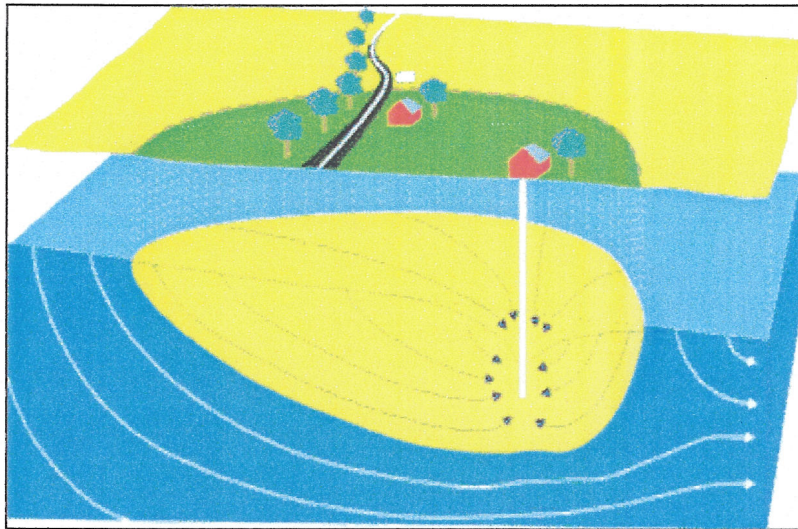


SOURCE WATER ASSESSMENT
FOR CALVERT MANOR HEALTHCARE, INC.
CECIL COUNTY, MD



Prepared By
Water Management Administration
Water Supply Program
May 2005



Robert L. Ehrlich, Jr.
Governor

Kendl P. Philbrick
Secretary

Michael S. Steele
Lt. Governor

Jonas A. Jacobson
Deputy Secretary

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SUMMARY

The Maryland Department of the Environment's (MDE's) Water Supply Program (WSP) has conducted a Source Water Assessment for Calvert Manor Healthcare Center, Inc., a nursing home located about four miles east of Rising Sun in Cecil County, Maryland (Figure 1). This report delineates the area that contributes water to the well, identifies potential sources of contamination within the area and determines the susceptibility of the water supply to contamination. Recommendations for protecting the water supply conclude the report.

The source of Calvert Manor's water supply is two wells in the Sykesville Formation. The aquifer appears to be unconfined at this location. The Wellhead Protection area was delineated using by the WSP using EPA-approved methods.

Point sources of contamination were identified within and near the assessment area from field inspections and MDE databases. The Maryland Office of Planning's 2000 land use map for Cecil County was used to identify non-point sources of contamination. Maps showing location of the well, potential sources of contamination, and land use are included at the end of this report.

The susceptibility analysis is based on a review of existing water quality data for the water system, the presence of potential sources of contamination, in the assessment area, well integrity and the inherent vulnerability of the aquifer. It was determined that Calvert Manor's water supply is not susceptible to inorganic compounds, volatile organic compounds, synthetic organic compounds or microbiological contaminants. The wells may be susceptible to radon based on the MCL adopted by EPA but not to other radionuclides. The water system should properly abandon and seal unused wells as they may provide a pathway for contaminants to enter the aquifer.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for Calvert Manor Health Care Center, Inc., a 185-bed nursing home, which owns and operates its own water and septic systems.

As defined as part of Maryland's Source Water Assessment Plan (SWAP), "large systems" are community and noncommunity water systems that have water appropriation and use permits with average annual appropriation permit exceeding 10,000 gpd. Calvert Manor's water appropriation and use permit allows for an average annual water use of 13,600 gpd.

HYDROGEOLOGY

Calvert Manor Healthcare Center, Inc. is located southeast of the Piedmont Physiographic Province. This region is underlain crystalline igneous and metamorphic rock.

The geologic formations underlying Calvert Manor were formerly known as the Port Deposit Gneiss and Wissahickon Formations and those names remain in use in many MDE records. However, the area has been remapped by Maryland Geological Survey (MGS) as the Pelitic Schist Lithofacies of the Sykesville Formation. MGS describes the formation as "Strongly crinkled, silvery-gray to brownish-gray, fine- to medium-grained quartz-biotite-plagioclase-muscovite schist, locally garnetiferous. Poorly exposed, but contacts appear to be gradational with other units of the metasedimentary rock sequence." In such rocks, water is stored in fractures and in the overlying saprolite and soils. The ground water is generally unconfined and the water table mimics the surface topography. Well yields are dependent on the number and nature of fractures penetrated by the well. Well depths in the Pelitic Schist typically range from about 17 to 400 feet. Yields range from 1 to 100 gpm, with median yield around 10 gpm.

WELL INFORMATION

Well information for the system was obtained from the Water Supply Program's data base, site visits well completion reports and sanitary survey inspection reports. The Appendix consists of copies of the applications to drill the wells and the well completion reports. As indicated in Table 1, Calvert Manor currently has two production wells and three unused wells.

TABLE 1. CALVERT MANOR HEALTH CARE CENTER, INC WELL INVENTORY

WELL #	PERMIT #	TOTAL DEPTH	CASING DEPTH	YEAR DRILLED	COMMENTS
WELL 1	CE660217	142'	107'	1965	not in use; behind building, near air conditioning units
WELL 2	CE660030	150'	118'	1965	production well; in front of building, in lawn area
WELL 3	CE733938	400'	147'	1981	not in use; in front of building, covered by bush in landscaped area
WELL 4	CE650304	123'	116'	1965	not in use; protective rails around it
WELL 5	CE812044	275'	137'	1986	production well; near parking lot, protected by concrete poles

SOURCE WATER ASSESSMENT AREA DELINEATION

For ground water systems, a Wellhead Protection Area (WHPA) is considered to be the source water assessment for the system. As defined by Maryland's SWAP, the wellhead protection area for a small public water system whose wells are completed in fractured crystalline rock is the drainage area that contributes water to the wells. As Calvert Manor's wells are located at the top of a hill, a portion of this hilltop was estimated to supply the water needed for Calvert Manor's average annual appropriation of 13,600 gpd. If water level monitoring data were available for this area, the WHPA could be modified to more accurately reflect ground water flow directions. Figure 2 shows the 41-acre Wellhead Protection Area (WHPA) that was delineated.

POTENTIAL SOURCES OF CONTAMINATION

Potential sources of contamination can be classified as either point or non-point sources. Examples of point sources are underground storage tanks, ground and surface water discharges, landfills, animal feeding operations, and ground water contamination sites. These sites are usually associated with commercial or industrial facilities that use chemicals that may, if handled inappropriately, contaminate ground water via a discrete point location. Non-point sources are associated with land use practices, such as use of pesticides, fertilizer, animal wastes or septic systems, that lead to ground water contamination over a larger area.

Point sources of contamination were identified within and near the assessment area from field inspections and from MDE Water and Waste Management databases. Figure 2 is an aerial photograph showing potential sources of contamination near the WHPA. Table 2 lists the facilities identified from MDE databases, as potential sources of contamination and their locations are shown in Figure 2. Underground Storage Tanks (UST) sites were the only sources identified in the WHPA. At three sites, heating oil is stored on site in underground tanks registered with the MDE Waste Management Administration.

TABLE 2. POTENTIAL CONTAMINANT POINT SOURCES WITHIN THE CALVERT MANOR WHPA

ID	Type	Site Name	Address	Potential Contaminant	Status
1	UST	Calvert Manor	1881 Telegraph Rd.	VOC	4,000 gal. heating oil tank
2	UST	John Laugh	27 Walnut Garden Rd.	VOC	2,000 gal. heating oil tank
3	UST	Calvert Elem. School	79 Brick Meeting Rd.	VOC	10,000 gal. heating oil tank

The Maryland Office of Planning's 2000 land use map for Cecil County was used to identify non-point sources of contamination (Figure 3). Three land use categories were identified within the delineated WHPA: commercial/institutional, cropland and forest (Table 1). The predominant land uses are commercial and cropland.

