

# MARIN

ENVIRONMENTAL

JUL 30 10 05 AM '99

WASTE

SCIENTISTS  
ENGINEERS  
GIS SPECIALISTS

28 July 1999

Mr. Carl Ruprecht  
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1700 HEGEMAN AVENUE  
COLCHESTER, VT 05446  
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Re: *Initial Site Investigation,*  
*Ralph's Foreign Auto, Burlington, VT (VT DEC Site # 98-2422)*  
*2467*

116 CONSUMER SQUARE  
SUITE 174  
PLATTSBURGH, NY 12901  
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Dear Mr. Ruprecht:

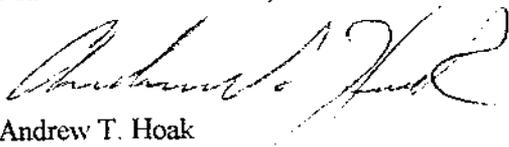
Enclosed is a copy of the Initial Site Investigation Report for Ralph's Foreign Auto in Burlington, Vermont.

Please call me if you have any questions regarding the enclosed information or recommendations.

7 BLAND DOCK ROAD  
HADDAM CT 06438  
1.860.345.4578  
1.800.524.9256  
FAX 1.860.343.3854

Sincerely,

Marin Environmental, Inc.



Andrew T. Hoak  
Hydrogeologist

600 CHARLTON STREET  
SOUTHBRIDGE, MA 01550  
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ATH/REF: 98122103.DOC

Enclosure

Cc: Chuck Schwer, VT DEC

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**INITIAL SITE INVESTIGATION REPORT**

**RALPH'S FOREIGN AUTO**  
**Burlington, Vermont**

**(VT DEC SITE #98-2467)**

22 July 1999

Prepared for:

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**Marin Project # VT98-0122**  
**Document # 98122isi.doc**

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## EXECUTIVE SUMMARY

Marin Environmental, Inc. (Marin) has conducted an initial site investigation (ISI) at Ralph's Foreign Auto, located on Shelburne Road in Burlington, Vermont. The ISI included the installation of five soil borings and subsequent installation of two monitoring wells, ground-water and soil testing, and an evaluation of potential threats to nearby receptors. Marin's findings related to this work are summarized as follows:

- Subsurface petroleum contamination was discovered at the site on 9 and 14 July 1998 during the closure and replacement of piping associated with four gasoline underground storage tanks (USTs). Photoionization detector (PID) readings from soils within the excavation ranged from 6.3 to 1,516 parts per million (ppm), with the highest reading observed approximately three feet below ground surface (bgs). The primary source of petroleum contamination detected on-site appeared to be the former UST-piping system.
- Analytical results from ground-water sampling performed on 15 January 1999 indicate that the shallow aquifer beneath the site is contaminated with dissolved-phase gasoline-related volatile organic compounds (VOCs). The lateral extent of dissolved-phase contamination has not been adequately defined.
- Total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations in ground water at the site ranged from 8,540 micrograms per liter ( $\mu\text{g/L}$ ) in monitoring well MW-2 to 14,296  $\mu\text{g/L}$  in monitoring well MW-1. Vermont Groundwater Enforcement Standards (VGESs) were exceeded at MW-1 for ethylbenzene, xylenes, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene. Although benzene was not detected in MW-1, the detection limit was raised above the enforcement standard of 5  $\mu\text{g/L}$  due to relatively high concentrations of other target analytes. Benzene, ethylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene also exceeded their respective VGESs in MW-2.
- Lead exceeded the 15  $\mu\text{g/L}$  VGES for Priority Pollutant Metals at MW-1 with a concentration of 26  $\mu\text{g/L}$ . Also, Total Petroleum Hydrocarbons were detected at this location at 32.9 milligrams per liter.
- No VOCs or Total Petroleum Hydrocarbons were detected in a soil sample collected from the bottom of soil boring SB-3 on top of apparent bedrock, suggesting that the on-site contamination does not originate from an upgradient, off-site source.
- Underground utilities at the site, namely the sanitary sewer corridor, water supply, and downgradient manhole, may be at risk from petroleum vapor accumulation based on their proximity to contaminants identified on-site.

## EXECUTIVE SUMMARY

- In general, fine to medium brown sands with little silt are present across the site from the surface down to approximately four to ten feet below ground surface (bgs). Auger refusal was encountered at all soil-boring and monitoring-well locations at depths ranging from four to 10.5 feet bgs. No bedrock outcrops were observed on-site. During the boring program, ground water was encountered at approximately six to seven feet bgs. Soil boring locations SB-1, SB-2, and SB-3 were observed to be dry to bedrock.
- Additional data are necessary to adequately characterize hydrogeologic conditions at the site. Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward Lake Champlain, with an average horizontal hydraulic gradient of approximately six percent. Shallow ground-water flow beneath the site may be influenced by the attitude of the underlying bedrock and nearby municipal utilities such as water and wastewater lines located along Shelburne Road. The underground utilities might act as a preferential pathway for ground-water migration. The vertical ground-water flow components at the site, and the hydraulic relationship between the shallow unconfined aquifer and the bedrock aquifer, are currently unknown.

Based on all the data collected at the site to date, Marin recommends the following:

1. Two water-table monitoring wells should be installed at adjacent residential properties to further characterize the lateral extent of downgradient contamination at the site. The proposed monitoring well locations are included on Figure 5, Appendix A.
2. The newly installed and existing monitoring wells should be sampled and analyzed for the possible presence of volatile petroleum compounds by EPA Method 8021B. If free product is encountered in any of the wells at recoverable quantities, it should be removed and containerized on-site in a properly labeled drum.
3. The storm water drain at the junction of Ledge Road and the downgradient sanitary-sewer manhole, located along Shelburne Road, should be screened for the possible presence of VOCs with a PID. Water samples should also be collected from these locations and analyzed by EPA Method 8021B.
4. Upon completion of the additional work, a report should be prepared which includes relevant tables and figures, and identifies an appropriate course of action for the site.

## 1.0 INTRODUCTION

This report details the results of an Initial Site Investigation (ISI) performed by Marin Environmental, Inc. (Marin) at Ralph's Foreign Auto, located on Shelburne Road in Burlington, Vermont (Figures 1 and 2, Appendix A). This report has been prepared by Marin on behalf of S.B. Collins, Inc., owner of the on-site underground storage tanks (UST). The ISI was conducted in accordance with a work plan approved by the Vermont Department of Environmental Conservation (VT DEC) on 11 December 1998.

### 1.1 Site Description and Physical Setting

The site is located on Shelburne Road in Burlington, Vermont, at the intersection of South Willard Street and Ledge Road (Figure 1, Appendix A). A single structure, which serves as an automotive repair shop, is present on the property (Figure 2, Appendix A). The remainder of the property consists of a gasoline fueling station and asphalt parking areas. Four 3,000-gallon in-service gasoline underground storage tanks (USTs) are located immediately west of the on-site pump island. A 500-gallon waste-oil UST is located northeast of the pump island. The site is bounded by Shelburne Road to the west, South Willard Street to the northwest, Ledge Road to the south, and residential structures to the east. The facility is reportedly connected to the municipal water supply and sanitary sewer.

In general, the ground surface at the site slopes to the west-southwest. The steepest grades observed at the site are located immediately east of the property line along Ledge Road, and on the west side of Shelburne Road at Christ the King Elementary School. A municipal storm water drain is situated at the junction of Ledge Road and Shelburne Road. A sanitary sewer manhole was observed along Shelburne Road approximately 100 feet south of the site.

### 1.2 Site History

On 9 and 14 July 1998, subsurface petroleum contamination was discovered at Ralph's Foreign Auto during the closure and replacement of piping associated with four gasoline underground storage tanks (USTs). Photoionization detector (PID) readings from soils within the excavation ranged from 6.3 to 1,516 parts per million (ppm), with the highest reading observed approximately three feet below ground surface (bgs). Ground water was also observed at approximately three feet bgs. All of the petroleum contamination could not be removed during piping closure activities, so all soils from the excavation were backfilled.

### 1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- evaluate the degree and extent of petroleum contamination in soil and ground water;

- qualitatively assess the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways; and
- identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these objectives, **Marin** has:

- supervised the advancement of five soil borings, and the subsequent installation of two water-table monitoring wells;
- screened subsurface soils from the soil borings for the possible presence of volatile organic compounds (VOCs) using a PID;
- collected and submitted ground-water samples from the two monitoring wells for laboratory analysis of volatile petroleum compounds by EPA Method 8021B or EPA Method 8260;
- collected and submitted a soil sample from an upgradient soil boring location for laboratory analysis of total petroleum hydrocarbons by EPA Method 8015;
- identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors;
- prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions, and offers recommendations for further action.

## 2.0 INVESTIGATIVE PROCEDURES AND RESULTS

### 2.1 Soil Boring / Monitoring Well Installation

On 5 January 1999, **Marin** supervised the completion of five soil borings and the subsequent installation of two monitoring wells (MW-1, MW-2, SB-1, SB-2, and SB-3) to initially characterize contaminant and hydrogeologic conditions at the site (Figure 2, Appendix A). Monitoring wells MW-1 and MW-2 were installed in the presumed downgradient direction from the existing gasoline USTs. It is believed that MW-1 is also located downgradient of the waste-oil UST. Soil borings SB-1 and SB-3 were located west of the UST area in the presumed upgradient direction and west of the UST area, while SB-2 was advanced cross-gradient and north of the UST area.

In general, fine to medium brown sands with little silt were encountered across the site to approximately four to ten feet bgs. Auger refusal was encountered at all soil-boring and monitoring-well locations at depths ranging from four to 10.5 feet bgs. No bedrock outcrops were observed on-site. During the boring program, ground water was encountered approximately

six to seven feet bgs. Soil boring locations SB-1, SB-2, and SB-3 were observed to be dry to bedrock.

