Waite - Heindel
Environmental Management

January 4, 2017

Hugo Martinez Cazon
VT DEC
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704

Sent via email: hugo.martinez.cazon@vermont.gov

RE: Groundwater Monitoring Report: October 2016
Young Residence
28 North Williams Street
Burlington, VT 05401
SMS Site #2013-4436

Dear Hugo:

Waite-Heindel Environmental Management (WHEM) is pleased to present the *Groundwater Monitoring Report* for work conducted during October 2016 at the Young property at 28 North Williams Street in Burlington, Vermont. This is the second quarterly monitoring event following the CAP approval on May 20, 2016. This report also presents influent and effluent data to date from the sump treatment system activated in late July 2016.

Do not hesitate to contact me if you have questions. I can be reached at (802) 860-9400 ext. 101 or by email at mwaite@waiteenv.com

Sincerely,

Miles E. Waite, Ph.D.
Senior Hydrogeologist

Cc: Bill and Sally Young

Enclosure

# GROUNDWATER MONITORING REPORT: OCTOBER 2016

# Young Residence
# 28 N. Williams Street
# Burlington, Vermont 05401

**SMS SITE #2013-4436**

January 4, 2017

*Prepared for:*

Hugo Martinez Cazon
VT DEC
Waste Management & Prevention Division
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704

*Prepared by:*

Waite - Heindel
Environmental Management

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# 1.0 INTRODUCTION

Waite-Heindel Environmental Management (WHEM) of Burlington, Vermont conducted a round of quarterly groundwater quality monitoring and sump sampling on October 18, 2016, at the Young residence, located at 28 North Williams Street in Burlington, VT (SMS #2013-4436). In addition, WHEM conducted bi-weekly sampling of the new groundwater treatment system on September 6 and 20, October 5 and 18, and November 1 and 15, 2016.

The work performed was in accordance with WHEM's Corrective Action Plan (CAP) dated August 14, 2015 (revised April 14, 2016), which was approved by VT DEC in an email dated May 20, 2016. The approvals were for the installation of a groundwater treatment system with continued groundwater monitoring; alternative remedial options such as injections of REGENESIS ORC Advanced® were also approved contingent upon the discretion of the VTDEC. The October 2016 groundwater sampling event is the second round of quarterly monitoring, and the first round following installation of the sump treatment system. An As-Built Report on the treatment system installation and initial operation is forthcoming.

# 2.0 GROUNDWATER SAMPLING

## 2.1 Sump and System Sampling

On October 18, 2016, WHEM conducted a sump sampling from Sump South and Sump North for VOC analysis via Method 8021B; Sump North is now the Influent sample to the treatment system, and includes water pumped from Sump South, so it is no longer a discrete sampling location. Sump locations are shown on the Site Plan in Appendix 1. Both sumps were purged and allowed to recharge prior to sampling. Sump water at Sump North produced a faint petroleum odor, and sump water at Sump South produced a moderate, stale petroleum odor. A light sheen was observed at Sump North, and a more noticeable sheen was observed at Sump South. Sheen was also observed in the July 2016 event. Samples were stored on ice and delivered to Endyne Laboratories for analysis on the day of sampling. Results are discussed in Section 2.3.

Sump pump usage is now measured via a totalizing flow meter on the influent side of the treatment system. Per the discharge permit, system flow is measured twice a month. Additionally, system effluent samples are collected twice a month, and influent samples are collected once monthly. System flow and water quality data are provided in Table 3 of Appendix A. To date, flow rates are well below what we anticipated using electric volt meters,

with actual flow ranging between 1.9 and 13.0 gallons per day (gpd) as measured with the totalizing flow meter (direct read for City of Burlington billing). Previous estimates assumed around 120 gpd would be pumped; although conditions have been dry until recently, it seems very unlikely that flows of that magnitude will be reached. More consistent rainfall in late October and November 2016 has resulted in a substantial increase in flow rate, from 5.7 gpd from 10/18/16 to 11/1/16 to 13.0 gpd from 11/1/16 to 11/15/16.

## 2.2 Groundwater Sampling

On October 18, 2016, WHEM performed groundwater monitoring from the three (3) existing monitoring wells, identified on the Site Plan as MW-1, MW-2, and MW-3. Prior to sampling, wells were gauged for depth to groundwater, which ranged from 3.40 ft below top of casing (BTOC) in MW-1 to 7.21 ft BTOC in MW-2. Groundwater elevations, presented in Table 1 in Appendix 2, ranged from a high of 96.60 ft (MW-1) to a low of 91.99 ft (MW-2). The groundwater elevation in MW-3 was the lowest to date; in both MW-1 and MW-2, elevations were towards the low end of historic values. Groundwater elevations have been mapped and contoured as shown in Figure 2 in Appendix 1. All groundwater elevation data collected to date is included as Table 1.0 in Appendix 2, and a chart showing variation in elevation over time is included in Appendix 2. The presence of the house foundation below the water table makes it unlikely that groundwater flow is linear and underneath the building; the new Groundwater Elevation Map depicts this more likely situation. It should be noted that the depressed water level in MW-2 may be influenced by the home's French drain system, which lowers the groundwater elevation immediately surrounding the house. This theory is supported by the muted change in groundwater elevation at MW-2 between monitoring rounds compared MW-1 and MW-3. As the contours show, groundwater flow most likely splits at the southeast corner of the building's foundation between northward flow towards Sump North and eastward flow towards MW-3 and North Williams Street. The site-wide horizontal hydraulic gradient is calculated at 0.136 ft/ft to the east-northeast, or 13.6% (calculated from MW-1 to MW-2).

All wells were purged of approximately three well volumes and sampled via peristaltic pump. All wells went dry very quickly, so three well volumes could not be successfully purged from any of the wells. All wells were allowed to recharge prior to sampling. Samples were delivered on ice following chain-of-custody procedures to Endyne Laboratories in Williston, Vermont; samples were submitted for analysis by 8021B.

Purged groundwater from MW-2 had a detectable septic odor, though there is no sign of a leaking sewer line from inside the house. Purged groundwater from MW-1 had a strong petroleum odor and faint sheen. Groundwater from MW-3 was clear and possessed no odor.

### 2.3 Groundwater and Sump Results

The groundwater results are presented in Table 2 in Appendix 2. The full laboratory report is provided in Appendix 3. Charts depicting variation in Naphthalene concentrations in Sump North, Sump South, and MW-1 are also included in Appendix 2. Groundwater elevation in MW-1 has been added to each of these charts to show the relationship between water table elevation and concentrations at these three locations. All concentrations have been compared to the Vermont Groundwater Enforcement Standards (VGES). These results, shown in micrograms per liter (ug/L), are summarized below:

- Results from the October 2016 Sump sampling event revealed the presence of a suite of petroleum VOCs in Sump South and in the system Influent (Sump North). At both locations, Total VOC concentrations were higher than in July 2016, though more significantly so in Sump South. At Sump South, Total VOC concentrations increased from 44.6 ug/L in July 2016 to 53.2 ug/L; at Sump North, concentrations increased from 35.3 ug/L in July 2016 to 39.9 ug/L. Total VOC concentrations in both locations appear to vary considerably from event to event, but changed relatively little between July and October 2016.

- In MW-1, VOC concentrations increased from the October 2016 sampling event to their highest total value to date (225 ug/L). Naphthalene (35.4 ug/L) increased and continues to exceed the VGES, as it has consistently since November 2014. Benzene (6.7 ug/L) increased to exceed the VGES. Other compounds detected that did not exceed VGES include Toluene (1.5 ug/L), Ethylbenzene (31.5 ug/L), Xylenes (85.2 ug/L), 1,3,5-Trimethylbenzene (17.2 ug/L), and 1,2,4-Trimethylbenzene (45.5 ug/L). Of these, Ethylbenzene and Naphthalene were reported at their highest concentrations to date.

- As displayed in the Charts in Appendix 2, there is some positive correlation at this site between water table elevation and Naphthalene concentrations. This did not appear to be the case in October 2016, because values in MW-1 were the highest to-date overall despite a depressed water table.

- No contaminants or unidentified peaks were reported in downgradient wells MW-2 and MW-3, which is consistent with historical data.

- Based on the reported concentrations in groundwater, it continues to be unlikely that VGES is exceeded for any compounds at the downgradient property line.

Quality Assurance/Quality Control (QA/QC) samples included a duplicate and trip blank, which was prepared at WHEM using de-ionized water obtained from Endyne Laboratories in Williston. The duplicate sample was collected in conjunction with the sample from MW-1, using the same sampling methodology. Results of the QA/QC sampling, included as Table 4 in Appendix 2 and in the lab report in Appendix 3, indicate that that results for all compounds reported at least twice the practical quantitation limit (PQL) were below 30% relative percent difference (RPD) in the duplicate pair (MW-1 and "Duplicate" sample). On average, VOC concentrations in the duplicate pair only differed by only 3.7%, indicating very strong sample parity. No contaminants were detected in the trip blank.