TABLE 3. LAND USE SUMMARY FOR THE WELLHEAD PROTECTION AREA

Land Use Categories	Total Area (acres)	Percentage of WHPA
Commercial/Institutional	23.8	57.9
Cropland	17.2	41.9
Forest	0.1	0.2

A review of Maryland Office of State Planning's Cecil County Sewer Map (Figure 4) shows that Calvert Manor operates a private sewer system with an on-site drainfield receiving the treated wastewater and that there is no planned municipal service to Calvert Manor, to its WHPA or to any of the surrounding area. Calvert Manor's drain field, located north of the facility, is not within the WHPA. Surrounding properties are served by private septic systems.

TABLE 4. SEWER SERVICE SUMMARY FOR THE WELLHEAD PROTECTION AREA

Sewage Service Area	Total Area (acres)	Percentage of WHPA
Area Served by Calvert Manor	22.8	55.6
No Planned Service	18.3	44.4

WATER QUALITY DATA

Water quality data from the Water Supply Program's (WSP) database was reviewed for Safe Water Drinking Act (SWDA) contaminants. In accordance with Maryland's SWAP, data submitted by the owner/operator of the system was compared with the Maximum Contaminant Levels (MCLs). If monitoring data is greater than 50% of the MCL, the assessment will describe the typical sources of that contaminant and locate the possible sources of the contaminant for this site. Calvert Manor's only water treatment is chlorination.

Inorganic Compounds

No inorganic compounds have been detected in quantities greater than 50% of the MCL. Low levels of barium have been detected twice and fluoride has been detected once. Their presence is generally attributed to leaching of naturally occurring minerals in the aquifer rocks.

Nitrate levels ranging from 0.9 to 4.2 ppm were detected in all inorganic sampling from 1993 to present. Even though nitrates have never exceeded 50% of the MCL of 10 ppm, their consistent presence is of note. Their presence is attributed to agricultural chemicals and fertilizers applied to the surrounding cropland and/or septic effluent from nearby septic systems. There is no apparent trend in the data and the levels are well below established regulatory standards.

Radionuclides

Radionuclides have been measured several times since 1992. There is currently no MCL for radon 222, however, EPA has proposed a MCL of 300 picocuries per liter (pCi/L) or an alternate of 4,000 pCi/L for community systems if the State has a program to address the more significant risk from radon in indoor air. Only one measurement exceeded 50% of the MCL. In 1996, radon 222 was measured at 1195 pCi/L which is above the lower proposed MCL of 300 pCi/L but less than 50% of the upper proposed MCL of 4,000 pCi/L. A neutral pH of 6.9 was measured at the same time. The high radon 222 is attributed to decay of naturally occurring minerals, like uranium, in the surrounding rocks.

Volatile Organic Compounds (VOCs)

VOCs have been sampled on thirteen occasions. Trichloroethene, the only VOC detected, was measured at 0.7 in 1994.

Synthetic Organic Contaminants

No synthetic organic compounds have been detected in the monitoring conducted at this water system.

Microbiological Contaminants

Routine bacteriological monitoring, which measures total coliform bacteria, is conducted in the finished water for each community water system on a monthly basis. Since Calvert Manor uses disinfection for treatment of its water supply, the negative bacteriological results may not be reflective of the quality of raw water from the wells. Total coliform bacteria are not pathogenic but are used as an indicator organism for other disease-causing microorganisms. No microbiological contaminants have been detected. Raw water bacteriological testing was conducted in 1999 on both Wells 3 and 5. No total or fecal coliform were detected in the raw water.

SUSCEPTIBILITY ANALYSIS

The wells serving Calvert Manor were completed in a unconfined crystalline rock aquifer. Wells completed in unconfined aquifers are generally more susceptible to contamination from surface sources. The susceptibility of source water to contamination is based on the following criteria: 1) the presence of natural and anthropogenic contaminant sources within the WHPA; 2) water quality data; 3) well integrity and 4) aquifer conditions. The susceptibility of Calvert Manor's water supply to various contaminants is shown in Table 5.

Table 5. Susceptibility Chart for Calvert Manor Water Supply

CONTAMINANT TYPE	Are Contaminant Sources present in the WHPA?	Are Contaminants detected in WQ samples at 50% of the MCL?	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to the Contaminant?
Inorganic Compounds)	YES	NO	NO	YES	NO
Volatile Organic Compounds	YES	NO	NO	YES	NO
Synthetic Organic Compounds	NO	NO	NO	YES	NO
Radon	YES	YES	NO	YES	MAYBE*
Radionuclides	NO	NO	NO	YES	NO
Microbiological Contaminants	YES	NO	NO	YES	NO

**depending on the MCL selected for adoption by EPA*

No IOC's were reported above the 50% MCL in any of the water samples analyzed. Approximately 44% of the area within the WHPA is supplied by private on-site septic systems which can possibly cause nitrate pollution, however no concentrations of nitrates above the 50% MCL have been reported and no upward trends are noted. The water supply at Calvert Manor is not susceptible to IOC's.

No VOC's greater than 50% MCL have been reported in the WHPA. While heating oil tanks were observed within the WHPA, the oils consist of heavy molecular weight compounds and little VOC's. Based on available water quality data, the lack of point sources, the Calvert Manor water supply is not susceptible to VOC's.

No SOC's have been detected in the Calvert Manor's water supply. The only SOC sources are herbicides and pesticides that potentially be used by Calvert Manor or

any of the other landowners on the WHPA. Calvert Manor's water supply is not susceptible to SOCs.

No microbiological contaminants have been detected in Calvert Manor's raw water. Based on the water quality data, Calvert Manor's water supply is not susceptible to bacteria or protozoans like *Cryptosporidium* or *giardia*.

Radon 222 is the only radionuclide detected in Calvert Manor's water samples. Its presence is most likely due to naturally occurring uranium minerals in the underlying bedrock. Based on the lower proposed MCL for radon, Calvert Manor's water supply may be susceptible to radon 222, but not to other radionuclides.

MANAGEMENT OF SOURCE THE WATER ASSESSMENT AREA

The wells serving Calvert Manor Healthcare Center appear to be in good condition. Water quality testing indicated the presence of only one naturally occurring radionuclide. Although nitrates are low, they are consistently present and may be a result of local agricultural practices or leaching from one or more septic systems in the area. Recommendations for maintaining the integrity of this system are listed below:

- Continue maintenance and protection of the wells.
- Ensure that all underground tanks are tested for leaks on a regular basis.
- Continue monitoring for VOCs, IOCs, SOCs and radionuclides.
- Annual sampling for microbiological contaminants is recommended. It is a good indicator of the integrity of the wellhead.
- The Consumer Confidence Report should list that this report is available to the general public through their public library or by contacting MDE.
- Any increase in pumpage or addition of new wells to the system may require extension of the WHPA. The system is required to contact the Water Supply Program when an increase in pumpage is applied for or when new wells are being considered.
- All water systems should have a Contingency Plan for their water system. COMAR 26.04.91.22 requires all community water systems to prepare and submit for approval a plan for providing a safe and adequate drinking water under emergency conditions.
- The water supplier should properly abandon and seal wells that are unused in accordance with State well regulations.

