



February 22, 2010

Dan Yonker  
Phoenix Consulting, LLC  
183 Bridge Street, PO Box 229  
Phoenixville, PA 19460

Dyonker@phoenixconsultingonline.com

RE: Initial Site Investigation Report  
Frohling Property, 17 Landgrove Road, Landgrove, Vermont  
VT DEC Site #2009-3980

Dear Dan:

Waite Environmental Management, LLC (WEM) is pleased to present Initial Site Investigation Report for the Frohling property in Landgrove, Vermont.

Do not hesitate to contact me if you have questions. I can be reached at (802) 860-9400 or by email at [mwaite@waiteenv.com](mailto:mwaite@waiteenv.com)

Sincerely,

Miles E. Waite, Ph.D.  
Principal Hydrogeologist

Enclosure

Cc: Ashley Desmond, VT DEC  
Michael and Page Frohling

**INITIAL SITE INVESTIGATION  
REPORT**

**FROHLING PROPERTY  
17 Landgrove Road  
Landgrove, Vermont**

**VT DEC Site#2009-3980**

*Prepared for:*

Phoenix Consulting, LLC  
183 Bridge Street, PO Box 229  
Phoenixville, PA 19460  
Attn: Dan Yonker

*and*

Michael and Page Frohling  
20 Summit Street  
Glen Ridge, NJ 07028

*Prepared by:*



11 Kilburn Street  
P.O. Box 4602  
Burlington, Vermont 05406-4602  
(802) 860-9400  
mwaite@waiteenv.com  
Contact: Miles E. Waite, PhD

**February 22, 2010**



**TABLE OF CONTENTS**

<b>Section</b>	<b>Page</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 BACKGROUND .....	1
1.2 SENSITIVE RECEPTORS .....	2
<b>2.0 INVESTIGATIVE METHODS AND RESULTS .....</b>	<b>2</b>
2.1 SOIL BORING INSTALLATION .....	2
2.2 MONITORING WELL INSTALLATION.....	3
2.3 SITE SURVEYING .....	3
2.4 SUPPLY WELL SAMPLE COLLECTION.....	3
2.5 SUPPLY WELL SAMPLING RESULTS .....	4
<b>3.0 CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>4</b>

**LIST OF APPENDICES**

- APPENDIX A:       FIGURES  
                    Site Location Map  
                    Site Plan
- APPENDIX B:       SOIL BORING LOGS  
                    WELL DRILLERS REPORTS
- APPENDIX C:       LABORATORY REPORT



## **1.0 INTRODUCTION**

The following Initial Site Investigation (ISI) Report was prepared by Waite Environmental Management, LLC (WEM) to describe work conducted between November 2009 and January 2010 at the Michael and Page Frohling property at 17 Landgrove Road in Landgrove, Vermont. (Site; refer to the Site Location Map in Appendix A). The work was conducted at the request of the Vermont Department of Environmental Conservation (VT DEC) to further define the extent and magnitude of contamination discovered during the removal of a petroleum underground storage tank in September 2009. WEM was contracted by the insurance carrier for the Frohlings, represented by Phoenix Consulting, LLC (Phoenix). This work was conducted in accordance with WEM's *Proposal for Initial Site Investigation* dated October 26, 2009 and approved by Phoenix on October 27, 2009. A change in work scope was recommended by WEM and approved by both the VT DEC and Phoenix on December 10, 2009.

Elements of this ISI included the following: 1) installation of eight (8) soil borings, 2) surveying of the property to develop a site plan; and 3) sampling and water quality analysis from three (3) water supply wells.

### **1.1 Background**

On September 4, 2009, WEM oversaw the removal of a 500-gallon fuel oil UST from the Site at the request of the Frohlings (refer to WEM's *Tank Closure Report* dated September 9, 2009). The single-walled steel tank was estimated to be 40+ years old. It was located near the northern property boundary (see Site Plan). The tank was rarely used, as the house is primarily a summer residence, so removal was desired to eliminate liability.

Based on soil screening and visual/olfactory observations, it was apparent that oil was released to the environment from the UST. Because no obvious holes were observed in the tank and highest PID readings were under the southern portion where the fill pipe was located, it is possible that leakage was via spills/overfills or from a breach at the fill pipe connection. Subsequent excavation of approximately 6 yards (8 tons) of contaminated soil on September 4 was successful at removing contaminated soil down to approximately 6 ft to what appeared to the top of a large boulder. The presence of the rock inhibited further vertical assessment of the soil. Groundwater was not encountered in the excavation. The excavated soil was encapsulated in plastic and stockpiled in the southeastern portion of the property (see Site Plan), where it currently remains. A composite sample of the soil was collected for laboratory analysis, with results showing typical fuel oil components and a total petroleum hydrocarbon concentration of 3,500 milligrams per kilogram (mg/Kg). The lab report is provided in Appendix C.

Surficial geology in this area is mapped as glacial till [Dohl, *Surficial Geologic Map of Vermont, 1970*]. Based on the well driller report for the drinking water well on the property (see Appendix B), the stratigraphy is "brown dirt and boulders" to 30 ft, "gravel" to 130 ft, and then "schist" below. This area is within the fluvial valley of the nearby Utley Brook.



## **1.2 Sensitive Receptors**

Drinking water for the Frohling residence is supplied by a drilled well (Frohling Well) located approximately 80 ft south of the UST. Drinking water for the abutting Bosch residence (contacts are Hans and Pien Bosch) is supplied by a drilled well (Bosch Well) located approximately 80 ft north of the UST. Drinking water for the abutting Pitcher barn (contacts are Lynn Tracy and Anna Dibble) is supplied by a drilled well (Pitcher Well) located approximately 60 ft east of the UST. Well locations are shown on the Site Plan, and Vermont Water Supply Division Well Reports for all three wells are included in Appendix B. The well reports indicate that all three wells have steel casing set into the bedrock with depths ranging from 175-280 ft and yields ranging from 1-10 gallon per minute (gpm).

The Frohling residence has a full basement with a stone foundation. The Bosch residence has a crawl space under the northern portion of the house, but the southern wing (garage) does not have a basement. Neither of the basement spaces has been screened for airborne VOCs. The Pitcher barn does not have a basement.

