
0.00	16.88	16.95	0.07		19.87	
0.50	15.45	15.47	0.02		18.76	
1.00	15.10	15.22	0.12		18.63	
2.00	14.62	14.85	0.23		18.54	
3.00	14.10	14.40	0.30		18.46	
4.00	13.65	13.97	0.32		18.26	
5.00	13.22	13.60	0.38		18.19	
6.00	12.90	13.30	0.40		18.08	
7.00	12.55	13.02	0.47		17.99	
8.00	12.25	12.71	0.46	17.83	17.84	0.01
9.00	11.95	12.48	0.53	17.75	17.76	0.01
10.00	11.72	12.24	0.52	17.64	17.65	0.01
12.00	11.37	11.91	0.54	17.46	17.47	0.01
14.00	11.05	11.68	0.63	17.33	17.35	0.02
16.00	10.79	11.44	0.65	17.21	17.22	0.01
18.00	10.59	11.25	0.66	17.09	17.10	0.01
20.00	10.44	11.05	0.61	16.95	16.97	0.02

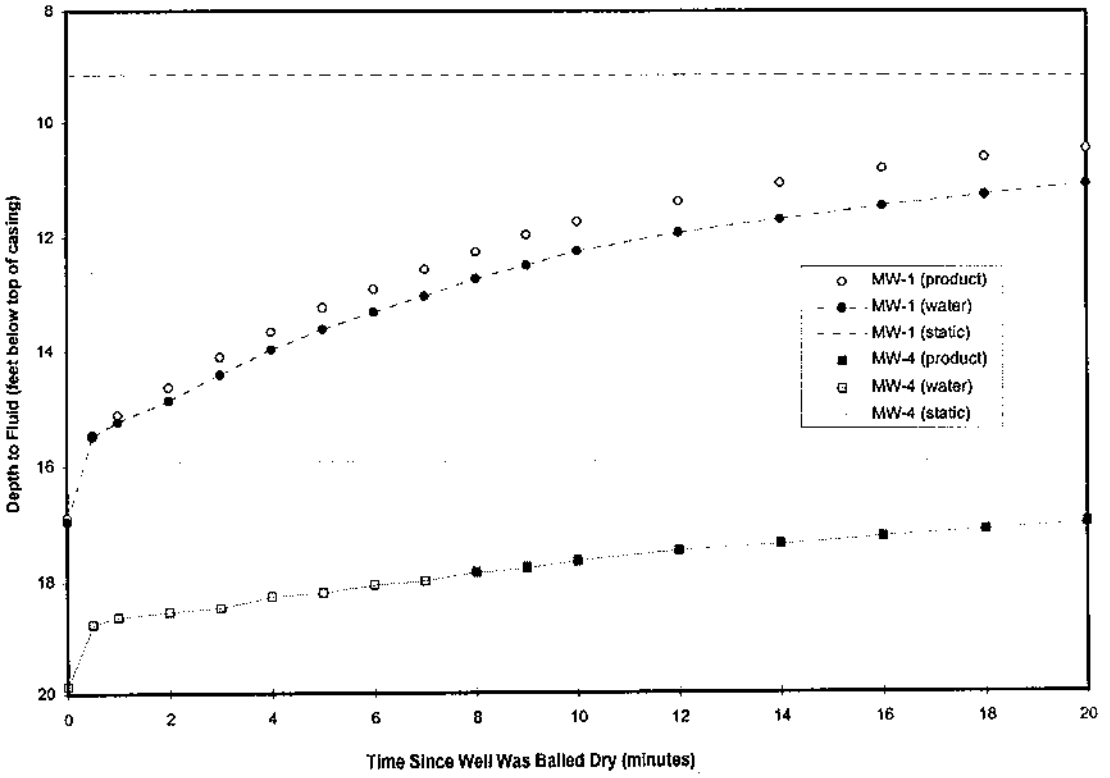


TABLE 5

Cost estimate for additional site investigation activities
former Portland Street Mini-Mart Site, St. Johnsbury, Vermont, SMS Site # 97-2205.

Project: Former Portland Street Mini-Mart (Brink)
Tasks: Install Monitoring Wells, Groundwater Monitoring,
Free Product Recovery, Report/CAFI Workplan Preparation

LABOR

Task	Hours	Rate	Amount	
Project Management	8.00	$55.00	$440.00	
File Review - Adjacent Vt Hazardous Waste Sites	6.00	$45.00	$270.00	
Monitoring Well Installations	24.00	$45.00	$1,080.00	
Well Logs	4.00	$45.00	$180.00	
Free Product Recovery (10 weekly trips*)	45.00	$45.00	$2,025.00	
Site Survey - Well Locations/Elevations	6.00	$45.00	$270.00	
Groundwater Sampling Event & Indoor Air PID Survey	10.00	$45.00	$450.00	
Basemap Update, Figure Preparation	6.00	$45.00	$270.00	
Report/CAFI Workplan Preparation	20.00	$55.00	$1,100.00	
		SUB-TOTAL LABOR		$5,645.00

H&A EXPENSES

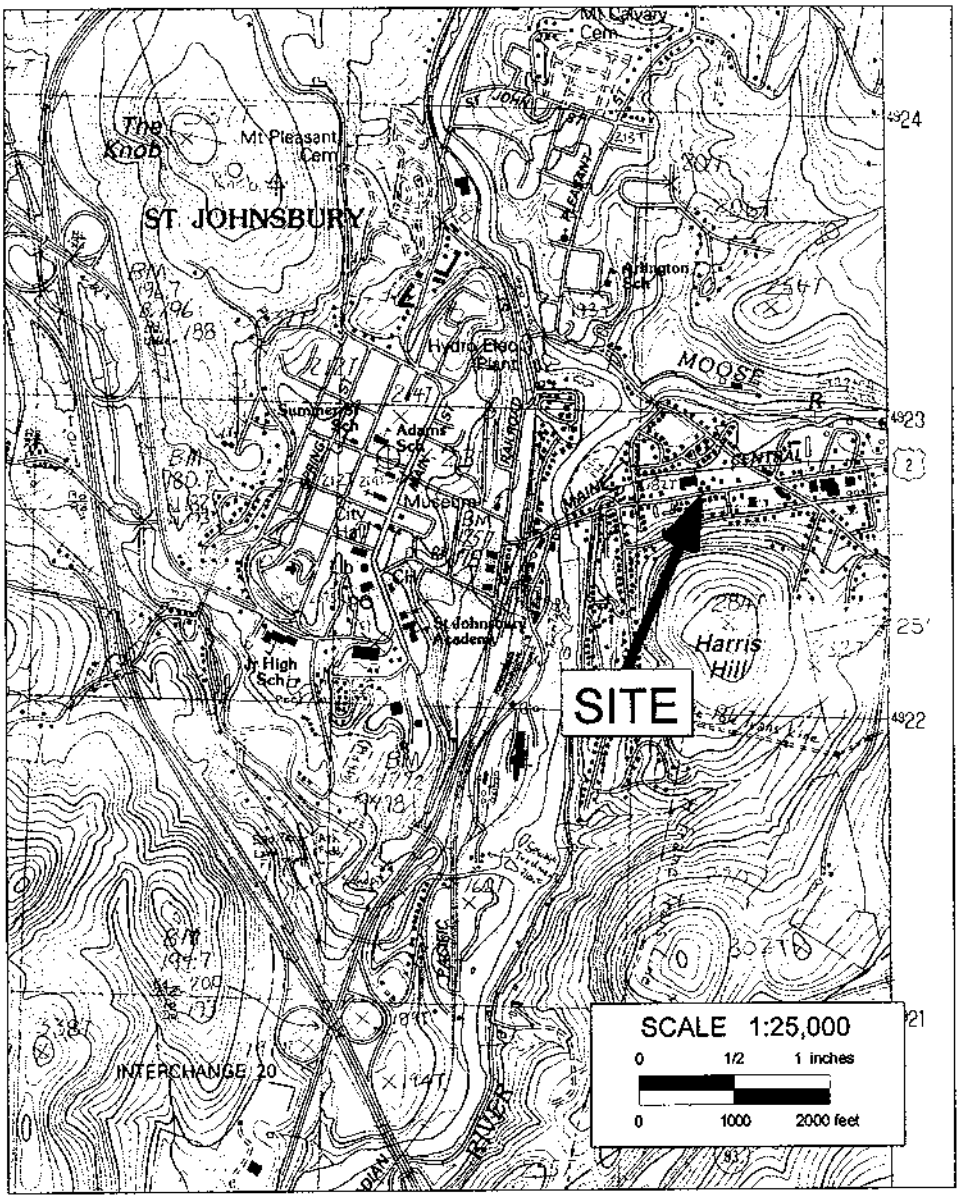
Expenses	Quantity	Rate	Amount	
Mileage - Well Installations	240	$0.28	$67.20	
Mileage - Free Product Bailing (10 weekly trips)	1200	$0.28	$336.00	
Mileage - Groundwater Sampling	120	$0.28	$33.60	
PID Rental (Monitoring Well Installations & Indoor Surveys	3	$75.00	$225.00	
Survey Equipment Rental	1	$30.00	$30.00	
Interface Probe Rental	10	$25.00	$250.00	
		SUB-TOTAL H&A EXPENSE		$941.80

