HOFFER CONSULTING INC.

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# SITE INVESTIGATION REPORT

## CHAMPLAIN CHEVROLET
## ENOSBURG FALLS, VERMONT

**JUNE 1999**

HOFFER CONSULTING INC.

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JUL 21 9 32 AM '99

July 19, 1999

Chuck Schwer
Sites Management Section
VTDEC - Waste Management Division
103 South Main Street / West Office
Waterbury, VT 05671 - 0404

Re: Site Investigation Report, Champlain Chevrolet, Enosburg Falls, VT
SMS Site #98-2574

Dear Mr. Schwer:

On behalf of S. B. Collins, Inc., Hoffer Consulting Inc. (HCI) is pleased to submit the enclosed site investigation report for the Champlain Chevrolet site in Enosburg Falls, Vermont. If you have any questions concerning this report or our recommendations, please contact HCI project manager Tony French at 229 - 1113 or Carl Ruprecht of S.B. Collins at 527 - 0116.

Sincerely,
HOFFER CONSULTING INC.

Jefferson P. Hoffer, PG
Principal Hydrogeologist

enc.

cc: Carl Ruprecht, UST Manager, S.B. Collins, Inc.

# SITE INVESTIGATION REPORT

# CHAMPLAIN CHEVROLET
# ENOSBURG FALLS, VERMONT

## SMS SITE #98-2574

June 1999

*Prepared for:*
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St. Albans, Vermont 05478
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*Prepared by:*
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# 1.0 INTRODUCTION

This report presents the procedures and results of a site investigation completed in March and April of 1999 at the Champlain Chevrolet automobile dealership and garage located in Enosburg Falls, Vermont. During closure of one gasoline underground storage tank (UST) in December of 1998, petroleum contaminated soil was detected at the base of the tank excavation, and a small hole was observed in the UST. The UST, piping and pump dispenser at this site were owned by S.B. Collins, Inc. (SBC) of St. Albans, Vermont.

At the request of SBC, Hoffer & Associates (H&A) initiated a site investigation to evaluate the degree and extent of petroleum contamination at the Champlain Chevrolet property. Site investigation activities centered on the installation of two monitoring wells in the presumed downgradient direction from the source area, sampling of these two wells and two existing site wells, and a photoionization detector (PID) survey of the basement of the Champlain Chevrolet automobile showroom. Additional objectives of this site investigation included: an evaluation of the potential for preferential contaminant migration along underground utility corridors, identification of potential receptors and an assessment of the potential effects of petroleum contamination on any receptors, and to provide recommendations concerning the need for further investigation or remedial efforts at the site.

# 2.0 SITE DESCRIPTION

## 2.1 Site Location and History

The Champlain Chevrolet property is located in the Village of Enosburg Falls, which is situated just north of a large bend in the Missisquoi River as it flows to the west through Franklin County, Vermont. A site location map is presented as Figure 1. The Champlain Chevrolet site is positioned directly north of the village green at the corner of Missisquoi and Stebbin Streets in the center of Enosburg Falls. A site vicinity map is included as Figure 2. This site has been used for many years as an automobile dealership and associated garage. The Champlain Chevrolet property is positioned on the eastern edge of the commercial district of Enosburg Falls, at the margin between the village's commercial enterprises which characterize the main thoroughfares, and residential properties which typify most side streets.

SBC had owned the gasoline storage and dispensing equipment at this site since 1966 when the equipment was reportedly installed. As such, the 2,000 gallon gasoline UST was approximately 32 years old when it was closed on December 30, 1998. The UST, which had been used to fuel autos on the Champlain Chevrolet lot, was positioned directly adjacent to the automobile showroom within eight feet of the southeast corner of the building, quite close to Missisquoi Street. Two existing monitoring wells were found within ten feet to the south and east of the UST. A site basemap is included as Figure 3.

The fuel pump dispenser had been disconnected and removed from the site on the day preceding the closure. Once removed from the ground, the UST was observed to be in fair to poor condition with a moderate degree of pitting and corrosion, and a few deeply pitted areas apparent. One hole was detected in the base of the tank opposite the fuel level gauging port approximately three feet from the south end. This hole was 3/8 inch in diameter. Petroleum contamination was evident at the base of the UST excavation near the south end. As such, the location of this UST is considered to be a source area for petroleum contamination at the property. The UST had been taken out of service a few days prior to the tank closure and a replacement skid tank had been delivered to the site and placed northwest of the automotive service facility.

Additional information on this site generated to date by H&A can be found in the following documents:

Letter/Report to Carl Ruprecht, *UST Site Assessment, Champlain Chevrolet, Enosburg Falls, VT, UST Facility ID # 9334455,* January 4, 1999, Hoffer & Associates, Consulting Hydrogeologists, Montpelier, Vermont.

Letter to Chuck Schwer, *Scope of Work and Cost Estimate for Site Investigation, Champlain Chevrolet, Enosburg Falls, VT,* February 26, 1999, Hoffer & Associates, Consulting Hydrogeologists, Montpelier, Vermont.

## 2.2 Environmental Setting

The Champlain Chevrolet property sits on level terrain approximately 1500 feet west and north of the Missisquoi River as it flows westward around Enosburg Falls in a large bend

(see Figure 2). This river is the closest surface water to the property. The flat ground which characterizes the site is either a river or possibly a former lake terrace which sits at an approximate elevation of 430 feet above sea level. It is likely that surface water drains to the east or south toward the Missisquoi, however, this is not readily apparent due to the lack of relief in the area around the site.

According to the Surficial Geologic Map of Vermont (Doll, 1970), two unconsolidated deposits are mapped in the vicinity of the site. The floodplain of the Missisquoi River is mapped as recent alluvium containing fluvial sands and gravels. The terrace on which the site is positioned is mapped as glaciolacustrine silt, silty clay and clay lake bottom sediments. These descriptions are consistent with observations of soil materials during UST closure activities.

Bedrock at the site has been mapped by Doll (1961) as the Tibbit Hill volcanic member of the Pinnacle formation, Camels Hump group, consisting of highly fractured greenstone of lower Cambrian age. Bedrock has not been observed at the site and depth to bedrock has not been determined.

## 2.3 Potential Receptors

Potential sensitive receptors include water supply wells located within close proximity to the site, indoor air quality of buildings, and surface water downgradient from the source area.

No water supply wells were identified within close proximity to the site during an informal survey of neighboring properties. The Director of Public Works in Enosburg Falls indicated all residential and commercial properties in the area were served by the municipal water system which has been in place for many decades. He knew of no surficial or bedrock domestic wells close to the site.

The only building located within close proximity to the former UST is the Champlain Chevrolet showroom and garage (Figure 3). This building has a basement into which petroleum vapors could penetrate and accumulate. Various residential structures are positioned across Missisquoi and Stebbin streets within approximately 120 feet of the former UST.

As mentioned previously, the Missisquoi River passes the site within approximately 1500 feet of the Champlain Chevrolet property at its closest point (east). This surface water feature likely receives groundwater from beneath the Champlain Chevrolet property and therefore would be the discharge point for any contaminants which reach the shallow groundwater system beneath the site.

Buried municipal water, sewer and stormwater lines run along Missisquoi street quite close to the location of the former UST (see Figure 3). While not considered sensitive, the excavations in which these lines are placed sometimes serve as preferential conduits for contaminant migration if they intersect shallow groundwater, and therefore are receptors which have the potential for significantly affecting the extent of contamination at a site. In addition, utility corridors can affect the subsurface migration of petroleum vapors.

# 3.0 FIELD INVESTIGATION PROCEDURES AND RESULTS

## 3.1 Soil Boring/Monitoring Well Installation

Two monitoring wells were installed at Champlain Chevrolet on March 22, 1999. These wells were positioned east and southeast of the former UST and pump area under the assumption that groundwater flow was east southeasterly towards the Missisquoi River. The new wells (MW-100 series) were added to the existing two wells for a current total of four groundwater monitoring points at this site (see Figure 3). At least one additional wells was to be installed (within the UST excavation area), yet severe weather on the day when drilling occurred required suspension of field activities prior to installing this well.