There are no wetlands on the property. The closest surface water is the Utley Brook located 300 ft to the east and 400 ft to the north.

## **2.0 INVESTIGATIVE METHODS AND RESULTS**

### **2.1 Soil Boring Installation**

On November 20, 2009 WEM oversaw advancement of eight (8) soil borings within the UST grave on the Frohling property and south-southeast of the UST grave on the Bosch property. The drilling was conducted by T&K Drilling (T&K) of Troy, New Hampshire with Geoprobe (direct push) drill rig. Continuous soil samples were collected using a 1¾" O.D. x 36" long steel sampler lined with a clear soil tube. Soil samples were logged by a WEM geologist and classified using the Unified Soil Classification System (USCS) as described in the American Society for Testing and Materials (ASTM) Designation D2487-93. WEM's soil boring logs are provided in the Appendix B.

The soil stratigraphy encountered in the borings was primarily fine-medium sand and gravel above very firm silty fine sand with gravel and cobbles (glacial till). Within the UST grave, the upper sand and gravel was fill material used as backfill after the UST removal. Unfortunately, the lower glacial till, which began at a depth of 3-4 ft, was very dense and stony and did not allow for any of the borings to reach the water table. Refusal was encountered at 4.1 to 6.9 ft depth. The water table here is presumed to fluctuate seasonally, but was apparently below a depth of 7 ft in November.



WEM used a photo-ionization detector (PID)<sup>1</sup> to screen the soils for the presence of VOCs during drilling. A plastic bag headspace method was used, wherein a composite soil sample from the sample interval was placed into a reclosable plastic bag approximately ½ full, and was allowed to equilibrate for at least 2 minutes. After equilibration, the bag was cracked open and the PID probe inserted to obtain the measurement. PID readings are shown in the soil boring logs in Appendix B.

Based on observations and PID readings in parts per million (ppm), evidence of VOCs was detected in borings SB-1, SB-2, SB-3, SB-4, and possibly in SB-5. The highest reading (108 ppm) was noted in the tank grave at a depth of 6 ft. The readings coincided with a petroleum (fuel oil) odor in the soil. These readings confirm that there is a zone of petroleum contamination in the soil under the UST grave (see Site Plan), primarily below a depth of 5 ft. With a low reading of VOCs (2.6 ppm) at 5 ft in SB-5 just north of the UST grave, it is possible that the horizontal extent is beyond the immediate footprint of the UST. The vertical extent of contamination could not be determined due to refusal.

Based on observation and PID readings, no evidence of VOCs was detected in borings SB-6, SB-7, or SB-8 located north and northeast of the UST grave. This suggests that the soil contamination is limited to the Frohling property and does not extend onto the Bosch property.

## **2.2 Monitoring Well Installation**

Due to refusal before encountering the water table, monitoring wells were not installed as planned.

## **2.3 Site Surveying**

On November 29, 2009, WEM surveyed locations of borings and other site features to create a the Site Plan (refer to Appendix A). The boundary survey was provided by Brodney Industries, who was hired by the Frohlings.

## **2.4 Supply Well Sample Collection**

Because the Geoprobe soil boring investigation was unable to determine whether groundwater has been impacted by the petroleum release, WEM discussed alternative options with the VT DEC. It was decided that rather than undertake a second drilling effort with a different method (air rotary), sampling of the onsite and abutting water supply wells for petroleum contamination would provide some idea of the magnitude, if any, of the release. WEM then undertook a effort to sample the Frohling well, Bosch well, and Pitcher well. After obtaining permission from the owners, WEM worked with the property management firm for the Frohling and Bosch houses and the plumber for the Pitcher barn to obtain these samples.

---

<sup>1</sup> Ion Science PhoCheck 2000EX with 10.6 eV lamp, calibrated on the morning of fieldwork to an isobutylene standard.



The sampling procedure for the Frohling residence, which is unheated in the winter and has the water turned off, involved having a heater in the basement to warm the water lines, activating the well pump at the electrical panel, and using the high water control to by-pass the basement pressure tank and discharge water through a hose spigot downstream of the pressure tank. Several gallons were allowed to flow before a sample was collected. The sampling location and well location are shown on the Site Plan.

The sampling procedure for the Pitcher barn, which is also unheated in the winter and has the water turned off, involved disconnecting a union upstream of the pressure tank, which is located in a manhole on the north side of the building, activating the well pump, and allowing the water to discharge from the union for several gallons before collecting a sample. The sampling location is shown on the Site Plan. The polyethylene water line from the well was observed coming into the manhole from the west, but the actual location of the well could not be located as it is apparently buried below grade. The location shown on the Site Plan is approximate only.

The sampling procedure at the Bosch house, which is winterized and used during the winter, involved sampling from the kitchen tap after allowing the cold water to discharge for several minutes. The sampling location and well location are shown on the Site Plan.

All samples were placed on ice and transported to Endyne Laboratory in Williston, Vermont under chain-of-custody procedures. Analysis was for VOCs by EPA Method 524.2. Results are discussed below.

## **2.5 Supply Well Sampling Results**

The results are provided in the laboratory report included in Appendix C. Based on these results, no VOCs were detected in the drinking water collected from the Frohling well, Bosch well, or Pitcher well.

## **3.0 CONCLUSIONS AND RECOMMENDATIONS**

After the installation of eight soil borings in November 2009 followed by sampling of three (3) drinking water wells in January 2010, WEM has developed the following conclusions:

- Based on soil screening data collected during the soil borings, petroleum contamination was detected below a depth of 5 ft in the UST grave, and possibly just beyond the northern edge of the UST grave. Borings to the north and northeast of the UST grave revealed no evidence of soil contamination. The soil contamination appears to be limited to the Frohling property and does not extend onto the Bosch property.
- Based on drinking water sampling, groundwater in the deeper aquifer within an 80-ft radius of the UST grave has not been impacted by the petroleum release.



- There continues to be 5-6 cubic yards of petroleum contaminated soil that it stockpiled in plastic on the property.

WEM does not recommend any further environmental assessment related to potential impacts to sensitive receptors from the petroleum release. With the presence of very dense till which limits vertical migration of contamination and lack the of detectable contamination to deeper aquifer groundwater, it is unlikely that there has been a significant impact to groundwater from the Frohling UST release. Indoor air impacts are also unlikely given that the Frohling basement is located upgradient from the UST grave and that the Bosch basement is outside the zone of detected soil contamination.

