



11/6/95 NOV 30 1995  
last record

28 November 1995

Mr. Richard Pelsue  
St. Michael's College  
Winooski Park  
Colchester, VT 05446

Re: Initial Site Investigation Report — Senior Hall

Dear Mr. Pelsue,

Please find enclosed a copy of the Initial Site Investigation Report for the Senior Hall site on the St. Michael's College campus. At your request I have forwarded copies of the report and this letter directly to Jason Feingold of the Vermont Department of Environmental Conservation.

Ground Water of Vermont appreciates having the opportunity to assist you with your environmental needs. Please feel free to call us with any questions or comments.

Sincerely,

*Kurt R. Sternlof*  
Kurt Sternlof  
Hydrogeologist

*I approved \$440 to explain to State About possibly meeting CA. criteria etc. 1/2 hr discussion w/ Ron Milk*  
*Friday Dec 22 95 12:00 pm*  
*Jason*



**INITIAL SITE INVESTIGATION REPORT**

**Senior Hall  
St. Michael's College  
Colchester, Vermont  
VT DEC Site #95-1868  
27 November 1995**

Prepared for:

St. Michael's College  
Winooski Park  
Colchester, VT 05439  
Contact: Richard Pelsue  
Phone: 802-654-2425

Prepared by:

**Ground Water of Vermont**  
1 Mill Street, Box C-5  
Burlington, Vermont  
Contact: Kurt Sternlof  
(802) 860-6065

GWV Project #V95-051

## EXECUTIVE SUMMARY

Ground Water of Vermont (GWV) has conducted an initial site investigation in the area of a former gasoline underground storage tank (UST) adjacent to Senior Hall on the campus of St. Michael's College in Colchester, Vermont. Field investigations following removal of the UST included the installation of six monitoring wells and two temporary well points; field screening of subsurface soils for the presence of volatile organic compounds (VOCs) throughout all eight borings; sampling and analysis of ground water from the five monitoring wells that did not exhibit free-phase contamination; and a site survey for the purposes of identifying and assessing potential risks to environmental and public health.

This Initial Site Investigation Report presents the results of these investigations, as well as GWV's conclusions and recommendations. In summary:

- Gasoline contamination of the subsurface around the former UST has occurred and consists of both free-phase and dissolved-phase liquid plumes, and of residual contamination adsorbed to soil above and below the water table. The former UST appears to be the only contaminant source.
- The free-phase and soil contamination apparently occur only within the immediate area of the tank grave.
- Surficial materials at the site consist of medium to fine sand and silt that support an unconfined aquifer with an estimated average flow velocity of from 0.002 to 0.12 feet per day to the south-southeast.
- The dissolved-phase plume has migrated at least 50 feet from the source in the downgradient direction, though the bulk of the high-concentration aqueous contamination also appears to be confined to the immediate vicinity of the tank grave. Levels of gasoline compounds in ground water from the downgradient monitoring wells were generally below Vermont Groundwater Enforcement Standards for the most recent sampling round.
- The contamination does not appear to pose an imminent threat to environmental or public health.
- Due to the presence of free-phase contamination on the water table and high levels of residual adsorbed-phase soil contamination in the UST grave, GWV recommends that soil and ground-water contamination at the site be remediated. Potentially useful remedial technologies include dual-phase extraction, and combined ground water/soil vapor extraction. Additional field work and pilot-testing for proper selection and design of a remedial system will be necessary prior to completion of a Corrective Action Plan.
- Periodic sampling of the site monitoring wells should be conducted until such time as analytical results indicate that remediation of the source area has been completed. An initial schedule of quarterly sampling would be appropriate.

## TABLE OF CONTENTS

	Page
<b>EXECUTIVE SUMMARY</b>	
<b>1.0. INTRODUCTION</b>	<b>1</b>
1.1 Site Location and Physical Setting	
1.2 Site History	
1.3 Purpose and Scope of Work	
<b>2.0. INVESTIGATIVE PROCEDURES AND RESULTS</b>	<b>4</b>
2.1 Underground Storage Tank Closure	
2.2 Subsurface Soil Screening	
2.3 Monitoring Well Installation	
2.4 Determination of Ground-Water Flow Direction and Gradient	
2.5 Ground-Water Sampling and Analysis	
<b>3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT</b>	<b>8</b>
<b>4.0 CONCLUSIONS</b>	<b>9</b>
<b>5.0 RECOMMENDATIONS</b>	<b>10</b>
<b>6.0 REFERENCES</b>	<b>11</b>
<b>APPENDIX A - FIGURES AND TABLES</b>	
Figure 1. Site Location Map	
Figure 2. Site Map	
Figure 3. Product Recovery Data	
Figure 4. Ground-Water Table Contour Map	
Figure 5. Contaminant Distribution Map	
Table 1. Ground-Water Elevation Calculations	
Table 2. Ground-Water Analytical Results	
<b>APPENDIX B - BORING LOGS</b>	
<b>APPENDIX C - LABORATORY REPORT FORMS</b>	

## 1.0 INTRODUCTION

This report details the results of an initial site investigation conducted near Senior Hall on the St. Michael's College campus in Colchester, Vermont (Figure 1). The report has been prepared by Ground Water of Vermont (GWV) for St. Michael's College (Mr. Richard Pelsue, Environmental/Energy Coordinator).

This site investigation was initiated under Vermont's Expressway Notification process following the removal on 23 to 24 August 1995 of a 5,000-gallon gasoline underground storage tank (UST) that had apparently leaked into the subsurface. GWV informed Mr. Ted Unkles of the Vermont Department of Environmental Conservation (VT DEC) in its UST Closure Report dated 29 August 1995 that a site investigation was warranted given the presence of free-phase product in the tank excavation.

### 1.1 Site Location and Physical Setting

The site is located immediately southeast of the intersection between Route 15 and Lime Kiln Road in the town of Colchester (Figure 1). This portion of the St. Michael's campus is zoned for mixed residential/commercial development and is currently occupied by two dormitory buildings (Senior Hall and St. Joseph's Hall), two garages and a barn. The area of impact lies beneath and around the UST grave, located along the north-facing back wall of the seven-bay garage adjacent to Senior Hall (Figure 2). The St. Michael's buildings are served by municipal water and sewer service, as are all other buildings in the area.

The St. Michael's campus is located just north of the Winooski River and west of the broad flood plain through which it meanders before entering Winooski Gorge. The entire area slopes generally toward the Winooski River, which passes about 1,000 feet to the south-southeast of Senior Hall. The area immediately around the UST grave is relatively level, but an abrupt slope break just southeast of the college buildings leads steeply down to a large, abandoned and water-filled quarry and thence down another steep slope to the river (Figure 1). Presumed regional surface drainage and ground-water flow are toward the Winooski River.

Native surficial materials at the site are mapped as pebbly marine sands associated with the Champlain Sea (Stewart and MacClintock, 1970). Bedrock underlying the site is mapped as Ordovician dolomites and marbles (Doll, 1961).

### 1.2 Site History

According to Mr. Richard Pelsue, St. Michael's purchased the property in 1930 for storage and student housing. Up until that time the property had been operated as a dairy farm. The two houses (now dormitories) and the barn (originally a creamery) were on the property when purchased by the college and date to the turn-of-the-century. St. Michael's built a two-bay garage

behind the barn in the 1930s and the seven-bay garage adjacent to Senior Hall in 1952. Operations at the Lime Kiln Quarry located a few hundred feet south of the property ceased during the 1950s.

According to information provided to GWV by VT DEC, another 5,000-gallon, single-walled, steel UST was removed from the site in October 1989. This earlier-removed tank was apparently located immediately along the east side of the garage, about 20 feet and around the corner of the building from the UST currently under investigation (Figure 2). Approximately 30 cubic yards of gasoline-contaminated soil were removed during the excavation and polyencapsulated on-site. In March 1990, VT DEC advised St. Michael's to mix the soil with manure, spread the mixture on-site and seed it with a plant cover. The soil pile was disposed of in this manner during the summer of 1990 and the site (VT DEC #89-0436) was placed on the inactive sites list.

The UST excavated in the presence of GWV personnel on 23 to 24 August 1995 (the subject of this site investigation) was a registered, single-walled, 5,000-gallon steel tank in service for approximately 16 years at the time of its removal. The tank lay about five feet from the back wall of the garage, near its northeastern corner (Figure 2). The pump was situated over the east end of the tank. The tank vent line was piped to the east side of the garage wall and the fill line was stubbed directly to the ground surface.

The tank was cleaned and purged prior to excavation by Champlain Electric of Milton, Vermont on 23 August 1995. The excavation and removal of the cleaned tank was performed by Bushey Excavating of Williston, Vermont on 24 August 1995. The excavated tank was also disposed of by Champlain Electric. The tank was found to be in generally poor condition — rusted and pitted — and had apparently leaked through a damaged seam. Contaminated soils encountered around the fill-port also suggest that spills occurred during tank refueling. All excavated soils were returned to the tank grave.

Marc Coleman of VT DEC was present on-site for both days of the UST removal and was verbally notified of the presence of gasoline contamination within the tank pit at that time. Soil headspace samples were analyzed on-site for volatile organic compounds (VOCs) using a Photovac Tip II photoionization detector (PID) calibrated with isobutylene gas to a benzene standard. PID readings from the tank pit averaged about 400 parts per million (ppm) and ranged up to 1,082 ppm.

