

Drinking Water Source Protection Report for the Hecla Water Association

The Hecla Water Association is a community public water system that voluntarily completed their drinking water source assessment under the Wellhead Protection Program. The Susceptibility Analysis was completed by Ohio EPA.

[Susceptibility Analysis for the Hecla Water Association \(completed by Ohio EPA, 2003\)](#)

[Hecla Water Wellhead Protection Program \(completed by Strand Associates, Inc., 2008\)](#)

ATTACHMENT C

Susceptibility Analysis for the Hecla Water Association

Susceptibility Analysis

The aquifer that supplies drinking water to the Hecla Water Association wells is moderately susceptible to contamination. This determination was made because of the following reasons:

- < The water table of the sand and gravel aquifer begins approximately 40 feet below the ground surface.
- < There is approximately 15-25 feet of sandy clay overlying the sand and gravel. This may slow the migration of contaminants into the aquifer.
- < Potential significant contaminant sources exist within the protection area.

Water quality data were evaluated using the drinking water compliance database at Ohio EPA. The available data do not indicate that contamination has impacted the aquifer at Hecla Water Association's wellfield. Because sampling requirements are for treated water, the lack of water quality impacts does not necessarily indicate a lack of contamination. This determination is limited by the sampling that is performed for the water system.

Eight (8) potential sources of contamination have been identified by Hecla Water Association including SR 7, the Ohio River, home septic systems, an auto body shop, commercial facilities with fuel/fuel oil tanks, and a salvage yard. Because of these potential sources of contamination that exist within the wellhead/source water protection area and the moderate sensitivity of the aquifer, the Hecla Water Association's wellfield is considered to be moderately susceptible to contamination. In summary, there is a moderate likelihood for contamination of the Hecla Water Association's source water. Implementing appropriate protection strategies for the potential contaminant sources will help reduce the likelihood of contamination affecting the aquifer.

Protection Activities

Since Hecla Water Association is owned by a homeowner's association, there is no route for regulatory approaches for protective strategies. Therefore, public education is the primary tool being used by Hecla Water Association to manage their wellhead/source water protection area. Signs have been posted along county and local transportation routes that cross the wellhead protection/source water protection area.. They should also contact ODOT to have signs erected along SR 7. Education will be focused on three separate groups: Youth, Adults, and Businesses. Hecla Water Association plans to work with the Lawrence County to encourage a hazardous waste collection event during the first year of implementation, and possibly annually thereafter. Hecla Water Association has also been working with the Lawrence County Health Department regarding ways to reduce or eliminate the potential impact from residential development within the wellhead protection area. Hecla Water Association has also established a Local Planning Team (made up of the Hecla Water Association Board and employees) that is responsible for implementing and overseeing the implementation of the wellhead protection/source water protection plan.

**HECLA WATER ASSOCIATION
WELLHEAD PROTECTION PROGRAM
WELL FIELD DELINEATION**

**JUNE, 1999
REVISED NOVEMBER, 2008**

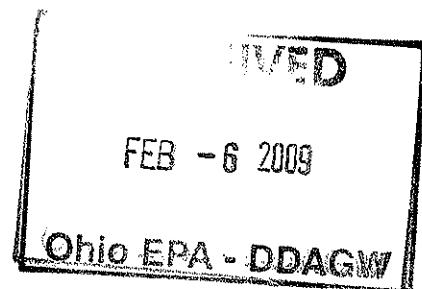


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**HECLA WATER
ASSOCIATION
WELLHEAD PROTECTION PROGRAM
WELLFIELD DELINEATION**

1.0 INTRODUCTION/BACKGROUND

The Hecla Water Association is a not for profit provider of water to rural customers in Lawrence County, Ohio. As of January 1, 2000, Hecla Water Association served 8,100 customers (taps). Water is supplied by eight (8) groundwater wells along the Ohio River at the Hecla well fields located at Athalia, Ohio along State Route #7, shown in Figure 1. The present well field capacity is 3,900 gallons per minute with one well out of service. However, actual sustained pumping is limited to around 2,400 gpm.

The groundwater is treated at a water plant at the well field by lime softening units, recarbonation, and gravity sand filters prior to clearwell storage. Water from the clearwell is pumped to the system by one or two 1,200 gpm high service pumps.

Hecla Water Association has contracted with Strand Associates, Inc., (formerly SIECO, Inc. Engineers) to prepare a well field delineation to comply with wellhead protection requirement for the State of Ohio.

The Water Plant well field was initially established in 1980 with three production wells identified as Production Wells 1, 2 and 3. In 1996, Production Wells 4 and 5 were added. Wells 6 and 7 were added in 2000 and 2002 south of the existing wells. In 2008, HECLA constructed Well 8 at a new well field site in Athalia. The daily output from the Water Plant well field is estimated to be a maximum of 3.4 million gallons per day (mgd) or approximately 2,400 gpm as stated earlier. The design capacity of the well field is approximately 6.5 mgd. The location of production wells are shown in Figure 2, on the Area of Interest Map in Appendix A, and the Water Plant well field site plan in Appendix B.

