
**West Street Corner Store
(Former Dart Mart II)
377 West Street
Rutland, Vermont 05701**

VTDEC Site #87-0105; KAS Job #410040120

AUGUST 2015 GROUNDWATER MONITORING REPORT

September 15, 2015

Prepared for:

Father & Son Enterprises
377 West Street
Rutland, Vermont 05701



368 Avenue D, Suite 15
PO Box 787
Williston, VT 05495

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802 383.0486 p
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1.0 Introduction

This report summarizes results of the August 2015 round of groundwater monitoring conducted at the West Street Corner Store (former Dart Mart II). The West Street Corner Store is located on the corner of Route 4 and Cramton Avenue in Rutland, Vermont. A site location map is included in Appendix A.

This work was conducted by KAS, Inc. (KAS) for Father & Son Enterprises of Rutland, Vermont. Groundwater monitoring is being performed according to KAS' work plan and cost estimate dated March 11, 2015, approved by Mr. James Donaldson of the Vermont Department of Environmental Conservation (VTDEC) on March 17, 2015 and in accordance with electronic mail (email) correspondence with Mr. James Donaldson. Continued annual groundwater monitoring was approved by Mr. James Donaldson in an email message dated March 17, 2015.

The sources of contamination at this Site were two gasoline underground storage tanks (USTs) removed in December, 1998. The Site has been monitored since 2001 to ensure that the processes of natural attenuation are effectively reducing contaminant concentrations over time. In November 2008, KAS conducted a closure assessment of two additional gasoline USTs. Approximately 120 tons of contaminated soil from the site was excavated and moved to an off-site location in November 2008 during UST replacement activities. This soil was removed for disposal on April 21, 2009 and May 20, 2009.

2.0 Determination of Groundwater Flow Direction and Gradient

Liquid level measurements were obtained on August 11, 2015 from the two site monitoring wells, MW-1 and MW-2. A Site map indicating the location of the monitoring wells is presented in Appendix A. The monitoring wells were gauged with a Keck™ interface probe to collect the depth to groundwater measurements, and also to detect the presence of free product. Free product was not measured in either well. Depth to water was measured at 19.48 feet below top of casing (btoc) in MW-1. MW-2 was measured dry on August 11, 2015. This well has consistently been dry during past monitoring events. Liquid level measurements, present and historic, are located in Appendix B.

The relative water table elevations for the monitoring wells were obtained by subtracting the depth to water from the top of casing elevation. The groundwater elevations obtained from the August 11, 2015 sampling event were plotted and are presented in Appendix A (see Groundwater Elevation Map). Based on geologic knowledge and observation, the groundwater presumably flows in a south-southwest direction.

3.0 Groundwater Sample Collection and Analysis

A groundwater sample was collected from MW-1 on August 11, 2015. The sample was analyzed by Endyne, Inc (Williston, VT) for major petroleum volatile organic compounds (VOCs) using EPA Method 8021B. The groundwater sample was collected using a disposable bailer



according to KAS' groundwater sampling protocol, stored on ice in the field, and submitted to Endyne, Inc. under proper chain-of-custody procedures. Analytical results of the groundwater sample are presented in Appendix C.

For MW-1 the laboratory data indicated the presence of benzene and total trimethylbenzene in the sample at concentrations greater than the Vermont Groundwater Enforcement Standard (VGES). Other dissolved hydrocarbons present in the sample were at concentrations lower than the VGES. Contaminant concentrations in groundwater collected from MW-1 remain lower than peak concentration levels detected during the October 5, 2004 sampling event but continue to fluctuate over time. No clear declining trend has been established since 2005.

Analytical results of the groundwater sample collected on August 11, 2015 from MW-1 is summarized and graphed in Appendix C along with the applicable VGES for the target petroleum compounds. The laboratory analysis report for the August 11, 2015 sampling data is included in Appendix D. The analytical results from the August 11, 2015 sampling event were plotted to identify the contamination concentrations (see the Contaminant Concentration Map in Appendix A).

3.1 Quality Assurance and Quality Control

One trip blank and one duplicate sample were collected for quality assurance/quality control (QA/QC). The results of the duplicate sample analysis were analyzed using a relative percent difference (RPD) method. The RPD is defined as 100 times the difference between the sample result and the duplicate result, divided by the mean of the sample and duplicate result. The RPD calculations are presented in the Groundwater Quality Summary in Appendix C. A low RPD value indicates a good correlation between two samples, while a high RPD indicates a poor correlation. The RPD values ranged from a high of 9.7% for ethylbenzene to a low of 2.3% for benzene with an overall RPD of 2.4% indicating a good correlation. The effect of spurious influences on sample quality was insignificant, as none of the tested compounds were reported above detection limits in the trip blank collected on August 11, 2015.

