GRIFFIN INTERNATIONAL INC

May 11, 2000

Mr. Gerold Noyes
Sites Management Section
VTDEC/WMD
103 South Main Street/West Bldg.
Waterbury, VT 05671-0404

RE: Investigation of Potential Subsurface Petroleum Contamination, Twin Village Quick Stop, Barnet, VT (VTDEC Site # 91-1131)

Dear Mr. Noyes:

Enclosed please find the report on the site investigation conducted at the above referenced site. I am forwarding this report to you at the request of Mr. Bill Everett, representative for the former site owner, Mr. Norman Lamothe.

None of the petroleum constituents targeted by laboratory analysis were detected at concentrations exceeding Vermont Groundwater Enforcement Standards in the wells placed in the vicinity of the Twin Village Quick Stop, and between the Quick Stop and the MTBE impacted supply well located on the Norman Lamothe property northeast of the site. Based on these results, Griffin is recommending that this site be granted Sites Management Activity Complete status by the Vermont Department of Environmental Conservation (VTDEC).

Please do not hesitate to call, if you have any questions or comments.

Sincerely,

Beth Stopford

Beth Stopford
Environmental Engineer

Enc.

cc: GI #10041660

P.O. Box 943 • Williston, VT 05495 • Phone 802-865-4288 • Fax 802-657-4129
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INVESTIGATION OF POTENTIAL SUBSURFACE PETROLEUM CONTAMINATION AT THE TWIN VILLAGE QUICK STOP AND POSSIBLE IMPACT TO AN AREA SUPPLY WELL

May 11, 2000

Site Location:

Twin Village Quick Stop
4675 US Route 5
Barnet, VT

VTDEC SITE #91-1131
GI Project #10041660

Prepared For:

Mr. Norman Lamothe
P.O. Box 151
McIndoe Falls, VT 05050

Prepared By:

P.O. Box 943 / 20 Commerce Street Williston, VT 05495 (802) 865-4288

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I. INTRODUCTION

This report summarizes the initial investigation of suspected subsurface petroleum contamination at the Twin Village Quick Stop, located at 4675 US Route 5 in Barnet, VT (see the Site Location Map in Appendix A). This investigation was conducted by Griffin International, Inc. (Griffin) for Mr. Norman Lamothe to address limited petroleum contamination detected during the permanent closure of two 1,000-gallon gasoline underground storage tanks (USTs) in September 1991, and MTBE contamination detected in a nearby supply well in January 2000. The Vermont Department of Environmental Conservation (VTDEC) requested that this work be completed in a letter to Griffin from Mr. Gerold Noyes of the VTDEC, dated January 25, 2000. Because MTBE was detected in a supply well located in an apparent down to crossgradient direction of the Twin Village Quick Stop, the VTDEC requested that a site investigation be performed. The objectives of the site investigation were to determine 1) the severity of residual contamination at the site, and 2) if petroleum contaminants had migrated from the UST pit at the Twin Village Quick Stop site to the nearby impacted supply well through the surficial aquifer. The site (VTDEC Site #91-1161) was formerly owned by Mr. Norman Lamothe, and Mr. Lamothe is the responsible party.

Work conducted in the vicinity of the site included the advancement of six soil borings, installation of three groundwater monitoring wells, and collection and laboratory analysis of groundwater samples from two of the three monitoring wells (the third well was dry). In addition, a sensitive receptor risk assessment was conducted to assess the risk that subsurface petroleum contamination at the site may pose to potentially sensitive receptors identified in the site vicinity. Work has been conducted in accordance with Griffin's *Work Plan and Cost Estimate for Subsurface Investigation at Twin Village Quick Stop* dated February 1, 2000 [1]. The Work Plan was approved by Mr. Bill Everett (representative for Mr. Lamothe) on February 1, 2000, and by Mr. Gerold Noyes of the VTDEC in a letter dated February 1, 2000.

II. SITE BACKGROUND

A. Site History

Petroleum contamination was detected in soils at the Twin Village Quick Stop during the closure of two 1,000-gallon gasoline underground storage tanks (USTs) at the site in September 1991. Elevated VOC concentrations (up to 69 parts per million (ppm)) were measured with a photoionization detector (PID) in soils in the vicinity of the fill pipes for the USTs. The adsorbed contamination was limited to soils from the direct vicinity of the fill pipes for the tanks. During excavation activities, bedrock was encountered at approximately 10 feet below grade, and groundwater was not encountered. Details of the closure inspection are outlined in the Underground Storage Tank Permanent Closure Form [2].

Approximately 12 cubic yards of soil (removed from the tank pit and the vicinity of the piping and pumps) were transported to an adjacent property where they were stockpiled. The soils

removed from the excavation during UST removal activities were stockpiled less than 500 feet northeast of the Twin Village Quick Stop, on an adjacent residential property also owned by Mr. Norman Lamothe. Soils remaining at the base of the excavated area exhibited a maximum VOC concentration of 2 ppm.

Soil stockpile monitoring and sampling of supply wells within a 500-foot radius of the site were requested by the Vermont Department of Environmental Conservation (VTDEC) in letters to the property owner, Mr. Lamothe, dated October 25, 1991 and November 12, 1992. On January 11, 2000 soil and supply well sampling was conducted by Griffin at the request of Mr. Bill Everett, a representative for Mr. Lamothe.

During the January 11 site visit, Griffin found that the stockpiled soils had been spread sometime between 1991 and the present, and the stockpile no longer existed. The former stockpile location was identified by Mr. Everett during the site visit, and two soil samples were collected from the area where the stockpiled soils had been located and screened for VOCs using a Microtip PID equipped with a 10.6 eV bulb. Soil screening was conducted in accordance with *Agency Guidelines for Petroleum Contaminated Soil and Debris* [3] and with the Griffin Jar/Polyethylene Bag Headspace Screening Protocol. No VOCs were detected in the samples screened.