WEM does recommend that the contaminated soil currently stockpiled onsite should be either: a) disposed of at a soil recycling facility such as ESMI of New Hampshire, which can arrange both transport and treatment (thermal desorption) of the soil, or b) remain polyencapsulated onsite and managed according to a long-term soil management plan. The decision on what to do with the soil should be made by the Frohlings. Future work related to treatment or disposal of the soil should be pre-approved by the VT DEC.

Once the soil stockpile is addressed, then a Sites Management Activity Complete (SMAC) designation should be sought. Given that there is a zone of soil contamination at the bottom of the UST grave with a TPH concentration likely in excess of the VT DEC's 200 mg/Kg cleanup guideline, an institutional control may be required to obtain a SMAC without further addressing this contamination. This would entail placing a notice to the land records (i.e. deed restriction) for the Frohling property that defines the zone of contamination and specifies that prior to conducting any subsurface work, excavation, or groundwater extraction in the vicinity of the UST grave that the VT DEC must be notified.

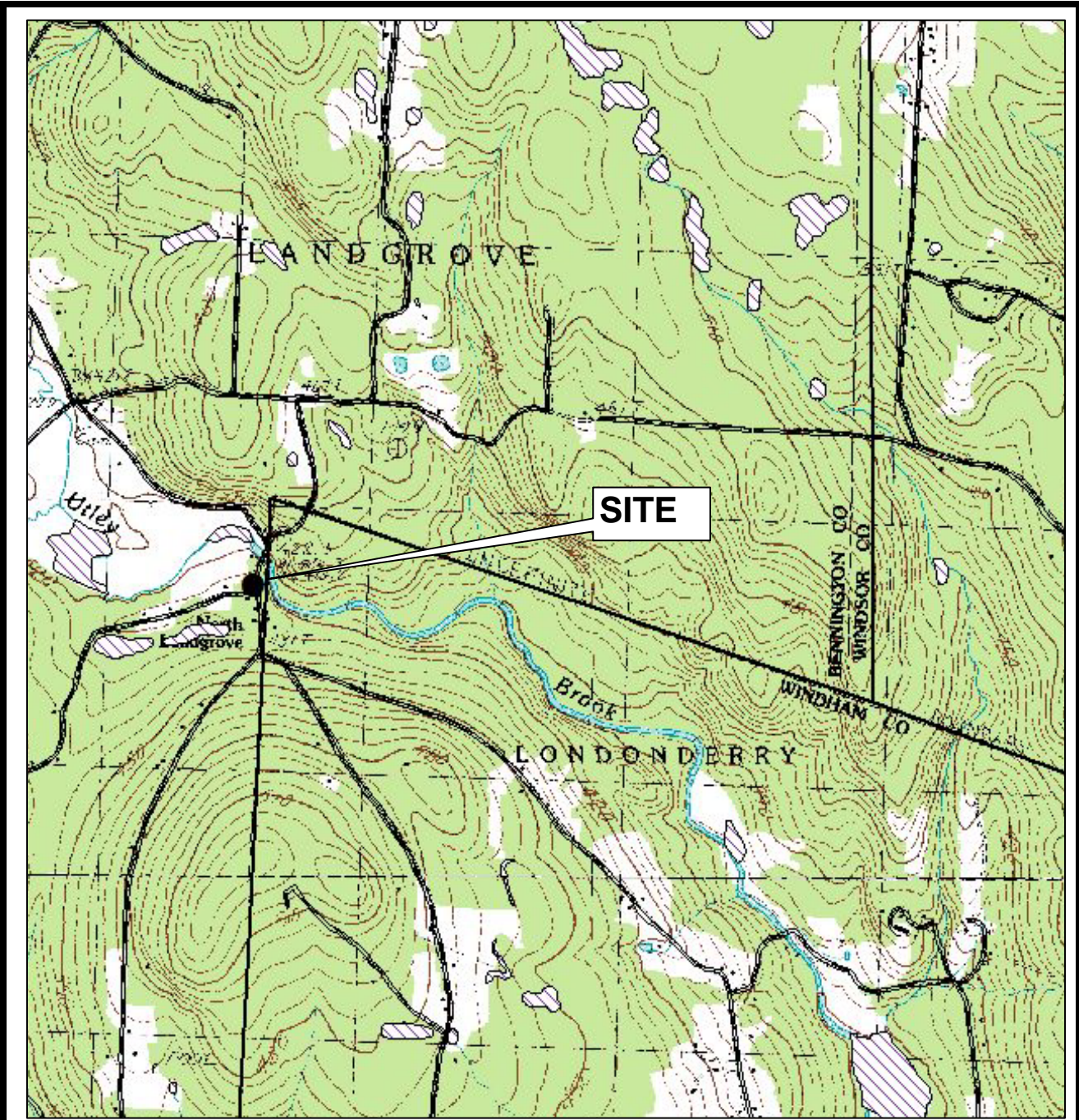




## **APPENDIX A**

### **FIGURES**

#### **Site Location Map Site Plan**



WEM Job Number: 09092-51  
 Map Source: USGS Mapping 7.5 Minute Weston, Vermont Quadrangle (1986)



