



# HOWARD COUNTY HEALTH DEPARTMENT

34052

DATE  
10 / 1 / 10

LLS

Received  
From

Hogles Well Drilling LLC

PHONE # 413-609-4195

☐ CASH  
☒ CHECK

NO. w  
12233

For Well permit - Lot 1  
5002 Ten Oaks Rd

one hundred sixty \$  
Dollars

\$

160 w

Received By

LLS MURPHY

C1 0758

SEQUENCE NO.  
(MDE USE ONLY)STATE OF MARYLAND  
WELL COMPLETION REPORT  
FILL IN THIS FORM COMPLETELY  
PLEASE TYPETHIS REPORT MUST BE SUBMITTED WITHIN  
45 DAYS AFTER WELL IS COMPLETED.1 2 3 6  
(THIS NUMBER IS TO BE PUNCHED  
IN COLS. 3-6 ON ALL CARDS)COUNTY  
NUMBER

ST/CO USE ONLY

DATE Received  
MM DD YY  
01 24 11

DATE WELL COMPLETED

MM DD YY  
12 18 10

Depth of Well

22 400 26  
(TO NEAREST FOOT)PERMIT NO.  
FROM "PERMIT TO DRILL WELL"H0-95-2020  
28 29 30 31 32 33 34 35 36 37

OWNER

STREET OR RFD

SUBDIVISION

last name

Rich

TOWNSHIP

last name

John

TOWN

Clarksville

SECTION

LOT

## WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR  
COLOR, DEPTH, THICKNESS AND IF WATER BEARINGDESCRIPTION (Use  
additional sheets if needed)

FEET

FROM

TO

check  
if water  
bearingBrown  
slate

0 36

Gray  
slate

36 400

Dry hole

Cement

0 40

Cuttings

40 400

## GROUTING RECORD

WELL HAS BEEN GROUTED  
(Circle Appropriate Box)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT ☒ CMBENTONITE CLAY ☐ BC

NO. OF BAGS 15 NO. OF POUNDS 1410

GALLONS OF WATER 84

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. to 39 ft.  
48 TOP 52 ft. to 54 BOTTOM 58 ft.  
(enter 0 if from surface)

## CASING RECORD

casing  
types  
insert  
appropriate  
code  
below☒ ST☐ CO☒ PL☐ OTMAIN  
CASING  
TYPENominal diameter  
top (main) casing  
(nearest inch)Total depth  
of main casing  
(nearest foot)

PL

06

41

E  
A  
C  
H  
C  
A  
S  
I  
N  
G

OTHER CASING (if used)

diameter  
inchdepth (feet)  
from toscreen type  
or open hole(insert  
appropriate  
code  
below)

## SCREEN RECORD

☒ ST☐ BR☒ HO☐ PL☐ BR☐ OT☐ PL☐ BR☐ OT

C 2

DEPTH (nearest ft.)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

E A C H 23 24 25 26 27 28 29 30 31 32 33 34 35 36

S C 3 38 39 40 41 42 43 44 45 46 47 48 49 50 51

R E 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

E N

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 68MDE 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) 01

PUMPING RATE (gal. per min.) 3

METHOD USED TO  
MEASURE PUMPING RATE 1 gal

WATER LEVEL (distance from land surface)

BEFORE PUMPING 56 ft.

WHEN PUMPING 390 ft.

TYPE OF PUMP USED (for test)

☒ A at ☐ P piston ☐ T turbine☐ C centrifugal ☐ R rotary ☐ O other (describe below)☐ J jet ☐ S submersible

## PUMP INSTALLED

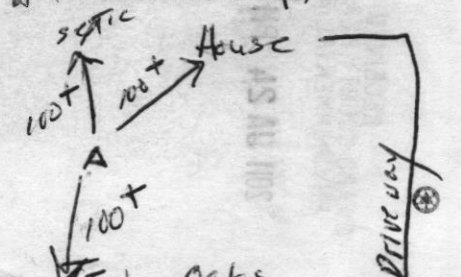
DRILLER INSTALLED PUMP (YES or NO) YES

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) 5

PUMP HORSE POWER 3/4

PUMP COLUMN LENGTH  
(nearest ft.) 380CASING HEIGHT (circle appropriate box  
and enter casing height)☒ + above } LAND SURFACE☐ - below } 01 (nearest foot)