2.0 HYDROGEOLOGIC SETTING

2.1 Review of Published Data/Interpretations

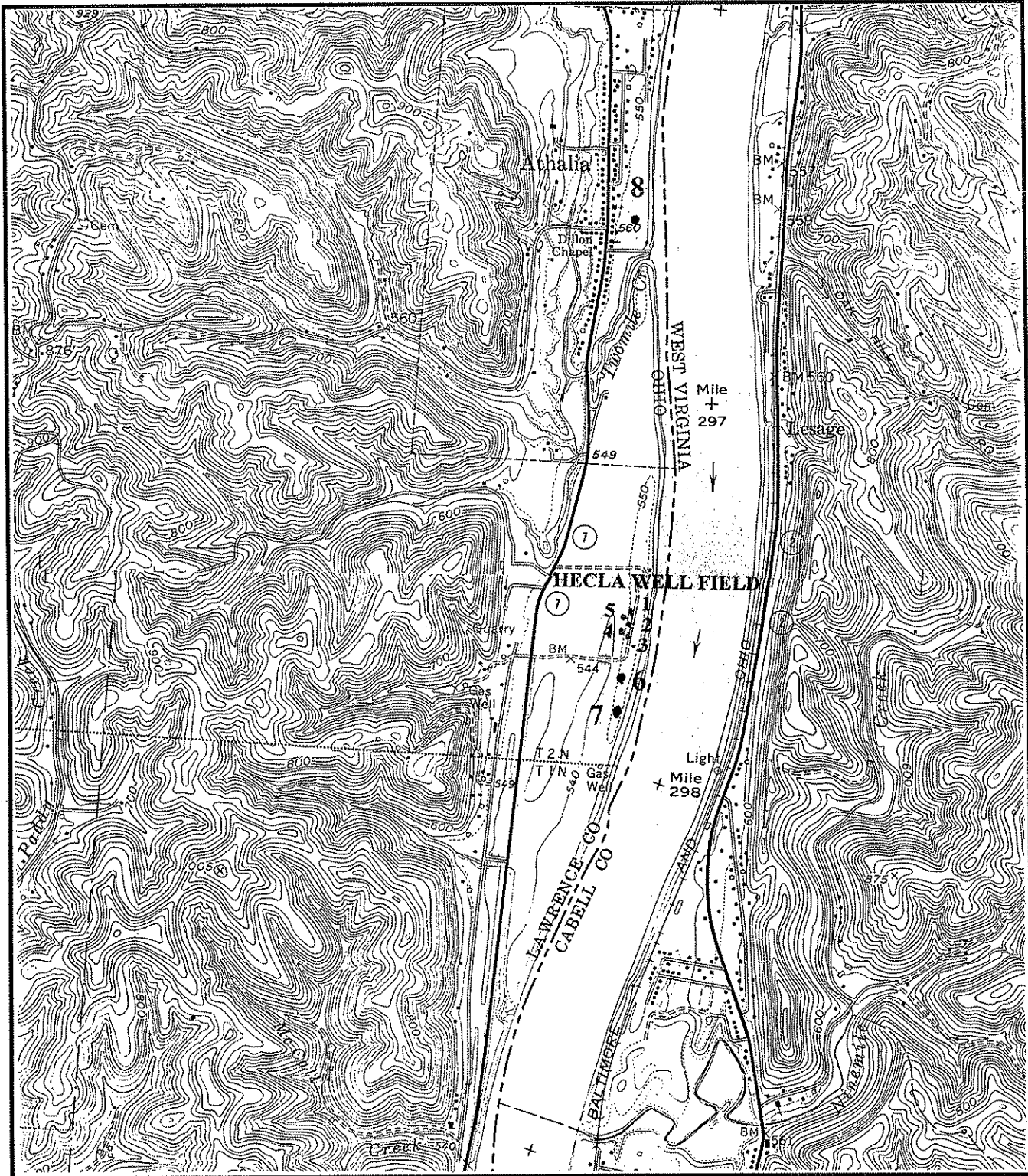
2.1.1 Regional Geology and Physiography

The Hecla Well Field is situated adjacent to the Ohio River in Lawrence County, Ohio as shown in Figures 1 and 2. Regionally this area has been described by the United States Geological Survey (USGS) as part of the Appalachian Plateaus Aquifers (Lloyd and Lyke, 1995). The region is dominated by two types of aquifers, the Surficial Aquifer System and the Pennsylvania Aquifer System.

The Surficial Aquifer System consists of sand and gravel deposits that overlie the consolidated bedrock materials. These deposits may be exposed to the surface or in buried bedrock valleys. Their origin is glacial alluvium deposited directly by ice or transported by glacial melt water. The alluvium present along the present Ohio River consists mostly of reworked alluvium of Wisconsinan glacial origin. It is typically covered by 10 to 30 feet of clay, silt or fine sand (Fenelon, Bobay, et al, 1994). The coarseness of the deposits in the Ohio River Valley generally coarsens with depth often times with boulders present at the bottom of the unconsolidated stratigraphy. The deposits are typically thickest nearest the Ohio River, with thinning observed toward the valley walls. The valley walls generally consist of lower permeability bedrock units and may be considered non-aquifer material in many areas. Groundwater wells can yield in excess of 1,000 gpm if properly constructed.

In Indiana, the horizontal hydraulic conductivities of the Ohio River Aquifer ranged from 13 to 375 ft./day with specific capacities from 1 to 500 gallons/minute/ft. (Fenelon et al, 1995, p. 184). Water levels in the aquifer generally slope toward the Ohio River, discharging into the river.

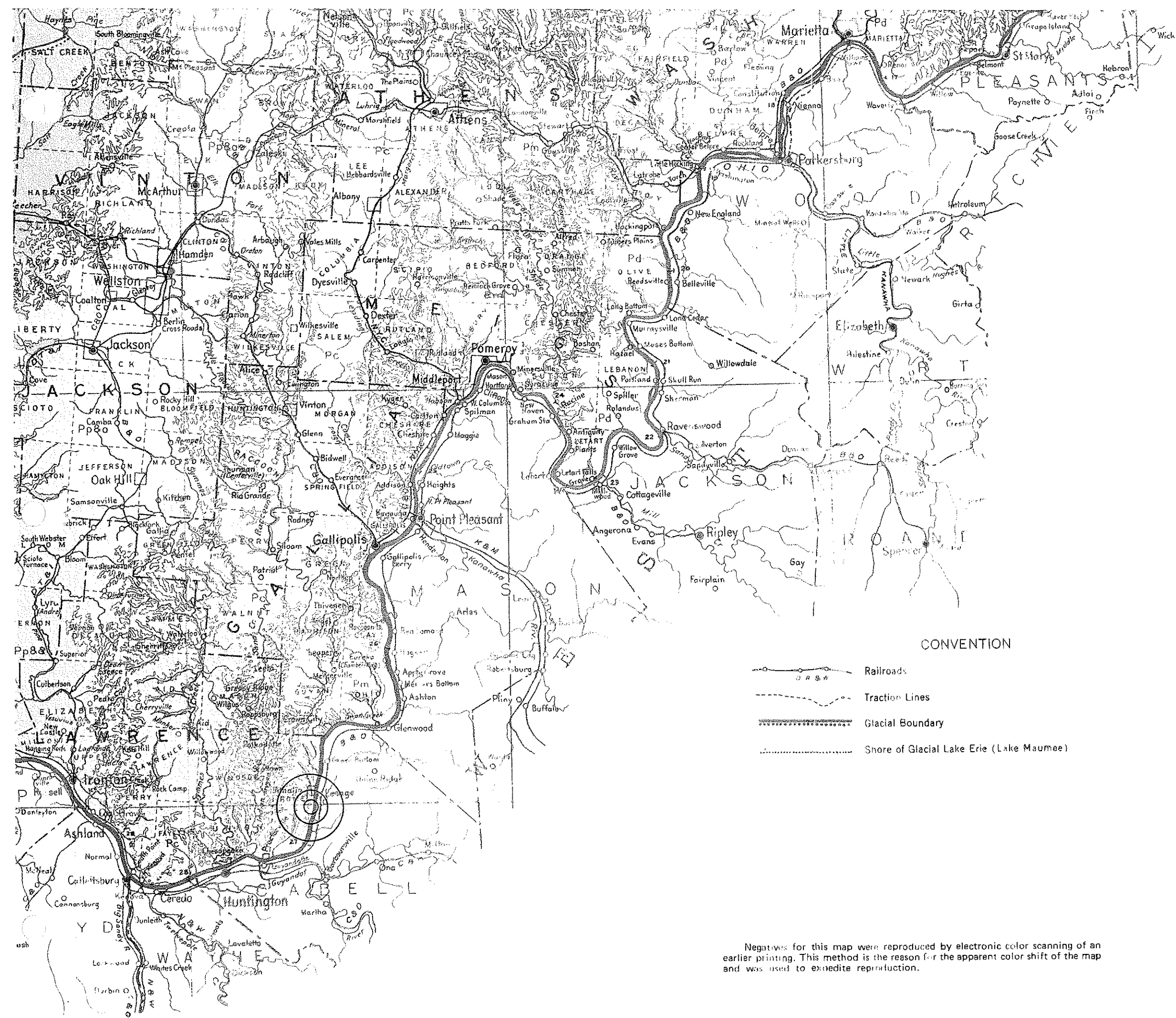
The regional bedrock material in the Hecla Well Field area is the Pennsylvanian Conemaugh formation near the valley floor and the Monongahela formation at the higher elevations (Bownocker, 1920). An excerpt of the Ohio geologic map is shown in Figure 3. These formations consist of sandstones, shales, coals and limestones that generally dip to the east. The Pennsylvanian bedrock sandstone and limestone units form a poor aquifer material that may only produce sufficient water for domestic use. The success of a water well completed in these units



SIECO INC.
 629 WASHINGTON STREET
 COLUMBUS IN 47201

Figure 2
 HECLA WPP
 SCALE - 1" = 2000'

TOPOGRAPHIC MAP EXERPT
 WITH HECLA WELL
 LOCATIONS



PERMIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Pd Dunkard (Shales, sandstones and coal)
PENNSYLVANIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Pm Monongahela (Coal, shales and sandstones)
PENNSYLVANIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Pc Conemaugh (Shales, sandstones, coal and limestone)
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Pp&a Pottsville and Allegheny (Coal, sandstone, shales and limestone)
MISSISSIPPIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Mw&m Waverly and Maxville (Shales, sandstones and limestones)
DEVONIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Dol&oh Olentangy and Ohio (Shales)
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Dc&d Columbus and Delaware (Limestone and shale)
SILURIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> m Monroe (Limestone)
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Sn Niagara (Limestone and shale) Contains some Monroe in Adams County
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Sb Brassfield (Limestone)
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Or Richmond (Shale and limestone)
	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Om Maysville (Shale and limestone)
ORDOVICIAN	<div style="border: 1px solid black; width: 30px; height: 20px; margin: 0 auto;"></div> Oa

- CONVENTION**
- Railroads
 - Traction Lines
 - Glacial Boundary
 - Shore of Glacial Lake Erie (Lake Maumee)

Negatives for this map were reproduced by electronic color scanning of an earlier printing. This method is the reason for the apparent color shift of the map and was used to expedite reproduction.

