



# Summit Testing & Inspection Company

P.O. Box 2231, Akron, Ohio 44309

Deliveries: 910 White Pond Dr., Akron, Ohio 44320

(330) 869-6606

Fax (330) 869-6437

July 10, 2024

RE: Crystal Lake Avenue Property – Mine Evaluation, Crystal Lake Ave NW, Canal Fulton, Ohio  
(**ST&I PROJECT No. G24-12777**)

JRK Holdings Ltd  
3692 Portage Point Blvd  
Akron, Ohio 44319

Attention: Joseph Kuntz

This report presents the writer's opinions and subsequent recommendations made for the planned development of the above referenced site. Our services were requested to determine if abandoned underground coal mines are present within the property as indicated by "Ohio Department of Natural Resources" web site.

**Project Description:** Plans call for the development of the 35-acre property into custom 5- to 10-acre lots to be sold for residential dwelling on the east side of Crystal Lake Avenue NW in Jackson Twp, Stark County, Ohio. We anticipate the residential structures will be one- or two-stories and have full basements. Construction will likely consist of isolated steel columns and load bearing masonry with brick / stone veneer.

According to the attached copy of mine map from the Ohio Department of Natural Resources web site, most of the property is underlain by mine SK-298 which is known as the "Rhodes and Companys Mine", operated by "Rhodes and Company", and was abandoned 1875. The mine map overlay by ODNR indicates the southeast corner of the subject property is not underlain by the abandoned mine.

**Ohio Department Of Natural Resources Mine Maps:** Review of the original mine map does not provide many significant landmarks, save an indication of steep slope and RR line, likely a spur for the mining activities, with the mine mostly located in property owned by Henry Spangle with properties to the west owned by Henry Foltz and George Young. Review of the L. H. Everts and Co. Atlas of Stark County 1875 Jackson Township map shows property owned by Henry Spangle (likely Spangle) comprises most of section 19 within Jackson Twp. According to this historical map the Spangle property's north and west borders are the north and west section lines for section 19. This indicates the Spangle property was located both north and south of the road now known as Lafayette Drive NW, AKA Ohio SR-236. Reviewing these maps, it is possible the actual mine map could be positioned with the northwest corner of the Henry Spangle property at the northwest corner of the Spangle property on the 1875 map. Which would position the underground mine outside of the footprint of subject property.

Prior to discussion, it MUST be noted that only 30% of mines are mapped per ODNR, the mapped mine locations are not 100% accurate, the "striped" orange areas are "best known" mine location, and solid shaded orange areas are "we know the mine is in general area but not sure of actual mine limits". Mines were often "robbed" of intact coal pillars left to support roof rock and prevent mine collapse / subsidence during the Great Depression (1929-1933) and/or expanded past ceased mining limits by vagrants.

**Field Testing / Site Observations:** On June 21<sup>st</sup>, the writer visited the site to assess general geological conditions, and signs of past or current surface subsidence. Between June 21<sup>st</sup> and 25<sup>th</sup> three air rotary test holes, as position of the attached “Boring Location Plan”, were advanced with an all-terrain air rotary drill rig to depths of 147 to 200 feet below the ground surface. Test hole AR-2 (ODNR Well Log Number 3015840) was advanced first in the southeast corner of the subject property and identified 21 feet of clay and gravel soils underlain by 179 feet of interbedded shale and sandstone bedrock to the termination depth of 200 feet below the ground surface. Next, test hole AR-1 (ODNR Well Log Number 3015838) located near the northeast corner of the property encountered 42 feet of clay and gravel soils underlain by 158 feet of interbedded shale and sandstone to the termination depth of 200 feet below the existing ground elevation. A 1-foot thick seam of coal was penetrated at depths between 66 and 67 feet. Finally, test hole AR-3 (ODNR Well Log Number 3015841), located in the northwest section of the subject property found 30 feet of clay and gravel at the surface underlain by 111 feet of interbedded shale and sandstone extending to 141 feet below the existing ground surface where a 5-foot thick mine void was penetrated. The mine was flooded as determined by the expelled groundwater that contained coal fragments. The test hole terminated in 1 foot of “sound” bedrock (i.e., below mine floor) at the depth of 147 feet due to loss of air.

Jackson Well Services completed two exploratory wells in the southwest, AR-4 (ODNR Well Log Number 3012908), and central AR-5 (ODNR Well Log Number 3012907) portions of the property for JRK holdings in January of 2024. Both test holes penetrated similar soil profiles of clay, sand and gravel soil at the surface to 12 to 23 feet deep underlain by interbedded shale and sandstone extending to termination depths of 200 to 240 feet. The central well also penetrated a 1-foot thick seam of coal between 131 to 132 feet deep. Neither of these exploratory wells penetrated a mine void.