Because VOCs were not detected in the soil samples screened with the PID, two confirmatory soil samples were collected for laboratory analysis. The samples were analyzed for VOCs via EPA Method 8021B and for TPH via Method 8015 GRO. None of the targeted compounds were detected above method detection limits in the samples analyzed, and no unidentified peaks were observed. Copies of the analytical results were forwarded to the VTDEC on January 19, 2000.

In compliance with the VTDEC request, the area was surveyed for the presence of supply wells within a 500-foot radius of the site. One supply well was identified; this supply well is located on the Norman Lamothe property, where the contaminated soils were stockpiled and thinspread. The supply well is located 480 feet northeast of the Twin Village Quick Stop, and is separated from the Twin Village Quick Stop by a small stream. According to an August 14, 1995 well completion report [4], the well was cleaned/serviced in 1995, and static water level was 40 feet below ground level, with a reported yield of 100 gallons per minute (see attached report). The well is believed to be drilled into bedrock, based on the presence of bedrock at 10 feet below ground level during UST excavation activities at the nearby Twin Village Quick Stop property.

A water sample was collected from a spigot located outside the Norman Lamothe residence on January 11, 2000, and was analyzed for VOCs via EPA Method 8021B. MTBE, a gasoline additive, was detected in the supply well sample at a concentration of 24.7 ug/L. None of the other compounds targeted by the analysis method were detected, and no unidentified peaks were noted. MTBE was also detected at a concentration of 38.1 ug/L in a second sample collected from the supply well on January 20, 2000. Analytical results were submitted to the VTDEC on January 19, 2000 and January 25, 2000.

In compliance with a request from the VTDEC that a subsurface investigation be conducted relative to the suspected source site, Twin Village Quick Stop, Mr. Bill Everett (representative of the property owner) retained the services of Griffin to conduct this initial site investigation.

B. Site Description

Twin Village Quick Stop is located on the east side of Route 5 in Barnet, VT (see Site Location Map in Appendix A). The area surrounding the site is comprised primarily of residential properties. The Quick Stop, and most of the residences in the area are serviced by municipal water and sewer. The Connecticut River is located approximately 700 feet east of the site. An unnamed tributary to the Connecticut River runs along the north and east boundary of the site.

The on-site building, housing a convenience store, is constructed on a cement slab foundation. The majority of the site is paved.

C. Site Geologic Setting

According to the Surficial Geologic Map of Vermont [5], the site is underlain by glaciofluvial gravel. Soils encountered during drilling activities consisted of sand and silt intermixed with cobbles and boulders overlying silt. Bedrock at the site is mapped as Cheshire quartzite [6].

Based on visual observation and review of the USGS topographic map [7], shallow groundwater in the vicinity of the Twin Village Quick Stop would be expected to flow to the east toward the tributary to the Connecticut River, following topographic contours.

III. INVESTIGATIVE PROCEDURES

A. Soil Boring/Monitoring Well Installation

On February 17, 2000, six soil borings were advanced by T&K Drilling of East Swanzey, New Hampshire using a hollow stem auger drilling rig. Three of the soil borings were completed as groundwater monitoring wells. Drilling and well construction were directly supervised by a Griffin engineer. Soil samples were collected at five-foot intervals from each boring. Each soil sample was screened for volatile organic compounds (VOCs) using an HNu™ Model HW-101 PID equipped with a 10.2 eV bulb. Soils were screened using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol, which conforms to state and industry standards. Contaminant concentrations and soil characteristics were recorded in detailed boring logs by the supervising Griffin engineer (see the Boring Logs and Well Construction Diagrams in Appendix B).

The soil borings/monitoring wells (SB1/MW1, SB2/MW2, SB3, SB4/MW3, SB5, SB6) were installed to help better define groundwater flow direction and gradient, and the degree and extent of potential petroleum contamination in the overburden materials between the Twin Village Quick Stop property and the nearby Lamothe residential property. SB1/MW1 and SB2/MW2 were installed northeast of the source area (e.g. the former gasoline UST systems) on property owned by Mr. Norman Lamothe, and on the opposite side of the tributary to the Connecticut River. These borings were placed between the source area and the Lamothe supply well. SB3 was installed on the Twin Village Quick Stop property, north of the former gasoline USTs, as close to their former location as site parameters allowed. The placement of this boring was limited by overhead power lines and overhanging trees. SB4/MW3, SB5, and SB6 were installed northeast of the Twin Village Quick Stop, in the vicinity of the MTBE impacted supply well located at the Norman Lamothe residence.

The monitoring wells were constructed of 2-inch diameter Schedule 40 PVC riser and 0.010-inch factory slotted, well screen. The length of the riser and the screened section of pipe varied depending on the depth of the well. The annulus between the well screen and the borehole was filled with a sand pack to just above the well screen. A bentonite seal was placed above the sand pack. The remainder of the boring was filled with native backfill. To complete the construction of each well, a road box was set in concrete at grade level. In addition, locking well caps were placed on the monitoring wells. Specific well construction details are displayed in the detailed Boring Logs and Well Construction Diagrams included in Appendix B.

SB1/MW1

The boring for SB1/MW1 was advanced to 12.5 feet below grade, at which point auger refusal was met. Soils from the boring for SB1/MW1 consisted of well-graded sand from 0 to 2 and 5 to 7 feet below grade. Wet silty sand was observed from 10 to 12 feet below grade. A maximum VOC concentration of 3.3 ppm was measured with a PID in soils collected from between 10 and 12 feet below grade, coincident with the approximate water table.

Groundwater was encountered at approximately 10.5 feet below grade. The boring was completed as MW1, and the screened section of the well was installed from 12.5 to 7.5 feet below the ground surface.

SB2/MW2

The boring for SB2/MW2 was advanced to 11 feet below grade, at which point auger refusal was met. Soils from the boring for SB2/MW2 consisted of dry, silty sand from 0 to 2 feet below grade. Moist, silty sand and sand was observed between 5 and 7 feet. Soils from 10 to 12 feet below grade consisted of wet silt with sand. A maximum VOC concentration of 0.2 ppm was measured with a PID in soils collected from 0 to 2 and from 10 to 10.5 feet below grade.