OHIO GEOLOGIC
MAP-EXERPT

Figure 3
HECLA WPP

SIECO INC.
629 WASHINGTON STREET
COLUMBUS IN 47201

will depend on the number of fractures encountered in the bedrock where most of the available water is found. The water quality in these units will vary considerably depending on the depth from which water is produced and the type of bedrock from which it originates. Generally, as the depth of the water increases, the amount of hardness and dissolved solids increases due to the longer residence time of the water in the rock units. The Monongehela and Conemaugh Groups average about 1,000 feet in thickness and generally increase in thickness to around 1,500 feet in eastern Ohio (Lloyd and Lyke, 1995).

2.1.2 Hecla (Athalia, Ohio) Geology/Hydrogeology

The geologic/hydrogeologic setting at the Hecla Well Field is a typical strip sand and gravel aquifer along the Ohio River. The stratigraphy is shown in Cross Section N – S in Appendix C and Cross Section NW – SW in Appendix D. The location of cross sections are shown on the Area of Interest Map in Appendix A. Well logs used in each cross section are contained in each appendix. The scarcity of well logs from the upland areas resulted in a short cross section across the Ohio River.

The cross sections demonstrate the presence of a long narrow band of sand and gravel outwash materials associated with the Ohio River. This band of sand and gravel is also shown on the “Groundwater Resources of Lawrence and Gallia Counties” map prepared by the Ohio Department of Natural Resources (Schmidt, 1985). An excerpt of this ODNR Map covering the Hecla Well Field is presented in Appendix E.

The aquifer materials appear to consist of ± 50 feet of sand and gravel deposits overlain by ± 25 feet of sandy clay. The piezometric surface appears to be at ± 40 feet from grade which is below the top of the aquifer material indicating water table conditions in the aquifer. The piezometric level observed in cross section also appears to closely correspond with the normal pool elevation of the Ohio River indicating a probable good hydraulic connection to the Ohio River. The well logs indicate that the outwash aquifer material is underlain by shale bedrock likely of Pennsylvanian age. Sandstone and shale bedrock material is in contact with the aquifer material in the valley sidewall shown in cross section NE – SW. The availability of water from the sandstone and shale bedrock is limited as exemplified by well log 228634 in Appendix D where

the developed capacity was listed at 5 gpm from a 6-inch diameter well. The log listed water present at 45 and 115 feet in sandstone units. This represents a two order of magnitude decrease in capacity from the 600 gpm capacity of the Hecla wells, although the Hecla wells are 16-inches in diameter.

The construction and hydrology of the Hecla well field is well documented. In 1981, SIECO, Inc. Engineers performed 24-hour pump tests on Production Wells 1 and 3 and prepared a hydrology report dated December, 1981. An excerpt of the text of this report is contained in Appendix F. Subsequent to the 1981 report Hecla has added Production Wells 4 and 5 for which similar formation characteristics are assumed. Wells 6 and 7 were added in 2000 and 2002 and Well 8 was completed in Athalia in 2008. Table 1 lists the basic information for each production well. Well logs of Production wells are contained in Appendix G.

TABLE 1 – PRODUCTION WELL INFORMATION

<u>Well No.</u>	<u>Diameter (in.)</u>	<u>Screen Interval (ft.)</u>	<u>Rated Capacity (gpm)</u>
1	16	55 – 70	600
2	16	64 – 74	600
3	16	59 – 74	600
4	20	51 – 61	600
5	20	53 – 63	600
6	20	59 – 69	600
7	20	60 – 67	300
8	20	50.8 – 62.8	600

The pump test data from 1981 in Appendix F reported aquifer transmissivities in gallons per day per foot ranging from 149,000 to 195,000 in Production Well #1 which converts to a range of 19,720 to 26,070 sq. ft./day.

The pump test data for Production Well #3 reported a transmissivity range of 175,000 to 231,000 gpd/ft. which converts to a range of 23,396 to 30,881 sq. ft./day. The methods of analysis of the data included Log-Log curve, Semi-log curve, Time-Drawdown and Distance-Drawdown.

3.0 FIVE YEAR TIME OF TRAVEL DELINEATION MODELED BY WHPA

The HECLA well field was originally modeled in 1999 using the WHPA computer code. The original delineation was modified in conjunction with OEPA using the GFLOW code. In 2008, the addition of Well 8 in Athalia approximately 5,000 feet up river in Athalia resulted in a revision to the wellhead protection boundary in November 2008 using Version 2.1.2–July 8, 2007. The aquifer settings were not changed from previous modeling to remain consistent.

The GFLOW software was selected by HECLA because of the limited availability of detailed hydrogeologic information for the area to construct a detailed three-dimensional model. GFLOW allows for sufficient level of detail and flexibility to produce a useful model that can be built up for the future and used for long range planning decisions. The Wellhead Protection Local Planning Team decided to use the well capacity of 4,500 gpm as a level of pumping to use in the delineation.

3.1 Model Input Parameters

The groundwater flow model utilizing the GFLOW software was conducted using digital line graph topographic map information to construct a database of roads and hydrography. The base map was used to build analytic elements for the model. Streams and rivers were modeled as line sinks with specified width and resistance to surface water penetration. Wells with specific discharges were also added. The locations of high capacity wells are shown in Appendix A. The aquifer parameters including porosity and hydraulic conductivity were added in the inhomogeneity element domain of the model. Two model domains were created to allow for the transitions from lower permeability materials to higher permeability outwash materials. A sample data set is shown in Appendix H.

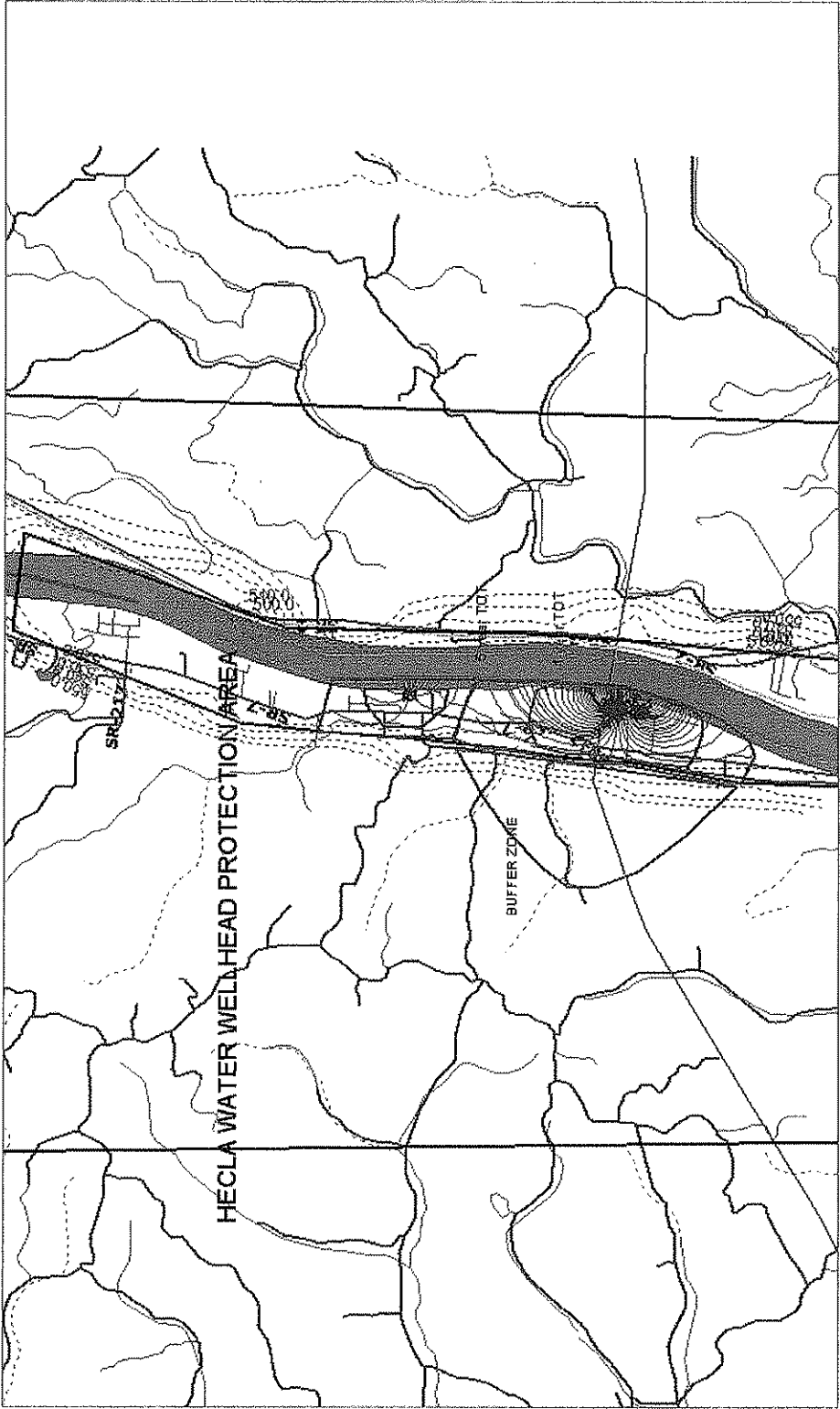
3.2 One-Year and Five-Year Time of Travel