The following table summarizes the preceding general subsurface profile:

<b>TEST No.</b>	<b>GROUND ELEV.</b>	<b>DEPTH TO ROCK (ft.)</b>	<b>DEPTH TO MINE (ft.)</b>	<b>DEPTH TO SOUND ROCK (ft.)</b>	<b>OVERBURDEN:VOID THICKNESS RATIO</b>
AR-1	1078	42 (158 thick)	N.A.	52	--
AR-2	1053	21 (179 thick)	N.A.	24	--
AR-3	1060	30 (111 thick)	141 - 146 (≤5.0' void)	45	28.2:1
AR-4	1091	23 (217 thick)	N.A.	25	--
AR-5	1061	12 (188 thick)	N.A.	29	--

Visual observations of the property did not reveal any signs of past or current mine subsidence.

According to the preceding subsurface profiling the following data and mine subsidence guidelines have been compiled:

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- 1 ) The depth to top of rock (i.e., soil thickness) was identified between 12 and 42 feet below the ground surface. The average soil thickness above the bedrock is 25.6 feet;
- 2 ) The bedrock thickness between the overburden soil and mine void at AR-3 is 111 feet.
- 3 ) The mine void at AR-3 was found at depths between 141 to 146 feet below the ground surface
- 4 ) The mine was found to be flooded;
- 7 ) Sandstone bedrock bridges subsidence better than shale bedrock;
- 8 ) Shale roof rock less than 10.0 feet in thickness will fail quickly;
- 9 ) 71.0% of surface subsidence occurs when overburden thickness (i.e., soil + bedrock over mine void) is less than 60.0 feet.
- 10 ) 90.0% of surface subsidence occurs when overburden thickness between 0.0 and 80.0 feet.
- 11 ) Surface subsidence is greatest where roof rock is less than mine thickness;
- 12 ) Surface subsidence will occur where overburden thickness to void thickness is less than 5:1;
- 13 ) Surface subsidence is greatly reduced where overburden thickness to void thickness is between 5:1 to 10:1; and
- 14 ) Most subsidence will not reach surface where overburden thickness to void thickness is greater than 10:1.

**Engineering Analysis:** According to the data presented in this report, it is our opinion that most of the subject 35-acre property is NOT underlain by the abandoned mine. The lack of mine voids encountered in four of these five exploratory wells and water wells for properties south of the subject site supports the notion that the SK-298 mine may be inaccurately located on the ODNR Mine Map Application. The mine void at AR-3 could have been extension of the eastern limits of the Rhodes and Companys mine, if positioned at the suspected relocation or an extension of the SK-049 mine mostly north of Lafayette Avenue. Generally speaking coal layers less than 12.0 to 18.0 inches were not easily “mineable” as the miner would have to lay on his stomach with not much room to swing his hand pick.

Given the 141 to 146 feet depth of mine, 5.0+/- feet thick mine thickness and overburden thickness to void thickness ratio of 28.2:1, it is our opinion that there is a lower risk that mine subsidence will reach the ground surface. The preceding opinion is further confirmed by the following:

- 1 ) No signs of past or current ongoing mine subsidence;
- 2 ) Flooded mines are less likely to incur subsidence; and

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3 ) According to Ohio Department of Natural Resources there are no emergency repairs for mine subsidence (Abandoned Mine Land Reclamation Program) in the area. The Mineral Resources Management received a complaint in May of 2018 which is listed as possible subsidence. This location is about 800 feet north of the northeast property corner of the subject site which is within or close to the SK-049 mine.

Stark County required homeowners to have mine subsidence insurance. Although there is lower risk for the mine subsidence to reach the ground surface given the thickness of bedrock above the mine and depth to the mine void, we cannot rule out that subsidence may eventually reach the surface. Additionally, in the event of mine collapse subsidence may extend horizontally away from the collapsed edge on a 15-degree angle to the surface. This means that ground surfaces up to 37 feet away from the collapse edge could be impacted if subsidence reaches the surface.

With regards to final foundation plans especially for the house in the northwest section of the property where the mine void was encountered, it is recommended to construct 3.0+/- feet thick trench footings (with 2 - #5 top / bottom rebar) as opposed to typical strip footings as the former would be rigid enough to limit any potential cosmetic/structural damage to building and allow ample time to stabilize random isolated areas of subsidence.

**General Considerations and Limitations:** This exploration and report are based on the proposed project as described herein. Should the project description, location, structural characteristics or proposed use change, we must be contacted to review the changes and modify our report as we deem necessary. In addition, in order for us to prepare this report, it was necessary to assume that subsurface conditions between, below and away from individual sampling locations and depths are similar to those described herein. If differing subsoil characteristics subsequently become evident, we must be asked to review the new information and then be allowed to modify our report as necessary. Conclusions about this site drawn by others from the data presented herein are strictly their responsibility.

**Standard of Care:** Summit Testing & Inspection has endeavored to provide its services in a manner that is consistent with appropriate professional practice and the level of care and skill ordinarily exercised by members of the profession currently practicing in this locality, at the same time, and under similar conditions as this project. No other representation, expressed or implied, is included or intended in this document.

Please do not hesitate to contact our office should there be any questions concerning this report or additional services required.

