

2522



February 10, 1999

Mr. Richard Spiese
Agency of Natural Resources
Department of Environmental Conservation
Waste Management Division
Petroleum Sites Management Section
103 South Main Street
Waterbury, VT 05671-0404

FEB 12 10 06 AM '99

Re: Contamination Evaluation
DPW Garage
DH 4080115

Dear Mr. Spiese:

Attached is a copy of the report of contamination evaluation at the DPW garage for your review. This report was prepared by Mr. Bruce Cox, P.E. of this office.

We look forward to your review comments.

Very truly yours,

DUFRESNE-HENRY, INC.

Richard B. Menge, P.E.
Senior Project Manager

RBM/rmn

Enclosure

cc: Mr. Harry Henderson - DPW Director (3 copies)
Mr. Scott Stewart - Water Supply Division (1 copy)
Mr. Bruce Cox, P.E. (1 copy)

N:\Springfield, VT, Town of\DPW Garage\02101510.n8.wpd

Phase (check one)	Type (check one)
<input checked="" type="checkbox"/> Site Investigation <input type="checkbox"/> Corrective Action Feasibility Investigation <input type="checkbox"/> Corrective Action Plan <input type="checkbox"/> Corrective Action Summary Report <input type="checkbox"/> Operations & Monitoring Report	<input type="checkbox"/> Work Scope <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> PCF Reimbursement Request <input type="checkbox"/> General Correspondence

SITE INVESTIGATION

**Department of Public Works Garage
 North Springfield, VT 05150**

SMS Site #98-2522

**A Facility Owned By:
 The Town of Springfield
 96 Main Street
 Springfield, VT 05156
 (802) 885 - 2104
 Contact: Robert Forguites**

**Prepared By:
 Dufresne-Henry, Inc.
 Precision Park
 North Springfield, VT 05150
 (802) 886-2261
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January 19, 1999

FEB 12 10 05 AM '99

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EXECUTIVE SUMMARY

A Site Investigation has been completed at the Department of Public Works Garage in North Springfield, Vermont. The investigation was conducted by the Town of Springfield as part of a Source Protection Planning project. The investigation concentrated on an active dry well, an abandoned dry well, two separate former UST locations, a floor drain outfall, and a sanitary sewer outfall.

Test pits were excavated to investigate shallow soil quality in several locations prior to the installation of monitoring wells. No BTEX above method detection limits was found at the former UST locations.

The routing of the floor drains and wastewater disposal system were verified in preparation to connecting them to the municipal sewer system. Samples of the dry well liquid and sludge were obtained and analyzed to facilitate excavation and disposal.

Five groundwater monitoring wells were installed, and two test borings completed on the site between November 24, 1998 and December 3, 1998. The wells were located at each of the locations noted above, with the exception of the abandoned dry well. Soil and/or groundwater contamination was confirmed at the active dry well, the abandoned dry well, and a floor drain outfall. Soil contamination at the dry wells appears to be limited horizontally, and extends vertically approximately eight feet to twelve feet. Soil contamination at the dry well was also detected immediately adjacent to groundwater approximately fifty feet below the ground surface. The areal and vertical limits at the floor drain outfall are not well defined.

Analysis of groundwater by EPA Method 8260B found 20 $\mu\text{g}/\text{L}$ of Acetone at the floor drain outfall, and 2 $\mu\text{g}/\text{L}$ each of sec-Butylbenzene and p-isoPropyltoluene at the active dry well. None of the concentrations exceed the respective Vermont Enforcement Standard. Approximately thirty feet of apparently uncontaminated soil between the dry well and the water table suggest a possible other source for the contamination observed at that location.

Soils at the garage site are stratified sand and gravel. These deposits are associated with the North Springfield Delta, a large scale area of deposition in glacial Lake Hitchcock at the end of the Pleistocene Epoch. Vertical hydraulic conductivity is likely to be quite variable, depending on the silt content of given layers. Refusal on possible bedrock was encountered in two of the borings at depths of 44'-6" and 58'-7". Based on a single round of sounding, the direction of groundwater flow is to the east and northeast toward the Town of Springfield well field and the Black River.

The potential receptor of primary concern is the Town of Springfield municipal well fields located to the north, east, and southeast of the DPW garage. There are two separate well fields; Chapman Meadow and Gilchrist. The Gilchrist field, consisting of four wells, is located approximately 800 feet to 1,400 feet to the north and northeast. The Chapman 1 field, consisting of 30 wells, is located approximately 1,000 feet to the southeast. Chapman 2, a single well, is

located approximately 500 feet to the east. Although not studied as part of this investigation, MTBE concentrations below the Vermont Enforcement Standard has been observed in the municipal wells. All of the surrounding properties are on the municipal water supply system. The nearest permanent surface water is the Black River approximately 750 feet to the east.

Based on these findings, the site is not likely to meet the SMS criteria for corrective actions. At this time it is our opinion that the following tasks be completed:

1. The septic tank should be connected to the municipal sewer system.
2. The two (2) floor drain systems should be connected to the municipal sewer system. The floor drains should be plugged until such time as a temporary containment tank is installed or a municipal sewer connection is constructed.
3. The liquid and sludge contents of the concrete block dry well should be properly disposed of. The dry well structure and underlying contaminated soil should also be properly disposed of.
4. A disposal plan should be developed for removal of contaminated soil at the floor drain outfall in the lagoon.
5. The potential source(s) of the deep contaminated soil and groundwater at MW-3 should be investigated. An exploration plan should be developed to include additional monitoring wells in the hydraulic upgradient and downgradient directions.
6. Additional rounds of water table sounding should be initiated to verify the direction of groundwater flow.
7. No remediation is recommended at this time for the abandoned dry well in the hydraulic jack trench. Rationale for this includes the apparent limited vertical and areal extent of soil contamination, the prevention of liquid input (and the subsequent potential for plume mobilization) by the concrete floor and roof area, and the difficulty of working in the area. The integrity of the seal in the trench floor should be verified, and repairs made as required.
8. The source of trace levels of MTBE detected in the production well(s) should be investigated. The production wells should be sampled on a more frequent basis. The sampling frequency will be coordinated with State regulatory agencies.
9. Submit this report to the Vermont Sites Management Section and Water Supply Division for review and comment.
10. Develop a remedial plan based on these recommendations and the comments of State regulatory agencies.

SITE INVESTIGATION

DEPARTMENT OF PUBLIC WORKS GARAGE NORTH SPRINGFIELD, VERMONT

Introduction

The Department of Public Works Garage is located on Fairground Road in North Springfield, Vermont. A site location map is included as Appendix A.

As part of a Source Protection Planning project, the Town of Springfield retained Dufresne-Henry to investigate potential or suspected sources of soil and/or groundwater contamination at the Public Works Garage. The investigation concentrated on an active dry well, an abandoned dry well, two separate former UST locations, a floor drain outfall, and a sanitary sewer outfall.

Work and Health and Safety Plans

This investigation was conducted on a voluntary basis by the Town of Springfield. However, because the work was conducted within the established wellhead protection zone, a work plan of proposed activities was forwarded to the State of Vermont Sites Management Section (SMS) for review on November 19, 1998. The work plan included the proposed locations of six (6) monitoring wells and an Off-Site Soil Treatment Request Form. The form was signed on November 20, 1998 and verbal approval of the work plan received the same day. Dufresne-Henry prepared a Health and Safety Plan for the proposed activities at the site. Copies of these documents will be found in Appendix B. The remainder of this report describes the on-site activities and subsequent findings of the investigation.

Site Description

The Department of Public Works garage is located on a 40± acre parcel on the west side of Fairground Road in North Springfield, Vermont. The Town of Springfield owns a significant amount of property contiguous to this parcel. The immediate property consists of the garage, a sand shed, a large storage shed, and a former sand and gravel pit. The shed has a concrete floor, but no floor drains were observed. The garage floor drain system will be described in detail in a future section. The Town well fields are located to the north, east, and southeast on the opposite side of Fairground Road. The property is served by the municipal water supply system and, currently, an on-site wastewater disposal system. The developed portion of the site is level. The former gravel pit occupies higher terrain to the west. The well fields are approximately 40 feet lower in elevation and near the Black River. At its nearest point, the Black River is approximately 750 feet to the east. The surrounding land use is predominately residential. A site plan is included as Appendix C.

The currently active dry well is located under the parking lot on the north side of the garage, and the abandoned dry well is located in the hydraulic jack pit in the northern most service bay. On the southerly side of the garage is an elongate depression. On the east end is the sanitary sewer outfall. On the west end is the outfall from the floor drains in the western garage addition. One (1) heating oil Underground Storage Tank (UST) was formerly located on the easterly end of the building, between the road and the building. Two (2) gasoline and one (1) diesel UST's, along with the dispenser, were formerly located in the parking lot near the southeast corner of the garage. The currently designated truck washing area is the gravel parking lot at the west end of the garage.

Site History

The history of the site is incompletely known. Discussions with DPW personnel suggest the garage has been in this location for at least forty to fifty years. The building is not shown on the 1929 USGS Ludlow, VT quadrangle which depicts this site.

The UST's noted above were reportedly removed in 1985 or 1986 by a local contractor. Known Aboveground Storage Tanks (AST's) currently on the site are (2) waste oil tanks inside the garage (with estimated volumes of 275 gallons and 300 gallons), and one (1) 1,000± gallon #2 heating oil tank in a shed attached to the southwest corner of the garage. The waste oil is burned on-site as a source of heat.

Maintenance on trucks, cars, and heavy equipment is performed at the garage. A wide variety of automotive fluids including motor oil, hydraulic oil, transmission fluid, antifreeze, grease, etc are stored and used at the facility. There is a small paint locker on the west end of the garage. It contains various paint, thinner, and reducer products. A parts washer is located in the easterly service bay. The parts washer solution is supplied by Crystal Clean, who also picks up spent solvent. Antifreeze is currently recycled, reportedly through Crystal Clean. The oils are stored on plastic secondary containment pallets. Approximately 400-500 gallons of liquid wastes were recently collected from the storage shed and disposed of as hazardous waste. Products included hydraulic oil, automotive waste oil, penetrating oil, thinners, and possible pesticides or herbicides.

Previous waste disposal practices were typical of the time. Most wastes were dumped down the floor drains in the easterly service bay. It was reported that essentially all of the products used at the garage went down the drains at one time or another. Gasoline was the preferred parts

cleaning liquid, although the use of chlorinated solvents could not be ruled out. An unverified rumor has waste oil being disposed of at an upgradient location in the gravel pit.

The Third Quarter 1998 Update (October 9, 1998) Vermont Hazardous Waste Sites List maintained by the Hazardous Materials Management Division (HMMD) contains twenty-six sites in Springfield. One site not on the list, the Springfield Armory, is also known to exist. Three (3) of the sites are within a one-half mile radius of the subject property, and several more are within a one mile radius. The nearest site is the Springfield Armory, the immediately adjacent property to the west. All of the other sites are separated from the subject property by the Black River or another stream. With exception of the Armory, none of the sites are likely to have a potential impact on the Town Garage.

Test Pit Program

A series of test pits were excavated on the site on November 12, 1998. The purpose was to screen previously highlighted areas of potential contamination before the installation of monitoring wells. The test pits were designated TP-1 through TP-6, and are shown on the site plan in Appendix C. A summary of the test pit data is presented in Table 1 below.

Table 1
Summary of Test Pit Data

Test Pit #	Location	Depth (ft)	PID Reading (ppm)	Odor
1	East end of lagoon	2	0.6	None
1	"	4	1.1	None
1	"	6	0.6	None
1	"	8	0.3	None
1	"	10	1.1	None
1	"	2	0.8	None
1	"	14	0.6	None
2	West end of lagoon	2	0.4	None
2	"	4	67	Waste Oil
2	"	6	291	Waste Oil
2	"	8	307	Waste Oil
2	"	10	349	Waste Oil
3	Former fuel UST's	2	0.7	None
3	"	4	1.7	None
3	"	6	1.2	None
3	"	8	1.8	None
3	"	10	1.4	None
3	"	12	1.5	None
5	Former #2 oil UST	2	1.4	None
5	"	4	0.7	None
5	"	6	1.1	None
5	"	8	0.8	None
5	"	10	1.2	None
6	Vehicle washing area	1	1.1	None
6	"	2	3.9	None
6	"	3	0.7	None

Each test pit was typically excavated to the limit of the machine, or to the depth deemed safe by the Dufresne-Henry inspector. At each location soil samples were collected at approximately two foot intervals, placed in Whirl-Pak® bags, and the headspace screened for Volatile Organic Compounds (VOC's). The screening was done with a Photovac HL-2000 photoionization detector (PID). The PID used a 10.6 eV lamp, and was calibrated on-site with 99.1 ppm Isobutylene. No evidence of contamination by visual or olfactory senses was observed at TP-1, TP-3, TP-5, and TP-6. Headspace PID readings were typically less than 1 ppm. At TP-2 a waste oil odor was observed along with PID readings up to 349 ppm. Portions of the soil column were stained black. If the contamination observed is primarily automotive waste oil or leaks and drips from equipment, the PID reading of 349 ppm is significant. PID readings of waste oil are typically relatively low because many of the volatiles are removed by the harsh operating environment of an engine. The readings suggest the possible presence of other products. TP-4 was excavated to locate the dry well which is under the paved parking lot. The dry well is constructed of concrete blocks with the webs exposed to the sidewalls, and has approximate dimensions of 6.5' long x 6.5' wide x 6' deep. The dry well was mostly full of dark oily water and had approximately twelve inches of black, foul smelling sludge on the bottom.

As part of this task the routing of the floor drain systems was determined. The westerly garage addition has two circular drains. They are connected and piped to an outfall in the west end of the lagoon. The test pit at the outfall revealed two different pipe materials, suggesting that the outfall may have moved to the south as the parking lot was expanded. The main portion of the garage has a centrally located gutter floor drain. The gutter is pitched to the east. At the low point the flow is directed 90° to the north and to the dry well in the parking lot. The drain in the

boiler room is connected to the drain in the western half of the eastern two service bays. This pipe run apparently wyes into the pipe from the gutter floor drain. The sink in the eastern bays connects to the gutter floor drain. Documentation of the field activities, including a summary table of PID readings and a sketch of the floor drain system, can be found in Appendix D.

To confirm the absence of any residual petroleum at the former UST locations, analytical soil samples were obtained from the bottom of these excavations. The samples were analyzed for VOC's by EPA Method 8021B and for Total Petroleum Hydrocarbons (TPH) by EPA Method 8100(mod). Liquid and sludge samples were also obtained from the dry well to facilitate future disposal. The analytical requirements for disposal of the dry well associated wastes were verified with North Country Environmental Services, Inc. The refrigerated samples were sent to Eastern Analytical, Inc., of Concord, New Hampshire via overnight carrier on November 12, 1998. Copies of the contract laboratory analytical report will also be found in Appendix D.

No VOC's above method detection limits were found in either of the former UST locations. A TPH concentration of 120 mg/kg was found at the former heating oil UST. TPH was below the method detection limit at the former gasoline and diesel UST location. The TPH concentration at the former heating oil UST location is well below the 1,000 mg/kg SMS cleanup guideline.

As expected, the dry well sludge is highly contaminated with gasoline, oil, metals, and chlorinated and unchlorinated solvents. The liquid contains many of the same compounds, but at lower concentrations.

Monitoring Well Installation

Five (5) groundwater monitoring wells were installed, and one (1) test boring and one (1) test probe completed between November 24, 1998 and December 3, 1998 by M & W Soils Engineering, Inc. of Charlestown, New Hampshire. All borings and well installations were under the field observation of Dufresne-Henry personnel. The monitoring wells are designated MW-1 through MW-5; the test boring is designated TB-1; and the test probe is designated TP-1. TP-1 was done to check for the presence of contamination between the garage and an old well near the barn in the well field that is reported to have a bad odor. A summary of relevant data for the borings is presented in Table 2 below. The boring locations are noted on the site plan in Appendix C. Logs of the borings and daily inspection reports are included as Appendix E.

Boring Designation	Location	Total Depth (ft)	PID Readings (ppm)
MW-1	East end of lagoon	58.58	<1.0 - 4.0
MW-2	West end of lagoon	44.5	<1.0 - 1.6
MW-3	East side of dry well	62.0	<1.0 - 430
MW-4	Northeast corner of garage	57.0	<1.0
MW-5	West side of well field	22.0	1.0 - 1.5
TB-1	DPW hydraulic lift trench	14.0	2.3 - 9.0
TP-1	West side of well field	11.0	N/A

During boring advancement split spoon soil samples were taken at various intervals as determined by the Dufresne-Henry inspector. Samples were obtained at least once every five feet. All soil samples were screened for the presence of VOC's with a Photovac HL-2000

photoionization detector (10.6 eV lamp, calibrated on-site with 99.1 ppm Isobutylene). The screening was done at ambient temperatures in the headspace of the sample jars.

In well MW-1, no evidence of soil contamination by visual or olfactory senses was observed. PID readings ranged from less than 1 ppm to 4.0 ppm. In MW-2, no evidence of soil contamination by visual or olfactory senses was observed. PID readings ranged from less than 1 ppm to 1.6 ppm. In MW-3, a faint, unusual odor was observed between five and nine feet, followed by a strong, foul odor from nine to eleven feet. Obvious soil staining was observed. PID readings ranged from less than 1 ppm to 430 ppm. Oily smelling contamination was again observed between fifty and fifty-seven feet, with PID readings of 43 ppm and 56 ppm. In MW-4, no evidence of soil contamination by visual or olfactory senses was observed. PID readings were less than 1 ppm. In MW-5, no evidence of soil contamination by visual or olfactory senses was observed. PID readings ranged from 1.0 ppm to 1.5 ppm. In TB-1, evidence of contamination was observed from five to seven feet. The upper two feet had a sweet, chemical-like odor, followed by a strong, very foul odor. PID readings ranged from 2.3 ppm to 9.0 ppm, with the instrument very slow to react.

The general geologic column in MW-1 through MW-4 is sand to fifteen feet or less, followed by sandy gravel and gravelly sand to the limit of the boring. The gravel has varying cobble and boulder content. In MW-5 sand was observed throughout the boring. Refusal on probable boulders or bedrock was encountered at 58'7" in MW-1 and at 44'6" in MW-2. Refusal was not encountered in MW-3, MW-4, MW-5, or TB-1. TB-1 was ceased well above the water table due to the apparent lack of contamination, and the fact that reaching the water table was unlikely with the tripod rig used. The boring was abandoned by filling the hole with bentonite

chips to approximately one foot below the bottom of the concrete, and the chips hydrated. The remainder of the hole was cemented to the top of the concrete.

Two-inch diameter PVC monitoring wells were installed in each of the borings except TB-1 and TP-1. Each well was constructed from .010-inch machine slotted screen. The screened interval is twenty feet in MW-1, ten feet in MW-2, twenty feet in MW-3, twenty feet in MW-4, and fifteen feet in MW-5. Each well was backfilled with clean silica sand to a point above the screen and a bentonite seal installed. The wells were protected at the ground surface by grouting in watertight cast iron monitoring well boxes for wells MW-1 through MW-4, and a locking stickup steel casing for MW-5. The wells were located in the field by ties to known landmarks, and the ground and top of well elevations surveyed to a known benchmark.

Excess contaminated soil was temporarily stored on-site in two (2) 55-gallon metal drums. Water from steam cleaning and monitoring well purging was temporarily stored on-site in one (1) 55-gallon metal drum. All of the drums were scheduled to be transported to the Springfield Recycling Center in accordance with the Off-Site Soil Treatment Request Form approved on November 20, 1998.

Test Well Sampling

Representative soil samples from observed or potential zones of contamination were obtained during installation of several of the monitoring wells and test borings. In MW-2 the sampled interval was twelve to sixteen feet, where the highest PID readings were observed. In MW-3 two intervals were sampled; the zone of contamination below the dry well (six to twelve feet), and at the water table (fifty to fifty-two feet). Although no evidence of contamination was observed, a soil sample was obtained from the water table (forty-five to fifty-one feet) in MW-4.

This was done because of the water table contamination observed in MW-3, which is approximately sixty feet away. In TB-1 a sample of the contaminated zone (four to eight feet) soil was obtained. The refrigerated samples were forwarded via overnight carrier to Eastern Analytical, Inc. at various times. All of the samples were analyzed for VOC's by EPA Method 8260B, for TPH by EPA Method 8100(mod), and for RCRA 8 Metals. The State of Vermont does not currently have standards for VOC's in soil. For the purpose of comparison only, we have included the United States Environmental Protection Agency risk based concentrations (RBC) for industrial soil. The RBC figures do not constitute regulation or guidance, but are used as a screening tool during baseline risk assessment. The figures are based on soil ingestion. Summaries of the findings are presented in Tables 3 through 5 below. A copy of the contract analytical laboratory reports will be found in Appendix F.

Compound	Industrial RBC	MW-2 12' - 16'	MW-3 6' - 12'	MW-3 50' - 52'	MW-4 45' - 51'	TB-1 4' - 8'
Xylenes	4.1×10^9	<10	30	<100	<10	<10
1,3,5-Trimethylbenzene	1.0×10^8	<10	320	<100	<10	<10
1,2,4-Trimethylbenzene	1.0×10^8	<10	200	<100	<10	<10
sec-Butylbenzene	2.0×10^7	<10	<10	100	<10	<10
p-isoPropyltoluene	N.E.	<10	70	200	<10	<10
Naphthalene	4.1×10^7	<10	20	200	<10	<10

RBC USEPA Risk Based Concentration (10/1/98)
 N.E. Standard Not Established

Table 4 Summary of TPH in Soil (mg/kg)					
Compound	MW-2 12' - 16'	MW-3 6' - 12'	MW-3 50' - 52'	MW-4 45' - 51'	TB-1 4' - 8'
TPH	110	780	110	<50	1,900

The State of Vermont does not have soil concentration standards. The SMS does have a cleanup guideline of 1,000 mg/kg for TPH. The USEPA industrial soil RBC concentrations are shown as a basis of comparison.

