

# **Wellhead Protection Area Delineation Study for Lebanon Correctional Institution**

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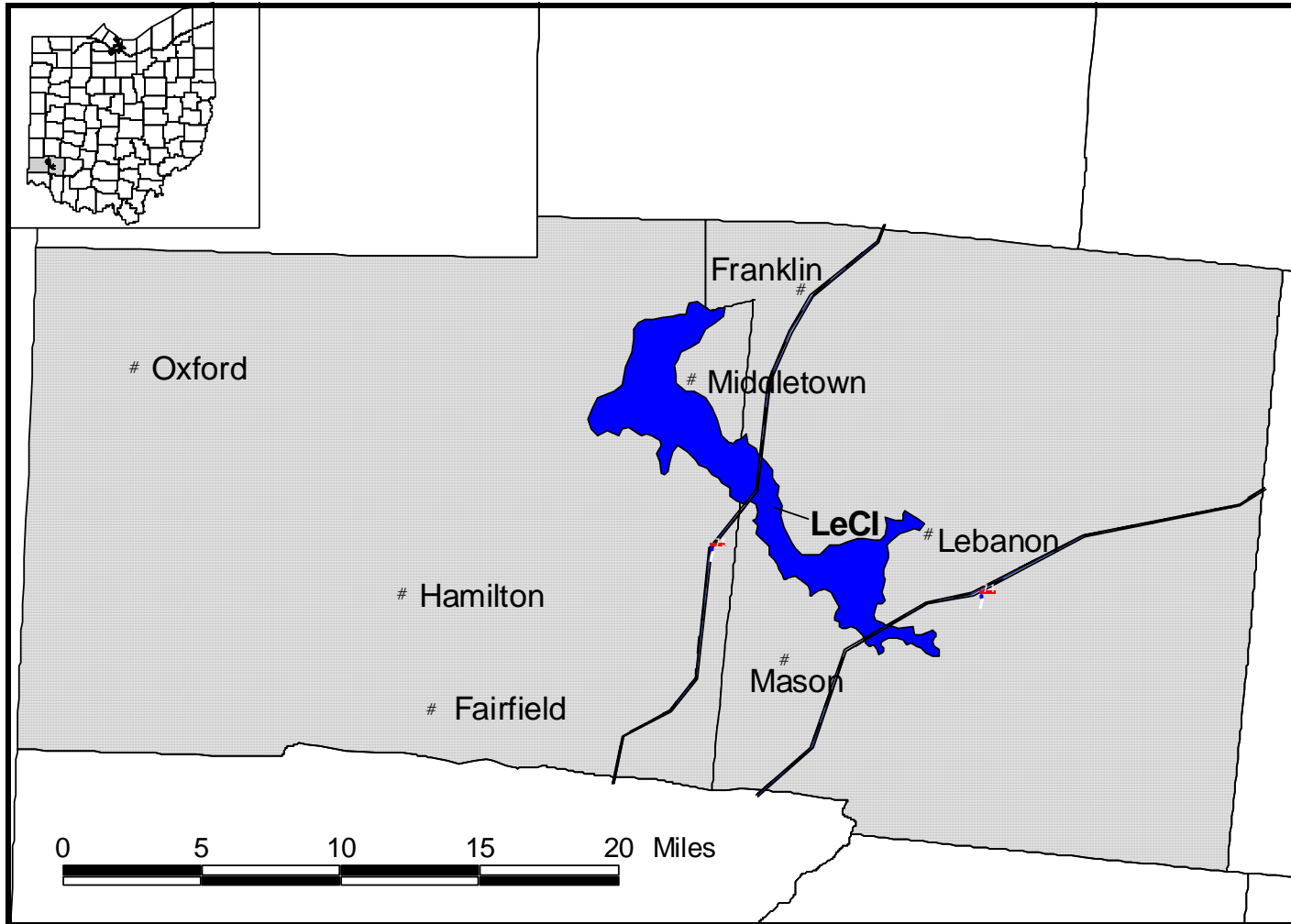


Figure 1. Shaker Creek Aquifer, located in Southwestern Ohio, extends across the border separating Warren and Butler Counties

### Documentation of Effort

In late-1996, Mr. Michael P. Ekberg (then with Ohio EPA) suggested to Mr. Larry Gillum (then supervisor of the Lebanon Correctional Institute's water treatment plan) that the Department of Geology of the University of Cincinnati be asked to prepare a wellhead protection area delineation for the Lebanon Correctional Institute (LeCI). In the Spring of 1997 the study reported here was initiated.

The research was conducted as a two-academic-quarter (six month) course for advanced undergraduate and graduate students in the departments of geology and environmental engineering during the winter and spring academic quarters 1997, 1998, 1999, and 2000. The study involved regular field investigations of the site (Fig. 1) twenty-six miles NNE of the university. Profs. Thomas V. Lowell (glacial geologist), J. Barry Maynard (aqueous geochemist), and David B. Nash (hydrogeologist) directed and closely monitored the project. Software (ArcView and Argus), monitoring equipment (water level measurement, pressure transducers, and dataloggers), surveying equipment, and a computer were purchased with USEPA grant X985708-01-0.

Research during the 1997 and 1998 academic years centered on canvassing wells, surveying wellhead elevations, measurement of water levels, and geochemical sampling and analysis. Driller's logs were collected and correlated during the 1999 academic year to produce geologic cross sections of the area. Hydrologic modeling was completed during the 2000 academic year.

### Introduction

LeCl draws its water from a deep buried valley containing a highly productive, heavily utilized aquifer system named the Shaker Creek Aquifer (Fig. 2) by the Ohio Department of Natural Resources Division of Water (ODNR). The buried valley, formed during Pleistocene glaciation of the area, extends from Little Miami River at South Lebanon, Ohio to Great Miami River at Middletown, Ohio (Fig. 3). The valley contains a thick, complex, and interfingering sequence of glacial lake clay, glacial till, sand and gravel glacial outwash, and silty alluvium reaching thicknesses of more than seventy meters near its confluence with Great Miami River.

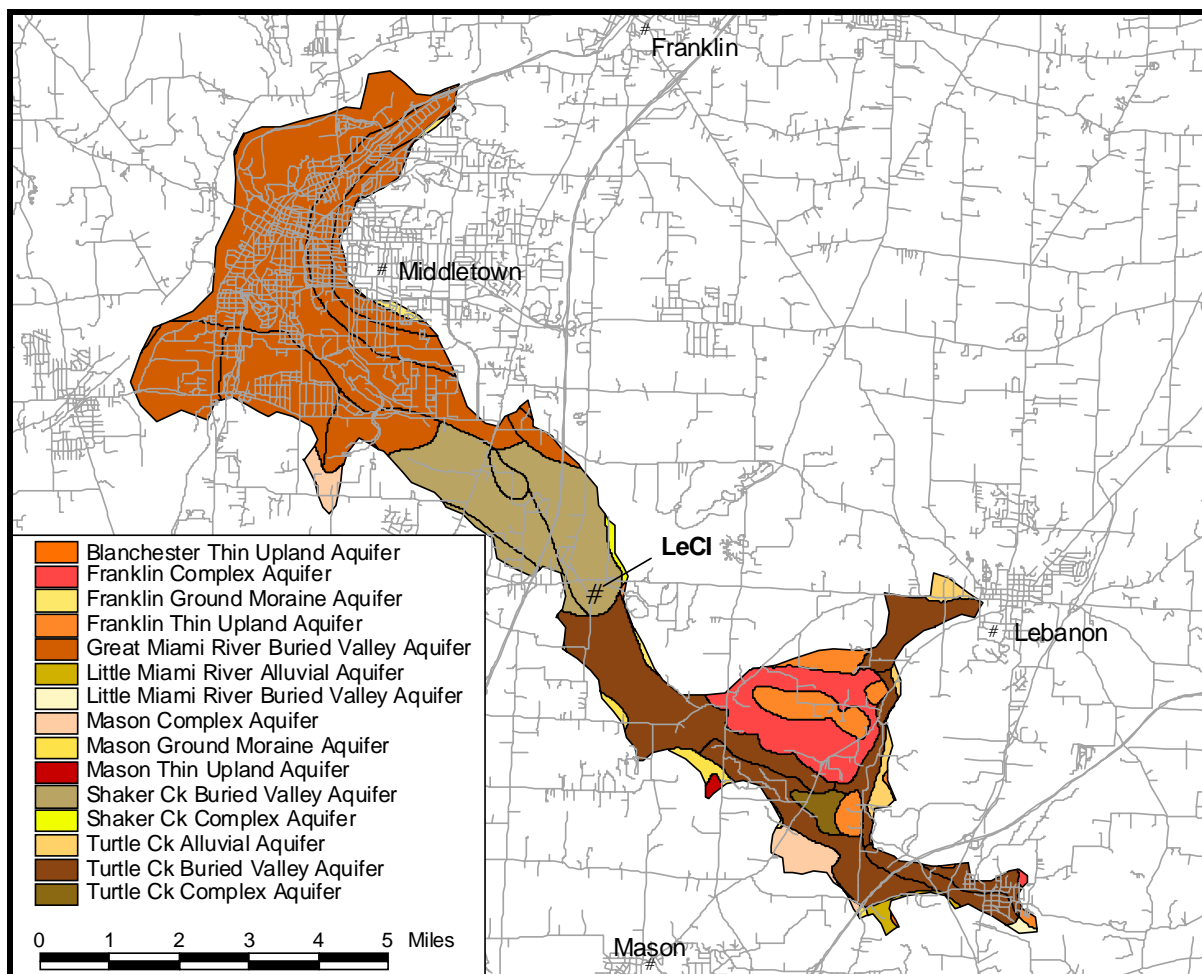


Figure 2. Following the nomenclature of ODNR Division of water, the aquifer system used by LeCl is referred to as the Shaker Creek aquifer system (map derived from <http://www.dnr.state.oh.us/odnr/water/samp/sampconv/GlacialShape.zip>).



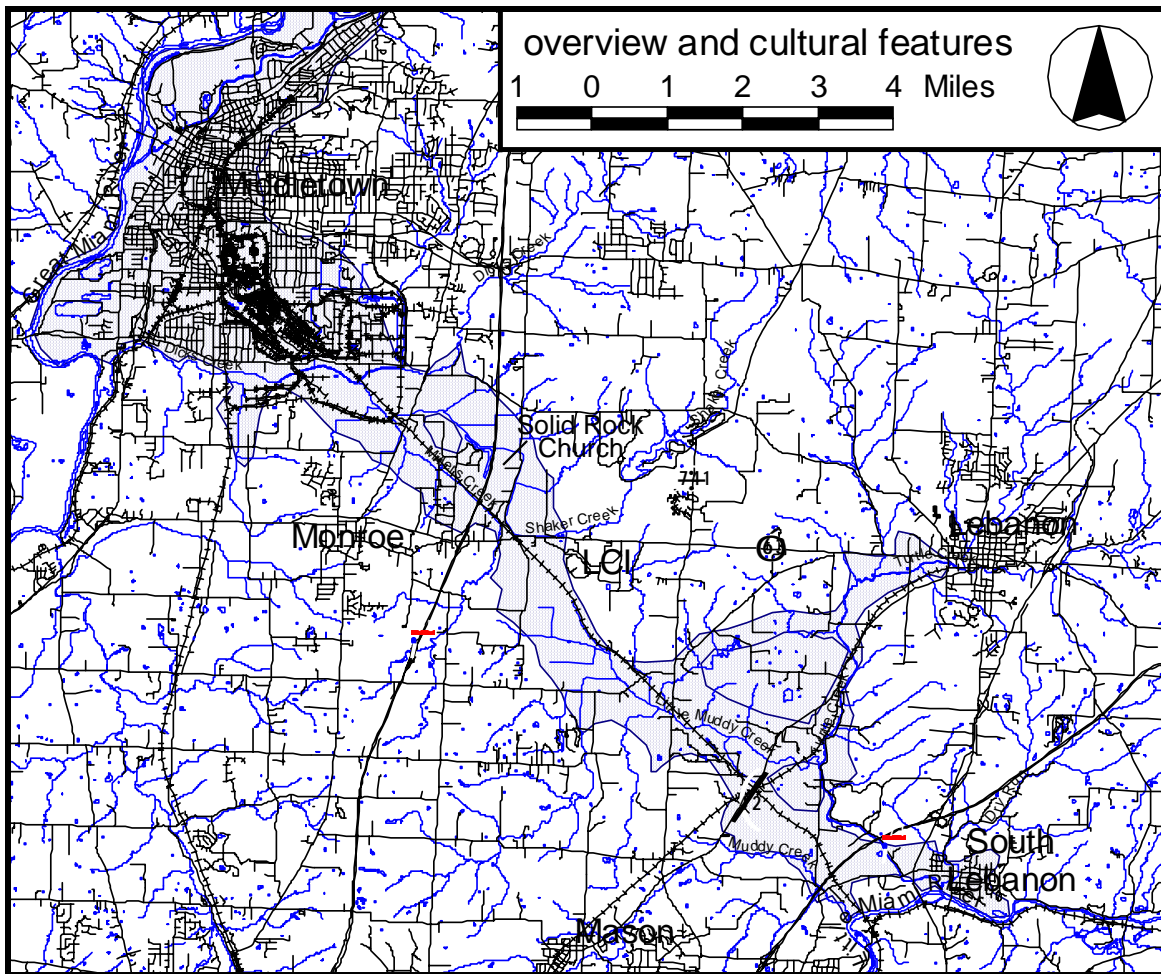


Figure 3. The Shaker Creek Aquifer System (shaded) occupies a buried valley connecting Little Miami River at South Lebanon with Great Miami River at Middletown. The Lebanon Correctional Institute (LeCI) wellfield is located near the center of the aquifer system.

Although providing exceedingly high yields (Fig. 4), water level measurements taken continuously for more than thirty years at state well W-5 near Solid Rock Church (Fig. 3) suggest the aquifer system is being overdrafted. This has caused water levels to decline at an average annual rate of 0.84 ft/yr (Fig. 5). The steady decline in head makes the validity of steady-state modeling of the aquifer suspect. Steady-state modeling is, however, suggested by the Ohio EPA's guidelines and is therefore done for almost all well-head delineations. To be consistent, we have also followed the steady-state approach.

It should be noted that both English and metric units of measurement are used in the study. Several of the data sources are maps from the U.S. Geological Survey (digital line graphs, DLG's) and bedrock elevation maps from the Geologic Division of the Ohio Department of Natural Resources (ODNR) and are in feet. These data cannot be easily converted to metric units and therefore are presented in their original units. All modeling was done in metric units.

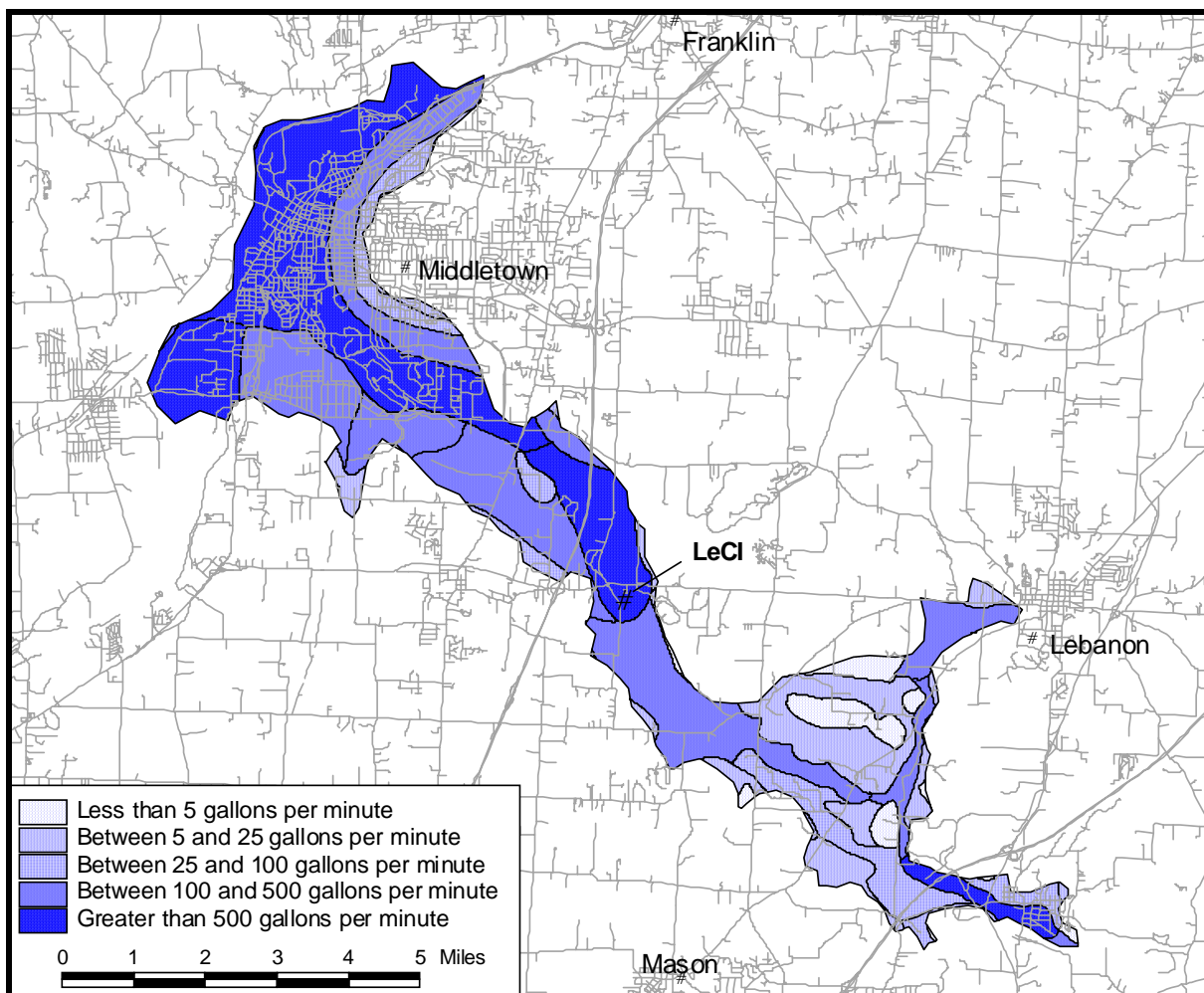


Figure 4. The thick sand and gravel deposits of the Shaker Creek aquifer system provide exceedingly high yields (map derived from <http://www.dnr.state.oh.us/odnr/water/samp/sampconv/GlacialShape.zip>).

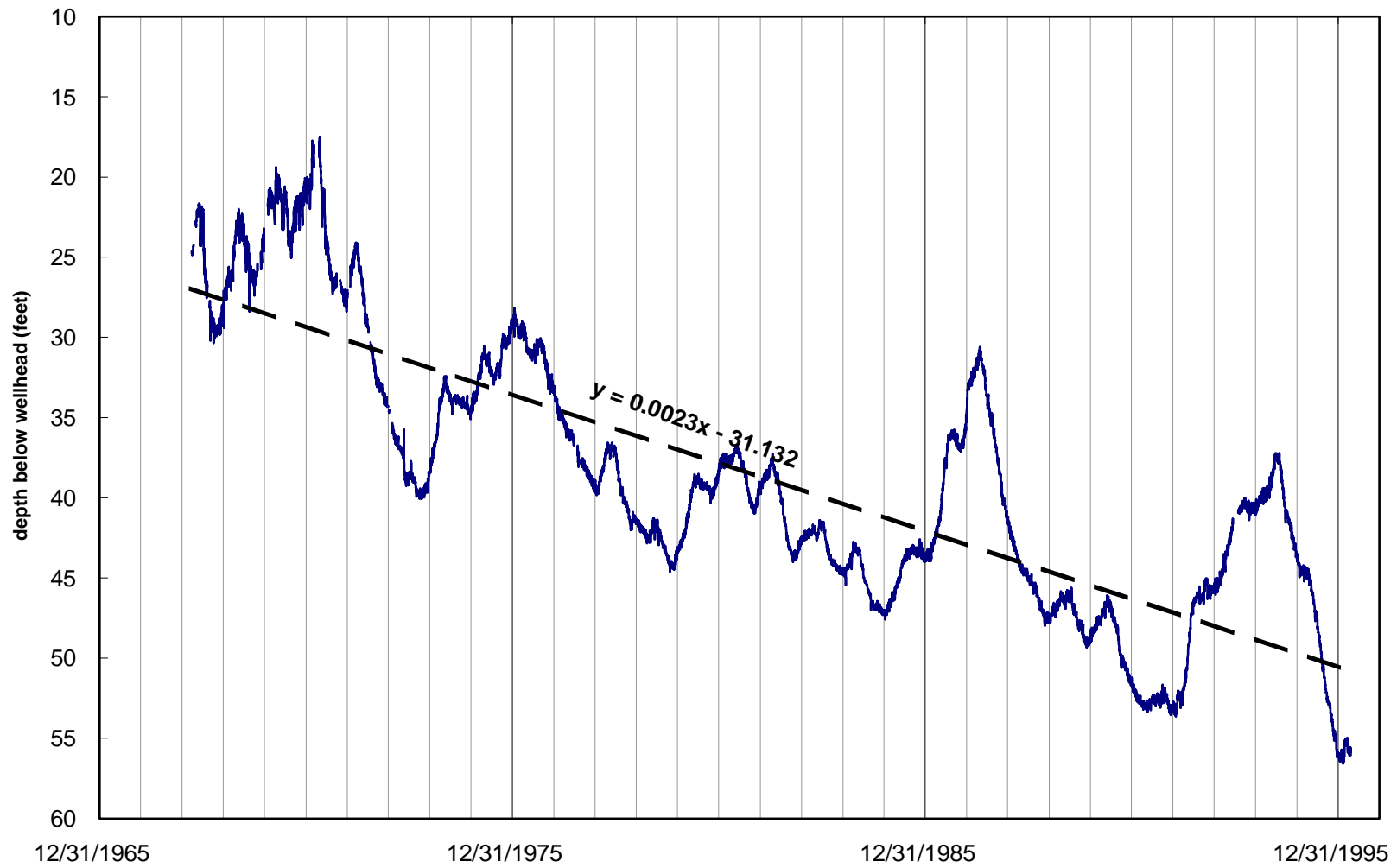


Figure 5. Water levels recorded continuously at state well W-5 near Solid Rock Church indicate water levels have declined at an average rate of 0.84 ft/yr suggesting that the aquifer system has been overdrafted for at least three decades.

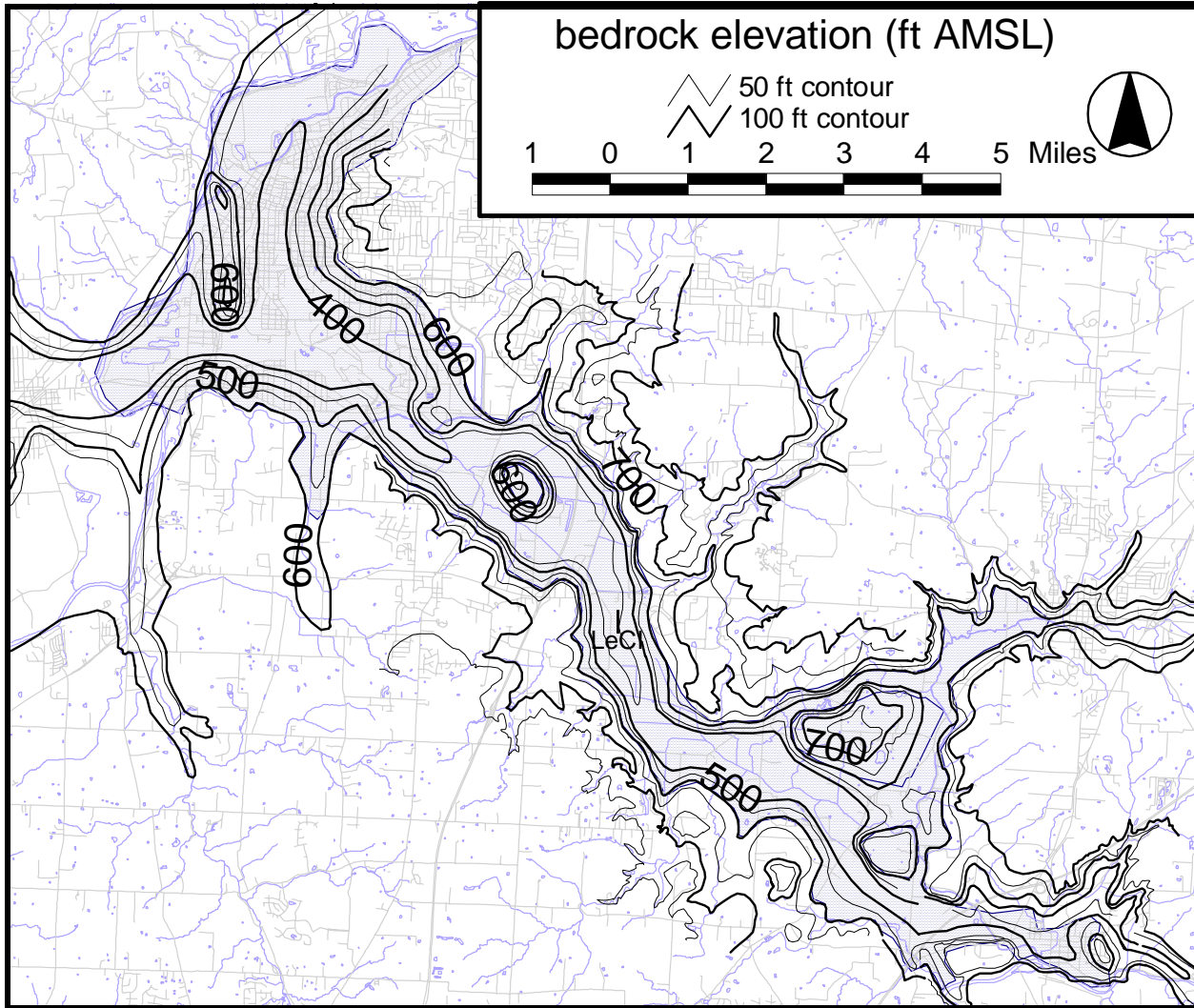


Figure 6. Elevation of the Ordovician shale-limestone bedrock beneath the Shaker Creek Aquifer system.

