October 21, 2016

Mr. Jim Richmond
Oil Control Program
Maryland Department of the Environment
1800 Washington Blvd, Suite 620
Baltimore, Maryland 21230

RE: **Request for Monitoring Reduction**
Monrovia BP/Former Green Valley Citgo
11791 Fingerboard Road
Monrovia, Maryland
OCP Case #2005-0834-FR

Dear Mr. Richmond,

Groundwater & Environmental Services, Inc. (GES), on behalf of Carroll Independent Fuel Company (CIFC), respectfully submits this Request for Monitoring Reduction for select monitoring wells and potable locations related to OCP case #2005-0834-FR, Monrovia BP/Former Green Valley Citgo, 11791 Fingerboard Road, Monrovia, Maryland (Site).

On August 9, 2016 GES met with representatives of the Maryland Department of the Environment- Oil Control Program (MDE-OCP) to discuss reductions to the Site's monitoring program that had initially been requested in the Fourth Quarter 2015 Monitoring Report for the Site, submitted by GES on February 12, 2016.

The MDE-OCP indicated, at the time of the August 9, 2016 meeting, that the Department would consider additional reductions to the monitoring and sampling program if the request was resubmitted and addressed the following requirements:

- Proposed reductions to the current monitoring well network should consider the future configuration of a "high-risk groundwater use area" (HRGUA) monitoring well network, which will be required to be maintained at the Site after case closure.
- Monitoring well construction logs should be included for any well which is requested for removal from Site's monitoring program.
- Any well that is requested (and granted) to be removed from the monitoring well network shall be abandoned within a set time period.

Based on these criteria and requirements, GES respectfully submits the following request and supporting rationale for modifications to the Site's current groundwater and potable well monitoring program.

<u>Proposed High Risk Groundwater Use Area (HRGUA) Wells</u>

After assessing the currently established groundwater monitoring well network, GES, on behalf of CIFC recommends that monitoring wells MW-1, MW-4, MW-5, MW-13, and MW-18SR be considered as future HRGUA wells and therefore should be left permanently in place. These five (5) monitoring wells are sufficiently positioned around the gasoline dispensers and UST field to 1) provide sentinel detection of new releases and 2) assist in the determination groundwater flow direction away from the dispensers and UST field, thereby meeting the criteria for HRGUA monitoring wells as stipulated in COMAR 26.10.

Furthermore, GES petitions that wells MW-1, MW-4 MW-5 and MW- 13 now be monitored on an annual frequency based on the following rationale:.

- Monitoring well MW-1 has not had a methyl tert-butyl ether (MTBE) detection which has exceeded 20 micrograms per liter (µg/L) since April 2008.
- Monitoring wells MW-4 and MW-5 were approved to be removed from the monitoring well network in July 2015. However, in consideration of preserving a future HRGWUA monitoring well network, GES recommends reactivating well MW-5 and abandoning adjacent well MW-2. (Monitoring well MW-2 is a two-inch diameter well screened from 40 to 61.5 feet that occasionally provides less than 1 foot of water in the well. MW-5 is a more viable four-inch diameter well screened from 40 to 70 feet and typically has more than 10 feet of water. Both wells are historically non-detect for petroleum constituents.)
- Monitoring well MW-13 has a current (Third Quarter 2016) MTBE concentration of 6.2 µg/L. (The MTBE concentration for MW-13 has not exceeded 20 µg/L since January 2014.

The fifth proposed HRGUA monitoring well (MW-18S-R) would continue to be monitored on a quarterly sampling frequency due to its current rank as the highest onsite MTBE-bearing well.

A Site Map, depicting monitoring wells proposed for both abandonment and continuation within the current monitoring well network for the Site, is presented as **Figure 1**. A summary of monitoring well specifications and proposed changes to sampling frequency is included in **Table 1**. Boring logs for all Site monitoring wells are included as **Appendix A**. A historical tabulation of monitoring well analytical results will be included in the Third Quarter 2016 Monitoring Report for the Site, which will be submitted concurrently with this correspondence.

Revised Monitoring Well Network

In addition to the changes associated with the proposed HRGUA monitoring wells noted in the previous section, GES, on behalf of CIFC, requests additional reductions to the current monitoring well network, similar to those proposed in the Fourth Quarter 2015 Monitoring Report for the Site. In summary, GES proposes the removal and abandonment of eight (8) monitoring wells from the monitoring well network which include MW-2, MW-8, MW-9, MW-10, MW-11, MW-14S, MW-15D, and MW-16. The proposed monitoring wells for elimination demonstrate low-level and decreasing trends for all contaminants-of-concern (CoCs), including MTBE. (Specifically, the highest, current (3Q2106) MTBE concentration among the eight wells proposed for removal and abandonment is 1.1 µg/L (MW-10) and none of the eight wells has exceeded an MTBE concentration of 20 µg/L in the last six quarterly sampling events.)

Only two (2) monitoring wells at the Site currently have MTBE concentrations that exceed 20 µg/L (MW-18S-R at 100 µg/L and MW-14D at 44 µg/L). On the front side of the Green Valley Plaza, the proposed monitoring well network would now consist of MW-18S-R (a shallow well), MW-18D (a nearby, deep monitoring well) and MW-7 (a downgradient, shallow well). On the back side of the Green Valley Plaza, the monitoring well network would now consist of MW-14D (a deep well) and MW-17 (a nearby, shallow well with historically elevated impacts). The selected, remaining monitoring wells will provide continued monitored natural attenuation (MNA) and sentinel well monitoring functions while adequately representing these areas of historic concern. In summary, the revised monitoring well network would still establish the five (5) proposed HRGUA monitoring wells in addition to four (4) additional downgradient wells (MW-7, MW-14D, MW-17, and MW-18D). GES proposed that these four (4) additional monitoring wells, along with the HRGUA well MW-18S-R, continue to be sampled on a quarterly basis. A summary of proposed monitoring well reductions is included as **Table 1**.

Well Abandonment

For any monitoring well that is approved to be removed from the monitoring well network, it is proposed that the well be abandoned within 90 days of the MDE-OCP approval. This would apply to the eight (8) monitoring wells currently proposed for removal from the Site, as well as the other monitoring and former remediation wells that are no longer utilized. These wells proposed for abandonment include:

- Monitoring wells MW-6 and MW-12 that were previously removed from the monitoring well network;
- Injection wells IW-1S/D, IW-2S/D, IW-3S/D, and IW-4;
- Vapor extraction well VE-1; and
- Soil vapor monitoring points SV-1 and SV-2.

Boring logs for those wells and points proposed for abandonment are included as **Appendix A**.

Residential Potable Well POET

GES, on behalf of CIFC, requests that the maintenance of the point-of-entry treatment (POET) systems for 3923 Rosewood Road and 3997 Farm Lane be relinquished to the homeowners. CIFC proposes to continue to sample the influent, midpoint, and effluent for two (2) additional quarters upon MDE approval and then conduct influent-only sampling at the two homes thereafter. For 3923 Rosewood Road, the Third Quarter 2016 MTBE influent concertation was 1.2 µg/L with a decreasing historic trend. Furthermore, the influent concentration for 3923 Rosewood Rd has tested below 10 µg/L since September 2011 (27 events). For 3997 Farm Lane, the Third Quarter 2016 MTBE influent concertation was 0.6 µg/L with a decreasing historic trend. For 3997 Farm Lane, the influent concentration has tested below 10 µg/L since September 2011 (25 events). A summary of current and proposed sample frequency modifications for all potable and POET wells related to the case, is included as **Table 2**.

Residential Potable Wells

GES, on behalf of CIFC, requests that potable sampling be discontinued at the five (5) residences including 3740 Blueberry Court, 3991 Farm Lane, 3993 Farm Lane, 3995 Farm Lane, and 3998 Farm Lane. (Currently, these five residences are sampled on a semiannual basis.) As indicated in the table below, the historic maximum MTBE concentrations and the current MTBE concentrations at these five residences are all well below 10 µg/L. Upon view of the table, it is observed that all maximum MTBE concentrations at the listed residences occurred in 2007 and 2008. Therefore, it is the opinion of GES that the MTBE impacts have not recently increased or expanded in plume footprint and therefore, the request for discontinuation of sampling at these homes is justified. A historical tabulation of potable well analytical results will be included in the Third Quarter 2016 Monitoring Report for the Site, which will be submitted concurrently with this correspondence.

Location	Historic Maximum MTBE Concentration (Sample Date)	Current MTBE Concentration
3740 Blueberry Court	0.6 µg/L (April 2007)	0.2 µg/L (J)
3991 Farm Lane	0.3 µg/L (November 2007)	Non-detect since October 2008 (26 events)
3993 Farm Lane	1.0 µg/L (July 2007)	0.1 µg/L (J)
3995 Farm Lane	0.2 µg/L (October 2008)	0.1 µg/L (J)

Location	Historic Maximum MTBE Concentration (Sample Date)	Current MTBE Concentration
3998 Farm Lane	1.4 µg/L (October 2008)	Non-detect since October 2008 (29 events)

Note: "(J)" suggests MTBE was detected between the Method Detection Limit (MDL) and the Reporting Limit (RL); therefore, the result is an estimated value.

We appreciate the MDE-OCP's review of this important series of monitoring reductions to be proposed for the case. If you have any questions or would like additional information, please contact the undersigned at 800-220-3606, extension 3712 or 3717, respectively, or Herb Meade at 410-261-5450.

Sincerely,
GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

Prepared By:

Dan Drennan
Senior Project Engineer

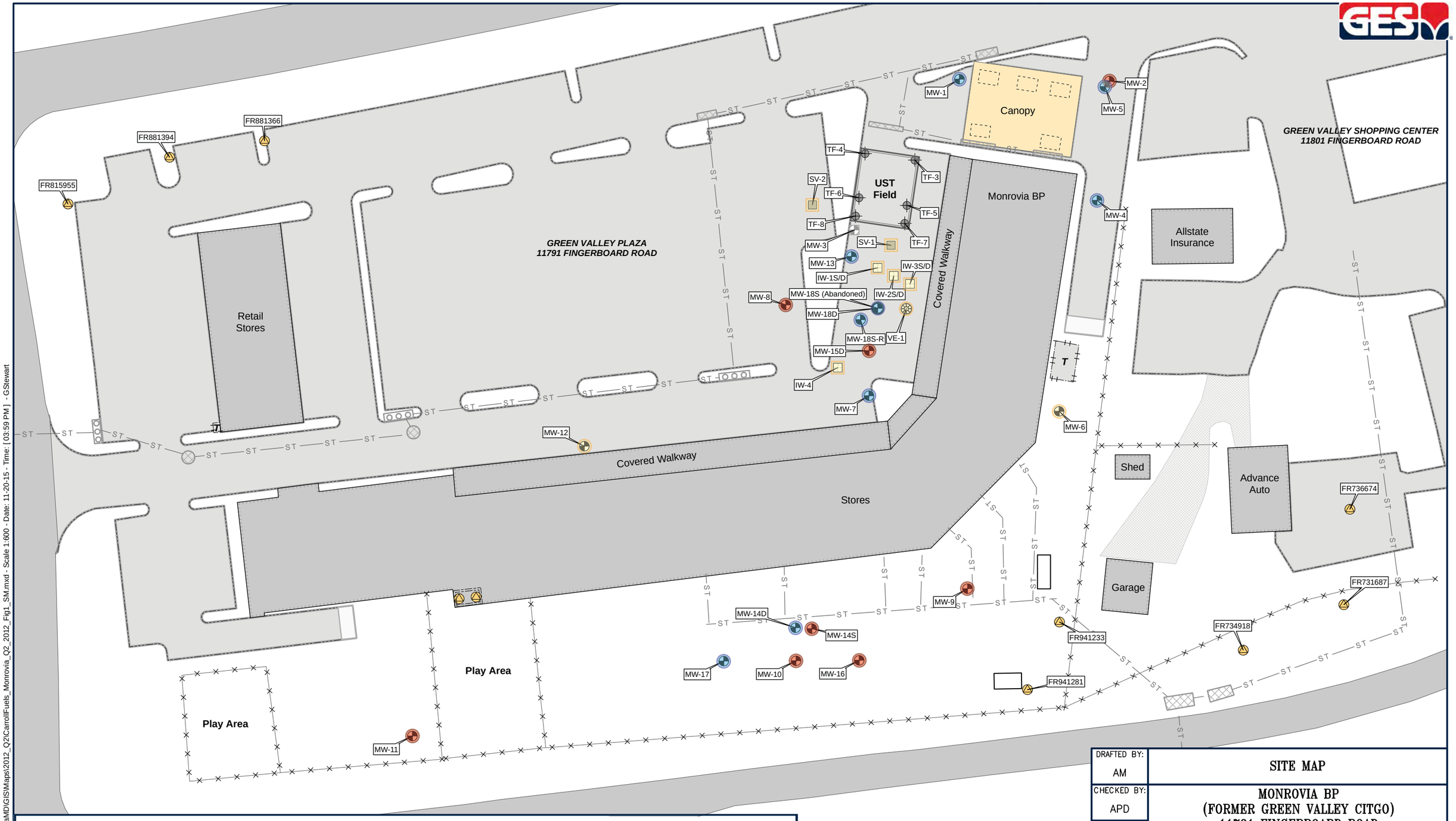
Reviewed By:

Peter Reichardt
Project Hydrogeologist

Attachments:
- Figure 1 – Site Map
- Table 1 – Monitoring Well Sampling Frequency
- Table 2 – Potable Well Sampling Frequency
- Appendix A – Boring Logs

c: Jim Richmond – MDE (2 additional copies & CD)
Herb Meade – CIFC (electronic copy)
Barry Glotfelty – Frederick County Health Department
Samir Andrawos – Timbercrest Limited Partnership
Jennifer Andrawos – Timbercrest Limited Partnership
File – GES, MD (PSID# 613402)

FIGURES



Legend

- Abandoned Well
- Monitoring Well
- Potable Well
- Tank Field Well
- Soil Vapor Point
- Injection Well
- Nested Obs Well
- Vapor Extraction Well
- Fence
- ST Storm Sewer
- Curb Catch Basin
- Catch Basin
- Building
- Canopy
- Dispenser
- Tank Field
- Propane AST
- Pump Room
- T Transformer
- Dumpster
- Well to be Removed From Network
- Well to Remain in Network
- Former Well to be Abandoned

Source:
NAIP aerial photograph for Frederick Co. Based on GIS data provided by Environmental Alliance, Inc.