Table 5 Summary of RCRA 8 Metals in Soil (mg/kg)						
Metal	Industrial RBC	MW-2 12' - 16'	MW-3 6' - 12'	MW-3 50' - 52'	MW-4 45' - 51'	TB-1 4' - 8'
Arsenic	3.8	2	<2	2	<2	<2
Barium	140,000	14	21	31	13	16
Cadmium	1000	2.1	1.6	2.0	1.7	1.5
Chromium	6,100	8.1	8.4	11	5.4	11
Lead	N.E.	6	6	5	5	10
Mercury	N.E.	<0.2	<0.2	<0.2	<0.2	<0.2
Selenium	10,000	<2	<2	<2	<2	<2
Silver	10,000	<0.2	<0.2	<0.2	<0.2	<0.2

RBC USEPA Risk Based Concentration (10/1/98)
N.E. Standard Not Established

Monitoring Well Water Sampling

Monitoring wells MW-1 and MW-2 were sampled on December 1, 1998. The sampling was performed by Dufresne-Henry personnel. Three well volumes were purged prior to drawing a

sample. No odors were noted upon opening the wells, nor was any evidence of a sheen observed at either location. Monitoring wells MW-3, MW-4, and MW-5 were sampled following the same protocols by Dufresne-Henry personnel on December 10, 1998. The refrigerated samples were shipped to Eastern Analytical, Inc. via overnight carrier on December 2, 1998 and December 10, 1998 for the respective rounds. Each of the samples was analyzed for VOC's by EPA Method 8260B and for TPH by EPA Method 8100(mod). Table 6 below is a summary of the detected VOC's. TPH above method detection limits was found only in MW-3 at a concentration of 230 mg/l. A copy of the contract laboratory analytical reports is included as Appendix G.

Compound	E.S.	RBC	MW-2	MW-3
Acetone	700	3,700	20	<10
sec-Butylbenzene	N.E.	61	<1	2
p-isoPropyltoluene	N.E.	N.E.	<1	2

E.S. Vermont Groundwater Enforcement Standard
RBC USEPA Risk Based Concentration for tap water (10/1/98)
N.E. Standard Not Established

Site Geology

Surficial geology at the site is published as glaciolacustrine sand and gravel. The material is part of the North Springfield Delta, a large scale area of deposition in glacial Lake Hitchcock at the end of the Pleistocene Epoch. The test borings at the garage corroborate the mapping,

showing thick deposits of stratified sand and gravel. The material in the vicinity of MW-5 and TP-1 is recent alluvium in the flood plain of the Black River.

Published mapping indicates bedrock on the site is the Mount Holly Formation. The Mount Holly is generally described as fine - medium grained biotitic gneiss, that may be granitoid or schistose in places. There may be minor beds of mica schist and quartzite, and numerous small bodies of pegmatite and gneissoid granitic rock. The age of the formation is Precambrian. No bedrock outcrops were observed in the immediate vicinity.

Site Hydrogeology

At the time the monitoring wells were sounded on December 10, 1998, the depth to the water table ranged from approximately 9.7-feet at the lower terrace adjacent to the well field to approximately 47.0-feet in the vicinity of the DPW garage. Based on this single sounding, the direction of groundwater flow is generally to the northeast and east toward the Black River. The gradient is approximately 2.3%. The site plan in Appendix C shows the groundwater contours on December 10, 1998. A summary of water table elevations to date is included as Appendix H.

Potential Receptors

The potential receptor of primary concern is the Town of Springfield municipal well fields located to the north, east, and southeast of the DPW garage. There are two separate well fields; Chapman Meadow and Gilchrist. The Gilchrist field, consisting of four wells, is located approximately 800 feet to 1,400 feet to the north and northeast. The Chapman 1 field, consisting of 30 wells, is located approximately 1,000 feet to the southeast. Chapman 2, a single well, is

located approximately 500 feet to the east. The available monitoring well sounding data indicates the direction of groundwater flow is to the east and northeast.

There are in excess of one hundred structures within a one-half mile radius of the site. All are on the municipal water supply system, or can be connected. The nearest downgradient surface water is the Black River approximately 750 feet to the east. The garage has a slab on grade foundation. The only other nearby building, the Springfield Armory, is primarily a slab on grade foundation with a small lower elevation for the furnace room. No evidence of breakout was observed on the steep bank between Fairground Road and the Town well field. A copy of the North Springfield water system base map, and a site map showing the well fields are included as Appendix I.

Previous sampling of the Town wells has found periodic, low-level concentrations of MTBE. All occurrences have been below the Vermont Groundwater Standard. The source of the MTBE has not been explored. Given that the DPW UST's were reportedly removed in 1985 or 1986, the results of the on-site soil and groundwater testing, and the observed direction of groundwater flow, those tanks have a limited probability of being the source. The presence of MTBE almost surely indicates a gasoline source. MTBE is a gasoline additive used as an octane booster. Widespread use in Vermont began in the early 1980's. MTBE has the characteristic of being significantly more soluble in water than other gasoline constituents. As such, it moves quicker and its detection is generally a precursor to the arrival of the main part of the plume.

Summary

The Springfield Department of Public Works garage has occupied the site for at least forty years. Potentially hazardous materials have been, and continue to be, stored and used at the site.

Historical disposal practices have included floor drains, discharging both subsurface and into open depressions. Products disposed of in this manner are likely to include gasoline, diesel fuel, used crankcase oil, hydraulic oil, and spent parts washing fluid. Two (2) gasoline and one (1) #2 heating oil UST's were reportedly removed in 1985 or 1986. The site has also been the probable source of chlorides in the nearby municipal well fields. Current product storage and waste disposal practices are under review by the Town.

The garage currently has two active floor drains. One discharges to an open depression, the other discharges to a dry well. The sanitary sewer discharge is currently to the same open depression. However, the Town initiated a practice in November 1998 to pump out the septic tank on a weekly basis to eliminate the discharge. One additional dry well has been abandoned, but not cleaned up. Analysis of soil samples for VOC's, TPH, and RCRA 8 Metals has confirmed contamination at each discharge point except for the wastewater outfall. VOC analysis at the former UST locations revealed no compounds above detection limits. A low level TPH concentration was found at the former heating oil UST. The concentration is below SMS cleanup guidelines. The dry well liquid and sludge were analyzed to facilitate future disposal.

Five (5) groundwater monitoring wells were installed in November and December 1998. The wells were sampled once for VOC's and TPH. In two (2) of the wells sec-Butylbenzene and p-isoPropyltoluene were both found at a concentration of 2 $\mu\text{g/L}$. One instance most likely is related to a floor drain outfall. The explanation for the other, at the location of the dry well, is not immediately obvious. Approximately thirty-seven feet of apparently uncontaminated soil was found below the lower depth of contaminated soil, and the water table where an oily odor

was observed. At this time it is presumed that the source of those compounds is further upgradient.

All of the monitoring wells have been sounded once. Based on this limited data, the direction groundwater flow is to the northeast and east, toward the Black River.

The potential receptor of primary concern is the Town of Springfield municipal well fields located to the north, east, and southeast of the DPW garage. The direction of groundwater flow across the site is directly toward these wells. There are approximately 1,800 residential and 500 commercial accounts in the Town connected to the municipal water supply. The nearest downgradient surface water is the Black River approximately 750 feet to the northeast. All of the buildings on the property have slab on grade foundations. No other occupied buildings exist in the downgradient direction before the Black River is reached. There are three (3) AST's on the site; two waste oil tanks in the garage and one 1,000 gallon #2 heating oil tank on the outside of the southeast corner of the garage. Significant quantities of various automotive fluids are stored and used on the property.

It is apparent that at least one of the Springfield municipal well fields is at some risk from conditions at the Department of Public Works garage. Low level groundwater contamination exists on the site. The downgradient limits are not fully defined. Three (3) sources of contamination have been identified and confirmed at the site. An additional source(s) is postulated based on groundwater quality at MW-3.

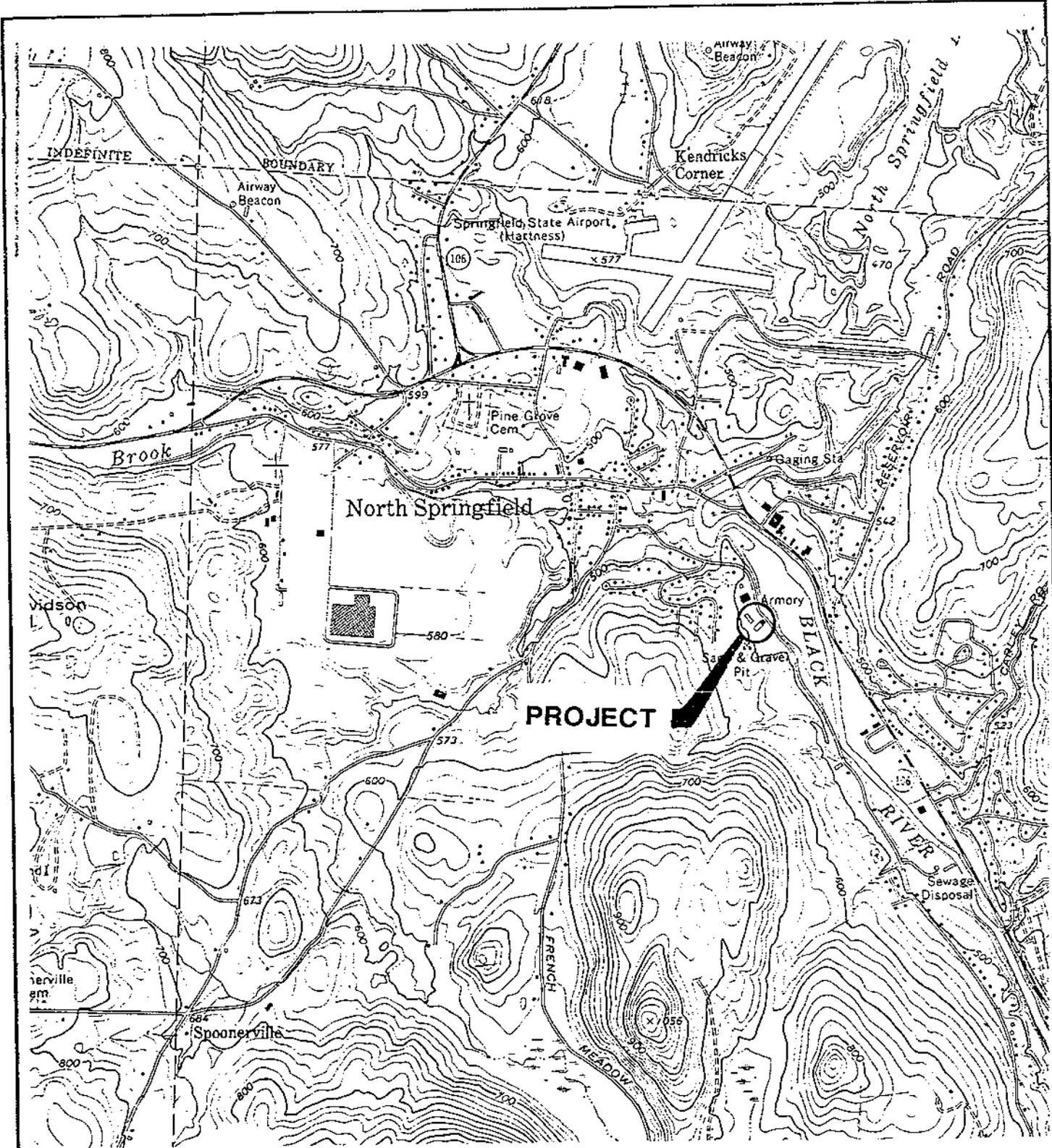
Recommendations

It is our opinion that the following tasks be completed:

1. The septic tank should be connected to the municipal sewer system. This will greatly reduce the potential for additional pathogen introduction, and reduce the recharge of poor quality water. Provided the septic tank continues to be pumped on a regular basis, this work does not need to be completed until spring. A permit will be required from the Wastewater Management Division.
2. The two (2) floor drain systems should be connected to the municipal sewer system. The floor drains should be plugged until such time as a temporary containment tank is installed or a municipal sewer connection is constructed. The connection to the municipal system is likely to require a permit from the Wastewater Management Division.
3. The liquid and sludge contents of the concrete block dry well should be properly disposed of. The dry well structure and underlying contaminated soil should also be properly disposed of. This should be completed after installation of a temporary holding structure.
4. A disposal plan should be developed for removal of contaminated soil at the floor drain outfall in the lagoon.
5. The potential source(s) of the deep contaminated soil and groundwater at MW-3 should be investigated. An exploration plan should be developed to include additional monitoring wells in the hydraulic upgradient and downgradient directions.
6. Additional rounds of water table sounding should be initiated to verify the long-term direction of groundwater flow.

7. No remediation is recommended at this time for the abandoned dry well in the hydraulic jack trench. Rationale for this includes the apparent limited vertical and areal extent of soil contamination, the prevention of liquid input (and the subsequent potential for plume mobilization) by the concrete floor and roof area , and the difficulty of working in the area. The integrity of the seal in the trench floor should be verified, and repairs made as required.
8. The source of trace levels of MTBE detected in the production well(s) should be investigated. The production wells should be sampled on a more frequent basis. The sampling frequency will be coordinated with State regulatory agencies.
9. Submit this report to the Vermont Sites Management Section and Water Supply Division for review and comment.
10. Develop a remedial plan based on these recommendations and the comments of State regulatory agencies.

APPENDIX A
SITE LOCATION MAP



PROJECT

SCALE
1:24,000

TAKEN FROM A QUADRANGLE MAP FOR CHESTER, VT
FIELD CHECKED IN 1972

SITE LOCATION PLAN

TOWN OF SPRINGFIELD
DEPARTMENT OF PUBLIC WORKS



SPRINGFIELD,

VERMONT

Project No.	4080115
Proj. Mgr.	R.B.M.
Scale	AS NOTED
Date	DEC. '98
A	SLP

APPENDIX B

**WORK PLAN, OFF-SITE TREATMENT FORM,
SITE HEALTH AND SAFETY PLAN**

Proposed Work Plan
Site Investigation

**DEPARTMENT OF PUBLIC WORKS GARAGE
SPRINGFIELD, VERMONT**

This work plan outlines the tasks to be completed for a Site Investigation at the Department of Public Works Garage in Springfield, Vermont. On November 11, 1998 the Town conducted a preliminary test pit investigation to ascertain near-surface soil contamination in several suspected areas. The areas included a floor drain outfall in a dry well; the location of a former heating oil UST; the location of a former gasoline UST, a former diesel fuel UST, and their associated pump; a floor drain outfall in a shallow depression; a sewer outfall in a shallow depression; and the area where trucks and other vehicles are washed. Evidence of soil contamination was observed at the floor drain outfalls. A separate former dry well under one of the hydraulic lifts could not be accessed. No evidence of contamination was observed at the locations of the former heating oil, gasoline, and diesel tanks, or the pump. Soil samples were obtained from these locations to corroborate the field observations. In anticipation of excavation and disposal, soil and water samples were obtained from the dry well. No results were available as of this submittal. Products disposed of likely include gasoline, diesel fuel, degreasers (possibly chlorinated), antifreeze, waste oil, hydraulic oil, and other automotive fluids.

The purpose of the investigation is to determine the existence and extent of subsurface contamination at the site. This investigation is not intended to necessarily identify the full vertical and areal extent of contamination. Rather, those areas previously identified or suspected will be investigated. The proposed monitoring wells will be used to help ascertain the extent of a contamination plume(s) and provide basic hydrogeologic data. At this time it is proposed that six (6) groundwater monitoring wells will be installed. All field personnel are OSHA certified for hazardous site operations under 29 CFR part 1910.120.

TEST BORINGS

The proposed locations for the test borings are immediately adjacent to the exterior dry well; the interior former dry well; the floor drain outfall in the depression; near the sewer outfall in the depression; and two locations in the presumed downgradient direction. A site sketch of the proposed locations is attached. It is anticipated that the borings for the monitoring wells will be completed using 4 1/4" hollow stem augers. If possible, monitoring well borings will be taken a minimum of ten (10) feet into the prevailing water table. The depth to the water table is currently being estimated at 50' - 70'. Petroleum based pipe dope for use on drill rods, tools, or casing will not be allowed. No type of drilling mud, including polymers, will be used. Should flowing sands be encountered, clean water obtained locally will be used to increase hydraulic head. If flowing sands are particularly problematic, casing will be used. All borings and monitoring well installations will be performed by M & W Soils Engineering, Inc. of Charlestown, New Hampshire under the field supervision of Dufresne-Henry personnel. As of this date the borings are scheduled

for November 24 - 30, 1998.

SOIL SAMPLING

It is anticipated that continuous split spoon soil samples will be taken in those areas where contamination is discovered. In other areas the frequency of sampling will not exceed 5 feet. The frequency will be a field decision of the Dufresne-Henry inspector. The split spoon sampler allows retrieval of relatively undisturbed soil samples from a known depth for classification and Volatile Organic Compound (VOC) screening. All soil samples and material from the auger flights will be screened for VOC's by headspace analysis with a Photovac HL-2000 photoionization detector (10.6 eV lamp, calibrated with Isobutylene). The act of driving the sampler (Standard Penetration Test) also gives an indication of the density or degree of compaction of the soil. Representative samples from each spoon will be placed in glass jars and retained by Dufresne-Henry. These are for project records only and are not intended for chemical analysis.

At this time it is anticipated that soil samples from the worst contamination in each boring will be collected and analyzed for VOC's by EPA Method 8260B, Total Petroleum Hydrocarbons by EPA Method 8100(mod), and for RCRA 8 Metals. The analytical work will be performed by Eastern Analytical, Inc. of Concord, New Hampshire or Scitest, Inc. Detailed logs of geology, drilling data, PID readings, and monitoring well installation will be prepared for each boring.

As the potential for DNAPL's exists, care will be taken to prevent the penetration of lower permeability soils layers which may enhance the downward migration of contamination. If such a layer is encountered, conditions will be noted, and appropriate measures will be taken to maintain those conditions. This may include placement of an extended bentonite seal during well installation, or abandoning the boring altogether, and sealing it with a cement-bentonite slurry.

MONITORING WELLS

Monitoring wells will be constructed from 2", 0.010" machine slotted, threaded, flush joint, Schedule 40 PVC. Assuming no refusal, each monitoring well will consist of 20' of screen with sufficient riser to reach approximately 2" below the surface grade. The bottom of the well will be set such that approximately 10 feet of screen extends below the water table observed at the time of installation. For wells with shallow depth to the water table, the screened interval will be a decision of the Dufresne-Henry inspector. The bottom of all wells will be provided with a PVC cap or point, or a plug with an expanding gasket. The annular space between the auger and the screen will be carefully backfilled with clean silica sand or native material to create a filter pack around the well. The filter pack will extend from the bottom of the well to approximately 2 feet above the screen. A bentonite seal will be installed above the filter pack, and the remainder of the hole will be backfilled with native soil. A protective monitoring well box will be grouted in flush at the surface or a stick-up steel casing installed depending on the location. All wells will have removable top caps for sampling and sounding.

GROUNDWATER SAMPLING

Water quality samples will be obtained from the Dufresne-Henry installed monitoring wells following a period of stabilization. The samples will be taken by Dufresne-Henry personnel. Samples will be obtained with disposable bailers which will be left in the wells to facilitate future sampling. All of the monitoring wells will be analyzed for VOC's by EPA Method 8260B and for TPH by EPA Method 8100(mod). The analyses will be done by Eastern Analytical, Inc. of Concord, New Hampshire, or by Scitest, Inc.

DRY WELL ABANDONMENT

Plans are being prepared to abandon use of the two (2) floor drain outfalls. One of the outfalls is approximately a 6' x 6' x 6' dry well on the west side of the garage. The other is a pipe daylighting into a small depression. The outfalls will be abandoned in two (2) phases. In Phase I, the discharge pipe from the garage for each system will be cut and a 1,000± gallon concrete oil/water separator installed. The inlets and outlets will consist of hooded pipes. These vessels will serve as holding tanks. When a tank is full the "clear" liquid portion only, i.e. neither floating product nor sediment, will be pumped and disposed of at the Town wastewater treatment plant. The permanent solution (Phase II) will be incorporated into sanitary sewer improvements at the garage. The discharge from each tank will be tied into the municipal wastewater disposal system. Sediment and floating product will be disposed of by a certified contractor on an as needed basis.

The dry well on the west side of the garage is viewed as a significant potential source of contamination. As part of Phase I, the dry well (liquid, sludge, and concrete blocks) will be removed and disposed of by a certified contractor. The amount of soil under the dry well that may need to be removed will be estimated during the test boring program. Recommendations for remedial actions at the outfall in the depression will be part of the site investigation report.

DECONTAMINATION

The borings may, or may not, be completed within the zone of contamination. However, to prevent cross contamination between the borings, strict decontamination procedures will be followed. All in-ground tools and equipment will be decontaminated by steam cleaning prior to the start of work and between borings. All decontamination will be done at the Springfield Recycling Center. Within the known contaminated area, routine cleaning of equipment, such as split spoons, will use water obtained at the site and a product such as ALCONOX. Water from the steam cleaning, spent ALCONOX cleaning solution, and water evacuated from the wells during sampling will be drummed on site. It is our understanding that verbal authorization has been granted by the SMS to transport contaminated soil to the Springfield Recycling Center. An Off-Site Soil Treatment Request Form is attached to this document.

SITE SURVEY

The relative locations and elevations of the monitoring wells will be determined. A site survey is in preparation.

RECEPTOR ASSESSMENT

A receptor assessment will be conducted to identify potential receptors including nearby water supply wells and surface water. The basements of nearby buildings, if any, will be screened with the PID as deemed necessary. It is known that the well field for the municipal water supply is topographically downgradient of the DPW Garage. No sampling of those wells will be conducted as part of this investigation. Recommendations for additional analytical parameters or modification to the sampling frequency will be part of the site investigation report.

REPORTING

A report will be prepared summarizing the findings and recommendations of the investigation including the monitoring well installation, groundwater quality and overall characterization of shallow subsurface conditions, and the likely impacts on potential receptors. Conclusions and recommendations regarding the need for excavation and disposal, long term treatment and/or monitoring will be included. The report will be submitted within 45 days of the monitoring well installation.