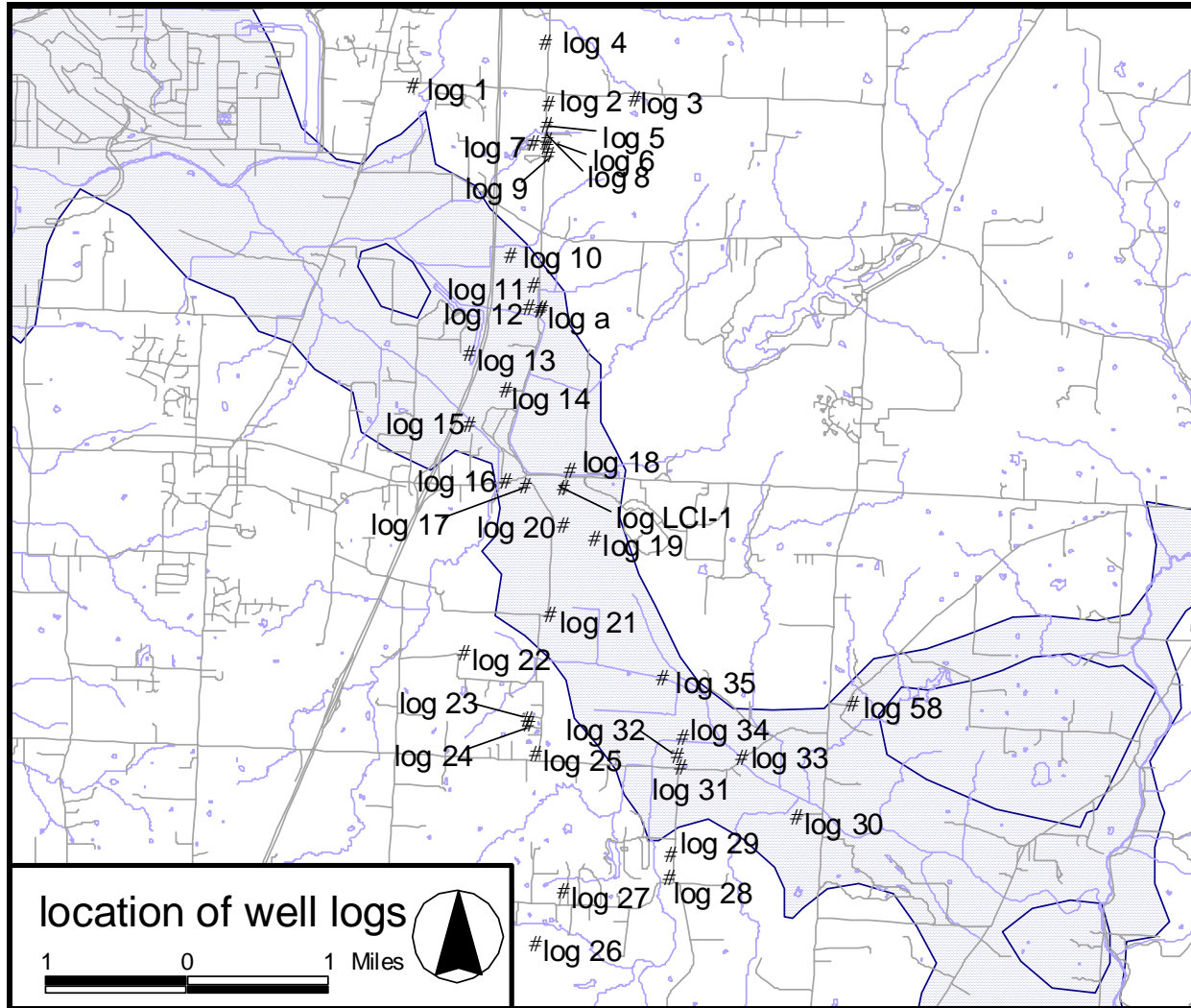


Figure 7. Locations of driller's logs (Appendix A) used in construction of geologic cross sections (Figure 4 and Appendix B).

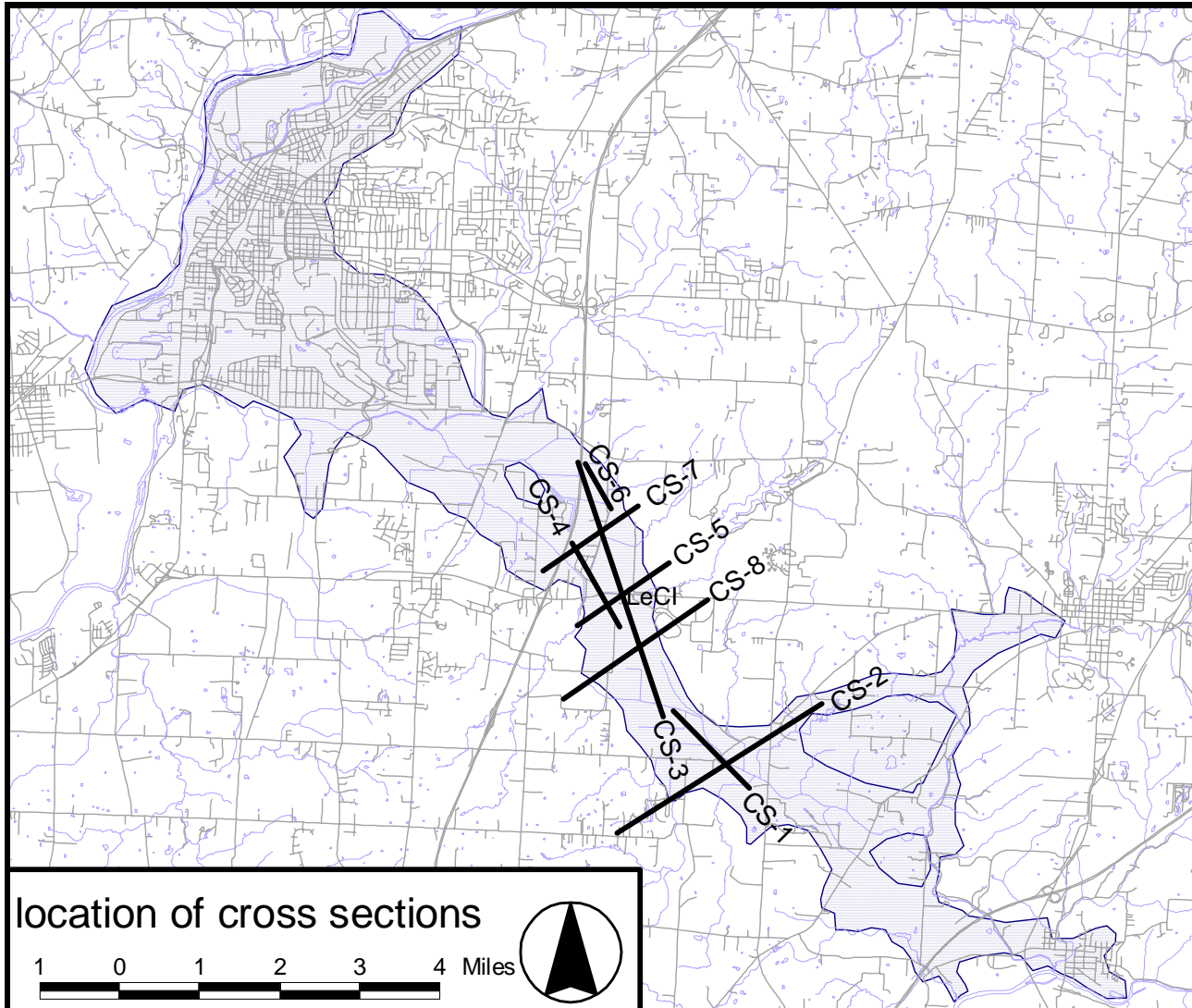


Figure 8. Location of cross section (Appendix B)

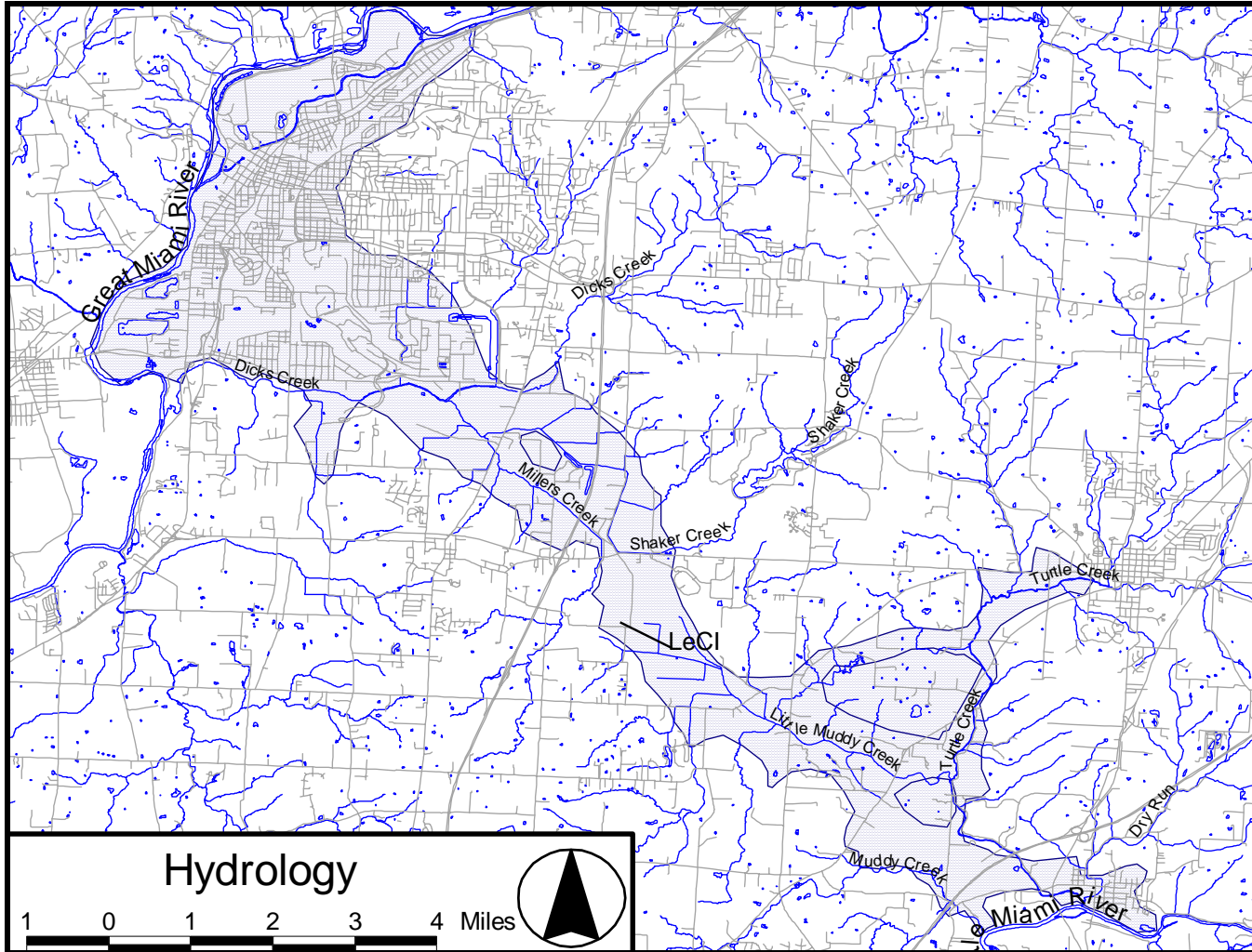


Figure 9. Great and Little Miami Rivers are assumed to penetrate to the aquifer and be hydrologically connected to it. The smaller creeks rising on the bedrock surface above the valley, however, are assumed to provide little recharge to the aquifer except immediately adjacent to the valley walls.

**Table 1**  
Measured Chemical Constituents

Chemical Analysis of Groundwater at Lebonan Correctional Institute

Samples Collected 5/99 and 4/97

\* all ion concentrations in ppm

Well	year of collection		pH	Eh, mv	Calcium	Iron	Magnesium	Manganese	Potassium	Silica	Sodium	Alkalinity	Chloride	Sulfate	Nitrate	Phosphate
LCI #2	1999	nonfiltered	6.9	81	100	2.8	31	0.04	1	6.6	18	349	39	59	BDL	BDL
LCI #2	1999	filtered	7.3	66	110	2.8	32	0.05	1	6.7	19	341	37	70	BDL	BDL
LCI MW -1	1999	filtered	7.15	67	94	2.1	29	0.06	1	6.5	13	285	48	109	BDL	BDL
LCI MW -2	1999	filtered	7.37	76	85	2.4	36	0.06	2	7.5	9	341	15	52	BDL	BDL
Mason	1999	filtered	7.24	82	120	2.4	32	0.13	2	6.3	21	328	48	164	BDL	BDL
LCI #2	1997	unfiltered	7.37	155	116	2.85	36	0.054	BDL	ND	19	333	36	51	BDL	BDL
Mason	1997	unfiltered	8.07	ND	129	1.05	34	0.14	ND	ND	16	314	38	108	BDL	BDL
LCI Pig Farm	1997	unfiltered	7.15	145	132	4.49	39	0.099	BDL	ND	13	344	50	93	BDL	0.09
Monroe #4	1997	unfiltered	7.22	120	150	5.45	99	0.092	BDL	ND	48	333	144	91	BDL	BDL
Warren Co #2	1997	unfiltered	7.31	155	144	5.67	39	0.086	BDL	5.5	13	336	26	115	BDL	BDL
Otterbein #2	1997	unfiltered	6.82	300	98	BDL	25	BDL	BDL	2.5	27	248	56	43	1.96	BDL
Rahm Farm	1997	unfiltered	7.2	44	83	0.658	35	0.194	4	3.9	46	291	49	58	BDL	BDL
Berns Field	1997	unfiltered	7.67	330	93	0.22	27	0.015	3	ND	31	228	54	76	1.54	BDL
Berns Nursery	1997	unfiltered	7.28	397	101	0.084	25	0.014	3	3.4	27	249	48	53	2.23	BDL
Shaker Creek	1997	unfiltered	8.11	307	52	BDL	14	BDL	BDL	BDL	12	139	24	24	1.4	0.1

BDL = below detection

ND = not determined



### Hydrogeologic Setting

The aquifer system is in a deep valley incised into Ordovician shales and limestones. The ODNR has estimated the elevation of the bedrock beneath the aquifer system in a series of bedrock elevation maps drawn on 7.5 minute topographic quadrangle sheets. The maps are constructed from drillers' logs. Relatively few of the wells penetrate to bedrock. Therefore, in most places, the elevation is estimated. The six quadrangles covering the aquifer were digitized and mosaiced (Fig. 6).

More than fifty drillers logs were collected from the ODNR, homeowners, Warren County, and LeCl. Of these, forty (Fig. 7) could be used for construction of geologic cross sections (Fig. 8). The logs are Appendix A and the constructed cross sections are Appendix B to this report.

The cross sections indicate a quite complex subsurface geology (generally the case with buried glacial valleys). Deposits have been partially eroded and covered by younger deposits as the glaciers advanced and retreated. In addition, depositional facies in a glacial environment change rapidly in the lateral as well as vertical direction making correlation of units between wells difficult.

The valley fill consists of gray stoney till, very coarse grained gravel outwash, low permeability glacial lake clays, and younger alluvial silts and clays. The aquifer system consists of a thin upper discontinuous aquifer and a thicker, lower more continuous aquifer. Most of the water pumped from the aquifer system comes from wells screened in the lower aquifer (including LeCl's wells). At the LeCl well field, and probably in most other areas, the aquifer is confined; the depth to the top of the lower aquifer at the LeCl well field is 90 to 100 feet while the depth to water is usually around 65 feet.

Early in 1999 a set of monitoring wells was drilled by a consortium of Shaker Creek Aquifer system users (LeCl, Warren County, and the cities of Monroe, Mason, and Lebanon) on LeCl property. One of the wells is screened in the upper aquifer and the other is screened in the lower aquifer. Although immediately adjacent to each other, the water level in the shallow well is more than 15 feet above the water level in the deep well, suggesting the two aquifers are isolated from each other.

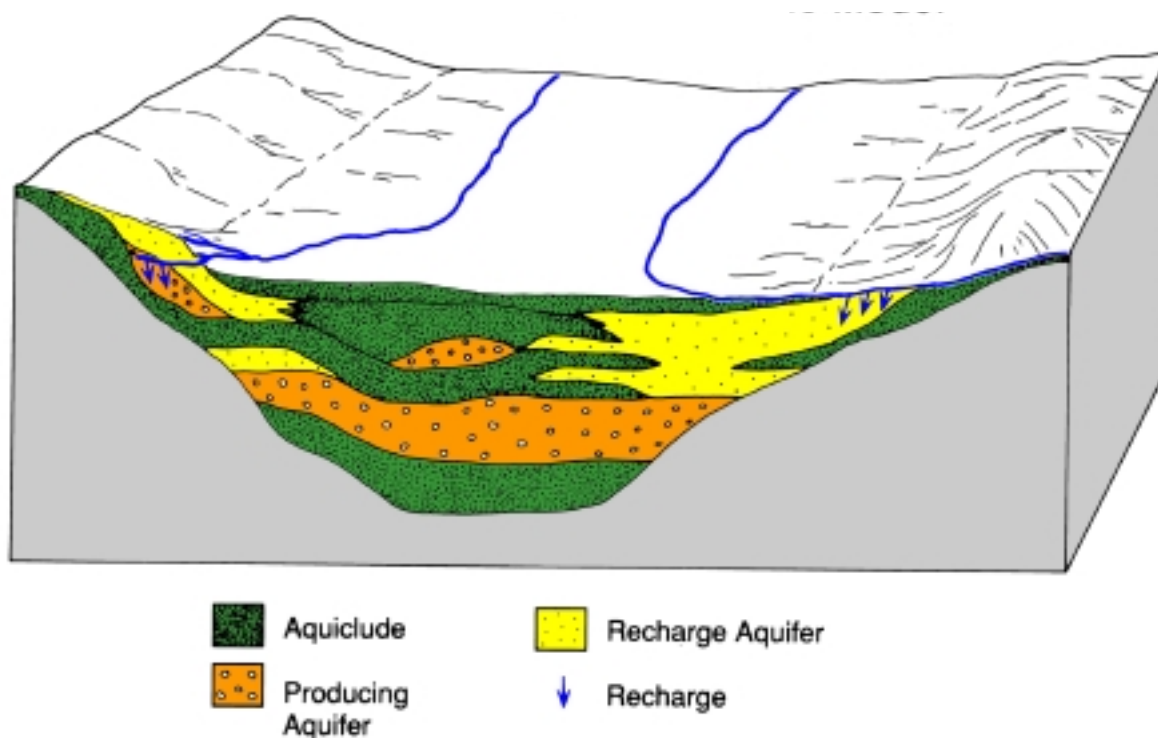


Figure 10. Recharge to the aquifer is assumed to result primarily from channel loss of the streams crossing the terrace as flow from the bedrock uplands.

### Conceptual Hydrologic Model

A laterally persistent surface cover of silt and clay (Appendix B) of recent alluvium is found throughout the area and is assumed to limit infiltration of precipitation. Great and Little Miami Rivers are likely in good hydrologic contact with the aquifer system. Channel loss measurement from small streams (e.g., Shaker, Miller, Dick's Creek etc., Fig. 9) were inconclusive. Dissolved oxygen content of the water from the aquifer was measured using an Eh electrode (Table 1). The water was consistently found to be more oxygenated in wells closer to the valley sides (e.g., more than 300 mV at Bern's Nursery) than at wells in the center of the valley (e.g., less than 70 mV at LeCl). This suggests the aquifer is recharged from its edges rather than surface. As the water travels through the aquifer, it progressively loses oxygen by reacting with pyrite ( $\text{FeS}_2$ ) taking  $\text{Fe}^{++}$  into solution (a problem for most of the users of the aquifer).

The conceptual model (Fig. 10) assumes that the outwash terraces surrounding most of the buried valley provide direct recharge to the aquifer primarily by infiltration from the small streams

crossing the terraces from the surrounding bedrock uplands and to a lesser extent from infiltration of precipitation on the terraces. Water leaves the aquifer primarily by pumpage and by underflow to Great and Little Miami Rivers.

Although minor seeps emanate from cracks and dissolved conduits in the bedrock walls of the valley sides, the contribution of this water is minimal so little error is introduced by assuming the bedrock valley walls are no-flow boundaries.

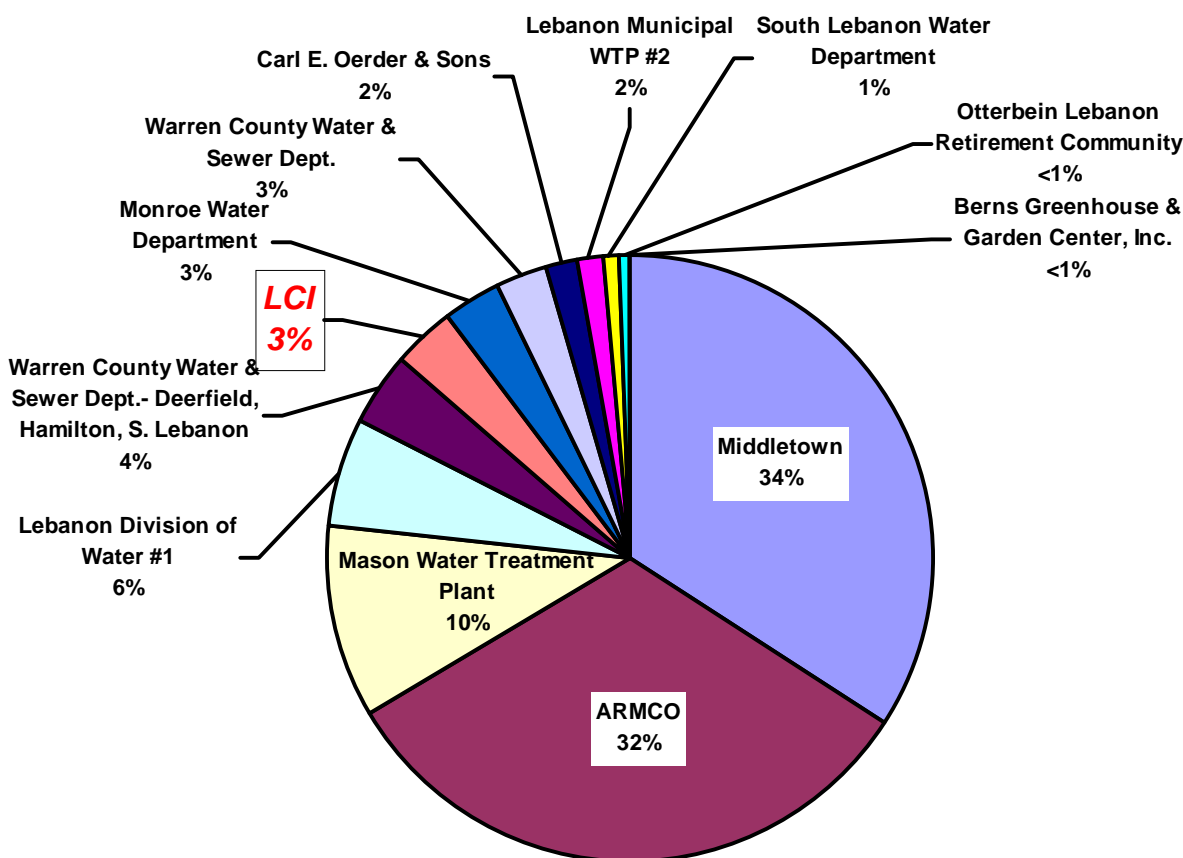


Figure 11. Percentage of the total annual pumpage from the Shaker Creek Aquifer system contributed by each of the largest consumers. Much or most of Middletown's water undoubtedly comes from channel loss from Great Miami River.

Table 2

Annual pumpage reported by the heaviest users of groundwater from the Shaker Creek Aquifer system.

state number	description	1994 million gallons	1995 million gallons	1996 million gallons	1997 million gallons	1994-1997 average (million gallons/year)
430	Middletown	3,673	3,290	3,404	3,043	3,353
1227	ARMCO	3,115	3,460	3,170	2,959	3,176
238	Mason Water Treatment Plant	834	1,020	1,034	1,092	995
159	Lebanon Division of Water #1	549	527	587	686	587
1853	Warren County Water & Sewer Dept.- Deerfield, Hamilton, S. Lebanon		202	262	634	366
941	LeCl	331	347	342	295	329
394	Monroe Water Department	316	289	303	288	299
1318	Warren County Water & Sewer Dept.	377	308	274	172	283
627	Carl E. Oerder & Sons	150	149	145	204	162
160	Lebanon Municipal WTP #2	122	138	164	179	151
111	South Lebanon Water Department	88	82	78	78	82
1696	Otterbein Lebanon Retirement Community	44	48	40	35	42
1741	Berns Greenhouse & Garden Center, Inc.	1	1	1	4	2

### Rationale for Delineation Method Choice

A groundwater flow model, MODFLOW-96 written by Harbaugh and McDonald (1996) was used in conjunction with MODPATH, a particle tracking program written by Pollock (1994). Both programs were run using ARGUS by Shapiro, Margolin, Dolev, and Ben-Israel (1997) as a pre- and post-processor. Although much less complex methods may be permitted by Ohio EPA (*i.e.*, fixed radius method and uniform flow equation), neither of these methods are appropriate for situations in which there is considerable interference from nearby wells (the LeCl, Monroe, Mason, Otterbein, and Warren County Union Road well fields are all less than a mile away from each other).

For several reasons the aquifer system was modeled over its entire extent from Little to Great

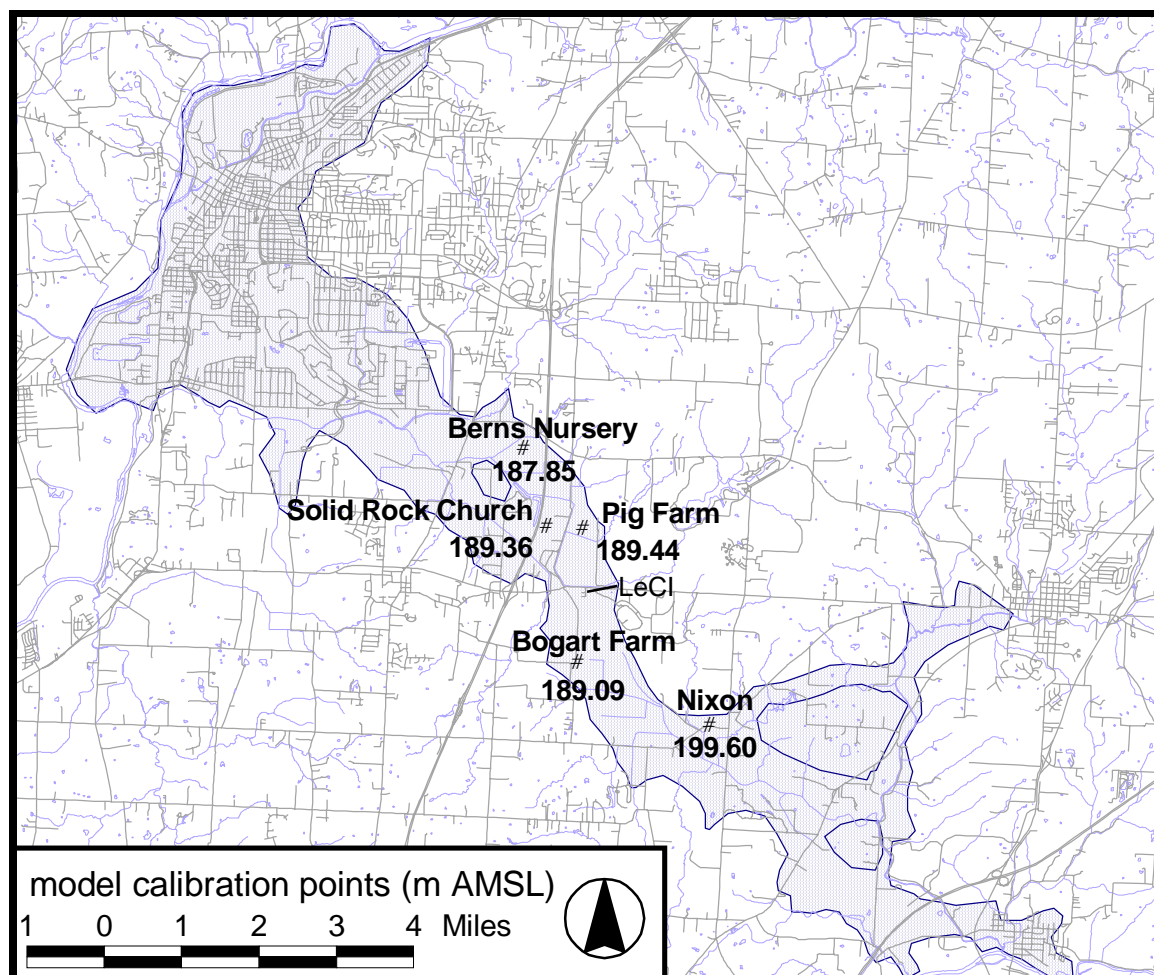


Figure 12. Piezometric elevations in the lower aquifer of the Shaker Creek Aquifer system measured between 9:30 and 14:30 May 9, 1998 (see Table 2).

