



August 13, 1998

DEC 2 10 11 AM '98
Vermont Department of Environmental Conservation

Mr. Rusty Harding
The Middlebury Hotel Corporation
Box 631
Middlebury, Vermont 05753

RE: The Middlebury Inn, Middlebury, Vermont (Site# 97-2327) - Subsurface Contaminant Investigation Report

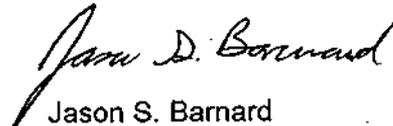
Dear Mr. Harding:

Lincoln Applied Geology, Inc. (LAG) is pleased to present this Subsurface Contaminant Investigation Report for The Middlebury Inn located at Court Square in Middlebury, Vermont. In response to the discovery of petroleum contaminated soils during the removal of one 10,000 gallon #2 fuel oil underground storage tank (UST) in November 1997, the Vermont Department of Environmental Conservation (VDEC) Sites Management Section (SMS) requested that a subsurface contaminant investigation be performed to determine the degree and extent of petroleum contamination. The requested contaminant investigation was performed by LAG on July 7, 8, and 21, 1998. The initial Underground Storage Tank (UST) assessment and closure report dated November 17, 1997 was performed and previously submitted by Griffin International Inc. (GI) to the VDEC Underground Storage Tank Program.

The enclosed Subsurface Contaminant Investigation report includes well logs, monitoring data, and ground water quality results. The investigation shows that ground water beneath the site has not been impacted by the petroleum contamination detected in soils when the UST was removed. There are no contaminant impacts to potential sensitive receptors other than the limited amount of soil that was backfilled at the former UST location. We believe that no further investigation and/or remedial work is necessary at the site. Based on data collected during the subsurface investigation, we formally request that a Site Management Activity Completed (SMAC) status be granted to the site.

After you have completed your review and approval of this report, please call us so that we can forward a copy to the VDEC SMS. If you have any questions or comments, please contact me or Bill Norland, Project Manager, at (802) 453-4384.

Sincerely,
Lincoln Applied Geology, Inc.


Jason S. Barnard
Geologist

JSB/jb
enclosures

cc: Chuck Schwer

Subsurface Contaminant Investigation Report

The Middlebury Inn
Court Square, Middlebury, Vermont
(VDEC Site #97-2327)

Prepared for:

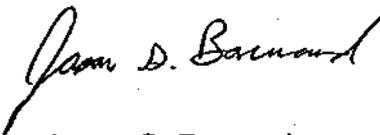
The Middlebury Hotel Corporation
The Middlebury Inn
Court Square
Middlebury, Vermont 05753
Contact: Rusty Harding
Phone: (802) 388-4961

Prepared by:

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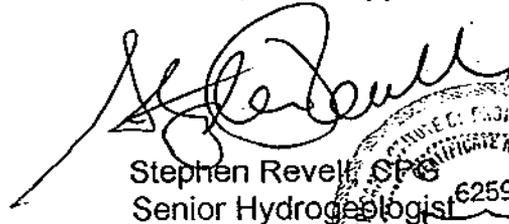
August 13, 1998

Prepared by:



Jason S. Barnard
Geologist

Reviewed and Approved by:



Stephen Revell, CPE
Senior Hydrogeologist



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Executive Summary

On November 10, 11, and 12, 1997 the combined efforts of Moe Dubois & Son Excavating (MDSE), MacIntyre Fuels Inc. (MFI) and Griffin International Inc. (GI) completed the removal and closure of one 10,000 gallon #2 fuel oil underground storage tank (UST) at the Middlebury Inn (MI), in Middlebury, Vermont. The UST (#1) was in fair condition with some rusting, pitting, and scaling, but no holes. Soils beneath UST #1 were excavated to a depth of 13 feet below grade where a soil PID level of 46 parts per million (ppm) was assayed. As described in the GI UST closure report all soils were backfilled in the excavation.

Based on the results of the November UST removal and related data, the VDEC Sites Management Section (SMS) requested that additional work be performed to further define the degree and extent of the petroleum contamination. Mr. Rusty Harding, the MI Manager, contracted Lincoln Applied Geology, Inc. (LAG) to conduct the requested subsurface investigation.

In order to define the extent and magnitude of the fuel oil contamination, LAG installed four monitor wells on-site on July 7 and 8, 1998. One well (MW-1) was installed upgradient of the former UST #1 area and three wells (MW-2, MW-3, and MW-4) were installed in locations downgradient of the former UST #1. LAG also conducted a sensitive receptor survey and monitored the ambient air space of the Middlebury Inn buildings and basements. Following their installation the wells were properly developed and sampled two weeks later. A complete stadia survey of all monitor wells and pertinent on-site structures was performed on July 13, 1998.

On July 21, 1998 ground water levels and well headspace vapor level data was collected from each well, and ground water quality samples were collected. All samples were analyzed for the presence of petroleum related compounds including BTEX, MTBE, and total petroleum hydrocarbons (TPH).

Review of the July 21st water quality data shows that the petroleum related compounds BTEX, MTBE, and TPH were not detected in any of the samples. Therefore, we strongly recommend that no further work be performed at the site. It is our professional opinion that the very limited quantity of contaminated soils, identified during UST removal activities is and will be naturally attenuated overtime, in part by biodegradation processes. Additionally, there is no evidence that the limited soil contamination identified by GI in the former UST area has impacted the underlying ground water system.

Site Description

The MI site is located at Court Square in Middlebury, Vermont as shown on the



General Location Map presented as **Figure 1**. The property is bound by Vermont Route 7 to the south and west, private single and multiple family residences to the north, and commercial properties to the east. The buildings on-site are served by municipal water and sewer. The MI main building contains a basement that has cut stone foundation walls and concrete floors. Several on-site buildings also surround the former UST #1 area including the "300" Motel, "400" Motel (both constructed on a concrete slab at grade), and the Porter Mansion (with a full basement). Pertinent site features including buildings, former UST #1 and new UST #2 locations, roads, and the four ground water monitor well locations are shown on **Figure 2**.