OFF-SITE SOIL TREATMENT REQUEST FORM

Off-Site Location

Soil Volume: Peak PID/Avg. PID: unknown
Off-Site Street Address: Springfield Recycling Center
Fairground Road Springfield, VT
Name of Land Owner: Town of Springfield
Phone # of Land Owner: 886 - 2208

Generator/Owner of Soil

Name: Town of Springfield
Facility ID#, Name, and Street Address: DPW Garage
Fairground Road N. Springfield, VT 05150
Contact: Harry Henderson
Phone #: 886 - 2208

Off-Site Soil Treatment Siting Criteria Checklist

- There are no bedrock drinking water supplies within 200 feet of the treatment location.
- There are no shallow water supplies (e.g. dug wells, driven wells, etc.) within 300 feet of the treatment location. This limit may need to be extended if shallow water supplies are shown to be hydraulically downgradient.
- There are no sensitive environments such as a stream, river, lake, pond, wildlife refuge, wetland, floodplain or other similar areas, within 100 feet of the treatment location.
- There is adequate room to allow for treatment to occur over the necessary time frame.
- Public access to the treatment area has been restricted (e.g. fencing, posted). *{Recycling Center open Wed & Sat}*
- The treatment location is not in a residential area.
- Written approval from the landowner, if different from the soil generator, has been obtained before treatment begins. This must include written approval from the landowner granting Department of Environmental Conservation (DEC) investigators property access for the purpose of inspecting soil treatment at any reasonable time.
- The local municipality has been notified in writing of the off-site location prior to initiating any soil treatment. The soil generator has provided evidence to the Waste Management Division (WMD) that this notification has been made. If applicable, local permits should be obtained. *{The municipality is the generator}*
- An area map of the soil location has been submitted to the WMD.
- The WMD has given approval to move soils to the off-site location specified above, as indicated by the WMD representative's signature below.

As the party responsible for compliance with the "Agency Guidelines for Petroleum Contaminated Soil and Debris," subchapter 6 of the "Vermont Underground Storage Tank Regulations," and applicable statutes, I hereby certify that the representations made on this form are to the best of my knowledge true and correct.

JEFFERY F. STRONG
Name of Owner/Operator Representative (printed)

Town of Springfield w/ww Supt.
Company Title

Jeffery F. Strong
Signature

11/19/98
Date

As land owner of the soil treatment location, I hereby give approval to the soil generator to treat the soil volume cited above at the above referenced location. In addition, I hereby grant property access to DEC investigators for the purpose of inspecting soil treatment at any reasonable time.

Jeffery F. Strong
Signature of Land Owner

11/19/98
Date

Richard Spese
Signature of WMD Representative

11/20/98
Date of Approval

volume & bench - network completed

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PROJECT: SPRINGFIELD, VT DPW GARAGE SITE INVESTIGATION
JOB NO.: 4080115

HEALTH AND SAFETY PLAN
FOR

SITE INVESTIGATION

DEPARTMENT OF PUBLIC WORKS GARAGE

NORTH SPRINGFIELD, VERMONT

This Health and Safety Plan applies only to Dufresne-Henry, Inc. employees.

PROPOSED ON-SITE ACTIVITIES:

Installation of six (6) groundwater monitoring wells, decontamination, and groundwater sampling.

PROPOSED DATE(S) OF WORK: Wells: November 24 - 30, 1998
Sampling: Week of November 30, 1998

ANTICIPATED WEATHER CONDITIONS: temperatures in the 20's - 40's, possible snow or rain.

PROPOSED SITE INVESTIGATION TEAM:

<u>Personnel</u>	<u>Responsibilities</u>
Richard Menge	Project Manager
Bruce Cox	Site Safety Officer
Bruce Cox/Oscar Garcia	Field Team Leader (Monitoring Wells/Sampling)
Harry Henderson/Robert Forguites	Site Representative
Richard Spiese	ANR Representative

All Dufresne-Henry, Inc. personnel arriving or departing the Site should check in and out with the Site Safety Officer. All Dufresne-Henry activities on-Site must be cleared through the Field Team Leader or Project Manager.

Background Information

Site Status: Active Inactive Unknown

Site Description (Topography, on-site structures, vegetation, surrounding population, contaminated areas (if known))

The Springfield DPW Garage is located on the south side of Fairground Road. On-site utilities include underground water and sewer lines. Overhead power lines exist. The depth to the water table is greater than 26'.

Dig Safe was contacted on 11/18/98. The site is clear after 7:15 am on 11/20/98. The Dig Safe number is 984703662. The Town of Springfield Water and Sewer Department will locate those utilities.

Site History:

The site history is not known at this time. The site has been used for the DPW garage in excess of 40 years. Three (3) UST's were removed in 1985 or 1986.

Monitoring or Sampling Data From Previous Site work:

A preliminary test pit investigation was conducted by Dufresne-Henry on November 11, 1998 to ascertain near-surface soil contamination in several known or suspected locations. Evidence of contamination was found at the outfalls from two separate floor drain systems. The former UST and pump locations appeared to be uncontaminated.

No other site investigations are known.

HAZARD REFERENCE

Waste Types:

Liquid Solid (soil) Sludge Vapor Unknown

Waste Characteristics:

Corrosive Ignitable Radioactive
 Volatile Toxic Reactive
 Unknown Other Persistent

Specific Substances of Greatest Concern (if known): gasoline, diesel fuel, degreasers

Hazard Evaluation:

Task: Mon. Well Install. Low Medium High

Identification of Hazards: gasoline, diesel fuel, degreasers

Task: Decontamination Low Medium High

Identification of Hazards: gasoline, diesel fuel, degreasers

Task: Sampling Low Medium High

Identification of Hazards: gasoline, diesel fuel, degreasers

Task: Low Medium High

Identification of Hazards:

Other Physical Hazards: (weather, heavy equipment, site structures...)
Drill rig, traffic, weather.

Hazard Assessment:

OVERALL HAZARD: ___ Serious ___ Moderate X Low ___ Unknown

On-Site Control

Site control is necessary to minimize potential exposure of workers to hazardous waste/materials, protect the public from the Site's chemical and physical hazards, and to facilitate work activity. The procedures to be followed involve the establishment of Site work zones, Site security, and safe work practices.

The on-Site staging area and support zone has been established at:

The DPW Garage.

The personal contamination reduction zone (decon area) has been established at:

The DPW Garage.

During the intrusive work, the exclusion area will be defined as follows:

A 15 foot radius around the drill rig.

The decontamination of sampling and/or heavy equipment will be conducted:

The Springfield Recycling Center.

These sub-regions of on-Site control have been established in order to reduce the potential cross contamination and proliferation of contamination by potentially contaminated equipment and personal protective equipment.

SITE ACTIVITIES

Required Personal Protective Equipment (PPE)

<u>Task</u>	<u>Entry Level of Protection</u>	<u>Monitoring Equipment</u>	<u>Upgrade/Downgrade Contingency</u>
Well Install.	Mod D	Photovac HL-2000 Explosimeter O ₂ meter H ₂ S meter	Upgrade to Level C with PID readings over 10 ppm for 5 minutes in breathing space.
Decon.	Mod D	"	"
Sampling	Mod D	"	"

Note: Breathing space PID readings of 50 ppm, explosimeter readings over 25% of the LEL, O₂ deficiency or enrichment, or H₂S readings will result in shutting down the job and consulting with State officials and the client.

Specific protective equipment for each level of protection is as follows:

Level C: Full Face Respirator w/appropriate cartridge (Willson T45)
Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots

Modified Level D: Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots
Safety Glasses or Face Shield

Level D: Work Clothes
Steel Toe/Shank Work Boots
Surgical Gloves
Hard Hat

Rationale for change in level of protection:

Upgrade to Level C with PID readings of 10 ppm or more for 5 minutes in the breathing space. PID readings over 50 ppm in the breathing space, explosimeter readings of over 25% of the LEL, O₂ deficiency or enrichment, or H₂S readings will result in shutting down the job and consulting with State officials and the client.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER OR PROJECT MANAGER.

Monitoring Procedures

Site Monitoring Equipment:

- Photovac MicroTIP (Model HL-2000, 10.6 eV lamp)
- Explosimeter
- Draeger Tube & Pump
- O₂ Meter
- Other: H₂S meter

Methods and Frequency of Monitoring:

Air space and soil samples: Photovac MicroTIP HL-2000.

Air space: explosimeter/O₂ meter/H₂S meter.

Frequency: Soil samples; as obtained.
Air; not to exceed every 15 minutes.

Decontamination and Disposal

Personnel Decontamination Procedure:

Level C: Slush boot and glove wash, slush boot and glove rinse, tape removal, outer glove removal, (cartridge change), slush boot removal, suit removal, inner glove removal.

Modified Level D: Slush boot and glove wash, slush boot and glove rinse, slush boot removal, suit removal, glove removal.

Equipment Decontamination:

The drill rig and tools will be decontaminated by steam cleaning prior to the start of work and between borings. The use of clean augers (not previously used on the job) will be permitted with washing of the bit in ALCONOX. All decontamination will be done on-site. Routine washing of split spoon samplers, etc will use water obtained at the site. Disposal of spent cleaning liquid will be on site.

Disposal Procedure for Investigation-Derived Materials:
(decon waste, disposables)

All decon waste and disposables will remain on site. Contaminated soil will be drummed on site.

SITE OPERATING PROCEDURES/SAFETY GUIDELINES

- ** Always observe the buddy system. Never enter or exit site alone, and never work alone in an isolated area. Never wander off by yourself.
- ** Always maintain a line-of-sight.
- ** Practice contamination avoidance. Never sit down or kneel, never lay equipment on the ground, avoid obvious sources of contamination such as puddles, and avoid unnecessary contact with on-site objects
- ** No eating, drinking, or smoking outside the designated "clean" zone.
- ** In the event PPE is ripped or torn, work shall stop and PPE shall be removed and replaced as soon as possible.
- ** Be alert to any unusual changes in your own condition; never ignore warning signs. Notify Health and Safety Coordinator as to suspected exposures or accidents.
- ** A vehicle will be readily available exclusively for emergency use. All personnel going on-site shall be familiar with the most direct route to the nearest hospital.
- ** In the event of direct skin contact, the affected area shall be washed immediately with soap and water
- ** Copies of the Health and Safety Plan shall be readily accessible at the command post.
- ** Note wind direction. Personnel shall remain upwind whenever possible during on-site activities.
- ** Never climb over or under refuse or obstacles. Use safety harness/safety lines when sampling lagoons, stream beds, and ravines with steep banks.
- ** Hands and face must be thoroughly washed before eating, drinking, etc.
- ** Any modifications to this safety plan MUST be approved by the Site Safety Officer.

PROJECT: SPRINGFIELD, VT DPW GARAGE SITE INVESTIGATION
JOB NO.: 4080115

Special Procedures:
Confined Space Entry

- No attempt will be made to enter abandoned buildings, manholes, tanks, or any other confined areas.
- Other:

Personnel Monitoring: (If applicable: Heat stress, frostbite, air sampling of individual breathing zone)

Monitoring of individual breathing space will be monitored by a Photovac MicroTIP HL-2000, explosimeter, and O₂ meter as outlined in monitoring procedures. Monitoring of weather related hazards will be dictated by existing conditions.

EMERGENCY SITUATIONS

The following standard emergency procedures will be used by Dufresne-Henry on-site personnel. The Site Safety Officer (SSO) shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury to Dufresne-Henry Employees in the Exclusion Zone

Upon notification of an injury to a Dufresne-Henry employee in the exclusion zone, a rescue team will enter the zone (if required) to remove the injured person to the hotline. The SSO and Project Manager should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the support zone. The SSO shall arrange for appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No Dufresne-Henry personnel shall re-enter the exclusion zone until the cause of the injury or symptoms are determined.

Personnel Injury to Dufresne-Henry Employees in the Support Zone

Upon notification of an injury to a Dufresne-Henry employee in the support zone, the Project Manager and SSO will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site Field Team Leader initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, all Dufresne-Henry personnel shall move to the decon line for further instructions. Dufresne-Henry activities on-site will cease until the added risk is removed or minimized.

Fire/Explosion

Upon notification of a fire or explosion on-site, all Dufresne-Henry personnel will assemble at the decon line. The fire department shall be alerted and all Dufresne-Henry personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure

If any Dufresne-Henry site personnel experience a failure or alteration of protective equipment that effects the protection factor, that person and his/her buddy shall immediately leave the exclusion zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure

If any other equipment on-site fails to operate properly, the Project Manager and SSO shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of on-site Dufresne-Henry personnel or prevents the completion of the tasks, all Dufresne-Henry personnel shall leave the exclusion zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the exclusion zone, Dufresne-Henry personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. Dufresne-Henry personnel have been briefed on any changes in the Site Safety Plan.

PROJECT: SPRINGFIELD, VT DPW GARAGE SITE INVESTIGATION
JOB NO.: 4080115

EMERGENCY INFORMATION

AMBULANCE: Springfield Phone: (802) 885 - 4545

HOSPITAL: Springfield Hospital
25 Ridgewood Road
Springfield, VT
(see attached map) Phone: (802) 885 - 2151

POLICE: Springfield Phone: (802) 885 - 2113

FIRE DEPARTMENT: Springfield Phone: (802) 885 - 4545

POISON CENTER: Phone: (603) 650 - 5000

ANR INCIDENT RESPONSE: Office Phone: (802) 241 - 3888

CORPORATE:

Dufresne-Henry N. Springfield, VT Phone: (802) 886 - 2261

Project Manager: F. David Deane Ext 431

SITE REPRESENTATIVE Harry Henderson Phone: (802) 886 - 2208

NEAREST PHONE: On site

LOCATION OF ON-SITE FIRST AID KIT: On site

EMERGENCY VEHICLE:

The following individuals have read this safety document and are familiar with its contents, site conditions, and on-site safety procedures (please sign below):

<u>Name</u>	<u>Company</u>
<u>Bruce Cox</u>	<u>Dufresne-Henry, Inc.</u>
<u>Oscar Garcia</u>	<u>Dufresne-Henry, Inc.</u>
<u>Myron Domingue</u>	<u>M & W Soils Engineering, Inc.</u>
<u>Michael Hitchcock</u>	<u>M & W Soils Engineering, Inc.</u>
_____	<u>M & W Soils Engineering, Inc.</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
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_____	_____
_____	_____

Copies of this SSP have been given to:

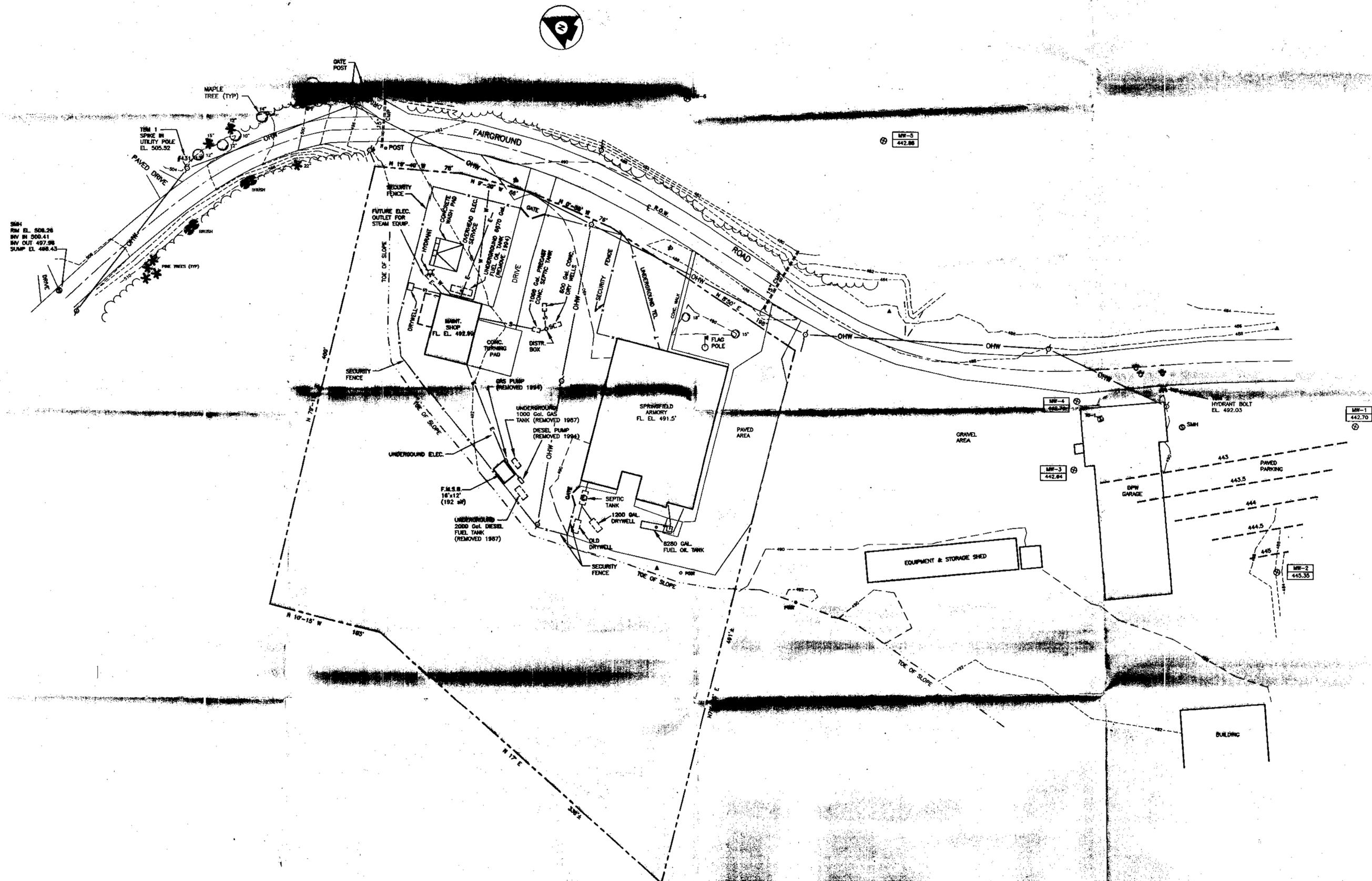
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- _____
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- _____

Approval Signatures:

- PM _____
- Div. Dir. _____

APPENDIX C

SITE PLAN



Rev.	Description	By	Date

GROUNDWATER CONTOUR PLAN
 GROUNDWATER ELEVATIONS OBTAINED
 ON DECEMBER 10, 1998
DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD TOWN GARAGE
SITE PLAN
 VERMONT
 SPRINGFIELD

Project No.	408116
Proj. Manager	R.B. MENDE
Proj. Designer	R.B. MENDE
Drawn By	J.M. TANGUAY
Checked By	
Scale	1" = 40'
Approved	
Date	DECEMBER 1998

APPENDIX D

**TEST PIT EXCAVATION
AND
SAMPLING DOCUMENTATION**

DUFRESNE-HENRY, INC.

MEMO TO: Harry Henderson, File
FROM: Oscar D. Garcia Jr, Richard B. Menge
DATE: November 12, 1998
SUBJECT: Springfield D.P.W. - Site Evaluation

On November 11, 1998, Oscar Garcia was at the above referenced location to perform a preliminary site evaluation. A total of six test pits were excavated, the on-site dry well located, and dye testing performed to determine the flow paths of various floor drain systems. The excavation was performed by the Town of Springfield. The test pit locations are noted on the attached site sketch.

Test Pit Observations (listed by order of occurrence)

Test pit #1, identified in the field as "LN" was excavated at the north end of the "lagoon" to a depth of 14 feet. This depth was roughly 5 foot below the water level in the "lagoon." The soil was gravel through the top 3 feet +/- . Below that there was coarse sand to the excavation limit. The sand had layers visible, indicating that it was likely to be native material. There was no visual or olfactory evidence of contamination present in this pit. There was no groundwater present to the depth of 14 feet.

Test pit #5, identified as "R" was excavated near the road in the area of the former heating oil tank to a depth of 10 feet. Based on the mechanics recollection, the bottom of the pit was roughly at the bed of the former tank. The soil was sandy with trace amounts of silt throughout the depth. There was no visual or olfactory evidence of contamination present in this pit. There was no groundwater present.

Test pit #2, identified as "LS" was excavated at the south end of the "lagoon" to a depth of 10 feet. At a depth of 4 feet the pipe outlet from the floor drain located in Bay #9 was exposed. At that depth the soil turned black, and had a "muddy" consistency. We continued excavating to determine the depth of this material. At 10 foot deep (6 feet below the pipe invert) the soil conditions had not improved and excavation was halted. There was visual and olfactory evidence of contamination present in this pit. The odor was noted as waste oil.

SCITEST and Eastern Analytical were contacted to confirm adequacy of sample volumes taken. The samples were sent to Eastern Analytical as SCITEST required a greater sample quantity than had been collected.

Drain Line Evaluation

The line tracing was performed using two colors of dye. We found that the maintenance area sink was connected to the floor drain in the garage then flows to the dry well via a six inch diameter clay tile pipe. The drain in the furnace room was not connected to the garage floor drain, but there must be a wye or tee in the line between the floor drain and the tank as we did observe the furnace room dye flowing into the dry well. There was only one pipe emptying into the dry well.

Elevations of the top of the drain pipe were obtained at several locations which will be incorporated into a site survey to be performed at a later date.