**Table 3**

Piezometric elevations in the lower aquifer of the Shaker Creek Aquifer system. Wellhead MP elevation was determined by leveling a closed circuit from the nearest benchmark.

<b>Name</b>	<b>Well Use</b>	<b>Address</b>	<b>Phone #</b>	<b>Contacts</b>	<b>depth to water (feet)</b>	<b>MP elevation (feet AMSL)</b>	<b>closure error (feet)</b>	<b>peizometric elevation (feet AMSL)</b>
LeCl Pig Farm	farm	Rt 63	(513) 932-1211 x-2222	Greg Davis	49.90	671.407	0.1	621.507
Otterbein	commu- nity	Rt 63	(513) 933-0044	George E. Ter- williger	15.11	676.071	0.084	675.987
Solid Rock Church	church	Union Road, Lebanon, Ohio		State Well W-5	41.37	662.645	0.043	621.255
Burns Nursery	farm	Greentree & Cin-Day Rd.			40.29	656.582	0.076	616.292
Ann Hill	domestic	4202 Hamilton Lebanon, Ohio 45036	(513) 934-3970	Jack Nixon, owner 398 - 7000 Ann Hill, resident	41.09	695.95	0.031	654.87
Ed Siesmore	domestic	6303 Nickel Rd, Leba- non Ohio 45036	(513) 573-0578	Ed Siesmore	0.00	711.399	0.045	696.399
Tad and Carla Buffenbarger	domestic	4677 Butler Warren Rd, Lebanon, Ohio 45036	(513) 539-9709	Tad and Carla Buffenbarger	22.15	691.03	0.095	668.88
Bogart Farm	farm	890 Union Rd	(513) 932-6334	Amy Davis, owner	46.81	667.189	0.095	620.379

**Note:** All depth measurements were taken between the times of 9:30 and 2:30, Saturday, May 9, 1998. There was 0 rainfall for the day and 0 rainfall the preceding day. Elevations and depth measurements were taken in feet.

Miami Rivers.

- 1) Doing so involved a minimum assumption of boundary conditions: no-flow boundaries along the aquifer sides and constant head boundaries at Little and Great Miami Rivers.
- 2) The model could be used for wellhead protection area delineations for other well fields in the aquifer.
- 3) The model could be used to investigate overdrafting of the aquifer system.
- 4) The model could be used to investigate different management strategies for the aquifer system.
- 5) The model provided an excellent learning experience for the students involved with the project.

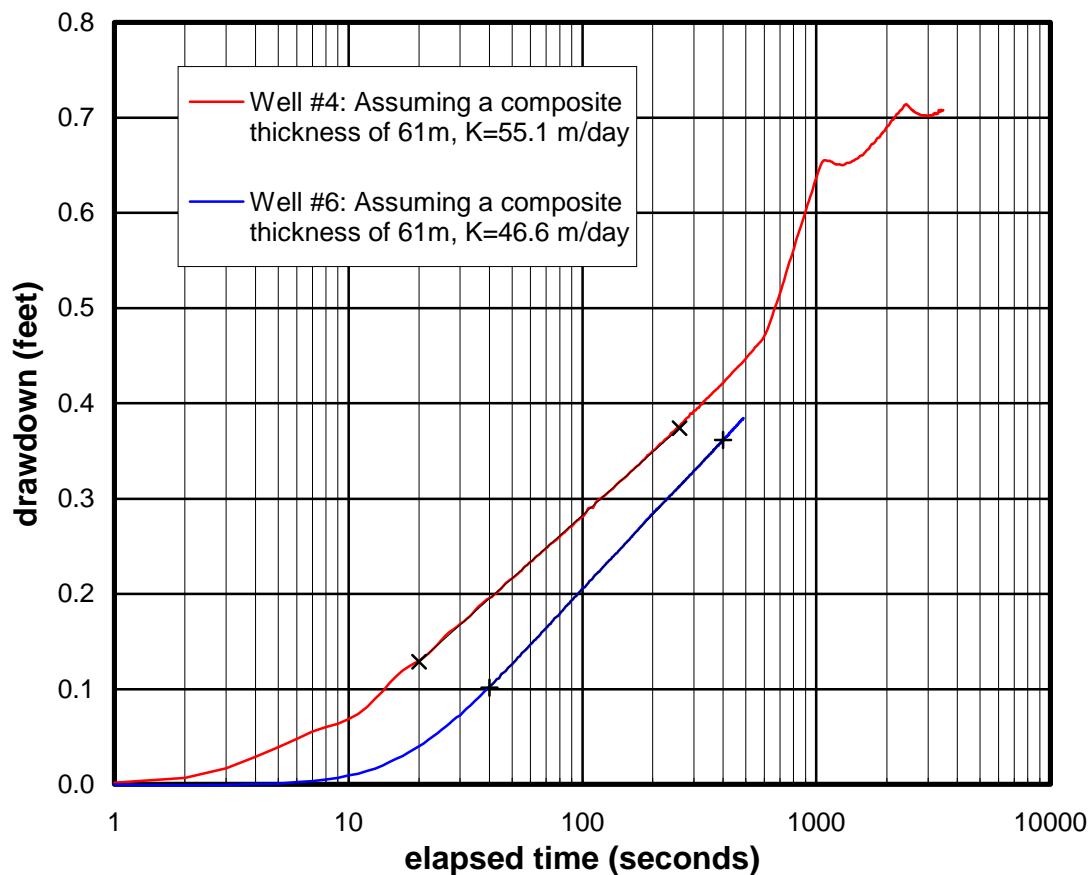


Figure 13. Results of pump test conducted at LeCl well field the night of February 13-14, 1998.

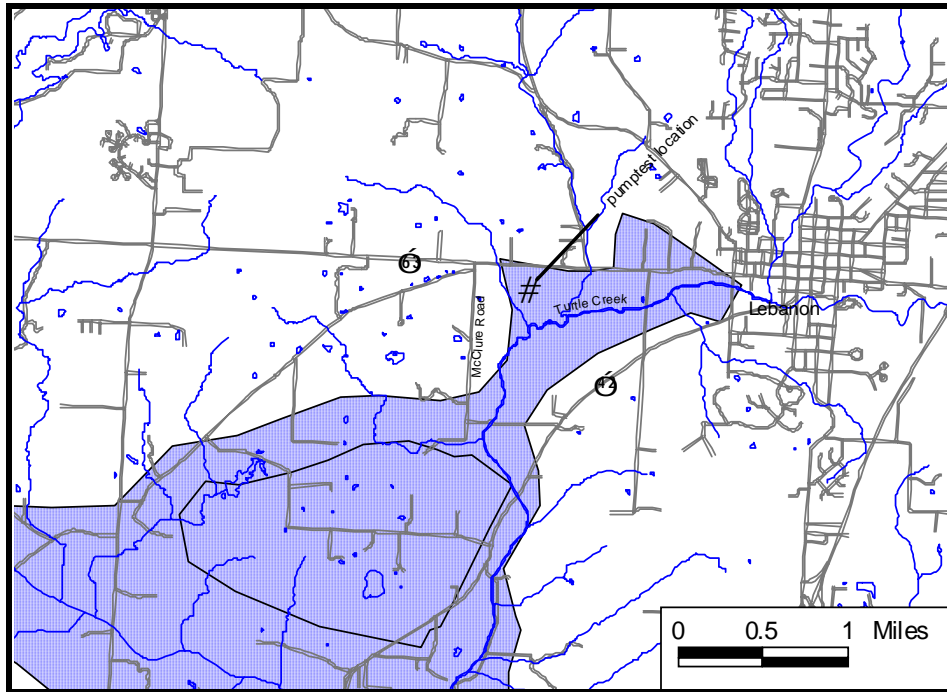


Figure 14. Map of the location at which Lane-Ohio conducted a pump test for the City of Lebanon, Ohio on September 8, 1992.

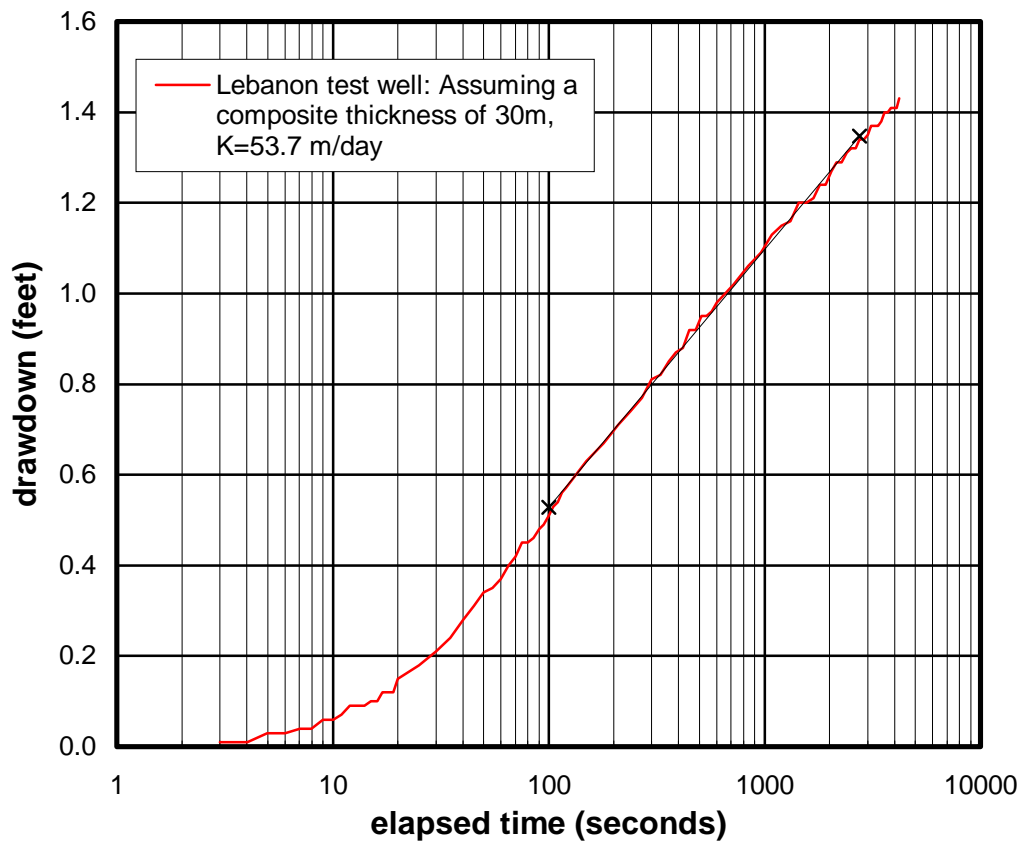


Figure 15. Results of pump test conducted for City of Lebanon, Ohio on September 8, 1992.



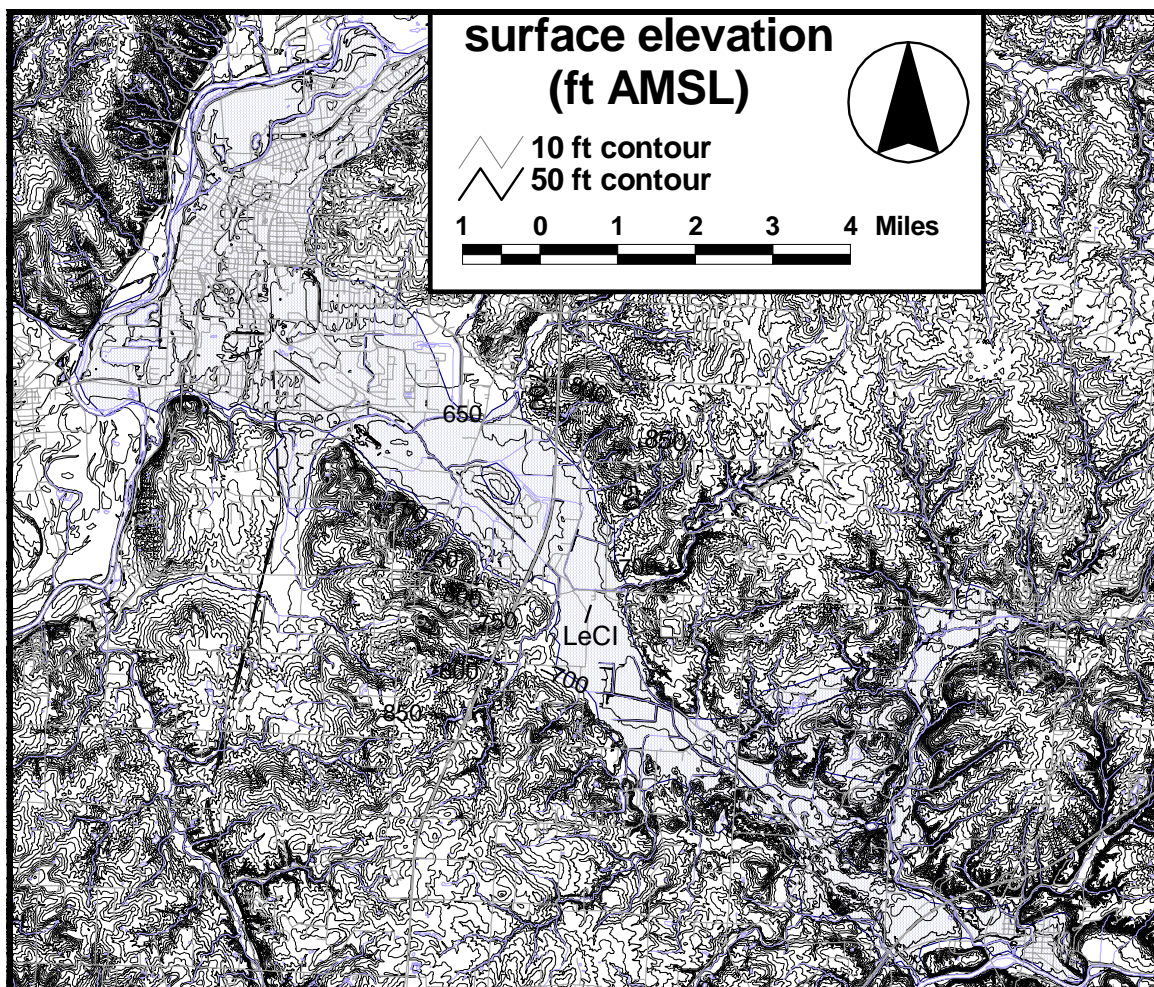


Figure 16. Surface elevations constructed from a mosaic of U.S. Geological survey 7.5' digital line graphs (DLGs) of the area.

### Presentation of Input Data

#### Pumpage data

The annual pumpage by major users reported to the ODNR Water Division averaged 9,825 million gallons during the years 1994 through 1997 (Table 1 and Fig. 11). The heaviest pumpage was by ARMCO and the City of Middletown. It should be noted, however, that Middletown's well field is located at near Hook's Airfield, immediately adjacent to Great Miami River and undoubtedly much of the water comes from channel loss from that river (Fig. 9).

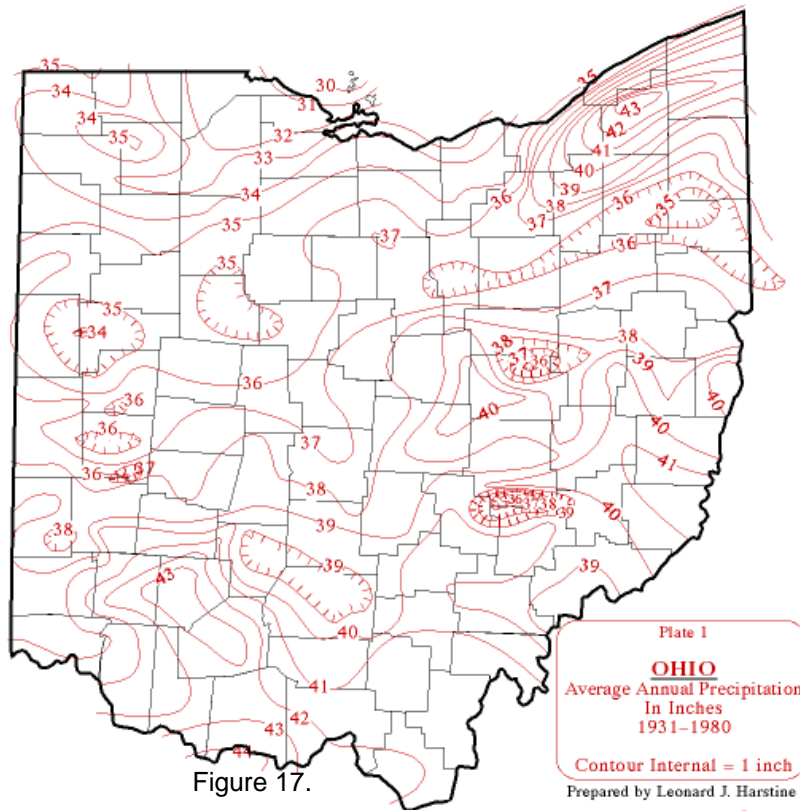


Figure 17.

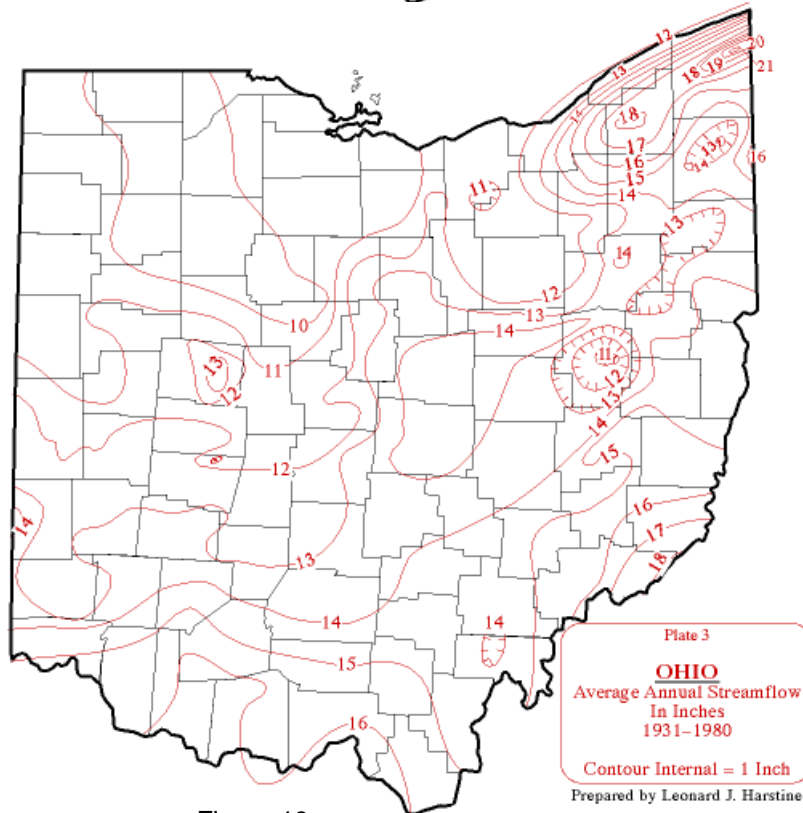


Figure 18.

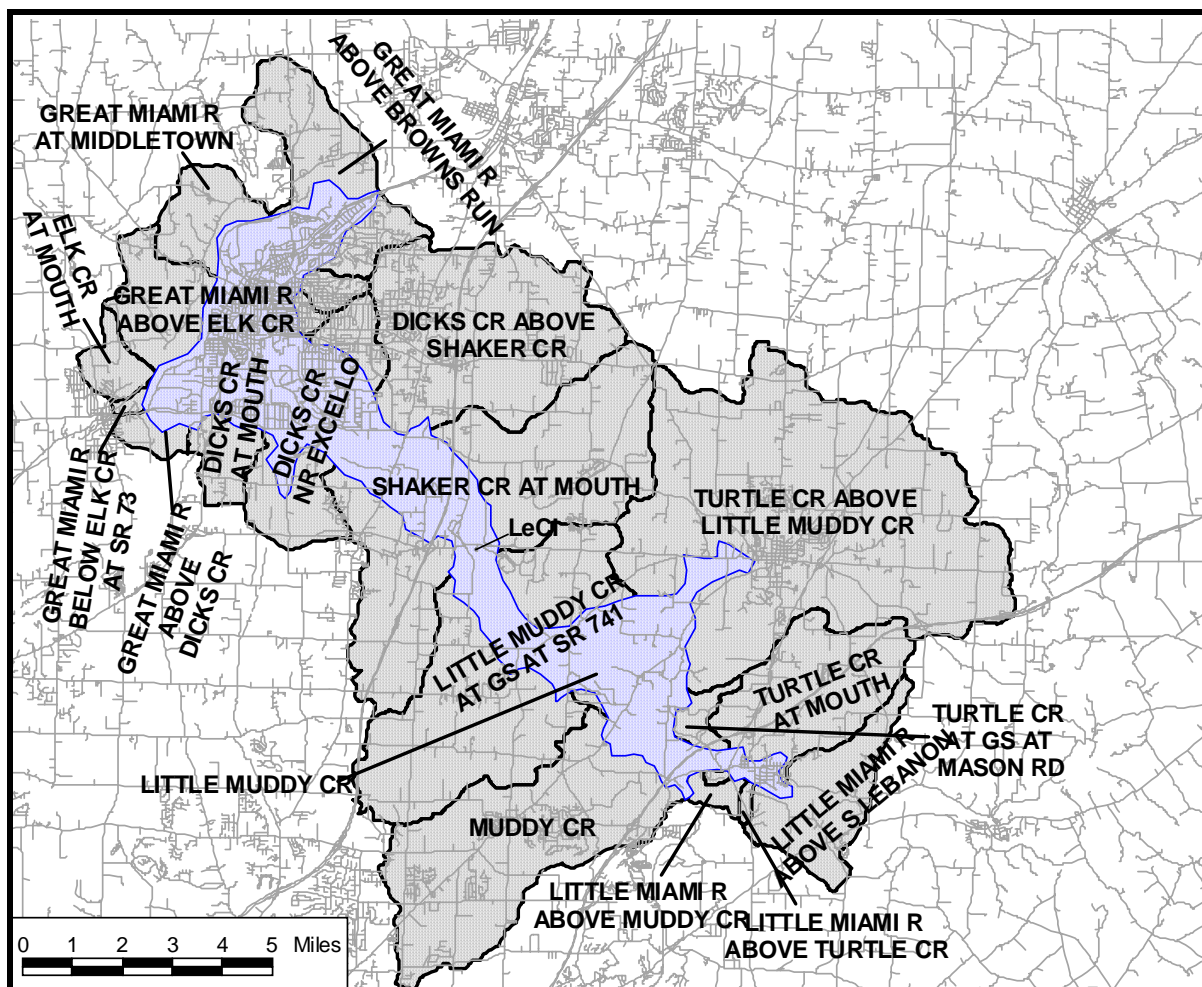


Figure 19. Watersheds recharging the Shaker Creek aquifer system (from <http://www.dnr.state.oh.us/geodata/Statewide/ohwsheds.exe>)

### Piezometric surface and model calibration points

An extensive search was made to find unused or rarely used wells screened in the lower aquifer that could be used to establish the piezometric surface and serve as calibration points for the hydrologic flow model. After the wells were located and access permission obtained, the measuring point (MP) elevation for each well was determined by surveying. The depth to water was measured periodically. On Saturday, May 9, 1998 all of the observation wells were measured between 09:30 and 14:30 (Table 2 and Fig. 12).

Table 4

Drainage basin area, estimated recharge using annual runoff of 13 inches and the area of the terrace to which recharge is applied.

<b>stream</b>	<b>basin area (m<sup>2</sup>)</b>	<b>estimated discharge (m<sup>3</sup>/day)</b>	<b>applied terrace area (m<sup>2</sup>)</b>
Shaker Creek	21,974,000	19,865	249,646
Miller's Creek	11,900,000	10,758	267,595
South Shaker Creek	13,300,000	12,024	640,137
Turtle Creek	86,200,000	77,928	651,913
Muddy Creek	28,000,000	25,313	1,009,230
Little Muddy Creek	25,200,000	22,782	1,020,990
creek west of Monroe	8,900,000	8,046	1,357,080
creek by Monroe	4,500,000	4,068	1,610,560
Dick's Creek	29,300,000	26,488	2,089,400
North Branch Dick's Creek	12,900,000	11,662	2,794,510

### Transmissivity

A pump test was conducted at the LeCl well field during the night of Friday February 13, 1998 and the early morning of Saturday February 14, 1998. All pumping at the LeCl, Monroe, and Warren County Union fields was suspended for three hours to allow the piezometric surface to recover to static levels. A single well was then pumped at 520 gpm and water levels were measured with pressure transducers in wells 257 feet and 570 feet away (Fig. 13). Transmissivities of 1,505 ft<sup>2</sup>/hr and 1,275 ft<sup>2</sup>/hr were determined using the Jacob method on the data collected at the near and distant observation wells respectively. Using a composite thickness of 61m for the aquifer system at the LeCl well field yields effective horizontal hydraulic conductivities of 55.1 and 46.6 m/day for the near and the distant wells respectively.

Results for another pump test conducted on Tuesday September 8, 1992 by Lane-Ohio Company were also used. The pumpage was from a newly installed test well near Turtle Creek and observations were made with a pressure transducer in a well 520 feet away (Fig. 14). A transmissivity of 734 ft<sup>2</sup>/hr is determined using the Jacob method (Fig. 15). Using a composite aquifer thickness of 30m (from well logs for the test well), yields an effective horizontal conductivity 53.7 m/day (which is within the range of conductivities determined from the LeCl pump test).

Ideally a sufficient number of pump tests would be available to correlate transmissivity with subsurface geology. This is not the case for this study (or for most studies). The close correspondence of effective horizontal hydraulic conductivity based on the thickness of the valley fill suggests that horizontal transmissivity may reasonably be estimated by subtracting the bedrock elevation (Fig. 6) from the surface elevation (Fig. 16) to determine fill thickness.