REFERENCES

Scott, P.S., C.T.Rodano, 1999, Calvert Manor Hydrogeologic Report, Geotechnology Associates, Inc.,5p.

Higgins, M.W. and Conant, L.B., 1990, The Geology of Cecil County, Maryland, Maryland Geological Survey Bulletin 37, 183p.

Maryland Department of the Environment, Water Supply Program, 1999, Maryland's Source Water Assessment Plan, 36p.

Maryland Department of the Environment, Water Supply Program, 2002, Source Water Assessment for Small Systems in Cecil County, 17p.

Otton, E.G., Willey, R.E., McGregor, R.A., Achmad, G., Hiortdahl, S.N. and Gerhart, J.M., 1988, Maryland Geological Survey Bulletin 34, 133p.

FIGURES

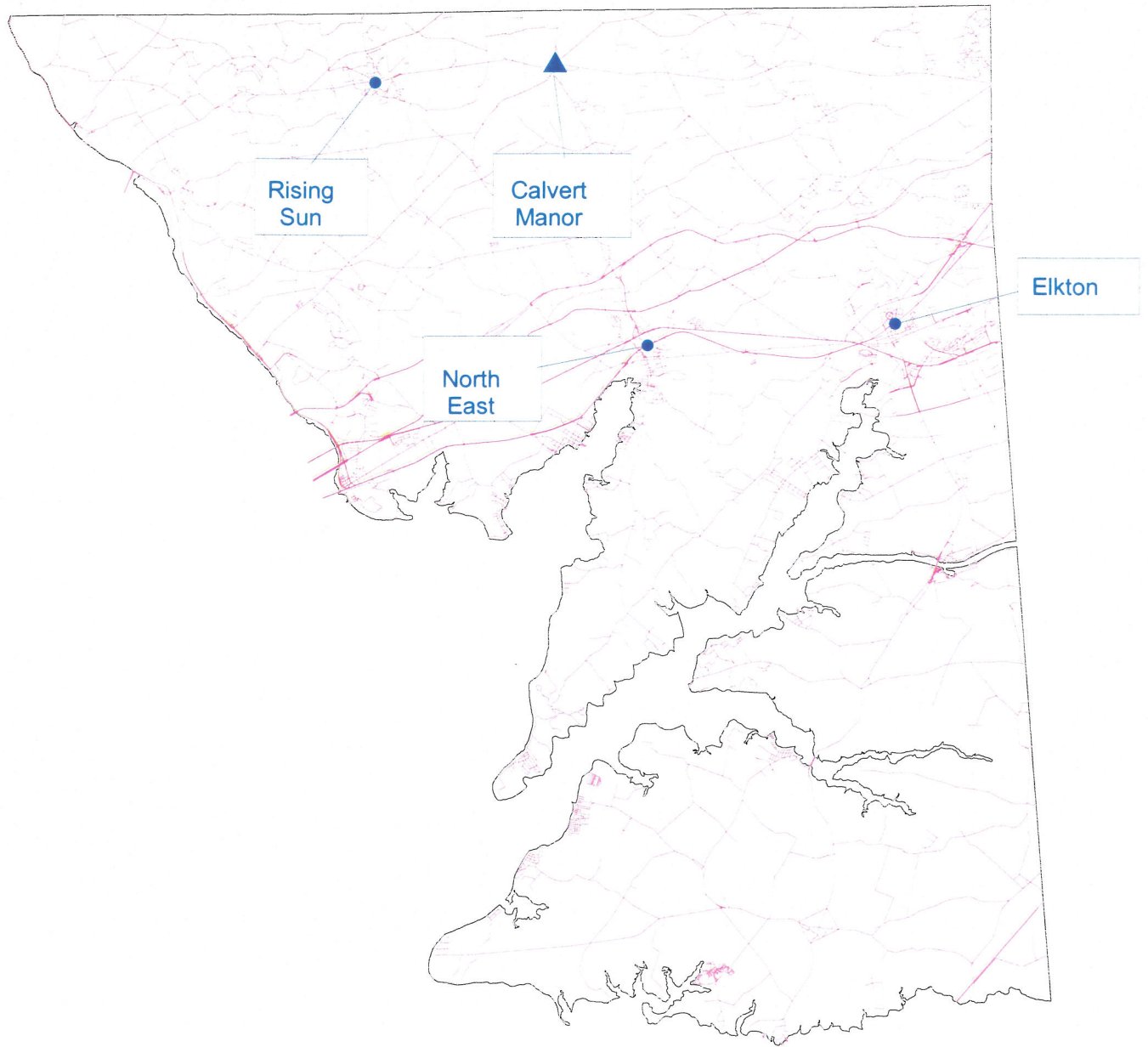
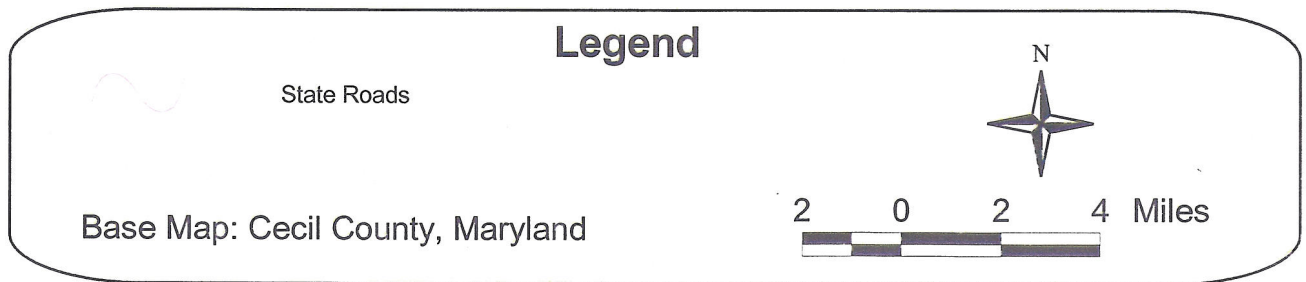


