GRIFFIN INTERNATIONAL INC

September 22, 1999

Mr. Chuck Schwer
VT Department of Environmental Conservation
Waste Management Division
103 South Main St./ West Bldg.
Waterbury, VT 05671-0404

RE: Subsurface Investigation, Army Maintenance Facility, Rutland, VT,
(VTDEC #98-2563)

Dear Chuck:

Enclosed please find the September 1999 *Report on the Site Investigation of Suspected Subsurface Petroleum Contamination* for Army Maintenance Facility site in Essex Junction, Vermont. Mr. Rod Cioffi requested that we forward a copy to you. Please call if you have any questions or comments.

Sincerely,

Timothy J. Kelly, PG
Staff Geologist

Encl.

cc: Rod Cioffi
GI #39941500

P.O. Box 943 • Williston, VT 05495 • Phone 802-865-4288 • Fax 802-657-4129
59 Clinton Street • Plattsburgh, NY 12901 • Phone 518-562-4666 • Fax 518-561-6832

REPORT ON THE SITE INVESTIGATION OF SUSPECTED SUBSURFACE PETROLEUM CONTAMINATION

AT

ARMY MAINTENANCE FACILITY
24-26 Allen Street
Rutland, Vermont

VTDEC Site #98-2563
Griffin Proj. #39941500

September 21, 1999

Prepared For:

Mr. Rod Cioffi
Alvin Properties
171 US Route 4 East
Woodstock Ave
Rutland, VT 05701

Prepared by

GRIFFIN INTERNATIONAL

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Williston, Vermont 05495
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TABLE OF CONTENTS

I. INTRODUCTION

This report provides a summary of the tasks completed for the site investigation of suspected subsurface petroleum contamination at the Army Maintenance Facility (Site), 24-26 Allen Street, Rutland, Vermont (see Site Location Map in Appendix A). Results of the following investigative tasks performed by Griffin International, Inc., (Griffin) are presented:

- ◊ monitoring well installation;
- ◊ site survey;
- ◊ determination of groundwater flow direction and gradient;
- ◊ groundwater sampling and analyses;
- ◊ sensitive receptor survey.

The work for the initial site investigation was performed based on a request from Mr. Chuck Schwer of the Vermont Department of Environmental Conservation (VTDEC) in a letter to Mr. Rod Cioffi of Alvin Properties dated February 24, 1999. Work for the initial site investigation was performed in accordance with the March 3, 1999, *Work Plan and Cost Estimate for an Initial Site Investigation of Suspected Subsurface Petroleum Contamination*, prepared by Griffin. Mr. Cioffi gave verbal approval of the work plan in a telephone conversation with Mr. Timothy Kelly of Griffin on March 16, 1999. Mr. Schwer approved the March 3, 1999, work plan and cost estimate in a letter to Mr. Cioffi dated April 6, 1999.

II. SITE BACKGROUND

The Site is located at 24-26 Allen Streets, Rutland, Vermont (see Site Location Map and Area Map in Appendix A). Topography at the Site slopes gently to the west and northwest. The Site is bounded to the north by Allen Street, across which is a Comfort Inn, and bordered on the east by a deli and convenience store. The Site is bordered on the south by the parking lot for the facility. The Site is bordered on the west by a parking lot and a railroad track. The Moon Brook flows to the southwest approximately 1,400 feet north of the Site. The Site and the surrounding properties are served by a municipal water supply. The site is underlain by well-sorted littoral (beach) sand according to the *Surficial Geologic Map of Vermont* (Ref. 1).

One, 1,000-gallon underground storage tank (UST) formerly used to contain diesel fuel (UST1) and one 2,000-gallon UST formerly used to contain gasoline (UST2), were removed and permanently closed at this facility on December 14, 1998. No replacement USTs were installed. A UST closure report was subsequently forwarded to the VTDEC UST program by Griffin (Ref. 2). Samples of soil excavated from around the USTs were collected and screened on-site for volatile organic compounds (VOCs) with an HNu HW-101 photoionization detector (PID) equipped with a 10.2 eV lamp. Soils in the former UST1 excavation exhibited an average headspace concentration of 38 parts per million volume (ppmv) at depths ranging from 2 feet to approximately 7 feet below grade. Soils in former UST2 excavation exhibited an average headspace concentration of 149 ppmv at depths ranging from 1 foot to approximately 8 feet

below grade. The USTs were reported to be in fair to poor condition. No holes were reported to have been observed in the USTs. Based on the data obtained during the UST closure inspection, the contamination observed in the UST excavation was likely due to historical spills and overfills in the vicinity of the two USTs.

III. INVESTIGATIVE PROCEDURES

To further define the extent of subsurface petroleum contamination in the area of the Site, the following additional investigative tasks were undertaken as per the March 3, 1999, Work Plan: installation of four monitoring wells; site survey; determination of groundwater flow direction and gradient; groundwater sampling and analyses for petroleum-related constituents; and an evaluation of sensitive receptors.

A. Monitoring Well Installation

On May 28, 1999, four shallow monitoring wells were installed at the site (see Site Map in Appendix A). The boreholes were installed utilizing hollow-stem auger drilling methods. T&K Drilling, of Troy, New Hampshire, installed the wells under the direct supervision of a Griffin hydrogeologist. During borehole advancement, soil samples were collected from every five foot run. Soils were screened for VOCs using an HNu™ Model HW-101 PID, equipped with a 10.2 eV lamp, using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol, which conforms to state and industry standards. Soil characteristics and headspace concentrations were recorded by the hydrogeologist in detailed well logs which are presented in Appendix B. MW1 was installed west of the maintenance facility building in the vicinity of the former UST2 location. MW2 was installed in a presumed downgradient direction from the former UST2 location. MW3 was installed in a presumed downgradient direction from the former UST1 location. MW4 was installed in the vicinity of the former UST1 location.

#2 - Jan

1 - dy

Wells were completed with 2-inch diameter, Schedule 40 PVC riser and factory-slotted screened intervals (0.010-inch slots). A silica sand pack was installed in the annular space surrounding the screened interval. The sand pack was brought to approximately 0.5 foot above the top of the screened interval in each well. A bentonite seal a minimum of 1 foot thick was installed in the annular space immediately above the sand pack. Each of the wells were completed with a flush-mounted road box and secured with a compression cap.