4.0 Conclusions

Based on the results of the August 2015 groundwater monitoring event and historical data collected to date, KAS has reached the following conclusions:

- Monitoring well MW-2 was unable to be gauged and sampled in August 2015. Results obtained during the April 2014 monitoring event indicated contaminant concentrations were below VGES at this location;
- The laboratory data for monitoring well MW-1 indicates benzene and total trimethylbenzene concentrations have fluctuated over time, however, concentrations remain lower than peak concentration levels detected during the October 5, 2004 sampling event;
- The removal of approximately 120 tons of contaminated soil in November 2008 along with the natural attenuation processes has reduced contaminant concentrations in the groundwater beneath the site; and
- No sensitive receptors appear to be at risk other than soil and groundwater at this time



5.0 Recommendations

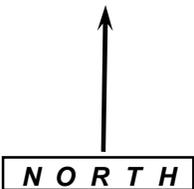
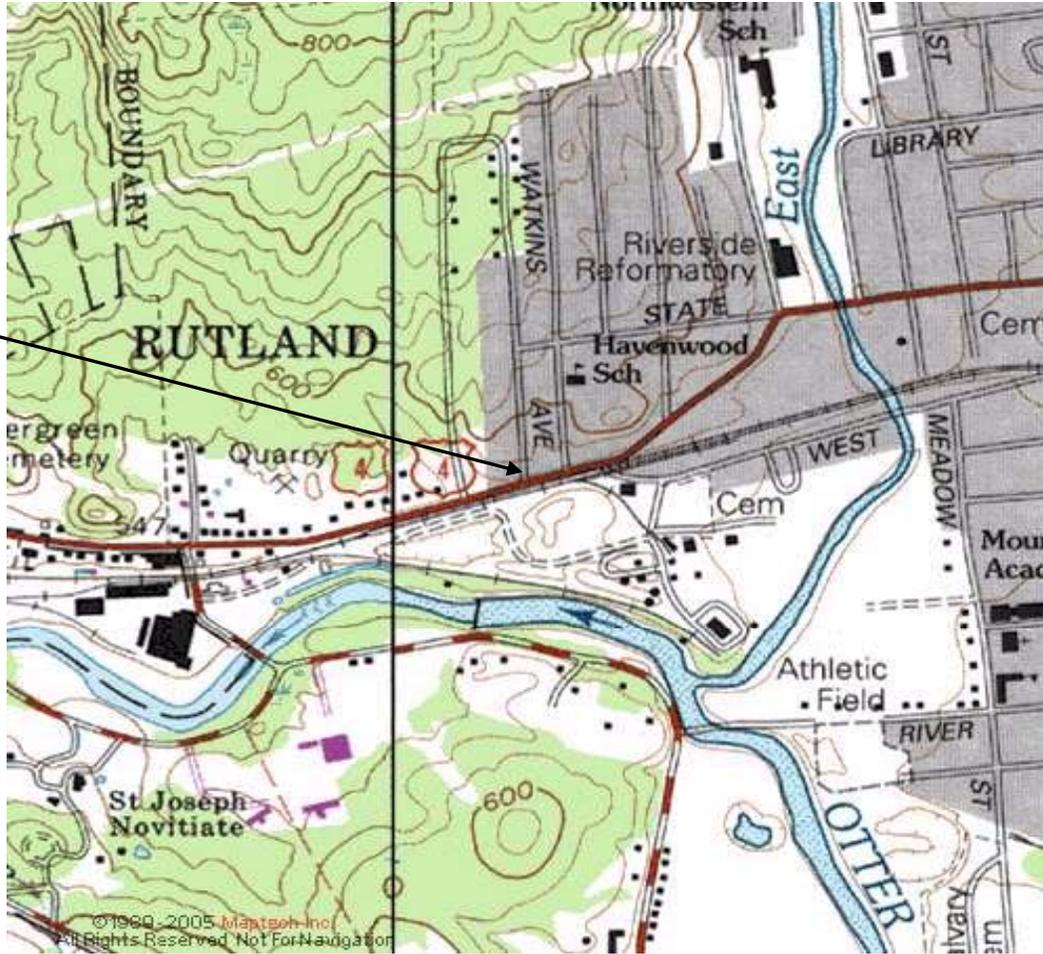
Since VOC concentrations in groundwater continue to show no clear declining trend, KAS recommends a confirmatory groundwater monitoring event be conducted in August 2016. If all compounds are stable or declining in monitoring well MW-1, a Site Management Activity Complete (SMAC) status with notice to Land Records should be considered. The next round of groundwater monitoring should be scheduled for August of 2016. Both monitoring wells (MW-1 and MW-2) should be sampled via EPA Method 8021B. If MW-2 is dry, it is recommended a sample still be collected from MW-1.