## 3.0 TREATMENT SYSTEM INSTALLATION & OPERATION

WHEM, with the assistance of Vermont Water Treatment of Lincoln, Vermont, successfully installed a groundwater treatment system in the basement of the Young Residence. This system combines the sump flow from Sump North and Sump South into a single stream, which is pumped through water meter, backflow preventer, a canister of granular activated carbon, then to a secondary pump, before discharge to the City sanitary sewer system. Refer to the Site Plan for the location of the treatment system. An As-Built Report with more details if forthcoming.

As part of the operation of the groundwater treatment system, we now conduct bi-monthly sump sampling for reporting to the VT DEC as part of the discharge permit. WHEM has copied the Sites Management Section on all discharge reports, but copies of the September, October, and November discharge reports are included as Appendix 4. The discharge reports confirm that the treated water being discharged to the City system is free of petroleum contamination. Results to date also indicate that the influent has been consistently below VGES for all compounds, suggesting that ongoing treatment of sump water may not be necessary.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results presented in this report, WHEM reaches the following conclusions:

1. Sump North and Sump South continue to intercept petroleum contaminated groundwater and prevent it from surfacing in the Young Basement. Since late July 2016, contaminated sump water has been treated with by filtration through activated carbon prior to being discharged to the City of Burlington's sanitary sewer system. At Sump South, concentrations increased compared to July 2016 but remain in the lower end of historic ranges. System influent (Sump North) has been consistently below VGES for all compounds since the system was installed. System flow has been much lower than anticipated, but has begun to increase in November 2016, as precipitation has increased following a very dry Summer and Fall.

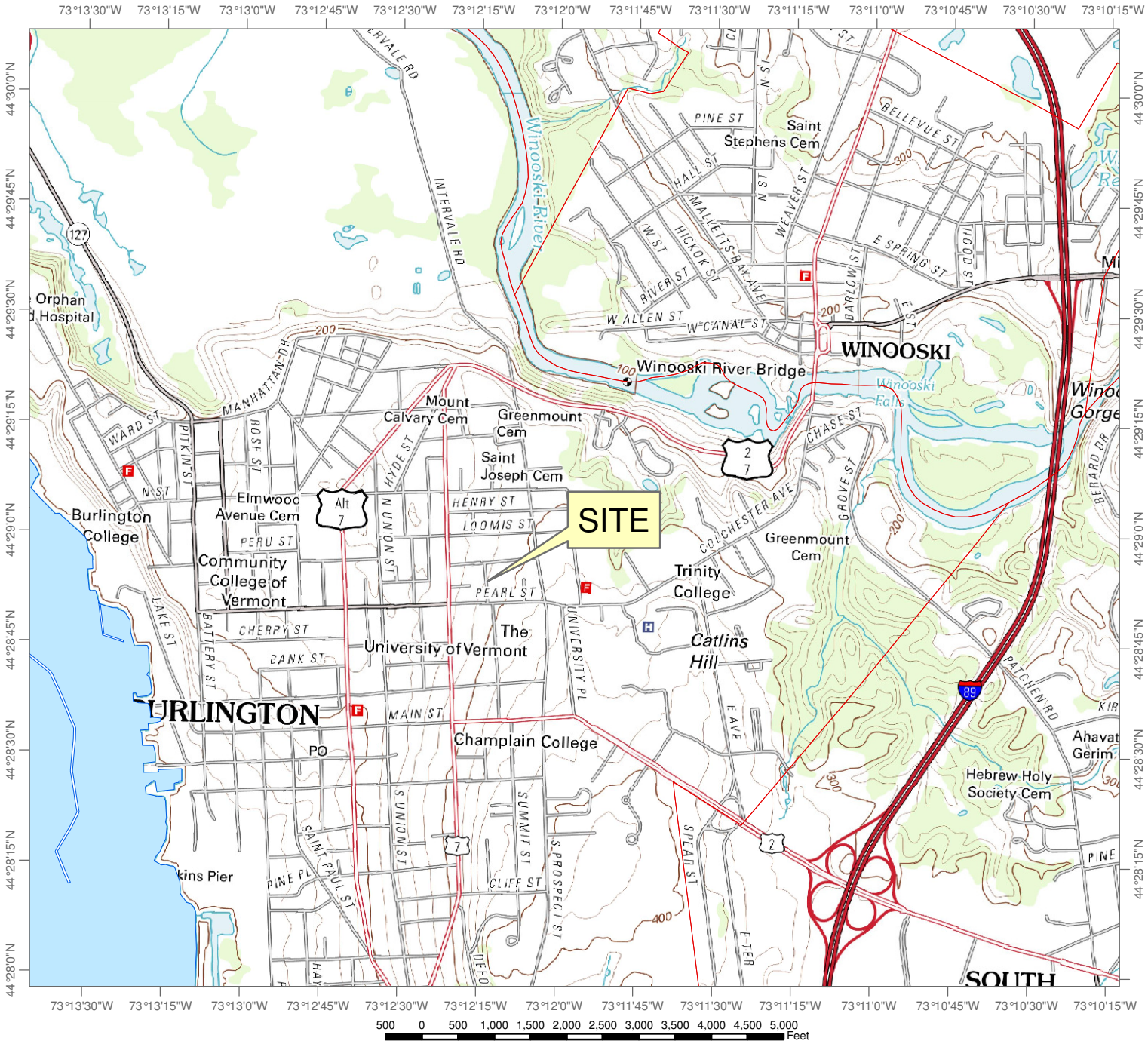
2. In MW-1, VOC concentrations increased to their highest total to date (225 ug/L). Benzene and Naphthalene both exceeded VGES, as is generally the case in this well, and Naphthalene was reported at its highest concentration to date (35.4 ug/L). No other compounds exceeded VGES, as is typically the case.

3. No petroleum VOCs were detected in MW-2 or MW-3, which is consistent with historical data. Additionally, no unidentified peaks were reported in these wells.

Now that the groundwater treatment system is operational, an As-Built Report will be developed by WHEM. This As-Built Report will contain the Operations & Maintenance (O&M) and sampling requirements of the system. Regular sampling of the system influent and effluent (discharge) will be conducted for monthly reporting to the Watershed Management Division until it may be possible to reduce sampling frequency. The SMS has indicated that due to the low influent concentrations, ongoing treatment of sump water may not be required. Regular groundwater monitoring from MW-1, MW-2, and MW-3 will also proceed on a quarterly basis, with the third quarterly event scheduled for January 2016. Following the fourth event, WHEM will make recommendations regarding the need for injections on-site to accelerate attenuation of petroleum in groundwater and shallow soils around the identified source area.

# APPENDIX 1

# FIGURES




# USGS

Young Property
28 N. Williams Street
Burlington, Vermont

October 1, 2013
Map produced by:
C:\Users\MILESW~1\AppData\Local\Temp\~DFE51841EF9C75B4E3.TMP

Subject Area
Town Boundary

Site Coordinates:
*Geographic (Degrees Minutes Seconds):*
Northing: 0
Easting: 0
*VT State Plane Meters:*

Circle Radius: 0.5 mile(s)


**Waite - Heindel**
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• Water and Wastewater Design •
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***References:***


United States Geological Survey xxxx Vermont Quadrangle. Computer file, USGS. Distributed through Vermont Center for Geographic Information, April 2007.
Town boundary, best sources. Computer file, bndhash, Vermont Center for Geographic Information, Waterbury, VT. Distributed through Vermont Center for Geographic Information, Inc. 2007.

GARAGE

NEW (JULY 2016)
GROUNDWATER
TREATMENT SYSTEM

AS
OUTDOOR

JANUARY 2014
EXCAVATION LIMITS

ASPHALT
DRIVEWAY

ADDITION:
SLAB ON GRADE

SIDEWALK

STUDY

RELICT U.S.T. REMOVED
SEPTEMBER 2013

SEPTEMBER 2013 EXCAVATION
LIMITS

CRAWL SPACE

MW-1

FRENCH DRAIN

SUMP SOUTH

KITCHEN (1ST FLOOR)

SUMP NORTH

DISCHARGE TO
SANITARY SEWER

AS
BASEMENT
POOL TABLE
(BASEMENT)

BASEMENT
FLOOR ELEV. APPROX: 92 FT

LIVING ROOM
(1ST FLOOR)

AS
FIRST FLOOR

YOUNG RESIDENCE
28 N. WILLIAMS STREET
SITE #2013-4436

EXISTING CLEANOUT IN
FLOOR HATCH

UNUSED A.S.T. REMOVED
IN JANUARY 2014

HUDDLE RESIDENCE
34 N. WILLIAMS STREET
SITE #2011-4316

20 N. WILLIAMS STREET

MW-2

MW-3

WATER LINE (APPROX)

SEWER LINE (APPROX)

ASPHALT DRIVE

SIDEWALK

N. WILLIAMS STREET

N

LEGEND

- PROPERTY LINE FROM TAX MAP (APPROX)
- SUMP PUMP INSTALLED BY OWNER
- MW-1 MONITORING WELL INSTALLED BY WHEM
- AS AIR SAMPLE LOCATION (NOVEMBER 2014)

0 5 10 20

GRAPHIC SCALE: 1"=10'

NOTES:
1. BASE PLAN IS ORIGINAL BLUEPRINT OF HOUSE PROVIDED BY OWNER.
2. ALL LOCATIONS APPROXIMATE. THIS IS NOT A SURVEYED PLAN.