DRAFTED BY: AM	SITE MAP
CHECKED BY: APD	MONROVIA BP (FORMER GREEN VALLEY CITGO) 11791 FINGERBOARD ROAD MONROVIA, MARYLAND
REVIEWED BY: GR	Groundwater & Environmental Services, Inc. 2142 PRIEST BRIDGE COURT, SUITE 1, CROFTON, MD 21114
NORTH	SCALE IN FEET: 0 50 / DATE: 11-20-15 / FIGURE: 1

L:\Projects\CarrollFuels\MonroviaMD\GIS\Maps\2012_Q2\CarrollFuels_Monrovia_Q2_2012_Fig1_SM.mxd - Scale 1:600 - Date: 11-20-15 - Time: [03:59 PM] - GStewart

TABLES

Table 1

MONITORING WELL SAMPLING FREQUENCY

Carroll - Monrovia MD - Green Valley Citgo
11791 Fingerboard Road
Monrovia, MD

Monitoring Well	Well Diameter (inches)	TOS from Ground Surface	BOS from Ground Surface	Well Type	Current Sampling Frequency	Proposed Sampling Frequency or Action	Comments
MW-1	2	40	61.5	Monitoring Well	Quarterly	Annually (HRGUA Well)	MTBE has not exceeded 20 µg/L since April 2008
MW-2	2	40	61.5	Monitoring Well	Quarterly	Abandon	One historic MTBE detection (4.38 µg/L in January 2012)
MW-3	2	40	64	Monitoring Well	Abandoned	-	
MW-4	2	40	61.5	Monitoring Well	None - Removed 7/2015	Annually (HRGUA Well)	
MW-5	4	40	70	Monitoring Well	None - Removed 7/2015	Annually (HRGUA Well)	
MW-6	4	40	59.5	Monitoring Well	None - Removed 7/2015	Abandon	No longer monitored
MW-7	4	53	80	Monitoring Well	Quarterly	Quarterly	
MW-8	4	45	70	Monitoring Well	Quarterly	Abandon	MTBE has not exceeded 20 µg/L since July 2010
MW-9	4	48	78	Monitoring Well	Quarterly	Abandon	MTBE has not exceeded 20 µg/L since October 2009
MW-10	4	40	80	Monitoring Well	Quarterly	Abandon	MTBE has not exceeded 20 µg/L since July 2012
MW-11	4	47	77	Monitoring Well	Quarterly	Abandon	One historic MTBE detection (1.2 µg/L in April 2009)
MW-12	4	44	82	Monitoring Well	None - Removed 7/2015	Abandon	No longer monitored
MW-13	4	49	84	Monitoring Well	Quarterly	Annually (HRGUA Well)	MTBE has not exceeded 20 µg/L since January 2014
MW-14S	4	40	100	Monitoring Well	Quarterly	Abandon	MTBE has not exceeded 20 µg/L since August 2012
MW-14D	4	201	221	Monitoring Well	Quarterly	Quarterly	
MW-15D	4	45.5	133.5	Monitoring Well	Quarterly	Abandon	MTBE last hit 20 µg/L in January 2015 (has been below 50 µg/L since April 2012)
MW-16	4	35.5	121	Monitoring Well	Quarterly	Abandon	MTBE has not exceeded 20 µg/L since November 2010
MW-17	4	35	121	Monitoring Well	Quarterly	Quarterly	
MW-18S	2	45	70	Monitoring Well	Abandoned	-	
MW-18D	2	120	130	Monitoring Well	Quarterly	Quarterly	
MW-18S-R	4	25	70	Monitoring Well	Quarterly	Quarterly (HRGUA Well)	
VE-1	4	5	25	Vapor Extraction Well	None	Abandon	
IW-1S	0.60	63	67	Injection Well	None	Abandon	
IW-1D	0.60	69	73	Injection Well	None	Abandon	
IW-2S	0.60	87	91	Injection Well	None	Abandon	
IW-2D	0.60	99	103	Injection Well	None	Abandon	
IW-3S	0.60	123	127	Injection Well	None	Abandon	
IW-3D	0.60	130	134	Injection Well	None	Abandon	
IW-4	0.75	85	89	Injection Well	None	Abandon	
SV-1	2	9	34	Soil Vapor Point	None	Abandon	
SV-2	2	9	29.5	Soil Vapor Point	None	Abandon	

Notes:
BOS = Bottom of screen
TOS = Top of screen
HRGUA = High Risk Groundwater Use Area

Table 2

POTABLE WELL SAMPLING FREQUENCY

Carroll - Monrovia MD - Green Valley Citgo
11791 Fingerboard Road
Monrovia, MD

Monitoring Well	Well Type	Current Sampling Frequency	Proposed Action	Comments
GVP - FR-94-1233	Non-Transient, Non-Community Supply Well	Quarterly	-	
GVP - FR-94-1281	Non-Transient, Non-Community Supply Well	Quarterly	-	
GVP - FR-81-5955	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
GVP - FR-88-1394	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
GVP - FR-88-1366	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
GVP - Combined Flow	Non-Transient, Non-Community Supply Well POET	Quarterly	-	
GVSC - FR-73-4918	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
GVSC - FR-73-6674	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
GVSC - FR-73-7687	Non-Transient, Non-Community Supply Well	None - Removed 7/2015	-	
3923 Rosewood Road:	Residential Potable Well POET	Quarterly	Cessation of POET maintenance, reduce sampling to annually	Current MTBE influent concertation is 1.2 µg/L with a decreasing trend. The influent concentration has tested below 10 µg/L since September 2011 (27 events).
3990 Farm Lane:	Residential Potable Well POET	Quarterly	-	
3992 Farm Lane:	Residential Potable Well POET	Quarterly	-	
3994 Farm Lane:	Residential Potable Well POET	Quarterly	-	
3996 Farm Lane:	Residential Potable Well POET	Quarterly	-	
3997 Farm Lane:	Residential Potable Well POET	Quarterly	Cessation of POET maintenance, reduce sampling to annually	Current MTBE influent concertation at 0.6 µg/L with a decreasing trend. The influent concentration has tested below 10 µg/L since September 2011 (25 events).
3740 Blueberry Court	Residential Potable Well	Semiannually	Cessation of potable sampling	The historic maximum MTBE concentration is 0.6 µg/L (April 2007). The current concentration is 0.2 (J) µg/L.
3991 Farm Lane	Residential Potable Well	Semiannually	Cessation of potable sampling	Since the Third Quarter 2015, GES has made numerous attempts via USPS, Fed Ex and hand-delivered (door) mailings to arrange potable sampling at the residence without response. MTBE has not been detected since October 2008 (26 events).
3993 Farm Lane	Residential Potable Well	Semiannually	Cessation of potable sampling	The historic maximum MTBE concentration is 1.0 µg/L (July 2007). The current concentration is 0.1 (J) µg/L.
3995 Farm Lane	Residential Potable Well	Semiannually	Cessation of potable sampling	The historic maximum MTBE concentration is 0.2 µg/L (October 2008). The current concentration is 0.1 (J) µg/L.
3998 Farm Lane	Residential Potable Well	Semiannually	Cessation of potable sampling	The historic maxmim MTBE concentration is 1.4 µg/L (July 2008). MTBE has not been detected since October 2008 (29 events).
3979 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3981 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3982 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3984A Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3984 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3985 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3987 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3989 Farm Lane	Residential Potable Well	None - Removed 7/2015	-	
3833 Greenridge Road	Residential Potable Well	None - Removed 7/2015	-	
3835 Greenridge Road	Residential Potable Well	None - Removed 7/2015	-	
3837 Greenridge Road	Residential Potable Well	None - Removed 7/2015	-	
3737 Blueberry Court	Residential Potable Well	None - Removed 7/2015	-	
3739 Blueberry Court	Residential Potable Well	None - Removed 7/2015	-	
3992 Rye Lane	Residential Potable Well	None - Removed 7/2015	-	
3994 Rye Lane	Residential Potable Well	None - Removed 7/2015	-	
3996 Rye Lane	Residential Potable Well	None - Removed 7/2015	-	
3998 Rye Lane	Residential Potable Well	None - Removed 7/2015	-	

Notes:

GVSC = Grean Valley Shopping Center
GVP = Green Valley Plaza
POET = Point-of-entry treatment
MTBE = Methyl-tert-butyl ether
µg/L = micrograms per liter
J = Detected between the Method Detection Limit (MDL) and the Reporting Limit (RL); therefore, result is an estimated value.

APPENDIX A

Boring Log

Log of Boring: GP-01

Date Started: 09/14/05
Date Completed: 09/14/05
Total Depth (ft): 16.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT SC: Red sandy clay, dry, no odor.			
-5	2		48		19.4	SHALE: Red/orange silty sandy weathered shale, dry.			
	3		36		96.3				
-10	4		36		770				Sample collected 11'-14' for laboratory analysis. Slight petroleum odor 11'-16'.
	5		24		575				
-15									

Log of Boring: GP-02

Date Started: 09/14/05
Date Completed: 09/14/05
Total Depth (ft): 13.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT			
						MH: Silty clay, red, dry, no odor.			
						SHALE: Silty/sandy weathreed shale, brown/orange, dry, no odor.			
	2		48		0.0				
-5									
	3		36		58				Mica at 8', sample collected for laboratory analysis.
-10									
	4		24		0.0				

Log of Boring: GP-03

Date Started: 09/14/05
Date Completed: 09/14/05
Total Depth (ft): 13.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT SHALE: Silty sandy weathered shale, dry, no odor.			
	2		48		108				
-5									
	3		36		1428				Sample collected 8'-11' for laboratory analysis.
-10									Quartz 10'-11'.
	4		24		693				

Log of Boring: GP-04

Date Started: 09/14/05
Date Completed: 09/14/05
Total Depth (ft): 15.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT SHALE: Sandy silty weathered shale, brown/orange, dry, no odor.			
	2		48		0.0				
-5									
	3		36		98.5				Sample collected 8'-11 for laboratory analysis.
-10									
	4		36		48.5				
	5		12		84.7				
-15									

Log of Boring: GP-05

Date Started: 09/14/05
Date Completed: 09/14/05
Total Depth (ft): 12.50
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT SHALE: Red silty shale, dry, no odor.			
-5	2		48		0.0				
	3		36		0.0				Collected sample 8'-11' for laboratory analysis.
-10	4		18		0.0				

Log of Boring: GP-06

Date Started: 09/15/05
Date Completed: 09/15/05
Total Depth (ft): 17.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeve

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		49.5	ASPHALT SHALE: Silty sandy weathered shale, dry, brown/orange, no odor.			
	2		48		540				
-5									
	3		36		803				Sample collected 8'-11' for laboratory analysis.
-10									
	4		36		221				
	5		24		225				
-15									
	6		12		137				

Log of Boring: GP-07

Date Started: 09/15/05
Date Completed: 09/15/05
Total Depth (ft): 14.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT CL: Red clay, dry, no odor.			
						SHALE: Silty sandy weathered shale, orange/brown, dry, no odor.			
-5	2		48		308				
	3		36		246				
-10	4		36		502				Sample collected 11'-14' for laboratory analysis.
15									

Log of Boring: GP-08

Date Started: 09/15/05
Date Completed: 09/15/05
Total Depth (ft): 17.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT			
						MH: Red silty clay, dry, no odor.			
-5	2		48		0.0				
						SHALE: Silty sandy shale, dry, brown/orange, changes to red at 11'.			
	3		36		0.0				
-10	4		36		0.0				
	5		24		398				Sample collected 14'-16' for laboratory analysis.
-15	6		12		0.0				

Log of Boring: GP-09

Date Started: 09/15/05
Date Completed: 09/15/05
Total Depth (ft): 20.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT SHALE: Red/brown silty sandy weathered shale, dry, no odor.			
	2		48		0.0				
-5									
	3		36		0.0				
-10									
	4		36		0.0				
	5		24		0.0				
-15									
	6		36		0.0				
	7		12		0.0				Sample collected 18'-20' for laboratory analysis.
-20									

Log of Boring: GP-10

Date Started: 09/15/05
Date Completed: 09/15/05
Total Depth (ft): 12.00
Boring Diameter (in): 2
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Jason Thomas
Drill Rig: Simco Earthprobe 200
Drill Method: Direct push
Sampling Method: Acetate sleeves

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1		48		0.0	ASPHALT			
						SHALE: Red/brown silty sandy weathered shale, dry, no odor, changes to brown at 6.5'.			
	2		48		0.0				
-5									
	3		36		0.0				
-10									
	4		12		0.0				Sample collected 11'-12' for laboratory analysis.

Log of Boring: MW-1

Date Started: 02/07/06
Date Completed: 02/07/06
Total Depth (ft): 61.50
Boring Diameter (in): 6
Bedrock Depth (ft): 38
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Andrew Applebaum
Drill Rig: Schramm T450WS
Drill Method: Air rotary
Sampling Method: N/A

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					0.0	ASPHALT: and gravel fill.			Background air PID 0.0.
-5						MH: Orange brown/tan alternating micaceous silt, dry. Soft spot, damp at 12'.			Set 2" Sch. 40 PVC well at 60.5' with 20' of 0.01"-slot screen and 40' of casing. #1 sand 61.5'-38', bentonite 38'-2', cement/set manhole 2'-grade.
-10									
-15									
-20									
-25					0.0	SAPROLITE: Tan micaceous weathered rock, dry, harder drilling with depth.			
-30									
-35									
-40					0.0	BEDROCK: Gray micaceous rock, dry, hard drilling, possible soft zones at 53' to 57'.			
-45									
-50									
-55									
-60									

Log of Boring: MW-2

Date Started: 02/07/06
Date Completed: 02/07/06
Total Depth (ft): 61.50
Boring Diameter (in): 6
Bedrock Depth (ft): 33
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Andrew Applebaum
Drill Rig: Schramm T450WS
Drill Method: Air rotary
Sampling Method: N/A

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					0.0	ASPHALT: and gravel fill.			Background air PID 0.0.
-5						MH: Orange brown micaceous silt, grades to red brown, soft, dry to damp with depth.			Set 2" Sch. 40 PVC well at 60.5' with 20' of 0.01"-slot screen and 40' of casing. #1 sand 61.5'-37', bentonite 37'-2',cement/set manhole 2'-grade.
-10									
-15									
-20									
-25					0.0	SAPROLITE: Orange brown to red brown weathered micaceous rock & rock fragments, dry.			
-30									
-35					0.0	BEDROCK: Gray micaceous rock, dry, darker moist zones at 41', 47', 53' & 57'. The 53' & 57' zones produce water.			
-40									
-45									
-50									
-55									
-60									

Log of Boring: MW-3

Date Started: 02/07/06
Date Completed: 02/07/06
Total Depth (ft): 81.50
Boring Diameter (in): 6
Bedrock Depth (ft): 32
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Andrew Applebaum
Drill Rig: Schramm T450WS
Drill Method: Air rotary
Sampling Method: N/A

