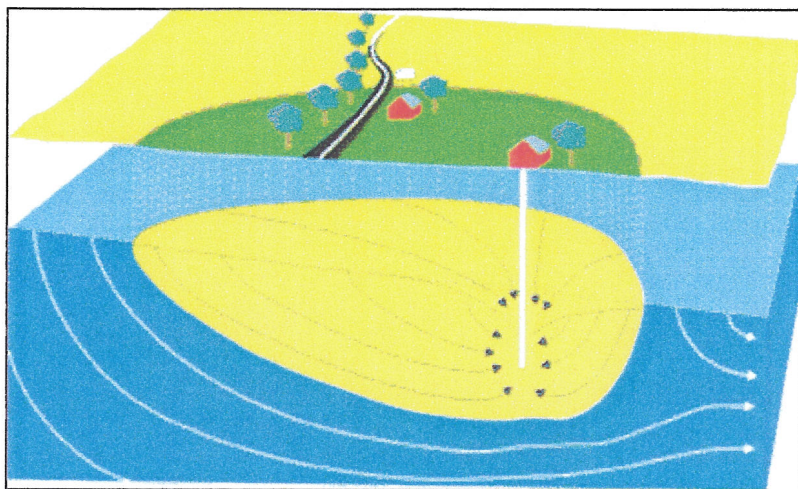


**SOURCE WATER ASSESSMENT
FOR WEST NOTTINGHAM ACADEMY
CECIL COUNTY, MD**



**Prepared By
Water Management Administration
Water Supply Program
June, 2005**



Robert L. Ehrlich
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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 West Nottingham Academy, a private school located near Colora in Cecil County, Maryland. 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 West Nottingham Academy's public water supply is a fractured-rock aquifer known as the Sykesville Formation. The system uses six wells to obtain its water supply. 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 West Nottingham Academy's water supply is susceptible to nitrates, radionuclides and total coliform bacteria. It is not susceptible to volatile organic compounds, synthetic organic compounds, other inorganic compounds, fecal coliform or protozoans like *cryptosporidia* and *giardia*. To reduce the risk of bacterial contamination, the water system should conduct a thorough inspection of wells 9 and 11, which were drilled prior to current grouting standards and abandon any unused wells on the property. Monitoring over the past seven years has shown a decrease in nitrate levels. This suggests a reduction in the use of nitrogen-based fertilizers or an improvement in the management of on-site wastewater disposal in the Wellhead Protection Area.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for West Nottingham Academy, a private school, which owns and operates its own water and septic systems. The system uses six wells, which are each individually treated as its own treatment plant.

As defined as part of Maryland's Source Water Assessment Plan (SWAP), "large systems" are community and non-community water systems that have water appropriation and use permits with average annual appropriation permit exceeding 10,000 gpd. West Nottingham Academy's water appropriation and use permit allows for an average annual water use of 19,000 gpd.

HYDROGEOLOGY

West Nottingham Academy is located southeast of the Piedmont Physiographic Province. This region is underlain crystalline igneous and metamorphic rock.

The geologic formation underlying West Nottingham Academy was formerly known as the Port Deposit Gneiss and that names remain in use in some 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 database, 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. There are a total of 14 wells at the school, however, only six of them are considered public supply wells. The non-public supply wells include residential, standby, irrigation and shop wells. The supply wells and standby wells for the public system are listed on Table 1 and the well completion reports are included in the Appendix. At least 24 wells have been drilled on the West Nottingham Academy property. Several of the wells are shallow wells that were drilled prior to 1940. It is not known if all wells that are not in use have been abandoned.

TABLE 1. WEST NOTTINGHAM ACADEMY WELL INVENTORY

WELL #	PERMIT #	TOTAL DEPTH	CASING DEPTH	YEAR DRILLED	COMMENTS
WELL 2	CE053998	92	22	1963	Not in use; served faculty residence house
WELL 5	CE930222	200'	93'	1993	In use; serves Ware Field House
WELL 8					In use; serves laundry, Rush & Middle School
WELL 9	CE054001	64'	40'	1963	In use; serves McGraw
WELL 10	CE942513	200'	60'	1998	In use; serves East & West Dorms
WELL 11	CE032198	100'	88'	1958	In use; serves Rowland Finley & Buck
WELL 12	CE880873	270'	70'	1989	In use, serves Foutz Center

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 public water system using more than 10,000 gallons per day whose wells are completed in fractured crystalline rock is the drainage area that contributes water to the wells. This area is then modified by accounting for surface water bodies, topography, significant land features and by using a conservative calculation of total ground water recharge during a drought. For conservative purpose a drought condition of 400 gpd per acre was used to estimate the total ground water contribution area required to supply the wells. Figure 2 shows the 220-acre Wellhead Protection Area (WHPA) that was delineated, which is more than adequate to meet the daily average ground water recharge for this system.

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 a topographic map showing potential sources of contamination within and 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. One under ground storage tank (UST) site and one ground water discharge were the only sources identified in the WHPA. At the UST site, diesel oil is stored on site in an underground tank registered with the MDE Waste Management Administration. The ground water discharge is from the West

Nottingham Academy's wastewater treatment plant (WWTP). The wastewater treatment plant is relatively new (installed in 1998) and is surrounded by three ground water quality monitoring wells, as required by their discharge permit. The proximity of the drainfield to a nearby stream makes it difficult to be certain that the discharge from the drainfield would migrate toward the supply wells. It is just as conceivable that the treated effluent would ultimately discharge in the in the stream. Given that all the nitrate levels in recent years (since 1998) are lower than previous suggests that this ground water discharge is not impacting the supply wells.

TABLE 2. POTENTIAL CONTAMINANT POINT SOURCES WITHIN THE WEST NOTTINGHAM ACADEMY WHPA

	Type	Site Name	Address	Potential Contaminant	Status
	UST	Nottingham Roads Yard	191 Harrisville Road	VOC	2,000 gal. diesel oil tank
	WWTP	West Nottingham Academy	1079 Firetower Road	Nitrates, microbial pathogens	septic absorption trench

The Maryland Office of Planning's 2000 land use map for Cecil County was used to identify non-point sources of contamination (Figure 3). Several land use categories were identified within the delineated WHPA (Table 3). The predominant land uses within the WHPA are for the school and low-density residential development.

TABLE 3. LAND USE SUMMARY FOR THE WELLHEAD PROTECTION AREA

Land Use Categories	Total Area (acres)	Percentage of WHPA
Low Density Residential	63	22
Commercial/Institutional	54	25
Pasture	36	17
Cropland	35	16
Open Urban Land	30	14
Forest	2	1

A review of Maryland Office of State Planning's Cecil County Sewer Map (Figure 4) shows that West Nottingham Academy operates a private sewer system with an on-site drain field receiving the treated wastewater and that there is no planned sewer service to any homes within the WHPA or to any of the surrounding area. West Nottingham Academy's septic absorption trench is located 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 West Nottingham	101	46
No Planned Service	118	54

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. West Nottingham Academy's only water treatment is post hypochlorination and pH adjustment.