Waite Environmental Management

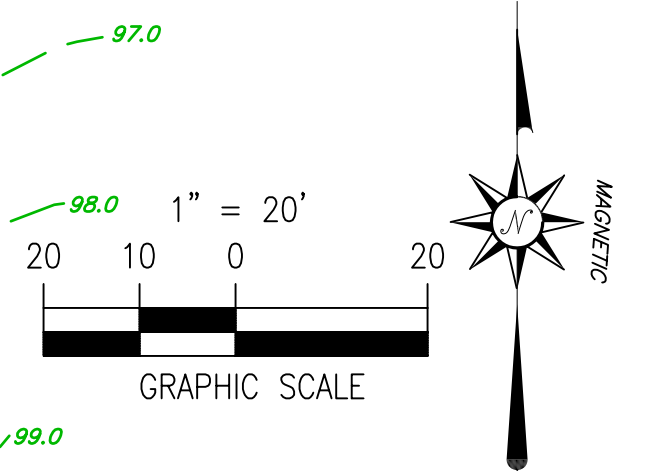
## SITE LOCATION MAP

Frohling Property

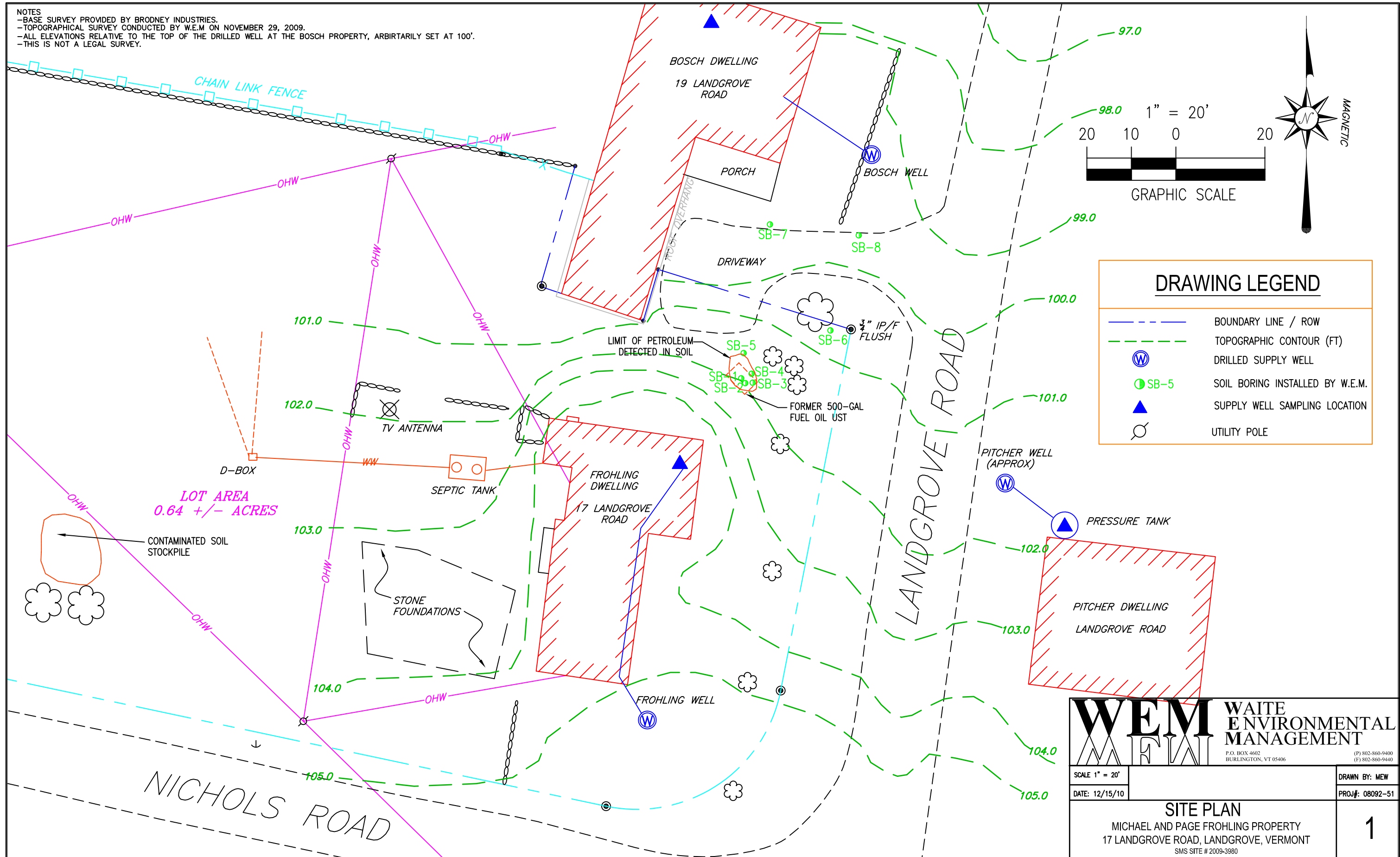
17 Landgrove Road, Landgrove, Vermont

Date: 09/09/09	Drawing No. 1	Scale: 1:24,000	By: MEW
----------------	---------------	-----------------	---------

NOTES  
 -BASE SURVEY PROVIDED BY BRODNEY INDUSTRIES.  
 -TOPOGRAPHICAL SURVEY CONDUCTED BY W.E.M. ON NOVEMBER 29, 2009.  
 -ALL ELEVATIONS RELATIVE TO THE TOP OF THE DRILLED WELL AT THE BOSCH PROPERTY, ARBITRARILY SET AT 100'.  
 -THIS IS NOT A LEGAL SURVEY.



DRAWING LEGEND	
	BOUNDARY LINE / ROW
	TOPOGRAPHIC CONTOUR (FT)
	DRILLED SUPPLY WELL
	SOIL BORING INSTALLED BY W.E.M.
	SUPPLY WELL SAMPLING LOCATION
	UTILITY POLE



<b>WAITE ENVIRONMENTAL MANAGEMENT</b> <small>P.O. BOX 4602 BURLINGTON, VT 05406</small>		<small>(P) 802-860-9400 (F) 802-860-9440</small>
SCALE 1" = 20'	DATE: 12/15/10	DRAWN BY: MEW
<b>SITE PLAN</b> MICHAEL AND PAGE FROHLING PROPERTY 17 LANDGROVE ROAD, LANDGROVE, VERMONT <small>SMS SITE # 2009-3980</small>		PROJ#: 08092-51  <b>1</b>



**APPENDIX B**

**SOIL BORING LOGS**  
**WELL DRILLERS REPORTS**



# SOIL BORING LOG

SB-1

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by: T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(')			
0.25		0.0' - 3.0'	0.0	TOPSOIL above F-M SAND WITH GRAVEL (tank backfill), light brown, friable, dry, no odor	TS F
0.50		1.2'			
0.75					
1.00					
1.25					
1.50					
1.75					
2.00					
2.25					
2.50					
3.00					
3.25		3.0' - 5.6'		F-M SAND WITH GRAVEL (tank backfill)	F
3.50		1.5'			
3.75					
4.00					
4.25			6.2	SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, slight petroleum odor	SW
4.50					
4.75					
5.00					
5.25					
5.50					
5.75				REFUSAL AT 5.6' - END OF BORING	
6.00				NO WELL INSTALLED	
6.25					
6.50					
6.75					
7.00					
7.25					
7.50					
7.75					
8.00					
8.25					
8.50					
8.75					