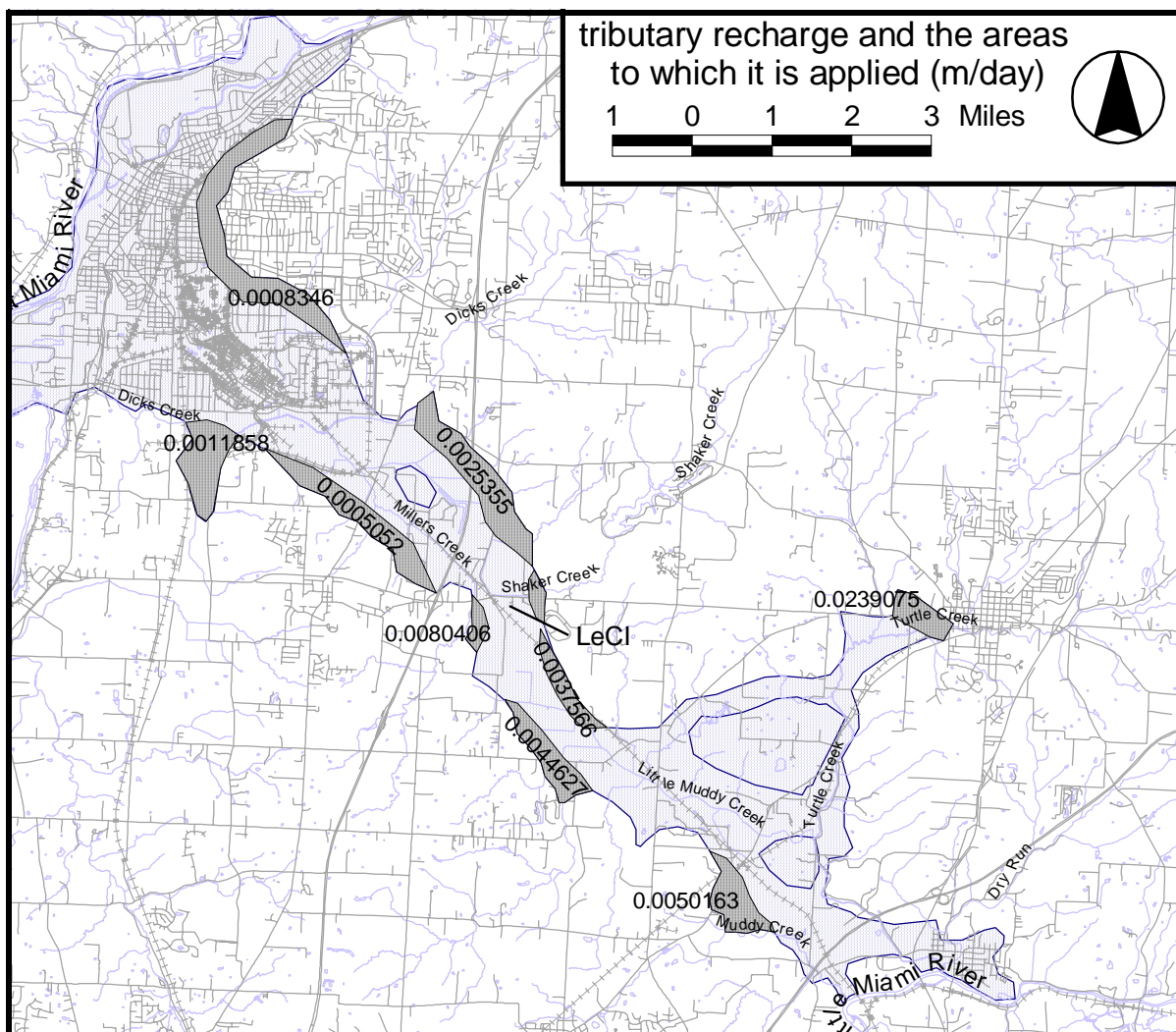


Figure 20. Recharge from streams as they cross the outwash terraces bordering the valley.

### Recharge

The average annual precipitation for the area of Shaker Creek Aquifer System reported by the ODNR's Hydrologic Atlas of Ohio is 40 inches (Fig. 17). Although it is generally assumed that approximately 30% of the annual precipitation infiltrates to recharge underlying aquifers, the continuous thick cover of clay and silt over the surface of the lowlands limits the amount of infiltration (confirmed by the Eh of the water found at the center of the aquifer).

Recharge from streams at the edges of the valley is the major source of recharge. None of

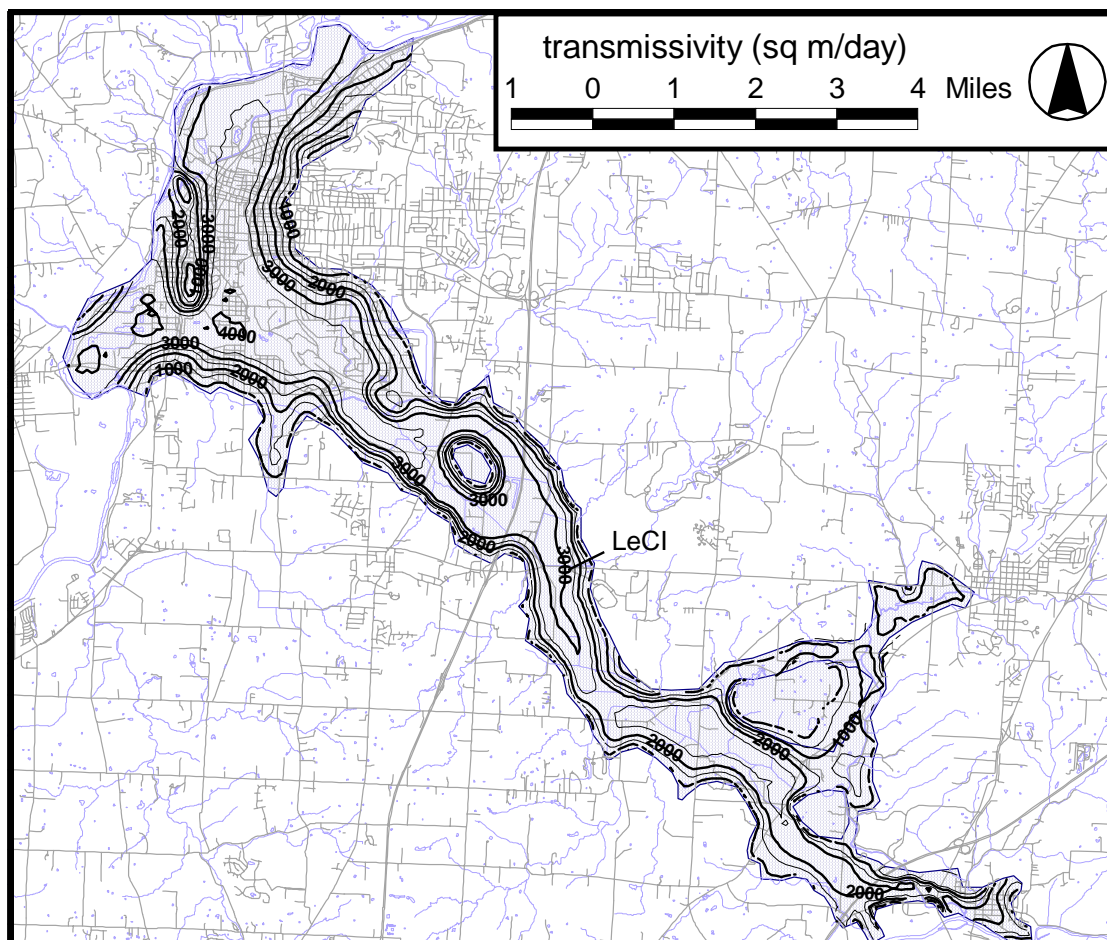


Figure 21. Model-calibrated transmissivity using a hydraulic conductivity of 47 m/day.

**Table 5**

Deviation of head predicted by flow model with head measured in the field

Calibration point	measured head (m AMSL)	observed head (m AMSL)	deviation (m)
Bern's Nursery	187.85	187.82	-0.03
W-5	189.36	188.71	-0.65
LCI pig farm	189.44	188.95	-0.49
Bogart farm	189.09	193.48	4.39
Nixon well	199.60	199.00	-0.60

mean deviation: 0.52 m  
 mean absolute deviation: 1.23 m

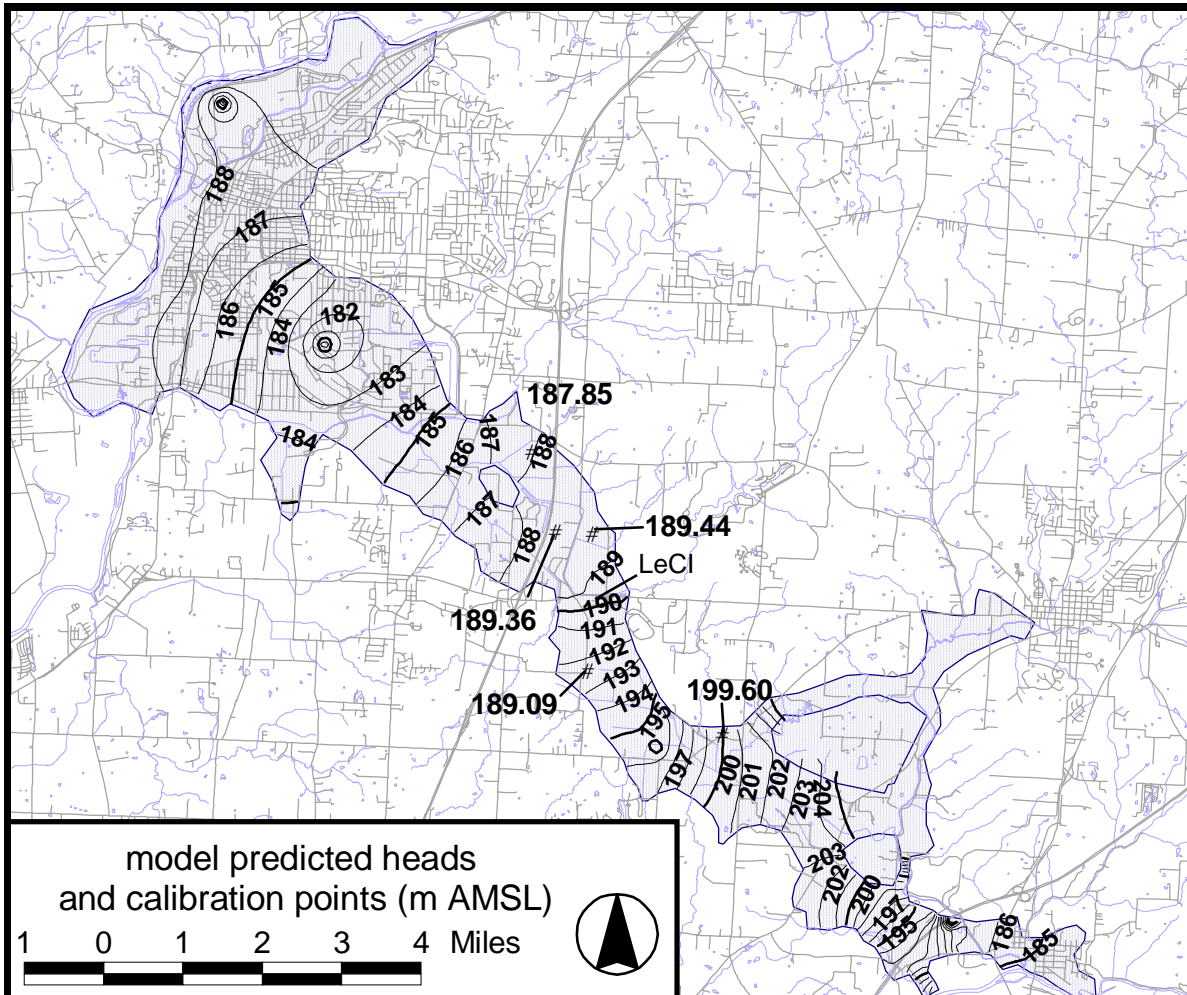


Figure 22. Hydraulic head predicted by the model (contour lines) and observed model calibration heads.

Table 6

Volumetric flux budget for flow model

constant head in: 48,308 m<sup>3</sup>/day  
recharge in: 57,138 m<sup>3</sup>/day  
**total in:** 105,446 m<sup>3</sup>/day

constant head out: 5,337 m<sup>3</sup>/day  
wells out: 100,098 m<sup>3</sup>/day  
**total out:** 105,435 m<sup>3</sup>/day

**in - out:** 11 m<sup>3</sup>/day

discrepancy: 0.01 %



these streams are gauged so the discharge must be estimated by multiplying upstream drainage area (Table 3) by 13 in/year, the surface runoff reported in ODNR's Hydrologic Atlas of Ohio (Fig. 18). A proportion of this discharge determined by model calibration is assumed to recharge the aquifer as it passes over the outwash terraces (Figs. 19 and 20).

### **Porosity**

MODPATH calculates the average velocity fluid flow,  $v$ , by dividing seepage velocity  $q$  (discharge per unit area) by porosity  $n$  (proportion of aquifer volume composed of voids). Porosity of aquifer materials ranges from 0.2 to 0.3; a value of 0.2 is used in this study.

### **Discretization**

The model domain (Fig. 2) was divided into square model cells 100m per side. The average annual pumpage rates (Table 1) were applied to the cells nearest the center of each well field. Hydraulic conductivity was varied between 46.6 and 55.1 m/day. Areal recharge by precipitation was varied between calibration limits from 0 to 30% of total annual precipitation. Recharge by infiltration from channel loss of streams crossing the terraces along the valley sides was varied between calibration limits of 0 to 30% of the estimated annual discharge.

The model input values for recharge and hydraulic conductivity were varied within the calibration limits to fit the calibration targets (Fig. 12). Values of 6% and 20% of annual precipitation and stream discharge respectively and hydraulic conductivity of 47 m/day (Fig. 21) were found to provide the closest fit the calibration targets.

### **Presentation of Computer Modeling Information**

The heads predicted by the flow model fit the five observed heads with an average deviation of 1.23 m (Fig. 22 and Table 4). The volumetric flow budget for the aquifer is shown in Table 5.

### **Delineation Results**

MODPATH can be used to track the movement of particles either forward or backward with time. The particle is assumed to be transported advectively at the average rate of groundwater movement ( $v$ ). MODPATH assumes the effects of molecular diffusion and of longitudinal and transverse dispersion are negligible. If the steady-state flow domain predicted by the flow model is valid for a future five year period, the travel paths of particles released at the LeCl well field may be traced backwards in time (Fig. 23).

It should be kept in mind that the delineated well head protection area is conservative; an aquifer porosity of 0.30 would result in a smaller protection area. It should also be remembered that the effects of molecular diffusion and of longitudinal and transverse dispersion would result in a larger protection area. Further, the validity of basing travel times on the flow regime predicted by a steady-state model must be questioned in an area demonstrating a historic and continuing withdrawal of water from storage due to overdrafting of the aquifer system.

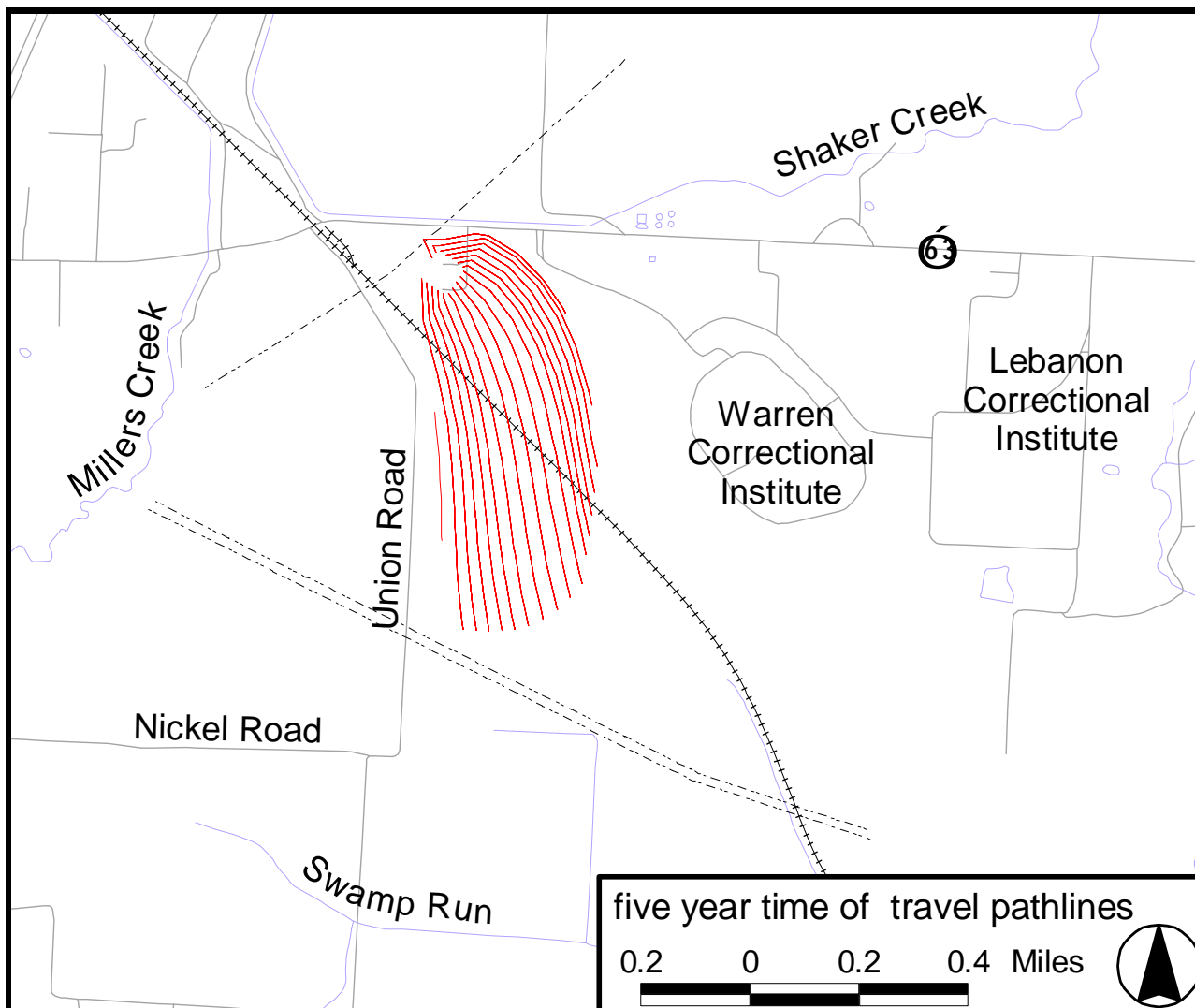


Figure 23. Five year time of travel pathlines to the LeCI well field. Assumes steady state flow model and transport by advection only.

### References

- Harbaugh, A.W., and McDonald, M.G., 1996, User's documentation for MODFLOW-96, an update to the U.S. Geological Survey modular finite-difference ground-water flow model: *U.S. Geological Survey Open-File Report 96-485*, 56 p.
- McDonald, M.G., and Harbaugh, A.W., 1988, A modular three-dimensional finite-difference ground-water flow model: *U.S. Geological Survey Techniques of Water-Resources Investigations, book 6, chap. A1*, 586 p.
- Pollock, D.W., 1994, User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post-processing package for MODFLOW, the U.S. Geological Survey finite-difference ground-water flow model: *U.S. Geological Survey Open-File Report 94-464*, 6 ch.
- Shapiro, A.M., Margolin, J., Dolev, S., and Ben-Israel, Y., 1997, A Graphical-User Interface for the U.S. Geological Survey Modular Three-Dimensional Finite-Difference Ground-Water Flow Model (MODFLOW-96) Using Argus Numerical Environments: *U.S. Geological Survey Open-File Report 97-121*, 50 p.

**Appendix A**  
**Driller's logs**

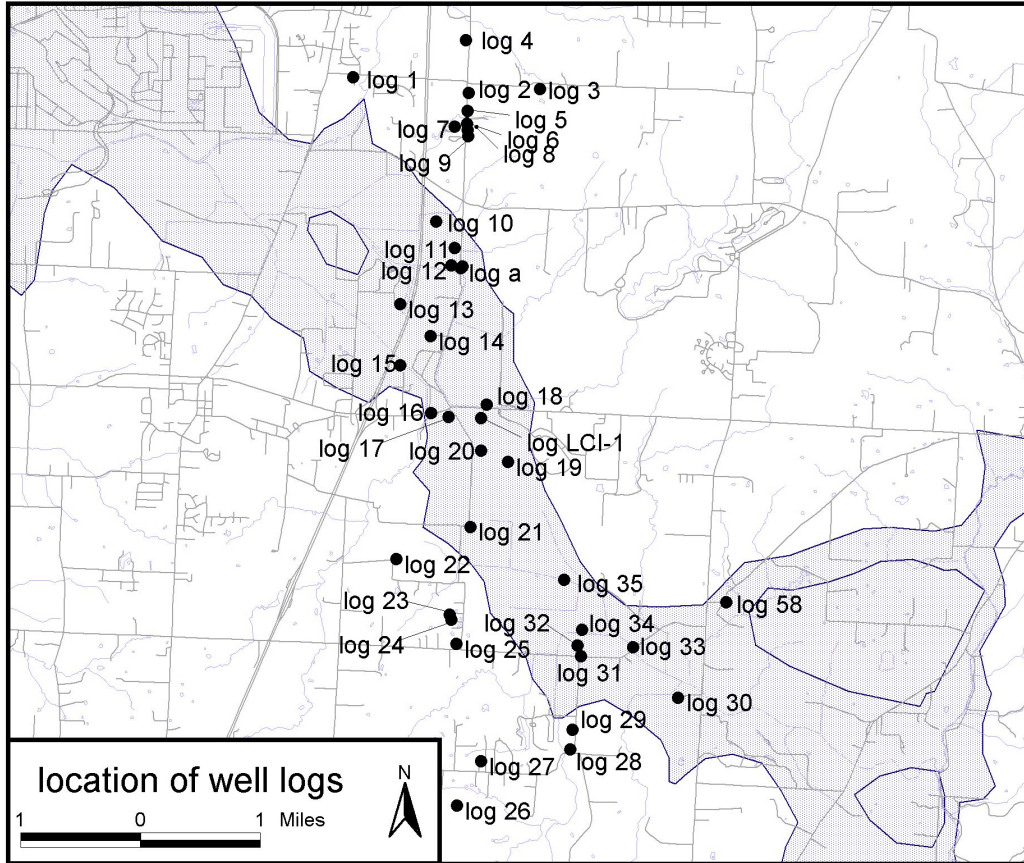


Figure A-1. Location of driller's logs used for construction of cross sections in Appendix B.

# WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

No. 424189

County Butler Warren Township Lemon Turtle Creek Section of Township  
Owner Faith Albine Chuck Address 165 S. Broadway St  
Middletown Ohio  
Location of property Henderson Rd.

### CONSTRUCTION DETAILS

Well casing diameter 6" Length of casing 37  
Type of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion 8-30-72

### BAILING OR PUMPING TEST (Specify one by circling)

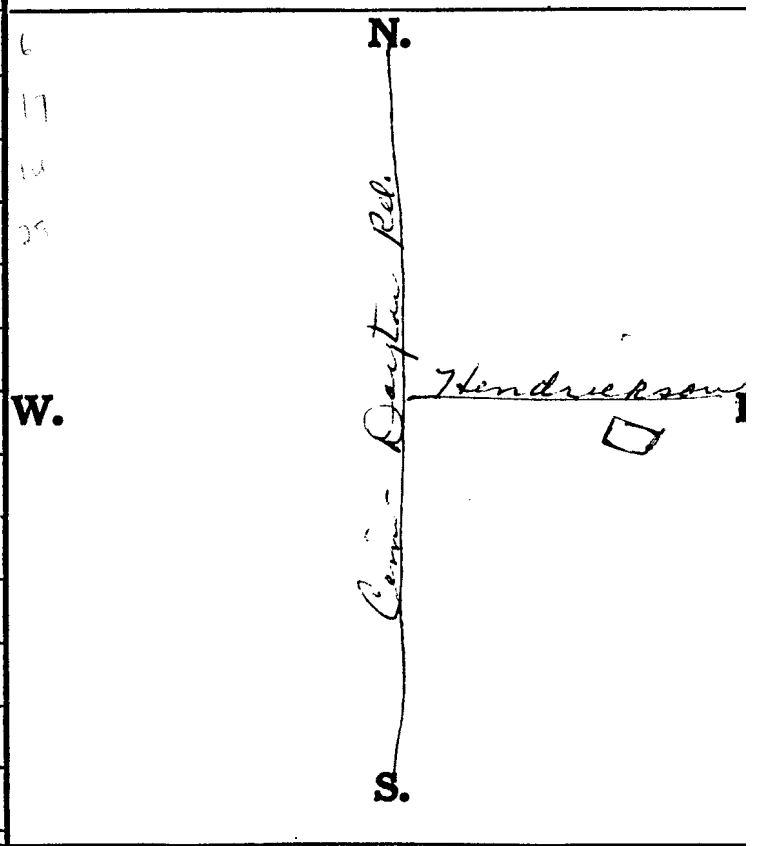
Test Rate 10 G.P.M. Duration of test \_\_\_\_\_  
Drawdown None ft. Date \_\_\_\_\_  
Static level-depth to water 18  
Quality (clear, cloudy, taste, odor) \_\_\_\_\_  
Pump installed by \_\_\_\_\_

### WELL LOG\*

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Red Clay</u>	<u>0 Feet</u>	<u>6 Ft.</u>
<u>Brown Clay</u>	<u>6</u>	<u>23</u>
<u>Shale Rock</u>	<u>23</u>	<u>37</u>
<u>Limestone</u>	<u>37</u>	<u>66</u>
<u>Water at 33'</u>		

### SKETCH SHOWING LOCATION

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc



Drilling Firm Dewey Fraligh  
Address R.R. 1  
Hermantown, O

Date 8-30-72  
Signed Dewey Fraligh

WELL LOG AND DRILLING REPORT

ORIGI ✓

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Columbus, Ohio

No 156979

County Warren Township Franklin Section of Township Turtle Creek or Lot Number

Owner Robert Keys Address Middletown, Ohio

Location of property Union Road just South of Henderson Rd on East side of Union Rd

CONSTRUCTION DETAILS		PUMPING TEST	
Casing diameter <u>6"</u>	Length of casing <u>45'</u>	Pumping rate <u>bailing estimate</u>	Duration of test <u>—</u>
Type of screen <u>none</u>	Length of screen <u>—</u>	Drawdown <u>—</u> ft.	Date <u>June 23, 1955</u>
Type of pump <u>none</u>		Developed capacity <u>60 gal. pr. hr.</u>	
Capacity of pump <u>—</u>		Static level—depth to water <u>12</u>	
Depth of pump setting <u>—</u>		Pump installed by <u>PUMP NOT YET INST.</u>	

WELL LOG			SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, et	
clay dirt	0 Feet	20		
blue clay	20	45		
Shale Rock	45	100		

See reverse side for instructions

Drilling Firm Elmer Miller  
Address R#1, Germantown, Ohio

Date June 23, 1955  
Signed Elmer Miller



WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

No. 380312 ✓

County Warren Township 1/2 Turtle Creek Section of Township \_\_\_\_\_

Owner Harvey Thomas Address Wendricks Rd.

Location of property 5 mile E of Turtle Creek on Wendricks Rd.