Groundwater was encountered at approximately 9.5 feet below grade. The boring was completed as MW2, and the screened section of the well was installed from 11 to 6 feet below grade.

SB3A and SB3B

The boring for SB3A was advanced to 5 feet below grade, at which point auger refusal was met. Soils from the boring consisted of well-graded sand from 0 to 2 feet below grade. Because auger refusal was met at 5 feet, the drill rig was moved approximately 5 feet to the SSE, and boring SB3B was advanced. Auger refusal was met in SB3B at 4 feet below ground level, and a soil sample was collected from the auger flights from the 3 to 4 foot interval. Soils from 3 to 4 feet below grade consisted of moist silty sand. A maximum VOC concentration of 0.1 ppm was measured with a PID in the sample collected between 3 and 4 feet below grade.

Groundwater was not encountered in the borings for SB3A or SB3B. The borings were not completed as monitoring wells.

SB4/MW3

The boring for SB4/MW3 was advanced to 25 feet below grade. Soils from the boring consisted of dry silty sand from 0 to 2 feet below grade. No recovery was achieved in the split spoon from 5 to 7 feet below grade. Moist to wet silt with layers of fine sand was observed from 10 to 12 feet below grade. Soils from 15 to 17 and 20 to 22 feet below grade consisted of moist to wet silty sand.

Groundwater was encountered in the boring at approximately 19 feet below grade, and SB4 was completed as monitoring well MW3. The screened section of the well was installed from 25 to 15 feet below grade. A maximum VOC concentration of 1.2 ppm was measured with a PID in the sample collected from 0 to 2 feet below grade.

SB5

The boring for SB5 was advanced to approximately 15.5 feet below grade, at which point auger refusal was met. Soils from grade to 2 feet below grade consisted of dry silty sand. Soils from 5 to 7 feet below grade consisted of dry, well-graded sand with silt. Dry to moist silty sand was observed from 10 to 12 and from 15 to 17 feet below grade.

Groundwater was not encountered in the boring for SB5. The boring was not completed as a monitoring well. A maximum VOC concentration of 0.1 ppm was measured with a PID in the samples collected from 0 to 2 and from 5 to 7 feet below grade.

SB6

The boring for SB6 was advanced to approximately 12.5 feet below grade, at which point auger refusal was met. Soils from 0 to 2 and from 5 to 7 feet below grade consisted of dry well-graded sand. Soils from 10 to 12 feet below grade consisted of moist silty sand.

Groundwater was not encountered in the boring for SB6. The boring was not completed as a monitoring well. A maximum VOC concentration of 0.2 ppm was measured with a PID in the sample collected from 0 to 2 feet below grade.

B. Determination of Groundwater Flow Direction and Gradient

Water table elevation measurements were collected from two of the three monitoring wells (MW3 was dry) on March 7, 2000 using an MMC interface probe. These measurements were subtracted from the top of casing elevations, which were determined relative to a benchmark elevation of 500 feet, located on the south side of Monroe Road, to determine the water table elevation at each of the wells. Groundwater level data are recorded in Appendix C. No free phase petroleum product was observed in the monitoring wells gauged on March 7, 2000. A groundwater contour map was not developed, as water elevations were only measured in two of the wells gauged.

Groundwater was absent in the overburden materials at the site in September 1991 during UST closure activities, and in soil borings advanced to bedrock in February of 2000. When groundwater is present at the site in shallow overburden materials, it is inferred to flow to the east or southeast toward the tributary to the Connecticut River which borders the property, and toward the Connecticut River, following topographic contours.

C. Groundwater Sample Collection and Analysis

Groundwater samples were collected from two of the three monitoring wells immediately following well gauging on March 7, 2000. MW3 was dry and could not be sampled. Samples were analyzed for the presence of VOCs per EPA Method 8021B. Laboratory report forms are presented in Appendix D.

None of the compounds targeted by 8021B analysis were detected above method detection limits in the samples collected from MW1 and MW2, located between the former UST system and the Lamothe residence supply well.

Samples were collected according to Griffin's groundwater sampling protocol, which complies with industry and state standards. Results from the analyses of the trip blank and duplicate

samples indicate that adequate quality assurance and control (QA/QC) were maintained during sample collection and analysis.

D. Sensitive Receptor Risk Assessment

A receptor risk assessment was conducted to identify known and potential receptors of contamination at the Twin Village Quick Stop. A visual survey was conducted during drilling activities on February 17, 2000, and during the sampling event on March 7, 2000. Based on these observations, a determination of the potential risk to identified receptors, specifically the Norman Lamothe supply well, was made based on proximity to the expected source area (i.e., the former UST system at the Twin Village Quick Stop), inferred groundwater flow directions, and contaminant concentration levels in soil and groundwater.

Water Supplies

Twin Village Quick Stop and most of the surrounding residences are served by municipal water supplied from the McIndoes Water System [8]. The water source for the McIndoes Water System is three drilled wells located in the vicinity of Coburn Pond [9], located approximately 1.2 miles southwest and topographically upgradient of the Twin Village Quick Stop. Given: 1) the low VOC concentrations detected in soils at the Twin Village Quick Stop and neighboring properties during the advancement of soil borings; 2) that dissolved petroleum contamination was not detected in overburden groundwater samples above method detection limits in the site vicinity; and 3) the town water supply is located more than one mile from and topographically upgradient of the subject property, the town water supply is not considered at risk of impact from petroleum contamination migrating from the Twin Village Quick Stop.

