



SITE # 97-2196  
SPILL # 97-177

September 5, 1997

SEP 0 10 19 1997

Mr. Bill Brooks  
Adjuster  
Vermont Mutual Insurance  
P.O. Box 188  
Montpelier, VT 05601-0188

RE: Foss Residence, North Hyde Park, Vermont - Summary and Recommendations

Dear Mr. Brooks:

Lincoln Applied Geology, Inc. (LAG) recently visited the Hutchinson property located across (west) Route 100 from the Foss residence in North Hyde Park (**Figure 1**). An open field at the north end of the Hutchinson property is used as a horse pasture. The field was impacted in May 1997 by #2 fuel oil that leaked from an above-ground storage tank (AST) in the basement of the Foss house, flowed through subsurface piping and soils, and then flowed through a storm sewer culvert beneath Route 100 and across the field.

On August 20, 1997 LAG was on-site to supervise the excavation and stockpiling of fuel oil contaminated soils from impacted areas in the field. Prior to excavation, 5 hand auger holes and 4 shovel pits were placed within the impacted areas to depths up to 3.5 feet. Soils were assayed at various depths by photoionization detector (PID) and the results are summarized and presented in **Table 1**. Review of these results indicate that the PID contaminant levels have declined considerably as compared to PID assays obtained from boring samples (B-1, 2, and 3) and shovel samples (S-1, 2, and 3) collected on June 12 and July 21, 1997, respectively, at the locations shown on **Figures 2 and 3**. The recent 5 auger borings and 4 shovel pits are also shown on **Figure 3**.

As shown on **Figure 2 and Table 1**, PID levels obtained from B-1, 2, and 3 on June 12<sup>th</sup> ranged from 1.2 parts per million (ppm) to 30 ppm at 1 - 1.5 feet, background (BG) to 56 ppm at 1.0 - 1.5 feet, and BG to 42 ppm at 1.5 - 2.0 feet. On July 21<sup>st</sup> PID levels from S-1, 2, and 3 ranged from 8.0 to 16.0 ppm at 0 - 0.5 feet, 45 to 65 ppm at 0.5 feet, and 44 to 60 ppm at 1.0 - 1.2 feet. Comparison of these two data sets indicates that sufficient residual fuel oil contamination was present in the shallow soils to require remediation. The third set of PID assays was collected on August 20<sup>th</sup> and reveals a significant decline in soil contaminant levels as compared to the previous data sets. PID levels ranged from BG to 5.2 ppm at 0 - 1.0 feet, BG to 12.0 ppm at 1.0 - 2.0 feet, and BG to 10.0 ppm at 2.0 to 3.5 feet.

The reduction in PID levels within the shallow soils may have been caused by recent significant precipitation events flushing adsorbed contaminants from the upper

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soils, active bioremediation of the contaminants by naturally occurring soil microbes, volatilization of some contaminants directly from soils, or a combination of these processes. Since shallow soils did not contain PID levels considerably above 10 ppm, soils were not excavated and stockpiled on August 20<sup>th</sup> for off-site transport and permanent disposal through thermal treatment.

Instead, three soil samples were collected from shovel pits excavated on August 20<sup>th</sup>. These samples were analyzed for total petroleum hydrocarbons by EPA Method 8100. The sample locations are shown on **Figure 3**. The samples were chosen from the zone which contained the highest PID level as shown on **Table 1**. Two individual grab samples from a depth of 1.5 - 2.0 feet were obtained from "Near B-2" and "Near S-3", and one sample from 2.0 - 2.5 feet was obtained from "Near B-1". The soil quality laboratory reports are included as **Attachment A**. The results indicate that TPH was not detected in any of the samples above the analytical detection limit of 50 ppm. This contrasts sharply with the one soil sample collected on June 12<sup>th</sup> from B-2 at a depth of 0.5 to 1.0 feet which contained 600 parts per billion (ppb) of xylenes and 1,700 ppm TPH were detected.