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



# SOIL BORING LOG

## SB-2

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by: T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(')			
0.25		0.0' - 3.0'	0.0	TOPSOIL above F-M SAND WITH GRAVEL (tank backfill), light brown, friable, dry, no odor	TS
0.50			1.2'		F
0.75					
1.00					
1.25					
1.50					
1.75					
2.00					
2.25					
2.50					
2.75					
3.00					
3.25		3.0' - 6.0'		F-M SAND WITH GRAVEL (tank backfill)	F
3.50		1.5'			
3.75					
4.00					
4.25					
4.50					
4.75					
5.00					
5.25				SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, slight petroleum odor	SW
5.50			49.1		
5.75					
6.00					
6.25		6.0' - 6.3'	108	SILTY FINE SAND WITH GRAVEL (till), obvious petroleum odor	SW
6.50		0.4'			
6.75				REFUSAL AT 6.3' - END OF BORING	
7.00				NO WELL INSTALLED	
7.25					
7.50					
7.75					
8.00					
8.25					
8.50					
8.75					

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



# SOIL BORING LOG

## SB-3

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by: T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(')			
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00 5.25 5.50 5.75 6.00 6.25 6.50 6.75 7.00 7.25 7.50 7.75 8.00 8.25 8.50 8.75	Ft < Grade 	0.0' - 3.0' 1.8'	0.0	TOPSOIL above F-M SAND WITH GRAVEL (tank backfill), light brown, friable, dry, no odor	<b>TS</b> <b>F</b>
		3.0' - 6.0' 1.5'		F-M SAND WITH GRAVEL (tank backfill)	<b>F</b>
			51.4	SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, slight petroleum odor	<b>SW</b>
				REFUSAL AT 6.1' - END OF BORING NO WELL INSTALLED	

### 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



# SOIL BORING LOG

## SB-4

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by : T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(%)			
0.25		0.0' - 3.0'	0.0	TOPSOIL	TS
0.50					
0.75					
1.00					
1.25					
1.50					
1.75					
2.00					
2.25					
2.50					
2.75					
3.00					
3.25		3.0' - 5.2'		SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, very slight petroleum odor	SW
3.50		1.2'			
3.75					
4.00					
4.25					
4.50					
4.75					
5.00			13.6		
5.25					
5.50				REFUSAL AT 5.2' - END OF BORING	
5.75				NO WELL INSTALLED	
6.00					
6.25					
6.50					
6.75					
7.00					
7.25					
7.50					
7.75					
8.00					
8.25					
8.50					
8.75					

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





# SOIL BORING LOG

SB-5

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by : T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(')			
0.25		0.0' - 3.0'	0.0	TOPSOIL	TS
0.50		2.2'		F-M SAND WITH GRAVEL, light brown, friable, dry, no odor	SW
0.75					
1.00					
1.25					
1.50					
1.75					
2.00					
2.25					
2.50					
3.00					
3.25		3.0' - 5.2'		SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, very slight petroleum odor	SW
3.50		2.0'			
3.75					
4.00					
4.25					
4.50					
4.75					
5.00			2.6		
5.25					
5.50				REFUSAL AT 5.3' - END OF BORING	
5.75				NO WELL INSTALLED	
6.00					
6.25					
6.50					
6.75					
7.00					
7.25					
7.50					
7.75					
8.00					
8.25					
8.50					
8.75					

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





# SOIL BORING LOG

## SB-7

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by: T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics		
		Recovery(')				
0.25		0.0' - 3.0'	0.0	TOPSOIL	TS	
0.50			2.1'			
0.75					F-M SAND WITH GRAVEL, light brown, friable, dry, no odor	SW
1.00						
1.25						
1.50						
1.75						
2.00						
2.25						
2.50						
2.75			0.0			
3.00						
3.25		3.0' - 5.1'		SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, no odor	SW	
3.50		1.7'				
3.75						
4.00						
4.25						
4.50						
4.75			0.0			
5.00						
5.25				REFUSAL AT 5.1' - END OF BORING		
5.50				NO WELL INSTALLED		
5.75						
6.00						
6.25						
6.50						
6.75						
7.00						
7.25						
7.50						
7.75						
8.00						
8.25						
8.50						
8.75						

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



# SOIL BORING LOG

**SB-8**

**Site Name: Frohling Property**  
**17 Landgrove Road, Landgrove, Vermont**

WEM Project # 08092-51

Date Installed: 11/20/2009

VT DEC Site # 2009-3980

Drilling Method: Geoprobe; 2" direct push probe

Drilled by : T&K Drilling

Sampling Method: Geoprobe: 2" x 36" clear soil liners

Logged by: Miles Waite

Development Method: NA

Grade = 0	NO WELL INSTALLED	Interval (')	PID (ppm)	Soil Characteristics	
		Recovery(%)			
0.25		0.0' - 3.0'	0.0	DRIVEWAY STONES	F
0.50		2.1'		F-M SAND WITH GRAVEL, light brown, friable, dry, no odor	SW
0.75					
1.00					
1.25					
1.50					
1.75					
2.00					
2.25					
2.50					
3.00					
3.25		3.0' - 5.1'		SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, no odor	SW
3.50		1.7'			
3.75					
4.00					
4.25					
4.50					
4.75					
5.00			0.0		
5.25					
5.50					
5.75					
6.00					
6.25				SILTY FINE SAND WITH GRAVEL (till), olive brown, very firm, dry, no odor	SW
6.50					
6.75			0.0		
7.00					
7.25				REFUSAL AT 6.9' - END OF BORING	
7.50				NO WELL INSTALLED	
7.75					
8.00					
8.25					
8.50					
8.75					

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

# Frohling Well

## Water Supply Division Well Report Well Statistics

Printed: 9/09/2009

Well Tag Number:                      Date Report Received: 6/20/84      Well Report Number:                      51                      Map Cell:

Owner's Name: JOHN FROHLING

Unique Location Name For GIS: LA51

Purchaser's Name:

E-911 Address:

Town Name: Landgrove

Sub Division:

Lot Number:

Date Well Was Completed: 12/12/83

Purposed Use of Well: Domestic

Reason for Drilling Well: Replace existing supply

Well Type:

Drilling Equipment: Rotary (AP)

Well Has Screen      Total Depth of Well (in feet): 280.00

Casing Finish: Above ground, finished

Total Casing Length (in feet): 130.00      Casing Length below Land Surface (in feet): 0.00      Casing Length Exposed: 0.00

Casing Diameter (in inches): 6.00      Casing Material:      Casing Weight (in lbs/foot): 0.00

Length of Liner Used (in feet): 0.00      Liner Diameter (in inches): 0.00      Liner Material:

Liner Weight (in lbs/foot): 0.00      Depth To Liner Top: 0.00

Method of Sealing Casing: Drive shoe only

Not Steel Casing

Grout Type:

Diameter Drilled in Bedrock (in inches): 0.00

Depth Drilled in Bedrock: 0.00

Screen Make and Type:

Screen Material:

Screen Length (in feet): 0.00

Screen Diameter (in inches): 0.00

Screen Slot Size (in inches): 0.000

Depth to top of screen below land surface (in feet): 0.00

Gravel Size or Type:

Yield Test Method: Compressed air

Yield Tested At (Gallons per Minute): 3.00

Hydro Fractured Resulting Flow if HydroFractured:

0.00

Static Water Level (in feet): 30.00

Well is OverFlowing

Has Water been Analyzed

Comments:

Reason for Well Development:

Well Driller: Clyde (Jack) Frost

Tax Map:

Depth To Bedrock (in feet): 130

Items in *ITALICS* are recent additions to the computer databases. Information for these fields MAY exist in the paper files that is not entered here.

Frohling Well, cont.

Water Supply Division Well Report

Printed: 9/09/2009

Well Lithology

Town: Landgrove

Well Report Number:

51

Starting Depth	Ending Depth	GPM	Lithology	Driller's Description
0.00	30.00		brown dirt and boulders	Boulders & dirt
30.00	130.00		gravel	Gravel
130.00	280.00		schist	Rock, bedrock, ledge, etc.

Items in *ITALICS* are recent additions to the computer databases. Information for these fields MAY exist in the paper files that is not entered here



# Bosch well, cont

Water Supply Division Well Report

Printed: 12/09/2009

## Well Lithology

Town: Landgrove

Well Report Number:

29

Starting Depth	Ending Depth	<i>GPM</i>	Lithology	Driller's Description
0.00	65.00		hardpan	Hardpan
65.00	263.00		granite	Rock, bedrock, ledge, etc.

Items in *ITALICS* are recent additions to the computer databases. Information for these fields MAY exist in the paper files that is not entered here





Pitcher Well, cont.

Water Supply Division Well Report

Printed: 12/09/2009

Well Lithology

Town: Landgrove

Well Report Number:

18

Starting Depth	Ending Depth	GPM	Lithology	Driller's Description
0.00	140.00		hardpan gravel sand	Hardpan
140.00	175.00		granite	Rock, bedrock, ledge, etc.

Items in *ITALICS* are recent additions to the computer databases. Information for these fields MAY exist in the paper files that is not entered here



**APPENDIX C**

**LABORATORY REPORT**



Waite Environmental Mgt.

PO Box 4602

100675

Burlington, VT 05406

Atten: Miles Waite

PROJECT: Frohling

WORK ORDER: **0909-13034**

DATE RECEIVED: September 08, 2009

DATE REPORTED: September 24, 2009

SAMPLER: MW

## Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Randolph, VT facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.  
Laboratory Director

[www.endynelabs.com](http://www.endynelabs.com)



160 James Brown Dr., Williston, VT 05495  
Ph 802-879-4333 Fax 802-879-7103

P.O. Box 405, Randolph, VT 05060  
Ph 802-728-6313 Fax 802-728-6044



## Laboratory Report

DATE REPORTED: 09/24/2009

CLIENT: Waite Environmental Mgt.  
PROJECT: Frohling

WORK ORDER: **0909-13034**  
DATE RECEIVED 09/08/2009

001 Site: Soil Pile Date Sampled: 9/4/09 Time: 12:45

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Vt Petroleum List 8260B							
Methyl-t-butyl ether (MTBE)	< 100	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
Benzene	< 40.0	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
Toluene	< 40.0	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
Ethylbenzene	< 40.0	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
Xylenes, Total	< 80.0	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
1,3,5-Trimethylbenzene	214	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	N	
1,2,4-Trimethylbenzene	98.8	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	N	
Naphthalene	< 80.0	ug/Kg, Dry	EPA 8260B	9/18/09	W DAW	A	
Surr. 1 (Dibromofluoromethane)	105	%	EPA 8260B	9/18/09	W DAW	A	
Surr. 2 (Toluene d8)	104	%	EPA 8260B	9/18/09	W DAW	A	
Surr. 3 (4-Bromofluorobenzene)	108	%	EPA 8260B	9/18/09	W DAW	A	
Unidentified Peaks	> 10		EPA 8260B	9/18/09	W DAW	U	
TPH DRO Package							
Extraction by EPA 3550B	Completed		EPA 3550B	9/16/09	W MDP	U	
C7-C10 TPH	< 300	mg/Kg, dry	EPA 8015B	9/16/09	W MDP	U	
C10-C26 TPH-DRO	3,390	mg/Kg, dry	EPA 8015B	9/16/09	W MDP	U	
C26-C40 TPH	< 300	mg/Kg, dry	EPA 8015B	9/16/09	W MDP	U	
Tot. Petroleum Hydrocarbons	3,500	mg/Kg, dry	EPA 8015B	9/16/09	W MDP	A	
Hydrocarbon Window	C10-C28		EPA 8015B	9/16/09	W MDP	U	





## Laboratory Report

Waite Environmental Mgt.	100675
PO Box 4602	
Burlington, VT 05406	
Atten: Miles Waite	

PROJECT: Frohling  
WORK ORDER: **1001-00721**  
DATE RECEIVED: January 19, 2010  
DATE REPORTED: January 26, 2010  
SAMPLER: Miles Waite

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody located at the end of this report.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

This NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory.