Respectfully submitted,

SUMMIT TESTING & INSPECTION COMPANY

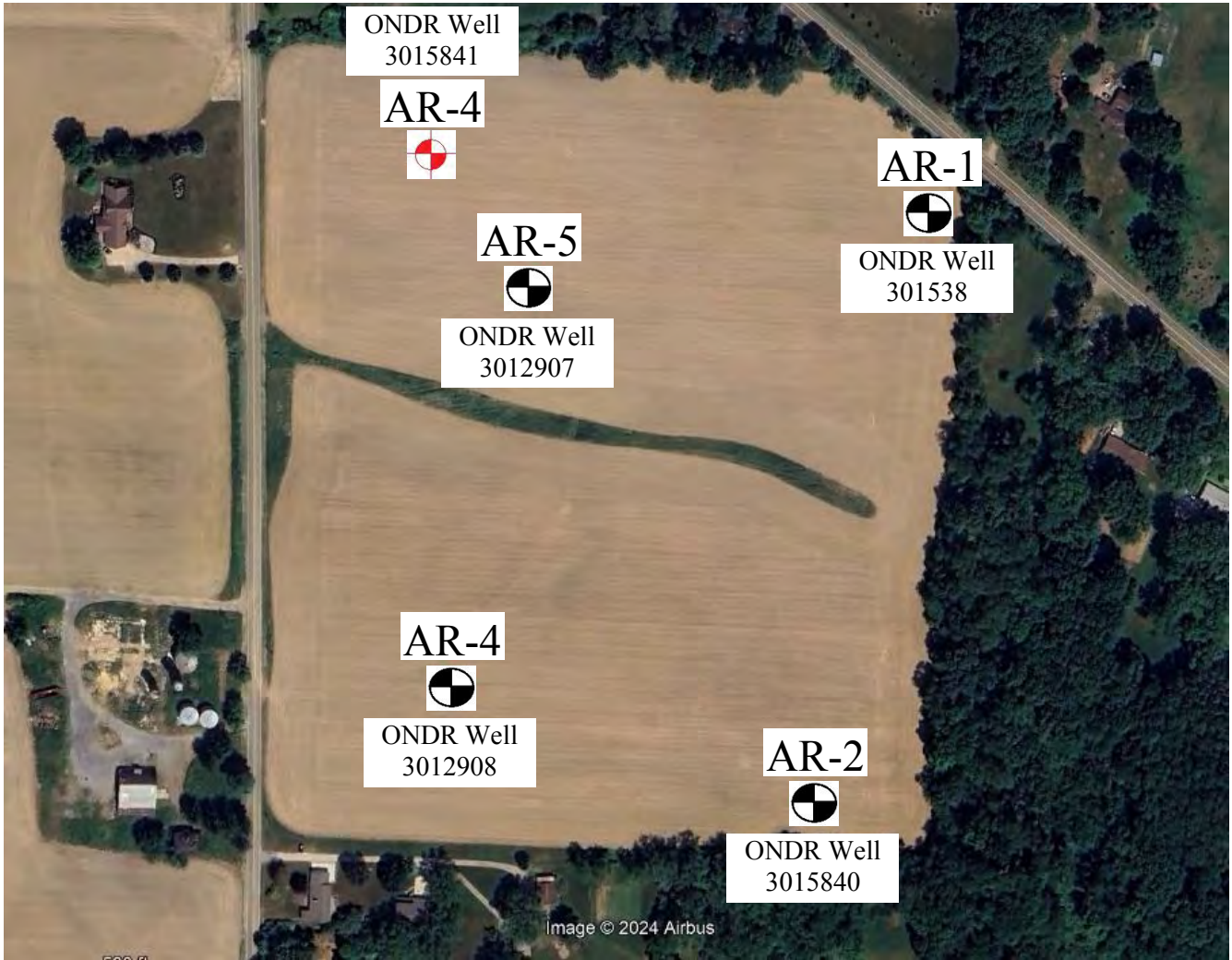


Kevin Freese, P.E., MSCE

CC: File

## **APPENDIX**

**BORING LOCATION PLAN**



-  Mine Void Encountered
-  Mine Void Not Encountered

<b>BORING LOCATION PLAN</b>	
Crystal Lake Avenue Abandoned Mine Evaluation Crystal Lake Avenue NW Canal Fulton, Ohio	
Project No. G24-12777	Scale: NTS
Drawn By: K.F.	Date: 07-10-2024
<b>SUMMIT TESTING &amp; INSPECTION COMPANY</b> 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	
	