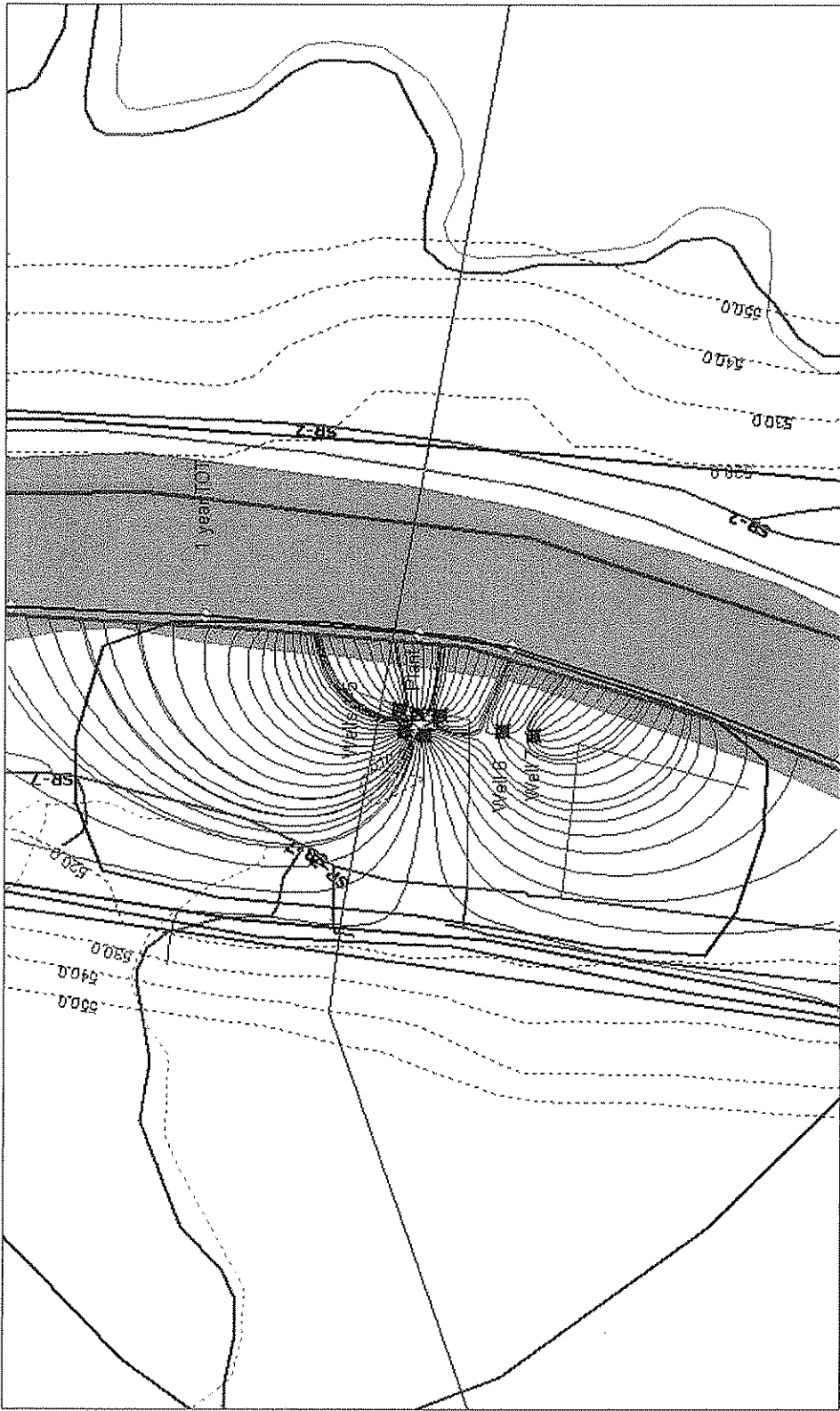
The One-Year and Five-Year Time of Travel map is shown in Appendix H. The revised wellhead protection boundary reflects the addition of Wells 6, 7 and 8. Well 8, in Athalia, extends the wellhead protection boundary significantly to encompass most of Athalia. The wellhead protection boundary will continue to include a buffer zone on the west side of the water plant well field.