The soils encountered in the soil borings consisted of light brown, olive brown, and brown silty sand and sandy silt with local clay from grade to approximately 13 feet below grade. Groundwater was encountered at an average approximate depth of 6.4 feet below grade in the four on-site wells immediately after well installation. VOCs were detected in the headspace of soil samples collected from the MW1 boring at concentrations ranging from 1 to 200 ppmv. VOCs were detected in the headspace of the soil sample collected from MW2 at 10 to 12 feet below grade at a concentration of 1.5 ppmv. No VOCs were detected in the headspace of the soil samples collected from MW3. VOCs were detected in the headspace of soil samples collected from the MW4 at concentrations ranging from 15 to 85 ppmv. The 200 ppmv and 85 ppmv

measurements were made on the soils collected from the 5 feet to seven feet sample interval, in association with the water table.

The sediments encountered in these four soil borings were generally finer than the soils mapped on the *Surficial Geologic Map of Vermont* (Ref. 1).

B. Determination of Groundwater Flow Direction and Gradient

The four wells were located in azimuth and elevation for inclusion on the Site Map presented in Appendix A. The top of PVC casing in MW1 was assigned an arbitrary elevation of 100.00 feet. The locations of the maintenance facility building and other significant site features were surveyed for inclusion on this Site Map.

Prior to groundwater sampling on June 23, 1999, all four on-site monitoring wells were monitored for presence of free floating product and depths to water. Results are tabulated as Liquid Level Monitoring Data in Appendix C. No free-phase product was observed in any of the four on-site monitoring wells on June 23, 1999. For each well, the measured depth to water was subtracted from the surveyed elevation of the measurement reference point to determine the water table elevation. Water table elevations were plotted on the site map to generate the Groundwater Contour Map presented in Appendix A. From this figure it can be seen that the groundwater flow is directed generally to the northwest toward the Moon Brook at an approximate gradient of 1.7%.

C. Groundwater Sampling and Analyses

A groundwater sample was collected from each of the four monitoring wells, using disposable bailers, on June 23, 1999. Groundwater samples were analyzed by Endyne, Inc., laboratory of Williston, Vermont. The samples from all four wells were analyzed via by EPA Method 8021B for petroleum-related VOCs. The samples from MW3 and MW4 were also analyzed via EPA Method 8015B for total petroleum hydrocarbons (TPHs), diesel range organics (DRO). Quality Assurance/ Quality Control (QA/QC) samples (a trip blank and duplicate sample) were also collected and analyzed via EPA Method 8021B. Analytical results are summarized in tabular form in Appendix D. The applicable groundwater standards are provided for reference in this summary table. Appendix D also contains the analytical laboratory reports. Analytical results of the trip blank and duplicate sample indicate that adequate Quality Assurance/ Quality Control was maintained throughout sample collection and analyses.

No VOCs were reported in the samples collected from MW1 on June 23, 1999. 1,2,4-Trimethylbenzene was reported at a trace concentration below the detection limit in the sample collected from MW2 on June 23, 1999. No other VOCs were reported in the sample collected from MW2 on June 23, 1999. 1,2,4-Trimethylbenzene was reported at a concentration above the applicable Vermont Groundwater Enforcement Standard (VGES) in the sample collected from MW3 on June 23, 1999. Select other VOCs were reported at concentrations below the applicable VGES in the sample collected from MW3 on June 23, 1999. 1,3,5-Trimethylbenzene, 1,2,4-

trimethylbenzene, and naphthalene were reported at concentrations above the applicable VGES in the sample collected from MW4 on June 23, 1999. Select other VOCs were reported at concentrations below the applicable VGES in the sample collected from MW4 on June 23, 1999. TPHs were detected in the samples collected from MW3 and MW4 on June 23, 1999. There is no VGES for TPHs.

The total targeted VOC concentrations detected in the samples collected from the monitoring wells on June 23, 1999, were plotted on the site map to generate the Contaminant Concentration Map in Appendix A.

IV. EVALUATION OF POTENTIALLY SENSITIVE RECEPTORS

The following potentially sensitive receptors in the vicinity of Army Maintenance Facility site were identified:

- the existing Army Maintenance Facility building,
- the commercial properties in the immediate vicinity of the Site
- the Moon Brook, located approximately 1,400 feet south-southwest of the former

Risks of vapor impact to the existing Army Maintenance Facility building were determined to be minimal due to the low apparent source strength and because the building is built with a slab on grade. Therefore, the Army Maintenance Facility building was not screened for VOCs with a PID. Due to the low apparent source strength, the basement of the Comfort Inn north of the Site was not screened for VOCs with a PID. No petroleum vapors have been reported in this building to date. Based on the soil screening data from the soil borings advanced for monitoring well installation, there apparently has been minimal impact to soils above the water table outside the immediate vicinity of the former UST excavations and the associated pump islands.

Given the significant distance from the site to the Moon Brook, north of the site, and the low apparent source strength, the current risks posed to this surface water body are likely to be minimal.

Given that the depth of burial of water-bearing utilities is typically 6 feet below grade and the average depth to groundwater at this site was approximately 6.4 feet below the top of casing on June 23, 1999, it is possible that the on-site utility corridors may be a preferential route of migration for dissolved phase contamination. However, due to the low apparent source strength and the low dissolved petroleum concentrations reported in the downgradient wells MW2 and MW3, it is not expected that the concentration of dissolved phase contamination migrating to local subsurface utility corridors would be greater than the applicable VGES. Based on "Digsafe" markings and consultation with utility personnel, no utility corridors have been identified as trending through former UST source areas at the site.

The presence or absence of vapor phase contamination along utility corridors has not been assessed with field techniques. However, given the limited area of vadose-zone contamination and the low apparent source strength, as determined during the UST removal and this site investigation, it is not expected that vapor phase contamination would migrate to local utility corridors at a concentration of concern.

V. CONCLUSIONS

Based upon the results of the above investigative tasks, Griffin presents the following conclusions:

1) Based on the soil screening data from the UST removal, and the screening and laboratory analytical data from this investigation, it appears likely that the contamination at the site is the result of occasional spills and overfills associated with historical operation of the gasoline and diesel USTs formerly located at the site. These USTs were removed from the site on December 14, 1998.

2) Four monitoring wells were installed to approximately 13 feet below grade on May 28, 1999, to asses the degree and extent of petroleum impact to subsurface soils and groundwater at the site.

3) Based on the screening results from monitoring well installation, minimal adsorbed-phase contamination is present in the vadose zone at the site in the immediate vicinity of MW1 and MW4, which were installed in the area of the former UST excavations.