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
casing diameter <u>6"</u> Length of casing <u>31'</u>	Test Rate <u>30</u> G.P.M. Duration of test <u>2</u> hr.
type of screen <u>radis</u> Length of screen <u>6'</u>	Drawdown <u>3</u> ft. Date <u>11/1/68</u>
type of pump _____	Static level-depth to water <u>16</u>
capacity of pump _____	Quality (clear, cloudy, taste, odor) <u>Clear</u>
depth of pump setting _____	Pump installed by _____
date of completion _____	

WELL LOG*			SKETCH SHOWING LOCATION	
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc	
<u>Shale</u>	<u>0 Feet</u>	<u>8 Ft.</u>	<p>N.</p> <p>8</p> <p>8</p> <p>2</p> <p>18</p> <p>4</p> <p>W.</p> <p>S.</p>	
<u>Shale</u>	<u>8</u>	<u>16</u>		
<u>Shale</u>	<u>16</u>	<u>18</u>		
<u>Shale</u>	<u>18</u>	<u>36</u>		
<u>Shale</u>	<u>36</u>	<u>40</u>		

Drilling Firm Wallace L. Day Date 11/5/68  
 Address 7165 Newark Ave. Signed W. L. Day  
Franklin, Ohio

WELL LOG AND DRILLING REPORT

ORIG

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Columbus, Ohio

No 139634

County Warren Township Franklin Section of Township Turtle Creek or Lot Number Lot # 16

Owner James C. Suggs Address \_\_\_\_\_

Location of property 2 1/2 miles off of Route 22 on main Rd going South which

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 18'  
Type of screen Prop Length of screen 7'  
Type of pump Building  
Capacity of pump 5 gals  
Depth of pump setting none

PUMPING TEST

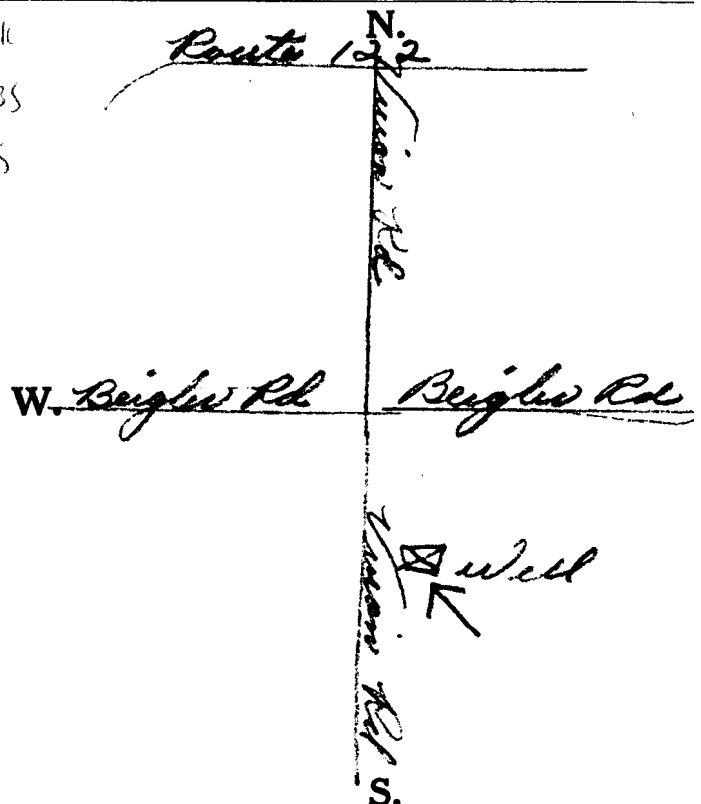
Building Test  
Pumping rate 7 1/2 G.P.M. Duration of test 1  
Drawdown \_\_\_\_\_ ft. Date 10-16-55  
Developed capacity 450 gals  
Static level—depth to water \_\_\_\_\_  
Pump installed by none

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	0 Feet	<u>10'</u> Ft.
<u>Limestone</u>	<u>10'</u>	<u>45'</u>
<u>lime shell</u>	<u>45'</u>	<u>60'</u>

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, e



later at 16'

See reverse side for instructions

Drilling Firm Miller & Dails  
Address 8001 Franklin

Date 10-16-55  
Signed C. Everett Miller

Core #5  
USE PENCIL  
OR TYPEWRITER  
DO NOT USE INK.

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
1562 W. First Avenue  
Columbus, Ohio 43212

No. 349266

County Warren Township Franklin Section of Township Turtle Creek  
Owner Henry Dehard Address RR Franklin  
Location of property E S Union rd 1/2 mi N of Mantel rd

CONSTRUCTION DETAILS

BAILING OR PUMPING TEST

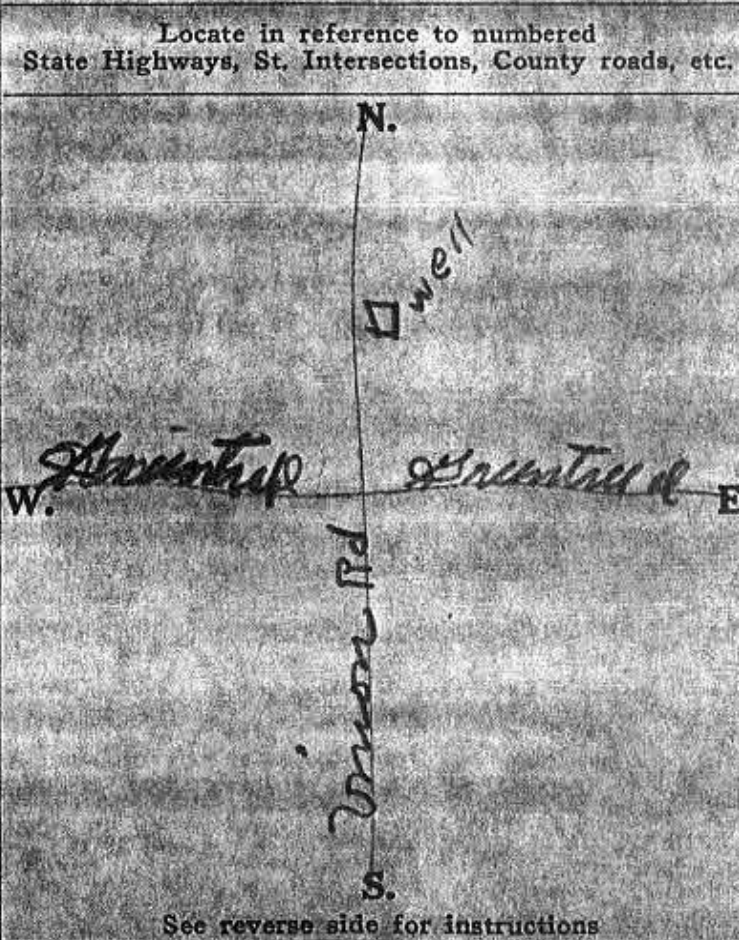
Casing diameter 8" Length of casing 30'  
Type of screen Perforated Length of screen 16'  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion \_\_\_\_\_

Pumping Rate 5 G.P.M. Duration of test 2 hr  
Drawdown 60 ft. Date 12 66  
Static level depth to water 18  
Quality (clear, cloudy, taste, odor)  
Pump installed by \_\_\_\_\_

WELL LOG\*

SKETCH SHOWING LOCATION

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Shale</u>	0 Feet	30 Ft.
<u>Shale</u>	30	60



See reverse side for instructions

Drilling Firm Kinsey Well Drilling Date 12 66  
Address 3110 Jackson rd Signed [Signature]

\*If additional space is needed to complete well log, use next consecutive numbered form

Core #6  
 PLEASE USE PENCIL  
 OR TYPEWRITER  
 DO NOT USE INK.

State of Ohio  
 DEPARTMENT OF NATURAL RESOURCES  
 Division of Water  
 1562 W. First Avenue  
 Columbus 12, Ohio

No. 319672

County Warren Township Franklin Section of Township Turtle Creek  
 Owner Henry DeLeon Address Middletown O  
 Location of property E S Union rd 7/10 mi. Slat at 12.2

CONSTRUCTION DETAILS

BAILING OR PUMPING TEST

Casing diameter 8" Length of casing 40' Pumping Rate 6 G.P.M. Duration of test 1 hr  
 Type of screen Push Length of screen 6' Drawdown 10' ft. Date 11-13-64  
 Type of pump \_\_\_\_\_ Static level-depth to water 20' ft  
 Capacity of pump \_\_\_\_\_ Quality (clear) (cloudy, taste, odor)  
 Depth of pump setting \_\_\_\_\_ Pump installed by \_\_\_\_\_  
 Date of completion \_\_\_\_\_

WELL LOG

SKETCH SHOWING LOCATION

Formations	From	To	Sketch showing location
Sandstone, shale, limestone, gravel and clay	0 Feet	36 Ft.	<p>Locate in reference to numbered State Highways, St. Intersections, County roads, etc.</p> <p><u>36</u> N.</p> <p><u>W. Slat at 12.2</u> E</p> <p>S.</p> <p><i>DeLeon</i></p> <p>See reverse side for instructions</p>
<u>Clay shale</u>	36	100'	

Drilling Firm Krisser Well Drilling Date 12-30-64  
 Address 3117 Yankee rd Middletown O Signed [Signature]

Core #7

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

498271

*Turtle Creek*

COUNTY WARREN TOWNSHIP *Franklin* SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER FRED MYERS ADDRESS 2055 UNION RD  
LOCATION OF PROPERTY 1 MILES SOUTH OF STATE ROUTE 122

**CONSTRUCTION DETAILS**

Drilling diameter 5 5/8 Length of casing 65 FT  
Type of screen NONE Length of screen \_\_\_\_\_  
Type of pump \_\_\_\_\_  
Capacity of pump ~~12-14~~ *2-10 GPM*  
Depth of pump setting 60'  
Date of completion 10-13-76

**BAILING OR PUMPING TEST**  
(specify one by circling)

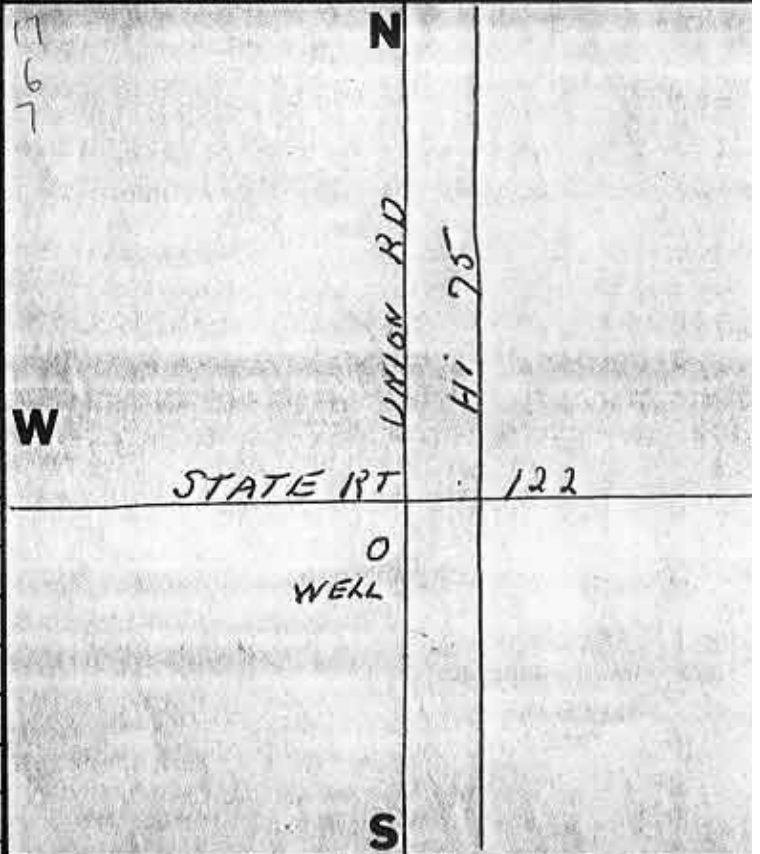
Test rate 12-14 gpm Duration of test 2 hr  
Drawdown 4 ft Date \_\_\_\_\_  
Static level (depth to water) 26'  
Quality (clear, cloudy, taste, odor) Clear  
Pump installed by *Bradley Barnett*

**WELL LOG\***

Formations: sandstone, shale, limestone, gravel, clay	From	To
<i>CLAY</i>	0 ft	17 ft
<i>BROWN SHALE</i>	17	23
<i>SHALE LIMESTONE</i>	23	30

**SKETCH SHOWING LOCATION**

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM *Barnett Well Drilling*  
ADDRESS 7789 Lyn Dr.  
Franklin Ohio 45005

DATE 10-23-76  
SIGNED *Bradley Barnett*

Core #8

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Columbus, Ohio

No 156984

County WAYNES Township TURTLE CREEK Section of Township 6  
Owner Joe Riddle Address Jaxewell, Tenn.  
Location of property East Side of Union Rd - 1/2 South of Henderson

CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 40 Pumping rate 2/3 GPM Duration of test 2  
Type of screen — Length of screen — Drawdown — ft. Date July 11-1  
Type of pump — Developed capacity NO PER HR  
Capacity of pump — Static level—depth to water —  
Depth of pump setting — Pump installed by Pump not  
INSTALL AS YET

PUMPING TEST  
Drilling estimation

WELL LOG

SKETCH SHOWING LOCATION

Formations	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
Sandstone, shale, limestone, gravel and clay	0 Feet	30 Ft.	
Clay	0	30	
Rock + Shale	30	65	

See reverse side for instructions

Drilling Firm E. Ivey Miller Date July 11-1955  
Address RR #1 GERMANTOWN Signed E. Ivey Miller

Core #9

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Columbus, Ohio

No 139616

County Warren Township Franklin Section of Township Turtle Creek or Lot Number

Owner Nelson Wastan Jr Address RR#1 Franklin Ohio

Location of property 2 miles off Route 122 on Union Rd 1/2 mile south of Biggs Rd.

CONSTRUCTION DETAILS

PUMPING TEST

Casing diameter <u>5 5/8</u>	Length of casing <u>21'</u>	Pumping rate.....G.P.M.	Duration of test.....h
Type of screen <u>Pup</u>	Length of screen <u>12'</u>	Drawdown.....ft.	Date.....
Type of pump.....		Developed capacity.....	
Capacity of pump.....		Static level—depth to water.....	
Depth of pump setting.....		Pump installed by.....	

WELL LOG

SKETCH SHOWING LOCATION

Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
---	------	----	--

<u>Clay</u> <u>limestone</u>	0 Feet	<u>10 Ft.</u>	<u>Route 122</u> <u>W. Biggs Rd</u> <u>Biggs Rd</u>
	<u>10</u>	<u>50 ft</u>	<u>Union Rd</u> <u>Warren Ohio</u>

DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Columbus, Ohio

See reverse side for instructions

Drilling Firm Miller & Pails Date 6-29-55  
Address RR#1 Franklin Ohio Signed E. Miller

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456774

County WARTER Township TURTLE CREEK Section of Township E-2

Owner Division of Biological Survey Address Fountain Square Columbus

Location of property off State Rt 63 on Union Rd & Brentwood Rd

CONSTRUCTION DETAILS

casing diameter 5/8" Length of casing 165  
 type of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 type of pump \_\_\_\_\_  
 capacity of pump \_\_\_\_\_  
 depth of pump setting \_\_\_\_\_  
 date of completion \_\_\_\_\_

BAILING OR PUMPING TEST  
(Specify one by circling)

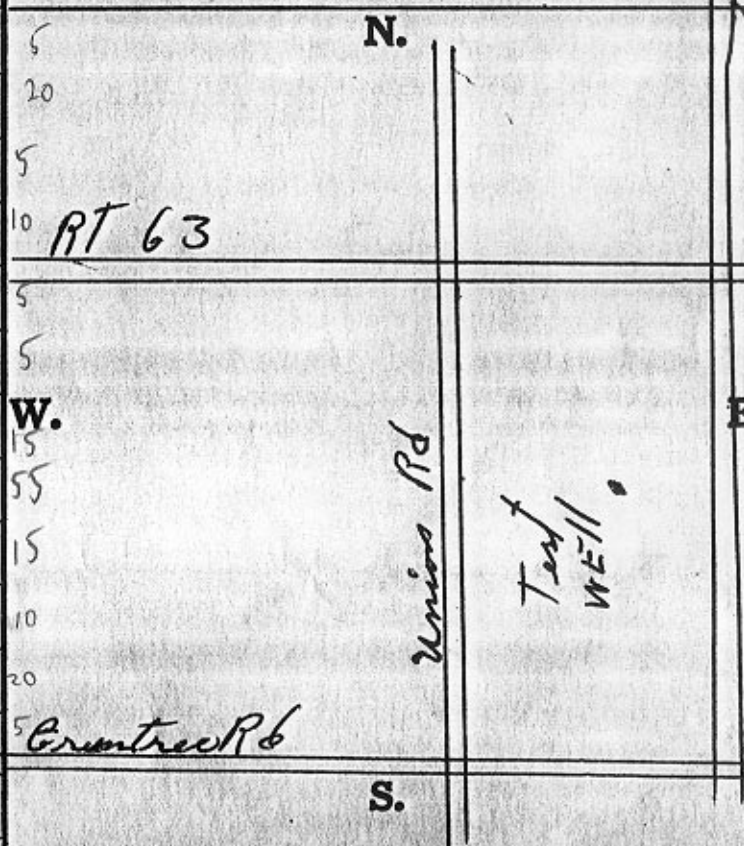
Test Rate 20 G.P.M. Duration of test 2 h  
 Drawdown 60 ft. Date Feb-4-74  
 Static level-depth to water 34  
 Quality (clear, cloudy, taste, odor) Clear  
 Pump installed by None

WELL LOG\*

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>5 Ft.</u>
<u>Clay Fine sand</u>	<u>5</u>	<u>25</u>
<u>Fine sand</u>	<u>25</u>	<u>30</u>
<u>Gravelly sand &amp; G</u>	<u>30</u>	<u>40</u>
<u>Clay</u>	<u>40</u>	<u>45</u>
<u>Gravelly sand &amp; Gravel</u>	<u>45</u>	<u>50</u>
<u>Clay</u>	<u>50</u>	<u>65</u>
<u>Coarse sand &amp; Gravel</u>	<u>65</u>	<u>120</u>
<u>Gravelly sand &amp; Brown clay</u>	<u>120</u>	<u>135</u>
<u>Gravelly sand &amp; Gravel</u>	<u>135</u>	<u>145</u>
<u>Coarse clay &amp; gravel</u>	<u>145</u>	<u>165</u>
<u>Limestone &amp; shale</u>	<u>165</u>	<u>170</u>
<u>water at</u>	<u>145 to 110</u>	

SKETCH SHOWING LOCATION

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc.



Drilling Firm Bob Well Drilling  
Address Ben Dale Reynoldsville  
Ohio

Date Feb 5-74  
Signed Jack L...



Core #12  
 NO CARBON PAPER  
 NECESSARY—  
 SELF-TRANSCRIBING

State of Ohio  
 DEPARTMENT OF NATURAL RESOURCES  
 Division of Water  
 65 S. Front St., Rm. 815 Phone (614) 469-2646  
 Columbus, Ohio 43215

450804 ✓

County Warren Township Turtle Creek Section of Township \_\_\_\_\_

Owner Warren County Address Lebanon, Ohio

Location of property 150 ft north of road, <sup>100 ft</sup> west of creek

**CONSTRUCTION DETAILS**

Casing diameter 2 1/2" Length of casing 74'  
 Type of screen Cook bronze Length of screen 30'  
 Type of pump None  
 Capacity of pump \_\_\_\_\_  
 Depth of pump setting \_\_\_\_\_  
 Date of completion 10-15-71

**BAILING OR PUMPING TEST**  
 (Specify one by circling)

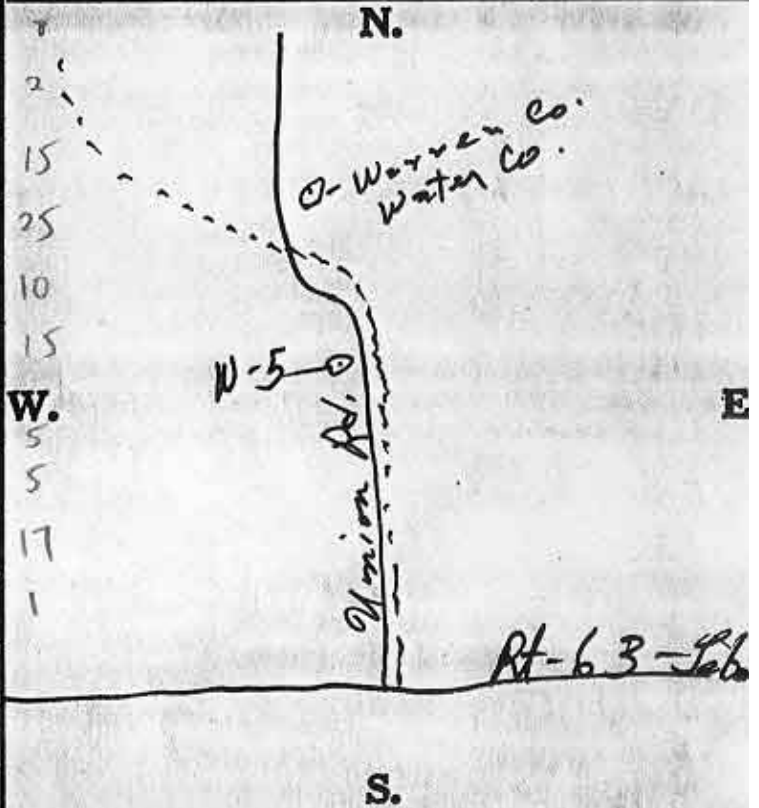
Test Rate 600 G.P.M. Duration of test 24 hr  
 Drawdown 44" ft. Date \_\_\_\_\_  
 Static level-depth to water 23'  
 Quality (clear, cloudy, taste, odor) \_\_\_\_\_  
 Pump installed by \_\_\_\_\_

**WELL LOG\***

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Top soil</u>	<u>0 Feet</u>	<u>8 Ft.</u>
<u>Brown sand</u>	<u>8</u>	<u>10</u>
<u>Sand, gravel &amp; clay</u>	<u>10</u>	<u>25</u>
<u>Blue sandy clay</u>	<u>25</u>	<u>50</u>
<u>Sand, gravel &amp; clay</u>	<u>50</u>	<u>60</u>
<u>Sand &amp; gravel</u>	<u>60</u>	<u>75</u>
<u>Fine sand</u>	<u>75</u>	<u>80</u>
<u>Sand, gravel &amp; clay</u>	<u>80</u>	<u>85</u>
<u>Sand &amp; gravel</u>	<u>85</u>	<u>102</u>
<u>Blue clay</u>	<u>102</u>	<u>103</u>

**SKETCH SHOWING LOCATION**

Locate in reference to numbered  
 State Highways, St. Intersections, County roads, etc.



Drilling Firm Layne Ohio Co  
 Address Columbus, Ohio

Date 12-5-71  
 Signed Layne Ohio Co

\*If additional space is needed to complete well log, use next consecutive numbered form

Core #13

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456758

M-M NO 3

County WARREN Township TURTLE CREEK Section of Township F-1

Owner DIVISION GEOLOGICAL SURVEY Address FOUNTAIN SQUARE COLUMBUS

Location of property OFF STATE RT 63 ON GARVAT RD END OF LAKE

CONSTRUCTION DETAILS

PULL BACK 125

Casing diameter 6" O.D. Length of casing 120  
Type of screen SCALE Length of screen  
Type of pump  
Capacity of pump  
Depth of pump setting  
Date of completion

BAILING OR PUMPING TEST

(Specify one by circling)

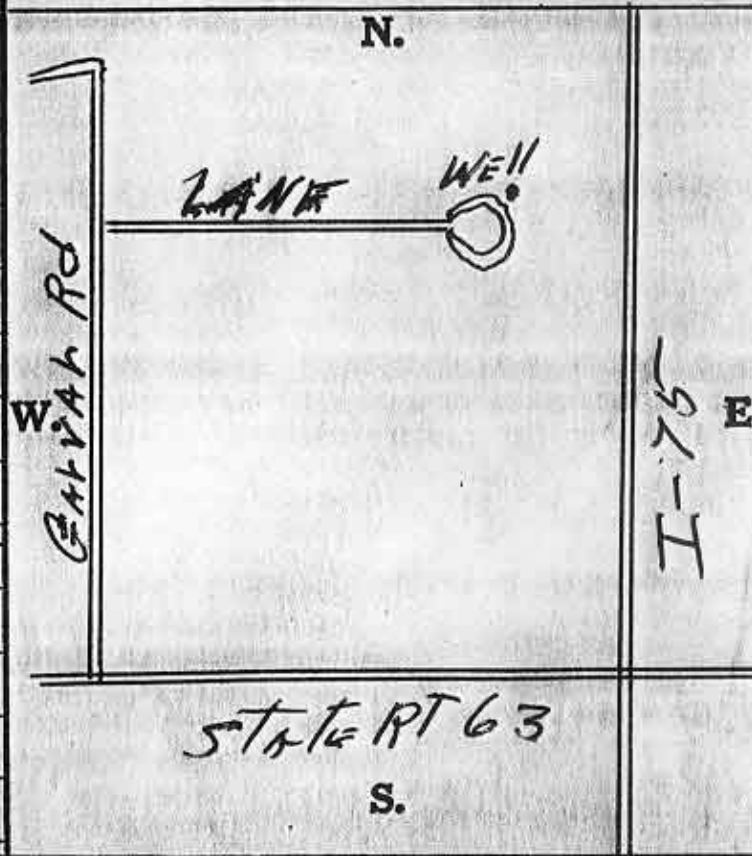
Test Rate 20+ G.P.M. Duration of test 2 hr  
Drawdown 54 ft. Date Aug - 5 - 73  
Static level-depth to water 96-8 ft  
Quality (clear, cloudy, taste, odor) CLEAR  
Pump installed by

WELL LOG\*

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>15 Ft.</u>
<u>Clay Sand &amp; G.</u>	<u>15</u>	<u>48</u>
<u>Sand</u>	<u>48</u>	<u>51</u>
<u>Dirty sand &amp; G.</u>	<u>51</u>	<u>70</u>
<u>Sand &amp; Clay</u>	<u>70</u>	<u>80</u>
<u>Sand &amp; Clay &amp; Mixed</u>	<u>80</u>	<u>95</u>
<u>Sand &amp; G.</u>	<u>95</u>	<u>115</u>
<u>Sand &amp; Clay</u>	<u>115</u>	<u>120</u>
<u>Dirty sand &amp; G.</u>	<u>120</u>	<u>125</u>
<u>Sand &amp; Clay</u>	<u>125</u>	<u>130</u>
<u>Water at 57 ft to 125 ft.</u>		

SKETCH SHOWING LOCATION

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc.



Drilling Firm L & L WELL DRILLING Date Aug 30 73  
Address Box Del Waynesville Ohio Signed Jack & Louie's

Core #14

LEASE USE PENCIL  
OR TYPEWRITER  
DO NOT USE INK.

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
1562 W. First Avenue  
Columbus, Ohio 43212

No. 363352

County WARREN Township TURTLE-CREEK Section of Township 6

Owner JAY-EDYAR-FRICK Address 1301-HEMPSTEAD-RD.-DAYTON

Location of property UNION-RD. 1/4<sup>th</sup> MI. NORTH-OF-S.R. 63

CONSTRUCTION DETAILS

Casing diameter 12" I.D. Length of casing 75 FT.  
Type of screen COOK Length of screen 20 FT.  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion JULY-25-67

BAILING OR PUMPING TEST

Pumping Rate 1500 G.P.M. Duration of test 8 hr  
Drawdown 48 ft. Date \_\_\_\_\_  
Static level-depth to water 28  
Quality (clear, cloudy, taste, odor) \_\_\_\_\_  
Pump installed by \_\_\_\_\_

WELL LOG\*

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>SOIL</u>	<u>0 Feet</u>	<u>1 Ft.</u>
<u>BROWN-CLAY</u>	<u>1 "</u>	<u>7 "</u>
<u>BROWN-GRAYLEY-CLAY</u>	<u>7 "</u>	<u>19 "</u>
<u>BROWN-SANDY-CLAY</u>	<u>19 "</u>	<u>22 "</u>
<u>GRAY-SANDY-CLAY</u>	<u>22 "</u>	<u>36 "</u>
<u>QUICK-SAND</u>	<u>36 "</u>	<u>66 "</u>
<u>HARD-PAN</u>	<u>66 "</u>	<u>69 "</u>
<u>WATER-GRAVEL</u>	<u>69 "</u>	<u>95 "</u>

SKETCH SHOWING LOCATION

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc.

