

Water Withdrawal Permit Application

version 1.1

(Submission #: HQN-AQYQ-XH0EB, version 1)

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Location: State of Michigan

Details

Submission ID HQN-AQYQ-XH0EB

Form Input

Applicant Information

Applicant Information:

First Name **Last Name**

Greg Kolodziej

Organization/Company Name

High Grade Materials Company

Phone Type **Number** **Extension**

Mobile

Email

Address

9266 Snows Lake Road

Greenville, MI 48838

Is the primary contact different than the applicant?

No

Are there additional property owners or other contacts you would like to add to the application?

Yes

Additional Contact Information (1 of 2)

Contact Role(s)

Consultant

Contact Information

Prefix

NONE PROVIDED

First Name Last Name

Frank Tokar

Title

NONE PROVIDED

Organization Name

Natural Resources Management

Phone Type Number Extension

Business

Email**Address**

13923 Sherman White Road

Swanton, OH 43558

Additional Contact Information (2 of 2)

Contact Role(s)

Consultant

Contact Information**Prefix**

NONE PROVIDED

First Name Last Name

Alyssa Beall

Title

NONE PROVIDED

Organization Name

Natural Resources Management

Phone Type Number Extension

Business

Email**Address**

13923 Sherman White Road

Swanton, OH 43558

Location of Proposed Water Withdrawal

Water Source Type (choose one):

Groundwater

Description of Project Boundary (if applicable):

NONE PROVIDED

Water Withdrawal Location:

42.878391765945636,-84.32249592514148

Site Address:

Colby Lake Road

Laingsburg, MI 48848

County

Shiawassee

Project Name (if applicable)

NONE PROVIDED

Are there additional withdrawal locations?

No

Proposed Water Withdrawal Details**Total Maximum Pump Capacity (Million Gallons per Day):**

0.90

Maximum Withdrawal per Month:

Month:	Maximum Withdrawal (Millions of Gallons):
January	0.00
February	0.00
March	0.00
April	5.60
May	5.60
June	5.60
July	5.60
August	5.60
September	5.60
October	5.60
November	5.60
December	0.00
	Sum: 44.80

Primary Purpose of Use:

Processed water to be used in the process of washing construction aggregate.

Proposed Return Flow Discharge Information**Name of Discharge Location:**

on-site pond

Receiving Water Type (choose one):

Groundwater

Discharge Location:

42.87848484569495,-84.32266081593204

Return Flow Discharge

Provide the amount of water discharged after its use for the proposed withdrawal's purpose. Choose either the amount in millions of gallons per day, or as a percentage of the original withdrawal to be discharged.

Return Flow Discharge Amount

Type of Discharge Amount	Total (Number Only):	Unit
Percentage	80	Percentage of Proposed Withdrawal

Are there additional discharge locations?

No

Evaluation of Existing Hydrological and Hydrogeological Conditions

Evaluation of Existing Conditions Upload:

HGM Sciota Hydro 02052026 final.pdf - 05/05/2026 03:01 PM

Comment

NONE PROVIDED

Private Property Conflict Contingency Plan**Private Property Conflict Contingency Plan Upload**

Private Property Conflict Contingency Plan.pdf - 05/05/2026 01:41 PM

Comment

NONE PROVIDED

Environmentally Sound and Economically Feasible Water Conservation Measures

Water conservation measures are available online at:

<https://www.michigan.gov/egle/about/organization/water-resources/water-use/water-conservation-measures>

Water Conservation Measures Upload

HGM Sciota Environmentally Sound and Economically Feasible Water Conservation Measures.pdf - 05/05/2026 01:41 PM

Comment

NONE PROVIDED

I certify that I will be in compliance with the water conservation measures described above.

Yes

Decision-Making Standard of the Great Lakes ♦ St. Lawrence River Basin Water Resources Compact

Describe how all water withdrawn shall be returned, either naturally or after use, to the source watershed less an allowance for consumptive use.

Water will be pumped from the freshwater pond for use at the processing plant. The water from the processing plant will be redirected to the on-site slurry pond. From the slurry-pond water will be directed back to the freshwater pond.

Describe how the withdrawal will be implemented so as to ensure it will not result in significant individual or cumulative adverse impacts to the quantity or quality of the waters and water dependent natural resources of the source watershed and the Great Lakes.

High Grade Materials has proposed to implement best management practices to ensure the withdrawal process does not lead to significant individual or cumulative adverse impacts on the quantity or quality of the waters and water-dependent natural resources of the source watershed and the Great Lakes.

During the material processing operations, groundwater will be used as process water with no additives, thereby preserving the quality of the water. The process begins with the transfer of mined material from the mining area to the process plant. Here groundwater drawn from the freshwater pond situated east of the plant will be used to segregate sand from stone and silt.

Post-use, all process water is channeled into the slurry pond. From the slurry pond, water is drained back into the freshwater pond. This closed-loop system ensures that water is continually cycled back into its natural environment, thereby maintaining the quantity of the water source and minimizing any potential adverse impacts on the watershed and the Great Lakes.

Describe how the withdrawal will be implemented so as to incorporate Environmentally Sound and Economically Feasible Water Conservation Measures.

High Grade Materials, confirms the implementation of the withdrawal, effectively incorporating environmentally sound and economically feasible water conservation measures for the Aggregates Industry Sector.

Describe how the withdrawal or consumptive use will be implemented so as to ensure that it is in compliance with all applicable municipal, State and federal laws as well as regional interstate and international agreements, including the Boundary Waters Treaty of 1909.

High Grade Materials will be in alignment with all applicable municipal, state, and federal laws, as well as regional interstate and international agreements such as the Boundary Waters Treaty of 1909. Through these measures, High Grade Materials is committed to ensuring full compliance with all applicable legal and regulatory requirements.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration of whether the proposed withdrawal is planned in a fashion that provides for efficient use of the water, and will avoid or minimize the waste of water.

As previously stated, High Grade Materials has engineered this project to efficiently use the proposed water withdrawal.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration of if the proposal is for an increased withdrawal, whether efficient use is made of existing water supplies.
The application is not requesting an increased withdrawal and therefore this does not apply to this project.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration of the balance between economic development, social development and environmental protection of the proposed withdrawal and use and other existing or planned withdrawals and water uses sharing the water source.

From an economic development standpoint, the demand for construction sand and gravel is projected to increase both in Michigan and the surrounding market areas. This need is driven by rising populations, continuous public and private construction and infrastructure developments, and the depletion of existing quarries. The quarry in Sciota Township will play a critical role in fulfilling this demand.

Simultaneously, the proposed water withdrawal also considers the principals of social development and environmental protection. The Baseline Hydrogeologic Analysis dated January 16, 2026 confirms that the planned withdrawal will not impact local drinking water wells, wetland areas, or surface water drainage systems, ensuring the preservation of vital environmental resources for the community.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration of the supply potential of the water source, considering quantity, quality, and reliability and safe yield of hydrologically interconnected water sources.

In terms of groundwater supply potential, High Grade Materials is using a management strategy to ensure sufficient quantity, quality, and reliability while preserving the safe yield of hydrologically interconnected water sources. This has been evaluated in the Baseline Hydrogeologic Analysis dated January 16, 2026.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration of the probable degree and duration of any adverse resource impacts caused or expected to be caused by the proposed withdrawal under foreseeable conditions, to other lawful consumptive or non-consumptive uses of water or to the quantity or quality of the waters and water dependent natural resources of the Basin, and the proposed plans and arrangements for avoidance or mitigation of such impacts.

Regarding potential adverse resource impacts, High Grade Materials anticipates no significant impacts from the proposed withdrawal. This assertion is based on the dynamics of the excavation process, where the site is immediately recharged through groundwater inflow as material is being extracted. This ensures that groundwater will promptly fill the created void, maintaining the quantity and quality of the waters.

This characteristic of the extraction process is applicable to all stages of the project, and as a result, it minimizes any potential adverse impact on the consumptive or non-consumptive uses of water or the water-dependent natural resources of the Basin under foreseeable conditions.

Given this natural and instant recharge mechanism, the probability of High Grade Materials causing any adverse impact on the water resources is significantly low in terms of both degree and duration. Therefore, while High Grade Materials is committed to continuous monitoring and mitigation strategies, current projections indicate no significant need for additional plans or arrangements for avoidance or mitigation of such impacts. This is further discussed in the Baseline Hydrogeologic Analysis dated January 16, 2026.

Describe how the proposed use is reasonable under common law principles of water law in Michigan, based upon a consideration as to the need for the proposal to include restoration of hydrologic conditions and functions of the source watershed.

High Grade Materials believes that this use will be compliance with the above laws and agreements. Water use will be minimized as much as possible; no additives are used in this process; water will be returned to the groundwater table after use. Rainwater is retained onsite to minimize use of groundwater. The Baseline Hydrogeologic Analysis dated January 16, 2026, that was completed for this location indicates any change to the water table beyond the nearest property line will be negligible and consistent with seasonal fluctuations.

Cooling Water Intake Structure

Does this facility hold a permit issued under Part 31 for a cooling water intake structure?

No

Application Fee

Amount Due:
\$2,000

WATER WITHDRAWAL PERMIT APPLICATION

Supplemental Information

Private Property Conflict Contingency Plan

High Grade Materials is committed to ensuring the responsible and sustainable operation of its mining activities, with a particular focus on mitigating any potential impacts on neighboring water wells. In the event of conflicts with the normal functioning of these wells, be it a temporary or permanent impact to the water's quantity or quality or other conflicts with private property rights, High Grade Materials will promptly address and thoroughly investigate all related complaints.

If any problems arise, High Grade Materials will adhere to the local health department's (LHD) guidelines in addressing and remedying any water well issues.

WATER WITHDRAWAL PERMIT APPLICATION

Supplemental Information

Environmentally Sound and Economically Feasible Water Conservation Measures

This project's water use sector is Aggregates Industry. High Grade Materials has reviewed the Michigan Aggregates Association best management practices for water conservation guidelines and this project will follow the listed conservation measures as provided below:

1) Reduce or Eliminate Landscape Watering

- a. No Landscape watering is proposed for this project throughout the mining process.

2) Minimize Water Discharge to What is Needed to Keep the Facility Operating

- a. In accordance with our operational plans, all activities encompassing removal, processing, and transportation will occur from April 1st to November 30th. During these days, water extraction will be carried out using a water pump, with a capacity of approximately 1,500-gpm. This pump will be used to withdraw water from the on-site well to fill the clay-lined freshwater pond that will be used at the processing plant. This well will only be used to keep the freshwater pond full. The pumping rate will vary throughout the project and will depend on the time of the year and amount of material being processed.

3) Slope Ground Surfaces to Direct Water into Retention Basins

- a. All ground surfaces within the mining area will be sloped towards the on-site slurry pond. This is an additional measure to ensure any surface runoff is isolated and directed on the property toward the excavation and limit any stormwater from leaving the site.

4) Retain Stormwater as Much as Practical to Use for Process water and Dust Suppression

- a. High Grade Materials will make every effort to retain stormwater on-site and utilize it for practical purposes such as process water and dust suppression.

5) Use Process Water in Spray Bar Systems and for Dust Suppression to Optimize Water Usage When Practical

- a. High Grade Materials will use the water withdrawn in spray bar systems on the processing plant and for dust suppression on the property, if needed.

6) Many Water Usages Are Imposed on The Facility by Government Directive-Continue to Work with Regulators to Minimize the Use of Water

- a. High Grade Materials acknowledges that certain water usages are mandated by government directives. Therefore, High Grade Materials commits to working closely with local and state regulatory bodies to minimize water consumption within the facility.

7) Dewatering is Required for Efficient, Economical and Safe Operations. Continue to Review Maximizing Discharge Water for Internal Usages.

- a. No Dewatering is proposed for this mining operation and therefore this BMP does not apply to this project.

Baseline Hydrogeologic Analysis

For

**High Grade Materials Company
Sciota Township
Shiawassee County, Michigan**

January 16, 2026

Report Prepared For:
High Grade Materials Company
9266 Snows Lake Road
Greenville, MI 48838

Report Prepared By:



Natural Resources Management, LLC
13923 Sherman White Road
Swanton, OH 43558

Table of Contents

1.0 INTRODUCTION.....	3
2.0 STUDY AREA.....	4
2.1 Watershed	4
2.2 Existing Lakes	4
2.3 Existing Ponds	4
2.4 Existing Wetlands and Watercourses	4
2.5 Floodways and Floodplains	5
3.0 SUBSURFACE SETTING	5
3.1 Glacial Geology & Unconsolidated Deposits	5
3.2 Bedrock Geology.....	5
3.3 Groundwater Characteristics.....	5
3.4 Water Withdrawal Assessment Tool.....	6
4.0 ANALYTICAL METHOD AND DESIGN	6
4.1 Parameter Inputs	6
5.0 ANALYTICAL SIMULATION RESULTS	7
6.0 FINDINGS AND OPINIONS.....	8
7.0 REFERENCES.....	10

List of Figures

Figure 1: Site Location.....	13
Figure 2: Resources Map	14
Figure 3: Bedrock Geology.....	15
Figure 4: Quaternary Geology	16
Figure 5: Forecasted Drawdown.....	17
Figure 6: Current Potentiometric Surface	18

List of Appendices

Appendix A: Drawdown Calculation Summary	19
Appendix B: Summary of Domestic Wells & Well Logs.....	21
Appendix C: Soil Borings	47
Appendix D: Geologic Cross Sections	48
Appendix E: EGLE Water Withdrawl Assesment Tool	53

1.0 Introduction

Natural Resources Management, LLC (NRM) has prepared a Baseline Hydrogeologic Analysis on behalf of the client, High Grade Materials Company (HGM) for the proposed construction sand and gravel mining operation. The site consists of three (3) parcels of land with a total area of 104.05 acres. This site is located south of the intersection of Colby Lake Road and W Grand River Road in Sciota Township, Shiawassee County, Michigan. The site is a proposed sand and gravel surface mine, extracting construction aggregate from the glacial deposit above the groundwater table, with no mining proposed within the aquifer with the exception of one (1) 0.75-acre pond used in the processing of the material. HGM will also excavate 1 0.75-acre slurry pond located above the groundwater table, which will serve as a settling area for sediment. The proposed slurry pond will be constructed with a 1- foot clay liner to contain both water and sediment within the pond. For a detailed visual representation of the HGM site and its surrounding area, please refer to Figure 1, which depicts the site location along with other relevant geographic information.

This report contains the five items required in Shiawassee County Zoning Ordinance Article 4, Section 4.3.67(2)G(10) adopted on January 12, 2012, and requirements to obtain an Environmental Great Lakes, and Energy (EGLE) Water Withdrawal Permit. The purpose of this analysis is to identify and describe the existing characteristics of the subsurface conditions and proposed excavation impacts within the boundaries of the site.

The purpose of this report is to:

- A detailed description of subsurface conditions.
- Depth of water table throughout the planned excavation area.
- A map depicting the thickness and depths of material to be excavated.
- A discussion of the environmental impacts of the proposed excavation, including but not limited to the impact of the proposed excavation upon existing area wells.
- A recommendation of the necessity to install monitoring wells.

This Baseline Hydrogeologic Analysis focuses on the site and within 1,000 feet from site property boundary, further known as the “study area.”

The proposed water withdraw is estimated to be an average of 900,000 gallons per day (GPD) at the Sciota Quarry. Water pumped from the aquifer will be in the freshwater pond used for aggregate processing. Water will be pumped from this pond and to the processing plant for processing the sand and gravel. Used wash water will be recirculated to a slurry pond to allow for sediment to settle, and then the water will be pumped back into the freshwater pond.

2.0 Study Area

NRM conducted three (3) site visits on the dates on August 26, August 27, and October 24, 2024. Fourteen (14) wetlands, three (3) ponds, and (3) swales were delineated on the site. The physical nature of the topography in the study area can be described as rolling hills and valleys with ground surface elevations ranging from approximately 816 feet, (ft, NAVD88) to 854 ft, NAVD88 (Figure 2).

2.1 Watershed

The proposed site lies within the Leisure Lakes-Looking Glass River watershed. Various named tributaries are located within the watershed (USGS, 2023). A section of the Unnamed Tributary to Looking Glass River begins in the northwest corner of the property boundary (Figure 1).

2.2 Existing Lakes

No lakes are located within the study area of the site.