Figure 1. Location Map



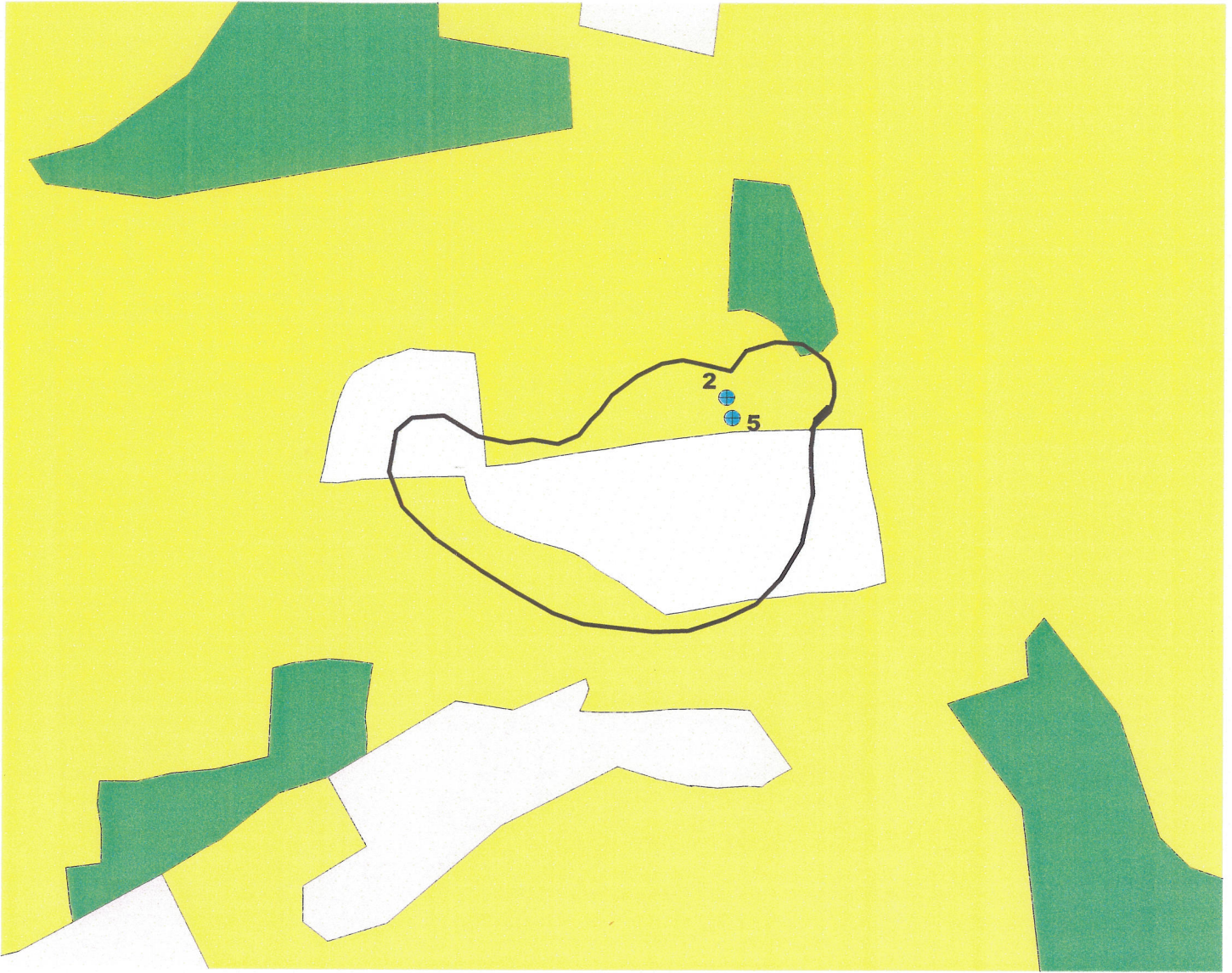
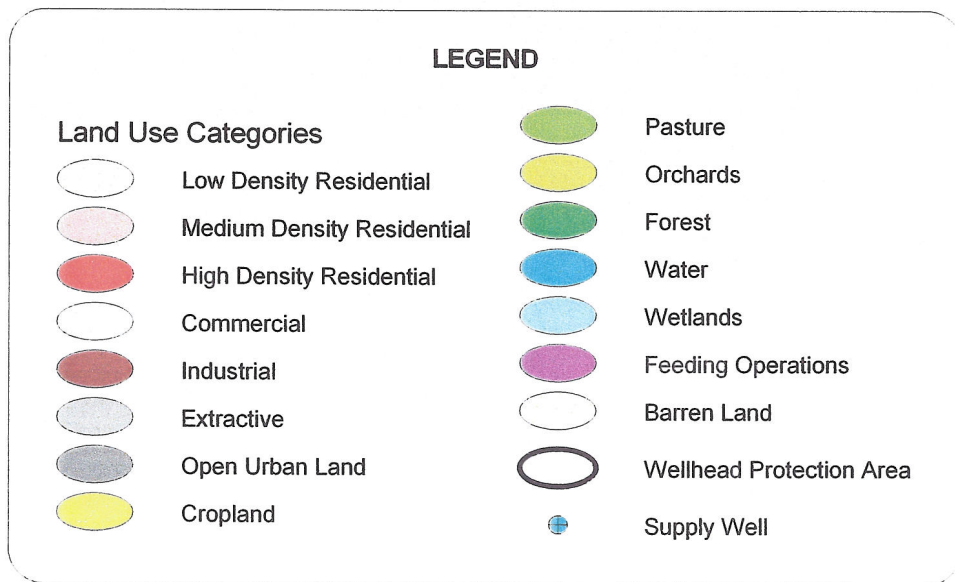


Figure 3. Land Use Map of the Calvert Manor Wellhead Protection Area



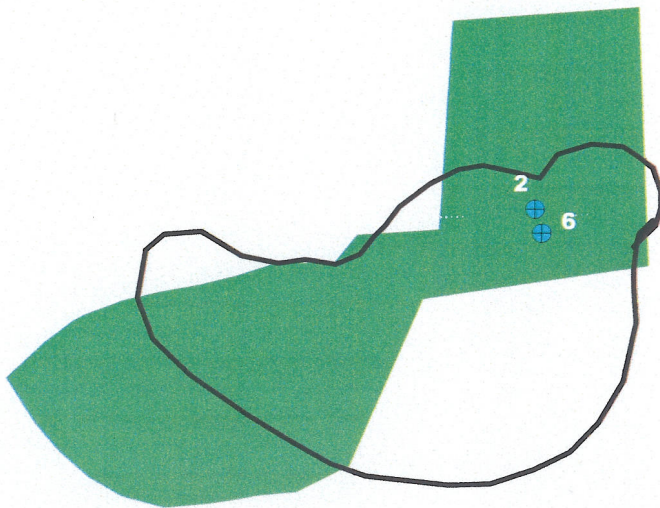
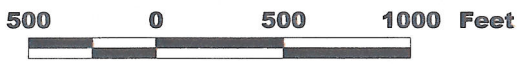
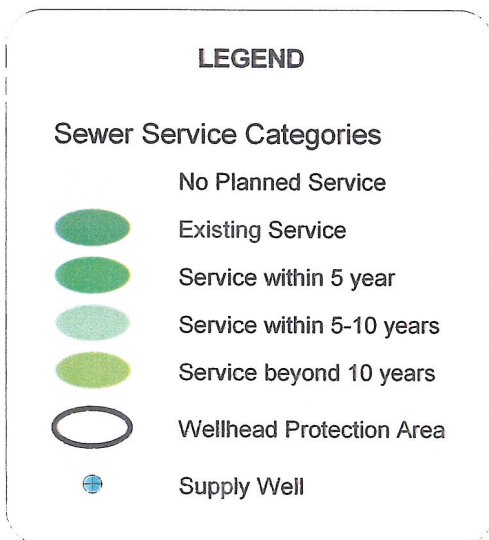


Figure 4. Sewer Service Map of the Calvert Manor Wellhead Protection Area



Base Map: Maryland Dept. of Planning Sewer Service Map of Cecil County (2003)

APPENDIX

'65 MAR 2 AM 8:40

DEPARTMENT OF WATER RESOURCES
State Office Building
ANNAPOLIS, MARYLAND 21401

MAR 1 1965

Dee

DEPARTMENT OF WATER RESOURCES

CECIL COUNTY HEALTH DEPT.

CE650304

APPLICATION FOR PERMIT TO DRILL WELL

An application must be submitted and permit received before drilling a well

Owner FRANK GRAY BEAL Driller R. WALTER SLAUGH License Number 25075

Street or R. F. D. _____ Post Office LINCOLN UNIV., PA.

Post Office MATTINGHAM, PA. Date FEB. 24, 1965

Quantity of Water to be Produced 6 G.P.M. Location of Well _____

Total Quantity Needed For Use 600 G.P.D. County CECIL

Use for Water HOUSE REPAIRING DRILLED WELLS Nearest Town CALVERT

Approximate Depth of Well (feet) 100 Distance from Town IN THE TOWN

Method of Drilling to be used CABLE TOOLS Direction from Town _____

Description of Location of Well
(This information should be definite enough to permit locating well on a county map.)