Site History

GI, in conjunction with MDSE and MFI completed the excavation, removal, and assessment of UST #1 at the Middlebury Inn property between November 10-12, 1997. The UST Permanent Closure Form, photoionization detector (PID) data, and photographs of the site were submitted by GI to the VDEC Underground Storage Tank Program (USTP) in a report dated November 17, 1997. Excavated soils were screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). The preliminary findings stated in the UST closure report are summarized below.

- UST #1:** A 10,000 gallon single wall steel #2 fuel oil UST, approximately 30 years old;
- UST was found in fair condition with some rust, pitting, and scaling;
 - no holes were found in the UST;
 - PID soil assays ranged from non-detect at 2.0 feet below grade to 52 parts per million (ppm) at 12-13 feet below grade;
 - no free product was encountered during the excavation;
 - ground water was not encountered during the excavation; and
 - all excavated soils were backfilled.

Approximately 55 gallons of fuel oil and UST bottom wastes were generated during the UST #1 removal. No soil samples for laboratory analyses were collected from the UST #1 excavation during its removal. Therefore, the extent and degree of soil (and possibly ground water) contamination in the vicinity of the UST #1 required further investigation.

This LAG Subsurface Contaminant Investigation Report presents the results of the additional site investigation which was completed on July 21, 1998, along with an appropriate list of conclusions and recommendations for the site.



Site Geology

Four monitor wells (MW-1, 2, 3, and 4) were drilled and installed using hollow stem auger drilling techniques on July 7 and 8, 1998 by Tri-State Drilling & Boring, Inc. (TSDB) of West Burke, Vermont. Two foot long soil samples were collected at five foot intervals, descriptively logged, and screened by PID (with a 10.2 eV lamp) for VOCs typically associated with petroleum. In each boring a PVC monitor well was installed. Monitoring wells were constructed of 2.0" diameter PVC, with 10 or 15 foot long well screens, and 3.5 to 9.5 foot long solid riser pipes. Each well was properly constructed with sufficient well screen and sand pack. A bentonite seal was placed atop the sand pack, the remaining annulus was backfilled with drill cuttings, and a bolt-down well box was cemented flush with grade. The location of the 4 wells are shown on **Figures 2 and 3**.

Soils encountered during drilling include a layer of fill up to 2 feet thick consisting primarily of coarse sand and medium gravel. Below the fill unit in MW-1 and MW-4 is a native silty clay with some gravel that is dry to wet, has a dense blocky structure, and ranges in thickness from 5.0 feet (MW-4) to 10.6 feet (MW-1). Below the clay unit is a moist to dry, fine sandy silt type dense glacial till unit that ranges in thickness from 5.0 feet (MW-1) to 21.1 feet (MW-3). The glacial till layer is the most permeable and hydraulically conductive subsurface unit at the site. Bedrock was not encountered during the well drilling activities.

The LAG detailed well logs including soil descriptions, PID levels, and well construction are included as **Appendix A**. The TSDB logs are also included in **Appendix A**. Review of **Appendix A** indicates that no evidence of vapor phase contamination by VOCs associated with petroleum were detected in soils from any of the monitor well borings. These data indicate that no vapor phase contamination is present upgradient and/or downgradient of the former UST #1 area.

Ground Water Level and Well Headspace PID Monitoring

On July 13, 1998, LAG conducted a top of casing (TOC) stadia survey of MW-1, 2, 3, 4, and other on-site features pertinent to the subsurface investigation. On July 21st ground water level measurements were collected from all monitor wells using an electronic interface probe capable of measuring 0.01 feet of free-floating petroleum product. LAG also assayed the headspace of each monitor well with a properly calibrated PID for the presence of petroleum related VOCs. Review of the collected data indicates that depth to ground water varied from 6.16 feet below TOC (MW-2) to 9.07 feet (MW-3). A summary of ground water elevation data from July 21st is presented in **Table 1**, and PID assays are included in **Table 2**. Review of **Table 2** indicates that well headspace PID levels on July 21st were all at background (BG), except MW-3 which assayed 1.2 ppm. This low PID level could be caused by moisture effects or may

suggest that a very minimal amount of residual vapor phase contamination may be present at MW-3.

Site Hydrogeology

Ground water elevation data from July 21st was used to develop the Ground Water Contour Map of the shallow ground water system presented as **Figure 2**. Review of **Figure 2** shows that ground water generally flows to the west towards Route 7. The moderate ground water gradient of 0.12 feet/foot was calculated using water level data from MW-2 and MW-3. The ground water generally mimics the topography of surface contours in the area.

Water Quality Sampling

On July 21, 1998 water quality samples were collected from MW-1, 2, 3, and 4 using industry accepted methods. All samples were analyzed along with a trip blank for the petroleum constituents BTEX and MTBE via EPA Method 8020, and TPH via EPA Method 8100 at Green Mountain Laboratories, Inc. in Montpelier, Vermont.

The water quality results are summarized in **Table 3** and are presented on the Water Quality Summary Map included as **Figure 3**. Copies of the laboratory reports are included as **Appendix B**. Review of **Table 3**, **Figure 3**, and **Appendix B** indicate that no detectable concentrations of BTEX, MTBE, or TPH were present in the ground water samples collected on July 21st. Based on this water quality data, it is clear that ground water beneath the site has not been impacted by the minimal amount of residual petroleum contamination identified in soils during the removal of UST #1.

Potential Sensitive Receptors

On July 7, 1998 LAG conducted a sensitive receptor survey of the site and surrounding properties. Potential sensitive receptors include indoor air of several on-site buildings (Middlebury Inn/Hubbard, Porter Mansion, and the "300" and "400" Motels). As presented in **Table 2**, PID assays of indoor air in basements of the Middlebury Inn and Porter Mansion, and the first floor of the "300" and "400" yielded only BG levels. One storm sewer (SS-1) associated with the site is shown on **Figure 2** and assayed BG on July 7th. As a result of the sensitive receptor survey, it is obvious that the indoor air of all on-site buildings has not been impacted by the limited amount of residual contamination noted during the UST #1 removal.

Based upon these data, LAG strongly believes that the health related risks associated with the very small amount of residual fuel oil contamination identified during the November UST removal are non-existent. It is also our professional opinion that ground water beneath the site has not been impacted by the limited fuel oil

contaminants identified in soils in the vicinity of UST #1.