2.3 Existing Ponds

There are five (5) existing ponds within the study area. Three (3) of these ponds are located on the southeast side of the site ranging in size approximately 0.03 to 0.32 acres. One (1) pond is located west of the site and is approximately 0.67 acres. One (1) pond is located east of the site and is approximately 0.26 acres. These ponds appear to be man-made with the exception of the ponds located within wetland complexes. No estimated depths were documented.

2.4 Existing Wetlands and Watercourses

Fifteen (15) wetlands were mapped within the study area of the site. Fourteen (14) of these wetlands are fully located or partially located on the site and were field verified during the growing season by NRM. Eight (8) of these wetlands were identified as emergent ranging in size from 0.17 acres to 0.98 acres. Three (3) of these were identified as forested ranging in size from 0.2 acres to 4.59 acres. One (1) of these were identified as scrub-shrub with an acreage of 3.0. Two (2) of these wetlands were identified as emergent/scrub-shrub ranging in size from 1.53 acres to 7.32 acres.

As stated in the NRM Wetland Delineation Report dated November 7, 2024, four (4) of these wetlands appear to be connected to the large wetland complex (>100 acres) to the west of the subject property and are likely connected off-site with each other.

For a complete review of the onsite wetlands, please see the NRM Wetland Delineation Report dated November 7, 2024 (Appendix IV of the application narrative).

The remaining one (1) wetland located within the study area was depicted on the National Wetlands Inventory database. Please note, the >100 acre wetland complex and these off-site wetlands are unable to be field verified and the >100 acre wetland complex continues outside of the study area. This off-site wetland is estimated to be 15.9 acres and is located east of the site.

2.5 Floodways and Floodplains

No floodways or floodplains within the study area were depicted on the FEMA Floodplain Database (Appendix C). The study area is identified as Zone X (Area of minimal flood hazard).

3.0 Subsurface Setting

3.1 Glacial Geology & Unconsolidated Deposits

Subsurface exploration of the site was conducted in February 2025 by HGM. Six soil borings were completed, and the subsurface materials consist of a mixture of topsoil, sand and gravel, clayey sand, and clay from the ground surface to elevations down to a maximum elevation of 772 ft, NAVD88. A copy of these soil boring logs is provided in Appendix B. Two geologic cross-sections were created for the site using these soil borings is provided in Appendix C.

3.2 Bedrock Geology

The bedrock units underlying the glacial deposits were mapped by the Michigan Department of Natural Resources (MDNR) as Pennsylvanian sedimentary rocks consisting of sandstone, shale, coal, and limestone (Figure 3) (Milstein, 1987).

The Saginaw Formation consists of various lithologies including shale, sandstone, siltstone, and carbonates. It serves as a confining unit (Westjohn and Weaver, 1998). The thickness of the Saginaw Formation varies significantly throughout Michigan, ranging from less than 400-ft to 500-ft (Westjohn & Weaver, 1996; Westjohn & Weaver, 1998).

3.3 Groundwater Characteristics

The elevation and direction of groundwater movement was determined by the on-site groundwater connected wetlands and soil borings that were reviewed during the NRM site visits in August and October 2024. The determination was based on water elevations collected from data points.

The average depth from the ground surface to the water table across the site ranges from 2 ft, below ground surface (ft, bgs) on the south side to 24 ft, bgs on the north side with an average depth of 11 ft, bgs.

The groundwater flows from the northeast to the southwest towards the Leisure Lakes-Looking Glass River ranging from 831 ft, NAVD88 to 815 ft, NAVD88. The groundwater flow has a hydraulic gradient of 0.6 ft/ft, as depicted on the Existing Potentiometric Surface Map (Figure 6).

3.4 Water Withdrawal Assessment Tool

The EGLE Water Withdrawal Assessment Tool was used for this site. The pumping capacity determined by gallons per minute (gpm) was 625 gpm. The intake depth was determined to be 5 ft. The pumping frequency is intermittent, since the pump will be used at a maximum of 2 days a week and 10 hours a day. The determined water withdrawal screening result zone was Zone A. Screenshots of the calculations of the run and results can be found in Appendix E.

4.0 Analytical Method and Design

The Theis equation was the analytical method used for estimating the cone of depression (drawdown) near the proposed pumping well at the Sciota Quarry. The Theis Method is often used to simulate nonequilibrium radial flow within a confined aquifer using several assumptions. These assumptions include the following (Theis, 1935):

- One-dimensional steady state.
- Flow with no lateral boundaries or vertical leakage.
- Aquifer has an infinite areal extent
- Aquifers are homogeneous and of uniform thickness.

This analytical method required corrections to account for the proposed pumping well that is proposed to be located in an unconfined aquifer. Therefore, the Theis correction for unconfined aquifers was used to adjust the drawdown calculation so it accurately reflects unconfined conditions. For the purposes of this study the correction factor used is $S' = s - (s^2 / 2b)$ (Kruseman et al., 1994). All calculations used for determining drawdown can be found in Appendix A.

4.1 Parameter Inputs

Input parameters required to calculate drawdown using the Theis Method include:

- Hydraulic Conductivity (K)
- Aquifer Thickness (B)
- Transmissivity (T)
- Storativity (S) / Specific Yield (Sy)
- Well Pumping Rate (Q)
- Time (t)

Transmissivity was calculated using the equation $T(\text{ft}^2/\text{day}) = K(\text{ft}/\text{day}) B(\text{ft})$; where K is the estimated hydraulic conductivity and B is the saturated thickness of the aquifer. The hydraulic conductivity was estimated based upon the saturated well-sorted sands encountered in the soil borings (Fetter, 1988; Applied Hydrogeology, Second Edition, p. 80) conservatively low as 10-3cm/sec or 2.835 ft/day. The saturated thickness of the aquifer was estimated using the domestic well logs within the study area, 68 ft. Therefore, if $K=2.835 \text{ ft}/\text{day}$ and $B=68 \text{ ft}$, Transmissivity can be calculated as:

$$T = K B$$

$$T = (2.835 \text{ ft/day}) (68\text{ft})$$

$$T = 192.78 \text{ ft}^2/\text{day}$$

Storativity in an unconfined aquifer is a function of the specific yield, specific storage and thickness of the saturated zone. The storativity in an unconfined aquifer is usually taken to be equal to the specific yield and ranges from 0.02 to 0.30 (Fetter, 1988; Applied Hydrogeology, Second Edition; p. 107).

Storativity in an unconfined aquifer is a function of the specific yield, specific storage, and thickness of the saturated zone. The storativity in an unconfined aquifer usually equals the specific yield and ranges from 0.02 to 0.30 (Fetter & Kreamer, 2022; p.105). The specific yield as a function of grain size has been estimated for various types of sediments and plotted on a curve and a table as a function of grain size (Fetter & Kreamer, 2022; p.84-85). From this table, the specific yield for the coarse to fine gravelly sands encountered on the property has been conservatively estimated to be 0.26 (26% Specific Yield).

The aquifer thickness was determined by using 25 domestic well logs within 1,000 feet from the surrounding properties. Using the surface digital elevation model (DEM) and subtracting it by the static water level (SWL) for each well. Taking the SWL elevation and subtracting it by the top of bedrock elevation gives you the saturated thickness of 68 ft. Summary table and copies of the domestic well logs can be found in Appendix B.

Transmissivity was calculated using the average hydraulic conductivity of (2.835-ft/day), and a calculated saturated thickness of 68-ft. Transmissivity was calculated to be 193 ft²/day.

The pumping rate was obtained based upon personal communication with HGM. The pumping from the pond is capable of 1,500-GPM. This rate was used in a calculation assuming the pump will operate at full capacity for 10 hours per day. Therefore, the pump will conservatively withdrawal 0.9-MGD or 625 GPM.

The time interval used for the Theis calculation was 1-day. 1-day was used for the calculation to account for a recharge of the aquifer. This value was derived from the pump operating at 10 hours per day over a 24-hour period.

5.0 Analytical Simulation Results

The analytical model predicts the following potentiometric surface changes depicted in the potentiometric surface change map and drawdown spreadsheets in Appendix A. The analysis focused on the nearest identified domestic wells and regulated resources up, down, and side

gradient in relation to the proposed lake. DEM elevations were obtained from a 1-meter DEM provided by USGS (USGS, 2020):

- **Up-Gradient Resource**

- DW-1 is predicted to experience no change in the current potentiometric surface. The forecasted groundwater elevation following the excavation is 789.89 ft, NAVD88.
- DW-2 is predicted to experience no change in the current potentiometric surface. The forecasted groundwater elevation following excavation is 802.27 ft, NAVD88.
- WL-5 is predicted to experience a no change decrease in the current potentiometric surface. The forecasted groundwater elevation following excavation is 822.86 ft, NAVD88.

- **Side-Gradient Resources**

- WL-8 is predicted to experience a no change in the current potentiometric surface. The forecasted groundwater elevation following excavation is 821.97 ft, NAVD88.

- **Down-Gradient Resources**

- WL-6 is predicted to experience no change in the current potentiometric surface. The forecasted groundwater elevation following excavation is 813.80 ft NAVD88.

6.0 Findings and Opinions

NRM conducted a comprehensive assessment of the project hydrogeological environment. The data collected provides insights into the surface water drainage patterns, subsurface geological materials, and characteristics of the aquifer. As required by Shiawassee County Zoning Ordinance Article 4, Section 4.3.67(2)G(10) adopted on January 12, 2012, we have identified and described the existing characteristics of the subsurface conditions.

Our findings indicate that the dry mining activities as proposed will not result in any significant changes in water quality or quantity. The project has been designed in accordance with the standards of the above-referenced Ordinance and based upon the data evaluated, we have not identified any significant changes to the hydrogeology within the study area. Considering the mining methods employed, we anticipate no significant alterations or impacts to surface water flow, upgradient or downgradient groundwater levels, or the water supply to neighboring wetlands and surface waters.

Findings:

1. A detailed description of subsurface conditions.

The subsurface condition on the site consists of a mixture of topsoil, sand and gravel, clayey

sand, and clay from the ground surface to elevations down to a maximum elevation of 772 ft, NAVD88.

2. Depth of water table throughout the planned excavation area.

The average depth from the ground surface to the water table across the site ranges from ft, bgs on the south side to 24 feet, bgs on the north side with an average depth of 11 feet, bgs. Excavation of the 1- 0.75-acre freshwater pond will be terminated approximately 5 feet below from the groundwater elevation. The remaining excavation area will be above the groundwater table.

3. A map depicting the thickness and depths of material to be excavated.

Two geologic cross-sections were created for the site using these soil borings (Appendix D).

4. A discussion of the environmental impacts of the proposed excavation, including but not limited to the impact of the proposed excavation upon existing area wells.

No mining within the groundwater table is proposed with the exception of one (1) 0.75-acre pond that will be used for processing material. This analysis indicates that the proposed mining plan will not result in any significant changes and therefore, no impacts are expected on existing domestic wells.

5. A recommendation of the necessity to install monitoring wells.

No mining within the groundwater table with the exception of the one (1) 0.75-acre pond that will be used for processing material. This report evaluated the resources within the study area and no impacts are expected. Therefore, no impacts are expected on and therefore installation of monitoring wells is not necessary for this proposed project.