Inorganic Compounds

The only inorganic compound that has been detected in quantities greater than 50% of the MCL is nitrate. As indicated in Table 5, nitrate levels as high as 8.73 ppm have been reported. Its presence is attributed to local septic seepage, pasture and cropland in the wellhead protection area. No values greater than 5.0 mg/l, however, have been reported since 1998. Cadmium was detected in excess of 50% of the MCL on one occasion at one well. Cadmium was not detected in two subsequent samples from the same well.

**TABLE 5. IOC DETECTS AT WEST NOTTINGHAM ACADEMY
ABOVE 50% of MCLs**

PLANT ID	WELL NUMBER	CONTAMINANT NAME	MCL (ppm)	SAMPLE DATE	RESULT (ppm)
01	CE054001	NITRATE	10	05-FEB-93	5.5
03	*	NITRATE	10	11-JAN-95	5.43
03	*	NITRATE	10	15-JAN-97	7.19
03	*	NITRATE	10	14-MAY-97	5.96
03	*	NITRATE	10	02-JUL-97	5.60
04	CE032198	NITRATE	10	07-JUL-93	5.36
04	CE032198	NITRATE	10	13-OCT-93	6.81
04	CE032198	NITRATE	10	02-OCT-94	5.0
04	CE032198	NITRATE	10	11-JAN-95	5.23
04	CE032198	NITRATE	10	12-APR-95	6.56
04	CE032198	NITRATE	10	23-JAN-96	5.14
04	CE032198	CADMIUM	0.005	23-JUL-96	0.003
04	CE032198	NITRATE	10	02-OCT-96	5.70
04	CE032198	NITRATE	10	15-JAN-97	6.1
04	CE032198	NITRATE	10	14-MAY-97	5.21
04	CE032198	NITRATE	10	14-JAN-98	5.0
05	CE880873	NITRATE	10	03-FEB-93	5.3
05	CE880873	NITRATE	10	02-JUN-93	7.3
05	CE880873	NITRATE	10	07-JUL-93	6.48
05	CE880873	NITRATE	10	13-OCT-93	8.73
05	CE880873	NITRATE	10	15-JAN-97	5.61

*no number assigned

Radionuclides

Radionuclides have been measured several times since 1999. 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. In 1999, radon 222 was measured in Well 9 at 675 pCi/L and in 2002 it was measured in Well 15 at 880 pCi/L, both over twice the lower proposed MCL of 300 pCi/L, but less than 4000 pCi/L. Gross alpha ranging from 11 to 15 pCi/L was measured in plant 5 (well 12) on two occasions. Ph measurements range from 6.4 to 8.7. The high radon 222 and gross alpha are attributed to decay of naturally occurring minerals, like uranium and thorium, in the surrounding rocks.

TABLE 6. RADIONUCLIDE DETECTS AT WEST NOTTINGHAM ACADEMY

PLANT ID	WELL NUMBER	CONTAMINANT NAME	MCL (pCi/L)	SAMPLE DATE	RESULT (pCi/L)
01	CE054001	RADON-222	300*	31-AUG-99	675
05	CE880873	GROSS ALPHA	15	30-APR-01	15
05	CE880873	GROSS ALPHA	15	25-MAY-04	11
05	CE880873	GROSS ALPHA (SHORT TERM)	15	25-MAY-04	15
07	CE942513	RADON-222	300*	29-MAY-02	880

Volatile Organic Compounds (VOCs)

A review of the data indicates that no VOCs have been detected above 50% of the MCL. Chloroform, bromodichloromethane, dibromochloromethane, chloromethane, bromoform, and methyl-tert-butyl-ether (MTBE) have been detected at low levels. The first four compounds are trihalomethanes (THMS). THMS are disinfection by-products, which result from the reaction between chlorine and organic material present in the aquifer. MTBE currently does not have an MCL, but a taste and odor threshold 20-40 ppb. Both times it was detected, it was measured at 0.7 ppb in well 8. One possible source is infiltration of storm water containing trace levels of gasoline into the ground water near well 8 or other unregistered underground storage tanks.

Synthetic Organic Contaminants

Improvements to well caps and screens to reduce the risk of contamination from insects were also made. A review of available data indicates that dicamba and di(2-ethylhexyl)phthalate were detected at low levels. di(2-ethylhexyl)phthalate was found in laboratory blanks and is not representative of the water quality of the system. Dicamba was only detected one time and the latest sample shows no detects.

Microbiological Contaminants

Raw water samples were collected from all the seven wells and tested for bacteria to determine whether those sources are ground water under the influence of surface water (GWUDI). The wells are classified as medium risk to surface water influence based on age of the well, using depth and distance from surface water bodies. One raw water bacteriological sample after a minimum of 0.5" of rainfall was required to be collected for each well. The results of the GWUDI testing indicate that none of the wells had any fecal

coliform. None of the wells had any total coliform except for well 11, which has a total coliform detection of 2-6 mpn/100 ml. This level may be attributed to microorganisms entering the well from defects in well construction or a persistent biofilm from previous entry of microorganisms in the well and not be related to aquifer water quality. Well 11 was drilled in 1958, and the well completion report does not indicate that the well was grouted.

Routine bacteriological monitoring, which measures total coliform bacteria, is conducted in the finished water for each community water system on a monthly basis. Since West Nottingham Academy 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 indicator-organisms for other disease-causing microorganisms.

SUSCEPTIBILITY ANALYSIS

The wells serving West Nottingham Academy are completed in an 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 West Nottingham Academy's water supply to various contaminants is shown in Table 7.

**TABLE 7. SUSCEPTIBILITY CHART FOR WEST NOTTINGHAM
ACADEMY 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	YES	NO	YES	YES
Volatile Organic Compounds	YES	NO	NO	YES	NO
Synthetic Organic Compounds	NO	NO	NO	YES	NO
Radon	YES	YES	NO	YES	MAYBE*
Radionuclides	YES	YES	NO	YES	YES
Microbiological Contaminants	YES	NO	YES	YES	NO

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

One IOC, nitrate, was reported above the 50% MCL in the water samples analyzed. Approximately 54% of the area within the WHPA is supplied by private on-site septic systems, which can possibly cause nitrate pollution. In addition, landscaping and lawn maintenance activities in residential properties can contribute to nitrate in ground water. Also, 33% of the WHPA is either pasture or cropland. Animal waste in the pasture and fertilizer on the cropland are possible nitrate sources. The water supply at West Nottingham Academy is susceptible to nitrates, but not to other IOCs. The lower levels of nitrates in recent years suggest that improved management of nitrate sources or reduction in fertilizer usage has occurred in the recharge area of the wells.

No Volatile Organic Compounds (VOCs) were detected at levels that would be considered a concern at any of West Nottingham's wells. One potential source of VOCs underground storage of diesel was identified but it is about 1500' from the nearest well. The low levels of MTBE found in one well are consistent with non point source contamination (i.e., runoff from paved areas). The water supply is considered not vulnerable contamination of VOCs at this time.

Repeated samples have been collected for SOC's from the West Nottingham Academy's water sources. No detections have been at levels of concern. The SOC sources that are present are herbicides and pesticides that would potentially be used by the school or any of the other landowners on the WHPA. Given the make up of the soil above the aquifer and properties of the chemicals applied the water supply was determined to not be susceptible to contamination from SOC's.

