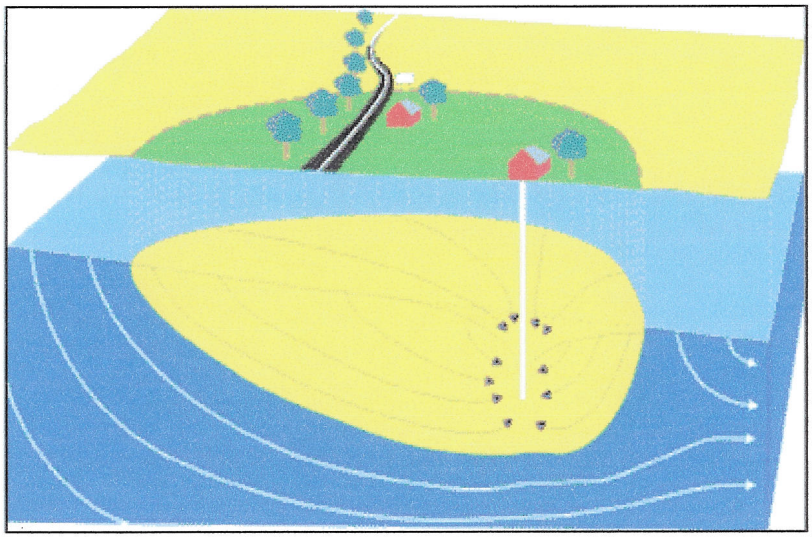
SOURCE WATER ASSESSMENT

FOR ESSROC CEMENT CORP.

FREDERICK COUNTY, MD



Prepared By
Water Management Administration
Water Supply Program
January 2006

MDE

Robert L. Ehrlich, Jr.
Governor

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Secretary

Michael S. Steele
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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 Essroc Cement Corp. Essroc is located near Buckeystown in Frederick County, Maryland. This report delineates the area that contributes water to the drinking water wells, 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 the plant's potable water supply is the Grove Limestone, an unconfined aquifer. The system uses three wells to obtain its drinking 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 Department of Planning's 2002 land use map for Frederick County was used to identify non-point sources of contamination. Maps showing location of the wells, 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. The water sources are susceptible to contamination by nitrates, volatile organic compounds and total coliform bacteria. The age of the facility's wells (45 to 50 years) indicates that their integrity should be thoroughly be evaluated.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for Essroc Cement Corp. Essroc is located near Buckeystown in Frederick County, Maryland. The facility operates its own water treatment plants and uses three wells. One well supplies the office while the other two wells supply the lab and garage buildings.

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 gallons per day (gpd). Essroc's water appropriation and use permit allows for an average annual water use of 1,600,000 gpd; however, most of the water is used for quarry dewatering, dust control, cooling water and process water. The plant has about 100 employees and average annual water use for potable and sanitary uses is about 2,000 gpd.

HYDROGEOLOGY

Essroc is located in the Frederick Valley, which is considered part of the Piedmont Physiographic Province. This region is underlain by carbonate rocks, which contain typical karst features such as sinkholes and large springs. Recharge to the aquifer occurs via precipitation percolating through soils, through seepage beneath stream channels and direct flow into sinkholes. Ground water is stored in joints, fractures, solution channels and caverns. The aquifers are unconfined and poorly protected from surface contamination.

Essroc obtains its water supply from the Grove Limestone, which is one of the most productive aquifers in Frederick County. The formation is described as "...thickly bedded nearly pure limestone with massive beds of fine-grained dolomite in the lower part and highly quartzose limestone at the base. The total thickness of the formation is about 600 feet." Solution cavities are common in the Grove Limestone. Most of it weathers to a reddish-brown residual clay. The quartzose limestone weathers to sand or sandy clay.

Regional ground water flow is likely toward Rocky Fountain Run and the Monocacy River. In the immediate vicinity of the quarry pit, shallow ground water flow is toward the pit.

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 facility is served by three potable supply wells that are listed in Table 1. The well and treatment serving the office building is regulated under the Safe Drinking Water Act as it serves more than 25 persons on a regular basis. The wells and treatment serving the

laboratory and garage buildings, while not being regulated by the Safe Drinking Water Act, are included in the report. Copies the applications to drill the wells and their well completion reports for wells 1 and 3 are in the Appendix. Maryland Geological Survey well records indicate that there may have been a fourth drinking water well on the property at one time, but it is not currently in use and its exact location is unknown.