## LOCATION OF WELL ON LOT

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

NUMBER OF UNSUCCESSFUL WELLS: 1

WELL HYDROFRACTURED

yes

Y

no

N

## CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED  
WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION  
WELLI 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 S D 009

DRILLERS SIGNATURE

(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. 1 D

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

B 1	5547	SEQUENCE NO. (MDE USE ONLY)	STATE OF MARYLAND APPLICATION FOR PERMIT TO DRILL WELL <u>534052</u> please type	STATE PERMIT NUMBER <u>40-95-2020</u> <small>fill in this form completely</small>
Date Received (APA) <u>10 1 10</u> <small>8 MM DD YY 13</small>		OWNER INFORMATION		
15 Last Name <u>Rich John</u>		34 First Name		
36 Street or RFD <u>4656 Linthicum Rd.</u>		55		
57 Town <u>Dayton, md.</u>		76 Zip <u>21036</u>		
DRILLER INFORMATION				
Driller's Name <u>Allen Compton</u>		MSD 009 76 License No. 81		
Firm Name <u>Fogles Well Drilling LLC</u>				
Address <u>P.O. Box 202, Woodbine md</u>				
Signature <u>Allen Compton</u> Date <u>9/29/10</u>				
B 2		WELL INFORMATION		
1 2		APPROX. PUMPING RATE (GAL. PER MIN.) <u>5</u>		
		8 12		
		AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) <u>500</u>		
		14 20		
USE FOR WATER (CIRCLE APPROPRIATE BOX)				
<input checked="" type="checkbox"/> DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION <input type="checkbox"/> FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION) <input type="checkbox"/> INDUSTRIAL, COMMERCIAL, DEWATERING <input type="checkbox"/> PUBLIC WATER SUPPLY WELL <input type="checkbox"/> TEST, OBSERVATION, MONITORING <input type="checkbox"/> GEO-THERMAL				
NOT TO BE FILLED IN BY DRILLER HEALTH DEPARTMENT APPROVAL				
COUNTY NAME <u>Howard</u> COUNTY NO. <u>(13)</u> STATE SIGNATURE _____ INSERT S → 41 DATE ISSUED <u>10/13/10</u> CO SIGNATURE <u>John Way</u> EXP. DATE <u>10/18/10</u> <small>43 MM DD YY 48</small> NORTH GRID <u>510</u> 0 0 0 EAST GRID <u>0806</u> 0 0 0 <small>50 55 57 63</small>				
APPROXIMATE DEPTH OF WELL <u>300</u> FEET <small>24 28</small>		APPROXIMATE DIAMETER OF WELL <u>6</u> INCH <small>NEAREST INCH</small>		
METHOD OF DRILLING (circle one)				
BORED (or Augered) JETTED Jetted & DRIVEN <input checked="" type="checkbox"/> AIR-ROTary <input type="checkbox"/> AIR-PERCussion <input type="checkbox"/> ROTARY (Hydraulic Rotary) <input type="checkbox"/> CABLE <input type="checkbox"/> REVerse-ROTary <input type="checkbox"/> DRive-POINT other _____				
REPLACEMENT OR DEEPEMED WELLS (CIRCLE APPROPRIATE BOX)				
<input 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 <input checked="" 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 DEEPEMED 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 _____ G _____				
PERMIT No. <u>40-95-2020</u> <small>70 71 72 73 74 75 76 77 78 79</small>				
SPECIAL CONDITIONS <u>Must keep 100' from septic's. Ex well to be sealed per contract</u>				

LOCATION OF WELL  
 8 COUNTY Howard 21  
 23 SUBDIVISION \_\_\_\_\_ 42  
 SECTION 44 46 LOT 1 48 50  
Clarksville  
 52 NEAREST TOWN \_\_\_\_\_ 71  
 MILES FROM TOWN (enter 0 if in town) 5 M I  
73 76 77 78

5002 Ten Oaks Rd.  
 11 NEAR WHAT ROAD \_\_\_\_\_ 30  
 ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)  
 NORTH ☐ WEST ☐ EAST ☐ SOUTH ☒  
 34 250 37  
 DISTANCE FROM ROAD ft  
 ENTER FT OR MI 38 39  
 TAX MAP: 28 BLK: 14 PARCEL 242