One supply well is located northeast of the source area at the Twin Village Quick Stop, approximately 480 feet from the Twin Village Quick Stop. The supply well is located on a neighboring property, at the residence of Mr. Norman Lamothe. This supply well has been impacted with MTBE, a component of gasoline. Based on the lack of detectable dissolved petroleum concentrations in groundwater collected from monitoring wells (MW1 and MW2) located between the Twin Village Quick Stop property and this supply well, contamination from the former UST source area is not believed to have contributed to the trace levels of MTBE contamination in this supply well via the overburden aquifer.

During the sensitive receptor survey conducted on March 7, 2000 the Lamothe supply well was located and the area around it inspected. The supply well is located approximately 10 feet north of a garage/maintenance shop located on the Norman Lamothe property. Automobiles, auto parts and engines, and other materials were observed stored in the area around the well casing. It is suspected that MTBE impact to the supply well may be related to the storage of these items in the vicinity of the well casing.

Buildings in the Vicinity

Environmental risk to the building on the Twin Village Quick Stop property is considered minimal, given the low VOC concentrations detected with a PID in soils at the Twin Village Quick Stop and neighboring properties during the advancement of soil borings on February 17, 2000.

Other buildings in the area are considered at minimal risk from the on-site petroleum contamination due to the low concentrations of contamination detected at the site, given their distance from the source area, and because they are serviced by a municipal water supply.

Surface Water

The nearest surface water is a tributary to the Connecticut River, which borders the site to the north and east. The Connecticut River is located approximately 700 feet east of the Twin Village Quick Stop. These surface waters are in a presumed downgradient direction from the former UST system at the Twin Village Quick Stop, based upon site topography. These surface waters are considered at minimal risk of petroleum impact from the Twin Village Quick Stop given the low VOC concentrations measured in soils with a PID.

Utility Corridors

Most of the area surrounding Twin Village Quick Stop is serviced by municipal water [8]. Adsorbed petroleum contamination was not detected in soils at the Twin Village Quick Stop or neighboring properties during drilling. Dissolved petroleum contamination was not detected in groundwater in the vicinity of the site. Therefore the potential of contaminant migration via utility corridors is considered minimal.

IV. CONCLUSIONS

Based on this investigation of petroleum contamination at the Twin Village Quick Stop site, the following conclusions are offered:

1. There has been an apparent release(s) of gasoline in the subsurface at the subject site. The exact nature and duration of the release(s) is not known. However, soil data from the UST closure indicate that petroleum contamination was limited to soils in the vicinity of the UST fill pipes.

2. VOC readings of soils collected during a UST replacement in September 1991 indicate that adsorbed petroleum compounds existed in the soils in the vicinity of the former gasoline

USTs. Measured VOC concentrations ranged from 0 to 69 ppm. All of the soils excavated during UST closure activities were stockpiled off-site. The Twin Village Quick Stop site is primarily paved, and are not readily accessible, reducing risk to potential receptors from any remaining contamination in soils beneath the site.

3. Six soil borings and three groundwater monitoring wells were installed at the Twin Village Quick Stop on February 17, 2000 in order to determine the severity of contamination at the site, and whether petroleum contaminants had migrated from the UST pit at the Twin Village Quick Stop site to a nearby supply well through the surficial aquifer. During monitoring well installation a maximum VOC concentration of 3.3 ppm was measured in a soil sample collected from SB1/MW1, at a depth of 10 to 12 feet below grade, coincident with the water table. VOC concentrations measured with the PID in all other soil samples collected for screening did not exceed 2 ppm.

4. Groundwater flow in the overburden aquifer beneath the site is presumed to be directed generally to the east or southeast toward a tributary to the Connecticut River and the Connecticut River based on observed topography.

5. No free product was present in the two monitoring wells sampled on March 7, 2000.

6. None of the targeted petroleum constituents were detected in the groundwater samples collected from the two monitoring wells sampled (MW1 and MW2). The supply wells sampled are located between the former UST systems and the Lamothe supply well, which has been impacted with MTBE. MW3 was dry and could not be sampled.

7. No receptors are believed to be at risk from low levels of subsurface petroleum contamination migrating from the Twin Village Quick Stop property, based on currently available data.

8. The Norman Lamothe supply well, located approximately 480 feet northeast of the Twin Village Quick Stop has been impacted with MTBE. Based on a sensitive receptor survey, the low concentrations of VOCs detected in soils in the vicinity of the site, and lack of detectable petroleum compounds in groundwater in the vicinity of the site, the MTBE is not believed to have migrated to the supply well from the Twin Village Quick Stop through the surficial aquifer. Auto parts and engines were observed to be stored in close proximity to the casing for the Norman Lamothe supply well, and may have caused MTBE contamination to the well.

V. RECOMMENDATIONS

Based on the results of this site investigation, Griffin recommends that the Twin Village Quick Stop in Barnet, Vermont be removed from the VTDEC Active Hazardous Waste Sites List and

that the three existing monitoring wells be properly abandoned. This recommendation is offered based upon achievement of the following closure criteria, as per the VTDEC Site Management Activity Completed (SMAC) Checklist (dated December 1, 1997):

1) The source(s), nature, and extent of the petroleum contamination at the site have been adequately defined.

   See Conclusions #1, #2, #3, #5, #6, and #8.

2) Source(s) has been removed, remediated, or adequately contained.

   See Conclusions #1, #2, #3, #5, #6, #7, and #8.

3) Levels of contaminants in soil and groundwater shall be stable, falling, or non-detectable.

   See Conclusion #3, #5, and #6.

4) Groundwater enforcement standards are met at the following compliance points:

   Any point of present use of groundwater as a source of potable water: See conclusion #5 and #6.

   Any point at or within the boundary of any Class I groundwater area: The Twin Village Quick Stop property is not within a Class I groundwater area.

   Any point at the boundary of the property on which the contaminant source is located: See conclusion #5 and #6.

5) Soil guideline levels are met. If not, engineering or institutional controls are in place.

   See Conclusion #3.

6) No unacceptable threat to human health or the environment exists on site.

   See Conclusions #2, #3, #5, #6, and #7.

7) Site meets RCRA requirements.