Appendix A

- 1) Site Location Map**
- 2) Site Map**
- 3) Groundwater Elevation Map**
- 4) Contaminant Concentration Map**

SITE



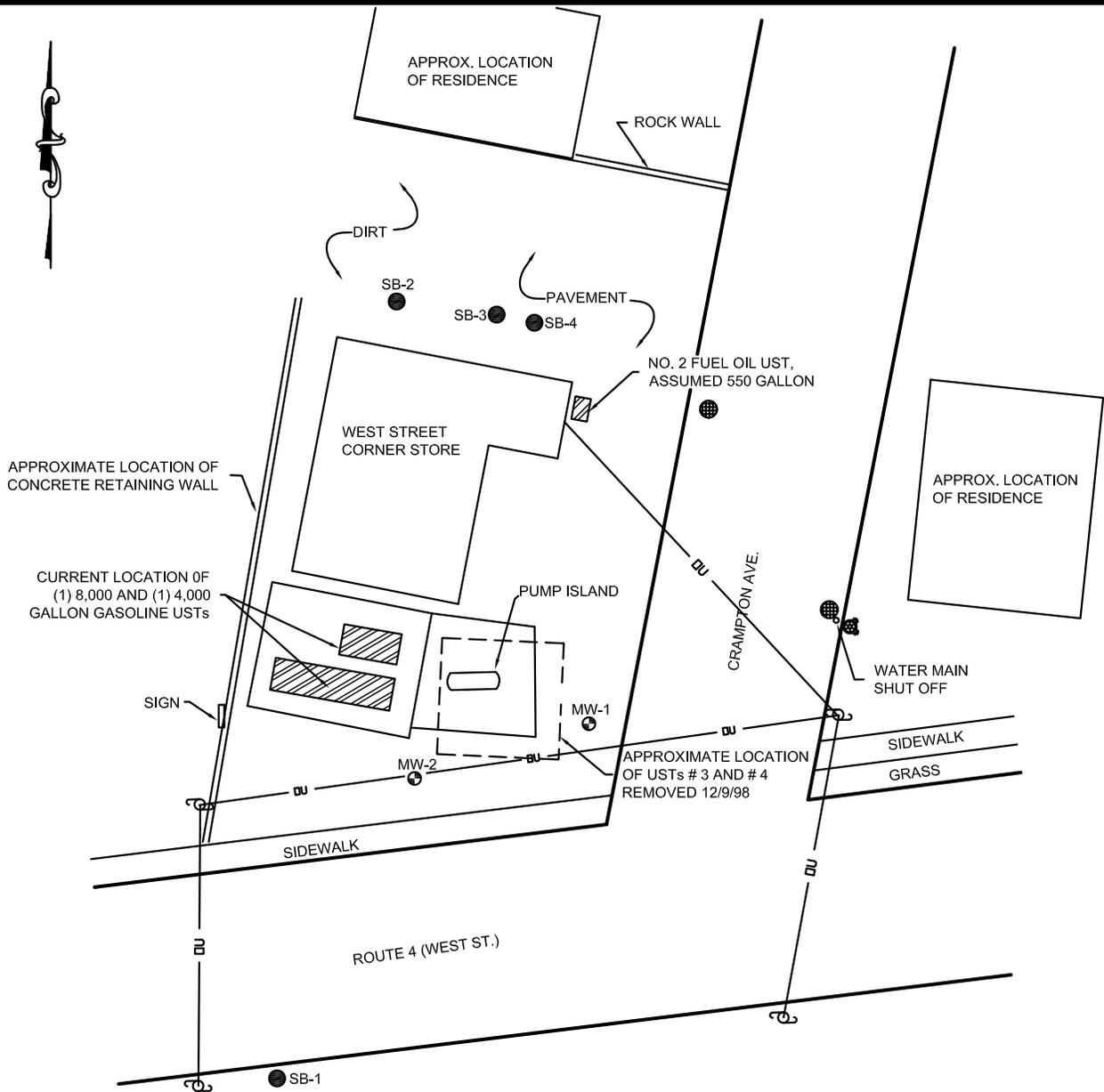
SMS Site#: 87-0105
 Source: www.maptech.com