Adams Engineering of Underhill, Vermont installed the monitoring wells under the direction of H&A personnel. A hollow barrel sampling tube (2.4-inch diameter) was advanced below the ground in five-foot increments. This technique allows for continuous sampling down to the terminal depth of the boring. After each sampling run the sampling tube was retracted from the borehole and the soil sample was pulled (or vibrated) from the tube. Soil samples were characterized for texture (USDA/SCS), color, and moisture, and were screened with a photoionization detector (PID) to evaluate relative levels of petroleum contamination. Samples were placed in plastic ziplock bags for headspace analysis. The PID (Photovac MicroTIP HL-2000) was calibrated and set to respond to isobutylene prior to use. Soil sample descriptions and PID screening results are included on the Soil Boring / Monitoring Well Logs included as Appendix A.

After drilling to the target depth the drilling tools were retracted and 1.5-inch diameter PVC monitoring wells were inserted into the boreholes. The wells were constructed with ten feet of factory-slotted PVC screen (0.010 inch) and solid riser up to slightly below the ground surface. Well screens were positioned so the screened interval straddles the water table to allow for monitoring of potential floating free product during seasonal groundwater fluctuation. A commercially-sorted sand was placed into the annular space between the well screen and surrounding formation, extending to at least one foot above the top of the screen. Bentonite powder was installed from the top of the sandpack to approximately six inches below the ground surface, and hydrated to form an annular seal. All wells were completed with steel manways that were cemented in place flush with the ground surface. Well development was accomplished with a peristaltic pump operating for at least one hour. Very little water was evacuated from the wells due to low recharge associated with the materials beneath the water table. Monitoring well construction details are presented on the well logs in Appendix A.

Horizontal and vertical control of site monitoring wells were surveyed by H&A following installation. Elevations were recorded at the top of the PVC well and ground surface at each location, and were surveyed relative to the existing site wells, and an on-site benchmark (100.00 feet) which was established near the former pump dispenser (see Figure 3).

### *3.1.1 Stratigraphy*

The soil boring/monitoring well logs include descriptions and interpretations of soil samples collected during the soil boring efforts. The general profile of soil materials encountered at the Champlain Chevrolet site was similar at both borings, and quite similar to the soil profile observed during the UST closure. In general, the soil materials below approximately three feet of fill materials consisted of loose and dry, poorly-sorted

fine to coarse sand and gravel down to approximately 5.5 feet below the ground surface (BGS). The sandy sequence was underlain by moist and greasy, blue-gray lacustrine silt/clay down to at least 13.0 feet BGS, the terminal depth of both borings. Iron oxide staining (mottling) often indicative of the high groundwater position was observed at MW-101 in the sands at a depth of 4.7 feet BGS. No obvious water table was encountered at either soil boring during drilling, although the silt/clay sequence was generally moist throughout.

### *3.1.2 PID Screening Results*

PID screening results for soil samples collected during the soil boring program are included on the soil boring/monitoring well logs. Elevated PID readings indicative of petroleum contamination were not detected at either boring location. No readings were recorded above 2.0 part per million (ppm) at MW-101, or above 1.0 ppm at MW-102. No visual or olfactory evidence of contamination was encountered at either location.

## 3.2 Water Level Monitoring

Site water levels were measured two weeks following monitoring well installation during site surveying activities on April 2, 1999. A second round of measurements associated with groundwater sampling were collected on April 8, 1999, and a third measurement was recorded on June 10, 1999. Measurements were obtained from the four site wells using an electric water level probe. Depths to water were recorded relative to the top of the PVC risers at the wellhead and have been converted to groundwater elevations. This data is presented on Table 1.

On April 2, 1999 depth to water at the site ranged from 6.04 feet at MW-1 to 7.27 feet at MW-101, a vertical distance of 1.23 feet. A water table contour map for the April 2 measurements is provided as Figure 4. Groundwater flow direction across the site follows an easterly route parallel to Missisquoi Street from the former UST toward the intersection of Missisquoi and Archibald Streets. Figure 5 depicts the flow path resulting from the second round of water levels measurements (April 8, 1999), with a slight southeasterly flow component. Figure 6 includes the water table configuration on June 10, 1999, confirming the earlier measurements. The average hydraulic gradient across the site is 0.038. The depth to water measurements place the water table within the silt/clay materials just below the contact with the overlying sand and gravel.

## 3.3 Groundwater Sampling and Analysis

All four site monitoring wells were sampled on April 8, 1999. Depths to water were measured and the water levels and total well depths were used to calculate the volume of standing water present in each well. Prior to sampling, all wells were purged of standing water by bailing. Due to low recharge in all four wells, three well volumes of purge water were not available. Purging and sampling of the monitoring wells were accomplished with dedicated polyethylene bailers. Groundwater samples were transferred from the bailers directly into 40 mL sample vials. Two vials were filled at each sampling location and were labeled with the date, time, site name, sample location and sampler's initials. The sample vials contained hydrochloric acid for sample preservation and were placed into a cooler with ice for storage and transport to the laboratory.

Quality assurance/quality control (QA/QC) samples included a trip blank, a field blank, and a blind duplicate. The trip blank consisted of two vials provided by the laboratory.

These vials were transported to the site and handled in the same fashion as other samples. A field blank was collected at the site after sampling the last well, and was prepared by pouring deionized water provided by the laboratory into two sampling vials. The duplicate sample was collected from MW-2 and labeled with a fictitious sample location (MW-A) and time. A laboratory chain-of-custody form and groundwater sampling data sheet were used to document the sampling event.

Groundwater samples were submitted to SCITEST, Inc. in Randolph, Vermont, and were analyzed for BTEX, MTBE, trimethylbenzene isomers and naphthalene using EPA Method 8021B. Copies of the laboratory report, chain-of-custody and sampling data sheet are provided in Appendix B.

The analytical results of groundwater sampling completed on April 8 are presented on Table 2. As indicated on Table 2, no dissolved contamination was detected in the groundwater samples collected at this site. All compounds were below detection limits in all four wells. Both QA/QC blank samples (field and trip blanks) were below detection limits for all compounds analyzed.

### 3.4 Indoor Air Quality Surveys

On March 17, 1999, the basement of the Champlain Chevrolet auto dealership and garage was surveyed with a PID to evaluate indoor air quality. The basement floor of this building is located less than 5 feet west and at the same approximate elevation as the base of the former UST (see Figure 3). The basement floor and walls are constructed of poured concrete. The PID survey centered on the basement floors and walls where they meet the floor, and any breaches in the walls or floors (such as floor drains, foundation cracks, etc.). The basement area positioned closest to the former UST was closely evaluated. No elevated readings above ambient background levels were detected at any location in the basement of this building during the survey. Background readings ranged from 2.5 - 3.1 ppm. These concentrations are less than half of what ambient levels in the automotive showroom registered (one floor above), probably due to automotive exhaust vapors migrating from the adjacent service area.

### 3.5 PID Measurements

During monitoring well installation and sampling, and indoor air quality screening, a Photovac MicroTIP HL-2000 photoionization detector, equipped with a 10.6 eV lamp, was used to evaluate organic vapor concentrations. Before each day's activities, the PID was calibrated and set to respond to isobutylene. Readings are reported as parts per million (ppm), and represent ppm equivalents relative to isobutylene.

# 4.0 DISCUSSION OF RESULTS

## 4.1 Site Hydrogeology

The Champlain Chevrolet site is positioned on a very flat ground, likely a river or former lake terrace, approximately 1500 feet from the Missisquoi River. Groundwater flow direction beneath the site is easterly with perhaps a slight southeasterly component towards the river, which indicates the Missisquoi is the discharge zone for groundwater flowing beneath the site. The average horizontal hydraulic gradient downgradient from the source area is 0.038, which is moderately steep. Any seasonal shift in the water table position and groundwater flow direction has not been evaluated due to limited depth to water measurements at the site.

