



March 16, 2015

Mr. James Richmond  
Maryland Department of the Environment  
Oil Control Program  
1800 Washington Boulevard  
Baltimore, Maryland 21230

- *Engineering*
- *Remediation*
- *Consulting*

**Re: Supplemental Information for Case Closure  
Sheetz Store #177  
3281 Main Street  
Manchester, Maryland  
MDE Case # 06-0056CL  
MDE Facility ID No. 6297**

Dear Mr. Richmond:

Environmental Alliance, Inc. (Alliance) was contracted by Sheetz, Inc. (Sheetz) to complete the environmental activities required by the Maryland Department of the Environment (MDE) for the above-referenced site. The groundwater pump and treat remediation system was started on December 20, 2010. Monitoring wells were gradually added to the remediation pumping system through October 2011, to include pumping deep monitoring well MW-17D, six shallow monitoring wells MW-2, MW-5, MW-8, MW-9, MW-10, MW-11, and the agricultural well located at 3017 Walnut Street to further address MTBE concentrations. The pumped water was treated via an air stripper tower and discharged into an on-site infiltration gallery. Pulsed pumping on monitoring well MW-17D by pumping for two weeks and then allowing two weeks with no pumping was initiated in March 2012 and the system was shut down for post-remedial monitoring in March 2014. On-going site activities include approved deactivation of the groundwater extraction system based on a successful remediation strategy for rebound assessment, groundwater gauging and sampling of the monitoring well network and potable supply wells, as directed in the March 4, 2014 MDE directive.

The post remediation monitoring has demonstrated for five consecutive quarterly sampling events to be in compliance with the remediation reactivation thresholds of 160 ug/l MtBE for off site wells and 6,000 ug/l MtBE for on-site shallow wells. In addition, the remediation efforts completed at the site between December 2010 and March 2013 have achieved a 99.11% reduction of MtBE in the monitoring well network. MtBE was the only compound of concern (COC) identified during the initial site investigation. Due to the achievements of the remediation system and the demonstration of stable or continued decreasing concentration, Alliance requested the MDE to consider case closure in the Quarterly Monitoring Report dated January 12, 2015.

At the request of the MDE case manager, a risk assessment including the seven risk factors from the Maryland Environmental and Assessment Technology (MEAT) Guidance Document is being provided to

assist in a review for possible case closure along with a future activity recommendation for which monitoring wells will be retained as part of the monitoring well network for annual high-groundwater use area (HGUA) monitoring.

The following is an outline of the seven risk factors as applicable to the site:

**Liquid Phase Hydrocarbons (LPH):**

Site data indicates that LPH has never been detected in the site monitoring well network. The site monitoring network has consisted of over 34 on- and off-site monitoring wells. Monitoring wells have been gauged on at least a quarterly basis since 2005. Based on the historical site groundwater data collected over the last decade LPH is not present on site. A Site Base Map is included as **Figure 1**.

**Current and Future Use of Impacted Groundwater:**

A well search was first conducted during the course of investigation in 2005. For this assessment, the well search was re-conducted in February 2015 with updated information from the MDE well database. The MDE well database identified one hundred twenty-four potable wells within a half-mile of the site. However, upon further investigation; seventy-six wells were confirmed to be outside the half-mile radius of the site or identified as test wells, nineteen of the wells specific locations could not be verified, and fourteen of the wells were Town of Manchester supply wells. The remaining fourteen are confirmed potable wells and one confirmed agricultural well (DePalmer Well) which are located within the one-half mile radius of the site. A list of wells located within a half mile of the site is presented in **Table 1** and their locations are presented in **Figure 2**.

As directed by MDE, six of the closest confirmed potable wells have been sampled as part of the investigation and the concentrations have always been below applicable MDE standards. In addition, the Town of Manchester supply wells have been sampled on a quarterly basis for the past eight years as part of the site investigation and concentrations have always been below applicable MDE standards.

One potable well located at 3017 Walnut Street (DePalmer residence) had MTBE concentrations (above 10,000 ug/l) which is above the MDE Standard. The residence was connected to the Town of Manchester public water supply and the well was taken out of use as a potable supply well, and was dedicated to exclusive use for agricultural purposes. During active remediation, the 3017 Walnut agricultural well was connected to the groundwater remediation system. Methyl tert-butyl ether (MTBE) concentrations within the 3017 Walnut agricultural well indicated 99% reductions since groundwater remediation initiation. It should be noted, that the 3017 Walnut agricultural well will continued to be sampled on an annual basis as proposed below.