TABLE 1. WELL INVENTORY

WELL #	PERMIT #	TOTAL DEPTH	CASING DEPTH	YEAR DRILLED	COMMENTS
1	FR025622	156'	54.5'	1957	office well
2		166'	70'	1958	lab & cooling water
3	FR026836	87'	77.5	1958	truck wash & garage

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 greater than 10,000 gallons per day whose wells are completed in fractured crystalline rock is the drainage area that contributes water to the wells. Wells 1 and 3 are located between an un-named tributary to Rocky Fountain Run and the quarry. Well 2 is located in an area that drains southwest to Rocky Fountain Run. Ground water flow in the vicinity of wells 1 and 3 may have been altered by the quarry pit, which is 180 feet deep with a surface area of 140 acres. Essroc's water appropriation and use permit allows an annual average withdrawal of 1.6 mgd; however, most of the water appropriated is dewatering of the quarry pit, dust suppression and process water. Water withdrawn from the wells (used for drinking water, dust suppression and process water) accounts for about 4% of the appropriation of about 64,000 gpd. Actual potable and sanitary use by the 100 employees is about 2,000 gpd. Figure 2 shows the 710-acre Wellhead Protection Area (WHPA) that was delineated, which is more than adequate to meet the daily average ground water usage 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 that were identified within the assessment area from field inspections and from MDE Water and Waste Management databases. The closest sources are underground storage of gasoline and diesel fuel and industrial discharges by Essroc itself. Figure 2 shows potential sources of contamination within and near the WHPA.

The Maryland Department of Planning's 2002 land use map for Frederick County was used to identify non-point sources of contamination (Figure 3). Two land use categories were identified within the delineated WHPA (Table 2). The predominant land use within the WHPA is cropland.

TABLE 2. LAND USE SUMMARY FOR THE WELLHEAD PROTECTION AREA

Land Use Categories	Total Area (acres)	Percentage of WHPA
Cropland	463.6	65.3
Extractive	220.0	31.0
Low Density Residential	18.4	2.6
Forest	5.0	0.7
Water	2.8	0.4

A review of Maryland Department Planning's Frederick 2004 Sewer Map (Figure 4) shows that the Essroc is served by an on-site sewer system. The on-site septic system is located downgradient of Well 1 (Figure 2).

TABLE 3. SEWER SERVICE SUMMARY FOR THE WELLHEAD PROTECTION AREA

Sewage Service Area	Total Area (acres)	Percentage of WHPA
No Planned Service	667	95.5
Ultimate Service (>20 years)	32	4.5

WATER QUALITY DATA

Water quality data from the Water Supply Program's (WSP) database was reviewed for Safe Water Drinking Act (SWDA) contaminants. Little data is available from wells 2 and 3 in MDE's data base after year 2000 as these sources are not regularly monitored under the Safe Drinking Water Act requirements. 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. At Essroc, the drinking water from each well is treated by ultraviolet radiation.

Inorganic Compounds (IOCs)

From 1993 to 2005, nitrate has been measured 28 times. Nitrate has been detected in every sample, but only 13 samples exceeded 50% of the MCL (Table 4). Barium, chromium, nickel and cadmium have also been detected, but not in quantities greater than 50% of the mcl.

Table 4. Nitrate Measurements Greater Than 50% MCL

Date	Well #	PPM	MCL
3/18/1993	1	6.2	10
6/16/1993	1	5.5	10
8/2/1993	1	6.8	10
12/20/1993	1	5.7	10
6/8/1994	1	5.6	10
9/28/1994	1	5.6	10
9/21/1997	1	5.0	10
9/24/1997	1	5.0	10
12/14/1998	1	5.5	10
3/25/1999	1	5.7	10
3/27/1999	3	5.9	10
2/22/2002	1	5.3	10
3/21/2005	1	6.7	10

Volatile Organic Compounds (VOCs)

VOC's have been measured 32 times in the three different wells since 1990. Nineteen samples were from Well 1, five were from Well 2 and eight were from Well 3. Bromochloromethane, bromoform, chlorform, dibromochloro methane, and 1,1,1 trichloroethane have been detected in Well 1. Ethylene dibromide has been detected once in Well 2 and chloroform has been detected once in Well 3. Other than 1,1,1 trichloroethane and ethylene dibromide, all of the other VOC's that were detected are trihalomethanes (THMS), which are disinfection by products. THMS are generated as a result of the reaction between chlorine used for disinfection and organic matter in the water. Total trihalomethanes (TTHMSs) were detected at levels well below maximum contaminant level of 80 ppb. No TTHMs were detected after Essroc switched from using chlorine as a water treatment disinfectant to ultraviolet radiation. The detection of 1,1,1 trihaloethane was also well below the MCL (from 6% to7% of the MCL). The one detection of ethylene dibromide was not confirmed with subsequent tests nor is the method used for volatile organic compound analysis (502.2) acceptable for compliance purposes. EPA method 504 is required to be performed for ethylene dibromide. A sample collected in April of 1995, using the EPA method (504) from Well2 did not detect ethylene dibromide.