Groundwater was encountered approximately 6.5 feet BGS. This puts the water table within and near the top of the lacustrine silt/clay materials, and helps explain the steep gradient beneath such level topography at the site; in general, steeper hydraulic gradients characterize low permeable materials. It is likely that the water table extends up into the coarser materials during wet periods of the year as this past spring when depth to water measurements were collected was unusually dry, and mottling was observed in one of the soil borings as well as in the UST excavation. Groundwater flow rates through the silt/clay are likely to be quite slow, with horizontal flow predominating.

We estimate the hydraulic conductivity (K) in the saturated zone to range from $1 \times 10^{-6}$ to $1 \times 10^{-4}$ cm/sec (0.0028 to 0.28 ft/yr). This estimate is based on published literature values (Freeze and Cherry, 1979, and Fetter, 1988), and experience at other sites with similar soil types. Using these values, the measured hydraulic gradient ($I = 0.038$), and an assumed effective porosity ($n_e$) of 0.35, the average linear velocity ($V_x$) of groundwater flow can be calculated from the equation $V_x = KI/n_e$. This yields a range of groundwater flow through the silt/clay between 0.1 and 11 feet per year.

## 4.2 Extent of Contamination

Observation of soils and the tank during UST closure activities indicated gasoline has been released at this site. Soil contamination was documented throughout the base of the UST excavation; soil samples collected from the tank pit were saturated with free-phase gasoline. The timing of this release is unclear, yet the tank had been in service until it was closed.

Recent groundwater sampling at MW-2 and MW-101, positioned quite close to and downgradient from the former UST and pump dispenser, detected no dissolved petroleum compounds. No indication of contamination was encountered during soil boring, well installation, or groundwater sampling activities either. As such, the extent of contamination at this site appears relatively limited, and may be confined to the area in and directly adjacent to the UST excavation. Based on observations during the tank closure, the UST pit appeared to have penetrated the top of the silt/clay materials to a depth of at least one foot, and therefore a depression in these materials may be serving to contain the contamination observed at the base of the excavation. Given the low flow rates calculated within the silt/clay, contamination may not have migrated very far from the source point. The seasonal fluctuation of the water table may significantly affect the distribution of contaminants at this site, particularly if it fluctuates up into the coarser and more permeable materials overlying the silt/clay sequence.

### 4.3 Risk to Receptors

Given the limited extent of contamination and low groundwater flow rates associated with the silt/clay materials, there appears to be minimal risk to the potential receptors identified previously from contaminant migration through the subsurface. These receptors include downgradient water wells, of which none have been identified, the Missisquoi River, and the basements of residential structures potentially at risk from petroleum vapors. The Champlain Chevrolet building itself was screened for accumulated vapors, yet none were identified. No other buildings are within close proximity to the former UST.

Buried municipal water and sewer corridors run along Missisquoi street quite close to the location of the former UST, with spurs connecting to the Champlain Chevrolet building (see Figure 3). These features can sometimes serve as preferential conduits for contaminant migration if they intersect shallow groundwater, with the potential to significantly affect the extent of contamination. The location of several underground utility corridors were assessed and the Director of Public Works in Enosburg Falls (Mr. Gary Atherton) was interviewed to evaluate the likelihood that these features are serving as pathways for site contamination.

Of the three underground utilities identified (water, stormwater and sewer), only the new sewer line installed in 1995 is deep enough (9 - 10 feet BGS) to intersect the water table. The location of this utility line is in the center of Missisquoi Street (running east-west, see Figure 3) and therefore generally parallel to the groundwater flow path as currently defined. As such it is unlikely that dissolved contamination has entered this utility corridor. The potential for vapor migration along utility pathways is somewhat higher, yet thus far there has been no indication that this is occurring. The Director of Public Works indicated no evidence of contamination was observed in this area during excavation of the new sewer line in 1995. If it is subsequently found that the seasonal high water table position is significantly higher than recorded thus far, or that groundwater flow direction is variable throughout the year, the potential that site contamination has entered these utility corridors will be reexamined.

# 5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## 5.1 Summary and Conclusions

A site investigation was completed at the Champlain Chevrolet property in Enosburg Falls, Vermont, to determine the degree and extent of soil and groundwater contamination. Two monitoring wells were installed and one round of groundwater sampling has been completed. A release of petroleum has resulted in contamination to soils at this site. Inspection of soils during the UST closure revealed gasoline contamination within the UST excavation, and the UST itself was found to have a hole at the base of it. However, analytical results from the initial round of groundwater sampling indicate any impact to the groundwater surrounding the former UST has yet to be documented. Therefore the extent of contamination appears to be relatively limited and possibly confined to the former UST pit area, and immediate region surrounding it.

Based on three rounds of water level measurement, groundwater flow direction was determined to be generally easterly along a hydraulic gradient of 0.038. The water table is positioned within a sequence of lacustrine silt/clay, which transmits water at a very slow rate. The seasonal fluctuation of the water table and groundwater flow direction has not been determined.

No known drinking water supplies, nearby buildings, or downgradient surface water appear to be at risk. A PID survey in the basement of the Champlain Chevrolet building revealed no evidence of petroleum vapors entering this structure from below ground. An assessment of underground utility corridors was completed to assess the possibility of preferential migration of site contamination along these corridors. Based on the location of underground utility lines and limited extent of contamination, it does not currently appear likely that contamination has entered and migrated along site utility corridors.

## 5.2 Recommendations

It is recommended that two additional monitoring wells be installed at the site. One of these wells should be placed in the former tank pit area, with the second located immediately southeast of this feature, as depicted on Figure 7. We propose to use Adams Engineering to install the wells in the same manner as MW-101 and MW-102 . Following well installation the water levels in all site wells should be measured and groundwater samples should be collected from four site monitoring wells, to include the new wells (MW-103 and MW-104) and the two wells closest to the former UST (MW-1 and MW-2). An additional PID screening survey within the basement of the Champlain Chevrolet building should also be conducted given its proximity to the former UST. Once the analytical report becomes available, a letter report documenting the procedures and results of this additional work will be prepared. This report will include an assessment of the need and schedule for additional monitoring at the site. The costs associated with well installation, sampling and reporting have been included on Table 3.

# REFERENCES

Doll, Charles G. (editor), 1961, Centennial Geologic Map of Vermont, Vermont Geological Survey, State of Vermont

Doll, Charles G. (editor), 1970, Surficial Geologic Map of Vermont, Vermont Geological Survey, State of Vermont

Freeze, R. A., and Cherry, J. A., 1979, Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604 pp.

Fetter, C. W., 1988, Applied Hydrogeology, Second Edition, Merrill Publishing Company, Columbus, Ohio, 592 pp.