7.0 References

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List of Figures

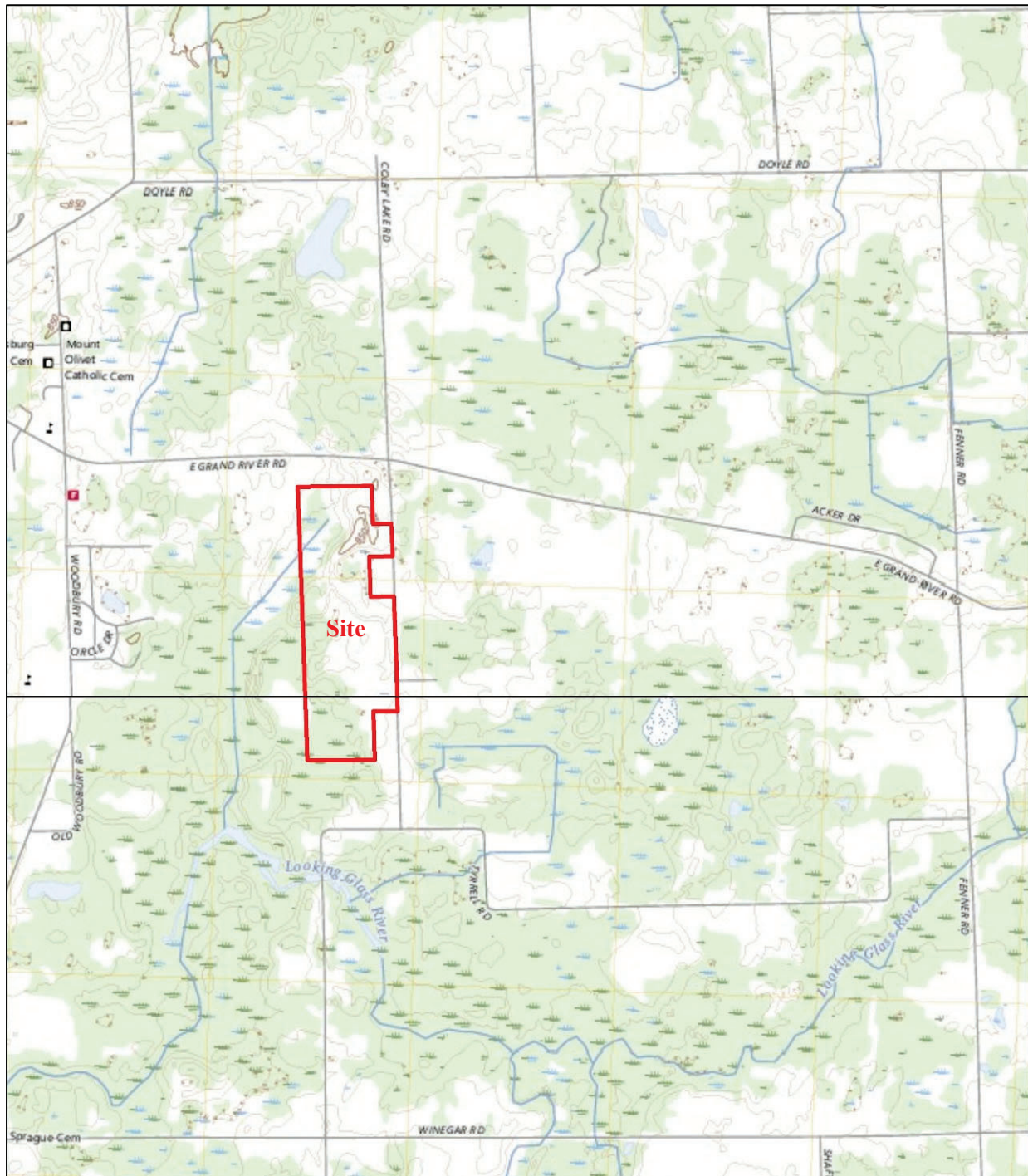
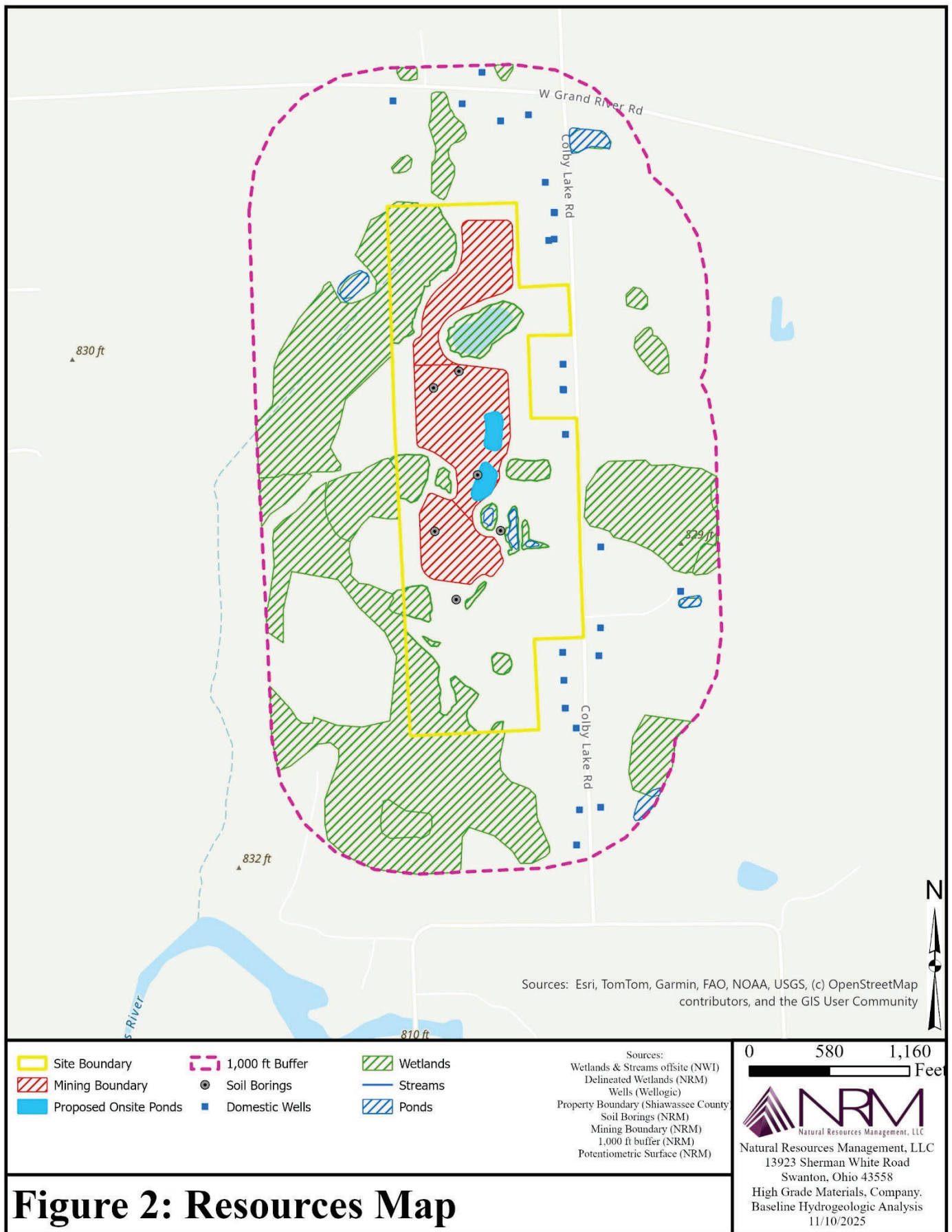
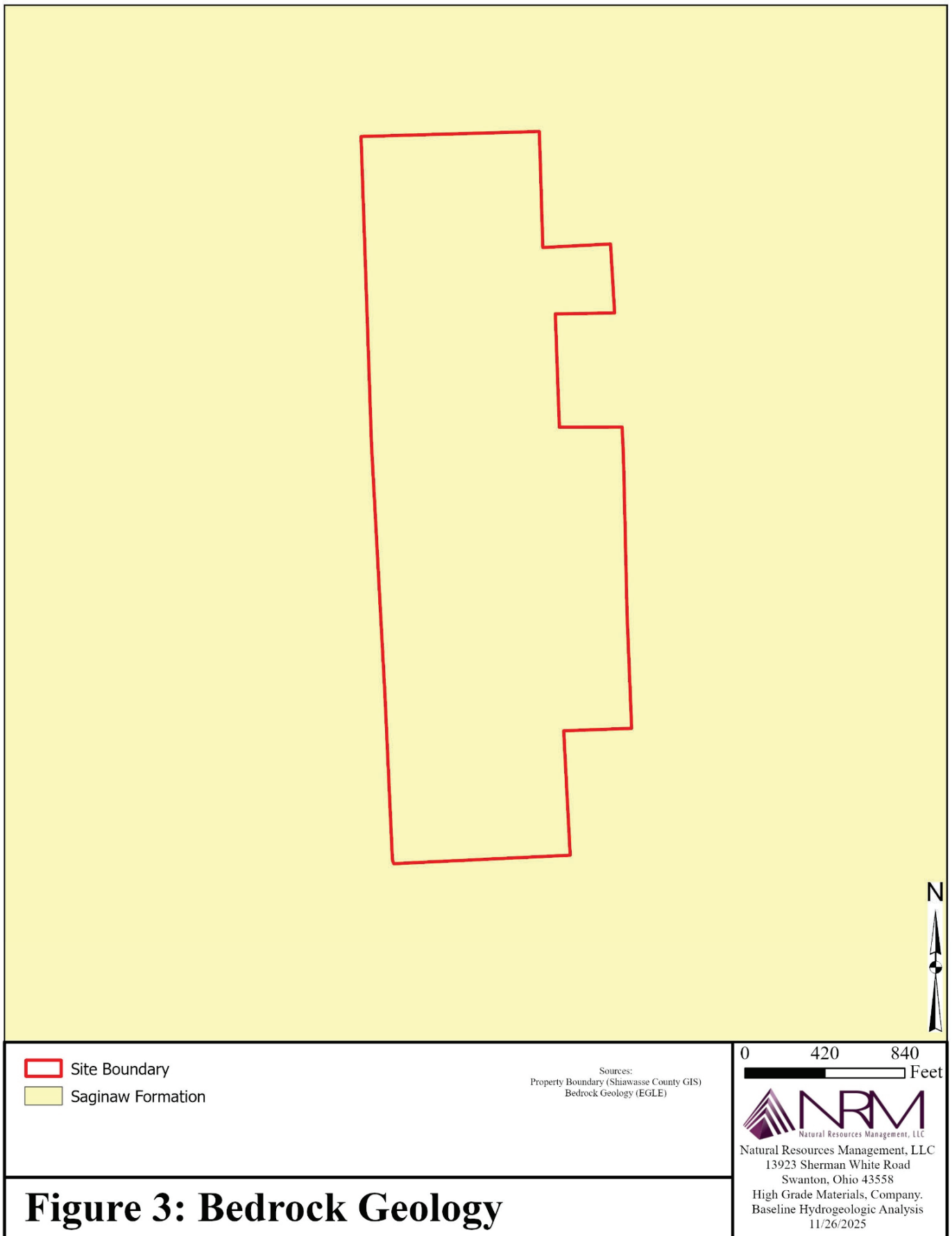
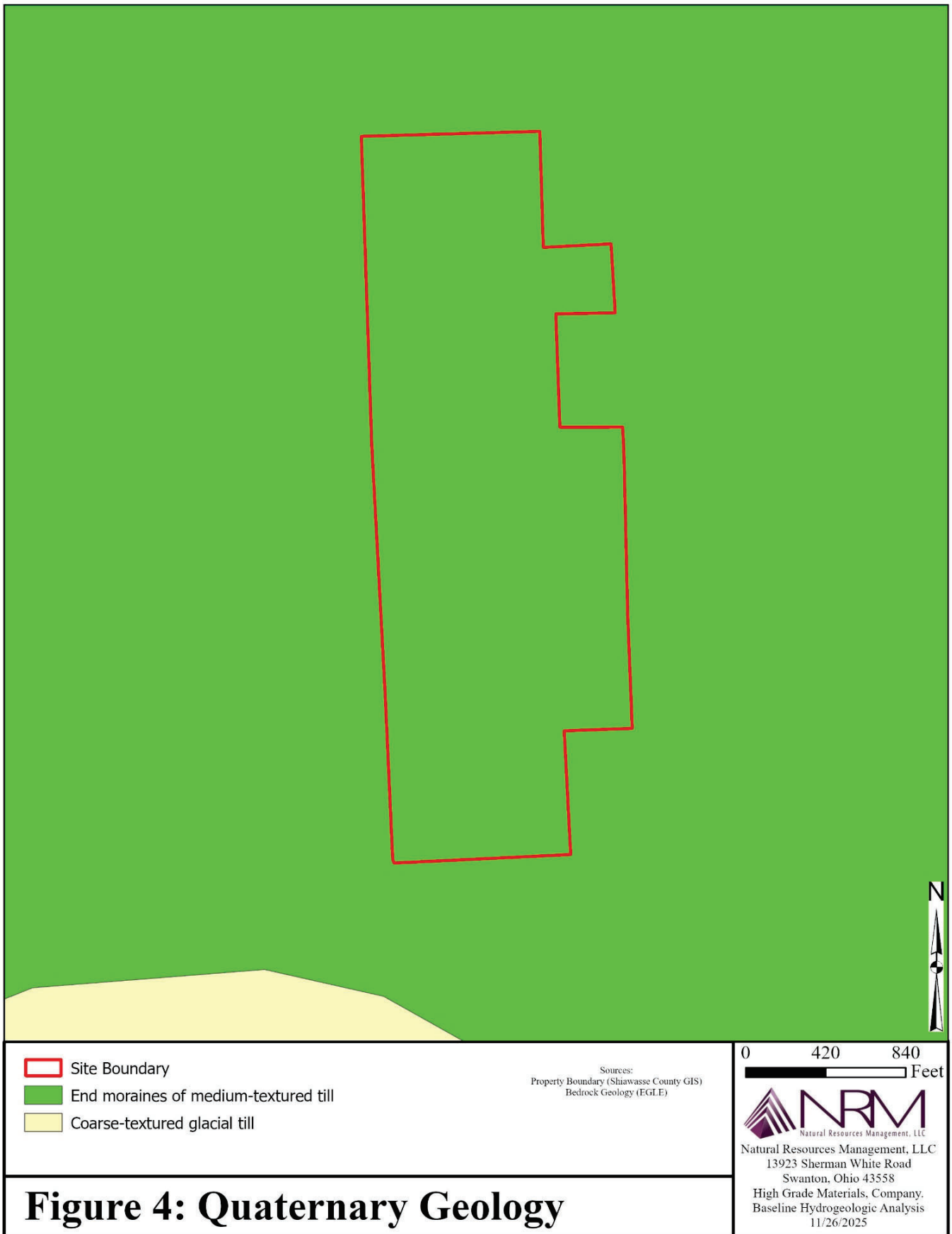


Figure 1: Site Location

Source: USGS 7.5-minute topographic quadrangle maps for Laingsburg & Shaftsbury, MI







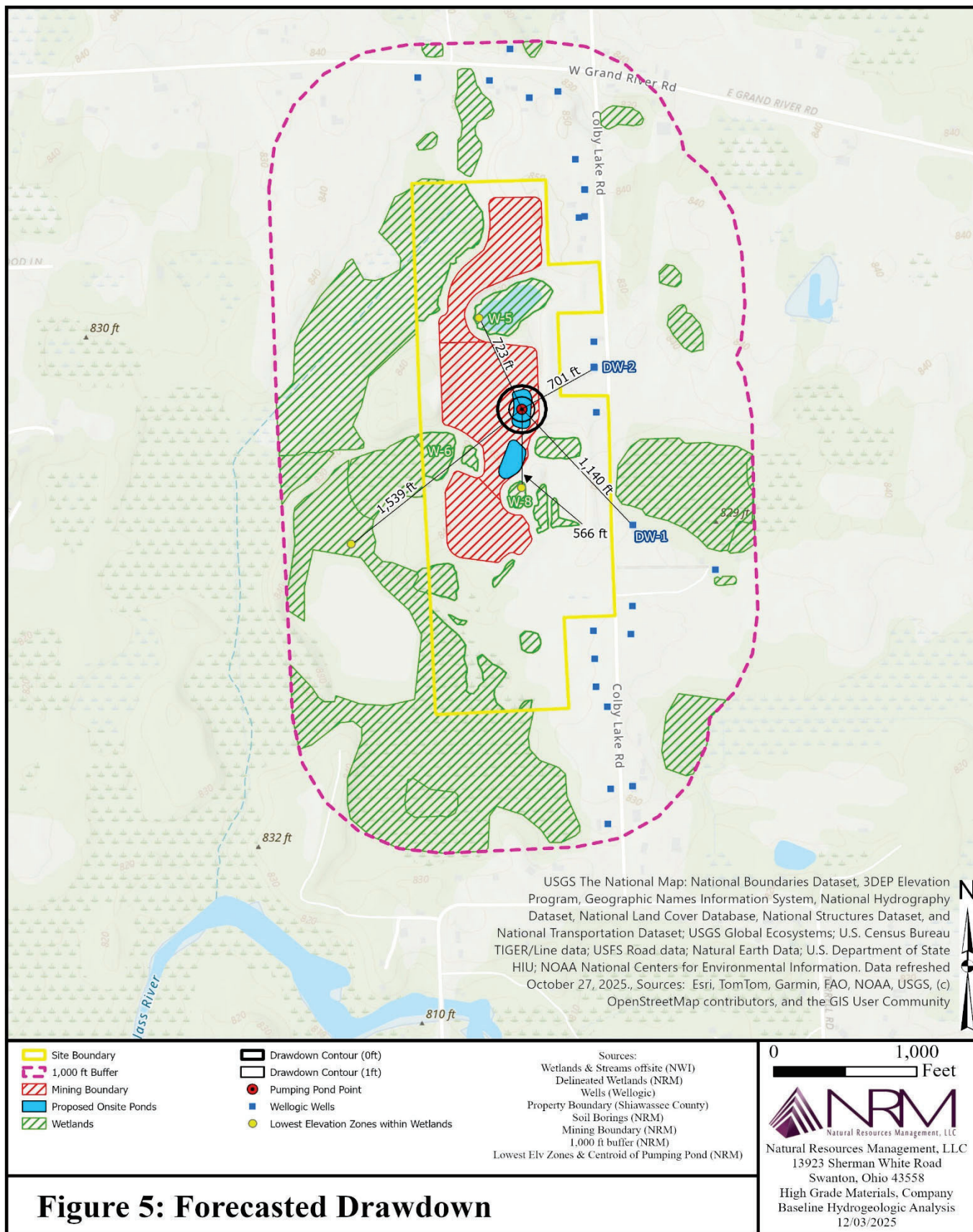
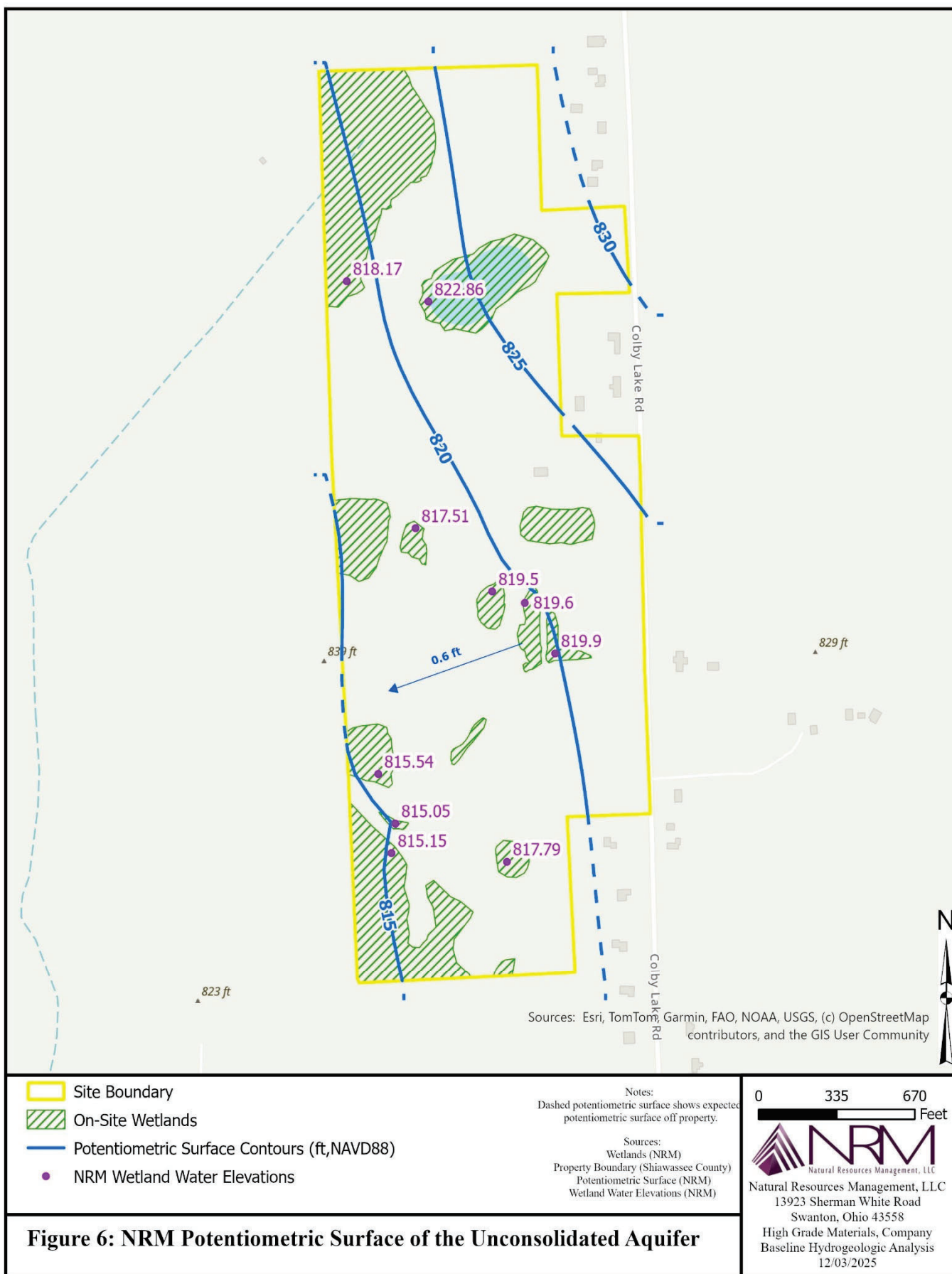