The soil borings were installed using vibratory drilling techniques by Adams Engineering of Underhill, Vermont. Soil samples were collected continuously from each boring using a five-foot long core tube lined with polyethylene. Soil recovery was generally fair to good, ranging from 40 to 60 percent. All downhole drilling and sampling equipment was decontaminated during use as appropriate.

The two on-site monitoring wells were constructed with one-and-one half inch-diameter PVC with 0.010-inch slots. The tops of the screen sections were set between 4 to 4.5 feet above the ground-water level. Sections of solid PVC were added to bring the tops of the well casings to approximately 0.5 feet bgs. Clean silica #1 filter sand was placed in the borehole annulus around each well to one foot above the slotted interval. A granular bentonite seal, approximately one foot thick, was set above the sand pack and the remainder of the annular space was backfilled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a water-tight compression cap.

To remove fine-grained sediment, the monitoring wells were developed immediately after installation using a peristaltic pump. Small amounts of free-phase product were observed in MW-1 during development, and a heavy sheen was observed at MW-2. Development water was discharged directly to the ground surface in the vicinity of each well. On 4 November 1998, the monitoring wells were surveyed relative to existing site features, with an azimuth accuracy of  $\pm 1.0$  feet, and an elevation accuracy of  $\pm 0.01$  feet. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

## **2.2 Soil-Screening Results**

During the soil-boring program on 5 January 1999, soil samples were collected from discrete intervals in each boring for headspace screening with a PID. Elevated PID readings were measured on soil samples collected at each soil boring location except SB-1.

The highest PID reading (1,170 ppm) was recorded from a soil sample collected from approximately nine feet bgs in MW-1. Elevated PID readings were observed throughout the soil column at this location, with a PID reading of 1,061 ppm detected in the base of the boring at approximately 10.5 feet bgs and on the presumed bedrock surface.

In MW-2, PID readings generally increased with depth and ranged from 12.1 to 83.7 ppm. The boring was advanced to bedrock surface at a depth of 7.4 feet.

PID readings in soil boring SB-1 were at background levels to refusal at four feet bgs. A single PID detection of 3.6 ppm was observed at SB-2 at a depth of approximately five feet bgs. Bedrock was encountered at SB-2 at a depth of six feet bgs. All PID readings in SB-3 were at background levels except at two feet bgs with a low-level detection of 1.6 ppm. Auger refusal was encountered at five feet bgs at SB-3.

A Marin hydrogeologist screened soil samples from each soil boring for the possible presence of volatile organic compounds (VOCs) using a PhotoVac Model 2020 portable photoionization detector (PID). The PID was calibrated in the field with an isobutylene standard gas to a benzene reference. PID screening results are included on the boring logs in Appendix B.

### 2.3 Ground-Water Elevation Calculations and Flow Direction

Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward Lake Champlain, with an average horizontal hydraulic gradient of approximately six percent.

Fluid levels were measured in the two on-site monitoring wells and one off-site monitoring well located at the Rotary Gulf along Shelburne Road and south of the subject parcel on 15 January 1999. Depths to water ranged from 4.67 feet (MW-1) to 5.51 feet (off-site well MW-A) below top-of-casing. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet. Water-level measurements and elevation calculations for 15 January 1999 are presented in Table 1 (Appendix A); Figure 3 is the water-table contour map prepared using these data (Appendix A).

### 2.4 Sampling and Analysis

The 15 January 1999 analytical results indicate that the shallow aquifer beneath the site is contaminated with dissolved-phase gasoline-related VOCs. The lateral extent of dissolved-phase contamination has not been adequately defined. Given the available hydrogeologic and contaminant-distribution data, it appears that the petroleum contamination detected on-site may be attributed to the on-site UST system.

Total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations in groundwater samples ranged from 8,540 micrograms per liter ( $\mu\text{g/L}$ ) in monitoring well MW-2 to 14,296  $\mu\text{g/L}$  in monitoring well MW-1. Vermont Groundwater Enforcement Standards<sup>1</sup> (VGESs) were

<sup>1</sup> The Vermont DEC has established Groundwater Enforcement Standards (VGESs) for eight petroleum related VOCs, as follows: benzene - 5  $\mu\text{m/L}$ ; toluene — 1,000  $\mu\text{m/L}$ ; ethylbenzene - 700  $\mu\text{m/L}$ ; xylenes — 10,000  $\mu\text{m/L}$ .; MTBE, a gasoline additive. - 40  $\mu\text{m/L}$  ppb; naphthalene — 20  $\mu\text{m/L}$ ; 1,2,4 trimethylbenzene — 5  $\mu\text{m/L}$ ; and 1,3,5 trimethylbenzene — 4  $\mu\text{m/L}$ . Enforcement standards for Priority Pollutant Metals areas follows: Antimony - 6

exceeded at MW-1 for the following compounds: ethylbenzene, xylenes, 1,3,5 trimethylbenzene, 1,2,4 trimethylbenzene, naphthalene, and lead. Although benzene was not detected in MW-1, the detection limit was raised above the enforcement standard of 5 µg/L due to relatively high concentrations of other target analytes. The gasoline constituents isopropylbenzene and n-propylbenzene were also detected in MW-1 at concentrations of 147 µg/L and 380 µg/L, respectively. The two compounds are not regulated under the Vermont Groundwater Protection Rule and Strategy. Arsenic and zinc were detected in MW-1 at concentrations below their appropriate VGESs. Benzene, ethylbenzene, 1,3,5 trimethylbenzene, 1,2,4 trimethylbenzene, and naphthalene were also detected at concentrations above their respective VGESs in MW-2. Total Petroleum Hydrocarbons (TPH) were detected at MW-1 at 32.9 milligrams per liter (mg/L).

No VOCs or TPH were detected in a soil sample collected from the bottom of soil boring SB-3 on top of apparent bedrock. Analytical results are included in Table 2, and on the Contaminant-Distribution Map (Figure 4, Appendix A). Laboratory report forms are included in Appendix C.

Water-quality samples were collected on 15 January 1999 from the two on-site monitoring wells (MW-1 and MW-2). Monitoring wells were purged and then sampled using dedicated bailers and dropline. Purge water was discharged directly to the ground in the vicinity of each well. A soil sample was collected from SB-3 during drilling activities on 5 January 1999 at a depth of approximately five feet bgs. Trip blank and duplicate samples were collected to ensure that adequate quality assurance/quality control (QA/QC) standards were maintained. All field procedures were conducted in accordance with Marin standard protocols.

All samples were transported under chain-of-custody in an ice-filled cooler to Endyne, Inc. of Williston, Vermont. The sample collected from MW-2 was submitted for laboratory analysis of VOCs by EPA Method 8021B. MW-1, which is in the presumed downgradient direction of the waste-oil UST, was sampled for VOCs by EPA Method 8260, total petroleum hydrocarbons (TPH) by modified EPA Method 8015, and Priority Pollutant Metals. The soil sample collected from SB-3 was submitted for laboratory analysis of VOCs by EPA Method 8021B and TPH by modified EPA Method 8015.

Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. VOCs were not detected in the trip blank. Analytical results for the blind field duplicate sample collected from MW-2 were within approximately two percent of the original sample results. Table 2 also includes a summary of the QA/QC analytical results.

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µm/L; Arsenic – 50 µm/L; Beryllium – 4 µm/L; Cadmium – 5 µm/L; Chromium – 100 µm/L; Copper – 1,300 µm/L; Lead – 15 µm/L; Mercury – 2 µm/L; Nickel – 100 µm/L; Selenium – 50 µm/L; Silver – 0.1 µm/L; Thallium – 2 µm/L; and Zinc – 5,000 µm/L.

### 3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

#### 3.1 Sensitive Receptor Survey

Marin conducted a survey to identify sensitive receptors in the vicinity of Ralph's Foreign Auto that could potentially be impacted by contamination associated with the site. The following sensitive receptors were identified in the vicinity of the site:

- indoor air-quality in the on-site building, which does not have a basement, and in the basements of off-site buildings, located immediately downgradient of or adjacent to UST area; and
- underground utilities present on the site.

#### 3.2 Risk Assessment

Marin assessed the risks that the residual soil and dissolved-phase subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway.

The results of our risk assessment are as follows:

- The indoor air of the on-site building does not appear to be at high risk from petroleum vapor contamination. PID levels within the store were non-detect during an inspection on 5 January 1999.

Indoor air quality in off-site structures also does not appear to be at high risk from petroleum vapor contamination. PID levels in the basement of the residential structure located at 83 Shelburne Road averaged approximately 2.0 parts per million (ppm). However, the detected vapors are not believed to be associated with the petroleum contamination identified at the subject parcel. The site owner reported closing a heating-oil UST adjacent to the basement wall which was known to have leaked. Small amounts of discoloration were observed along the southern side of the basement wall adjacent to the location of the former UST.

PID readings throughout the basement of the apartment building located at 169 Locust Street were at background levels.

- Underground utilities at the site, namely the sanitary sewer corridor, storm-water drain and downgradient manhole, may be at risk for petroleum vapor accumulation based on their proximity to contaminants identified on-site.