**TABLE 1**

Groundwater depths and elevations,

Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site # 98 - 2574.

| DEPTH TO WATER (feet below TOC) | | | | |
|---|---|---|---|---|
| | Elevation of | | | |
| *Well ID* | *TOC (feet)* | *04/02/99* | *04/08/99* | *06/10/99* |
| MW-1 | 99.35 | 6.04 | 6.14 | 6.17 |
| MW-2 | 99.42 | 6.65 | 6.30 | 6.53 |
| MW-101 | 98.45 | 7.27 | 7.23 | 6.63 |
| MW-102 | 98.49 | 6.22 | 6.16 | 5.77 |

| GROUNDWATER ELEVATIONS (feet) | | | | |
|---|---|---|---|---|
| | Elevation of | | | |
| *Well ID* | *TOC (feet)* | *04/02/99* | *04/08/99* | *06/10/99* |
| MW-1 | 99.35 | 93.31 | 93.21 | 93.18 |
| MW-2 | 99.42 | 92.77 | 93.12 | 92.89 |
| MW-101 | 98.45 | 91.18 | 91.22 | 91.82 |
| MW-102 | 98.40 * | 92.27 | 92.33 | 92.63 |

Notes:

TOC = top of casing (PVC lip)

* elevation of MW-102 reduced to 98.40 on April 12, 1999 (was 98.49 on 4/2 & 4/8/99)

## TABLE 2

Analytical Results for Groundwater Sampling Conducted on April 8, 1999,
Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site # 98 - 2574.

| | ANALYSES BY EPA METHOD 8021B (results in micrograms per liter) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | Methyl-tert-butyl-ether | Benzene | Toluene | Ethylbenzene | Total Xylenes | 1,3,5-Tri-methylbenzene | 1,2,4-Tri-methylbenzene | Naphthalene |
| **MW-1 / Duplicate** | **< 1.0 / < 1.0** | **< 0.5 / < 0.5** | **< 1.0 / < 1.0** | **< 1.0 / < 1.0** | **< 1.0 / < 1.0** | **< 1.0 / < 1.0** | **< 1.0 / < 1.0** | **< 1.0 / < 1.0** |
| **MW-2** | **< 1.0** | **< 0.5** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** |
| **MW-101** | **< 1.0** | **< 0.5** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** |
| **MW-102** | **< 1.0** | **< 0.5** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** |
| **Field Blank** | **< 1.0** | **< 0.5** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** |
| **Trip Blank** | **< 1.0** | **< 0.5** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** | **< 1.0** |
| *VTGES* | *40* | *5.0* | *1000* | *700* | *10000* | *4.0* | *5.0* | *20* |

NOTES:

**< 1.0 = less than a detection limit of 1.0 micrograms per liter**

**VT GES = Vermont Primary Groundwater Enforcement Standard (Groundwater Protection Rule & Strategy, 11/15/97)**

**Analyses performed by SCITEST, Inc.**

**TABLE 3**

Cost Estimate For Installing Additional Monitoring Wells,

Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site #98-2574

***LABOR***

| TASK | Staff | Hours | Rate | Amount |
|---|---|---|---|---|
| Drilling Preparation (Well siting, Digsafe, Site contact, etc.) | SCF | 4.0 | $45 | $180 |
| Monitoring Well Drilling & Surveying | SCF | 10.0 | $45 | $450 |
| Well Logs | SCF | 2.0 | $45 | $90 |
| Groundwater Levels & Sampling - PID Survey | SCF | 8.0 | $45 | $360 |
| Letter Report Preparation | SCF | 12.0 | $45 | $540 |
| | | | **Total H&A Labor** | **$1,620** |

***EXPENSES***

| ITEM | Quantity | Rate | Mark Up | Amount |
|---|---|---|---|---|
| Mileage - Clear Utilities & Well Installation (2 trips) | 300 | $0.31 | $0.00 | $93 |
| Mileage - Groundwater Sampling & PID Survey | 150 | $0.31 | $0.00 | $47 |
| PVC Bailers | 2 | $20.00 | $0.00 | $40 |
| PID Rental | 1 | $75.00 | $0.00 | $75 |
| Survey Equipment Rental | 1 | $30.00 | $0.00 | $30 |
| ADAMS ENGINEERING | | | | |
| Mobilization / Demobilization | 1 | $150.00 | $0.00 | $150 |
| Two 1.5-inch diam. monitoring wells | 2 | $275.00 | $0.00 | $550 |
| SCITEST LABORATORY SERVICES | | | | |
| 8021B Analyses (4 wells, 3 QA/QC) | 7 | $40.00 | $0.00 | $280 |
| | | | **Total Expenses** | **$1,265** |