Table 5. VOC Detects

Date	Well#	VOC	PPB	MCL (PPB)
11/12/1990	1	1,1,1 trichloroethane	12	200
2/25/1991	3	Chloroform	0.8	80
2/25/1991	1	1,1,1 trichloroethane	2.1	200
6/11/1991	1	1,1,1 trichloroethane	1.4	200
12/18/1991	1	1,1,1 trichloroethane	2.5	200
3/10/1992	1	1,1,1 trichloroethane	1.5	200
12/28/1992	2	ethylene dibromide	0.3	0.05
10/17/1995	1	Bromo dichloromethane	7.5	80
10/17/1995	1	Bromoform	11.7	80
10/17/1995	1	Chloroform	5.4	80
10/17/1995	1	Dibromochloro methane	13.8	80
5/16/1996	1	Bromo dichloromethane	0.9	80
5/16/1996	1	Chloroform	2.0	80
5/16/1996	1	Dibromochloro methane	0.7	80

Synthetic Organic Contaminants (SOCs)

A review of the data indicates that SOCs have been measured five times. The only SOC's found were metolachlor and di(ethylhexyl) phthyalate. Metolachlor is used as a herbicide in agricultural applications. Di(ethylhexyl) phthalate laboratory blanks water measured concurrently with each sample. These detections of di(ethylhexyl) phthalate are therefore not considered representative of actual well water quality.

Table 6. SOC Detects

Date	Well#	VOC	PPM
4/12/1995	2	di(ethylhexyl) phthalate	0.86
4/12/1995	3	di(ethylhexyl) phthalate	0.5
12/13/1995	1	di(ethylhexyl) phthalate	0.5
3/2/1998	1	metolachlor	1.26
11/19/2002	1	di(ethylhexyl) phthalate	0.7

Microbiological Contaminants

Routine bacteriological monitoring, which measures total coliform bacteria, is conducted in the finished water for each noncommunity water system on a quarterly basis. Total coliform bacteria are not pathogenic but are used as indicator-organisms for other disease-causing microorganisms. Microbiological contaminants were sampled 39 times from 1996 to 2005. In June 2001, samples were found to be positive, but have been negative since that occasion. Because the facility practices disinfection, the finished water samples are not representative of well water conditions. Special raw water samples were collected under dry and wet weather conditions to examine the vulnerability of each well to protozoan organisms such as giardia and cryptosporidium. The results are shown below. Eight wet-weather samples and two dry weather samples were collected from each well. Low levels of total coliform were detected in nine of ten samples for Well 2, in two of the samples for Well1 and in one of ten samples for Well 3. Of the thirty samples collected, only one was positive (one tube) for fecal coliform (one dry-weather sample for Well 2). The results indicate that the wells are not vulnerable to contamination by enteric or disease causing pathogens and that Well 2 is likely colonized by coliform bacteria.

TABLE 7. Raw Water Bacteriological Test Results

Source Name	Rain Date	Rain Amount (inches)	Remark	Sample Date	Total Coliform (col/100ml)	Fecal Coliform (col/100ml)
Well 1	1/8/1998	0.5	Rainfall Set 1	1/8/1998	-1.1	-1.1
Well 1	1/8/1998	0.5	Rainfall Set 1	1/9/1998	-1.1	-1.1
Well 1	1/8/1998	0.5	Rainfall Set 1	1/10/1998	8	-1.1
Well 1	1/8/1998	0.5	Rainfall Set 1	1/11/1998	23	-1.1
Well 1	2/12/1998	0.5	Rainfall Set 2	2/12/1998	-1.1	-1.1
Well 1	2/12/1998	0.5	Rainfall Set 2	2/13/1998	-1.1	-1.1
Well 1	2/12/1998	0.5	Rainfall Set 2	2/14/1998	-1.1	-1.1
Well 1	2/12/1998	0.5	Rainfall Set 2	2/15/1998	-1.1	-1.1
Well 1	3/30/1998	0	Dry 1	3/30/1998	-1.1	-1.1
Well 1	5/22/1998	0	Dry 2	5/22/1998	-1.1	-1.1
Well 2	1/8/1998	0.5	Rainfall Set 1	1/8/1998	1.1	-1.1
Well 2	1/8/1998	0.5	Rainfall Set 1	1/9/1998	1.1	-1.1
Well 2	1/8/1998	0.5	Rainfall Set 1	1/10/1998	4.6	-1.1