SUB-CONTRACTOR EXPENSE

Contractor/Task	Quantity	Rate	Amount	
North Country Environmental Services				
Drum Pick-up/Disposal (55 gallons gas/water)/Replacement Drum	1	$300.00	$300.00	
Tri-State Drilling & Boring				
Mobilization	1	$100.00	$100.00	
2-inch Monitoring Wells	3	$500.00	$1,500.00	
4-inch Monitoring Wells	2	$750.00	$1,500.00	
Adams Engineering				
Mobilization	1	$300.00	$300.00	
1.5-inch Monitoring Wells	3	$300.00	$900.00	
Scitest Laboratory Services				
8020 Analyses for BTEX/MTBE (10 wells, 3 QA/QC)	13	$50.00	$650.00	
free product fingerprint analyses (2 wells)	2	$160.00	$320.00	
		SUB-TOTAL SUB-CONTRACTOR EXPENSE		$5,570.00
		Sub-Contractor Mark-Up (10%)		$557.00
		SUB-CONTRACTOR TOTAL EXPENSE		$6,127.00

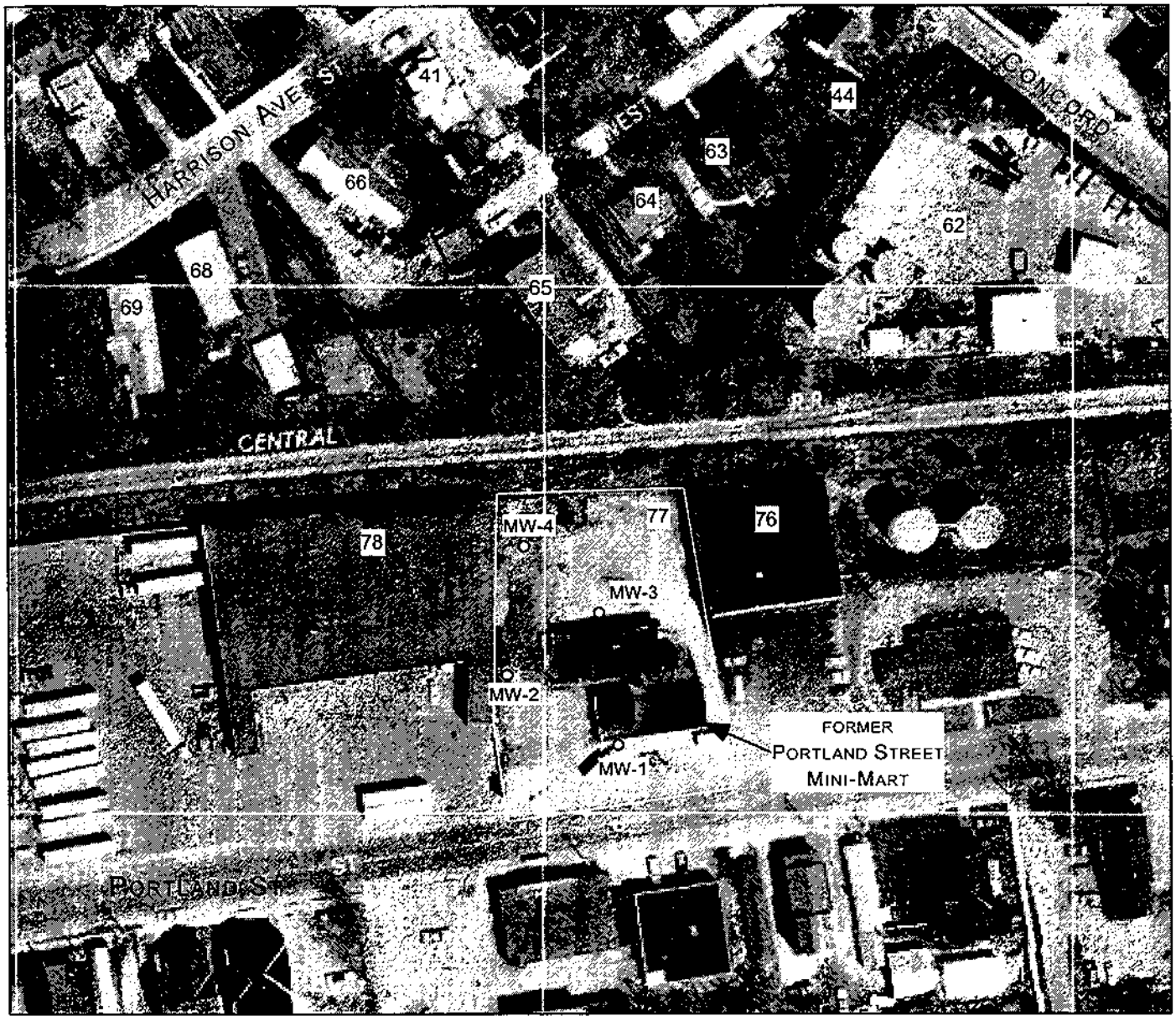
TOTAL ESTIMATED PROJECT COST	**$12,713.80**

* Weekly Trips Starting November 3, 1997



BASE FROM U.S. GEOLOGICAL SURVEY, 1:25,000;
ST. JOHNSBURY, VERMONT, 1983 PROVISIONAL

FIGURE 1
SITE LOCATION MAP,
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.