#### 4.0 CONCLUSIONS

Based on the results of the site investigation described above, **Marin** concludes the following:

- Subsurface petroleum contamination was discovered at the site on 9 and 14 July 1998 during the closure and replacement of piping associated with four gasoline underground storage tanks (USTs). Photoionization detector (PID) readings from soils within the excavation ranged from 6.3 to 1,516 parts per million (ppm), with the highest reading observed approximately three feet below ground surface (bgs). The primary source of petroleum contamination detected on-site appeared to be the former UST-piping system.
- Analytical results from ground-water sampling performed on 15 January 1999 indicate that the shallow aquifer beneath the site is contaminated with dissolved-phase gasoline-related volatile organic compounds (VOCs). The lateral extent of dissolved-phase contamination has not been adequately defined.
- Total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations in ground water at the site ranged from 8,540 micrograms per liter ( $\mu\text{g/L}$ ) in monitoring well MW-2 to 14,296  $\mu\text{g/L}$  in monitoring well MW-1. Vermont Groundwater Enforcement Standards (VGESs) were exceeded at MW-1 for ethylbenzene, xylenes, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene. Although benzene was not detected in MW-1, the detection limit was raised above the enforcement standard of 5  $\mu\text{g/L}$  due to relatively high concentrations of other target analytes. Benzene, ethylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene also exceeded their respective VGESs in MW-2.
- Lead exceeded the 15  $\mu\text{g/L}$  VGES for Priority Pollutant Metals at MW-1 with a concentration of 26  $\mu\text{g/L}$ . Also, Total Petroleum Hydrocarbons were detected at this location at 32.9 milligrams per liter.
- No VOCs or Total Petroleum Hydrocarbons were detected in a soil sample collected from the bottom of soil boring SB-3 on top of apparent bedrock, suggesting that the on-site contamination does not originate from an upgradient, off-site source.
- Underground utilities at the site, namely the sanitary sewer corridor, water supply, and downgradient manhole, may be at risk from petroleum vapor accumulation based on their proximity to contaminants identified on-site.
- In general, fine to medium brown sands with little silt are present across the site from the surface down to approximately four to ten feet below ground surface (bgs). Auger refusal was encountered at all soil-boring and monitoring-well locations at depths ranging from four to 10.5 feet bgs. No bedrock outcrops were observed on-site. During the boring program, ground water

was encountered at approximately six to seven feet bgs. Soil boring locations SB-1, SB-2, and SB-3 were observed to be dry to bedrock.

- Additional data are necessary to adequately characterize hydrogeologic conditions at the site. Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward Lake Champlain, with an average horizontal hydraulic gradient of approximately six percent. Shallow ground-water flow beneath the site may be influenced by the attitude of the underlying bedrock and nearby municipal utilities such as water and wastewater lines located along Shelburne Road. The underground utilities might act as a preferential pathway for ground-water migration. The vertical ground-water flow components at the site, and the hydraulic relationship between the shallow unconfined aquifer and the bedrock aquifer, are currently unknown.

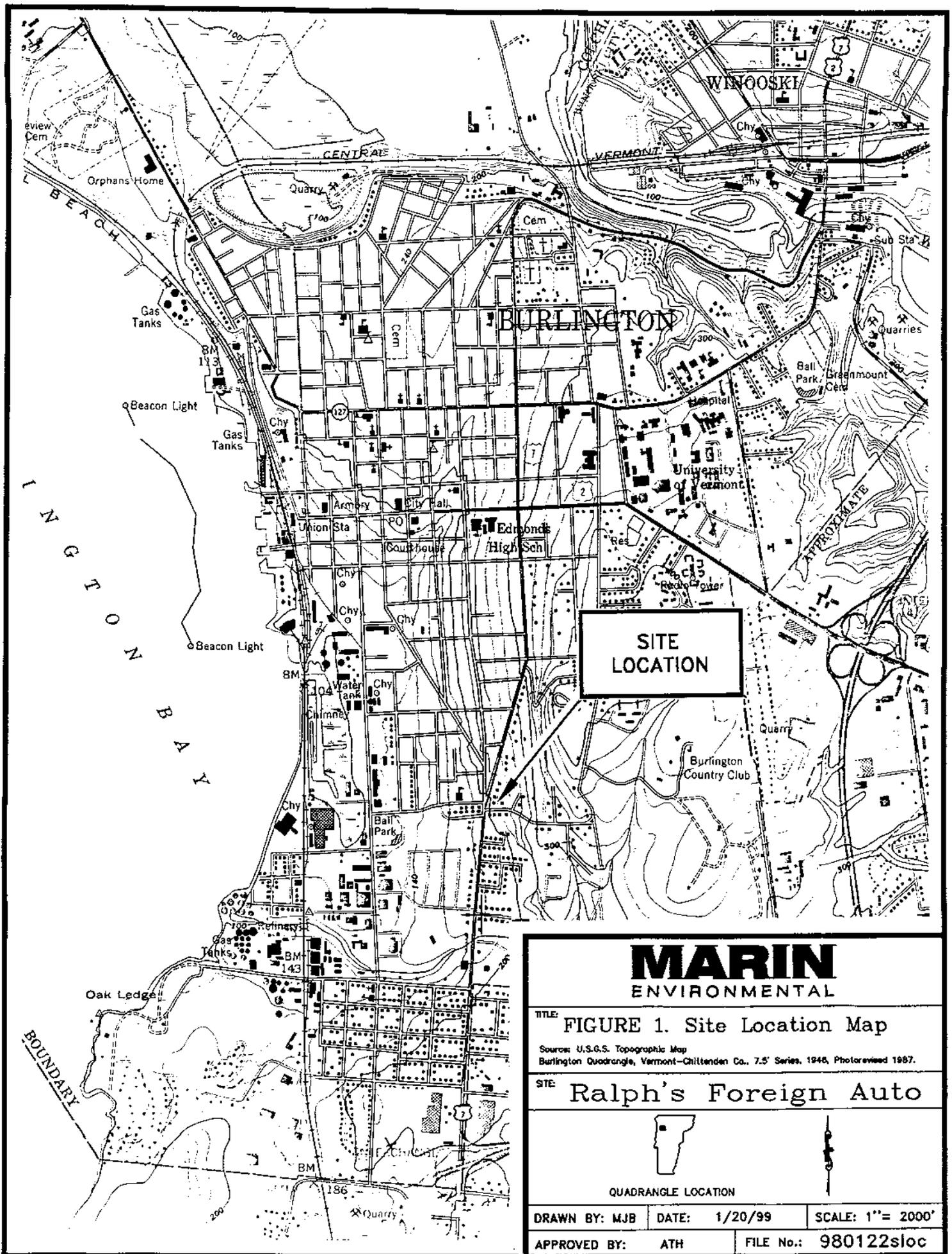
## 5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, Marin recommends the following:

1. Two water-table monitoring wells should be installed at adjacent residential properties to further characterize the lateral extent of downgradient contamination at the site. The proposed monitoring well locations are included on Figure 5, Appendix A.
2. The newly installed and existing monitoring wells should be sampled and analyzed for the possible presence of volatile petroleum compounds by EPA Method 8021B. If free product is encountered in any of the wells at recoverable quantities, it should be removed and containerized on-site in a properly labeled drum.
3. The storm water drain at the junction of Ledge Road and the downgradient sanitary-sewer manhole, located along Shelburne Road, should be screened for the possible presence of VOCs with a PID. Water samples should also be collected from these locations and analyzed by EPA Method 8021B.
4. Upon completion of the additional work, a report should be prepared which includes relevant tables and figures, and identifies an appropriate course of action for the site.

**APPENDIX A**

**Figures and Tables**



**MARIN ENVIRONMENTAL**

TITLE: **FIGURE 1. Site Location Map**

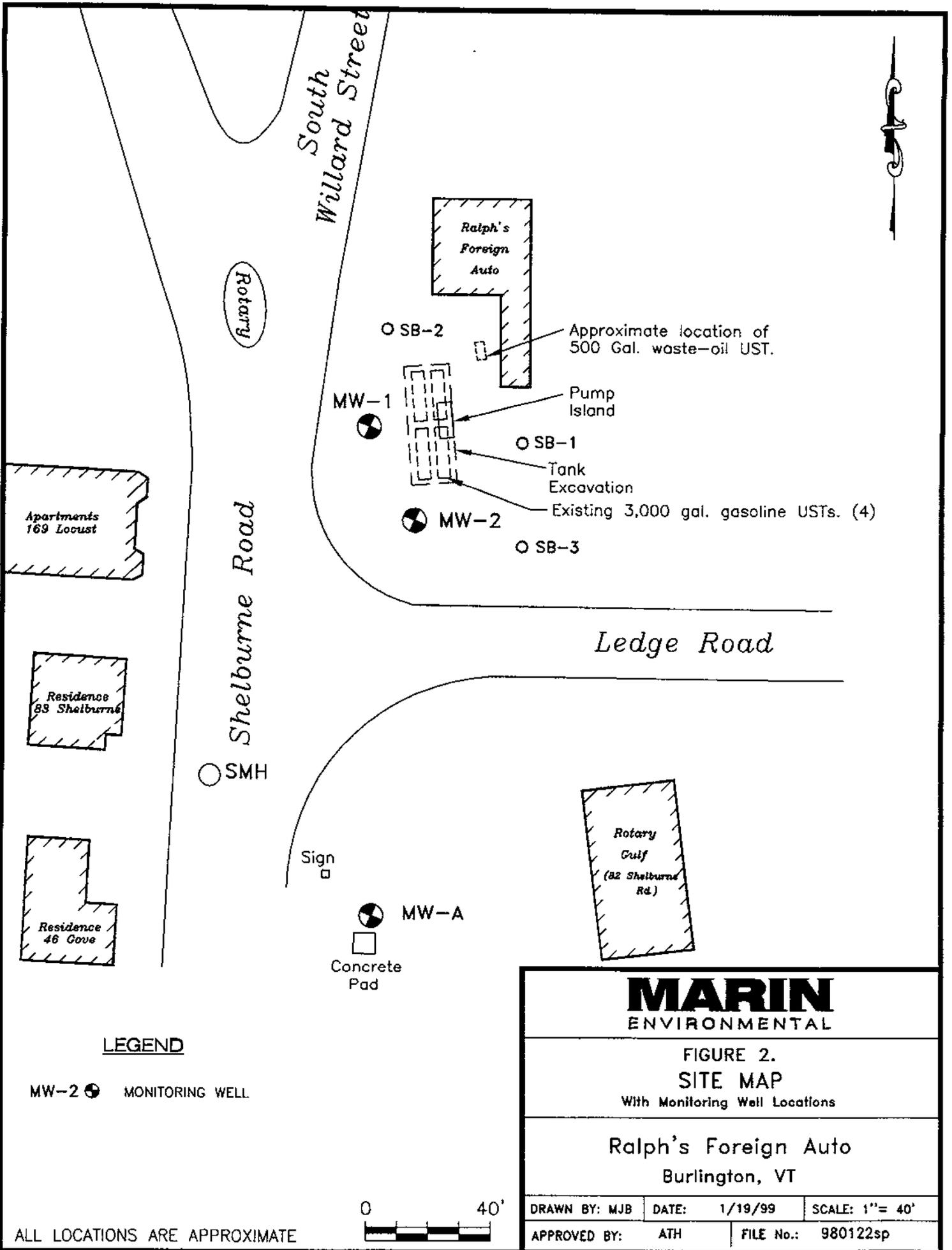
Source: U.S.G.S. Topographic Map  
Burlington Quadrangle, Vermont-Chittenden Co., 7.5' Series, 1946, Photorevised 1987.