SPRINGFIELD DEPARTMENT OF PUBLIC WORKS

SOIL SCREENING RESULTS

NOVEMBER 11, 1998

TEST PIT #	FIELD ID.	DEPTH (FT)	READING (PPM)	ODOR
1	LN	2	0.6	NONE
1	LN	4	1.1	NONE
1	LN	6	0.6	NONE
1	LN	8	0.3	NONE
1	LN	10	1.1	NONE
1	LN	12	0.8	NONE
1	LN	14	0.6	NONE
				NONE
5	R	2	1.4	NONE
5	R	4	0.7	NONE
5	R	6	1.1	NONE
5	R	8	0.8	NONE
5	R	10	1.2	NONE
2	LS	2	0.4	NONE
2	LS	4	67	WASTE OIL
2	LS	6	291	WASTE OIL
2	LS	8	307	WASTE OIL
2	LS	10	349	WASTE OIL
3	ST	2	0.7	NONE
3	ST	4	1.7	NONE
3	ST	6	1.2	NONE
3	ST	8	1.8	NONE
3	ST	10	1.4	NONE
3	ST	12	1.5	NONE
6	W	1	1.1	NONE
6	W	2	3.9	NONE
6	W	3	0.7	NONE

PHOTOIONIZATION DETECTOR:

PHOTOVAC MICRO-TIP HL-2000, W/ 10.6 EV LAMP

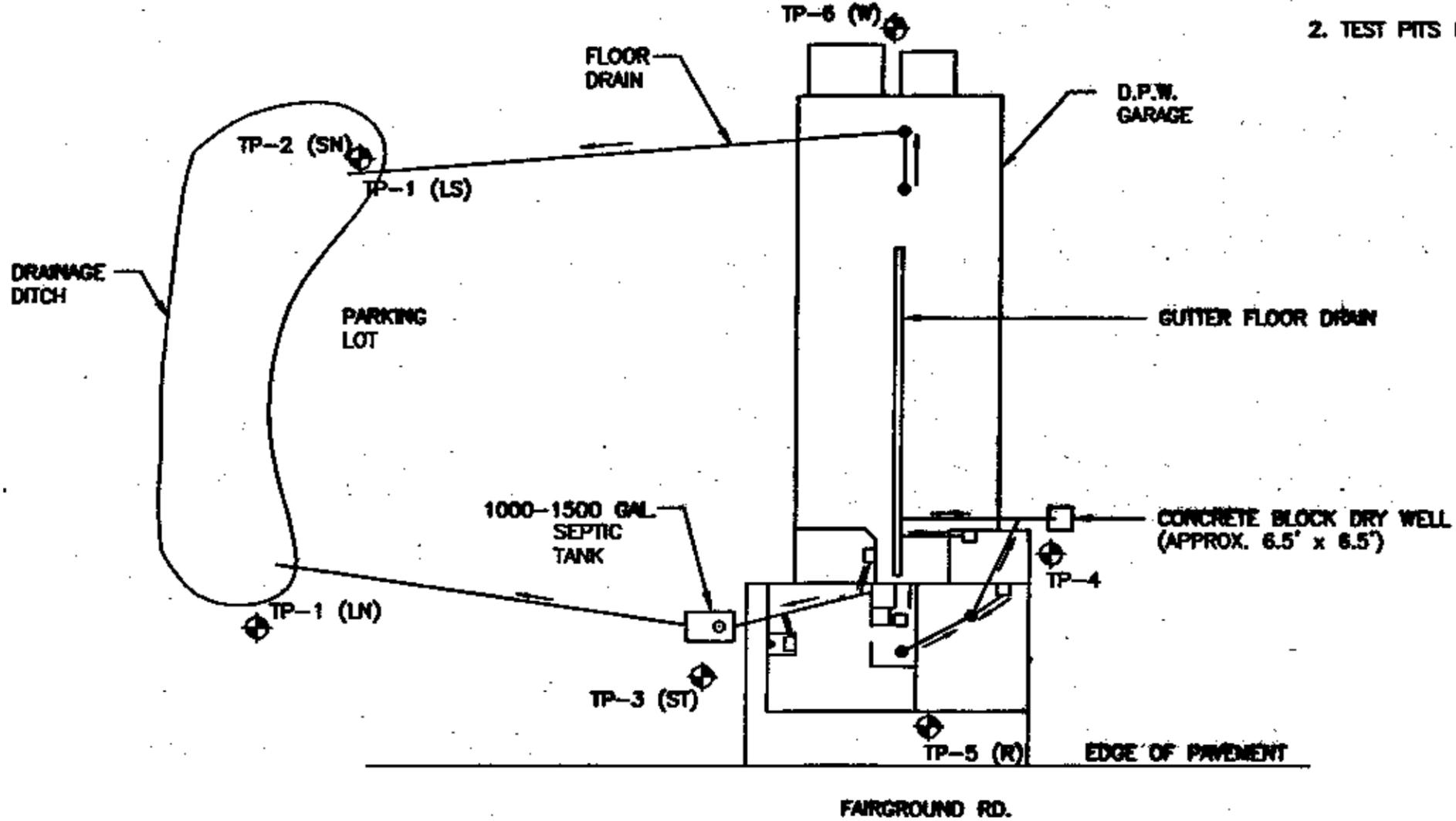
SAND SHED



LEGEND

- ◆ TP-6 (R) TEST PIT NUMBER, FIELD IDENTIFICATION
- FLOW DIRECTION

- NOTES:**
1. SITE SKETCH AS PROVIDED BY DEPARTMENT OF PUBLIC WORKS.
 2. TEST PITS PERFORMED ON NOVEMBER 11, 1998.



SPL.dwg 1-12-99 11:02:00 am 877



**SITE EVALUATION
DPW GARAGE FACILITY**

SPRINGFIELD,

VERMONT

Project No.	4000/115
Proj. Mgr.	R.B.M.
Scale	1" = 40'
Date	JANUARY 1999
	B



eastern analytical

professional laboratory services

Oscar Garcia
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

RECEIVED

DEC 14 1998

DUFRESNE-HENRY, INC.

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 14768 DUFVT
Client Identification: Springfield D.P.W. 4080115
Date Received: 11/13/98

Dear Mr. Garcia :

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (M)
Will Brunkhorst, President

12/10/98
Date



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Sample ID: DW-L

Analytical Type: Sample

Matrix: aqueous

Date Sampled: 11/11/98

Date Received: 11/13/98

		Units	Date of Analysis	Method	Analyst
Arsenic	< 0.01	mg/l	11/24/98	200.7	RTW
Barium	< 0.05	mg/l	11/24/98	200.7	RTW
Cadmium	< 0.001	mg/l	11/24/98	200.7	RTW
Chromium	< 0.002	mg/l	11/24/98	200.7	RTW
Lead	0.02	mg/l	11/24/98	200.7	RTW
Mercury	< 0.0002	mg/l	11/24/98	245.1	DS
Selenium	< 0.05	mg/l	11/24/98	200.7	RTW
Silver	< 0.005	mg/l	11/24/98	200.7	RTW

Sample ID: DW-S

Analytical Type: Sample

Matrix: soil

Date Sampled: 11/11/98

Date Received: 11/13/98

		Units	Date of Analysis	Method	Analyst
Arsenic	13	mg/kg	11/24/98	6010B	RTW
Barium	340	mg/kg	11/24/98	6010B	RTW
Cadmium	40	mg/kg	11/24/98	6010B	RTW
Chromium	160	mg/kg	11/24/98	6010B	RTW
Lead	3700	mg/kg	11/24/98	6010B	RTW
Mercury	3.0	mg/kg	11/23/98	7471	DS
Selenium	< 2	mg/kg	11/24/98	6010B	RTW
Silver	2.1	mg/kg	11/24/98	6010B	RTW

Approved By: Timothy Schaper Organics Supervisor



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Sample ID:	DW-S	DW-L			
Analytical Type:	Sample	Sample			
Matrix:	soil	aqueous			
Date Sampled:	11/11/98	11/11/98			
Date Received:	11/13/98	11/13/98			
Flashpoint	> 140	> 140	°F	11/25/98	1010 JB

Approved By: Lorraine Olashaw Inorganics Supervisor

Lorraine Olashaw 12/2/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Volatile Organic Compounds

Sample ID:	DW-L	DW-L
Matrix:	Aqueous	Aqueous
Date Received:	11/13/98	11/13/98
Units:	µg/L	µg/L
Date of Analysis:	11/25/98	11/25/98
Analyst:	JDS	JDS
EPA Method:	8260B	8260B
Dichlorodifluoromethane	< 5	1,3-Dichloropropane < 2
Chloromethane	< 2	Tetrachloroethene < 2
Vinyl chloride	< 2	Dibromochloromethane < 2
Bromomethane	< 2	1,2-Dibromoethane < 2
Chloroethane	< 5	Chlorobenzene < 2
Trichlorofluoromethane	< 5	1,1,1,2-Tetrachloroethane < 2
Diethyl ether	< 5	Ethylbenzene 8
Acetone	370	mp-Xylene 91
1,1-Dichloroethene	< 1	o-Xylene 42
Methylene chloride	< 5	Styrene < 1
Carbon disulfide	< 5	Bromoform < 2
Methyl-t-butyl ether(MTBE)	< 10	iso-Propylbenzene 3
trans-1,2-Dichloroethene	< 2	1,1,2,2-Tetrachloroethane < 2
1,1-Dichloroethane	< 2	1,2,3-Trichloropropane < 2
2-Butanone(MEK)	60	n-Propylbenzene 6
2,2-Dichloropropane	< 2	Bromobenzene < 1
cis-1,2-Dichloroethene	5	1,3,5-Trimethylbenzene 51
Chloroform	< 2	2-Chlorotoluene < 2
Bromochloromethane	< 2	4-Chlorotoluene < 2
Tetrahydrofuran(THF)	< 10	tert-Butylbenzene < 1
1,1,1-Trichloroethane	< 2	1,2,4-Trimethylbenzene 120
1,1-Dichloropropene	< 2	sec-Butylbenzene 5
Carbon tetrachloride	< 2	p-isoPropyltoluene 210
1,2-Dichloroethane	< 2	1,3-Dichlorobenzene < 1
Benzene	2	1,4-Dichlorobenzene < 1
Trichloroethene	3	n-Butylbenzene < 1
1,2-Dichloropropane	< 2	1,2-Dichlorobenzene < 1
Bromodichloromethane	< 2	1,2-Dibromo-3-chloropropane < 2
Dibromomethane	< 2	1,2,4-Trichlorobenzene < 1
4-Methyl-2-pentanone(MIBK)	< 10	Hexachlorobutadiene < 1
cis-1,3-Dichloropropene	< 2	Naphthalene 10
Toluene	30	1,2,3-Trichlorobenzene < 1
trans-1,3-Dichloropropene	< 2	
1,1,2-Trichloroethane	< 2	
2-Hexanone	< 10	

Approved By: Clifford Chase, Volatile Organics Supervisor

Clifford Chase 11/30/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Volatile Organic Compounds

Sample ID:	DW-S	DW-S
Matrix:	Soil	Soil
Date Received:	11/13/98	11/13/98
Units:	µg/kg	µg/kg
Date of Analysis:	11/23/98	11/23/98
Analyst:	JDS	JDS
EPA Method:	8260B	8260B
Dilution Factor:	100	100
Dichlorodifluoromethane	< 10000	1,3-Dichloropropane < 1000
Chloromethane	< 10000	Tetrachloroethene < 1000
Vinyl chloride	< 2000	Dibromochloromethane < 1000
Bromomethane	< 1000	1,2-Dibromoethane < 1000
Chloroethane	< 10000	Chlorobenzene 1,000
Trichlorofluoromethane	< 10000	1,1,1,2-Tetrachloroethane < 1000
Diethyl ether	< 1000	Ethylbenzene 39,000
Acetone	< 50000	mp-Xylene 230,000
1,1-Dichloroethene	< 1000	o-Xylene 110,000
Methylene chloride	< 1000	Styrene < 1000
Carbon disulfide	< 1000	Bromoform < 1000
Methyl-t-butyl ether(MTBE)	< 20000	iso-Propylbenzene 9,000
trans-1,2-Dichloroethene	< 1000	1,1,2,2-Tetrachloroethane < 1000
1,1-Dichloroethane	< 1000	1,2,3-Trichloropropane < 1000
2-Butanone(MEK)	< 10000	n-Propylbenzene 22,000
2,2-Dichloropropane	< 1000	Bromobenzene < 1000
cis-1,2-Dichloroethene	3,000	1,3,5-Trimethylbenzene 63,000
Chloroform	< 1000	2-Chlorotoluene < 1000
Bromochloromethane	< 1000	4-Chlorotoluene < 1000
Tetrahydrofuran(THF)	< 10000	tert-Butylbenzene < 1000
1,1,1-Trichloroethane	< 1000	1,2,4-Trimethylbenzene 220,000
1,1-Dichloropropene	< 1000	sec-Butylbenzene 9,000
Carbon tetrachloride	< 1000	p-isoPropyltoluene 10,000
1,2-Dichloroethane	< 1000	1,3-Dichlorobenzene < 1000
Benzene	3,000	1,4-Dichlorobenzene 2,000
Trichloroethene	1,000	n-Butylbenzene < 1000
1,2-Dichloropropane	< 1000	1,2-Dichlorobenzene 3,000
Bromodichloromethane	< 1000	1,2-Dibromo-3-chloropropane < 1000
Dibromomethane	< 1000	1,2,4-Trichlorobenzene < 1000
4-Methyl-2-pentanone(MIBK)	< 10000	Hexachlorobutadiene < 1000
cis-1,3-Dichloropropene	< 1000	Naphthalene 21,000
Toluene	95,000	1,2,3-Trichlorobenzene < 1000
trans-1,3-Dichloropropene	< 1000	
1,1,2-Trichloroethane	< 1000	
2-Hexanone	< 10000	

Approved By: Clifford Chase, Volatile Organics Supervisor

 11/30/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Volatile Organic Compounds

Client ID:	TP#5 R	TP#3 ST
Matrix:	soil	soil
Date Received:	11/13/98	11/13/98
Date Analyzed:	11/21/98	11/21/98
Analyst:	VG	VG
Units:	ug/Kg	ug/Kg
Method:	8021	8021

MTBE	< 300	< 200
Benzene	< 50	< 40
Toluene	< 50	< 40
Ethylbenzene	< 50	< 40
m,p-Xylene	< 50	< 40
o-Xylene	< 50	< 40

Clifford Chase 11/30/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14768

Client: Dufresne-Henry

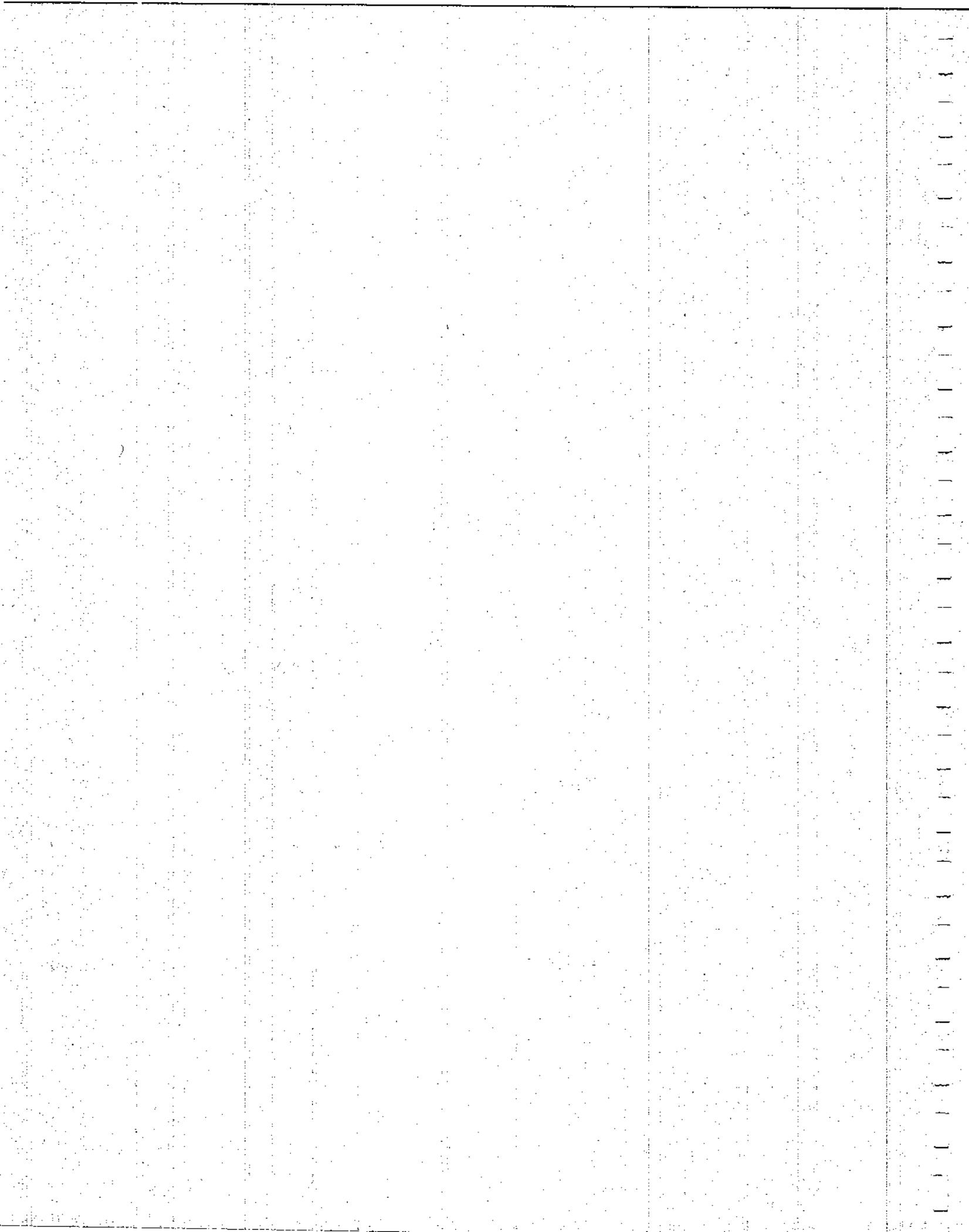
Client Designation: Springfield D.P.W. 4080115

Sample ID:	TP#5 "R"	TP#3 "ST"
Analytical Type:	Sample	Sample
Matrix:	soil	soil
Date Sampled:	11/11/98	11/11/98
Date Received:	11/13/98	11/13/98
Units:	mg/kg	mg/kg
Date of Extraction/Prep:	11/13/98	11/13/98
Date of Analysis:	11/16/98	11/16/98
Analyst:	DJS	DJS
Method:	8100 Mod	8100 Mod
Dilution Factor:	1	1
TPH (C9-C40)	120	< 50

Approved By: Timothy Schaper Organics Supervisor

Timothy Schaper 11/18/98

APPENDIX E
BORING LOGS
AND
DAILY REPORTS



BORING LOCATION MW-4 INCLINATION V BEARING DATE START/FINISH DECEMBER 1, 1998 / DECEMBER 2, 1998
 CASING ID CORE SIZE TOTAL DEPTH 57 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 489.13 DEPTH TO WATER/DATE 46± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
484.13	5.0						4 1/4" HSA	8"/CCH	0' - 3" Bituminous concrete pavement. 3" - 1'± Medium brown, sandy GRAVEL. 1' - 5' Medium brown SAND.
482.13	7.0	SS-1	5 3 4 7	2	16	24			Medium gray, loose - medium dense, SAND. Very fine - medium grained (predominately fine - medium grained), well sorted sand. 10% non plastic fines. 10%± fine rounded gravel to 1/2". Dry. No odor or staining. 0.2 ppm.
479.13	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
477.13	12.0	SS-2	9 8 8 10	2	16	24			Tan - light gray brown, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 20%+ non plastic fines. Trace of mica and mafic minerals. Faint horizontal layering. Dry. No odor or staining. 0.5 ppm.
474.13	15.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above, becoming gravelly.
472.13	17.0	SS-3	9 9 16 14	2	16	24			Light - medium gray brown, medium dense, sandy GRAVEL. Very fine - rarely coarse grained (predominately very fine - fine grained), moderately well sorted sand. 20%± non plastic fines. 50%+ fine rounded gravel 1/8" - 1"+. Dry. No odor or staining. 0.7 ppm.
469.13	20.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above changing to SAND at 19'±
467.13	22.0	SS-4	8 8 9 11	2	16	24			Light brown, medium dense, silty SAND. Very fine grained, well sorted sand. 40%± non plastic fines. Dry - slightly moist. No odor or staining. 0.4 ppm.
464.13	25.0						4 1/4" HSA	8"/CCH	Probable SAND as above getting coarser with depth.
462.13	27.0	SS-5	8 10 9 10	2	18	24			Light - medium gray, medium dense, SAND. Very fine - rarely coarse grained (predominately fine - medium grained), moderately well sorted sand. 10%+ non plastic fines. Dry. No odor or staining. 0.5 ppm.
459.13	30.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
457.13	32.0	SS-6	9 6 7 7	2	17	24			Light - medium brown gray, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 20%+ non plastic fines. Trace of mica and mafic minerals. Dy. No odor or staining. 0.6 ppm.
454.74	35.0						4 1/4" HSA	8"/CCH	Probable silty SAND similar to above, changing to GRAVEL at 35'.
			13						Medium brown, dense, sandy GRAVEL. Very fine - occasionally

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 489.05

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: DEC 2, 1998 PROJECT: 4080115



BORING LOCATION MW-3 INCLINATION V BEARING DATE START/FINISH NOVEMBER 30, 1998 / DECEMBER 1, 1998

CASING ID CORE SIZE TOTAL DEPTH 62.0 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 489.45 DEPTH TO WATER/DATE 49'± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)			
427.45	62.0	SS-16	13 14 23	2	13	24			above. Saturated. No odor or staining. 13 ppm peak, 2.5+ ppm sustained.
									No refusal to depth. Installed 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC at 59'6". Sand backfill to 36'7". Bentonite seal 35'5" - 36'7". Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 489.00

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: DEC 1, 1998 PROJECT: 4080115



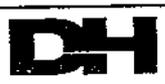
BORING LOCATION MW-3 INCLINATION V BEARING DATE START/FINISH NOVEMBER 30, 1998 / DECEMBER 1, 1998
 CASING ID CORE SIZE TOTAL DEPTH 62.0 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 489.45 DEPTH TO WATER/DATE 49± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
462.45	27.0								or staining. 1.2 ppm.
459.45	30.0						4 1/4" HSA	8"/CCH	Probable SAND and GRAVEL similar to above.
457.45	32.0	SS-10	15 18 16 23	2	18	24			Medium gray, dense, sandy GRAVEL. Very fine - rarely very coarse grained (predominately fine - medium grained), moderately well sorted sand. 10%+ non plastic fines. 60%+ fine rounded gravel 1/8" - 1/2". Dry. No odor or staining. 0.8 ppm.
454.45	35.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
452.45	37.0	SS-11	18 14 14 17	2	15	4	12/1/98		Medium gray, medium dense, gravelly SAND similar to above, with less and finer sized gravel. Dry. No odor or staining. 0.4 ppm.
449.45	40.0						4 1/4" HSA	8"/CCH	Probable SAND and GRAVEL similar to above.
447.45	42.0	SS-12	12 11 13 12	2	14	24			Medium brown gray, medium dense, sandy GRAVEL similar to above, but with more gravel. 50%+ rounded gravel 1/8" - 1". Dry. No odor or staining. 0.5 ppm.
444.45	45.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
442.45	47.0	SS-13	25 14 20 42	2	20	24			Medium gray, dense - very dense, sandy GRAVEL similar to above, but grayer and with slightly less, slightly finer gravel. Dry. No odor or staining. 1.2 ppm.
439.45	50.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above, getting coarser with depth.
437.45	52.0	SS-14	14 18 11 12	2	14	24			Medium - dark gray brown, medium dense - dense, sandy GRAVEL. Very fine - very coarse grained, poorly sorted sand. 10%± non plastic fines. 60%+ rounded gravel 1/8" - occasional cobbles. Saturated. Faint oily odor. 56 ppm peak, 40+ ppm sustained.
434.45	55.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above, becoming sandier below 53'±
432.45	57.0	SS-15	19 27 21 26	2	10	24			Medium brown, dense, gravelly, silty SAND. Very fine - occasionally medium grained, moderately well sorted sand. 10% - 20% non plastic fines. 10%+ fine rounded gravel. Slight odor, no staining. 43 ppm.
429.45	60.0						4 1/4" HSA	8"/CCH	Probable gravelly SAND similar to above.
			20						Medium brown, medium dense, sandy GRAVEL similar to