Property Owners

41 - Mosher, 15 Harrison Ave
44 - Gillette, 67 Concord Ave
62 - Alan D. Rosi, Concord Ave
63 - Boisvert, 1 West Cottage St
64 - Smyth, 3 West Cottage St
65 - LaFerriere, 5 West Cottage St
66 - Moses/Goupee, 13 Harrison Ave
68 - Bedor, 11 Harrison Ave
69 - Chamberlain, 9 Harrison Ave
76 - Bona (Offices), 90 Portland St
77 - Brink (former Mini-Mart), 80 Port. St
78 - ABFB Corp (White Market), 76 Port. St

Basemap:
VT Mapping Program Orthophoto,
1:1,250 Series, 1986,
Portland Street, St. Johnbury

FIGURE 2
SITE VICINITY MAP,
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.

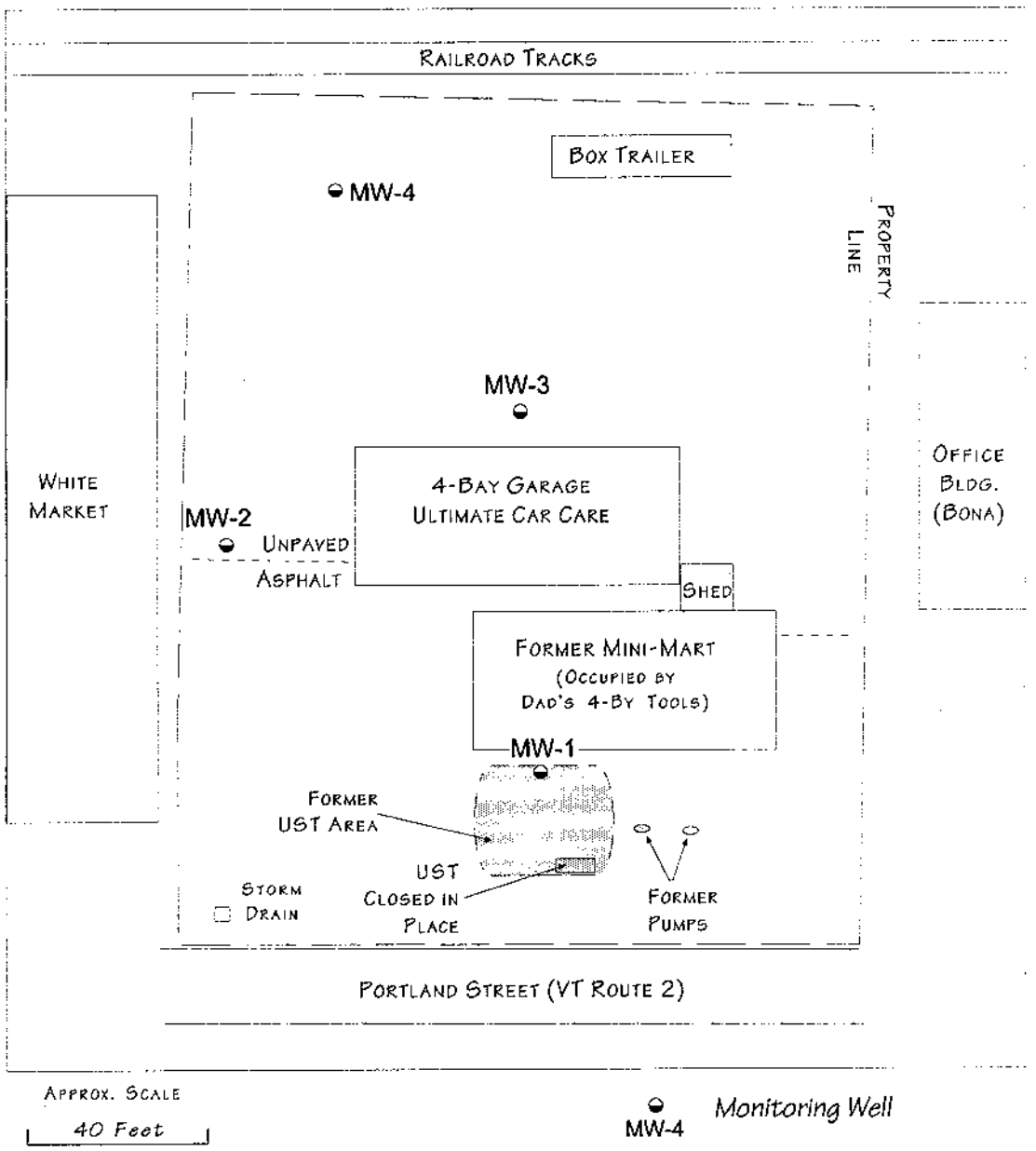
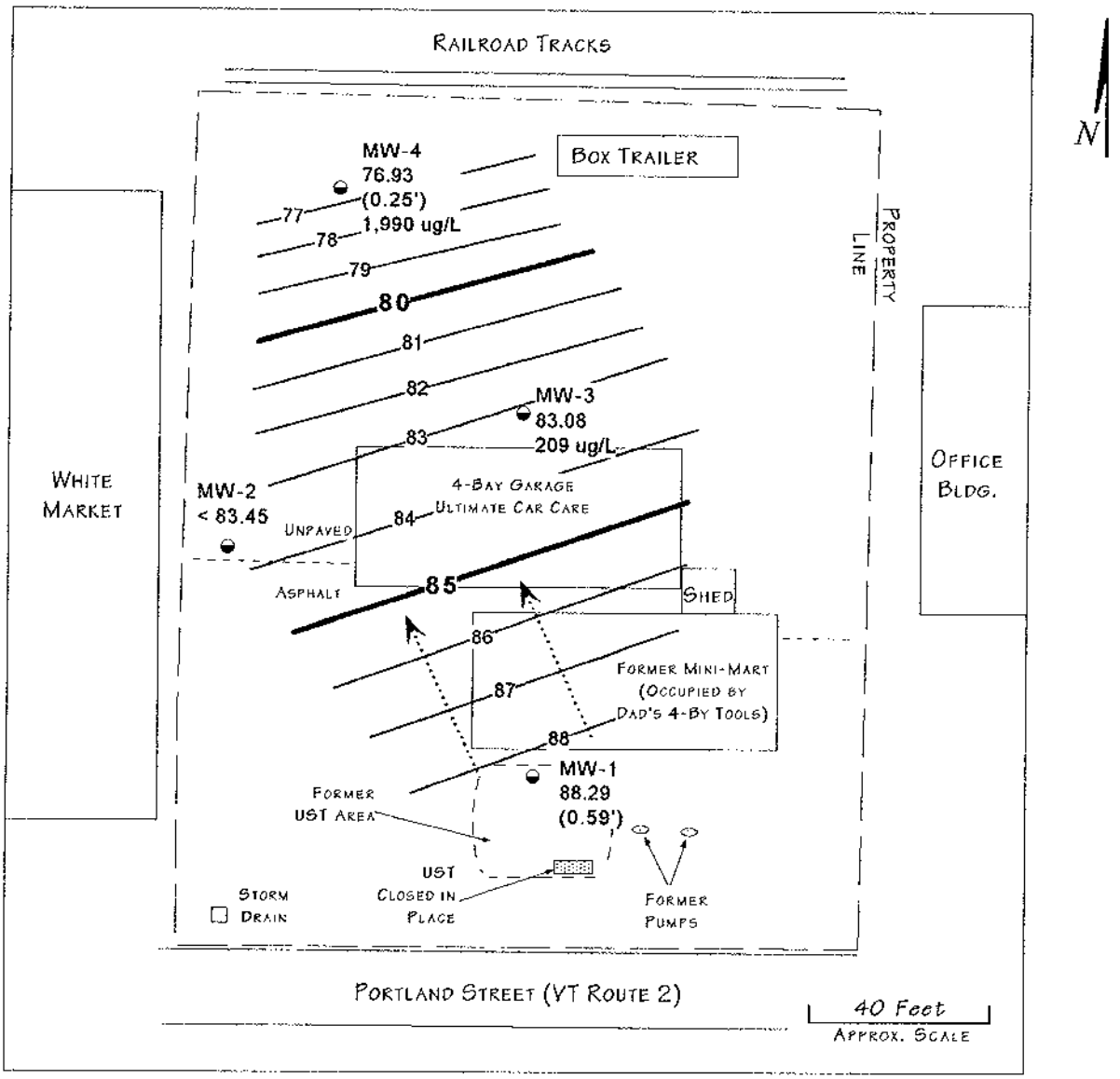