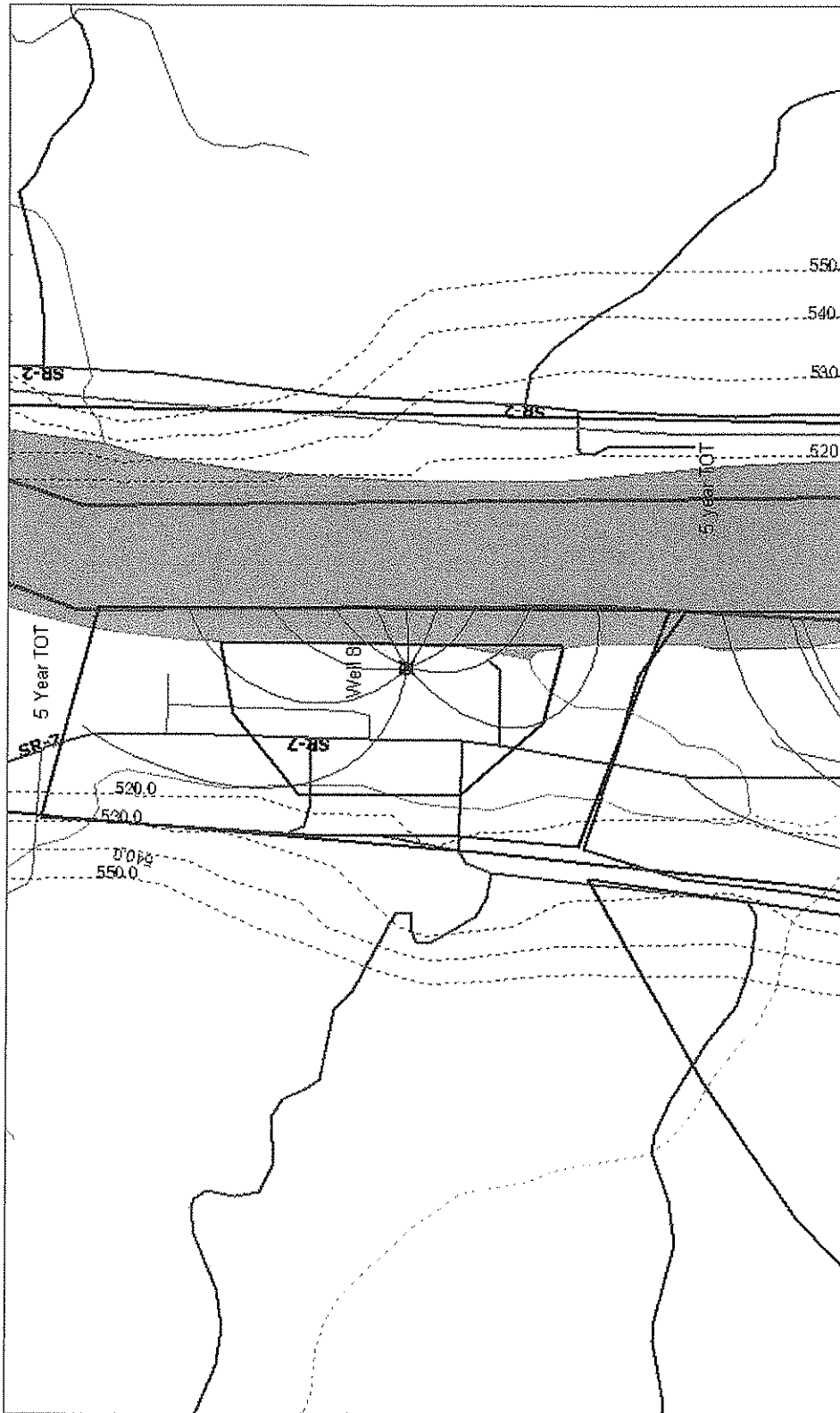
4.0 REFERENCES

1. Bownocker, J. A., 1920, Reprinted 1992, Geologic Map of Ohio, Ohio Department of Natural Resources.
2. Fenelon, J.M., Bobay, K.E., et al, 1994, Hydrogeologic Atlas of Aquifers of Indiana. Water Resources investigations Report 92-4142, U.S. Geological Survey.
3. Lloyd, Orville B., and Lyke, William L., 1995, Groundwater Atlas of the United States, Illinois, Indiana, Kentucky, Ohio and Tennessee, HA 730-K, U.S. Geological Survey.
4. Morin, Richard, 1981, Hecla Hydrology Report for Production Wells #1 and #3, Unpublished Technical Report from SIECO, Inc., Engineers
5. Schmidt, James, J., 1985, Groundwater Resources of Lawrence and Gallia Counties, Ohio Department of Natural Resources.
6. U.S. Geological Survey, 1968, 7.5 Minute Series Topographic Map: Athalia Quadrangle.
U.S. Geological Survey, 1968, 7.5 Minutes Series Topographic Map: Barboursville Quadrangle.

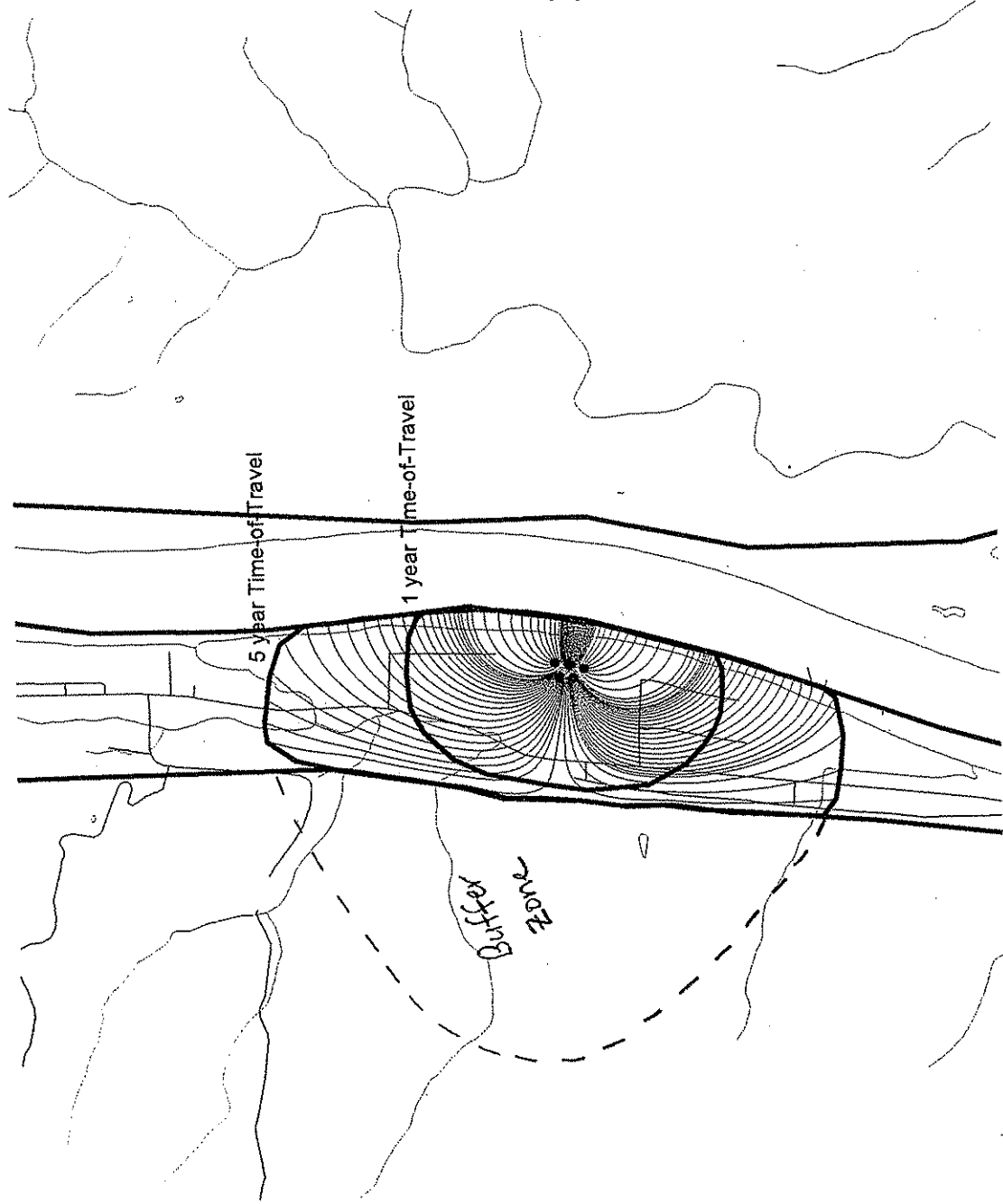
APPENDIX H
ONE AND FIVE YEAR TIME OF TRAVEL MAP
1" = 1,000'





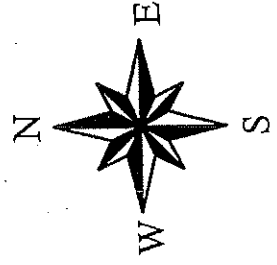


Hecla Wellhead Protection Area



Legend

- Particle Tracks from Pumping Wells
- Capture Zones (1 and 5 Year TOT)
- Model Elements (Wells and Boundaries)
- State Routes
- City/Village Roads
- County Roads
- Streams/Rivers
- Streams/Rivers



