



FEDEX: 798970320260

September 14, 2012

Ms. Susan Bull
Maryland Department of the Environment
Oil Control Program
1800 Washington Boulevard
Baltimore, MD 21230

**RE: Subsurface Investigation Work Plan
Southside Facility #20025
31 Heather Lane
Perryville, Cecil County, Maryland
MDE Case No. 2006-0489-CE**

Dear Ms. Bull:

Kleinfelder, on behalf of Southside Oil, LLC (Southside), has prepared this Work Plan to assess the vertical and lateral extent of petroleum contamination in the soil and groundwater to the east of the underground storage tank (UST) field at the above referenced facility (Site). This Work Plan has been prepared in accordance with Maryland Department of the Environment's (MDE) *Request for Work Plan* letter dated June 27, 2012 requesting the submittal of a subsurface investigation work plan by August 15, 2012. The MDE in an email dated August 15, 2012 approved a 30 day extension for the work plan to allow for discussion with off-site property owners for the proposed wells. The MDE correspondence and extension approval are attached. The proposed subsurface investigation activities are listed below and detailed in this work plan:

- Installation of an overburden monitoring wells to the east and southeast of the Site;
- Installation of one bedrock well to the east of the Site;
- Installation of one bedrock well off-site to the south of the Site;
- Borehole geophysical and packer testing on the proposed bedrock wells;
- Professional survey of the existing and proposed wells;
- Completion of the bedrock wells as monitoring wells or abandonment; and
- Submission of a Site Investigation Report.

OVERBURDEN MONITORING WELLS

Kleinfelder, on behalf of Southside, proposes the installation of two monitoring wells (MW-13 and MW-14) to delineate methyl t-butyl ether (MTBE) in the overburden aquifer and aid in refining the groundwater flow direction. The proposed well locations are depicted on **Figure 1**. The proposed monitoring well MW-13 is located on site and to the east of the tank field. The purpose of this monitoring well is to assess MTBE concentrations in the groundwater east of the existing monitoring well network. As discussed with the MDE on August 14th, delineation further to the east across Perrylawm Drive is not recommended at this time due to the presence of a former service station (Harbolt Motor Company) located at the intersection of Perryville Drive and Blythedale Road. Monitoring well MW-14 is located off-site and to the southeast of the Site. This monitoring well is intended to assess MTBE concentrations in the groundwater to the southeast of the Site towards 1836 Perryville Road where MTBE has been detected in the potable well below the MDE action level. Off-site access is required for the installation of monitoring well MW-14 and an access request to the property owner will be submitted following MDE approval of this work plan. In the event that access is not granted, alternative locations will be assessed and presented to the MDE for review and approval.

Upon receipt of signed access approval for monitoring well MW-14, Kleinfelder will contact Miss Utility to mark underground utilities. Kleinfelder will verify that the utilities are marked prior to the start of field activities. The proposed locations will be cleared to approximately five feet below grade using air knife/vacuum excavation technology to avoid damage to utilities during subsequent drilling activities. Kleinfelder will oversee a Maryland licensed well driller and the borings for the monitoring wells will be completed using an air rotary drill rig. Following borehole clearance, the proposed monitoring wells will be advanced to the top of competent bedrock estimated at approximately 45 feet below grade. Due to the location of overhead lines, space and topography constraints, a limited access tracked air rotary drill rig, which does not have the ability to collect split spoon soil samples, will be required to complete the proposed wells. During drilling, Kleinfelder will log the cuttings for lithology and perform standard headspace analysis of drilling cuttings with a photo-ionization detector (PID) to screen for volatile organic compounds (VOCs) in the overburden. No soil samples will be collected for laboratory analysis.

The monitoring wells will be constructed using 2-inch diameter schedule 40 polyvinyl chloride (PVC) riser and approximately 20 feet of 0.020-inch machine slotted PVC screen. A clean No. 2 moiré sand envelope will be installed in the annular space between the borehole and the well screen and casing from the bottom of the boring to approximately two feet above the screened interval.

Between two to three feet of bentonite clay will be placed on top of the sand pack and hydrated to form a seal above the sand. After allowing the bentonite to set, the remaining portion of the annular space will be grouted with a Portland cement / ~7% powdered bentonite grout to approximately 6 inches below the top of casing. The monitoring wells will be completed with a lockable expansion-grip cap and covered with a bolt down, water-tight steel traffic box set in a 2' X 2' concrete pad.

Following installation, the monitoring wells will be developed using a 2-inch diameter submersible pump. The wells will be purged until the water being discharged is of minimal turbidity and no longer visually cloudy.