4) Groundwater was encountered at an approximate average depth of 6.4 feet below the top of casing on June 23, 1999. Based on the groundwater elevations measured on June 23, 1999, groundwater flows to the northwest at an approximate gradient of 1.7%.

5) No free-phase product was observed in any of the four on-site monitoring wells on June 23, 1999.

6) Dissolved petroleum-related compounds were detected at elevated levels in two of the four on-site wells (MW3 and MW4). The concentration of select petroleum-related VOCs in these two wells exceeded the applicable groundwater standards for the applicable compounds. No VOCs were reported in the samples collected from MW1 on June 23, 1999. 1,2,4-Trimethylbenzene was reported at a trace concentration below the detection limit in the sample collected from MW2 on June 23, 1999, which is below the applicable VGES for this compound. It is expected that dissolved petroleum constituent concentrations will decrease over time with the progressive action of natural mitigative processes, including biodegradation, dispersion, and dilution.

7) Risks posed to potentially sensitive receptors in the vicinity of Army Maintenance Facility appear minimal, based on currently available data.

VI. RECOMMENDATIONS

Based upon the above conclusions, Griffin recommends the following additional work. To document and confirm the expected reductions in constituent concentrations, one round of groundwater samples should be collected from the on-site wells MW3 and MW4 in the Summer of 2000 and analyzed by EPA Method 8021B for presence of petroleum-related VOCs. Based on the available data, no additional samples should be collected from MW1 and MW2. The depth to water should be measured in MW1 and MW2 concurrently with the sampling of MW3 and MW4 in the Summer of 2000. The need for additional site monitoring, if appropriate, will be reassessed following this second round of groundwater sampling.

Sample & gauge all wells
via 8260

because:

① 200 ppm in MW-1, but
no target analytes

② >10 ug/l in MW-2, -3, -4

Do they in April high water.

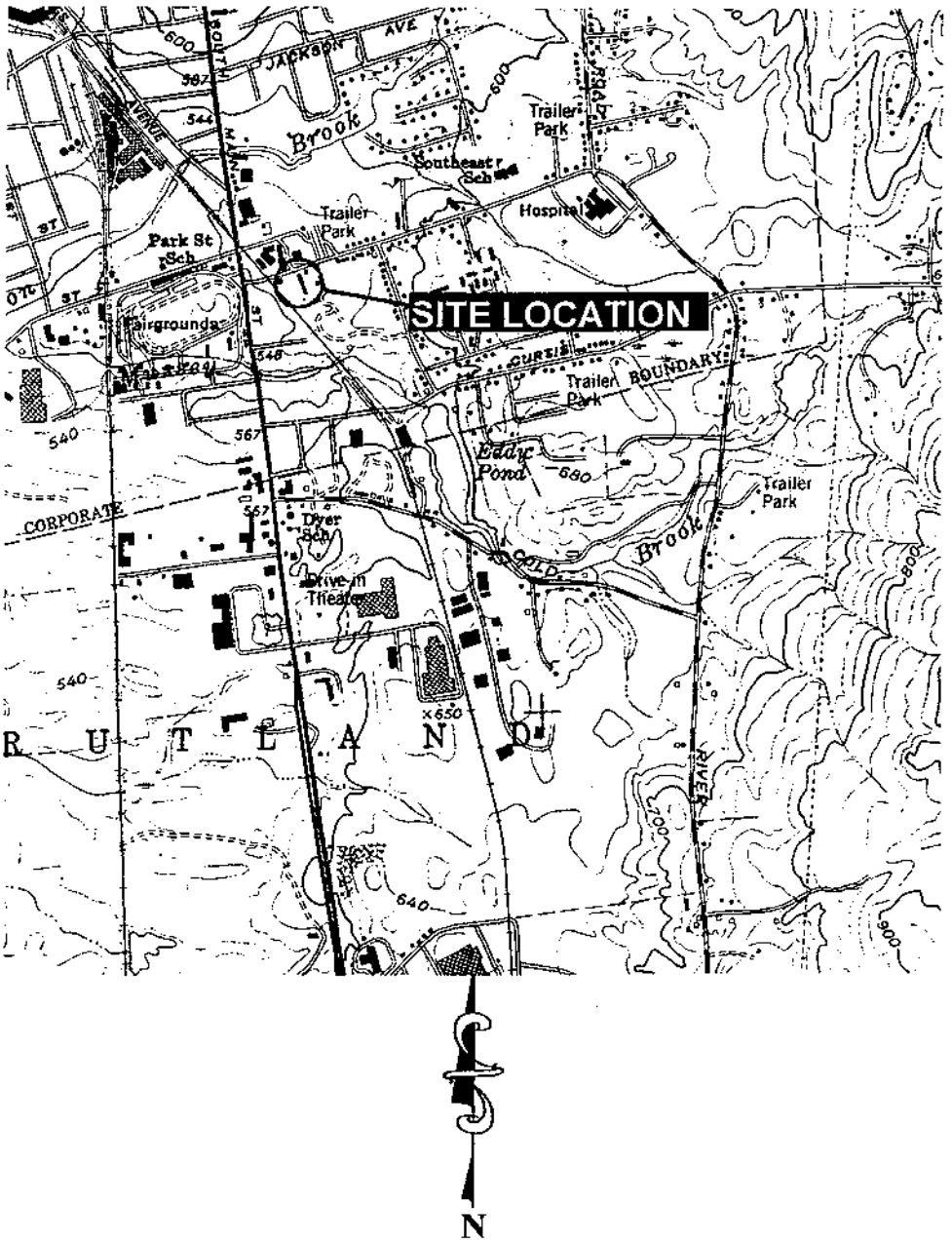
VII. REFERENCES

1. Doll, Charles G., D.P. Stewart, and P. MacClintock, eds., 1970, *Surficial Geologic Map of Vermont*, State of Vermont.

2. Griffin International, Inc., December 18, 1998, Underground Storage Tank Removal Report, Underground Storage Tanks at: Army Maintenance Facility, 24-26 Allen Street, Rutland, VT.

