Phase (check one)	Type (check one)
☐ Initial Site Investigation ☐ Corrective Action Feasibility Investigation ☐ Corrective Action Plan ☐ Corrective Action Summary Report ☐ Operations & Monitoring Report	☐ Work Scope ☐ Technical Report ☐ PCF Reimbursement Request ☐ General Correspondence

SITE INVESTIGATION

Peacham Town Garage
Ricker Hill Road
Peacham, Vermont 05862

SMS Site # 97-2231

Prepared For:
Peacham Selectboard
P.O. Box 244
Peacham, Vermont 05862
(802) 592-3218
Contact: Ms. Phyllis Randall, Peacham Town Clerk

Prepared By:
THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, Vermont 05602
(802) 229-4600
Contact: Mr. Eric R. Hanson, CGWP

February 11, 1998

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering

February 11, 1998

Peacham Selectboard
Town of Peacham
P.O. Box 244
Peacham, Vermont 05862

Re: Site Investigation Report for Peacham Town Garage; Peacham, Vermont
Vermont SMS # 97-2231.
JCO No. 1-1640-4.

Dear Peacham Selectboard:

The Johnson Company is pleased to present our site investigation report for the referenced property. The results of this investigation indicate that there are no concentrations of chemical compounds found in diesel fuel above detection limits in the groundwater immediately adjacent to and hydraulically downgradient of the former diesel fuel underground storage tank at the town garage. We are recommending no further site investigation or remediation activities for this site.

Please review the site investigation report, and call with any questions.

Respectfully Submitted,

THE JOHNSON COMPANY, INC.

By: _____
Eric Hanson, CGWP
Project Hydrologist
email: ehanson@jcomail.com

cc: Bob Butler, Vermont Waste Management Division

enclosure

Reviewed By: dmm
I:\PROJECTS\1-1640-4\SLRPT February 6, 1998 erh

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

The Johnson Company performed a site investigation at the Peacham Town Garage (the Site) in Peacham, Vermont on January 29, 1998 at the request of the Vermont Waste Management Division's Sites Management Section (SMS) and the Town of Peacham. The site investigation was performed to determine the degree and extent of petroleum-contaminated soil and groundwater on the Site associated with release(s) from a former diesel fuel underground storage tank (UST) that was removed from the Site in July 1997, and to identify potential sensitive receptors of any contamination that may exist.

The site investigation included the installation of one temporary and three permanent groundwater monitoring wells by Adams Engineering, Inc. of Underhill, Vermont and The Johnson Company; screening of soils for the presence of volatile organic compound (VOC) vapors using a photoionization detector (PID); and groundwater sampling for laboratory analysis for the presence of petroleum-related VOCs. The monitoring wells were installed at four locations immediately adjacent to and hydraulically downgradient of the former UST. All coreholes in which the monitoring wells were installed were completed to refusal (likely bedrock) in the silty sand overburden on the Site.

The only elevated VOC vapor concentrations (as measured with the PID) and petroleum odors were noted at the coring location closest to the former UST (JCO-1). At each of the locations, monitoring wells were installed to allow the collection of groundwater samples. We performed a level survey of the monitoring wells and measured the depths to groundwater prior to the collection of groundwater samples to develop a groundwater contour map. The groundwater beneath the Site is flowing south-southwestward towards East Peacham Brook which is adjacent to the Site. East Peacham Brook was identified as the only sensitive receptor associated with the Site.

The Johnson Company collected groundwater samples on January 29, 1998 at the Site from the groundwater monitoring wells. A duplicate sample was also collected from temporary monitoring well JCO-1 for quality assurance purposes. These samples were analyzed by The Johnson Company's in-house laboratory for petroleum- related VOCs and for total petroleum hydrocarbons (TPH) using Environmental Protection Agency (EPA) Methods 8020 and modified 8100, respectively.

No petroleum-related VOCs in concentrations above the 2 microgram per liter (µg/L) detection limit were noted in groundwater samples collected from any of the monitoring wells. Only trace concentrations of TPH below the laboratory detection limit of 1 milligram per liter (mg/L) were noted in the groundwater sample collected from temporary monitoring well JCO-1.

Soil and groundwater information collected during this site investigation indicate that petroleum-contaminated silty sand soils exist in the vicinity immediately hydraulically downgradient of the former UST (at the location of temporary monitoring well JCO-1). However, no resultant petroleum-related groundwater contamination was observed above the laboratory detection limits of 2 µg/L in groundwater samples collected immediately adjacent to and hydraulically downgradient of the former UST. East Peacham Brook is not being affected by contaminated groundwater. Therefore, we recommend no additional site investigation or remedial activities for this Site.

1.0 INTRODUCTION

The Johnson Company has completed a site investigation at the Peacham Town Garage (the Site) located on Ricker Hill Road in Peacham, Vermont (Figure 1, SMS Site # 97-2231). This investigation was performed at the request of the Vermont Waste Management Division's Sites Management Section (SMS) and the Town of Peacham Selectboard. The purpose of the site investigation was to determine the degree and extent of petroleum-related soil and groundwater contamination on the Site attributable to a former diesel fuel underground storage tank (UST) that was removed from the Site in July 1997 under the direction of Marin Environmental, Inc. of Colchester, Vermont. A new 6,000 gallon replacement UST has since been installed at the Site in approximately the same location of the closed UST.