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 489.00

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: DEC 1, 1998 PROJECT: 4080115



BORING LOCATION MW-3		INCLINATION V		BEARING		DATE START/FINISH NOVEMBER 30, 1998 / DECEMBER 1, 1998				
CASING ID		CORE SIZE		TOTAL DEPTH 62.0		FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)				
GROUND EL (NGVD) 489.45		DEPTH TO WATER/DATE 49±		FT/ IMMED.		LOGGED BY: B. COX				
ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION	
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)				
484.45	5.0						4 1/4" HSA	8"/CCH	Medium brown, silty SAND FILL. Dry. No odor or staining.	
482.45	7.0	SS-1	8 9 5 6	2	18	24			Medium - dark brown, medium dense, gravelly SAND. Very fine - medium grained, moderately well sorted sand. 10% - 20% non plastic fines. 20%+ gravel to 1"±. Moist. Faint unusual odor, no staining. 2.4 ppm.	
480.45	9.0	SS-2	8 9 5 6	2	20	24			Medium - dark brown gray, medium dense, silty SAND. Very fine - occasionally medium grained, moderately well sorted sand. 20%± non plastic fines. Trace of mica. Moist. Faint odor as above. 46 ppm peak, 25+ ppm sustained.	
478.45	11.0	SS-3	7 9 7 7	2	3	24			Medium - dark brown gray, medium dense, silty SAND similar to above, but with 10%± fine rounded gravel. Moist. Moderate - strong, disagreeable, weathered petroleum odor. Color likely due to contamination. 430 ppm peak, 350+ ppm sustained.	
476.45	13.0	SS-4	8 8 9 9	2	21	4			Light - medium orange brown, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 20%± non plastic fines. Trace of mica and mafic minerals. Moist - wet. Upper 1± is stained gray. 6.5 ppm.	
474.45	15.0	SS-5	8 9 9 11	2	10	24			Light - medium orange brown, medium dense, silty SAND as above. Abundant medium - dark orange mottles in layers. Moist. No odor or staining. 21 ppm.	
472.45	17.0	SS-6	10 10 10 10	2	10	24			Medium brown, medium dense, silty SAND similar to above, but a different color, and slightly coarser grained. Occasional mottles as above. Very slightly moist. No odor or staining. 2.5 ppm.	
470.45	19.0	SS-7	9 9 23 26	2	18	24			Medium brown, medium dense - dense, sandy GRAVEL (increased gravel content with depth). Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand. 10%+ non plastic fines. 50%+ fine gravel 1/8" - 1/2". Dry - very slightly moist. No odor or staining. 3.0 ppm.	
469.45	21.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.	
467.45	23.0	SS-8	78* 20 18 15	2	13	24	* boulder		Medium gray brown, dense - very dense, sandy GRAVEL. Very fine - very coarse grained, poorly sorted sand. 10%+ non plastic fines. 50%+ gravel 1/8" - boulders. Dry. No odor or staining. 2.0 ppm.	
464.45	25.0						4 1/4" HSA	8"/CCH	Probable SAND and GRAVEL similar to above.	
		SS-9	13 12 17	2	17	24			Medium gray, medium dense - dense, silty SAND. Very fine - rarely medium grained, well sorted predominately quartz sand. 10% - 20% non plastic fines. 10%± fine gravel. Dry. No odor	
B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler. REC - Length of sample recovered. SS - Split spoon sample. U - Undisturbed samples S - Shelby tube D - Denison F - Fixed piston P - Pitcher O - Osterberg SAMP OD - Outside diameter of sampling spoon							NOTES HSA = Hollow Stem Auger CCH = Conical Cutter Head ppm Refers to PID reading (10.6 eV lamp) Top of PVC elev = 489.00		SPRINGFIELD DPW GARAGE SITE INVESTIGATION SPRINGFIELD, VERMONT DATE: DEC 1, 1998 PROJECT: 4080115	
PAGE 1 OF 3			LOG OF BORING: MW-3							

BORING LOCATION MW-2 INCLINATION V BEARING DATE START/FINISH NOVEMBER 25, 1998 / NOVEMBER 30, 1998
 CASING ID CORE SIZE TOTAL DEPTH 44.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 488.16 DEPTH TO WATER/DATE 43± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
451.16	37.0	SS-9	22 17 15	2	17	24			to above. Dry. No odor or staining. 36'6" - 37' Medium brown, dense, silty SAND. Very fine - medium grained, moderately well sorted sand. 10% - 20% non plastic fines. Dry - very slightly moist. No odor or staining. 0.4 ppm.
448.16	40.0						4 1/4" HSA	8"/CCH	Probable SAND with boulders similar to above. Tried sampling at 40', but weight bouncing.
443.66	44.5						11/30/98 4" SSA	4 1/2"/FB	Probable SAND and GRAVEL with boulders.
									Refusal on SSA at 44'6" on probable bedrock or boulder. Installed 10' of .010" slot, threaded, flush joint, Scd 40 PVC at 44'. Sand backfill to 30.5'. Bentonite seal 28' - 30.5'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 487.94

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: NOV 30, 1998 PROJECT: 4080115



BORING LOCATION MW-2 INCLINATION V BEARING DATE START/FINISH NOVEMBER 25, 1998 / NOVEMBER 30, 1998
 CASING ID CORE SIZE TOTAL DEPTH 44.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (1IGVD) 488.16 DEPTH TO WATER/DATE 43± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)			
483.16	5.0						4 1/4" HSA	8"/CCH	Medium brown, gravelly SAND FILL. Dry. No odor or staining.
481.16	7.0	SS-1	4 9 5 5	2	15	24			Medium gold brown, loose - medium dense, gravelly SAND FILL. Very fine - occasionally coarse grained, moderately poorly sorted sand. 10% - 20% non plastic fines. 30%+ fine gravel. Dry - slightly moist. No odor or staining. 1.6 ppm.
478.16	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
476.16	12.0	SS-2	7 4 3 3	2	11	24			Medium gray brown, loose, sandy SILT. Very fine grained, well sorted sand. 60%+ non plastic, inorganic fines. Trace of mica. Wet. No odor or staining. 1.1 ppm.
474.16	14.0	SS-3	5 4 3 4	2	3	24			Medium brown, loose, gravelly, silty SAND. Very fine - occasionally coarse grained, moderately well sorted sand. 10% - 20% non plastic fines. 10%+ fine gravel. Dry - moist. No odor or staining. 1.9 ppm.
472.16	16.0	SS-4	8 9 5 6	2	8	24			Medium brown, medium dense, sandy GRAVEL. Very fine - coarse grained, poorly sorted sand. 10%+ non plastic fines. 50%+ fine gravel. Dry. No odor or staining. 1.5 ppm.
470.16	18.0	SS-5	8 10 6 6	2	14	24			Medium brown, medium dense, gravelly SAND, similar to above, but with less gravel. Dry. No odor or staining. 1.0 ppm.
468.16	20.0	SS-6	4 10 28 38	2	14	24			Medium brown gray, dense - very dense, gravelly SAND similar to above, but grayer. Dry. No odor or staining. 0.2 ppm.
466.16	22.0	SS-7	24 23 43 39	2	14	24			Medium brown gray, very dense, sandy GRAVEL. Very fine - very coarse grained, poorly sorted sand of quartz and rock fragments. 10% non plastic fines. 50%+ gravel of various rock types 1/8" - probable cobbles. Dry. 0.3 ppm.
458.16	30.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL with boulders similar to above. Tried sampling at 25', but weight bouncing.
456.16	32.0	SS-8	40 30 24 21	2	21	24			Medium gray, dense - very dense, sandy GRAVEL similar to above. Dry. No odor or staining. 0.3 ppm.
453.16	38.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
			17						35' - 36'6"± Medium brown gray, dense, sandy GRAVEL similar

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler. REC - Length of sample recovered. SS - Split spoon sample. U - Undisturbed samples S - Shelby tube D - Denison F - Fixed piston P - Pitcher O - Osterberg SAMP OD - Outside diameter of sampling spoon	NOTES HSA = Hollow Stem Auger CCH = Conical Cutter Head ppm Refers to PID reading (10.6 eV lamp) Top of PVC elev = 487.94	SPRINGFIELD DPW GARAGE SITE INVESTIGATION	
	SPRINGFIELD, VERMONT DATE: NOV 30, 1998 PROJECT: 4080115		



BORING LOCATION MW-1 INCLINATION V BEARING DATE START/FINISH NOVEMBER 24, 1998 / NOVEMBER 25, 1998
 CASING ID CORE SIZE TOTAL DEPTH 58.6 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 489.74 DEPTH TO WATER/DATE 47.5± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
447.74	42.0	SS-8	14 25 36 48	2	14	24			Light - medium gray brown, dense - very dense, sandy GRAVEL. Very fine - very coarse grained (predominately very fine - medium grained) poorly sorted sand. 10% - 20% non plastic fines. 50%+ gravel 1/8" - cobbles. Dry. No odor or staining. 1.1 ppm.
444.74	45.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL with boulders similar to above.
444.74	45.0		70*	2	0	0	* 70/0"		No sample recovery.
439.74	50.0						11/25/98 4 1/4" HSA	8"/CCH	Probable sandy GRAVEL with boulders similar to above.
437.74	52.0	SS-9	38 24 24 45	2	16	24			Medium brown, dense - very dense, silty, sandy GRAVEL similar to above, but browner. Saturated. No odor or staining. 0.8 ppm.
434.74	55.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above, with decreasing gravel content.
432.74	57.0	SS-10	19 22 28 40	2	10	24			Medium - dark brown, dense - very dense, sandy GRAVEL. Fine - very coarse grained (predominately medium - coarse grained), poorly sorted, clean sand of quartz and rock fragments. Trace of non plastic fines. 50%+ rounded gravel 1/8" - occasionally 3/4". Saturated. No odor or staining. 0.9 ppm.
431.16	58.58						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
									Refusal on HSA at 58'7" on probable bedrock or boulder. Installed 20' of .010" slot, threaded, flush joint, Scd 40 PVC at 57.6'. Sand backfill to 35'. Bentonite seal 33'6" - 35'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 489.20

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: NOV 25, 1998 PROJECT: 4080115



BORING LOCATION MW-1 INCLINATION V BEARING DATE START/FINISH NOVEMBER 24, 1998 / NOVEMBER 25, 1998
 CASING ID CORE SIZE TOTAL DEPTH 58.6 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 489.74 DEPTH TO WATER/DATE 47.5± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
484.74	5.0						4 1/4" HSA	8"/CCH	Medium brown, silty SAND. Dry. No odor or staining.
482.74	7.0	SS-1	7 6 7 7	2	14	24			Light - medium brown, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 30%+ non plastic fines. Trace of mica and mafic minerals. Dry. No odor or staining. 0.7 ppm.
479.74	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above, becoming gravelly at 9±.
477.74	12.0	SS-2	37 6 18 15	2	6	24			Light brown gray, dense, sandy GRAVEL. Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand. 10%+ non plastic fines. 50%+ gravel 1/8" - cobbles. Dry. No odor or staining. 1.3 ppm.
474.74	15.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL with boulders similar to above.
472.74	17.0	SS-3	37 26 24 27	2	12	24			Light gray, medium dense - dense, sandy GRAVEL as above. Dry. No odor or staining. 1.2 ppm.
469.74	20.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL with boulders similar to above.
469.41	20.33	SS-4	68*	2	4	4	* 68/4"		Light gray brown, dense, sandy GRAVEL similar to above, but browner and with an increased fines content. Dry. No odor or staining. 1.4 ppm.
464.74	25.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
462.74	27.0	SS-5	27 23 17 19	2	13	24			Light - medium gray, dense, sandy GRAVEL similar to above, but with predominately fine - medium grained sand, and smaller gravel. Trace of mica and mafic minerals. Dry. No odor or staining. 2.0 ppm.
459.74	30.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above, changing to SAND at 28±.
457.74	32.0	SS-6	9 11 16 21	2	16	24			Light - medium brown gray, medium dense - dense, silty SAND. Very fine - fine grained, well sorted sand. 30%+ non plastic fines. Trace of mica and mafic minerals. Dry. No odor or staining. 3.4 ppm.
454.74	35.0						4 1/4" HSA	8"/CCH	Probable silty SAND similar to above.
452.74	37.0	SS-7	10 11 14 19	2	20	24			Light - medium gray brown, medium dense - dense, SAND. Very fine - very coarse grained, poorly sorted sand of quartz and rock fragments. 10%+ non plastic fines. Trace of mica and mafic minerals. Occasional horizontal layering. Dry. No odor or staining. 4.0 ppm.
449.74	40.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above with increasing gravel content.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 HSA = Hollow Stem Auger
 CCH = Conical Cutter Head
 ppm Refers to PID reading (10.6 eV lamp)
 Top of PVC elev = 489.20

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION
 SPRINGFIELD, VERMONT
 DATE: NOV 25, 1998 PROJECT: 4080115



BORING LOCATION TP-1 INCLINATION V BEARING DATE START/FINISH DECEMBER 2, 1998 / DECEMBER 2, 1998
 CASING ID CORE SIZE TOTAL DEPTH 11 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.H.)
 GROUND EL (NGVD) DEPTH TO WATER/DATE 10± FT/ IMMED. LOGGED BY: B. COX

ELEV		SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	REC (IN)		PENE-TRATION (IN)				
							4" SSA	4 1/2" FB	0' - 8"± Dark brown, sandy, silty, ORGANIC SOIL. 8" - 11' Medium brown and gray, SILT and SAND. Saturated at 10'±. No odor or staining. This boring was located several hundred feet east (downstream) of MW-5, at the south edge of the field.	

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 SSA = Solid Stem Auger
 FB = Finger Bit
 ppm Refers to PID reading (10.6 eV lamp)

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION

SPRINGFIELD,
 DATE: DEC 2, 1998

VERMONT
 PROJECT: 4080115

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LOG OF BORING: TP-1



BORING LOCATION TB-1 INCLINATION V BEARING DATE START/FINISH DECEMBER 3, 1998 / DECEMBER 3, 1998
 CASING ID CORE SIZE TOTAL DEPTH 14 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)
 GROUND EL (NGVD) 482.56 DEPTH TO WATER/DATE DRY FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		B	REC (IN)			
480.56	2.0						4" SSA	4 1/2" FB	Augered through 8"± of concrete on the bottom of the jack pit. Sampling started at 2'.
478.56	4.0	SS-1	2 3 3 6	2	20	24			Light - medium gray brown, loose, silty SAND. Very fine - fine grained, well sorted sand. 30%± non plastic fines. Trace of gravel, mica, and mafic minerals. Dry. Faint, sweet, chemical-like odor, no staining. 5.4 ppm (very slow to react).
476.56	6.0	SS-2	6 6 9 9	2	21	24			4' - 5' Medium brown, medium dense, silty SAND as above. 5' - 6' Medium - dark gray, medium dense, silty SAND similar to above, but with a strong, very disagreeable odor. Moist. 8.0 ppm (very slow to react).
474.56	8.0	SS-3	10 10 11 13	2	16	24			Light brown, medium dense, silty SAND similar to above. Very fine - fine grained, well sorted sand. 30%+ non plastic fines. Dry. No odor or staining. 9.0 ppm (very slow to react).
472.56	10.0	SS-4	11 12 14 18	2	20	24			Light brown, medium dense, silty SAND as above, with horizontal and nearly horizontal layering. Dry. No odor or staining. 7.0 ppm (very slow to react).
470.56	12.0	SS-5	11 12 14 16	2	15	24			Light brown, medium dense, silty SAND as above. Dry. No odor or staining. 4.4 ppm (very slow to react)
468.56	14.0	SS-6	10 12 16 20	2	8	24			Light brown, medium dense - dense, silty SAND as above. Dry. No odor or staining. 2.3 ppm (very slow to react).
									No refusal to depth. The boring was not advanced further due to the apparent lack of contamination, and the fact that reaching the water table with the tripod rig used was unlikely. The hole was filled with bentonite pellets to a point approximately 1' below the bottom of the concrete, and the pellets hydrated. The remainder of the hole was cemented to the top of the concrete.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
 REC - Length of sample recovered.
 SS - Split spoon sample.
 U - Undisturbed samples
 S - Shelby tube D - Denison
 F - Fixed piston P - Pitcher
 O - Osterberg
 SAMP OD - Outside diameter of sampling spoon

NOTES
 SSA = Solid Stem Auger
 FB = Finger Bit
 ppm Refers to PID reading (10.6 eV lamp)

 The ground elevation noted above is the bottom of the pit.

SPRINGFIELD DPW GARAGE
 SITE INVESTIGATION

 SPRINGFIELD, VERMONT
 DATE: DEC 3, 1998 PROJECT: 4080115



BORING LOCATION MW-4		INCLINATION V		BEARING		DATE START/FINISH DECEMBER 1, 1998 / DECEMBER 2, 1998				
CASING ID		CORE SIZE		TOTAL DEPTH 57 FT		DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)				
GROUND EL (NGVD) 489.13		DEPTH TO WATER/DATE 46±		FT/ IMMED.		LOGGED BY: B. COX				
ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION	
	NGVD (FT)	DEPTH (FT)	TYPE AND NO.		8	REC (IN)				PENE-TRATION (IN)
452.13	37.0	SS-7	20 21 18	2	13	24			very coarse grained (predominately fine - medium grained), moderately poorly sorted sand. 10% - 20% non plastic fines. 50%+ gravel 1/8" - 2"±. Dry. No odor or staining. 1.2 ppm.	
449.13	40.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.	
447.13	42.0	SS-8	12 14 11 11	2	13	24			Medium brown, medium dense, sandy GRAVEL similar to above, but darker in color and with a coarser sand fraction. Dry. No odor or staining. 0.8 ppm.	
444.13	45.0						12/2/98 4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.	
442.13	47.0	SS-9	7 5 6 8	2	18	24			Medium - dark brown, medium dense, SAND. Very fine - very coarse grained, poorly sorted sand of quartz and rock fragments. 10%+ non plastic fines. Trace of fine gravel. Trace of mica and mafic minerals. Saturated. No odor or staining. 0 ppm.	
440.13	49.0	SS-10	8 9 9 10	2	16	24			Medium - dark brown, medium dense, SAND similar to above, but with 10%+ gravel to 1". Saturated. No odor or staining. 0 ppm.	
438.13	51.0	SS-11	10 8 5 9	2	20	24			Dark brown, medium dense, SAND similar to above, but predominately medium - coarse grained, and with a trace of fine gravel. Saturated. No odor or staining. 0.1 ppm.	
434.13	55.0						4 1/4" HSA	8"/CCH	Probable SAND as above getting gravelly with depth.	
432.13	57.0	SS-12	7 3 5 4	2	15	24			Dark brown, loose - medium dense, sandy GRAVEL. Very fine - very coarse grained, very poorly sorted sand of quartz and rock fragments. 10%± non plastic fines. 50%+ gravel 1/8" - 1"±. Saturated. No odor or staining. 0.2 ppm.	
									No refusal to depth. Installed 20' of 2" dia, .010" slot, threaded, flush joint, Schd 40 PVC at 55'. Sand backfill to 32'8". Bentonite seal 31'7" - 32'8". Grouted in flush, watertight, cast iron monitoring well box.	
<p>B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler. REC - Length of sample recovered. SS - Split spoon sample. U - Undisturbed samples S - Shelby tube D - Denison F - Fixed piston P - Pitcher O - Osterberg SAMP OD - Outside diameter of sampling spoon</p>							<p>NOTES HSA = Hollow Stem Auger CCH = Conical Cutter Head ppm Refers to PID reading (10.6 eV lamp) Top of PVC elev = 489.05</p>		<p>SPRINGFIELD DPW GARAGE SITE INVESTIGATION</p> <p>SPRINGFIELD, VERMONT DATE: DEC 2, 1998 PROJECT: 4080115</p>	
PAGE 2 OF 2					LOG OF BORING: MW-4					



BORING LOCATION MW-5 INCLINATION V BEARING DATE START/FINISH DECEMBER 2, 1998 / DECEMBER 2, 1998

CASING ID CORE SIZE TOTAL DEPTH 22 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.H.)

GROUND EL (NGVD) 452.43 DEPTH TO WATER/DATE 10± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)			
452.05	5.0						4 1/4" HSA	8"/CCH	0' - 8"± Dark brown, sandy, silty, ORGANIC SOIL. 8" - 5' Medium brown, silty and gravelly SAND.
450.05	7.0	SS-1	3 5 5 6	2	18	24			Medium orange gray, loose - medium dense, silty SAND. Very fine - occasionally medium grained, well sorted sand. 20%± non plastic fines. Trace of mica and mafic minerals. Abundant moderately prominent - prominent, medium - dark orange mottles throughout. Dry - slightly moist. No odor or staining. 1.5 ppm.
447.05	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
445.05	12.0	SS-2	5 6 7	2	16	24			Medium - dark gold brown, loose - medium dense, silty SAND. Very fine grained, well sorted sand. 40%+ non plastic inorganic fines. Trace of mica. Saturated. No odor or staining. 1.0 ppm.
442.05	15.0						4 1/4" HSA	8"/CCH	Probable SILT and SAND similar to above.
440.05	17.0	SS-3	4 6 9 8	2	17	24			Medium gray, medium dense, silty SAND similar to above, but gray and with occasional thin brown horizontal layers. Saturated. No odor or staining. 1.4 ppm.
437.05	20.0						4 1/4" HSA	8"/CCH	Probable SAND and SILT as above.
435.05	22.0	SS-4	4 7 6 10	2	19	24			Medium - dark gray, medium dense, silty SAND similar to above. Saturated. No odor or staining. 1.2 ppm.
									No refusal to depth. Installed 15' of 2" dia. .010" slot, threaded, flush joint, Schd 40 PVC at 20'. Sand backfill to 27". Bentonite seal 2'3" - 27". Grouted in steel stick up casing.