Well 2	1/8/1998	0.5	Rainfall Set 1	1/11/1998	12	-1.1
Well 2	2/12/1998	0.5	Rainfall Set 2	2//1998	2.6	-1.1
Well 2	2/12/1998	0.5	Rainfall Set 2	2//1998	1.1	-1.1
Well 2	2/12/1998	0.5	Rainfall Set 2	2//1998	1.1	-1.1
Well 2	2/12/1998	0.5	Rainfall Set 2	2//1998	-1.1	-1.1
Well 2	3/30/1998	0	Dry 1	3/30/1998	4.6	-1.1
Well 2	5/22/1998	0	Dry 2	5/22/1998	16.1	2.2
Well 3	1/08/1998	0.5	Rainfall Set 1	1/8/1998	-1.1	-1.1
Well 3	1/08/1998	0.5	Rainfall Set 1	1/9/1998	-1.1	-1.1
Well 3	1/08/1998	0.5	Rainfall Set 1	1/10/1998	-1.1	-1.1
Well 3	1/08/1998	0.5	Rainfall Set 1	1/11/1998	-1.1	-1.1
Well 3	2/12/1998	0.5	Rainfall Set 2	2/12/1998	-1.1	-1.1
Well 3	2/12/1998	0.5	Rainfall Set 2	2/13/1998	-1.1	-1.1
Well 3	2/12/1998	0.5	Rainfall Set 2	2/14/1998	1.1	-1.1
Well 3	2/12/1998	0.5	Rainfall Set 2	2/15/1998	-1.1	-1.1
Well 3	3/30/1998	0	Dry 1	3/30/1998	-1.1	-1.1
Well 3	5/22/1998	0	Dry 2	5/22/1998	-1.1	-1.1

SUSCEPTIBILITY ANALYSIS

The wells serving Essroc are completed in the Grove Limestone, an unconfined aquifer. Wells completed in unconfined limestone aquifers are generally more susceptible to contamination from surface sources. Therefore, managing this area to minimize the risk to the supply and continued routine monitoring of the contaminants is essential in assuring a safe drinking water supply. 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 the Essroc's water supply to various contaminants is shown in Table 7.

Inorganic Compounds (IOCs)

Nitrate, barium, chromium, nickel, and cadmium were the only IOCs detected at Essroc. Of those, nitrate was the only IOC to exceed 50% of the MCL. Most of the WHPA is in an area used for cropland, a possible source of nitrate.

Volatile Organic Compounds (VOC's)

Underground tanks containing gasoline and diesel fuel are located in close proximity to Wells 1 and 3. As the underground storage of materials has contaminated many water supply wells across the state, this water supply is considered vulnerable to VOC contamination given the proximity of the tanks and the highly transmissive nature of the aquifer.

Synthetic Organic Compounds (SOC's)

Di(ethylhexyl) phthlate and metolachlor have been detected in Essroc's water supply. Phthalate was detected in laboratory blanks and is not believed to be representative of the water supply. Metolachlor detection is consistent with the agricultural land use in the area. The wells are not considered vulnerable to SOC's. The level detected is considerably lower than EPA's health advisory of 70 ppb. As there is no point source of this compound in the area and the lack of detection in four other samples from Essroc's wells that this contaminant is not likely to be present in Essroc's water supply at levels of concern.

Microbiological Contaminants

Based on raw water bacteriological data, Essroc's wells were determined not to be under the influence of surface water. Positive samples occurred in June 2001, but have not occurred before or after. Essroc's water supply is susceptible to total coliform bacteria, but not to the protozoans, giardia or cryptosporidia.

TABLE 8. SUSCEPTIBILITY CHART

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	NO	YES	NO	YES	NO
Synthetic Organic Compounds	YES	NO	NO	YES	NO
Microbiological Contaminants	YES	YES (raw water)	POSSIBLY	YES	YES

MANAGEMENT OF THE SOURCE WATER ASSESSMENT AREA

The wells serving Essroc have significant age and their integrity needs to be reviewed. Recommendations for better protecting the water supply are listed below:

- All three are 45 to 50 years old and therefore were constructed before current well construction requirements. It is recommended that they be photosurveyed with a down-hole camera for integrity due to the potential for corrosion of the steel casing. Well 2 appears to be colonized by colliform bacteria. Vigorous cleaning with disinfectant could alleviate the persistence presence.
- Maryland Geological Survey records indicate a fourth production well on the property. It is not in use and its location is forgotten. If the well is located it should be abandoned according to State regulations.
- The underground storage tanks should be monitored regularly for leaks. Relocation of the tanks to above ground storage or to sites distant from the wells is recommended.
- Abandon all wells that are not in use according to State regulations.
- Continue monitoring for VOCs, IOCs, and SOCs in accordance with MDE's requirements.
- Annual sampling for microbiological contaminants under wet weather conditions is recommended.
- Any increase in pumpage, addition of new wells to the system or expansion of the quarry pit 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.