APPENDIX A

Site Maps

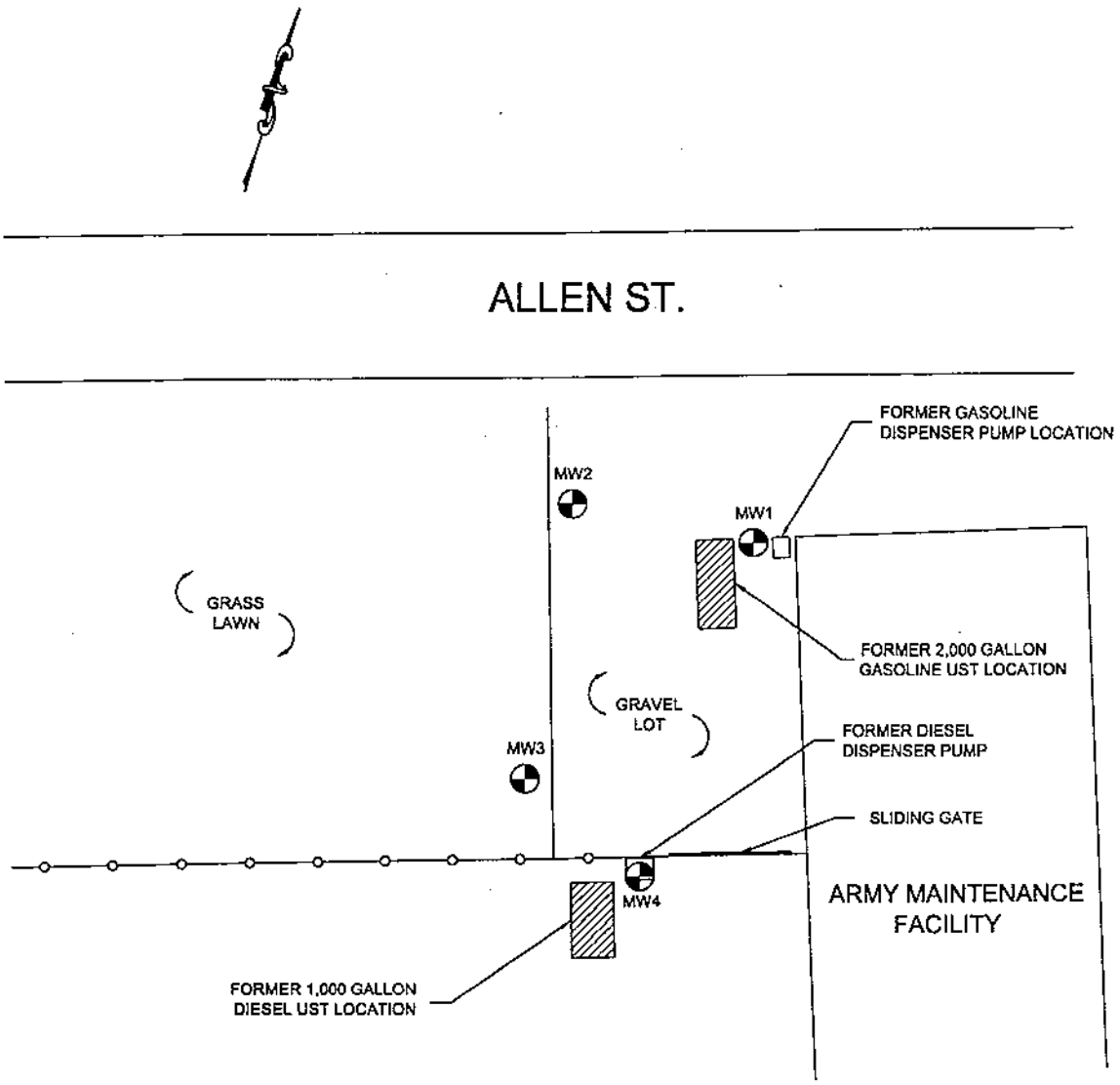


GRIFFIN INTERNATIONAL

GI# 39941500

SITE LOCATION MAP

ARMY MAINTENANCE FACILITY
RUTLAND, VT
Rutland (1988), VT, USGS
QUADRANGLE MAP
1 : 24,000 (1" =2,000')



SOURCE: GRIFFIN SURVEY JUNE 23, 1999

JOB #: 39941500 VTDEC SITE # 98-2563

GRIFFIN INTERNATIONAL INC

ARMY MAINTENANCE FACILITY

24-26 ALLEN ST., RUTLAND, VT

SITE MAP

DATE: 9/21/99	DWG.#: 1	SCALE: 1"= 40'	DRN.: BB	APP.: TK

GRIFFIN INTERNATIONAL Inc
19 Commerce Street
P.O. Box 943
Williston, VT 05495
Ph/Fax (802) 865-4288
E-mail: griffint@together.net

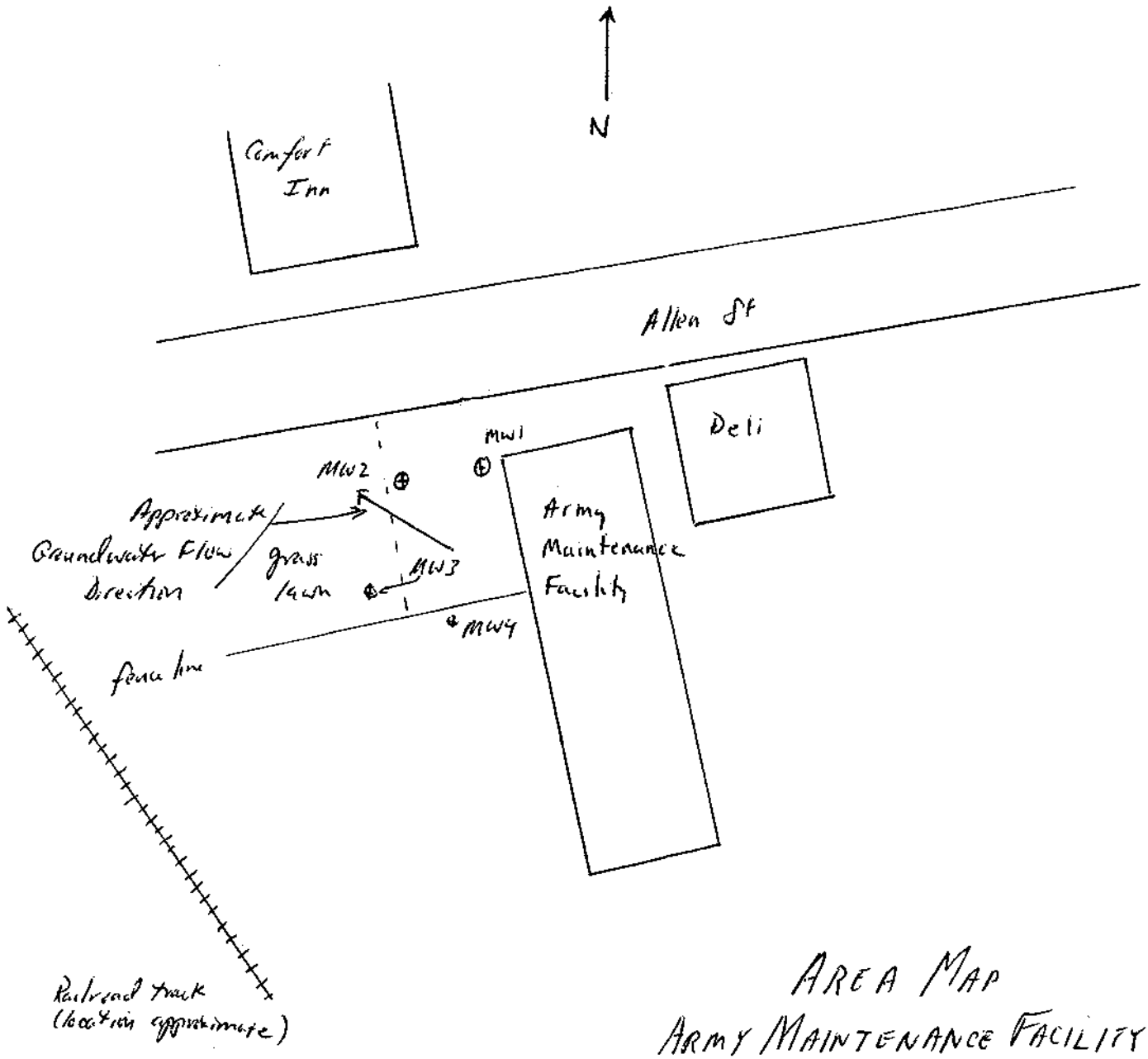
JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____