Total coliform bacteria were detected in West Nottingham Academy's raw water. Based on the water quality data, West Nottingham Academy is not susceptible to fecal coliform or protozoans like *Cryptosporidium* or *giardia*, but may be susceptible to total coliform bacteria. Further investigation of the cause of the total coliform in well 11 is recommended.

Gross alpha levels were present in West Nottingham Academy's water samples at levels of concern. Its presence is most likely due to naturally occurring uranium and thorium minerals in the underlying bedrock. Depending on the MCL adopted for radon, West Nottingham Academy's water supply may be susceptible to radon as it is also naturally present in the ground water at West Nottingham Academy.

MANAGEMENT OF THE SOURCE WATER ASSESSMENT AREA

The wells serving West Nottingham Academy appear to be in good condition, but two of the wells regularly used for production predate modern construction standards (well 11 and well 9). Water quality testing indicated the presence of coliform bacteria in well 11, and naturally occurring radionuclides in well 12 at levels near the MCL for gross alpha. Nitrates have exceeded 50% of the MCL, they are consistently present and appear to be a result of local agricultural practices or leaching from one or more septic systems in the area. Tests since 1998, however, are all below 50% of the MCL. Recommendations for maintaining the integrity of this system are listed below:

- Continue maintenance and protection of the wells.
- Abandon all wells on the school property that are not being used according to State regulations.
- Continue monitoring for VOCs, IOC, SOC and radionuclides in accordance with MDE's requirements.
- Annual sampling for microbiological contaminants is recommended. It is a good indicator of the integrity of the wellhead. Wells 11 and 9 deserve a thorough inspection, including a video of the integrity of the well casing.
- 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

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- 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