STE: **Ralph's Foreign Auto**

QUADRANGLE LOCATION

DRAWN BY: MJB	DATE: 1/20/99	SCALE: 1" = 2000'
APPROVED BY: ATH	FILE No.: 980122sloc	



South Willard Street

Rotary

Shelburne Road

Ledge Road

Ralph's Foreign Auto

Apartments 169 Locust

Residence 83 Shelburne

Residence 46 Cove

Rotary Culf (82 Shelburne Rd.)

SB-2

Approximate location of 500 Gal. waste-oil UST.

MW-1

Pump Island

SB-1

Tank Excavation

MW-2

Existing 3,000 gal. gasoline USTs. (4)

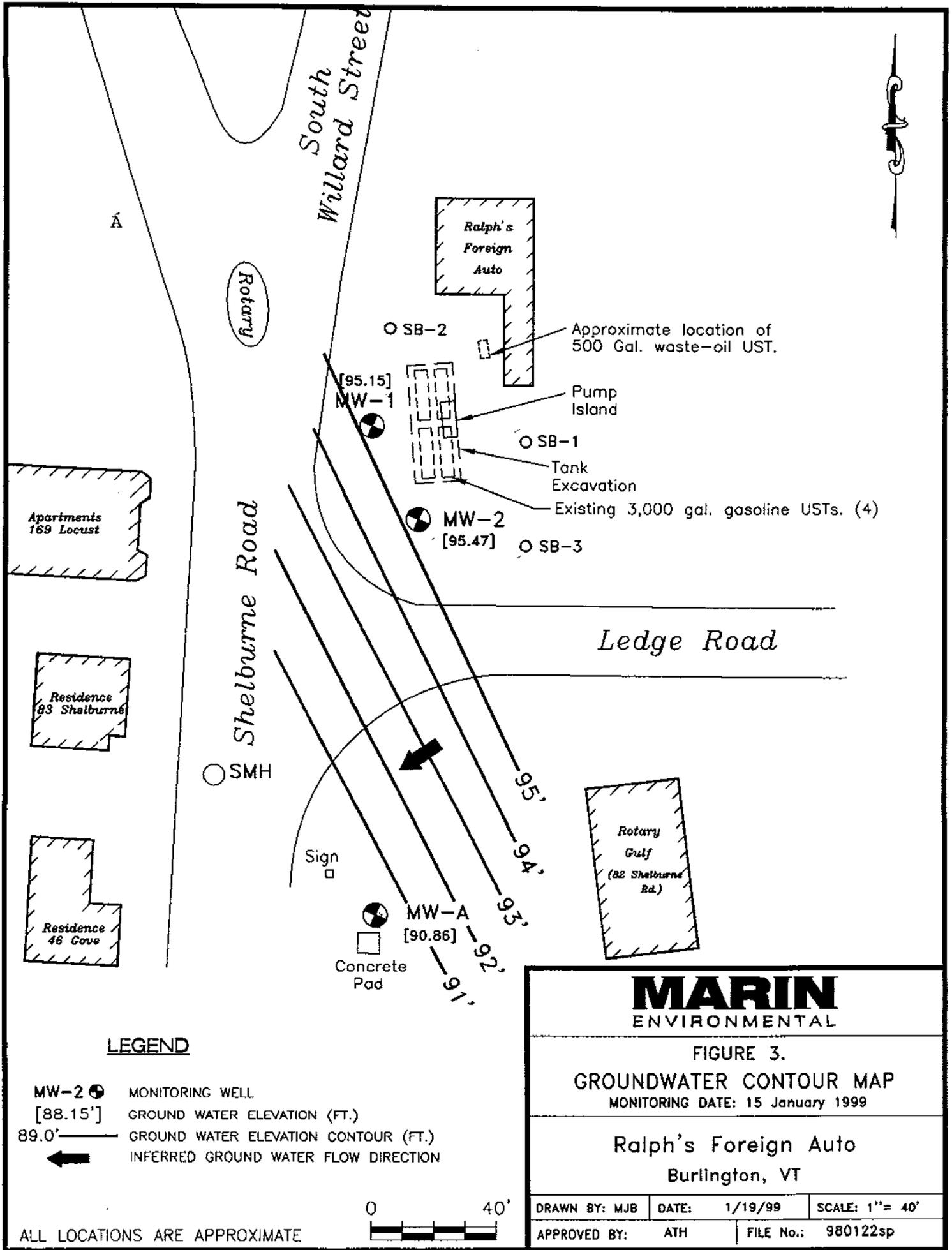
SB-3

SMH

Sign

MW-A

Concrete Pad



**LEGEND**

- MW-2 MONITORING WELL
- [88.15'] GROUND WATER ELEVATION (FT.)
- 89.0' GROUND WATER ELEVATION CONTOUR (FT.)
- INFERRED GROUND WATER FLOW DIRECTION

ALL LOCATIONS ARE APPROXIMATE

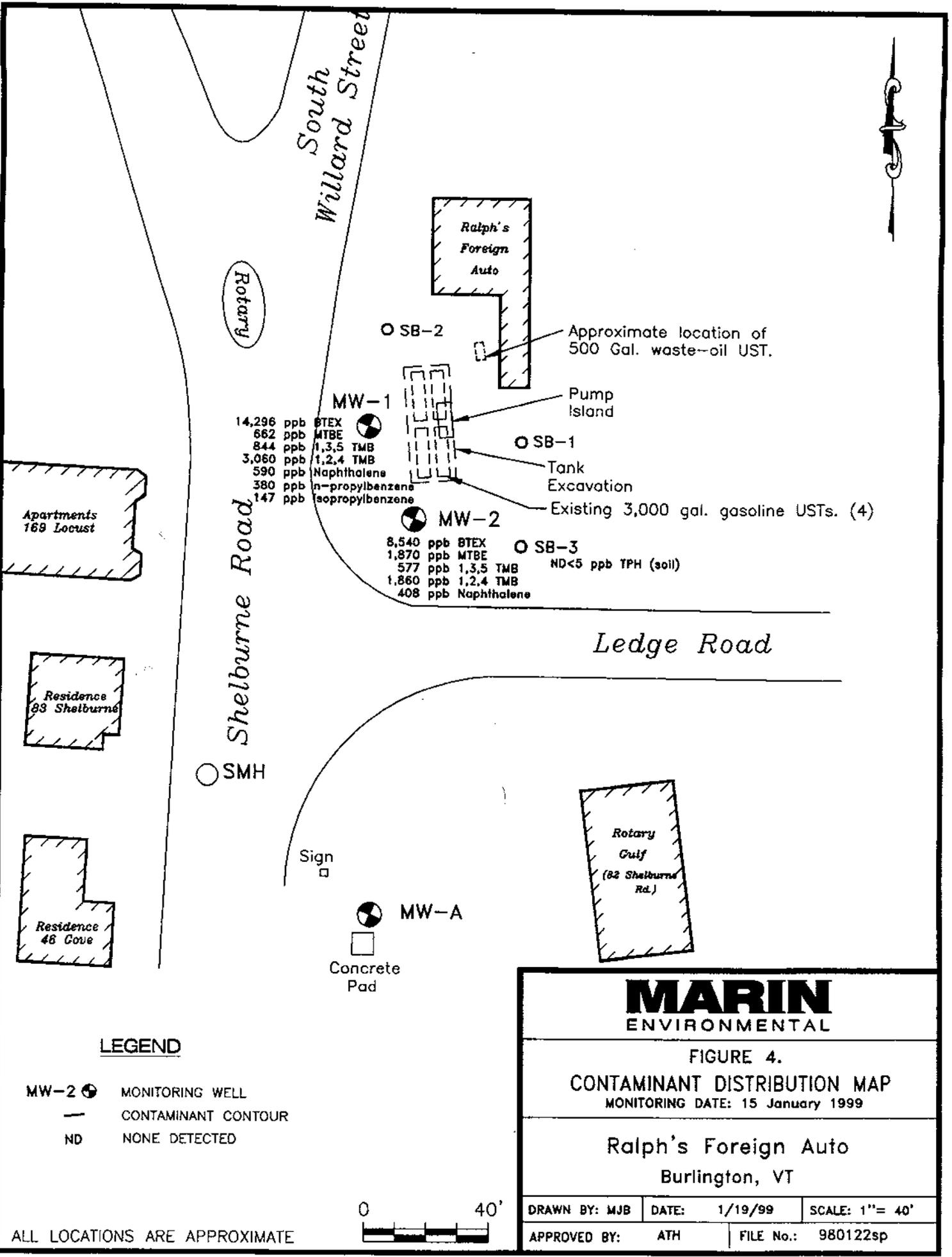


**MARIN**  
ENVIRONMENTAL

**FIGURE 3.**  
**GROUNDWATER CONTOUR MAP**  
MONITORING DATE: 15 January 1999

Ralph's Foreign Auto  
Burlington, VT

DRAWN BY: MJB	DATE: 1/19/99	SCALE: 1" = 40'
APPROVED BY: ATH	FILE No.: 980122sp	



14,296 ppb BTEX  
 662 ppb MTBE  
 844 ppb 1,3,5 TMB  
 3,060 ppb 1,2,4 TMB  
 590 ppb Naphthalene  
 380 ppb n-propylbenzene  
 147 ppb Isopropylbenzene