Although there is evidence (soil mottles) of perched ground water at depths of 1.5 feet and greater (on August 20<sup>th</sup> it was greater than 3.5 feet), the unconfined ground water surface is deeper. On August 20<sup>th</sup> a water quality sample was collected (for TPH analysis via EPA Method 8100) from a ground water seep. The seepage area is located downgradient and to the west of the spill area, along the face of the steep embankment to the Gihon River as shown on **Figure 3**. The water quality laboratory report is also included as **Attachment A**, and indicates that TPH was not detected above the analytical detection limit of 0.5 ppm. If there is downgradient migration of fuel oil contaminants in ground water, they will eventually be detected in water from the seep.

Fuel oil impacted the Hutchinson's field via the storm sewer culvert that conveys drainage water from the east side of Route 100 to the west side. Since the spill event in May, a considerable volume of water has flowed through the culvert and apparently flushed adsorbed fuel oil contaminants from the soils. It is possible that the contaminants have been flushed deeper into the silt, sand, and gravel soils underlying the spill area. The reduction in soil PID contaminant levels may also be partially due to volatilization of some contaminants as well as naturally occurring intrinsic bioremediation.

Based upon the history of the spill, and data collected, which shows that no sensitive environmental receptors have been impacted by the fuel oil spill, LAG recommends the following tasks be performed to ensure that residual fuel oil contaminants on the Hutchinson's property do not adversely impact any sensitive



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environmental receptors.

- Collect water quality samples in the fall of 1997 from the Race residence bedrock well and the downgradient ground water seep. Analyze the samples for BTEX and MTBE, and TPH by Method 8100.
- Collect soil samples to depths of up to 10 feet, if possible, in the spring of 1998 from four borings placed using hand auger techniques. One boring would be installed near the west end of the storm sewer culvert, and one boring would be installed in each of the three downgradient lobes impacted. Soils extracted from the borings will be screened by PID for the presence of fuel oil contaminants, and one soil sample per boring will be collected and be analyzed for BTEX and MTBE, and TPH by Method 8100.
- Repeat the water quality sampling and analyses of the Race residence bedrock well and ground water seep in the spring of 1998.
- Submit brief summary letter reports to the VDEC SMS including data, laboratory reports, conclusions, and recommendations following receipt of the analytical results from the fall 1997 and spring 1998 sampling events.

We are confident that the data obtained during these two proposed sampling and reporting events will show that the limited fuel oil contamination remaining on the Hutchinson property presents a low potential risk to any sensitive environmental receptors and will be naturally bioremediated with time.

If you have any questions or comments, please call me at (802) 453-4384.

Sincerely,



William D. Norland  
Hydrogeologist

WDN/sjt  
enclosures  
cc: Marc Roy, SMS

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**Soil PID Assays  
 August 20, 1997**

Depth (ft)	Auger PID Assays (ppm)				
	Near B-1	Near B-2	East of S-2	West of S-2	Between B-1 and S-3
0 - 0.5	BG	0.2			
0.5 - 1.0	BG	5.2	2.5	BG	BG
1.0 - 1.5	0.2	5.8	5.0	BG	0.2
1.5 - 2.0	0.4		8.0	1.2	BG
2.0 - 2.5	0.8	4.6		1.2	5.6
2.5 - 3.0	1.5			6.0	8.8
3.0 - 3.5		3.2			
Shovel Pit PID Assays (ppm)					
Depth (ft)	Near B-1	Near B-2	Near S-3	West of B-3	
0 - 0.5					
0.5 - 1.0	BG	BG	BG	BG	
1.0 - 1.5	BG	1.2	BG	BG	
1.5 - 2.0	1.2	4.2*	12.0*	BG	
2.0 - 2.5	1.8*		10.0	BG	
2.5 - 3.0			10.0	BG	
3.0 - 3.5			8.0		

NOTES:

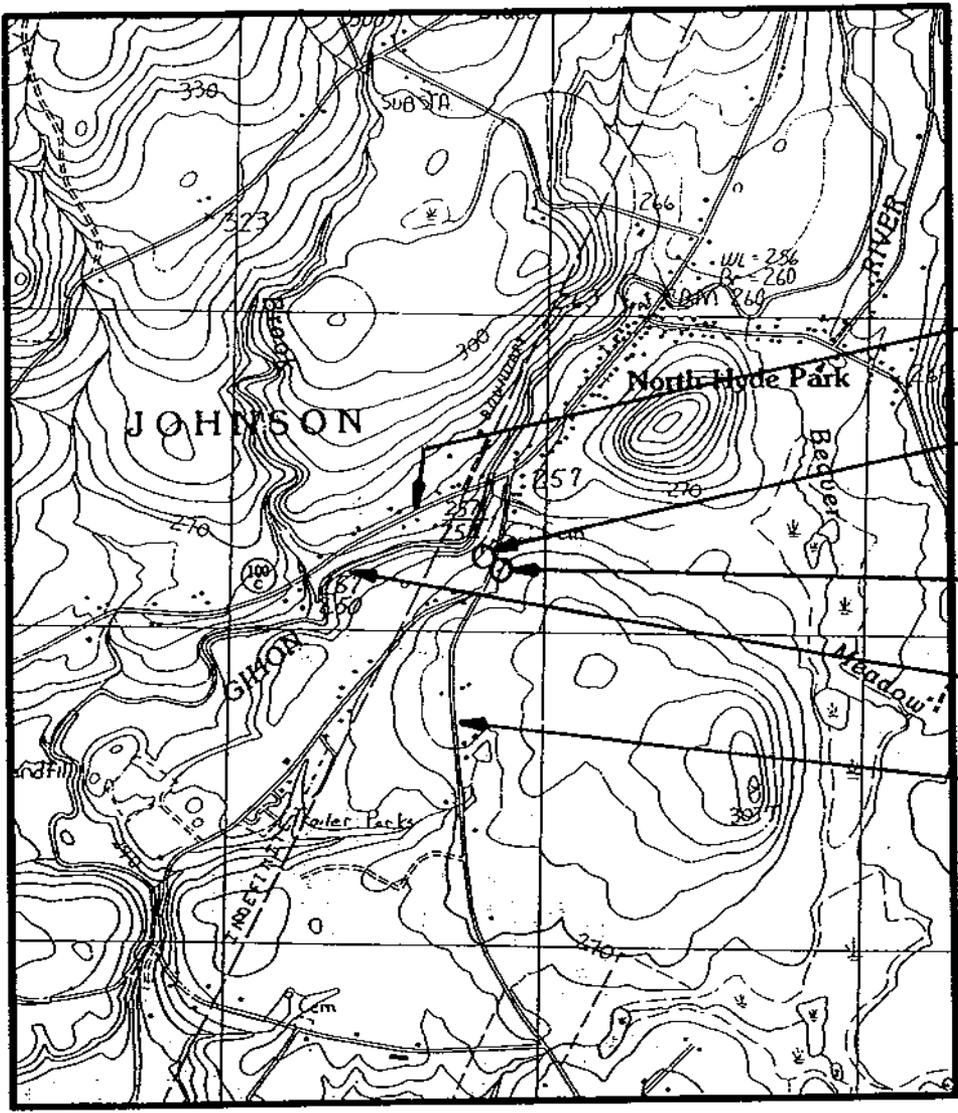
\* = Soil sample collected for TPH analysis via EPA Method 8100

BG = Background

Auger and shovel pit locations are shown on Figure 3.