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1

DATE: 8/31/16
PROJECT NO.
DRAWN BY: D.W.F.
PROJ. MGR: C.P.
APPROVED: M.E.W.

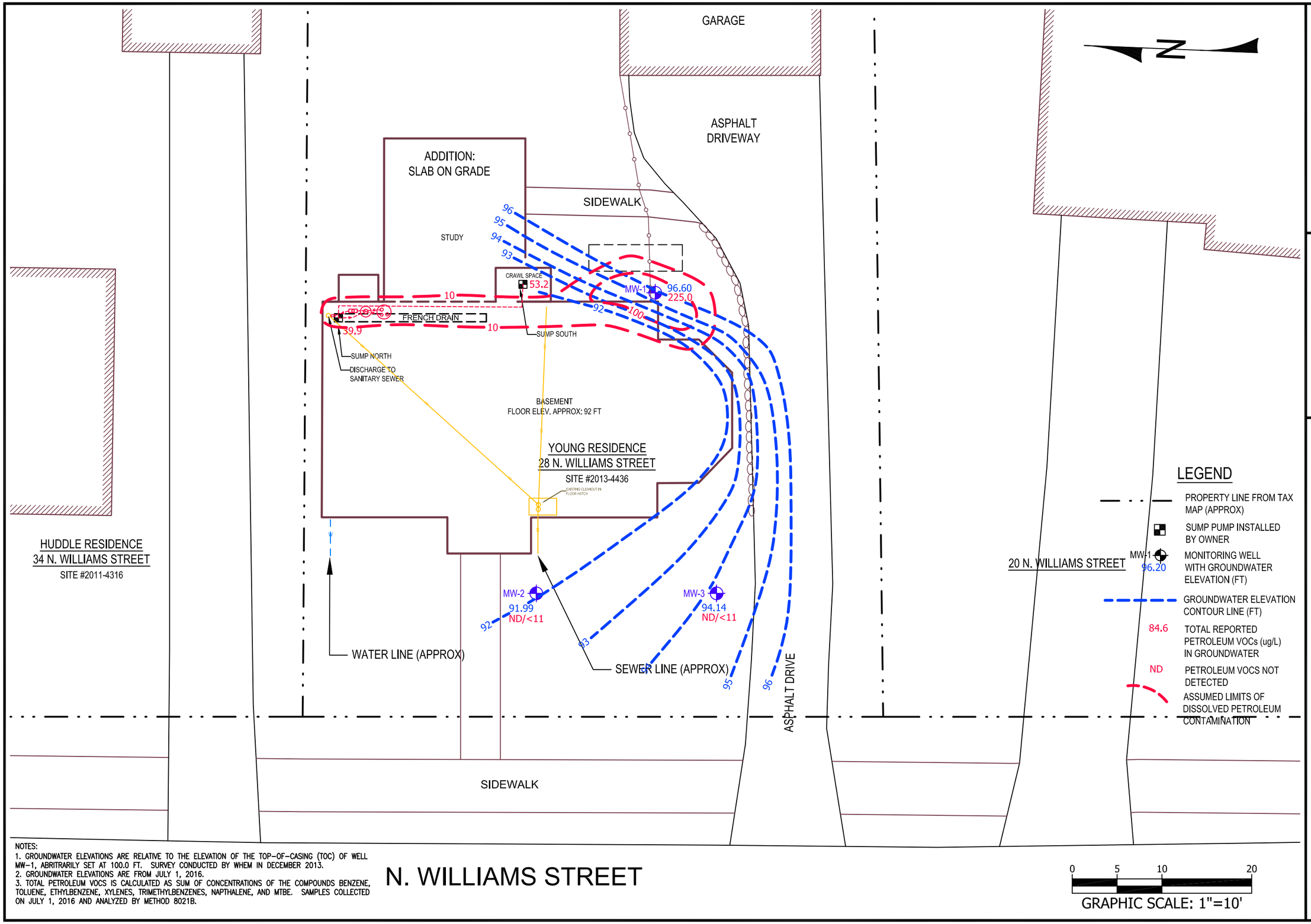
☐ DRAFT ☒ FINAL

YOUNG
28 NORTH WILLIAMS STREET
BURLINGTON, VERMONT

# SITE PLAN

FILE: Young Williams Street.dwg

SCALE: 1" = 10'




NOTES:
1. GROUNDWATER ELEVATIONS ARE RELATIVE TO THE ELEVATION OF THE TOP-OF-CASING (TOC) OF WELL MW-1, ABRITRARILY SET AT 100.0 FT. SURVEY CONDUCTED BY WHEM IN DECEMBER 2013.
2. GROUNDWATER ELEVATIONS ARE FROM JULY 1, 2016.
3. TOTAL PETROLEUM VOCS IS CALCULATED AS SUM OF CONCENTRATIONS OF THE COMPOUNDS BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, TRIMETHYLBENZENES, NAPTHALENE, AND MTBE. SAMPLES COLLECTED ON JULY 1, 2016 AND ANALYZED BY METHOD 8021B.

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Burlington, Vermont • (802) 860-9400

2

DATE: 11/23/2016
PROJECT NO.
DRAWN BY: D.W.F.
PROJ. MGR: C.P.
APPROVED: M.E.W.

☐ DRAFT ☒ FINAL

YOUNG
28 NORTH WILLIAMS STREET
BURLINGTON, VERMONT (SITE #2013-4436)

GROUNDWATER ELEVATION AND CONTAMINANT CONCENTRATION MAP - OCTOBER 2016

FILE: Young Williams Street.dwg

SCALE: 1" = 10'

# APPENDIX 2

# TABLES AND CHARTS

**TABLE 1.0**
**Groundwater Elevation Measurements:**
**Young Residence**
**28 N. Williams Street, Burlington**
**SMS Site #2013-4436**

| Well ID | Measuring Point (ft) | Measuring Point Elevation (ft) | Date | Depth to Water (ft btoc) | Groundwater Elevation (ft) |
|---|---|---|---|---|---|
| MW-1 | TOC | 100.00 | 12/23/13 | 3.80 | 96.20 |
| | | | 8/11/14 | 3.10 | 96.90 |
| | | | 11/18/14 | 2.81 | 97.19 |
| | | | 2/19/15 | 3.45 | 96.55 |
| | | | 7/28/15 | 3.12 | 96.88 |
| | | | 12/2/15 | 2.73 | 97.27 |
| | | | 7/1/16 | 3.13 | 96.87 |
| | | | 10/18/16 | 3.40 | 96.60 |
| MW-2 | TOC | 99.20 | 12/23/13 | 7.28 | 91.92 |
| | | | 8/11/14 | 7.04 | 92.16 |
| | | | 11/18/14 | 6.96 | 92.24 |
| | | | 2/19/15 | 7.10 | 92.10 |
| | | | 7/28/15 | 7.33 | 91.87 |
| | | | 12/2/15 | 7.02 | 92.18 |
| | | | 7/1/16 | 6.43 | 92.77 |
| | | | 10/18/16 | 7.21 | 91.99 |
| MW-3 | TOC | 98.54 | 12/23/13 | 4.08 | 94.46 |
| | | | 8/11/14 | 3.87 | 94.67 |
| | | | 11/18/14 | 3.60 | 94.94 |
| | | | 2/19/15 | 4.35 | 94.19 |
| | | | 7/28/15 | 3.58 | 94.96 |
| | | | 12/2/15 | 3.36 | 95.18 |
| | | | 7/1/16 | 3.88 | 94.66 |
| | | | 10/18/16 | 4.40 | 94.14 |

Notes:
-All elevations are in feet, relative to arbitrary benchmark (MW-1 top of casing)
-"<"= less than bottom elevation of well, signifiying that the well dry during monitoring event; "NA" = not available; blank = not sampled.