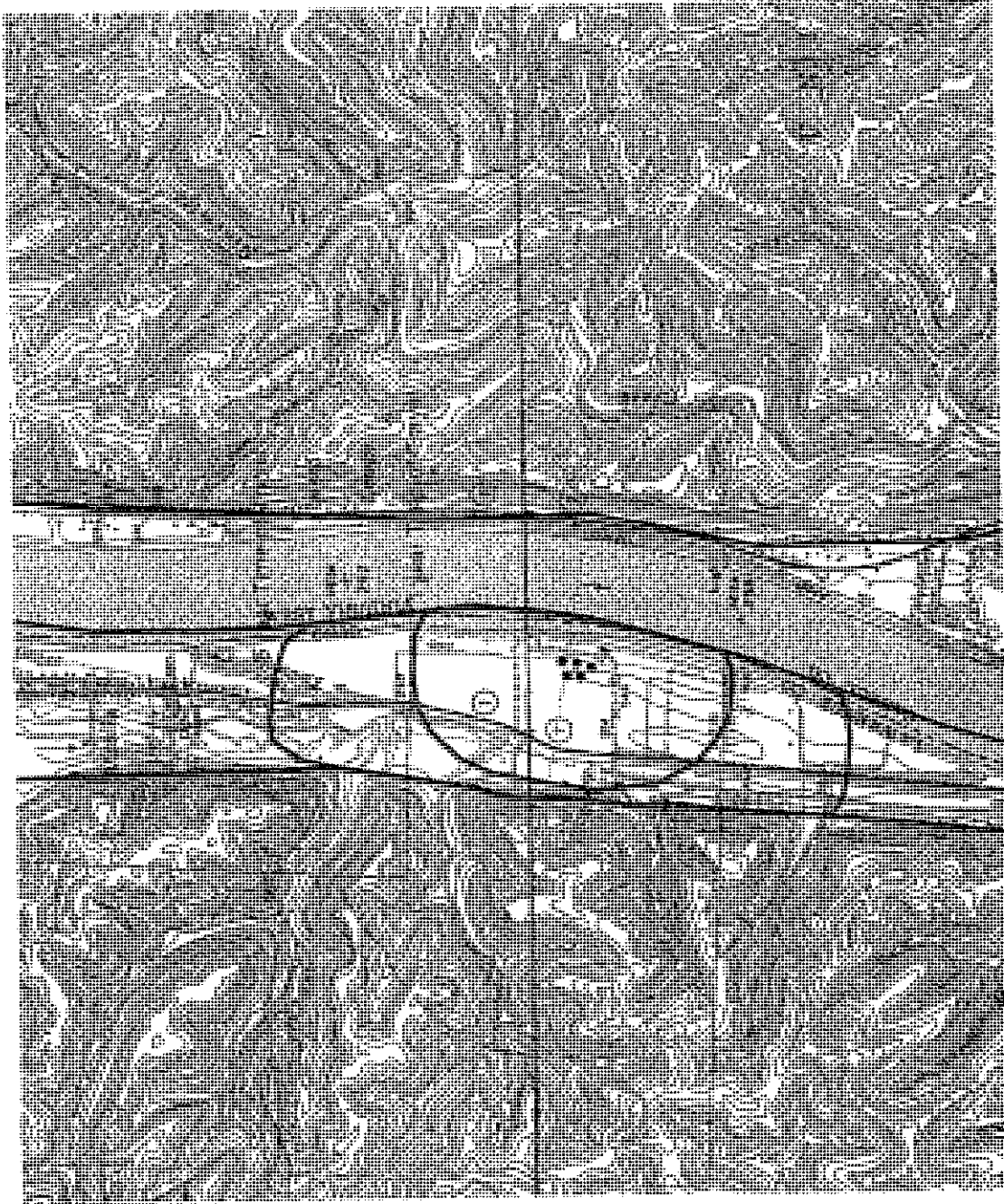
1.8 Miles

0.9








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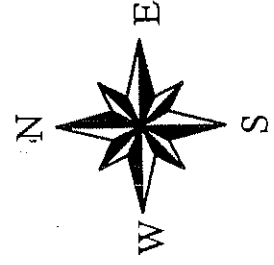
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Hecla Wellhead Protection Area



Legend

-  Capture Zones (1 and 5 Year TOT)
-  Model Elements (Wells and Boundaries)
-  State Routes
-  City/Village Roads
-  County Roads
-  Streams/Rivers
-  Streams/Rivers



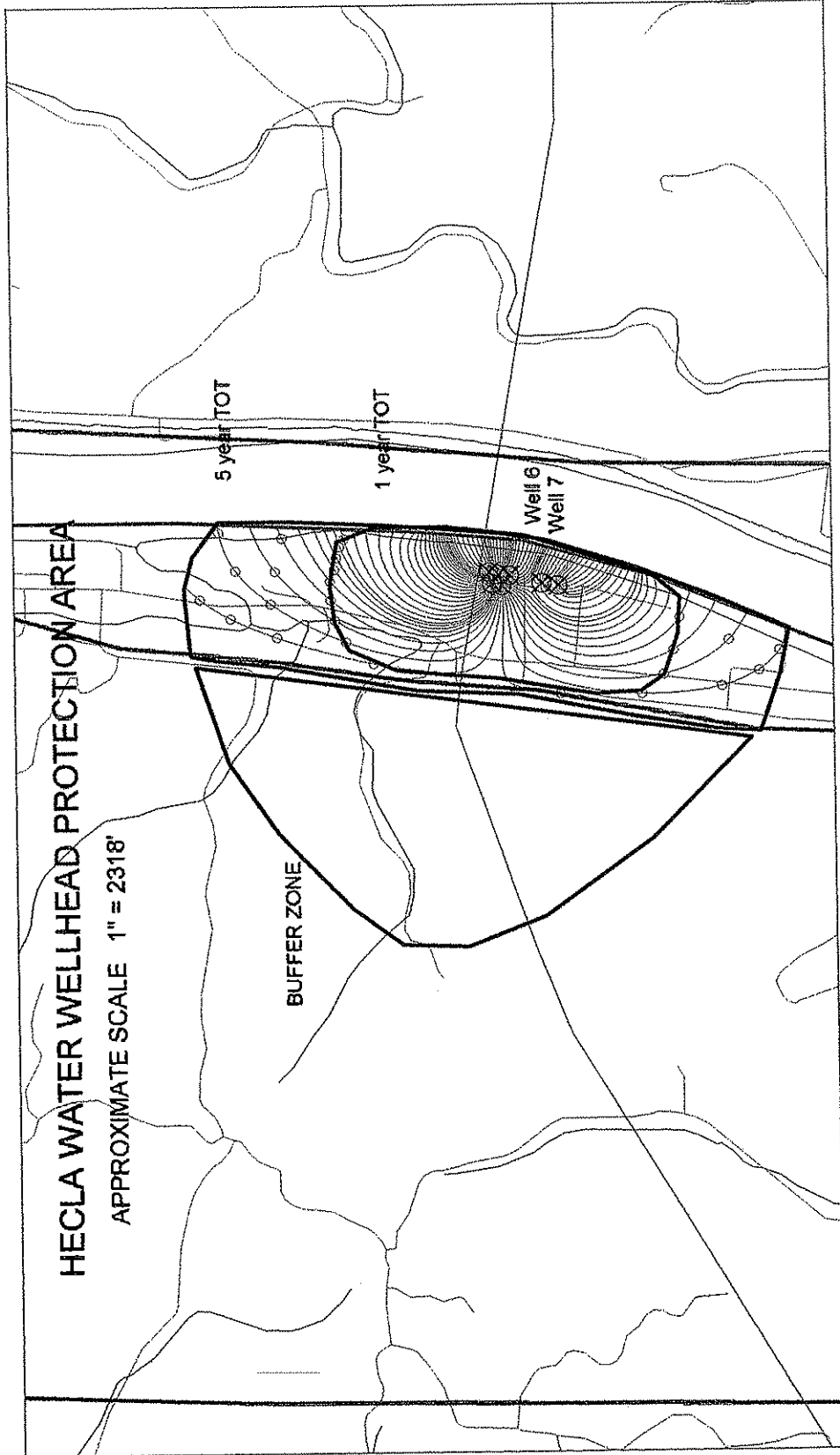
1.8 Miles

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**HECLA WATER ASSOCIATION
WELLHEAD PROTECTION PROGRAM
POLLUTION SOURCE INVENTORY**

NOVEMBER, 1999

Revised November, 2008

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APPENDICES

A - DATABASE SEARCHES

B - SOURCE IDENTIFICATION FORMS

C - POLLUTION SOURCE TABLE

D - MAP OF POTENTIAL POLLUTION SOURCES 1" = 1,000' and 1" 400'

**HECLA WATER ASSOCIATION
WELLHEAD PROTECTION PROGRAM
POLLUTION SOURCE INVENTORY**

1.0 BACKGROUND

Pursuant to requirements of OEPA, Hecla Water Association (Hecla) has prepared this pollution source inventory as part of their Wellhead Protection Program. This inventory was prepared under the supervision of the Hecla Water Association Board (Board). The purpose of the pollution source inventory is to generate a listing of sites which may possess pollution sources capable of providing a negative impact on the groundwater within a five (5) year time of travel around the Hecla water supply wells. The Board has created this inventory as a planning tool. A listing as potential pollution source in no way is intended to imply that contamination to groundwater has or will occur from a site.