Pursuant to the UST Closure Report and accompanying Site Investigation Expressway Notification form submitted to VT DEC on 29 August 1995, four ground-water monitoring wells were installed at the site on 31 August 1995. Of these, one well was installed within the tank grave (MW-4) and three were installed downgradient (MW-1, 2 and 3) based on the presumed southeasterly direction of ground-water flow.

Free-phase petroleum resembling a mixture of fresh and weathered gasoline accumulated in MW-4 to a thickness of about one foot immediately after installation. No product was noted in the other three wells. On 1 September 1995, GWV received telephone approval from Bob

Haslam of VT DEC to initiate product recovery by manual bailing. Recovery began on 7 September 1995, at which time product thickness was 4.45 feet.

After 12 gallons of product had been bailed from the well in a few hours on 7 September, GWV sought and received verbal approval from Jason Feingold of VT DEC to install an automatic product recovery pump in the well. A Clean Earth Technologies prototype model Product Terminator recovery pump was installed in MW-4 and activated on 11 September 1995. From 11 to 14 September, 97 gallons of product were recovered. Well siltation due to a heavy rainstorm interrupted operation of the product pump from 14 to 18 September. Another 158 gallons of product were recovered by the pumping system between 18 September and 6 November.

The total amount of product recovered as of 6 November was 267 gallons. Product recovery rates from MW-4 have steadily declined from an initial high of 28 gallons per day (gpd) to near zero (Figure 3).

### **1.3 Purpose and Scope of Work**

The purposes of this initial site investigation were to:

- Determine the full extent of free-phase gasoline contamination in the subsurface at the site.
- Determine the extent of dissolved-phase gasoline contamination in ground water at the site.
- Determine the extent of soil contamination above the water table at the site.
- Qualitatively assess the risks to environmental and public health by identifying all relevant sensitive receptors and potential contaminant migration pathways.
- Identify potentially appropriate remedial actions based on the site conditions.
- Provide preliminary recommendations for future action.

To accomplish these objectives, GWV has:

- Reviewed existing historical site data.
- Supervised the initial installation of four monitoring wells (MW-1, 2, 3 and 4), and determined the local ground-water flow direction, gradient and approximate velocity.
- Collected and submitted for laboratory analysis ground-water samples from the three downgradient monitoring wells (MW-1, 2 and 3).
- Identified sensitive receptors in the area.
- Assessed the risk posed by the contamination to these potential receptors.
- Supervised the installation of two additional monitoring wells (MW-5 and 7) and two temporary well points (MW-6 and 8) in order to fully define the extent of free-phase contamination.
- Collected and submitted for laboratory analysis a second round of ground-water samples that included the two additional wells.
- Evaluated the need for treatment and/or a long-term monitoring plan for the site.
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

## 2.0 INVESTIGATIVE PROCEDURES AND RESULTS

GWV has conducted several phases of field investigations designed to obtain the data necessary for fulfilling the objectives outlined in Section 1.3 above. All work has been conducted in a safe, professional and expeditious manner in accordance with state requirements and GWV established protocols.

### 2.1 Underground Storage Tank Closure

A detailed UST closure report for the tank removed from the site on 23-24 August 1995 was filed with VT DEC on 29 August 1995. Evidence that the tank had released gasoline products to the subsurface led to the installation of four ground-water monitoring wells under the Site Investigation Expressway Notification process. A summary of these early activities and the ongoing free-phase product recovery is presented in Section 1.2 of this report.

Mr. Richard Pelsue of St. Michael's has informed GWV that, to the best of his knowledge, all USTs at the site have now been removed.

### 2.2 Monitoring Well Installation

On 31 August 1995, GWV supervised the installation of four monitoring wells. Wells MW-1, 2 and 3 were placed in an arc presumed to be downgradient from the recent UST grave, as suggested by surface topography. MW-4 was placed within the tank grave itself. Approximate well locations are shown on Figure 2. The monitoring wells were installed by Adams Engineering of Underhill, Vermont using vibratory drilling techniques to both advance the borings and emplace the wells.

Continuous soil samples were collected at each monitoring-well boring location using a five-foot polyethylene-lined core barrel with a 2.375 -inch inner diameter. The core barrel, which also served as the drill bit with an outer diameter of 3.0 inches, was simultaneously pushed and vibrated into place to advance the boring. The sample cores obtained were screened for the presence of gasoline products with a PID and logged for lithology by GWV personnel. All downhole drilling equipment was decontaminated and the polyethylene core barrel liner changed between borings. The PID soil screening results are discussed in Section 2.3 below.

The unconsolidated overburden encountered in each boring generally consisted, from the ground surface down, of up to one foot of topsoil and/or pavement, two to four feet of poorly sorted, medium to coarse sand with occasional stringers of gravel, and from 13 to 17 feet of fine brown sand and gray silt that fined downward. The boring for MW-4, located in the UST grave, encountered poorly sorted, medium to coarse brown sand fill material to a depth of 11 feet. The borings were completed to depths of between 17.4 and 19.0 feet. Detailed stratigraphic soil descriptions are included on the boring/well logs in Appendix B. Bedrock was not encountered in any of the borings.

Ground water was encountered in each of the borings at about 11 to 12 feet below ground surface. A monitoring well was installed in each soil boring by vibrating a two-inch diameter PVC well point into the open hole left by the core barrel. A 10-foot section of 0.010-inch slot high-flow screen was placed such that four to five feet of screen extended above the apparent water table. Solid two-inch diameter PVC riser extended from the top of screen to approximately 0.5 feet below ground surface. Clean quartz #2 filter sand was placed in any open annulus around the well to at least one foot above the top of the screened interval. A bentonite-slurry seal at least one-foot thick was installed above the sand pack and the remainder of the annular space was filled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Monitoring-well construction details are included on the boring/well logs in Appendix B.

Wells MW-1, 2 and 3 were developed immediately after construction using a peristaltic pump. All three developed slowly but successfully cleaned up after significant pumping. Development water was discharged to the ground surface in the vicinity of each well. Well MW-4 accumulated a foot of free-product immediately following installation and so was not developed.

On 30 October 1995 an additional round of drilling and well installation was conducted at the site in order to more tightly define the extent of the free-product plume around MW-4 and the UST grave. The drilling contractor, methods and subsurface materials encountered were all similar to those described above.

Four additional wells were installed at this time: MW-5 was placed about 10 feet directly upgradient from MW-4; MW-6 was placed in the tank grave of the UST removed in 1989; MW-7 was placed about 10 feet directly downgradient from MW-4; and MW-8 was installed about 10 feet cross-gradient to the northeast from MW-4. Ground water was encountered at about 8 to 9 feet below ground surface in these holes. None of the borings encountered free-product and MW-6 and MW-8 were pulled. MW-5 and MW-7 were completed and are being monitored for the appearance of free-product. Stratigraphic descriptions and well construction details for all four wells are included on the boring/well logs in Appendix B.

### **2.3 Subsurface Soil Screening Results**

Soil headspace screening for the presence of volatile organic compounds (VOCs) was conducted in the field on samples from discrete depth intervals throughout each boring using a Photovac Tip II PID calibrated with isobutylene gas to a benzene reference. Readings ranged from 0.6 ppm in a shallow sample from MW-1 to over 2,000 ppm (the effective upper quantitation limit) in most samples from MW-7 and MW-8. Readings were markedly higher in the vicinity of the tank grave (MW-4, 5, 7 and 8) and generally increased with depth to the water table at each boring. PID screening results are included on the boring logs in Appendix B.

## 2.4 Determination of Ground-Water Flow Direction and Gradient

On 6 November 1995, fluid levels were measured in all six of the site monitoring wells. Depth-to-water varied from 7.54 (MW-1) to 8.81 feet (MW-5) below top-of-casing in the wells without free-product. In MW-4 depth-to-product was 9.13 feet; depth-to-water was 9.25 feet. Water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary 100.00-foot datum. Note that as MW-4 contains an active product-recovery pump, the water-table-elevation calculation cannot be considered as representative of static conditions.

Water-level measurements and elevation calculations for 6 November 1995 are presented in Table 1. The ground-water contour map in Figure 4 was prepared using this data. The water table beneath the site rose some two feet during September and October 1995 and may have been depressed during the tank closure and initial well installation phases of work due to the protracted summer drought. Ground water now reaches up to the lower levels of the UST grave. Recharge rates observed in all the wells during development and pre-sample purging were low.

Ground water in the unconfined surficial aquifer beneath the site does appear to be flowing in a generally south-southeasterly direction toward the Winooski River as originally presumed. The average gradient of the local ground-water table on 6 November 1995 was about 2%. As discussed in Sections 1.1 and 2.2 above, unconsolidated surficial materials beneath the water table at the site consist largely of medium to fine sand and silt of marine origin. Such materials typically exhibit effective porosities of 0.3 to 0.5 and hydraulic conductivities of 0.03 to 3 feet per day (Fetter, 1994). Assuming Darcian flow, these estimated ranges of porosity and conductivity combine with the calculated ground-water gradient of 2% to yield an estimated average ground-water-flow velocity in the surficial aquifer of between 0.002 and 0.12 feet per day.

It is important to note that water levels in MW-4 and MW-7, situated within the tank grave, are anomalously high in comparison to the wells around them. The coarse and poorly packed sand used to fill the excavation appears to be acting like a sponge, preferentially collecting storm run-off from the garage roof and surrounding, less permeable, less conductive natural materials. Thus the tank grave collects percolating surface water faster than it loses it in the subsurface, filling like a bowl and creating a localized ground-water mound. GWV does not believe that this slight artificial perturbation in the natural water-table surface is of significance within the framework of ground-water flow beneath the site as a whole, and has ignored the anomaly in constructing Figure 4 and determining the overall ground-water flow direction and gradient.