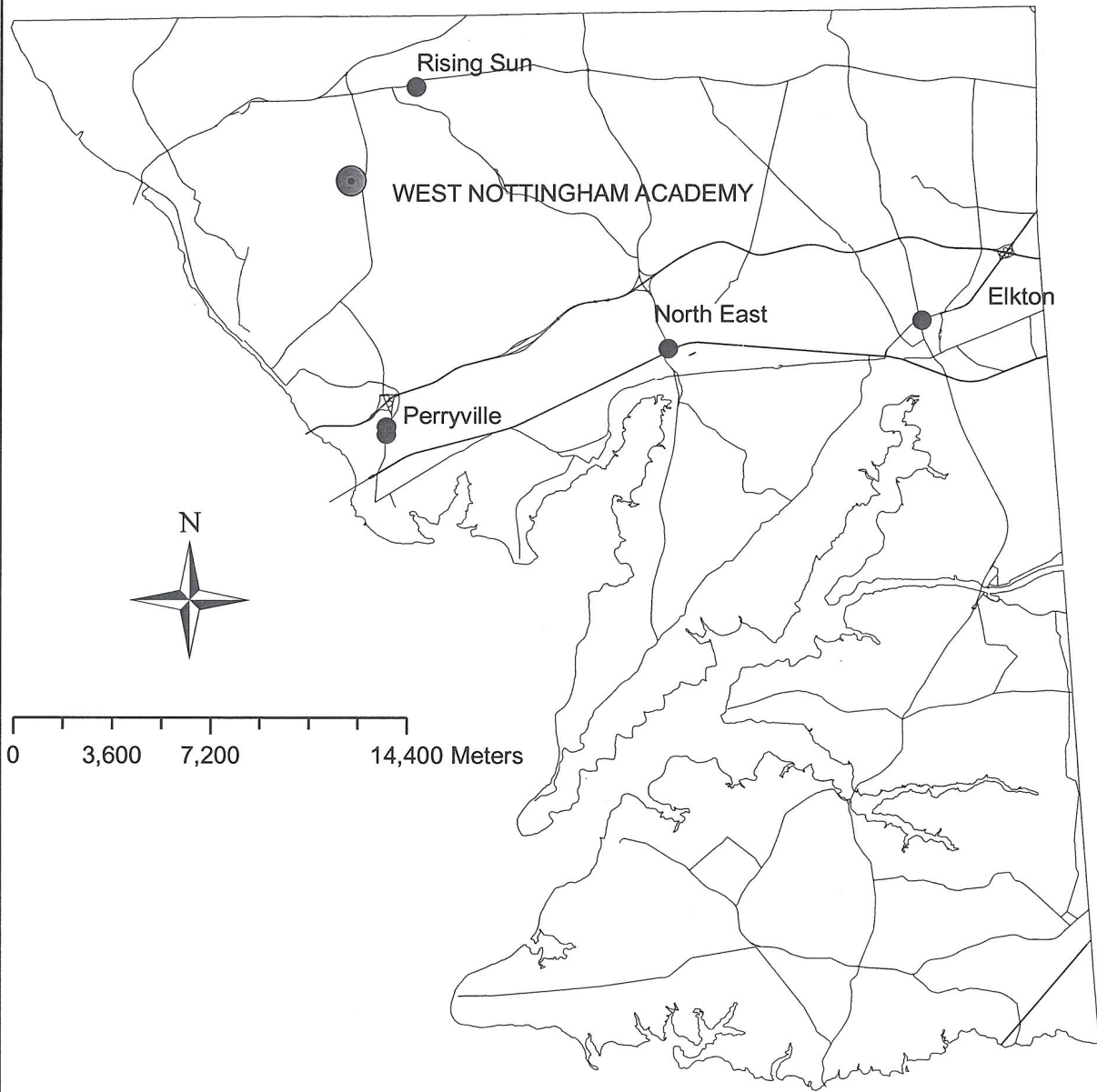


Figure 1 Location Map

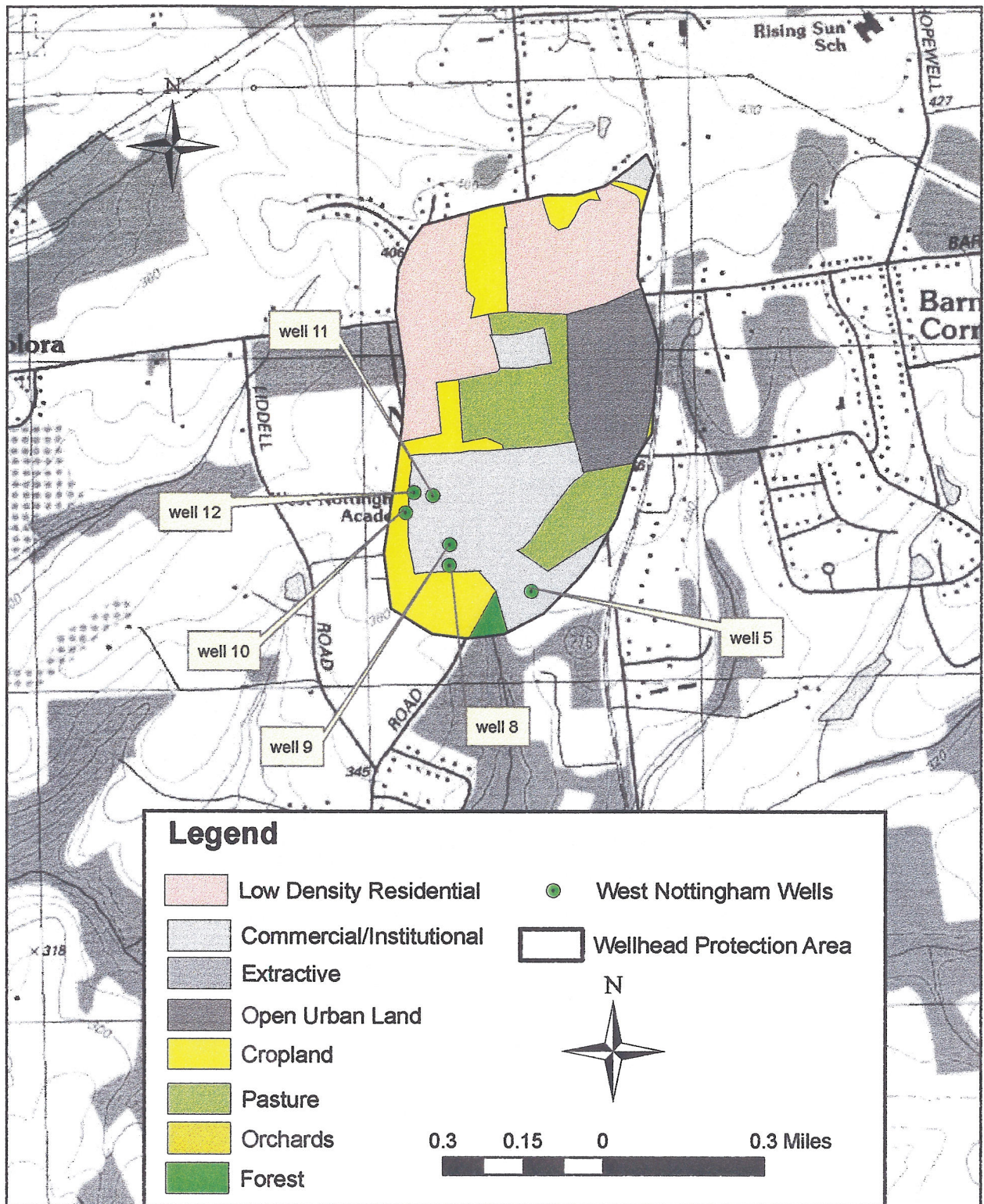


Figure 3. Land Use Map of West Nottingham Academy Wellhead Protection Area

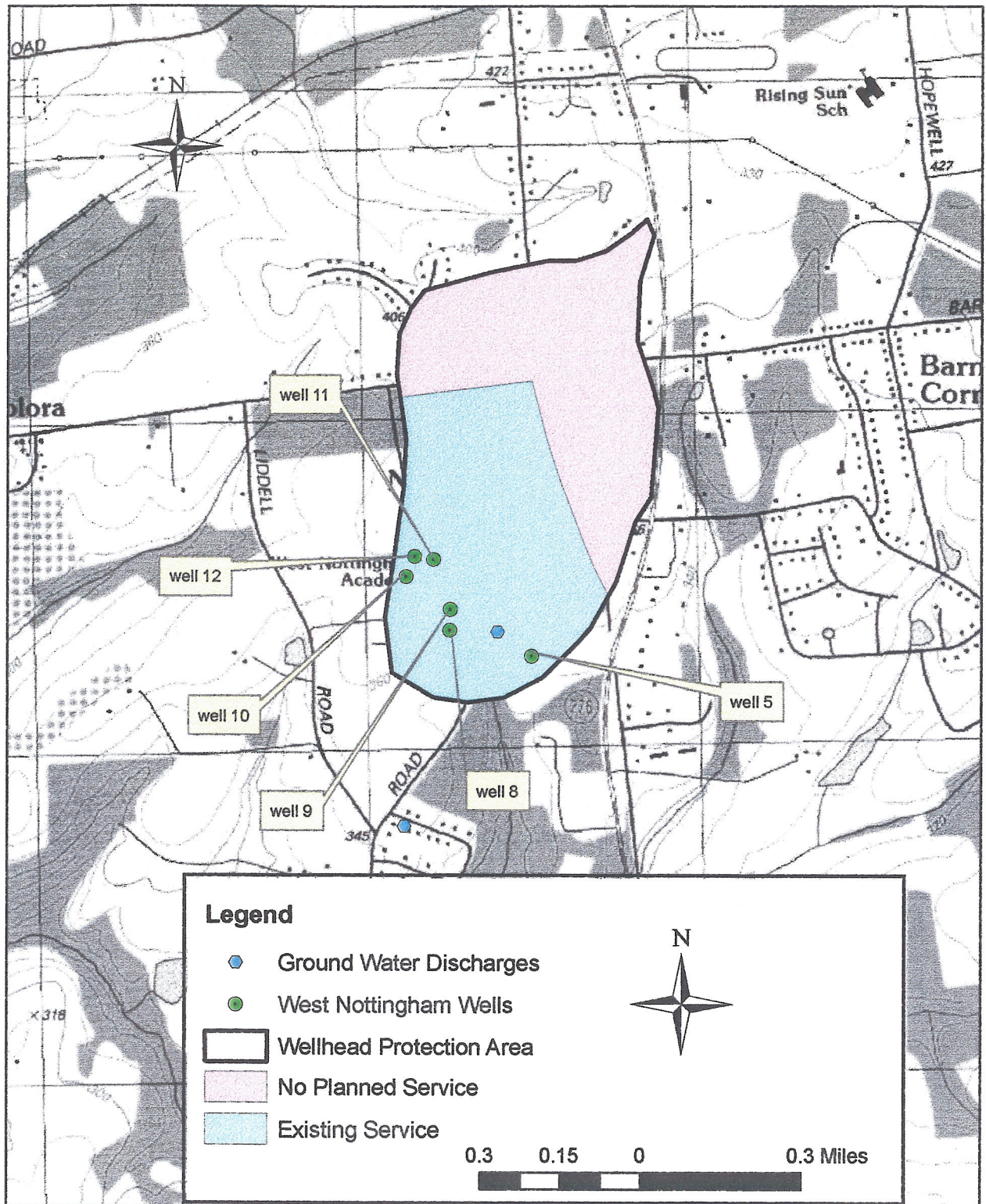


Figure 4. Sewer Service Area For West Nottingham Academy Wellhead Protection Area

APPENDIX

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University
BALTIMORE 18, MARYLAND

Ce-Ac 78

CE032198

APPLICATION FOR PERMIT TO DRILL WELL

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

Owner West Nottingham AcademyDriller Victor D. Praesten

Street or R. F. D. _____

Street or R. F. D. _____

Post Office _____

Post Office _____

Post Office Cotara, Md.

Date _____

Date 4-15-58Quantity of Water Needed (G. P. M.) 15

Use for Water _____

Approximate Depth of Well (feet) 100 ft.

Method of Drilling to be used _____

Method of Drilling to be used Rotary R

Location of Well _____

County _____

Nearest Town _____

Distance from Town _____

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 WoodlawnOn which side of road West

(North, East, South, West)

Distance from road 1000 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.

Well located between

Magraw Hall & Sill House

NORTH

THIS IS ABOUT 1/3 OF A MILE S; LOCATION NOT VERY PRECISE

Md.

269

Well

Academy
Grounds.West
Nottingham

Woodlawn Rd.