**TABLE 2.0**
**Groundwater Quality Data**
**Young Residence**
**28 N. Williams St, Burlington, Vermont**

| **Sump South** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | 4/29/2014 | 8/11/2014 | 11/18/2014 | 2/19/2015 | 7/28/2015 | 12/2/2015 | 7/1/2016 | 10/18/2016 |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 4.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | **2.5** | ND / < 5.0 | ND / < 1.0 | ND / < 1.0 | ND / < 2.0 | **2.3** | **1.2** | **1.5** |
| Toluene | ug/L (ppb) | 1,000 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 2.0 | **1.1** | ND / < 1.0 | ND / < 1.0 |
| Ethylbenzene | ug/L (ppb) | 700 | **13.6** | **16.9** | **3.4** | **11.8** | **10.3** | **21.4** | **8.5** | **12.8** |
| Xylenes | ug/L (ppb) | 10,000 | **22.9** | **14.0** | **3.3** | **13.2** | **30.8** | **67.1** | **12.8** | **11.5** |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | **22.8** | **8.0** | **1.4** | **3.9** | **5.4** | **19.3** | **3.3** | **11.8** |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | **27.0** | **26.4** | **4.1** | **16.1** | **16.2** | **46.4** | **5.7** | **7.8** |
| Naphthalene | ug/L (ppb) | 20 | **70.1** | **38.3** | **7.0** | **13.9** | **24.6** | **47.8** | **10.1** | **4.8** |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | ***156.4*** | ***103.6*** | ***19.2*** | ***58.9*** | ***87.3*** | ***202.0*** | ***44.6*** | ***53.2*** |
| Unidentified Peaks | # | -- | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| **NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)** | | | | | | | | | | |
| Acetone | ug/L (ppb) | 700 | | | | ND / < 10.0 | | | | |
| Bromodichloromethane | ug/L (ppb) | 80 | | | | ND / < 0.5 | | | | |
| Chloroform | ug/L (ppb) | | | | | ND / < 1.0 | | | | |
| 2-Butanone | ug/L (ppb) | 4200 | | | | ND / < 10.0 | | | | |
| Tetrachloroethene | ug/L (ppb) | 5.0 | | | | ND / < 1.0 | | | | |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | | | | | | | |

| **Sump North (System Influent)** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | 4/29/2014 | 8/11/2014 | 11/18/2014 | 2/19/2015 | 7/28/2015 | 12/2/2015 | 7/1/2016 | 10/18/2016 |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | **1.6** | **2.1** | **1.3** | ND / < 1.0 | **1.3** | **1.6** | **1.4** | ND / < 1.0 |
| Toluene | ug/L (ppb) | 1,000 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Ethylbenzene | ug/L (ppb) | 700 | **8.6** | **11.2** | **6.7** | **7.2** | **4.9** | **9.3** | **3.0** | **6.4** |
| Xylenes | ug/L (ppb) | 10,000 | **25.3** | **26.4** | **10.3** | **6.3** | **7.3** | **14.2** | **7.8** | **6.0** |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | **11.6** | **9.8** | **5.3** | **3.5** | **3.6** | **7.4** | **3.0** | **3.9** |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | **20.0** | **28.1** | **25.8** | **12.8** | **10.5** | **17.0** | **8.3** | **10.2** |
| Naphthalene | ug/L (ppb) | 20 | **29.6** | **24.5** | **23.4** | **3.9** | **7.4** | **13.7** | **8.8** | **9.4** |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | ***96.7*** | ***102.1*** | ***72.8*** | ***33.7*** | ***35.0*** | ***63.2*** | ***35.3*** | ***39.9*** |
| Unidentified Peaks | # | -- | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| **NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)** | | | | | | | | | | |
| Acetone | ug/L (ppb) | 700 | | | | ND / < 10.0 | | | | |
| Bromodichloromethane | ug/L (ppb) | 80 | | | | ND / < 0.5 | | | | |
| Chloroform | ug/L (ppb) | | | | | ND / < 1.0 | | | | |
| 2-Butanone | ug/L (ppb) | 4200 | | | | ND / < 10.0 | | | | |
| Tetrachloroethene | ug/L (ppb) | 5.0 | | | | ND / < 1.0 | | | | |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | | | | | | | |

| **MW-1** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | 4/29/2014 | 8/11/2014 | 11/18/2014 | 2/19/2015 | 7/28/2015 | 12/2/2015 | 7/1/2016 | 10/18/2016 |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 10.0 | ND / < 10.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | | ND / < 5.0 | **4.6** | **5.1** | **5.1** | **7.5** | **4.6** | **6.7** |
| Toluene | ug/L (ppb) | 1,000 | | **5.4** | **1.8** | **1.0** | ND / < 5.0 | ND / < 5.0 | ND / < 1.0 | **1.5** |
| Ethylbenzene | ug/L (ppb) | 700 | | **10.6** | **13.2** | **16.8** | **25.6** | **28.5** | **22.3** | **31.5** |
| Xylenes | ug/L (ppb) | 10,000 | | **34.7** | **40.5** | **42.1** | **70.7** | **93** | **65.8** | **85.2** |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | | **7.9** | **8.6** | **9.7** | **12.1** | **19.1** | **11.6** | **17.2** |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | | **15.9** | **23.2** | **26.5** | **33.4** | **48.5** | **34.7** | **45.5** |
| Naphthalene | ug/L (ppb) | 20 | | **10.3** | **24.3** | **30.1** | **27.5** | **35.3** | **24.5** | **35.4** |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | | ***84.8*** | ***116.2*** | ***131.3*** | ***174.4*** | ***231.9*** | ***166.5*** | ***225.0*** |
| Unidentified Peaks | # | -- | | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| **NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)** | | | | | | | | | | |
| Acetone | ug/L (ppb) | 700 | | | | **11.3** | | | | |
| Bromodichloromethane | ug/L (ppb) | 80 | | | | ND / < 0.5 | | | | |
| Chloroform | ug/L (ppb) | | | | | ND / < 1.0 | | | | |
| 2-Butanone | ug/L (ppb) | 4200 | | | | ND / < 10.0 | | | | |
| Tetrachloroethene | ug/L (ppb) | 5.0 | | | | ND / < 1.0 | | | | |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | | | | | | | |

Waite - Heindel

**TABLE 2.0**
**Groundwater Quality Data**
**Young Residence**
**28 N. Williams St, Burlington, Vermont**

| **MW-2** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | | 8/11/2014 | 11/18/2014 | 2/19/2015 | 7/28/2015 | 12/2/2015 | 7/1/2016 | 10/18/2016 |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Toluene | ug/L (ppb) | 1,000 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Ethylbenzene | ug/L (ppb) | 700 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Xylenes | ug/L (ppb) | 10,000 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Naphthalene | ug/L (ppb) | 20 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* |
| Unidentified Peaks | # | -- | | 1 | 0 | 2 | 1 | >10 | 0 | 0 |
| **NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)** | | | | | | | | | | |
| Acetone | ug/L (ppb) | 700 | | | | **22.5** | | | | |
| Bromodichloromethane | ug/L (ppb) | 80 | | | | ND / < 0.5 | | | | |
| Chloroform | ug/L (ppb) | | | | | ND / < 1.0 | | | | |
| 2-Butanone | ug/L (ppb) | 4200 | | | | ND / < 10.0 | | | | |
| Tetrachloroethene | ug/L (ppb) | 5.0 | | | | ND / < 1.0 | | | | |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | | | | | | | |

| **MW-3** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | | 8/11/2014 | 11/18/2014 | 2/19/2015 | 7/28/2015 | 12/2/2015 | 7/1/2016 | 10/18/2016 |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Toluene | ug/L (ppb) | 1,000 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Ethylbenzene | ug/L (ppb) | 700 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Xylenes | ug/L (ppb) | 10,000 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Naphthalene | ug/L (ppb) | 20 | | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* | *ND / < 11.0* |
| Unidentified Peaks | # | -- | | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)** | | | | | | | | | | |
| Acetone | ug/L (ppb) | 700 | | | | ND / < 10.0 | | | | |
| Bromodichloromethane | ug/L (ppb) | 80 | | | | ND / < 0.5 | | | | |
| Chloroform | ug/L (ppb) | | | | | ND / < 1.0 | | | | |
| 2-Butanone | ug/L (ppb) | 4200 | | | | ND / < 10.0 | | | | |
| Tetrachloroethene | ug/L (ppb) | 5.0 | | | | ND / < 1.0 | | | | |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | | | | | | | |

NOTES:
1. ND = not detected above any of the estimated reporting limits.
2. VGES = Vermont Groundwater Enforcement Standards, February 2005.
3. Results reported above the method detection limit are