<p>B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler. REC - Length of sample recovered. SS - Split spoon sample. U - Undisturbed samples S - Shelby tube D - Denison F - Fixed piston P - Pitcher O - Osterberg SAMP OD - Outside diameter of sampling spoon</p>	<p>NOTES HSA = Hollow Stem Auger CCH = Conical Cutter Head ppm Refers to PID reading (10.6 eV lamp) Top of PVC elev = 455.41</p>	<p>SPRINGFIELD DPW GARAGE SITE INVESTIGATION</p>	
		<p>SPRINGFIELD, VERMONT DATE: DEC 2, 1998 PROJECT: 4080115</p>	<p>PAGE 1 OF 1 LOG OF BORING: MW-5</p>



M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO. _____
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

SHEET 1 OF 2
DATE 11/24/98
HOLE NO. MW-1
LINE & STA. _____
OFFSET _____

GROUND WATER OBSERVATIONS		Type Size I. D. Hammer Wt. Hammer Fall	CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT <u>47'6"</u>	AT <u>1</u> HOURS		HSA	SS		DATE STARTED <u>11/24/98</u>
AT _____	AT _____ HOURS				DATE COMPL. <u>11/25/98</u>	
					BORING FORMAN <u>M.H. & C.C.</u>	
					INSPECTOR <u>B. COX</u>	
					SOILS ENGR. _____	

LOCATION OF BORING NEAR SEWER LAGOON, NORTH END

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE			
							NO.	PEN	REC	
5'	5' - 7'	SS	7	6	MED. DENSE	LIGHT BROWN FINE SAND - TRACE OF SILT	1	24"	14"	
			7	7						
10'	10' - 12'	SS	37	8	10'		2	24"	6"	
			16	15						
15'	15' - 17'	SS	37	26			3	24"	12"	
			24	27						
20'	20' - 20'4"	SS	68	4"	MED. DENSE TO DENSE	BROWN COARSE GRAVEL WITH COARSE SAND, COBBLES AND BOULDERS	4	4"	4"	
25'	25' - 27'	SS	27	23			5	24"	13"	
			17	19						
30'	30' - 32'	SS	9	11			6	24"	16"	
			16	21						
35'	35' - 37'	SS	10	11	33'	MED. DENSE	BROWN FINE SAND - TRACE OF SILT	7	24"	21"
			14	19						
40'	40' - 42'	SS	14	25	40'	DENSE	LIGHT BROWN COARSE SAND	8	24"	15"

GROUND SURFACE TO _____

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING _____
ROCK CORING _____
SAMPLES _____
HOLE NO. MW-1

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

SHEET 2 OF 2
DATE 11/24/98
HOLE NO. MW-1
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT 47'6"	AT 1 HOURS	Type HSA	SS	DATE STARTED	11/24/98
		Size I. D. 4 1/4"	1 1/2"	DATE COMPL.	11/25/98
		Hammer Wt. 140#	BIT	BORING FORMAN	M.H. & C.C.
AT	AT HOURS	Hammer Fall 30"		INSPECTOR	B. COX
				SOILS ENGR.	

LOCATION OF BORING NEAR SEWER LAGOON, NORTH END

Depth	SAMPLE DEPTHS FROM TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE					
								NO.	PEN	REC			
45'			36	48	VERY DENSE	45'	BROWN MEDIUM SAND WITH COBBLES AND BOULDERS						
	45'	SS	70/0"							9	0"	0"	
50'	51' - 52'	SS	38	24	DENSE - WET	58'6"	REFUSAL TO SPLIT SPOON BROWN COARSE SAND AND FINE TO COARSE GRAVEL						
			24	45							10	24"	16"
55'	55' - 57'	SS	19	22									
			28	40							11	24"	10"
60'						58'6"	REFUSAL TO AUGER SET 2" PVC WELL AT 58'6" TOP OF WELL AT 38'6" SAND TO 35' BENTONITE TO 33'6" MATERIALS USED: 20' OF 2" PVC 0.010" SLOT SCREEN 40' OF 2" PVC SOLID 35# OF BENTONITE CHIPS 450# OF SAND 40# OF CEMENT MIX 1 2" GRIPPER 1 2" PVC CAP 1 6" CAST IRON MANHOLE						

GROUND SURFACE TO 58'6"

USED HSA CASING THEN

Sample Type D-Dry C-Cored W-Washed UP-Unfinished Piston TP-Test Pit A-Augur V-Vane UT-Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb. wt. x 30"-fall an 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	summary
				EARTH BORING 58'6" ROCK CORING SAMPLES 11 HOLE NO. MW-1

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 11/25/98
HOLE NO. MW-2
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT 43'6"	AT 24	HOURS	Type HSA SS	DATE STARTED 11/25/98	
AT	AT	HOURS	Size I. D. 4 1/4" 1 1/2"	DATE COMPL. 11/30/98	
			Hammer Wt. 140# BIT	BORING FORMAN M.D., M.H. & C.C.	
			Hammer Fall 30"	INSPECTOR B. COX	
				SOILS ENGR.	

LOCATION OF BORING WEST END OF SEWER LAGOON

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
							NO.	FEET	REC
5'				LOOSE		SANDY GRAVELLY FILL			
10'	10' - 12'	SS	7 4		10'		1	24"	11"
			3 3				2	24"	3"
	12' - 14'	SS	5 4				3	24"	8"
			3 4						
15'	14' - 16'	SS	8 9	LOOSE TO MED. DENSE		BROWN MEDIUM SAND WITH SOME FINE GRAVEL	4	24"	14"
			5 6						
	16' - 18'	SS	8 10				5	24"	14"
			6 6						
	18' - 20'	SS	4 10						
			28 38						
20'	20' - 22'	SS	24 23		20'		6	24"	14"
			43 39						
25'				VERY DENSE		BROWN MEDIUM TO COARSE SANDS - TRACE OF FINE GRAVEL			
30'	30' - 32'	SS	40 30				7	24"	16"
			24 21						
35'	35' - 37'	SS	17 22	DENSE	35'	BROWN MEDIUM SAND - TRACE OF SILT	8	24"	21"
			17 15						

GROUND SURFACE TO _____

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING _____
ROCK CORING _____
SAMPLES _____
HOLENO. MW-2

M & W Soils Engineering Inc.

Main St. Charlestown, NH 03603

SHEET 2 OF 2
 DATE 11/25/98
 HOLE NO. MW-2
 LINE & STA.
 OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
 PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
 REPORT SENT TO BRUCE COX PROJ. NO.
 SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		Type HSA	CASING 4 1/4"	SAMPLER SS	CORE BAR	SURFACE ELEV.
AT 43'6"	AT 24 HOURS					
Type		Size I. D.	Hammer Wt.	Hammer Fall	BIT	DATE STARTED 11/25/98
AT _____ AT _____ HOURS		4 1/4"	140#	30"		DATE COMPL 11/30/98
						BORING FORMAN M.D., M.H. & C.C.
						INSPECTOR B. COX
						SOILS ENGR.

LOCATION OF BORING WEST END OF SEWER LAGOON

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
							NO.	PEN	REC
45'					44'6"	SAME MATERIAL			
						REFUSAL TO AUGERS - BEDROCK OR BOULDER (DEEPEST OF THREE ATTEMPTS)			
						SET 2" PVC WELL AT 44'			
						TOP OF WELL AT 34'			
						SAND TO 30'			
						BENTONITE TO 28'6"			
						MATERIALS USED:			
						10' OF 2" PVC 0.010" SLOT SCREEN			
						35' OF 2" PVC SOLID			
						25# OF BENTONITE CHIPS			
						100# OF SAND			
						40# OF CEMENT MIX			
						1 2" GRIPPER			
						1 2" PVC CAP			
						1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 44'6"

USED HSA CASING THEN

Sample Type D-Dry C-Cured W-Washed UP-Unfinished Piston TP-Test Pl: A-Auger V-Vane UT-Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb. wt. x 30"-fall an 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	summary
				EARTH BORING 44'6" ROCK CORING SAMPLES 8 HOLE NO. MW-2

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 11/30/98
HOLE NO. MW-3
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT 49'	AT IMMEDIATELY	HOURS	Type HSA	SS	DATE STARTED 11/30/98
AT	AT	HOURS	Size I. D. 4 1/4"	1 1/2"	DATE COMPL. 11/30/98
			Hammer Wt. 140#	BIT	BORING FORMAN M.D. & M.H.
			Hammer Fall 30"		INSPECTOR B. COX
					SOILS ENGR.

LOCATION OF BORING JUST OFF WEST SIDE OF BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE																	
							NO.	PEN	REC															
5'	5' - 7'	SS	3 5	MED. DENSE	20'	BROWN MEDIUM TO COARSE SAND WITH OCCASIONAL COBBLE	1	24"	18"															
			8 9				2	24"	20"															
	7' - 9'	SS	8 9				3	24"	3"															
			5 6				4	24"	21"															
10'	9' - 11'	SS	7 9				DENSE	24'	BROWN COARSE GRAVELS WITH COBBLES AND BOULDERS	5	24"	10"												
			7 7							6	24"	10"												
	11' - 13'	SS	8 8							7	24"	18"												
			9 9							8	24"	13"												
15'	13' - 15'	SS	8 9							DENSE	32'	BROWN COARSE SANDS	9	24"	17"									
			9 11										10	24"	18"									
	15' - 17'	SS	10 10										11	24"	15"									
			10 10										12	24"	14"									
20'	17' - 19'	SS	9 9	DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							13	24"	12"									
			22 26										14	24"	17"									
	20' - 22'	SS	78 20										15	24"	14"									
			18 15										16	24"	11"									
25'							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				17	24"	19"									
													18	24"	14"									
	25' - 27'	SS	13 12										19	24"	11"									
			17 19										20	24"	11"									
30'										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	21	24"	11"									
													22	24"	11"									
	30' - 32'	SS	15 18										23	24"	11"									
			16 23										24	24"	11"									
35'				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							25	24"	11"									
													26	24"	11"									
	35' - 37'	SS	18 14										27	24"	11"									
			14 17										28	24"	11"									
40'							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				29	24"	11"									
													30	24"	11"									
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	31	24"	11"						
			32													24"	11"							
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				33	24"	11"						
			34													24"	11"							
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	35	24"	11"			
			36																24"	11"				
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													37	24"	11"			
			38																24"	11"				
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	39	24"	11"
			40																			24"	11"	
							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													41	24"	11"
			42																			24"	11"	
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							43	24"	11"
			44																			24"	11"	
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL										45	24"	11"
			46																			24"	11"	
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				47	24"	11"
			48																			24"	11"	
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL																49	24"	11"
			50																			24"	11"	
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	51	24"	11"
			52																			24"	11"	
							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													53	24"	11"
			54																			24"	11"	
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							55	24"	11"
			56																			24"	11"	
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL										57	24"	11"
			58																			24"	11"	
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				59	24"	11"
			60																			24"	11"	
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL																61	24"	11"
			62																			24"	11"	
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	63	24"	11"
			64																			24"	11"	
							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													65	24"	11"
			66																			24"	11"	
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							67	24"	11"
			68																			24"	11"	
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL										69	24"	11"
			70																			24"	11"	
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				71	24"	11"
			72																			24"	11"	
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL																73	24"	11"
			74																			24"	11"	
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	75	24"	11"
			76																			24"	11"	
							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													77	24"	11"
			78																			24"	11"	
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							79	24"	11"
			80																			24"	11"	
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL										81	24"	11"
			82																			24"	11"	
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				83	24"	11"
			84																			24"	11"	
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL																85	24"	11"
			86																			24"	11"	
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	87	24"	11"
			88																			24"	11"	
							DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL													89	24"	11"
			90																			24"	11"	
													DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL							91	24"	11"
			92																			24"	11"	
										DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL										93	24"	11"
			94																			24"	11"	
																DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL				95	24"	11"
			96																			24"	11"	
				DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL																97	24"	11"
			98																			24"	11"	
																			DENSE	32'	GREY COARSE SAND - TRACE OF FINE GRAVEL	99	24"	11"
			100																			24"	11"	

GROUND SURFACE TO _____ USED _____ CASING THEN _____ summary

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	EARTH BORING _____
D-Dry C-Cored W-Washed	trace 0 to 10%	Cohesionless Density	ROCK CORING _____
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	SAMPLES _____
TP-Test Pit A-Augur V-Vane	some 20 to 35%	10-30 Med. Dense	HOLE NO. MW-3
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	

M & W Soils Engineering Inc.

Main St. Charlestown, NH 03603

SHEET 2 OF 2
 DATE 11/30/98
 HOLE NO. MW-3
 LINE & STA.
 OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
 PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
 REPORT SENT TO BRUCE COX PROJ. NO.
 SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT 49'	AT IMMEDIATELY	Hours	Type HSA	SS	DATE STARTED 11/30/98
AT	AT	Hours	Size I. D. 4 1/4"	1 1/2"	DATE COMPL. 11/30/98
			Hammer Wt. 140#	BIT	BORING FORMAN M.D. & M.H.
			Hammer Fall 30"		INSPECTOR B. COX
					SOILS ENGR.

LOCATION OF BORING JUST OFF WEST SIDE OF BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6' on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
								NO.	PEN	REC
45'			13	12			SAME MATERIAL			
	45' - 47'	SS	25	14				13	24"	20"
			20	42						
50'	50' - 52'	SS	14	18		48' +/-	BROWN COARSE SAND AND FINE GRAVEL WITH A FEW COBBLES	14	24"	14"
			11	12						
55'	55' - 57'	SS	19	21	DENSE		NO BEDROCK TO DEPTH	15	24"	10"
			27	26						
60'	60' - 62'	SS	20	13		62'	SET 2" PVC WELL AT 59'6" TOP OF WELL AT 39'6" SAND TO 36'7" BENTONITE TO 35'5" MATERIALS USED: 20' OF 2" PVC 0.010" SLOT SCREEN 40' OF 2" PVC SOLID 25# OF BENTONITE CHIPS 400# OF SAND 60# OF CEMENT MIX 1 2" GRIPPER 1 2" PVC CAP 1 6" CAST IRON MANHOLE	16	24"	13"
			14	23						
65'										

GROUND SURFACE TO 62'

USED HSA CASING THEN DROVE SS 24'

Sample Type

D-Dry C-Cured W-Washed
 UP-Unfinished Piston
 TP-Test Pit A-Auger V-Vane
 UT-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense
 Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary

EARTH BORING 62'
 ROCK CORING
 SAMPLES 16
 HOLE NO. MW-3

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 12/1/98
HOLE NO. MW-4
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		CASING		SAMPLER		CORE BAR		SURFACE ELEV.	
AT 48'	AT IMMEDIATELY	HOURS	Type	HSA	SS			DATE STARTED	12/1/98
			Size I. D.	4 1/4"	1 1/2"			DATE COMPL.	12/1/98
			Hammer Wt.		140#		BIT	BORING FORMAN	M.H. & C.C.
			Hammer Fall		30"			INSPECTOR	B. COX
								SOILS ENGR.	

LOCATION OF BORING JUST OFF NORTHWEST CORNER OF BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6' on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
							NO.	PEN	REC
					3'	ASPHALT			
					1'	BROWN FINE GRAVEL			
5'	5' - 7'	SS	5 3 4 7				1	24"	16"
10'	10' - 12'	SS	9 8 8 10	MED. DENSE		BROWN MEDIUM TO COARSE SAND - TRACE OF FINE GRAVEL WITH OCCASIONAL COBBLE OR BOULDER	2	24"	16"
15'	15' - 17'	SS	9 9 16 14				3	24"	16"
20'	20' - 22'	SS	8 8 9 11	MED. DENSE	19'	BROWN FINE SAND - TRACE OF SILT	4	24"	16"
25'	25' - 27'	SS	8 10 9 10		25'		5	24"	18"
30'	30' - 32'	SS	9 6 7 7	MED. DENSE		LIGHT BROWN MEDIUM SAND	6	24"	17"
35'	35' - 37'	SS	13 20 21 18		36'		7	24"	13"
				DENSE		BROWN COARSE GRAVEL	8	24"	14"
	40' - 42'	SS	12 14						

GROUND SURFACE TO _____

USED _____ CASING THEN _____ summary

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	EARTH BORING
D-Dry C-Cored W-Washed	trace 0 to 10%	Cohesionless Density	ROCK CORING
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	SAMPLES
TP-Test Pit A-Auger V-Vane Tes	some 20 to 35%	10-30 Med. Dense	HOLE NO. MW-4
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

SHEET 2 OF 2
DATE 12/1/98
HOLE NO. MW-4
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS		Type Size I. D. Hammer Wt. Hammer Fall	CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT 46'	AT IMMEDIATELY HOURS		HSA	SS		DATE STARTED 12/1/98
AT	AT HOURS		4 1/4"	1 1/2"		DATE COMPL. 12/1/98
				140#	BIT	BORING FORMAN M.H. & C.C.
				30"		INSPECTOR B. COX
						SOILS ENGR.

LOCATION OF BORING JUST OFF NORTHWEST CORNER OF BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
			NO.	PEN				REC		
			11	11		41'	SAME MATERIAL			
45'	43' - 47'	SS	7	5				9	24"	18"
			6	8						
	47' - 49'	SS	8	9				10	24"	16"
			9	10						
50'	49' - 51'	SS	10	8	MED. DENSE WET		BROWN COARSE SAND	11	24"	20"
			5	9						
55'	53' - 57'	SS	7	5		57'		12	24"	19"
			3	4						
60'							NO BEDROCK TO DEPTH			
							SET 2" PVC WELL AT 55'			
							TOP OF WELL AT 35'			
							SAND TO 32'8"			
							BENTONITE TO 31'7"			
							MATERIALS USED:			
							20' OF 2" PVC 0.010" SLOT SCREEN			
							35' OF 2" PVC SOLID			
							25# OF BENTONITE CHIPS			
							400# OF SAND			
							40# OF CEMENT MIX			
							1 2" GRIPPER			
							1 2" PVC CAP			
							1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 57'

USED HSA CASING THEN DROVE SS 24"

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 57'
ROCK CORING
SAMPLES 12
HOLE NO. MW-4

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO. _____
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7598-98

SHEET 1 OF 1
DATE 12/3/98
HOLE NO. TB-1
LINE & STA. _____
OFFSET _____

GROUND WATER OBSERVATIONS		Type Size I. D. Hammer Wt. Hammer Fall	CASING HSA	SAMPLER SS	CORE BAR 1 1/2"	SURFACE ELEV. DATE STARTED DATE COMPL.
AT <u>DRY</u>	AT <u>IMMEDIATELY</u> HOURS					
AT _____	AT _____ HOURS					INSPECTOR <u>B. COX</u>

LOCATION OF BORING IN BOTTOM OF PIT IN BUILDING, 78" BELOW FLOOR LEVEL

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
							NO.	PEN	REC
					8"	CONCRETE FLOOR	1	24"	16"
5'	2' - 4'	SS	2 3		MED. DENSE	BROWN MEDIUM SAND - TRACE OF SILT	2	24"	21"
			3 6				3	24"	20"
	4' - 6'	SS	6 6				4	24"	18"
			9 9				5	24"	20"
	6' - 8'	SS	10 10				6	24"	19"
10'	8' - 10'	SS	11 12		DENSE	BROWN FINE SAND - TRACE OF SILT			
			11 12						
	10' - 12'	SS	14 16						
15'	12' - 14'	SS	10 12		NO BEDROCK TO DEPTH (GROUTED HOLE BACK AND CEMENTED HOLE IN FLOOR) MATERIALS USED: 25# OF BENTONITE PELLETS 40# OF CEMENT MIX				
			16 20						

GROUND SURFACE TO 14' USED HSA CASING THEN DROVE SS 24' summary

Sample Type	Proportions Used	140 lb. wt. x 30"-fall an 2" O.D. Sampler	EARTH BORING 14'
D-Dry C-Cored W-Washed	trace 0 to 10%	Cohesionless Density	ROCK CORING _____
UP-Unfinished Piston	little 10 to 20%	0-10 Loose	SAMPLES 6
TP-Test Pit A-Auger V-Vane Test	some 20 to 35%	10-30 Med. Dense	HOLE NO. <u>TB-1</u>
UT-Undisturbed Thinwall	and 35 to 50%	30-50 Dense	
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30 + Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 12/2/98
HOLE NO. MW-5
LINE & STA.
OFFSET

TO DUFFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD DPW GARAGE LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFFRESNE-HENRY, INC. OUR JOB NO. 7598-98

GROUND WATER OBSERVATIONS		Type HSA	CASING SS	CORE BAR	SURFACE ELEV.
AT 10'	AT IMMEDIATELY				
AT _____ AT _____ HOURS		Hammer Wt. 140#	BIT	DATE COMPL. 12/2/98	BORING FORMAN M.D. & C.C.
AT _____ AT _____ HOURS		Hammer Fall 30"		INSPECTOR B. COX	SOILS ENGR.

LOCATION OF BORING ACROSS HIGHWAY, AT TOE OF SLOPE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
							NO.	PEN	REC
				LOOSE	8"	TOPSOIL			
5'	5' - 7'	SS	3 5 5 6	LOOSE TO MED. DENSE	7'6"	BROWN FINE SAND	1	24"	18"
10'	10' - 12'	SS	5 5 6 7	MED. DENSE	9"	BROWN COARSE SAND AND FINE GRAVEL	2	24"	16"
15'	15' - 17'	SS	4 6 9 8	MED. DENSE WET		BROWN FINE TO MEDIUM SANDS - TRACE OF SILT	3	24"	17"
20'	20' - 22'	SS	4 7 6 10				4	24"	19"
25'					22'	NO BEDROCK TO DEPTH			
						SET 2" PVC WELL AT 20'			
						TOP OF WELL AT 5'			
						SAND TO 27"			
						BENTONITE TO 2'3"			
						MATERIALS USED: 15' OF 2" PVC 0.010" SLOT SCREEN 10' OF 2" PVC SOLID 10# OF BENTONITE CHIPS 150# OF SAND 40# OF CEMENT MIX 1 2" GRIPPER 1 2" PVC CAP 1 5" STICKUP WITH LOCK			

GROUND SURFACE TO 22'

USED HSA CASING THEN DROVE SS 24"

Sample Type

D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary

EARTH BORING 22'
ROCK CORING
SAMPLES 4
HOLE NO. MW-5

DEPARTMENT OF PUBLIC WORKS GARAGE
SITE INVESTIGATION
SPRINGFIELD, VERMONT

November 24, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 1:45 pm.