Figure 1

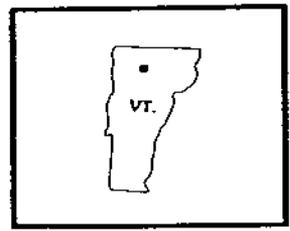
**Foss Residence  
Route 100  
North Hyde Park, VT  
GENERAL LOCATION MAP**



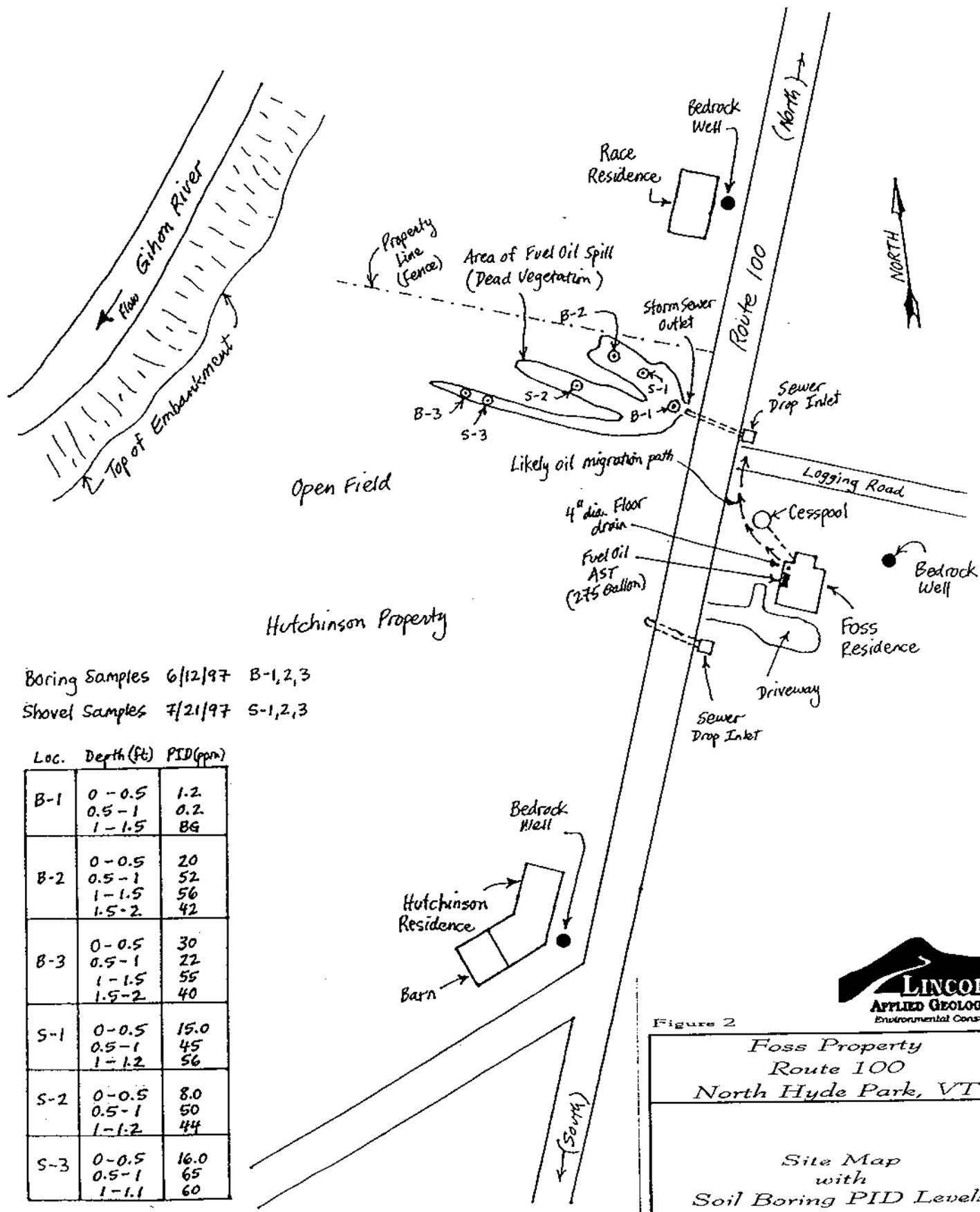
- Route 100C
- Contaminated Soils on Hutchinson Property
- Foss Residence
- Gihon River
- Meadow
- Route 100