**TABLE 3.0**
**Groundwater Treatment System Data**
**Young Residence**
**28 N. Williams St, Burlington, Vermont**

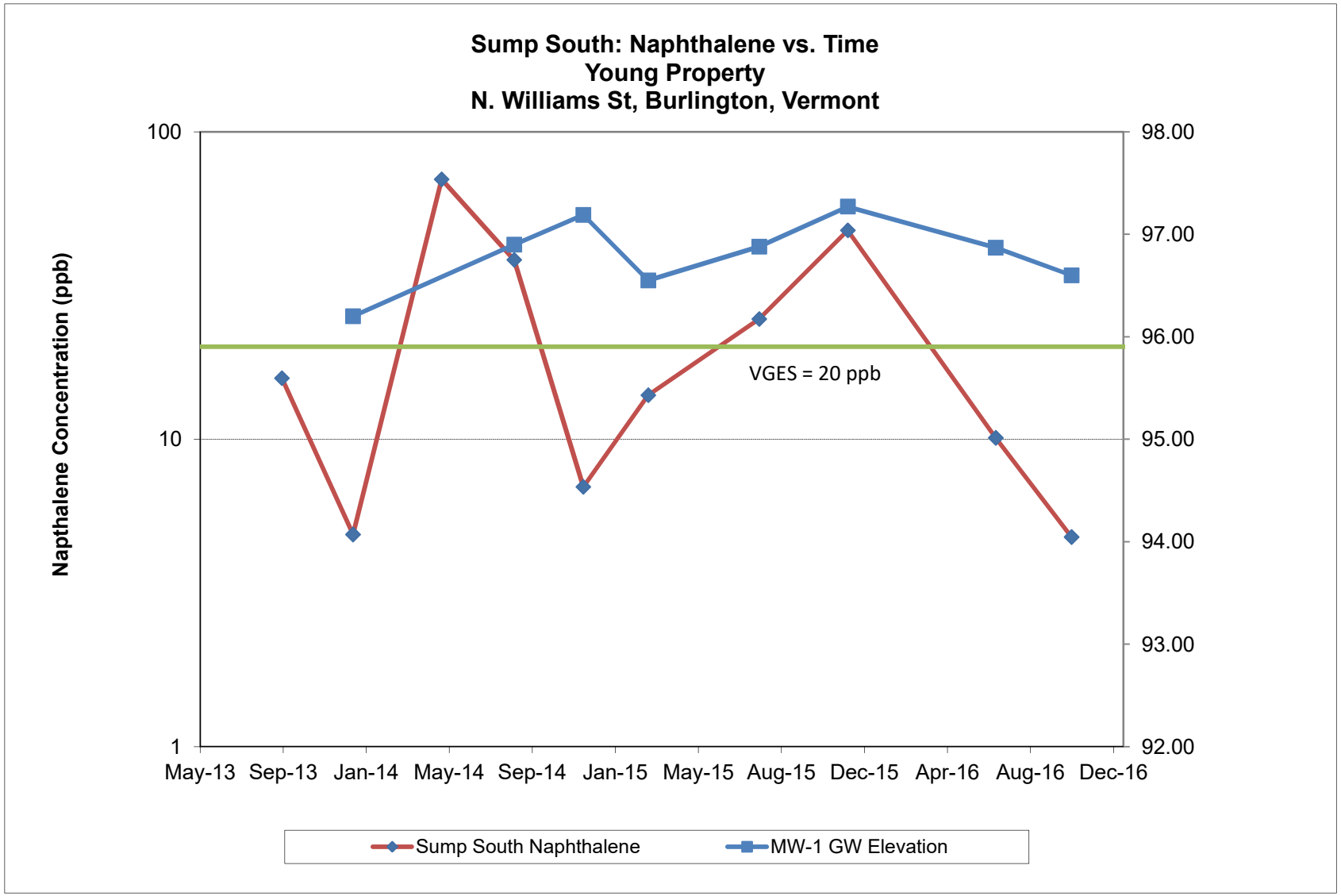
| **INFLUENT** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | **8/2/2016** | **8/16/2016** | **9/6/2016** | **9/20/2016** | **10/5/2016** | **10/18/2016** | **11/1/2016** | **11/15/2016** |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | | ND / < 2.0 | | ND / < 2.0 | | ND / < 2.0 | | |
| Benzene | ug/L (ppb) | 5.0 | | **1.2** | | ND / < 0.5 | | ND / < 1.0 | | |
| Toluene | ug/L (ppb) | 1,000 | | ND / < 1.0 | | ND / < 1.0 | | ND / < 1.0 | | |
| Ethylbenzene | ug/L (ppb) | 700 | | **7.1** | | ND / < 1.0 | | **6.4** | | |
| Xylenes | ug/L (ppb) | 10,000 | | **7.9** | | ND / < 2.0 | | **6.0** | | |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | | **3.7** | | **1.0** | | **3.9** | | |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | | **9.0** | | ND / < 1.0 | | **10.2** | | |
| Naphthalene | ug/L (ppb) | 20 | | **5.8** | | ND / < 2.0 | | **9.4** | | |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | | ***34.7*** | | ***1.0*** | | ***35.9*** | | |
| Unidentified Peaks | # | -- | | >10 | | 5 | | >10 | | |
| Total Flow (Calculated from Totalizer) | Gallons | | 0.0 | 80.3 | 171.3 | 211.5 | 239.4 | 265.3 | 344.5 | 526.4 |
| Flow Over Period | Gallons | | NA | 80.3 | 91.0 | 40.2 | 27.9 | 25.9 | 79.2 | 181.9 |
| Daily Flow Over Period | GPD | | NA | 5.7 | 4.3 | 2.9 | 1.9 | 2.0 | 5.7 | 13.0 |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | | **3.4** | | ND / < 0.4 | | **0.67** | | |

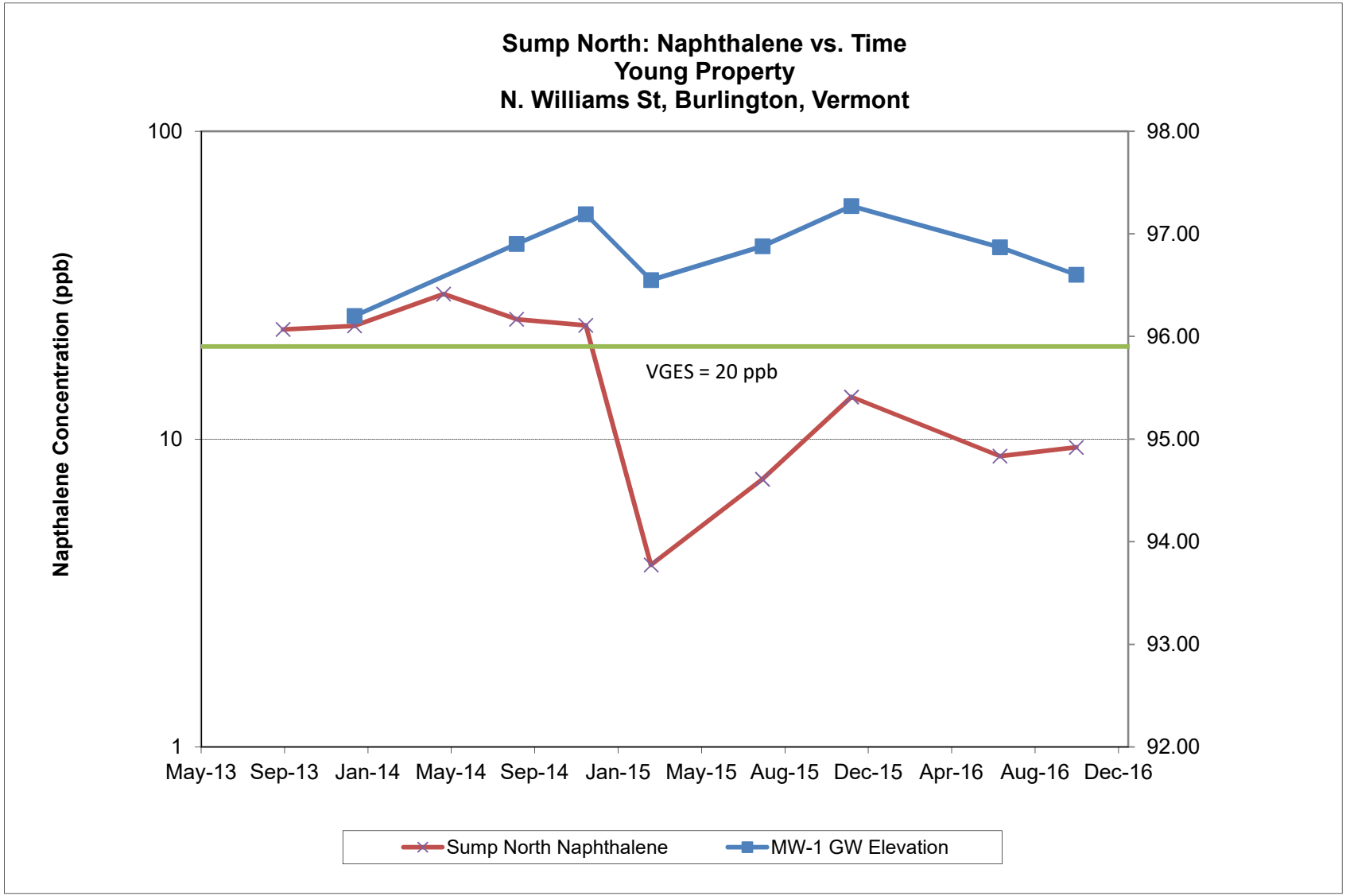
| **EFFLUENT** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Date | Units | VGES | **8/2/2016** | **8/16/2016** | **9/6/2016** | **9/20/2016** | **10/5/2016** | **10/18/2016** | **11/1/2016** | **11/15/2016** |
| **PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260/8021B)** | | | | | | | | | | |
| MTBE | ug/L (ppb) | 40 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| Benzene | ug/L (ppb) | 5.0 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 | ND / < 0.5 |
| Toluene | ug/L (ppb) | 1,000 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Ethylbenzene | ug/L (ppb) | 700 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Xylenes | ug/L (ppb) | 10,000 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | 350 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 | ND / < 1.0 |
| Naphthalene | ug/L (ppb) | 20 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 | ND / < 2.0 |
| *TOTAL PETROLEM VOCS* | *ug/L (ppb)* | -- | ***ND*** | ***ND*** | ***ND*** | ***ND*** | ***ND*** | ***ND*** | ***ND*** | ***ND*** |
| Unidentified Peaks | # | -- | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)** | | | | | | | | | | |
| TPH-DRO | mg/L (ppm) | | ND / < 0.4 | ND / < 0.4 | ND / < 0.4 | ND / < 0.4 | | | | |