Conclusions

Based on the results of the UST #1 removal assessment performed by GI, the generated investigation data, and the evaluation presented, the following conclusions are made:

1. A 10,000 gallon fuel oil UST #1 was excavated and removed from the site by GI on November 10 to 12, 1997.
2. UST #1 was in fair condition with some rust, pitting, and scaling. No holes or apparent leaks were noted during the GI inspection of the UST.
3. PID levels ranging from non-detect to 52 ppm were detected by GI from soils in the UST #1 excavation. The extent of soil contamination was not fully delineated during the UST removal and assessment performed by GI.
4. Soils in the vicinity of the former UST #1 consist of a layer of fine to medium sandy silt, with some gravel. Ground water was not encountered during the excavation and removal of UST #1.
5. The depth to shallow ground water system on-site ranges from 6.16 feet (MW-2) to 9.07 feet (MW-3) below grade.
7. The shallow ground water flow direction on-site is toward the west at a moderate gradient of 0.12 feet/foot.
8. The underlying ground water system has not been impacted by the extremely limited amount of petroleum related contaminants identified in soils found during the excavation and removal of UST #1. No quantifiable concentrations of petroleum related compounds were present in ground water samples collected on July 21, 1998.
9. All the SMS Site Management Activity Completed (SMAC) criteria have been met at the site.

Recommendations

As a result of the findings from the UST #1 removal and this Subsurface Contaminant Investigation Report, the following recommendations are made:

1. Do not perform any further contaminant-related investigation work at the

site.

2. Properly abandon monitor wells MW-1, 2, 3, and 4.
3. The MI Site should be granted a SMAC designation and be removed from the Active Hazardous Waste Sites List.

FACLIENTS\SITES\INMIDDLE\SUM0898.RPT

Project: Middlebury Inn
Location: Middlebury, Vermont

Table 1
VDEC Site # 97-2327
Sheet 1 of 1

Ground Water Elevation/Product Level (feet)

Data Point	TOC	07/21/98				
MW-1	100.00	91.80				
MW-2	98.51	92.35				
MW-3	97.71	88.64				
MW-4	95.70	88.23				

Notes:
1 - Elevation datum assumed
2 - Reference elevation is elevation of top of PVC well casing
Light Grey Cell = DRY
Dark Grey Cell = Inaccessible

Project: Middlebury Inn
Location: Middlebury, Vermont

Table 2
VDEC Site # 97-2327
Sheet 1 of 1

Photoionization Results (PID - ppm)

Data Point	07/21/98					
MW-1	BG					
MW-2	BG					
MW-3	1.2					
MW-4	BG					
SS-1	BG					
Middlebury Inn Basement	BG					
Porter Mansion Basement	BG					
"300" Motel	BG					
"400" Motel	BG					

Notes:
BG - Background
SL - Saturated Lamp

Ground Water Quality Results

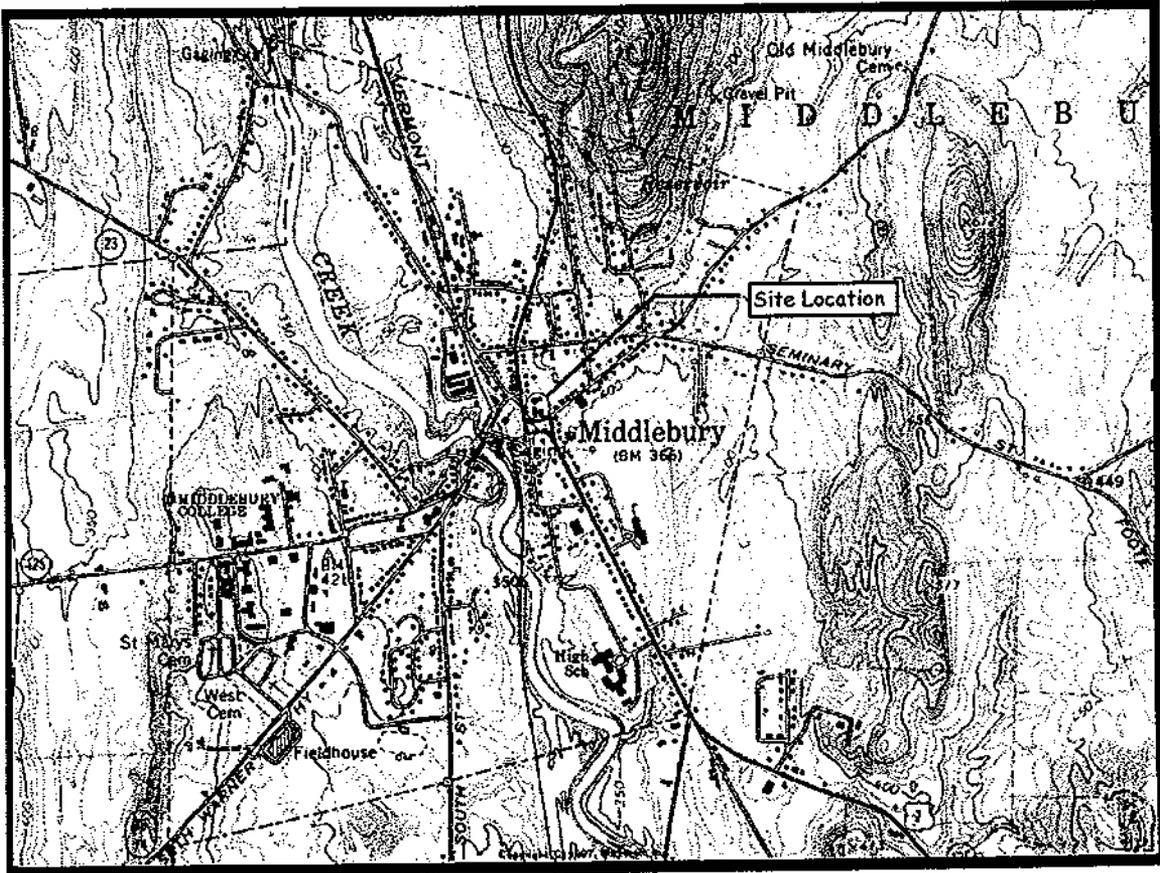
Data Point	Compound	07/21/98				
MW-1	Benzene	<1				
	Toluene	<1				
	Ethylbenzene	<1				
	Xylenes	<3				
	MTBE	<5				
	BTEX	<6				
	BTEX + MTBE	<11				
	TPH (8100) pp	<0.1				
MW-2	Benzene	<1				
	Toluene	<1				
	Ethylbenzene	<1				
	Xylenes	<3				
	MTBE	<5				
	BTEX	<6				
	BTEX + MTBE	<11				
	TPH (8100) pp	<0.1				
MW-3	Benzene	<1				
	Toluene	<1				
	Ethylbenzene	<1				
	Xylenes	<3				
	MTBE	<5				
	BTEX	<6				
	BTEX + MTBE	<11				
	TPH (8100) pp	<0.1				
MW-4	Benzene	<1				
	Toluene	<1				
	Ethylbenzene	<1				
	Xylenes	<3				
	MTBE	<5				
	BTEX	<6				
	BTEX + MTBE	<11				
	TPH (8100) pp	<0.1				
TRIP BLANK	Benzene	<1				
	Toluene	<1				
	Ethylbenzene	<1				
	Xylenes	<3				
	MTBE	<5				
	BTEX	<6				
	BTEX + MTBE	<11				