## 2.5 Ground-Water Sampling and Analysis

Ground-water samples were collected from monitoring wells MW-1, 2 and 3 on 7 September 1995. Samples were collected from monitoring wells MW-1, 2, 3, 5 and 7 on 6 November 1995. Each monitoring well was purged prior to sampling using a new disposable bailer and dropline, which were then used to collect the sample and left in the well for future sample collection. Trip blank and duplicate samples were collected on each occasion to ensure that adequate quality

assurance/quality control (QA/QC) standards were maintained. All field procedures were conducted in accordance with GWV standard protocols. MW-4 has not been sampled due to the continued presence of free-phase petroleum.

Samples were submitted to a certified analytical laboratory, where they were tested for the presence of BTEX compounds and MTBE by EPA Method 8020. \* Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. No petroleum compounds were detected in the trip-blank samples. Analytical results for the 6 November duplicate sample fell within two percent of the original sample results for BTEX, and within five percent for MTBE. The 7 September duplicate fell within 50 percent for BTEX and 10 percent for MTBE in a sample with low levels of these compounds.

Analytical results for all the samples are summarized in Table 2. A contaminant distribution map of BTEX and MTBE combined is presented as Figure 5. Laboratory report forms are included in Appendix C.

Results from the 7 September samples indicated the presence of a low-level dissolved-phase plume extending downgradient from the tank grave at least as far as MW-1, which yielded 122 ppb BTEX and 127 ppb MTBE. The sample from MW-2 contained 23 ppb BTEX and 436 ppb MTBE. The sample from MW-3, located on the opposite side of the seven-bay garage from the tank grave, contained 7 ppb BTEX and 31 ppb MTBE. MW-1 and MW-2 exceeded VGES limits for benzene and MTBE.

Results from the same three monitoring wells for the 6 November sampling showed a marked decrease in downgradient contamination. BTEX was non-detect in MW-1 and MW-3, and was detected at 8 ppb in MW-2. MTBE was detected at 278 ppb in MW-2, and 3 ppb and 34 ppb in MW-1 and MW-3, respectively. Of these only MTBE in MW-2 exceeded VGES limits. This drop in dissolved-phase contaminant concentrations over the autumn might be related to the two-foot rise in the water table following the summer drought. The rise could translate into higher flow velocities and volumes, thus acting to dilute and disperse the contaminant plume.

Nonetheless, the initial sample results from monitoring wells MW-5 and MW-7 indicate that the dissolved-phase plume, like the free-phase plume, remains tightly constrained within the immediate area of the UST grave. BTEX was detected in the well samples at 71,580 ppb and 137,600 ppb, respectively. MTBE was detected at 10,400 ppb and 26,000 ppb, respectively.

Although MW-5 is, strictly speaking, located 10 feet upgradient from the contaminant source, the presence of significant contamination in this well is not surprising given the nearby presence of a plug of free-phase product recently as thick as 4.45 feet. This body of product could have caused a localized disruption in the water table that induced limited upgradient contaminant flow. Also, it appears that preferential collection of percolating surface water within the tank grave has created a ground-water mound, which could cause localized radial flow from the source. GWV does not believe that any small component of upgradient contaminant migration is of significant consequence in assessing site conditions as a whole.

---

\* Gasoline compounds of interest are the BTEX components (benzene, toluene, ethylbenzene and xylenes) and the fuel additive MTBE (methyl-tertiary butyl ether). Vermont Groundwater Enforcement Standard (VGES) levels for these compounds in parts per billion (ppb) are: benzene (5 ppb); toluene (2,420 ppb); ethylbenzene (680 ppb); xylenes (400 ppb) and MTBE (40 ppb).

### 3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

GWV conducted a survey to identify potentially impacted sensitive receptors near the site and related potential risks to human health.

- No water-supply wells were identified within at least 0.5 miles of the site, which like all nearby facilities is served by municipal water and sewer.
- Site plans obtained from St. Michael's do not indicate the presence of any buried utilities in the immediate vicinity of the UST grave or to the east-southeast (the apparent direction of ground-water flow). A survey of nearby storm-drain culverts revealed no qualitative evidence of gasoline-compound contamination emanating from the site as liquid or gaseous phases.
- The garage immediately adjacent to the tank grave has an at-grade concrete slab foundation. The older barn located just downgradient from MW-1 has a field stone and concrete foundation with a partially subgrade lower level that appears to be well ventilated. Both buildings are used for storage only. Thus gasoline-vapor contamination of indoor air does not appear to constitute an appreciable hazard.
- Evidence indicates that the area of free-product contamination is small and has been constrained to the immediate area of the UST grave by the low hydraulic conductivity of the surrounding soil. Ongoing product recovery from MW-4 (262 gallons as of 30 October 1995) also continually lessens the potential for future or unforeseen impacts.
- A site walk-through revealed no evidence of ground-water seeps in the woods adjacent to the site. Although certain areas appear prone to pooling of surface run-off, no signs of odors, sheens, or areas of increased bacterial activity were evident.
- The nearest surface water body is the abandoned Lime Kiln west quarry, approximately 250 feet to the south-southeast at its closest point. The quarry is filled with water and now forms a pond approximately 1.4 acres in area. Access to the quarry is restricted by a chain-link fence. The Winooski River lies about 1,000 feet away at its closest point along the same direction. There is no evidence to suggest that appreciable levels of dissolved-phase gasoline compounds from the site have reached as far as the quarry.
- PID soil screening data from the monitoring-well borings indicate that VOC concentrations in the uppermost five feet of overburden outside of the UST grave itself are no more than 31 ppm and generally much less. The UST grave is now secured behind a stockade fence and is inaccessible to the public. Thus direct exposure to contaminated soils is unlikely.
- While the on-site dormitories house college students, younger children do not frequent the area and so are unlikely to create unforeseen exposure pathways.

In summary, available evidence suggests that subsurface contamination associated with the former leaking UST — free-product, dissolved-phase, soil and soil-gas — does not pose an imminent threat to any nearby sensitive receptors and/or human health.

#### 4.0 CONCLUSIONS

Based on the results of the site investigation described above, Ground Water of Vermont concludes the following:

1. Gasoline has been released to the subsurface at the site and all evidence points to the UST removed in August 1995 as the primary source. Soil-screening results from the boring advanced through the circa 1989 UST grave, located about 20 feet downgradient, indicate that it is at most a minor secondary source of gasoline-compound contamination. No evidence for additional and/or ongoing sources of contamination came to light during the investigation.
2. The gasoline release has resulted in significant concentrations of contamination adsorbed to soil in the immediate vicinity of the UST grave, where PID readings on soil samples in some cases exceeded the instrument's linear range of 2,000 ppm. <sup>ppm?</sup>
3. The adsorbed-phase soil contamination in the vicinity of the UST grave represents a continuing source of ground-water contamination.
4. Free-phase gasoline contamination has appeared only in monitoring well MW-4, which initially intersected over four feet of product and from which more than 267 gallons have been recovered. The free-phase plume does not appear to have migrated appreciably from the source area, although its extent beneath the adjacent garage remains unknown.
5. The bulk of the dissolved-phase plume also appears to have remained in the immediate area of the source, where concentrations of BTEX and MTBE range in the tens to hundreds of thousands of ppb. Dissolved levels in the downgradient wells, 30 - 50 feet away, range in the tens to hundreds of ppb and have shown an initial downward trend over the first two sampling events.
6. The unconsolidated surficial deposits at the site consists of medium to fine sand and silt and comprise an unconfined aquifer. Ground-water flow velocities through this aquifer are expected to be on the order of 0.002 to 0.12 feet per day. On 6 November 1995, the water table was found to be 8 - 9 feet below ground surface and to exhibit overall a southeasterly trending gradient of approximately 2 %.
7. The area of contamination does not appear to pose any immediate risk to environmental and public health. There are no water-supply wells or surface water bodies imminently threatened by the small and slow-moving contaminant plume.
8. A significant degree of remediation has already been achieved with the ongoing program of product recovery from MW-4.

## 5.0 RECOMMENDATIONS

On the basis of the findings reached during this investigation, Ground Water of Vermont makes the following recommendations:

1. The presence of free-phase gasoline on the water table and adsorbed to soil in the UST grave, surrounded as it is by a tightly constrained ring of high-level dissolved-phase contamination, indicates that corrective action should be undertaken at the site. The limited area of high contamination around a clearly defined single source suggests that a rapid, preventative cleanup would be cost effective.
2. The fine-grained nature of surficial materials at the site suggest that a standard ground-water pump-and-treat system combined with soil vapor extraction (SVE) would prove a relatively slow and costly remedial option, since rates of recovery and zones of influence would be limited. One possible alternative technology would be dual-phase extraction, whereby a liquid-ring vacuum pump creates a vacuum in the unsaturated subsurface that is an order of magnitude greater than that of conventional SVE systems. This leads to a larger area of capture within the unsaturated zone, and strips volatile organics from contaminated ground water as well as sucking a certain amount of water into the system. Dual-phase extraction might allow for effective remediation of the localized source area from a single extraction well. A pilot study should be conducted at the site to evaluate these remedial methods. The pilot-test results should be used to develop a Corrective Action Plan for the site.
3. All of the site monitoring wells should be sampled and analyzed for BTEX and MTBE on a quarterly basis. Once a remedial system has been installed, the sampling schedule may need to be adjusted.