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X  
 SOURCES OF DRILLING WATER  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 WRITE THE BOX NUMBER FROM THE MAP HERE  
 E 510  
 N 84006  
 000 000  
 DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION

HOWARD COUNTY HEALTH DEPARTMENT  
BUREAU OF ENVIRONMENTAL HEALTH  
WATER AND SEWERAGE PROGRAM  
TEL: (410)313-2640 FAX: (410)313-2648

Information Form for the Installation of the Well Pump, Pitless Adapter, and Supply Piping

NOTE: The installer is responsible for requesting an inspection prior to 9 am on the day of the desired inspection. No work is to be covered until approved by the Health Department. All installations must comply with the National Standard Plumbing Code (NSPC, as amended locally) and COMAR 26.04.04 (MD Well Construction Regulations). Submission of a complete form is required prior to Use and Occupancy approval.

Company Name: \_\_\_\_\_ Telephone #: \_\_\_\_\_  
Address: \_\_\_\_\_

(Must circle one) Licensed Plumber      Licensed Well Driller      Licensed Well Pump Installer

License # and name of individual responsible for the field installation:

Name (Print): \_\_\_\_\_ License# \_\_\_\_\_

\*A licensed individual must perform the actual installation. Apprentices must be under the direct supervision of a licensed journeyman or master plumber, pump installer or well driller. Licenses may be subjected to field verification.

Name of Property Owner: \_\_\_\_\_ Telephone #: \_\_\_\_\_

Subdivision: \_\_\_\_\_ Lot #: \_\_\_\_\_ Well Tag #: HO - \_\_\_\_\_

Site Address: 5002 Ten Oaks Rd

Submersible Pump Data

Make: \_\_\_\_\_

Model #: \_\_\_\_\_

Pump Capacity \_\_\_\_\_ GPM

Well Yield: \_\_\_\_\_ GPM

Depth of well encountered at time of pump installation: \_\_\_\_\_ (feet)

If pump capacity exceeds well yield, a low water cut off switch is required by NSPC 1990 Section 17.8.4

Torque arrestors or Cable guards are required - Must circle one

Safety rope, if used, attached to inside of well casing with eye bolt \_\_\_\_\_

Pitless Adapter

Make: \_\_\_\_\_

Model #: \_\_\_\_\_

Depth: \_\_\_\_\_ (36" min)

NSF approved: \_\_\_\_\_

Well Cap and Electric Conduit

Two piece watertight cap: \_\_\_\_\_

Screened, vented well cap: \_\_\_\_\_

Cap secured to casing: \_\_\_\_\_

Conduit min 18" B.G.: \_\_\_\_\_

Conduit secured to well cap: \_\_\_\_\_

Piping to house

Type: \_\_\_\_\_

PSI: \_\_\_\_\_ (160 psi min)

Depth of supply line: \_\_\_\_\_ (36" min)

House Connection

PVC sleeved to undisturbed soil at wall penetration: \_\_\_\_\_

Approximate length of sleeve: \_\_\_\_\_

Sleeve caulked and sealed properly: \_\_\_\_\_

The water supply line is required to be at least ten feet from the septic tank, pump chamber, sewage piping, distribution box, drainfields, and sewage reserve area. If this cannot be accomplished, contact this office for approval prior to installation.

Signature of company representative responsible for installation \_\_\_\_\_ date \_\_\_\_\_

For Health Department Use Only - Not to be completed by Installer

Date Insp. Requested: \_\_\_\_\_ Date Insp. Approved: \_\_\_\_\_

Inspection Data: Pitless adapter and water supply line at least 36" below grade ☒

Two piece cap installed and attached to casing securely ☒

Elec. conduit extends at least 18" below grade attached to cap properly ☒

Safety rope installed inside of well casing ☒

Correct well tag attached properly and casing 3" above finished grade ☒

Water supply line sleeved adequately at house connection ☒

Adequate grout observed below pitless adapter ☒

12/7/2010 BB

No Tag



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION

1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

WATER WELL ABANDONMENT-SEALING REPORT FORM

SUBMIT COPIES OF COMPLETED FORM TO:

- \* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
- \* WELL OWNER
- \* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 6-6-11 (month/day/year)

\* PERMIT NUMBER OF ABANDONED WELL (if any) \_\_\_\_\_

\* PERMIT NUMBER OF REPLACEMENT WELL \_\_\_\_\_

\* PERSON ABANDONING WELL: Allen Compton

WELL DRILLERS LICENSE NUMBER: 009

CIRCLE: MWD / MSD / MGD

\* OWNER'S NAME: John Rich

SITE LOCATION MAP

\* WELL LOCATION:  
 COUNTY: Howard  
 NEAREST TOWN: Clarksville  
 TAX MAP 0028 BLOCK 0014 PARCEL 0242  
 SUBDIVISION: \_\_\_\_\_  
 SECTION: \_\_\_\_\_ LOT: 1  
 NEAREST ROAD: 5002 Ten Oaks Rd.



\* TYPE OF WELL BEING ABANDONED:

☒ DRILLED ☐ JETTED  
☐ BORED/AUGERED ☐ HAND DUG  
☐ OTHER (specify) \_\_\_\_\_

\* USE CODE:

☒ DOMESTIC ☐ MUNICIPAL/PUBLIC  
☐ IRRIGATION ☐ INDUSTRIAL  
☐ TEST/OBSERVATION ☐ GEOTHERMAL

\* TYPE OF CASING:

☐ STEEL ☐ PLASTIC  
☐ CONCRETE ☐ OTHER (specify) NO casing

\* SIZE OF CASING: \_\_\_\_\_ INCHES IN DIAMETER

\* DEPTH OF WELL: 400' FEET DEEP

\* WAS ANY CASING REMOVED? ☐ YES ☒ NO  
 if yes, length removed, in feet: \_\_\_\_\_