REFERENCES

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2. Duigon, M.T. and J.R. Dine, 1987, Water Resources of Frederick County, Maryland, Maryland Geological Survey Bulletin 33, 106p.

3. Edsall, M.K., 2004, Geologic Report Zone of Influence Essroc Essroc Quarry, 77-sp-0015, Maryland Department of the Environment, Water Management Administration, Minerals, Oil and Gas Division, 26 p.

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

5. Nutter, L.J., 1973, Hydrogeology of the Carbonate Rocks, Frederick and Hagerstown Valleys Maryland, Maryland Geological Survey Report of Investigations, 70 p.

FIGURES

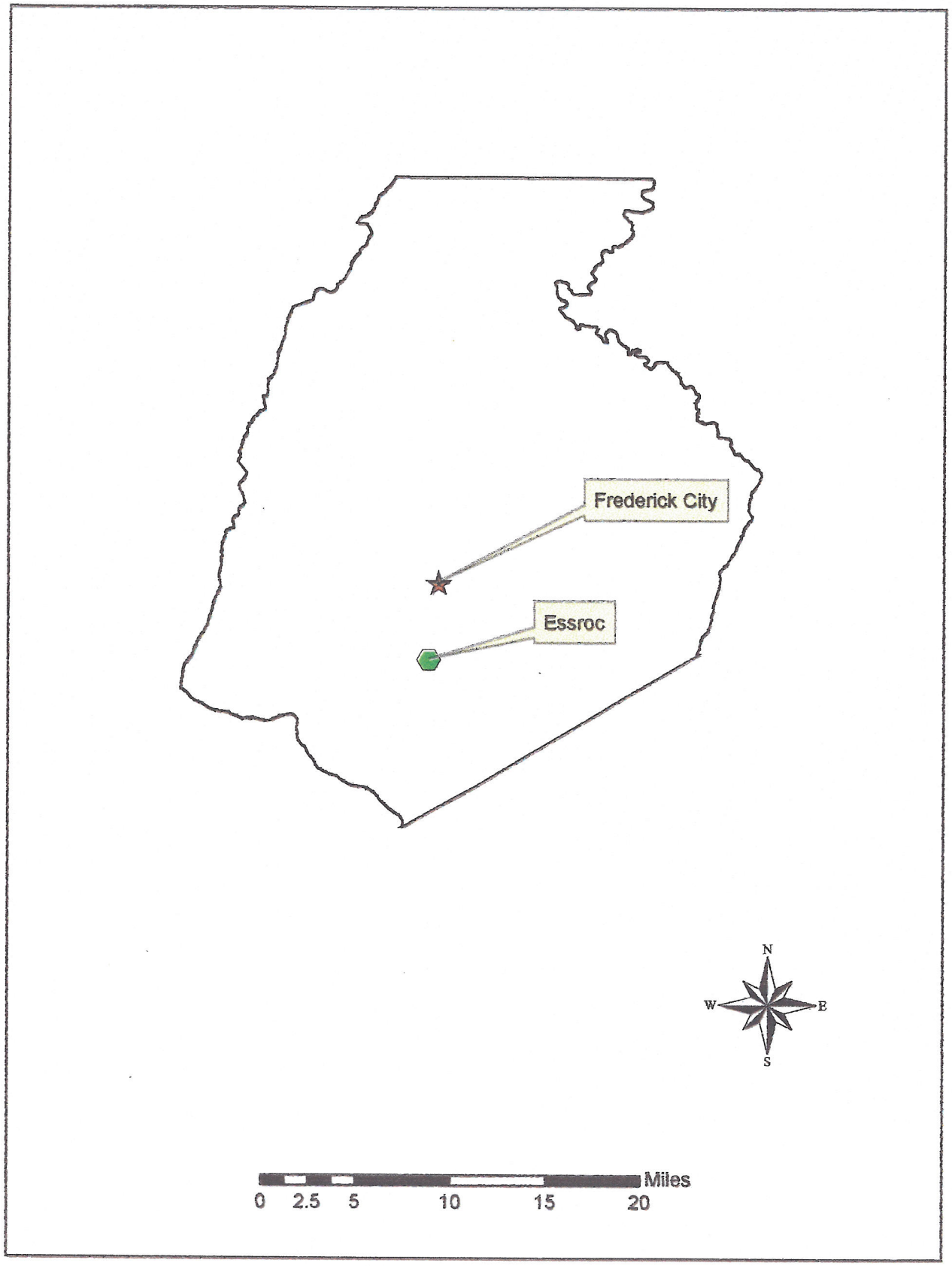


Figure 1- Location Map

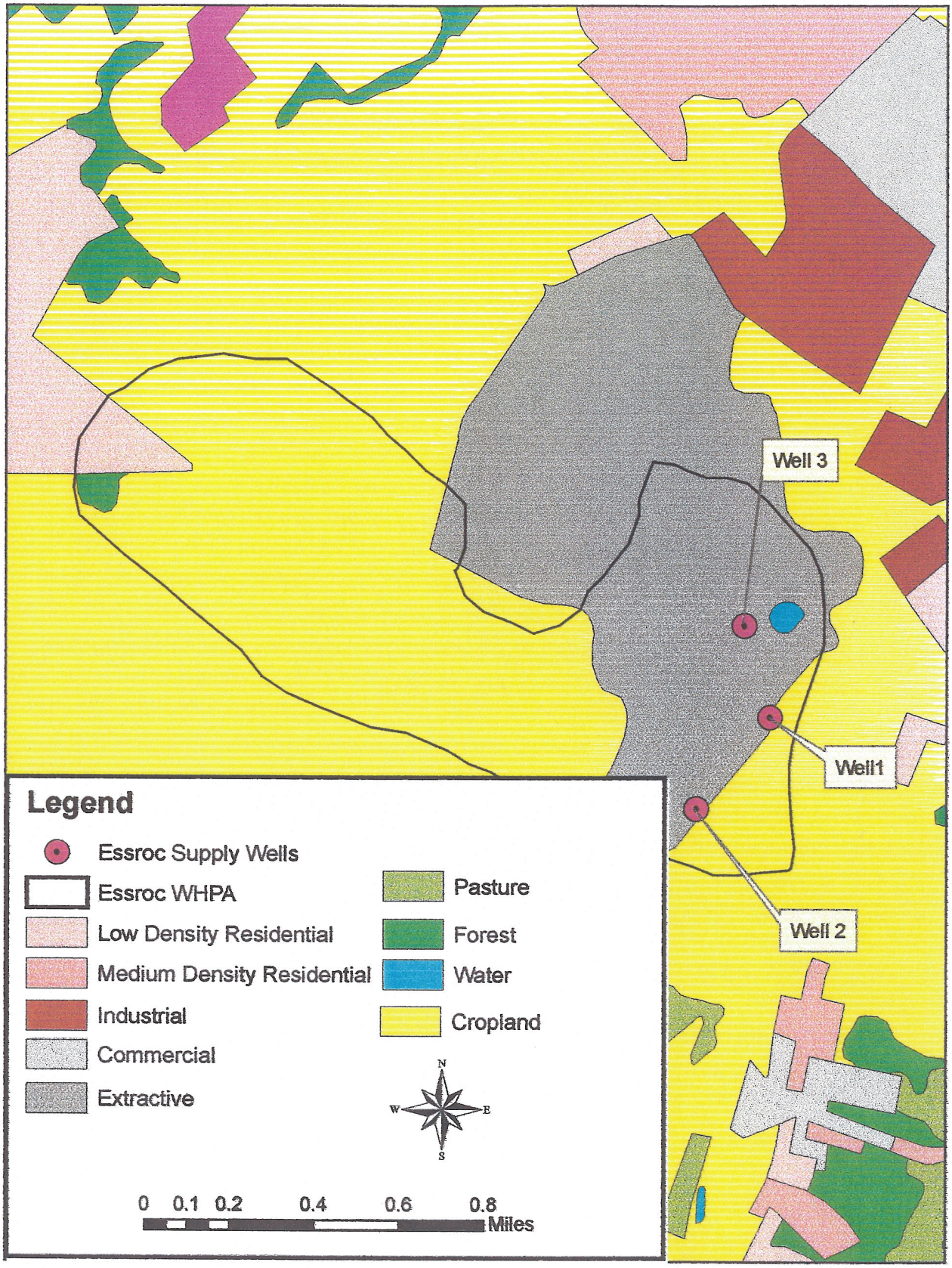