   Available records indicate that the Twin Village Quick Stop is not in violation of the Resource Conservation and Recovery Act (RCRA) as defined in 40 CFR 264. A RCRA compliance inspection was not conducted at this facility as part of this work scope.

8) Site meets CERCLA requirements.

Available records indicate that the Twin Village Quick Stop is not in violation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as defined in 40 CFR 300. A site inspection relative to CERCLA compliance was not conducted at this site as part of this work scope.

VI. REFERENCES

1. Griffin International, Inc. February 1, 2000. *Work Plan and Cost Estimate for Subsurface Investigation of Suspected Petroleum Contamination at Twin Village Quick Stop.*

2. Griffin International Inc., September 16, 1991. UST Closure Letter Report from Peter Murray to Marc Coleman (VTDEC) re: Tank Pull Inspection, Twin Village Quick Stop, UST Facility 6332589.

3. Vermont Department of Environmental Conservation. August 1996. *Agency Guidelines for Contaminated Soils and Debris.*

4. Well Completion Report. State of Vermont Department of Environmental Conservation. August 14, 1995.

5. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, State of Vermont.

6. Doll, Charles G., ed., 1961, *Centennial Geologic Map of Vermont*, State of Vermont.

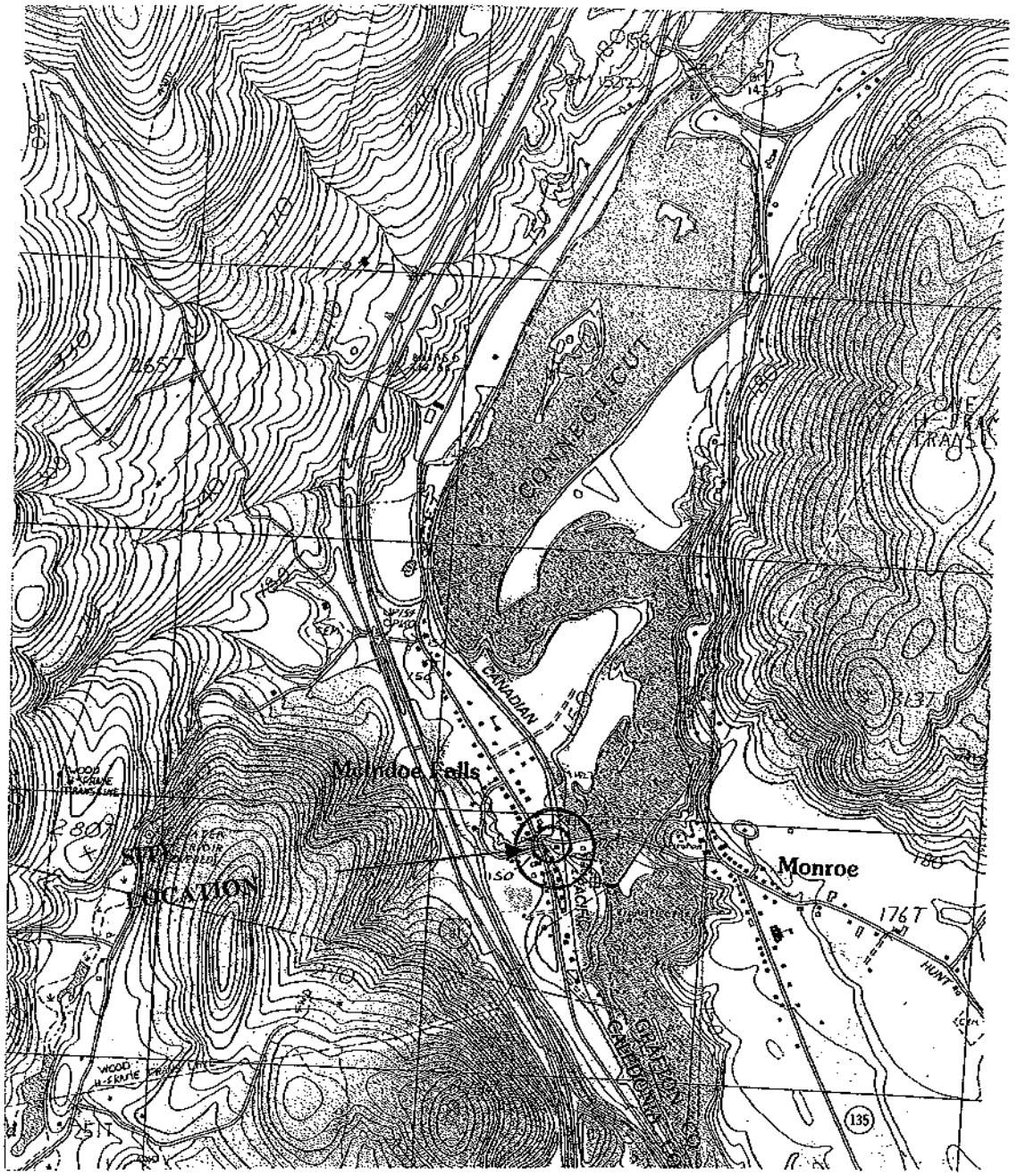
7. USGS 7.5 Minute Topographic Quadrangle Map. 1983. Barnet, Vermont.

8. Russell E. Pearl, Operator, McIndoes Water System. Letter dated January 9, 2000.

9. Kevin McGraw, Water Supply Division of the Vermont Department of Environmental Conservation. Telephone conversation with Robert Higgins of Griffin International, Inc., May 10, 2000.