N.

W.

E.

S.

See reverse side for instructions

Drilling Firm IRA-W. BARNES, SONS.

Date JULY-27-67

Address DAYTON OHIO

Signed Merwin W. Barnes  
(DRILLER)

\*If additional space is needed to complete well log, use next consecutive numbered form

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456767

M-M-NO 1

County Warren Township Turtle Creek Section of Township E-1

Owner Division of Geological Survey Address Fountain Square Columbus

Location of property off state RT 63 at old 25 at Mt Lock

**CONSTRUCTION DETAILS**

using diameter 6" O.D. Length of casing 75  
 type of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 type of pump \_\_\_\_\_  
 capacity of pump \_\_\_\_\_  
 depth of pump setting \_\_\_\_\_  
 date of completion \_\_\_\_\_

**BAILING OR PUMPING TEST**  
(Specify one by circling)

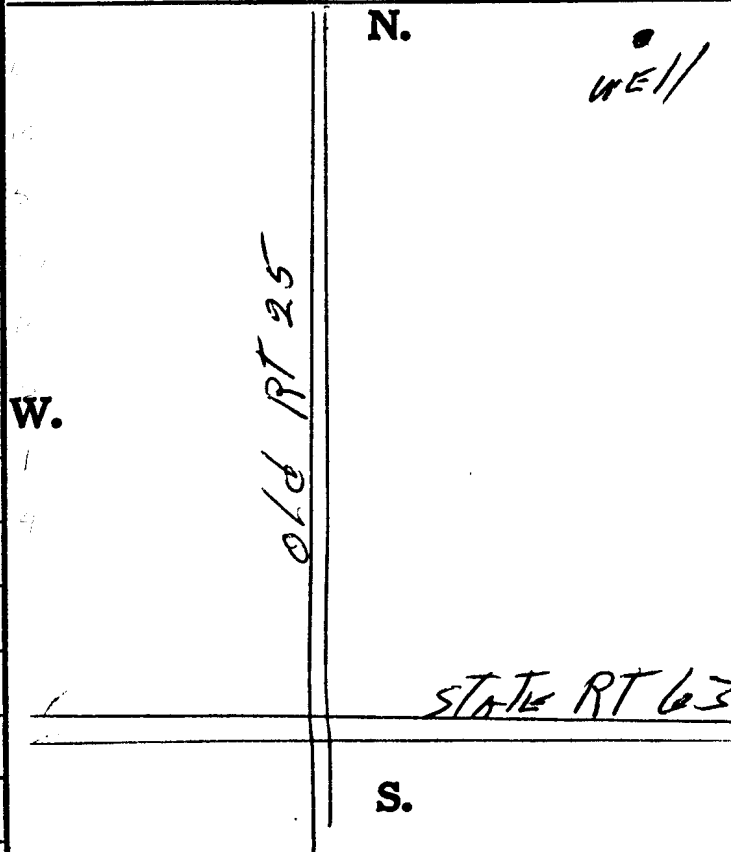
Test Rate \_\_\_\_\_ G.P.M. Duration of test \_\_\_\_\_  
 Drawdown 40+ ft. Date Sept. 25  
 Static level-depth to water None  
 Quality (clear, cloudy, taste, odor) \_\_\_\_\_  
 Pump installed by \_\_\_\_\_

**WELL LOG\***

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>clay mixed with sand</u>	<u>0 Feet</u>	<u>9 Ft.</u>
<u>clay &amp; sand</u>	<u>9</u>	<u>15</u>
<u>clay mixed sand &amp; G</u>	<u>15</u>	<u>30</u>
<u>Fine sand</u>	<u>30</u>	<u>35</u>
<u>clay mixed sand &amp; G</u>	<u>35</u>	<u>55</u>
<u>Fine sand &amp; clay</u>	<u>55</u>	<u>65</u>
<u>clay mixed gravel</u>	<u>65</u>	<u>70</u>
<u>course sand &amp; G</u>	<u>70</u>	<u>71</u>
<u>Rock</u>	<u>71</u>	<u>75</u>
<u>water 30 ft.</u>		
<u>water at 70 ft.</u>		

**SKETCH SHOWING LOCATION**

Locate in reference to numbered  
State Highways, St. Intersections, County roads, et



Drilling Firm 6th Well Drilling

Address Wynnewille Ohio

Date Sept. 29-73

Signed Jack A. Lewis

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456759 ✓  
M-M NO

County WARREN Township FOUNTAIN CREEK Section of Township F-2

Owner DIVISION OF GEOLOGICAL SURVEY Address FOUNTAIN SQUARE COLUMBUS OH

Location of property OFF STATE RT 63

**CONSTRUCTION DETAILS**

using diameter 6-0.D. Length of casing 141  
Type of screen NONE Length of screen \_\_\_\_\_  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion \_\_\_\_\_

**BAILING OR PUMPING TEST**  
(Specify one by circling)

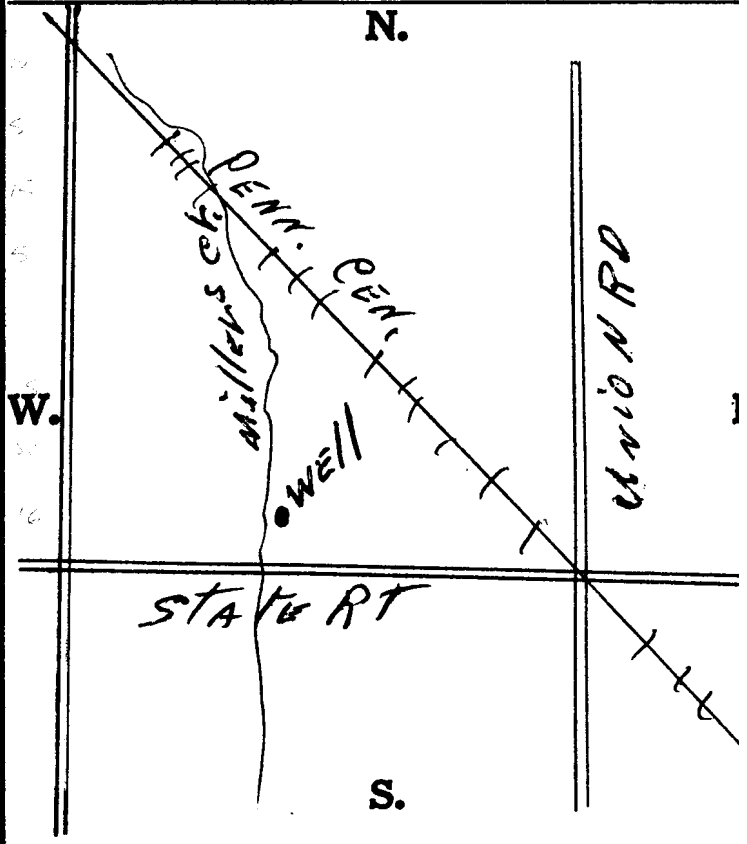
Test Rate 20 G.P.M. Duration of test 2  
Drawdown NONE ft. Date Aug-10-73  
Static level-depth to water 39-6  
Quality (clear, cloudy, taste, odor) CLEAR  
Pump installed by \_\_\_\_\_

**WELL LOG\***

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>CLAY</u>	<u>0 Feet</u>	<u>10 Ft.</u>
<u>CLAY + GRAVEL</u>	<u>10</u>	<u>15</u>
<u>CLAY</u>	<u>15</u>	<u>30</u>
<u>CLAY + GRAVEL</u>	<u>30</u>	<u>35</u>
<u>Coarse sand + GRAVEL</u>	<u>35</u>	<u>60</u>
<u>Fine sand</u>	<u>60</u>	<u>75</u>
<u>Coarse sand + G.</u>	<u>75</u>	<u>125</u>
<u>Coarse sand + clay</u>	<u>125</u>	<u>141</u>
<u>water at 35</u>		
<u>)) )) 125</u>		

**SKETCH SHOWING LOCATION**

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc



Drilling Firm 546 WELL DRILLING  
Address GEN. DEL. WAYNESVILLE OHIO

Date Aug 30 73  
Signed Jack D. Lewis

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

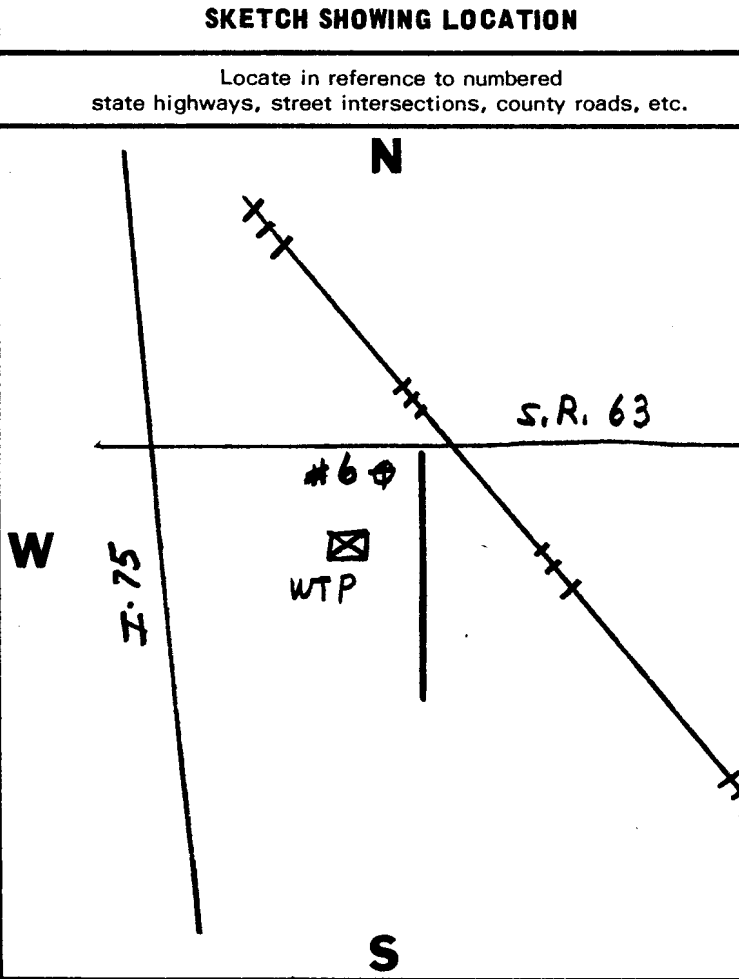
547513 ✓

COUNTY Warren TOWNSHIP Turtle Creek SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER Municipality of Monroe ADDRESS 2 E. Elm Street, Monroe, Ohio  
LOCATION OF PROPERTY Municipal well field, east of I75 South of SR. 63

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (specify one by circling)
casing diameter <u>12"</u> Length of casing <u>114'7"</u>	Test rate <u>500</u> gpm Duration of test <u>8</u>
diameter of screen <u>Cook w-w</u> Length of screen <u>25'</u>	Drawdown <u>8</u> ft Date <u>12/18/79</u>
type of pump <u>Peerless vertical turbine</u>	Static level (depth to water) <u>35</u>
capacity of pump <u>500 gal @ 80' TDH</u>	Quality (clear, cloudy, taste, odor) <u>Clear</u>
depth of pump setting <u>83'</u>	Pump installed by <u>(test only)</u>
date of completion <u>September 1979</u>	

WELL #6 WELL LOG\*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Sand	0 ft	7 ft
Sandy Clay	7	40
Sandy Clay	40	67
Sandy Clay	67	75
Sand & Stones	75	110
Sand & Gravel	110	115
Sand & Gravel & Large rocks	115	120
Sand & Gravel, Large rocks	120	125
Sand & Gravel, Large Rocks	125	130
Sand & Gravel, Large Rocks	130	137'5"
Sand & Gravel	137'5"	139



DRILLING FIRM Moody's of Dayton, Inc.  
ADDRESS 4359 Infirmary Rd., P.O. Box 123  
Miamisburg, Ohio 45342

DATE January 4, 1980  
SIGNED James Lamer

\*If additional space is needed to complete well log, use next consecutive numbered form

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

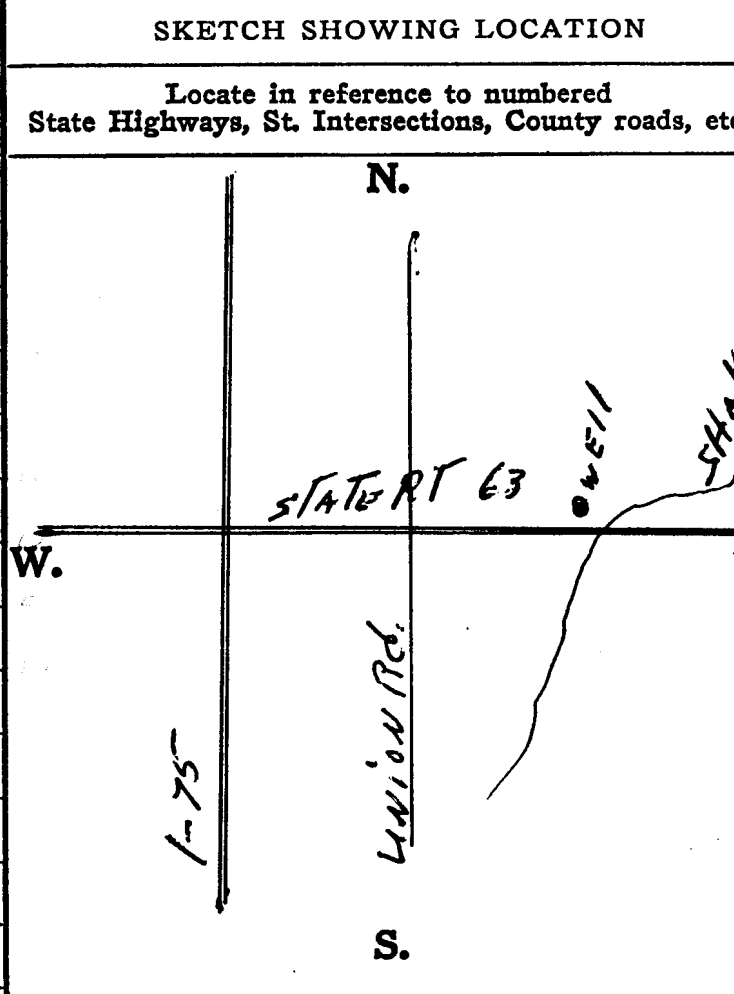
State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456755 ✓  
M-M NO 6<sup>#</sup>

County WARREN Township TURTLE CREEK Section of Township F-2  
Owner DIVISION OF GEOLOGICAL SURVEY Address FOUNTAIN SQUARE COLUMBUS OH  
Location of property OFF STATE RT 63 ON STATE FARM

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
using diameter <u>6" O.D.</u> Length of casing <u>110 ft.</u>	Test Rate <u>30</u> G.P.M. Duration of test <u>1</u>
type of screen <u>NONE</u> Length of screen _____	Drawdown <u>44</u> ft. Date <u>July 16</u>
type of pump <u>NONE</u>	Static level-depth to water <u>32' 6"</u>
capacity of pump _____	Quality (clear, cloudy, taste, odor) <u>CLEAR</u>
depth of pump setting _____	Pump installed by _____
date of completion _____	

WELL LOG*		
Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>15 Ft.</u>
<u>FINE SAND &amp; G.</u>	<u>14</u>	<u>24</u>
<u>FINE SAND</u>	<u>24</u>	<u>30</u>
<u>Clay sand &amp; gravel</u>	<u>30</u>	<u>40</u>
<u>Clay</u>	<u>40</u>	<u>60</u>
<u>Clay &amp; sand</u>	<u>60</u>	<u>70</u>
<u>Clay &amp; sand</u>	<u>70</u>	<u>80</u>
<u>Sand</u>	<u>80</u>	<u>85</u>
<u>Sand &amp; clay</u>	<u>85</u>	<u>95</u>
<u>Sand &amp; Gravel</u>	<u>95</u>	<u>110</u>
<u>WATER at 19 ft.</u>		
<u>WATER at 95 ft.</u>		



Drilling Firm LOHWEIL DRILLING Date Aug 30-73  
Address 261 DEL. WAYNESVILLE OHIO Signed Jack Lewis

NO CARBON PAPER  
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State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

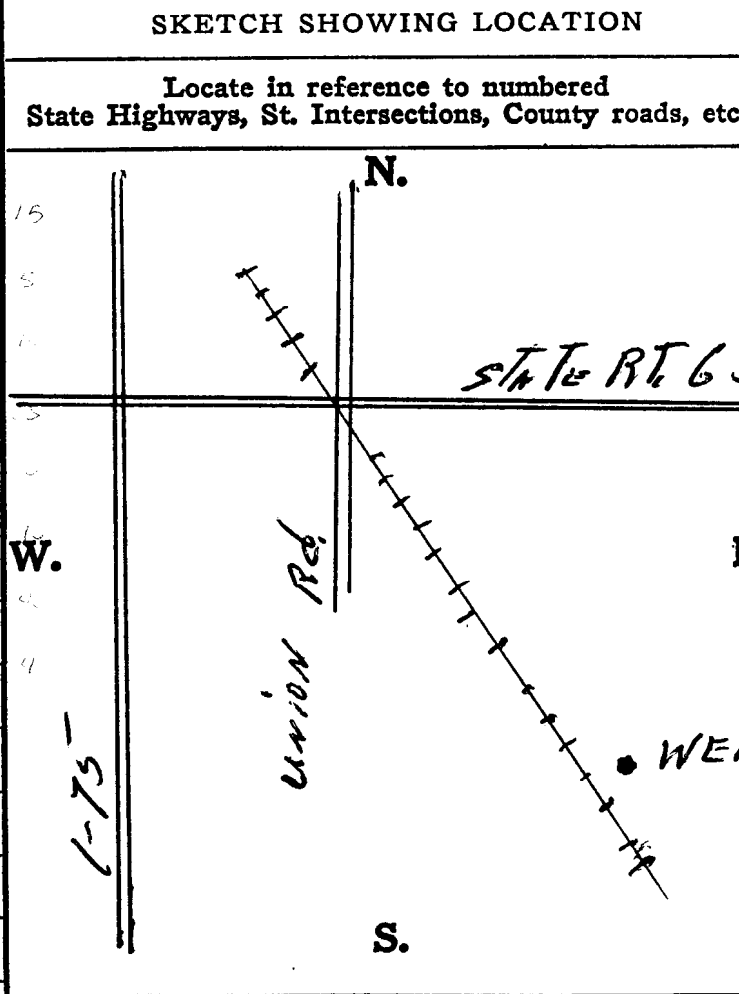
456756

M-N NO 7

County WARREN Township TURTLE CREEK Section of Township F-2  
Owner DIVISION OF GEOLOGICAL SURVEY Address FOUNTAIN SQUARE COLUMBUS OH  
Location of property OFF STATE RT. 63 ON STATE FARM SOUTH

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
casing diameter <u>6 O.D.</u> Length of casing <u>129</u>	Test Rate <u>20+</u> G.P.M. Duration of test <u>1</u>
type of screen <u>NONE</u> Length of screen _____	Drawdown _____ ft. Date <u>July 27-73</u>
type of pump _____	Static level-depth to water <u>25</u>
capacity of pump <u>NONE</u>	Quality (clear, cloudy, taste, odor) <u>clear</u>
depth of pump setting _____	Pump installed by _____
date of completion _____	

WELL LOG*		
Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>10-9 Ft.</u>
<u>Fine sand</u>	<u>10-9</u>	<u>25</u>
<u>Fine sand &amp; clay</u>	<u>25</u>	<u>30</u>
<u>Clay to sand</u>	<u>30</u>	<u>40</u>
<u>Fine sand</u>	<u>40</u>	<u>65</u>
<u>Clay to sand</u>	<u>65</u>	<u>75</u>
<u>Clay sand mixed</u>	<u>75</u>	<u>85</u>
<u>Sand to gravel</u>	<u>85</u>	<u>125</u>
<u>Clay mixed with</u>	<u>125</u>	<u>129</u>
water at <u>25 ft</u> <u>85 ft</u> <u>and 115</u>		



Drilling Firm Lee Well Drilling Date Aug 30-73  
Address Gen Del. Waynesville Ohio Signed Jack & Lewis



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NECESSARY -  
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State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

619137 ✓

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP ?

OWNER Don Sigg ADDRESS BANK BLDG LEBANON, O

LOCATION OF PROPERTY \_\_\_\_\_

CONSTRUCTION DETAILS		BAILING OR PUMPING TEST <small>(specify one by circling)</small>	
casing diameter <u>6"</u>	Length of casing <u>68</u>	Test rate <u>20</u> gpm	Duration of test <u>4</u>
type of screen <u>COOK SS # 20</u>	Length of screen <u>3</u>	Drawdown <u>3</u> ft	Date <u>10/27/83</u>
type of pump _____		Static level (depth to water) <u>46'4"</u>	
capacity of pump _____		Quality (clear, cloudy, taste, odor) <u>CL</u>	
depth of pump setting _____		Pump installed by _____	
date of completion _____			

WELL LOG*			SKETCH SHOWING LOCATION
Formations: sandstone, shale, limestone, gravel, clay	From	To	Locate in reference to numbered state highways, street intersections, county roads, etc.
<u>TOP SOIL</u>	<u>0 ft</u>	<u>6 ft</u>	
<u>BROWN CLAY &amp; GRAVEL</u>	<u>6</u>	<u>12</u>	
<u>BLUE CLAY</u>	<u>12</u>	<u>35</u>	
<u>SAND &amp; CLAY</u>	<u>35</u>	<u>48</u>	
<u>DIRTY SAND</u>	<u>48</u>	<u>52</u>	
<u>BLUE CLAY</u>	<u>52</u>	<u>58</u>	
<u>VERY DIRTY GRAVEL</u>	<u>58</u>	<u>62</u>	
<u>COARSE SAND</u>	<u>62</u>	<u>71</u>	

DRILLING FIRM WM CRANE CO DATE 11/23/83  
 ADDRESS BOX 33 SHANDON, O 45063 SIGNED WM Crane

\*If additional space is needed to complete well log, use next consecutive numbered form.

✓

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456766  
M-M 108

County WARREN Township TURTLE CREEK Section of Township E-1

Owner DIVISION GEOLOGICAL SURVEY Address Fountain square Columbus OH

Location of property off state RT 63 on ~~old~~ UNION RD

**CONSTRUCTION DETAILS**

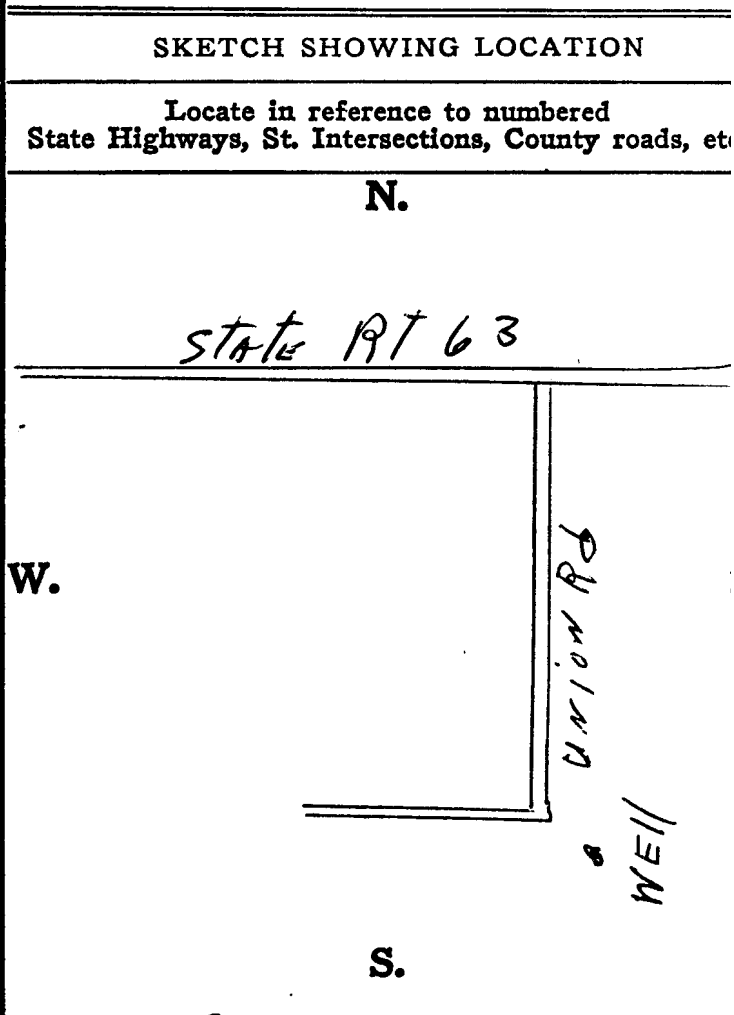
Casing diameter 6 O.D. Length of casing 75  
 Type of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 Type of pump \_\_\_\_\_  
 Capacity of pump \_\_\_\_\_  
 Depth of pump setting \_\_\_\_\_  
 Date of completion \_\_\_\_\_

**BAILING OR PUMPING TEST**  
(Specify one by circling)

Test Rate 404 G.P.M. Duration of test 2  
 Drawdown none ft. Date Sept 22  
 Static level-depth to water 22  
 Quality (clear, cloudy, taste, odor) Clear  
 Pump installed by \_\_\_\_\_

**WELL LOG\***

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>26 Ft.</u>
<u>Clay &amp; G</u>	<u>20</u>	<u>25</u>
<u>Sand</u>	<u>25</u>	<u>35</u>
<u>Clay &amp; G - mixed</u>	<u>35</u>	<u>59</u>
<u>Coarse sand &amp; G</u>	<u>59</u>	<u>75</u>
<u>Fine sand</u>	<u>75</u>	<u>85</u>
<u>Fine sand clay</u>	<u>85</u>	<u>100</u>
<u>Britt sand &amp; G</u>	<u>100</u>	<u>106</u>
<u>Fine sand</u>	<u>106</u>	<u>110</u>
<u>Water at 100 ft.</u>		



Drilling Firm L & L Well Drilling  
 Address Pen. Del. Way Newville  
A. K. I. D.