**West Street Corner Store
 Rutland, Vermont**

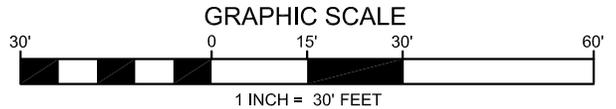
Site Location Map

Date: 04/19/13	Drawing No. 1	Scale: NTS	By: JM
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LEGEND

- MW-1  MONITORING WELL
-  HYDRANT
-  MANHOLE
-  TELEPHONE POLE
- SB-1  APPROX. LOCATION OF SOIL BORING
- OU — OVERHEAD UTILITIES



SITE SURVEY BY GRIFFIN INTERNATIONAL, 4/14/00

VTDEC SITE #: 87-0105
 ESPC #: 20044026
 KAS #: 410040120

368 Avenue D, Suite 15
 PO Box 787
 Williston, VT 05495

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WEST STREET CORNER STORE
 ROUTE 4 (WEST ST.), RUTLAND, VT

SITE MAP

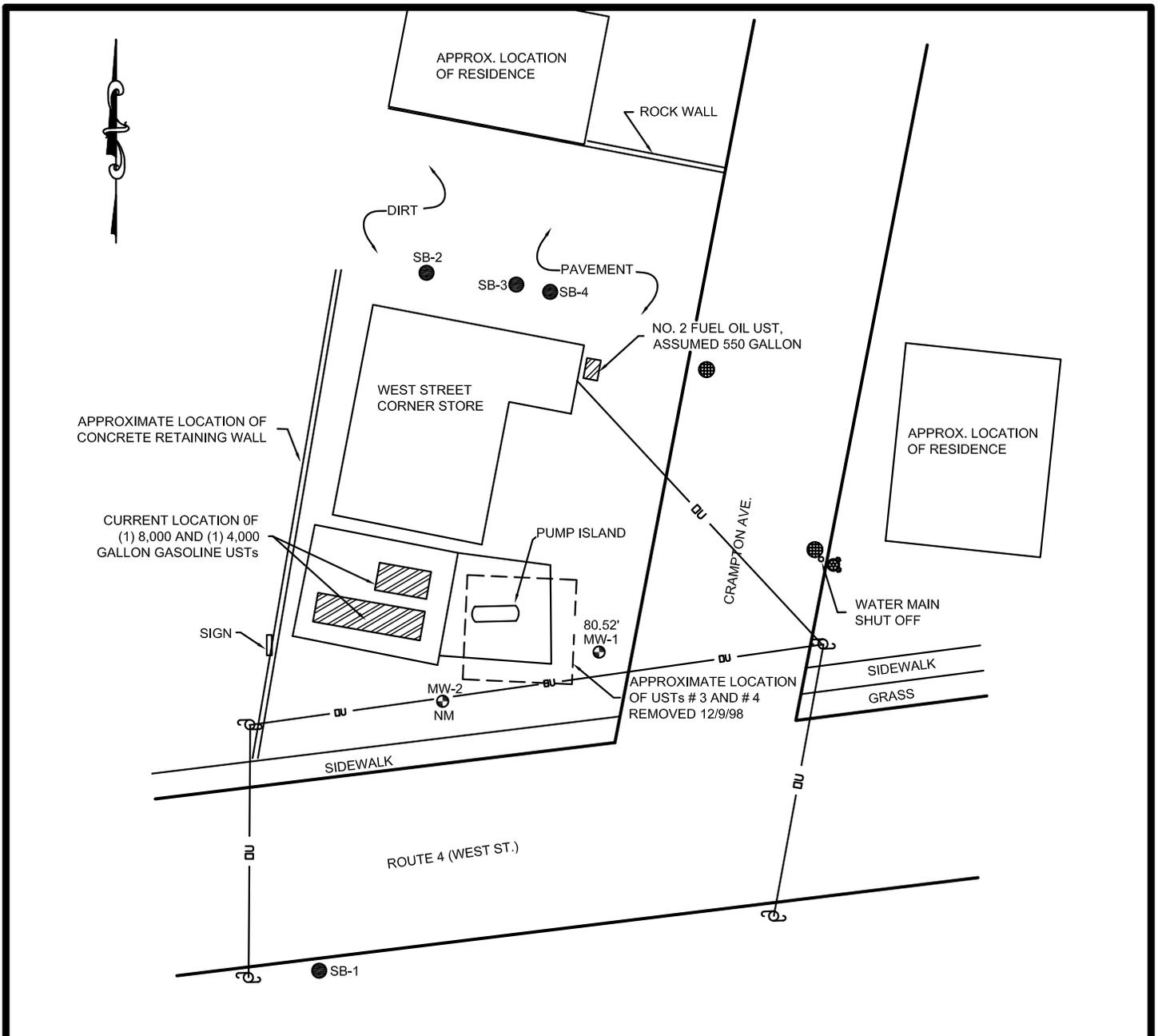
DATE: 9/14/15

DWG.#: 1

SCALE: 1" = 30'