2.0 LAND USE NARRATIVE

The Hecla WHPA encompasses mostly rural or residential areas with the exception of the area around Well No. 8 in Athalia. The one (1) year and five (5) year time of travel (TOT) is shown on the 1" = 1,000' scale topographic map.

The 1 year TOT includes part of S.R. 7 to the west and a subdivision with septic systems to the north as well as septic systems in Athalia. Hecla owns the strip of ground around the water plant well field from the Ohio River to the east side of S.R. 7 where development is limited to water treatment activities.

The 5 year TOT includes additional residences along S.R. 7 and in Athalia. The 5 year TOT has a "Buffer Zone" designated on the west side that takes into consideration the poorly understood nature of the aquifer transition from bedrock to outwash or alluvial materials. Please refer to the delineation document for a more detailed discussion of the "Buffer Zone". The land use in the "Buffer Zone" is mostly undeveloped forest or agricultural land with steep slopes in most areas. A surface spill in this area which may not reach the aquifer directly underneath, may travel quickly by surface flow to more permeable alluvial material in the valley floor.

At the present time there is no county wide zoning in Lawrence County. An area planning board has been formed to provide some regulation of subdivision growth. However, no land use zoning has been implemented. The Village of Athalia has no zoning or land restrictions.

3.0 POLLUTION SOURCE IDENTIFICATION PROCESS

The potential pollution source inventory was prepared in 2001 by combining a computer records search of regulated facilities with a windshield survey. The computer record search was updated in 2008 with a review of federal and state databases.

3.1 Regulatory Databases Reviewed

Hecla utilized the services of EcoSearch Environmental Resources, Inc. to perform a computer record search of regulated sites within the identified WHPA. The results of the EcoSearch data search are included in Appendix A for reference. The EcoSearch report identified no sites with reported regulatory involvement in the following categories.

Federal Databases

- NPA - National Priorities List
- CERCLA - Comprehensive Environmental Response, Compensation, and Liability Information System
- RCRA TSD - Resource Conservation and Recovery Act – Treatment Storage and Disposal Facilities
- RCRA Generator - Resource Conservation and Recovery Act – Large and Small Quantity Hazardous Waste Generators
- RAATS - RCRA Administrative Action Tracking System
- ERNS - Emergency Response Notification System
- PADS - PCB Activity Database System
- TRI - Toxic Release Inventory
- SSTS - Section Seven Tracking System
- DOCKET - Civil Enforcement Docket
- TSCA - Toxic Substances Control Act Inventory

Ohio Databases

- MSL (HWS) - Ohio Master List Sites
- SWF - Ohio Permitted Solid Waste Facilities
- LUST - Ohio Leaking Underground Storage Tank List
- UST - Ohio Registered Underground Storage Tank List

- SPILL - Ohio Spills Database
- CRTK - Ohio Community Right-to-Know Database
- PEST - Ohio Commercial & Restricted Use Pesticide Dealers

The EcoSearch data search identified no sites with regulatory involvement.

3.2 Windshield Survey

The EcoSearch computer based record review was supplemented by a windshield survey to identify non-regulated sites with potential pollution sources. The windshield survey identified six (6) additional sites for listing. A Source Identification form was completed for each of these sites. These forms are contained in Appendix B. A complete table of sites is contained in Appendix C.

The Windshield Survey was accomplished by driving the perimeter of the WHPA and all of the streets with commercial and/or industrial activities. Most activities were located along S.R. 7. Housing subdivisions with the potential for concentrated septic system use and/or fuel oil were identified. Inventory forms were completed for these sites.

3.3 Historical Site Uses

The LPT was able to identify potential pollution sources through historical information mostly obtained through long time residents on the committee. The Lawrence County Health department also contributed possible sites that were field checked by the consultant for inclusion on the list.

3.4 Transportation Sources

The Hecla WHPA includes a major highway transportation route along S.R. 7. There is no hazardous cargo restriction for this route of transportation. A wide variety of chemical transport can be expected on this highway with no above average chemical transportation of a single chemical expected.

There are no railroads or pipe lines in the WHPA to transport chemicals. The Ohio River forms the eastern boundary of the WHPA. The river is a major transportation route for a wide variety

of chemicals. The Hecla well field may be vulnerable to surface spills of chemicals, especially those more dense than water that may sink to the river bottom. Hecla monitors river activity and receives notices of river spills and will continue and improve this information where possible.

3.5 Potential Pollution Source Map

Each potential pollution source was assigned a sequential number beginning at 1 and ending with 7. The site location was spotted on the WHPA Map in Appendix D along with a number identifying the site. The site number can be cross referenced to the Pollution Source Table in Appendix D and the Source Identification forms in Appendix C to obtain specific information on these sites. All sites listed were a result of the windshield survey.

3.6 Potential Pollution Source Table

The potential pollution source table in Appendix C was completed with information about potential contaminants, current activity status, and estimated risk to the well fields.

Each of the sites in the inventory has been assigned a risk as low, moderate, or high as a general indicator of the sites potential to adversely affect the city's well fields. The assignment of risk is based on the location of the site relative to the well fields, the type of operation, and the status of any releases that may have been reported for the site. The initial risk evaluation was made by Hecla's engineering consultant with experience in assessing the environmental condition of property. The consultant used the risk ranking matrix contained in the EPA Handbook 625/R-94/001, Groundwater and Wellhead Protection and ranking information from the State of Ohio Wellhead Protection Program to assist in risk determination.

4.0 DISCUSSION

The potential pollution source inventory has revealed that the Hecla plant well field has few potential sources due to its location in a relatively undeveloped area. The majority of the potential pollution sources are septic systems from a nearby subdivision. The transportation routes at S.R. 7 and the Ohio River form a low potential but significant threat from surface spills.

This inventory will be updated whenever a new site is identified by the Local Planning Team or utility personnel. An updated computer record search will be performed bi-annually or when determined necessary by the Local Planning Team.

5.0 RESOURCES

The following resources were used or have been referred to in this Pollution Source Inventory.

1. EPA/625/R-94/001, Handbook, Groundwater and Wellhead Protection, September, 1994.
2. Ohio EPA, Ohio Wellhead Protection Program, May, 1992.
3. Indiana Department of Environmental Management, Indiana Wellhead Protection Program, no date.