Figure 5: Forecasted Drawdown



Appendix A

Drawdown Calculation Summary & Calculations

Theis Equation						
$S' = (15.32 \times Q) / (T \times W(u))$						
$u = (r^2 \times S) / (4Tt)$						
$W(u) = -0.5772 - \ln(u) + u - ((u^2) / (2 \times 2!)) + ((u^3) / (3 \times 3!)) - ((u^4) / (4 \times 4!)) + \dots$						
Theis Correction for an Unconfined Aquifer						
$S' = (s-s^2) / (2b)$						
Variables						
Q = Pumping Rate (GPM)						
T = Transmissivity (ft ² /day)						
t = Elapsed time since start of pumping (days)						
b = Aquifer Thickness (ft.)						
S' = Drawdown (ft.)						
s = Observed Drawdown (ft.)						
S = Storage Coefficient (unitless)						
r = Radial distance from the pumping well to the observation well (ft.)						
K = Hydraulic Conductivity (ft/day)						
$W(u)$ = Theis well function for nonleaky confined aquifers						
Input Parameters						
$Q = 625$ GPM						
$T = K \times b = 193$ ft ² /day						
Derived From a Hydraulic Conductivity (K) of 2.835-ft/day and an Aquifer Thickness (b) of 68-ft						
$t = 1$ days						
$S = 0.26$ (Per Fetter & Kreamer, 2022; p.85)						
$b = 68$ ft						
Distance (feet)	u	$W(u)$	Drawdown (feet)	Drawdown (inches)	Unconfined Drawdown (feet)	Unconfined Drawdown (Inches)
0	0	(NA)	(NA)	(NA)	(NA)	(NA)
10	0.0323834	2.89	143.13	1717.56	4.97	59.64
20	0.1295337	1.59	78.98	947.81	3.85	46.14
30	0.2914508	0.93	46.00	551.99	3.19	38.23
40	0.5181347	0.54	26.71	320.50	2.72	32.64
50	0.8095855	0.31	15.14	181.74	2.36	28.34
60	1.1658031	0.17	8.30	99.58	2.07	24.86
70	1.5867876	0.09	4.37	52.39	1.83	21.97
80	2.0725389	0.04	2.20	26.34	1.63	19.50
90	2.623057	0.02	1.05	12.62	1.45	17.37
100	3.238342	0.01	0.48	5.75	1.29	15.51
110	3.9183938	0.00	0.21	2.48	1.16	13.86
120	4.6632124	0.00	0.08	1.02	1.03	12.41
130	5.4727979	0.00	0.03	0.39	0.93	11.11
140	6.3471503	0.00	0.01	0.14	0.83	9.95
150	7.2862694	0.00	0.00	0.05	0.74	8.91
160	8.2901554	0.00	0.00	0.02	0.67	7.98
170	9.3588083	0.00	0.00	0.00	0.60	7.14

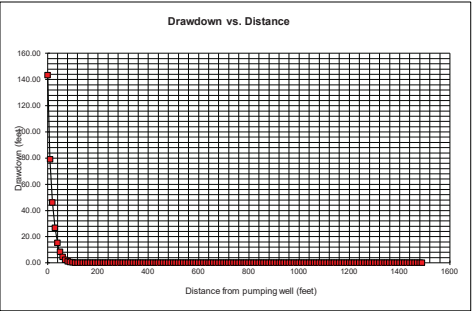
Identified Feature	HGM - Sciota Township							
	DW-1 (78000011795)	DW-2 (78000003542)	WL-6		WL-5		WL-8	
Distance from Lake Center to Lowest Elevation Zone of Feature (ft)	1140	700	Distance from Lake Center to Lake Edge (ft.)	400	Distance from Lake Center to Lake Edge (ft.)	530	Distance from Lake Center to Lake Edge (ft.)	420
			Distance from Lake Edge to Feature (ft.)	1540	Distance from Lake Edge to Feature (ft.)	720	Distance from Lake Edge to Feature (ft.)	560
DEM Elevation (ft, msl)	829.90	837.27	816.16		824.47		819.50	
Average 2024 Estimated Groundwater Elevation (ft, msl)	789.89	802.27	813.80		822.86		821.97	
Estimated Long Term Excavation Potentiometric Surface Change (ft)	0.00	0.00	0.00		0.00		0.00	
Forecasted Groundwater Elevation (ft, msl)	789.89	802.27	813.80		822.86		821.97	
Feature Direction from the West Lake	Up-Gradient	Up-Gradient	Down-Gradient		Up-Gradient		Side Gradient	

Program to calculate drawdown at different distances
from a pumping well using the method of Theis (1935).
The method assumes one-dimensional steady-state
flow with no lateral boundaries or vertical leakage.
Drawdown is calculated at different distances from the pumping well.
A time value is input for these calculations.

Up-Gradient Identified Resource: DW-1

Hydraulic Conductivity, K 2.835 feet/day
Thickness, B 66 feet

Transmissivity (ft²/day) (T=K*B) 193.000
Storativity 2.500E-01
Well pumping rate (gpm) 625.00 Long Term
Time (days) 1.000
Distance to calculate drawdown (feet) 4000.000
Increment to calculate drawdown (feet) 10.000



Distance (feet)	u	W(u)	Drawdown (feet)	Drawdown (inches)
0	0.0E+00	#NUM!	#NUM!	#NUM!
10	3.2E-02	2.89	143.13	1717.56
20	1.3E-01	1.59	78.98	947.81
30	2.9E-01	0.93	46.00	551.99
40	5.2E-01	0.54	26.71	320.50
50	8.1E-01	0.31	15.14	181.74
60	1.2E+00	0.17	8.30	99.58
70	1.6E+00	0.09	4.37	52.39
80	2.1E+00	0.04	2.20	26.34
90	2.6E+00	0.02	1.05	12.62
100	3.2E+00	0.01	0.48	5.75
110	3.9E+00	0.00	0.21	2.48
120	4.7E+00	0.00	0.08	1.02
130	5.5E+00	0.00	0.03	0.39
140	6.3E+00	0.00	0.01	0.14
150	7.3E+00	0.00	0.00	0.05
160	8.3E+00	0.00	0.00	0.02
170	9.4E+00	0.00	0.00	0.00
180	1.0E+01	0.00	0.00	0.00
190	1.2E+01	0.00	0.00	0.00
200	1.3E+01	0.00	0.00	0.00
210	1.4E+01	0.00	0.00	0.00
220	1.6E+01	0.00	0.00	0.00
230	1.7E+01	0.00	0.00	0.00
240	1.9E+01	0.00	0.00	0.00
250	2.0E+01	0.00	0.00	0.00
260	2.2E+01	0.00	0.00	0.00
270	2.4E+01	0.00	0.00	0.00
280	2.5E+01	0.00	0.00	0.00
290	2.7E+01	0.00	0.00	0.00
300	2.9E+01	0.00	0.00	0.00
310	3.1E+01	0.00	0.00	0.00
320	3.3E+01	0.00	0.00	0.00
330	3.5E+01	0.00	0.00	0.00
340	3.7E+01	0.00	0.00	0.00
350	4.0E+01	0.00	0.00	0.00
360	4.2E+01	0.00	0.00	0.00
370	4.4E+01	0.00	0.00	0.00
380	4.7E+01	0.00	0.00	0.00
390	4.9E+01	0.00	0.00	0.00
400	5.2E+01	0.00	0.00	0.00
410	5.4E+01	0.00	0.00	0.00
420	5.7E+01	0.00	0.00	0.00
430	6.0E+01	0.00	0.00	0.00
440	6.3E+01	0.00	0.00	0.00
450	6.6E+01	0.00	0.00	0.00
460	6.9E+01	0.00	0.00	0.00
470	7.2E+01	0.00	0.00	0.00
480	7.5E+01	0.00	0.00	0.00
490	7.8E+01	0.00	0.00	0.00
500	8.1E+01	0.00	0.00	0.00
510	84.22927	0.00	0.00	0.00
520	87.56477	0.00	0.00	0.00
530	90.96503	0.00	0.00	0.00
540	94.43005	0.00	0.00	0.00
550	97.95984	0.00	0.00	0.00
560	101.5544	0.00	0.00	0.00
570	105.2137	0.00	0.00	0.00
580	108.9378	0.00	0.00	0.00
590	112.7267	0.00	0.00	0.00
600	116.5803	0.00	0.00	0.00
610	120.4987	0.00	0.00	0.00
620	124.4819	0.00	0.00	0.00
630	128.5298	0.00	0.00	0.00
640	132.6425	0.00	0.00	0.00
650	136.8199	0.00	0.00	0.00
660	141.0622	0.00	0.00	0.00
670	145.3692	0.00	0.00	0.00
680	149.7409	0.00	0.00	0.00
690	154.1775	0.00	0.00	0.00
700	158.6788	0.00	0.00	0.00
710	163.2448	0.00	0.00	0.00
720	167.8756	0.00	0.00	0.00
730	172.5712	0.00	0.00	0.00
740	177.3316	0.00	0.00	0.00
750	182.1567	0.00	0.00	0.00
760	187.0466	0.00	0.00	0.00
770	192.0013	0.00	0.00	0.00
780	197.0207	0.00	0.00	0.00
790	202.1049	0.00	0.00	0.00
800	207.2539	0.00	0.00	0.00
810	212.4676	0.00	0.00	0.00
820	217.7461	0.00	0.00	0.00
830	223.0894	0.00	0.00	0.00
840	228.4974	0.00	0.00	0.00
850	233.9702	0.00	0.00	0.00
860	239.5078	0.00	0.00	0.00
870	245.1101	0.00	0.00	0.00
880	250.7772	0.00	0.00	0.00
890	256.5091	0.00	0.00	0.00
900	262.3057	0.00	0.00	0.00
910	268.1671	0.00	0.00	0.00
920	274.0933	0.00	0.00	0.00
930	280.0842	0.00	0.00	0.00
940	286.1399	0.00	0.00	0.00
950	292.2604	0.00	0.00	0.00
960	298.4456	0.00	0.00	0.00
970	304.6956	0.00	0.00	0.00
980	311.0104	0.00	0.00	0.00
990	317.3899	0.00	0.00	0.00
1000	323.8342	0.00	0.00	0.00
1010	330.3433	0.00	0.00	0.00
1020	336.9171	0.00	0.00	0.00
1030	343.5557	0.00	0.00	0.00
1040	350.2591	0.00	0.00	0.00
1050	357.0272	0.00	0.00	0.00

upgrad downgrad
-2.16 2.16

Wetland

	UP-GRADIENT (Water Table decline) (feet)	DOWN-GRADIENT (Water Table rise) (feet)
	UP-GRADIENT (FT)	DOWN-GRADIENT (FT)
10	-2.16	2.16
20	-0.07	0.07
30	0.00	0.00
40	0.00	0.00
50	0.00	0.00
60	0.00	0.00
70	0.00	0.00
80	0.00	0.00
90	0.00	0.00
100	0.00	0.00
110	0.00	0.00
120	0.00	0.00
130	0.00	0.00
140	0.00	0.00
150	0.00	0.00
160	0.00	0.00
170	0.00	0.00
180	0.00	0.00
190	0.00	0.00
200	0.00	0.00
210	0.00	0.00
220	0.00	0.00
230	0.00	0.00
240	0.00	0.00
250	0.00	0.00
260	0.00	0.00
270	0.00	0.00
280	0.00	0.00
290	0.00	0.00
300	0.00	0.00
310	0.00	0.00
320	0.00	0.00
330	0.00	0.00
340	0.00	0.00
350	0.00	0.00
360	0.00	0.00
370	0.00	0.00
380	0.00	0.00
390	0.00	0.00
400	0.00	0.00
410	0.00	0.00
420	0.00	0.00
430	0.00	0.00
440	0.00	0.00
450	0.00	0.00
460	0.00	0.00
470	0.00	0.00
480	0.00	0.00
490	0.00	0.00
500	0.00	0.00
510	0.00	0.00
520	0.00	0.00
530	0.00	0.00
540	0.00	0.00
550	0.00	0.00