**Contamination Migration:**

Groundwater leaching of impacted soils and down gradient movement of dissolved phase hydrocarbons are the release mechanisms for the potential exposure pathway of groundwater. Since minimal impact to site soils were detected, groundwater leaching of impacted soil is considered to be minimal. In addition to the extensive monitoring network provided by the potable wells, specific monitoring wells were gradually added to the remediation system through October 2011, to include one deep monitoring well, six shallow

monitoring wells, and the agricultural well located at 3017 Walnut Street to further address MTBE concentrations.

A groundwater recovery and treatment system was started on December 20, 2010, to prevent further downgradient groundwater movement of dissolved phase hydrocarbons and to facilitate removal/remediation of the dissolved phase. Treated water was discharged to an on-site infiltration gallery. The system was 92.69% operational for the life of system operation (December 2010 through March 2013). The average groundwater quality reductions in target monitoring wells since system operation indicate a 96.69% decline in monitoring well MTBE concentrations since system start-up. The system had treated over 16.1 million gallons of groundwater and treated approximately 98 pounds of dissolved-phase hydrocarbons. Once the system was shut-down upon MDE approval in March 2013, a four quarter post remedial monitoring period was initiated in March 2013. During the post remedial monitoring period, MTBE concentrations in site monitoring wells continued to exhibit decreasing trends. Since the remediation system successfully addressed the on-site and off-site plume, contaminate migration through downgradient movement of dissolved phase hydrocarbons is considered minimal if not non-existent. In addition, select site monitoring wells will continue to be monitored on an annual basis per MDEs high-groundwater use area (HGUA) monitoring requirements, as outlined below.

**Human Exposure:**

During the installation of on-site monitoring wells in 2005 and 2006, total petroleum hydrocarbons for diesel range organics (TPH-DRO) were detected above applicable MDE soil standards at two locations, while all other volatile organic compounds (VOCs) were below applicable soil standards. In order to confirm the data, and further the site conceptual model, a supplemental subsurface soil investigation was conducted in 2008. During the supplemental investigation the soil samples indicated VOC detections below applicable MDE soil standards. In addition, to a subsurface soil investigation a soil vapor extraction (SVE) system was installed and operated. The SVE system was connected to six monitoring wells and two SVE wells and operated from February 2009 to November 2010. During system operation air monitoring results ranged from 27 PID units to 0.0 PID units. Also from May 2009 to November 2010 air monitoring results indicated no mass removal as results were 0.0 PID units for all extraction wells. Since the SVE system removed limited mass from the subsurface soils, limited residual mass in subsurface soils is indicated to exist. Since soil data indicated VOCs below MDE soil standards (only two samples above TPH-DRO MDE soil standards) and the on-site SVE system had limited mass removal, potential soil exposure to human does not present a concern.

As described above, based on municipally supplied potable water to the site and the region, the absence of a potable well at the site, and the implementation of a groundwater treatment system that reduced MtBE concentrations by 96.69% and treated over 16.1 million gallons of site groundwater, the threat of human exposure to the dissolved phase hydrocarbon plume is relatively low.

However, the Town of Manchester municipal supply wells are located down gradient within a one-half mile radius of the site. The potable wells are used for the municipal water supply and have been monitored for the past eight years at non-detect levels. In addition, the 3017 Walnut Street agricultural well (described above) was discovered to be impacted in 2007 and this residence has since been converted to the municipal water supply. As select site monitoring wells will continue to be monitored on an annual

basis per MDEs HGUA regulations, annual monitoring events will serve as an indication of potential migration of any residual impacts.

**Environmental Ecological Exposure:**

An unnamed stream, which originates from a pond in Memorial Park is located approximately a quarter-mile to the southwest of the site. The groundwater gradient from the site flows toward the northwest, which is away from the unnamed pond and stream. Since groundwater from the site flows away from the unnamed pond and stream, impacts associated with groundwater infiltration to surface water is unlikely.

In addition, the Huppman spring is located to the north of the site. Monitoring well MW-23D is located approximately 150 feet from Huppman spring. Since the first groundwater sampling event (September 14, 2010), monitoring well MW-23D groundwater analytical data has been non-detect for all site VOCs. Thus, there are no impacts from site groundwater to Huppman spring.