Near what road PRESENTLY ON MD 273

On which side of road NORTH
(North, East, South, West)

Distance from road 100 FT

Draw a sketch below showing location of well in relation to nearby towns, roads and streams with North in the direction of the arrow, and give distance from well to nearest road junction or stream crossing shown on the sketch.

PERMIT TO DRILL WELL
(Permit to be returned to Driller)
NOT TO BE FILLED IN BY DRILLER

Permit No. CE 65-W-304 (Verbal approval) Y
March 1, 1965

Samples of Cuttings Required by Department Yes No Mrs. Stallings

Owner Requires Permit to Appropriate Water Yes No

Owner Has Permit to Appropriate Water Yes No BS

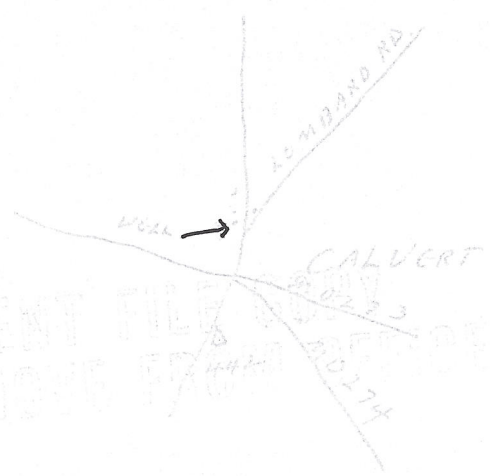
The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.

Baul W. McKee

Director

Date 0302-65

Special conditions that may apply:



Health Department Approval of Application _____

or State Department of Health

Approved by David S. [unclear]
Title Supervising Sanitarian
Date 3/1/65

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4428
40273
40274

ORIGINAL

DEPARTMENT OF WATER RESOURCES

CE650304

RECEIVED

State Office Building
ANNAPOLIS, MARYLAND 21401

031665

WELL COMPLETION REPORT - This report must be submitted within 30 days after completion of the well

105 MAR 24 AM 8:28

117 WELL DESCRIPTION

123

CE-65-W-304
Permit Number

Name of Owner
FRANK GRAYDEAL

DEPARTMENT OF WATER RESOURCES
State the kind of formations penetrated, their depth, their thickness, and if water-bearing

CASING AND SCREEN RECORD
State the kind and size of casing, liner, shoe, screen, and other accessories (if no casing used, give diameter of well).

	FEET		DIAM. (inches)	FEET from.....to.....
	from.....to.....			
Top soil	0-1			
clay	1-15			
Sandy clay	15-72		6.50	116-10
rock	72-73			
Sand (water bearing)	73-78			
green shale	78-110			
green & black rock	110-123			

PUMPING TEST
Hours Pumped..... 2
Type of Pump Used..... BAILER
Pumping Rate
Gallons per Minute..... 15

WATER LEVEL
Distance from land surface to water:
Before Pumping..... 12 Ft.
When Pumping..... 80 Ft.

APPEARANCE OF WATER
Clear.....
Cloudy.....
Taste.....
Odor.....

Height of Casing Above Land
Surface..... Ft.

PUMP INSTALLED
Type.....
Capacity
Gallons per Minute.....
Gallons per Hour.....
Pump Column Length..... Ft.

REMARKS
BAILER TESTED

Well Was Completed
Date MARCH 16, 1965
Well Driller.....
Signature

ORIGINAL

JUL 12 1965

Ce660030

APPLICATION FOR PERMIT TO DRILL WELL WATER RESOURCES

CECIL COUNTY HEALTH DEPT.

Owner Cecil W. McKee Nursing Home
Street or R. F. D. 9 Francis Brookside
Post Office Reisterstown Md.

Driller Robert Henderson License Number 106
Street or R. F. D. 1 Box 230
Post Office Harwood Village Md.

Quantity of Water to be Produced 20 G.P.M.
Total Quantity Needed For Use 1400 G.P.D.

Date July 9, 1965
Location of Well
Subdivision

Use for Water Nursing Home
Approximate Depth of Well (feet) 150
Method of Drilling to be used Rotary R

Section _____ Lot _____
County Cecil
Nearest Town Perryman
Distance from Town 6.000
Direction from Town S

Is this a Replacement Well? Yes - No N
If YES, indicate date abandoned well is to be sealed: _____
and by whom: _____

Description of Location of Well
(This information should be definite enough to permit locating well on a county map.)
Near what road 373
On which side of road N
(North, East, South, West)

PERMIT TO DRILL WELL (Not To Be Filled In By Driller)

Well Permit No. Ce-66-W-30

Samples of Cuttings Required by Department: Yes No
Owner Requires Permit to appropriate Water: Yes No
Owner Has Permit to appropriate Water: Yes No

Appropriation Permit No. Ce-66-GA P005
The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.

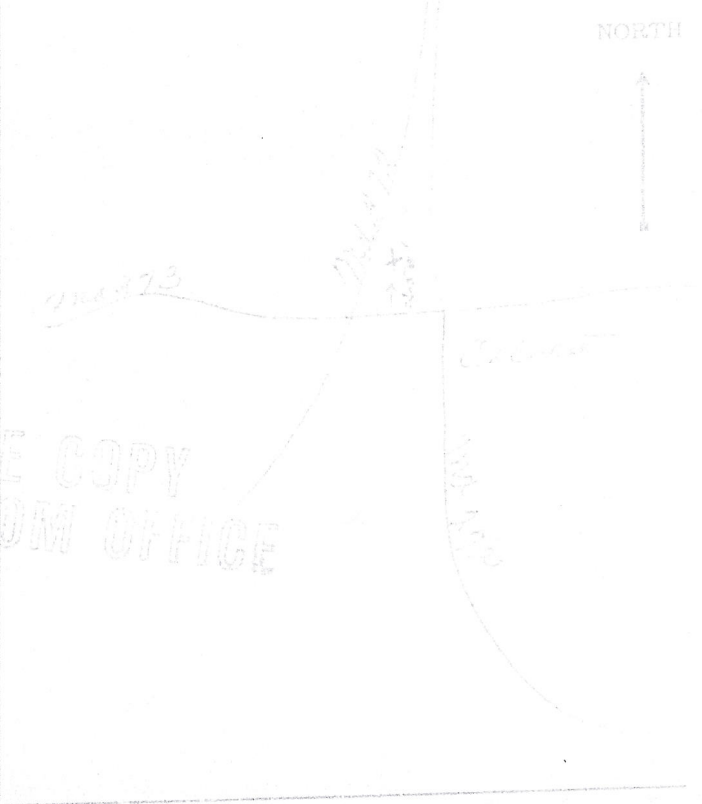
Baul W. McKee 07-22-65
Director Date wp

THIS PERMIT IS NOT TRANSFERRABLE WITHOUT WRITTEN PERMISSION FROM THE DEPARTMENT
Special conditions that must be observed:

PERMANENT FILE COPY DO NOT REMOVE FROM OFFICE

Health Department Approval of Application
Cecil County Department of Health
or State Department of Health
Approved by David S. Moore
Title Supervising Sanitarian
Date 7/12/65

Distance from road 150'
Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow, and give distance from well to nearest road junction or stream crossing shown on the sketch.



ORIGINAL

THIS REPORT
MUST BE SUBMITTED
WITHIN 30 DAYS
AFTER COMPLETION
OF THE WELL

Ce660030

WELL COMPLETION REPORT

080965

6

118 WELL DESCRIPTION

158

WELL LOG

State the kind of formations penetrated, their color, their depth, their thickness, and if water-bearing

CASING AND SCREEN RECORD

State the kind and size and position of casing, liner, shoe, screen, and other accessories (if no casing used, give diameter of well).