8,540 ppb BTEX  
 1,870 ppb MTBE  
 577 ppb 1,3,5 TMB  
 1,860 ppb 1,2,4 TMB  
 408 ppb Naphthalene

Approximate location of  
 500 Gal. waste-oil UST.  
 Pump  
 Island  
 Tank  
 Excavation  
 Existing 3,000 gal. gasoline USTs. (4)  
 ND<5 ppb TPH (soil)

**LEGEND**

- MW-2 MONITORING WELL
- CONTAMINANT CONTOUR
- ND NONE DETECTED



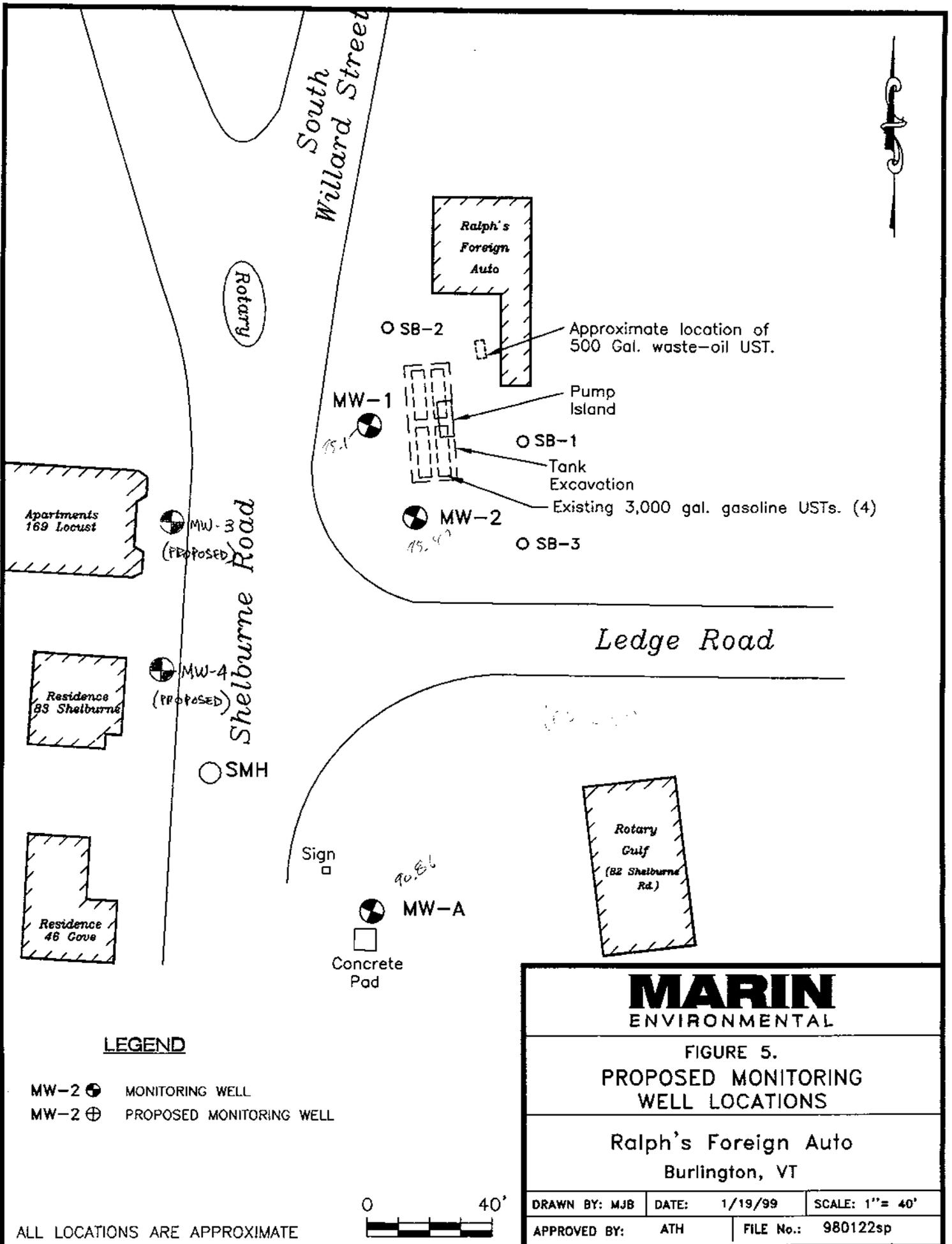
ALL LOCATIONS ARE APPROXIMATE

**MARIN**  
ENVIRONMENTAL

FIGURE 4.  
CONTAMINANT DISTRIBUTION MAP  
MONITORING DATE: 15 January 1999

Ralph's Foreign Auto  
Burlington, VT

DRAWN BY: MJB	DATE: 1/19/99	SCALE: 1" = 40'
APPROVED BY: ATH	FILE No.: 980122sp	



**MARIN**  
 ENVIRONMENTAL

FIGURE 5.  
 PROPOSED MONITORING  
 WELL LOCATIONS

Ralph's Foreign Auto  
 Burlington, VT

DRAWN BY: MJB	DATE: 1/19/99	SCALE: 1" = 40'
APPROVED BY: ATH	FILE No.: 980122sp	

**TABLE 1**  
**GROUND-WATER ELEVATION CALCULATIONS**

**Ralph's Mobil**  
**Burlington, Vermont**

**Monitoring Date: 15 January 1999**

Well I.D.	Top of Casing Elevation	Depth to Water	Water Table Elevation
MW-1	99.82	4.67	95.15
MW-2	100.00	4.53	95.47
MW-A	101.36	10.50	90.86

All values reported in feet relative to arbitrary site datum of 100.00 feet.

**TABLE 2**  
**LABORATORY ANALYTICAL RESULTS**  
(Petroleum Hydrocarbons)

Ralph's Mobil  
Burlington, VT

Monitoring Date: 15 January 1999

Sample Location	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5 TMB	1,2,4 TMB	Napthalene	Total VOCs	TPH
Ground Water										
MW-1	682	ND<100	486	2,130.0	1,170.0	844.0	44.1	13.2	15859.3	32.9
MW-2	1870	51.2	469	1220	6640	577.0	1,860	408	13095.2	NS
VGES	40	5	1,000	700	10,000	4	5	20	--	--
Soil										
SB-3	ND<20	ND<10	ND<10	ND<10	ND<20	ND<10	ND<10	ND <50	ND	ND<5.0
QA/QC										
MW-2	1970	51.2	469	1220	6640	577.0	1,860	408	13095.2	NS
Duplicate (MW-2)	1950	56.8	470	1200.0	6,640.0	583	1,910.0	419.0	13138.8	NS
Trip Blank	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	NS
VGES	40	5	1,000	700	10,000	4	5	20	--	--

Notes: All concentrations reported in ug/L, except TPH which is mg/l

Shaded values exceed VGES.

Detection limit raised in MW-1 due to high levels of contaminants, benzene non-detection limit exceeds VGES.

Isopropyl benzene and n-propyl benzene were detected in MW-1 at 147 and 380 ug/L, respectively.

SB-3 was obtained 4 January 1999

NS = Not sampled for this parameter

ND = None Detected above quantitation limit

VGES = Vermont Groundwater Enforcement Standard

**TABLE 3**  
**LABORATORY ANALYTICAL RESULTS**  
(Priority Pollutant Metals)

Ralph's Mobil  
Burlington, VT

Monitoring Date: 15 January 1999

MW-1		
Parameter	Result mg/l	VGES mg/l
Total Antimony	ND<0.004	0.006
Total Arsenic	<b>0.006</b>	0.050
Total Beryllium	ND<0.002	0.004
Total Cadmium	ND<0.002	0.005
Total Chromium	ND<0.010	0.100
Total Copper	ND<0.020	1.300
Total Lead	<b>0.026</b>	0.015
Total Mercury	ND<0.001	0.002
Total Nickel	ND<0.020	0.100
Total Selenium	ND<0.005	0.050
Total Silver	ND<0.010	0.0001
Total Thallium	ND<0.001	0.002
Total Zinc	<b>0.014</b>	5.000

Notes: All VGES are Primary Enforcement Standards except Silver and Zinc which are Secondary Enforcement Standards.

Shaded values exceed VGES.

**VGES** = Vermont Groundwater Enforcement Standards

ND = None Detected above quantitation limit

**APPENDIX B**

**Boring Logs /Monitoring Well Construction Diagrams**

Marin Environmental, Inc.