**Impact to Utilities and Other Buried Structures:**

The underground electrical conduit and underground telephone are located on the south side of the site while the water and storm sewer lines are located on the west side of the site. Underground utilities could potentially be considered a migration pathway for groundwater. However, the estimated depth of utilities (approximately four to six feet bgs) precludes the migration of dissolved-phase hydrocarbons along the utility pathways due to the shallowest recorded depth to groundwater being approximately 27 feet bgs.

**Other Sensitive Receptors:**

A basement was observed at the Manchester Veterinary Service located to the south of the site. No other adjacent properties were observed to have basements. Depth to water data in the vicinity of Manchester Veterinary has historically been approximately 35 feet. Groundwater at a depth of 35 is not likely to infiltrate the basement or sump of the Manchester Veterinary Service eliminating any possible exposure pathway for groundwater.

Other sensitive receptors located adjacent to the site are recreational fields belonging to Manchester Elementary School, which are located directly northeast of the site. A potable/agricultural well is not located on the property and the elementary school is served by a public water supply. Thus, exposure to site groundwater is not possible through agricultural application of groundwater since the school is supplied by public water.

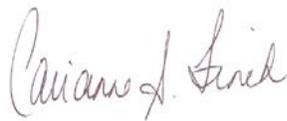
Finally, the Long View Nursing Home is located northwest of the site across MD Route 30 (Hanover Pike). The nursing home is served by a public water supply, thus exposure via the groundwater pathway is eliminated.

**HGUA Annual Sampling Work Plan**

Alliance is recommending the retention of the following monitoring wells as part of the monitoring well network; monitoring wells MW-2, MW-5, MW-17D, MW-19D, and 3017 Walnut (DePalmer residence) agricultural well will be sampled on an annual basis as per MDE HGUA regulations.

The post remediation monitoring has demonstrated for five consecutive quarterly sampling events to be in compliance with the remediation reactivation thresholds (160 ug/l in deep monitoring wells and 6,000 ug/l in shallow monitoring wells for MtBE) which has exceeded the four-quarter compliance requirement set by MDE. In addition, the remediation efforts have achieved a 99.11% reduction of MtBE in the monitoring well network. Due to the achievements of the remediation system, the demonstration of stable or continued decreasing concentration, and compliance with the seven risk factors from the MEAT guidance, Alliance requests the MDE to consider case closure. Upon approval, the remediation system will be removed and monitoring wells including infiltration gallery piezometers will be properly abandoned, with the exception of the monitoring wells proposed for HGUA compliance. Should you have any questions, please contact the undersigned at (410) 729-9000 ext. 5014.