BEDROCK WELLS

Two bedrock monitoring wells (BR-1 and BR-2) are proposed to the east (BR-1) and southeast (BR-2) of the tank field (**Figure 1**). Bedrock monitoring well BR-1 is located on site while bedrock monitoring well BR-2 is located off-site at 1825 Perryville Road. The property owner of 1825 Perryville Road has agreed in principle with the installation of the proposed bedrock well on the property and our proposed access agreement is in review with the property owner. The newly installed monitoring wells will be used to assess the vertical and lateral extent of MTBE in the bedrock aquifer and characterize potential preferential pathways within the aquifer, and may be used as sentinel wells for groundwater monitoring between the Site and potential receptors.

The proposed bedrock wells will be completed to a total depth of approximately 150 feet below grade. The proposed well depth was selected to correspond with the typical construction depths of the residential potable wells in the vicinity of the Site as identified through a review of publicly available data from the Cecil County Health Department. Of particular note are the potable wells located at 1825 Perryville Road (south of the Site) and 9 Blythedale Road (east of the Site). Based on the well completion reports, the potable well located at 1825 Perryville Road was drilled to a total depth of 160 feet below grade and the potable well at 9 Blythedale Road was drilled to a depth of 120 feet below grade. Potable wells located within the vicinity of the site are depicted on **Figure 2**, and the well completion reports for 1825 Perryville Road and 9 Blythedale Road are attached.

Bedrock wells BR-1 and BR-2 will be used to perform borehole geophysical and packer testing activities, as detailed below. The wells will be completed in two stages. Stage one includes the advancement a 10-inch borehole using air rotary drilling methods to five feet below the top of competent bedrock, estimated at approximately 45 feet below grade. Steel casing will be installed, grouted in place and allowed to set overnight.

The boring will then be advanced, through the steel casing, to its completion depth of approximately 150 feet below grade using air rotary drilling methods and completed as a six inch diameter open borehole.

Following completion, the proposed bedrock wells will be developed using a combination of air lifting with the drill rig and pumping with a submersible pump. Development will continue until the water being discharged is of minimal turbidity and no longer visually cloudy. Water produced during well development will be treated on-site with portable granular activated carbon filters before discharging to the surface in a landscaped area.

Borehole Geophysical Analysis

Kleinfelder proposes to perform borehole geophysical analysis of the proposed bedrock wells. The objectives of the geophysical analysis include the identification of water-bearing zones, determination of the vertical fluid flow rate, and determination of strike and dip of planar features such as fractures and bedding planes. The methods to be utilized are.

- 3-Arm Caliper
- Natural Gamma Ray
- Single Point Resistance
- 8, 16, 32, and 64 inch Normal Resistivity
- Spontaneous Potential (SP)
- Fluid Temperature
- Fluid Resistivity
- Heat Pulse Flow meter (HPFM) and
- Optical Televiwer (OPTV) or Acoustical Televiwer (ATV)

The purpose of running each of these tools varies depending on the application, as such, a description of the information obtained by each tool is provided. Caliper testing yields a depiction of borehole rugosity often associated with formational properties or drilling irregularities, sometimes representative of highly fractured or water bearing zones.

Spontaneous potential is the difference the borehole electrical potential and the surface ground, which can be used to identify relative changes in permeability. Natural Gamma is used to detect naturally occurring radioelements commonly found in fine-grained materials.

OPTV and ATV survey data are utilized to identify specific fracture zones through use of optical or acoustical image acquisition. These tools yield a two dimensional image of the borehole which can be used not only to identify fractures and foliations in bedrock but also to identify the strike and dip of these features. Single Point Resistance and Borehole Resistivity surveys both yield a depiction of a material's opposition to electrical conductivity. Fluid Resistivity and Fluid Temperature logs are often utilized together as they will generally depict areas with changing hydraulic properties indicative of flow through the well column at specific intervals or formational properties. The HPFM is utilized to detect any vertical flow component within the well column by tracking the movement of a heated packet of water as the probe is held stationary. The test is conducted using standard intervals throughout the entire well column.

Packer Testing

Following the borehole geophysical testing, the acquired data will be processed and evaluated to determine the specifications for subsequent packer testing. A straddle packer string (consisting of two inflatable packers, with pressure transducers located above, between and below the packers and a submersible pump with a discharge line) will be set across selected water-bearing fracture zones. Pressure transducer will also be set within the nearby overburden monitoring wells and each bedrock well to evaluate the hydraulic connection between the overburden and bedrock and between the bedrock wells.

Packer testing will be performed on the bedrock well based on the results from the borehole geophysical analysis. Packer testing will address the following objectives: 1) measure the specific yield of individual fracture zones, and 2) correlate each fracture zone with the geology and hydraulic characteristics that are observed in the geophysical logging data and 3) measure the concentration of VOCs at different depth intervals. Water samples will be collected from each packer tested zone for laboratory analysis. The water samples will be submitted to Lancaster Laboratories for analysis of full list VOCs and fuel oxygenates using Environmental Protection Agency (EPA) Method 8260B.