SITE NAME: RALPH'S AUTO		BORING NO: MW-1		
LOCATION: BURLINGTON, VT		TOTAL DEPTH: 10.5' BGS		
JOB NO. 98-0122		DEPTH TO WATER: 7' BGS		
DATE: 1/5/99		FIELD SUPERVISOR: A. HOAG J. DEMONTE		
DRILLING METHOD VIBRATORY		CONTRACTOR: J. ADAMS		
BORING DIAMETER 4 1/4"		DRILLERS:		

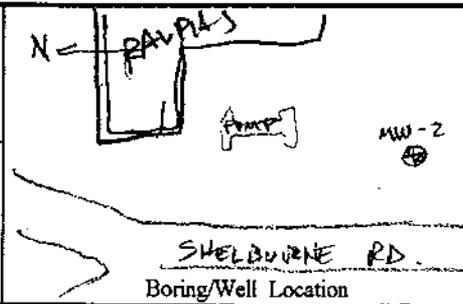
Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
							30"	DARK BROWN TOPSOIL, DUFF		0.4
5'								MEDIUM TO COARSE BROWN SAND WITH TRACE SILT, DRY		0.4
10'							24"	MEDIUM TO COARSE BROWN SAND WITH LITTLE SILT, WET, VEILY STRONG PETROL ODORS AND SHEENING; W.T @ 7 FT BGS REFUSAL @ 10.5' BGS		1.2 1170 1061
15'										
20'								WELL DEVELOPED w/ PERISTALTIC PUMP; NO BAILER DEDICATED; 9" ROAD BOX		
25'										
30'										
35'										
40'										

		BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	1 1/2" PVC 7.5'
SOME	20-33%	4-10	LOOSE	SLOT SIZE	0.010
LITTLE	10-20%	10-30	MEDIUM	RISER	1 1/2" PVC 1.5'
TRACE	0-10%	30-50	DENSE	GRADED SAND	10.5 - 2 FT BGS
		> 50	VERY DENSE	BENTONITE PELLETS	2-1 FT BGS
				BENTONITE GROUT	

Marin Environmental, Inc.

SITE NAME: RALPH'S MOBILE  
 LOCATION: BURLINGTON, VT  
 JOB NO. 980122  
 DATE: 1/5/99

BORING NO: MW-2  
 TOTAL DEPTH: 7.4' BGS  
 DEPTH TO WATER: 6 FT BGS



DRILLING METHOD: VIBRATORY  
 BORING DIAMETER: 4 1/4"

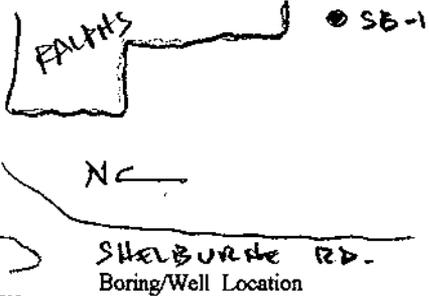
FIELD SUPERVISOR: A. HOAK  
 J. DEMERSE  
 CONTRACTOR: J. ADAMS

DRILLERS:

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL			PID (ppm)
		0-6	6-12	12-18	18-24	24+						
								BLACK TOP				
5'								FINE TO MEDIUM BROWN SAND WITH SOME SILT, WET @ 6' BGS. PETROLEUM ODOR; REFUSAL AT 7.4'				12.1
							32"					79.6
												83.7
10'												
15'												
20'								WELL DEVELOPED w/ PERISTALTIC PUMP; NO SAILER DELEGATED; SPECIAL 1/2" ROAD BOX - REQUIRES ADAMS ROAD BOX TOOL				
25'												
30'												
35'												
40'												

		BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOOSE	WELL SCREEN	1/2" PVC
SOME	20-33%	4-10	LOOSE	SLOT SIZE	0.010
LITTLE	10-20%	10-30	MEDIUM	RISER	1/2" PVC
TRACE	0-10%	30-50	DENSE	GRADED SAND	7.4-11.5 FT
		> 50	VERY DENSE	BENTONITE PELLETS	1.5-0.5 FT
			BENTONITE GROUT		

Marin Environmental, Inc.

SITE NAME: RALPH'S Auto LOCATION: BURLINGTON, VT JOB NO. 98-0122 DATE: 11/5/98	BORING NO: SB-1 TOTAL DEPTH: 4' DEPTH TO WATER: NA	
DRILLING METHOD VIBRATORY	FIELD SUPERVISOR: A HOAK J. DEMERSE	
BORING DIAMETER	CONTRACTOR: J. ADAMS	
DRILLERS:		SHELBORNE RD. Boring/Well Location

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL		PID (ppm)
		0-6	6-12	12-18	18-24	24-30					
							BLACKTOP				
						24'	MEDIUM BROWN SAND WITH LITTLE SILT, MUSKY REFUSAL AT 4' SOIL BORING - NO WELL INSTALLED				0.0
5'											
10'											
15'											
20'											
25'											
30'											
35'											
40'											

		BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOOSE	WELL SCREEN	
SOME	20-33%	4-10	LOOSE	SLOT SIZE	
LITTLE	10-20%	10-30	MEDIUM	RISER	
TRACE	0-10%	30-50	DENSE	GRADED SAND	
		> 50	VERY DENSE	BENTONITE PELLETS	
				BENTONITE GROUT	

Marin Environmental, Inc.

SITE NAME: RALPH'S AUTO		BORING NO: SB-2		
LOCATION: BURLINGTON, VT		TOTAL DEPTH: 6'		
JOB NO. 98-0122		DEPTH TO WATER: NA		
DATE: 11/5/99		FIELD SUPERVISOR: A. HOAK J. DEMARSE		
DRILLING METHOD: VIBRATORY		CONTRACTOR: J. ADAMS		
BORING DIAMETER: 4 1/8"		DRILLERS:		

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	Boring/Well Location			PID (ppm)
		0	6	12	18	24			WELL DETAIL			
								BLACKTOP				
5'						24"		MEDIUM TO FINE BROWN SAND WITH LITTLE SILT, MOIST AND SLIGHT PETROL ODOR. REFUSAL @ 6' BGS. SOIL BORING - NO WELL INSTALLED				3.6
10'												
15'												
20'												
25'												
30'												
35'												
40'												

		BLOW COUNT		MATERIALS USED		SIZE/TYPE	QUANTITY
		0-4	VERY LOSE	WELL SCREEN			
AND	33-50%	4-10	LOOSE	SLOT SIZE			
SOME	20-33%	10-30	MEDIUM	RISER			
LITTLE	10-20%	30-50	DENSE	GRADED SAND			
TRACE	0-10%	> 50	VERY DENSE	BENTONITE PELLETS			
				BENTONITE GROUT			

Marin Environmental, Inc.

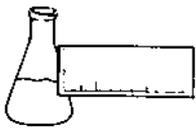
SITE NAME: <b>RALPH'S AUTO</b> LOCATION: <b>BURLINGTON, VT.</b> JOB NO. <b>VT 98-0122</b> DATE: <b>11/5/98</b>	BORING NO.: <b>SB-3</b> TOTAL DEPTH: <b>5'</b> DEPTH TO WATER: <b>NA</b>	
DRILLING METHOD: <b>VIB ROTOARY</b>	FIELD SUPERVISOR: <b>A. HOAN</b> <b>J. DEMERSE</b>	
BORING DIAMETER: <b>4 1/4"</b>	CONTRACTOR: <b>J. ADAMS</b>	
DRILLERS:		Boring/Well Location

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL			PID (ppm)
		0	6	12	18	24						
								BLACKTOP				1.6
5'							30"	MEDIUM TO FINE BROWN SAND WITH TRACE SILT, MOIST REFUSAL @ 5 FT BGS. CONFIRMATORY SAMPLE COLLECTED 2 - 40 ml glass				0.0
10'								SOIL BORING - NO WELL INSTALLED				N.D.
15'												
20'												
25'												
30'												
35'												
40'												

		BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0 - 4	VERY LOSE	WELL SCREEN	
SOME	20-33%	4 - 10	LOOSE	SLOT SIZE	
LITTLE	10-20%	10 - 30	MEDIUM	RISER	
TRACE	0-10%	30 - 50	DENSE	GRADED SAND	
		> 50	VERY DENSE	BENTONITE PELLETS	
				BENTONITE GROUT	

**APPENDIX C**

**Laboratory Report Forms**



**ENDYNE, INC.**

**Laboratory Services**

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

**LABORATORY REPORT**

CLIENT: Marin Environmental

ORDER ID: 1072

PROJECT: Ralph's Mobil/ VT980122

DATE RECEIVED: January 15, 1999

REPORT DATE: January 26, 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.

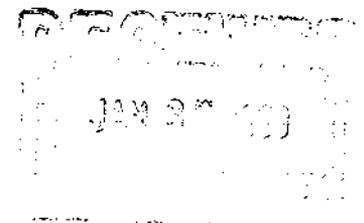
Blank contamination was not observed at levels affecting the analytical results.

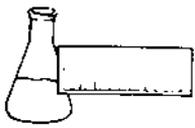
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures





**ENDYNE, INC.**

**Laboratory Services**

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

**LABORATORY REPORT**

CLIENT: Marin Environmental  
PROJECT: Ralph's Mobil/ VT980122  
REPORT DATE: January 26, 1999

ORDER ID: 1072  
DATE RECEIVED: January 15, 1999  
SAMPLER: JD/JB  
ANALYST: 820

Ref. Number: 133835

Site: SB-3

Date Sampled: January 4, 1999

Time: 2:00 PM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>	<u>Analysis Date</u>
TPH 8015 DRO	< 5.0	mg/Kg	SW 8015	1/21/99

VT490122

CHAIN-OF-CUSTODY RECORD

1 of 2

31068

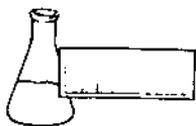
Project Name: Ralph's Mobil	Reporting Address: 1700 Highway 100 Colchester VT	Billing Address: S.B. Collins
Site Location: Colchester	Company: Martin Env	Sampler Name: Steve Demorse / Jason Breckley
Endyne Project Number: 1072	Contact Name/Phone #: Andrew Park 855-0011	Phone #: 855-0011

Lab #	Sample Location	Matrix	GRA	COMP	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
133835	SB-3	Soil	Y		1-4 1400	1	40 ml 1.5L		30A	Ice	
	SB-3	Soil	Y		1400	1	40 ml 1.5L		30B	Ice	
/											

Relinquished by: Signature <i>A. Dem</i>	Received by: Signature <i>Meganne A. Spring</i>	Date/Time: 1/15/99 4:05
Relinquished by: Signature	Received by: Signature	Date/Time

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	8	Total Diss. P	13	TDS	18	COB	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD <sub>5</sub>	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): 30A: 80216 30B: TPH by mail 8100										



**ENDYNE, INC.**

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Marin Environmental  
PROJECT NAME: Ralph's Mobil/VT980122  
DATE REPORTED: January 29, 1999  
DATE SAMPLED: January 4, 1999

ORDER ID: 1072  
REF. #: 133,835

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody did not indicated proper preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods. Samples were analyzed past EPA Method Specified holding times.