## 6.0 REFERENCES

- Doll, C.G. and others, 1961. *Geologic Map of Vermont*, Office of the State Geologist.
- Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 691 p.
- Domenico, P.A., and Schwartz, F.W., 1990. *Physical and Chemical Hydrogeology*, John Wiley and Sons, New York, 824 p.
- Stewart, D.P. and P. MacClintock, 1970. *Surficial Geologic Map of Vermont*, Office of the State Geologist.

**APPENDIX A**

**Figures and Tables**

**TABLE 1. GROUND-WATER ELEVATION CALCULATIONS**

**St. Michael's College  
Colchester, VT**

**Monitoring Date: 6 November 1995**

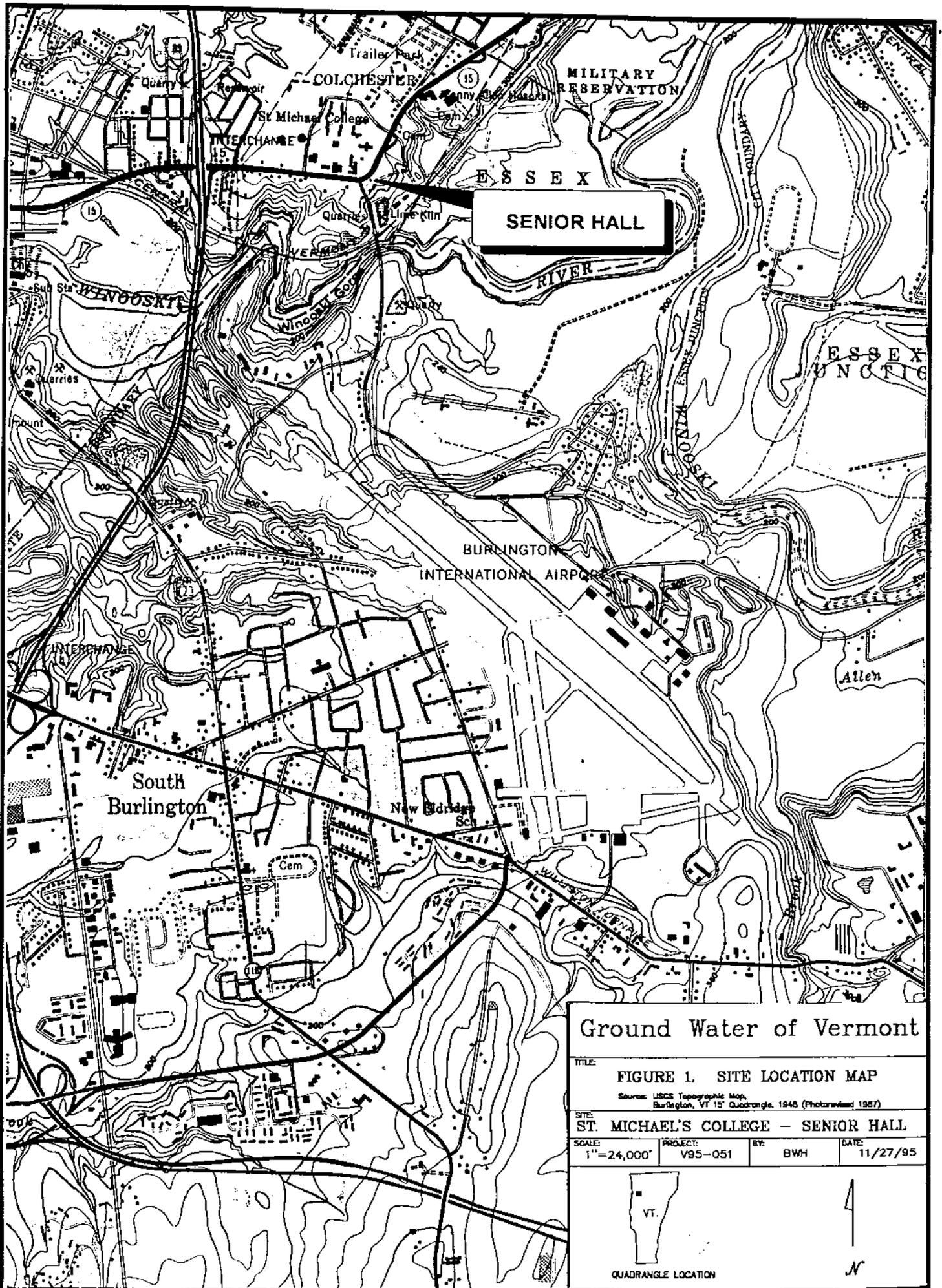
Well I.D.	Top of Casing Elevation	Depth to Product	Depth to Water	Product Thickness	Corrected Depth to water	Water Table Elevation
MW-1	97.72	-	7.54	-	-	90.18
MW-2	98.56	-	7.76	-	-	90.80
MW-3	98.86	-	8.33	-	-	90.53
MW-4	100.00	8.11	8.23	0.12	8.13	91.87
MW-5	100.33	-	8.81	-	-	91.52
MW-7	100.07	-	8.03	-	-	92.04

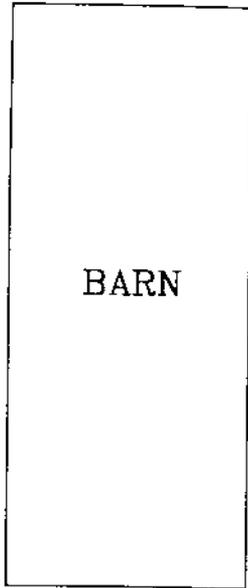
All values reported in feet relative to arbitrary datum.

**TABLE 2. Ground-Water Analytical Results  
St. Michael's College  
Colchester, Vermont**

Sampling Date	Location	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE
09/07/95	MW-1	81	29	12	ND	122	127
	MW-2	7	16	ND <5	ND <5	23	436
	MW-3	ND <1	7	ND <1	ND <1	7	31
	Dup. (MW-2)	TBQ	12	ND <5	ND <5	12	393
	Trip Blank	ND <1	ND <1	ND <1	ND <1	ND	ND <1
11/06/95	MW-1	ND <1	ND <1	ND <1	ND <1	ND	3
	MW-2	ND <5	8	ND <5	ND <5	8	278
	MW-3	ND <1	ND <1	ND <1	ND <1	ND	34
	MW-5	18,000	39,600	1,580	12,400	71,580	10,400
	MW-7	26,000	70,600	6,200	34,800	137,600	26,000
	Dup. (MW-5)	17,900	39,000	1,490	12,100	70,490	10,900
	Trip Blank	ND <1	ND <1	ND <1	ND <1	ND	ND <1
VGES	5	2,420	680	400		40	

Notes: Results given in parts per billion (ppb).  
 ND < -- Non-detect at specified detection limit.  
 TBQ - Trace below quantitation limit.





DRIVEWAY



MW-1  
90.18

MW-2  
90.80

MW-3  
90.53

5K UST (Removed)

MW-6  
(TEMP)

MW-7  
92.04

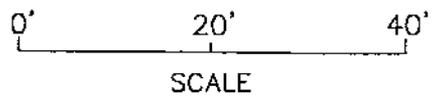
MW-4  
91.87

MW-5  
91.52

MW-8  
(TEMP)

GARAGE

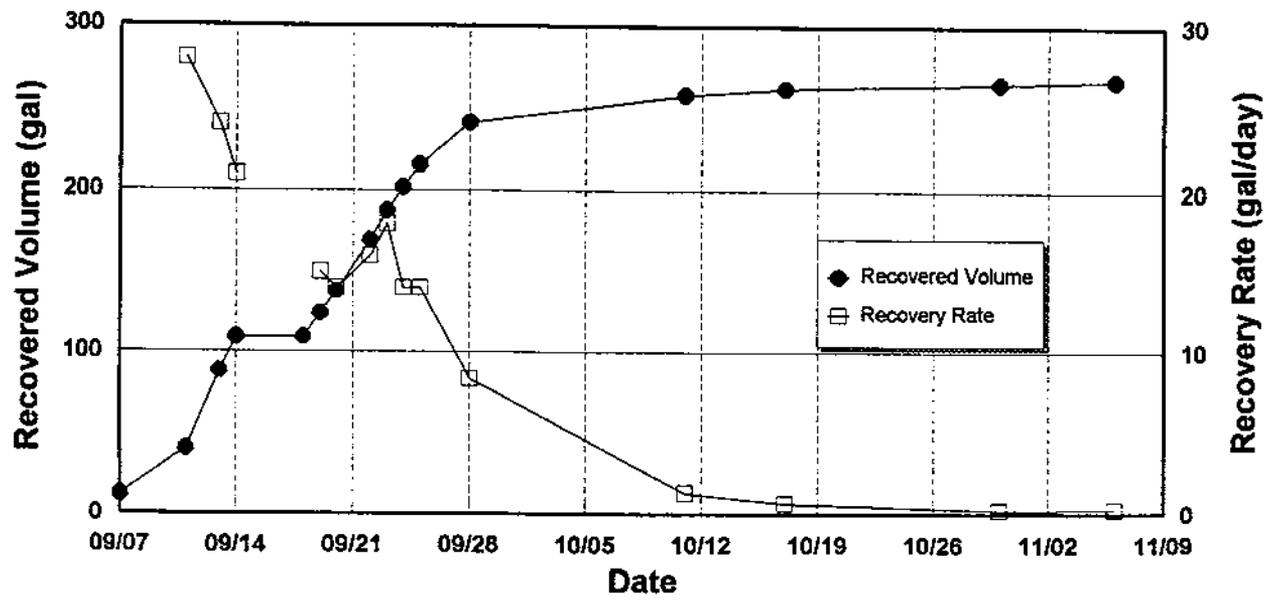
PARKING



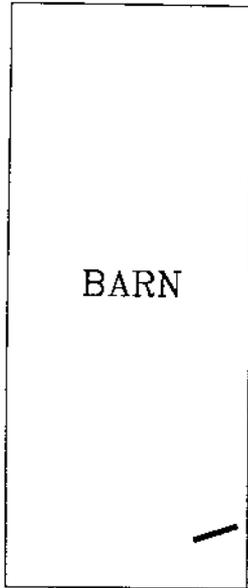
Ground Water of Vermont			
TITLE: FIGURE 2. SITE MAP			
SITE: ST. MICHAELS COLLEGE, COLCHESTER VT			
SCALE: 1" = 20'	PROJECT: V95-051	BY: BWH	DATE: 11/7/95
EXPLANATION			
		Monitoring Well	
		Removed Monitoring Well	
All Locations are Approximate			