Well Completion

Following completion of the geophysical testing and sampling on the bedrock wells BR-1 and BR-2, the borings will be completed into monitoring wells or abandoned. The decision to complete to monitoring wells or abandon the boring will be based upon the ability to adequately seal the well against potential vertical migration of groundwater from the shallow unconfined aquifer into the regionally utilized aquifer and whether continued groundwater monitoring of the bedrock wells are deemed necessary based upon the results of the sampling.

After completion of the geophysical logging and packer testing, Kleinfelder will verbally coordinate with the MDE Case Manager to ensure that all actions regarding the potential conversion, additional testing, or abandonment of the bedrock wells are agreed upon prior to initiation of said conversion or abandonment activities.

SURVEY

Follow the completion of drilling activities, the horizontal position and vertical elevation of the land surface and top-of-casing (TOC) of new and existing monitoring wells associated with the Site will be surveyed by a licensed professional land surveyor.

WASTE MANAGEMENT

Soils produced during drilling will be containerized and transported for off-site disposal pending characterization. Water produced during well development will be treated with portable granular activated carbon units and discharged to landscaped areas.

GROUNDWATER SAMPLING

Approximately two weeks following development, groundwater samples will be collected from the newly installed monitoring wells. This groundwater sampling event will be scheduled to coincide with continued quarterly groundwater monitoring at the Site. Groundwater samples will be collected from the monitoring and tank field wells and the samples will be analyzed for full list VOCs and fuel oxygenates using EPA Method 8260B and TPH-GRO and TPH-DRO using EPA Method 8015B.

POTABLE WELL SAMPLING

As part of the quarterly groundwater monitoring, potable well samples will be collected from the point of entry treatment system (POET) at 1825 Perryville Road and at the potable well at 1836 Perryville Road for VOCs using EPA Method 524.2.

REPORTING

Following completion of the monitoring wells and receipt of analytical results, a Subsurface Investigation Report (SIR) will be submitted to the MDE. This report will contain an updated Site Conceptual Model, description of local aquifers of concern and provide further information regarding potential preferential pathways for the migration of MTBE identified during the investigation. The report will include a summary of the well installations, geophysical testing, field sampling procedures, and the groundwater analytical results. The report will contain the appropriate figures, tables, boring logs, and appendices.

IMPLEMENTATION SCHEDULE

Kleinfelder, on behalf of Southside, is prepared to initiate the proposed activities following written approval of this Work Plan from the MDE. The following implementation schedule is approximate and is dependent upon MDE approval of the Work Plan and cooperation of off-site property owners. Kleinfelder will provide notification to the MDE for any significant schedule change. Kleinfelder will notify the MDE case manager at least five days prior to the initiation of field activities.

Activity	Anticipated Dates
MDE Work Plan Approval	30 days (October 15, 2012)
Off-Site Access	October / November 2012
Well Installation and Development	December 2012
Borehole Geophysical Survey	One week following well installation (December 2012)
Fourth Quarter 2012 Groundwater and Potable Well Sampling and Reporting	December 2012 / January 2013
Packer Testing of Bedrock Wells	January 2013
Professional Survey of Wells	January 2013
Site Investigation Report	Within 60 Days After Receipt of Final Sample Results (March 2013)

LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated.


Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. It should be recognized that definition and evaluation of geologic and environmental condition are a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present. Although risk can never be eliminated, more-detailed and extensive investigations yield more information, which may help understand and manage the level of risk. Since detailed investigation and analysis involves greater expense, our clients participate in determining levels of service that provide adequate information for their purposes at acceptable levels of risk. More extensive studies, including subsurface investigations or field tests, may be performed to reduce uncertainties. Acceptance of this report will indicate that Client has reviewed the document and determined that it does not need or want a greater level of service than provided.

CLOSING

Southside and Kleinfelder appreciate the continued cooperation and assistance of the MDE in the successful completion of this project. Please contact the undersigned at (410) 850-0404 if you have questions or require additional information.

Sincerely yours,
Kleinfelder East, Inc.



Paxton Wertz
Geologist



Brian Barone
Project Manager

Attachments

cc: Mr. Marshall Hare – Southside Oil, LLC (File)



MARYLAND DEPARTMENT OF THE ENVIRONMENT

Oil Control Program, Suite 620, 1800 Washington Blvd., Baltimore MD 21230-1719

410-537-3442 410-537-3092 (fax)

1-800-633-6101, ext. 3442

Martin O'Malley
Governor

Robert M. Summers, Ph.D.
Secretary

Anthony G. Brown
Lieutenant Governor

June 27, 2012

RECEIVED
JUN 29 2012

BY: 

Ms. Jewel Cox
ExxonMobil Environmental Services
Suite 106, #232
1016 West Poplar Avenue
Collierville TN 38017