APPENDIX A

Maps



Job #: 10041660

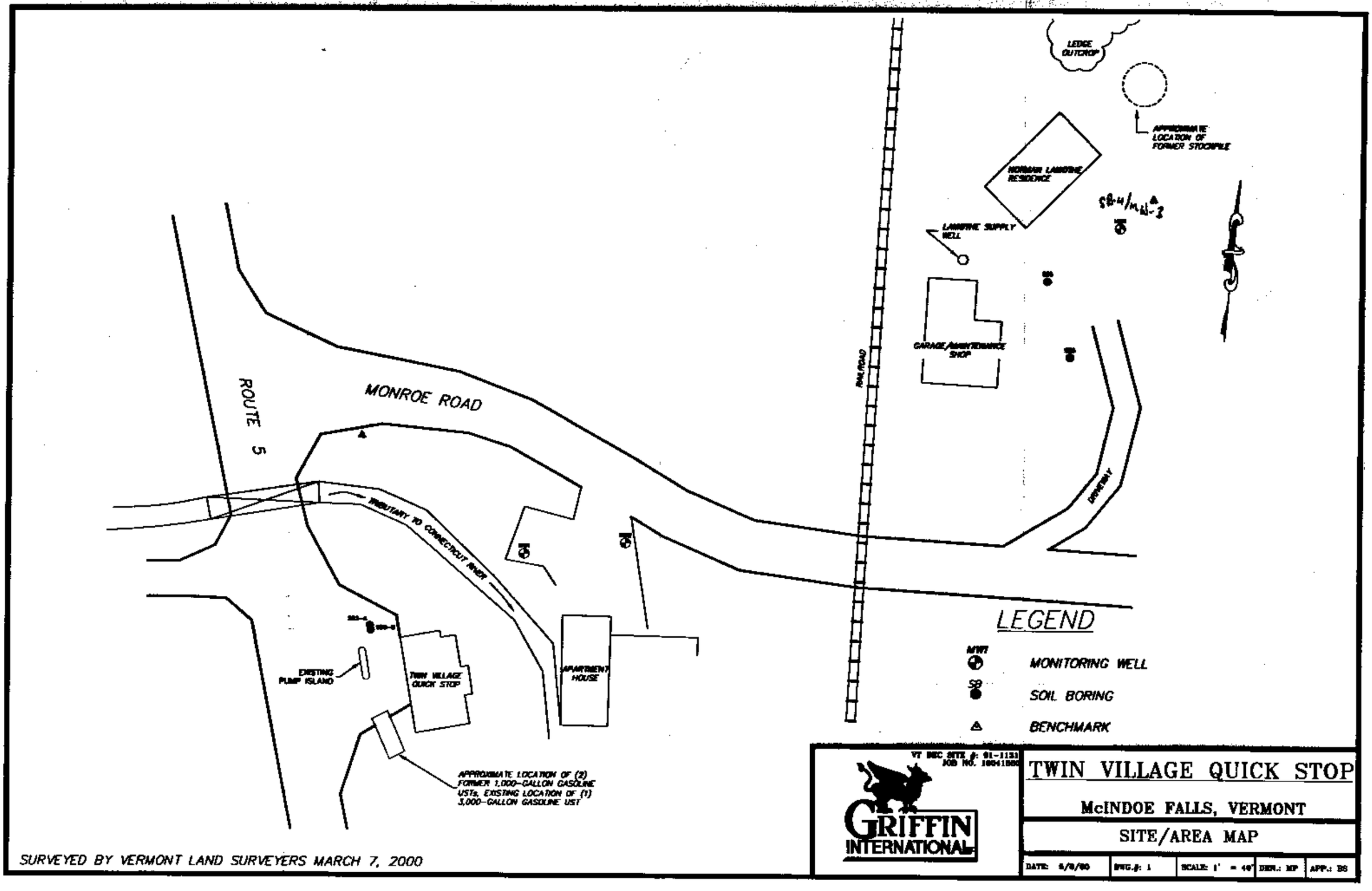
GRIFFIN INTERNATIONAL

Twin Village Quick Stop

McIndoe Falls, VT

Site Location Map

Date:	Source:	Scale:
1/18/2000	USGS Topographic Map, Barnet, VT Quadrangle. Provisional edition 1983.	1:24,000



SURVEYED BY VERMONT LAND SURVEYERS MARCH 7, 2000

VT DEC SITE #: 91-1131
JOB NO. 10041580

GRIFFIN INTERNATIONAL

TWIN VILLAGE QUICK STOP

McINDOE FALLS, VERMONT

SITE/AREA MAP

DATE: 5/8/00	DWG.#: 1	SCALE: 1" = 40'	DRN.: MP	APP.: BS

APPENDIX B

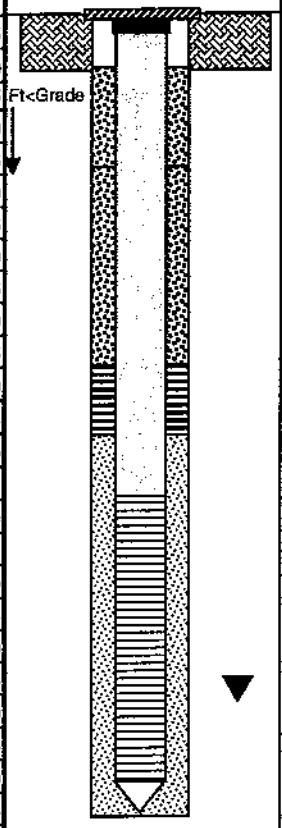
Boring Logs and Monitoring Well Construction Diagrams

BORING LOG AND WELL CONSTRUCTION DIAGRAM
Well No: SB1/MW1

GRIFFIN INTERNATIONAL

Twin Village Quick Stop
Barnet, VT

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	Bailer
Logged by:	EES	Screened Length:	5 Ft.