The performance of site investigation to further investigate soil contamination noted during the UST closure was requested by Mr. Chuck Schwer of the SMS in an October 30, 1997 letter to Ms. Phyllis Randall, Peacham Town Clerk. The Johnson Company responded to a request to environmental consultants by the Peacham Selectboard to perform the site investigation work. The Johnson Company received word of approval of our November 18, 1997 work plan for the site investigation in a copy of a January 1, 1998 letter from the SMS to Ms. Randall, and we proceeded with scheduling the work.

2.0 SITE INVESTIGATION

The Johnson Company completed the fieldwork for the site investigation on January 29, 1998. Components of the site investigation included the installation of four small-diameter groundwater monitoring wells, screening of soils for VOC vapors, groundwater sampling and analysis, and identification and evaluation of potential sensitive receptors.

2.1 MONITORING WELL INSTALLATION AND SOIL SCREENING

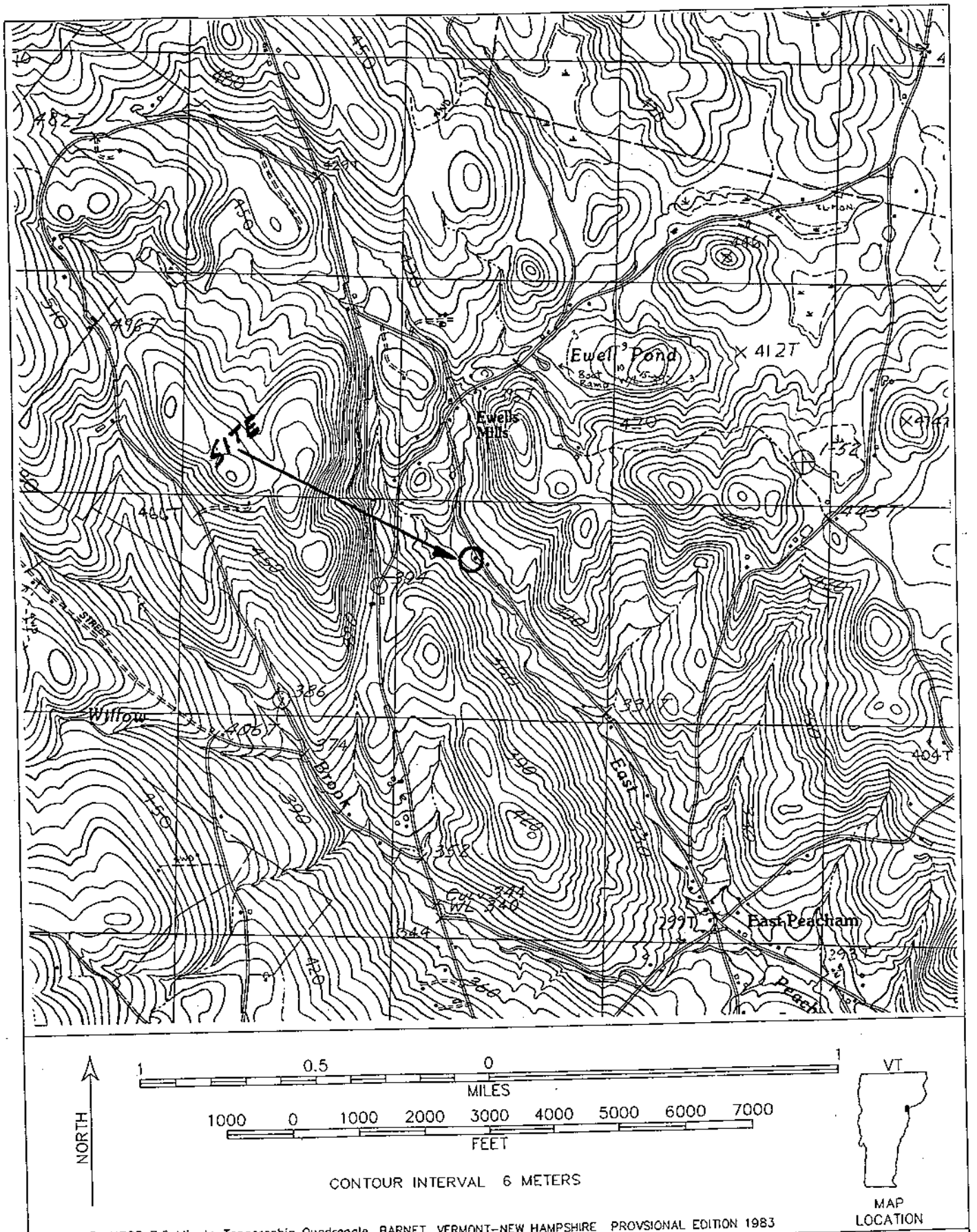
2.1.1 Monitoring Well Installation

Because of the topography and access limitations associated with the Site, one temporary and three permanent monitoring wells were installed using two different methods. Adams Engineering, Inc. of Underhill, Vermont used their pickup truck-mounted vibratory coring rig to install one, one-inch diameter temporary monitoring well on the Site immediately downgradient of the UST location (JCO-1) as shown on Figure 2. This portion of the Site consists of several feet of sandy fill over the native silty sand soils. The ground surface drops off steeply approximately 20 feet southwest of temporary

monitoring well JCO-1 to an area of native soils (i.e., no fill) near the southeastward flowing East Peacham Brook. The corehole for temporary monitoring well JCO-1 was installed using a vibratory driven core barrel with a cylindrical clear plastic lining for soil core retrieval. The well was constructed of stainless steel 0.006-inch factory-slotted screen (five-foot screen interval) surrounded by the native and fill soils, and solid stainless steel riser pipe.