FIGURE 3

SITE MAP,
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.



MW-1 88.29 (0.59') — MONITORING WELL WITH GROUNDWATER ELEVATION IN FEET (FREE PRODUCT THICKNESS IN FEET OR BENZENE CONCENTRATION IN UG/L)

88 — GROUNDWATER ELEVATION CONTOUR (FEET)

GROUNDWATER FLOW DIRECTION

FIGURE 4

WATER-TABLE MAP FOR NOVEMBER 3, 1997,
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.

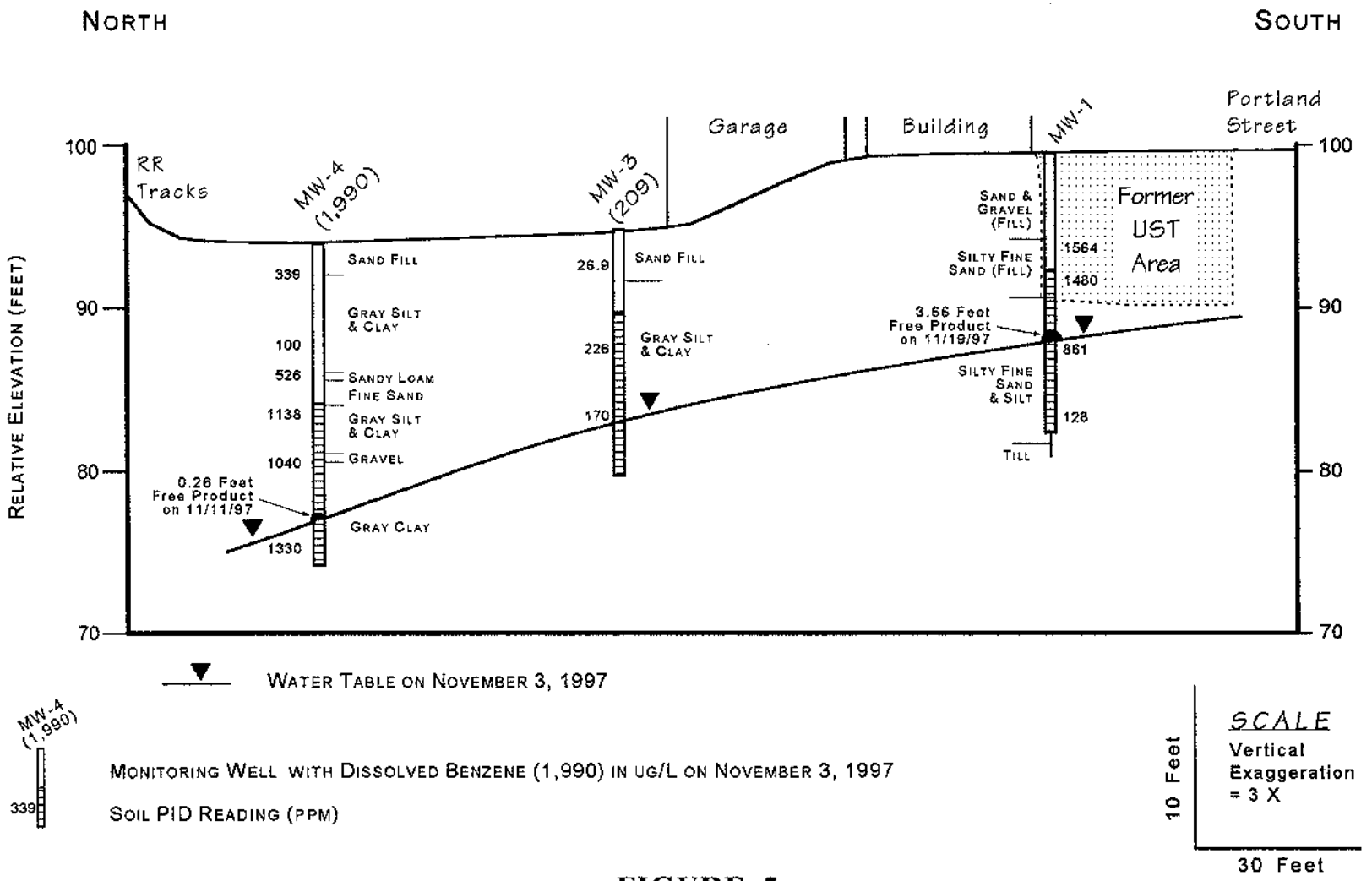
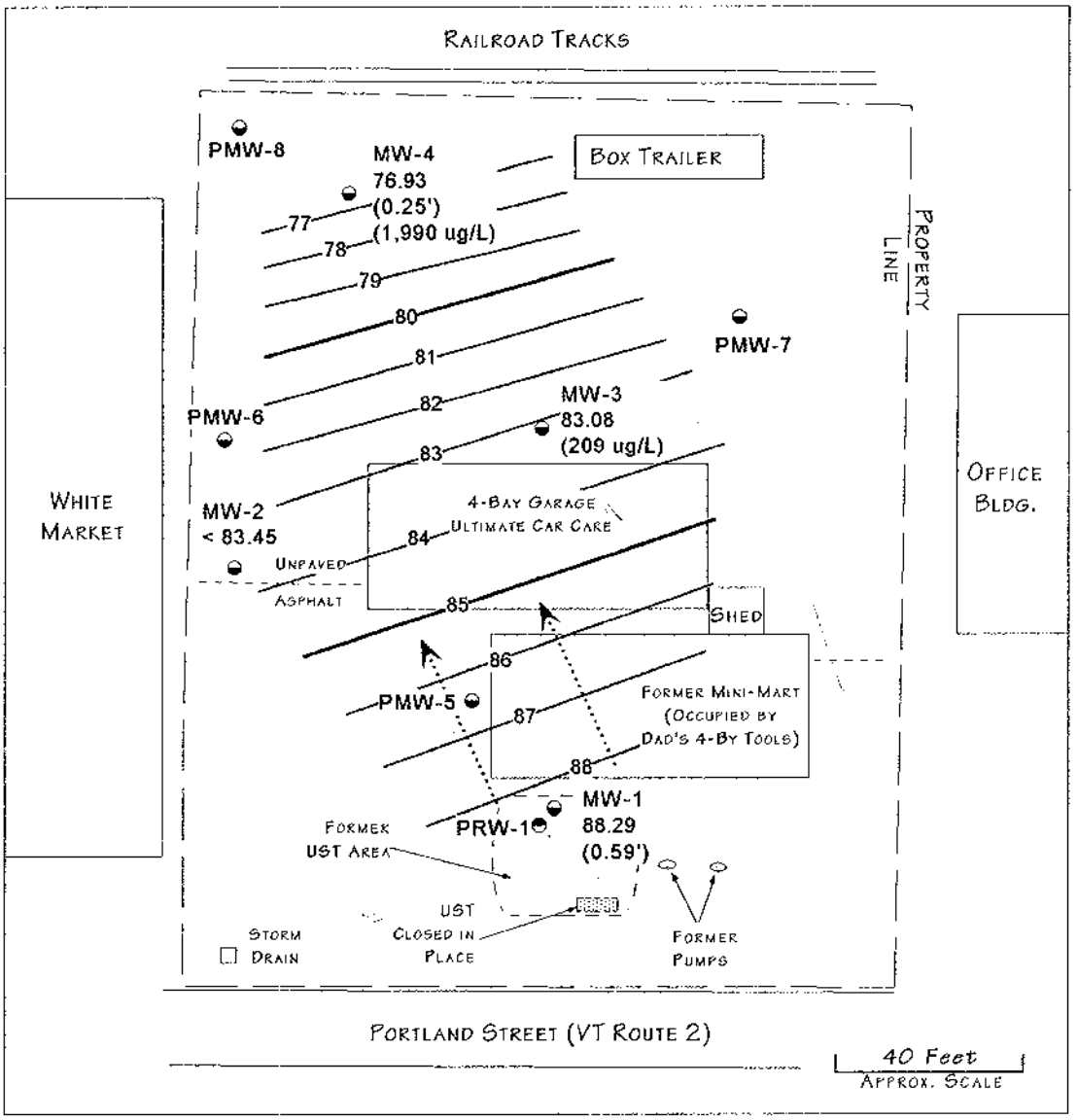