**ODNR MINE MAP SK-298**







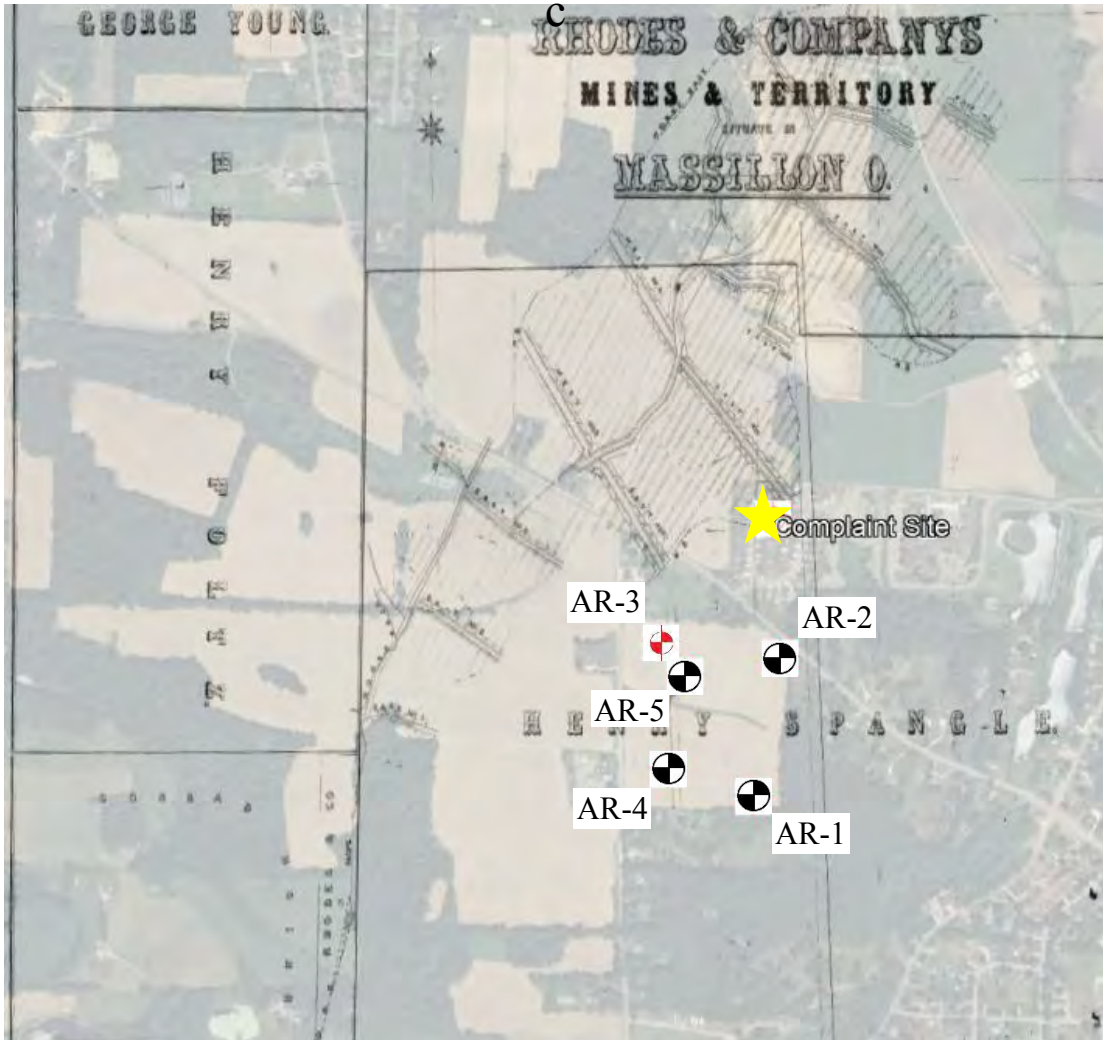
<b>ODNR SK-298 Mine Map</b>	
Crystal Lake Avenue Abandoned Mine Evaluation Crystal Lake Avenue NW Canal Fulton, Ohio	
Project No. G24-12777	Scale: NTS
Drawn By: K.F.	Date: 07-10-2024
<b>SUMMIT TESTING &amp; INSPECTION COMPANY</b> 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	
	