(ORIGINAL)

Md 276

PERMIT TO DRILL WELL

(Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLER

Permit No. 32198

Samples of Cuttings _____

Required by Department ☒ Yes ☐ NoOwner Requires Permit (Yes to Appropriate Water) ☒ Yes ☐ NoOwner Has Permit (Yes to Appropriate Water) ☒ Yes ☐ No

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

John T. Hines, Jr.

Director

Date _____

September 11, 1958

Special conditions that may apply: _____

Owner's permit issued 9/11/58

Copy mailed Cecil Co. Health Dept.

9/14/58

Goulds Jet-A-Matic
340 3150 RPH

Chlorinator

At Rowland Hall - new dorm.

Between John and ...

Rowland

The Johns Hopkins University
BALTIMORE 18, MARYLAND

WELL COMPLETION REPORT

This report must be submitted within 30 days after completion of the well

100

32198

32197

6

200 WELL DESCRIPTION

WELL LOG

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)

Permit Number

Name of Owner

Nottingham Academic

PUMPING TEST

Hours Pumped

Type of Pump Used

Pumping Rate

Gallons per Minute 35

WATER LEVEL

Distance from land surface to water:

Before Pumping a 6 Ft

When Pumping Ft

APPEARANCE OF WATER

Clear yes

Cloudy

Taste ok

Odor no

Height of Casing Above Land

Surface 1 Ft

PUMP INSTALLED S

Type Gould Jet-a-matic

Capacity 2 HP 3450 RPM

Gallons per Minute

Gallons per Hour

Pump Column Length Ft

REMARKS

Water bearing
at 50-58-70 ft.
sealed off
water bearing at
95 ft.

Well Was Completed

Date Apr. 17, 1958

Well Driller

Victor D. Preston

Signature

FEET

from to

DIAM.

(inches)

FEET

from to

Clay, decomposed
rock, sand & gravel
Granite

0-88

88-100

Black pipe

6 1/4

6 1/8

0-88

88-100

Pump and chlorinator
in basements of Rowland
Hall. Well located about
8 ft. from building on
south side. Fitted pipe & plug
at surface lands into
well; no pump.Supplies Rowland Hall
(about 20 showers) plus
Luncheon Hall academic bldg.
to the south

STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University
BALTIMORE 18, MARYLAND

Mail to -
Mr. Norman Anderson
Colora, Md. CEO 53998

APPLICATION FOR PERMIT TO DRILL WELL

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

Owner West Nottingham Academy Driller Victor Preston
Street or R. F. D. 2 Aberdeen, Md.
Post Office Colora, Md. Date Aug 1, 1963

Quantity of Water Needed (G. P. M.) 5
Use for Water Teachers quarters
Approximate Depth of Well (feet) 50
Method of Drilling to be used Rotary R

Location of Well
County Cecil
Nearest Town West Nottingham
Distance from Town — in
Direction from Town —

PERMIT TO DRILL WELL

(Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLER

Permit No. 53998

Samples of Cuttings Yes
Required by Department No

Owner Requires Permit Yes
to Appropriate Water No

Owner Has Permit Yes
to Appropriate Water No

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

Ernst Claus
Acting Director
Date September 20, 1963

Special conditions that may apply:

092063
Owner's permit pending
Issued 11/10/63

Description of Location of Well

(This information should be definite enough to permit locating well on a county map)

Near what road Fire Lower Rd.

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

Distance from road approx 200 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.

Colora

Academy
Grounds.

Well

House

Jacob Jones

Memorial Highway

1211 Rd.

Fire Lower Rd.

Copy mailed Cecil Co. Health Dept.
10/21/63 (ORIGINAL)

This report must be submitted within 30 days after completion of the well

Permit Number 22790

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)

Name of Owner

West Nottingham ^{Reading}

PUMPING TEST

Hours Pumped

Type of Pump Used.....

Pumping Rate

Gallons per Minute. 70

WATER LEVEL

Distance from land surface to water: 2500

Before Pumping. 15 Ft.

When Pumping.....Ft.

APPEARANCE OF WATER

Clear Yes

Cloudy _____

Taste *etc.*

Odor None

Height of Casing Above Land

Surface Ft.

PUMP INSTALLED

Type

Capacity: 1000

Gallons per Minute.....

Gallons per Hour.....

Pump Column Length.....Ft.

REMARKS

Well Was Completed

Date Aug. 3, 1962

Well Driller.....

C. Hamilton Jr.

Signature _____

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University
BALTIMORE 18, MARYLAND

APPLICATION FOR PERMIT TO DRILL WELL

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

Owner West Nottingham Academy Driller Victor D. Preston

Street or R. F. D. _____

Post Office Bx 335 Cedar

Post Office Colona, Md.

Date Sept. 12, 1963

Quantity of Water Needed (G. P. M.) 8

Use for Water Administration Bldg.

Approximate Depth of Well (feet) 100

Method of Drilling to be used Rotary R

Location of Well _____

County Cecil

Nearest Town West Nottingham

Distance from Town _____

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 Woodburn

On which side of road West

(North, East, South, West)

Distance from road 1000 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. 54,001

Samples of Cuttings Required by Department ☒ Yes ☐ No

Owner Requires Permit to Appropriate Water ☒ Yes ☐ No

Owner Has Permit to Appropriate Water ☒ Yes ☐ No

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

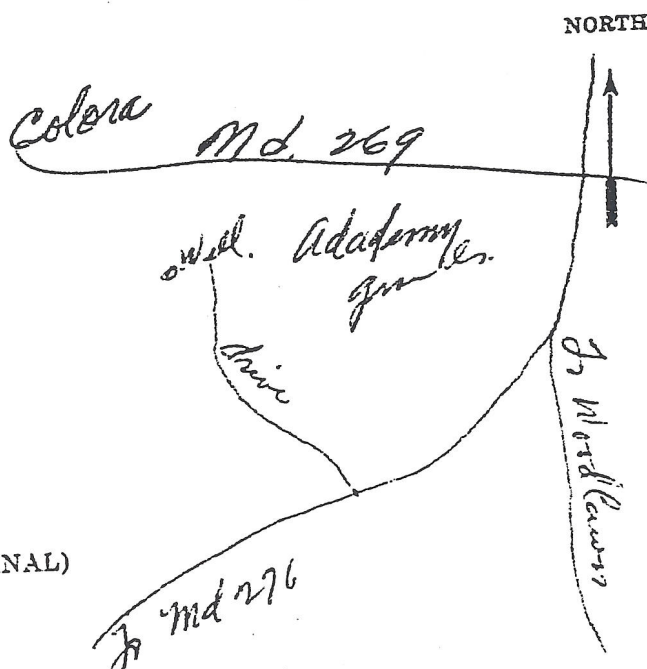
Date September 20, 1963

Special conditions that may apply: 092063

Owner's permit pending

(ORIGINAL)

Copy mailed Cecil Co. Health Dept.
10/2/63



STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

The Johns Hopkins University
BALTIMORE 18, MARYLAND

WELL COMPLETION REPORT

This report must be submitted within 30 days after completion of the well

091443

64

WELL DESCRIPTION

Permit Number 54001

WELL LOG

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)

Name of Owner

West Nottingham Area

PUMPING TEST

Hours Pumped

Type of Pump Used

Pumping Rate
Gallons per Minute 20

WATER LEVEL

Distance from land surface water:

Before Pumping 18

When Pumping

APPEARANCE OF WATER

Clear yes

Cloudy

Taste ok

Odor

Height of Casing Above Land Surface 1

PUMP INSTALLED

Type

Capacity

Gallons per Minute

Gallons per Hour

Pump Column Length

REMARKS

Well Was Completed

Date Sept. 14, 19

Well Driller

C. Hamilton Jr.

Signature

Clay & top soil 0-4

Clay, sand & gravel 4-20

Decomposed rock & clay 20-40

Granite - hard 40-64

Black pipe 6 1/4 0-40
6 5/8 40-64

B 1	0447	SEQUENCE NO. (DP USE ONLY)	STATE OF MARYLAND APPLICATION FOR PERMIT TO DRILL WELL please print or type	STATE PERMIT NUMBER <div style="border: 1px solid black; padding: 2px; display: inline-block;"> CE-88-0873 </div>
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)				
Date Received (APA) <u>Joe Chamberlain</u> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> 102989 </div>		OWNER INFORMATION <u>658-2965</u> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> West Nottingham Academy </div>		
15 Last Name <u>West</u> 13 36 Street or RFD <u>Firetower Rd</u> 55 57 Town <u>Collora</u> 70 State <u>MD</u> 72 Zip <u>21917</u> 76		LOCATION OF WELL C3236 8 COUNTY <u>Cecil</u> 21 23 SUBDIVISION _____ 42 SECTION _____ LOT _____ 44 46 48 50 52 NEAREST TOWN <u>West Nottingham</u> 71 MILES FROM TOWN (enter 0 if in town) <u>2</u> 73 76 77 78		
DRILLER INFORMATION <u>LARRY A. BROWN</u> <u>38</u> Driller's Name 77 License No. 80 <u>Brown Bros. Drilling</u> Firm Name <u>497 Kicks Mill Rd, Nottingham, PA 19362</u> Address <u>Larry A. Brown 10-17-89</u> Signature Date				
WELL INFORMATION APPROX. PUMPING RATE (GAL. PER MIN.) <u>10</u> AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) <u>1000</u>				
USE FOR WATER (CIRCLE APPROPRIATE BOX) <input type="checkbox"/> D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY) <input type="checkbox"/> F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION) <input checked="" type="checkbox"/> I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. <input checked="" type="checkbox"/> P OTHER (REQUIRES APPROPRIATION PERMIT) <input checked="" type="checkbox"/> P PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL) <input type="checkbox"/> T TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)				
APPROXIMATE DEPTH OF WELL <u>250</u> FEET APPROXIMATE DIAMETER OF WELL <u>6"</u> NEAREST INCH				
METHOD OF DRILLING (circle one) BORED (or Augered) JETTED Jetted & DRIVEN 30 AIR-ROTary 37 AIR-PERCussion ROTARY (Hydraulic Rotary) CABLE REVerse-ROTary DRIVE-POINT other _____				
REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX) <input checked="" type="checkbox"/> N THIS WELL WILL NOT REPLACE AN EXISTING WELL <input type="checkbox"/> Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED 39 <input type="checkbox"/> S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY <input type="checkbox"/> D 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 (OEP USE ONLY)				
APPROP. PERMIT NUMBER <u>CE54GAP009</u> FORCE <u>CS</u> WRITE INITIALS IN BOX PERMIT No. <u>CE-88-0873</u> SPECIAL CONDITIONS				

NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL

Cecil COUNTY NAME COUNTY NO. _____

STATE SIGNATURE Zohreh A. Izadi INSERT S 5

DATE ISSUED 10/26/89 Charles E. Singer EXP. DATE 4/26/90

43 NORTH GRID 665000 48 CO SIGNATURE 55 EAST GRID 1056000 63

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER

- Well
-
-

WRITE THE BOX NUMBER FROM THE MAP HERE

E 1050
N 660

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION

N

Public Sewage

West Nottingham Academy

Firetower Rd

100'

1,000'

276

1 1980
SEQUENCE NO. (DENV USE ONLY)
1 2 3 6
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

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

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

COUNTY
NUMBER C3236

ST/CO USE ONLY
DATE Received

NOV 20 1989

DATE WELL COMPLETED

11 02 89

Depth of Well

22 270 26
(TO NEAREST FOOT)

PERMIT NO.
FROM "PERMIT TO DRILL WELL"
CE-88-0873
28 29 30 31 32 33 34 35 36 37

OWNER West Nottingham Academy
STREET OR RFD 1819 Firetower Rd. first name TOWN Colons, md. 21917
SUBDIVISION 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 FROM TO Check if water bearing

Clay 0 40 ✓
Sand 40 60 ✓
Granite 60 270 ✓

RAW A
24 Hr.
Pump test
for State
Tested
water
Quality

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) YES ☒ NO ☐
TYPE OF GROUTING MATERIAL
CEMENT ☒ BENTONITE CLAY ☐
NO. OF BAGS 25 NO. OF POUNDS 1150
GALLONS OF WATER 125
DEPTH OF GROUT SEAL (to nearest foot)
from 0 ft. to 70 ft.
(enter 0 if from surface)

CASING RECORD

case types insert appropriate code below
STEEL ☒ CONCRETE ☐
PLASTIC ☐ OTHER ☐
MAIN CASING TYPE Nominal diameter top (main) casing (nearest inch) Total depth of main casing (nearest foot)
ST 6 70
60 61 63 64 66 70

OTHER CASING (if used) diameter inch depth (feet) from to
EACH CASING

screen type or open hole insert appropriate code below
STEEL ☐ BRASS ☐ OPEN HOLE ☒
BRONZE ☐ PLASTIC ☐ OTHER ☐
C2

DEPTH (nearest ft.)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51
H 70 270

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

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "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.

DRILLERS IDENT. NO. 38
Larry A. Brown

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)
Larry A. Brown

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

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

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
70 72 74 75 76
TELESCOPE CASING LOG INDICATOR OTHER DATA

C 3
PUMPING TEST
HOURS PUMPED (nearest hour) 3
PUMPING RATE (gal. per min. to nearest gal.) 32
METHOD USED TO MEASURE PUMPING RATE Air
WATER LEVEL (distance from land surface)
BEFORE PUMPING 10
WHEN PUMPING 63
TYPE OF PUMP USED (for test)
A air P piston T turbine
C centrifugal R rotary O other (describe below)
J jet S 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) 31 35
PUMP HORSE POWER 37 41
PUMP COLUMN LENGTH (nearest ft.) 43 47
CASING HEIGHT (circle appropriate box and enter casing height)
+ above } LAND SURFACE (nearest foot)
- below }

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)
Public Sewage
Firetower Rd.
276
100' X well
1,000'

B 1 03717

SEQUENCE NO.
(DP USE ONLY)STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL

STATE PERMIT NUMBER

CE-93-0222

fill in this form completely

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

please print or type

Date Received (APA)

410-658-5556

OWNER INFORMATION

112293

West Nottingham Academy

1079 Firetower Rd.

Columbia Md 21917

76 State 72 Zip 76

DRILLER INFORMATION

LARRY A. BROWN

38

Driller's Name

77 License No. 80

Brown Bros. Drilling

Firm Name

497 Kirkmill Rd, Nottingham, PA 19362

Address

Larry A. Brown

11-18-93

Signature

Date

WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.)