Mr. Marshal Hare
Director of Facilities
Mid-Atlantic Convenience Stores, LLC
1011 Boulder Springs Drive, Suite 100
Richmond VA 23225

RE: REQUEST FOR WORK PLAN

Case No. 2006-0489-CE

Former Exxon #20025

31 Heather Lane, Perryville

Cecil County, Maryland

Facility I.D. No. 1190

Dear Ms. Cox and Mr. Hare:

The Oil Control Program recently completed a review of the case file for the above-referenced property, including the *Site Assessment Report and Site Conceptual Model - December 21, 2011*, the *Potable Well Sampling Information - April 4 & 16, 2012*, and the *First Quarter 2012 Groundwater Monitoring Report - April 30, 2012*. This case was opened in 2005 when petroleum constituents were detected during high-risk groundwater use area (HRGUA) sampling. Additional delineation completed for due diligence in 2009 identified the presence of additional petroleum contamination to the south of the underground storage tank (UST) field and refined the groundwater flow to the south, as well as to the previously projected northerly direction. Sampling of select off-site drinking water supply wells in November 2011 identified the presence of methyl tertiary-butyl ether (MTBE) in the supply well located at 1825 Perryville Road, above the State's action level of 20 parts per billion (ppb). A granular activated carbon (GAC) filtration system was retrofitted to that drinking water supply well.

The *Supplemental Site Assessment and Site Conceptual Model (SCM)* concluded that there are multiple potential groundwater flow directions at this site due to unconsolidated overburden. The SCM also confirmed groundwater contamination in the vicinity of the active UST system and off-site migration of MTBE. The Department acknowledges that additional private supply wells in the area present a potential risk.

The most recent off-site sampling results for 1825 Perryville Road, collected in March 2012, continued to detect MTBE at 18 ppb in the pre-filtration sample. All post-filtration analyses were non-detect for volatile organic compounds (VOCs). Additional off-site supply well VOC sampling results were non-detect or below the State's action level for MTBE. The current monitoring well network at the subject facility includes a total of eleven monitoring wells (ten on-site and one off-site). The most recent sampling event conducted in March 2012 detected MTBE at 360 ppb. Groundwater flow for this sampling event was projected to the northeast, southeast, and west.

Based on our review of the provided *SCM*, the Department concurs that MTBE contamination persists on-site and that migration has occurred off-site. In addition, full delineation of petroleum contamination has not been completed. Based on the identified potential receptors, the Department requires the following activities be completed:

SUBSURFACE INVESTIGATION WORK PLAN:

- 1) Submit a detailed *Subsurface Investigation Work Plan* designed to fully assess the vertical and lateral extent of petroleum contamination in the soil and groundwater to the east of the UST field where elevated petroleum contamination continues to be identified. Off-site access may be required to identify the extent of the petroleum plume. The Department will require written access agreements with off-site property owners prior to approving off-site work activities. Consideration must be given to the migration of petroleum contamination via groundwater and other preferential subsurface pathways. The *Work Plan* must outline a detailed schedule of all the work necessary to implement and complete the subsurface investigation. The schedule must specify the dates and time frames for implementing and completing each phase of the proposed *Work Plan*. The Department expects to receive this *Work Plan* **no later than August 15, 2012.**
- 2) Any soil and groundwater samples collected must be analyzed for full-suite VOCs, including fuel oxygenates, using EPA Method 8260 and for total petroleum hydrocarbons/diesel-range and gasoline-range organics (TPH/DRO and TPH/GRO) using EPA Method 8015B.
- 3) Submit a final report that includes a description of local aquifers of concern and a full definition of subsurface preferential flow across the property to off-site receptors. Boring log(s) must be annotated with field screening results, soil sampling locations, and lithologic descriptions. Also include illustrative maps showing groundwater interpretations (e.g., groundwater contoured maps with water table elevations; groundwater flow direction) and any other pertinent qualitative and/or qualitative discussions. Permanent monitoring wells must be surveyed to a known elevation point (specify point in report) that can be used to incorporate future monitoring wells into the network, used for elevation adjustments and groundwater flow calculations.
- 4) The Department expects that the information collected as part of this subsurface investigation will result in the final selection of a *Corrective Action Plan (CAP)* to capture, contain, and reduce the migration of the dissolved phase hydrocarbon (MTBE) groundwater contamination plume. The proposed *CAP* must aggressively remediate contaminated soil and groundwater on the subject property and mitigate any potential current and future risks to on-site and/or off-site receptors.


- 5) Upon receipt and compilation of additional data, including groundwater delineation to the east and groundwater and drinking water supply well sampling results, the Department requires an update of the *SCM* to reflect newly acquired information. The *SCM* must be continually refined as new information is received.