**ESTIMATED TOTAL COST** **$2,885**

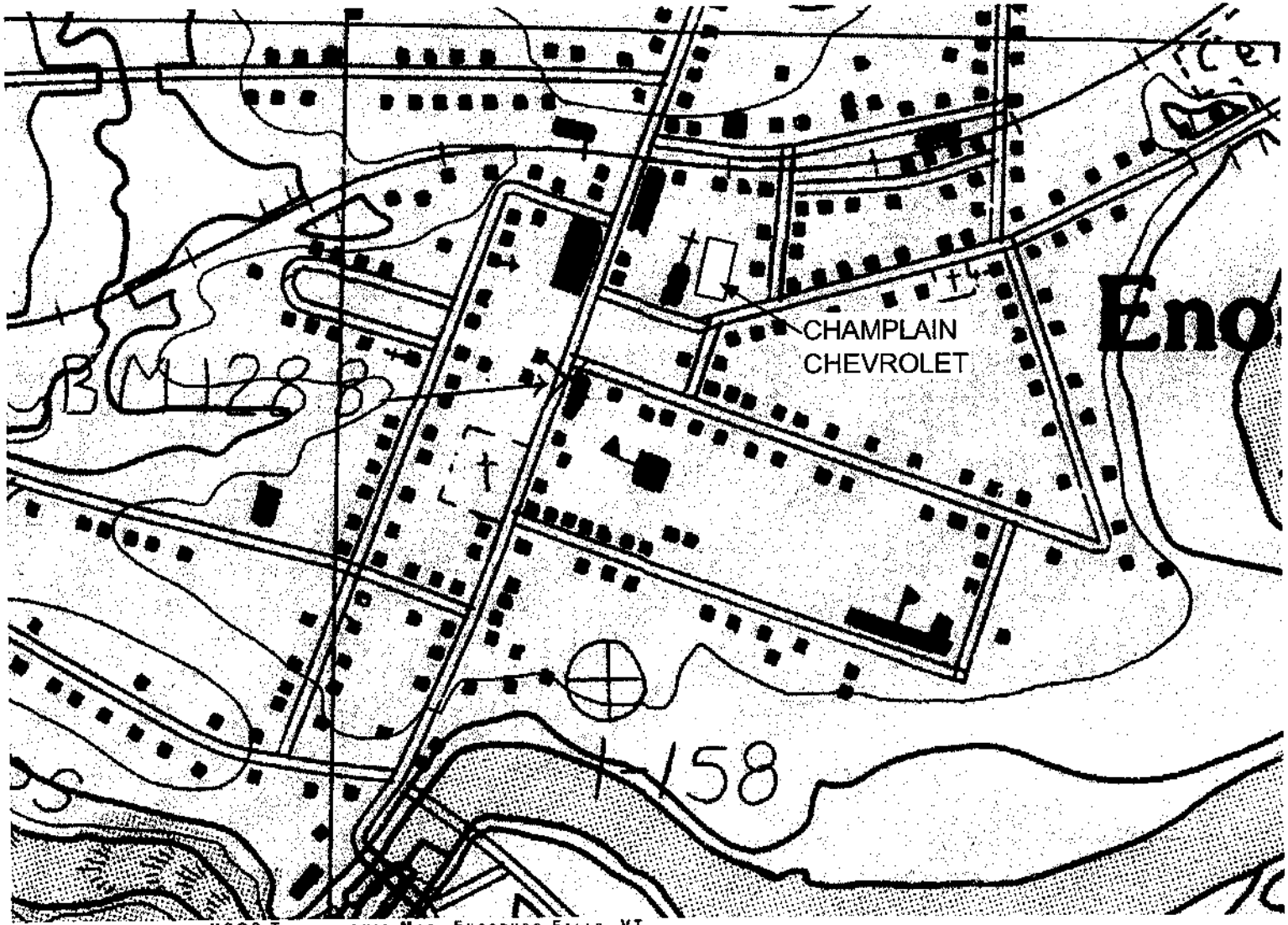


**FIGURE 2**
**Site vicinity map, Champlain Chevrolet,**
**Enosburg Falls, Vermont, SMS Site #98-2574.**

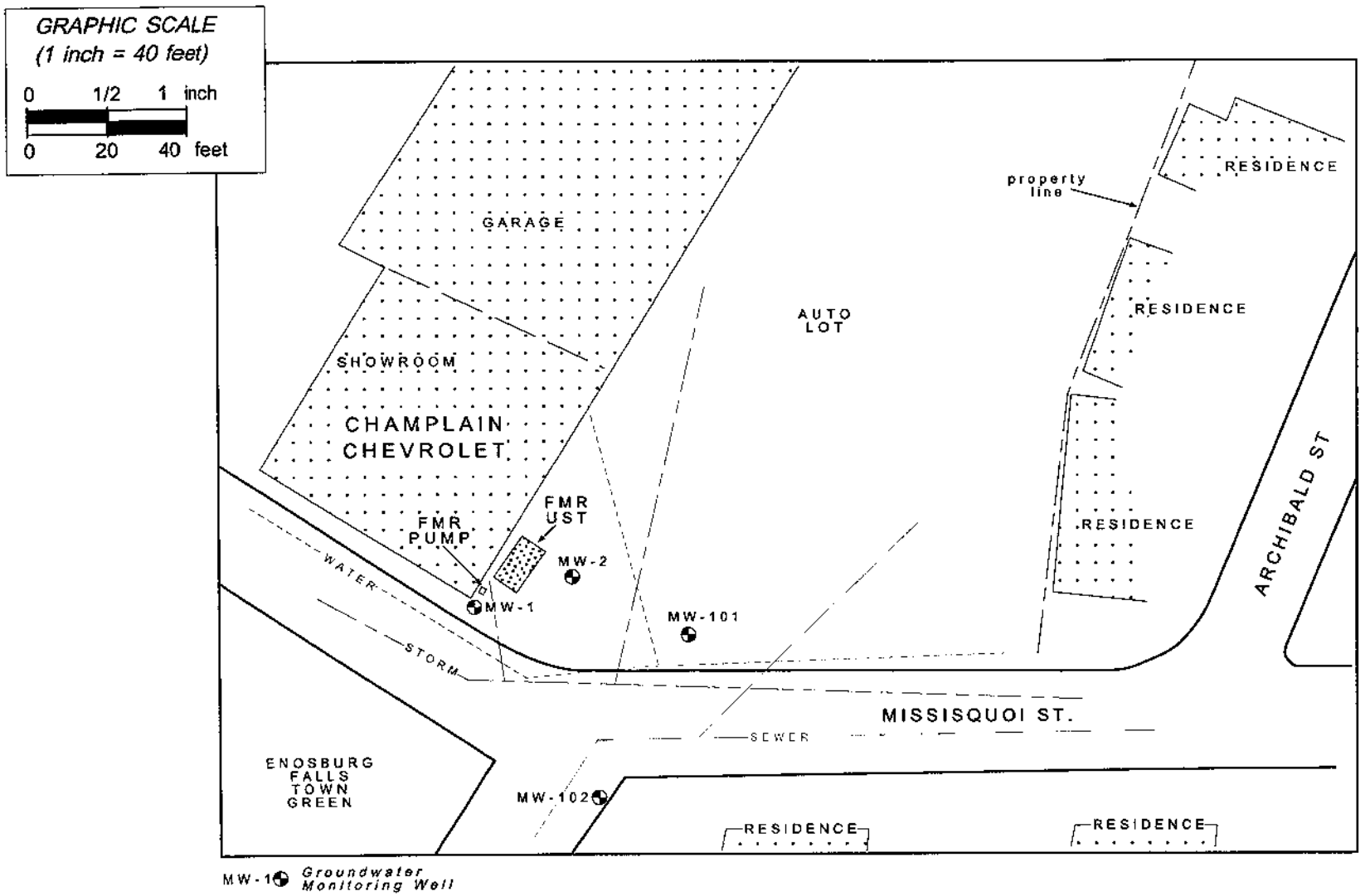


**FIGURE 3**
**Site map, Champlain Chevrolet,**
**Enosburg Falls, Vermont, SMS Site #98-2574.**

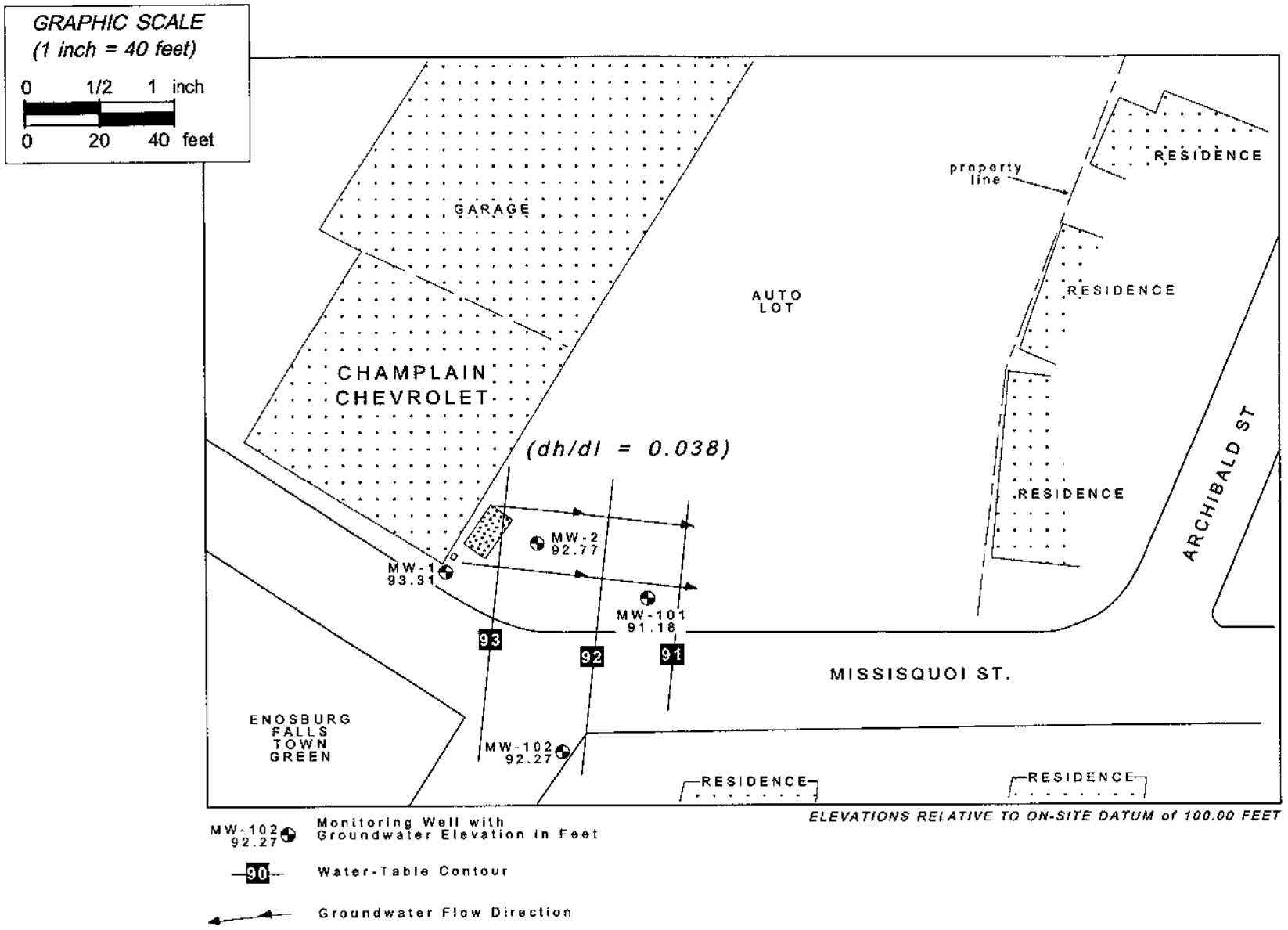


**FIGURE 4**
**Water-Table Map for April 2, 1999, Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site #98-2574.**

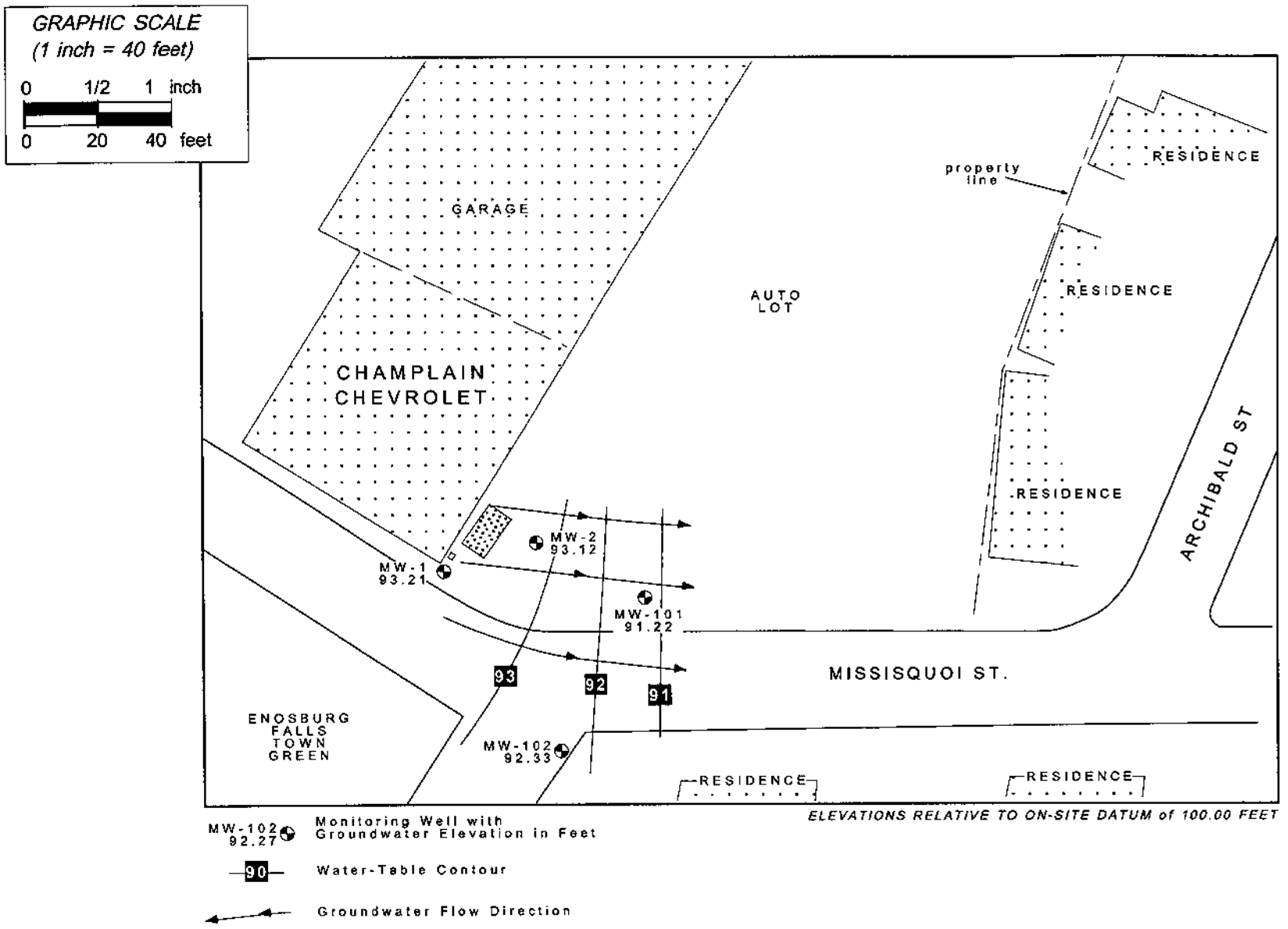


**FIGURE 5**
**Water-Table Map for April 8, 1999, Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site #98-2574.**

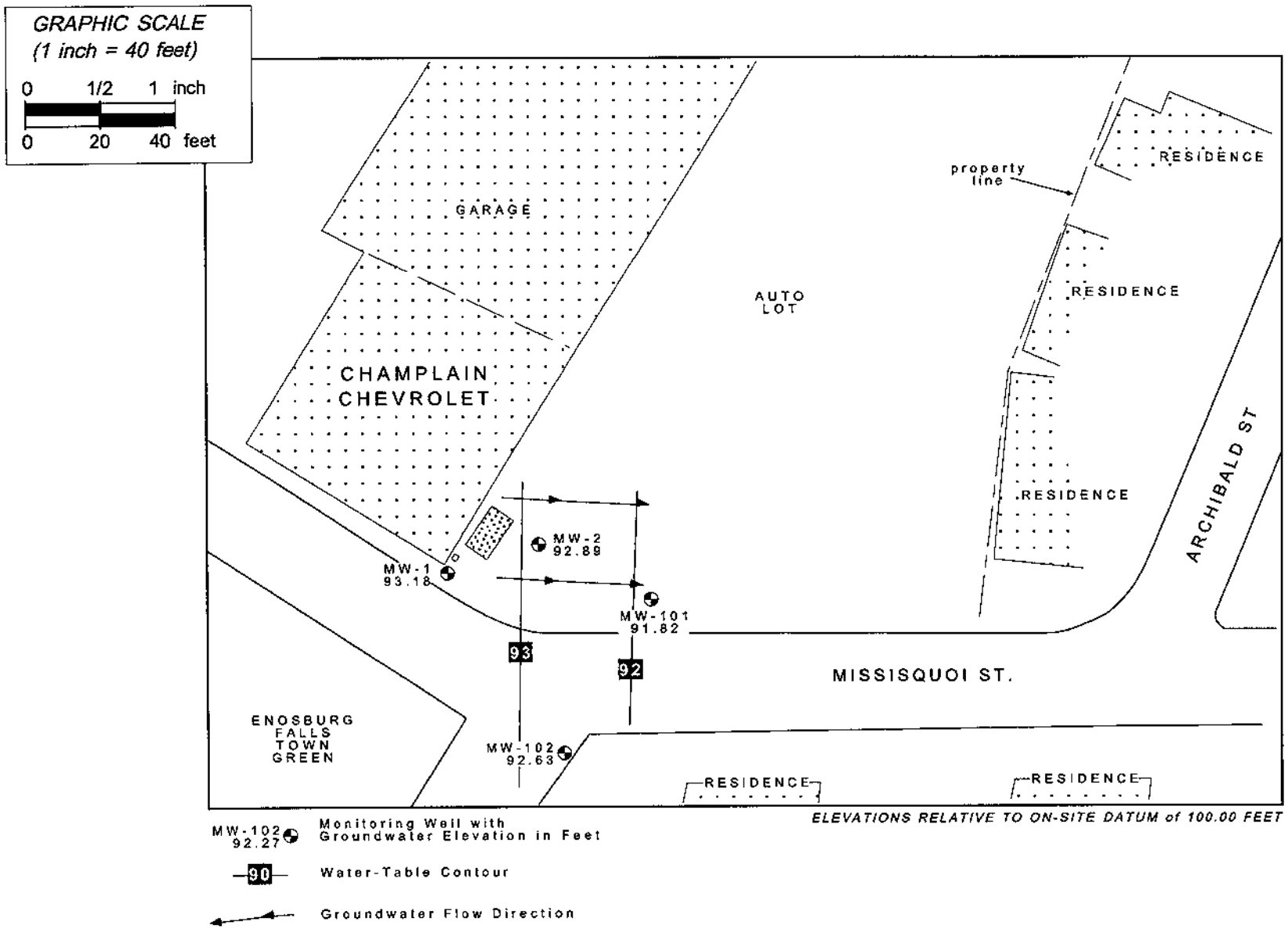


**FIGURE 6**
**Water-Table Map for June 10, 1999, Champlain Chevrolet, Enosburg Falls, Vermont, SMS Site #98-2574.**

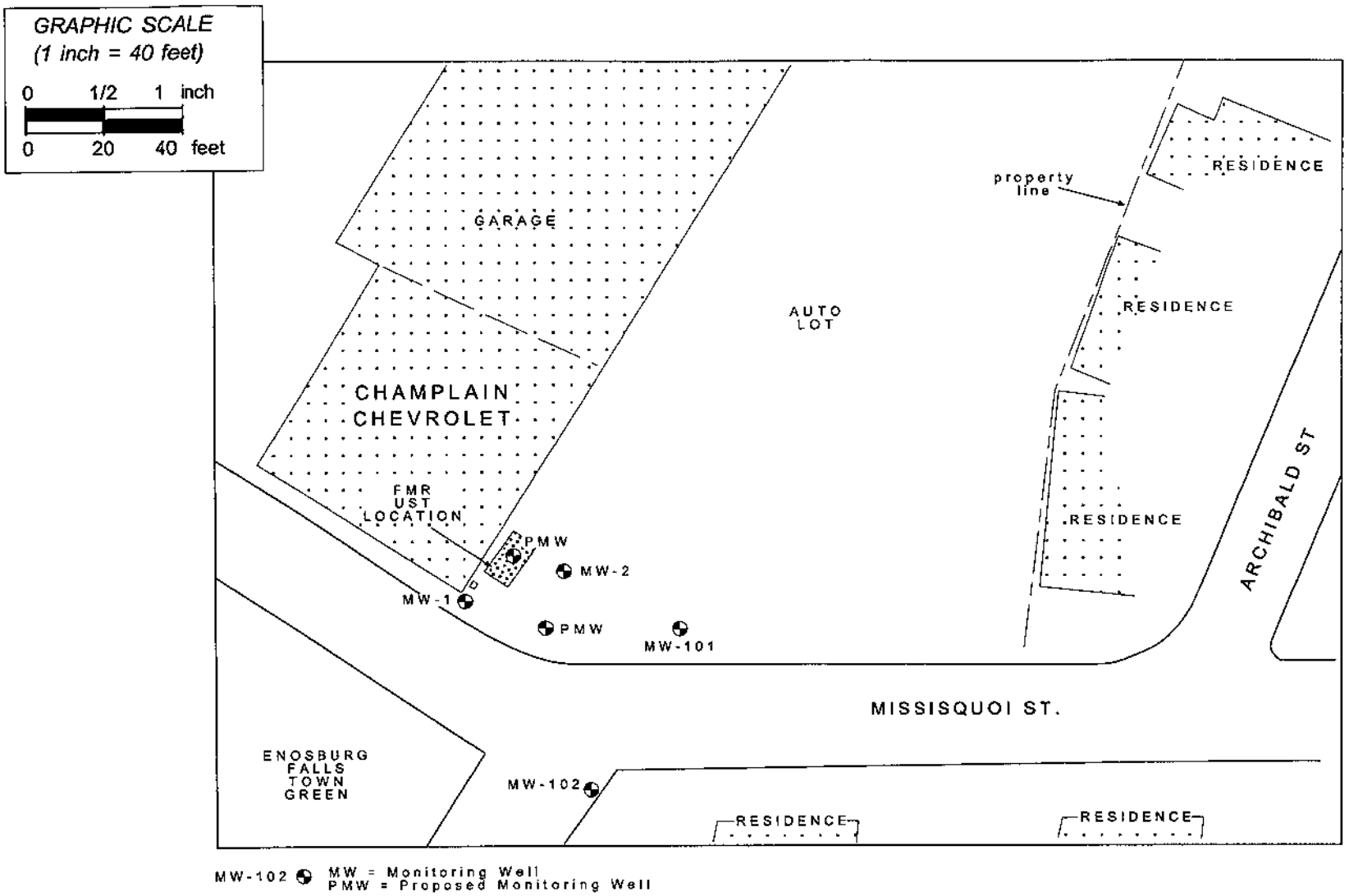


**FIGURE 7**
**Proposed Additional Monitoring Wells,**
**Enosburg Falls, Vermont, SMS Site #98-2574.**

## SOIL BORING / MONITORING WELL CONSTRUCTION LOG

**WELL BORING ID: MW-101**

| | |