NOTES:

- < - Contaminant not detected at specified detection limit
- * - All results are in parts per million (ppb) except TPH which is in parts per million (ppm)

Figure 1

Middlebury Inn
VDEC Site # 97-2327
Middlebury, Vermont

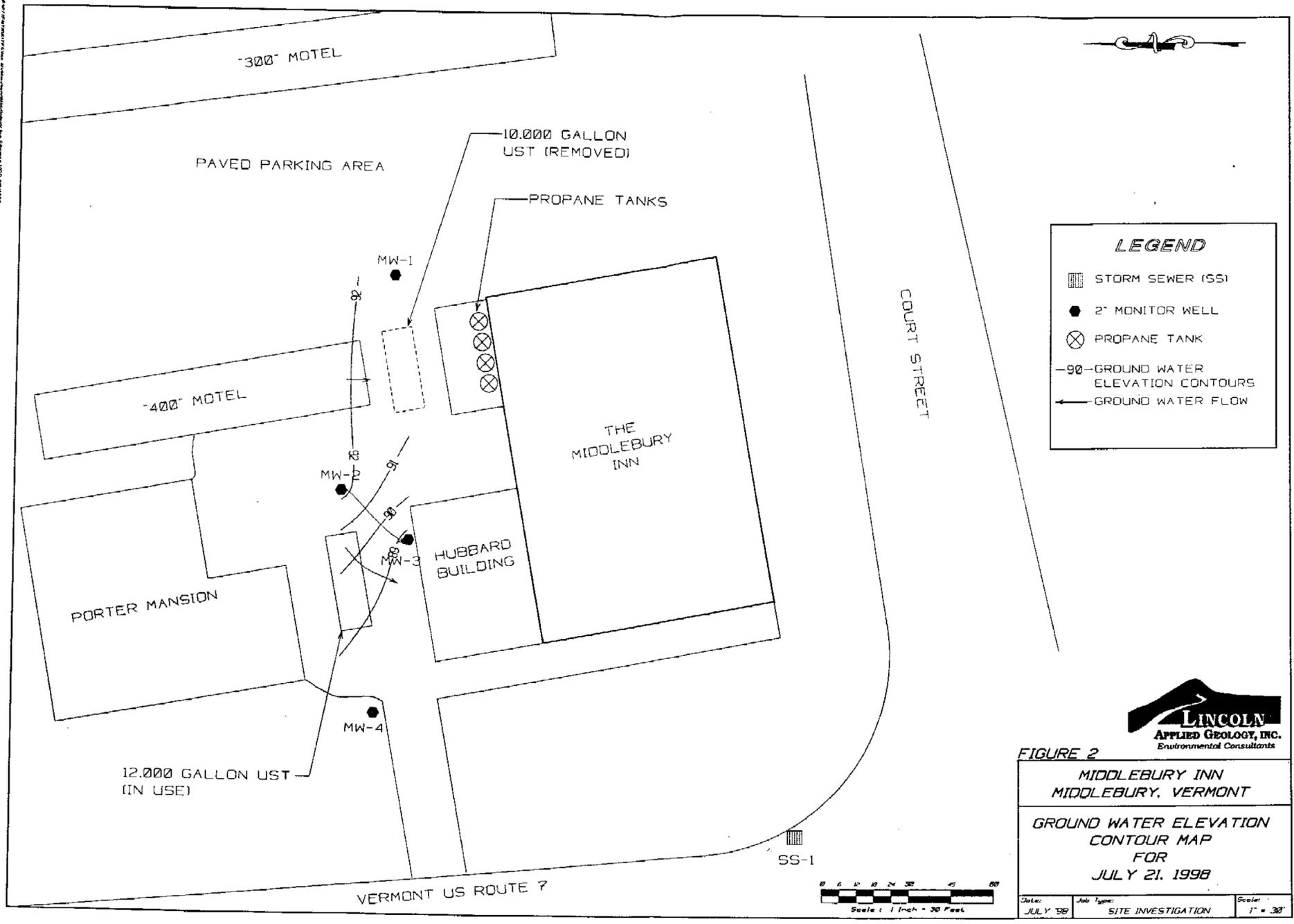


Scale 1" = 2,000'



QUADRANGLE LOCATION

U. S. Route State Route
MIDDLEBURY, VT.
SW/4 MIDDLEBURY 15' QUADRANGLE
44073-A2-TF-024
1963
PHOTOINSPECTED 1983
DMA 6372 II SW--SERIES V813



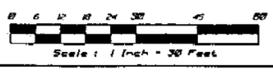
LEGEND

-  STORM SEWER (SS)
-  2" MONITOR WELL
-  PROPANE TANK
-  90-GROUND WATER ELEVATION CONTOURS
-  GROUND WATER FLOW



FIGURE 2
MIDDLEBURY INN
MIDDLEBURY, VERMONT
GROUND WATER ELEVATION
CONTOUR MAP
FOR
JULY 21, 1998

Date: JULY 98	Job Type: SITE INVESTIGATION	Scale: 1" = 30'
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Appendix A