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

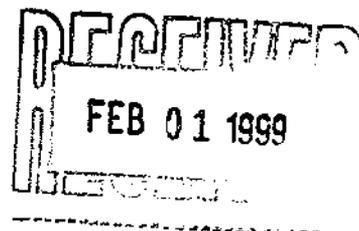
Blank contamination was not observed at levels affecting the analytical results.

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.

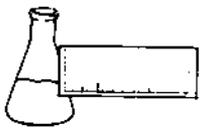
Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director



enclosures



**ENDYNE, INC.**

Laboratory Services

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

LABORATORY REPORT

EPA METHOD 8021B COMPOUNDS BY EPA METHOD 8260

CLIENT: Marin Environmental

PROJECT NAME: Ralph's Mobil/VT980122

REPORT DATE: January 29, 1999

DATE SAMPLED: January 4, 1999

DATE RECEIVED: January 15, 1999

ANALYSIS DATE: January 26, 1999

ORDER ID: 1072

REF.#: 133,835

STATION: SB-3

TIME SAMPLED: 14:00

SAMPLER: J.D./J.B.

<u>Parameter</u>	<u>Detection Limit (ug/kg)</u>	<u>Concentration (ug/kg)</u>
Benzene	10	ND <sup>1</sup>
Toluene	10	ND
Ethylbenzene	10	ND
Xylenes	20	ND
MTBE	20	ND
1,2,4-Trimethylbenzene	10	ND
1,3,5-Trimethylbenzene	10	ND
Naphthalene	50	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 102%

Toluene-d8: 95%

4-Bromofluorobenzene: 92%

PERCENT SOLIDS: 85%

NOTES:

1 None Detected

V7490122

**CHAIN-OF-CUSTODY RECORD**

31068

112

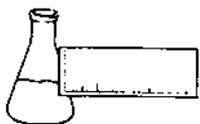
Project Name: <i>Palpe Pond</i>	Reporting Address: <i>112 ...</i>	Billing Address: <i>S.E. Collins</i>
Site Location: <i>Palpe Pond</i>		
Endyne Project Number: <i>1072</i>	Company: <i>...</i>	Sampler Name: <i>...</i>
	Contact Name/Phone #: <i>...</i>	Phone #: <i>...</i>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
<i>13325</i>	<i>SB-1</i>	<i>Soil</i>	<i>✓</i>		<i>1/14</i>	<i>1</i>	<i>...</i>		<i>30 A</i>	<i>Ice</i>	
	<i>SB-3</i>	<i>Soil</i>	<i>✓</i>		<i>1/14</i>	<i>1</i>	<i>...</i>		<i>30 B</i>	<i>Ice</i>	

Relinquished by: Signature <i>A. ...</i>	Received by: Signature <i>...</i>	Date/Time <i>1/15/99 4:05</i>
Relinquished by: Signature	Received by: Signature	Date/Time

 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 <sub>5</sub>	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): <i>30A: ...</i>										



**ENDYNE, INC.**

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Marin Environmental  
PROJECT NAME: Ralph's Mobil/ VT980122  
REPORT DATE: January 25, 1999  
DATE SAMPLED: January 15, 1999

PROJECT CODE: 1073  
REF.#: 133,836 - 133,838

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.

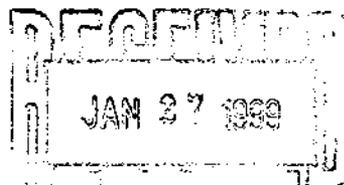
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

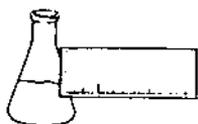
Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures





**ENDYNE, INC.**

**Laboratory Services**

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

**EPA METHOD 8021B--PURGEABLE AROMATICS**

CLIENT: Marin Environmental

DATE RECEIVED: January 15, 1999

PROJECT NAME: Ralph's Mobil/ VT980122

REPORT DATE: January 25, 1999

CLIENT PROJ. #: VT980122

PROJECT CODE: 1073

Ref. #:	133,836	133,837	133,838	
Site:	Trip Blank	Duplicate	MW-2	
Date Sampled:	1/15/99	1/15/99	1/15/99	
Time Sampled:	9:00	NI	2:30	
Sampler:	J.D. & J.B.	J.D. & J.B.	J.D. & J.B.	
Date Analyzed:	1/22/99	1/22/99	1/22/99	
UIP Count:	0	>10	>10	
Dil. Factor (%):	100	2	2	
Surr % Rec. (%):	98	96	97	
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	
MTBE	<1	1,850.	1,870.	
Benzene	<1	56.8	51.2	
Toluene	<1	470.	469.	
Ethylbenzene	<1	1,200.	1,220.	
Xylenes	<1	6,640.	6,800.	
1,3,5 Trimethyl Benzene	<1	593.	577.	
1,2,4 Trimethyl Benzene	<1	1,910.	1,860.	
Naphthalene	<1	419.	408.	

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

CHAIN-OF-CUSTODY RECORD

19/ - 24 - 1

VT 95 0122

Project Name: <i>Ralphs Mobil</i>	Reporting Address: <i>1700 Ingeman Ave. Colchester, VT</i>	Billing Address: <i>S. B. Collins</i>
Site Location: <i>Burlington</i>	Company: <i>Marion Env</i>	Sampler Name: <i>John Demaree / Susan Brubly</i>
Endyne Project Number: <i>1073</i>	Contact Name/Phone #: <i>Andrew Hill 655-0511</i>	Phone #: <i>655-0511</i>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
33836	Trip blank	H <sub>2</sub> O	Y		0900	2	40 ml / 120 ml		30 A	HCl	
33837	Duplicate				-	1					
33838	mw-2				1430	1					
33839	mw-1				1415	2	40 ml / 120 ml		30 C	HCl	
	mw-1				1420	2	40 ml / 120 ml		30 B	HCl	
	mw-1				1425	1	16 oz. plastic		30 D	HNO <sub>3</sub>	

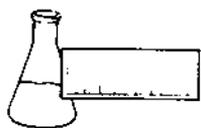
Relinquished by: Signature <i>J. Demaree</i>	Received by: Signature <i>Regina A. Spring</i>	Date/Time <i>1/15/99 4:05</i>
Relinquished by: Signature	Received by: Signature	Date/Time

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 <sub>5</sub>	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): <i>30A: 8071b 30B: TPH in methyl succ 30C: Vol. by 8260 30D: Metals</i>										

↳ Priority Pollutant



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32 James Brown Drive  
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(802) 879-4333  
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REPORT OF LABORATORY ANALYSIS

CLIENT: Marin Environmental  
PROJECT NAME: Ralph's Mobil/VT980122  
REPORT DATE: January 25, 1999  
DATE SAMPLED: January 15, 1999

ORDER ID: 1073  
REF.#: 133,839

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.

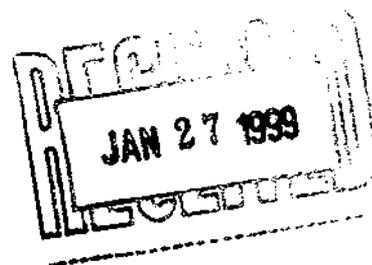
Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

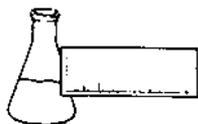
Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures





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FAX 879-7103

### LABORATORY REPORT

#### EPA METHOD 8260 WATER MATRIX

CLIENT: Marin Environmental  
PROJECT NAME: Ralph's Mobil/VT980122  
REPORT DATE: January 25, 1999  
DATE SAMPLED: January 15, 1999  
DATE RECEIVED: January 15, 1999  
ANALYSIS DATE: January 25, 1999

ORDER ID: 1073  
REF.#: 133,839  
STATION: MW - 1  
TIME SAMPLED: 14:15  
SAMPLER: J.D./J.B.