In the area below the filled area near East Peacham Brook, we used a 3½-inch diameter hand auger to create boreholes into which permanent monitoring wells JCO-2, JCO-3, and JCO-4 were installed (Figure 2). These monitoring wells were constructed of 1-inch diameter PVC screen and PVC riser. The annular space around the screened intervals were sandpacked and a bentonite seal was placed in the annular space above the sandpack. All the monitoring wells were placed in the selected locations to enable the collection of soil and groundwater samples near the location of the former UST and hydraulically downgradient of the former UST. At all coring locations, soil samples were collected for stratigraphic analysis and screening for volatile organic compound (VOC) vapors with a photoionization detector (PID). All coreholes were completed to refusal (likely bedrock). Detailed drilling logs are included in Appendix A.

After the completion of the monitoring well installation, we performed a level survey of the top-of-casing for monitoring wells JCO-1 through JCO-4 to determine their relative elevations. An arbitrary datum elevation of 100 feet at the top of casing for temporary monitoring well JCO-1 was chosen. With this and depth to groundwater information, we developed a groundwater contour map for January 29, 1998 (Fig. 2).



BASE MAP: USGS 7.5 Minute Topographic Quadrangle BARNET, VERMONT–NEW HAMPSHIRE PROVSIONAL EDITION 1983