\* WAS CASING RIPPED OR PERFORATED? ☐ YES ☒ NO

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN

LICENSE # 009

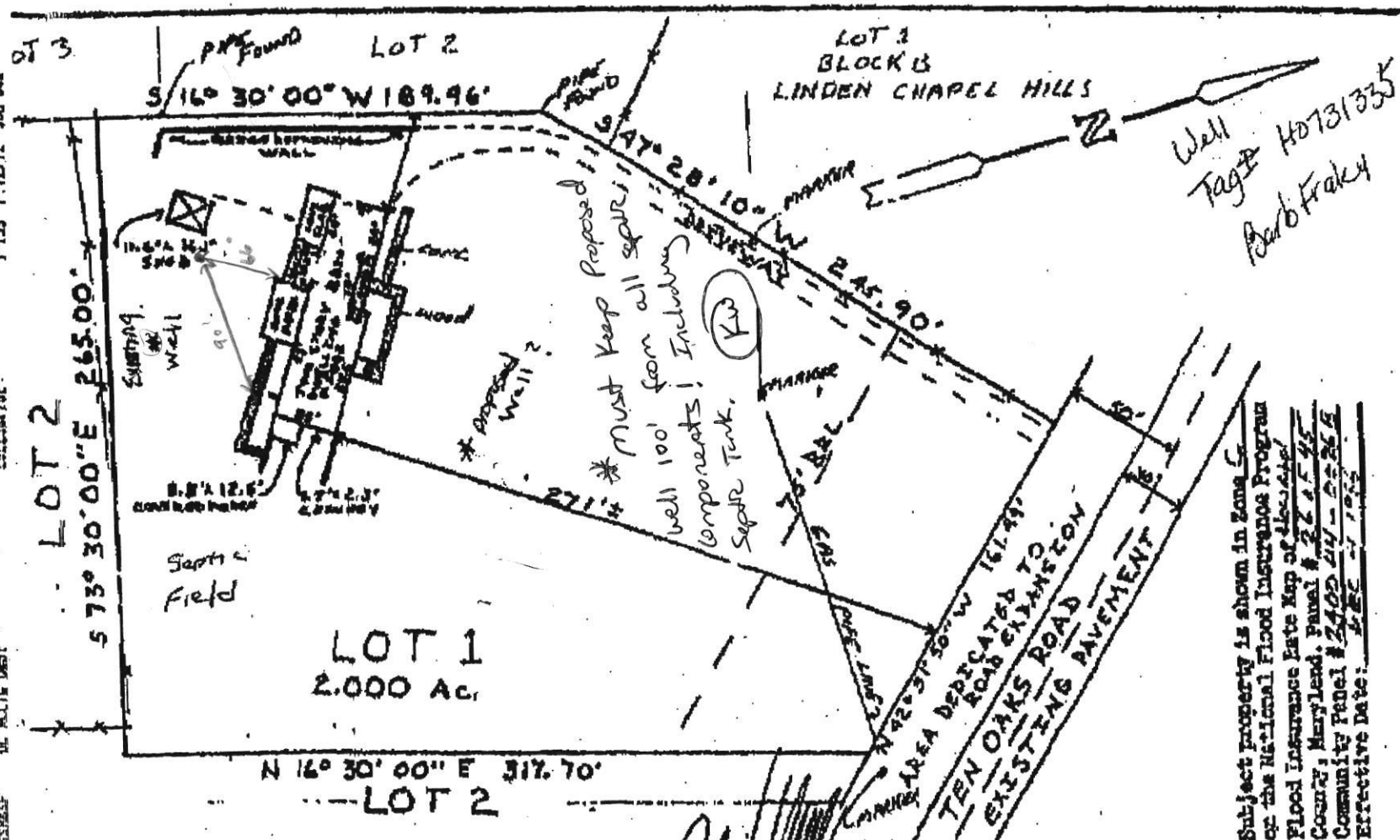
MWD / MSD / MGD  
 CIRCLE ONE

DATE 7-7-11



LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
cement	0	40
Rock cuttings	40	400
VOLUME OF MATERIAL USED		
14 bags		



Subject property is shown in zone C  
on the National Flood Insurance Program  
Flood Insurance Rate Map of the  
County, Maryland, Panel # 22-15-45  
Community Panel # 2400-24-1-26-5  
Effective Date: 1-1-1973

is to certify that I have surveyed the property  
own as LOT 1 AS SHOWN ON A PLAT ENTITLED  
MELNISON PROPERTY PLAT,

est 1 of 1 recorded in West of: 1900 among the  
nd Records of HOWARD County, Maryland for the  
pose of locating the improvements thereon.

(1)S PLAT SHOWS ONLY THAT THE IMPROVEMENTS WERE  
MAINTAINED WITHIN THE OUTLINES OF THE LOT AND IS  
IT TO BE USED TO ESTABLISH PROPERTY LINES.



Cart IndgLn# PLS#06

## LOCATION SURVEY

3002 TEN OAKS ROAD  
5<sup>TH</sup> ELECTION DISTRICT  
HOWARD COUNTY, MD.

WTA ASSOCIATES, INC.  
16205 Old Frederick Road  
Mt. Airy, Maryland 21771

Phone 442-2031

Scale 1" = 60'

Date 7-12-94

Filed By JCL

Drawn By **246**

## BEWILDER

Attn Jeff Williams  
FOUNTAIN VALLEY

## REPORT OF ANALYSIS

Laboratory ID #:	78603	Account #:	3123
Reference:	Mr. Rich	Company:	National Water Servicing
Location:	5002 Ten Oak Road Dayton, MD 21036	Requested By:	Dave Rycke
Date/ Time Collected:	2/28/2011 1155	Source:	Well Water
Date/Time Rec'd:	2/28/2011 1400	Site:	Kitchen Sink Tap
Chlorine ppm:	Free: ND Total: ND	Treatment:	None
Collected By:	C. Holland 0547CH	pH:	5.1
		Well #:	No Tag

Bacteria, Coliform, Total, MPN	<1.0	MPN/ 100 ml	<1.0	SM18 9223	3/1/2011 / 0830 / BCD
Bacteria, E. coli, MPN	<1.0	MPN/ 100 ml	<1.0	SM18 9223	3/1/2011 / 0830 / BCD
Nitrate	8.92	mg/L	10	601	2/28/2011 / 1700 / CCH
Turbidity	1.15	NTU	<10	SM18 2130B	2/28/2011 / 1440 / KME
Sand	NS	mg/L	5	Visual/Gravimetric	2/28/2011 / 1440 / KME