AREA MAP

ARMY MAINTENANCE FACILITY

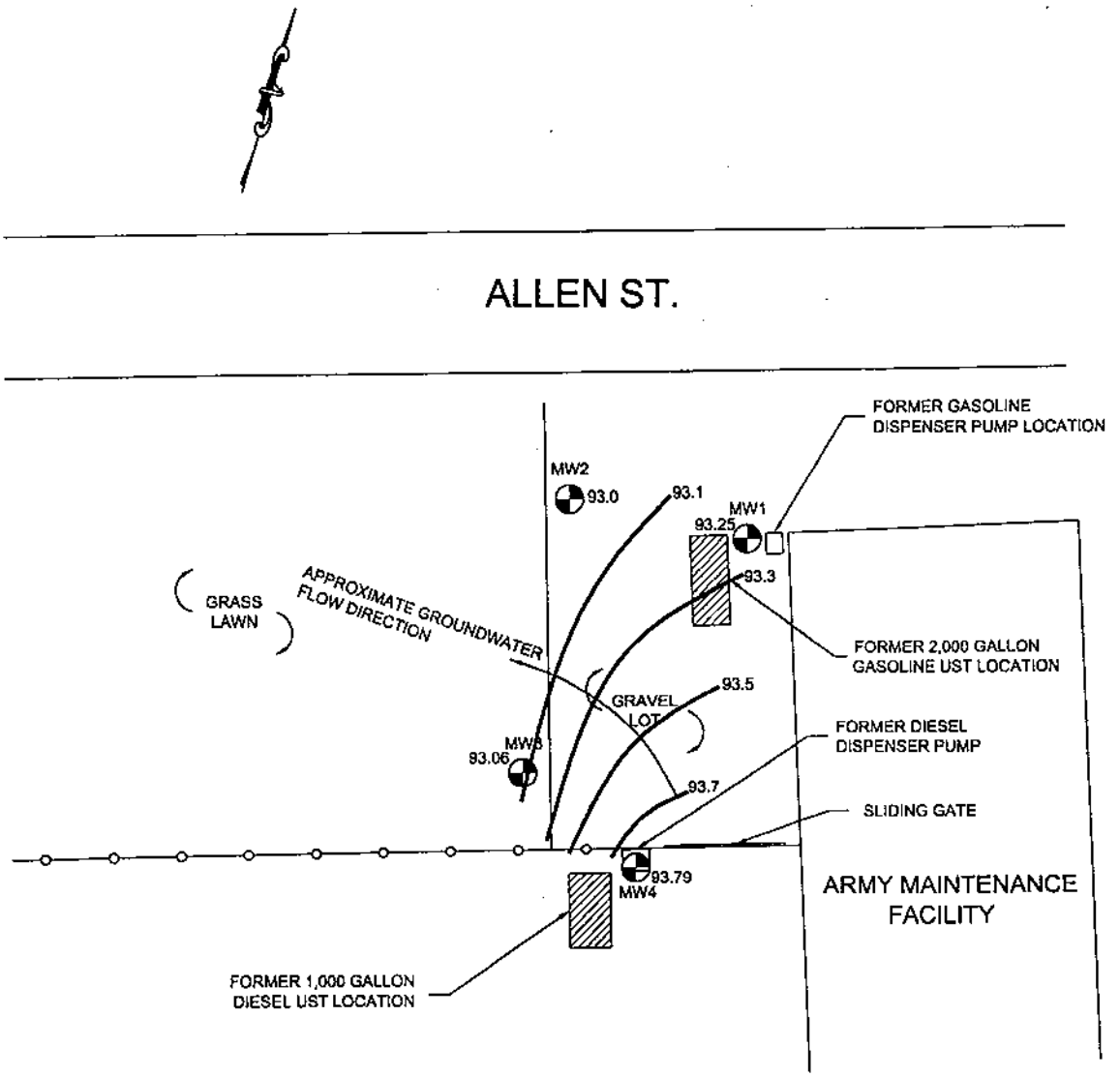
24-26 ALLEN ST, RUTLAND, VT

VTDEC SITE # 95-2563

NOT TO SCALE

GIA 39941500

DRAWN BY GRIFFIN INTERNATIONAL



SOURCE: GRIFFIN SURVEY JUNE 23, 1999

JOB #: 39941500 VTDEC SITE # 96-2563

GRIFFIN INTERNATIONAL INC

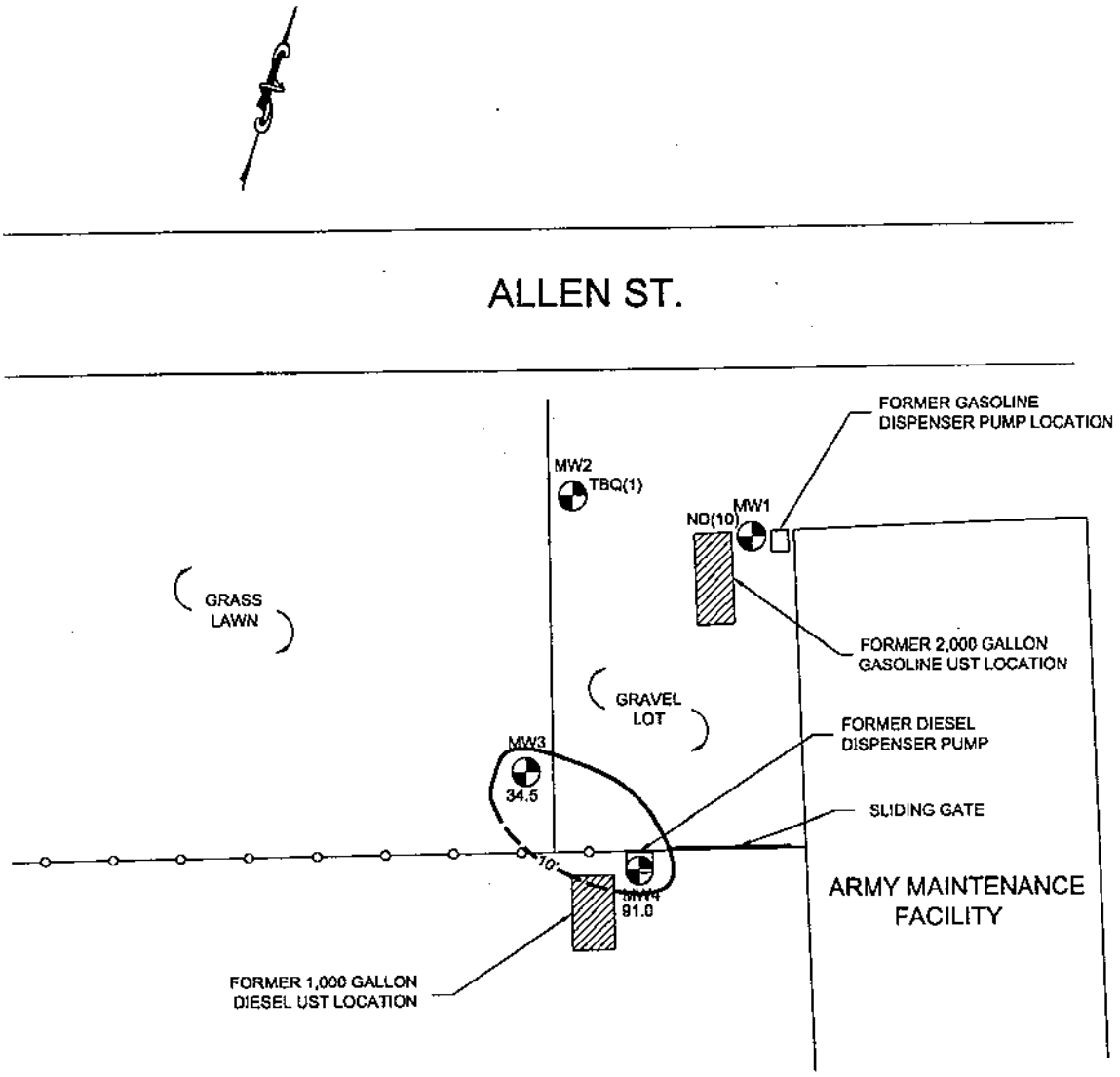
ARMY MAINTENANCE FACILITY

24-26 ALLEN ST., RUTLAND, VT

GROUNDWATER CONTOUR MAP

MEASURED 6/23/99

DATE: 9/21/99	DWG.#: 2	SCALE:1"= 40'	DRN.:BB	APP.: TK



LEGEND

MW4 91.0 MONITORING WELL WITH VOC CONCENTRATION (ppb)

FORMER UST LOCATION

—o— FENCE

10' ISOCONCENTRATION CONTOUR (PPB) (DASHED WHERE INFERRED)

SOURCE: GRIFFIN SURVEY JUNE 23, 1999

JOB #: 39941500 VTDEC SITE # 98-2563

GRIFFIN INTERNATIONAL INC

ARMY MAINTENANCE FACILITY

24-26 ALLEN ST., RUTLAND, VT

CONTAMINANT CONCENTRATION MAP

TOTAL TARGETED VOCs SAMPLED 6/23/99