DRN.: TB

APP.: JD

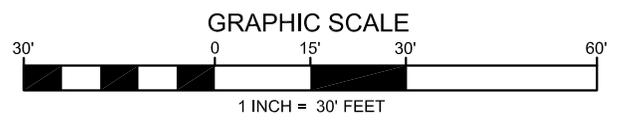


LEGEND

- MW-1

 MONITORING WELL WITH GROUNDWATER ELEVATION (ft)
- NM
 NOT MEASURED
- HYDRANT
- MANHOLE
- TELEPHONE POLE
- SB-1

 APPROX. LOCATION OF SOIL BORING
- OU —
 OVERHEAD UTILITIES



SITE SURVEY BY GRIFFIN INTERNATIONAL, 4/14/00

VTDEC SITE #: 87-0105
 ESPC #: 20044026
 KAS #: 410040120

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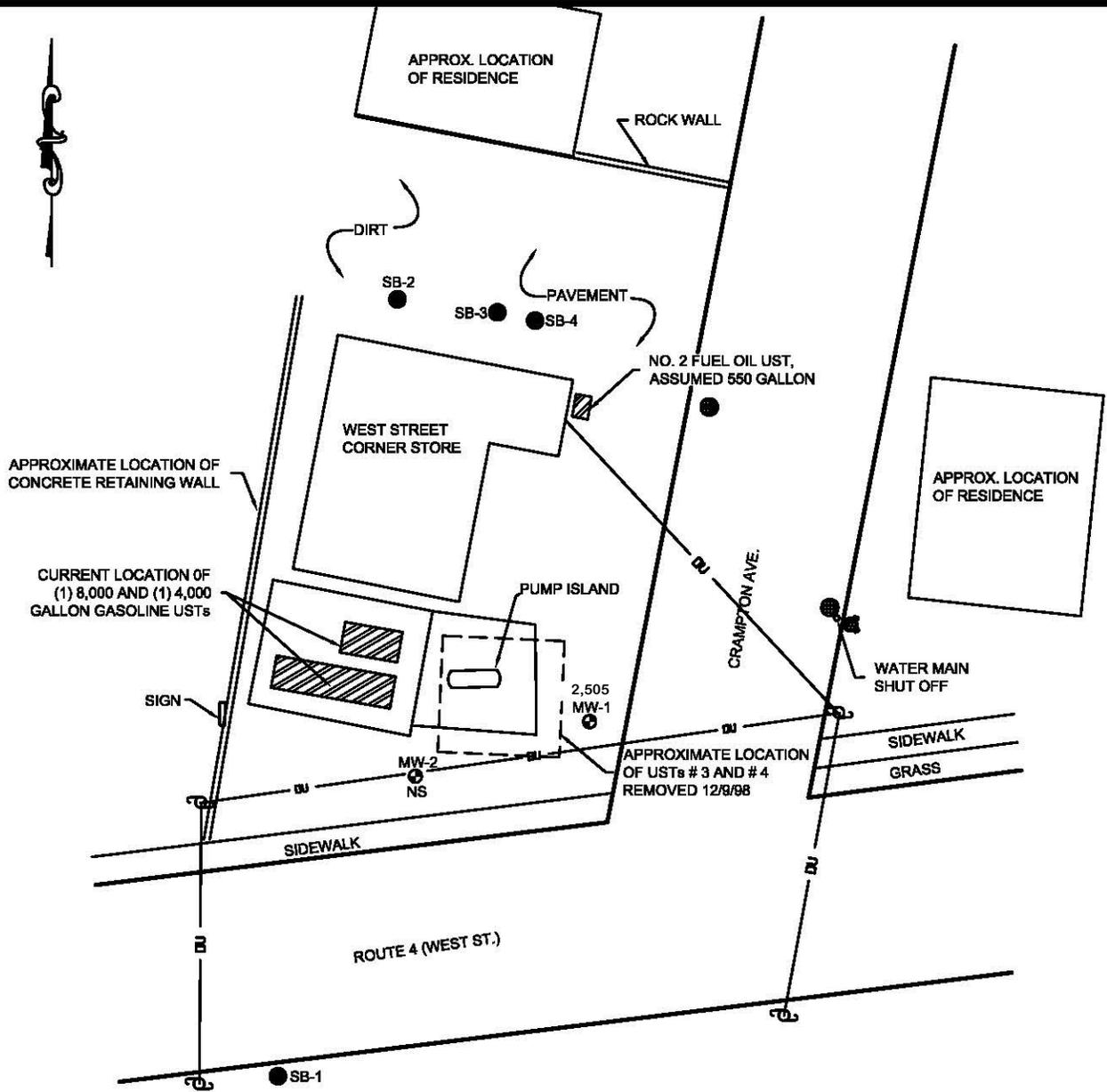
WEST STREET CORNER STORE