LAG and TSDB Well Logs

WELL LOG

WELL: MW-1
LOCATION: Middlebury Inn, Middlebury, Vermont - Upgradient of the removed UST.
DRILLER: Tri-State Drilling & Boring
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: July 7, 1998

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0 - 7.0'	Brown to grey, silty clay, dense blocky structure, dry.	BG
10.0 - 10.6'	Brown, clay, some silt, trace medium sand, dense blocky structure, dry.	BG
10.6 - 12.0'	Light brown, silty clay, some medium to coarse sand, pliable, moist.	BG
15.0 - 15.6'	Light brown, fine sandy silt, little clay, trace medium gravel, moist.	BG
15.5 - 16.3'	Light grey, fine sandy silt, trace medium gravel, granular structure, moist.	BG
16.3 - 17.0'	Grey, fine sandy silt, some clay, dense angular blocky structure, dry.	BG
18.0 - 20.0'	Light grey, very fine to fine sandy silt, trace clay, dense blocky structure, moist.	BG

Well Construction:

Bottom of Boring: 20.0'
Bottom of Well: 20.0'
Well Screen: 10.0' (10.0 - 20.0') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 9.5' (0.5 - 10.0') of 2" sch. 40 PVC
Sand Pack: 12.0' (8.0 - 20.0') of No. 1 Morie sand
Bentonite Seal: 2.0' (6.0 - 8.0') of bentonite chips
Backfill: 5.0' (1.0 - 6.0')
Well Box: Cemented Flush

WELL LOG

WELL: MW-2
LOCATION: Middlebury Inn, Middlebury, Vermont - Near the southwest corner of the 400 Motel building.
DRILLER: Tri-State Drilling & Boring
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: July 8, 1998

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
0.0 - 2.0'	Brown to grey, medium to coarse sand, some medium gravel, dry.	BG
5.0 - 7.0'	Light brown, very fine sand, little silt, trace medium gravel, damp.	BG
10.0 - 12.0'	Light brown, very fine sandy silt, some small to medium gravel, trace clay, dense blocky structure, reworked till, moist.	BG
15.0 - 17.0'	Light brown, fine sandy silt, some medium gravel, reworked till, saturated.	BG

Well Construction:

Bottom of Boring: 15.0'
Bottom of Well: 15.0'
Well Screen: 10.0' (5.0 - 15.0') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 4.5' (0.5 - 5.0') of 2" sch. 40 PVC
Sand Pack: 12.0' (3.0 - 15.0') of No. 1 Morie sand
Bentonite Seal: 2.0' (1.0 - 3.0') of bentonite chips
Backfill: None
Well Box: Cemented Flush

WELL LOG

WELL: MW-3
LOCATION: Middlebury Inn, Middlebury, Vermont - Approximately five feet north of the Hubbard building.
DRILLER: Tri-State Drilling & Boring
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: July 7, 1998

Soils Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
0.5 - 0.9'	Asphalt chips.	BG
0.9 - 2.0'	Brown to light brown, very fine to fine sandy silt, some small gravel, dry.	BG
6.5 - 7.5'	Brown, very fine sandy silt, moist.	BG
7.5 - 8.5'	Grey, very fine sandy silt, dense angular blocky structure, reworked till, moist.	BG
10.0 - 11.5'	Grey, fine sandy silt, trace medium gravel, dense angular blocky structure, moist.	BG
15.0 - 17.0'	Light brown, sand, some silt, trace small gravel, dense angular blocky structure, moist.	BG
20.0 - 22.0'	Light brown, fine to medium sandy silt, some medium gravel, saturated.	BG

Well Construction:

Bottom of Boring: 22.0'
Bottom of Well: 22.0'
Well Screen: 15.0' (7.0 - 22.0') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 6.5' (0.5 - 7.0') of 2" sch. 40 PVC
Sand Pack: 17.0' (5.0 - 22.0') of No. 1 Morie sand
Bentonite Seal: 2.0' (3.0 - 5.0') of bentonite chips
Backfill: 2.0' (1.0 - 3.0')
Well Box: Cemented Flush

WELL LOG

WELL: MW-4
LOCATION: Middlebury Inn, Middlebury, Vermont - Approximately 20 feet off the southwest corner of the Porter Mansion.
DRILLER: Tri-State Drilling & Boring
HYDROGEOLOGIST: Jason S. Bamard, Lincoln Applied Geology, Inc.
DATE: July 8, 1998

Solids Description: (BG = Background [0.2], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0 - 7.0'	Dark brown, silty clay, pliable, moist.	BG
10.0 - 12.0'	Grey, very fine sandy silt, some medium gravel, dense angular blocky structure.	BG
15.0 - 17.0'	Light brown, very fine sandy silt, some medium gravel, dense blocky structure, reworked till, moist.	BG

Well Construction:

Bottom of Boring: 20.0'
Bottom of Well: 19.0'
Well Screen: 15.0' (4.0 - 19.0') of 2" sch. 40 PVC, 0.010" slot
Solid Riser: 3.5' (0.5 - 4.0') of sch. 40 PVC
Sand Pack: 17.0' (2.0 - 19.0') of No. 1 Morie sand
Bentonite Seal: 1.0' (1.0 - 2.0') of bentonite chips
Backfill: None
Well Box: Cemented Flush

Tri-State Drilling & Boring, Inc.