Sincerely,  
**ENVIRONMENTAL ALLIANCE, INC.**



Carianne A. Finch  
Professional Engineer

**ATTACHMENTS:**

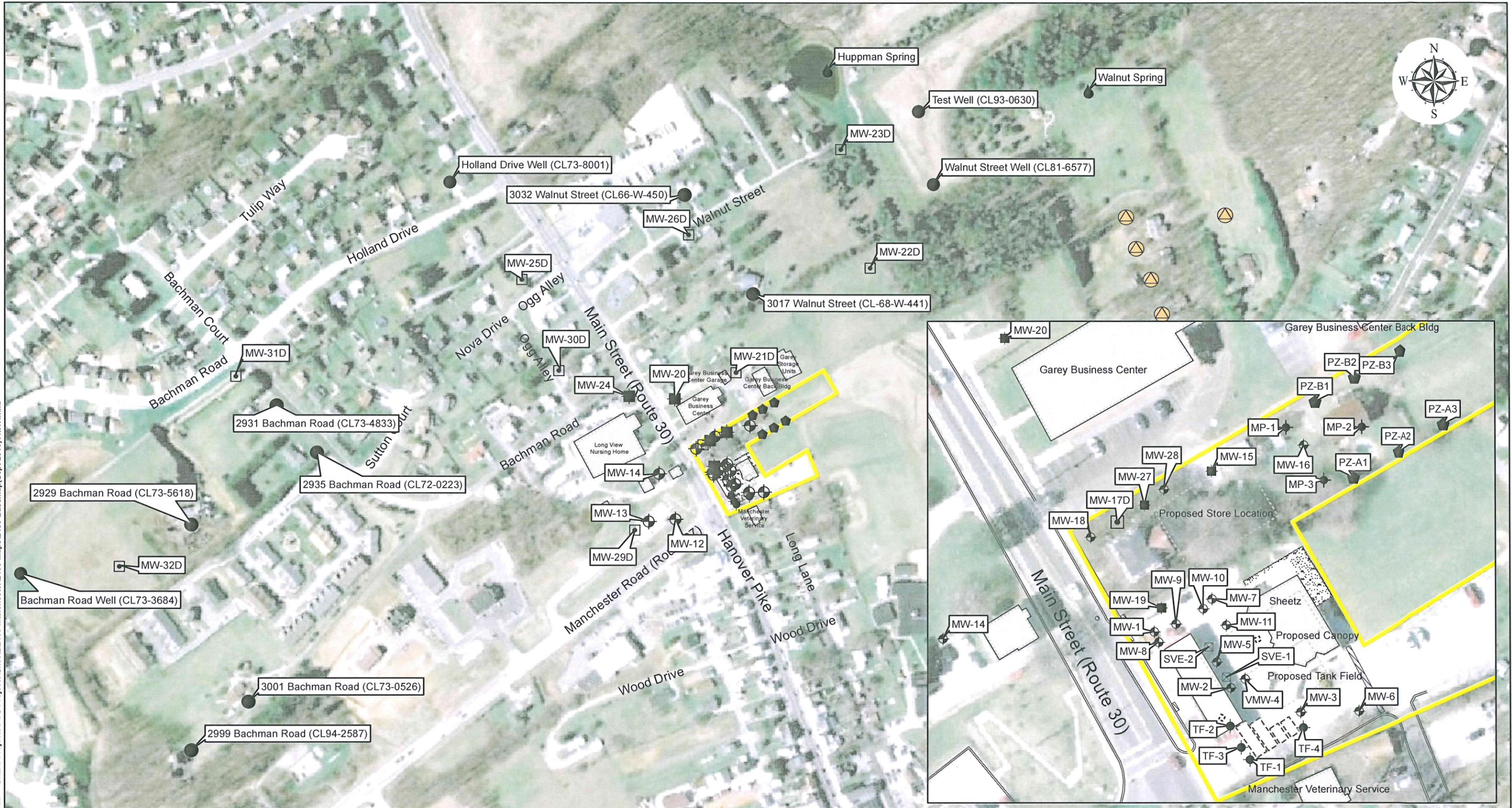
<b>Figure 1:</b>	Site Base Map
<b>Figure 2:</b>	Potable Well Location Map Half Mile Radius
<b>Table 1:</b>	Potable Well Information

- c: Mr. David Dodson, Sheetz, Inc. (electronic submittal and hard copy)
- Ms. Susan Bull, MDE – Oil Control (one copy plus CD)
- Mr. Chris Ralston, MDE – Oil Control (one copy)
- Mr. Edwin Singer, Carroll County Health Department (CD only)
- Mr. Steve Miller, Town of Manchester (CD only)
- Mr. Warren Fox, XL Insurance (email only)
- Mr. Tom Devilbiss, Carroll County (CD only)
- Mr. John Grace, MDE Water Supply (CD only)
- Mr. Peter Garey, Garey Business Center (CD only)

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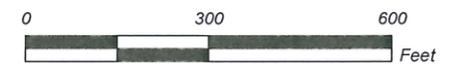
## FIGURES

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**Legend**

- |                                |                                       |                  |               |                   |               |
|--------------------------------|---------------------------------------|------------------|---------------|-------------------|---------------|
| Potable Well                   | Deep Well                             | Piezometer       | Site Boundary | UST               | Concrete      |
| Town of Manchester Supply Well | Shallow Well                          | Spring           | Building      | Proposed Features | Stone Pathway |
| Nested Well                    | Tank Field Well                       | Soil Vapor Point | Canopy        | Storm Drain       |               |
|                                | Infiltration Gallery Monitoring Point | Curbing          | Dispenser     |                   |               |