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					0.0	ASPHALT: and gravel fill.			Background air PID 0.0.
-5					14.9	MH: Orange brown to red brown micaceous silt, rock fragments, dry. Soft damp zone 8'-9'.			Backfilled borehole to 64' with bentonite and 64' to 60' with #1 sand. Set 2" Sch. 40 PVC well at 60' with 20' of0.01"-slot screen and 40' of casing. #1 sand 60'-38', bentonite 38'-2', cement/set manhole 2'-grade.
-10									
-15									
-20					7.9	SAPROLITE: Tan micaceous weathered rock, dry.			
-25									
-30					2.2	BEDROCK: Orange brown to tan micaceous rock, dry.			
-35									
-40									
-45						BEDROCK: Gray micaceous rock, dry, with darker discoloration/damp at 47'.			
-50									
-55									
-60									
-65									
-70									
-75									
-80									

Log of Boring: MW-4

Date Started: 02/06/06
Date Completed: 02/06/06
Total Depth (ft): 61.50
Boring Diameter (in): 6
Bedrock Depth (ft): 28
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Andrew Applebaum
Drill Rig: Schramm T450WS
Drill Method: Air rotary
Sampling Method: N/A

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID Units	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					0.0	ASPHALT: and gravel fill.			Background air PID 0.0.
-5						MH: Orange brown micaceous silt, some fine to medium sand & rock fragments, grades to micaceous silt, dry.			Set 2" Sch. 40 PVC well at 60.5' with 20' of 0.01"-slot screen and 40' of casing. #1 sand 61.5'-38', bentonite 38'-2',cement/set manhole 2'-grade.
-10									
-15									
-20					0.0	MH: Orange-red micaceous silt, dry to damp.			
-25					0.0	SAPROLITE: Brown to tan micaceous weathered rock, dry.			
-30						BEDROCK: Tan micaceous rock, competent, harder drilling, dry.			
-35									
-40									
-45						BEDROCK: Gray micaceous rock with soft spot/dust reduction at 49'-50' and 58'.			
-50									
-55									
-60									

Log of Boring: SV-1

Date Started: 05/31/07
Date Completed: 05/31/07
Total Depth (ft): 35.25
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Aaron Hartman
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1				0.0	SC: Orange-brown micaceous silt with phyllite gravel, dry.			
-5	2		9	10-30-38-40	0.0 0.0 0.0 0.0 0.0				
-10	3		10	18-46-51/4"	0.0 0.0 0.0 0.0 0.0	SAPROLITE: Micaceous phyllite (saprolite, orange brown, silty, dry).			
-15	4		10	20-51/5"	0.0 0.0 0.0 0.0 0.0	SAPROLITE: Light brown micaceous phyllite, silty, dry. SAPROLITE: Same as above with quartz gravel.			

Log of Boring: SV-1

Date Started: 05/31/07
Date Completed: 05/31/07
Total Depth (ft): 35.25
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Aaron Hartman
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
	5		12	20-51/5"	0.0	SAPROLITE: Orange brown silt with quartz gravel, moist.			
					0.0				
					0.0	SAPROLITE: Orange brown, with quartz gravel, dry.			
	6		16	51/4"	0.0				
-20	7		7	51/4.5"	0.0				
					0.0				
	8		6	51/5"	0.0	SAPROLITE: Orange brown gray phyllite.			
					0.0				
	9		6	71/6"	0.0				
	10		1	100/1"	0.0				Collected soil sample from 24.5' for laboratory analysis of VOCs, fuel oxygenates, TPH-DRO & TPH-GRO.
-25	11		NA		0.0				
-30	12		NA		0.1	SAPROLITE: Same as above with fine cuttings.			
						SAPROLITE: Same as above with larger phyllite cuttings.			
						SAPROLITE: Same as above with fine cuttings - green/dark gray on fresh surfaces.			
-35	13		3	51/3"					

Log of Boring: SV-2

Date Started: 05/31/07
Date Completed: 05/31/07
Total Depth (ft): 30.25
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Aaron Hartman
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1					SC: Orange brown micaceous silt with phyllite gravel.			
-5	2		15	12-12-16-15	0.1 0.0 0.0 1.0	SAPROLITE: Dark brown silt, gravel & sand (highly weathered phyllite).			
-10	3		18	12-51/4.5"	1.0 9.0	SAPROLITE: Orange brown micaceous silt/phyllite.			
-15	4		3	51/3"	6.0	SAPROLITE: Light brown micaceous silt/phyllite.			

Log of Boring: SV-2

Date Started: 05/31/07
Date Completed: 05/31/07
Total Depth (ft): 30.25
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Aaron Hartman
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-20	5		1	51/1"	1.0	SAPROLITE: Light brown & gray phyllite.			Collected soil sample from 20' for laboratory analysis of VOCs, fuel oxygenates, TPH-DRO & TPH-GRO.
-25	6		5	51/5"	14.3	SAPROLITE: Same as above.			Collected soil sample for laboratory analysis of TPH-DRO as composite sample from 25' & 30' due to insufficient volume.
-30	7		3	51/3"	20.3 30.2				Collected soil sample from 30' for laboratory analysis of VOCs, fuel oxygenates & TPH-GRO.
-35									

Log of Boring: SV-3

Date Started: 06/01/07
Date Completed: 06/01/07
Total Depth (ft): 32.00
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Chris Thoeny
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1				0.0	SC: Orange brown micaceous silt, moist, with pieces of mica schist/phyllite (quartz veins).			
-5	2		14	9-25-32-40	3.6 2.7	SC: Saprolite crushes to gravel & silt. PID screening of cuttings 4.0-35.0.			
-10	3		15	16-23-24-24	24.6 39.0	SAPROLITE: Orange red saprolite/phyllite. PID screening of cuttings 29.0-16.0.			Collected soil sample from 10' to 12' and 15'-17' for laboratory analysis of VOCs, fuel oxygenates, TPH-DRO & TPH-GRO.
-15	4		14	24-51/5"	24.0 55.0	SAPROLITE: Orange red silt (crushed saprolite) with minor pieces of rock. PID screening of cuttings 21.9-16.0.			
-20	5		15	35-51/4"	17.4 36.3	SAPROLITE: Weathered phyllite, satiny texture, crushes to gravel & silt, orange red & tan, high angle foliations. PID screeningof cuttings 29.5-42.6.			
-25	6		4	51/4"	11.3 21.7	SAPROLITE: Red, micaceous, orange red silt with some rock fragments. PID screening of cuttings 52.1-14.5.			
-30	7		5	51/4"	10.2 6.8	SAPROLITE: Red orange phyllite/saprolite.			

Log of Boring: SB-1

Date Started: 06/01/07
Date Completed: 06/01/07
Total Depth (ft): 17.00
Boring Diameter (in): 8
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark:

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Earth Matters, Inc.
Logged By: Chris Thoeny
Drill Rig: Boart Longyear
Drill Method: Hollow stem auger
Sampling Method: Split spoon

Depth	Sample Number	Sample Interval	Recovery (inches)	Blow Counts	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0	1				0.0	SC: Pinkish brown micaceous silt with pieces of phyllite.			
-5	2		13	11-18-18-24	0.0	SAPROLITE: Red silt with crushed micaceous phyllite.			
-10	3		18	10-20-40-46	0.0	SAPROLITE: Gray & red weathered phyllite with high laminations/foliation.			
-15	4		13	51/5"	0.0	SAPROLITE: Reddish brown silt, red-gray saprolite, relict structure, satiny texture (phyllite).			Collected soil sample from 15'-17' for laboratory analysis of VOCs, fuel oxygenates, TPH-DRO & TPH-GRO.

Log of Boring: MW-5

Date Started: 05/12/08
Date Completed: 02/23/09
Total Depth (ft): 70.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 36
Elevation (ft-msl): N/A
Remark: Permit # FR-95-0982

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Chris Thoeny
Drill Rig: Schram T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					SAPROLITE: Asphalt, gravel then orange-tan silt and clay with pieces of flat, angular, silver-gray phyllite / saprolite.			0-5' soft dig with air knife.
-5				0.3	SAPROLITE: Saprolite crushed to pinkish brown micaceous silt.			5'-14' drill with a 12" dual roller bit
-10				0.3	SAPROLITE: Light tan colored micaceous saprolite as above.			
-15				0.2	SAPROLITE: Saprolite crushed to varicolored orange-brown, slightly micaceous silt.			Drill out hole with 8" diameter air hammer.
-20								Well Construction - Flushmount: Steel casing 0 to 14-ft. bgs. Cement placed from 0 to 30-ft. bgs. Bentonite placed from 30 to 33-ft. bgs Filter pack of #1 sand placed from 33 to 70-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 40-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 40 to 70-ft. bgs
-25				0.2	SAPROLITE: Saprolite as above, all soft drilling with increase in crushed rock fragments at 29'.			
-30				0.2	SAPROLITE: Saprolite as above, possible soft zone at 33 and 34'.			
-35				0.2	BEDROCK: Bedrock at 36' shows increase in dust and cuttings change to gray silt (from crushed phyllite/schist). Slightly moist and discolored tan-light tan at 39', then more competent drilling by 40'.			
-40								
-45				1.4	BEDROCK: Phyllite/schist as above, Possible water zone at 44.5' slightly discolored brown along with increase in rock fragments. Cuttings change back to gray at 49.5' with harder drilling.			
-50								
-55				0.7	BEDROCK: Rock as above. Possible fractures/soft zones at 51.5' 53' and 57-58' indicated by softer drilling and discoloration.			
-60				0.4	BEDROCK: Phyllite/Schist, Cuttings greenish-gray micaceaous silt. Soft zone at 62'. Darder drilling 63'-69' Soft zone with some discoloration 69-70'			
-65								
-70								End boring at 70'

Log of Boring: MW-6

Date Started: 05/12/08
Date Completed: 02/23/09
Total Depth (ft): 66.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 58
Elevation (ft-msl): N/A
Remark: Permit # FR-95-0983

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Chris Thoeny
Drill Rig: Schram T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					SAPROLITE: Asphalt, gravel then orange-tan silt and clay with pieces of flat, angular, silver-gray phyllite / saprolite			0-5' soft dig with air knife.
-5				1.7	SAPROLITE: Saprolite, crushed to brown slightly micaceous silt. Cuttings change from orange-brown to brown at ~ 10'.			5'-14' drill with a 12" dual roller bit
-10				2.0				
-15				0.4	SAPROLITE: Cuttings, brown micaceous silt with fine grain schist/phyllite and quartz fragments.			Drill out hole with 8" diameter air hammer.
-20				4.8	SAPROLITE: As above, soft drilling at 26.5'			Well Construction - Flushmount: Steel casing 0 to 14-ft. bgs. Cement placed from 0 to 33-ft. bgs. Bentonite placed from 33 to 36-ft. bgs Filter pack of #1 sand placed from 36 to 59.5-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 39.5-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 39.5 to 59.5-ft. bgs
-25								
-30				0.0	SAPROLITE: Cuttings as above, soft, moist zone at 35' with reddish brown discoloration.			
-35								
-40				0.0	SAPROLITE: Saprolite: Cuttings: Brown, micaceous silt.			
-45								
-50								
-55								
-60				22.4	BEDROCK: Harder driling at 58', cuttings change to silver and greenish gray phyllite/schist, slightly micaceous with quartz veins. Begin show water at 62'. Possible fracture at 64. Showing good water by 66'.			Boring depth measures 59.5' indicating the bedrock that the boring infiltrated collapsed.
-65								End boring at 66'

Log of Boring: MW-7

Date Started: 05/12/08
Date Completed: 02/24/09
Total Depth (ft): 80.60
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 50
Elevation (ft-msl): N/A
Remark: Permit # FR-95-0984

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Chris Thoeny
Drill Rig: Schram T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					SAPROLITE: Asphalt, gravel then orange-tan silt and clay with pieces of flat, angular, silver-gray phyllite / saprolite			0-5' soft dig with air knife.
-5				0.0				5'-14' drill with a 12" dual roller bit
				0.3	SAPROLITE: Pinkish, micaceous saprolite ground to sand and clay with pieces of fine grain rock fragments.			
-10				0.2				
-15					SAPROLITE: As above, soft from 15-16', harder drilling 18-19'			Drill out hole with 8" diameter air hammer.
-20				0.3	SAPROLITE: Orange-brown micaceous silt. Soft zone at 27'.			Well Construction - Flushmount: Steel casing 0 to 19.5-ft. bgs. Cement placed from 0 to 48.5-ft. bgs. Bentonite placed from 48.5 to 52-ft. bgs Filter pack of #1 sand placed from 52 to 80.6-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 53-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 53 to 80-ft. bgs
-25								
-30				0.8	SAPROLITE: Cuttings as above, become slightly darker at 30' harder drilling at 32'.			
-35								
-40				0.8	SAPROLITE: Cuttings as above, soft zone at 41' and 46.5'. Color change to orange at 48'.			
-45								
-50				9.8	BEDROCK: Cuttings change to silver-blue-gray, very dusty. Soft zone at 60', cuttings change to green-brown phyllite/schist. End boring at 63'.			Begin adding water at 50' to keep dust down.
-55								
-60								
-65				0.0	BEDROCK: Phyllite, varying shades of brown and micaceous cuttings with small fragments of phyllite. 73'-74' evidence of water.			
-70								
-75								
-80								End boring at 80.6'

Log of Boring: MW-8

Date Started: 05/12/08
Date Completed: 02/23/09
Total Depth (ft): 71.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 38
Elevation (ft-msl): N/A
Remark: Permit # FR-95-0985

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Chris Thoeny
Drill Rig: Schram T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0				0.4	SAPROLITE: Asphalt, gravel then orange-tan silt and clay with pieces of flat, angular, silver-gray phyllite / saprolite			0-5' soft dig with air knife; Rain; Breathing Zone PID 2.1-5.1
-5					SAPROLITE: Pinkish-tan, micaceous phyllite, soft at 10'. Color change to deeper orange. Slightly firmer drilling by 15'			5'-15' drill with a 12" dual roller bit
-10								
-15				0.2	SAPROLITE: Crushed Saprolite: light tan-brown micaceous fine grain silt.			Drill out hole with 8" diameter air hammer.
-20				0.2				Well Construction - Flushmount: Steel casing 0 to 15-ft. bgs. Cement placed from 0 to 33-ft. bgs. Bentonite placed from 33 to 36-ft. bgs Filter pack of #1 sand placed from 36 to 71-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 45-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 45 to 70-ft. bgs
-25								
-30								
-35								
-40				0.4	BEDROCK: Greenish gray schist, crushed to silt with fine grain pieces of slightly micaceous rock.			Slightly harder drilling
-45				1.8				
-50				1.8	BEDROCK: Possible water bearing zone, softer drilling and decrease in dust.			
				2.4	BEDROCK: Major increase in dust at 55'. Rock fragments: dark green, slightly micaceous schist with quartz veins.			
-55				2.4				Drill out boring at 60' clear hole and let sit for recharge evaluation. Only one-foot of water accumulated in hole after allowing to sit for 24 hours.
-60				0.2	BEDROCK: Cuttings: Crushed phyllite/schist as bluish-gray silt, fairly dry. Soft zone at 64' with some brown discoloration. Cuttings show gradual decrease in dust 66-70'.			
-65								
-70								End boring at 71'

Log of Boring: MW-9

Date Started: 02/25/09
Date Completed: 03/11/09
Total Depth (ft): 78.00
Boring Diameter (in): 8
Bedrock Depth (ft): 22
Elevation (ft-msl): N/A
Remark: Permit # FR-95-1216

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					SAPROLITE: Saprolite, brown with rock (phyllite) fragments. 17'-17.5 Orange with no rock fragments.			Well Construction - Flushmount: Steel casing 0 to 10.5-ft. bgs. Cement placed from 0 to 40-ft. bgs. Bentonite placed from 40 to 46-ft. bgs Filter pack of #1 sand placed from 46 to 78-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 48-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 48 to 78-ft. bgs
-5								
-10								
-15								
-20								
-25				0.0	BEDROCK: Phyllite, varying shades of brown and micaceous cuttings with rock (phyllite) fragments. 22' Increase in amount of rock fragments. 55'-56' Soft zone. 56'-58' Grey. 61'-64' Grey. 64'-66' Greenish. 71'-73' Green/grey. 77'-78' Greenish.			
-30								
-35								
-40								
-45								
-50								
-55				0.0				
-60				0.0				No evident water bearing zone observed during drilling. Drill was stopped at 78' bgs and the boring was allowed to sit for approximately half an hour. When drill was reengaged water was present.
-65								
-70								
-75				0.0				End boring at 78'.