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.  
Laboratory Director

[www.endynelabs.com](http://www.endynelabs.com)



160 James Brown Dr., Williston, VT 05495  
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766  
Ph 603-678-4891 Fax 603-678-4893



CLIENT: Waite Environmental Mgt.  
 PROJECT: Frohling  
 REPORT DATE: 1/26/2010

WORK ORDER: **1001-00721**  
 DATE RECEIVED: 01/19/2010

## TEST METHOD: EPA 524.2

001 Site: Pitcher Well Date Sampled: 1/19/10 10:20 Analysis Date: 1/22/10 W MMW

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Dichlorodifluoromethane	< 0.5	ug/L	A		Chloromethane	< 0.5	ug/L	A	
Vinyl chloride	< 0.5	ug/L	A		Bromomethane	< 0.5	ug/L	A	
Chloroethane	< 0.5	ug/L	A		Trichlorofluoromethane	< 0.5	ug/L	A	
1,1-Dichloroethene	< 0.5	ug/L	A		Methylene chloride	< 1.0	ug/L	A	
Methyl-t-butyl ether (MTBE)	< 0.5	ug/L	A		trans-1,2-Dichloroethene	< 0.5	ug/L	A	
1,1-Dichloroethane	< 0.5	ug/L	A		2,2-Dichloropropane	< 0.5	ug/L	A	
cis-1,2-Dichloroethene	< 0.5	ug/L	A		Bromochloromethane	< 0.5	ug/L	A	
Chloroform	< 0.5	ug/L	A		1,1,1-Trichloroethane	< 0.5	ug/L	A	
Carbon tetrachloride	< 0.5	ug/L	A		1,1-Dichloropropene	< 0.5	ug/L	A	
Benzene	< 0.5	ug/L	A		1,2-Dichloroethane	< 0.5	ug/L	A	
Trichloroethene	< 0.5	ug/L	A		1,2-Dichloropropane	< 0.5	ug/L	A	
Dibromomethane	< 0.5	ug/L	A		Bromodichloromethane	< 0.5	ug/L	A	
cis-1,3-Dichloropropene	< 0.5	ug/L	A		Toluene	< 0.5	ug/L	A	
trans-1,3-Dichloropropene	< 0.5	ug/L	A		1,1,2-Trichloroethane	< 0.5	ug/L	A	
Tetrachloroethene	< 0.5	ug/L	A		1,3-Dichloropropane	< 0.5	ug/L	A	
Dibromochloromethane	< 0.5	ug/L	A		Chlorobenzene	< 0.5	ug/L	A	
Ethylbenzene	< 0.5	ug/L	A		1,1,1,2-Tetrachloroethane	< 0.5	ug/L	A	
Xylenes, Total	< 1.0	ug/L	A		Styrene	< 0.5	ug/L	A	
Bromoform	< 0.5	ug/L	A		Isopropylbenzene	< 0.5	ug/L	A	
1,1,2,2-Tetrachloroethane	< 0.5	ug/L	A		Bromobenzene	< 0.5	ug/L	A	
n-Propylbenzene	< 0.5	ug/L	A		1,2,3-Trichloropropane	< 0.5	ug/L	A	
2-Chlorotoluene	< 0.5	ug/L	A		1,3,5-Trimethylbenzene	< 0.5	ug/L	A	
4-Chlorotoluene	< 0.5	ug/L	A		t-Butylbenzene	< 0.5	ug/L	A	
1,2,4-Trimethylbenzene	< 0.5	ug/L	A		s-Butylbenzene	< 0.5	ug/L	A	
4-Isopropyltoluene	< 0.5	ug/L	A		1,3-Dichlorobenzene	< 0.5	ug/L	A	
1,4-Dichlorobenzene	< 0.5	ug/L	A		n-Butylbenzene	< 0.5	ug/L	A	
1,2-Dichlorobenzene	< 0.5	ug/L	A		1,2,4-Trichlorobenzene	< 0.5	ug/L	A	
Hexachlorobutadiene	< 0.5	ug/L	A		Naphthalene	< 0.5	ug/L	U	
1,2,3-Trichlorobenzene	< 0.5	ug/L	A		Surr. 1 (4-Bromofluorobenzene)	106	%	A	
Surr. 2 (1,2-Dichlorobenzene d4)	111	%	A						