1060	363.8601	0.00	0.00	0.00	560	0.00	0.00
1070	370.7578	0.00	0.00	0.00	570	0.00	0.00
1080	377.7202	0.00	0.00	0.00	580	0.00	0.00
1090	384.7474	0.00	0.00	0.00	590	0.00	0.00
1100	391.8394	0.00	0.00	0.00	600	0.00	0.00
1110	398.9961	0.00	0.00	0.00	610	0.00	0.00
1120	406.2176	0.00	0.00	0.00	620	0.00	0.00
1130	413.5039	0.00	0.00	0.00	630	0.00	0.00
1140	420.8549	0.00	0.00	0.00	640	0.00	0.00
1150	428.2707	0.00	0.00	0.00	650	0.00	0.00
1160	435.7513	0.00	0.00	0.00	660	0.00	0.00
1170	443.2966	0.00	0.00	0.00	670	0.00	0.00
1180	450.9067	0.00	0.00	0.00	680	0.00	0.00
1190	458.5816	0.00	0.00	0.00	690	0.00	0.00
1200	466.3212	0.00	0.00	0.00	700	0.00	0.00
1210	474.1256	0.00	0.00	0.00	710	0.00	0.00
1220	481.9948	0.00	0.00	0.00	720	0.00	0.00
1230	489.9288	0.00	0.00	0.00	730	0.00	0.00
1240	497.9275	0.00	0.00	0.00	740	0.00	0.00
1250	505.9909	0.00	0.00	0.00	750	0.00	0.00
1260	514.1192	0.00	0.00	0.00	760	0.00	0.00
1270	522.3122	0.00	0.00	0.00	770	0.00	0.00
1280	530.5699	0.00	0.00	0.00	780	0.00	0.00
1290	538.8925	0.00	0.00	0.00	790	0.00	0.00
1300	547.2798	0.00	0.00	0.00	800	0.00	0.00
1310	555.7319	0.00	0.00	0.00	810	0.00	0.00
1320	564.2487	0.00	0.00	0.00	820	0.00	0.00
1330	572.8303	0.00	0.00	0.00	830	0.00	0.00
1340	581.4767	0.00	0.00	0.00	840	0.00	0.00
1350	590.1878	0.00	0.00	0.00	850	0.00	0.00
1360	598.9637	0.00	0.00	0.00	860	0.00	0.00
1370	607.8044	0.00	0.00	0.00	870	0.00	0.00
1380	616.7098	0.00	0.00	0.00	880	0.00	0.00
1390	625.6801	0.00	0.00	0.00	890	0.00	0.00
1400	634.715	0.00	0.00	0.00	900	0.00	0.00
1410	643.8148	0.00	0.00	0.00	910	0.00	0.00
1420	652.9793	0.00	0.00	0.00	920	0.00	0.00
1430	662.2085	0.00	0.00	0.00	930	0.00	0.00
1440	671.5026	0.00	0.00	0.00	940	0.00	0.00
1450	680.8614	0.00	0.00	0.00	950	0.00	0.00
1460	690.285	0.00	0.00	0.00	960	0.00	0.00
1470	699.7733	0.00	0.00	0.00	970	0.00	0.00
1480	709.3264	0.00	0.00	0.00	980	0.00	0.00
1490	718.9443	0.00	0.00	0.00	990	0.00	0.00
1500	728.6269	0.00	0.00	0.00	1000	0.00	0.00
1510	738.3744	0.00	0.00	0.00	1010	0.00	0.00
1520	748.1865	0.00	0.00	0.00	1020	0.00	0.00
1530	758.0635	0.00	0.00	0.00	1030	0.00	0.00
1540	768.0052	0.00	0.00	0.00	1040	0.00	0.00
1550	778.0117	0.00	0.00	0.00	1050	0.00	0.00
1560	788.0829	0.00	0.00	0.00	1060	0.00	0.00
1570	798.2189	0.00	0.00	0.00	1070	0.00	0.00
1580	808.4197	0.00	0.00	0.00	1080	0.00	0.00
1590	818.6852	0.00	0.00	0.00	1090	0.00	0.00
1600	829.0155	0.00	0.00	0.00	1100	0.00	0.00
1610	839.4106	0.00	0.00	0.00	1110	0.00	0.00
1620	849.8705	0.00	0.00	0.00	1120	0.00	0.00
1630	860.3951	0.00	0.00	0.00	1130	0.00	0.00
1640	870.9845	0.00	0.00	0.00	DW-1 1140	0.00	0.00
1650	881.6386	0.00	0.00	0.00	1150	0.00	0.00
1660	892.3575	0.00	0.00	0.00	1160	0.00	0.00
1670	903.1412	0.00	0.00	0.00	1170	0.00	0.00
1680	913.9856	0.00	0.00	0.00	1180	0.00	0.00
1690	924.9028	0.00	0.00	0.00	1190	0.00	0.00
1700	935.8808	0.00	0.00	0.00	1200	0.00	0.00
1710	946.9236	0.00	0.00	0.00	1210	0.00	0.00
1720	958.0311	0.00	0.00	0.00	1220	0.00	0.00
1730	969.2034	0.00	0.00	0.00	1230	0.00	0.00
1740	980.4404	0.00	0.00	0.00	1240	0.00	0.00
1750	991.7422	0.00	0.00	0.00	1250	0.00	0.00
1760	1003.109	0.00	0.00	0.00	1260	0.00	0.00
1770	1014.54	0.00	0.00	0.00	1270	0.00	0.00
1780	1026.036	0.00	0.00	0.00	1280	0.00	0.00
1790	1037.597	0.00	0.00	0.00	1290	0.00	0.00
1800	1049.223	0.00	0.00	0.00	1300	0.00	0.00
1810	1060.913	0.00	0.00	0.00	1310	0.00	0.00
1820	1072.668	0.00	0.00	0.00	1320	0.00	0.00
1830	1084.488	0.00	0.00	0.00	1330	0.00	0.00
1840	1096.373	0.00	0.00	0.00	1340	0.00	0.00
1850	1108.323	0.00	0.00	0.00	1350	0.00	0.00
1860	1120.337	0.00	0.00	0.00	1360	0.00	0.00
1870	1132.416	0.00	0.00	0.00	1370	0.00	0.00
1880	1144.56	0.00	0.00	0.00	1380	0.00	0.00
1890	1156.768	0.00	0.00	0.00	1390	0.00	0.00
1900	1169.041	0.00	0.00	0.00	1400	0.00	0.00
1910	1181.38	0.00	0.00	0.00	1410	0.00	0.00
1920	1193.782	0.00	0.00	0.00	1420	0.00	0.00
1930	1206.25	0.00	0.00	0.00	1430	0.00	0.00
1940	1218.782	0.00	0.00	0.00	1440	0.00	0.00
1950	1231.38	0.00	0.00	0.00	1450	0.00	0.00
1960	1244.041	0.00	0.00	0.00	1460	0.00	0.00
1970	1256.768	0.00	0.00	0.00	1470	0.00	0.00
1980	1269.56	0.00	0.00	0.00	1480	0.00	0.00
1990	1282.416	0.00	0.00	0.00	1490	0.00	0.00
2000	1295.337	0.00	0.00	0.00	1500	0.00	0.00
2010	1308.323	0.00	0.00	0.00	1510	0.00	0.00
2020	1321.373	0.00	0.00	0.00	1520	0.00	0.00
2030	1334.488	0.00	0.00	0.00	1530	0.00	0.00
2040	1347.668	0.00	0.00	0.00	1540	0.00	0.00
2050	1360.913	0.00	0.00	0.00	1550	0.00	0.00
2060	1374.223	0.00	0.00	0.00	1560	0.00	0.00
2070	1387.597	0.00	0.00	0.00	1570	0.00	0.00
2080	1401.036	0.00	0.00	0.00	1580	0.00	0.00
2090	1414.54	0.00	0.00	0.00	1590	0.00	0.00
2100	1428.109	0.00	0.00	0.00	1600	0.00	0.00
2110	1441.742	0.00	0.00	0.00	1610	0.00	0.00
2120	1455.44	0.00	0.00	0.00	1620	0.00	0.00
2130	1469.203	0.00	0.00	0.00	1630	0.00	0.00
2140	1483.031	0.00	0.00	0.00	1640	0.00	0.00
2150	1496.924	0.00	0.00	0.00	1650	0.00	0.00
2160	1510.881	0.00	0.00	0.00	1660	0.00	0.00
2170	1524.903	0.00	0.00	0.00	1670	0.00	0.00
2180	1538.99	0.00	0.00	0.00	1680	0.00	0.00
2190	1553.141	0.00	0.00	0.00	1690	0.00	0.00
2200	1567.358	0.00	0.00	0.00	1700	0.00	0.00
2210	1581.639	0.00	0.00	0.00	1710	0.00	0.00
2220	1595.984	0.00	0.00	0.00	1720	0.00	0.00
2230	1610.395	0.00	0.00	0.00	1730	0.00	0.00
2240	1624.87	0.00	0.00	0.00	1740	0.00	0.00
2250	1639.411	0.00	0.00	0.00	1750	0.00	0.00
2260	1654.016	0.00	0.00	0.00	1760	0.00	0.00
2270	1668.685	0.00	0.00	0.00	1770	0.00	0.00

2280	1683.42	0.00	0.00	0.00
2290	1698.219	0.00	0.00	0.00
2300	1713.083	0.00	0.00	0.00

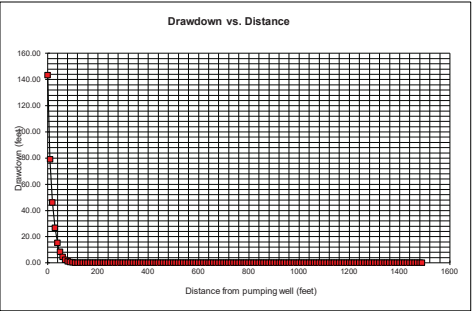
1780	0.00	0.00
1790	0.00	0.00
1800	0.00	0.00

Program to calculate drawdown at different distances
from a pumping well using the method of Theis (1935).
The method assumes one-dimensional steady-state
flow with no lateral boundaries or vertical leakage.
Drawdown is calculated at different distances from the pumping well.
A time value is input for these calculations.

Up-Gradient Identified Resource: DW-2

Hydraulic Conductivity, K 2.835 feet/day
Thickness, B 66 feet

Transmissivity (ft²/day) (T=K*B) 193.000
Storativity 2.500E-01
Well pumping rate (gpm) 625.00 Long Term
Time (days) 1.000
Distance to calculate drawdown (feet) 4000.000
Increment to calculate drawdown (feet) 10.000



Distance (feet)	u	W(u)	Drawdown (feet)	Drawdown (inches)
0	0.0E+00	#NUM!	#NUM!	#NUM!
10	3.2E-02	2.89	143.13	1717.56
20	1.3E-01	1.59	78.98	947.81
30	2.9E-01	0.93	46.00	551.99
40	5.2E-01	0.54	26.71	320.50
50	8.1E-01	0.31	15.14	181.74
60	1.2E+00	0.17	8.30	99.58
70	1.6E+00	0.09	4.37	52.39
80	2.1E+00	0.04	2.20	26.34
90	2.6E+00	0.02	1.05	12.62
100	3.2E+00	0.01	0.48	5.75
110	3.9E+00	0.00	0.21	2.48
120	4.7E+00	0.00	0.08	1.02
130	5.5E+00	0.00	0.03	0.39
140	6.3E+00	0.00	0.01	0.14
150	7.3E+00	0.00	0.00	0.05
160	8.3E+00	0.00	0.00	0.02
170	9.4E+00	0.00	0.00	0.00
180	1.0E+01	0.00	0.00	0.00
190	1.2E+01	0.00	0.00	0.00
200	1.3E+01	0.00	0.00	0.00
210	1.4E+01	0.00	0.00	0.00
220	1.6E+01	0.00	0.00	0.00
230	1.7E+01	0.00	0.00	0.00
240	1.9E+01	0.00	0.00	0.00
250	2.0E+01	0.00	0.00	0.00
260	2.2E+01	0.00	0.00	0.00
270	2.4E+01	0.00	0.00	0.00
280	2.5E+01	0.00	0.00	0.00
290	2.7E+01	0.00	0.00	0.00
300	2.9E+01	0.00	0.00	0.00
310	3.1E+01	0.00	0.00	0.00
320	3.3E+01	0.00	0.00	0.00
330	3.5E+01	0.00	0.00	0.00
340	3.7E+01	0.00	0.00	0.00
350	4.0E+01	0.00	0.00	0.00
360	4.2E+01	0.00	0.00	0.00
370	4.4E+01	0.00	0.00	0.00
380	4.7E+01	0.00	0.00	0.00
390	4.9E+01	0.00	0.00	0.00
400	5.2E+01	0.00	0.00	0.00
410	5.4E+01	0.00	0.00	0.00
420	5.7E+01	0.00	0.00	0.00
430	6.0E+01	0.00	0.00	0.00
440	6.3E+01	0.00	0.00	0.00
450	6.6E+01	0.00	0.00	0.00
460	6.9E+01	0.00	0.00	0.00
470	7.2E+01	0.00	0.00	0.00
480	7.5E+01	0.00	0.00	0.00
490	7.8E+01	0.00	0.00	0.00
500	8.1E+01	0.00	0.00	0.00
510	84.22927	0.00	0.00	0.00
520	87.56477	0.00	0.00	0.00
530	90.96503	0.00	0.00	0.00
540	94.43005	0.00	0.00	0.00
550	97.95984	0.00	0.00	0.00
560	101.5544	0.00	0.00	0.00
570	105.2137	0.00	0.00	0.00
580	108.9378	0.00	0.00	0.00
590	112.7267	0.00	0.00	0.00
600	116.5803	0.00	0.00	0.00
610	120.4987	0.00	0.00	0.00
620	124.4819	0.00	0.00	0.00
630	128.5298	0.00	0.00	0.00
640	132.6425	0.00	0.00	0.00
650	136.8199	0.00	0.00	0.00
660	141.0622	0.00	0.00	0.00
670	145.3692	0.00	0.00	0.00
680	149.7409	0.00	0.00	0.00
690	154.1775	0.00	0.00	0.00
700	158.6788	0.00	0.00	0.00
710	163.2448	0.00	0.00	0.00
720	167.8756	0.00	0.00	0.00
730	172.5712	0.00	0.00	0.00
740	177.3316	0.00	0.00	0.00
750	182.1567	0.00	0.00	0.00
760	187.0466	0.00	0.00	0.00
770	192.0013	0.00	0.00	0.00
780	197.0207	0.00	0.00	0.00
790	202.1049	0.00	0.00	0.00
800	207.2539	0.00	0.00	0.00
810	212.4676	0.00	0.00	0.00
820	217.7461	0.00	0.00	0.00
830	223.0894	0.00	0.00	0.00
840	228.4974	0.00	0.00	0.00
850	233.9702	0.00	0.00	0.00
860	239.5078	0.00	0.00	0.00
870	245.1101	0.00	0.00	0.00
880	250.7772	0.00	0.00	0.00
890	256.5091	0.00	0.00	0.00
900	262.3057	0.00	0.00	0.00
910	268.1671	0.00	0.00	0.00
920	274.0933	0.00	0.00	0.00
930	280.0842	0.00	0.00	0.00
940	286.1399	0.00	0.00	0.00
950	292.2604	0.00	0.00	0.00
960	298.4456	0.00	0.00	0.00
970	304.6956	0.00	0.00	0.00
980	311.0104	0.00	0.00	0.00
990	317.3899	0.00	0.00	0.00
1000	323.8342	0.00	0.00	0.00
1010	330.3433	0.00	0.00	0.00
1020	336.9171	0.00	0.00	0.00
1030	343.5557	0.00	0.00	0.00
1040	350.2591	0.00	0.00	0.00
1050	357.0272	0.00	0.00	0.00

upgrad downgrad
-2.16 2.16

Wetland

	UP-GRADIENT (Water Table decline) (feet)	DOWN-GRADIENT (Water Table rise) (feet)
	UP-GRADIENT (FT)	DOWN-GRADIENT (FT)
10	-2.16	2.16
20	-0.07	0.07
30	0.00	0.00
40	0.00	0.00
50	0.00	0.00
60	0.00	0.00
70	0.00	0.00
80	0.00	0.00
90	0.00	0.00
100	0.00	0.00
110	0.00	0.00
120	0.00	0.00
130	0.00	0.00
140	0.00	0.00
150	0.00	0.00
160	0.00	0.00
170	0.00	0.00
180	0.00	0.00
190	0.00	0.00
200	0.00	0.00
210	0.00	0.00
220	0.00	0.00
230	0.00	0.00
240	0.00	0.00
250	0.00	0.00
260	0.00	0.00
270	0.00	0.00
280	0.00	0.00
290	0.00	0.00
300	0.00	0.00
310	0.00	0.00
320	0.00	0.00
330	0.00	0.00
340	0.00	0.00
350	0.00	0.00
360	0.00	0.00
370	0.00	0.00
380	0.00	0.00
390	0.00	0.00
400	0.00	0.00
410	0.00	0.00
420	0.00	0.00
430	0.00	0.00
440	0.00	0.00
450	0.00	0.00
460	0.00	0.00
470	0.00	0.00
480	0.00	0.00
490	0.00	0.00
500	0.00	0.00
510	0.00	0.00
520	0.00	0.00
530	0.00	0.00
540	0.00	0.00
550	0.00	0.00

1060	363.8601	0.00	0.00	0.00
1070	370.7578	0.00	0.00	0.00
1080	377.7202	0.00	0.00	0.00
1090	384.7474	0.00	0.00	0.00
1100	391.8394	0.00	0.00	0.00
1110	398.9961	0.00	0.00	0.00
1120	406.2176	0.00	0.00	0.00
1130	413.5039	0.00	0.00	0.00
1140	420.8549	0.00	0.00	0.00
1150	428.2707	0.00	0.00	0.00
1160	435.7513	0.00	0.00	0.00
1170	443.2966	0.00	0.00	0.00
1180	450.9067	0.00	0.00	0.00
1190	458.5816	0.00	0.00	0.00
1200	466.3212	0.00	0.00	0.00
1210	474.1256	0.00	0.00	0.00
1220	481.9948	0.00	0.00	0.00
1230	489.9288	0.00	0.00	0.00
1240	497.9275	0.00	0.00	0.00

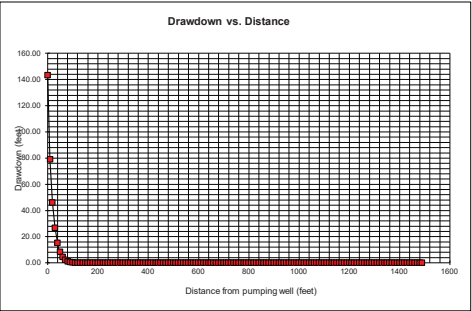
560	0.00	0.00
570	0.00	0.00
580	0.00	0.00
590	0.00	0.00
600	0.00	0.00
610	0.00	0.00
620	0.00	0.00
630	0.00	0.00
640	0.00	0.00
650	0.00	0.00
660	0.00	0.00
670	0.00	0.00
680	0.00	0.00
690	0.00	0.00
DW-2	700	0.00
710	0.00	0.00
720	0.00	0.00
730	0.00	0.00
740	0.00	0.00

Program to calculate drawdown at different distances
from a pumping well using the method of Theis (1935).
The method assumes one-dimensional steady-state
flow with no lateral boundaries or vertical leakage.
Drawdown is calculated at different distances from the pumping well.
A time value is input for these calculations.