DATE: 9/21/99	DWG.#: 3	SCALE:1"= 40'	DRN.:BB	APP.: TK

APPENDIX B

Monitoring Well Logs

PROJECT #39941500 ARMY MAINTENANCE FACILITY

LOCATION 24-26 ALLEN ST. RUTLAND, VT

DATE DRILLED 5/28/99 TOTAL DEPTH OF HOLE 13'

DIAMETER 4.5"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

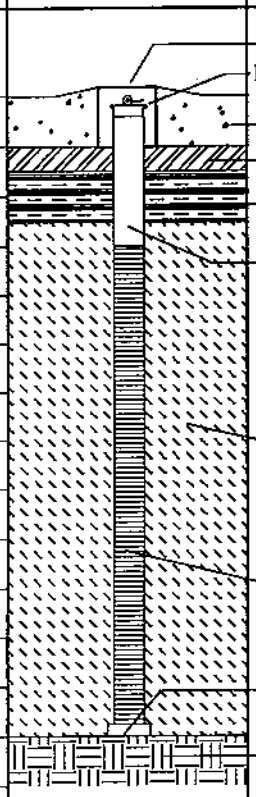
DRILLING CO. T&K DRILLING DRILLING METHOD HSA

DRILLER A. TOMMILA LOG BY CW

WELL NUMBER MW1

Site Sketch

GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE NATIVE BACKFILL BENTONITE WELL RISER SAND PACK WELL SCREEN BOTTOM CAP UNDISTURBED NATIVE SOIL	0-2' 1 ppm 5'-7'- 2,3,7,9 200 ppm 10'-12'-5,8,12,14 1.5 ppm	SANDY SILT (ML)- dry, brown, from auger cuttings SILTY SAND (SM)- 60% sand, moist, light brown 7' WATER TABLE ▼ SILT (ML)- 5% wet, brown BASE OF WELL AT 13' END OF EXPLORATION AT 13'	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