MW-4

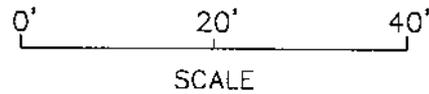
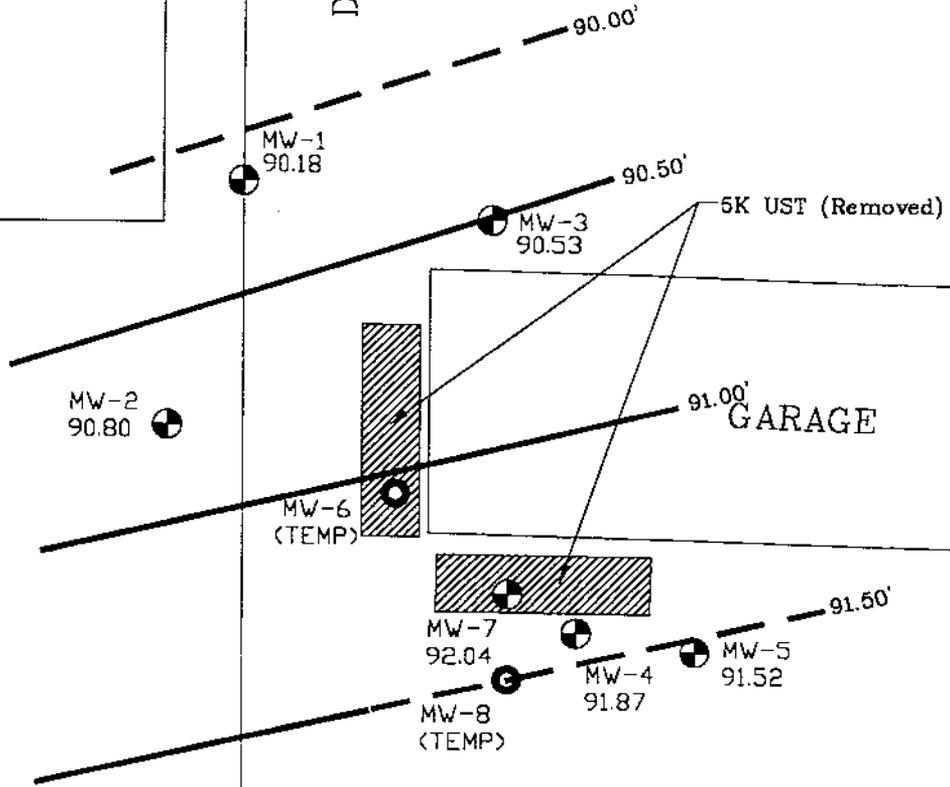
**Figure 3. Product Recovery Data**  
Senior Hall, St. Michael's College



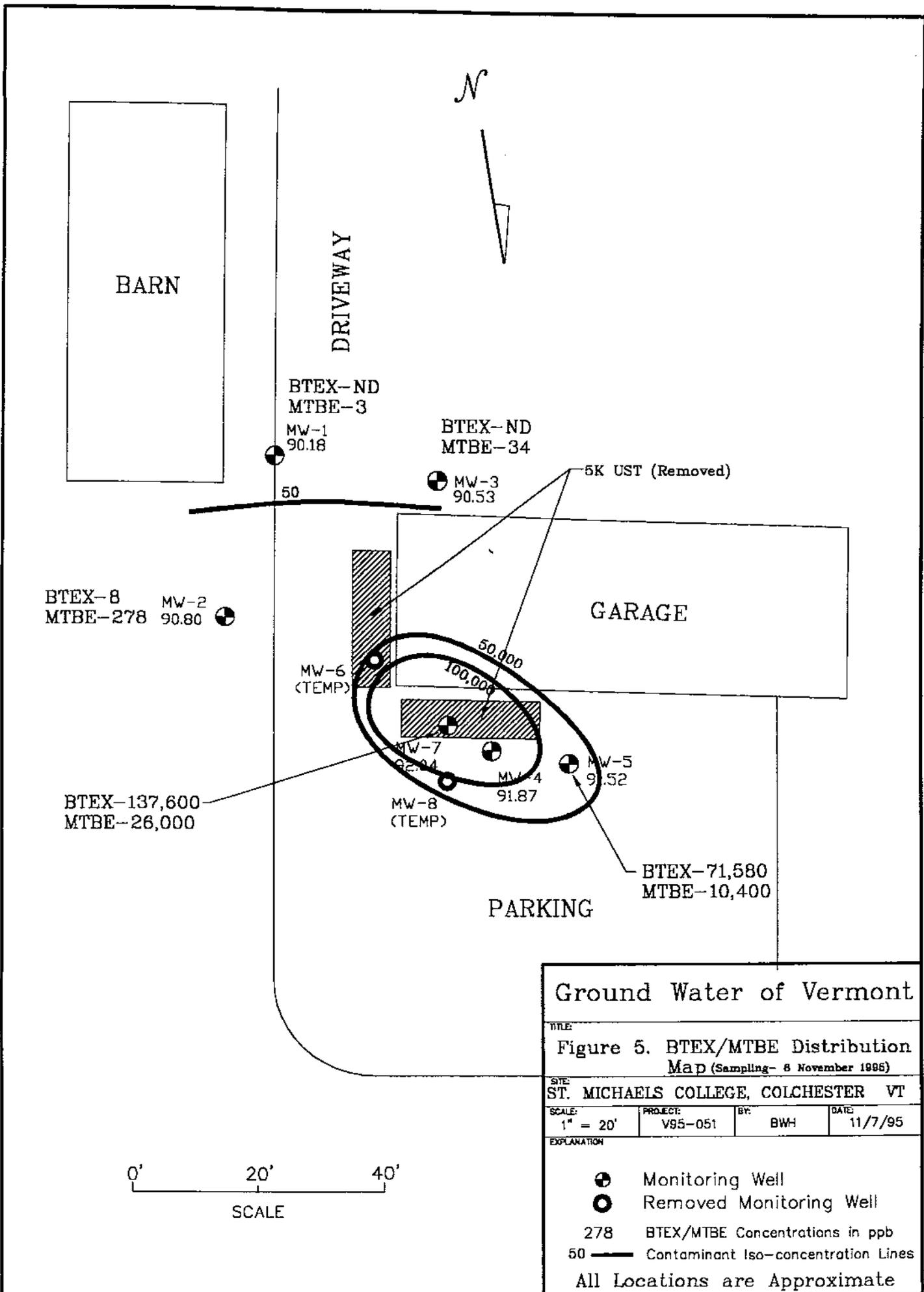
Date	Product Tank Level (inches)	Product Volume (gal)	Recovery since prev Visit (gal)	Recovery Rate (gal/day)	Recovered Volume (gal)
09/07/95	Bailing into Drum		12		12
09/11/95	Pumping into Drum		28	28	40
09/13/95	12	65	48	24	88
09/14/95	15	86	21	21	109
09/14/95	System Shutdown				109
09/18/95	System Restarted				109
09/19/95	17	101	15	15	124
09/20/95	19	115	14	14	138
09/22/95	23.5	147	32	16	170
09/23/95	26	165	18	18	188
09/24/95	28	179	14	14	202
09/25/95	30	193	14	14	216
09/28/95	33.5	218	25	8	241
10/11/95	36	235	17	1	258
10/17/95	36.5	239	4	1	262
10/30/95	37	242	3	0	265
11/06/95	37.25	244	2	0	267



DRIVEWAY



Ground Water of Vermont			
TITLE:			
FIGURE 4. GROUND WATER CONTOUR MAP			
Monitoring Date: 6 November 1995			
SITE:			
ST. MICHAELS COLLEGE, COLCHESTER VT			
SCALE:	PROJECT:	BY:	DATE:
1" = 20'	V95-051	BWH	11/7/95
EXPLANATION			
	Monitoring Well		
	Removed Monitoring Well		
90.0'—	Ground Water Contour		
All Locations are Approximate			



**APPENDIX B**

**Boring Logs**



# Ground Water of Vermont

FIELD SUPERVISOR Brian Storer  
CONTRACTOR Adams Engineering  
DRILLERS Jerry Adams