Up-Gradient Identified Resource: W-5

Hydraulic Conductivity, K 2.835 feet/day
Thickness, B 66 feet

Transmissivity (ft²/day) (T=K*B) 193.000
Storativity 2.500E-01
Well pumping rate (gpm) 625.00 Long Term
Time (days) 1.000
Distance to calculate drawdown (feet) 4000.000
Increment to calculate drawdown (feet) 10.000



Distance (feet)	u	W(u)	Drawdown (feet)	Drawdown (inches)
0	0.0E+00	#NUM!	#NUM!	#NUM!
10	3.2E-02	2.89	143.13	1717.56
20	1.3E-01	1.59	78.98	947.81
30	2.9E-01	0.93	46.00	551.99
40	5.2E-01	0.54	26.71	320.50
50	8.1E-01	0.31	15.14	181.74
60	1.2E+00	0.17	8.30	99.58
70	1.6E+00	0.09	4.37	52.39
80	2.1E+00	0.04	2.20	26.34
90	2.6E+00	0.02	1.05	12.62
100	3.2E+00	0.01	0.48	5.75
110	3.9E+00	0.00	0.21	2.48
120	4.7E+00	0.00	0.08	1.02
130	5.5E+00	0.00	0.03	0.39
140	6.3E+00	0.00	0.01	0.14
150	7.3E+00	0.00	0.00	0.05
160	8.3E+00	0.00	0.00	0.02
170	9.4E+00	0.00	0.00	0.00
180	1.0E+01	0.00	0.00	0.00
190	1.2E+01	0.00	0.00	0.00
200	1.3E+01	0.00	0.00	0.00
210	1.4E+01	0.00	0.00	0.00
220	1.6E+01	0.00	0.00	0.00
230	1.7E+01	0.00	0.00	0.00
240	1.9E+01	0.00	0.00	0.00
250	2.0E+01	0.00	0.00	0.00
260	2.2E+01	0.00	0.00	0.00
270	2.4E+01	0.00	0.00	0.00
280	2.5E+01	0.00	0.00	0.00
290	2.7E+01	0.00	0.00	0.00
300	2.9E+01	0.00	0.00	0.00
310	3.1E+01	0.00	0.00	0.00
320	3.3E+01	0.00	0.00	0.00
330	3.5E+01	0.00	0.00	0.00
340	3.7E+01	0.00	0.00	0.00
350	4.0E+01	0.00	0.00	0.00
360	4.2E+01	0.00	0.00	0.00
370	4.4E+01	0.00	0.00	0.00
380	4.7E+01	0.00	0.00	0.00
390	4.9E+01	0.00	0.00	0.00
400	5.2E+01	0.00	0.00	0.00
410	5.4E+01	0.00	0.00	0.00
420	5.7E+01	0.00	0.00	0.00
430	6.0E+01	0.00	0.00	0.00
440	6.3E+01	0.00	0.00	0.00
450	6.6E+01	0.00	0.00	0.00
460	6.9E+01	0.00	0.00	0.00
470	7.2E+01	0.00	0.00	0.00
480	7.5E+01	0.00	0.00	0.00
490	7.8E+01	0.00	0.00	0.00
500	8.1E+01	0.00	0.00	0.00
510	84.22927	0.00	0.00	0.00
520	87.56477	0.00	0.00	0.00
530	90.96503	0.00	0.00	0.00
540	94.43005	0.00	0.00	0.00
550	97.95984	0.00	0.00	0.00
560	101.5544	0.00	0.00	0.00
570	105.2137	0.00	0.00	0.00
580	108.9378	0.00	0.00	0.00
590	112.7267	0.00	0.00	0.00
600	116.5803	0.00	0.00	0.00
610	120.4987	0.00	0.00	0.00
620	124.4819	0.00	0.00	0.00
630	128.5298	0.00	0.00	0.00
640	132.6425	0.00	0.00	0.00
650	136.8199	0.00	0.00	0.00
660	141.0622	0.00	0.00	0.00
670	145.3692	0.00	0.00	0.00
680	149.7409	0.00	0.00	0.00
690	154.1775	0.00	0.00	0.00
700	158.6788	0.00	0.00	0.00
710	163.2448	0.00	0.00	0.00
720	167.8756	0.00	0.00	0.00
730	172.5712	0.00	0.00	0.00
740	177.3316	0.00	0.00	0.00
750	182.1567	0.00	0.00	0.00
760	187.0466	0.00	0.00	0.00
770	192.0013	0.00	0.00	0.00
780	197.0207	0.00	0.00	0.00
790	202.1049	0.00	0.00	0.00
800	207.2539	0.00	0.00	0.00
810	212.4676	0.00	0.00	0.00
820	217.7461	0.00	0.00	0.00
830	223.0894	0.00	0.00	0.00
840	228.4974	0.00	0.00	0.00
850	233.9702	0.00	0.00	0.00
860	239.5078	0.00	0.00	0.00
870	245.1101	0.00	0.00	0.00
880	250.7772	0.00	0.00	0.00
890	256.5091	0.00	0.00	0.00
900	262.3057	0.00	0.00	0.00
910	268.1671	0.00	0.00	0.00
920	274.0933	0.00	0.00	0.00
930	280.0842	0.00	0.00	0.00
940	286.1399	0.00	0.00	0.00
950	292.2604	0.00	0.00	0.00
960	298.4456	0.00	0.00	0.00
970	304.6956	0.00	0.00	0.00
980	311.0104	0.00	0.00	0.00
990	317.3899	0.00	0.00	0.00
1000	323.8342	0.00	0.00	0.00
1010	330.3433	0.00	0.00	0.00
1020	336.9171	0.00	0.00	0.00
1030	343.5557	0.00	0.00	0.00
1040	350.2591	0.00	0.00	0.00
1050	357.0272	0.00	0.00	0.00

upgrad -2.16 downgrad 2.16

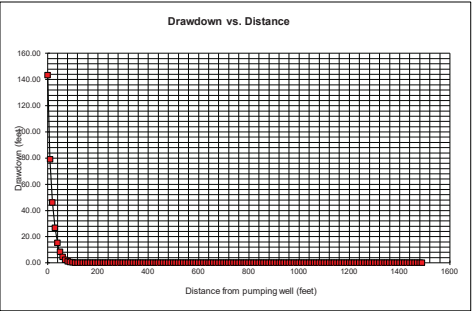
Wetland	
UP-GRADIENT (Water Table decline) (feet)	DOWN-GRADIENT (Water Table rise) (feet)
UP-GRADIENT (FT)	DOWN-GRADIENT (FT)
10	-2.16
20	-0.26
30	-0.03
40	0.00
50	0.00
60	0.00
70	0.00
80	0.00
90	0.00
100	0.00
110	0.00
120	0.00
130	0.00
140	0.00
150	0.00
160	0.00
170	0.00
180	0.00
190	0.00
200	0.00
210	0.00
220	0.00
230	0.00
240	0.00
250	0.00
260	0.00
270	0.00
280	0.00
290	0.00
300	0.00
310	0.00
320	0.00
330	0.00
340	0.00
350	0.00
360	0.00
370	0.00
380	0.00
390	0.00
400	0.00
410	0.00
420	0.00
430	0.00
440	0.00
450	0.00
460	0.00
470	0.00
480	0.00
490	0.00
500	0.00
510	0.00
520	0.00
530	0.00
540	0.00
550	0.00
560	0.00
570	0.00
580	0.00
590	0.00
600	0.00
610	0.00
620	0.00
630	0.00
640	0.00
650	0.00
660	0.00
670	0.00
680	0.00
690	0.00
700	0.00
710	0.00
WL-5	720
730	0.00
740	0.00
750	0.00
760	0.00

Program to calculate drawdown at different distances
from a pumping well using the method of Theis (1935).
The method assumes one-dimensional steady-state
flow with no lateral boundaries or vertical leakage.
Drawdown is calculated at different distances from the pumping well.
A time value is input for these calculations.

Down-Gradient Identified Resource: WL-6

Hydraulic Conductivity, K 2.835 feet/day
Thickness, B 66 feet

Transmissivity (ft²/day) (T=K*B) 193.000
Storativity 2.500E-01
Well pumping rate (gpm) 625.00 Long Term
Time (days) 1.000
Distance to calculate drawdown (feet) 4000.000
Increment to calculate drawdown (feet) 10.000



Distance (feet)	u	W(u)	Drawdown (feet)	Drawdown (inches)
0	0.0E+00	#NUM!	#NUM!	#NUM!
10	3.2E-02	2.89	143.13	1717.56
20	1.3E-01	1.59	78.98	947.81
30	2.9E-01	0.93	46.00	551.99
40	5.2E-01	0.54	26.71	320.50
50	8.1E-01	0.31	15.14	181.74
60	1.2E+00	0.17	8.30	99.58
70	1.6E+00	0.09	4.37	52.39
80	2.1E+00	0.04	2.20	26.34
90	2.6E+00	0.02	1.05	12.62
100	3.2E+00	0.01	0.48	5.75
110	3.9E+00	0.00	0.21	2.48
120	4.7E+00	0.00	0.08	1.02
130	5.5E+00	0.00	0.03	0.39
140	6.3E+00	0.00	0.01	0.14
150	7.3E+00	0.00	0.00	0.05
160	8.3E+00	0.00	0.00	0.02
170	9.4E+00	0.00	0.00	0.00
180	1.0E+01	0.00	0.00	0.00
190	1.2E+01	0.00	0.00	0.00
200	1.3E+01	0.00	0.00	0.00
210	1.4E+01	0.00	0.00	0.00
220	1.6E+01	0.00	0.00	0.00
230	1.7E+01	0.00	0.00	0.00
240	1.9E+01	0.00	0.00	0.00
250	2.0E+01	0.00	0.00	0.00
260	2.2E+01	0.00	0.00	0.00
270	2.4E+01	0.00	0.00	0.00
280	2.5E+01	0.00	0.00	0.00
290	2.7E+01	0.00	0.00	0.00
300	2.9E+01	0.00	0.00	0.00
310	3.1E+01	0.00	0.00	0.00
320	3.3E+01	0.00	0.00	0.00
330	3.5E+01	0.00	0.00	0.00
340	3.7E+01	0.00	0.00	0.00
350	4.0E+01	0.00	0.00	0.00
360	4.2E+01	0.00	0.00	0.00
370	4.4E+01	0.00	0.00	0.00
380	4.7E+01	0.00	0.00	0.00
390	4.9E+01	0.00	0.00	0.00
400	5.2E+01	0.00	0.00	0.00
410	5.4E+01	0.00	0.00	0.00
420	5.7E+01	0.00	0.00	0.00
430	6.0E+01	0.00	0.00	0.00
440	6.3E+01	0.00	0.00	0.00
450	6.6E+01	0.00	0.00	0.00
460	6.9E+01	0.00	0.00	0.00
470	7.2E+01	0.00	0.00	0.00
480	7.5E+01	0.00	0.00	0.00
490	7.8E+01	0.00	0.00	0.00
500	8.1E+01	0.00	0.00	0.00
510	84.22927	0.00	0.00	0.00
520	87.56477	0.00	0.00	0.00
530	90.96503	0.00	0.00	0.00
540	94.43005	0.00	0.00	0.00
550	97.95984	0.00	0.00	0.00
560	101.5544	0.00	0.00	0.00
570	105.2137	0.00	0.00	0.00
580	108.9378	0.00	0.00	0.00
590	112.7267	0.00	0.00	0.00
600	116.5803	0.00	0.00	0.00
610	120.4987	0.00	0.00	0.00
620	124.4819	0.00	0.00	0.00
630	128.5298	0.00	0.00	0.00
640	132.6425	0.00	0.00	0.00
650	136.8199	0.00	0.00	0.00
660	141.0622	0.00	0.00	0.00
670	145.3692	0.00	0.00	0.00
680	149.7409	0.00	0.00	0.00
690	154.1775	0.00	0.00	0.00
700	158.6788	0.00	0.00	0.00
710	163.2448	0.00	0.00	0.00
720	167.8756	0.00	0.00	0.00
730	172.5712	0.00	0.00	0.00
740	177.3316	0.00	0.00	0.00
750	182.1567	0.00	0.00	0.00
760	187.0466	0.00	0.00	0.00
770	192.0013	0.00	0.00	0.00
780	197.0207	0.00	0.00	0.00
790	202.1049	0.00	0.00	0.00
800	207.2539	0.00	0.00	0.00
810	212.4676	0.00	0.00	0.00
820	217.7461	0.00	0.00	0.00
830	223.0894	0.00	0.00	0.00
840	228.4974	0.00	0.00	0.00
850	233.9702	0.00	0.00	0.00
860	239.5078	0.00	0.00	0.00
870	245.1101	0.00	0.00	0.00
880	250.7772	0.00	0.00	0.00
890	256.5091	0.00	0.00	0.00
900	262.3057	0.00	0.00	0.00
910	268.1671	0.00	0.00	0.00
920	274.0933	0.00	0.00	0.00
930	280.0842	0.00	0.00	0.00
940	286.1399	0.00	0.00	0.00
950	292.2604	0.00	0.00	0.00
960	298.4456	0.00	0.00	0.00
970	304.6956	0.00	0.00	0.00
980	311.0104	0.00	0.00	0.00
990	317.3899	0.00	0.00	0.00
1000	323.8342	0.00	0.00	0.00
1010	330.3433	0.00	0.00	0.00
1020	336.9171	0.00	0.00	0.00
1030	343.5557	0.00	0.00	0.00
1040	350.2591	0.00	0.00	0.00
1050	357.0272	0.00	0.00	0.00

upgrad downgrad
-2.16 2.16

Wetland

	UP-GRADIENT (Water Table decline) (feet)	DOWN-GRADIENT (Water Table rise) (feet)
	UP-GRADIENT (FT)	DOWN-GRADIENT (FT)
10	-2.16	2.16
20	-0.07	0.07
30	0.00	0.00
40	0.00	0.00
50	0.00	0.00
60	0.00	0.00
70	0.00	0.00
80	0.00	0.00
90	0.00	0.00
100	0.00	0.00
110	0.00	0.00
120	0.00	0.00
130	0.00	0.00
140	0.00	0.00
150	0.00	0.00
160	0.00	0.00
170	0.00	0.00
180	0.00	0.00
190	0.00	0.00
200	0.00	0.00
210	0.00	0.00
220	0.00	0.00
230	0.00	0.00
240	0.00	0.00
250	0.00	0.00
260	0.00	0.00
270	0.00	0.00
280	0.00	0.00
290	0.00	0.00
300	0.00	0.00
310	0.00	0.00
320	0.00	0.00
330	0.00	0.00
340	0.00	0.00
350	0.00	0.00
360	0.00	0.00
370	0.00	0.00
380	0.00	0.00
390	0.00	0.00
400	0.00	0.00
410	0.00	0.00
420	0.00	0.00
430	0.00	0.00
440	0.00	0.00
450	0.00	0.00
460	0.00	0.00
470	0.00	0.00
480	0.00	0.00
490	0.00	0.00
500	0.00	0.00
510	0.00	0.00
520	0.00	0.00
530	0.00	0.00
540	0.00	0.00
550	0.00	0.00