FIGURE 1: SITE LOCATION MAP
PEACHAM TOWN GARAGE
PEACHAM, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602

1-1640-4\SITE.dwg

NOTE: ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

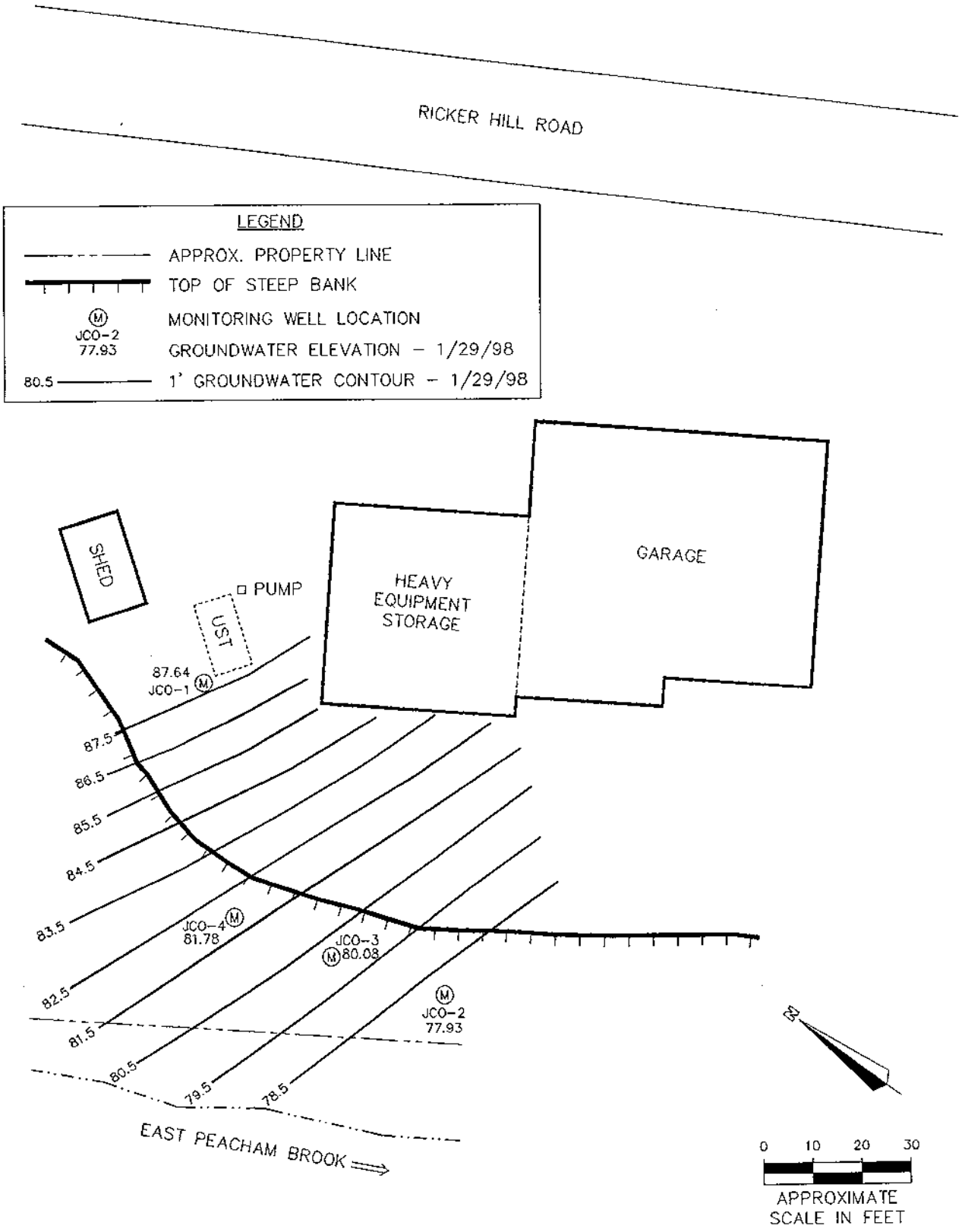


FIGURE 2: SITE SKETCH
PEACHAM TOWN GARAGE
PEACHAM, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602

2.1.2 *Soil Screening*

During the installation of monitoring wells JCO-1 through JCO-4, soil samples collected from the coreholes were screened via a resealable plastic bag method for the presence of VOC vapors using a PID. The PID, a Thermo Environmental Model 580B OVM, was calibrated on-site to 100 parts per million (ppm) isobutylene gas. For the resealable plastic bag headspace method, soil samples were placed in quart-sized resealable plastic bags to fill the bags approximately halfway. The bags were sealed and allowed to sit in a sunny area for several minutes after which time the tip of the PID was inserted into the bags to collect the VOC vapor concentration readings. The maximum reading from each sample was recorded. The results of the headspace analyses, and other pertinent monitoring well installation information, are presented on the drilling logs in Appendix A. The only notably elevated PID readings were noted in the soils from 10 to 13.8 feet below ground surface at temporary monitoring well JCO-1 where a peak reading of 47 ppm was observed. No evidence of free product was noted in any of the soil samples.

2.1.3 *Groundwater Sampling*

Prior to sampling, the static water level in each of the monitoring wells was measured using an electronic water level indicator. Using the level survey data, we developed a groundwater contour map for the Site on January 29, 1998 that is shown on Figure 2. As can be noted, the groundwater flow direction in the vicinity of the former UST is generally south-southwestward towards East Peacham Brook.

All groundwater samples were collected using a small-diameter disposable (i.e., single use) bailer. A duplicate sample collected from temporary monitoring well JCO-1 was submitted for laboratory analysis for quality assurance/quality control purposes.

After the groundwater samples were collected, they were immediately chilled in a cooler until their delivery to The Johnson Company where they were analyzed by our in-house laboratory for benzene, toluene, ethylbenzene, and xylenes (BTEX) using Environmental Protection Agency (EPA) Method 8020 and for total petroleum hydrocarbons (TPH) using Modified EPA Method 8100. The complete laboratory report is included in Appendix B. No detectable concentrations of BTEX or TPH

were noted in any of the groundwater samples. Trace concentrations of TPH below the 1 milligram per liter (mg/L) detection limit were identified in the original and duplicate samples collected from temporary monitoring well JCO-1. There is no groundwater enforcement standard for TPH.

2.2 POTENTIAL SENSITIVE RECEPTORS

During the site investigation, we performed a survey to identify potential sensitive receptors of soil and groundwater contamination in the area. Besides soil and groundwater, the only sensitive receptor identified was East Peacham Brook located immediately to the southwest of the Site. There are no nearby basements that could be affected by soil vapor contamination (the nearest residence is across Ricker Hill Road and southeast of the town garage, approximately 750 feet away and upgradient of the Site), and the water supply for the town garage is a spring located hydraulically upgradient of the former UST location, up a hill on the opposite (northeastern) side of Ricker Hill Road. According to Marin Environmental's July 17, 1997 UST closure assessment report, the water supply for the nearby residence is an on-site bedrock well.

3.0 DISCUSSION

Soil and groundwater information collected during this site investigation indicate that petroleum-contaminated soils exist in the immediate vicinity of the former UST. One-half of the soil samples collected by Marin Environmental during the UST closure had VOC vapor concentrations greater than 10 ppm as measured with a PID. Therefore, assuming that approximately 190 cubic yards of soil were excavated during the UST closure (using the 6,500 cubic feet excavation volume presented on the UST Closure Form included with Marin Environmental's July 17, 1997 UST closure assessment report minus the UST volume), an estimated 95 cubic yards of soil exhibiting PID readings of greater than 10 ppm remain in the ground. However, we observed no resultant BTEX groundwater contamination above our laboratory detection limits of 2 micrograms per liter (µg/L) in groundwater samples collected immediately adjacent to and hydraulically downgradient of the former UST. Only trace concentrations of TPH, below the 1 mg/L detection limit, were noted in the groundwater sample collected immediately adjacent to the former UST.

Assuming that the soil contamination has been present since at least July 1997 (when it was observed during the UST closure, about 200 days prior to the site investigation) and a groundwater velocity of 0.3 feet per day (a conservative estimate based upon an estimated hydraulic conductivity of 1 foot/day, a porosity of 0.40, and a hydraulic gradient of 0.12 feet/foot), groundwater passing through contaminated soil associated with the former UST has traveled 60 feet, or at least as far as each one of the groundwater sampling locations tested during this investigation, with the possible exception of monitoring well JCO-2. Because no BTEX contamination of groundwater above the 2 µg/L detection limit was noted at any of the sampling locations, this suggests that the petroleum-related contaminants in the soil are effectively adsorbed and will naturally attenuate without migration to receptors.