	FEET
	from to
clay, sand	0-118
soft, black, granite	118-158
Water	120
	130'
	150'

DIAM.	FEET
(inches)	from to
6 1/4	0-118

Permit Number CE-66-W-3
 Owner Calvin Mann
 Address Mossy Lane
 Subdivision Reddy Sun
 Section 40

PUMPING TEST
 Hours Pumped 4 hr.
 Type of Pump Used compressor
 Pumping Rate 35 gal.
 Gallons per Minute _____

WATER LEVEL
 Distance from land surface to water:
 Before Pumping 25 Ft.
 When Pumping 150 Ft.

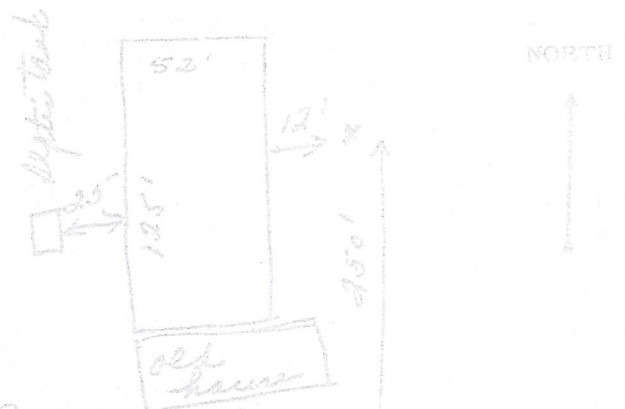
APPEARANCE OF WATER
 Clear yes Cloudy no
 Taste no
 Odor no

Height of Casing Above Land Surface 4 Ft.

PUMP INSTALLED
 Type _____
 Capacity _____
 Gallons per Minute _____
 Gallons per Hour _____
 Pump Column Length _____ Ft.

LOCATION OF WELL ON LOT

Show permanent structures such as building(s), septic tank, and/or other landmarks and indicate not less than 2 distances (measurements) to well.



Date Well Completed Aug. 9, 1965

Well Driller Preston & Hamilton
Signature Charles Hamilton, Jr.

md 273

CE660217
DEPARTMENT OF
WATER RESOURCES

APPLICATION FOR PERMIT TO DRILL WELL

NOV 2 1965 OJD

Owner Long Bank Cemetery Assoc.

Street or R. F. D. 1

Post Office Nottingham, Maryland

Quantity of Water to be Produced 4 G.P.M.

Total Quantity Needed For Use 400 G.P.D.

Use for Water domestic (tenant home) D

Approximate Depth of Well (feet) 751

Method of Drilling to be used rotary R

Is this a Replacement Well? Yes - Y

if YES, indicate date abandoned well is to be sealed: _____

and by whom: _____

Driller Preston and Hamilton License _____

Street or R. F. D. 1, Box 230, Carre de Craun, Md.

Post Office _____

Date Oct. 30, 1965

Location of Well

Subdivision _____

Section _____ Lot _____

County Coall

Nearest Town Rising Sun

Distance from Town 6 miles

Direction from Town S

Description of Location of Well
(This information should be definite enough to permit locating well on a county map).

Near what road rd. 275

On which side of road _____
(North, East, South, West)

PERMIT TO DRILL WELL
(Not To Be Filled In By Driller)

Well Permit No. CE-66-W-217

Samples of Cuttings Required by Department: Yes No

Owner Requires Permit to Appropriate Water: Yes No

Owner Has Permit to Appropriate Water: Yes No

Appropriation Permit No. _____

The applicant is herewith granted a permit to drill this well subject to the conditions stipulated.

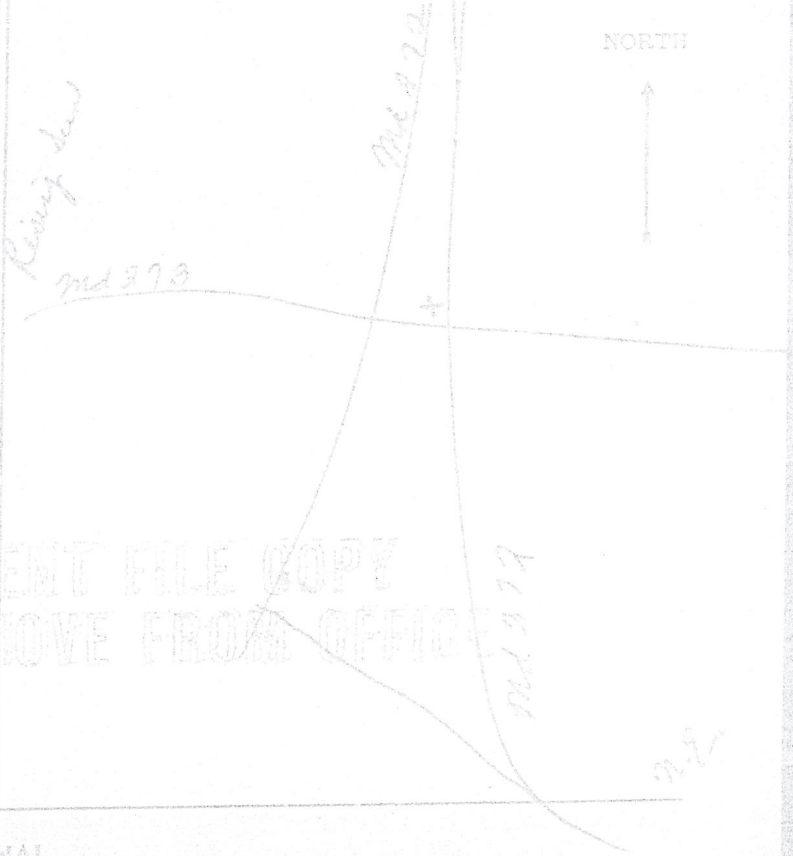
David W. McKee Director Oct. 11 1965-65 Date

THIS PERMIT IS NOT TRANSFERABLE
WITHOUT WRITTEN PERMISSION FROM THE DEPARTMENT

Special conditions that must be observed:

Distance from road _____

Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow, and give distance from well to nearest road junction or stream crossing shown on the sketch.



Health Department Approval of Application

Coall County Department of Health

or State Department of Health

Approved by David S. Moore (P)

Title Supervising Sanitarian

Date November 2, 1965

PERMANENT FILE COPY
DO NOT REMOVE FROM OFFICE

ORIGINAL

MUST BE SUBMITTED
WITHIN 30 DAYS
AFTER COMPLETION
OF THE WELL

6660217 WELL COMPLETION REPORT 111965
WATER 107 WELL DESCRIPTION 140

WELL LOG
State the kind of formations penetrated, their color, their depth, their thickness, and if water-bearing

CASING AND SCREEN RECORD
State the kind and size and position of casing, liner, shoe, screen, and other accessories (if no casing used, give diameter of well)

Permit Number CELL-W-217
Owner Ray Charles Combs
Address De Puy Road
Subdivision _____
Section _____ Lot _____

PUMPING TEST
Hours Pumped 2
Type of Pump Used Seepin A
Pumping Rate 15
Gallons per Minute _____

WATER LEVEL
Distance from land surface to water:
Before Pumping 35 ft.
When Pumping 142 ft.

APPEARANCE OF WATER
Clear Cloudy
Taste slt
Odor slt
Height of Casing Above Land Surface 4 ft.

PUMP INSTALLED
Type _____
Capacity _____
Gallons per Minute _____
Gallons per Hour _____
Pump Column Length _____ ft.