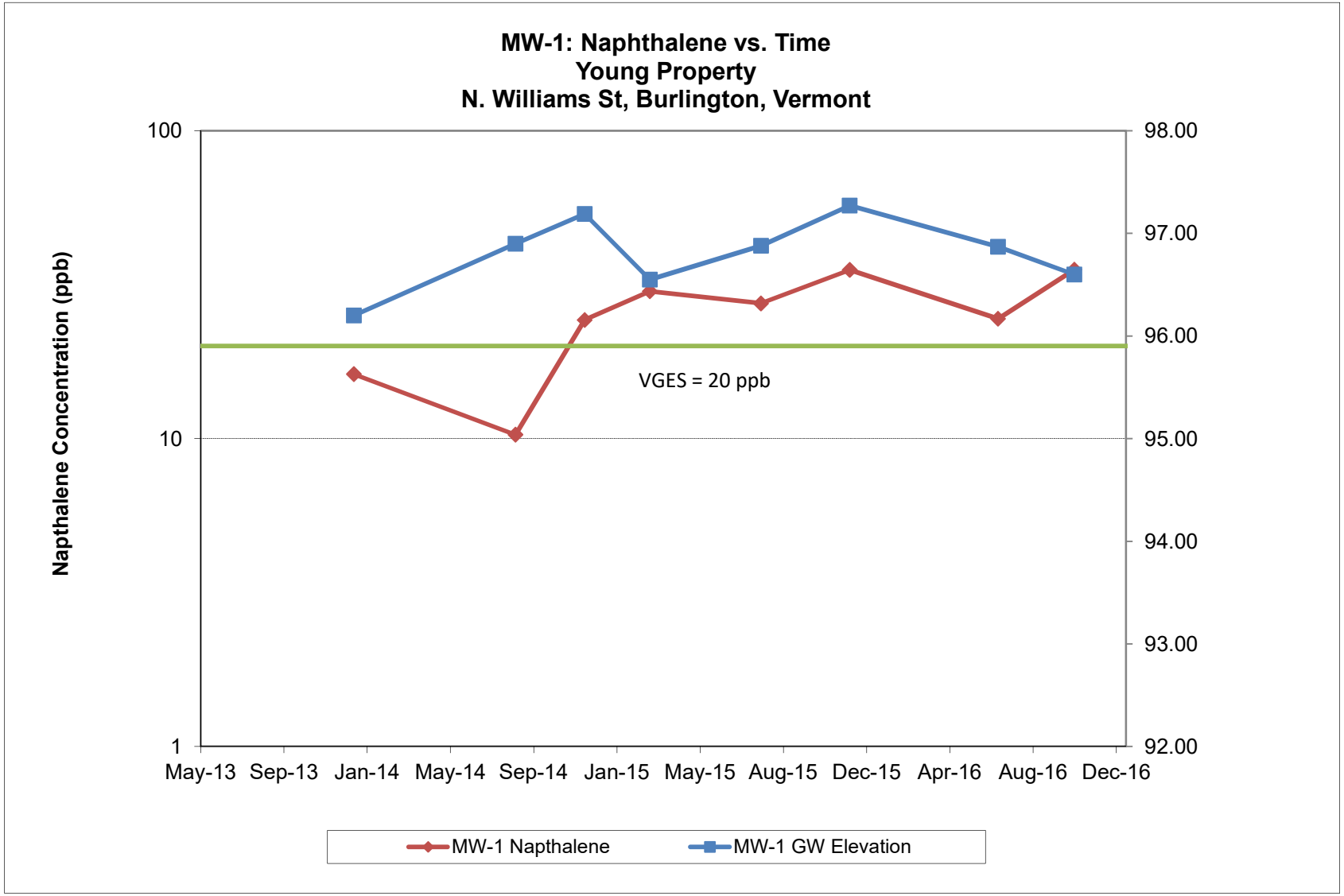
**TABLE 4.0**
**Quality Assurance / Quality Control Data**
**Young Residence**
**28 N. Williams Street, Burlington, Vermont**

| Sample Location | | Trip Blank | MW-1 | Duplicate | RPD |
|---|---|---|---|---|---|
| | | | | | |
| Sample Date | | 10/18/2016 | 10/18/2016 | 10/18/2016 | |
| Benzene | ug/L (ppb) | ND / 1.0 | **6.7** | **6.8** | 1.5 |
| Toluene | ug/L (ppb) | ND / 1.0 | 1.5 | 1.6 | 6.5 |
| Ethylbenzene | ug/L (ppb) | ND / 1.0 | **31.5** | **31.1** | 1.3 |
| Xylenes | ug/L (ppb) | ND / 2.0 | **85.2** | **83.2** | 2.4 |
| 1,3,5-Trimethylbenzene | ug/L (ppb) | ND / 1.0 | **17.2** | **16.4** | 4.8 |
| 1,2,4-Trimethylbenzene | ug/L (ppb) | ND / 1.0 | **45.5** | **43.1** | 5.4 |
| Naphthalene | ug/L (ppb) | ND / 2.0 | **35.4** | **34.0** | 4.0 |
| MTBE | ug/L (ppb) | ND / 2.0 | ND / 2.0 | ND / 2.0 | NA |

Notes:
1. The results of the laboratory analysis of the duplicate sample were analyzed using a relative percent difference (RPD) analysis. The RPD is defined as 100 times the difference in reported concentration between sample and duplicate, divided by the mean of the two samples. A small RPD indicates good correlation between sample and duplicate. RPD values cannot be calculated ("na") for undetected compounds.


Sump South: Naphthalene vs. Time
Young Property
N. Williams St, Burlington, Vermont
Napthalene Concentration (ppb)
100
10
1
98.00
97.00
96.00
95.00
94.00
93.00
92.00
VGES = 20 ppb
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Aug-15
Dec-15
Apr-16
Aug-16
Dec-16
Sump South Naphthalene
MW-1 GW Elevation


Sump North: Naphthalene vs. Time
Young Property
N. Williams St, Burlington, Vermont
Napthalene Concentration (ppb)
100
10
1
98.00
97.00
96.00
95.00
94.00
93.00
92.00
VGES = 20 ppb
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Aug-15
Dec-15
Apr-16
Aug-16
Dec-16
Sump North Naphthalene
MW-1 GW Elevation


MW-1: Naphthalene vs. Time
Young Property
N. Williams St, Burlington, Vermont
Napthalene Concentration (ppb)
100
10
1
98.00
97.00
96.00
95.00
94.00
93.00
92.00
VGES = 20 ppb
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Aug-15
Dec-15
Apr-16
Aug-16
Dec-16
MW-1 Napthalene
MW-1 GW Elevation

# APPENDIX 3

# LABORATORY REPORTS

ENDYNE Inc.
Environmental Laboratories

Laboratory Report

| | |
|---|---|
| WaiteHeindel Environmental Mgt | 100675 |
| 7 Kilburn Street | |
| Suite 301 | |
| Burlington, VT 05406 | |
| Atten: Miles Waite | |

PROJECT: Young MW's
WORK ORDER: **1610-23933**
DATE RECEIVED: October 18, 2016
DATE REPORTED: October 24, 2016
SAMPLER: Chandler

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

CLIENT: WaiteHeindel Environmental Mgt
PROJECT: Young MW's
REPORT DATE: 10/24/2016

WORK ORDER: **1610-23933**
DATE RECEIVED: 10/18/2016

TEST METHOD: EPA 8021B

001 Site: MW-1 Date Sampled: 10/18/16 11:15 Analysis Date: 10/21/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | 6.7 | ug/L | N | |
| Toluene | 1.5 | ug/L | N | | Ethylbenzene | 31.5 | ug/L | N | |
| Xylenes, Total | 85.2 | ug/L | N | | 1,3,5-Trimethylbenzene | 17.2 | ug/L | N | |
| 1,2,4-Trimethylbenzene | 45.5 | ug/L | N | | Naphthalene | 35.4 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 97 | % | N | | Unidentified Peaks | > 10 | | N | |

TEST METHOD: EPA 8021B

002 Site: MW-2 Date Sampled: 10/18/16 11:00 Analysis Date: 10/21/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | < 1.0 | ug/L | N | |
| Toluene | < 1.0 | ug/L | N | | Ethylbenzene | < 1.0 | ug/L | N | |
| Xylenes, Total | < 2.0 | ug/L | N | | 1,3,5-Trimethylbenzene | < 1.0 | ug/L | N | |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | N | | Naphthalene | < 2.0 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 94 | % | N | | Unidentified Peaks | 0 | | N | |