PROJECT #39941500 ARMY MAINTENANCE FACILITY

LOCATION 24-26 ALLEN ST. RUTLAND, VT

DATE DRILLED 5/28/99 TOTAL DEPTH OF HOLE 13'

DIAMETER 4.5"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.7' TYPE sch 40 pvc

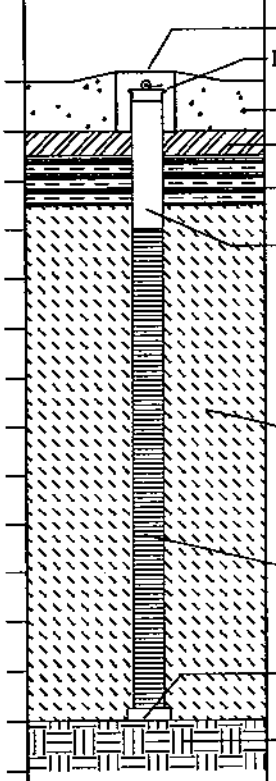
DRILLING CO. T&K DRILLING DRILLING METHOD HSA

DRILLER A. TOMMILA LOG BY CW

WELL NUMBER MW2

Site Sketch

GRIFFIN INTERNATIONAL, INC



DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0					0
1			0-2' 0 ppm	SILTY SAND w/GRAVEL (SM)- dry, brown, from auger cuttings	1
2					2
3					3
4					4
5					5
6			5'-7'- 10,12,12,11 0 ppm	SANDY SILT (ML)- 30% sand, wet, brown	6
7				6.7' WATER TABLE ▼	7
8					8
9					9
10					10
11			10'-12'-4,7,2,1 1.5 ppm	LEAN CLAY (CL)- wet, olive brown	11
12					12
13				BASE OF WELL AT 13' END OF EXPLORATION AT 13'	13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT #39941500 ARMY MAINTENANCE FACILITY

LOCATION 24-26 ALLEN ST. RUTLAND, VT

DATE DRILLED 5/28/99 TOTAL DEPTH OF HOLE 13'

DIAMETER 4.5"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.7' TYPE sch 40 pvc

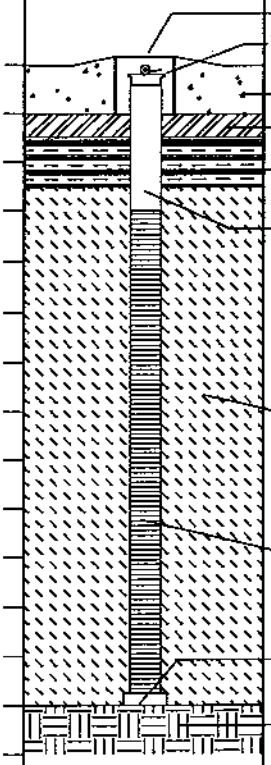
DRILLING CO. T&K DRILLING DRILLING METHOD HSA

DRILLER A. TOMMILA LOG BY CW

WELL NUMBER MW3

Site Sketch

GRIFFIN INTERNATIONAL, INC



DEPTH IN FEET	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0			
1		0-2' 0 ppm	SANDY SILT (ML)- 30% sand, 10% gravel, dry, brown, from auger cuttings
2			
3			
4			
5			
6		5'-7'- 2,2,4,11 0 ppm	6' WATER TABLE ▼ SANDY SILT (ML)- 40% sand, wet, olive brown
7			
8			
9			
10			
11		1,1,1,1 0 ppm	LEAN CLAY (CL)- wet, olive brown
12			
13			BASE OF WELL AT 13' END OF EXPLORATION AT 13'
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

PROJECT #39941500 ARMY MAINTENANCE FACILITY

LOCATION 24-26 ALLEN ST. RUTLAND, VT

DATE DRILLED 5/28/99 TOTAL DEPTH OF HOLE 13'

DIAMETER 4.5"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.6' TYPE sch 40 pvc

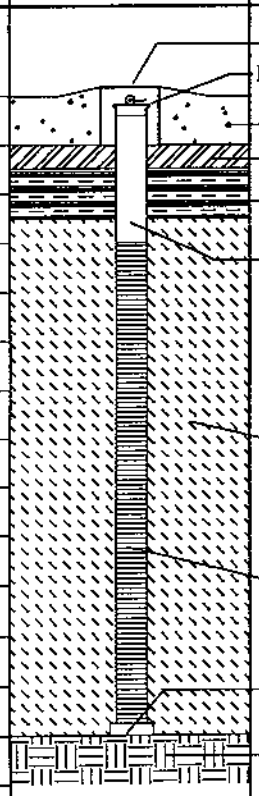
DRILLING CO. T&K DRILLING DRILLING METHOD HSA

DRILLER A. TOMMILA LOG BY CW

WELL NUMBER MW4

Site Sketch

GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE NATIVE BACKFILL BENTONITE WELL RISER SAND PACK WELL SCREEN BOTTOM CAP UNDISTURBED NATIVE SOIL	0-2' 0 ppm 5'-7'- 7,7,10,13 85 ppm 10'-13'- 15 ppm	SILTY w/SAND (ML)- dry, brown, from auger cuttings 5.7' WATER TABLE SILTY w/SAND (ML)- wet, light brown LEAN CLAY (CL)- wet, light brown BASE OF WELL AT 13' END OF EXPLORATION AT 13'	0
1					1
2					2
3					3
4					4
5					5
6					6
7					7
8					8
9					9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX C

Liquid Level Data, June 23, 1999

Liquid Level Monitoring Data, Army Maintenance Facility
24-26 Allen St., Rutland, Vermont

Monitoring Date: 6-23-99

Well I.D.	Top of Casing Elevation	Depth to Product	Depth to Water	Water Table Elevation
MW-1	100.00	-	6.75	93.25
MW-2	99.86	-	6.86	93.00
MW-3	99.32	-	6.26	93.06
MW-4	99.44	-	5.65	93.79

Note: All values reported in feet. Surveyed 6/23/99
NM = Not Measured

APPENDIX D

Groundwater Quality Data, June 23, 1999

Summary of Grounwater Quality Data, Army Maintenance Facility
24-26 Allen St., Rutland, Vermont