5

AVERAGE DAILY QUANTITY NEEDED
(GAL. PER DAY)

500

USE FOR WATER (CIRCLE APPROPRIATE BOX)

☒ HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)☐ FARMING (LIVESTOCK WATERING & AGRICULTURAL
IRRIGATION)☒ INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV.
OTHER (REQUIRES APPROPRIATION PERMIT)☐ PUBLIC OR PRIVATE WATER COMPANY (REQUIRES
APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT
APPROVAL)☐ TEST, OBSERVATION, MONITORING (MAY REQUIRE
APPROPRIATION PERMIT)

APPROXIMATE DEPTH OF WELL 250 FEET

APPROXIMATE DIAMETER OF WELL 6" NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered)

JETTED

Jetted & DRIVEN

AIR-ROTARY

AIR-PERCussion

ROTARY (Hydraulic Rotary)

CABLE

REVerse-ROTARY

Drive-POINT

other

REPLACEMENT OR DEEPEINED 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 DEEPEIN AN EXISTING WELLPERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEINED
(IF AVAILABLE)

Not to be filled in by driller (OEP USE ONLY)

APPROP. PERMIT NUMBER CE54GAP009

FORCE CE5

WRITE
INITIALS
IN BOX

PERMIT No.

CE-93-0222

SPECIAL CONDITIONS

B 3

LOCATION OF WELL

05380-93

Cecil

8 COUNTY

23 SUBDIVISION

SECTION 44 46

LOT 48 50

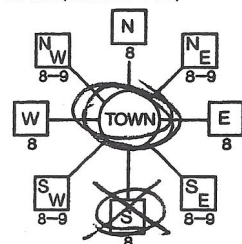
West Nottingham

52 NEAREST TOWN

MILES FROM TOWN (enter 0 if in town)

0 MI

B 4

DIRECTION OF WELL FROM
TOWN (CIRCLE BOX)

Firetower Rd

NEAR WHAT ROAD

ON WHICH SIDE OF ROAD
(CIRCLE APPROPRIATE BOX)34 200 37
DISTANCE FROM ROAD

ENTER FT or MI

FT

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Cecil

COUNTY NAME

COUNTY NO.

STATE
SIGNATURE

INSERT S

DATE ISSUED

11/24/94

112493

43

NORTH GRID

669000

50

55

EAST GRID

1059000

57

63

SHOW MAJOR FEATURES OF
BOX & LOCATE WELL

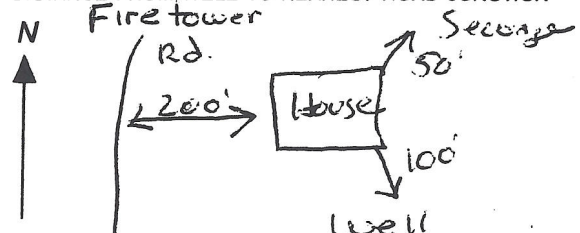
WITH AN X

SOURCES OF DRILLING WATER

1. well

2.

3.

WRITE THE BOX NUMBER
FROM THE MAP HEREE 1050
N 660000
000DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN
RELATION TO NEARBY TOWNS AND ROADS AND GIVE
DISTANCE FROM WELL TO NEAREST ROAD JUNCTION

11081

SEQUENCE NO.
(DENV USE ONLY)

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

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

123
(THIS NUMBER IS TO BE PUNCHED
IN COLS. 3-6 ON ALL CARDS)

ST/CO USE ONLY
DATE Received
JAN 3 1994

DATE WELL COMPLETED
12 6 93

Depth of Well
2220028
(TO NEAREST FOOT)

PERMIT NO.
FROM "PERMIT TO DRILL WELL"
CE-93-0222

COUNTY
NUMBER

OWNER West Nottingham Academy

STREET OR RFD 1079 last name Firetower Rd. first name

TOWN Colormd 21917

SUBDIVISION

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	
Fill, old	0	4	
Foundation			
Clay	4	71	
Gravel	71	82	
Granite	82	200	

GROUTING RECORD

WELL HAS BEEN GROUTED
(Circle Appropriate Box)

yes ☒ Y no ☐ N

TYPE OF GROUTING MATERIAL

CEMENT ☒ CM BENTONITE CLAY ☐ BC

NO. OF BAGS 47 NO. OF POUNDS 3290

GALLONS OF WATER 230

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. to 92 ft.

CASING RECORD

casing types insert appropriate code below

ST CO
STEEL CONCRETE
PL OT
PLASTIC OTHER

MAIN CASING TYPE

Nominal diameter top (main) casing (nearest inch)

Total depth of main casing (nearest foot)

PL 6 92

OTHER CASING (if used)

diameter inch

depth (feet) from to

SCREEN RECORD

screen type or open hole

insert appropriate code below

ST BR HO
STEEL BRASS OPEN HOLE
PL PLASTIC OTHER

DEPTH (nearest ft.)

140 92 200

SLOT SIZE 1 2 3

DIAMETER OF SCREEN

from to

GRAVEL PACK

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

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

T (E.R.O.S.)

W Q

TELESCOPE CASING

LOG INDICATOR

OTHER DATA

PUMPING TEST

HOURS PUMPED (nearest hour) 3

PUMPING RATE (gal. per min. to nearest gal.) 12

METHOD USED TO MEASURE PUMPING RATE Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 30

WHEN PUMPING 45

TYPE OF PUMP USED (for test)

A air P piston T turbine
C centrifugal R rotary O other (describe below)
J jet S 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)

LAND SURFACE

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)

Diagram showing well location relative to house and septic tank.

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

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "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.

DRILLERS IDENT. NO. 38

DRILLERS SIGNATURE Larry A. Brown

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

GRAVEL PACK

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

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

T (E.R.O.S.)

W Q

TELESCOPE CASING

LOG INDICATOR

OTHER DATA

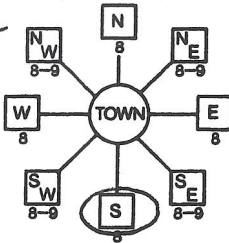
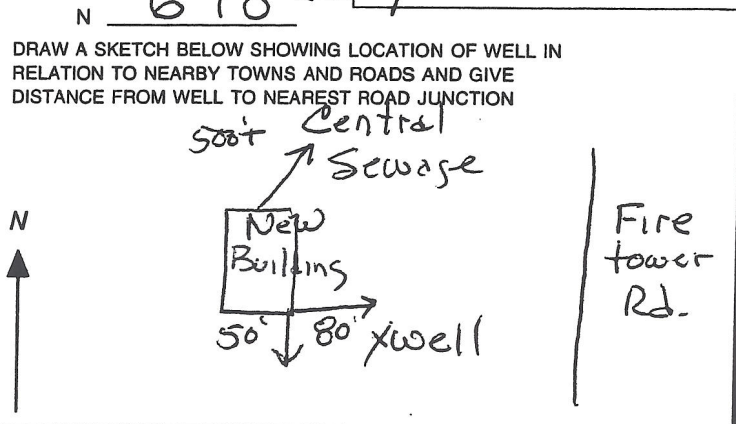
LOCATION OF WELL ON LOT

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

Diagram showing well location relative to house and septic tank.