ROUTE 4 (WEST ST.), RUTLAND, VT

GROUNDWATER ELEVATION MAP

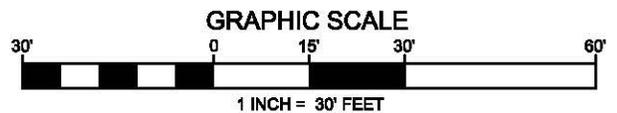
MEASURED: 8/11/15

DATE: 9/14/15	DWG.#: 2	SCALE: 1" = 30'	DRN.: TB	APP.: JD
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LEGEND

- MW-1
12,505 MONITORING WELL WITH TOTAL TARGETED VOCs CONCENTRATION (ppb; M=8021B)
- HYDRANT
- MANHOLE
- TELEPHONE POLE
- SB-1
APPROX. LOCATION OF SOIL BORING
- OVERHEAD UTILITIES
- NS NOT SAMPLED
- ND NONE DETECTED



SITE SURVEY BY GRIFFIN INTERNATIONAL, 4/14/00

VTDEC SITE #: 87-0105
ESPC #: 20044026
KAS #: 410040120

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WEST STREET CORNER STORE
ROUTE 4 (WEST ST.), RUTLAND, VT

CONTAMINANT CONCENTRATION MAP

SAMPLED: 8/11/15

DATE: 9/14/15

DWG.#: 3

SCALE: 1" = 30'

DRN.: TB

APP.: JD



Appendix B

Liquid Level Monitoring Data



Liquid Level Data
West Sreet Corner Store (Former Dart Mart II)
Rutland, Vermont

Monitoring Date: 08/11/15

<i>Well I.D.</i>	<i>Well Depth</i>	<i>Top of Casing Elevation</i>	<i>Depth To Product</i>	<i>Depth To Water</i>	<i>Corrected Depth To Water</i>	<i>Corrected Water Table Elevation</i>
MW-1	23	100.00	-	19.48	-	80.52
MW-2	20	99.14	-	-	-	-

Notes:

All Values Reported in feet

NM - Not Measured

Elevations are based on Arbitrary Datum



Historic Liquid Level Monitoring Data

Well I.D.	Measurement Date:							
	4/14/2000	10/5/2004	4/14/2005	4/4/2006	5/2/2007	5/1/2008	4/21/2009	3/26/2010
MW-1	83.93	80.4	84.11	81.47	85.14	84.31	83.98	83.77
MW-2	83.32	DRY	83.27	DRY	84.48	83.82	83.68	83.49

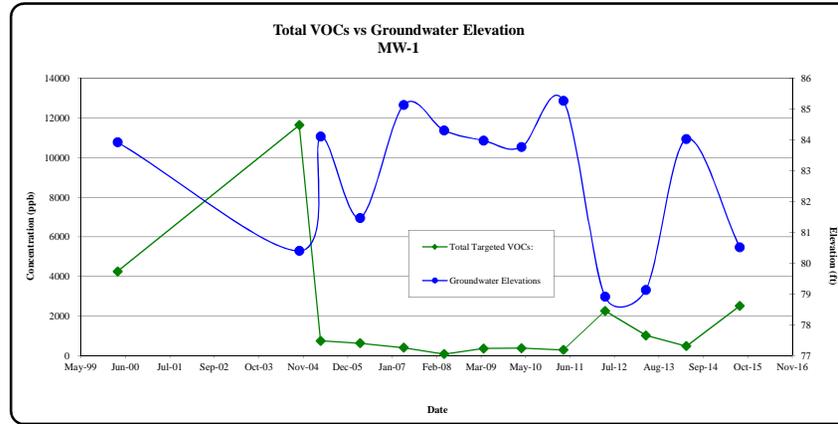
Well I.D.	Measurement Date:							
	4/8/2011	4/17/2012	4/19/2013	4/18/2014	8/11/2015			
MW-1	85.27	78.91	79.13	84.03	80.52			
MW-2	84.59	<81.14*	<81.14*	83.50	<81.14*			