FIGURE 5

NORTH TO SOUTH CROSS SECTION,
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.



MW-1 88.29 (0.59') — MONITORING WELL WITH GROUNDWATER ELEVATION IN FEET (11/3/97) (FREE PRODUCT THICKNESS IN FEET OR BENZENE CONCENTRATION IN UG/L)

—88— GROUNDWATER ELEVATION CONTOUR IN FEET (11/3/97)

GROUNDWATER FLOW DIRECTION (11/3/97)

PMW — PROPOSED MONITORING WELL (2-INCH)

PRW — PROPOSED RECOVERY WELL (4-INCH)

FIGURE 6

PROPOSED MONITORING WELL LOCATIONS(ON-SITE),
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.

Hoffer & Associates

Consulting Hydrogeologists

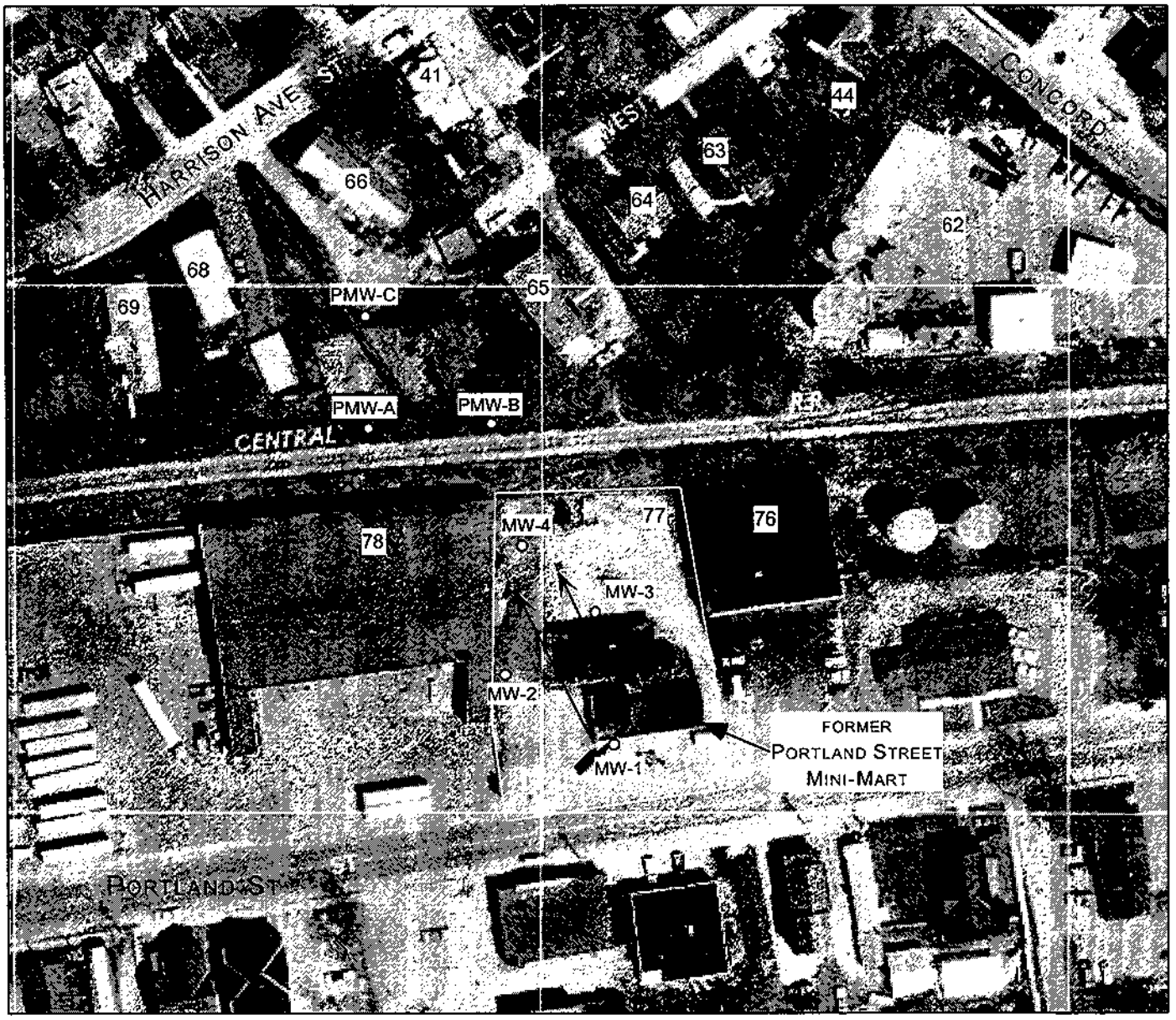


FIGURE 7

PROPOSED MONITORING WELL LOCATIONS(OFF SITE),
FORMER PORTLAND STREET MINI-MART,
ST. JOHNSBURY, VERMONT, SMS SITE # 97-2205.