Well Construction	Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics	Letter Symbol	Graphic Symbol
			Asphalt Surface		
	na na	0 - 2 nd	Dry, light brown, well-graded sand. 100% fine to medium sand.	SW	
	24/8 2 1 2 1	5 - 7 nd	Dry to moist, dark brown and red, well-graded sand. 90% coarse to fine sand, 5% fine gravel, 5% silt.	SW	
	24/6 5 10 16 18	10 - 12 3.3	Wet, dark brown, silty sand. 50% fine, poorly graded sand, 5% fine gravel, 45% silt.	SM	
		12.5	Base of Exploration. Auger refusal.		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

na - Not available
nd - Not detected

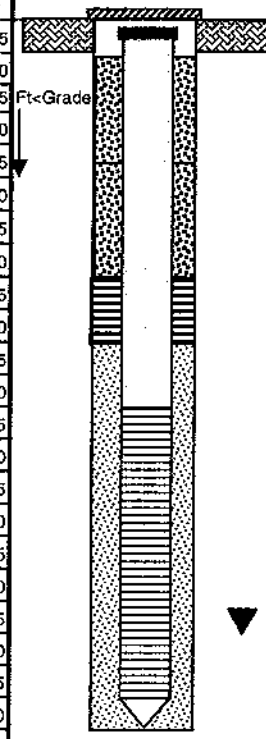
BORING LOG AND WELL CONSTRUCTION DIAGRAM

Well No: SB2/MW2

Twin Village Quick Stop
Barnet, VT

GRIFFIN INTERNATIONAL

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	Bailer
Logged by:	EES	Screened Length:	5 Ft.



Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics: Asphalt Surface	Letter Symbol	Graphic Symbol
na	0 - 2	Dry, dark brown, silty sand. 85% fine to medium well-graded sand, 15% silt.	SM	
na	0.2			
24/19	5 - 7	Moist, light brown, red, and olive gray silty sand and sand. Layers of 100% fine to medium well-graded sand (SW) and silty sand consisting of 20% silt and 80% fine to medium well-graded sand.	SW	
3 4 5 7	0.1		SM	
6/6	10 - 10.5	Wet, olive gray, silt with sand. 20% fine sand, 80% silt.	ML	
14 for 6"	0.2			
	11	Base of Exploration.		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

na - Not available
nm - Not measured due to PID malfunction

BORING LOG AND WELL CONSTRUCTION DIAGRAM
Well No: SB3A/SB3B

Twin Village Quick Stop
Barnet, VT

GRIFFIN INTERNATIONAL

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	not developed
Logged by:	EES	Screened Length:	not completed as a monitoring well

Grade = 0	Well Construction	Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics: Asphalt Surface	Letter Symbol	Graphic Symbol
0.5						
1.0		na	0 - 2	Dry, dark brown, well-graded sand. 95% fine to medium	SW	
1.5	Ft<Grade	na	nd	sand, 5% silt.		
2.0						
2.5						
3.0						
3.5		na	3 - 4	Moist, light brown, silty sand. 85% fine, poorly graded sand,	SM	
4.0		na	0.1	15% silt.		
4.5						
5.0						
5.5						
6.0						
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5						
11.0						
12.0						
13.0						
14.0						
15.0						
16.0						
17.0						
18.0						
19.0						
20.0						
21.0						
22.0						
23.0						
24.0						
25.0						
26.0						
27.0						
28.0			5	Base of Exploration. Auger refusal.		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

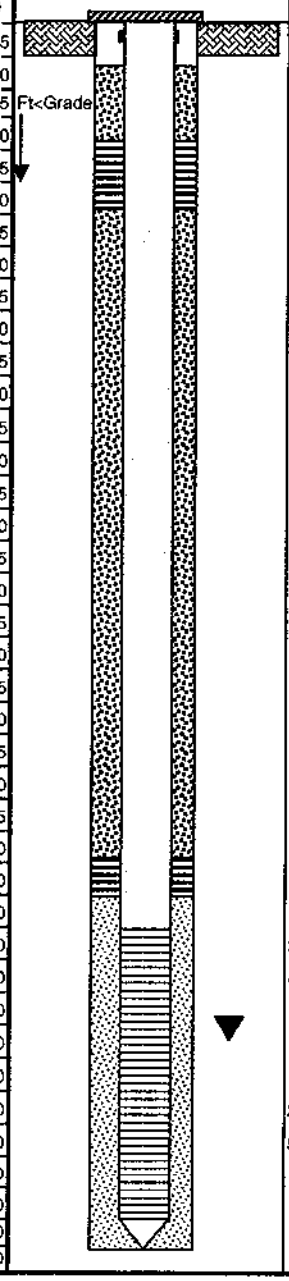
na - Not available
nm - Not measured due to PID malfunction

BORING LOG AND WELL CONSTRUCTION DIAGRAM
Well No: SB4/MW3

Twin Village Quick Stop
Barnet, VT

GRIFFIN INTERNATIONAL

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	Bailer
Logged by:	EES	Screened Length:	10 Ft.



Well Construction	Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics	Letter Symbol	Graphic Symbol
			Asphalt Surface		
	na	0 - 2	Dry, brown, silty sand. 85% fine, poorly graded sand, 15% silt.	SM	
	na	1.2			
	na	5 - 7	Split spoon bounced at this interval, no recovery.		
	na	na			
	24/18	10 - 12	Moist to wet, olive gray silt with layers of fine sand and black shale material. 95% silt, 5% fine sand, in layers.	ML	
	13 7 3 4	0.1			
	24/22	15 - 17	Moist, brown, silty sand. 75% fine sand, 25% silt.	SM	
	4 4 6 6	0.3			
	24/18	20 - 22	Moist to wet, light brown and olive gray, silty sand. 70% fine, poorly graded sand, 30% silt.	SM	
	5 6 5 7	0.1			
		25	Base of Exploration.		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

na - Not available
nm - Not measured due to PID malfunction

BORING LOG AND WELL CONSTRUCTION DIAGRAM
Well No: SB5

GRIFFIN INTERNATIONAL

Twin Village Quick Stop
Barnet, VT

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	not developed
Logged by:	EES	Screened Length:	not completed as a monitoring well