Id #80.5/11/98 #121090-MTK

EMERGENCY/TEMP NO. IF ANY

B 14 1 2 3 6 5122 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)	SEQUENCE NO. (MDE USE ONLY)	STATE OF MARYLAND APPLICATION FOR PERMIT TO DRILL WELL please print or type	STATE PERMIT NUMBER CE 94 2513 <small>fill in this form completely</small>
Date Received (APA) <u>05-11-98</u> 8 MM DD YY 13 OWNER INFORMATION <u>West Nottingham Academy</u> 15 Last Name Owner First Name 34 <u>1079 Firetower Rd.</u> 36 Street or RFD 55 <u>Colora md. 21917</u> 57 Town 70 State 72 Zip 76		LOCATION OF WELL 8 COUNTY <u>Cecil</u> 21 PCO 23 SUBDIVISION 42 SECTION <u>44</u> 46 LOT <u>48</u> 50 <u>West Nottingham</u> 52 NEAREST TOWN 71 MILES FROM TOWN (enter 0 if in town) <u>1.2</u> M I 73 76 77 78	
DRILLER INFORMATION <u>LARRY A. BROWN MWD038</u> Driller's Name 76 License No. 81 <u>Brown Bros. Drilling</u> Firm Name <u>487 Kirks Mill Rd, Nottingham, PA. 19122</u> Address <u>Larry A. Brown 5-7-98</u> Signature Date		B 4 1 2 DIRECTION OF WELL FROM TOWN (CIRCLE BOX)  ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) 11 <u>Firetower Rd.</u> 30 NEAR WHAT ROAD 34 <u>1000</u> 37 DISTANCE FROM ROAD <u>Et</u> ENTER FT OR MI 38 39 TAX MAP: <u>17</u> BLK: <u>2</u> PARCEL <u>3</u>	
B 2 1 2 WELL INFORMATION APPROX. PUMPING RATE <u>20</u> (GAL. PER MIN.) 8 12 AVERAGE DAILY QUANTITY NEEDED <u>2000</u> (GAL. PER DAY) 14 20		NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL Cecil COUNTY NAME COUNTY NO. STATE SIGNATURE <u>[Signature]</u> INSERT S → <u>S</u> 41 DATE ISSUED <u>05-28-98</u> <u>June Hill</u> 05-27-99 43 MM DD YY 48 CO SIGNATURE EXP. DATE NORTH GRID <u>671</u> 000 EAST GRID <u>1060</u> 000 .50 55 57 63	
USE FOR WATER (CIRCLE APPROPRIATE BOX) <input type="checkbox"/> HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY) <input type="checkbox"/> FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION) <input checked="" type="checkbox"/> INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT) <input type="checkbox"/> PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE APPROVAL) <input type="checkbox"/> TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)		SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X SOURCES OF DRILLING WATER 1. <u>Well</u> 2. 3. WRITE THE BOX NUMBER FROM THE MAP HERE E <u>1060</u> N <u>670</u> DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION 	
APPROXIMATE DEPTH OF WELL <u>300</u> FEET 24 28 APPROXIMATE DIAMETER OF WELL <u>6"</u> NEAREST INCH			
METHOD OF DRILLING (circle one) BORED (or Augered) <u>JETTED</u> Jetted & DRIVEN 30 AIR-ROTARY <u>AIR-PERCUSION</u> ROTARY (Hydraulic Rotary) 37 CABLE <u>Reverse-ROTARY</u> Drive-POINT other _____			
REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX) <input checked="" type="checkbox"/> THIS WELL WILL NOT REPLACE AN EXISTING WELL <input type="checkbox"/> THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED 39 <input type="checkbox"/> THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS <input type="checkbox"/> THIS WELL WILL DEEPEM AN EXISTING WELL PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPEMED (IF AVAILABLE) 41 _____ 52			
Not to be filled in by driller (MDE OR COUNTY USE ONLY) APPROP. PERMIT NUMBER <u>CE 54 GAP 009</u> 54 63 FORCE <u>CE 94 2513</u> 67 68 IN BOX PERMIT No. 70 71 72 73 74 75 76 77 78 79			
SPECIAL CONDITIONS NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED -			

C1 02137 SEQUENCE NO. (MDE USE ONLY) STATE OF MARYLAND WELL COMPLETION REPORT THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED. COUNTY NUMBER PCO W Nottingham Acad. DATE RECEIVED 02/19/98 DATE WELL COMPLETED 06/09/98 Depth of Well 200' PERMIT NO. FROM "PERMIT TO DRILL WELL" CE 94 2513 OWNER WEST NOTTINGHAM ACADEMY STREET OR RFD 1019 Firetower Rd. TOWN Colora, md. 21917 SUBDIVISION 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	
Clay	0	12	
Sand	12	46	✓
Gravel	46	55	✓
Granite	55	200	✓
Water Bearing Zones			
85-190			

16-50# SKTS BE CHIPS 800lb.

GROUTING RECORD YES NO Y N WELL HAS BEEN GROUTED (Circle Appropriate Box) TYPE OF GROUTING MATERIAL (Circle one) CEMENT CM BENTONITE CLAY BC NO. OF BAGS 28 NO. OF POUNDS 1960 GALLONS OF WATER 140 DEPTH OF GROUT SEAL (to nearest foot) from 0 TOP 52 ft. to 60 BOTTOM 58 ft. (enter 0 if from surface) CASING RECORD ST CO PL OT MAIN CASING TYPE ST Nominal diameter top (main) casing (nearest inch) 6 Total depth of main casing (nearest foot) 60 OTHER CASING (if used) diameter inch depth (feet) from to EACH CASING

C3 PUMPING TEST HOURS PUMPED (nearest hour) 3 PUMPING RATE (gal. per min.) 150 METHOD USED TO MEASURE PUMPING RATE Air WATER LEVEL (distance from land surface) BEFORE PUMPING 5 ft. WHEN PUMPING 200 ft. TYPE OF PUMP USED (for test) A air P piston T turbine C centrifugal R rotary O other (describe below) J jet S submersible

NUMBER OF UNSUCCESSFUL WELLS: 0 WELL HYDROFRACTURED YES NO Y 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 I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "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. DRILLERS LIC. NO. 1 M-038, Larry A. Brown DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION) LIC. NO. 1 M-038, Larry A. Brown SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

C2 DEPTH (nearest ft.) 60 200 E A C H S C R E E N 1 8 9 11 15 17 21 23 24 26 30 32 36 38 39 41 45 47 51 SLOT SIZE 1 2 3 DIAMETER OF SCREEN (NEAREST INCH) 56 60 from to GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER) T (E.R.O.S.) W Q 70 72 74 75 76 TELESCOPE CASING LOG INDICATOR OTHER DATA

PUMP INSTALLED DRILLER WILL INSTALL PUMP YES NO IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS. TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29 CAPACITY: GALLONS PER MINUTE (to nearest gallon) 31 35 PUMP HORSE POWER 37 41 PUMP COLUMN LENGTH (nearest ft.) 43 47 CASING HEIGHT (circle appropriate box and enter casing height) + above LAND SURFACE - below 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) Fire tower Rd. 120' 25' x well