GRIFFIN INTERNATIONAL INC

April 29, 1997

Ms. Susan Thayer
State of Vermont DEC
Management and Prevention Section
103 South Main Street, West Building
Waterbury, Vermont 05671-0404

RE: UST Closure Inspection at Former Portland Street Mini Mart, St. Johnsbury, Vermont.
Facility #7484994

Dear Ms. Thayer:

On April 24, 1997, I conducted a closure inspection of three underground storage tanks (USTs) at the former Portland Street Mini Mart located at 80 Portland Street in Saint Johnsbury, Vermont (see attached Site Location Map). The USTs were owned by B & AB, Inc., of Saint Johnsbury, Vermont, contact: Bill Brink. The USTs were removed under the coordination of Fenhoff Excavating of Danville, Vermont. Waste was removed from the UST, and the UST was subsequently cleaned by Great Northern Environmental Services of Bath, New Hampshire.

During the closure, a fourth UST (UST #4) was discovered in the excavation. No piping was connected to the UST. A bung was opened on top of the tank, and the tank was observed to be full of concrete. I obtained permission by telephone from Ms. June Middleton, VTDEC, to leave this UST closed-in-place.

No replacement USTs were installed. No other USTs are known to exist at the site.

Please find the attached State of Vermont Tank Closure Form, Site Diagram, and photographs of the USTs and excavation.

The USTs removed were located in a common field located adjacent to the south side of the building (see Site Sketch). The USTs were installed in 1977. The USTs removed were all single wall steel constructions used for the storage of gasoline.

UST #1 was in poor condition with significant pitting and corrosion, particularly on the northern end of the tank. UST # 2 and UST #3 were in fair condition with some rust and no significant

pitting. The piping from all three USTs to dispensers was fiberglass installed in 1992 and was in good condition.

In the excavation of the UST, from the ground surface to 3 feet below grade, soils consisted of dry brown gravel fill. From 3 to 10 feet below grade, at the limits of the excavation of UST #2, soil consisted of damp fine sand and silt. Groundwater was present perched at approximately 6 feet. A heavy sheen was present on groundwater in the excavation.

Thirteen soil samples were collected from areas excavated around the USTs, from below the USTs and from the limits of the excavation. The samples were placed in sample bags, and the head space of the bags were screened for volatile organic compounds (VOCs) with an HNU Model HW-10 photo ionization detector (PID) equipped with a 10.2 electron-volt lamp and calibrated with isobutylene, benzene reference.

VOC concentrations detected in the excavation ranged from 25 to 350 parts per million (ppm). Gasoline contamination was present surrounding, above and below the USTs and in the vicinity of the dispensers.

Approximately 50 cubic yards of clean and contaminated soils were backfilled into the excavation. A stockpile of soil was present north of the building. This soil resulted from excavation for the piping replacement in 1992. On April 24, 1997, I collected eight soil samples from this stockpile and screened the samples for the presence of VOCs with a PID. No VOCs were detected. Permission was granted from June Middleton, VTDEC, to use this soil as replacement backfill in the tank field excavation, and such was done.

The site and nearby area is served by municipal water. No water supply wells are known to be located within one-half mile of the site. No receptors other than the soil and groundwater at the site were observed to be impacted by petroleum contamination.

In conclusion, gasoline contamination was present in soils and groundwater in the tank field excavation. The full degree and extent of contamination was not assessed.

Please call me with any questions you may have regarding this UST closure.

Sincerely,

Laurie T. Reed

Laurie T. Reed
Project Geologist

Attachments

c. Mr. Bill Brink, B & AB, Inc.
Mr. Kerk Fenhoff, Fenhoff Excavating

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-1

Client / Site:	William Brink/Portland Street Mini Mart
Location:	80 Portland Street, St. Johnsbury, VT.
Project Number:	77-01
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/8" Sampler (vibratory)
Geologist:	Tim Schmalz
Sampling Method:	continuous samples
Date:	10/30/97
Weather:	Cool, cloudy, slight wind.
Boring Location:	In asphalt to west of entrance.

Well Construction Information	
Total Depth Drilled:	18.0' BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 17.0 - 7.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC /7.0' - 0.5' BGS
Sandpack Type/Interval:	#1 sand & natural pack / 18.0' - 3.5' BGS
Seal Type/Interval:	Bentonite slurry / 3.5' - 0.5' BGS
Depth to Water/Date	11.20' (free product at 10.61') - 11/3/97
Elevation Ground:	99.3
Elevation TOC:	98.98
Other:	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)
0.5 to 4.8	4.3 / 3.0		0.5 - 4.5	brown, m/c sand with 15-25% f/m gravel (backfill), dry	sand	2.0' - 0.1 4.5' - 0.2
5.0 - 10.0	5.0 / 3.0	0.5	5 - 6	as above		
		2.5	6 - 10	light gray to olive gray silty fine sand, 10-20% fine gravel moist from 7.0', some petroleum sheen, black staining	sandy loam	7' - 1564 9' - 1480
10.0 - 15.0	5.0 / 3.3	3.3	10.0 - 13.3	Dark gray to black, wet, soft fine sands with silt, sheens (75% fine sand, 25% silt and clay).	sandy loam to loamy sand	861
15.0 - 20.0	3.0 / 3.0	3.0	15.0 - 18.0	Brown, wet silt (80% silt, 20% fine sand), grading to stiff silts and sands (till). Refusal at 18.0" BGS.	silt	128

Generalized Geologic Log and Other Observations:

0.0' - 0.5': Asphalt & sub-base gravel
0.5' - 6.0': sand and gravel (backfill)
6.0' - 10.0': gray silty fine sand, some fine gravel, moist from 7', petroleum sheens
10' - 18.0': dark gray to brown silt and fine sand
18.0' : Dark gray till

Notes:

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

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-2

Client / Site:	William Brink/Portland Street Mini Mart
Location:	80 Portland Street, St. Johnsbury, VT.
Project Number:	77-01
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/8" Sampler (vibratory)
Geologist:	Tim Schmalz
Sampling Method:	continuous samples
Date:	10/30/97
Weather:	Cool, cloudy, slight wind
Boring Location:	Unpaved area west of buildings

Well Construction Information	
Total Depth Drilled:	18.0' BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 17.0' - 7.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC / 7.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack / 17.0' - 2.2' BGS
Seal Type/Interval:	Bentonite slurry / 2.2' - 1.0' BGS
Depth to Water/Date	dry to 16.5' - 11/3/97
Elevation Ground:	100.03
Elevation TOC:	100.00
Other:	dry

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)
0.0 - 5.0	5.0 / 2.0	2.0	1.0 - 3.0	Fill, consisting of brown sandy gravel (50% coarse angular gravel, 30% fine sand, 20 % silt and clay).	gravelly sandy loam	0.0
5.0 - 10.0	5.0 / 1.5	0.5	5.0 - 5.5	Same (as above) due to hole collapse	gravelly sandy loam	0.0
		1.0	5.5 - 6.5	Brown, slightly moist soft fine sand with silt (60% v.f. sand, 40% silt and clay).	sandy loam	0.0
10.0 - 15.0	5.0 / 4.2	4.2	10.0 - 14.2	Same (as above), becoming wet.	sandy loam	0.8
15.0 - 18.0	3.0 / 3.0	3.0	15.0 - 18.0	Same (as above).	sandy loam	0.0

Generalized Geologic Log and Other Observations:

0.0' - 4.0' : Gravel parking lot fill.

4.0' - 18.0' : Lacustrine silty fine sands, wet at 13 feet.

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, 10.6 eV lamp, calibrated to benzene.