Figure 3. Land Use Map

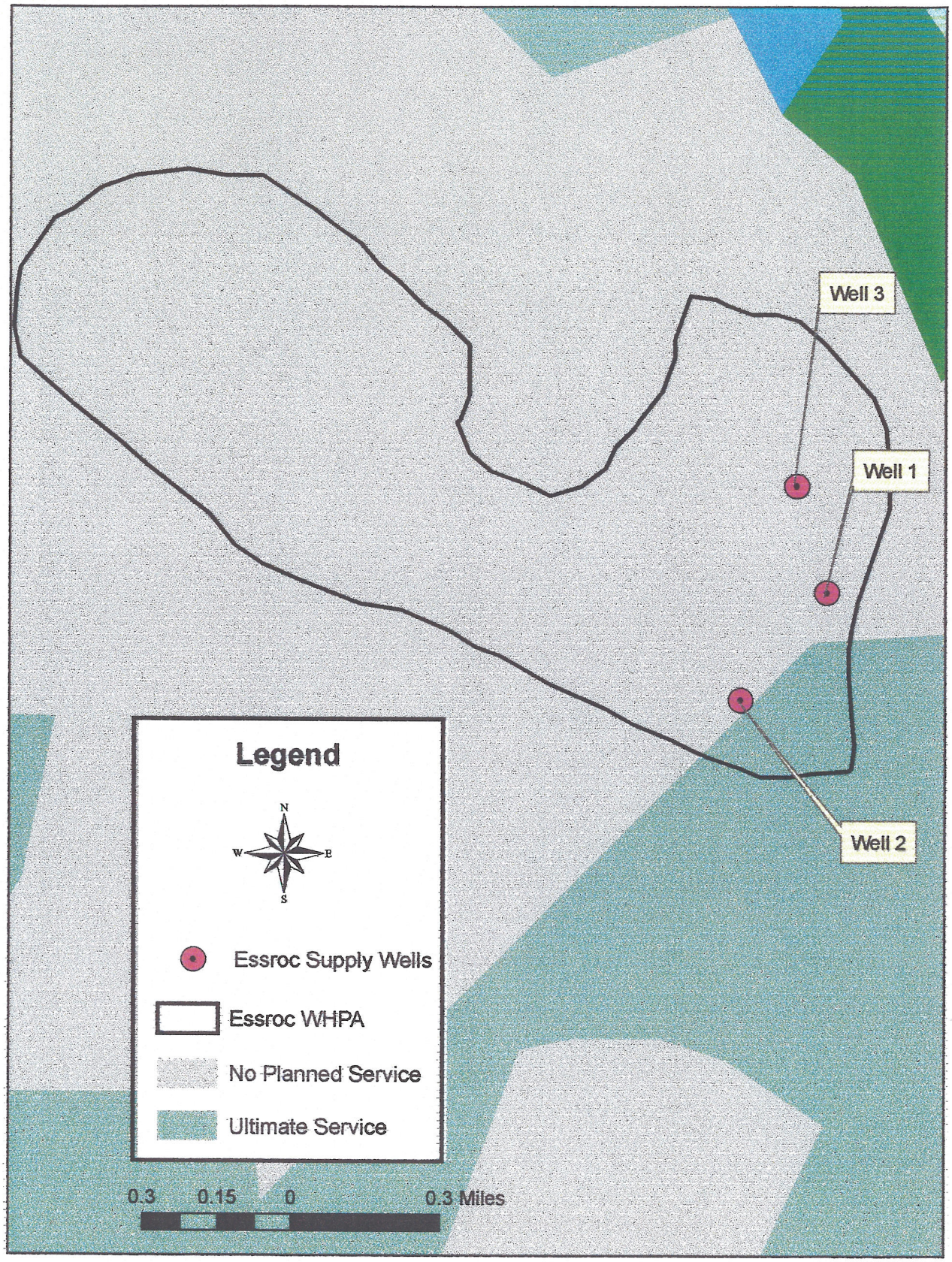


Figure 4. Sewer Service Map

APPENDIX

Fr-Ed 60 25622

Form 4

STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES
The Johns Hopkins University
BALTIMORE 18, MARYLAND

Fr-Ed 60 Buckeystown

FR025622

APPLICATION FOR PERMIT TO DRILL WELL

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

Owner ALPHA PORTLAND CEMENT CO. Driller AUSTIN PEYSER

Street or R. F. D. 2 Street or R. F. D. Post Office 3 Fred. MD.

Post Office Frederick, MD. Date Dec. 5-56

Quantity of Water Needed (G. P. M.) 20

Use for Water DRINKING WATER D

Approximate Depth of Well (feet) 100

Method of Drilling to be used ROTARY R

Location of Well

County Fred. Co.

Nearest Town LIME KILN

Distance from Town NONE

Direction from Town NONE

PERMIT TO DRILL WELL

(Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLER

Permit No. 25622

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.

John T. Simpson
Director

Date December 7, 1956

Special conditions that may apply:

12 Φ 756

Cuttings samples desired from every 10-foot depth interval. Sample sacks being sent under separate cover.

Owner's permit in process

Description of Location of Well

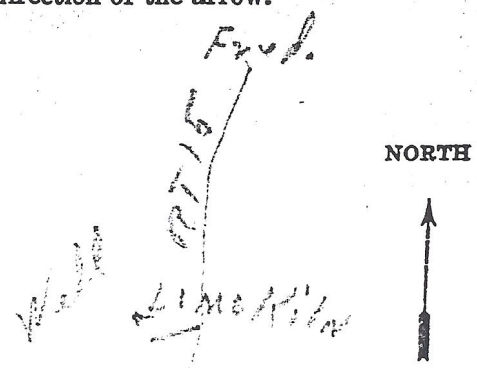
(This information should be definite enough to permit locating well on a county map)

Near what road RT. 15

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

Distance from road 1100 YDS.