Dave Sol. 252 9391

calcium feeder

TRK →  
Hardness

### NOTES

- 1 mg/L = milligrams per liter (also, parts per million)
- 2 MPN/ 100 ml = Most Probable Number [of viable bacteria] per 100 ml of sample.
- 3 NS = None Seen (NS indicates less than 5 mg/L)
- 4 NTU = Nephelometric Turbidity Units
- 5 Results less than or within the reference range are considered satisfactory and within potable water limits at the time of sampling.
- 6 ND:None Detected
- 7 Visual well check: Sealed, vented cap
- 8 pH and Chlorine level tested on site

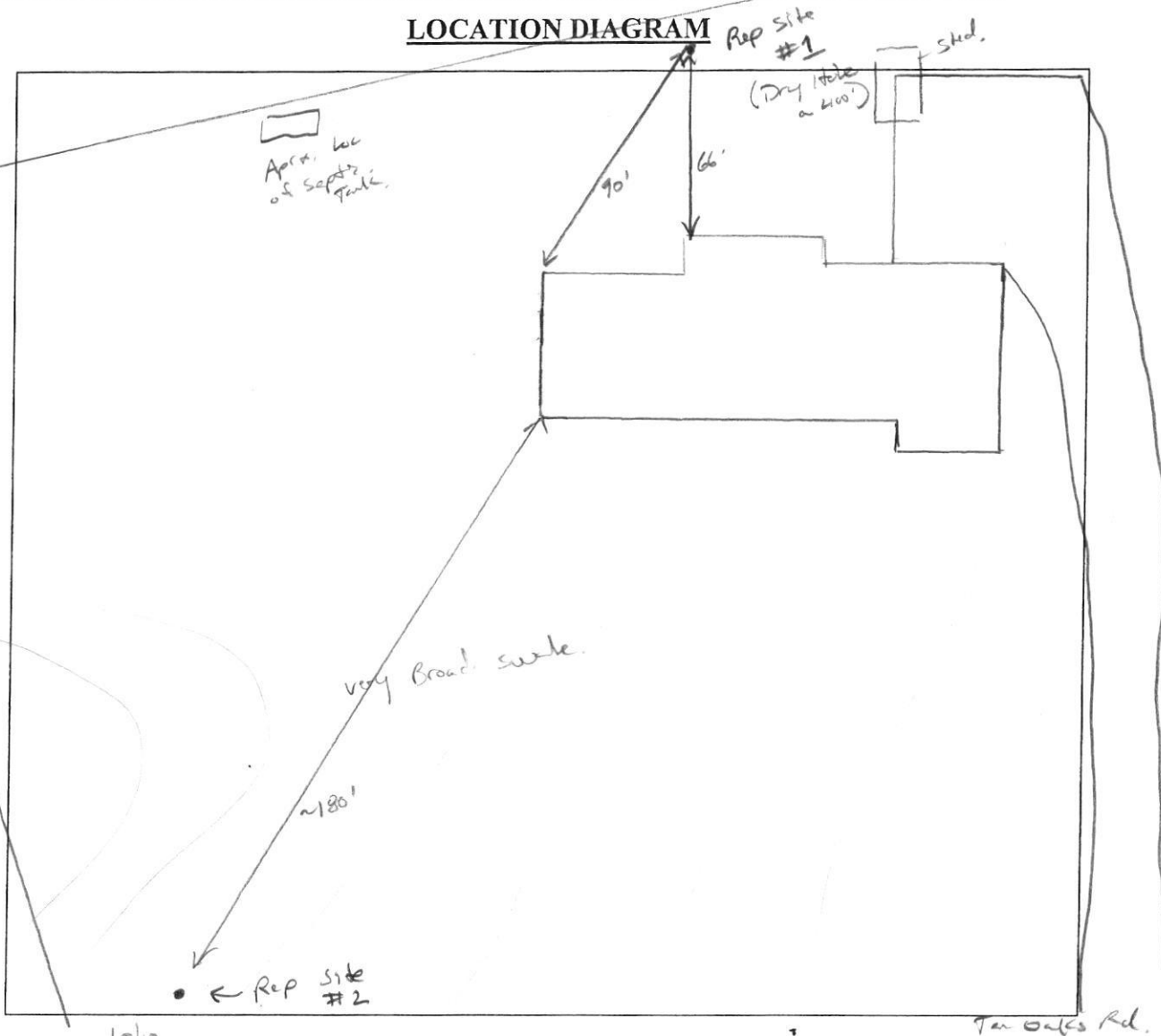
Reason for Test : Client's Information

Date Reported: 3/1/2011

# SITE INSPECTION SHEET

OWNER: \_\_\_\_\_ PHONE #: \_\_\_\_\_  
ADDRESS: 5002 Ten Oaks Rd CONTRACTOR: Fogles (Allen Compton)  
SUBDIVISION: \_\_\_\_\_ LOT: \_\_\_\_\_ WELL TAG #: \_\_\_\_\_  
PROPOSAL: out of H<sub>2</sub>O COUNTY #: (13)

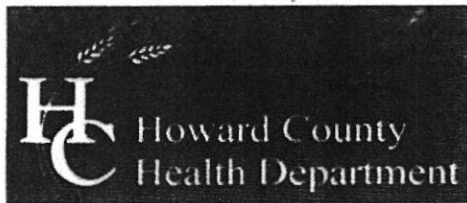
## LOCATION DIAGRAM



COMMENTS: 11/3/10 Picked location ~ 20' from ex. Dry well. (No Tag). Septic Tank loc approx from homeowner records. Dry well loc. (P10) 11/18/10 Rep. Site #2 checked. out of swale, away from possible septic reserve area. (P10)

DATE: 11/3/10 INSPECTOR: K. Wolf





Bureau of Environmental Health  
7178 Columbia Gateway Drive, Columbia, MD 21046-2147  
(410) 313-2640 Fax (410) 313-2648  
TDD (410) 313-2323 Toll Free 1-866-313-6300  
website: www.hchealth.org

Peter L. Beilenson, M.D., M.P.H., Health Officer

### TO ALL INTERESTED PARTIES

When submitting a well permit application for a proposed well for new construction, please indicate one of the following:

Well Site Location:

John Rich 1 5002 Ten Oaks rd  
Subdivision/Property Name Lot# Road Name

- ☐ The well site has been staked by \_\_\_\_\_,  
(professional land surveyor or company employing professional land surveyors)  
on \_\_\_\_\_ (date) and does not require a site inspection.