|---|---|
| **Client / Site:** | S B Collins, Inc. / Champlain Chevrolet |
| **Location:** | Enosburg Falls |
| **Project Number:** | 04 - 38 |
| **Driller:** | Adams Engineering - Gerry Adams |
| **Drilling Method:** | 2 3/4" Vibratory Spoon |
| **Geologist:** | Stratton French |
| **Sampling Method:** | 2 3/8" vibratory spoon (five foot) |
| **Date** | 3/22/99 |
| **Weather:** | Partly cloudy, rain, snow & hail (20's - 30's) |
| **Boring Location:** | East of UST excavation in Auto lot driveway |

| **Well Construction Information** | |
|---|---|
| **Total Depth Drilled:** | 13' BGS |
| **Screen Type/Interval:** | 1.5" sch. 40, 10-slot PVC / 13.0' - 3.0' BGS |
| **Riser Type/Interval:** | 1.5" sch. 40 PVC / 3.0' - 0.3' BGS |
| **Sandpack Type/Interval:** | #1 sand / 13.0' - 2.0' BGS |
| **Seal Type/Interval:** | Bentonite / 2.0' - 1.0' BGS |
| **Depth to Water/Elevation/Date** | 7.27 / 91.68 / 4-2-99 |
| **Elevation Ground:** | 99.25 |
| **Elevation TOC:** | 98.95 |
| **Other:** | Well developed with peristaltic pump - low flow |