Draw a sketch below showing location of well in relation to nearby towns, roads and streams with north in the direction of the arrow.



(DUPLICATE)

See also P26835 & P26836

Form 5

FR025622

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

WELL DESCRIPTION

6 55

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

	FEET from	to
Clay	0	26
Lime Stone	26	156

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)

	DIAM. (Inches)	FEET from	to
Steel	6 in	1	54½

Is this the same well as the other (attached) completion report? (2 other holes were started)

Permit Number 25622

Name of Owner Alpha Porcelain Co.

PUMPING TEST
Hours Pumped
Type of Pump Used
Pumping Rate Gallons per Minute

WATER LEVEL
Distance from land surface to water:
Before Pumping 40 Ft.
When Pumping Ft.

APPEARANCE OF WATER
Clear
Cloudy
Taste
Odor

Height of Casing Above Land Surface +1 Ft.

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

REMARKS
Good

Well Was Completed June 1, 1957
Date
Well Driller
Signature

Form 4

STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES
The Johns Hopkins University
BALTIMORE 18, MARYLAND

Fr. Ed 62

Burkeystown

Fr 026836

APPLICATION FOR PERMIT TO DRILL WELL

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

Owner: Alpha Portland Cement Co

Street or R. F. D.:

Post Office: Lime Kiln

Driller: Austin L. Kiger

Street or R. F. D. #3

Post Office: Frederick, Md.

Date: 5/3/57

Quantity of Water Needed (G. P. M.): D

Use for Water:

Approximate Depth of Well (feet):

Method of Drilling to be used: O

Location of Well

County: Frederick

Nearest Town: Lime Kiln

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:

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

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.

PERMIT TO DRILL WELL

(Permit to be returned to Driller)

NOT TO BE FILLED IN BY DRILLER

Permit No. 26836

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.

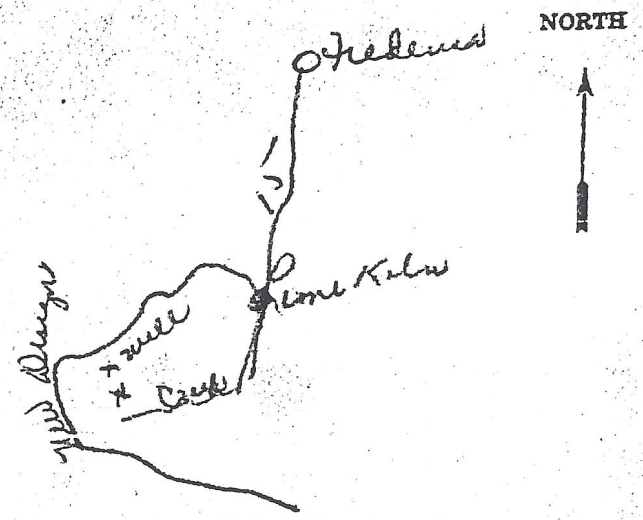
~~Joe T. Kingsley~~, Director

Date: May 6, 1957

Special conditions that may apply:

Owner's permit 11/5/56

05067



(DUPLICATE)

See also P25622 & P26835

Permit no #3

Form 5

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES
The Johns Hopkins University
BALTIMORE 18, MARYLAND

Fr 026836

WELL COMPLETION REPORT

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

8 — WELL DESCRIPTION 87

Permit Number 26836

Name of Owner Alpha Portland Cement Co.

WELL LOG

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

	FEET from ... to ...
Limestone	0 - 87

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)

	DIAM. (inches)	FEET from ... to ...
	8"	0 - 77 1/2
	10"	0 - 57

Company geologist's test:
200 gpm for 24 hrs.
SWL 38.3 below unknown M.P.
DD 4.7

Used for process water, crusher + sanitary facilities

PUMPING TEST

Hours Pumped 24
Type of Pump Used Turbine
Pumping Rate Gallons per Minute 115

WATER LEVEL

Distance from land surface to water:
Before Pumping 34 Ft.
When Pumping — Ft.

APPEARANCE OF WATER

Clear Yes
Cloudy
Taste good
Odor none

Height of Casing Above Land Surface ... Ft.

PUMP INSTALLED

Type Submersible
Capacity 10 HP
Gallons per Minute
Gallons per Hour
Pump Column Length 65 Ft.

REMARKS

Well Was Completed
Date 2-9-58
Well Driller Robert Cline
Signature