SAMPLING REQUIREMENTS:

- 6) Continue **quarterly (every three months)** sampling of the GAC filtration system (pre-, mid- and post-filtration) at 1825 Perryville Road and continued **quarterly** monitoring of the drinking water supply well at 1836 Perryville Road. All samples collected must be analyzed for full-suite VOCs, including fuel oxygenates, using EPA Method 524.2.
- 7) Continue **quarterly (every three months)** sampling of all existing monitoring wells and tank field monitoring pipes. All samples collected must be analyzed for full-suite VOCs, including fuel oxygenates, using EPA Method 8260 and for TPH/DRO and TPH/GRO using EPA Method 8015B.

If you have any questions, please contact the case manager, Mr. Chad Widney, at 410-537-3386 (email: cwidney@mde.state.md.us) or me at 410-537-3499 (email: sbull@mde.state.md.us).

Sincerely,



Susan R. Bull, Western Region Section Head
Remediation and State Lead Division
Oil Control Program

CW/nln

cc: Fezell Property Management II, LLC (1825 Perryville Road)
Ms. Sheila B. Anderson (1836 Perryville Road)
Ms. Denise Breder (Town of Perryville)
Ms. Natalie Morales Hendricks (Kleinfelder East, Inc.)
Mr. Charles Smyser (Cecil County Health Dept.)
Mr. Andrew B. Miller
Mr. Christopher H. Ralston
Mr. Horacio Tablada

Candace Pittmon

From: Susan Bull <sbull@mde.state.md.us>
Sent: Wednesday, August 15, 2012 2:50 PM
To: Mark Steele
Cc: Brian Barone; Paxton Wertz; Andrew Miller; Susan Bull; MHare@Midatlanticstores.com
Subject: Re: Exxon 20025 Perryville MD Work Plan Extension Request

Mark,

The Department here-by approves the requested extension. We will expect to receive the hard copy Work Plan by not later than September 15, 2012.

Susan Bull
MDE-OCP
1800 Washington Blvd., Suite 620
Baltimore, MD 21230-1719
410-537-3499(O)