JOB LOCATION St Michael's  
College, Senior Hall  
DATE 8/31/95

DRILLING METHOD		BORING DIAMETER		AND		BORING LOCATION		BORING #					
vibratory mini rig		2.375"		40 - 50%		sketch on back or on-site plan		MW-1					
BORING DIAMETER		BLOWS PER 6"		SOME		with measurements		TOTAL DEPTH					
2.375"		0 6 12 18 24		10 - 40%				18' 0"					
TRACE		REG.		SAMPLE DESCRIPTION		STRAT CHG		GENERAL DESCRIPTION		WELL DETAIL		DEPTH	
0 - 10%								P10 readings (parts per million)					
5'					4.7'	coarse brown sand and gravel			Background Response				
						fine brown sand with a trace of silt			0.0 ppm 0.6 ppm				
									0.0 ppm 0.9 ppm				
10'					6.0'				4.7' - 9.7' sample				
									0.0 ppm 4.7 ppm				
15'					5.0'	fine sand and some gray silt			9.7' - 14.7' sample				
						gray silt and some fine sand			0.0 ppm 23.7 ppm				
20'					4.3'				14.7' - 19.0' sample				
25'													
30'													
35'													
40'													

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010 2"	10'	GROUT		
SLOT SIZE	.010 2"	10'	BACKFILL		
RISER PIPE	PVC 2"	8'	WATER USED		
GRADED SAND	#2	20 lbs	STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	yes	5 lbs			



# Ground Water of Vermont

FIELD SUPERVISOR Brian Storer  
CONTRACTOR Adams Engineering  
DRILLERS Jerry Adams

JOB LOCATION St Michael's  
College, Senior Hall  
DATE 8/31/95

DRILLING METHOD		BORING DIAMETER		AND		BORING LOCATION		BORING #					
vibratory mini rig		2.375"		40 - 50%		sketch on back or on-site plan		mw-2					
				SOME 10 - 40%		with measurements		TOTAL DEPTH					
				TRACE 0 - 10%				17'0"					
DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REG.	SAMPLE DESCRIPTION	STRAT CHG	P.V. D readings GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL	DEPTH
			0	6	12	18	24						
5'							5'	topsoil poorly sorted sand (brown) ↓ fine brown sand with a trace of silt ↓ fine brown sand and gray silt ↓		1.3 ppm  0'-5' sample  2.9 ppm  5-10' sample - water table  17.4 ppm  10-15' sample - odor 30.6 ppm  15-18' sample	riser  screen	5'	
10'							5'						10'
15'							5						15'
20'							3						20'
25'													25'
30'													30'
35'													35'
40'													40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2"	10'	GROUT		
SLOT SIZE	Ø10	10'	BACKFILL		
RISER PIPE	PVC 2"	7'	WATER USED		
GRADED SAND	#2	20 lbs	STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	yes	5 lbs			



# Ground Water of Vermont

FIELD SUPERVISOR Brian Storer  
 CONTRACTOR Adams Engineering  
 DRILLERS Jerry Adams

JOB LOCATION St Michael's College, Senior Hall  
 DATE 8/31/95

DRILLING METHOD vibratory mini-rig

BORING DIAMETER 2.375

AND 40 - 50%  
 SOME 10 - 40%  
 TRACE 0 - 10%

BORING LOCATION BORING #  
 sketch on back or on-site plan MW-3  
 with measurements TOTAL DEPTH  
 17'0"

BLOWS PER 6"

0	6	12	18	24
6	12	18	24	

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REG.	SAMPLE DESCRIPTION	STRAT CHG	PID readings GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL	DEPTH
			0	6	12	18	24						
								pavement					
								poorly sorted brown sand			-1.3 ppm		
5'							5'	↓					
								fine sand with a trace of silt			0'-5' sample		
								fine sand with a trace of gray silt			-1.4 ppm		
10'							5'	↓			5'-10' sample		
							24'				in water table -1.7 ppm		
											10'-12.4' sample		
15'											-1.4 ppm		
							5'	↓					
											12.4'-17.4' sample		
20'													
25'													
30'													
35'													
40'													

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	D10 2"	10'	GROUT		
SLOT SIZE	1010 2"	10'	BACKFILL		
RISER PIPE	PVC 2"	7'	WATER USED		
GRADED SAND	42	20 lbs	STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	yes	5 lbs			



# Ground Water of Vermont

FIELD SUPERVISOR Brian Storer  
CONTRACTOR Adams Engineering  
DRILLERS Jerry Adams

JOB LOCATION St. Michael's  
College, Senior Hall  
DATE 8/31/95

DRILLING METHOD vibratory  
mini rig

BORING DIAMETER 2.375

AND 40 - 50%  
SOME 10 - 40%  
TRACE 0 - 10%

BORING LOCATION BORING #  
sketch on back or on-site plan MW-4  
with measurements TOTAL DEPTH  
17.5'

DEPTH SAMPLES SAMPLE NUMBER BLOWS PER 5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 5'				
			0-6	6-12	12-18	18-24	24+
5'							
10'							
15'							
20'							
25'							
30'							
35'							
40'							

REC.	SAMPLE DESCRIPTION	STRAT CHG
5'	Poorly sorted brown sand ↓	
10'	medium to coarse brown sand ↓	
15'	fine sand and gray silt ↓	
3'		

PID readings	GENERAL DESCRIPTION
- 1142 ppm	0'-5' sample gasoline odor
- 1575 ppm	5'-10' sample free phase product
- 1602 ppm	10'-15' sample ~ water table
	15'-18' sample - soils saturated with product - no sample

WELL DETAIL	DEPTH
riser	5'
screen	10'
native soil	15'
	20'
	25'
	30'
	35'
	40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010 2"	10'	GROUT		
SLOT SIZE	.010 2"	10'	BACKFILL		
RISER PIPE	PVC 2"	7.5'	WATER USED		
GRADED SAND	#2	20 lbs	STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE	yes	5 lbs			



# Ground Water of Vermont

FIELD SUPERVISOR Brian Stene  
CONTRACTOR Adam Engineering  
DRILLERS Jerry Adams

JOB LOCATION St. Mike's College  
DATE 10/30/95

DRILLING METHOD					AND					BORING LOCATION				
vibratory method					40 - 50%					BORING #				
BORING DIAMETER 2.375"					SOME 10 - 40%					sketch on back or on-site plan				
BLOWS PER 6"					TRACE 0 - 10%					TOTAL DEPTH				
DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REG.	SAMPLE DESCRIPTION	STRAT CHG	PID reading GENERAL DESCRIPTION Parts per million (ppm)	WELL DETAIL	DEPTH	
			0	6	12	18	24							
								4.0	medium light brown sand		17.6 ppm	riser grouting seal		
									poorly sorted dk brown sand w/a trace of gravel		21.2 ppm		5'	
5'								4.0	↓					
									fine sand and gray silt		1376 ppm			
10'								2.5	↓	odor, strong	1707 ppm			
										dump				
										WT II				
15'								4.8	↓		767 ppm			
20'														
										bottom @ 19'				
25'										Depth to Product - NO				
										Depth to water - 8.98865				
										well was perm. installed				
30'														
35'														
40'														

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010 1.5"	10'	GROUT		
SLOT SIZE	.010 1.5"	10'	BACKFILL		
RISER PIPE	1.5"	6'	WATER USED		
GRADED SAND	#2		STEAM CLEANER		
PELLET BENTONITE	N/A				
GRANULAR BENTONITE	yes				



# Ground Water of Vermont

FIELD SUPERVISOR *Brian Storer*  
 CONTRACTOR *Adams Engineering*  
 DRILLERS *Jerry Adams*

JOB LOCATION *St. Mike's College*

DATE *10/30/95*

DRILLING METHOD  
*vibratory method*

AND 40 - 50%  
 SOME 10 - 40%  
 TRACE 0 - 10%

BORING LOCATION BORING #  
*sketch on back or on-site plan* *MW-6*  
 with measurements TOTAL DEPTH  
*17.8'*

BORING DIAMETER *2.375"*

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6"					REC.
		0	6	12	18	24	
							4.8
5'							4.0
10'							4.8
15'							4.0
20'							
25'							
30'							
35'							
40'							

SAMPLE DESCRIPTION

poorly sorted brown sand and gravel

↓

medium to fine brown sand w/A trace of silt (gray)

↓

fine sand and gray silt

↓

gray silt

↓

STRAT CHG

P10 Readings  
GENERAL DESCRIPTION  
Parts per million (ppm)

12.7 ppm

12.3 ppm

11.7 ppm  
- damp, odor - WT II

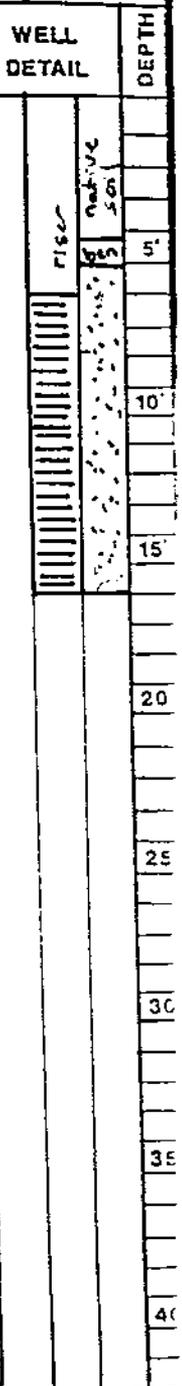
62.4 ppm  
- odor

223 ppm

14.1 ppm  
- tight, odor

bottom @ 17.8'

Depth to product - ND  
 Depth to water - 8.55 BGS  
 well removed



MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010	10'	GROUT		
SLOT SIZE	.010	10'	BACKFILL		
RISER PIPE	1.5"	6'	WATER USED		
GRADED SAND	#2		STEAM CLEANER		
PELLET BENTONITE	N/A				
GRANULAR BENTONITE	yes				