Bedrock groundwater was not sampled during this site investigation. According to Marin Environmental's UST closure assessment report dated July 17, 1997, at the time of the tank closure on July 15, 1997, no groundwater was noted in the UST excavation to a depth of 13 feet, where bedrock was encountered. This suggests the presence of an intermittent or seasonal groundwater table in the unconsolidated deposits beneath the former UST location. The remaining source for potential groundwater contamination is the petroleum-contaminated soil placed back into the UST excavation at the time of closure. Groundwater may contact this area during times when there is a water table present in the unconsolidated deposits, as there was during this site investigation, that would be in contact with bedrock groundwater via fractures in the bedrock. However, minimal to non-detectable concentrations of petroleum-related compounds were noted in the groundwater during this site investigation. Therefore, it is unlikely that concentrations of petroleum-related compounds in bedrock groundwater exceed applicable groundwater enforcement standards.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The site investigation performed at the Peacham Town Garage indicates that, although residual petroleum-related soil contamination exists in the vicinity of the former UST, the contaminated soil is not resulting in groundwater contamination above any applicable standards. East Peacham Brook is not being affected by contaminated groundwater and no other receptors are being affected. Therefore, we recommend no further site investigation or remedial activities, and that the SMS consider Site Management Activity Completed (SMAC) status for this Site.

Appendix A

Drilling Logs

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

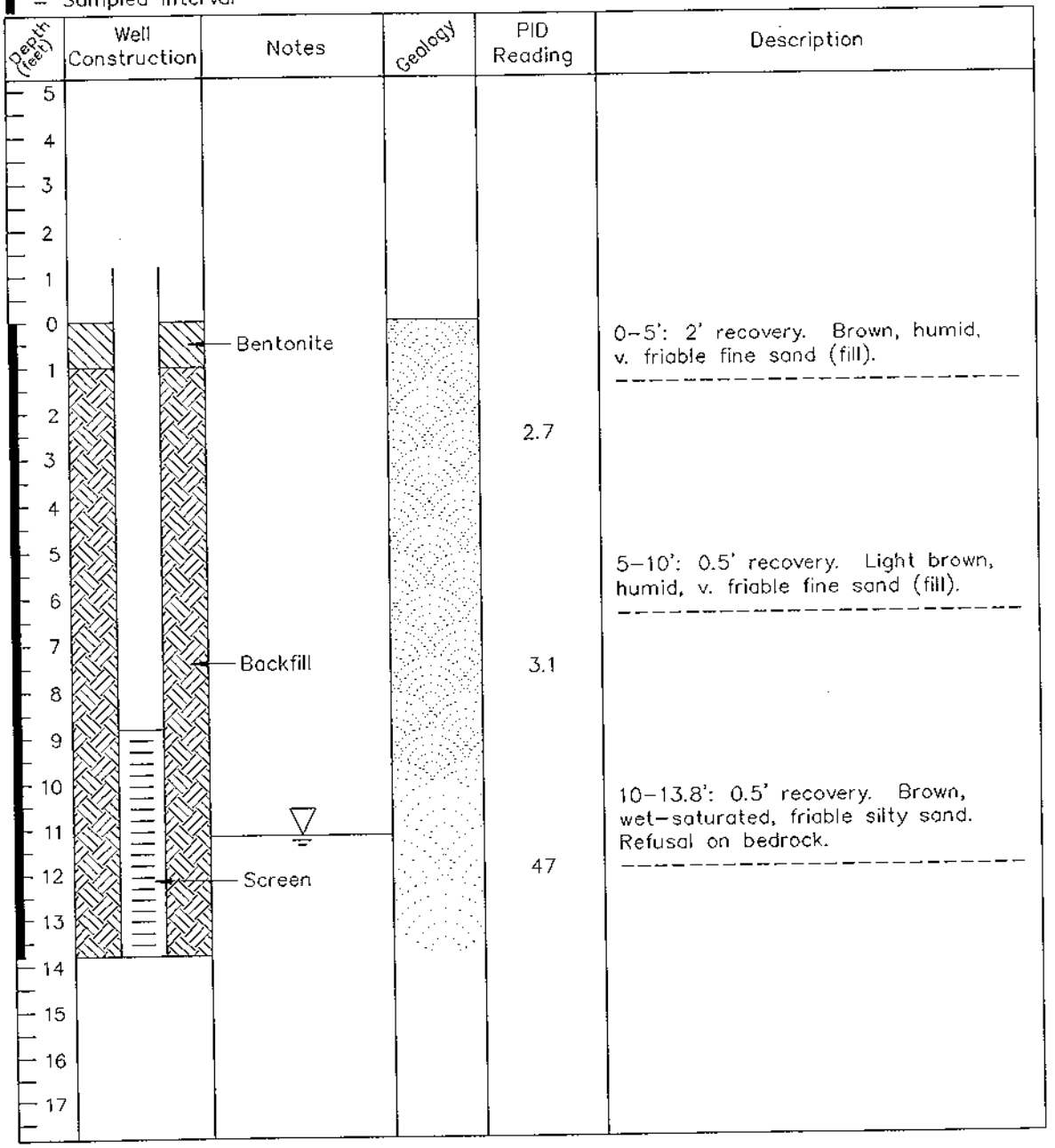
DRILLING LOG
WELL # JCO-1

Project: Peacham Town Garage
Location: Peacham, Vermont
Job # 1-1640-4
Logged By: ERH
Date Drilled: 1/29/98
Driller: Adams Engineering
Drill Method: Vibratory Coring

Casing Type: Stainless Steel
Casing Diameter: 1.0 in.
Casing Length: 10.0 ft.
Screen Type: Stainless Steel
Screen Diameter: 1.0 in.
Screen Length: 5.0 ft.
Slot Size: .006"