*bottom of well measured at 18 feet



Appendix C

Groundwater Quality Summary



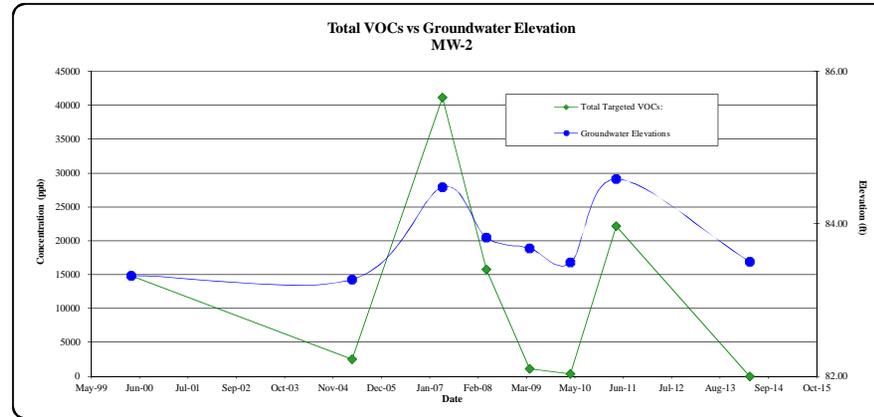
Groundwater Quality Summary MW-1

8021 B PARAMETER	Sample Date								VGES
	4/14/2000	10/5/2004	4/14/2005	4/4/2006	5/2/2007	5/1/2008	4/21/2009	3/26/2010	
Benzene	399.	1,030.	62.9	34.0	ND<10.0	1.3	3.6	ND<5.0	5
Toluene	1,150.	4,940.	289.	257.	59.9	14.3	69.0	98.8	1000
Ethylbenzene	218.	605.	38.1	34.4	12.4	1.7	6.4	21.6	700
Xylenes	1,250.	4,140.	258.	250.	219.	19.9	139	148	10,000
Total BTEX:	3,017.	10,715.	648.	575.	291.	37.2	218	268	-
Total Trimethylbenzene	611.	731.	89.5	47.9	102.	35.5	129.3	90.4	350
Naphthalene	109.	ND<100	5.0	ND<5.0	ND<20.0	2.7	5.9	10.8	20
MTBE	515.	200.	ND<10.0	ND<10.0	ND<20.0	ND<2.0	ND<2.0	ND<10.0	40
Total Targeted VOCs:	4252	11646	743	623	394	75.4	353	370	-

8021 B PARAMETER	Sample Date					VGES
	4/8/2011	4/17/2012	4/19/2013	4/18/2014	8/11/2015	
Benzene	ND<1.0	66.3	44.2	5.0	21.8	5
Toluene	27.8	824	368.	121.	373	1000
Ethylbenzene	13.1	164	103	35.4	51.8	700
Xylenes	130	974	343.	234.	1,610	10,000
Total BTEX:	171	2028	858.	395.	2,057	-
Total Trimethylbenzene	102.9	228.7	134.3	77.6	448	350
Naphthalene	7.3	ND<20.0	19.0	5.7	ND<10.0	20
MTBE	ND<2.0	ND<20.0	4.7	ND<2.0	ND<10.0	40
Total Targeted VOCs:	281	2257	1016	479	2505	-

NOTES:

All values reported in ug/l (ppb) unless otherwise noted
 Results reported above detection limits are indicated in bold
 Values greater than the VGES are shaded.
 ND-X - Not Detected (Detection Limit); TBQ < X Trace Below Quantitation Limit
 NS - Not Sampled



Groundwater Quality Summary MW-2

8021 B PARAMETER	Sample Date								VGES
	4/14/2000	10/5/2004	4/14/2005	4/4/2006	5/2/2007	5/1/2008	4/21/2009	3/26/2010	
Benzene	1,550.		297.		3,810.	910.	63.1	19.7	5
Toluene	4,360.	Not Sampled	753.	Not Sampled	21,100.	8,970.	400	140	1000
Ethylbenzene	756.	(Well Dry)	129.	(Well Dry)	1,920.	788.	57.3	23.6	700
Xylenes	4,490.		794.		10,700.	4,390.	407	139	10,000
Total BTEX:	11,156		1,973		37,530	15,058	927	322	-
Total TMB	2,139.		410.		2,561.	740.	112.4	52.8	350
Naphthalene	461.		104.		569.	ND<400	17.3	ND<10.0	20
MTBE	1,020.		ND<200		457.	ND<400	17.0	ND<10.0	40
Total Targeted VOCs:	14,776	NS	2,487	NS	41,117	15,798	1,074	375	-