TEST METHOD: EPA 8021B

003 Site: MW-3 Date Sampled: 10/18/16 11:05 Analysis Date: 10/21/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | < 1.0 | ug/L | N | |
| Toluene | < 1.0 | ug/L | N | | Ethylbenzene | < 1.0 | ug/L | N | |
| Xylenes, Total | < 2.0 | ug/L | N | | 1,3,5-Trimethylbenzene | < 1.0 | ug/L | N | |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | N | | Naphthalene | < 2.0 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 95 | % | N | | Unidentified Peaks | 0 | | N | |

TEST METHOD: EPA 8021B

004 Site: Duplicate Date Sampled: 10/18/16 Analysis Date: 10/21/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | 6.8 | ug/L | N | |
| Toluene | 1.6 | ug/L | N | | Ethylbenzene | 31.1 | ug/L | N | |
| Xylenes, Total | 83.2 | ug/L | N | | 1,3,5-Trimethylbenzene | 16.4 | ug/L | N | |
| 1,2,4-Trimethylbenzene | 43.6 | ug/L | N | | Naphthalene | 34.0 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 94 | % | N | | Unidentified Peaks | > 10 | | N | |

TEST METHOD: EPA 8021B

005 Site: Trip Blank Date Sampled: 10/18/16 08:40 Analysis Date: 10/22/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | < 1.0 | ug/L | N | |
| Toluene | < 1.0 | ug/L | N | | Ethylbenzene | < 1.0 | ug/L | N | |
| Xylenes, Total | < 2.0 | ug/L | N | | 1,3,5-Trimethylbenzene | < 1.0 | ug/L | N | |
| 1,2,4-Trimethylbenzene | < 1.0 | ug/L | N | | Naphthalene | < 2.0 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 102 | % | N | | Unidentified Peaks | 0 | | N | |

CLIENT: WaiteHeindel Environmental Mgt
PROJECT: Young MW's
REPORT DATE: 10/24/2016

WORK ORDER: **1610-23933**
DATE RECEIVED: 10/18/2016

TEST METHOD: EPA 8021B

006 Site: Sump South Date Sampled: 10/18/16 09:30 Analysis Date: 10/22/16 W EEP

| Parameter | Result | Unit | Nelac | Qual | Parameter | Result | Unit | Nelac | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Methyl-t-butyl ether (MTBE) | < 2.0 | ug/L | N | | Benzene | 1.5 | ug/L | N | |
| Toluene | < 1.0 | ug/L | N | | Ethylbenzene | 12.8 | ug/L | N | |
| Xylenes, Total | 11.5 | ug/L | N | | 1,3,5-Trimethylbenzene | 11.8 | ug/L | N | |
| 1,2,4-Trimethylbenzene | 7.8 | ug/L | N | | Naphthalene | 4.8 | ug/L | N | |
| Surr. 1 (Bromobenzene) | 108 | % | N | | Unidentified Peaks | > 10 | | N | |

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

# CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: _____

| | | |
|---|---|---|
| Project Name: Young | Client/Contact Name: WHEM | Sampler Name: Chandler Noyes |
| State of Origin: VT X NY __ NH __ Other __ | Phone #: WHEM | Phone #: 860-9400 (x106) |
| Endyne WO # | Mailing Address: WHEM | Billing Address: WHEM |

| Sample Location | Matrix | GRAB | COMP | Date/Time Sampled | Sample Containers No. | Sample Containers Type/Size | Sample Preservation | Analysis Required | F | Due Date |
|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | $H_2O$ | X | | 10-18-16 1115 | 2 | 40 mL VOA | HCl, ice | 19 | | |
| MW-2 | ↓ | ↓ | | 1100 | ↓ | ↓ | ↓ | ↓ | | |
| MW-3 | ↓ | ↓ | | 1105 | ↓ | ↓ | ↓ | ↓ | | |
| Duplicate | ↓ | ↓ | | — | ↓ | ↓ | ↓ | ↓ | | |
| Trip Blank | ↓ | ↓ | | 0840 | ↓ | ↓ | ↓ | ↓ | | |
| Sump South | ↓ | ↓ | | 0930 | ↓ | ↓ | ↓ | ↓ | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

1610-23933
1610-23933
WaiteHeindel Environmental Mgt
Young MW's

| Relinquished by: | Date/Time | Received by: | Date/Time | Received by: | Date/Time |
|---|---|---|---|---|---|
| | 10-18-16 @1200 | | | Eileen Tormey | 10/18/16 @12:00 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | pH | 6 | TKN | 11 | Total Solids | 16 | Sulfate | 21 | 1664 TPH/FOG | 26 | 8270 PAH Only |
| 2 | Chloride | 7 | Total P | 12 | TSS | 17 | Coliform (Specify) | 22 | 8015 GRO | 27 | 8081 Pest |
| 3 | Ammonia N | 8 | Total Diss. P | 13 | TDS | 18 | COD | 23 | 8015 DRO | 28 | 8082 PCB |
| 4 | Nitrite N | 9 | BOD | 14 | Turbidity | 19 | VT PCF | 24 | 8260B | 29 | PP13 Metals |
| 5 | Nitrate N | 10 | Alkalinity | 15 | Conductivity | 20 | VOC Halocarbons | 25 | 8270 B/N or Acid | 30 | Total RCRA8 |
| 31 | Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn | | | | | | | | | | |
| 32 | TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides) | | | | | 33 | Other | | | | |
| 34 | Corrosivity | 35 | Ignitability | 36 | Reactivity | 37 | Other | | | | |
| 38 | Other | | | | | | | | | | |

LAB USE ONLY
Delivery: Client
Temp: 3.5
Comment:

(White - Laboratory / Yellow - Client)

# APPENDIX 4

# OCTOBER DISCHARGE REPORTS

Waite - Heindel
Environmental Management

September 28, 2016

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier, VT 05620-3522

Re: Monitoring Report Form for NOI #3-4220 – September 2016
Young Residence, 22 N Williams Street, Burlington, VT (SMS Site #2013-4436)

Dear Data Clerk:

Enclosed please find the September 2016 monitoring report for the Young Residence (NOI #3-4220) located in Burlington, VT.

September 2016 was the second month of metered discharge. A total of 131.2 gallons was discharged from August 16th to September 20th, which is below the anticipated flow rate for the system; this is likely due to generally dry conditions observed throughout the late summer and into September. At no point has the treatment system malfunctioned, allowing the discharge of contaminated water above discharge limits. Both influent (one sample) and effluent samples (two samples) were non-detected for VOCs in September 2016.

Please do not hesitate to contact me at 802-860-9400 x104 or cpage@waiteenv.com with any questions you may have.

Sincerely,

Chris Page

Christopher Page
Project Scientist

Enclosures
cc: Bill Young
Steve Roy - City of Burlington
Hugo Martinez-Cazón-Waste Management and Prevention Division (via email)

\\SERVER\DATA\PROJECTS - WHEM\YOUNG WILLIAMS STREET\DISCHARGE PERMIT\MONTHLY REPORTS\YOUNG DISCHARGE MONITORING SEPTEMBER 2016.DOCX

# ATTACHMENT

# MONITORING REPORT FOR DISCHARGES FROM PETROLEUM RELATED REMEDIATION ACTIVITIES AUTHORIZED BY GENERAL PERMIT 3-9004 and 3-9016

**PERMITTEE:** Bill Young
**ADDRESS:** 28 N. Williams Street
Burlington VT 05401
**PHONE:** 802-862-8018

**NOI#** 3-4220.1605
**Discharge Point** Burlington POTW-LaVallee Ln
**Monitoring Period** 09/16
**Month/Year**

**NOIs authorized by both General Permits must monitor the influent at least once per month.**

| PARAMETERS | FLOW | BENZENE | TOTAL BTEX | MTBE | TPH * |
|---|---|---|---|---|---|
| UNITS OF MEASURE: | GALLONS | ppb | ppb | ppb | ppb |
| FREQUENCY OF MEASURE: | 1x per month | 2x per month | 2x per month | 2x per month | 2x per month |
| SAMPLE TYPE: | MEASURED TOTAL | GRAB | GRAB | GRAB | GRAB |
| LIMIT: | Not to exceed pump capacity | 5 ppb | 50 ppb | monitor only | 1000 ppb |
| SAMPLE DATE: | INFLUENT SAMPLE RESULTS | | | | |
| 9/20/2016 | — | <1.0 | <5.0 | <2.0 | <400 |
| | | | | | |
| SAMPLE DATE: | INDIVIDUAL EFFLUENT SAMPLE RESULTS | | | | |
| 9/6/2016 | 91.04 | <1.0 | <5.0 | <2.0 | <400 |
| 9/20/2016 | 40.17 | <1.0 | <5.0 | <2.0 | <400 |
| | | | | | |
| | | | | | |
| FLOW TOTAL: | 131.2 | | | | |
| AVERAGE: | 65.61 | <1.0 | <5.0 | <2.0 | <400 |

- General Permit 3-9004 **and** General Permit 3-9016 = Effluent discharges lasting less than two weeks in duration shall be sampled a minimum of two times for those parameters listed above. Influent shall be sampled a minimum of one time.
- If sample results indicate that the effluent does not meet limits, take an additional effluent sample within 3 business days of receiving the results.
- Flow shall be measured as the total gallons discharged since the last meter reading. Flows may be measured or estimated by use of integrating timers on pumps, or by use of a weir or flume and a continuous recording flow meter.
- *** TPH monitoring is required if the source is diesel, heating oil, kerosene, and or jet fuel.**

**COMMENT AND EXPLANATION OF ANY VIOLATIONS:** ***(Reference all attachments here)***

**Prepared by:** Chris Page, WHEM PRINT: Chris Page Phone: 802 860 9400 x104

**I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.**

**Approved by:** _____ _____
(Authorized Agei

Mail report form to:

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier VT 05620-3522

**Do not attach lab sheets.** Retain them as required in Part III.H.

Waite-Heindel
Environmental Management

November 8, 2016

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier, VT 05620-3522

Re: Monitoring Report Form for NOI #3-4220 – October 2016
Young Residence, 22 N Williams Street, Burlington, VT (SMS Site #2013-4436)

Dear Data Clerk:

Enclosed please find the September 2016 monitoring report for the Young Residence (NOI #3-4220) located in Burlington, VT.