# Ground Water of Vermont

FIELD SUPERVISOR Brian Storer  
 CONTRACTOR Adams Engineering  
 DRILLERS Jerry Adams

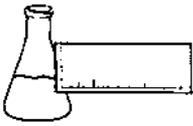
JOB LOCATION St. Miles College  
 DATE 10/30/95

DRILLING METHOD					AND		BORING LOCATION		BORING #	
vibratory method					40 - 50%		sketch on back or on-site plan		mw-8	
BORING DIAMETER 2.375"					SOME 10 - 40%		with measurements		TOTAL DEPTH 17'	
TRACE 0 - 10%					REG.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL	DEPTH
DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"							
			0	6	12	18	24			
5'								excavation silt	riser	5'
								30.6 ppm		
								odor		
								over 2000 ppm		
10'								silt lense		10'
								dump		
								wt II		
								odor		
								over 2000 ppm		
15'								odor		15'
								over 2000 ppm		
								bottom @ 17'		
20'								Depth to Product - ND		20'
								Depth to Water 9.2306		
								well removed		
25'										25'
30'										30'
35'										35'
40'										40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010	10'	GROUT		
SLOT SIZE	.010	10'	BACKFILL		
RISER PIPE	1.5"	6'	WATER USED		
GRADED SAND	#2		STEAM CLEANER		
PELLET BENTONITE	N/A				
GRANULAR BENTONITE	yes				

**APPENDIX C**

**Laboratory Report Forms**



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,102 - 79,106

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated samples were preserved with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

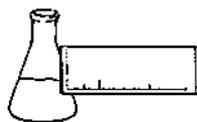
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

**LABORATORY REPORT**

**EPA METHOD 8020--PURGEABLE AROMATICS**

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995  
DATE RECEIVED: September 7, 1995  
DATE ANALYZED: September 18, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,104  
STATION: MW-1  
TIME SAMPLED: 9:00  
SAMPLER: Brian Starer

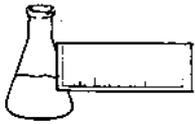
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	80.8
Chlorobenzene	1	ND <sup>1</sup>
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	11.8
Toluene	1	29.3
Xylenes	1	ND
MTBE	1	127.

Bromobenzene Surrogate Recovery: 104%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

**NOTES:**

1 None detected



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995  
DATE RECEIVED: September 7, 1995  
DATE ANALYZED: September 19, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,105  
STATION: MW-2  
TIME SAMPLED: 9:45  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	5	6.8
Chlorobenzene	5	ND <sup>2</sup>
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Ethylbenzene	5	ND
Toluene	5	16.0
Xylenes	5	ND
MTBE	5	436.

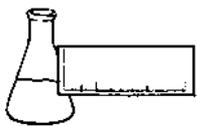
Bromobenzene Surrogate Recovery: 119%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at 20% dilution.

2 None detected



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

**LABORATORY REPORT**

**EPA METHOD 8020--PURGEABLE AROMATICS**

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995  
DATE RECEIVED: September 7, 1995  
DATE ANALYZED: September 19, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,106  
STATION: MW-3  
TIME SAMPLED: 10:30  
SAMPLER: Brian Starer

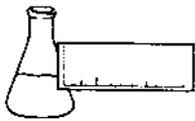
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	7.2
Xylenes	1	ND
MTBE	1	31.4

Bromobenzene Surrogate Recovery: 104%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



**ENDYNE, INC.**

Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995  
DATE RECEIVED: September 7, 1995  
DATE ANALYZED: September 19, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,103  
STATION: Duplicate  
TIME SAMPLED: Not Indicated  
SAMPLER: Brian Starer

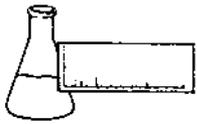
<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	5	TBQ <sup>2</sup>
Chlorobenzene	5	ND <sup>3</sup>
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Ethylbenzene	5	ND
Toluene	5	12.0
Xylenes	5	ND
MTBE	5	393.

Bromobenzene Surrogate Recovery: 106%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 20% dilution.
- 2 Trace below quantitation limit
- 3 None detected



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

**LABORATORY REPORT**

**EPA METHOD 8020--PURGEABLE AROMATICS**

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: September 20, 1995  
DATE SAMPLED: September 7, 1995  
DATE RECEIVED: September 7, 1995  
DATE ANALYZED: September 19, 1995

PROJECT CODE: GWVT1090  
REF.#: 79,102  
STATION: Trip Blank  
TIME SAMPLED: 8:00  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

Bromobenzene Surrogate Recovery: 103%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



# GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401  
(802)-860-6065 (802)-860-6076 Fax

## CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:

- RUSH (2-DAY)
- PRIORITY (4-DAY)
- BEST AVAILABLE TIME

PROJECT NUMBER: U95-051  
 PROJECT NAME: St. Michaels College  
 PROJECT LOCATION: Colchester, VT  
 PROJECT MANAGER: Bon Miller  
 COLLECTED BY: Gris Stover  
 DATE: 9/7/95

G.W.VT 1090

### ANALYSIS REQUESTED

METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (P)  
 OIL & GREASE: IR ( ) GRV: ( )  
 VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( )  
 8010 ( ) 8015 ( ) 8020 & MTBE (✓)  
 EXTRACTABLES: ACIDS ( ) PH ( ) SPEC COND ( )  
 PESTS ( ) B-H ( ) PCBs ( )  
 204000 ( )  
 TSS ( ) TDS ( )  
 BACTERIA: SPC ( ) TOT COU ( ) FEC COU ( )  
 CYANIDE: AMEN ( ) TOT ( )  
 CL ( ) F ( ) SO4 ( )  
 NO3 ( ) NO2 ( ) NH3 ( )  
 TCLP: METALS ( ) VOLATILES ( ) PESTICIDES ( )  
 SEMIVOLATILES ( ) HERBICIDES ( )  
 OTHER:  
 OTHER:

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRV	METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (P)	OIL & GREASE: IR ( ) GRV: ( )	VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 & MTBE (✓)	EXTRACTABLES: ACIDS ( ) PH ( ) SPEC COND ( ) PESTS ( ) B-H ( ) PCBs ( ) 204000 ( )	TSS ( ) TDS ( )	BACTERIA: SPC ( ) TOT COU ( ) FEC COU ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	NO3 ( ) NO2 ( ) NH3 ( )	TCLP: METALS ( ) VOLATILES ( ) PESTICIDES ( ) SEMIVOLATILES ( ) HERBICIDES ( )	OTHER:	OTHER:	REMARKS	
Trip Blank	9/7	800A	W	VOA 79,102	2	I1A			X											
Duplicate		-		79,103					X											
mw-1		900A		79,104					X											
mw-2		945A		79,105					X											
mw-3		1030A		79,106					X											

#### MATRIX

W = AQUEOUS  
 S = SOLIDS

#### PRESERVATIVE

I = ICED  
 A = ACIDIFIED (1:1 HCl 4 drops)  
 B = BASE  
 = SO M B FA

#### RELINQUISHED BY

*[Signature]*

#### DATE

9/7/95

#### TIME

12:10

#### RECEIVED BY

*[Signature]*



# Groundwater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401  
(802)-860-6065 (802)-860-6076 Fax

## CHAIN OF CUSTODY RECORD

LABORATORY

PROJECT NUMBER: 095-051  
PROJECT NAME: St. Michaels College  
PROJECT LOCATION: Colchester, VT  
PROJECT MANAGER: Bon Miller  
COLLECTED BY: Brian Storer  
DATE: 9/7/95

ANALYSIS STATUS:  
 RUSH (2-DAY)  
 PRIORITY (4-DAY)  
 BEST AVAILABLE TIME

### ANALYSIS REQUESTED

METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (9)

OIL & GREASE: IR ( ) GRAV. ( )

VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( )  
8010 ( ) 8015 ( ) 8020 & MTBE (X)

EXTRACTABLES: ACIDS ( ) PESTS ( ) PCBs ( )  
PHTHALATES ( )

TSS ( ) TDS ( ) PH ( ) SPEC COND ( )

BACTERIA: SFC ( ) TOT COL ( ) FEC COL ( )

CYANIDE: AMEN ( ) TOT ( )

CL ( ) F ( ) SO4 ( )

NO3 ( ) NO2 ( ) NH3 ( )

TECP: METALS ( ) VOLATILES ( ) PESTICIDES ( )  
SEMI-VOLATILES ( ) HERBICIDES ( )

OTHER: ( )

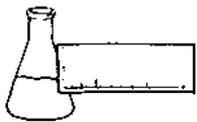
OTHER: ( )

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (9)	OIL & GREASE: IR ( ) GRAV. ( )	VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 & MTBE (X)	EXTRACTABLES: ACIDS ( ) PESTS ( ) PCBs ( ) PHTHALATES ( )	TSS ( ) TDS ( ) PH ( ) SPEC COND ( )	BACTERIA: SFC ( ) TOT COL ( ) FEC COL ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	NO3 ( ) NO2 ( ) NH3 ( )	TECP: METALS ( ) VOLATILES ( ) PESTICIDES ( ) SEMI-VOLATILES ( ) HERBICIDES ( )	OTHER: ( )	OTHER: ( )	REMARKS	
Trip Blank	9/7	800A	W	VOA	2	I/A			X											
Duplicate		-							X											
mw-1		900A							X											
mw-2		945A							X											
mw-3		1030A							X											

**MATRIX**  
W = AQUEOUS  
S = SOLIDS

**PRESERVATIVE**  
I = ICED  
A = ACIDIFIED (1.1 HCl 4 drops)  
B = BASE  
N = SODIUM BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
<i>Brian Storer</i>	9/7/95	12:10	<i>Bon Miller</i>

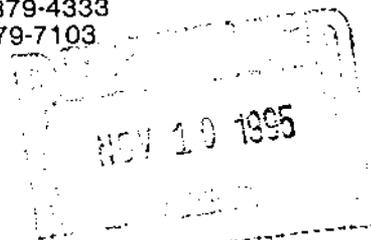


**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

REPORT OF LABORATORY ANALYSIS



CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,636 - 82,642

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

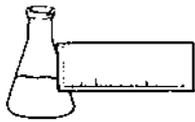
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 7, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,636  
STATION: Trip Blank  
TIME SAMPLED: 9:00  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

Bromobenzene Surrogate Recovery: 100%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 8, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,637  
STATION: Duplicate  
TIME SAMPLED: Not Indicated  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	500	17,900.
Chlorobenzene	500	ND <sup>2</sup>
1,2-Dichlorobenzene	500	ND
1,3-Dichlorobenzene	500	ND
1,4-Dichlorobenzene	500	ND
Ethylbenzene	500	1,490.
Toluene	500	39,000.
Xylenes	500	12,100.
MTBE	500	10,900.