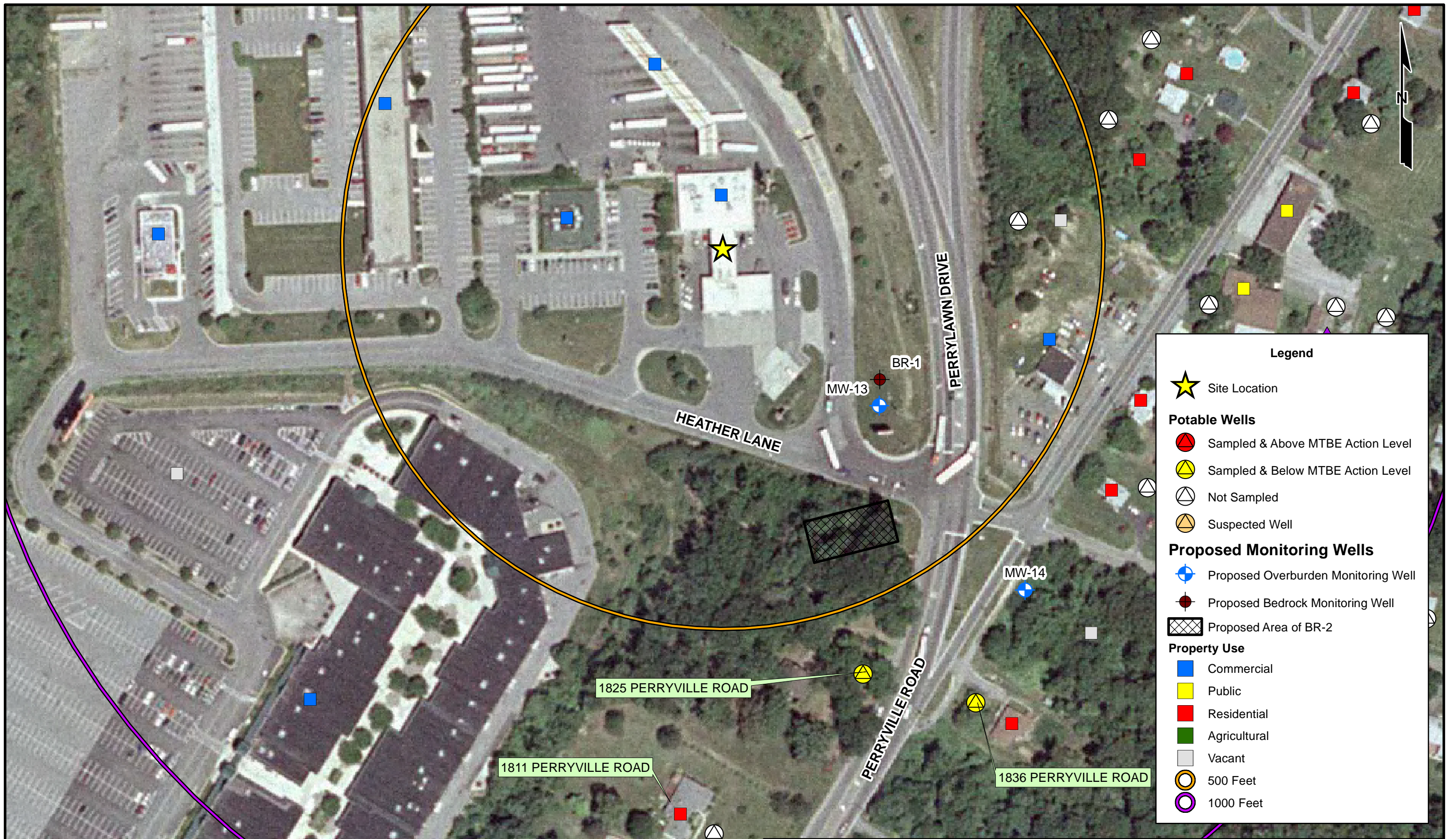
>>> Mark Steele 08/14/12 3:57 PM >>>

Susan ? As discussed this afternoon, Kleinfelder, on behalf of Southside Oil, requests a 30 day extension to September 14, 2012 for the submission of the *Subsurface Investigation Work Plan* requested by the MDE for Exxon 20025 in Perryville, MD (Case # 2006-0489-CE). The extension is requested to negotiate approval from the property owner for an additional monitoring well and continued access to existing well MW-12 on the 1825 Perryville Road property. This proposed monitoring well will be used to vertically delineate MTBE concentrations between the site UST field and downgradient potable wells. Alternate locations for the vertical delineation well are deemed infeasible due to the location of the site UST field on the property boundary and truck traffic within Heather Lane presenting concerns for safety and future well integrity. A written response to this request is greatly appreciated.

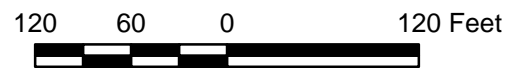
Please let us know if there are questions or if additional information is required. Thanks in advance for your assistance.

Mark C. Steele
Program Manager
1340 Charwood Road, Suite I
Hanover, MD 21076
o| 410.850.0404
d| 410.689.0789
c| 443.745.4101
f| 410.850.0049

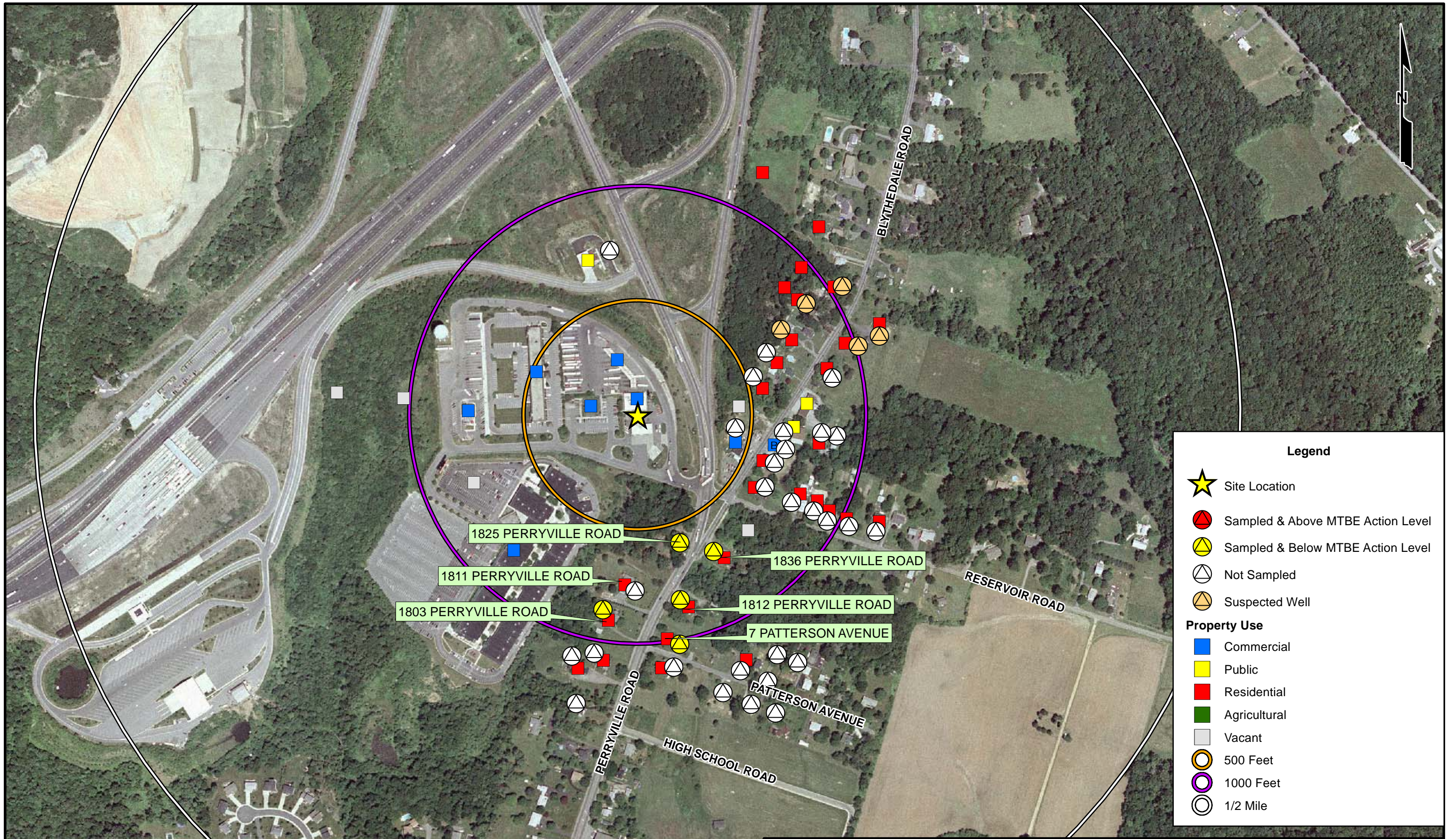
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	PROJECT NO. 113847	PROPOSED MONITORING WELL LOCATION	FIGURE 1
	DRAWN: 09/07/12		
	DRAWN BY: JR	SOUTHSIDE FACILITY # 20025 31 HEATHER LANE PERRYVILLE, MARYLAND CECIL COUNTY	
	CHECKED BY: BB		
FILE NAME: 20025_MW_Loc.mxd			