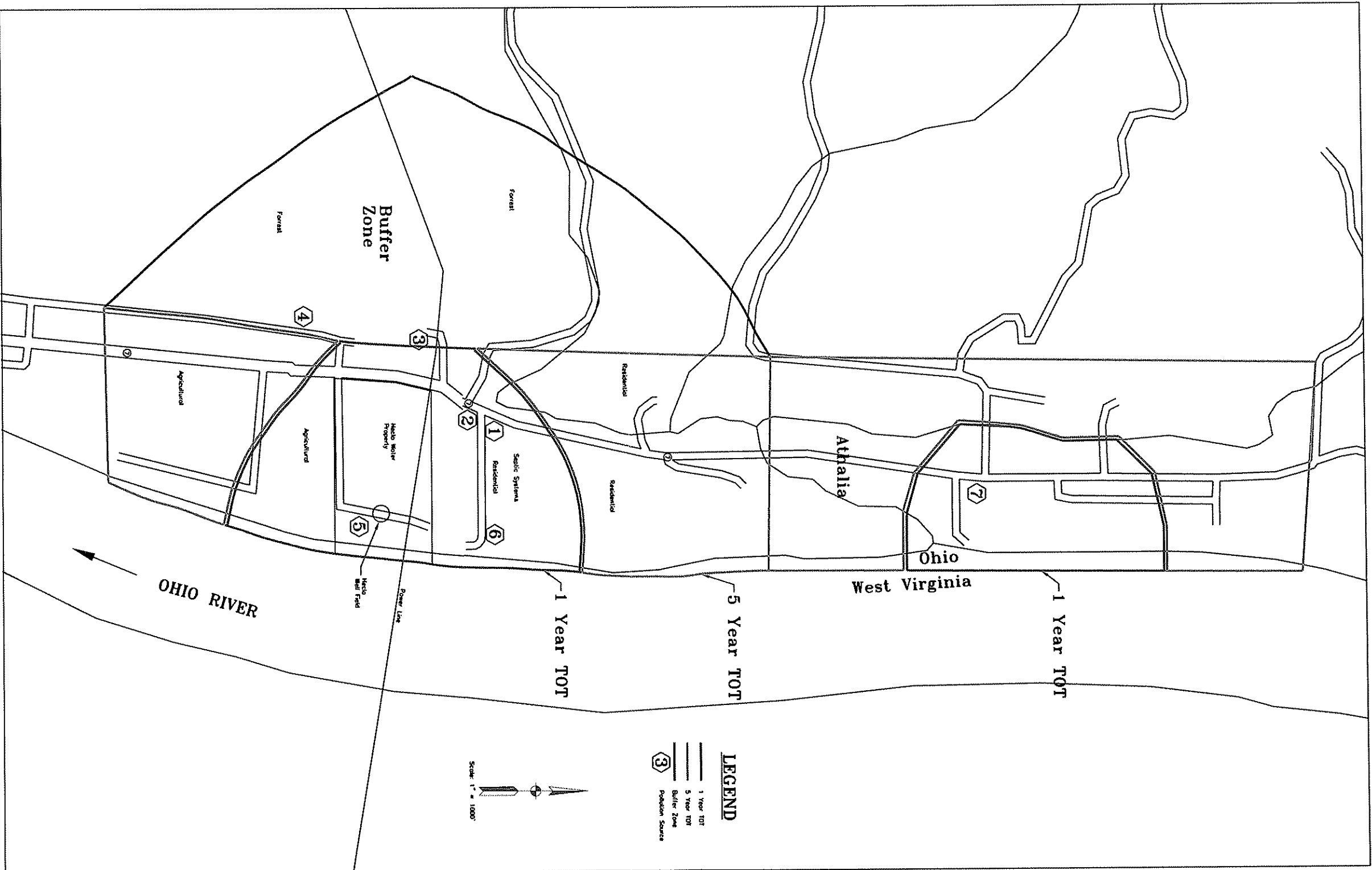
APPENDIX C
POLLUTION SOURCE TABLE

SITE SURVEY INVENTORY FORM

MAP I.D. NUMBER	DATABASE/ AGENCY ID #	FACILITY NAME	ADDRESS	POTENTIAL CONTAMINANTS	DISTANCE FROM NEAREST WELL	OPERATING STATUS	RISK
1	Windshield Survey	Gary,s Auto Body	SR 7	Petroleum, Solvents, Paints, VOC	1 yr TOT	Active	Low
2	Windshield Survey	Paint, Wallpaper, and More	SR 7	Fuel Oil AST	1 yr TOT	Active	Low
3	Windshield Survey	Maden and Jenkins Construction	CR 402	Diesel Fuel	5 yr TOT	Active	Low
4	Windshield Survey	Danny Daniels	276 CR 402	Heavy Metals, Petroleum	5 yr TOT	Active	Low
5	Windshield Survey	Hecla Water Plant	Private Road	Diesel Fuel, Chlorine, Fluoride	1 yr TOT	Active	Low
6	Windshield Survey	Riverview Drive Subdivision	SR 7 and Riverview Drive	Sceptic Systems and Nitrates	1 yr TOT	Active	Low
7	Windshield Survey	Athalia	SR 7	Sceptic Systems and Nitrates	1 yr TOT	Active	Low

Name: _____ Date: _____

Hecla Water Association Wellhead Protection Program



LEGEND

- 1 Year TOT
- 5 Year TOT
- Buffer Zone
- Population Source



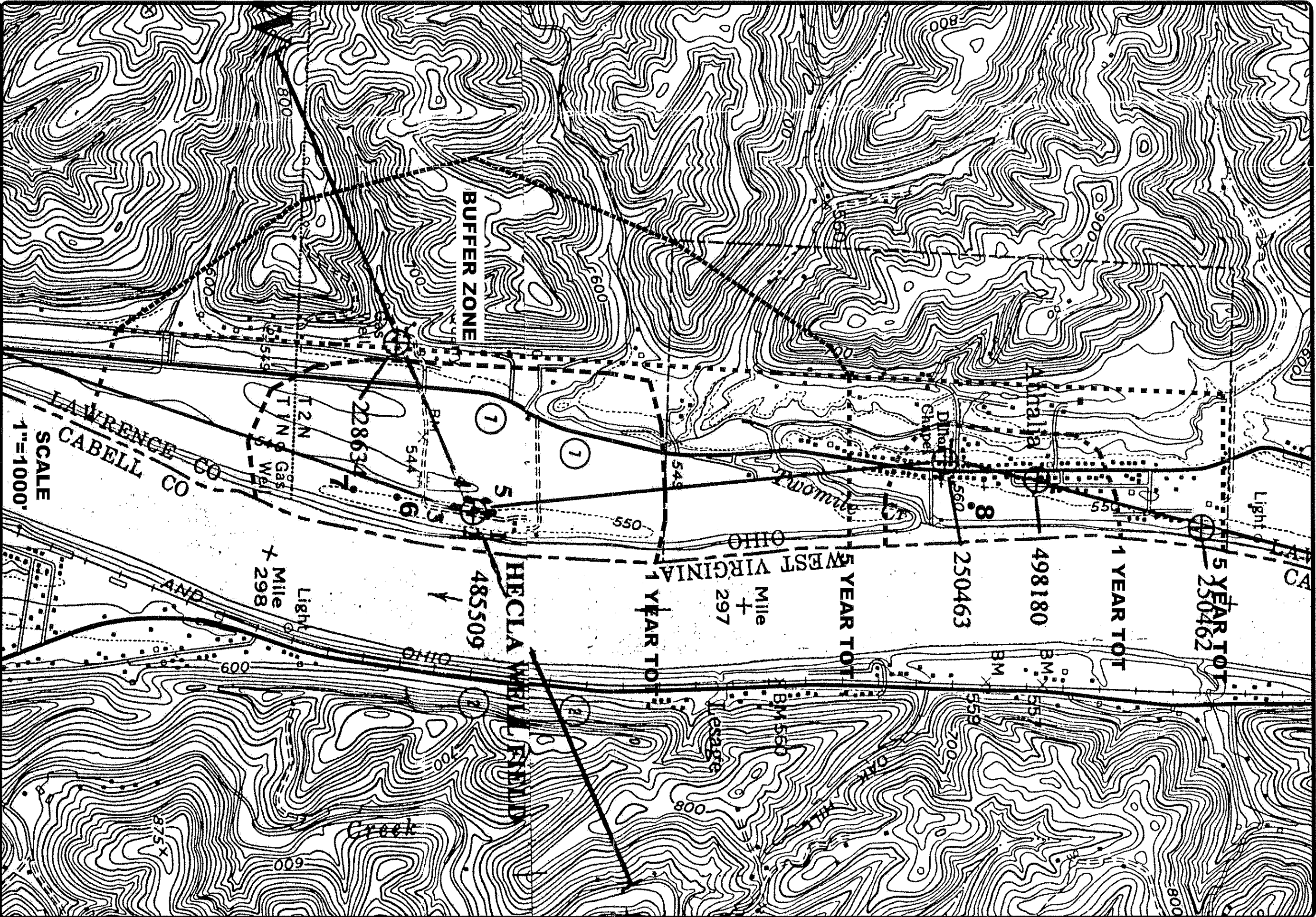
POTENTIAL POLLUTION SOURCES

HECLA WELL HEAD PROTECTION

**HECLA WATER ASSOCIATION
LAWRENCE COUNTY, OHIO**



4056.016



LAWRENCE CO
CABELL CO
SCALE
1"=1000'

T 2 N
T 1 N
Gas
Well

BUFFER ZONE

HECLA Well Head

1 YEAR TOT

5 YEAR TOT

5 YEAR TOT

1 YEAR TOT

498180

250463

Mile
+
297

485509

1 Mile
Light
+
298

APPENDIX
STRAND ASSOCIATES, INC.
ENGINEERS
4056.016

OEPA MODIFIED WELLHEAD PROTECTION BOUNDARY
1 AND 5 YEAR TOT
HECLA Well Head PROTECTION
HECLA WATER ASSOCIATION
LAWRENCE COUNTY, OHIO