RR#2 Box 113, Gaskell Hill
West Burke, Vermont 05871
802-467-3123

BIT # FTG

BIT # FTG

SHEET	1 of 4
DATE	July 7, 1998
HOLE NO.	MW-1
LINE & STA.	
OFFSET	

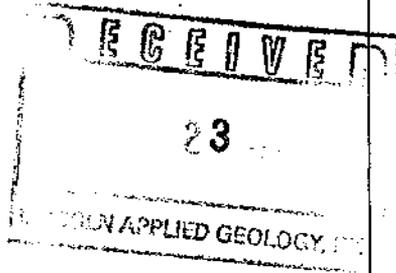
TO Lincoln Applied Tech	Address
PROJECT NAMIMiddlebury Inn	Location Middlebury
REPORT SENT TO	PROJECT #
SAMPLES SENT TO	OUR JOB # <u>413</u>

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR
AT _____ AFTER _____ HRS	TYPE	<u>4.25</u>		
	SIZE ID			
AT _____ AFTER _____ HRS	HAMMER WT.	<u>140</u>		<u>BIT</u>
	HAMMER FAL	<u>30</u>		

SURFACE ELEV.	
DATE STARTED	<u>7/7/98</u>
DATE COMPLE.	<u>7/7/98</u>
BORING FOREMAN	<u>Wayne</u>
INSPECTOR	<u>Jason</u>
SOILS ENGR.	

LOCATION OF BORING

DEPTH	CASING BLOWS	SAMPLE DEPTHS	TYPE OF	BLOWS PER 6' ON SAMPLER				MOISTURE	NO.	PEN.	REC.	SOIL IDENTIFICATION			
				SAMPLER									DENSITY	CONSIST.	REMARKS, INCLUDE COLOR, GRADATION, TYPE OF SOIL, ROCK-COLOR, TYPE, CONDITION, HARNESS, DRILLING TIME, SEAMS AND ETC.
				FROM	TO	FROM	TO								
				0-6	6-12	12-18	18-24								
		<u>5-7</u>	<u>Dry</u>	<u>7</u>	<u>9</u>	<u>8</u>	<u>8</u>	<u>Dry</u>	<u>1</u>	<u>24</u>	<u>24</u>	<u>Clay</u>			
		<u>10-12</u>	<u>Dry</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>7</u>	<u>Wet</u>	<u>2</u>	<u>24</u>	<u>24</u>	<u>Clay into sift clay with some & fine to coarse sand, tra</u>			
		<u>15-17</u>	<u>Dry</u>	<u>9</u>	<u>12</u>	<u>13</u>	<u>27</u>	<u>Moist</u>	<u>3</u>	<u>24</u>	<u>24</u>	<u>Clay, sand with fine to coarse gravel into till</u>			
		<u>18-20</u>	<u>Dry</u>	<u>27</u>	<u>30</u>	<u>33</u>	<u>28</u>	<u>Moist</u>	<u>4</u>	<u>24</u>	<u>20</u>	<u>Till</u>			
												<u>Set well @ 20'</u>			
												<u>1 offset Refusal @ 5'</u>			



WELL REPORT

Set well @ 20', used 10' screen, 9.5' Riser, sand to 8', chips to 6, Backfill w/natural

GROUND SURFACE TO	USED	CASING: THEN	
SAMPLE TYPE	PROPORTIONS USED	140LB WT. X30' FALL ON 2' O.D. SAMPLER	
D=DRY C=CORED W=WASHED	TRACE 0 TO 10%	COHESIONLESS DENSITY	COHESIVE CONSISTENCY
UP=UNDISTURBED PISTON	LITTLE 10 TO 20%	0-10 LOOSE	0-4 SOFT
TP=TEST PIT A=AUGER V=VANE TEST	SOME 20 TO 35%	10-30 MED.DENSE	4-8 M/STIFF
UT=UNDISTURBED THINWALL	AND 35 TO 50%	30-50 DENSE	8-15 STIFF
		50+ VERY DENSE	15-30 VERY STIFF

SUMMARY
EARTH BORING
Steam
SAMPLES

MATERIALS USED

SCREEN	<u>10</u>	SAND	<u>3</u>	ROAD BOX	<u>1</u>
RISER	<u>9.5</u>	BENTONITE		WELL GUARDS	
CAPS	<u>1</u>	HOLE PLUG	<u>1/2</u>	MIS:	<u>cement</u>
L.PLUG	<u>1</u>	ENV GROUT			

Tri-State Drilling & Boring, Inc.

RR#2 Box 113, Gaskell Hill
West Burke, Vermont 05871
802-467-3123

BIT # FTG

BIT # FTG

SHEET 2 of 4

TO Lincoln Applied Tech Address

DATE July 7, 1998

PROJECT NAME Middlebury Inn Location Middlebury Vt

HOLE NO. MW-2

REPORT SENT TO _____ PROJECT # _____

LINE & STA. _____

SAMPLES SENT TO _____ OUR JOB # 418

OFFSET 5'

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.	
AT _____ AFTER _____ HRS	TYPE _____	<u>4.25</u>	_____	_____	DATE STARTED <u>7/7/98</u>	
AT _____ AFTER _____ HRS	SIZE ID _____	_____	_____	_____	DATE COMPLE. <u>7/7/98</u>	
	HAMMER WT. <u>140</u>	_____	<u>BIT</u>	_____	BORING FOREMAN <u>Wayne</u>	
	HAMMER FAL <u>30"</u>	_____	_____	_____	INSPECTOR <u>Jason</u>	
					SOILS ENGR. _____	

LOCATION OF BORING

DEPTH	CASING BLOWS	SAMPLE DEPTHS	TYPE OF	BLOWS PER 6' ON SAMPLER				MOISTURE DENSITY/CONSIST.	NO.	PEN.	REC.	SOIL IDENTIFICATION REMARKS, INCLUDE COLOR, GRADATION, TYPE OF SOIL ROCK-COLOR, TYPE, CONDITION, HARNESS, DRILLING TIME, SEAMS AND ETC.
				FROM	TO	0-6	6-12					
		<u>1-3</u>	<u>Dry</u>	<u>14</u>	<u>10</u>	<u>10</u>	<u>11</u>	<u>Dry</u>	<u>1</u>	<u>24</u>	<u>24</u>	<u>Brown medium to coarse sand</u>
		<u>5-7</u>	<u>Dry</u>	<u>55</u>	<u>Ref @ 6'</u>			<u>Dry</u>	<u>2</u>	<u>24</u>	<u>20</u>	<u>Very fine & fine sand</u>
		<u>10-12</u>	<u>Dry</u>	<u>11</u>	<u>13</u>	<u>15</u>	<u>38</u>	<u>Dry</u>	<u>3</u>	<u>24</u>	<u>24</u>	<u>Till/trace clay on top part/firmer toward 12'</u>
												<u>Auger ref @ 13'</u>
												<u>Set overnite/set well- Bridged in auger 2x/moved & redrilled to 15', Set well @ 15'</u>