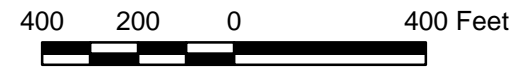
Legend

- Site Location
- Sampled & Above MTBE Action Level
- Sampled & Below MTBE Action Level
- Not Sampled
- Suspected Well

Property Use

- Commercial
- Public
- Residential
- Agricultural
- Vacant
- 500 Feet
- 1000 Feet
- 1/2 Mile

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PROJECT NO.	113847
DRAWN:	8/13/12
DRAWN BY:	JR
CHECKED BY:	PW
FILE NAME:	20025 PW Sample Loc Map.mxd

POTABLE WELL LOCATION MAP
SOUTHSIDE FACILITY # 20025 31 HEATHER LANE PERRYVILLE, MARYLAND CECIL COUNTY

FIGURE
2

C1 3118 SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

NUMBERS 15 TO BE PRINTED IN BOLD TYPE ON ALL CARDS

FILL IN THIS FORM COMPLETELY PLEASE TYPE

COUNTY NUMBER St. Mary's

DATE RECEIVED

DATE WELL COMPLETED

DEPTH OF WELL

PERMIT NO. FROM PERMIT TO DRILL WELL

OWNER: BLACKWATER KANAL D

STREET OR RD: 1825 Perryville Rd

TOWN: Perryville Md 21903

SUBDIVISION

SECTION

LOT

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS, AND IF WATER BEARING

Table with columns: DESCRIPTION (Clay, Sand, Granite, Water Bearing Zones, 4 1/2" PVC Liner w/ well-packer at 80'), FEET (FROM, TO), CHECK IF WATER BEARING.

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) TYPE OF GROUTING MATERIAL (Circle one) CEMENT (CM) BENTONITE CLAY (BC) NO. OF BAGS 122 NO. OF POUNDS 4340 GALLONS OF WATER 130 DEPTH OF GROUT SEAL (to nearest foot) from 0 to 55 ft.

CASING RECORD

Casing types insert appropriate code below: ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER. MAIN CASING: PL 4 inch diameter, 10 ft depth. OTHER CASING: PL 4 inch diameter, 10 ft depth.

SCREEN RECORD

screen type or open hole: ST STEEL, BR BRASS, HO OPEN HOLE, PL PLASTIC, OT OTHER. DEPTH (nearest ft.): PL 10, 160.

PUMPING TEST

HOURS PUMPED (nearest hour) 3 PUMPING RATE (gal. per min.) 10 METHOD USED TO MEASURE PUMPING RATE: Submersible pump WATER LEVEL (distance from land surface) BEFORE PUMPING 28 ft WHEN PUMPING 70 ft TYPE OF PUMP USED (for test): S submersible

PUMP INSTALLED

DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES (NO) IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS. TYPE OF PUMP INSTALLED: S submersible. CAPACITY: 31 GALLONS PER MINUTE (to nearest gallon). PUMP HORSE POWER: 37. PUMP COLUMN LENGTH (nearest ft.): 49. CASING HEIGHT (circle appropriate box and enter casing height): + above, - below. LAND SURFACE: 1 (nearest foot).