CLIENT: Waite Environmental Mgt.  
 PROJECT: Frohling  
 REPORT DATE: 1/26/2010

WORK ORDER: **1001-00721**  
 DATE RECEIVED: 01/19/2010

## TEST METHOD: EPA 524.2

002 Site: Frohling Well Date Sampled: 1/19/10 10:30 Analysis Date: 1/22/10 W MMW

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Dichlorodifluoromethane	< 0.5	ug/L	A		Chloromethane	< 0.5	ug/L	A	
Vinyl chloride	< 0.5	ug/L	A		Bromomethane	< 0.5	ug/L	A	
Chloroethane	< 0.5	ug/L	A		Trichlorofluoromethane	< 0.5	ug/L	A	
1,1-Dichloroethene	< 0.5	ug/L	A		Methylene chloride	< 1.0	ug/L	A	
Methyl-t-butyl ether (MTBE)	< 0.5	ug/L	A		trans-1,2-Dichloroethene	< 0.5	ug/L	A	
1,1-Dichloroethane	< 0.5	ug/L	A		2,2-Dichloropropane	< 0.5	ug/L	A	
cis-1,2-Dichloroethene	< 0.5	ug/L	A		Bromochloromethane	< 0.5	ug/L	A	
Chloroform	< 0.5	ug/L	A		1,1,1-Trichloroethane	< 0.5	ug/L	A	
Carbon tetrachloride	< 0.5	ug/L	A		1,1-Dichloropropene	< 0.5	ug/L	A	
Benzene	< 0.5	ug/L	A		1,2-Dichloroethane	< 0.5	ug/L	A	
Trichloroethene	< 0.5	ug/L	A		1,2-Dichloropropane	< 0.5	ug/L	A	
Dibromomethane	< 0.5	ug/L	A		Bromodichloromethane	< 0.5	ug/L	A	
cis-1,3-Dichloropropene	< 0.5	ug/L	A		Toluene	< 0.5	ug/L	A	
trans-1,3-Dichloropropene	< 0.5	ug/L	A		1,1,2-Trichloroethane	< 0.5	ug/L	A	
Tetrachloroethene	< 0.5	ug/L	A		1,3-Dichloropropane	< 0.5	ug/L	A	
Dibromochloromethane	< 0.5	ug/L	A		Chlorobenzene	< 0.5	ug/L	A	
Ethylbenzene	< 0.5	ug/L	A		1,1,1,2-Tetrachloroethane	< 0.5	ug/L	A	
Xylenes, Total	< 1.0	ug/L	A		Styrene	< 0.5	ug/L	A	
Bromoform	< 0.5	ug/L	A		Isopropylbenzene	< 0.5	ug/L	A	
1,1,2,2-Tetrachloroethane	< 0.5	ug/L	A		Bromobenzene	< 0.5	ug/L	A	
n-Propylbenzene	< 0.5	ug/L	A		1,2,3-Trichloropropane	< 0.5	ug/L	A	
2-Chlorotoluene	< 0.5	ug/L	A		1,3,5-Trimethylbenzene	< 0.5	ug/L	A	
4-Chlorotoluene	< 0.5	ug/L	A		t-Butylbenzene	< 0.5	ug/L	A	
1,2,4-Trimethylbenzene	< 0.5	ug/L	A		s-Butylbenzene	< 0.5	ug/L	A	
4-Isopropyltoluene	< 0.5	ug/L	A		1,3-Dichlorobenzene	< 0.5	ug/L	A	
1,4-Dichlorobenzene	< 0.5	ug/L	A		n-Butylbenzene	< 0.5	ug/L	A	
1,2-Dichlorobenzene	< 0.5	ug/L	A		1,2,4-Trichlorobenzene	< 0.5	ug/L	A	
Hexachlorobutadiene	< 0.5	ug/L	A		Naphthalene	< 0.5	ug/L	U	
1,2,3-Trichlorobenzene	< 0.5	ug/L	A		Surr. 1 (4-Bromofluorobenzene)	103	%	A	
Surr. 2 (1,2-Dichlorobenzene d4)	107	%	A						

CLIENT: Waite Environmental Mgt.  
 PROJECT: Frohling  
 REPORT DATE: 1/26/2010

WORK ORDER: **1001-00721**  
 DATE RECEIVED: 01/19/2010

## TEST METHOD: EPA 524.2

003 Site: Bosch Well Date Sampled: 1/19/10 10:40 Analysis Date: 1/22/10 W MMW

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Dichlorodifluoromethane	< 0.5	ug/L	A		Chloromethane	< 0.5	ug/L	A	
Vinyl chloride	< 0.5	ug/L	A		Bromomethane	< 0.5	ug/L	A	
Chloroethane	< 0.5	ug/L	A		Trichlorofluoromethane	< 0.5	ug/L	A	
1,1-Dichloroethene	< 0.5	ug/L	A		Methylene chloride	< 1.0	ug/L	A	
Methyl-t-butyl ether (MTBE)	< 0.5	ug/L	A		trans-1,2-Dichloroethene	< 0.5	ug/L	A	
1,1-Dichloroethane	< 0.5	ug/L	A		2,2-Dichloropropane	< 0.5	ug/L	A	
cis-1,2-Dichloroethene	< 0.5	ug/L	A		Bromochloromethane	< 0.5	ug/L	A	
Chloroform	< 0.5	ug/L	A		1,1,1-Trichloroethane	< 0.5	ug/L	A	
Carbon tetrachloride	< 0.5	ug/L	A		1,1-Dichloropropene	< 0.5	ug/L	A	
Benzene	< 0.5	ug/L	A		1,2-Dichloroethane	< 0.5	ug/L	A	
Trichloroethene	< 0.5	ug/L	A		1,2-Dichloropropane	< 0.5	ug/L	A	
Dibromomethane	< 0.5	ug/L	A		Bromodichloromethane	< 0.5	ug/L	A	
cis-1,3-Dichloropropene	< 0.5	ug/L	A		Toluene	< 0.5	ug/L	A	
trans-1,3-Dichloropropene	< 0.5	ug/L	A		1,1,2-Trichloroethane	< 0.5	ug/L	A	
Tetrachloroethene	< 0.5	ug/L	A		1,3-Dichloropropane	< 0.5	ug/L	A	
Dibromochloromethane	< 0.5	ug/L	A		Chlorobenzene	< 0.5	ug/L	A	
Ethylbenzene	< 0.5	ug/L	A		1,1,1,2-Tetrachloroethane	< 0.5	ug/L	A	
Xylenes, Total	< 1.0	ug/L	A		Styrene	< 0.5	ug/L	A	
Bromoform	< 0.5	ug/L	A		Isopropylbenzene	< 0.5	ug/L	A	
1,1,2,2-Tetrachloroethane	< 0.5	ug/L	A		Bromobenzene	< 0.5	ug/L	A	
n-Propylbenzene	< 0.5	ug/L	A		1,2,3-Trichloropropane	< 0.5	ug/L	A	
2-Chlorotoluene	< 0.5	ug/L	A		1,3,5-Trimethylbenzene	< 0.5	ug/L	A	
4-Chlorotoluene	< 0.5	ug/L	A		t-Butylbenzene	< 0.5	ug/L	A	
1,2,4-Trimethylbenzene	< 0.5	ug/L	A		s-Butylbenzene	< 0.5	ug/L	A	
4-Isopropyltoluene	< 0.5	ug/L	A		1,3-Dichlorobenzene	< 0.5	ug/L	A	
1,4-Dichlorobenzene	< 0.5	ug/L	A		n-Butylbenzene	< 0.5	ug/L	A	
1,2-Dichlorobenzene	< 0.5	ug/L	A		1,2,4-Trichlorobenzene	< 0.5	ug/L	A	
Hexachlorobutadiene	< 0.5	ug/L	A		Naphthalene	< 0.5	ug/L	U	
1,2,3-Trichlorobenzene	< 0.5	ug/L	A		Surr. 1 (4-Bromofluorobenzene)	102	%	A	
Surr. 2 (1,2-Dichlorobenzene d4)	102	%	A						