**1875 ATLAS MAP  
JACKSON TWP SECTION 19**



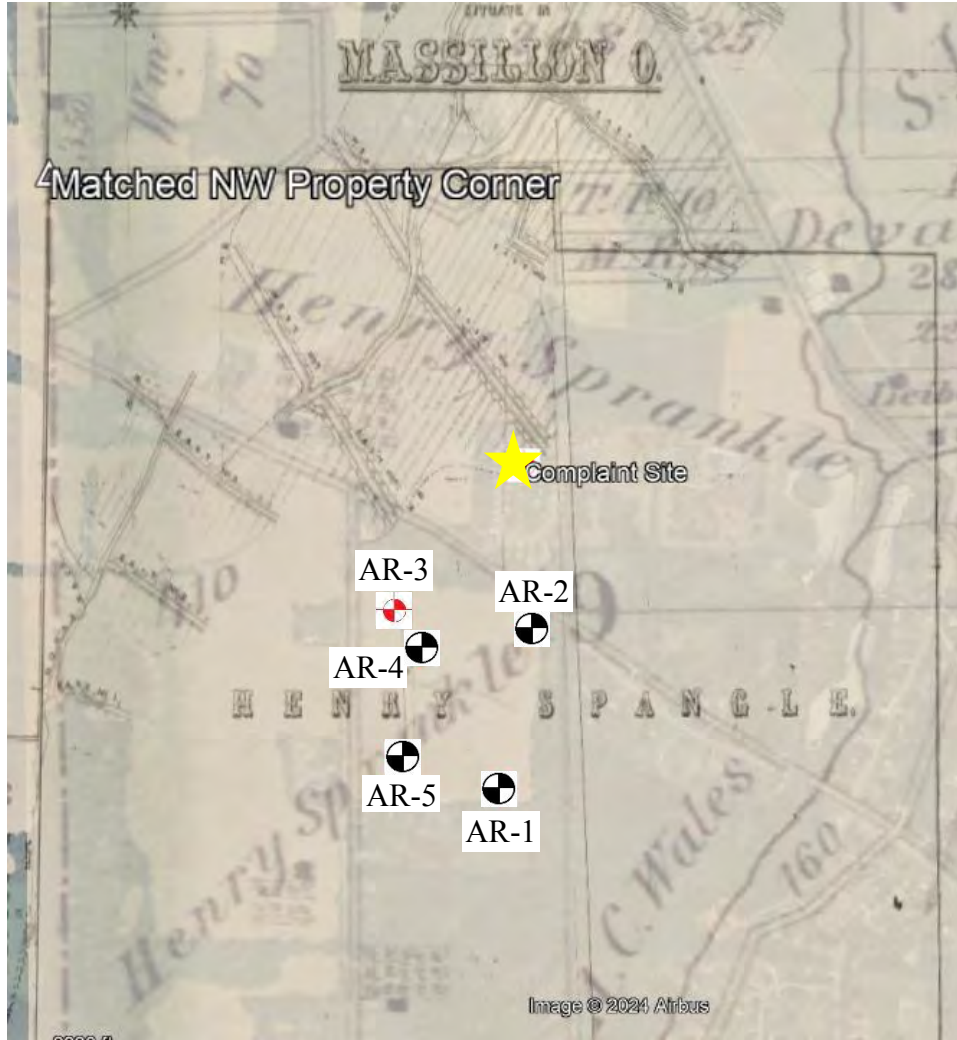
<b>1875 Jackson Township Atlas Map</b>	
Crystal Lake Avenue Abandoned Mine Evaluation Crystal Lake Avenue NW Canal Fulton, Ohio	
Project No. G24-12777	Scale: NTS
Drawn By: K.F.	Date: 07-10-2024
<b>SUMMIT TESTING &amp; INSPECTION COMPANY</b> 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	
	



**RELOCATED MINE MAP  
AT NORTH BOUNDARY OF HENRY SPANGLE PROPERTY**



<b>Rhodes Mine Map Reposition to Match NW Corner</b>	
Crystal Lake Avenue Abandoned Mine Evaluation Crystal Lake Avenue NW Canal Fulton, Ohio	
Project No. G24-12777	Scale: NTS
Drawn By: K.F.	Date: 07-10-2024
<b>SUMMIT TESTING &amp; INSPECTION COMPANY</b> 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	
	

**RELOCATED MINE MAP  
AT NORTH BOUNDARY OF HENRY SPANGLE PROPERTY  
WITH 1875 JACKSON TOWNSHIP ATLAS MAP UNDERLAY**



<b>Rhodes Mine Map Reposition to Match NW Corner with 1875 Atlas Map Underlay</b>	
Crystal Lake Avenue Abandoned Mine Evaluation Crystal Lake Avenue NW Canal Fulton, Ohio	
Project No. G24-12777	Scale: NTS
Drawn By: K.F.	Date: 07-10-2024
<b>SUMMIT TESTING &amp; INSPECTION COMPANY</b> 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	
	

**AR-1**  
**WATER WELL LOG**



# WELL LOG AND DRILLING REPORT

DNR 7802.05e

Ohio Department of Natural Resources  
Division of Geological Survey, 2045 Morse Road, Columbus, Ohio 43229-6605  
Phone (614) 265-6576

Well Log Number

Page \_\_\_ of \_\_\_ for this record.