PARAMETER	6-23-99				
	MW1	MW2	MW3	MW4	VGES
Benzene	ND(1)	ND(1)	ND(1)	**2.1**	**5**
Toluene	ND(1)	ND(1)	ND(1)	ND(1)	**1000**
Ethylbenzene	ND(1)	ND(1)	**1.1**	**11.0**	**700**
Xylenes	ND(1)	ND(1)	**5.4**	**10.6**	**10000**
Total BTEX	ND(1)	ND(1)	**6.5**	**23.7**	-
MTBE	ND(10)	ND(10)	ND(10)	ND(10)	**40**
1,3,5-Trimethylbenzene	ND(1)	ND(1)	**3.4**	**10.2**	**4**
1,2,4-Trimethylbenzene	ND(1)	**TBQ(1)**	**10.4**	**23.6**	**5**
Naphthalene	ND(1)	ND(1)	**14.2**	**33.5**	**20**
Total Targeted VOCs	ND(10)	**TBQ(1)**	**34.5**	**91.0**	-
TPHs (mg/L)	NA	NA	**0.69**	**1.10**	-

All values reported in ug/L (ppb) unless otherwise noted.

Detections are **Bold**

Values greater than the applicable Vermont Groundwater Enforcement Standard (VGES) are shaded

NA - Not Analyzed

ND(1000) - Not Detected (Detection Limit)

TBQ(1) - Trace Below Quantitation Limit (Detection Limit)

TPHs - total petroleum hydrocarbons

VGES - Vermont Groundwater Enforcement Standard, Source: VT Groundwater Protection Rule and Strategy, 11/15/97

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39941500

ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Army Main. Facility
REPORT DATE: July 6, 1999
DATE SAMPLED: June 23, 1999

ORDER ID: 2848
REF.#: 140,218 - 140,223

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

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EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Army Main. Facility
CLIENT PROJ. #: 39941500

DATE RECEIVED: June 24, 1999
REPORT DATE: July 6, 1999
ORDER ID: 2848

Ref. #:	140,218	140,219	140,220	140,221	140,222
Site:	Trip Blank	MW #1	Duplicate	MW #4	MW #2
Date Sampled:	6/23/99	6/23/99	6/23/99	6/23/99	6/23/99
Time Sampled:	7:00	1:39	1:39	1:46	1:50
Sampler:	D.T.	D.T.	D.T.	D.T.	D.T.
Date Analyzed:	7/3/99	7/3/99	7/5/99	7/3/99	7/6/99
UIP Count:	0	0	0	>10	>10
Dil. Factor (%):	100	100	100	100	100
Surr % Rec. (%):	97	97	96	98	96
Parameter	**Conc. (ug/L)**	**Conc. (ug/L)**	**Conc. (ug/L)**	**Conc. (ug/L)**	**Conc. (ug/L)**
MTBE	<10	<10	<10	<10	<10
Benzene	<1	<1	<1	2.1	<1
Toluene	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	11.0	<1
Xylenes	<1	<1	<1	10.6	<1
1,3,5 Trimethyl Benzene	<1	<1	<1	10.2	<1
1,2,4 Trimethyl Benzene	<1	<1	<1	23.6	TBQ <1
Naphthalene	<1	<1	<1	33.5	<1

Ref. #:	140,223
Site:	MW #3
Date Sampled:	6/23/99
Time Sampled:	1:53
Sampler:	D.T.
Date Analyzed:	7/4/99
UIP Count:	>10
Dil. Factor (%):	100
Surr % Rec. (%):	95
Parameter	**Conc. (ug/L)**
MTBE	<10
Benzene	<1
Toluene	<1
Ethylbenzene	1.1
Xylenes	5.4
1,3,5 Trimethyl Benzene	3.4
1,2,4 Trimethyl Benzene	10.4
Naphthalene	14.2

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

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#39941500

CHAIN-OF-CUSTODY RECORD

34489

Project Name: ARMY MAINTENANCE Facility Site Location: ROTTERDAM	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: 2848	Company: Contact Name/Phone #: TIM KELLY	Sampler Name: DON TOMPKINS Phone #:

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 6-23-99	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
140218	TRIP BLANK	H2O	✓		07:00	2	40 mL		8021B	HCl	
140219	MW#1				13:39				8021B		
140220	DUPLICATE				13:39				8021B		
140221	MW#4				13:46				8021B		
140222	MW#4				13:46				30		
140223	MW#2				13:50				8021B		
140224	MW#3				13:53				8021B		
140225	MW#3				13:53				30		

Relinquished by: Signature	Received by: Signature	Date/Time 6-24-99 10:20
Relinquished by: Signature	Received by: Signature	Date/Time 6/24/99 10:20

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify): 8015B (DRO)										

39941500

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LABORATORY REPORT

CLIENT: Griffin International
PROJECT: Army Main. Facility/#39941500
REPORT DATE: June 29, 1999

ORDER ID: 2848
DATE RECEIVED: June 24, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

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LABORATORY REPORT

CLIENT: Griffin International
PROJECT: Army Main. Facility/#39941500
REPORT DATE: June 29, 1999

ORDER ID: 2848
DATE RECEIVED: June 24, 1999
SAMPLER: DT
ANALYST: 820

Ref. Number: 140221 | Site: MW #4 | Date Sampled: June 23, 1999 | Time: 1:46 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	1.10	mg/L	SW 8015B	6/26/99

Ref. Number: 140223 | Site: MW #3 | Date Sampled: June 23, 1999 | Time: 1:53 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	0.69	mg/L	SW 8015B	6/26/99

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1 of 1

34489

CHAIN-OF-CUSTODY RECORD

#39941500

Project Name: ARMY MAINTENANCE Facility Site Location: Rutland	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: 2848	Company: Contact Name/Phone #: TINA KELLY	Sampler Name: Phone #: DON TOWNSHEND

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 6-23-99	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
140218	TRIP BLANK	H2O	✓		07:00	2	40 mL		8021B	HCl	
140219	mw#1				13:39				8021B		
140220	DUPLICATE				13:34				8021B		
140221	mw#4				13:46				8021B		
140222	mw#4				13:46				30		
140223	mw#2				13:50				8021B		
140224	mw#3				13:53				8021B		
140225	mw#3				13:53				30		

Relinquished by: Signature	Received by: Signature	Date/Time 6-24-99 10:20
Relinquished by: Signature	Received by: Signature Alison Howard	Date/Time 6/24/99 10:20

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify): 8015B (DRO)										