Total Pipe: 15.0 ft.
Stick Up: 1.2 ft.
Total Hole Depth: 13.8 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 11.2 ft.
Surface Elevation: ---
T.O.C. Elevation: 100.00'

■ = Sampled Interval



The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

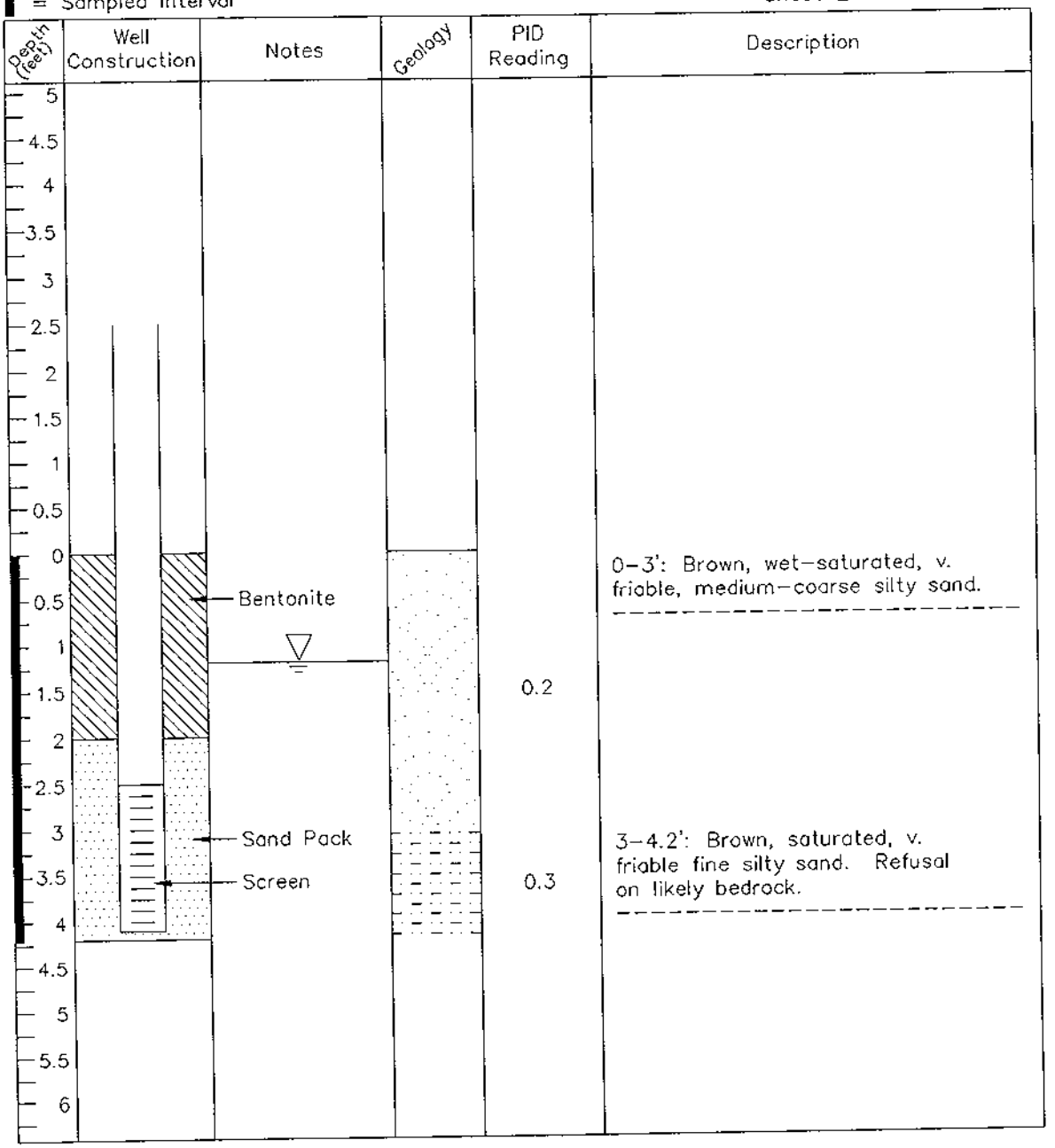
DRILLING LOG
WELL # JCO-2

Project: Peacham Town Garage
Location: Peacham, Vermont
Job # 1-1640-4
Logged By: ERH
Date Drilled: 1/29/98
Driller: ERH
Drill Method: Hand Auger

Casing Type: PVC
Casing Diameter: 1.0 in.
Casing Length: 5.0 ft.
Screen Type: PVC
Screen Diameter: 1.0 in.
Screen Length: 1.6 ft.
Slot Size: 0.010"

Total Pipe: 6.6 ft.
Stick Up: 2.5 ft.
Total Hole Depth: 4.2 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 1.2 ft.
Surface Elevation: -
T.O.C. Elevation: 81.62