| Sample Interval (feet BGS), Blow Counts | Total Driven / Recovery (feet) | Recovered Interval (feet) | Approximate Interval (feet BGS) | Sample Description (color, texture, moisture, etc.) | USDA Soil Texture | PID Reading* (ppm) |
|---|---|---|---|---|---|---|
| 2.0 - 5.0 | 3.5 / 3.5 | 0 - 1.5 | 2.0 - 3.5 | Wet, loose, poorly sorted silty sand and gravel (fill) | fill | 0.4 |
| | | 1.2 - 2.8 | 3.5 - 4.5 | Moist, dense, silt, and S&G (fill) | fill | 0.0 |
| | | 2.8 - 3.5 | 4.5 - 5.0 | Dry & loose, M-C sand and rnd gravel to 1 cm (FeO2 stains @ 4.7) | sand | 0.7 |
| 5.0 - 10.0 | 5.0 / 4.5 | 0 - 0.8 | 5.0 - 5.8 | Moist, poorly-sorted, fine-coarse sand & gravel with rounded pebbles to 1 cm | sand | 2.0 |
| | | 0.8 - 4.5 | 5.8 - 10.0 | Abrupt change to moist-wet blue gray greasy silt clay with a 0.6" section of very fine sandy silt, which is wet, right in the middle of sample | silt / clay | 1.2 |
| 10.0 - 13.0 | 3.0 / 3.5 | 0 - 3.5 | 10.0 - 13.0 | As above, moist and soft, no sandy sections | silt / clay | 0.3 |