Log of Boring: MW-10

Date Started: 02/25/09
Date Completed: 03/11/09
Total Depth (ft): 80.00
Boring Diameter (in): 8
Bedrock Depth (ft): 21
Elevation (ft-msl): N/A
Remark: Permit # FR-95-1217

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					MH: Clayey silt.			Well Construction - Flushmount: Steel casing 0 to 10.5-ft. bgs. Cement placed from 0 to 32.5-ft. bgs. Bentonite placed from 32.5 to 38.5-ft. bgs Filter pack of #1 sand placed from 38.5 to 80-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 40-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 40 to 80ft. bgs
-5				0.0	SAPROLITE: Brown with fragments of phyllite. 11'-16' Micaceous. 16'-21' More fragments of phyllite.			
-10				0.0				
				0.0				
-15				0.0				
-20				0.0				
-25				0.0	BEDROCK: Phyllite, varying shades of brown and micaceous cuttings with small rock (phyllite) fragments. 32'-34' Shades of grey. 40'-43' Soft zone. 47.5'-48' Soft zone. 54'-55' Green. 56'-60' Red; soft zone. 64'-70' Green/grey/brown. 64' Evidence of water. 70' Saturated cuttings with a high concentration of rock fragments (rock fragments include orange phyllite, blue phyllite, green phyllite, and a trace amount of quartz). 76-80' Green/brown.			
-30				0.0				
-35								
-40				0.0				
-45				0.0				
-50				0.0				
-55				0.0				Drill held at 55' bgs for approximately 10 minutes; when reengaged no evidence of water. Indication of water at 64' bgs; drill held for 10 minutes. When reengaged small amount of water present. Drill to 70' bgs to extend water column.
-60								
				0.0				
-65								
-70				0.0				End boring at 70'.
-75				0.0				
-80				0.0				Extended boring to 80' bgs on 03/11/2009

Log of Boring: MW-11

Date Started: 02/25/09
Date Completed: 03/11/09
Total Depth (ft): 77.00
Boring Diameter (in): 8
Bedrock Depth (ft): 19.5
Elevation (ft-msl): N/A
Remark: Permit # FR-95-1219

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					SAPROLITE: Brown, micaceous weathered rock. 0-15' Fragments of phyllite and quartz. 15'-16' Orange/brown. 16'-18.5' Red/brown.			Well Construction - Flushmount: Steel casing 0 to 10.5-ft. bgs. Cement placed from 0 to 38-ft. bgs. Bentonite placed from 38 to 45-ft. bgs Filter pack of #1 sand placed from 45 to 77-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 47-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 47 to 77-ft. bgs
-5				0.0				
				0.0				
-10								
-15				0.0				
-20				0.0	BEDROCK: Phyllite, varying shades of brown with small fragments of phyllite throughout and quartz fragments to 44'. 34'-35' Soft zone. 51'-59' Dark grey/brown to grey/green; an increase in small rock fragments. 58'-59.5' Soft zone. 62'-63.5' Blue/grey with larger rock fragments. 65'-70' Blue/grey with high concentration of rock fragments. 68' Evidence of water. 74'-77' Blue/grey.			
-25				0.0				
-30				0.0				
-35				0.0				
-40				0.0				
-45				0.0				
-50				0.0				Stop drill at 51' bgs for 10 minutes; when drill is reengaged no evidence of water. Continue drilling. Evidence of water at 68' bgs.
-55				0.0				
-60				0.0				
-65				0.0				
-70				0.0				
-75				0.0				End boring at 77'.

Log of Boring: MW-12

Date Started: 02/25/09
Date Completed: 03/12/09
Total Depth (ft): 84.00
Boring Diameter (in): 8
Bedrock Depth (ft): 35
Elevation (ft-msl): N/A
Remark: Permit # FR-95-1218

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					ASPHALT			Well Construction - Flushmount: Steel casing 0 to 10.5-ft. bgs. Cement placed from 0 to 35-ft. bgs. Bentonite placed from 35 to 42-ft. bgs Filter pack of #1 sand placed from 42 to 82-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 44-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 44 to 82-ft. bgs
-5				0.0	SAPROLITE: Varying shades of brown, clayey, micaceous, crushed weathered rock, relict structures. 0.5'-10' Small fragments of phyllite and quartz. 15'-17' Orange. 21'-23.5' Orange. 26'-27' Red with an increase of small fragments of phyllite. 27'-29.5' Orange. 32'-35' Yellow tint.			
-10				0.0				
-15				0.0				
-20				0.0				
-25				0.0				
-30				0.0				
-35				0.0	BEDROCK: Phyllite. 35'-37.5' Brown becoming more yellow at 37' with large rock (phyllite) fragments. 37.5'-84' Alternating between brown and blue/grey. 43'-44' Blue/grey with a high concentration of rock fragments. 51'-56' High concentration of rock fragments. 71'-78' Blue with larger rock fragments. 81'-84' Blue.			
-40				0.0				
-45				0.0				
-50				0.0				Stop drill at 78' bgs for 10 minutes; when drill is reengaged no evidence of water. Drill to 84' bgs. No clear water bearing zone observed.
-55				0.0				
-60				0.0				
-65								
-70				0.0				
-75				0.0				
-80				0.0				
-85								End boring at 84'.

Log of Boring: MW-13

Date Started: 02/26/09
Date Completed: 03/12/09
Total Depth (ft): 84.00
Boring Diameter (in): 8
Bedrock Depth (ft): 20
Elevation (ft-msl): N/A
Remark: Permit # FR-95-1215

Project Code: 1953
Project Name: Monrovia BP (former Green Valley Citgo)
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Hammer Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID/ FID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					ASPHALT			Well Construction - Flushmount: Steel casing 0 to 10.5-ft. bgs. Cement placed from 0 to 41-ft. bgs. Bentonite placed from 41 to 47-ft. bgs Filter pack of #1 sand placed from 47 to 84-ft. bgs. 4-inch Schedule 40 PVC riser placed from 0 to 49-ft. bgs 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 49 to 84-ft. bgs
-5				0.0	SAPROLITE: Saprolite, clayey, micaceous. 0.5'-11' Brown with large fragments of phyllite and quartz. 11'-20' Orange into brown at 15'.			
-10				0.0				
-15				0.0				
-20				0.0	BEDROCK: Phyllite, micaceous cuttings. 20'-34' Shades of brown. 20' Increase in rock fragments. 30-34' Higher concentration of rock fragments. 34'-38' Grey/green with a high concentration of rock fragments. 38'-56' Shades of brown. 56'-84' High concentration of very small rock fragments. 60.5'-76' Shades of grey. 76' Evidence of water. 76'-84' Brown with blue tint.			
-25				0.0				
-30				0.0				
-35				0.0				
-40				0.0				
-45								
-50				0.0				
-55				0.0				
-60				0.0				
-65								
-70				0.0				
-75				0.0				
-80				0.0				
-85								End boring at 84'.

Log of Boring: MW-14S

Date Started: 07/20/10
Date Completed: 07/21/10
Total Depth (ft): 100.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 37'
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Gill Rock Beetle
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					TOPSOIL: Grass/Top soil			
-5				0.0	SAPROLITE: Varying color (brown, red-brown, orange-brown, tan), crushes to silt, some weathered phyllite, dry, micaceous, 35-36' soft			8" diameter steel casing set at 11-ft. bgs and grouted in place
-10				0.0				- Well Construction - Flushmount: - Sand placed from 0 to 10-ft. bgs. - Bentonite placed from 10 to 37.25-ft. bgs - 4-inch Schedule 40 PVC riser placed from 0 to 40-ft. bgs - Filter pack of #2 sand placed from 37.25 to 100-ft. bgs. - 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 40 to 100-ft. bgs
-15								
-20								
-25								
-30								
-35								
-40					BEDROCK: Phyllite varying browns 49-50' soft zone 52-55' orange-brown soft zone 60-63' orange-brown soft zone, water-bearing 70' more competent 75-90' olive-brown 90-100' competent, blue phyllite with some quartz			
-45								
-50								
-55								
-60								PID did not function properly due to high humidity
-65								
-70								
-75								
-80								
-85								
-90								
-95								
-100								

Log of Boring: MW-14D

Date Started: 09/24/09
Date Completed: 09/24/09
Total Depth (ft): 273.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 50
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0 to -140				0.0	UNKNOWN: Top Soil			Air knifed & vacuum extracted soil to 3.25' bgs before refusal
				0.0	ML: Brown silt; very micaceous, with some weathered phyllite fragments			10.5' of 8" diameter; 3/8" thick, steel casing set at 10.75' bgs & grouted in place
				0.0	SAPROLITE: Saprolite weathered phyllite with relict structures, 2.75-10.75' Brown, 10.75-23' Red/orange brown, 23-50' brown & orange-brown 48' soft zone			
				0.0	BEDROCK: Phyllite, 50-51' grey, 51-74' Brown, orange, yellow/orange, 74-273' Competent bedrock; soft directly above, almost completely phyllite rock fragments in cuttings. 83' free water is observed; blue-grey cuttings, small phyllite fragmetns with little quartz. 124' little brown phyllite fragments, 126' blue-grey, 150' amount of quartz fragments increase. 164-170' brown. 170-190' blue-grey, 190-203' purple-grey, 199' possible small fracture, 203' green mineral, 223' orange phyllite large rock fragments. 239-257' blue-grey, decreased amount of orange phyllite fragments; increase in amount of quartz. 257' cuttings become very fine grained, groundwater is very silty; blue-grey.			
				0.0				
				0.0				
				0.0				
				0.0				
				0.0				

Log of Boring: MW-14D

Date Started: 09/24/09
Date Completed: 09/24/09
Total Depth (ft): 273.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 50
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-145								
-150								
-155								
-160				0.0				
-165								
-170								
-175								
-180				0.0				
-185				0.0				
-190								
-195								
-200								
-205				0.0				
-210								
-215								
-220								
-225								
-230								
-235								
-240				0.0				
-245								
-250								
-255								
-260				0.0				
-265								
-270								

Log of Boring: MW-14D

Date Started: 09/24/09
Date Completed: 07/21/10
Total Depth (ft): 273.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 50
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0 to -135				0.0	UNKNOWN: Top Soil			Air knifed & vacuum extracted soil to 3.25' bgs before refusal
				0.0	ML: Brown silt; very micaceous, with some weathered phyllite fragments			
				0.0	SAPROLITE: Saprolite weathered phyllite with relict structures, 2.75-10.75' Brown, 10.75-23' Red/orange brown, 23-50' brown & orange-brown 48' soft zone			10.5' of 8" diameter; 3/8" thick, steel casing set at 10.75' bgs & grouted in place Well constructed in previous open borehole
				0.0	BEDROCK: Phyllite, 50-51' grey, 51-74' Brown, orange, yellow/orange, 74-273' Competent bedrock; soft directly above, almost completely phyllite rock fragments in cuttings. 83' free water is observed; blue-grey cuttings, small phyllite fragments with little quartz. 124' little brown phyllite fragments, 126' blue-grey, 150' amount of quartz fragments increase. 164-170' brown. 170-190' blue-grey, 190-203' purple-grey, 199' possible small fracture, 203' green mineral, 223' orange phyllite large rock fragments. 239-257' blue-grey, decreased amount of orange phyllite fragments; increase in amount of quartz. 257' cuttings become very fine grained, groundwater is very silty; blue-grey.			- Well Construction - Flushmount: - Sand placed from 0 to 10-ft. bgs. - Bentonite placed from 10 to 196-ft. bgs - 4-inch Schedule 40 PVC riser placed from 0 to 201-ft. bgs - Filter pack of #2 sand placed from 196 to 224-ft. bgs. - 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 201 to 221-ft. bgs - Bentonite placed from 224 to 241-ft. bgs - Grout placed from 241 to 273-ft. bgs

Log of Boring: MW-14D

Date Started: 09/24/09
Date Completed: 07/21/10
Total Depth (ft): 273.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 50
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-140				0.0				
-145								
-150								
-155								
-160				0.0				
-165								
-170								
-175								
-180				0.0				
-185				0.0				
-190								
-195								
-200								
-205				0.0				
-210								
-215								
-220								
-225								
-230								
-235								
-240				0.0				
-245								
-250								
-255								
-260				0.0				
-265								
-270								

Log of Boring: MW-15D

Date Started: 09/28/09
Date Completed: 09/28/09
Total Depth (ft): 132.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 43'
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0				0.0	ASPHALT			
-5				0.0	ML: Brown, very micaceous silt; some weathered phyllite;dry			Air knifed & vacuum clear soil to 3' bgs before native material too hard to clear
-10				0.0	SAPROLITE: Saprolite brown, weathered phyllite; phyllitic structures; very micaceous. 2' medium to large rock fragments, 5' rock fragment size decreases			
-15				0.0				10' of 8" diameter; 3/8" thick, steel casing set at 10.5' bgs & grouted in place
-20				0.0				
-25				0.0				
-30				0.0				
-35				0.0				
-40				0.0				
-45				0.0	BEDROCK: Bedrock; grey phyllite. 43-50.5' tan & brown; medium rock fragments 50.5-57.5' orange-brown; brown; yellow-brown silty cuttings with small rock fragments. 57.5-71' brown with larger rock fragments 61-61.5' red/orange-brown. 71-132' competent bedrock-slower drilling; grey with larger rock fragments. 75' very sily free water. 77' free water is more abundant but silty. 83' free water becomes less silty. 85' no silt; little quartz. 83-88' slower drilling; 91' trace orange phyllite fragments			
-50				0.0				
-55				0.0				
-60				0.0				
-65				0.0				