1060	363.8601	0.00	0.00	0.00	560	0.00	0.00
1070	370.7578	0.00	0.00	0.00	570	0.00	0.00
1080	377.7202	0.00	0.00	0.00	580	0.00	0.00
1090	384.7474	0.00	0.00	0.00	590	0.00	0.00
1100	391.8394	0.00	0.00	0.00	600	0.00	0.00
1110	398.9961	0.00	0.00	0.00	610	0.00	0.00
1120	406.2176	0.00	0.00	0.00	620	0.00	0.00
1130	413.5039	0.00	0.00	0.00	630	0.00	0.00
1140	420.8549	0.00	0.00	0.00	640	0.00	0.00
1150	428.2707	0.00	0.00	0.00	650	0.00	0.00
1160	435.7513	0.00	0.00	0.00	660	0.00	0.00
1170	443.2966	0.00	0.00	0.00	670	0.00	0.00
1180	450.9067	0.00	0.00	0.00	680	0.00	0.00
1190	458.5816	0.00	0.00	0.00	690	0.00	0.00
1200	466.3212	0.00	0.00	0.00	700	0.00	0.00
1210	474.1256	0.00	0.00	0.00	710	0.00	0.00
1220	481.9948	0.00	0.00	0.00	720	0.00	0.00
1230	489.9288	0.00	0.00	0.00	730	0.00	0.00
1240	497.9275	0.00	0.00	0.00	740	0.00	0.00
1250	505.9909	0.00	0.00	0.00	750	0.00	0.00
1260	514.1192	0.00	0.00	0.00	760	0.00	0.00
1270	522.3122	0.00	0.00	0.00	770	0.00	0.00
1280	530.5699	0.00	0.00	0.00	780	0.00	0.00
1290	538.8925	0.00	0.00	0.00	790	0.00	0.00
1300	547.2798	0.00	0.00	0.00	800	0.00	0.00
1310	555.7319	0.00	0.00	0.00	810	0.00	0.00
1320	564.2487	0.00	0.00	0.00	820	0.00	0.00
1330	572.8303	0.00	0.00	0.00	830	0.00	0.00
1340	581.4767	0.00	0.00	0.00	840	0.00	0.00
1350	590.1878	0.00	0.00	0.00	850	0.00	0.00
1360	598.9637	0.00	0.00	0.00	860	0.00	0.00
1370	607.8044	0.00	0.00	0.00	870	0.00	0.00
1380	616.7098	0.00	0.00	0.00	880	0.00	0.00
1390	625.6801	0.00	0.00	0.00	890	0.00	0.00
1400	634.715	0.00	0.00	0.00	900	0.00	0.00
1410	643.8148	0.00	0.00	0.00	910	0.00	0.00
1420	652.9793	0.00	0.00	0.00	920	0.00	0.00
1430	662.2085	0.00	0.00	0.00	930	0.00	0.00
1440	671.5026	0.00	0.00	0.00	940	0.00	0.00
1450	680.8614	0.00	0.00	0.00	950	0.00	0.00
1460	690.285	0.00	0.00	0.00	960	0.00	0.00
1470	699.7733	0.00	0.00	0.00	970	0.00	0.00
1480	709.3264	0.00	0.00	0.00	980	0.00	0.00
1490	718.9443	0.00	0.00	0.00	990	0.00	0.00
1500	728.6269	0.00	0.00	0.00	1000	0.00	0.00
1510	738.3744	0.00	0.00	0.00	1010	0.00	0.00
1520	748.1865	0.00	0.00	0.00	1020	0.00	0.00
1530	758.0635	0.00	0.00	0.00	1030	0.00	0.00
1540	768.0052	0.00	0.00	0.00	1040	0.00	0.00
1550	778.0117	0.00	0.00	0.00	1050	0.00	0.00
1560	788.0829	0.00	0.00	0.00	1060	0.00	0.00
1570	798.2189	0.00	0.00	0.00	1070	0.00	0.00
1580	808.4197	0.00	0.00	0.00	1080	0.00	0.00
1590	818.6852	0.00	0.00	0.00	1090	0.00	0.00
1600	829.0155	0.00	0.00	0.00	1100	0.00	0.00
1610	839.4106	0.00	0.00	0.00	1110	0.00	0.00
1620	849.8705	0.00	0.00	0.00	1120	0.00	0.00
1630	860.3951	0.00	0.00	0.00	1130	0.00	0.00
1640	870.9845	0.00	0.00	0.00	1140	0.00	0.00
1650	881.6386	0.00	0.00	0.00	1150	0.00	0.00
1660	892.3575	0.00	0.00	0.00	1160	0.00	0.00
1670	903.1412	0.00	0.00	0.00	1170	0.00	0.00
1680	913.9896	0.00	0.00	0.00	1180	0.00	0.00
1690	924.9028	0.00	0.00	0.00	1190	0.00	0.00
1700	935.8808	0.00	0.00	0.00	1200	0.00	0.00
1710	946.9236	0.00	0.00	0.00	1210	0.00	0.00
1720	958.0311	0.00	0.00	0.00	1220	0.00	0.00
1730	969.2034	0.00	0.00	0.00	1230	0.00	0.00
1740	980.4404	0.00	0.00	0.00	1240	0.00	0.00
1750	991.7422	0.00	0.00	0.00	1250	0.00	0.00
1760	1003.109	0.00	0.00	0.00	1260	0.00	0.00
1770	1014.54	0.00	0.00	0.00	1270	0.00	0.00
1780	1026.036	0.00	0.00	0.00	1280	0.00	0.00
1790	1037.597	0.00	0.00	0.00	1290	0.00	0.00
1800	1049.223	0.00	0.00	0.00	1300	0.00	0.00
1810	1060.913	0.00	0.00	0.00	1310	0.00	0.00
1820	1072.668	0.00	0.00	0.00	1320	0.00	0.00
1830	1084.488	0.00	0.00	0.00	1330	0.00	0.00
1840	1096.373	0.00	0.00	0.00	1340	0.00	0.00
1850	1108.323	0.00	0.00	0.00	1350	0.00	0.00
1860	1120.337	0.00	0.00	0.00	1360	0.00	0.00
1870	1132.416	0.00	0.00	0.00	1370	0.00	0.00
1880	1144.56	0.00	0.00	0.00	1380	0.00	0.00
1890	1156.768	0.00	0.00	0.00	1390	0.00	0.00
1900	1169.041	0.00	0.00	0.00	1400	0.00	0.00
1910	1181.38	0.00	0.00	0.00	1410	0.00	0.00
1920	1193.782	0.00	0.00	0.00	1420	0.00	0.00
1930	1206.25	0.00	0.00	0.00	1430	0.00	0.00
1940	1218.782	0.00	0.00	0.00	1440	0.00	0.00
1950	1231.38	0.00	0.00	0.00	1450	0.00	0.00
1960	1244.041	0.00	0.00	0.00	1460	0.00	0.00
1970	1256.768	0.00	0.00	0.00	1470	0.00	0.00
1980	1269.56	0.00	0.00	0.00	1480	0.00	0.00
1990	1282.416	0.00	0.00	0.00	1490	0.00	0.00
2000	1295.337	0.00	0.00	0.00	1500	0.00	0.00
2010	1308.323	0.00	0.00	0.00	1510	0.00	0.00
2020	1321.373	0.00	0.00	0.00	1520	0.00	0.00
2030	1334.488	0.00	0.00	0.00	1530	0.00	0.00
2040	1347.668	0.00	0.00	0.00	WL-6	1540	0.00
2050	1360.913	0.00	0.00	0.00	1550	0.00	0.00
2060	1374.223	0.00	0.00	0.00	1560	0.00	0.00
2070	1387.597	0.00	0.00	0.00	1570	0.00	0.00
2080	1401.036	0.00	0.00	0.00	1580	0.00	0.00
2090	1414.54	0.00	0.00	0.00	1590	0.00	0.00
2100	1428.109	0.00	0.00	0.00	1600	0.00	0.00
2110	1441.742	0.00	0.00	0.00	1610	0.00	0.00
2120	1455.44	0.00	0.00	0.00	1620	0.00	0.00
2130	1469.203	0.00	0.00	0.00	1630	0.00	0.00
2140	1483.031	0.00	0.00	0.00	1640	0.00	0.00
2150	1496.924	0.00	0.00	0.00	1650	0.00	0.00
2160	1510.881	0.00	0.00	0.00	1660	0.00	0.00
2170	1524.903	0.00	0.00	0.00	1670	0.00	0.00
2180	1538.99	0.00	0.00	0.00	1680	0.00	0.00
2190	1553.141	0.00	0.00	0.00	1690	0.00	0.00
2200	1567.358	0.00	0.00	0.00	1700	0.00	0.00
2210	1581.639	0.00	0.00	0.00	1710	0.00	0.00
2220	1595.984	0.00	0.00	0.00	1720	0.00	0.00
2230	1610.395	0.00	0.00	0.00	1730	0.00	0.00
2240	1624.87	0.00	0.00	0.00	1740	0.00	0.00
2250	1639.411	0.00	0.00	0.00	1750	0.00	0.00
2260	1654.016	0.00	0.00	0.00	1760	0.00	0.00
2270	1668.685	0.00	0.00	0.00	1770	0.00	0.00

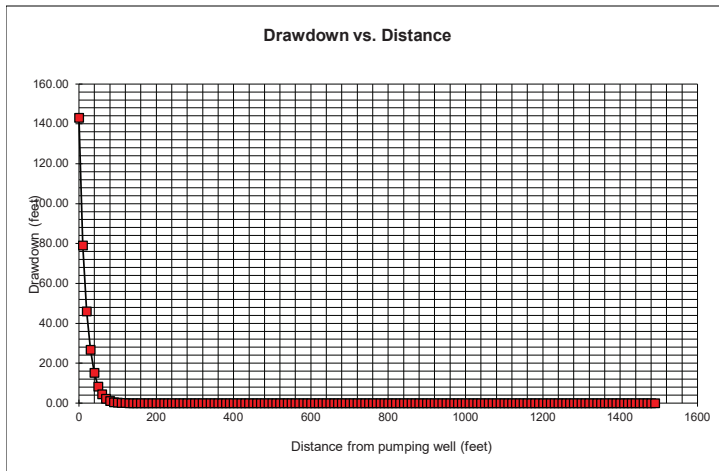
2280	1683.42	0.00	0.00	0.00	1780	0.00	0.00
2290	1698.219	0.00	0.00	0.00	1790	0.00	0.00
2300	1713.083	0.00	0.00	0.00	1800	0.00	0.00
2310	1728.012	0.00	0.00	0.00			
2320	1743.005	0.00	0.00	0.00			
2330	1758.063	0.00	0.00	0.00			
2340	1773.187	0.00	0.00	0.00			
2350	1788.374	0.00	0.00	0.00			
2360	1803.627	0.00	0.00	0.00			
2370	1818.944	0.00	0.00	0.00			
2380	1834.326	0.00	0.00	0.00			
2390	1849.773	0.00	0.00	0.00			
2400	1865.285	0.00	0.00	0.00			
2410	1880.861	0.00	0.00	0.00			
2420	1896.503	0.00	0.00	0.00			
2430	1912.209	0.00	0.00	0.00			
2440	1927.979	0.00	0.00	0.00			

Program to calculate drawdown at different distances
from a pumping well using the method of Theis (1935).
The method assumes one-dimensional steady-state
flow with no lateral boundaries or vertical leakage.
Drawdown is calculated at different distances from the pumping well.
A time value is input for these calculations.

Side Gradient Identified Resource W-8

Hydraulic Conductivity, K 2.835 feet/day
Thickness, B 68 feet

Transmissivity (ft²/day) (T=K*B) 193.000
Storativity 2.500E-01
Well pumping rate (gpm) 625.00 Long Term
Time (days) 1.000
Distance to calculate drawdown (feet) 4000.000
Increment to calculate drawdown (feet) 10.000



Distance (feet)	u	W(u)	Drawdown (feet)	Drawdown (inches)
0	0.0E+00	#NUM!	#NUM!	#NUM!
10	3.2E-02	2.89	143.13	1717.56
20	1.3E-01	1.59	78.98	947.81
30	2.9E-01	0.93	46.00	551.99
40	5.2E-01	0.54	26.71	320.50
50	8.1E-01	0.31	15.14	181.74
60	1.2E+00	0.17	8.30	99.58
70	1.6E+00	0.09	4.37	52.39
80	2.1E+00	0.04	2.20	26.34
90	2.6E+00	0.02	1.05	12.62
100	3.2E+00	0.01	0.48	5.75
110	3.9E+00	0.00	0.21	2.48
120	4.7E+00	0.00	0.08	1.02
130	5.5E+00	0.00	0.03	0.39
140	6.3E+00	0.00	0.01	0.14
150	7.3E+00	0.00	0.00	0.05
160	8.3E+00	0.00	0.00	0.02
170	9.4E+00	0.00	0.00	0.00
180	1.0E+01	0.00	0.00	0.00
190	1.2E+01	0.00	0.00	0.00
200	1.3E+01	0.00	0.00	0.00
210	1.4E+01	0.00	0.00	0.00
220	1.6E+01	0.00	0.00	0.00
230	1.7E+01	0.00	0.00	0.00
240	1.9E+01	0.00	0.00	0.00
250	2.0E+01	0.00	0.00	0.00
260	2.2E+01	0.00	0.00	0.00
270	2.4E+01	0.00	0.00	0.00
280	2.5E+01	0.00	0.00	0.00
290	2.7E+01	0.00	0.00	0.00
300	2.9E+01	0.00	0.00	0.00
310	3.1E+01	0.00	0.00	0.00
320	3.3E+01	0.00	0.00	0.00
330	3.5E+01	0.00	0.00	0.00
340	3.7E+01	0.00	0.00	0.00
350	4.0E+01	0.00	0.00	0.00
360	4.2E+01	0.00	0.00	0.00
370	4.4E+01	0.00	0.00	0.00
380	4.7E+01	0.00	0.00	0.00
390	4.9E+01	0.00	0.00	0.00
400	5.2E+01	0.00	0.00	0.00
410	5.4E+01	0.00	0.00	0.00
420	5.7E+01	0.00	0.00	0.00
430	6.0E+01	0.00	0.00	0.00
440	6.3E+01	0.00	0.00	0.00
450	6.6E+01	0.00	0.00	0.00
460	6.9E+01	0.00	0.00	0.00
470	7.2E+01	0.00	0.00	0.00
480	7.5E+01	0.00	0.00	0.00
490	7.8E+01	0.00	0.00	0.00
500	8.1E+01	0.00	0.00	0.00
510	84.22927	0.00	0.00	0.00
520	87.56477	0.00	0.00	0.00
530	90.96503	0.00	0.00	0.00
540	94.43005	0.00	0.00	0.00
550	97.95984	0.00	0.00	0.00
WL-8	560	101.5544	0.00	0.00
	570	105.2137	0.00	0.00
	580	108.9378	0.00	0.00
	590	112.7267	0.00	0.00
	600	116.5803	0.00	0.00