Source: USGS. 7.5 Min. x 15 Topographic Quadrangle of Eden, VT Quad Provisional Edition 1986

Scale: 1" = 2,000'



Quadrangle Location



Boring Samples 6/12/97 B-1,2,3  
 Shovel Samples 7/21/97 S-1,2,3

Loc.	Depth (ft)	PID (ppm)
B-1	0 - 0.5	1.2
	0.5 - 1	0.2
	1 - 1.5	89
B-2	0 - 0.5	20
	0.5 - 1	52
	1 - 1.5	56
	1.5 - 2	42
B-3	0 - 0.5	30
	0.5 - 1	22
	1 - 1.5	55
	1.5 - 2	40
S-1	0 - 0.5	15.0
	0.5 - 1	45
	1 - 1.2	56
S-2	0 - 0.5	8.0
	0.5 - 1	50
	1 - 1.2	44
S-3	0 - 0.5	16.0
	0.5 - 1	65
	1 - 1.1	60

**Figure 2**

**Foss Property**  
 Route 100  
 North Hyde Park, VT

**Site Map with Soil Boring PID Levels**

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Date: Sept 1997      Job Type: Fuel Oil Spill



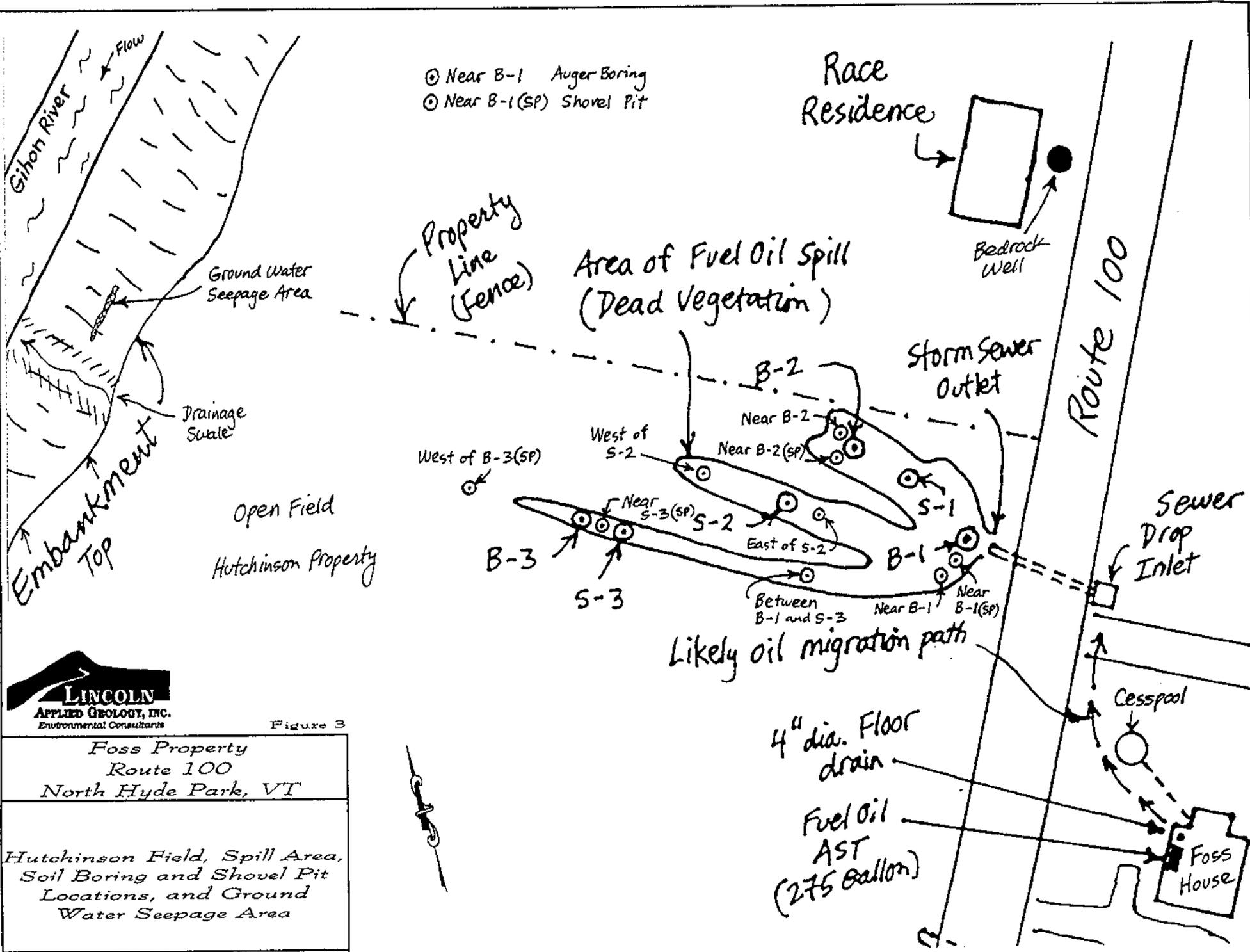


Figure 3

Foss Property  
Route 100  
North Hyde Park, VT

Hutchinson Field, Spill Area,  
Soil Boring and Shovel Pit  
Locations, and Ground  
Water Seepage Area

# Attachment A

Soil and Ground Water Quality  
Laboratory Reports  
for  
August 20 and 21, 1997

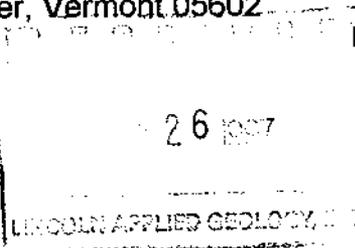
# Green Mountain Laboratories, Inc.

RR#3 Box 5210

Montpelier, Vermont 05602

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Fax (802) 223-8688