Log of Boring: MW-15D

Date Started: 09/28/09
Date Completed: 09/28/09
Total Depth (ft): 132.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 43'
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-70								
-75				0.0 0.0				
-80								
-85				0.0				
-90								
-95								
-100								
-105				0.0				
-110								
-115								
-120								
-125								
-130								

Log of Boring: MW-15D

Date Started: 09/28-09
Date Completed: 07/19/10
Total Depth (ft): 132.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 43'
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					ASPHALT			
-5				0.0	ML: Brown, very micaceous silt; some weathered phyllite;dry			Air knifed & vacuum clear soil to 3' bgs before native material too hard to clear
-10				0.0	SAPROLITE: Saprolite brown, weathered phyllite; phyllitic structures; very micaceous. 2' medium to large rock fragments, 5' rock fragment size decreases			
-15								10' of 8" diameter; 3/8" thick, steel casing set at 10.5' bgs & grouted in place
-20								
-25				0.0				
-30								
-35								Well constructed in previous open borehole
-40				0.0				
-45					BEDROCK: Bedrock; grey phyllite. 43-50.5' tan & brown; medium rock fragments 50.5-57.5' orange-brown; brown; yellow-brown silty cuttings with small rock fragments. 57.5-71' brown with larger rock fragments 61-61.5' red/orange-brown. 71-132' competent bedrock-slower drilling; grey with larger rock fragments. 75' very sily free water. 77' free water is more abundant but silty. 83' free water becomes less silty. 85' no silt; little quartz. 83-88' slower drilling; 91' trace orange phyllite fragments			- Well Construction - Flushmount: - Sand placed from 0 to 7-ft. bgs. - Bentonite placed from 7 to 41-ft. bgs - 4-inch Schedule 40 PVC riser placed from 0 to 45.5-ft. bgs - Filter pack of #2 sand placed from 41 to 133.5-ft. bgs. - 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 45.5 to 133.5-ft. bgs
-50				0.0				
-55								
-60								
-65				0.0				

Log of Boring: MW-15D

Date Started: 09/28-09
Date Completed: 07/19/10
Total Depth (ft): 132.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): 43'
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-70								
-75				0.0 0.0				
-80								
-85				0.0				
-90								
-95								
-100								
-105				0.0				
-110								
-115								
-120								
-125								
-130								

Log of Boring: MW-16

Date Started: 09/21/09
Date Completed: 09/21/09
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					ML: Brown, very micaceous silt with small phyllite rock fragments, dry			Air knifed & vacuum extracted soil to 4.5' bgs before refusal
-5				0.0	SAPROLITE: Weathered phyllite, crushes to micaceous silt 2-31 dry 2-6 brown 6-8 dark brown 8-21 orange-brown			
-10				0.0				
-15								9.57' of 8" diameter; 3/8" thick, steel casing set at 11.25' bgs & grouted in place
-20				0.0				
-25				0.0				
-30				0.0	BEDROCK: Bedrock-phyllite 31-34.5' grey, 34.5-35.5' brown-grey 35.5-51.5 brown; orange-brown & tan. 51.5-52.5' grey-brown 52.5-53 dark brown 53-57.5' brown & orange-brown, 54' first water 57.5-61 red/orange-brown 61-85' browns, tan; orange-brown, 68' soft zone; possible water bearing fracture			
-35								
-40								
-45				0.0				
-50								
-55				0.0				
-60								
-65				0.0				

Log of Boring: MW-16

Date Started: 09/21/09
Date Completed: 09/21/09
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-70								
-75								
-80								
-85				0.0	BEDROCK: Competent bedrock-harder drilling; blue-grey phyllte cuttings; little quartz; free water starts very silty; by 115' free water is cloudy by cuttings have no visible silt in them			
-90								
-95								
-100				0.0				
-105								
-110				0.0				
-115								
-120				0.0				

Log of Boring: MW-16

Date Started: 09/21/09
Date Completed: 07/20/10
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0					ML: Brown, very micaceous silt with small phyllite rock fragments, dry			Air knifed & vacuum extracted soil to 4.5' bgs before refusal
-5				0.0	SAPROLITE: Weathered phyllite, crushes to micaceous silt 2-31 dry 2-6 brown 6-8 dark brown 8-21 orange-brown			
-10				0.0				
-15								9.57' of 8" diameter; 3/8" thick, steel casing set at 11.25' bgs & grouted in place
-20				0.0				
-25				0.0				
-30				0.0				Well constructed in previous open borehole
-35					BEDROCK: Bedrock-phyllite 31-34.5' grey, 34.5-35.5' brown-grey 35.5-51.5 brown; orange-brown & tan. 51.5-52.5' grey-brown 52.5-53 dark brown 53-57.5' brown & orange-brown, 54' first water 57.5-61 red/orange-brown 61-85' browns, tan; orange-brown, 68' soft zone; possible water bearing fracture			
-40								- Well Construction - Flushmount: - Sand placed from 0 to 10-ft. bgs. - Bentonite placed from 10 to 35.5-ft. bgs - 4-inch Schedule 40 PVC riser placed from 0 to 39-ft. bgs - Filter pack of #2 sand placed from 35.5 to 121-ft. bgs. - 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 39 to 121-ft. bgs
-45				0.0				
-50								
-55				0.0				
-60								

Log of Boring: MW-16

Date Started: 09/21/09
Date Completed: 07/20/10
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450WS
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-65				0.0				
-70								
-75								
-80								
-85				0.0	BEDROCK: Competent bedrock-harder drilling; blue-grey phyllte cuttings; little quartz; free water starts very silty; by 115' free water is cloudy by cuttings have no visible silt in them			
-90								
-95				0.0				
-100								
-105								
-110				0.0				
-115								
-120				0.0				

Log of Boring: MW-17

Date Started: 09/21/09
Date Completed: 09/21/09
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0				0.0	ML: Brown, very micaceous silt with weathered phyllite fragments			Air knifed & vacuum extracted soil to 4.5' bgs before refusal
-5					SAPROLITE: Saprolite: very micacous silty cuttings with phyllite rock fragments; orange-brown 22-23' red/orange-brown 24-26.5' red/orange-brown 29-31 red			
-10				0.0				
-15								10.5' of 8" diameter; 3/8" thick, steel casing set at 11' bgs & grouted in place
-20								
-25				0.0				
-30								
-35					BEDROCK: Phyllite, 33-35' green/grey- brown 35-36' red 36-38' orange-brown 38-40' red 40-74' browns;orange-brown;tan 63 first water, very silty 74-120' competent bedrock, phyllite rock fragments; groundwater is less silty, blue-grey			
-40								
-45								
-50								
-55								
-60								
-65								

Log of Boring: MW-17

Date Started:	09/21/09
Date Completed:	09/21/09
Total Depth (ft):	120.00
Boring Diameter (in):	12"/8"
Bedrock Depth (ft):	N/A
Elevation (ft-msl):	N/A
Remark:	N/A

Project Code:	1953
Project Name:	Green Valley Citgo
Drilled By:	Eichelbergers
Logged By:	Megan Brown
Drill Rig:	Schramm T450
Drill Method:	Air Rotary
Sampling Method:	Cuttings

Depth	Sample Number	Sample Interval	Recovery (inches)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
-70								
-75								
-80								
-85								
-90								
-95								
-100								
-105								
-110								
-115								
-120								

Log of Boring: MW-17

Date Started: 09/21/09
Date Completed: 07/20/10
Total Depth (ft): 120.00
Boring Diameter (in): 12"/8"
Bedrock Depth (ft): N/A
Elevation (ft-msl): N/A
Remark: N/A

Project Code: 1953
Project Name: Green Valley Citgo
Drilled By: Eichelbergers
Logged By: Megan Brown
Drill Rig: Schramm T450
Drill Method: Air Rotary
Sampling Method: Cuttings

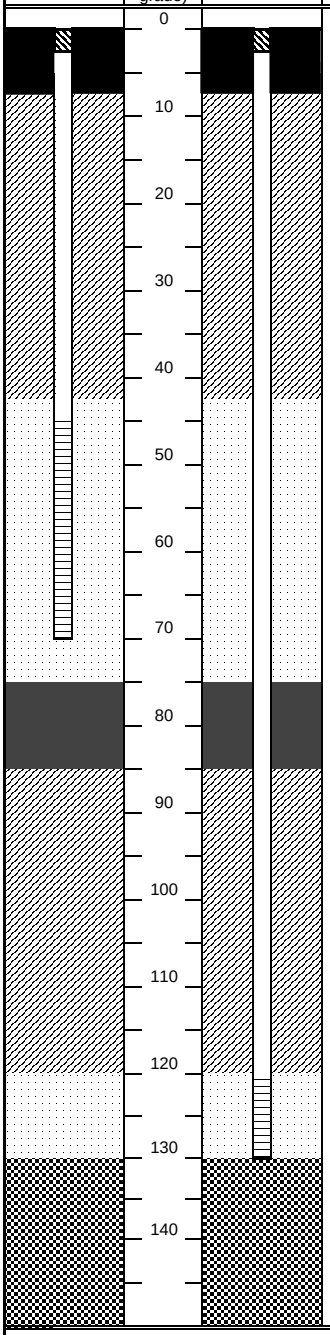
Depth	Sample Number	Sample Interval	Penetration Rate (Ft/Min)	PID	Lithological Description	Interpreted Lithology	Well Construction	Comments
0				0.0	ML: Brown, very micaceous silt with weathered phyllite fragments			Air knifed & vacuum extracted soil to 4.5' bgs before refusal
-5								
-10				0.0	SAPROLITE: Saprolite: very micacous silty cuttings with phyllite rock fragments; orange-brown 22-23' red/orange-brown 24-26.5' red/orange-brown 29-31 red			10.5' of 8" diameter; 3/8" thick, steel casing set at 11' bgs & grouted in place
-15								
-20								
-25				0.0				
-30								
-35					BEDROCK: Phyllite, 33-35' green/grey- brown 35-36' red 36-38' orange-brown 38-40' red 40-74' browns;orange-brown;tan 63 first water, very silty 74-120' competent bedrock, phyllite rock fragments; groundwater is less silty, blue-grey			Well constructed in previous open borehole - Well Construction - Flushmount: - Sand placed from 0 to 10-ft. bgs. - Bentonite placed from 10 to 35-ft. bgs - 4-inch Schedule 40 PVC riser placed from 0 to 41-ft. bgs - Filter pack of #2 sand placed from 35 to 121-ft. bgs. - 4-inch Schedule 40 PVC 0.020-inch slotted screen placed from 41 to 121-ft. bgs
-40								
-45								
-50								
-55								
-60								
-65								
-70								
-75								
-80								
-85								
-90								
-95								
-100								
-105								
-110								
-115								
-120								

NESTED MONITORING WELLS MW-18S AND MW-18D

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

2142 Priest Bridge Ct. - Suite 1, Crofton, MD (800) 220-3606

Client: **Carrol Fuel**	Depth to Water		Site Elevation Datum
Well: **MW-18S & MW-18D**	(ft. from measuring pt.)		Ground Elevation
Site Name: Address:	Date	DTW	NA
Monrovia BP **11791 Fingerboard Rd., Monvoria, MD**			Lat. N39°20.611
Drilling Company: Method:	-	not measured	Long. W77°15.236
BL Myers **Air Rotary - 6" down-hole hammer**	-	for either zone	Top of Casing
Date Started: Date Completed:			Shallow = Not determined
11/17/10 **11/18/10**		TOC	Deep = Not determined
Boring Depth:	Permit #		
130' (Nested 2" Mon. Wells terminating at 70' & 130')	FR-95-1674		



SHALLOW / DEEP	DEPTH (ft. below grade)	SAMPLES Recover. (inches)	SAMPLES Blow Count	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0	NA	not taken		0 - 1' Asphalt, fill, gravel
					1' -4' WEATHERED ROCK Orange brown SILT w/ rock frags
	10				4' -40' Orange, brown cuttings
	20			0.2	
				1.3	
				0.3	
	30			4.9	
				6.4	
	40			16.3	40' Orange, brown, grey cuttings
				9	45' Orange, brown, grey, green cuttings
	50			1.6	
					50' -65' Orange, brown, grey cuttings
				4.5	
	60			6.2	
				1.8	65' -70' Brown, grey, orange cuttings
	70			0.6	
					70' -75' Grey, green, orange cuttings - Driller notes rock
				0.2	
					75' -130' COMPETENT ROCK
	80			0.3	Grey cuttings
				8.2	
				0.3	
	90			0.1	
				0.1	
	100			0.7	
	110			0.1	
	120			0.1	
	130			0.1	
	140				

NOTE : PID values are presented were bagged screened, collected as cutting grab samples

Rig: Schramm T450 with 6" hammer

Shallow Zone Specifications:

Well screen: 2 inch PVC screened from **45 fbg to 70 fbg**

Riser: 2 inch PVC from **surface to 45 fbg**

Sand: **41 fbg to 725 fbg**

Bentonite: **6 fbg to 41 fbg**

Grout: **surface to 6 fbg**

Deep Zone Specifications:

Well screen: 2 inch PVC screened from **120 fbg to 130 fbg**

Riser: 2 inch PVC from **surface to 120 fbg**

Sand: **119 fbg to 130 fbg**

Bentonite: **85 fbg to 119 fbg (intermediate sealing zone)**

Grout: **72 fbg to 85 fbg (intermediate sealing zone)**

Legend

- Cement
- 2" PVC Riser
- Bentonite Seal
- #2 Morie Sand
- .020 Slot 2" PVC Screen
- Native Soil
- Top Cap/ Skirt