▌ = Sampled Interval



The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

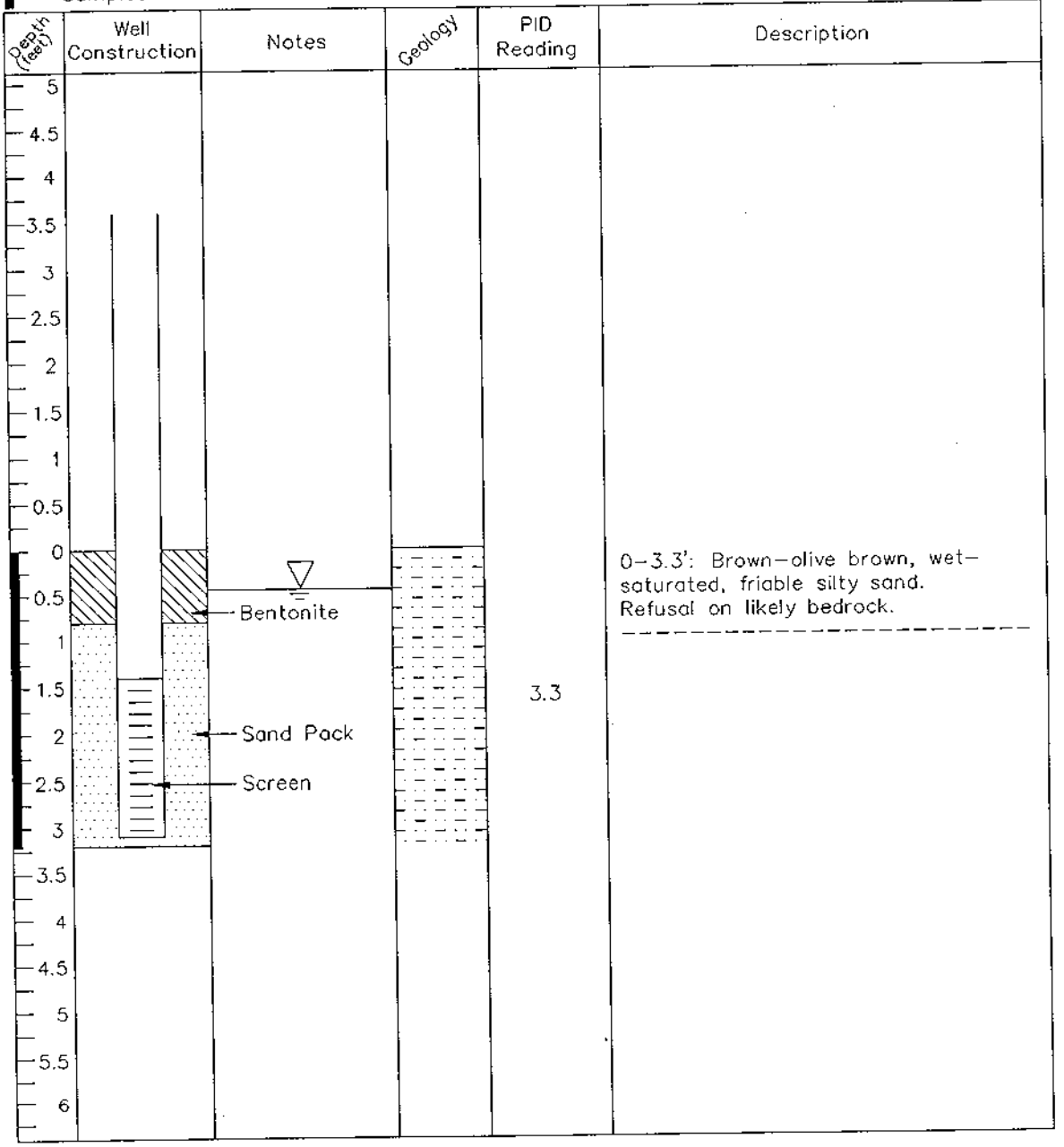
DRILLING LOG
WELL # JCO-3

Project: Peacham Town Garage
Location: Peacham, Vermont
Job # 1-1640-4
Logged By: ERH
Date Drilled: 1/29/98
Driller: ERH
Drill Method: Hand Auger

Casing Type: PVC
Casing Diameter: 1.0 in.
Casing Length: 5.0 ft.
Screen Type: PVC
Screen Diameter: 1.0 in.
Screen Length: 1.7 ft.
Slot Size: 0.010"

Total Pipe: 6.7 ft.
Stick Up: 3.6 ft.
Total Hole Depth: 3.2 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 0.4 ft.
Surface Elevation: —
T.O.C. Elevation: 84.08