8021 B PARAMETER	Sample Date						VGES
	4/8/2011	4/17/2012	4/19/2013	4/18/2014	8/11/2015		
Benzene	1,060.	NS	NS	ND<1.0	NS		5
Toluene	9,910.			ND<1.0			1000
Ethylbenzene	1,170.			ND<1.0			700
Xylenes	7,660.	Well	Well	ND<2.0	Well		10,000
Total BTEX:	19,800	Dry	Dry	ND	Dry		-
Total TMB	1,920.			ND<1.0			350
Naphthalene	448.			ND<2.0			20
MTBE	ND<200	NS	NS	ND<2.0	NS		40
Total Targeted VOCs:	22,168			ND			-

NOTES:

All values reported in ug/l (ppb) unless otherwise noted
 Results reported above detection limits are indicated in bold
 Values greater than the VGES are shaded
 ND<X - Not Detected (Detection Limit); TBQ < X Trace Below Quantitation Limit
 NS - Not Sampled



**Quality Assurance and Control Summary
West Street Corner Store (Former Dart Mart)
Rutland, Vermont**

PARAMETER	MONITORING DATE				
	8/11/2015				
	Trip Blank	MW-1	MW-1 Duplicate	RPD	VGES
Benzene	ND< 1.0	21.8	21.3	2.3%	5
Toluene	ND< 1.0	373	397	6.2%	1000
Ethylbenzene	ND< 1.0	51.8	57.1	9.7%	700
Xylenes	ND< 2.0	1610	1570	2.5%	10,000
Total BTEX:	ND	2057	2045	0.5%	-
Total Trimethylbenzene	ND< 1.0	448	459	2.4%	350
Naphthalene	ND< 2.0	ND< 10.0	ND< 10.0	na	20
MTBE	ND< 2.0	ND< 10.0	ND< 10.0	na	40
Total Targeted VOCs:	ND	2505	2504	2.4%	-

NOTES

Results reported above detection limits are indicated in bold
 * TMB = Trimethyl Benzene
 EPA Method 8021B used for laboratory analysis
 All values reported in ug/l (ppb) unless otherwise noted
 Values greater than the VGES are shaded.

ND<X - Not Detected (Detection Limit)
 TBQ <X = Trace Below Quantitation Limit
 NA - Not analyzed for this parameter
 na = not applicable



Appendix D

Analytical Laboratory Report



Laboratory Report

KAS, Inc.	100306
PO Box 787	
Williston, VT 05495	
Atten: Sam Driver	

PROJECT: 410040120 West St Corner Store

WORK ORDER: **1508-16831**

DATE RECEIVED: August 12, 2015

DATE REPORTED: August 18, 2015

SAMPLER: Sam Driver

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

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



CLIENT: KAS, Inc.
 PROJECT: 410040120 West St Corner Store
 REPORT DATE: 8/18/2015

WORK ORDER: **1508-16831**
 DATE RECEIVED: 08/12/2015

TEST METHOD: EPA 8021B

001 Site: MW-1 Date Sampled: 8/11/15 09:46 Analysis Date: 8/14/15 W MHM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>
Methyl-t-butyl ether (MTBE)	< 10.0	ug/L	N		Benzene	21.8	ug/L	N	
Toluene	373	ug/L	N		Ethylbenzene	51.8	ug/L	N	
Xylenes, Total	1,610	ug/L	N		1,3,5-Trimethylbenzene	185	ug/L	N	
1,2,4-Trimethylbenzene	263	ug/L	N		Naphthalene	< 10.0	ug/L	N	
Surr. 1 (Bromobenzene)	105	%	N		Unidentified Peaks	> 10		N	

TEST METHOD: EPA 8021B

002 Site: Duplicate Date Sampled: 8/11/15 09:46 Analysis Date: 8/14/15 W MHM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>
Methyl-t-butyl ether (MTBE)	< 10.0	ug/L	N		Benzene	21.3	ug/L	N	
Toluene	397	ug/L	N		Ethylbenzene	57.1	ug/L	N	
Xylenes, Total	1,570	ug/L	N		1,3,5-Trimethylbenzene	189	ug/L	N	
1,2,4-Trimethylbenzene	270	ug/L	N		Naphthalene	< 10.0	ug/L	N	
Surr. 1 (Bromobenzene)	105	%	N		Unidentified Peaks	> 10		N	

TEST METHOD: EPA 8021B

003 Site: Trip Blank Date Sampled: 8/10/15 15:46 Analysis Date: 8/14/15 W MHM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Nelac</u>	<u>Qual</u>
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)	108	%	N		Unidentified Peaks	0		N	