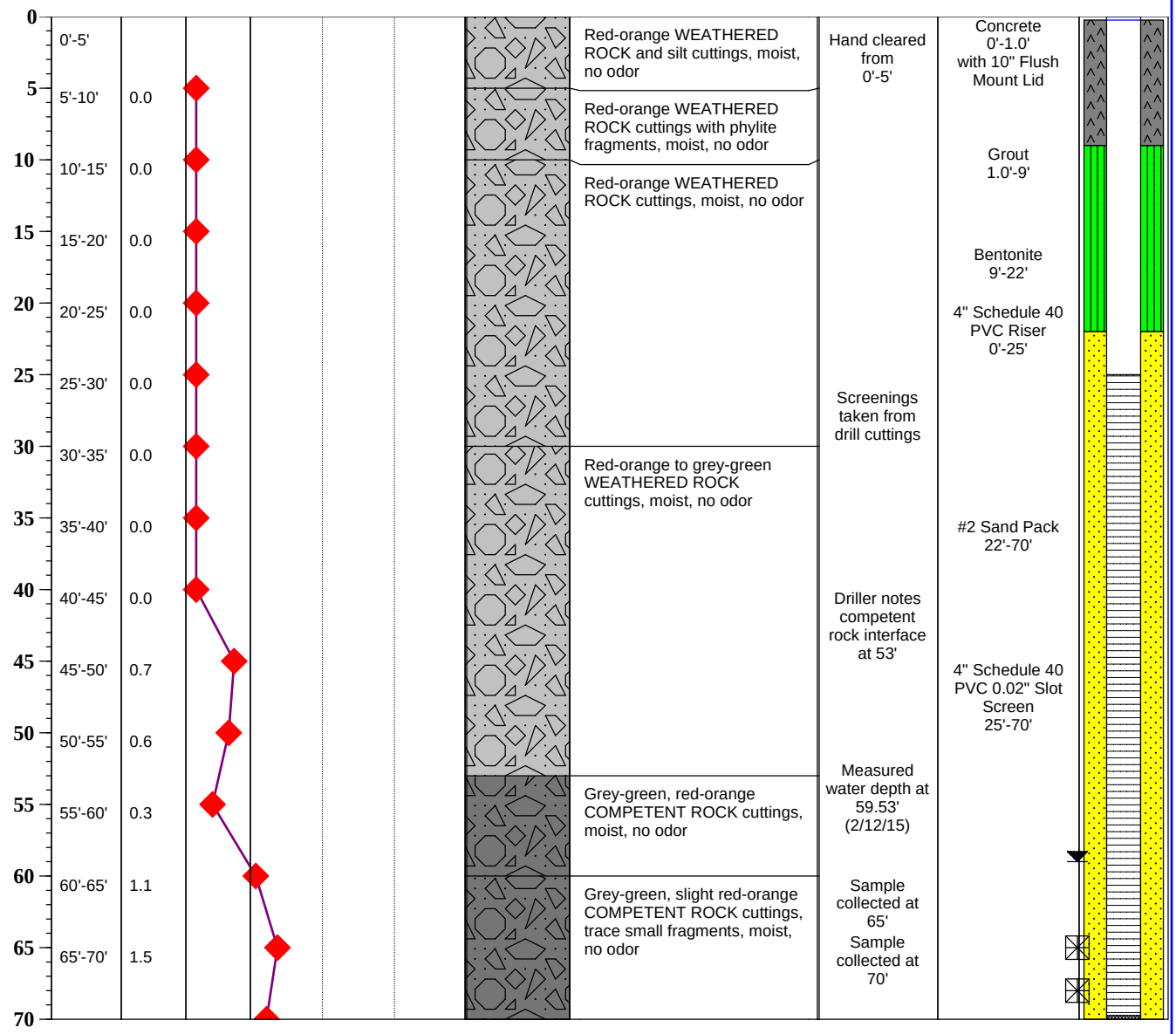
VAPOR POINT LOG

ID NO. **MW-18S-R**

Groundwater and Environmental Services, Inc.

PROJECT: **Carroll Monrovia**
WATER DEPTH:**59.53**
TOTAL DEPTH: **70'**
ADDRESS: **11791 Fingerboard Rd, Monrovia, MD**
WELL DIA.: **4"**
JOB NO. **0402888**
BOREHOLE DIA.:**8"**

Logged By:	**P. Reichardt**	Drilling Method:	**Drilltech D25 Air Rotary**
Dates Drilled:	**1/27/2015**	Field Screening:	**PID, 10.6 eV Lamp**
Drilling Company:	**Allied Drilling Services**	Soil Class. System:	**Unified Soil Classification System**



LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

eV = electron volt
NA = not available
ppm = parts per million
" = inches

Well ID: MW-18S-R

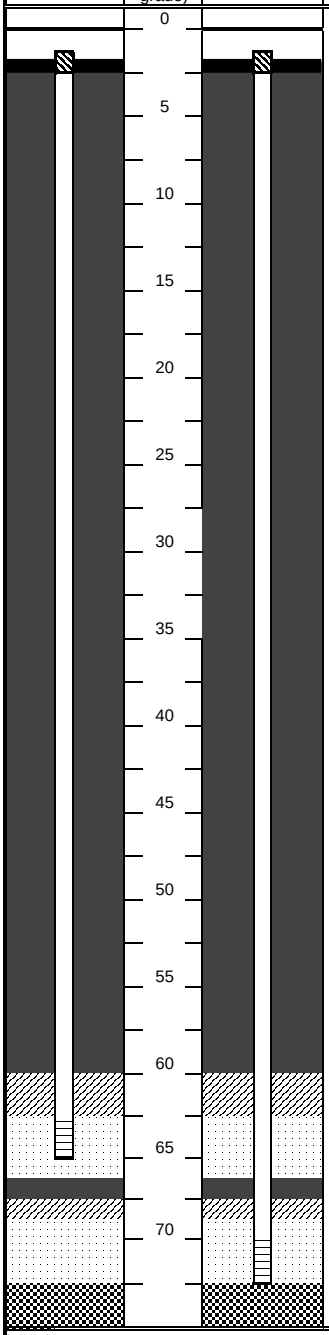
Groundwater & Environmental Services, Inc.
1350 Blair Drive, Suite A, Odenton, Maryland 800.220.3606 Fax 410.721.3733

INJECTION POINT IW-1

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

2142 Priest Bridge Ct. - Suite 1, Crofton, MD (800) 220-3606

Client: **Carrol Fuel**		Depth to Water	Site Elevation Datum
Well: **IW-1**		(ft. from measuring pt.)	Ground Elevation
Site Name:	Address:	Date / DTW	NA
Monrovia BP	**11791 Fingerboard Rd., Monvoria, MD**		Lat. N39°20.611
Drilling Company:	Method:	- not measured	Long. W77°15.245
BL Myers	**Air Rotary - 6" down-hole hammer**	- for either zone	Top of Casing
Date Started:	Date Completed:		Shallow = Not determined
11/17/10	**11/18/10**	TOC	Deep = Not determined
Boring Depth:		Permit #	
73.5' (Nested 3/4" Injection Points terminating at 66.5' & 73.5')			



SHALLOW	DEPTH (ft. below grade)	DEEP	SAMPLES Recover. (inches)	Blow Count	PID (ppm)	SOIL DESCRIPTION
	0		NA	not taken		0 - 1' Asphalt, fill, gravel
						1' -2' WEATHERED ROCK
	5				2.1	Orange brown SILT w/ rock frags
						2' -42' Orange, brown cuttings
	10				0	
	15				2.2	
	20				9.7	
	25				7.1	
	30				8.9	
					10.6	
	35				11.9	
	40				7.3	
						42' -50' Orange, brown, grey cuttings
					5.2	
	45				8.5	
	50				1.7	50' -60' Brown, green, grey cuttings
	55				6.2	
	60				3	60' -70' Grey, brown cuttings
	65				2	
	70				0.9	70' -73.5 Grey, brown green cuttings
					1.1	

NOTE : PID values are presented were bagged screened, collected as cutting grab samples

Rig: Schramm T450 with 6" hammer

Shallow Zone Specifications:

Well screen: ¾ inch stainless steel screened from **63 fbg to 67 fbg**

Riser: ¾ inch stainless steel from **surface to 63 fbg**

Sand: **60 fbg to 67 fbg**

Bentonite: **55.5 fbg to 60 fbg**

Grout: **surface to 55.5 fbg**

Deep Zone Specifications:

Well screen: ¾ inch stainless steel screened from **69 fbg to 73 fbg**

Riser: ¾ inch stainless steel from **surface to 69 fbg**

Sand: **68.5 fbg to 73.5 fbg**

Bentonite: **67 fbg to 68.5 fbg (intermediate sealing zone)**

Grout: **66.5 fbg to 67 fbg (intermediate sealing zone)**

Legend

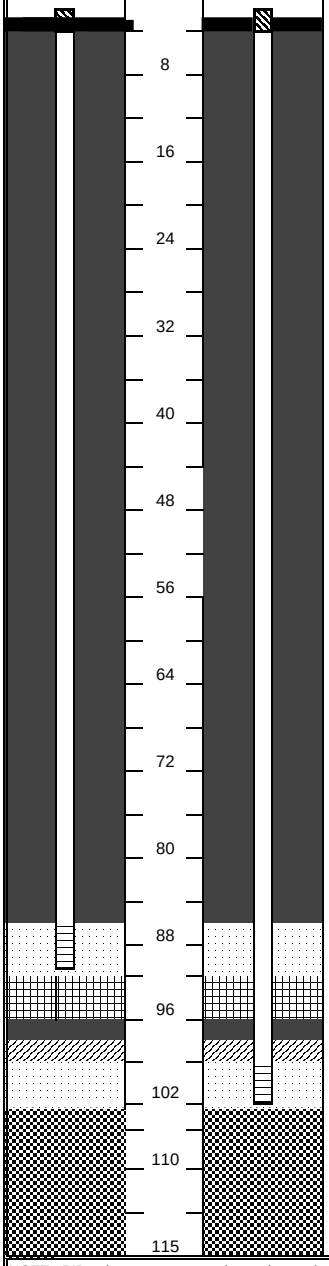
- Cement
- 3/4" SS Injection Point Riser
- Bentonite Seal
- #2 Morie Sand
- .020 Slot 3/4" SS Injection Screen
- Native Soil

INJECTION POINT IW-2

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

2142 Priest Bridge Ct. - Suite 1, Crofton, MD (800) 220-3606

Client: **Carrol Fuel**		Depth to Water	Site Elevation Datum
Well**: IW-2**		(ft. from measuring pt.)	Ground Elevation
Site Name:	Address:	Date / DTW	NA
Monrovia BP	**11791 Fingerboard Rd., Monvoria, MD**		Lat. N39°20.609
Drilling Company:	Method:	- not measured	Long. W77°15.241
BL Myers	**Air Rotary - 6" down-hole hammer**	- for either zone	Top of Casing
Date Started:	Date Completed:		Shallow = Not determined
11/18/10	**11/19/10**	TOC	Deep = Not determined
Boring Depth:		Permit #	
103.5' (Nested 3/4" Injection Points terminating at 91' & 103')			



SHALLOW	DEPTH (ft. below grade)	DEEP	SAMPLES Recover. (inches)	SAMPLES Blow Count	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0		NA	not taken		0 - 1' Asphalt, fill, gravel
						1' -3' WEATHERED ROCK Orange brown SILT w/ rock frags
	8				0.1	3' -10' Orange, brown, grey cuttings
					0	
	16				0.1	
					0	
	24				0.5	10' -30' Orange, brown cuttings
					2.2	
	32				5.7	30' -40' Orange, brown, grey cuttings (Driller notes "bedrock" encounted @ 30'-32')
					4.1	
	40					40' -46' Orange, brown cuttings
	48				15.1	47' Brown, grey green cuttings
						47' -55' Orange, brown, grey cuttings
	56				10.5	
					4	
	64				7.5	
	72				0.5	55' -75' Brown, grey, green cuttings
					0.1	
	80				0.1	
					0.1	
	88				0	
	96				0	75' -90' Grey, brown cuttings (Driller notes that rock "hardens")
	102				0.1	90' -100' Grey cuttings
	110					
	115					

NOTE : PID values are presented were bagged screened, collected as cutting grab samples

Rig: Schramm T450 with 6" hammer

Shallow Zone Specifications:

Well screen: ¾ inch stainless steel screened from **87 fbg to 91 fbg**

Riser: ¾ inch stainless steel from **surface to 87 fbg**

Sand: **86 fbg to 91 fbg**

Bentonite: **83 fbg to 86 fbg**

Grout: **surface to 83 fbg**

Deep Zone Specifications:

Well screen: ¾ inch stainless steel screened from **99 fbg to 103 fbg**

Riser: ¾ inch stainless steel from **surface to 99 fbg**

Sand: **98 fbg to 103.5 fbg**

Bentonite: **96 fbg to 98 fbg (intermediate sealing zone)**

Grout: **95.5 fbg to 96 fbg (intermediate sealing zone)**

Cave-In Slough: **91 fbg to 95.5 fbg (hardened)**

Legend

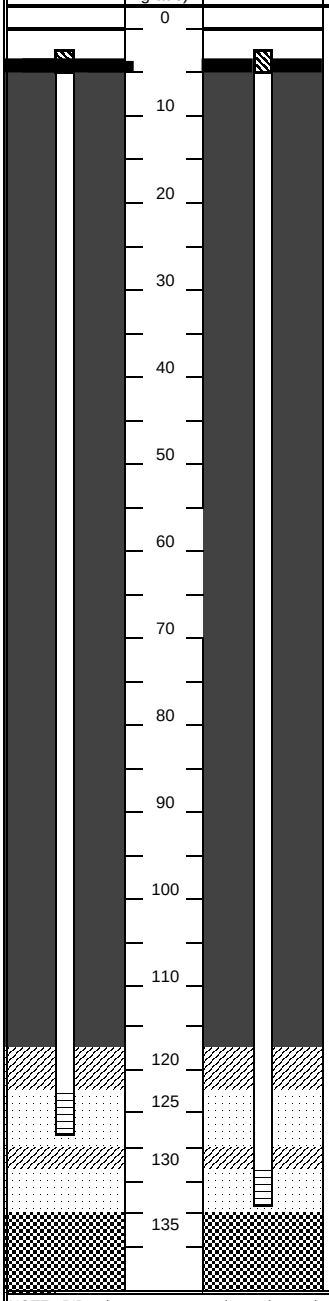
- Cement
- 3/4" SS Injection Point Riser
- Bentonite Seal
- #2 Morie Sand
- .020 Slot 3/4" SS Injection Screen
- Native Soil
- Slough (cave-in native soil)

INJECTION POINT IW-3

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

2142 Priest Bridge Ct. - Suite 1, Crofton, MD (800) 220-3606

Client: **Carrol Fuel**		Depth to Water	Site Elevation Datum
Well**: IW-3**		(ft. from measuring pt.)	Ground Elevation
Site Name:	Address:	Date / DTW	NA
Monrovia BP	**11791 Fingerboard Rd., Monvoria, MD**		Lat. N39°20.609
Drilling Company:	Method:	- not measured	Long. W77°15.238
BL Myers	**Air Rotary - 6" down-hole hammer**	- for either zone	Top of Casing
Date Started:	Date Completed:		Shallow = Not determined
11/18/10	**11/19/10**	TOC	Deep = Not determined
Boring Depth:		Permit #	
134' (Nested 3/4" Injection Points terminating at 127' & 134')			