Bromobenzene Surrogate Recovery: 98%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 0.2% dilution.

2 None detected



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 8, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,638  
STATION: MW-1  
TIME SAMPLED: 9:30  
SAMPLER: Brian Starer

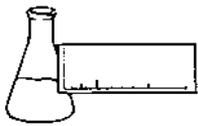
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	2.6

Bromobenzene Surrogate Recovery: 96%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 None detected



**ENDYNE, INC.**

**Laboratory Services**

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 7, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,639  
STATION: MW-2  
TIME SAMPLED: 10:00  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	5	ND <sup>2</sup>
Chlorobenzene	5	ND
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Ethylbenzene	5	ND
Toluene	5	7.9
Xylenes	5	ND
MTBE	5	278.

Bromobenzene Surrogate Recovery: 114%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 20% dilution.

2 None detected



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 7, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,640  
STATION: MW-3  
TIME SAMPLED: 10:30  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND <sup>1</sup>
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	34.4

Bromobenzene Surrogate Recovery: 100%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 7, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,641  
STATION: MW-5  
TIME SAMPLED: 11:00  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	500	18,000.
Chlorobenzene	500	ND <sup>2</sup>
1,2-Dichlorobenzene	500	ND
1,3-Dichlorobenzene	500	ND
1,4-Dichlorobenzene	500	ND
Ethylbenzene	500	1,580.
Toluene	500	39,600.
Xylenes	500	12,400.
MTBE	500	10,400.

Bromobenzene Surrogate Recovery: 100%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 0.2% dilution.

2 None detected



Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 8, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,642  
STATION: MW-7  
TIME SAMPLED: 11:30  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)<sup>1</sup></u>	<u>Concentration (ug/L)</u>
Benzene	500	26,000.
Chlorobenzene	500	ND <sup>2</sup>
1,2-Dichlorobenzene	500	ND
1,3-Dichlorobenzene	500	ND
1,4-Dichlorobenzene	500	ND
Ethylbenzene	500	6,200.
Toluene	500	70,600.
Xylenes	500	34,800.
MTBE	500	26,000.

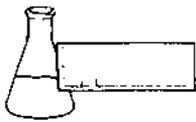
Bromobenzene Surrogate Recovery: 97%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 0.2% dilution.

2 None detected



**ENDYNE, INC.**

Laboratory Services

32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

EPA METHOD 8020 LABORATORY REPORT

MATRIX SPIKE AND DUPLICATE LABORATORY CONTROL DATA

CLIENT: GroundWater of Vermont  
PROJECT NAME: St. Michaels College  
REPORT DATE: November 8, 1995  
DATE SAMPLED: November 6, 1995  
DATE RECEIVED: November 6, 1995  
DATE ANALYZED: November 7, 1995

PROJECT CODE: GWVT1914  
REF.#: 82,640  
STATION: MW-3  
TIME SAMPLED: 10:30  
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Sample(ug/L)</u>	<u>Spike(ug/L)</u>	<u>Dup1(ug/L)</u>	<u>Dup2(ug/L)</u>	<u>Avg % Rec</u>
Benzene	ND <sup>1</sup>	10	8.7	8.8	88%
Toluene	ND	10	8.1	8.3	82%
Ethylbenzene	ND	10	8.2	8.4	83%
Xylenes	ND	30	24.8	25.4	84%

NOTES:

1 None detected



# GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401  
(802)-860-6065 (802)-860-6076 Fax

## CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:

- RUSH (2-DAY)
- PRIORITY (4-DAY)
- BEST AVAILABLE TIME

PROJECT NUMBER: 195-051  
 PROJECT NAME: St Michaels College  
 PROJECT LOCATION: Colchester, VT  
 PROJECT MANAGER: Ron Miller  
 COLLECTED BY: Brian Storer  
 DATE: 1/16/95

*GWVT 1914*

### ANALYSIS REQUESTED

METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (P)  
 OIL & GREASE: IR ( ) GRAY ( )  
 VOLATILE ORGANICS: 621 ( ) 601 ( ) 602 ( )  
 8010 ( ) 8015 ( ) 8020 & 8018 ( )  
 EXTRACTABLES: ACIDS ( ) PESTS ( )  
 8-H ( ) PDS ( )  
 6040000 ( )  
 TSS ( ) TDS ( ) PH ( ) SPEC COND ( )  
 BACTERIA: SFC ( ) TOT COU ( ) FEC COU ( )  
 CYANIDE: AMEN ( ) TOT ( )  
 CL ( ) F ( ) SO4 ( )  
 NO3 ( ) NO2 ( ) NH3 ( )  
 TOLP: METALS ( ) VOLATILES ( ) PESTICIDES ( )  
 SEMIVOLATILES ( ) HERBICIDES ( )  
 OTHER:  
 OTHER:

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (P)	OIL & GREASE: IR ( ) GRAY ( )	VOLATILE ORGANICS: 621 ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 & 8018 ( )	EXTRACTABLES: ACIDS ( ) PESTS ( ) 8-H ( ) PDS ( ) 6040000 ( )	TSS ( ) TDS ( ) PH ( ) SPEC COND ( )	BACTERIA: SFC ( ) TOT COU ( ) FEC COU ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	NO3 ( ) NO2 ( ) NH3 ( )	TOLP: METALS ( ) VOLATILES ( ) PESTICIDES ( ) SEMIVOLATILES ( ) HERBICIDES ( )	OTHER:	OTHER:	REMARKS	
Trip Blank	1/16	900A	W	VOA	2	EIA			X											
Duplicate		-							X											
mw-1		930A							X											
mw-2		1000A							X											
mw-3		1030A							X											
mw-5		1100A							X											
mw-7		1130A							X											

**MATRIX**  
 W = AQUEOUS  
 S = SOLIDS

**PRESERVATIVE**  
 I = ICED  
 A = ACIDIFIED (1:1 HCl. 4 drops)  
 B = BASE  
 N = SODIUM BICARBONATE

**RELINQUISHED BY** Brian Storer **DATE** 1/16/95 **TIME** 12:00 **RECEIVED BY** Ron Miller



# Groundwater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401  
(802)-860-6065 (802)-860-6076 Fax

## CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:

- RUSH (2-DAY)
- PRIORITY (4-DAY)
- BEST AVAILABLE TIME

PROJECT NUMBER: 195-051  
 PROJECT NAME: St Michaels College  
 PROJECT LOCATION: Colchester, VT  
 PROJECT MANAGER: Brian Miller  
 COLLECTED BY: Brian Storer  
 DATE: 11/6/95

### ANALYSIS REQUESTED

METALS - PLEASE LIST: MA ( ) EP-TOX ( ) (9)  
 OIL & GREASE: IR ( ) GRV. ( )  
 VOLATILE ORGANICS: 624 ( ) 607 ( ) 602 ( )  
 8010 ( ) 8015 ( ) 8020 & MTBE ( )  
 EXTRACTABLES: ACDS ( ) B-H ( ) PCBs ( )  
 PESTS ( ) 800/000 ( )  
 TSS ( ) TDS ( ) PH ( ) SPEC COND ( )  
 BACTERIA: SFC ( ) TOT COU ( ) FFC COU ( )  
 CYANIDE: AMEN ( ) TOT ( )  
 CL ( ) F ( ) SO4 ( )  
 NO3 ( ) NO2 ( ) NH3 ( )  
 TCLP: METALS ( ) VOLATILES ( ) PESTICIDES ( )  
 SEMI-VOLATILES ( ) HERBICIDES ( )  
 OTHER:  
 OTHER:

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	ANALYSIS REQUESTED	REMARKS
Trip Blank	11/6	900A	W	VOA	2	EIA		
Duplicate		-						
MW-1		930A						
MW-2		1000A						
MW-3		1030A						
MW-4		1100A						
MW-7		1130A						

#### MATRIX

W = AQUEOUS  
S = SOLIDS

#### PRESERVATIVE

I = ICED  
 A = ACIDIFIED (1:1 HCl 4 drops)  
 B = BASE  
 N = SODIUM BISULFATE

#### RELINQUISHED BY

*Brian Storer*

#### DATE

11/6/95

#### TIME

12:00

#### RECEIVED BY

*Low B...*