FORMATION	FEET from ___ to ___	DIAM. (inches)	FEET from ___ to ___
clay	0-107	6 1/4	0-107
chrome rock	107-142		
water	125-142		

LOCATION OF WELL ON LOT
Show permanent structures such as building(s), septic tank, and/or other landmarks and indicate not less than 2 distances (measurements) to well.



Date Well Completed 11/29/65
Well Driller Reston & Hammett
Signature Charles Hammett, Jr.

ORIGINAL

B 1 8982

STATE OF MARYLAND WATER RESOURCES ADMINISTRATION
TOWNSHIP OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

CE-73-3938
FILL IN THIS FORM COMPLETELY

1 2 3 (SEQ. NO.) 4
5 (THIS NUMBER IS TO BE PUNCHED
ON COLO. 5-6 ON ALL CARDS)

DATE RECEIVED (MVA USE ONLY)
6/16/81

OWNER CALVERT MANGR - HURSTING HOME
COL IS LAST NAME
STREET OR RFD 1881 Telegraph Road
COL 25
POST OFFICE Rising Sun, MD. 21077
COL 27

4704-64 Additional Water
FIRST NAME
COL. 34

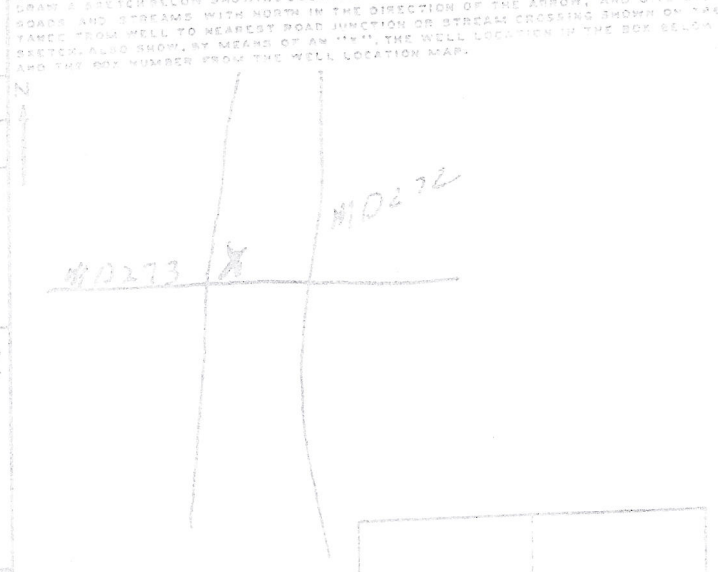
DRILLER INFORMATION
B 1 CONTINUED
1 2 3 (SEQ. NO.) 4
DATE 6/1-12-81
LICENSE NUMBER 112
Charles H. Hamilton, Jr.
DRILLER LAST NAME
SIGNATURE Charles H. Hamilton, Jr.

LOCATION OF WELL
B 3
1 2 3 (SEQ. NO.) 4
COUNTY Cecil
SUBDIVISION
SECTION LOT
NEAREST TOWN Calvert
MILES FROM TOWN (ENTER 0 IF IN TOWN)
75 0 75 77 78

WELL INFORMATION
B 2
1 2 3 (SEQ. NO.) 4
MAXIMUM PUMPING RATE (GALLONS PER MINUTE) 10
AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY) 5000
USE FOR WATER (CIRCLE APPROPRIATE BOX)
 HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
 FARMING, AGRICULTURE, IRRIGATION
 INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT.
 MUNICIPAL WATER SUPPLY } MUST HAVE STATE HEALTH DEPT. APPROVAL
 PRIVATE WATER COMPANY
 TEST

DIRECTION FROM TOWN (CIRCLE APPROPRIATE BOX)
1 2 3 (SEQ. NO.) 4
N NORTH E EAST NE NORTHEAST SE SOUTHEAST
S SOUTH W WEST NW NORTHWEST SW SOUTHWEST
TELEGRAPH RD
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) N S E W
DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX) 175
75 77 78 79

APPROXIMATE DEPTH OF WELL 150
APPROXIMATE DIAMETER OF WELL 6 (NEAREST INCH)
METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)
BORED (OR AUGERED) JETTED DRIVEN
30-37 AIR-ROTARY AIR-PERCUSSION ROTARY (HYDRAULIC ROTARY)
CABLE REVERSE-ROTARY DRIVE-POINT
OTHER (DESCRIBE)



REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)
 THIS WELL WILL NOT REPLACE AN EXISTING WELL
 THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
 THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
 THIS WELL WILL DEEPEN AN EXISTING WELL
PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE)

NOT TO BE FILLED IN BY DRILLER (MVA USE ONLY)
APPROPRIATION PERMIT NUMBER CE 66 GAP 005
ENGINEER REVIEW DISTRICT NO. A E N S G W O C L U
FORCE SM WRITE INITIALS IN BOX
CONDITIONS CE-73-3938
63 70 71 72 73 74 75 76 77 78 79

BOX NUMBER E 1080
N 680
NORTH COORDINATE 682000
EAST COORDINATE 1086000
ELEVATION AT WELL HEAD (FEET) 65 66 67 68
0/0 8/0

HEALTH DEPARTMENT APPROVAL
B 4 CONTINUED
1 2 3 (SEQ. NO.) 4
41 STATE HEALTH (CIRCLE BOX)
COUNTY NAME Cecil
COUNTY NO.
DATE 06 17 81
APPROVED BY William A. Summitt

SPECIAL CONDITIONS B-63 (MVA USE ONLY)

ORIGINAL

C 1 8832

WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

FILL IN THIS FORM
COUNTY NUMBER 4704-64

DATE RECEIVED (WRA USE ONLY)

DATE WELL COMPLETED 9-26-81

DEPTH OF WELL 400 (TO NEAREST FOOT)

PERMIT NO. FROM PERMIT TO DRILL WELL
CR-73-5938

OCT 28 1981

992681

DRILLERS IDENTIFICATION NO. 112

OWNER
STREET OR RD 1881 Telegraph

OWNER LAST NAME FIRST NAME
Calvert Manor Nursing Home
1881 Telegraph

POST OFFICE
Piscataway

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

YELLOW CLAY 0 30
BROWN SAND 30 50
SOFT GREEN FRACTURED ROCK FORMATION 50 140
HARD GRAY GRANITE 140 400

WELL DESCRIPTION
GROUTING RECORD
WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX)
TYPE OF GROUTING MATERIAL (CIRCLE BOX)
CEMENT CM BENTONITE CLAY BC
NO. OF BAGS 38 NO. OF POUNDS 3572
GALLONS OF WATER 150
DEPTH OF GROUT SEAL (TO NEAREST FOOT)
FROM 0 FT. TO 147 FT.
(ENTER 0 IF FROM SURFACE)

CASING RECORD
CASING TYPES (CIRCLE APPROPRIATE CODE)
INSERT BELOW (CIRCLE APPROPRIATE CODE)
STEEL CO CONCRETE
PL PLASTIC OT OTHER

MAIN CASING TYPE
NOMINAL DIAMETER (TO NEAREST INCH) 6
TOTAL DEPTH OF MAIN CASING (NEAREST FOOT) 147

OTHER CASING OF USED
DIAMETER (INCH) FROM TO

SCREEN RECORD
SCREEN TYPE OR SCREEN (CIRCLE APPROPRIATE CODE)
STEEL BR WOOD
PL PLASTIC OT OTHER

DEPTH (NEAREST WHOLE FOOT)
FROM TO
1 40 147 400
2
3

DIAMETER OF SCREEN (NEAREST INCH)
FROM TO

GRAVEL PACK
IF WELL DRILLED WAS A FLOWING WELL (CIRCLE BOX) F

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER)
LOG INDICATOR

PUMPING TEST
HOURS REQUIRED (TO NEAREST HOUR) 4
PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON) 9
METHOD USED TO MEASURE PUMPING RATE 10' tub