M & W Soils Engineering, Inc. - Michael Hitchcock and Chris Conant on site at 1:45 pm.

MW-1

MW-1 was located in undisturbed soil on the north end of the "lagoon". The boring was started at 2:00 pm. The rig and other equipment had been steam cleaned prior to arrival on site. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. Boring depth at the end of the day was 45'. The general geologic column is sand to 9'±, sandy gravel to 28'±, sand to 40', and sandy gravel to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed in the samples or on the tools. PID readings ranged from 0.7 ppm to 4.0 ppm.

Visitors: DPW personnel.

Weather: Mostly cloudy, rain in pm, 30's - 40's.

Off site: 4:40 pm.

November 25, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.

M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:05 am.

MW-1 (continued)

The boring was continued to refusal at 58'7". The geologic column below 45' is sandy gravel to the limit of the boring. The water table was encountered at approximately 47.5'. No evidence of contamination by visual or olfactory senses was observed. PID readings were less than 1.0 ppm. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 57.6'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 35'. A bentonite seal was installed from 33'6" - 35'. A 6" diameter cast iron,

water-tight, monitoring well box was grouted in at the surface.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
37'2" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
450 lb of silica sand.
35 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MW-2

MW-2 was located at the south end of the "lagoon", on the north side of the floor drain pipe, approximately 10' west of the outfall. It was not possible to get closer to the outfall due to steep slopes, loose soil, and ponded water in the lagoon. The boring was started at 10:15 am. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet (with continuous split spoons at the suspected depth of the water table). All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. The total depth of the first attempt was 16'9" with refusal on the hollow stem augers. Offset 5'± to the northeast. Total depth of the boring at the end of the day was 40'. The general geologic column is said to 14'±, and alternating layers of sandy gravel and gravelly sand to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed. PID readings ranged from 0.3 ppm to 1.6 ppm. At the 40' depth the spoon could not be driven. It was decided to retract the augers several feet, and check the hole for water after the holiday.

Visitors: DPW personnel.

Weather: Mostly cloudy, 30's - 40's

Off site: 3:30 pm.

November 30, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:05 am.

M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:15 am.

MW-2 (continued)

The boring was found to be dry. Augered to 44'6" with solid stem augers where refusal was

encountered. The hole was still dry. Offset 3' toward the garage and augered to a shallower depth. Reoccupied the previous hole and installed a well. Installed a 10' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 44'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 30.5'. A bentonite seal was installed from 28' - 30.5'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 10' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
34'9" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
100 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MW-3

MW-3 was located approximately 2' east of the eastern wall of the exterior dry well. The boring was started at 2:25 pm. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet (with continuous spoons between 5' and 19'). All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. Total depth of the boring at the end of the day was 32'. The general geologic column is sand to 17'±, sandy gravel to 25'±, sand to 30'±, then sandy gravel to the limit of the boring. A faint, unusual odor was observed between 5' and 9', followed by a strong, foul odor from 9' - 11'. Below 12'± no odor was observed. PID readings ranged from less than 1 ppm to 430 ppm.

Visitors: DPW personnel.
Weather: Partly cloudy, 30's - 40's.
Off site: 4:40 pm.

December 1, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:15 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant already on site.

MW-3 (continued)

The boring was continued to 62' with no refusal. The geologic column below 32' is sandy gravel. The water table was encountered at approximately 49'. A faint oily odor was observed between 50' and 57'. PID readings ranged from less than 1 ppm to 56 ppm. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 59'6". All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 36'7". A bentonite seal was installed from 35'5" - 36'7". A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
39'3" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
400 lb of silica sand.
25 lb± of bentonite chips.
60 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MW-4

The augers and tools were steam cleaned. MW-4 was located near the north corner of the building. The boring was started at 2:20 pm. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. Boring depth at the end of the day was 42'. The general geologic column is sand to 15'±, sandy gravel to 19'±, sand to 35', and sandy gravel to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed in the samples or on the tools. PID readings were less than 1 ppm.

Visitors: DPW personnel.
Weather: Partly sunny, 30's - 50's.
Off site: 4:30 pm±.

December 2, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:05 am.

TP-1

TP-1 was located several hundred feet downstream at the south edge of the field. The purpose of the well was to check the water quality between the garage and a well near the barn reported to have a bad odor. Drilled to 11' with solid stem augers. No evidence of contamination by visual or olfactory senses was observed in soil from the augers. The water table was encountered at 9'±.

Steam cleaned the augers and tools.

Visitors: DPW personnel.

Weather: Sunny am, partly sunny pm, 30's - 50's.

Off site: 2:45 pm±.

December 3, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 11:00 am.

M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 11:00 am.

TB-1

TB-1 was located in the northern garage bay near the abandoned dry well in the jack pit. The boring was started at 11:20 am. All water used for cleaning split spoons and other tools was obtained at the site. Drilled through the 8"± thick concrete floor slab with solid stem augers. The boring was advanced using a portable tripod rig. Continuous split spoon samples were taken starting 2' below the slab. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. Total depth of the boring was 14'. The general geologic column is sand throughout. Evidence of contamination was observed from 5' to 7'. The upper 2' had a sweet, chemical-like odor, followed by a strong, very disagreeable odor. PID readings ranged from 2.3 ppm to 9.0 ppm. The instrument was very slow to react in all instances. The boring was ceased at 14' due to the apparent lack of contamination, and the fact that reaching the water table with the tripod rig was unlikely. Also, the piston for the hydraulic lift moves back and forth. The hole was filled with bentonite chips to a point approximately 1' below the bottom of the concrete, and the chips hydrated. The remainder of the hole was cemented to the top of the concrete.

Visitors: DPW personnel.

Weather: Partly sunny, 30's - 40's.

Off site: 2:30 pm±.

MV-4 (continued)

The boring was continued to 57' with no refusal. The geologic column below 42' is sandy gravel to 45' sand to 54'±, and sandy gravel to the limit of the boring. The water table was encountered at approximately 46'. No evidence of contamination by visual or olfactory senses was observed. PID readings were less than 1.0 ppm. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 55'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 32'8". A bentonite seal was installed from 31'7" - 32'8". A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
34'9" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
400 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MV-5

MV-5 was located on the southerly side of the well field near the edge of the woods. The boring was started at 11:25 am. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 99.1 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. Total depth of the boring was 22'. The general geologic column is sand throughout. No evidence of contamination by visual or olfactory senses was observed in the samples or on the tools. PID readings ranged from 1.0 ppm to 1.5 ppm. The water table was encountered at approximately 10'. Installed a 15' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 20'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 2'7". A bentonite seal was installed from 2'3" - 2'7". A steel stickup casing was grouted in.

Materials: 15' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
9'± of 2", solid wall, threaded, flush joint, Schd 40 PVC.
150 lb of silica sand.
10 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 5' steel stickup with lock

APPENDIX F

LABORATORY ANALYTICAL REPORTS - SOIL



eastern analytical

professional laboratory services

Bruce Cox
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

RECEIVED

DEC 18 1998

DUFRESNE-HENRY, INC.

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 15068 DUFVT
Client Identification: DPW Garage 4080115 Spingfield
Date Received: 12/4/98

Dear Mr. Cox:

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (NY)
Will Brunkhorst, President

12/15/98
Date



LABORATORY REPORT

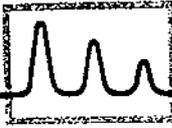
Eastern Analytical, Inc. ID#: 15068

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Sample ID:	MW-3 6-12	MW-3 50-52	MW-2 12-16			
Analytical Type:	QCParent	Sample	Sample			
Matrix:	soil	soil	soil			
Date Sampled:	11/30/98	12/1/98	11/25/98			
Date Received:	12/4/98	12/4/98	12/4/98	Units	Date of Analysis	Method Analyst
Arsenic	< 2	2	2	mg/kg	12/10/98	6010B RTV
Barium	21	31	14	mg/kg	12/10/98	6010B RTW
Cadmium	1.6	2.0	2.1	mg/kg	12/10/98	6010B RTV
Chromium	8.4	11	8.1	mg/kg	12/10/98	6010B RTV
Lead	6	5	6	mg/kg	12/10/98	6010B RTW
Mercury	< 0.2	< 0.2	< 0.2	mg/kg	12/10/98	7471 DC
Selenium	< 2	< 2	< 2	mg/kg	12/10/98	6010B RTV
Silver	< 0.2	< 0.2	< 0.2	mg/kg	12/10/98	6010B RTW

Approved By: Tim Wilson Metals Supervisor



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15068

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Volatile Organic Compounds

Sample ID:	MW-3 6-12	MW-3 50-52	MW-2 12-16		MW-3 6-12	MW-3 50-52	MW-2 12-16
Matrix:	Soil				Soil		
Date Received:	12/4/98	12/4/98	12/4/98		12/4/98	12/4/98	12/4/98
Units:	µg/kg				µg/kg		
Date of Analysis:	12/8/98	12/9/98	12/8/98		12/8/98	12/9/98	12/8/98
Analyst:	JDS				JDS		
EPA Method:	8260B				8260B		
Dilution Factor:	1	10*	1		1	10*	1
Dichlorodifluoromethane	< 100	< 1000	< 100	1,3-Dichloropropane	< 10	< 100	< 10
Chloromethane	< 100	< 1000	< 100	Tetrachloroethene	< 10	< 100	< 10
Vinyl chloride	< 20	< 200	< 20	Dibromochloromethane	< 10	< 100	< 10
Bromomethane	< 10	< 100	< 10	1,2-Dibromoethane	< 10	< 100	< 10
Chloroethane	< 100	< 1000	< 100	Chlorobenzene	< 10	< 100	< 10
Trichlorofluoromethane	< 100	< 1000	< 100	1,1,1,2-Tetrachloroethane	< 10	< 100	< 10
Diethyl ether	< 10	< 100	< 10	Ethylbenzene	< 10	< 100	< 10
Acetone	< 500	< 5000	< 500	mp-Xylene	< 10	< 100	< 10
1,1-Dichloroethene	< 10	< 100	< 10	o-Xylene	30	< 100	< 10
Methylene chloride	< 10	< 100	< 10	Styrene	< 10	< 100	< 10
Carbon disulfide	< 10	< 100	< 10	Bromoform	< 10	< 100	< 10
Methyl-t-butyl ether(MTBE)	< 200	< 2000	< 200	iso-Propylbenzene	< 10	< 100	< 10
trans-1,2-Dichloroethene	< 10	< 100	< 10	1,1,2,2-Tetrachloroethane	< 10	< 100	< 10
1,1-Dichloroethane	< 10	< 100	< 10	1,2,3-Trichloropropane	< 10	< 100	< 10
2-Butanone(MEK)	< 100	< 1000	< 100	n-Propylbenzene	< 10	< 100	< 10
2,2-Dichloropropane	< 10	< 100	< 10	Bromobenzene	< 10	< 100	< 10
cis-1,2-Dichloroethene	< 10	< 100	< 10	1,3,5-Trimethylbenzene	320	< 100	< 10
Chloroform	< 10	< 100	< 10	2-Chlorotoluene	< 10	< 100	< 10
Bromochloromethane	< 10	< 100	< 10	4-Chlorotoluene	< 10	< 100	< 10
Tetrahydrofuran(THF)	< 100	< 1000	< 100	tert-Butylbenzene	< 10	< 100	< 10
1,1,1-Trichloroethane	< 10	< 100	< 10	1,2,4-Trimethylbenzene	200	< 100	< 10
1,1-Dichloropropene	< 10	< 100	< 10	sec-Butylbenzene	< 10	100	< 10
Carbon tetrachloride	< 10	< 100	< 10	p-isoPropyltoluene	70	200	< 10
1,2-Dichloroethane	< 10	< 100	< 10	1,3-Dichlorobenzene	< 10	< 100	< 10
Benzene	< 10	< 100	< 10	1,4-Dichlorobenzene	< 10	< 100	< 10
Trichloroethene	< 10	< 100	< 10	n-Butylbenzene	< 10	< 100	< 10
1,2-Dichloropropane	< 10	< 100	< 10	1,2-Dichlorobenzene	< 10	< 100	< 10
Bromodichloromethane	< 10	< 100	< 10	1,2-Dibromo-3-chloropropane	< 10	< 100	< 10
Dibromomethane	< 10	< 100	< 10	1,2,4-Trichlorobenzene	< 10	< 100	< 10
4-Methyl-2-pentanone(MIBK)	< 100	< 1000	< 100	Hexachlorobutadiene	< 10	< 100	< 10
cis-1,3-Dichloropropene	< 10	< 100	< 10	Naphthalene	20	200	< 10
Toluene	< 10	< 100	< 10	1,2,3-Trichlorobenzene	< 10	< 100	< 10
trans-1,3-Dichloropropene	< 10	< 100	< 10				
1,1,2-Trichloroethane	< 10	< 100	< 10				
2-Hexanone	< 100	< 1000	< 100				

*Dilution was required due to high levels of non-target compounds.

Approved By: Clifford Chase, Volatile Organics Supervisor

Clifford Chase 12/4/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15068

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Sample ID:	MW-3 6-12	MW-3 50-52	MW-2 12-16
Analytical Type:	Sample	Sample	Sample
Matrix:	soil	soil	soil
Date Sampled:	11/30/98	12/1/98	11/25/98
Date Received:	12/4/98	12/4/98	12/4/98
Units:	mg/kg	mg/kg	mg/kg
Date of Extraction/Prep:	12/4/98	12/4/98	12/4/98
Date of Analysis:	12/9/98	12/9/98	12/9/98
Analyst:	DJS	DJS	DJS
Method:	8100 Mod	8100 Mod	8100 Mod
Dilution Factor:	1	1	1
TPH (C9-C40)	780	760	110

Approved By: Timothy Schaper Organics Supervisor

Timothy Schaper 12/10/98

CHAIN OF CUSTODY FC 15068

DH Dufresne-Henry, Inc.

PRECISION PARK
NO. SPRINGFIELD, VT 05150 (802) 886-2261

PAGE 1 OF 1

CLIENT: TOWN OF SPRINGFIELD, VT PROJECT #: 4080115 PROJECT NAME: DPW GARAGE

RETURN REPORT TO: BRUCE COX

PHONE #:

SAMPLER'S NAME: BRUCE COX

DATE: 12/3/98

ADDRESS:
(IF DIFFERENT THAN ABOVE)

SAMPLE IDENT. NUMBER	DATE	TIME	COMP. OR GRAB	W-WATER L-LIQUID S-SOLID	NUMBER/ SIZE CONTAINERS	FIELD PRESERVED Y/N	FIELD FILTERED Y/N	ANALYSIS REQUESTED/ REMARKS
MW-3 6'-12'	11/30/98	3:00 PM	GRAB	S	1/402	N	N	VOC'S EPA 8260B
"	"	"	"	"	1/402	N	N	TPH EPA 8100(MOD) 2-1
"	"	"	"	"	1/802	N	N	RCRA 8 METALS
MW-3 50'-52'	12/1/98	10:00 AM	GRAB	S	1/402	N	N	VOC'S EPA 8260B
"	12/1/98	"	"	"	1/402	N	N	TPH EPA 8100(MOD) 2-1
"	"	"	"	"	1/802	N	N	RCRA 8 METALS
MW-2 12'-16'	11/25/98	1:00 PM	GRAB	S	1/402	N	N	VOC'S EPA 8260B
"	"	"	"	"	1/402	N	N	TPH EPA 8100(MOD) 2-1
"	"	"	"	"	1/802	N	N	RCRA 8 METALS
								<p> MW-3 6-12 4oz broken. No bubble bags. paints only VOCs subsampled @ lab for .01.</p>

RELINQUISHED BY: Bruce Cox

DATE: 12/3/98
TIME: 8:00 AM

RECEIVED BY: *Obilly*

DATE: 12/4/98
TIME: 10:30

RELINQUISHED BY:

DATE:
TIME:

RECEIVED BY:

DATE:
TIME:

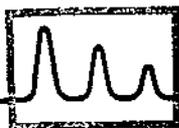
RELINQUISHED BY:

DATE:
TIME:

RECEIVED BY:

DATE:
TIME:

PLEASE RETURN COMPLETED CHAIN OF CUSTODY FORM WITH ANALYSIS RESULTS



eastern analytical

professional laboratory services

Bruce Cox
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

RECEIVED

DEC 18 1998

DUFRESNE-HENRY, INC.

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 15095 DUFVT
Client Identification: DPW Garage 4080115 Springfield
Date Received: 12/8/98

Dear Mr. Cox :

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (M)
Will Brunkhorst, President

12/15/98
Date



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15095

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Volatile Organic Compounds

Sample ID:	MW-4 45-51	TB-1 4-8		MW-4 45-51	TB-1 4-8
Matrix:	Soil	Soil		Soil	Soil
Date Received:	12/8/98	12/8/98		12/8/98	12/8/98
Units:	µg/kg	µg/kg		µg/kg	µg/kg
Date of Analysis:	12/9/98	12/9/98		12/9/98	12/9/98
Analyst:	JDS	JDS		JDS	JDS
EPA Method:	8260B	8260B		8260B	8260B
Dichlorodifluoromethane	< 100	< 100	1,3-Dichloropropane	< 10	< 10
Chloromethane	< 100	< 100	Tetrachloroethene	< 10	< 10
Vinyl chloride	< 20	< 20	Dibromochloromethane	< 10	< 10
Bromomethane	< 10	< 10	1,2-Dibromoethane	< 10	< 10
Chloroethane	< 100	< 100	Chlorobenzene	< 10	< 10
Trichlorofluoromethane	< 100	< 100	1,1,1,2-Tetrachloroethane	< 10	< 10
Diethyl ether	< 10	< 10	Ethylbenzene	< 10	< 10
Acetone	< 500	< 500	mp-Xylene	< 10	< 10
1,1-Dichloroethene	< 10	< 10	o-Xylene	< 10	< 10
Methylene chloride	< 10	< 10	Styrene	< 10	< 10
Carbon disulfide	< 10	< 10	Bromoform	< 10	< 10
Methyl- <i>n</i> -butyl ether(MTBE)	< 200	< 200	iso-Propylbenzene	< 10	< 10
trans-1,2-Dichloroethene	< 10	< 10	1,1,2,2-Tetrachloroethane	< 10	< 10
1,1-Dichloroethane	< 10	< 10	1,2,3-Trichloropropane	< 10	< 10
2-Butanone(MEK)	< 100	< 100	n-Propylbenzene	< 10	< 10
2,2-Dichloropropane	< 10	< 10	Bromobenzene	< 10	< 10
cis-1,2-Dichloroethene	< 10	< 10	1,3,5-Trimethylbenzene	< 10	< 10
Chloroform	< 10	< 10	2-Chlorotoluene	< 10	< 10
Bromochloromethane	< 10	< 10	4-Chlorotoluene	< 10	< 10
Tetrahydrofuran(THF)	< 100	< 100	tert-Butylbenzene	< 10	< 10
1,1,1-Trichloroethane	< 10	< 10	1,2,4-Trimethylbenzene	< 10	< 10
1,1-Dichloropropene	< 10	< 10	sec-Butylbenzene	< 10	< 10
Carbon tetrachloride	< 10	< 10	p-isoPropyltoluene	< 10	< 10
1,2-Dichloroethane	< 10	< 10	1,3-Dichlorobenzene	< 10	< 10
Benzene	< 10	< 10	1,4-Dichlorobenzene	< 10	< 10
Trichloroethene	< 10	< 10	n-Butylbenzene	< 10	< 10
1,2-Dichloropropane	< 10	< 10	1,2-Dichlorobenzene	< 10	< 10
Bromodichloromethane	< 10	< 10	1,2-Dibromo-3-chloropropane	< 10	< 10
Dibromomethane	< 10	< 10	1,2,4-Trichlorobenzene	< 10	< 10
4-Methyl-2-pentanone(MIBK)	< 100	< 100	Hexachlorobutadiene	< 10	< 10
cis-1,3-Dichloropropene	< 10	< 10	Naphthalene	< 10	< 10
Toluene	< 10	< 10	1,2,3-Trichlorobenzene	< 10	< 10
trans-1,3-Dichloropropene	< 10	< 10			
1,1,2-Trichloroethane	< 10	< 10			
2-Hexanone	< 100	< 100			

Approved By: Clifford Chase, Volatile Organics Supervisor

[Signature] 12/14/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15095

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Sample ID:	MW-4 45-51	TB-1 4-8
Analytical Type:	Sample	Sample
Matrix:	soil	soil
Date Sampled:	12/2/98	12/3/98
Date Received:	12/8/98	12/8/98
Units:	mg/kg	mg/kg
Date of Extraction/Prep:	12/8/98	12/8/98
Date of Analysis:	12/12/98	12/12/98
Analyst:	DJS	DJS
Method:	8100 Mod	8100 Mod
Dilution Factor:	1	1
TPH (C9-C40)	< 50	1900

Approved By: Timothy Schaper Organics Supervisor

Timothy Schaper 12/15/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15095

Client: Dufresne-Henry

Client Designation: DPW Garage 4080115 Springfield

Sample ID: MW-4 45-51 TB-1 4-8

Analytical Type: Sample Sample

Matrix: soil soil

Date Sampled: 12/2/98 12/3/98

Date Received: 12/8/98 12/8/98

			Units	Date of Analysis	Method	Analyst
Arsenic	< 2	< 2	mg/kg	12/10/98	6010B	RTW
Barium	13	16	mg/kg	12/10/98	6010B	RTW
Cadmium	1.7	1.5	mg/kg	12/10/98	6010B	RTW
Chromium	5.4	11	mg/kg	12/10/98	6010B	RTW
Lead	5	10	mg/kg	12/10/98	6010B	RTW
Mercury	< 0.2	< 0.2	mg/kg	12/10/98	7471	DS
Selenium	< 2	< 2	mg/kg	12/10/98	6010B	RTW
Silver	< 0.2	< 0.2	mg/kg	12/10/98	6010B	RTW

Approved By: Tim Wilson Metals Supervisor

APPENDIX G

LABORATORY ANALYTICAL REPORTS - GROUNDWATER



eastern analytical

professional laboratory services

Oscar Garcia
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

RECEIVED

DEC 18 1998

DUFRESNE-HENRY, INC.