- ☒ The well driller, builder or property owner will call the Health  
Department to schedule a time to meet in the field to verify the  
proposed well site location.

This sheet, along with two copies of an acceptable well site plan, must be attached to the green well permit application.

Revised 3/11/05

5602 Ten Oaks Rd.

## FILE INQUIRY NOTES

DATE	RESULTS OF REVIEW FOR FILE
5/11/11	Spoke w/ Allen (Well Driller). He explained that the homeowner was being very difficult about sealing the Dryhole. The Driller had personal problems and had to pull off site prior to sealing the dry hole. The hole exists w/ casing (amount unknown) and a well cap. Apparently, when the driller had to pull off site, the owner got frustrated and was not willing to pay for some of the money she had owed Fogles.
5/12/11	Made call to homeowner (Donna). Left message. no answer. I spoke to homeowner, Donna Rich. She confirmed that she had filled the dry hole with cuttings to the surface after the driller had not returned to clean up and seal the hole. I told her the hole has to be sealed. <del>She</del> She agreed to allow Fogles back on her property to seal it. gw
5/13/11	I spoke with Theresa w/ Fogles and explained that <del>we</del> we have a false completion report from them stating that the <sup>dry</sup> well was sealed. She stated that they are willing to go back and seal it. gw
5/16/11	I spoke with Allen + Theresa w/ Fogles and gave them until 5/23 to seal the dry hole as stated on the completion report to avoid enforcement action. gw
5/18/11	I spoke with the homeowner, Donna, and explained that as the homeowner, she is responsible for having the dry hole sealed properly. I told her that I gave Fogles until Monday to seal it. She agreed to allow them to seal it by Monday. gw over →

5/29/11 Made call to Theresa w/ Roy ks. Confirmation of dry  
hole made via phone call. Will confirm w/ site visit possibly  
along w/ abandonment report (Kw)