SHALLOW	DEPTH (ft. below grade)	DEEP	SAMPLES Recover. (inches)	Blow Count	PID (ppm)	SOIL DESCRIPTION
	0		NA	not taken		0 - 1' Asphalt, fill, gravel
					0.9	1' -4' 8" WEATHERED ROCK
	10				1.8	Orange brown SILT w/ rock frags
					0.3	4' 8' -10' Orange, brown, grey cuttings
	20				0.4	
					0.2	
	30				0.2	
					0.2	10' -30' Orange, brown cuttings
	40				0.6	
					1.3	
						30' -40' Orange, brown, grey cuttings
	50				2.5	(Driller notes "bedrock" encounted @ 30'-32')
					10.7	40' -46' Orange, brown cuttings
	60				6.6	47' Brown, grey green cuttings
					1.5	
						47' -55' Orange, brown, grey cuttings
	70				4.2	
					0.4	
	80				0.6	
					0.1	
	90				0.1	
						55' -75' Brown, grey, green cuttings
					0.3	
	100				0.3	
					0.3	
	110				0.4	
					0.3	
						75' -90' Grey, brown cuttings
	120				0.3	(Driller notes that rock "hardens")
	125				0.4	
						90' -100' Grey cuttings
	130					
	135					

NOTE : PID values are presented were bagged screened, collected as cutting grab samples

Rig: Schramm T450 with 6" hammer

Shallow Zone Specifications:

Well screen: ¾ inch stainless steel screened from **123 fbg to 127 fbg**

Riser: ¾ inch stainless steel from **surface to 123 fbg**

Sand: **122 fbg to 127 fbg**

Bentonite: **117 fbg to 122 fbg**

Grout: **surface to 117 fbg**

Deep Zone Specifications:

Well screen: ¾ inch stainless steel screened from **130 fbg to134 fbg**

Riser: ¾ inch stainless steel from **surface to 130 fbg**

Sand: **129.5 fbg to 134.5 fbg**

Bentonite: **127 fbg to 129 fbg (intermediate sealing zone)**

Grout: **None used in intermediate sealing zone**

Legend

- Slough (cave-in native soil)
- Cement
- 3/4" SS Injection Point Riser
- Bentonite Seal
- #2 Morie Sand
- .020 Slot 3/4" SS Injection Screen
- Native Soil

ROCKCORE AND INJECTION WELL COMPLETION LOG

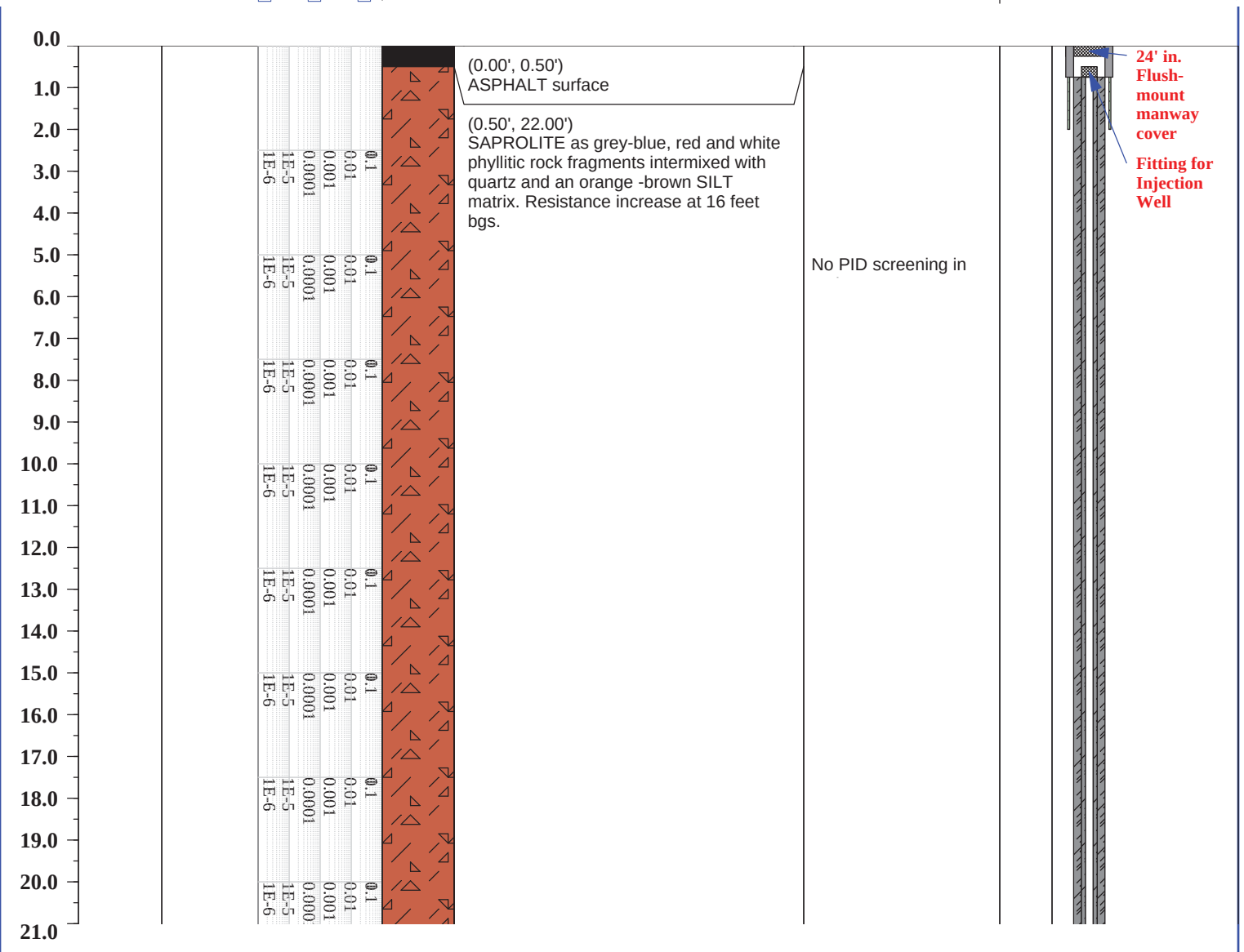
Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels

Well ID: IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
Drill Operator: Jeff Rausa	Drilling Method: Mud Rorary	Soil Classification System: USCS
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal: NA
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs



ROCKCORE AND INJECTION WELL COMPLETION LOG

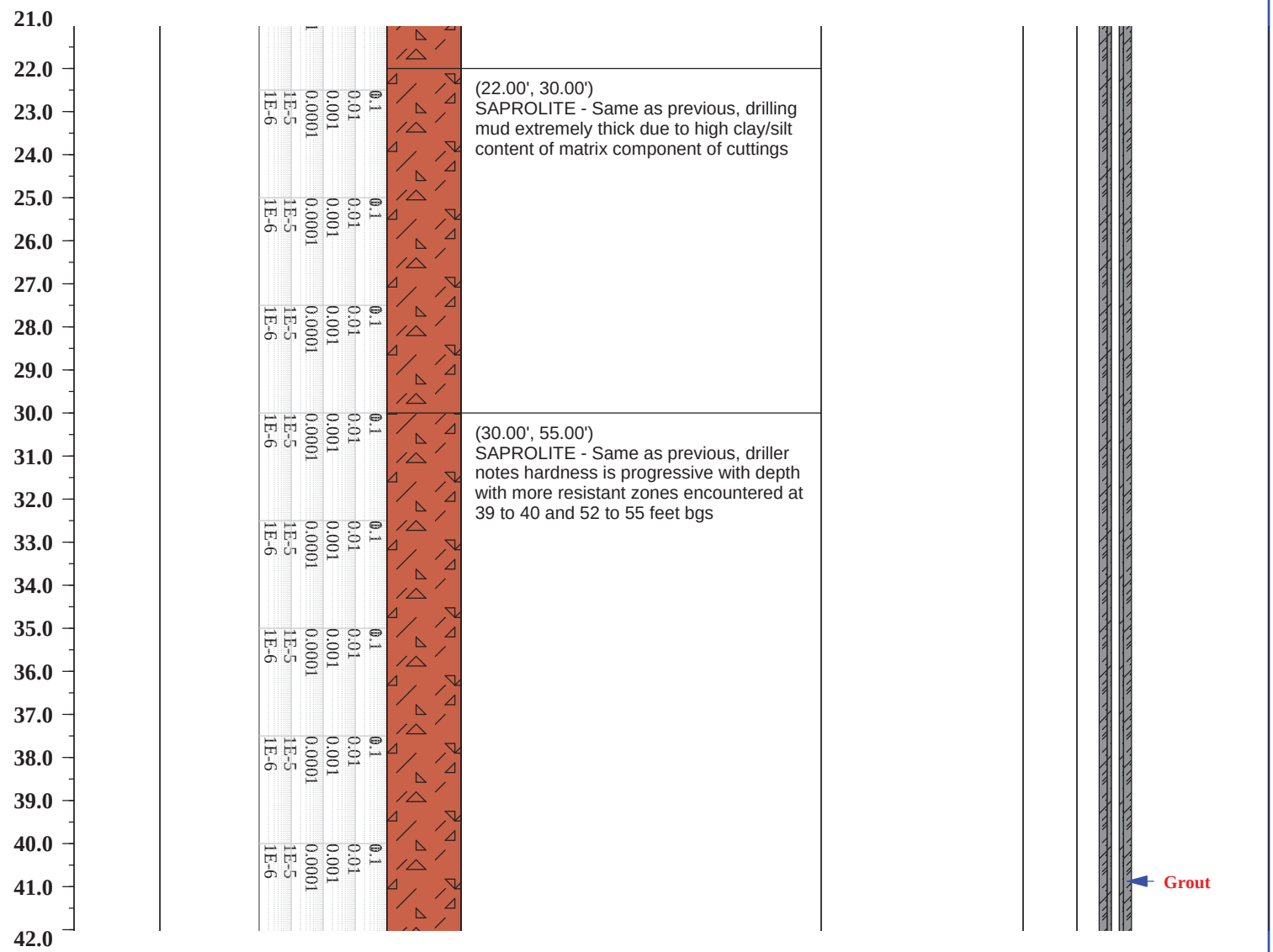
Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels **Well ID:** IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
Drill Operator: Jeff Rausa	Drilling Method: Mud Rorary	Soil Classification System: USCS
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal: NA
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs

Depth (feet)	Sample Interval (feet)	Total Organic Volatiles Field Screen ppm 0 1	Sample Lithology	Comments	Well Completion Detail



ROCKCORE AND INJECTION WELL COMPLETION LOG

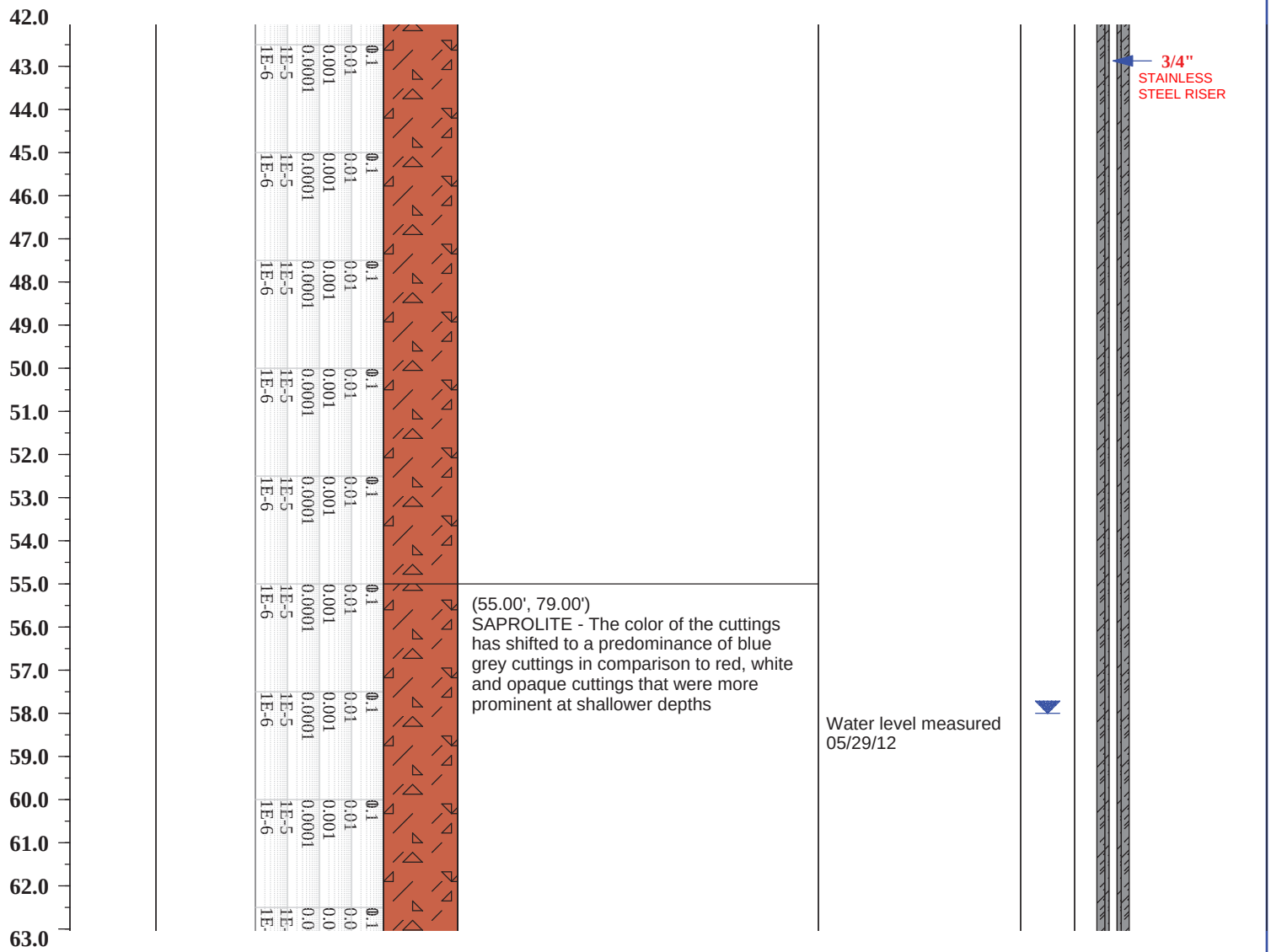
Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels **Well ID:** IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
Drill Operator: Jeff Rausa	Drilling Method: Mud Rorary	Soil Classification System: USCS
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal: NA
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs

Depth (feet)	Sample Interval (feet)	Total Organic Volatiles Field Screen ppm 0 1	Sample Lithology	Comments	Well Completion Detail