Source: Google Earth, 2007



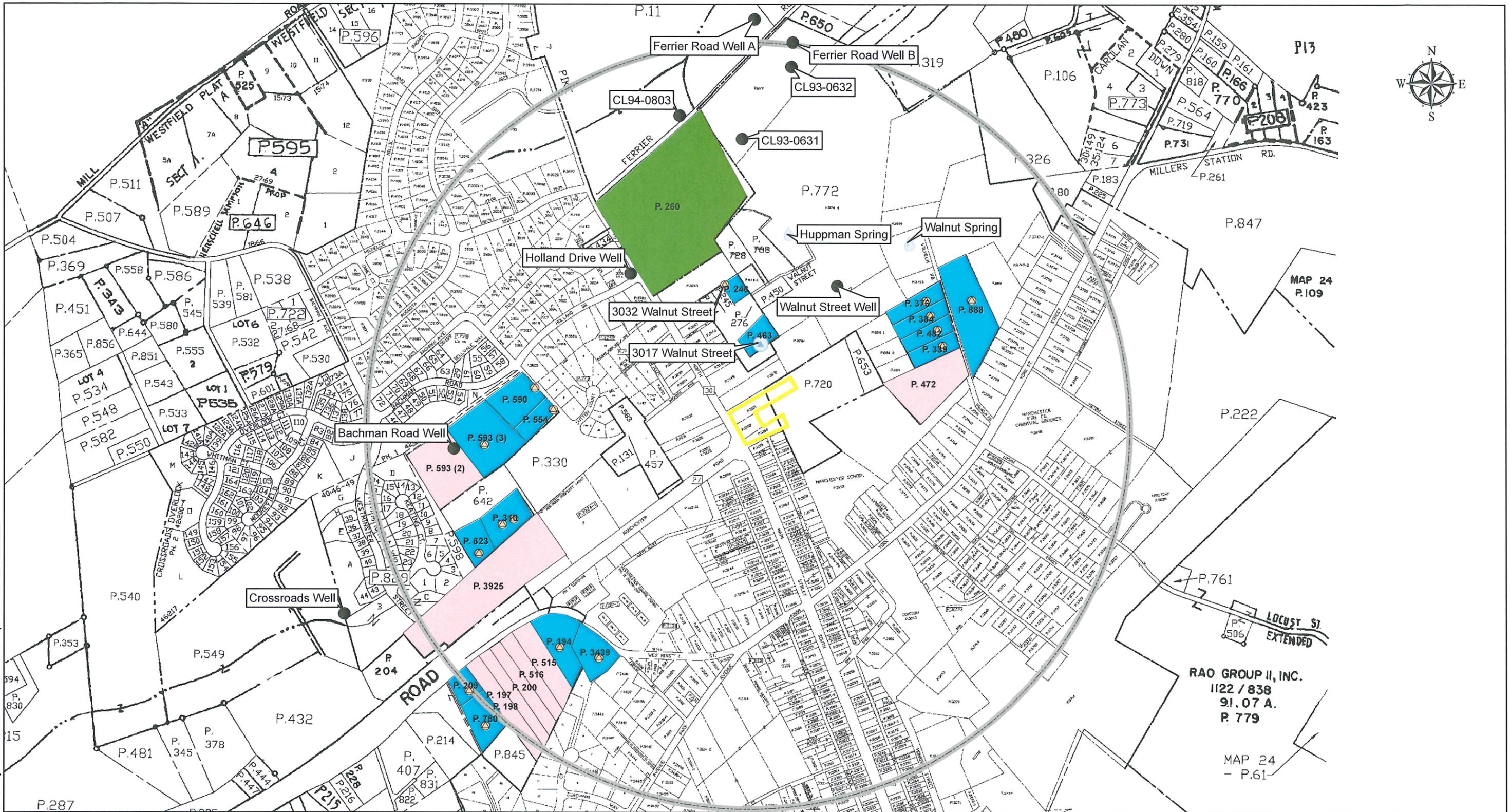
**Environmental Alliance, Inc.**  
1035 Benfield Blvd., Suite H, Millersville, MD 21108  
Phone: (410) 729-9000 - Fax: (410) 729-9001

**Sheetz Store #177**  
3281 Main Street  
Manchester, Maryland

**Site Base Map**

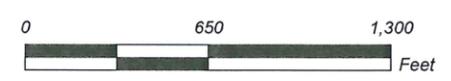
DESIGNED BY: CAF	DRAWN BY: SKJ	UPDATED BY:	FIGURE NO.:
APPROVED BY: 	PROJECT NO.: 2486	DATE: 05/09/2011	<b>1</b>

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**Legend**

- Town of Manchester Municipal Supply Wells
- Residential Potable Well
- Agricultural Well
- Spring
- Agricultural Land, no potable well identified
- Identified residential potable wells
- Vacant land, no potable well identified
- 1/2 Mile Radius
- Site Boundary



Source: Maryland Tax Map, Carroll County



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 1035 Benfield Blvd., Suite H, Millersville, MD 21108  
 Phone: (410) 729-9000 - Fax: (410) 729-9001

<b>SHEETZ STORE #177</b>			
3281 EAST MAIN STREET MANCHESTER, MARYLAND			
Potable Well Location Map Half Mile Radius			
DESIGNED BY: CF	DRAWN BY: SKJ	UPDATED BY: ---	FIGURE NO.:
APPROVED BY: <i>[Signature]</i>	PROJECT NO.: 2486	DATE: 02/09/2009	<b>2</b>