WELL REPORT

Set well @ 15', 10' Screen/4.5' Riser/sand pack to 3' Chips to 1'

Backfill 6"/Road Box

GROUND SUFACE TO	USED	CASING: THEN	SUMMARY
SAMPLE TYPE	PROPORTIONS USED	140LB WT. X30' FALL ON 2' O.D. SAMPLER	EARTH BORING
D=DRY C=CORED W=WASHED	TRACE 0 TO 10%	COHESIONLESS DENSITY	COHESIVE CONSISTENCY
UP=UNDISTURBED PISTON	LITTLE 10 TO 20%	0-10 LOOSE	0-4 SOFT
TP=TEST PIT A=AUGER V=VANE TEST	SOME 20 TO 35%	10-30 MED.DENSE	4-8 M/STIFF
UT=UNDISTURBED THINWALL	AND 35 TO 50%	30-50 DENSE	8-15 STIFF
		50+ VERY DENSE	15-30 VERY STIFF
			SAMPLES

MATERIALS USED

SCREEN <u>10</u>	SAND <u>3</u>	ROAD BOX <u>1</u>
RISER <u>4.5</u>	BENTONITE <u>1</u>	WELL GUARDS _____
CAPS <u>1</u>	HOLE PLUG _____	MIS: _____
L-PLUG <u>1</u>	ENV GROUT _____	

Tri-State Drilling & Boring, Inc.

RR#2 Box 113, Gaskell Hill
West Burke, Vermont 05871
802-467-3123

BIT # FTG

BIT # FTG

SHEET	3 of 4
DATE	July 7, 1998
HOLE NO.	MW-3
LINE & STA.	
OFFSET	1

TO Lincoln Applied Tech	Address
PROJECT NAME Middlebury Inn	Location Middlebury, Vt
REPORT SENT TO	PROJECT #
SAMPLES SENT TO	OUR JOB #

GROUND WATER OBSERVATIONS	CASING	SAMPLER CORE BAR	SURFACE ELEV.
AT _____ AFTER _____ HRS	TYPE _____	_____	DATE STARTED 7/7/98
AT _____ AFTER _____ HRS	SIZE ID _____	_____	DATE COMPLE. 7/8/98
	HAMMER WT. _____	_____	BORING FOREMAN Wayne
	HAMMER FALL _____	_____	INSPECTOR Jason
		BIT _____	SOILS ENGR.

LOCATION OF BORING

DEPTH	CASING BLOWS	SAMPLE DEPTHS	TYPE OF	BLOWS PER 6' ON SAMPLER				MOISTURE	NO.	PEN.	REC.	SOIL IDENTIFICATION			
				FROM TO									DENSITY	CONSIST.	REMARKS, INCLUDE COLOR, GRADATION, TYPE OF SOIL, ROCK-COLOR, TYPE, CONDITION, HARNESS, DRILLING TIME, SEAMS AND ETC.
				0-6	6-12	12-18	18-24								
	0-2		Dry	15	4	4	3	Dry	1	24	8	Fine sand with silt and clay & small stone			
	6.5-8.5		Dry	19	Ref			Dry	2	24	12	Till			
	10-12		Dry	19	15	31	Ref	Moist	3	18	18	Till			
	15-17		Dry	25	39	57	59	Moist	4	24	24	Till			
	20-22		Dry	10	20	27	31	Sat	5	24	24	Till			
												Set Well			

WELL REPORT

Set well @ 22'/15' Screen/6.5 Riser/Sand to 5'/holeplug to 3'/backfill

GROUND SURFACE TO	USED	CASING: THEN	SUMMARY
SAMPLE TYPE	PROPORTIONS USED	140LB WT. X30' FALL ON 2" O.D. SAMPLER	EARTH BORING 22'
D=DRY C=CORED W=WASHED	TRACE 0 TO 10%	COHESIONLESS DENSITY	ROCK CORING
UP=UNDISTURBED PISTON	LITTLE 10 TO 20%	0-10 LOOSE	SAMPLES 5'
TP=TEST PIT A=AUGER V=VANE TEST	SOME 20 TO 35%	10-30 MED.DENSE	
UT=UNDISTURBED THINWALL	AND 35 TO 50%	30-50 DENSE	
		50+ VERY DENSE	

MATERIALS USED

SCREEN	15	SAND	5	ROAD BOX	1
RISER	6.5	BENTONITE		WELL GUARDS	
CAPS	1	HOLE PLUG	1	MIS:	
L.PLUG	1	ENV GROUT			

Appendix B

Laboratory Reports for July 21, 1998

JUL 29 1998

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

CLIENT NAME:	Lincoln Applied Geology	REFERENCE NO:	3936
ADDRESS:	RD #1, Box 710 Bristol, VT 05443	PROJECT NO:	NA
SAMPLE LOCATION:	Middlebury Inn	DATE OF SAMPLE:	07/21/98
SAMPLER:	Jake Peirce	DATE OF RECEIPT:	07/21/98
ATTENTION:	Bill Norland	DATE OF ANALYSIS:	07/23/98
		DATE OF REPORT:	07/27/98

Pertaining to the analyses of specimens submitted under the accompanying chain of custody form, please note the following:

- Water samples submitted for VOC analysis were preserved with HCl.
- Specimens were processed and examined according to the procedures outlined in the specified method.
- Holding times were honored.
- Instruments were appropriately tuned and calibrations were checked with the frequencies required in the specified method.
- Blank contamination was not observed at levels interfering with the analytical results.
- Continuing Calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were determined to be within method QA/QC acceptance limits.
- The efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analyte to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:



Sarah Hallock
Director of Chemical Services

LABORATORY RESULTS

JUL 29 1998

GREEN MOUNTAIN LABORATORIES, INC.