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-3

Client / Site:	William Brink/Portland Street Mini Mart
Location:	80 Portland Street, St. Johnsbury, VT.
Project Number:	77-01
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/8" Sampler (vibratory)
Geologist:	Tim Schmalz
Sampling Method:	continuous samples
Date:	10/30/97
Weather:	Cool, cloudy, slight wind
Boring Location:	Unpaved area immediately behind garage

Well Construction Information	
Total Depth Drilled:	15.0' BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 15.0' - 5.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC / 5.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack / 15.0' - 2.0' BGS
Seal Type/Interval:	Bentonite slurry / 2.0' - 1.0' BGS
Depth to Water/Date	11.36'/11-3-97
Elevation Ground:	94.7
Elevation TOC:	94.44
Other:	Developed with peristaltic pump until dry

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)
0.0 - 5.0	5.0 / 2.0	2.0	1.0 - 3.0	Fill, consisting of dark gray to black gravel (50% coarse angular gravel, 30% fine sand, 20 % silt and clay).	gravelly sandy loam	26.9
5.0 - 10.0	5.0 / 4.5	4.5	5.0 - 9.0	Dark gray, firm, moist to wet silt (100% silt and clay), sheens.	silt	226.0
10.0 - 15.0	5.0 / 5.0	5.0	10.0 - 15.0	Same (as above), wet.	silt	170.0

Generalized Geologic Log and Other Observations:

0.0' -3.0': Coarse angular gravel and silty sand (fill)

3.0' - 15.0': Lacustrine gray silt and clay.

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, 10.6 eV lamp, calibrated to benzene.

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

WELL BORING ID: MW-4

Client / Site:	William Brink/Portland Street Mini Mart
Location:	80 Portland Street, St. Johnsbury, VT.
Project Number:	77-01
Driller:	Gerry Adams - Adams Engineering
Drilling Method:	2 3/8" Sampler (vibratory)
Geologist:	Tim Schmalz
Sampling Method:	continuous samples
Date:	10/30/97
Weather:	Cool, cloudy, slight wind
Boring Location:	Unpaved area to north of garage

Well Construction Information	
Total Depth Drilled:	20.0' BGS
Screen Type/Interval:	1.5" sch. 40, 10-slot PVC / 20.0' - 10.0' BGS
Riser Type/Interval:	1.5" sch. 40 PVC /10.0' - 0.3' BGS
Sandpack Type/Interval:	#1 sand & natural pack / 20.0' - 7.5' BGS
Seal Type/Interval:	Bentonite slurry / 7.5' - 1.0' BGS
Depth to Water/Date	16.68'/11-3-97
Elevation Ground:	93.9
Elevation TOC:	93.61
Other:	Developed with peristaltic pump until dry

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)
0.0 - 5.0	4.0 / 2.5	1.0	1.0 - 2.0	Fill, consisting of dark gray to black gravel (50% coarse angular gravel, 30% fine sand, 20 % silt and clay).	gravelly sandy loam	nm
		1.5	2.0 - 3.5	Dark gray, moist to wet soft silt (100% silt and clay).	silt	339.0
5.0 - 10.0	5.0 / 3.5	3.0	5.0 - 8.0	Gray, stiff, wet sticky silt and clay (50% silt, 50% clay).	clay to silty clay	100.0
		0.5	8.0 - 8.5	Brown, dry to slightly moist , soft silt loam to sandy loam (50% silt, 35 % fine sand, 15% clay), large to small roots.	silt loam	526.0
10.0 - 15.0	5.0 / 4.5	1.5	10.0 - 11.5	Gray, wet sand (100% fine sand), strong petroleum odors.	sand	1138.0
		3.0	11.5 - 14.5	Gray, stiff, wet sticky silt and clay (50% silt, 50% clay).	clay to silty clay	1040.0
15.0 - 20.0	5.0 / 4.8	0.5	15.0 - 15.5	Gray, loose, wet, fine to coarse angular gravel.	gravel	nm
		4.3	15.5 - 19.8	Dark gray, firm, wet stiff clay.	clay	1330.0

Generalized Geologic Log and Other Observations:

0.0' - 2.0': Parking lot material-coarse to fine angular gravel with sand and silt.

2.0' - 20.0': Lacustrine, stiff, gray silt and clay with occasional gravel and loam interlayers.

Notes:

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, 10.6 eV lamp, calibrated to benzene.

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

ADAMS ENGINEERING
Gerard Adams
#47 Blakey Rd., Underhill, VT 05489-9493
(802)-899-4945

November 1, 1997

Mr. Tim Schmalz
Hoffer & Associates
Well logs: Portland St. Mini Mart/St. Johnsbury

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 sampler lined with a polyethylene bag the sampler brought to the surface, and the sample contained in the liner vibrated out for examination. Monitor well with a 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.

10/30/97 MW #1

SOILS WELL

G Manway cemented in place.
-.3' Top well 1.5" solid riser, test plug.
-1' Top of bentonite slurry.
-2>4.8' Medium & coarse sand fill
-3.5' Bottom bentonite - top complete sand pack placed in open annulus.
-4.8>9.8' Same // (over) gray silt with petroleum.
-7.0' Top well screen 2-5' X 1.5" X .010" slot Monoflex, typ*.
-9.8>14.8' Same.
-12' Bottom complete sand pack-top native collapse partial sand pack & natural development.
-14.8>18.0' Silt.
-17.0' Bottom well screen, point.
Well developed: moderate flow,silty, petroleum..

MW #2 First try point refusal -6.5'.

G Manway packed with gravel.
-.3' Top well 1.5" solid riser, test plug.
-1.8' Top of bentonite slurry - would not hold in hole due to excessive porosity.
-2>4.8' Sand, gravel, & cobble fill unstable.
-2.2' Bottom bentonite - top complete sand pack placed in open annulus through boulders.
-4.8>9.2' Brown moist silty sand.
-7.0' Top well screen 2-5' *.
-9.2>14.2' Same.
-12' Bottom complete sand pack-top native collapse partial sand pack & natural development.
-14.2>17.0' No sample pushed rock that had fallen down hole.
-17.0' Bottom well screen, point.

Well not developed - dry.

MW #3

G Manway packed with gravel.
-.3' Top well 1.5" solid riser, test plug.
-1' Top of bentonite slurry.
-2>5.0' Gravel // silt.
-2.0' Bottom bentonite - top complete sand pack placed in open annulus through boulders.
-5.0>10.0' Saturated silt water -10'.
-4.9' Top well screen 2-5' .
-10>14.0' Same.
-8' Bottom complete sand pack-top native collapse partial sand pack & natural development.
-14.9' Bottom well screen, point.
Well developed: good flow cloudy.

MW #4

G Manway packed with gravel.
-.3' Top well 1.5" solid riser, test plug.
-1' Top of bentonite slurry.
-2>5.0' Gravel // gray fine sandy silt.
-7.5' Bottom bentonite - top complete sand pack placed in open annulus through boulders.
-5.0>10.0' Gray silt // peat tip.
-10.0' Top well screen 2-5' .
-10>15.0' Moist gray silt.
-12' Bottom complete sand pack-top native collapse partial sand pack & natural development.
-15>20.0' Same // saturated gravel.
-20.0' Bottom well screen, point.
Well developed: low flow silty, not completed.

* Well vibrated into place using rods inside well.