▌ = Sampled Interval



The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

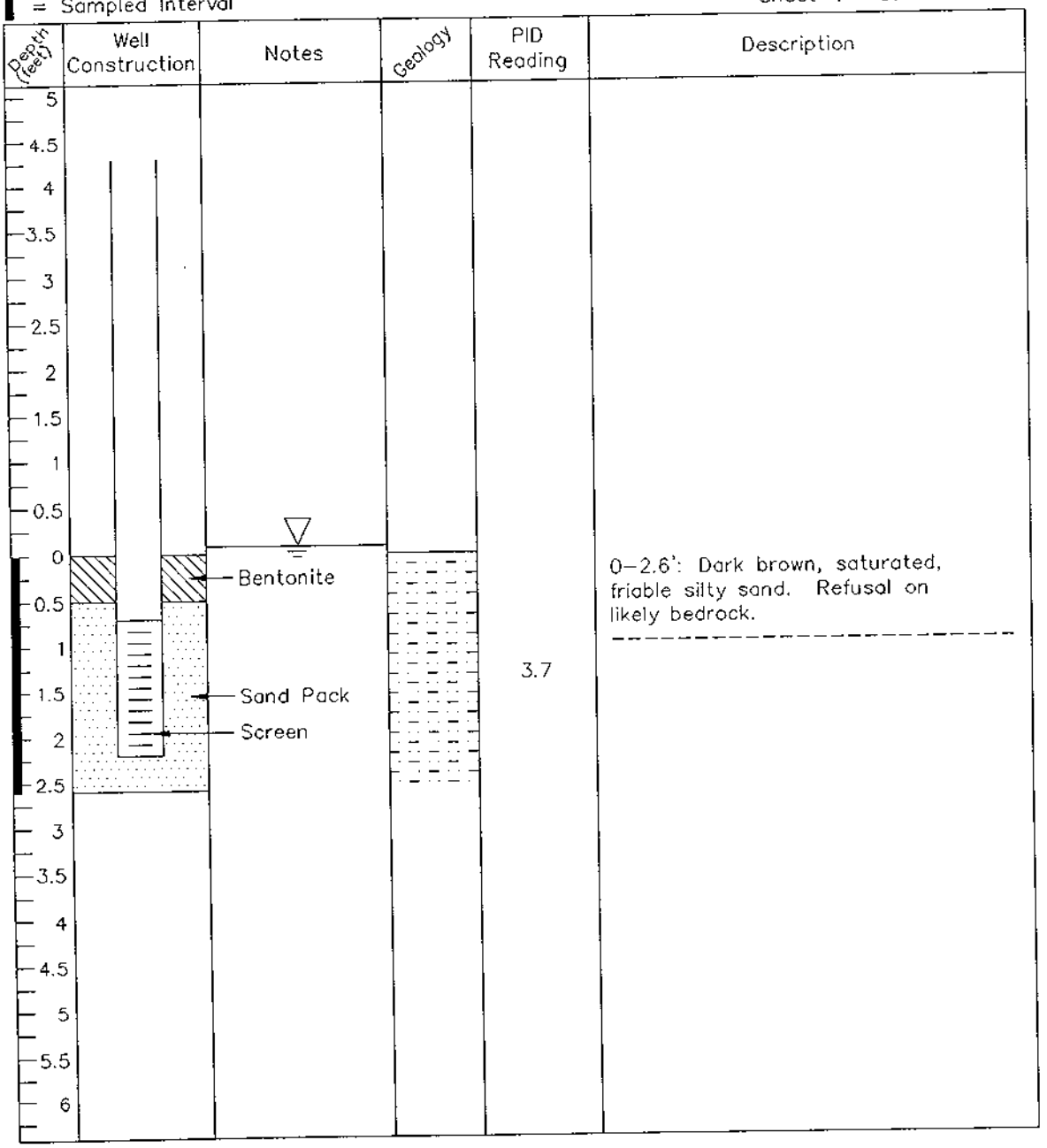
DRILLING LOG
WELL # JCO-4

Project: Peacham Town Garage
Location: Peacham, Vermont
Job # 1-1640-4
Logged By: ERH
Date Drilled: 1/29/98
Driller: ERH
Drill Method: Hand Auger

Casing Type: PVC
Casing Diameter: 1.0 in.
Casing Length: 5.0 ft.
Screen Type: PVC
Screen Diameter: 1.0 in.
Screen Length: 1.5 ft.
Slot Size: 0.010"

Total Pipe: 6.5 ft.
Stick Up: 4.3 ft.
Total Hole Depth: 2.6 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: -0.1 ft.
Surface Elevation: -
T.O.C. Elevation: 85.95

▌ = Sampled Interval



Appendix B

Laboratory Analytical Report

The JohnsonCompany
GC Laboratory Results Sheet

All water analyses reported as ug/L.
All soil analyses reported as ug/Kg.

Sample Name	Lab ID	DF	B	Q	T	Q	E	Q	X	Q	TPH	Q
Peacham Town Garage - JCO # 1-1640-4												
JCO-1	Peacham04	1.0	2	U	2	U	2	U	2	U	TBQ	U
JCO-DUP	Peacham05	1.0	2	U	2	U	2	U	2	U	TBQ	U
JCO-2	Peacham01	1.0	2	U	2	U	2	U	2	U	1000	U
JCO-3	Peacham02	1.0	2	U	2	U	2	U	2	U	1000	U
JCO-4	Peacham03	1.0	2	U	2	U	2	U	2	U	1000	U

TBQ = Traced below quantitation limit.

CHAIN OF CUSTODY RECORD

№ 1858

Client/Project Name	Project Location
Peacham Town Garage	Peacham, VT
Project No.	**Field Logbook No.**
1-1640-4(042)	
Sampler: (Signature)	**Chain of Custody Tape No.**

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	ANALYSES: BTEX	ANALYSES: TPH (Gas, diesel)	REMARKS
JCO-1	1/29/97	12:00		WATER	↓	↓	
JCO-2		12:15					
JCO-3		12:30					
JCO-4		12:45					
JCO-DUP	↓	–		↓	↓	↓	

	Date	Time		Date	Time
Relinquished by: (Signature)	1/29/97 EH	9:15 AM	Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received for Laboratory: (Signature)	1/30/97	9:15 AM
Sample Disposal Method:			Disposed of by: (Signature)		

SAMPLE COLLECTOR

100 X State Street
Montpelier, VT 05602
(802) 229-4600
Fax: (802) 229-5876

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering

ANALYTICAL LABORATORY

JCO – MDR

1974-3-84

WHITE - To accompany sample to the lab and returned to the Johnson Co. YELLOW - Lab copy PINK - Transporter copy ORANGE - Sampler copy