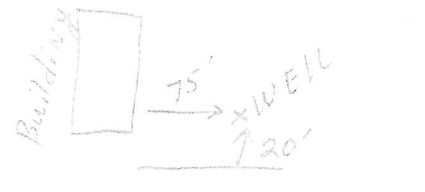
WATER LEVEL (DISTANCE FROM LAND SURFACE)
DEPTH PUMPING 20
WHEN PUMPING 400 (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX)
A AIR P BELTON T TURBINE
C CENTRIFUGAL R ROTARY O OTHER (DESCRIBE BELOW)
J JET S SUBMERSIBLE

PUMP INSTALLED
TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: A, C, J, P, R, S, T, O)
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES Y NO N
CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON) 31 25
PUMP HORSE POWER 37 31
PUMP COLUMN LENGTH (NEAREST FOOT) 43 47

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)
+ ABOVE LAND SURFACE
- BELOW 2 (NEAREST FOOT)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCED MEASUREMENTS TO WELL.



CIRCLE APPROPRIATE BOXES
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL
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.
DRILLERS NAME
SIGNATURE Charles H. Hardy, Jr.
Charles H. Hardy, Jr.

ORIGINAL

39999 (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MISSISSIPPI
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

08-81-2044
fill in this form completely

Date Received
03 22 86
OWNER INFORMATION
CALVERT MANOR HOME
883 TELEGRAPH RD
RISING SUN MD 21911

LOCATION OF WELL
CECIL
SUBDIVISION
SECTION 44 LOT 10
CALVERT
MILES FROM TOWN (enter 0 if in town) 0 MI

DRILLER INFORMATION
CHARLES H. HAMILTON JR 1112
JONES & HAMILTON
115 N. PARADISE RD. N D6-
Charles H. Hamilton 3/10/86

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)
TELEGRAPH RD.
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)
DISTANCE FROM ROAD 50 FT

WELL INFORMATION
APPROX. PUMPING RATE (GAL. PER MIN.) 10
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 1000

USE FOR WATER (CIRCLE APPROPRIATE BOX)
D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
P PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
T TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

Cecil
COUNTY NAME
DATE ISSUED 03 22 86
NORTH GRID 682000 EAST GRID 7086000

APPROXIMATE DEPTH OF WELL 150 FEET
APPROXIMATE DIAMETER OF WELL 6 INCH

METHOD OF DRILLING (circle one)
BORED (or Augered) JETTED Jettied & DRIVEN
AIR-ROTARY AIR-PERCUSSION ROTARY (Hydraulic Rotary)
CABLE REVERSE-ROTARY DRIVE-POINT

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X
SOURCES OF DRILLING WATER
WRITE THE BOX NUMBER FROM THE MAP HERE
E 1080
N 680

REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)
N THIS WELL WILL NOT REPLACE AN EXISTING WELL
Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
D THIS WELL WILL DEEPEM AN EXISTING WELL
PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROAD AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION
Sketch showing well location relative to roads (RD 100, RD 101) and a well site marked with an X.

Not to be filled in by driller (OEP USE ONLY)
APPROX. PERMIT NUMBER CE668APOOS
FORCE CS PERMIT NO. CE-81-2044

SPECIAL CONDITIONS

ORIGINAL

1005 (OEP USE ONLY)
 THIS NUMBER IS TO BE PUNCHED IN COLS. 3-8 ON ALL CARDS

WELL COMPLETION REPORT
 FILL IN THIS FORM COMPLETELY
 PLEASE PRINT OR TYPE

COUNTY **26508 - Community Supp**
 NUMBER

DATE Received **05/14/86** DATE WELL COMPLETED **03/13/86** Depth of Well **275** (TO NEAREST FOOT)
 PERMIT NO. FROM "PERMIT TO DRILL WELL" **03-181-204**

OWNER **Calvert Manda Home** last name **883 Telegraph Rd.** TOWN **Rising Sun, Md 21911**
 STREET OR RFD SECTION LOT

WELL LOG
 Not required for driven wells
 STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET		Check if water bearing
	FROM	TO	
BROWN sandy soil	0	30	
BROWN SAND	30	80	
SOFT BROWN WEATHERED SAND ROCK	80	130	
HARD GRAY GRANITE	130	275	

GROUTING RECORD
 WELL HAS BEEN GROUTED (Circle Appropriate Box) **Y** **N**
 TYPE OF GROUTING MATERIAL
 CEMENT **CM** BENTONITE CLAY **BC**

NO. OF BAGS **35** NO. OF POUNDS **3290**
 GALLONS OF WATER **175**
 DEPTH OF GROUT SEAL (to nearest foot) from **0** to **137** ft (enter 0 if from surface)

CASING RECORD
 casing types insert appropriate code below
ST **CO** STEEL CONCRETE
PL **OT** PLASTIC OTHER

MAIN CASING TYPE **ST** Nominal diameter (nearest inch) **6** Total depth of main casing (nearest foot) **137**

OTHER CASING diameter inch depth (feet) from to

SCREEN RECORD
 screen type or open hole insert appropriate code below
ST **BP** **HO** STEEL BRASS OPEN HOLE
PL **OT** PLASTIC OTHER

DEPTH (nearest ft) **40** **137** **275**

SLOT SIZE DIAMETER OF SCREEN (NEAREST INCH) from to

PUMPING TEST
 HOURS PUMPED (nearest hour) **3**
 PUMPING RATE (gal. per min to nearest gal) **310**
 METHOD USED TO MEASURE PUMPING RATE **ESTIMATE**
 WATER LEVEL (distance from land surface) BEFORE PUMPING **21** WHEN PUMPING **275**

TYPE OF PUMP USED (for test)
 Air piston turbine
 centrifugal rotary other (describe below)
 jet submersible

PUMP INSTALLED
 DRILLER WILL INSTALL PUMP YES NO
 IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
 TYPE OF PUMP INSTALLED PLACE (A, C, J, P, R, S, T, O) IN BOX - SEE ABOVE

CAPACITY: GALLONS PER MINUTE (to nearest gallon)
 PUMP HORSE POWER
 PUMP COLUMN LENGTH (nearest ft.)
 CASING HEIGHT (circle appropriate box and enter casing height) above } LAND SURFACE below } **2** (nearest foot)

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

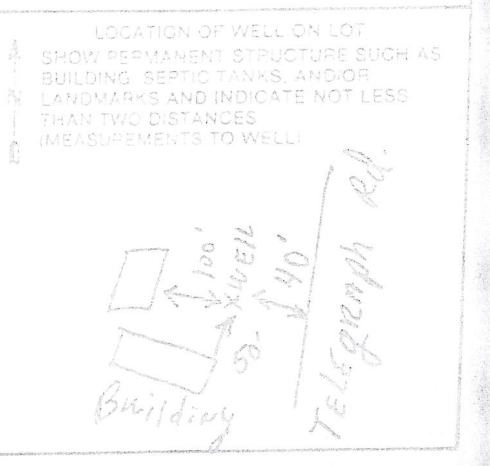
THEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION, AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLER'S IDENT. NO. **112**
Charles H. Hamilton Jr.
 DRILLER'S SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

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

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT P IN BOX 68

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
 T (E.R.O.S.) W/O
 TELESCOPE CASING LOG INDICATOR OTHER DATA



ORIGINAL