WELL LOCATION	CONSTRUCTION DETAILS																																																																										
County _____ Township _____  Owner/Builder _____  Address of Well Location _____  City _____ Zip Code +4 _____ Permit No. _____ Section: _____ and/or Lot No. _____ Use of Well _____	Drilling Method: _____ <b>BOREHOLE/CASING</b> (Measured from ground surface) 1 { Borehole Diameter _____ inches    Depth _____ ft. { Casing Diameter _____ in. Length _____ ft. Thickness _____ in. 2 { Borehole Diameter _____ inches    Depth _____ ft. { Casing Diameter _____ in. Length _____ ft. Thickness _____ in. Casing Height Above Ground _____ ft. Type { 1: _____ 2: _____ Joints { 1: _____ 2: _____																																																																										
<b>Coordinates of Well</b> (Use only one of the below coordinate systems)  Latitude, Longitude Coordinates Latitude: _____ Longitude: _____ Elevation of Well in feet: _____ +/- _____ ft. Datum Plane:    NAD27    NAD83    Elevation Source _____ Source of Coordinates: _____ Well location written description: _____	<b>SCREEN</b> Diameter _____ in. Slot Size _____ in. Screen Length _____ ft. Type _____ Material _____ Set Between _____ ft. and _____ ft. <b>GRAVEL PACK</b> (Filter Pack) Material/Size _____ Vol/Wt. Used _____ Method of Installation _____ Depth: Placed From: _____ ft. To: _____ ft. <b>GROUT</b> Material _____ Vol/Wt. Used _____ Method of Installation _____ Depth: Placed From: _____ ft. To: _____ ft.																																																																										
Comments on water quality/quantity and well construction:   	<b>DRILLING LOG*</b>																																																																										
	FORMATIONS INCLUDE DEPTH(S) AT WHICH WATER IS ENCOUNTERED. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 40%;">Color</th> <th style="width: 20%;">Texture</th> <th style="width: 20%;">Formation</th> <th style="width: 10%;">From</th> <th style="width: 10%;">To</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Color	Texture	Formation	From	To																																																																					
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Type of pump _____ Capacity _____ gpm Pump set at _____ ft.    Pitless Type _____ Pump installed by _____ I hereby certify the information given is accurate and correct to the best of my knowledge. Drilling Firm _____ Address _____ City, State, Zip _____ Signed _____ Date _____																																																																											
ODH Registration Number _____    Last Revised on _____	Aquifer Type (Formation producing the most water.) _____ Date of Well Completion _____    Total Depth of Well _____ ft.																																																																										

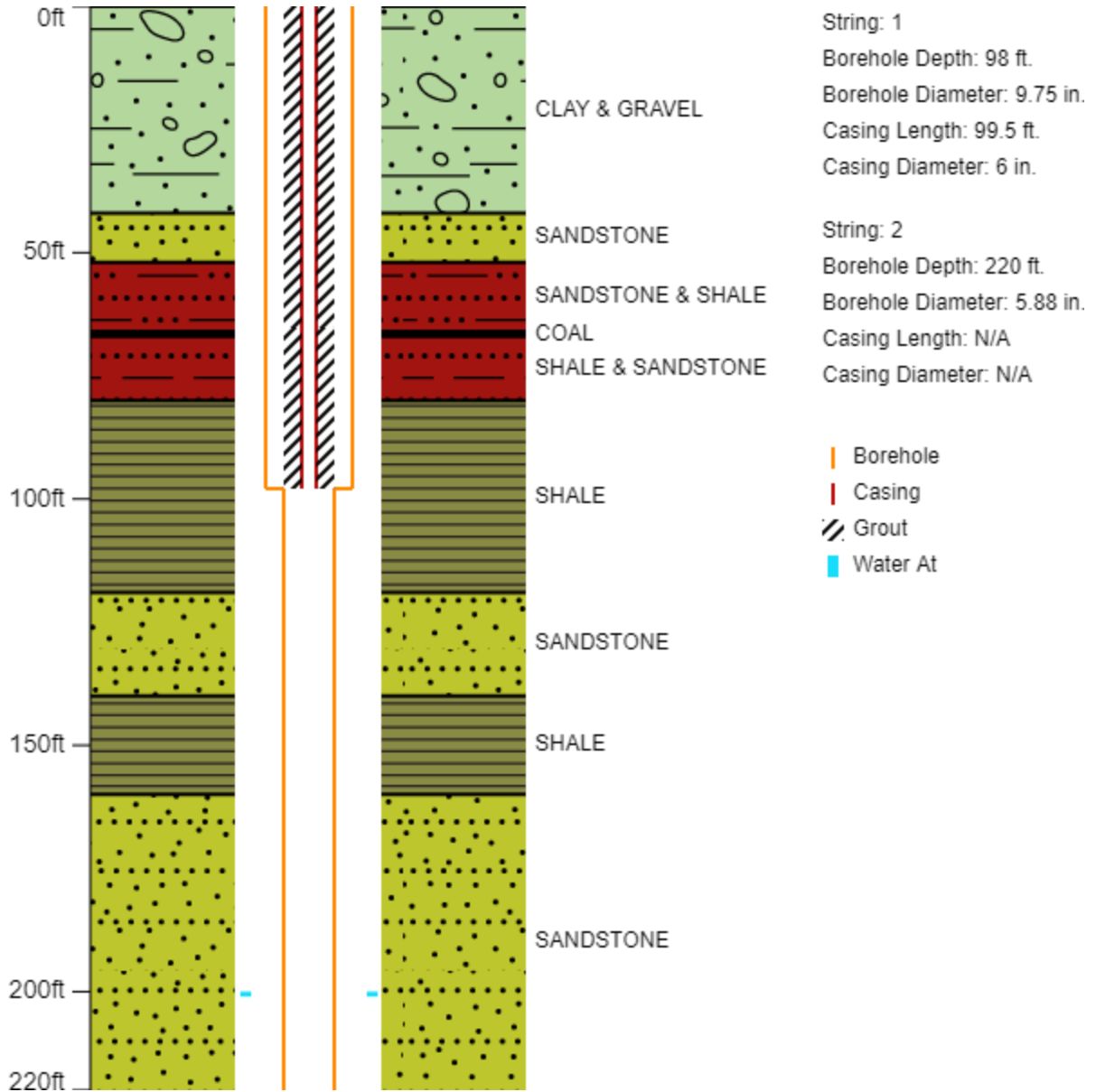
Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.  
Distribute copies of this record to Customer, and Local Health Department.

# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources  
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605  
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number

Page \_\_\_ of \_\_\_ for this record.



**AR-2**  
**WATER WELL LOG**

# WELL LOG AND DRILLING REPORT

DNR 7802.05e

Ohio Department of Natural Resources  
Division of Geological Survey, 2045 Morse Road, Columbus, Ohio 43229-6605  
Phone (614) 265-6576

Well Log Number \_\_\_\_\_

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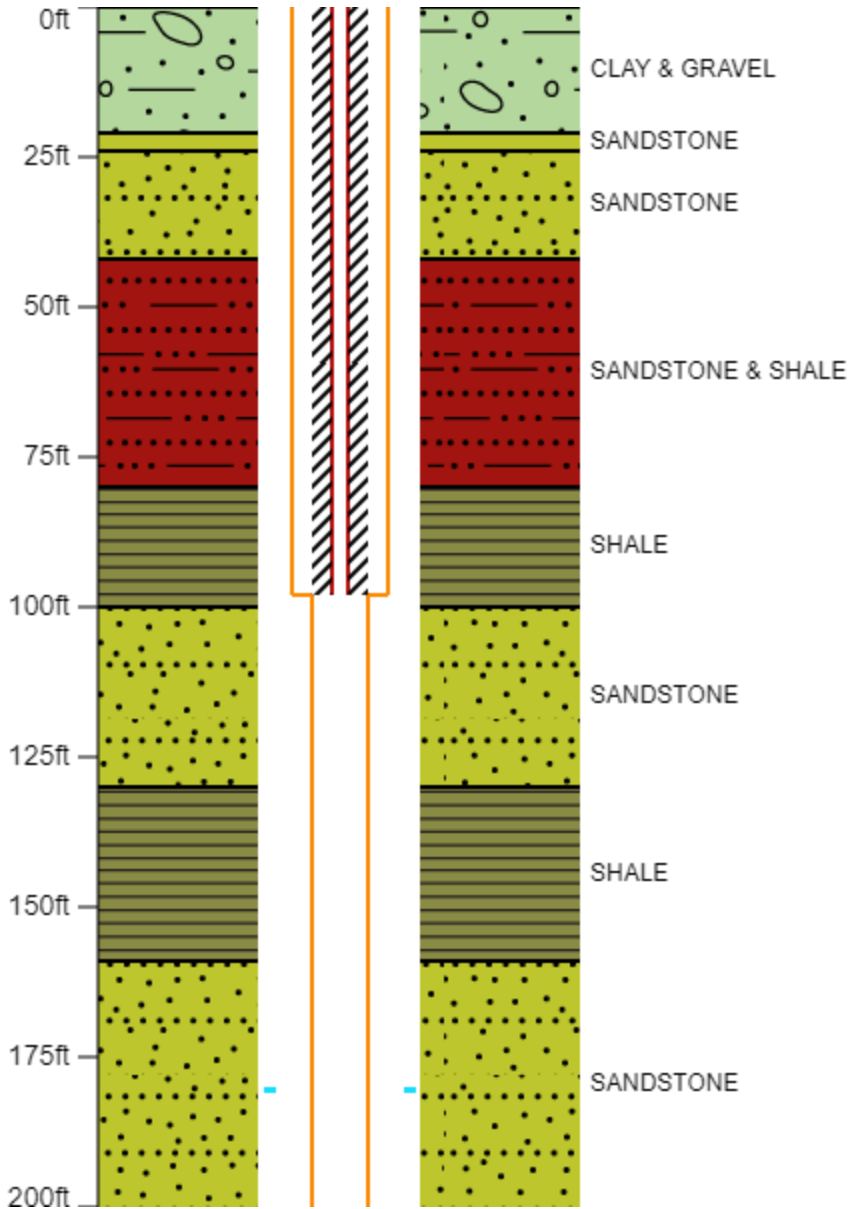
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Distribute copies of this record to Customer, and Local Health Department.

# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources  
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605  
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number

Page \_\_\_ of \_\_\_ for this record.



String: 1  
Borehole Depth: 98 ft.  
Borehole Diameter: 9.75 in.  
Casing Length: 99.5 ft.  
Casing Diameter: 6 in.