Grade = 0	Well Construction	Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics (Asphalt Surface)	Letter Symbol	Graphic Symbol
0.5						
1.0		na	0 - 2	Dry, dark brown, silty sand. 80% fine, well-graded sand, 20% silt.	SM	
1.5	Ft<Grade	na	0.1			
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						
5.0						
5.5		24/20	5 - 7	Dry, light brown, well-graded sand with silt. 90% fine well-graded sand, 10% silt.	SW-SM	
6.0		2 4 3 1	0.1			
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5		24/21	10 - 12	Dry to moist, light brown, silty sand. 60% fine well-graded sand, 40% silt.	SM	
11.0		2 4 5 6	nd			
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5		6/6	15 - 15.5	Moist, light brown to olive gray silty sand.	SM	
16.0		100 for 6"	nd			
16.5						
17.0						
17.5						
18.0						
18.5						
19.0						
19.5			15.5	Base of Exploration.		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

na - Not available
nm - Not measured due to PID malfunction

BORING LOG AND WELL CONSTRUCTION DIAGRAM
Well No: SB6

Twin Village Quick Stop
Barnet, VT

GRIFFIN INTERNATIONAL

Griffin Project #:	10041660	Date Installed:	02/17/2000
Drilled by :	Griffin International	Drilling Method:	Hollow-stem auger
Driller:	T&K Drilling	Boring Diameter.:	4.25"
Supervised by:	EES	Development Method:	not developed
Logged by:	EES	Screened Length:	not completed as a monitoring well

Grade = 0	Well Construction	Pen/Rec (") / Blow Count	Interval (') / PID (ppm)	Soil Characteristics: Asphalt Surface	Letter Symbol	Graphic Symbol
0.5						
1.0		na	0 - 2	Dry, dark brown, well-graded sand. 95% fine to medium sand, 5% silt.	SW	
1.5	Ft<Grade	na	0.2			
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						
5.0						
5.5		24/17	5 - 7	Dry, light brown, well-graded sand. 95% fine sand, 5% silt.	SW	
6.0		2 2 3 5	nd			
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5		24/19	10 - 12	Moist, light brown to olive gray, silty sand. Layers of fine to medium, well-graded sand and silt.	SM	
11.0		4 5 5 6	nd			
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5						
16.0						
16.5						
17.0						
17.5						
18.0						
18.5						
19.0						
19.5			12.5	Base of Exploration. Auger refusal		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1.5" ID, Schedule 40 PVC Riser.
- 1.5" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling
- Static Water Level

na - Not available
nm - Not measured due to PID malfunction

APPENDIX C

Liquid Level Data

Summary of Liquid Level Data

Measurement Date: March 7, 2000

Well I.D.	Well Depth btoc	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW1	12.0	492.14	-	6.79	-	-	-	-	**485.35**
MW2	10.4	491.68	-	6.44	-	-	-	-	**485.24**
MW3	24.4	497.55	-	dry	-	-	-	-	**<473.13**

All Values Reported in Feet

btoc - Below Top of Casing

nm - not measured

Site and monitoring wells surveyed by Vermont Land Surveyors, March 7, 2000

Elevations determined relative to benchmark of 500' located at pin on south side of Monroe Road

APPENDIX D

Laboratory Analysis Reports

ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Twin Village Q.S.
REPORT DATE: March 15, 2000
DATE SAMPLED: March 7, 2000

ORDER ID: 6281
REF.#: 151,422 - 151,425

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

EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Twin Village Q.S.
CLIENT PROJ. #: 10041660

DATE RECEIVED: March 8, 2000
REPORT DATE: March 15, 2000
ORDER ID: 6281

Ref. #:	151,422	151,423	151,424	151,425	
Site:	Trip Blank	MW 1	Duplicate	MW 2	
Date Sampled:	3/7/00	3/7/00	3/7/00	3/7/00	
Time Sampled:	7:08	11:20	11:20	11:57	
Sampler:	DT	DT	DT	DT	
Date Analyzed:	3/14/00	3/14/00	3/14/00	3/14/00	
UIP Count:	0	0	0	0	
Dil. Factor (%):	100	100	100	100	
Surr % Rec. (%):	93	106	103	96	
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	
MTBE	<10	<10	<10	<10	
Benzene	<1	<1	<1	<1	
Toluene	<1	<1	<1	<1	
Ethylbenzene	<1	<1	<1	<1	
Xylenes	<1	<1	<1	<1	
1,3,5 Trimethyl Benzene	<1	<1	<1	<1	
1,2,4 Trimethyl Benzene	<1	<1	<1	<1	
Naphthalene	<1	<1	<1	<1	

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

34730

#10041660

Project Name: TWIN VILLAGE QUICK STOP MOINDOE FALLS, VT.	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Order ID: (Lab Use Only) 6281	-O / -I / -S	Company: Contact Name/Phone #: BETH STOPFORD
		Sampler Name: Phone #: DON TOURANGEAU

Ref # (Lab Use Only)	Sample Identification	Matrix	GRAB	COMP	Date/Time 3-7-00	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
151422	TRIP BLANK	H2O	X		07:08	2	40mL		19	HCL	
151423	MW#1	↓	↓		11:20	↓	↓		↓	↓	
151424	DUPLICATE	↓	↓		11:20	↓	↓		↓	↓	
151425	MW#2	↓	↓		11:57	↓	↓		↓	↓	

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Dan Toye	3/7/00 14:25	Stacy Benjamin	11:10AM 3-8-00	Allison Iacucci	3/8/00 11:40

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sr, Ti, Tl, V, Zn										
32	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)					33					
34	Other										

(White, Yellow, Pink Copy - Laboratory / Goldenrod Copy - Client)

≡ ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Project Name:		Reporting Address:	Billing Address:
Endyne Order ID: (Lab Use Only)	-O / -I / -S	Company: Contact Name/Phone #:	Sampler Name: Phone #:

Ref # (Lab Use Only)	Sample Identification	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As Is, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sr, Ti, Tl, V, Zn										
32	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)					33					
34	Other										

White, [illegible] w, Pi[illegible]y - [illegible] tory [illegible] enrod [illegible] - Cli[illegible]