LOCATION OF WELL ON LOT: SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: YES (Y) NO (N)

CIRCLE APPROPRIATE LETTER: A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED. E ELECTRIC LOG OBTAINED. P TEST WELL CONVERTED TO PRODUCTION WELL.

NEEDS BEING ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: MWD 038 Larry A. Brown

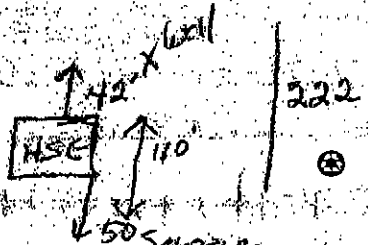
LIC. NO.: MWD 038 Larry A. Brown

SITE SUPERVISOR (sign of driller or journeyman responsible for work if different from permittee)

GRAVEL PACK: NEWELL DRILLED: WAS FLOWING WELL: INSERT F IN BOX: db

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.) W.G.

TELESCOPE CASING: INDICATOR: OTHER DATA



8416

SEQUENCE NO. (FOR USE ONLY)

STATE OF MARYLAND DEPARTMENT OF WATER RESOURCES STATE OFFICE BLDG. ANNAPOLIS, MARYLAND 21401 WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN AN 80-DAY PERIOD AFTER WELL COMPLETION FILE IN THIS FOR COMPLETION

DEPTH OF WELL

120

WELL IDENTIFICATION NUMBER

120

OWNER: Phillip Johnson Co. LAST NAME: FIRST NAME: STREET OR RD: POST OFFICE:

WELL LOG

NAME THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DENSITY, THICKNESS AND IF WATER BEARING

Table with columns: DESCRIPTION (e.g., yellow clay, red, grey, green, granite), FEET (FROM, TO), and WATER BEARING.

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX) YES NO. TYPE OF GROUTING MATERIAL (CIRCLE BOX) CEMENT BENTONITE CLAY. NO. OF BAGS 2. DEPTH OF GROUT SEAL (TO NEAREST FOOT) FROM 0 FT. TO 20 FT.

CASING RECORD

INSERT APPROPRIATE CODE BELOW. MAIN CASING TYPE: JT. NOMINAL DIAMETER TOP (MAIN) CASING: 6. TOTAL DEPTH OF MAIN CASING: 45.

OTHER CASING (IF USED)

DIAMETER (INCH) DEPTH (FEET) FROM TO

SCREEN RECORD

INSERT APPROPRIATE CODE BELOW. SCREEN TYPE OR OPEN HOLE: HO. DEPTH (NEAREST WHOLE FOOT) FROM 45 TO 120.

EACH SCREEN

Table with columns: SCREEN NO., DEPTH (NEAREST WHOLE FOOT) FROM, TO, SLOT SIZE 1, 2, 3.

DIAMETER OF SCREEN 36 (NEAREST INCH) FROM 80 TO

GRAVEL PACK

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX

OWNER USE ONLY (NOT TO BE FILLED IN BY DRILLER)

TELESCOPE CASING LOG INDICATOR

PUMPING TEST

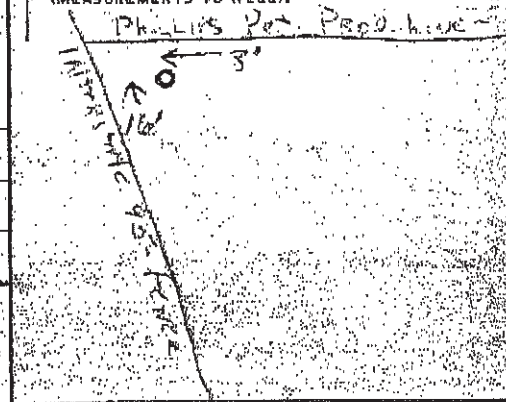
HOURS PUMPED (TO NEAREST HOUR) 3. PUMPING RATE: GALLONS PER MINUTE TO NEAREST GALLON 18. WATER LEVEL (DISTANCE FROM LAND SURFACE) BEFORE PUMPING 4.5. TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) A.

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX) A. CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON) 31. PUMP HORSE POWER 37. PUMP COLUMN LENGTH (NEAREST FOOT) 43. CASING HEIGHT (CIRCLE APPROPRIATE BOX) + ABOVE LAND SURFACE.

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



- CIRCLE APPROPRIATE BOXES: A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED. ELECTRIC LOG OBTAINED. COPY OF ELECTRIC LOG ATTACHED.

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED 'PERMIT TO DRILL WELL' AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: CHARLES HAMILTON, JR. SIGNATURE: Charles H. Hamilton, Jr.