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. #: 3936
STATION: MW-1
ANALYSIS DATE: 07/23/98
DATE SAMPLED: 07/21/98
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 105 %

JUL 28 1998

ND = Not Detected

BPQL = Below Practical Quantitation Limits

JUL 28 1998

GREEN MOUNTAIN LABORATORIES, INC.
27 CROSS ROAD
MIDDLESEX, VERMONT 05602

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 3936
STATION: MW-2
ANALYSIS DATE: 07/23/98
DATE SAMPLED: 07/21/98
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 104 %

JUL 23 1998

ND = Not Detected
BPQL = Below Practical Quantitation Limits

JUL 28 1998

GREEN MOUNTAIN APPLIED GEOLOGY, INC.

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. #: 3936
STATION: MW-3
ANALYSIS DATE: 07/23/98
DATE SAMPLED: 07/21/98
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 103 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits

JUL 28 1998

JUL 23 1998

GREEN MOUNTAIN GEOLOGY, INC.

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 3936
STATION: MW-4
ANALYSIS DATE: 07/23/98
DATE SAMPLED: 07/21/98
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 104 %

JUL 28 1998

ND = Not Detected

BPQL = Below Practical Quantitation Limits

JUL 28 1998

GREEN MOUNTAIN LABORATORIES, INC.

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. #: 3936
STATION: TRIP BLANK
ANALYSIS DATE: 07/23/98
DATE SAMPLED: 07/21/98
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 104 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits

JUL 29 1998

RECEIVED

JUL 28 1998

GREEN MOUNTAIN APPLIED GEOLOGY, INC.

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#

Green Mountain Laboratories, Inc.

RR #3, Box 5210
Montpelier, VT 05602

Phone (802) 223-1468 Fax (802) 223-8688

E-mail : GML@together.net

Analysis Requested

Page

1 of 1

GML #

3936

Client Name Lincoln Applied Geology
 Address 163 Revell Rd Lincoln, VT 05443
 Phone / Fax (802) 453-4384
 Project Name Middlebury Inn
 Project Number
 Project Manager Bill Norland
 Sampler Jake Perce

MTEL GTEX VIA EPA 8020
 TPH by 8100

	Sample Location	Date	Time	# of Cont.	Pres.	Sample Type									Remarks
1	MW-1	7-21-98	11:15	2	HCl	H ₂ O	✓								
2	MW-2		11:30	2	HCl		✓								
3	MW-3		11:55	2	HCl		✓								
4	MW-4		12:30	2	HCl		✓								
5	MW-1		11:15	1	-		✓								
6	MW-2		11:30	1	-		✓								
7	MW-3		11:55	1	-		✓								
8	MW-4	↓	12:30	1	-		✓								
9	Trip Blank	↓	8:00	2	HCl	↓	✓								

Chain of Custody

Relinquished By: <u>Jake Perce</u>	Date / Time: <u>7-21-98 14:30</u>	Received By: <u>[Signature]</u>	Date / Time: <u>7-21-98 @ 19:25</u>
Relinquished By:	Date / Time:	Received By:	Date / Time:
Relinquished By:	Date / Time:	Received By:	Date / Time:
Lot Temperature:	Vial Lot ID #:	Accepted By:	

GML GEOLOGY INC

Green Mountain Laboratories, Inc.

27 Cross Road
Middlesex, Vermont 05602

AUG 11 1998

Phone (802) 223-1468

Fax (802) 223-8688

LABORATORY RESULTS

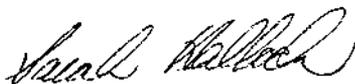
CLIENT NAME:	Lincoln Applied Geology	REF #:	3936
CLIENT ADDRESS:	RD 1 Box 710 Bristol, VT 05443	PROJECT NO.:	NA
PROJECT NAME:	Middlebury Inn	DATE OF SAMPLE:	07/21/98
SAMPLER:	Jake Peirce	DATE OF RECEIPT:	07/21/98
ATTENTION:	Bill Norland	DATE OF ANALYSIS:	08/03/98
		DATE OF REPORT:	08/06/98

Total Petroleum Hydrocarbons (TPH) by EPA Method 8100M (mg/L - ppm)

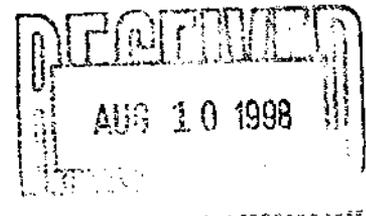
Sample	PQL	TPH Results
MW-1	0.10	< 0.10
MW-2	0.10	< 0.10
MW-2	0.10	< 0.10
MW-4	0.10	< 0.10

PQL= Practical Quantitation Limit

Reviewed by:



Sarah Hallock
Director of Chemical Services



G M L S A M P L E #	Green Mountain Laboratories, Inc.						Analysis Requested										Page <u>1</u> of <u>1</u>		
	RR #3, Box 5210 Montpelier, VT 05602 Phone (802) 223-1468 Fax (802) 223-8688 E-mail : GML@together.net																		
	Client Name <u>Lincoln Applied Geology</u>																GML #		
	Address <u>163 Revell Rd Lincoln, VT 05443</u>																3936		
	Phone / Fax <u>(802) 453-4384</u>																		
	Project Name <u>Middlebury Inn</u>																		
	Project Number																		
	Project Manager <u>Bill Norland</u>																		
	Sampler <u>Jake Perce</u>																		
		Sample Location	Date	Time	# of Cont.	Pres.	Sample Type	MUT/DET + BTEX VIA EPA 8020	TPH by 8/00										
1	MW-1	7-21-98	11:15	2	HCl	H ₂ O	✓												
2	MW-2		11:30	2	HCl		✓												
3	MW-3		11:55	2	HCl		✓												
4	MW-4		12:30	2	HCl		✓												
5	MW-1		11:15	1	-			✓											
6	MW-2		11:30	1	-			✓											
7	MW-3		11:55	1	-			✓											
8	MW-4	↓	12:30	1	-			✓											
9	Trip Blank	↓	8:00	2	HCl		✓												

Chain of Custody

Relinquished By: <u>Jake Perce</u>	Date / Time: <u>7-21-98 14:30</u>	Received By: <u>[Signature]</u>	Date / Time: <u>7-21-98 @ 14:25</u>
Relinquished By:	Date / Time:	Received By:	Date / Time:
Relinquished By:	Date / Time:	Received By:	Date / Time:
Lot Temperature:	Vial Lot ID #:	Accepted By:	