ROCKCORE AND INJECTION WELL COMPLETION LOG

Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels

Well ID: IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
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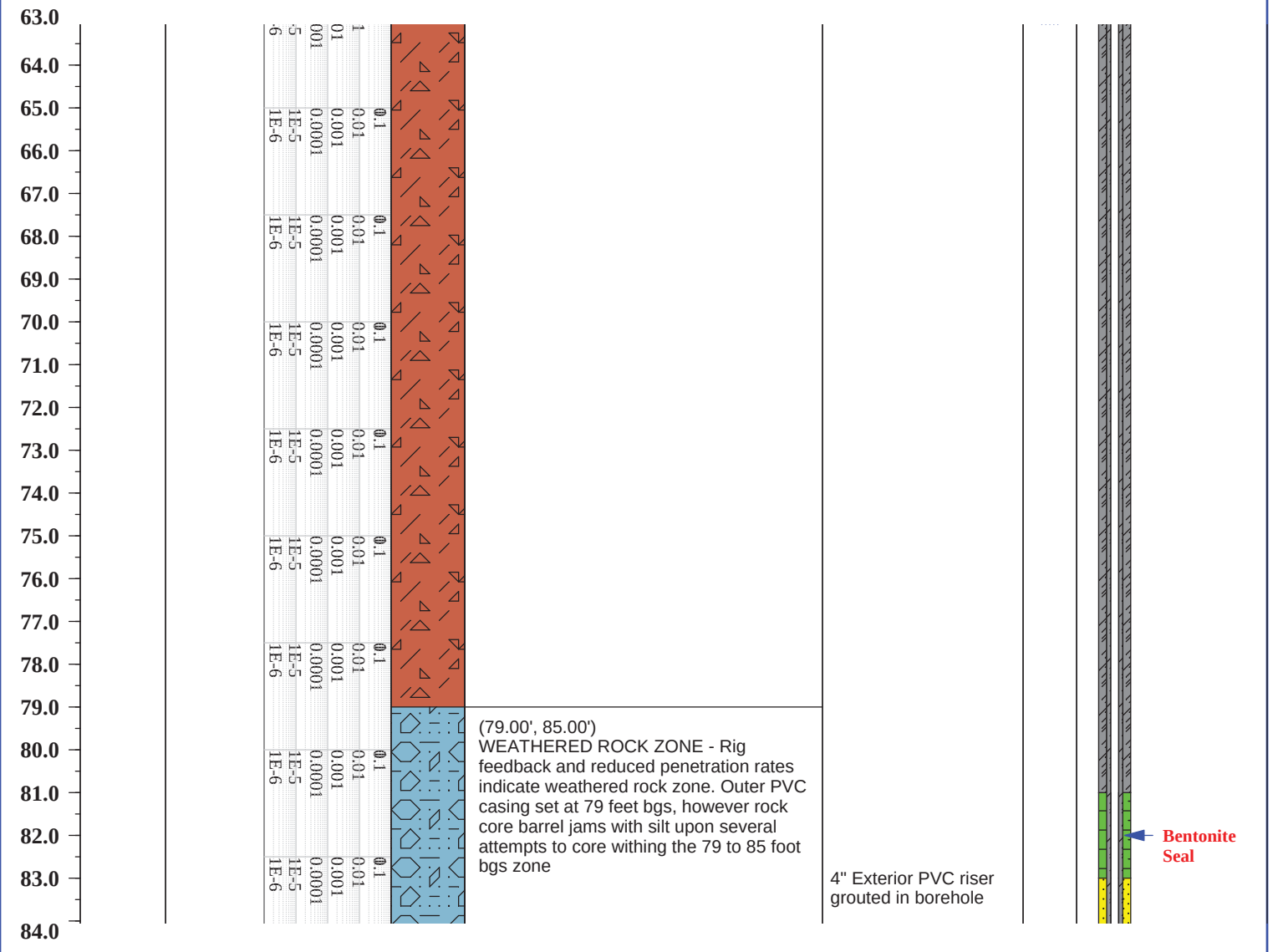
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal: NA
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs

Depth (feet)	Sample Interval (feet)	Total Organic Volatiles Field Screen ppm 0 1	Sample Lithology	Comments	Well Completion Detail



ROCKCORE AND INJECTION WELL COMPLETION LOG

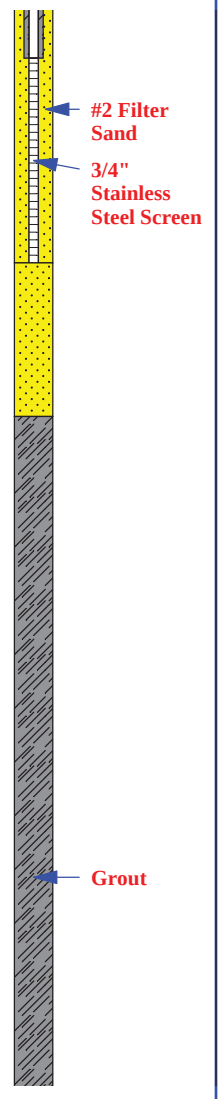
Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels **Well ID:** IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
Drill Operator: Jeff Rausa	Drilling Method: Mud Rorary	Soil Classification System: USCS
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal: NA
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs

Depth (feet)	Sample Interval (feet)	Total Organic Volatiles Field Screen ppm (0 – 1)	Sample Lithology	Comments	Well Completion Detail
84.0					
85.0	1.1			with interior 3/4" solid PVC injection well riser. Annulus between 4" PVC and 3/4" PVC is grouted.	
86.0	0.4		(85.00', 90.00') BEDROCK - Core Run #1 (85-90 feet bgs) -Competent blue grey phyllitic shist ROCK, highly fractured between 85 to 86 with moderate fracturing noted 86 to 90 feet bgs. Rock is thinly foliated with red oxidation present on fracture faces. Fracture inclination - avg 68-69 degrees. RQD=73%- Fair		
	0.6				
87.0	0.4				
88.0					
89.0	0.0				
90.0					
91.0	0.0		(90.00', 95.00') BEDROCK -Core Run #2 (90 to 95 feet bgs) - Competent blue grey phyllitic shist ROCK, moderatedly fractured between 90 and 95 feet bgs. Rock is thinly foliated, reduced oxidation/ mineralization present of noted fracture faces. RQD=69% - Fair		
92.0	0.5				
93.0					
94.0					
95.0	0.6		(95.00', 100.00') BEDROCK - Core Run #3 (95 to 100 feet bgs) - Competent grey green phyllitic shist ROCK, slightly fractured, thinly foliated, quartz banding, trace oxide precipitation or mineralization evident on fracture facies. Cross cutting fractures noted. Fractures appear fresh to slightly decomposed, most suspected machine breaks from coring process along planes of weakness. RQD=86%- good		
96.0	0.0				
	0.6				
97.0	0.6				
98.0	0.4				
99.0	0.0				
100.0	0.8		(100.00', 105.00') BEDROCK - Core Run #4 (100 to 105 feet bgs) - Competent grey green phyllitic shist ROCK, slightly fractured, thinly foliated, quartz banding, trace to no oxide precipitation or mineralization evident on fracture facies. Fractures appear fresh to slightly decomposed, most suspected machine breaks from coring process along planes of		
101.0	0.8				
102.0	0.8				
103.0	0.4				
104.0	0.8				
105.0	0.0				



ROCKCORE AND INJECTION WELL COMPLETION LOG

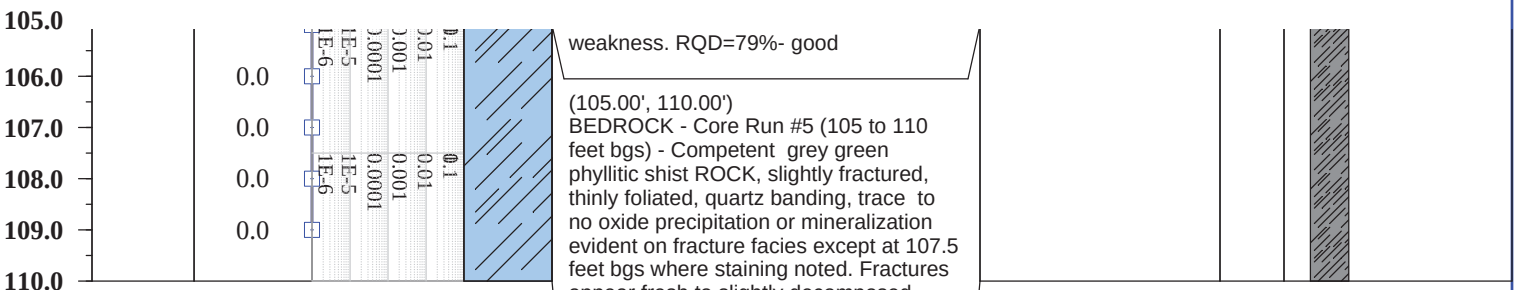
Groundwater & Environmental Services, Inc.

Former Green Valley Citgo - 11791 Fingerboard Rd., Monrovia, MD

Carroll Independent Fuels **Well ID:** IW-4

Logged By: Peter Reichardt	Date Drilled: 5.21.12-5.29.12	Split Spoon/Acetate Sleeve Diameter: N/A
Drilling Company: B. L. Myers Brothers, Inc. of NJ	Completion Date: 5.30.12	Split Spoon/Acetate Sleeve Length: N/A
Drill Operator: Jeff Rausa	Drilling Method: Mud Rorary	Soil Classification System: USCS
Drill Rig Type: Mobile B-80	Sampling Method: Cuttings grab/rock coring	Completion Type: Injection Well
Field Screening Method: Photo-ionization Detector with - 10.6 eV Lamp	Calibration Gas: 100 PPM Isobutylene Gas Lot No.: NA	Well Permit No.: FR-95-2019
UTM Northing: NA	Borehole Diameter: 8"	Top of Grout: 0' bgs
UTM Easting: NA	Well Diameter: 3/4"	Type of Seal: Bentonite grout
Total Depth: 110'	Riser Length: 85'	Top of Bentonite Seal:
Refusal Depth: NA	Screen Slot Size: 0.010-inch	Sand Type: #2
Initial Depth to Water: NA	Screen Length: 4'	Top of Sand 83' bgs
Static Depth to Water: 54'	Well Material Type: stainless steel	Bottom of Sand: 92' bgs

Depth (feet)	Sample Interval (feet)	Total Organic Volatiles Field Screen ppm (0 – 1)	Sample Lithology	Comments	Well Completion Detail
105.0					
106.0		0.0			
107.0		0.0			
108.0		0.0			
109.0		0.0			
110.0					



weakness. RQD=79%- good

(105.00', 110.00')
BEDROCK - Core Run #5 (105 to 110 feet bgs) - Competent grey green phyllitic shist ROCK, slightly fractured, thinly foliated, quartz banding, trace to no oxide precipitation or mineralization evident on fracture facies except at 107.5 feet bgs where staining noted. Fractures appear fresh to slightly decomposed, most suspected machine breaks from coring process along planes of weakness. RQD=95%- excellent

VAPOR EXTRACTION WELL LOG

Groundwater & Environmental Services, Inc.

ID NO. **VE-1**

Project: **Monrovia BP/Fmr Green Valley Citgo** Client: **Carroll Fuels** Regulatory Case #: **2005-0834-FR**

Address: **11791 Fingerboard Rd,Monrovia,MD** GES Job #: **0402632** Regulatory Case Mgr: **Jim Richmond**

County: **Frederick, MD** GES Project Mgr: **Gregory Reichart** Permit #:

Logged By: **Pete Reichardt** Date Drilled: **11-18-2010** Split Spoon/Acetate Sleeve Diameter:

Drilling Company: **BL Myer** Completion Date: **11-18-2010** Split Spoon/Acetate Sleeve Length: **NA**

Drill Operator: **Paul Fikes** Drilling Method: **Down-hole Air Hammer** Soil Classification System: **Burmister**

Drill Rig Type: **Schramm T450** Sampling Method: **Cuttings** Field Screening: **PID 10.9 eV Lamp (ppm)**

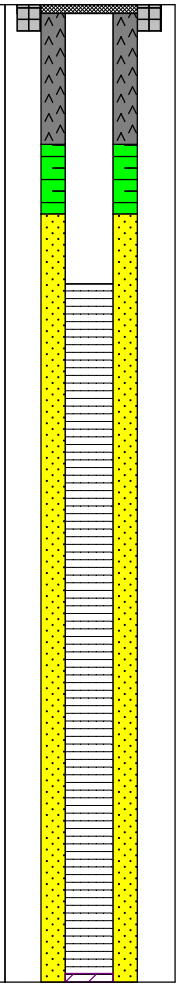
Borehole Details:
Borehole Diameter: **6"**
Total Boring Depth: **28 fbg.**
Initial Depth to Water: **Not encountered**
Longitude:
Lattitude:

Well Completion #1:
Riser Length: **8 ft**
Well Diameter: **4 in.**
Screen Length **20 ft.**
Screen Slot Size: **0.20**
Total Depth: **NA**

Well Completion #2:
Riser Length: **8 ft.**
Well Diameter: **4 in.**
Screen Length: **20 ft**
Screen Slot Size: **Slot #20**
Total Depth: **28 fbg**

Completion Details:
Grout Seal: **NA**
Type of Seal: **Bentonite Chips**
Sand Type: **#2 Sand, etc.**
Well Material Type: **Schedule 40 PVC**

Depth (feet)	Sample Interval (feet)	Recovery (inches)	Field Screen (ppm) 0 1	Blow Counts 1 50	Geologic Description	Comments	Well Completion:
5	5	NA	0.5		Asphalt: Asphalt	12 in. Flush-mount Manway in 2ft. x 2ft. Concrete Pad	
					SILT: Orange-brown SILT matrix with weathered rock fragments (Schist-phyllite)		
					PHYLLIC: Red, orange and brown cuttings	0-4 fbg Grout	
						0-8 fbg Solid PVC Riser	
						4-8 fbg Bentonite Seal	
10	10	NA	0.4	1 26 50	No Data Collected		
15	15	NA	0.2			6-28 fbg Filter Sand	
20	20	NA	0.6	0.1 1	1 26 50	8-28 fbg 0.020 in.-Slot PVC Well Screen	
25	25	NA	0.3			Threaded End Cap	



Proportions Used:
Trace = <5%
Few = 5-10%
Little = 10-20%
Some = 20-30%
Adjective = 30-40%
And = >40%

Notes:
NA = not available; fbg. = feet below grade
in. = inches; ft.= feet; ppm.= parts per million
Soil Lithologies based on field observations only.

Blow Count Pentration Resistance:

Consistency (M&C)		Density (G&S)	
<2 =	Very Soft	0-4 =	Very Loose
2-4 =	Soft	4-10 =	Loose
4-8 =	Medium	10-30 =	Medium
8-15 =	Stiff	30-50 =	Dense
15-30 =	Very Stiff	>50 =	Very Dense
>30 =	Hard		

Symbols:
Apparent Water Level
Lab Sample Location