## LABORATORY RESULTS

CLIENT NAME:	Lincoln Applied Geology	REF #:	2587
ADDRESS:	RD#1, Box 710 Bristol, Vermont 05443	PROJECT NO.:	N/A
SAMPLE LOCATION:	Foss Residence	DATE OF SAMPLE:	08/20/97
SAMPLER:	Rick Vandenberg	DATE OF RECEIPT:	08/20/97
ATTENTION:	Rick Vandenberg	DATE OF ANALYSIS:	08/25/97
		DATE OF REPORT:	08/26/97

### Total Petroleum Hydrocarbons (TPH) Results by EPA Modified 8100

Sample	Result (mg/l-ppm)*
NEAR B-1	<50
NEAR S-3	<50
NEAR B-2	<50

\* Carbon Range C9-C40 - Fuel (Diesel) and Lubricating Oil Range Organics.

Reviewed by:

Raul Sanchez  
Chemical Services



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## LABORATORY RESULTS

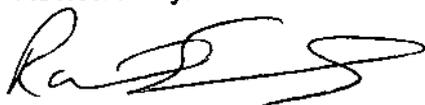
CLIENT NAME:	Lincoln Applied Geology	REF #:	2592
ADDRESS:	RD#1, Box 710 Bristol, Vermont 05443	PROJECT NO.:	N/A
SAMPLE LOCATION:	Foss Residence	DATE OF SAMPLE:	08/21/97
SAMPLER:	Rick Vandenberg	DATE OF RECEIPT:	08/21/97
ATTENTION:	Jeremy Revell	DATE OF ANALYSIS:	08/26/97
		DATE OF REPORT:	08/28/97

### Total Petroleum Hydrocarbons (TPH) Results by EPA Modified 8100

Sample	Result (mg/l-ppm)*
Ground Water Seep	<0.5

\* Carbon Range C9-C40 - Fuel (Diesel) and Lubricating Oil Range Organics.

Reviewed by:



Raul Sanchez  
Chemical Services