**TABLE**

**Table 1  
Potable Well Information  
Sheetz Store #177  
3281 Main Street  
Manchester, Maryland**

Permit	Water Use	Road Name	Tax Map	Block	Parcel	Section	Lot	Subdivision	Completion Date	Total Depth	Bottom of Grout (feet)	Casing Diameter (inches)	Casing Dpth (feet)	Bottom of Screen (feet)
<b>Town of Manchester Municipal Supply and Test Wells</b>														
-	P	WALNUT ST (UPPER SPRING )								0	0	0	0	0
-	P	WALNUT ST (HILLSIDE SPRING)								0	0	0	0	0
-	P	WALNUT ST (HUPPMAN SPRING)								0	0	0	0	0
CL816577	M	WALNUT ST (WELL 1)					1		1989-04-11	250	20	8	20	250
CL733684	M	BACHMAN RD (WELL 4)							1976-09-01	250	73	6	75	250
CL738001	M	HOLLAND DR (WELL 2)				1	6	PLEASANT ACRES	1979-03-28	100	48	8	48	100
CL930630	T	WALNUT ST							1995-12-07	300	32	6	70	300
CL930631	T	WALNUT ST							1995-11-13	320	93	6	127	320
CL930632	T	WALNUT ST							1995-11-13	300	54	6	58	300
CL940803	T	WALNUT STREET					WT-1		1998-08-19	360	55	8	73	360
CL940804	T	WALNUT STREET					WT-2		1998-08-19	300	65	6	71	300
CL943118	M	Ferrier Road	23	6	11			3501 Hanover Pike		280	50	6	50	280
CL943119	M	Ferrier Road	23	6	11			3501 Hanover Pike		455	63	8	63	455
CL943120	M	Ferrier Road	23	6	11			3501 Hanover Pike		400	81	8	81	400
<b>Confirmed Residential Potable Supply Wells</b>														
CL942587	D	3001 BACHMAN RD	23		310		O/C 2	ROBERT PROPERTY	2000-06-28	300	42	6	42	300
CL730526	D	3001 Bachman Road	23		310					310	38	6	40	310
CL66W450	D	3032 Walnut Street (Teets)	23		248					201	71.2	6.25	71.2	201
CL720223	D	2935 Bachman Road (Lewis)	23		554					120	30	6	57	120
CL734833	D	2931 Bachman Road	23		590					200	22	6	24	200
CL735618	D	2929 Bachman Road	23		593		3			135	40	6	70	135
	D	3001 Westminster Street	23		194									
	D	3025 Westminster Street	402		3439									
	D	2999 Bachman Road	23		823									
	D	3329 Wilhelm Lane	400		888									
	D	3336 Wilhelm Lane	23		376									
	D	3330 Wilhelm Lane	23		384									
	D	3326 Wilhelm Lane	23		482									
	D	3320 Wilhelm Lane	23		339									
<b>Confirmed Agricultural Well</b>														
CL68W441	A	3017 Walnut Street (DePalmer)	23		463					143	55	6.25	55	143
<b>Specific Location Not Able to Be Verified</b>														
CL941066	D	MD 30							1998-02-24	200	82	6	83	200
CL730365	D	Route 30								396	38	6	40	396
CL733320	D	Route 30								120	22	6	23	120
CL733545	D	Route 30				1	6	PLEASANT ACRES		100	38	6	50	100
CL733584	D	Route 30				1	4	PLEASANT ACRES		150	32	6	38	150
CL810386	D	Hanover Pike (Route 30)					13			100	21	6	21	100
CL813411	I	Route 30								220	75	6	210	220
CL815525	D	Route 30								150	22	6	24	150
CL880400	I	Route 30								125	19	6	20	125
CL881037	D	Hanover Pike (Route 30)								81	78	6	78	81
CL881398	D	Route 30								175	19	6	20	175
CL883071	D	Hanover Pike (Route 30)						TW-		243	25	10	25	243
CL883073	D	Hanover Pike (Route 30)						TW-		225	75	10	75	225
CL920198	D	Hanover Pike (Route 30)								100	44	6	45	100
CL940541	D	Route 30	33	1	973					400	69	6	70	400
CL944739	D	Manchester Road								200	68	6	69	200
CL736017	D	Westminster Street												
CL810398	D	York Road 1								153	129	6	133	153
CL815306	D	York Road 1												