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 15040 DUFVT
Client Identification: Springfield D.P.W. 4080115
Date Received: 12/3/98

Dear Mr. Garcia :

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (M)
Will Brunkhorst, President

12/15/98
Date



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15040

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Volatile Organic Compounds

Sample ID:	MW-1	MW-2		MW-1	MW-2
Matrix:	Aqueous	Aqueous		Aqueous	Aqueous
Date Received:	12/3/98	12/3/98		12/3/98	12/3/98
Units:	µg/L	µg/L		µg/L	µg/L
Date of Analysis:	12/10/98	12/10/98		12/10/98	12/10/98
Analyst:	JDS	JDS		JDS	JDS
EPA Method:	8260B	8260B		8260B	8260B
Dichlorodifluoromethane	< 5	< 5	1,3-Dichloropropane	< 2	< 2
Chloromethane	< 2	< 2	Tetrachloroethene	< 2	< 2
Vinyl chloride	< 2	< 2	Dibromochloromethane	< 2	< 2
Bromomethane	< 2	< 2	1,2-Dibromoethane	< 2	< 2
Chloroethane	< 5	< 5	Chlorobenzene	< 2	< 2
Trichlorofluoromethane	< 5	< 5	1,1,1,2-Tetrachloroethane	< 2	< 2
Diethyl ether	< 5	< 5	Ethylbenzene	< 1	< 1
Acetone	< 10	20	mp-Xylene	< 1	< 1
1,1-Dichloroethene	< 1	< 1	o-Xylene	< 1	< 1
Methylene chloride	< 5	< 5	Styrene	< 1	< 1
Carbon disulfide	< 5	< 5	Bromoform	< 2	< 2
Methyl-tert-butyl ether(MTBE)	< 10	< 10	iso-Propylbenzene	< 1	< 1
trans-1,2-Dichloroethene	< 2	< 2	1,1,2,2-Tetrachloroethane	< 2	< 2
1,1-Dichloroethane	< 2	< 2	1,2,3-Trichloropropane	< 2	< 2
2-Butanone(MEK)	< 10	< 10	n-Propylbenzene	< 1	< 1
2,2-Dichloropropane	< 2	< 2	Bromobenzene	< 1	< 1
cis-1,2-Dichloroethene	< 2	< 2	1,3,5-Trimethylbenzene	< 1	< 1
Chloroform	< 2	< 2	2-Chlorotoluene	< 2	< 2
Bromochloromethane	< 2	< 2	4-Chlorotoluene	< 2	< 2
Tetrahydrofuran(THF)	< 10	< 10	tert-Butylbenzene	< 1	< 1
1,1,1-Trichloroethane	< 2	< 2	1,2,4-Trimethylbenzene	< 1	< 1
1,1-Dichloropropene	< 2	< 2	sec-Butylbenzene	< 1	< 1
Carbon tetrachloride	< 2	< 2	p-isoPropyltoluene	< 1	< 1
1,2-Dichloroethane	< 2	< 2	1,3-Dichlorobenzene	< 1	< 1
Benzene	< 1	< 1	1,4-Dichlorobenzene	< 1	< 1
Trichloroethane	< 2	< 2	n-Butylbenzene	< 1	< 1
1,2-Dichloropropane	< 2	< 2	1,2-Dichlorobenzene	< 1	< 1
Bromodichloromethane	< 2	< 2	1,2-Dibromo-3-chloropropane	< 2	< 2
Dibromomethane	< 2	< 2	1,2,4-Trichlorobenzene	< 1	< 1
4-Methyl-2-pentanone(MIBK)	< 10	< 10	Hexachlorobutadiene	< 1	< 1
cis-1,3-Dichloropropene	< 2	< 2	Naphthalene	< 1	< 1
Toluene	< 1	< 1	1,2,3-Trichlorobenzene	< 1	< 1
trans-1,3-Dichloropropene	< 2	< 2			
1,1,2-Trichloroethane	< 2	< 2			
2-Hexanone	< 10	< 10			

Approved By: Clifford Chase, Volatile Organics Supervisor

Clifford Chase 12/15/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15040

Client: Dufresne-Henry

Client Designation: Springfield D.P.W. 4080115

Sample ID:	MW-1	MW-2
Analytical Type:	Sample	Sample
Matrix:	aqueous	aqueous
Date Sampled:	12/1/98	12/1/98
Date Received:	12/3/98	12/3/98
Units:	mg/l	mg/l
Date of Extraction/Prep:	12/4/98	12/4/98
Date of Analysis:	12/8/98	12/8/98
Analyst:	DJS	DJS
Method:	8100 Mod	8100 Mod
Dilution Factor:	1	1
TPH (C9-C40)	< 0.6	< 3

Detection limit elevated for sample MW-2 due to insufficient sample volume availability.

Approved By: Timothy Schaper Organics Supervisor

Timothy Schaper 12/10/98

CHAIN OF CUSTODY FORM

15040

DH Dufresne-Henry, Inc.
Precision Park
1, Springfield, VT 05150 (802)886-2261

Generator: Springfield D.P.W.

Page 1 of 1

Facility #:

DH #: 100015

Return To: Oscar
Address:

Client:

Client #:

Sampled By: Oscar

State Sampled: VT

Sample Identification	Date		Time		Comp. Desc.	Water Liquid Solid	# / Size Containers	Field Preserved Y/N	Field Filtered Y/N	Analysis Requested	Est. Lab Cost (\$)
	Start	Stop	Start	Stop							
<u>Mus-1</u>	<u>12/1/98</u>		<u>P.M.</u>		<u>C</u>	<u>W</u>	<u>2.40 ml 1-amb ltr</u>	<u>ACE NO</u>	<u>No No</u>	<u>B Call me! B100 L-1</u>	
<u>Mus-2</u>	<u>"</u>		<u>"</u>		<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	
										<u>L.M. w/DUFVT</u>	
										<u>Oscar, Bruce + Dean</u>	
										<u>not in to verify use</u>	
										<u>method. awaiting call</u>	
										<u>back 12/3.</u>	
	<u>12/3/98</u>		<u>please run</u>				<u>8200 B per Oscar Garcia</u>			<u>E</u>	

Estimated Lab Analysis Total

Generator Rep. Authorization:

Relinquished By Generator:

[Signature]

Date: 12/2/98
Time: 4:00

Received By:

[Signature]

Date: 12/3/98
Time: 1025

Relinquished By:

Date:
Time:

Received By:

Date:
Time:



eastern analytical

professional laboratory services

Oscar Garcia
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

RECEIVED

DEC 23 1998

DUFRESNE-HENRY, INC.

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 15155 DUFVT
Client Identification: Springfield DPW 4080115
Date Received: 12/11/98

Dear Mr. Garcia :

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (M)
Will Brunkhorst, President

12/11/98
Date



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15155

Client: Dufresne-Henry

Client Designation: Springfield DPW 4080115

Sample ID:	MW-3	MW-4	MW-5
Analytical Type:	Sample	Sample	Sample
Matrix:	aqueous	aqueous	aqueous
Date Sampled:	12/10/98	12/10/98	12/10/98
Date Received:	12/11/98	12/11/98	12/11/98
Units:	mg/l	mg/l	mg/l
Date of Extraction/Prep:	12/14/98	12/14/98	12/14/98
Date of Analysis:	12/11/98	12/11/98	12/11/98
Analyst:	DJS	DJS	DJS
Method:	8100 Mod	8100 Mod	8100 Mod
Dilution Factor:	10	1	1
TPH (C9-C40)	230	< 0.6	< 0.6

Approved By: Timothy Schaper Organics Supervisor

Timothy P. Schaper 12/17/98



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15155

Client: Dufresne-Henry

Client Designation: Springfield DPW 4080115

Volatile Organic Compounds

Sample ID:	MW-3	MW-4	MW-5		MW-3	MW-4	MW-5
Matrix:	Aqueous	Aqueous	Aqueous		Aqueous	Aqueous	Aqueous
Date Received:	12/11/98	12/11/98	12/11/98		12/11/98	12/11/98	12/11/98
Units:	µg/L	µg/L	µg/L		µg/L	µg/L	µg/L
Date of Analysis:	12/15/98	12/15/98	12/15/98		12/15/98	12/15/98	12/15/98
Analyst:	JDS	JDS	JDS		JDS	JDS	JDS
EPA Method:	8260B	8260B	8260B		8260B	8260B	8260B
Dichlorodifluoromethane	< 5	< 5	< 5	1,3-Dichloropropane	< 2	< 2	< 2
Chloromethane	< 2	< 2	< 2	Tetrachloroethene	< 2	< 2	< 2
Vinyl chloride	< 2	< 2	< 2	Dibromochloromethane	< 2	< 2	< 2
Bromomethane	< 2	< 2	< 2	1,2-Dibromoethane	< 2	< 2	< 2
Chloroethane	< 5	< 5	< 5	Chlorobenzene	< 2	< 2	< 2
Trichlorofluoromethane	< 5	< 5	< 5	1,1,1,2-Tetrachloroethane	< 2	< 2	< 2
Diethyl ether	< 5	< 5	< 5	Ethylbenzene	< 1	< 1	< 1
Acetone	< 10	< 10	< 10	mp-Xylene	< 1	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	o-Xylene	< 1	< 1	< 1
Methylene chloride	< 5	< 5	< 5	Styrene	< 1	< 1	< 1
Carbon disulfide	< 5	< 5	< 5	Bromoform	< 2	< 2	< 2
Methyl-t-butyl ether(MTBE)	< 10	< 10	< 10	iso-Propylbenzene	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 2	< 2	< 2	1,1,2,2-Tetrachloroethane	< 2	< 2	< 2
1,1-Dichloroethane	< 2	< 2	< 2	1,2,3-Trichloropropane	< 2	< 2	< 2
2-Butanone(MEK)	< 10	< 10	< 10	n-Propylbenzene	< 1	< 1	< 1
2,2-Dichloropropane	< 2	< 2	< 2	Bromobenzene	< 1	< 1	< 1
cis-1,2-Dichloroethene	< 2	< 2	< 2	1,3,5-Trimethylbenzene	< 1	< 1	< 1
Chloroform	< 2	< 2	< 2	2-Chlorotoluene	< 2	< 2	< 2
Bromochloromethane	< 2	< 2	< 2	4-Chlorotoluene	< 2	< 2	< 2
Tetrahydrofuran(THF)	< 10	< 10	< 10	tert-Butylbenzene	< 1	< 1	< 1
1,1,1-Trichloroethane	< 2	< 2	< 2	1,2,4-Trimethylbenzene	< 1	< 1	< 1
1,1-Dichloropropene	< 2	< 2	< 2	sec-Butylbenzene	< 2	< 1	< 1
Carbon tetrachloride	< 2	< 2	< 2	p-isoPropyltoluene	< 2	< 1	< 1
1,2-Dichloroethane	< 2	< 2	< 2	1,3-Dichlorobenzene	< 1	< 1	< 1
Benzene	< 1	< 1	< 1	1,4-Dichlorobenzene	< 1	< 1	< 1
Trichloroethene	< 2	< 2	< 2	n-Butylbenzene	< 1	< 1	< 1
1,2-Dichloropropane	< 2	< 2	< 2	1,2-Dichlorobenzene	< 1	< 1	< 1
Bromodichloromethane	< 2	< 2	< 2	1,2-Dibromo-3-chloropropane	< 2	< 2	< 2
Dibromomethane	< 2	< 2	< 2	1,2,4-Trichlorobenzene	< 1	< 1	< 1
4-Methyl-2-pentanone(MIBK)	< 10	< 10	< 10	Hexachlorobutadiene	< 1	< 1	< 1
cis-1,3-Dichloropropene	< 2	< 2	< 2	Naphthalene	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	1,2,3-Trichlorobenzene	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 2	< 2	< 2				
1,1,2-Trichloroethane	< 2	< 2	< 2				
2-Hexanone	< 10	< 10	< 10				

Approved By: Clifford Chase, Volatile Organics Supervisor

Clifford Chase 12/15/98

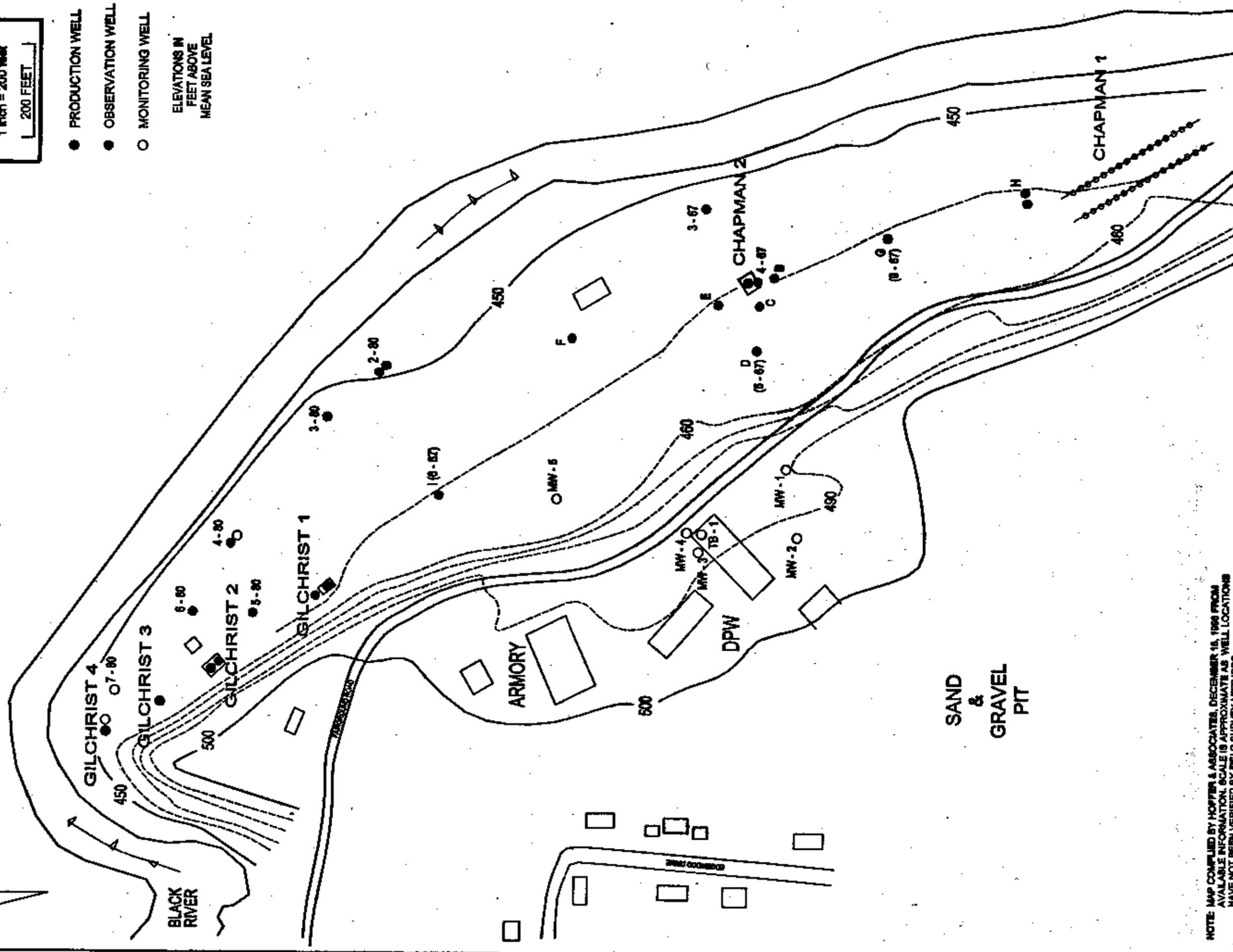
APPENDIX H
GROUNDWATER CONTOUR MAP



SCALE
1 inch = 200 feet
200 FEET

- PRODUCTION WELL
- OBSERVATION WELL
- MONITORING WELL

ELEVATIONS IN
FEET ABOVE
MEAN SEA LEVEL



NOTE: MAP COMPILED BY HOFFER & ASSOCIATES, DECEMBER 18, 1988 FROM AVAILABLE INFORMATION. SCALE IS APPROXIMATE AS WELL LOCATIONS HAVE NOT BEEN VERIFIED BY FIELD SURVEY METHODS.

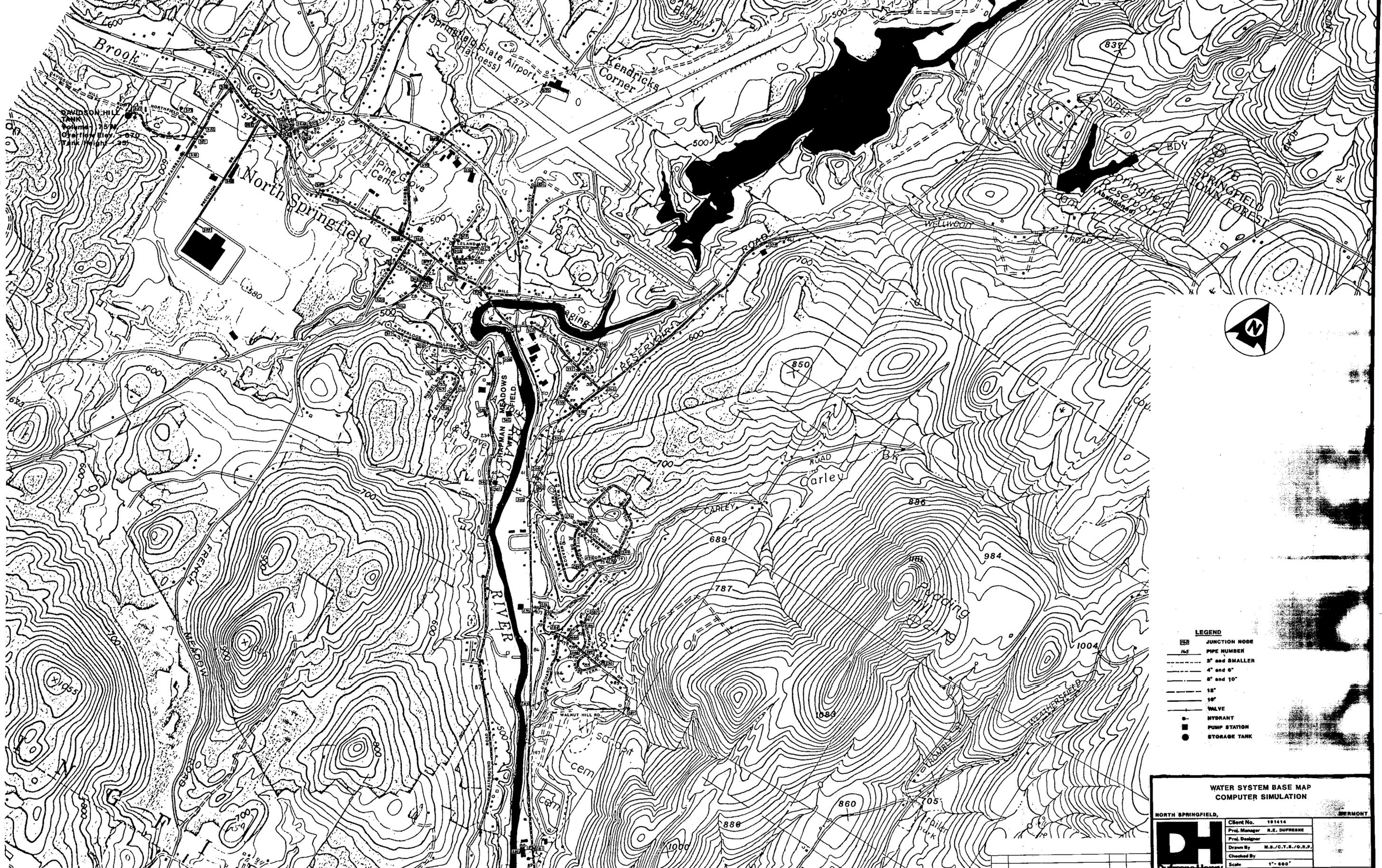
Project No.	Sheet No.
Proj. Manager	Scale
Drawn By	Checked By
Date	Appr. Date
Project Title	Project No.
FIGURE 1 SITE MAP, SPRINGFIELD WELLFIELD	
Source: PROTECTION PLAN - W-88-0000	Drawn: []
Project: []	Scale: []
Sheet: []	Appr. Date: []

SPRINGFIELD DEPARTMENT OF PUBLIC WORKS - SPRINGFIELD, VERMONT
Groundwater Elevation Summary

Location	Elevation of PVC	Water Elevation										
		12/01/98	12/10/98									
MW-1	Bot. @ 431.5 489.20	442.81	442.70									
MW-2	Bot. @ 444.1 487.94	445.14	445.35									
MW-3	Bot. @ 431.0 489.00		442.64									
MW-4	Bot. @ 434.8 489.05		442.74									
MW-5	Bot. @ 433.8 455.59		442.88									

APPENDIX I

SPRINGFIELD, VT WATER SYSTEM MAP



- LEGEND**
- JUNCTION NODE
 - PIPE NUMBER
 - 2" and SMALLER
 - 4" and 6"
 - 8" and 10"
 - 12"
 - VALVE
 - HYDRANT
 - PUMP STATION
 - STORAGE TANK

**WATER SYSTEM BASE MAP
COMPUTER SIMULATION**

NORTH SPRINGFIELD, VERMONT

DH Dunham-Henry INC.	Client No. 181414	Sheet 2 of 2
	Proj. Manager R.E. DUPRENE	
	Proj. Designer	
	Drawn By M.B./C.T.S./O.R.P.	
	Checked By	
Scale 1" = 500'	Approved	Date

MATCH LINE SHEET 1 of 2

Rev.	Description	By	Date