**Generalized Geologic Log and Other Observations:**

0.0' - 5.8': loose, fine to coarse sand and gravel

5.8' - 13.0': Moist blue/gray greasy silt/clay

**Notes:**

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

## SOIL BORING / MONITORING WELL CONSTRUCTION LOG

**WELL BORING ID: MW-102**

| | |
|---|---|
| **Client / Site:** | S B Collins, Inc. / Champlain Chevrolet |
| **Location:** | Enosburg Falls |
| **Project Number:** | 04 - 38 |
| **Driller:** | Adams Engineering - Garry Adams |
| **Drilling Method:** | 2 3/4" Vibratory Spoon |
| **Geologist:** | Stratton French |
| **Sampling Method:** | 2 3/8" vibratory spoon (five foot) |
| **Date:** | 3/22/99 |
| **Weather:** | Partly cloudy, rain, snow & hail (20's - 30's) |
| **Boring Location:** | Across street on corner by stop sign |

| **Well Construction Information** | |
|---|---|
| **Total Depth Drilled:** | 13' BGS |
| **Screen Type/Interval:** | 1.5" sch. 40, 10-slot PVC / 13.0' - 3.0' BGS |
| **Riser Type/Interval:** | 1.5" sch. 40 PVC / 3.0' - 0.3' BGS |
| **Sandpack Type/Interval:** | #1 sand / 13.0' - 2.0' BGS |
| **Seal Type/Interval:** | Bentonite / 2.0' - 0.8' BGS |
| **Depth to Water/Elevation/Date** | 6.22 / 92.27 / 4-2-99 |
| **Elevation Ground:** | 98.70 |
| **Elevation TOC:** | 98.40 |
| **Other:** | Well developed with peristaltic pump - low flow |

| Sample Interval (feet BGS), Blow Counts | Total Driven / Recovery (feet) | Recovered Interval (feet) | Approximate Interval (feet BGS) | Sample Description (color, texture, moisture, etc.) | USDA Soil Texture | PID Reading* (ppm) |
|---|---|---|---|---|---|---|
| 2.0 - 4.5 | 3.5 / 2.6 | 0 - 1.6 | 2.0 - 3.6 | Wet, loose, poorly sorted silty sand and gravel ang. rocks, debris (fill) | fill | 0.4 |
| | | 1.6 - 2.6 | 3.6 - 4.5 | poorly sorted, moist, sand and gravel w/some silt (5%), loose | gravelly sand | 0.2 |
| 4.5 - 9.5 | 5.0 / 4.6 | 0.0 - 0.7 | 4.5 - 5.2 | Wet & loose, poorly sorted silty sand & gravel ang. rocks, | gravelly sand | 0.0 |
| | | 0.7 - 4.6 | 5.2 - 9.5 | Abrupt change to moist-wet blue gray greasy silt clay with a 0.5' section of very fine sandy silt, 1' into the clay section | silt / clay | 1.0 |
| 9.5 - 13.0 | 3.0 / 0.0 | NR | 9.5 - 13.0 | No return - this sequence drilled similar to overlying silt/clay | | |

**Generalized Geologic Log and Other Observations:**

0.0' - 5.2': loose, fine to coarse sand and gravel

5.2' - 13.0': Moist blue/gray greasy silt/clay

**Notes:**

* = Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface, NR = No Recovery, NS = not sampled

CHAMPLAIN CHEVROLET : NEW SB COLLINS SITE

**Scitest, Inc.**
P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

Sample Logged in By: _____ Preservative Check:
Anomaly Sheet: Y____ N____ Temperature Check:

Client: Jefferson P. Hoffer & Associates
Address RR 4 Box 2286, Comstock Road
Montpelier, VT 05602

Contact ~~Jeff Hoffer~~ TONY FRENCH
Phone No:

Customer Nos: 70249
Project:
Job Template:

Date requested:
Date shipped:
Date scheduled:

## CHAIN OF CUSTODY

| | | | | | |
|---|---|---|---|---|---|
| Sampled by:* STRATTON FRENCH | Date | Time | Print Name Here:* | Date | Time |
| Relinquished by: | 4/8/99 | 17:20 | Accepted by: | | |
| Relinquished by: | | | Received by Scitest: | 4/9/99 | 8:00 |

| Item Nos | Client ID or Description | Sample Date | Sample Time | Matrix | Preservative | Container Material | Container Volume | Containers per Sample | Parameters |
|---|---|---|---|---|---|---|---|---|---|
| 1 | * TB-01 | * 4/8/99 | * 14:00 | $H_2O$ | HCl | 40ml | GLASS | 2 | 8021B |
| 2 | MW-A | | 14:15 | | | | | | |
| 3 | MW-102 | | 14:30 | | | | | | |
| 4 | MW-101 | | 14:45 | | | | | | |
| 5 | MW-1 | | 15:10 | | | | | | |
| 6 | MW-2 | | 15:20 | | | | | | |
| 7 | FB-01 | ~~15:30~~ | 15:30 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Post-it® Fax Note 7671 | Date 4/9/99 | # of pages ▲ 1
To Tony | From Anne
Co./Dept. Hoffer Assoc. | Co. Scitest
Phone # | Phone # 802-728-6313
Fax # 802-399-2780 | Fax #

SAMPLES MUST REACH THE LAB within _____ of sampling time to meet all holding times.

Parameters are correct as listed Client Initial: _____
Please fill in ALL areas marked with an asterisk (*). Thank you.
Additional instruction if applicable are attached.

Scitest Work Order: 9904-01339

PLEASE FAX COPY OF SIGNED COC. - Thanks

SCITEST
LABORATORY SERVICES

P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313
(802) 728-6044 (fax)
http://www.scitestlabs.com

# ANALYTICAL REPORT

SB Collins, Inc.
PO Box 671
St. Albans, VT 05478-0671

Mr. Carl Ruprecht

Work Order No.: 9904-01339

Project Name: Hoffer samples - Champlain Chevrolet
Customer Nos.: 090048

Date Received: 4/09/99
Date Reported: 4/19/99

Sample Desc.: TB-01
Sample Nos: 001

Sample Date: 4/08/99
Collection Time: 14:00

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 90 | % Recovery | JPM | 4/18/99 |

Sample Desc.: MW-A
Sample Nos: 002

Sample Date: 4/08/99
Collection Time: 14:15

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 87 | % Recovery | JPM | 4/18/99 |

# ANALYTICAL REPORT

Project Name: Hoffer samples - Champlain Chevrolet
Project No.: 090048

Work Order No.: 9904-01339

Sample Desc.: MW-102
Sample Nos: 003
Sample Date: 4/08/99
Collection Time: 14:30

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 86 | % Recovery | JPM | 4/18/99 |

Sample Desc.: MW-101
Sample Nos: 004
Sample Date: 4/08/99
Collection Time: 14:45

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 86 | % Recovery | JPM | 4/18/99 |

Sample Desc.: MW-1
Sample Nos: 005
Sample Date: 4/08/99
Collection Time: 15:10

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |

# ANALYTICAL REPORT

Project Name: Hoffer samples - Champlain Chevrolet
Project No.: 090048

Work Order No.: 9904-01339

Sample Desc.: MW-1
Sample Nos: 005
Sample Date: 4/08/99
Collection Time: 15:10

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 86 | % Recovery | JPM | 4/18/99 |

Sample Desc.: MW-2
Sample Nos: 006
Sample Date: 4/08/99
Collection Time: 15:20

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 86 | % Recovery | JPM | 4/18/99 |

Sample Desc.: FB-01
Sample Nos: 007
Sample Date: 4/08/99
Collection Time: 15:30

| Test Performed | Method | Results | Units | Analyst | Analysis Date |
|---|---|---|---|---|---|
| Volatiles, BTEX | EPA 8021B | | | JPM | 4/18/99 |
| Methyl tertiary-Butyl Ether | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Benzene | EPA 8021B | < 0.5 | ug/L | JPM | 4/18/99 |
| Toluene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Ethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Total Xylenes | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,3,5-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| 1,2,4-Trimethylbenzene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Naphthalene | EPA 8021B | < 1.0 | ug/L | JPM | 4/18/99 |
| Surrogate: 8021B | | | | JPM | 4/18/99 |
| ***Bromofluorobenzene-8021B | | 87 | % Recovery | JPM | 4/18/99 |

c: Hoffer & Associates

SCITEST
LABORATORY SERVICES

# ANALYTICAL REPORT

Project Name: Hoffer samples - Champlain Chevrolet
Project No.: 090048

Work Order No.: 9904-01339

Authorized by: _____