October 2016 was the third month of metered discharge. A total of 53.79 gallons was discharged from September 20 to October 18, which is well below the anticipated flow rate for the system. This is likely due to the generally dry conditions observed throughout this monitoring period; precipitation increased in late October, largely after the October 18 sampling date. At no point has the treatment system malfunctioned, allowing the discharge of contaminated water above discharge limits. The influent sample showed low levels of Ethylene, Xylenes, Trimethylbenzenes, Naphthalene, and TPH-DRO, all below groundwater enforcement standards. The effluent sample was non-detected for VOCs in October 2016.

Please do not hesitate to contact me at 802-860-9400 x104 or cpage@waiteenv.com with any questions you may have.

Sincerely,

Christopher Page
Project Scientist

Enclosures
cc: Bill Young
Steve Roy - City of Burlington
Hugo Martinez-Cazón-Waste Management and Prevention Division (via email)



TEL: 802-860-9400 • Fax: 802-860-9440 • www.waiteenv.com • 7 Kilburn St., Suite 301, Burlington, VT 05401

# ATTACHMENT

# MONITORING REPORT FOR DISCHARGES FROM PETROLEUM RELATED REMEDIATION ACTIVITIES AUTHORIZED BY GENERAL PERMIT 3-9004 and 3-9016

**PERMITTEE:** Bill Yaney
**ADDRESS:** 28 N. Williams Street
Burlington VT 05401
**PHONE:** 802-862-8018

**NOI#** 3-4220-1605
**Discharge Point** Burlington POTW - Lavelley Lane
**Monitoring Period** October 2016
**Month/Year**

**NOIs authorized by both General Permits must monitor the influent at least once per month.**

| PARAMETERS | FLOW | BENZENE | TOTAL BTEX | MTBE | TPH * |
|---|---|---|---|---|---|
| UNITS OF MEASURE: | GALLONS | ppb | ppb | ppb | ppb |
| FREQUENCY OF MEASURE: | 1x per month | 2x per month | 2x per month | 2x per month | 2x per month |
| SAMPLE TYPE: | MEASURED TOTAL | GRAB | GRAB | GRAB | GRAB |
| LIMIT: | Not to exceed pump capacity | 5 ppb | 50 ppb | monitor only | 1000 ppb |
| SAMPLE DATE: | INFLUENT SAMPLE RESULTS | | | | |
| 10/18/16 | — | ND/<1.0 | 16.4 | ND/<2.0 | 0.67 |
| | | | | | |
| SAMPLE DATE: | INDIVIDUAL EFFLUENT SAMPLE RESULTS | | | | |
| 10/5/16 | 27.9 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |
| 10/18/16 | 25.9 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |
| | | | | | |
| | | | | | |
| FLOW TOTAL: | 53.8 | | | | |
| AVERAGE: | 27 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |

- General Permit 3-9004 **and** General Permit 3-9016 = Effluent discharges lasting less than two weeks in duration shall be sampled a minimum of two times for those parameters listed above. Influent shall be sampled a minimum of one time.
- If sample results indicate that the effluent does not meet limits, take an additional effluent sample within 3 business days of receiving the results.
- Flow shall be measured as the total gallons discharged since the last meter reading. Flows may be measured or estimated by use of integrating timers on pumps, or by use of a weir or flume and a continuous recording flow meter.
- *** TPH monitoring is required if the source is diesel, heating oil, kerosene, and or jet fuel.**

**COMMENT AND EXPLANATION OF ANY VIOLATIONS:** *(Reference all attachments here)*

**Prepared by:** _____ PRINT: Chris Page, WHEM Phone: 802 862 4442 x104

**I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.**

**Approved by:** _____
(Authorized Agent)

Mail report form to:

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier VT 05620-3522

**Do not attach lab sheets.** Retain them as required in Part III.H.

Waite-Heindel
Environmental Management

November 22, 2016

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier, VT 05620-3522

Re: Monitoring Report Form for NOI #3-4220 – October 2016
Young Residence, 22 N Williams Street, Burlington, VT (SMS Site #2013-4436)

Dear Data Clerk:

Enclosed please find the November 2016 monitoring report for the Young Residence (NOI #3-4220) located in Burlington, VT.

November 2016 was the 4th month of metered discharge. A total of 261.1 gallons was discharged from October 18 to November 15, which is below the anticipated flow rate for the system but significantly higher than previous months. This is likely due to an increase in precipitation over the monitoring period relative to the dry months preceding it. At no point has the treatment system malfunctioned, allowing the discharge of contaminated water above discharge limits. The influent sample showed low levels of Benzene, Ethylene, Xylenes, Trimethylbenzenes, and Naphthalene, all below groundwater enforcement standards. The effluent sample was non-detected for VOCs in November 2016, with no Unidentified Peaks.

Please do not hesitate to contact me at 802-860-9400 x104 or cpage@waiteenv.com with any questions you may have.

Sincerely,

Christopher Page
Project Scientist

Enclosures
cc: Bill Young
Steve Roy - City of Burlington
Hugo Martinez-Cazón-Waste Management and Prevention Division (via email)



TEL: 802-860-9400 • Fax: 802-860-9440 • www.waiteenv.com • 7 Kilburn St., Suite 301, Burlington, VT 05401

# ATTACHMENT

# MONITORING REPORT FOR DISCHARGES FROM PETROLEUM RELATED REMEDIATION ACTIVITIES AUTHORIZED BY GENERAL PERMIT 3-9004 and 3-9016

**PERMITTEE:** Bill Young
**ADDRESS:** 28 North Williams Street
Burlington, VT 05401
**PHONE:** 802- 862- 8018

**NOI#** 3-4220.1605
**Discharge Point** Burlington - Lavalley Lane
**Monitoring Period** 11/2016
Month/Year

**NOIs authorized by both General Permits must monitor the influent at least once per month.**

| PARAMETERS | FLOW | BENZENE | TOTAL BTEX | MTBE | TPH * |
|---|---|---|---|---|---|
| UNITS OF MEASURE: | GALLONS | ppb | ppb | ppb | ppb |
| FREQUENCY OF MEASURE: | 1x per month | 2x per month | 2x per month | 2x per month | 2x per month |
| SAMPLE TYPE: | MEASURED TOTAL | GRAB | GRAB | GRAB | GRAB |
| LIMIT: | Not to exceed pump capacity | 5 ppb | 50 ppb | monitor only | 1000 ppb |
| SAMPLE DATE: | INFLUENT SAMPLE RESULTS | | | | |
| 11/15/2016 | | 1.2 | <21.4 | ND/<2.0 | ND/<0.4 |
| | | | | | |
| SAMPLE DATE: | INDIVIDUAL EFFLUENT SAMPLE RESULTS | | | | |
| 11/1/16 | 79.2 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |
| 11/15 | 181.9 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |
| | | | | | |
| | | | | | |
| FLOW TOTAL: | 261.1 | | | | |
| AVERAGE: | 130.5 | ND/<1.0 | ND/<5.0 | ND/<2.0 | ND/<0.4 |

- General Permit 3-9004 **and** General Permit 3-9016 = Effluent discharges lasting less than two weeks in duration shall be sampled a minimum of two times for those parameters listed above. Influent shall be sampled a minimum of one time.
- If sample results indicate that the effluent does not meet limits, take an additional effluent sample within 3 business days of receiving the results.
- Flow shall be measured as the total gallons discharged since the last meter reading. Flows may be measured or estimated by use of integrating timers on pumps, or by use of a weir or flume and a continuous recording flow meter.
- *** TPH monitoring is required if the source is diesel, heating oil, kerosene, and or jet fuel.**

**COMMENT AND EXPLANATION OF ANY VIOLATIONS:** ***(Reference all attachments here)***

**Prepared by:** [signature] PRINT: Chris Page, WHEM Phone: 802 860 9400 x104

**I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.**

**Approved by:** [signature]
(Authorized Agent)

Mail report form to:

Data Clerk
Watershed Management Division
One National Life Drive
Montpelier VT 05620-3522

**Do not attach lab sheets.** Retain them as required in Part III.H.