G. Adams

SCITEST
LABORATORY SERVICES

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

ANALYTICAL REPORT

Jefferson Hoffer & Associates
RR 4 Box 2286
Montpelier VT, VT 05602

Jeff Hoffer

Work Order No.: 9711-03653

Project Name: Portland Street Mini Mart
Customer Nos.: 070249

Date Received: 11/04/97
Date Reported: 11/14/97

Sample Desc.: MW-03
Sample Nos: 1

Sample Date: 11/03/97
Collection Time: 11:45

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	< 5	ug/L	JPM	11/12/97
Benzene	EPA 602/8020	209	ug/L	JPM	11/12/97
Toluene	EPA 602/8020	56	ug/L	JPM	11/12/97
Ethyl Benzene	EPA 602/8020	82	ug/L	JPM	11/12/97
Total Xylenes	EPA 602/8020	238	ug/L	JPM	11/12/97
Chlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,2-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,3-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,4-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
Surrogate: 8020				JPM	11/12/97
***Bromofluorobenzene-8020		102	% Recovery	JPM	11/12/97

Sample Desc.: MW-04
Sample Nos: 2

Sample Date: 11/03/97
Collection Time: 12:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	< 200	ug/L	JPM	11/12/97
Benzene	EPA 602/8020	1990	ug/L	JPM	11/12/97
Toluene	EPA 602/8020	4660	ug/L	JPM	11/12/97
Ethyl Benzene	EPA 602/8020	1420	ug/L	JPM	11/12/97
Total Xylenes	EPA 602/8020	7370	ug/L	JPM	11/12/97
Chlorobenzene	EPA 602/8020	< 200	ug/L	JPM	11/12/97
1,2-Dichlorobenzene	EPA 602/8020	< 200	ug/L	JPM	11/12/97
1,3-Dichlorobenzene	EPA 602/8020	< 200	ug/L	JPM	11/12/97
1,4-Dichlorobenzene	EPA 602/8020	< 200	ug/L	JPM	11/12/97
Surrogate: 8020				JPM	11/12/97
***Bromofluorobenzene-8020		98	% Recovery	JPM	11/12/97

ANALYTICAL REPORT

Project Name: Portland Street Mini Mart
Project No.: 070249

Work Order No.: 9711-03653

Sample Desc.: MW-20
Sample Nos: 3
Sample Date: 11/03/97
Collection Time: 12:15

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	< 5	ug/L	JPM	11/12/97
Benzene	EPA 602/8020	214	ug/L	JPM	11/12/97
Toluene	EPA 602/8020	58	ug/L	JPM	11/12/97
Ethyl Benzene	EPA 602/8020	85	ug/L	JPM	11/12/97
Total Xylenes	EPA 602/8020	244	ug/L	JPM	11/12/97
Chlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,2-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,3-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
1,4-Dichlorobenzene	EPA 602/8020	< 5	ug/L	JPM	11/12/97
Surrogate: 8020				JPM	11/12/97
***Bromofluorobenzene-8020		106	% Recovery	JPM	11/12/97

Sample Desc.: FB-01
Sample Nos: 4
Sample Date: 11/03/97
Collection Time: 12:30

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Surrogate: 8020				JPM	11/12/97
***Bromofluorobenzene-8020		96	% Recovery	JPM	11/12/97

Sample Desc.: Trip Blank (10/31/97)
Sample Nos: 5
Sample Date: 11/03/97
Collection Time: 11:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Aromatic Volatile Organics	EPA 8020/602			JPM	11/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Toluene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	11/12/97

ANALYTICAL REPORT

Project Name: Portland Street Mini Mart
Project No.: 070249

Work Order No.: 9711-03653

Sample Desc.: Trip Blank (10/31/97)
Sample Nos: 5
Sample Date: 11/03/97
Collection Time: 11:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	11/12/97
Surrogate: 8020				JPM	11/12/97
***Bromofluorobenzene-8020		96	% Recovery	JPM	11/12/97

BPQL = Below Practical Quantitation Limit; 1 ug/L

Authorized by: Linda Lamatta

SCITEST
LABORATORY SERVICES

GROUNDWATER SAMPLING DATA SHEET

LOCATION: PORTLAND ST. MINI MART
DATE: NOV. 3, 1997

SAMPLE METHOD: 1.5" PVC BAILERS
SAMPLING TEAM: T. SCHMALZ

WELL ID	PID Head Space (ppm)	Depth to Water (ft)	Total Well Depth (ft)	Water Column (ft)	3 Well Volumes* (gals)	Total Purged (gals)	Sample Time	Sample Type	Chain-of-Custody Number	Chain-of-Custody Time	Remarks
TB-01	NA	→				→		TB	TB-01	1100	TRIP BLANK
MW-04	548	16.68	30.6	5.32	0.93	.25	1200	S	MW-04	1200	DK. GRAY, SLTY.
MW-03	377	11.36	15.5	4.14	1.16	.25	1145	S	MW-03	1145	DK. GRAY, V. SLTY
MW-03	↓	↓	↓	↓	↓	↓	↓	DP	MW-20	1215	DUPLICATE SAMPLE
MW-02	NA	16.55 (DRY)									
FB-01	↓	→				→		FB	FB-01	1230	FIELD BLANK
MW-01	177	11.20	10.61	(F.P.)							

* *(1.5" = 0.092 gals/ft, 2" = 0.16 gals/ft, 4" = 0.65 gals/ft, 6"=1.5 gals/ft)*

REMARKS _____

Scitest, Inc.
P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

Sample Logged in By: MB
Anomaly Sheet: Y ___ N V

Portland Street Mini Mart
Preservative Check:
Temperature Check: cool

Client: Jefferson P. Hoffer & Associates
Address RR 4 Box 2286, Comstock Road
Montpelier, VT 05602

Contact Jeff Hoffer
Phone No:

Customer Nos: 70249
Project:
Job Template:

Date requested:
Date shipped:
Date scheduled:

CHAIN OF CUSTODY

	Date	Time		Date	Time
Sampled by:* Lundberg Schmalz			Print Name Here:* T. Schmalz		
Relinquished by: Lundberg Schmalz	11/5/97		Accepted by:		
Relinquished by:			Received by Scitest: RA Rumbleworth	11/4/97	8:00

Sample No:	Sample Description	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
1	MW-03	11/3/97	1145	GW	HCl	Glass	40 mL	2	EPA 8020
2	MW-04	"	1200	GW	HCl	Glass	40 mL	2	EPA 8020 both wells have bubble
3	MW-20	"	1215	GW	HCl	Glass	40 mL	2	EPA 8020
4	FB-01	"	1230	GW	HCl	Glass	40 mL	2	EPA 8020
5		"	"	GW	HCl	Glass	40 mL	2	EPA 8020
6		"	"	GW	HCl	Glass	40 mL	2	EPA 8020
5a	Trip Blank (10/31/97)		1100	WA	HCl	Glass	40 mL	2	EPA 8020
8	Extra Vials	"	"	GW	HCl	Glass	40 mL	2	EPA 8020

Please also include DI water for field blanks.

SAMPLES MUST REACH THE LAB within ___ of sampling time to meet all holding times.	Parameters are correct as listed Client Initial: ___	Scitest Work Order: 9711-03653
	Please fill in ALL areas marked with an asterisk (*). Thank you.	
	Additional instruction if applicable are attached.	

FAX NO. 8027286044
NOV- 4-97 TUE 1:45 PM SCITEST