String: 2  
Borehole Depth: 200 ft.  
Borehole Diameter: 5.88 in.  
Casing Length: N/A  
Casing Diameter: N/A

- | Borehole
- | Casing
- / Grout
- | Water At

**AR-3**  
**WATER WELL LOG**

# WELL LOG AND DRILLING REPORT

DNR 7802.05e

Ohio Department of Natural Resources  
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Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.  
 Distribute copies of this record to Customer, and Local Health Department.

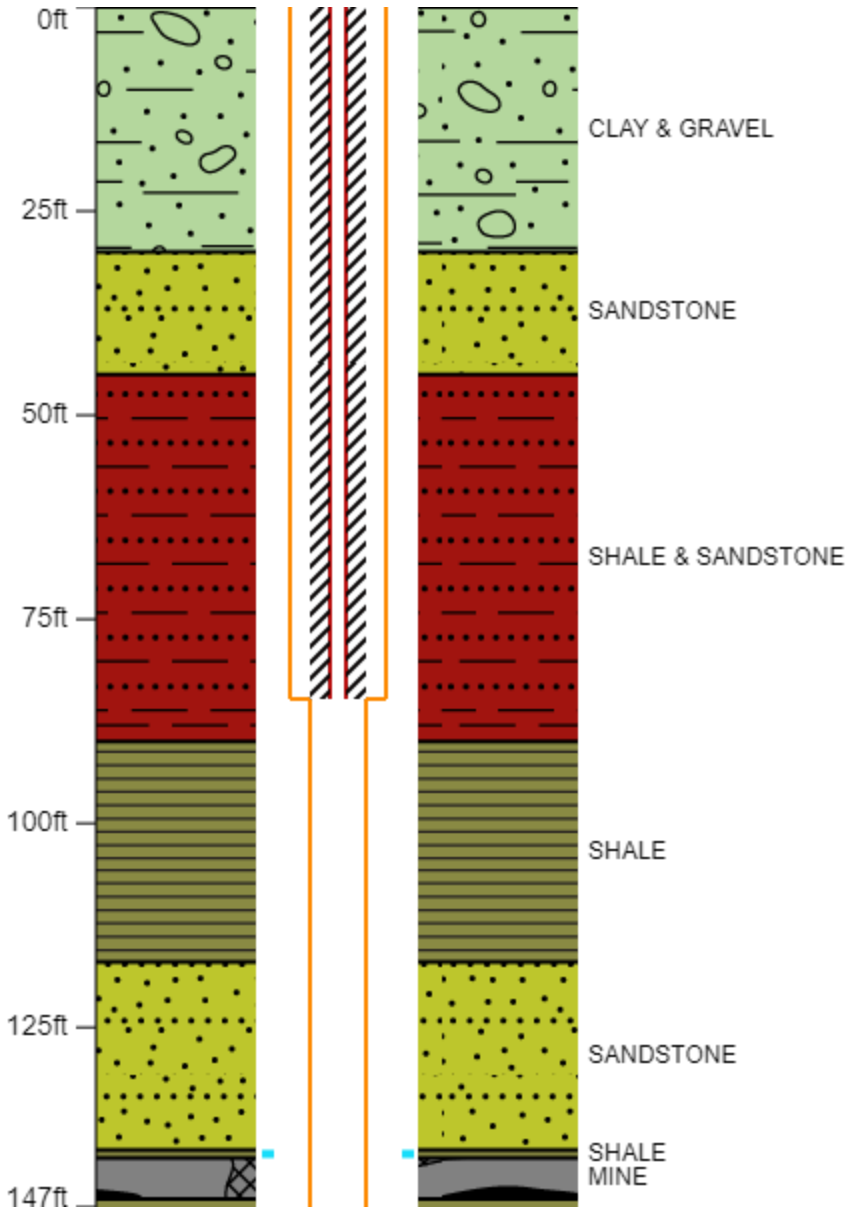
# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources  
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605  
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number

\_\_\_\_\_

Page \_\_\_ of \_\_\_ for this record.



String: 1  
 Borehole Depth: 85 ft.  
 Borehole Diameter: 9.75 in.  
 Casing Length: 86.5 ft.  
 Casing Diameter: 6 in.

String: 2  
 Borehole Depth: 147 ft.  
 Borehole Diameter: 5.88 in.  
 Casing Length: N/A  
 Casing Diameter: N/A

- | Borehole
- | Casing
- Grout
- Water At

Some formations labels have been removed due to space limitations.



**AR-4**  
**WATER WELL LOG**

# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources  
 Division of Geological Survey, 2045 Morse Road, Columbus, Ohio 43229-6605  
 Phone (614) 265-6576

Well Log Number \_\_\_\_\_

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**AR-5  
WATER WELL LOG**

# WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources  
Division of Geological Survey, 2045 Morse Road, Columbus, Ohio 43229-6605  
Phone (614) 265-6576

Well Log Number

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