Date Sept 30 - 73  
 Signed Jack L Lewis

**WELL LOG AND DRILLING REPORT**

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

454191 ✓

County Warren Township Furthencreek Section of Township \_\_\_\_\_

Owner Dr. RALPH YOUNG Address 4461 Nickel Rd

Location of property same

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
casing diameter <u>5 7/8</u> Length of casing _____	Test Rate..... G.P.M. Duration of test.....
type of screen _____ Length of screen _____	Drawdown _____ ft. Date <u>9-5-74</u>
type of pump _____	Static level-depth to water _____
capacity of pump _____	Quality (clear, cloudy, taste, odor) _____
depth of pump setting _____	_____
date of completion _____	Pump installed by _____

WELL LOG*			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc
<u>Clay</u>	<u>0 Feet</u>	<u>15 Ft.</u>	<p>N.</p> <p>W. O</p> <p>Nickel Rd</p> <p>S.</p>
<u>SAND GRAVEL</u>	<u>15-</u>	<u>18</u>	
<u>Clay</u>	<u>18</u>	<u>25</u>	
<u>Limestone</u>	<u>25-</u>	<u>50</u>	
<u>3 Holes drilled</u>			
<u>No water</u>			

740+  
25  
715

Drilling Firm H. Love & W.D. Date 9-13-74

Address Box 574 W. Waynesville Signed Herchel Young

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456764 ✓

County Warren Township Turtle Creek Section of Township G-1  
Owner Edison Booth Address 6175 Nickell Rd near  
Location of property off Hamilton Rd on Nickell Rd.

**CONSTRUCTION DETAILS**

casing diameter NONE Length of casing \_\_\_\_\_  
 type of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 type of pump \_\_\_\_\_  
 capacity of pump \_\_\_\_\_  
 depth of pump setting \_\_\_\_\_  
 date of completion \_\_\_\_\_

**BAILING OR PUMPING TEST**  
(Specify one by circling)

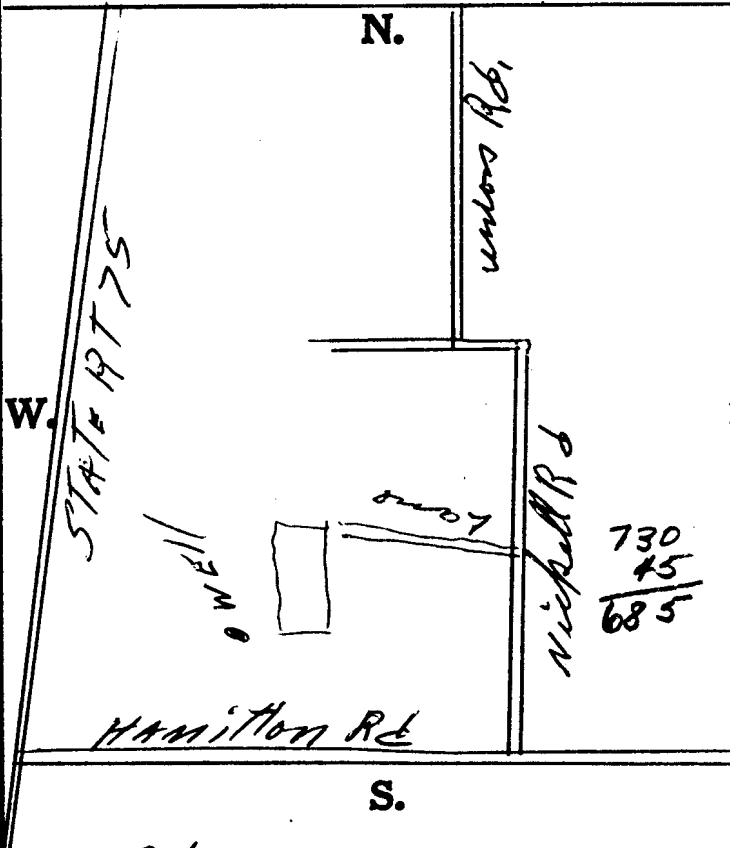
Test Rate..... G.P.M. Duration of test.....  
 Drawdown..... ft. Date.....  
 Static level-depth to water.....  
 Quality (clear, cloudy, taste, odor).....  
 Pump installed by.....

**WELL LOG\***

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>45 Ft.</u>
<u>Limestone</u>	<u>45</u>	<u>50</u>
<u>Drop Well</u>		

**SKETCH SHOWING LOCATION**

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc



Drilling Firm Booth & Co Date Sept 8-73  
Address Gen Dale Wagoner Signed Jack & Lewis  
Ohio

# WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

614165

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER BRIAN BUYERS ADDRESS 6137 Nickel Rd, Lebanon  
LOCATION OF PROPERTY 6137 Nickel Rd, Lebanon

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST <small>(specify one by circling)</small>
Drilling diameter <u>6"</u> Length of casing <u>25'</u>	Test rate <u>5</u> gpm Duration of test <u>3</u>
Depth of screen _____ Length of screen _____	Drawdown <u>40</u> ft Date _____
Capacity of pump _____	Static level (depth to water) <u>8-4-83</u>
Height of pump setting _____	Quality (clear, cloudy, taste, odor) <u>CLEAR</u>
Date of completion _____	Pump installed by <u>NOT INSTALLED</u>

WELL LOG*	SKETCH SHOWING LOCATION																																																																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%;">Formations: sandstone, shale, limestone, gravel, clay</th> <th style="width: 20%;">From</th> <th style="width: 20%;">To</th> </tr> <tr> <td><u>CLAY-SAND</u></td> <td><u>0 ft</u></td> <td><u>20 ft</u></td> </tr> <tr> <td><u>SHALE</u></td> <td><u>20</u></td> <td><u>25'</u></td> </tr> <tr> <td><u>LIMESTONE</u></td> <td><u>25</u></td> <td><u>64'</u></td> </tr> <tr> <td><u>WATER AT 40' + 64'</u></td> <td></td> <td></td> </tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> <tr><td> </td><td></td><td></td></tr> </table>	Formations: sandstone, shale, limestone, gravel, clay	From	To	<u>CLAY-SAND</u>	<u>0 ft</u>	<u>20 ft</u>	<u>SHALE</u>	<u>20</u>	<u>25'</u>	<u>LIMESTONE</u>	<u>25</u>	<u>64'</u>	<u>WATER AT 40' + 64'</u>																																																									<p style="text-align: center;">Locate in reference to numbered state highways, street intersections, county roads, etc.</p> <div style="text-align: center;"> <p><b>N</b></p> <p>STATE ROUTE 63</p> <p><b>S</b></p> </div>
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**Don Bates**

DRILLING FIRM Water Well Drilling DATE 8-8-83  
3504 Greenwood Drive  
 ADDRESS Middletown, Ohio 45042 SIGNED Don Bates

\*If additional space is needed to complete well log, use next consecutive numbered form.

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

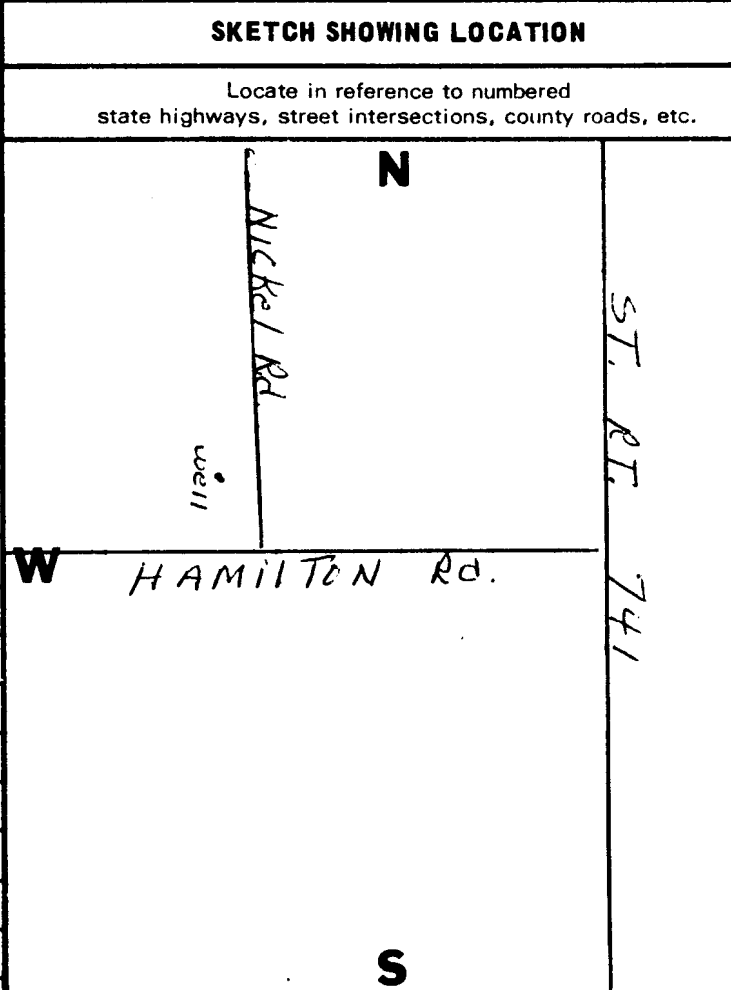
State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

614170

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER NORBERT BERGER ADDRESS 6003 Nickel Rd, Lebanon  
LOCATION OF PROPERTY 6003 Nickel Rd, Lebanon

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST <small>(Specify one by circling)</small>
Well diameter <u>6"</u> Length of casing <u>34</u>	Test rate <u>40</u> <sup>H</sup> gpm Duration of test <u>4</u>
Depth of screen <u>NONE</u> Length of screen _____	Drawdown <u>100</u> ft Date <u>8-29-83</u>
Depth of pump <u>SUBMERSIBLE</u>	Static level (depth to water) <u>30</u>
Capacity of pump <u>10 G.P.M.</u>	Quality (clear, cloudy, taste, odor) <u>CLEAR</u>
Depth of pump setting <u>105'</u>	Pump installed by <u>DON BATES</u>
Date of completion <u>9-3-83</u>	

WELL LOG*		
Formations: sandstone, shale, limestone, gravel, clay	From	To
<u>CLAY</u>	<u>0 ft</u>	<u>20 ft</u>
<u>SAND</u>	<u>20</u>	<u>30</u>
<u>SHALE</u>	<u>30</u>	<u>34</u>
<u>LIMESTONE</u>	<u>34</u>	<u>110</u>
<u>WATER AT 40'-80'</u>		



Don Bates

DRILLING FIRM Water Well Drilling  
3504 Greenwood Drive  
ADDRESS Middletown, Ohio 45042

DATE 9-12-83  
SIGNED Don & Bates

\*If additional space is needed to complete well log, use next consecutive numbered form.

# WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

614166 ✓

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP \_\_\_\_\_

OWNER JAMES FOX ADDRESS 110 TRAILS END, MONROE

LOCATION OF PROPERTY 6029 HAMILTON RD., LEBANON

CONSTRUCTION DETAILS		BAILING OR PUMPING TEST <small>(specify one by circling)</small>	
Drilling diameter <u>6</u>	Length of casing <u>33</u>	Test rate <u>2 1/2</u> gpm	Duration of test <u>4</u>
Depth of screen <u>NONE</u>	Length of screen _____	Drawdown <u>70</u> ft	Date <u>8-8-83</u>
Depth of pump <u>Submersible</u>		Static level (depth to water) <u>27</u>	
Capacity of pump <u>10 G.P.M.</u>		Quality (clear, cloudy, taste, odor) <u>clear</u>	
Depth of pump setting <u>95'</u>		Pump installed by <u>DON BATES</u>	
Date of completion <u>8-19-83</u>			

WELL LOG*			SKETCH SHOWING LOCATION	
Formations: sandstone, shale, limestone, gravel, clay	From	To	Locate in reference to numbered state highways, street intersections, county roads, etc.	
<u>Clay</u>	<u>0 ft</u>	<u>33 ft</u>		
<u>Limestone</u>	<u>33'</u>	<u>100'</u>		
<u>Water at 66'</u>				

DRILLING FIRM Don Bates Water Well Drilling DATE 8-25-83  
 ADDRESS 3504 Greenwood Drive SIGNED Donald E. Bates  
Middletown, Ohio 45042

\*If additional space is needed to complete well log, use next consecutive numbered form.

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

533630 **V**

*Turtle Creek*

COUNTY Warren TOWNSHIP Deerfield SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER Richard Wilson ADDRESS 654 Hanna, Loveland  
LOCATION OF PROPERTY Barrett Rd. 1 1/2 E. Butler-Warren Rd. 4511

**CONSTRUCTION DETAILS**

casing diameter 6 Length of casing 60  
 size of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 size of pump \_\_\_\_\_  
 capacity of pump \_\_\_\_\_  
 depth of pump setting \_\_\_\_\_  
 date of completion July 16, 1981

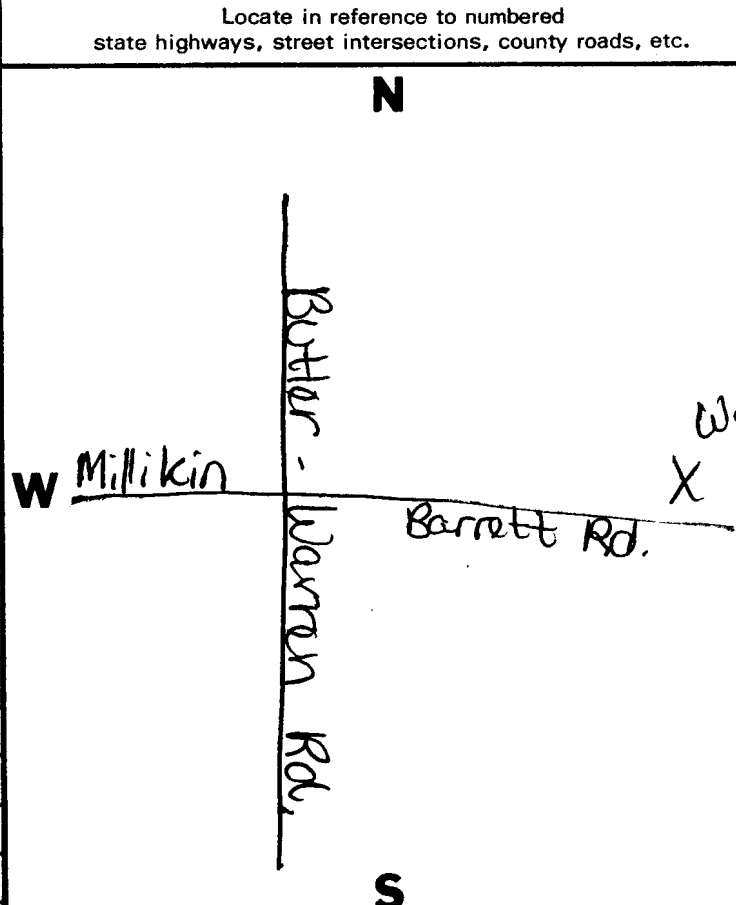
**BAILING OR PUMPING TEST**  
(specify one by circling)

Test rate 8 gpm Duration of test 1/2  
 Drawdown complete ft Date 7-16-81  
 Static level (depth to water) 23  
 Quality (clear, cloudy, taste, odor) cloudy  
 Pump installed by \_\_\_\_\_

**WELL LOG\***

Formations: sandstone, shale, limestone, gravel, clay	From	To
Topsoil	0 ft	2 ft
Yellow Clay	2	16
Sandy Clay	16	22
Sand & Gravel	22	37
Gravelly Clay	37	57
Blue Clay	57	59
Sand & Gravel	59	60
limestone-shale	60	85

**SKETCH SHOWING LOCATION**



DRILLING FIRM TREADWAY WELL DRILLING  
ADDRESS P.O. BOX 294  
SEVEN MILE, OHIO 45068  
(513) 726-6529

DATE July 20, 1981  
SIGNED WC Treadway



# WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
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SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

502622 ✓

COUNTY Warren TOWNSHIP Turtle Creek? SECTION OF TOWNSHIP \_\_\_\_\_  
OWNER Sam Kelly ADDRESS 7138 Floral Ave Mand  
LOCATION OF PROPERTY north end of Brewer Rd on Mason Montgomery

**CONSTRUCTION DETAILS**

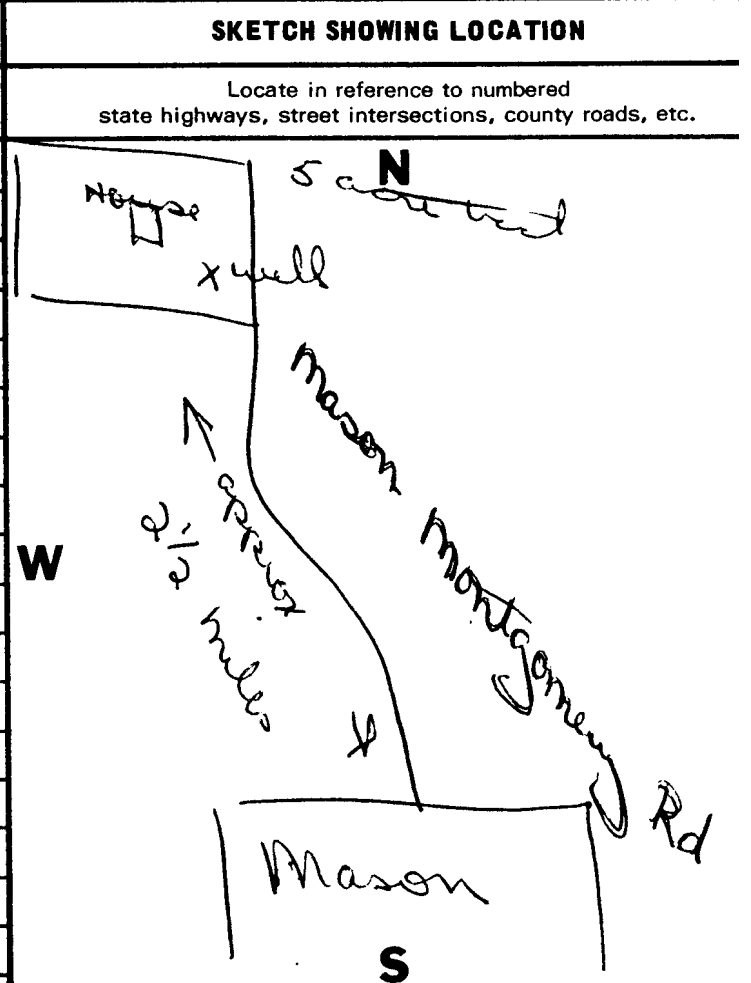
Well diameter 6" Length of casing 16'  
 Depth of screen \_\_\_\_\_ Length of screen \_\_\_\_\_  
 Make of pump \_\_\_\_\_  
 Capacity of pump \_\_\_\_\_  
 Method of pump setting \_\_\_\_\_  
 Date of completion 8-31-76

**BAILING OR PUMPING TEST**  
(Specify one by circling)

Test rate 2 gpm Duration of test 2  
 Drawdown all the way Date \_\_\_\_\_  
 Static level (depth to water) 20  
 Quality (clear, cloudy, taste, odor) clear  
 Pump installed by owner

**WELL LOG\***

Formations: sandstone, shale, limestone, gravel, clay	From	To
<u>top soil</u>	<u>0 ft</u>	<u>2 ft</u>
<u>brown clay</u>	<u>2</u>	<u>8</u>
<u>shale limestone</u>	<u>8</u>	<u>25</u>



RECEIVED  
DIVISION OF WATER  
AUG 31 1976

DRILLING FIRM TRE ALWAY WELL DRILLING DATE 8-31-76  
 ADDRESS 3775 Taylor School Rd SIGNED W C Tre-alway  
Hamilton, Ohio

# WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

594635 ✓

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP \_\_\_\_\_

OWNER PAUL STEINER ADDRESS 2265 ST. RT. 741 SOUTH, Leb.

LOCATION OF PROPERTY 2265 ST. RT. 741 SOUTH, Lebanon

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST <small>(specify one by circling)</small>
Drilling diameter <u>6"</u> Length of casing <u>145'</u>	Test rate <u>15</u> gpm Duration of test <u>5</u>
Type of screen <u>NONE</u> Length of screen _____	Drawdown <u>10</u> ft Date <u>7-17-82</u>
Type of pump <u>Submersible</u>	Static level (depth to water) <u>60</u>
Capacity of pump <u>10 G.P.M.</u>	Quality (clear, cloudy, taste, odor) <u>CLEAR</u>
Depth of pump setting <u>115'</u>	Pump installed by <u>DON BATES</u>
Date of completion <u>7-29-82</u>	

WELL LOG*			SKETCH SHOWING LOCATION
Formations: sandstone, shale, limestone, gravel, clay	From	To	Locate in reference to numbered state highways, street intersections, county roads, etc.
<u>SAND-GRAVEL</u>	<u>0 ft</u>	<u>40 ft</u>	
<u>HARD PAN</u>	<u>40'</u>	<u>100'</u>	
<u>CLAY</u>	<u>100'</u>	<u>125'</u>	
<u>SAND-GRAVEL</u>	<u>125'</u>	<u>140'</u>	
<u>GRAVEL</u>	<u>140'</u>	<u>145'</u>	
<u>WATER AT 145'</u>			

DRILLING FIRM Don Bates Water Well Drilling  
3504 Greenwood Drive  
 ADDRESS Middletown, Ohio 45042

DATE 7-29-82  
 SIGNED Donald E. Bates

\*If additional space is needed to complete well log, use next consecutive numbered form.

State of Ohio

LEASE USE PENCIL  
OR TYPEWRITER

DEPARTMENT OF NATURAL RESOURCES

№ 36655

Division of Water

1562 W. First Avenue

Columbus, Ohio 43212

County WARREN Township Turtle Creek Section of Township \_\_\_\_\_

Owner VILLAGE OF Address \_\_\_\_\_

Location of property MASON, O WATER WORKS

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter <u>12</u> Length of casing <u>105'</u>	Pumping Rate <u>500</u> G.P.M. Duration of test <u>24</u> hr
Type of screen <u>COOK BRASS</u> Length of screen <u>20'</u>	Drawdown <u>10</u> ft. Date <u>2/20/68</u>
Type of pump <u>F-M TURBINE</u>	Static level-depth to water <u>116 BASE OF PUMP</u>
Capacity of pump <u>500 BPM</u>	Quality (clear, cloudy, taste, odor) <u>Clear</u>
Depth of pump setting <u>60</u>	Pump installed by <u>W<sup>m</sup> CRANE</u>
Date of completion <u>FEB 15, '68</u>	

WELL LOG*			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc
	0 Feet	Ft.	
<u>Top soil</u>	<u>0</u>	<u>2</u>	<p>N.</p> <p>300'</p> <p>MASON, O WATER WORKS</p> <p>HAMILTON RD #13</p> <p>W.</p> <p>MASON MONTGOMERY ST. RD # 21</p>
<u>Blue clay</u>	<u>2</u>	<u>74</u>	
<u>Blue clay (hard, some gravel)</u>	<u>74</u>	<u>85</u>	
<u>Coarse gravel</u>	<u>85</u>	<u>95</u>	
<u>Coarse sand</u>	<u>95</u>	<u>125</u>	
<u>Strainer detail</u>			
<u>Top 15ft # 60</u>			
<u>Bottom 5ft # 40</u>			

See reverse side for instructions

Drilling Firm W<sup>m</sup> CRANE Date 2/23/68  
Address SHANDON, OHIO Signed [Signature]

\*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Geological Survey  
Fountain Square  
Columbus, Ohio 43224 Phone (614) 466-5344

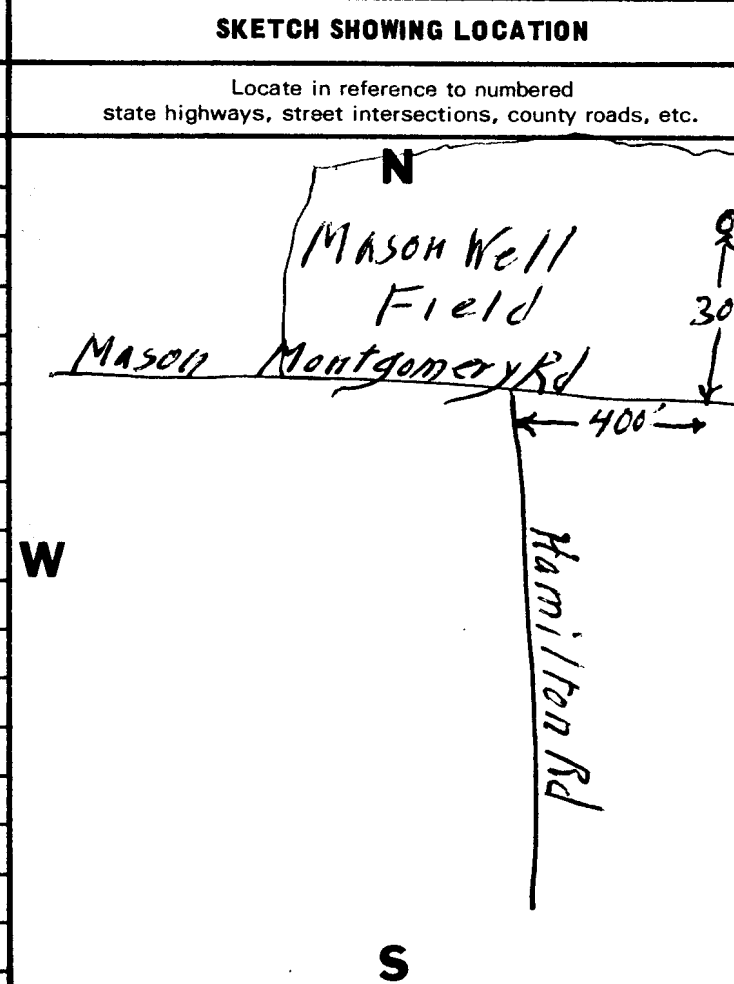
487025 ✓

COUNTY Warren TOWNSHIP Quintessence SECTION OF TOWNSHIP CL OR LOT NUMBER ?  
OWNER City of Mason, Ohio ADDRESS Water Dept - City Bldg  
LOCATION OF PROPERTY North Well Field Mason, Ohio

CONSTRUCTION DETAILS	
casing diameter <u>12</u> Length of casing <u>99</u>	
type of screen <u>Cook stainless steel See below</u> Length of screen <u>25</u>	
type of pump <u>Deep well turbine</u>	
capacity of pump <u>6,000</u>	
depth of pump setting <u>75 80'</u>	
date of completion <u>6/10/76</u>	

BAILING OR PUMPING TEST (specify one by circling)	
Test rate <u>1287</u> gpm Duration of test <u>24</u>	
Drawdown <u>18'4"</u> ft Date <u>5/13/76</u>	
Static level (depth to water) <u>11'0"</u>	
Quality (clear, cloudy, taste, odor) <u>clear</u>	
Pump installed by <u>W Crane</u>	

WELL LOG*		
Formations: sandstone, shale, limestone, gravel, clay	From	To
<u>Top soil</u>	<u>0 ft</u>	<u>3 ft</u>
<u>Brown gray clay</u>	<u>3</u>	<u>10</u>
<u>Blue clay gravel</u>	<u>10</u>	<u>81</u>
<u>Hard pan</u>	<u>81</u>	<u>85</u>
<u>Dirty coarse gravel</u>	<u>85</u>	<u>90</u>
<u>Sand</u>	<u>90</u>	<u>100</u>
<u>Med sand gravel</u>	<u>100</u>	<u>103</u>
<u>Coarse sand gravel</u>	<u>103</u>	<u>117</u>
<u>Sand</u>	<u>117</u>	<u>124</u>
<u>Strainer detail</u>		
<u>Top</u>	<u>4"</u>	<u>16 slot</u>
<u>Next</u>	<u>2"</u>	<u>30 "</u>
<u>Next</u>	<u>1"</u>	<u>100 "</u>
<u>Next</u>	<u>5'6"</u>	<u>80 "</u>
<u>Next</u>	<u>7'6"</u>	<u>60 "</u>
<u>Bottom</u>	<u>5"</u>	<u>50 "</u>