<u>Parameter</u>	<u>Detection Limit</u> (ug/L) <sup>1</sup>	<u>Result</u> (ug/L)	<u>Parameter</u>	<u>Detection Limit</u> (ug/L)	<u>Result</u> (ug/L)
Benzene	100	ND <sup>2</sup>	1,3-Dichloropropane	100	ND
Bromobenzene	100	ND	2,2-Dichloropropane	100	ND
Bromochloromethane	200	ND	1,1-Dichloropropene	100	ND
Bromodichloromethane	100	ND	cis-1,3-Dichloropropene	100	ND
Bromoform	100	ND	trans-1,3-Dichloropropene	100	ND
Bromomethane	500	ND	Ethylbenzene	100	2,110.
n-Butylbenzene	100	ND	Hexachlorobutadiene	500	ND
sec-Butylbenzene	100	ND	Isopropylbenzene	100	147.
tert-Butylbenzene	100	ND	p-Isopropyltoluene	100	ND
Carbon Tetrachloride	100	ND	Methylene Chloride	500	ND
Chlorobenzene	100	ND	Naphthalene	500	590.
Chloroethane	500	ND	n-Propylbenzene	100	380.
Chloroform	100	ND	Styrene	100	ND
Chloromethane	1,000	ND	1,1,1,2-Tetrachloroethane	200	ND
2&4-Chlorotoluene	200	ND	1,1,2,2-Tetrachloroethane	200	ND
Dibromochloromethane	100	ND	Tetrachloroethene	100	ND
1,2-Dibromo-3-Chloropropane	200	ND	Toluene	100	486.
1,2-Dibromoethane	200	ND	1,2,3-Trichlorobenzene	200	ND
Dibromomethane	200	ND	1,2,4-Trichlorobenzene	200	ND
1,2-Dichlorobenzene	100	ND	1,1,1-Trichloroethane	100	ND
1,3-Dichlorobenzene	100	ND	1,1,2-Trichloroethane	100	ND
1,4-Dichlorobenzene	100	ND	Trichloroethene	100	ND
Dichlorodifluoromethane	1,000	ND	Trichlorofluoromethane	200	ND
1,1-Dichloroethane	100	ND	1,2,3-Trichloropropane	100	ND
1,2-Dichloroethane	100	ND	1,2,4-Trimethylbenzene	100	3,060.
1,1-Dichloroethene	100	ND	1,3,5-Trimethylbenzene	100	844.
cis-1,2-Dichloroethene	100	ND	Vinyl Chloride	500	ND
trans-1,2-Dichloroethene	100	ND	Total Xylenes	200	11,700.
1,2-Dichloropropane	100	ND	MTBE	200	662.

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

#### ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane : 106.%  
Toluene-d8 : 95.%  
4-Bromofluorobenzene : 92.%

#### NOTES:

- Detection limit raised due to high levels of contaminants. Sample run at a 1% dilution.
- None detected

**CHAIN-OF-CUSTODY RECORD**

31066

10 2 2

VT 44 0122

Project Name: <u>Ralph's Mobil</u>	Reporting Address: <u>1700 ...</u>	Billing Address: <u>S.B. Collins</u>
Site Location: <u>Burlington</u>	Company: <u>...</u>	Sampler Name: <u>...</u>
Endyne Project Number: <u>1022</u>	Contact Name/Phone #: <u>...</u>	Phone #: <u>...</u>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
133836	Tray Blank					2	...		30 A	HCl	
133837	Duplicate					1	1				
133838	MW-2				1430	1	1				
133839	MW-1				1415	2	...		30 C	HCl	
	MW-1				1420	2	...		30 B	HCl	
	MW-1				1425	2	...		30 D	HNO <sub>3</sub>	

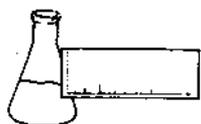
Relinquished by: Signature <u>[Signature]</u>	Received by: Signature <u>[Signature]</u>	Date/Time <u>1/15/99 4:05</u>
Relinquished by: Signature	Received by: Signature	Date/Time

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 <sub>5</sub>	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): <u>30 A: 807.4 20.1 EPA 807.4 20.1 807.4 20.1 807.4 20.1 807.4 20.1</u>										

↳ Priority Pollutant



**ENDYNE, INC.**

Laboratory Services

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Williston, Vermont 05495  
(802) 879-4333  
FAX 879-7103

LABORATORY REPORT

CLIENT: Marin Environmental

ORDER ID: 1073

PROJECT: Ralph's Mobil/ VT980122

DATE RECEIVED: January 15, 1999

REPORT DATE: January 29, 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.

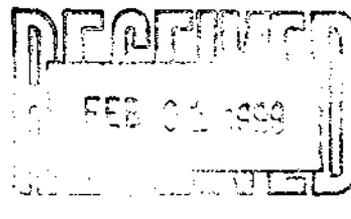
Blank contamination was not observed at levels affecting the analytical results.

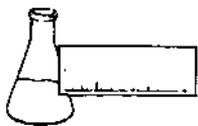
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director

enclosures





LABORATORY REPORT

CLIENT: Marin Environmental  
PROJECT: Ralph's Mobil/ VT980122  
SITE: MW -1  
DATE RECEIVED: January 15, 1999  
REPORT DATE: January 29, 1999

ORDER ID: 1073  
REFERENCE NUMBER: 133839  
DATE SAMPLED: January 15, 1999  
TIME SAMPLED: 2:25 PM  
SAMPLER: JD/JB

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>
Total Antimony	< 0.004	mg/L	SM 3113B	1/25/99	100
Total Arsenic	0.006	mg/L	SM 3113B	1/26/99	410
Total Beryllium	< 0.002	mg/L	EPA 6010	1/22/99	100
Total Cadmium	< 0.002	mg/L	EPA 6010	1/22/99	100
Total Chromium	< 0.010	mg/L	EPA 6010	1/22/99	100
Total Copper	< 0.020	mg/L	EPA 6010	1/22/99	100
Total Lead	0.026	mg/L	SM 3113B	1/26/99	410
Total Mercury	< 0.001	mg/L	EPA 7470	1/29/99	422
Total Nickel	< 0.020	mg/L	EPA 6010	1/22/99	100
Total Selenium	< 0.005	mg/L	SM 3113B	1/22/99	100
Total Silver	< 0.010	mg/L	EPA 6010	1/22/99	100
Total Thallium	< 0.001	mg/L	SM 3113B	1/25/99	100
Total Zinc	0.014	mg/L	EPA 6010	1/22/99	100

**CHAIN-OF-CUSTODY RECORD**

VT 95 0122

Project Name: <i>Kuloh's Mobil</i>	Reporting Address: <i>1700 Hygenia Ave. Colchester, VT</i>	Billing Address: <i>S.B. Collins</i>
Site Location: <i>S Burlington</i>	Company: <i>Marin Env</i>	Sampler Name: <i>Jim Demerick / Susan Blunty</i>
Endyne Project Number: <i>1073</i>	Contact Name/Phone #: <i>Andrew Hawk 653-0011</i>	Phone #: <i>653-0011</i>

Lab #	Sample Location	Matrix	GRA B	
			A	B
33836	Trip blank	H <sub>2</sub> O	Y	
133837	Duplicate			
33838	mw-2			
133839	mw-1			
	mw-1			
	mw-1			

Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
	No.	Type/Size				
1-15						
0900	2	40 ml VOA		30 A	HCl	
-	1					
1430	1					
1415	2	40 ml VOA		30 C	HCl	
1420	2	40 ml VOA		30 B	HCl	
1425	1	16 oz plastic		30 D	HNO <sub>3</sub>	

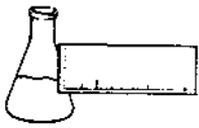
Relinquished by: Signature <i>J. Demerick</i>	Received by: Signature <i>Wendy A. Spring</i>	Date/Time <i>1/15/99 4:05</i>
Relinquished by: Signature	Received by: Signature	Date/Time

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 415.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD <sub>5</sub>	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) <i>30A: 80715 30B: TPH by method 8010 30C: Volatiles 8240 30D: Metals</i>										

Priority Pollutant



**ENDYNE, INC.**

**Laboratory Services**

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FAX 879-7103

**LABORATORY REPORT**

CLIENT: Marin Environmental  
PROJECT: Ralph's Mobil/ VT980122  
REPORT DATE: January 29, 1999

ORDER ID: 1073  
DATE RECEIVED: January 15, 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.

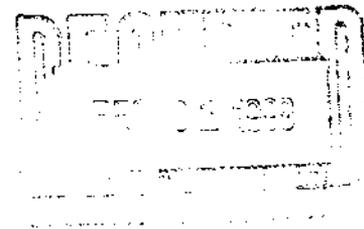
All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

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

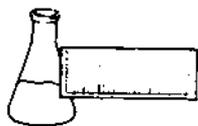
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.  
Laboratory Director



enclosures



LABORATORY REPORT

CLIENT: Marin Environmental  
PROJECT: Ralph's Mobil/ VT980122  
REPORT DATE: January 29, 1999

ORDER ID: 1073  
DATE RECEIVED: January 15, 1999  
SAMPLER: JD/JB  
ANALYST: 820

Ref. Number: 133839

Site: MW -1

Date Sampled: January 15, 1999

Time: 2:25 PM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>	<u>Analysis Date</u>
TPH 8015 DRO	32.9	mg/L	SW 8015	1/26/99

CHAIN-OF-CUSTODY RECORD

VT 44 0122

Project Name: <i>Galops Mobil</i>	Reporting Address: <i>1700 Ferguson Ave. Colicville, VT</i>	Billing Address: <i>S.B. Collins</i>
Site Location: <i>Burlington</i>	Company: <i>Marin Env</i>	Sampler Name: <i>Sam DeMotte / Susan Beverly</i>
Endyne Project Number: <i>1073</i>	Contact Name/Phone #: <i>Andrew Hobb 655-0211</i>	Phone #: <i>655-0211</i>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
33836	Trip blank	H <sub>2</sub> O	Y		1-15 0900	2	40ml Vial		30 A	HCl	
133837	Duplicate				-	1					
33838	mw-2				1430	1					
133839	mw-1				1415	2	40ml Vial		30 C	HCl	
	mw-1				1420	2	40ml Vial		30 B	HCl	
	mw-1				1425	1	40ml Vial		30 D	HNO <sub>3</sub>	

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>[Signature]</i>	Date/Time <i>1/15/99 4:05</i>
Relinquished by: Signature	Received by: Signature	Date/Time

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 <sub>5</sub>	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): <i>30A: 80716 30B: TPH by modified 8100 30C: Vol by 8760 30D: Metals</i>										

↳ Priority Pollutant