DRILLING FIRM W/M Crane  
ADDRESS Box 33 Shandon, O

DATE 7/15/76  
SIGNED [Signature]

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456760

M-M NO 11

County WARREN Township TURTLE CREEK Section of Township E-2

Owner Division Geological Survey Address Foundation Square Columbus OH

Location of property OFF STATE RT 741 on HAMILTON Rd

CONSTRUCTION DETAILS

using diameter 6" O.D. Length of casing 138ft  
Type of screen none Length of screen \_\_\_\_\_  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion \_\_\_\_\_

BAILING OR PUMPING TEST  
(Specify one by circling)

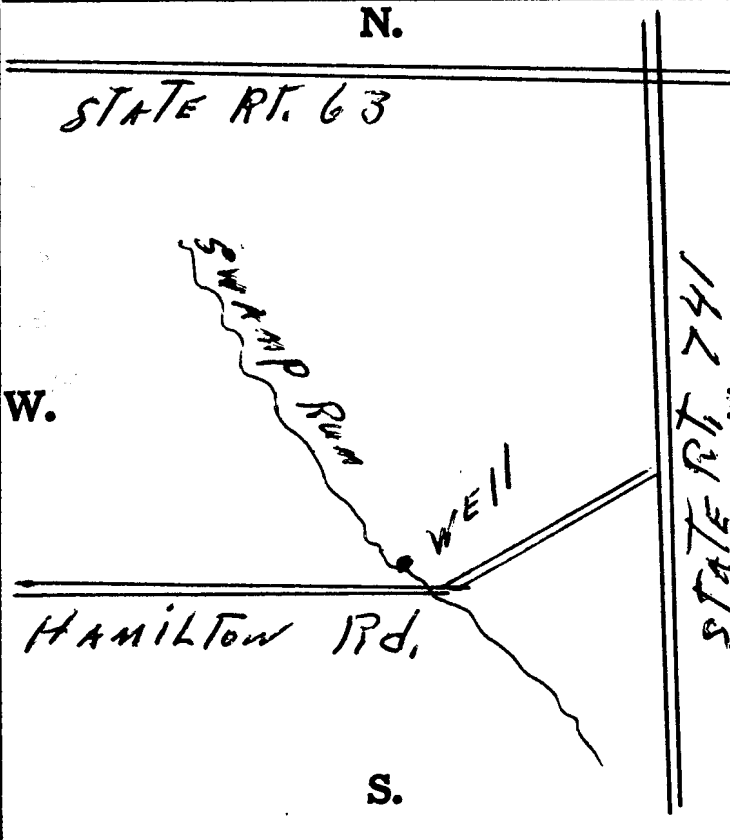
Test Rate 20+ G.P.M. Duration of test 2  
Drawdown none ft. Date aug 76-7  
Static level-depth to water 12  
Quality (clear, cloudy, taste, odor) clear  
Pump installed by \_\_\_\_\_

WELL LOG\*

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay</u>	<u>0 Feet</u>	<u>30 Ft.</u>
<u>Clay &amp; Gravel</u>	<u>30</u>	<u>35</u>
<u>Sand &amp; Gravel</u>	<u>35</u>	<u>45</u>
<u>Sand</u>	<u>45</u>	<u>50</u>
<u>Sand &amp; Gravel</u>	<u>50</u>	<u>75</u>
<u>Fine sand</u>	<u>75</u>	<u>90</u>
<u>Big sand &amp; G</u>	<u>90</u>	<u>105</u>
<u>Dirty sand &amp; G</u>	<u>105</u>	<u>125</u>
<u>Sand &amp; Clay</u>	<u>125</u>	<u>138</u>
<u>water at 40ft 120ft</u>		

SKETCH SHOWING LOCATION

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc



Drilling Firm Ed L. Well Drilling Date aug 30-73

Address Gen. Del. Wadsworthville Ohio Signed Jack & Ben's

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456761

M-M NO 1

County WARREN Township TURTLE CREEK Section of Township C-2

Owner DIVISION GEOLOGICAL SURVEY Address Fountain Square Columbus

Location of property OFF STATE RT 74 to HAMILTON Rd up Swamp Run Cr.

CONSTRUCTION DETAILS

BAILING OR PUMPING TEST  
(Specify one by circling)

Casing diameter 6" O.D. Length of casing 140  
Type of screen None Length of screen \_\_\_\_\_  
Type of pump \_\_\_\_\_  
Capacity of pump \_\_\_\_\_  
Depth of pump setting \_\_\_\_\_  
Date of completion \_\_\_\_\_

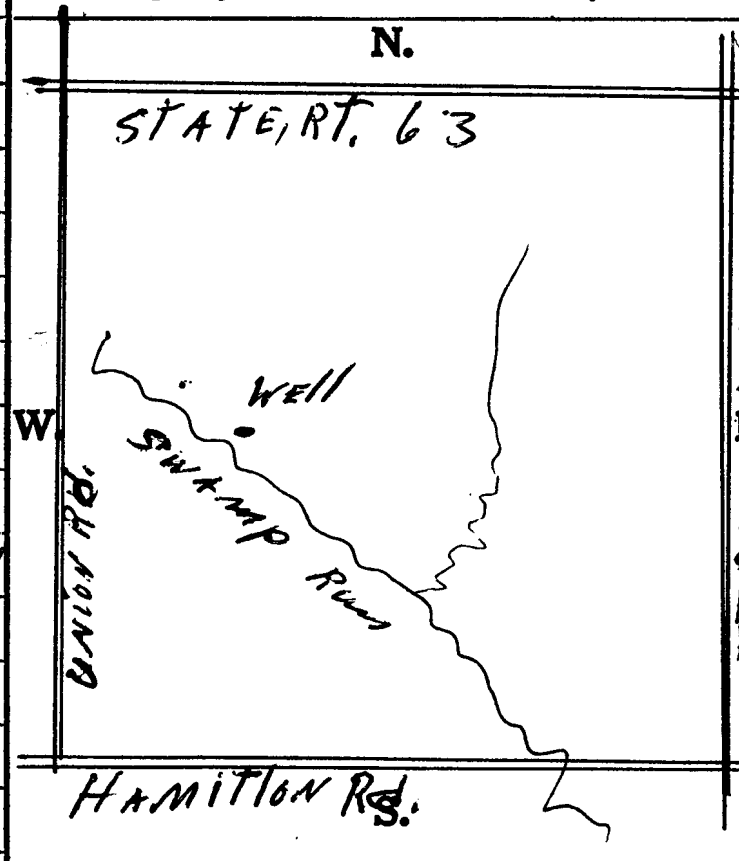
Test Rate 40 G.P.M. Duration of test 2  
Drawdown 21 ft. Date Aug 14-73  
Static level-depth to water 11 ft  
Quality (clear, cloudy, taste, odor) Clear  
Pump installed by \_\_\_\_\_

WELL LOG\*

SKETCH SHOWING LOCATION

Formations Sandstone, shale, limestone, gravel and clay	From	To
<u>Clay &amp; Fine sand</u>	<u>0 Feet</u>	<u>10 Ft.</u>
<u>Clay</u>	<u>10</u>	<u>60</u>
<u>Clay &amp; Fine sand</u>	<u>60</u>	<u>95</u>
<u>Fine sand &amp; Gravel</u>	<u>95</u>	<u>120</u>
<u>Coarse sand &amp; Gravel</u>	<u>120</u>	<u>135</u>
<u>Fine sand &amp; clay</u>	<u>135</u>	<u>140</u>
<u>water at 65 ft. to 125 ft.</u>		

Locate in reference to numbered  
State Highways, St. Intersections, County roads, etc



Drilling Firm L & L Well Drilling Date Aug 30-73  
Address Ben Del. Way newville Ohio Signed Jack O Lewis

WELL LOG AND DRILLING REPORT

NO CARBON PAPER  
NECESSARY—  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
65 S. Front St., Rm. 815 Phone (614) 469-2646  
Columbus, Ohio 43215

456762 NO 9  
M-M

County WARREN Township TURTLE CREEK Section of Township E-2

Owner DIVISION GEOLOGICAL SURVEY Address FOUNTAIN SQUARE COLUMBUS OH

Location of property OFF STATE RT 63 & UNION RD on LANE

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
using diameter <u>6" O.D.</u> Length of casing <u>81</u>	Test Rate <u>20</u> G.P.M. Duration of test <u>1</u>
Type of screen <u>ROCK</u> Length of screen	Drawdown <u>NONE</u> ft. Date <u>Aug 27</u>
Type of pump	Static level-depth to water <u>17-6</u>
Capacity of pump	Quality (clear, cloudy, taste, odor) <u>CLEAR</u>
Depth of pump setting	Pump installed by
Date of completion	

WELL LOG*			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc
<u>Clay</u>	<u>0 Feet</u>	<u>35 Ft.</u>	
<u>Clay &amp; Gravel</u>	<u>35</u>	<u>40</u>	
<u>Coarse sand &amp; G.</u>	<u>40</u>	<u>60</u>	
<u>Drift sand &amp; G.</u>	<u>60</u>	<u>65</u>	
<u>Fine sand</u>	<u>65</u>	<u>70</u>	
<u>Drift sand &amp; G.</u>	<u>70</u>	<u>78</u>	
<u>Clay &amp; Rock</u>	<u>78</u>	<u>81</u>	
<u>Water at 35 ft depth</u>			

Drilling Firm 666 WELL DRILLERS Date Aug 30-73  
Address 666 Wagonwheel Ohio Signed Jack Lewis

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio  
 DEPARTMENT OF NATURAL RESOURCES  
 Division of Water  
 1562 W. First Avenue  
 Columbus, Ohio

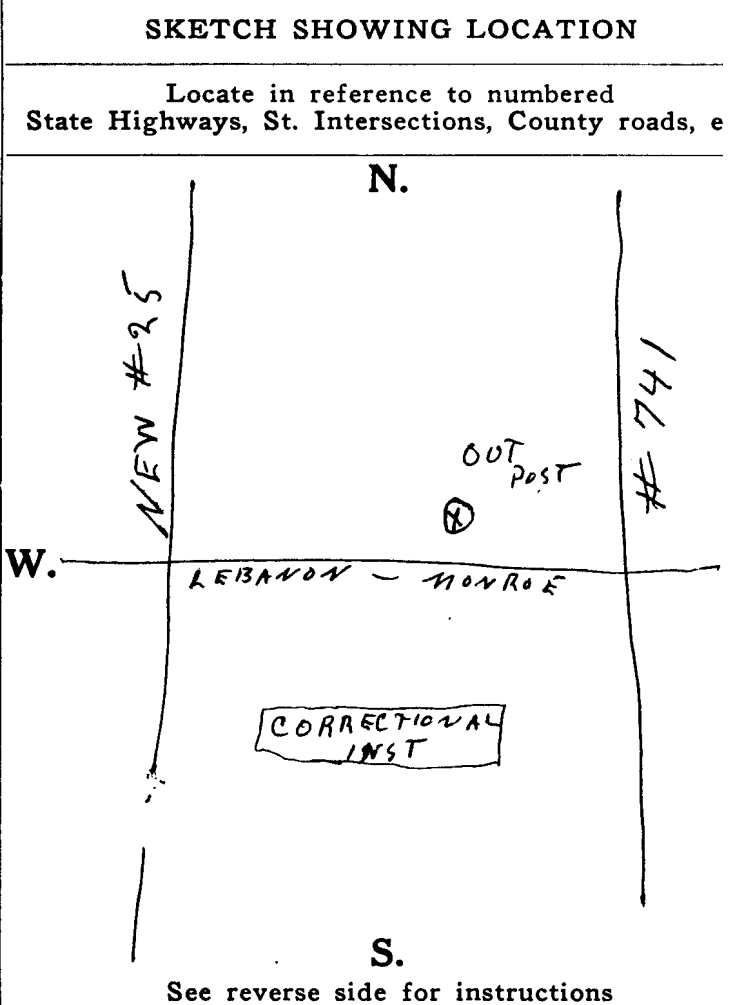
No. 271303

*Turtle Creek*

County Warren Township ~~Clear Creek~~ Section of Township.....  
 Owner State of Ohio Dept of Highways Address W Broad St Columbus Ohio  
 Location of property Lebanon Correctional Institution

CONSTRUCTION DETAILS		BAILING OR PUMPING TEST	
Casing diameter <u>6"</u>	Length of casing <u>45</u>	Pumping rate..... G.P.M.	Duration of test.....
Type of screen.....	Length of screen.....	Drawdown..... ft.	Date.....
Type of pump..... <u>DRY HOLE</u>		Developed capacity.....	<u>DRY HOLE</u>
Capacity of pump.....		Static level—depth to water.....	
Depth of pump setting.....		Pump installed by.....	
Date of completion..... <u>8/19/61</u>			

WELL LOG		
Formations Sandstone, shale, limestone, gravel and clay	From	To
Fill	0 Feet	<u>2</u> Ft.
Clay	2	18
Hardpan	18	44
Blue Shale and Bedrock	44	185
DRY HOLE		
Pulled Pipe and Plugged hole		



Drilling Firm Scott Well Drilling  
 Address 5859 Prantford Rd  
Davton Ohio

Date 8/19/61  
 Signed W. H. Scott  
 W H Scott



Core #58

PLEASE USE PENCIL  
OR TYPEWRITER.  
DO NOT USE INK.

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
1562 W. First Avenue  
Columbus, Ohio

No. 257926

County Warren Township Turtle Section of Township 33  
Owner Thomas Helsing Address Monroe Ohio  
Location of property 1 mile East of St Rt 25 on Hendrickson Rd.

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter <u>6"00</u> Length of casing <u>24</u>	Pumping rate <u>10</u> G.P.M. Duration of test <u>2</u>
Type of screen _____ Length of screen _____	Drawdown <u>total</u> ft. Date <u>Aug 29-1961</u>
Type of pump _____	Developed capacity <u>600 G.P.H.</u>
Capacity of pump _____	Static level—depth to water <u>16</u>
Depth of pump setting _____	Pump installed by _____
Date of completion <u>Aug 29-1961</u>	

WELL LOG			SKETCH SHOWING LOCATION
Formations Sandstone, shale, limestone, gravel and clay	From	To	Locate in reference to numbered State Highways, St. Intersections, County roads, etc.
<u>Clay</u>	<u>0</u> Feet	<u>12</u> Ft.	<p>N.</p> <p>← 1 MI → X</p> <p>W.</p> <p>St Rt 25</p> <p>S.</p> <p>See reverse side for instructions</p>
<u>Shale</u>	<u>12</u>	<u>42</u>	
<u>Limestone</u>	<u>42</u>	<u>60</u>	

Drilling Firm Bach Bros Date Aug 31-1961  
Address Somerville Signed Elmer Bach

Core A

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

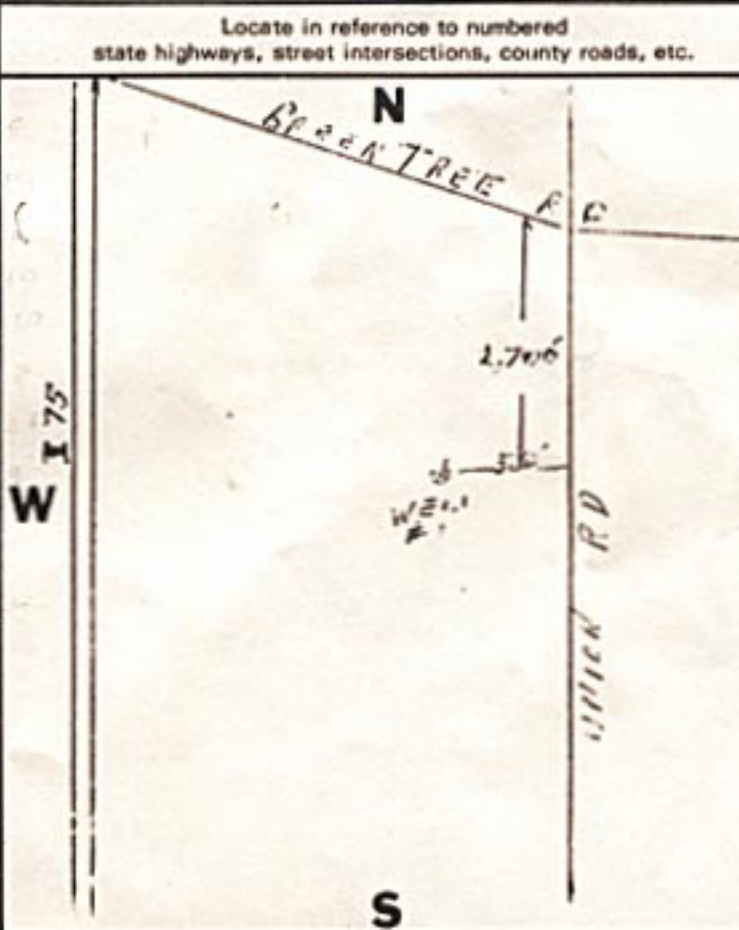
596056

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP 31  
OWNER FRANKLIN-LEBANON SEWER DISTRICT ADDRESS 320 E. SILVER ST LEBANON  
LOCATION OF PROPERTY UNION RD - WARREN CO OHIO

CONSTRUCTION DETAILS		BAILING OR PUMPING TEST <small>(specify one by circling)</small>	
casing diameter <u>8"</u>	Length of casing <u>96</u>	Test rate <u>500</u> gpm	Duration of test <u>24</u>
depth of screen <u>SEE BELOW</u>	Length of screen <u>15</u>	Drawdown <u>12'2"</u> ft	Date <u>8/4/81</u>
type of pump _____		Static level (depth to water) <u>41'4"</u>	
capacity of pump _____		Quality (clear, cloudy, taste, odor) <u>CL</u>	
depth of pump setting _____			
date of completion _____		Pump installed by <u>W CRANE</u>	

WELL LOG*	SKETCH SHOWING LOCATION
-----------	-------------------------

Formations: sandstone, shale, limestone, gravel, clay	From	To
<u>TOP SOIL</u>	<u>0 ft</u>	<u>5 ft</u>
<u>SILTY CLAY</u>	<u>5</u>	<u>10</u>
<u>GRAY TILL - SOME FINE GRAVEL</u>	<u>10</u>	<u>59</u>
<u>DIRTY SAND &amp; GRAVEL</u>	<u>59</u>	<u>60</u>
<u>SAND &amp; GRAVEL 80-100</u>	<u>60</u>	<u>70</u>
<u>SAND &amp; GRAVEL 60-70</u>	<u>70</u>	<u>80</u>
<u>SAND &amp; GRAVEL 30-50</u>	<u>80</u>	<u>88</u>
<u>MED SAND &amp; GRAVEL 20-30</u>	<u>88</u>	<u>111</u>
<u>GRAY SILTY CLAY</u>	<u>111</u>	<u>120</u>
<u>DEPTH OF WELL</u>	<u>111 FT</u>	
<u>5' COOK STAINLESS STEEL SCREEN</u>		
<u>INSTALL AS FOLLOWS</u>		
<u>TOP 4 FT</u>	<u># 55 SLOT</u>	
<u>NEXT 7 FT</u>	<u># 70 SLOT</u>	
<u>BOTTOM 4 FT</u>	<u># 80 SLOT</u>	



DRILLING FIRM W M CRANE DATE 8/26/81  
 ADDRESS BOX 33 SHADON, OH SIGNED W M Crane

\* If additional space is needed to complete well log, use next consecutive numbered form.

**WELL LOG AND DRILLING REPORT**

✓

NO CARBON PAPER  
NECESSARY -  
SELF-TRANSCRIBING

State of Ohio  
DEPARTMENT OF NATURAL RESOURCES  
Division of Water  
Fountain Square  
Columbus, Ohio 43224

596057

COUNTY WARREN TOWNSHIP TURTLE CREEK SECTION OF TOWNSHIP 31  
OWNER FRANKLIN-LEBANON SEWER DISTRICT ADDRESS 320 E SILVER ST  
LEBANON, OH  
LOCATION OF PROPERTY UNION RD

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST <small>(specify one by circling)</small>
Casing diameter <u>8"</u> Length of casing <u>95</u> Material of screen <u>LOCK STAINLESS STEEL</u> Length of screen <u>15</u> Size of screen <u>#70 SLOT</u> Type of pump _____ Capacity of pump _____ Depth of pump setting _____ Date of completion _____	Test rate <u>500</u> gpm Duration of test <u>24</u> Drawdown <u>9'6"</u> ft Date <u>8/16/1981</u> Static level (depth to water) <u>40'5"</u> Quality (clear, cloudy, taste, odor) _____ Pump installed by <u>W CRANE</u>

WELL LOG*			SKETCH SHOWING LOCATION
Formations: sandstone, shale, limestone, gravel, clay	From	To	Locate in reference to numbered state highways, street intersections, county roads, etc.
TOP SOIL	0 ft	7 ft	
SILT	7	25	
GRAY TILL	25	58	
DIRTY SAND & GRAVEL	58	70	
SAND & GRAVEL 60-70	70	75	
DIRTY SAND	75	87	
SAND & GRAVEL WITH COBBLES	87	110	
BLUE CLAY &			
GRAY TILL	110	116	
DEPTH	110		

DRILLING FIRM W M CRANE  
ADDRESS BOX 33 SHANDON, OH

DATE 8/26/81  
SIGNED [Signature]

\*If additional space is needed to complete well log, use next consecutive numbered form.

(B)

Core LCI-1

WELL LOG AND DRILLING REPORT

NO. \_\_\_\_\_

County Warren Township Turtle Creek Section of Township 36

Owner State of Ohio Address \_\_\_\_\_

Location of property Well #1, Lebanon State Prison Farm

CONSTRUCTION DETAILS		BAILING OR PUMPING TEST	
Casing diameter _____	Length of casing _____	Pumping rate _____	G.P.M. _____
Type of screen _____	Length of screen _____	Duration of test _____	hrs. _____
Type of pump _____	Drawdown _____	ft. _____	Date _____
Capacity of pump _____	Developed capacity _____		
Depth of pump setting _____	Static level - depth to water _____		ft. _____
Date of completion _____	Pump installed by _____		

WELL LOG	SKETCH SHOWING LOCATION		
Formation	From	To	NOTE: From old N. Dr. Stott file.
Soil + subsoil	0	2 1/2	
Brown Sandy Clay	2 1/2	4 1/2	
Tough Brown Clay	4 1/2	9	
Brown Gravelly Clay	9	14 1/2	Ledge Rock + Blue Clay 183 1/2 - 187 1/2
Gray Gravelly Clay	14 1/2	21	Blue Limestone 187 1/2 - 216
Tough Gray Clay	21	42 1/2	W. Blue Shale 216 - 224 E.
Gray Sandy Clay @ very little water	42 1/2	47 1/2	
Gray Quicksand	47 1/2	73	
Gray Gravelly Hardpan	73	80 1/2	"After thorough study of material was made as to water supply, well casing was removed + installed approx. 500ft West of this location."
Gray Clay	80 1/2	89	
Gray Hardpan	89	97 1/2	
Gray Quicksand	97 1/2	141 1/2	
Tough Gray Clay	141 1/2	158	
Gray Sandy Clay	158	163 1/2	
Gray Gravelly Hardpan	163 1/2	179	
Gray Clay	179	183 1/2	

Drilling Firm Navin V. Barnes - Driller for State Hwy Dept. Div. 2 Date \_\_\_\_\_

Address Middletown, Ohio Copied by N.S.P.

## **Appendix B**

### **Cross sections of Shaker Creek Aquifer System**

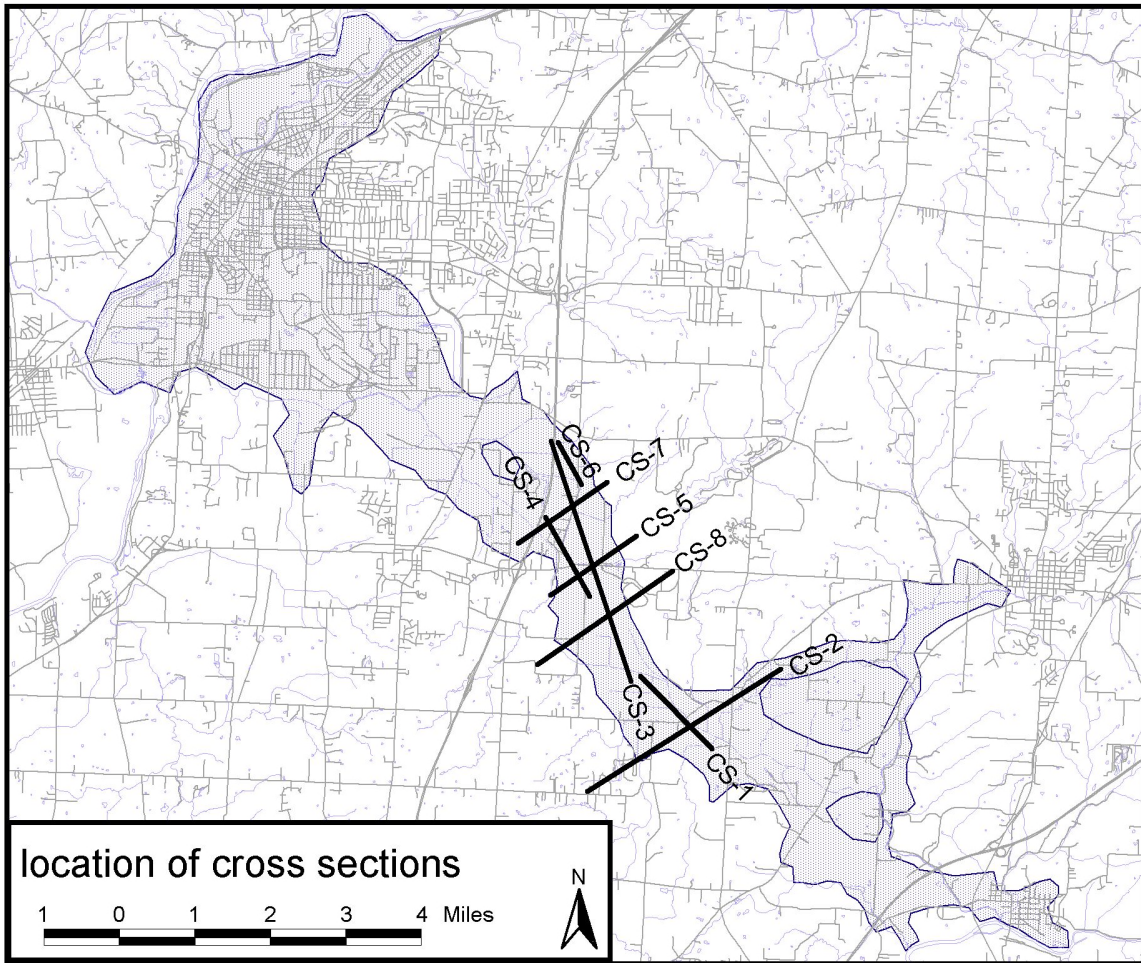


Figure B-1. Location of cross sections in Appendix B.

**Aquitards**



Fine grained matrix (till?)



Silts and clays



Bedrock

**Aquifers**



Sand and gravel



Fine sand

**23**

Well number

Figure B-2. Symbols and patterns used in cross sections in Appendix B