Appendix B

Summary of Domestic Wells & Well Logs

Sciota Township Domestic Wells within 1,000 feet													
Well ID	County	Township	Well Address	Zip Code	Well Depth (ft,bgs)	Well Type	Case Depth (ft,bgs)	SWL (ft,bgs)	Elevation DEM (ft,bgs)	SWL Elevation Calculated (ft, msl)	Aquifer Type	Lat	Long
78000002114	Shiawassee	Sciota	8400 COLBY LAKE RD	48848	260	HOSHLD	77	20	822.47	802.47	ROCK	42.87074644	-84.32034208
78000002760	Shiawassee	Sciota	7500 COLBY LAKE RD	48848	200	HOSHLD	130	39	844.04	805.04	ROCK	42.88327682	-84.32093063
78000003239	Shiawassee	Sciota	8171 COLBY LAKE RD	48848	160	HOSHLD	108	27	832.76	805.76	ROCK	42.87505018	-84.31969489
78000003281	Shiawassee	Sciota	8183 COLBY LAKE RD	48848	160	HOSHLD	110	25	835.47	810.47	ROCK	42.87449695	-84.31973767
78000003542	Shiawassee	Sciota	7840 COLBY LAKE RD	48846	160	HOSHLD	132	35	837.27	802.27	ROCK	42.87976431	-84.32068582
78000004017	Shiawassee	Sciota	8355 W GRAND RIVER RD	48848	200	HOSHLD	127	21	842.97	821.97	ROCK	42.88509645	-84.32238339
78000006928	Shiawassee	Sciota	7494 Colby Lake Rd	48848	160	HOSHLD	123	30	851.03	821.03	DRIFT	42.88388	-84.32118
78000007236	Shiawassee	Sciota	8220 COLBY LAKE RD	48848	220	HOSHLD	107	32	830.17	798.17	ROCK	42.87456415	-84.32071412
78000007407	Shiawassee	Sciota	8280 COLBY LAKE RD	48848	240	HOSHLD	97	32	834.57	802.57	ROCK	42.873063	-84.320351
78000007408	Shiawassee	Sciota	8260 COLBY LAKE RD	48848	240	HOSHLD	97	30	834.12	804.12	ROCK	42.87345649	-84.32064821
78000007415	Shiawassee	Sciota	8340 COLBY LAKE RD	48848	260	HOSHLD	90	25	834.98	809.98	ROCK	42.871441	-84.320265
78000007416	Shiawassee	Sciota	8240 COLBY LAKE RD	48848	240	HOSHLD	96	22	831.24	809.24	ROCK	42.87401029	-84.32068109
78000011415	Shiawassee	Sciota	7550 COLBY LAKE RD	48848	180	HOSHLD	125	35	846.31	811.31	ROCK	42.882728	-84.321086
78000011752	Shiawassee	Sciota	7550 COLBY LAKE RD	48848	48	HOSHLD	45	24	845.99	821.99	DRIFT	42.882753	-84.320939
78000011795	Shiawassee	Sciota	8047 COLBY LAKE RD	48848	162	HOSHLD	86	40	829.9	789.9	ROCK	42.876652	-84.319687
78000011808	Shiawassee	Sciota	8360 W GRAND RIVER RD	48848	180	HOSHLD	132	25	838.87	813.87	ROCK	42.88606	-84.322885
78000011811	Shiawassee	Sciota	8383 W GRAND RIVER RD	48848	200	HOSHLD	125	25	834.79	809.79	ROCK	42.885437	-84.323422
78000011823	Shiawassee	Sciota	7790 COLBY LAKE RD	48848	165	HOSHLD	130	24	834.93	810.93	ROCK	42.880274	-84.320701
78000011825	Shiawassee	Sciota	8309 W GRAND RIVER RD	48848	185	HOSHLD	130	30	842.05	812.05	ROCK	42.885219	-84.321632
78000011844	Shiawassee	Sciota	7884 COLBY LAKE RD	48848	28	HOSHLD	25	16	841.85	825.85	DRIFT	42.878881	-84.320637
78000011859	Shiawassee	Sciota	8501 W GRAND RIVER RD	48848	185	HOSHLD	120	15	834.99	819.99	ROCK	42.885495	-84.325291
78000012842	Shiawassee	Sciota	8155 COLBY LAKE RD	48848	165	HOSHLD	109	12	824.15	812.15	ROCK	42.87577	-84.31753
78000013234	Shiawassee	Sciota	8371 COLBY LAKE RD	48848	140	HOSHLD	96	30	835.66	805.66	ROCK	42.871492	-84.319694



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: W51 22 462	County: Shiawassee	Township: Sciota				
Well ID: 78000002114 Elevation: Latitude: 42.87074644 Longitude: -84.32034208 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: ON COLBY LAKE RD ON THE WEST SIDE, NORTH OF TYRELL					
		Well Owner: DARREN TANNER BUILDERS					
		Well Address: 8400 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: P.O. Box 1025 HOLT, MI 48842		

Drilling Method: Rotary Well Depth: 260.00 ft. Well Type: New Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: Shale packer/trap Diameter: 5.00 in. to 77.00 ft. depth Borehole: 8.50 in. to 77.00 ft. depth 4.50 in. to 260.00 ft. depth	Well Use: Household Date Completed: 12/6/2000 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Fairbanks-Morse Model Number: FB10 Drop Pipe Length: 70.00 ft. Drop Pipe Diameter: Draw Down Seal Used: No Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Goulds Model Number: V-60 Pressure Relief Valve Installed: No	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 10 GPM Pump Voltage: Drilling Record ID: Tank Capacity: 6.0 Gallons
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Static Water Level: 20.00 ft. Below Grade Well Yield Test: Pumping level 70.00 ft. after 1.00 hrs. at 30 GPM Yield Test Method: Air	Formation Description Brown Sand Gray Clay Gravel Gray Clay & Stones Gravel White Sandstone Black Shale Gray Shale Black Shale Gray Shale White Sandstone	Thickness 25.00 9.00 6.00 15.00 5.00 25.00 35.00 60.00 20.00 40.00 20.00	Depth to Bottom 25.00 34.00 40.00 55.00 60.00 85.00 120.00 180.00 200.00 240.00 260.00
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Screen Installed: No Intake: Bedrock Well	Well Grouted: Yes Grouting Method: Unknown Grouting Material: Bentonite slurry Bags: 4.00 Additives: None Depth: 0.00 ft. to 77.00 ft.	Geology Remarks:
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Wellhead Completion: Pitless adapter, 12 inches above grade
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Nearest Source of Possible Contamination: Type: Septic tank Distance: 60 ft. Direction: West	Drilling Machine Operator Name: DAVE H Employment: Employee
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Contractor Type: Water Well Drilling Contractor Business Name: J&M WELL DRILLING Business Address:	Reg No: 78-2272
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Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief.	
Signature of Registered Contractor	Date

General Remarks:

Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: W99181	County: Shiawassee	Township: Sciota		
Well ID: 78000002760 Elevation: Latitude: 42.88327682 Longitude: -84.32093063 Method of Collection: Interpolation-Map	Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:
	Distance and Direction from Road Intersection: OWNER: GREG TYLER				
	Well Owner: JOHN FERRICAN BLDR				
	Well Address: 7500 COLBY LAKE RD LAINGSBURG, MI 48848		Owner Address: 6174 E PRIO ST JOHNS, MI		

Drilling Method: Rotary Well Depth: 200.00 ft. Well Type: New Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: Shale packer/trap Diameter: 5.00 in. to 130.00 ft. depth Borehole: 8.00 in. to 130.00 ft. depth	Well Use: Household Date Completed: 1/13/2000 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: Drop Pipe Length: 80.00 ft. Drop Pipe Diameter: Draw Down Seal Used: No Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Well-X-Trol Model Number: WX203 Pressure Relief Valve Installed: No	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: Drilling Record ID: Tank Capacity: 32.0 Gallons
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Static Water Level: 39.00 ft. Below Grade Well Yield Test: Pumping level 200.00 ft. after 0.50 hrs. at 40 GPM Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
	Sand & Gravel	12.00	12.00
Screen Installed: No Intake: Bedrock Well	Clay & Gravel	108.00	120.00
	Shale & Sandstone	16.00	136.00
	Sandstone	64.00	200.00

Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: 5.00 Additives: None Depth: 0.00 ft. to 130.00 ft.	Geology Remarks:
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Wellhead Completion: Pitless adapter	Drilling Machine Operator Name: JOE WEST
Nearest Source of Possible Contamination: Type: Septic tank Distance: 70 ft. Direction: Northeast	Employment: Employee

	Contractor Type: Water Well Drilling Contractor Business Name: F&W WELL DRLG INC Business Address:	Reg No: 19-1868
	Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief.	
	Signature of Registered Contractor	Date

General Remarks:
Other Remarks:

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:		Permit No: W-6066-1098		County: Shiawassee			Township: Sciota	
Well ID: 78000003239 Elevation: Latitude: 42.87505018 Longitude: -84.31969489 Method of Collection: Interpolation-Map				Town/Range: 06N 01E	Section: 34	Well Status: Active	WSSN:	Source ID/Well No:
				Distance and Direction from Road Intersection: 1/2 MILE SOUTH OF GRAND RIVER; EAST SIDE				
				Well Owner: BOB BARR				
				Well Address: 8171 COLBY LAKE RD LAINGSBURG, MI 48848		Owner Address: 8171 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 160.00 ft. Well Type: Replacement	Well Use: Household Date Completed: 7/16/2001	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: Drop Pipe Length: 60.00 ft. Drop Pipe Diameter: Draw Down Seal Used: No	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 10 GPM Pump Voltage: Drilling Record ID:
Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None	Height:	Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Champion Model Number: 202	Tank Capacity: 20.0 Gallons Pressure Relief Valve Installed: No
Diameter: 5.00 in. to 108.00 ft. depth			
Borehole: 8.50 in. to 108.00 ft. depth 4.50 in. to 160.00 ft. depth			

Static Water Level: 27.00 ft. Below Grade Well Yield Test: at 50 GPM	Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
		Sand	42.00	42.00
		Clay	54.00	96.00
		Shale & Sandstone	8.00	104.00
Screen Installed: No	Intake: Bedrock Well	Sandstone	56.00	160.00

Well Grouted: Yes Grouting Method: Unknown				Geology Remarks:
Grouting Material	Bags	Additives	Depth	
Bentonite slurry	3.00	None	0.00 ft. to 108.00 ft.	

Wellhead Completion: Pitless adapter	
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			Drilling Machine Operator Name: DOODY
Nearest Source of Possible Contamination:			Employment: Unknown
Type	Distance	Direction	
Septic tank	65 ft.	East	

	Contractor Type: Water Well Drilling Contractor Business Name: DOODY WELL DRLG Business Address:	Reg No: 78-1616
Abandoned Well Plugged: Yes		

Casing Diameter: 2 in. Casing Removed: No Plugging Material: Bentonite chips/pellets No. of Bags: 2.00 Well Depth: 56 ft.		Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief. Signature of Registered Contractor Date
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General Remarks:	
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Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: W-16257-2615	County: Shiawassee	Township: Sciota				
Well ID: 78000003281 Elevation: Latitude: 42.87449695 Longitude: -84.31973767 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: .7 MILE SOUTH OF GRAND RIVER RD; 100' EAST OF COLBY LAKE RD					
		Well Owner: BLANCHARD BLDERS					
		Well Address: 8183 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 430 EAST MIDDLE WILLIAMSTON, MI 48895		

Drilling Method: Rotary Well Depth: 160.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 110.00 ft. depth Borehole: 8.50 in. to 110.00 ft. depth 4.75 in. to 160.00 ft. depth	Well Use: Household Date Completed: 9/30/2003 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Sta-Rite Model Number: 10SP40025 Drop Pipe Length: 40.00 ft. Drop Pipe Diameter: Draw Down Seal Used: No Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Well-X-Trol Model Number: WX202 Pressure Relief Valve Installed: No	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: Drilling Record ID: Tank Capacity: 6.0 Gallons																																																
Static Water Level: 25.00 ft. Below Grade Well Yield Test: Pumping level 160.00 ft. after 1.00 hrs. at 80 GPM Yield Test Method: Air		<table border="1"><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Brown Clay & Gravel Sandy</td><td>45.00</td><td>45.00</td></tr><tr><td>Gray Clay</td><td>40.00</td><td>85.00</td></tr><tr><td>Clay & Gravel</td><td>12.00</td><td>97.00</td></tr><tr><td>Gray & White Sandstone</td><td>63.00</td><td>160.00</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></tbody></table>		Formation Description	Thickness	Depth to Bottom	Brown Clay & Gravel Sandy	45.00	45.00	Gray Clay	40.00	85.00	Clay & Gravel	12.00	97.00	Gray & White Sandstone	63.00	160.00																																	
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Clay & Gravel	12.00	97.00																																																	
Gray & White Sandstone	63.00	160.00																																																	
Screen Installed: No Intake: Bedrock Well		Geology Remarks:																																																	
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: 6.00 Additives: None Depth: 0.00 ft. to 110.00 ft.		Wellhead Completion: Pitless adapter																																																	
Nearest Source of Possible Contamination: Type: Septic tank Distance: 50 ft. Direction: East		Drilling Machine Operator Name: GREG MEAD Employment: Employee																																																	
Abandoned Well Plugged: Yes		Contractor Type: Water Well Drilling Contractor Business Name: DYER WELL DRLG Business Address:																																																	
Casing Diameter: 1.25 in. Plugging Material: Bentonite chips/pellets No. of Bags: 0.50 Casing Removed: No Well Depth: 30 ft.		Reg No: 23-2227 Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief. Signature of Registered Contractor Date																																																	
General Remarks:																																																			
Other Remarks:																																																			



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: W-12804-3050	County: Shiawassee	Township: Sciota				
Well ID: 78000003542 Elevation: Latitude: 42.87976431 Longitude: -84.32068582 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: APPROX. .25 MILE SOUTH OF GRAND RIVER ROAD ON THE WEST SIDE OF COLBY LAKE ROAD					
		Well Owner: DAVE HADLEY					
		Well Address: 7840 COLBY LAKE RD LAINGSBURG, MI 48846			Owner Address: 7840 COLBY LAKE RD LAINGSBURG, MI 48846		

Drilling Method: Rotary Well Depth: 160.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 132.00 ft. depth Borehole: 8.50 in. to 132.00 ft. depth 4.75 in. to 160.00 ft. depth	Well Use: Household Date Completed: 4/2/2004 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Sta-Rite Model Number: 10SP40025 Drop Pipe Length: 60.00 ft. Drop Pipe Diameter: Draw Down Seal Used: No Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Well-X-Trol Model Number: WX205 Pressure Relief Valve Installed: No	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: Drilling Record ID: Tank Capacity: 35.0 Gallons																																													
Static Water Level: 35.00 ft. Below Grade Well Yield Test: Pumping level 160.00 ft. after 1.00 hrs. at 100 GPM Yield Test Method: Air		<table border="1"><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Brown Clay & Gravel</td><td>40.00</td><td>40.00</td></tr><tr><td>Gray Clay & Gravel</td><td>80.00</td><td>120.00</td></tr><tr><td>Gray Shale</td><td>8.00</td><td>128.00</td></tr><tr><td>Gray & White Sandstone</td><td>10.00</td><td>138.00</td></tr><tr><td>Gray Shale</td><td>1.00</td><td>139.00</td></tr><tr><td>Gray & White Sandstone & Shale</td><td>21.00</td><td>160.00</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></tbody></table>		Formation Description	Thickness	Depth to Bottom	Brown Clay & Gravel	40.00	40.00	Gray Clay & Gravel	80.00	120.00	Gray Shale	8.00	128.00	Gray & White Sandstone	10.00	138.00	Gray Shale	1.00	139.00	Gray & White Sandstone & Shale	21.00	160.00																								
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Gray & White Sandstone & Shale	21.00	160.00																																														
Screen Installed: No Intake: Bedrock Well		Geology Remarks:																																														
Well Grouted: Yes Grouting Method: Unknown Grouting Material: Bentonite slurry Bags: 7.00 Additives: None Depth: 0.00 ft. to 132.00 ft.		Wellhead Completion: Pitless adapter																																														
Nearest Source of Possible Contamination: Type: Septic tank Distance: 50 ft. Direction: Northeast		Drilling Machine Operator Name: GREG MEAD, TIM WALTZ Employment: Unknown																																														
Abandoned Well Plugged: Yes		Contractor Type: Water Well Drilling Contractor Reg No: 23-2227 Business Name: DYER WELL DRILLING AND SERVICE Business Address:																																														
Casing Diameter: 2 in. Plugging Material: Bentonite chips/pellets No. of Bags: 0.50 Casing Removed: No Well Depth: 28 ft.		Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief. Signature of Registered Contractor Date																																														
General Remarks:																																																
Other Remarks:																																																



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: W21066-3529	County: Shiawassee	Township: Sciota				
Well ID: 78000004017 Elevation: Latitude: 42.88509645 Longitude: -84.32238339 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: 300 YARDS WEST OF COLBY LAKE ROAD; SOUTH SIDE; 8355 WEST GRAND RIVER					
		Well Owner: R. CULPEPPER					
		Well Address: 8355 W GRAND RIVER RD LAINGSBURG, MI 48848			Owner Address: 8355 W GRAND RIVER RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 200.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 127.00 ft. depth Borehole: 8.50 in. to 127.00 ft. depth 4.50 in. to 200.00 ft. depth	Well Use: Household Date Completed: 3/30/2005 Height:	Pump Installed: No Pressure Tank Installed: No Pressure Relief Valve Installed: No																																													
Static Water Level: 21.00 ft. Below Grade Well Yield Test: Pumping level 200.00 ft. after 1.00 hrs. at 65 GPM Yield Test Method: Air		<table border="1"><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Brown Clay & Gravel</td><td>9.00</td><td>9.00</td></tr><tr><td>Sand & Gravel W/Stones</td><td>89.00</td><td>98.00</td></tr><tr><td>Gray Clay & Gravel</td><td>21.00</td><td>119.00</td></tr><tr><td>Sandstone & Shale</td><td>81.00</td><td>200.00</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></tbody></table>	Formation Description	Thickness	Depth to Bottom	Brown Clay & Gravel	9.00	9.00	Sand & Gravel W/Stones	89.00	98.00	Gray Clay & Gravel	21.00	119.00	Sandstone & Shale	81.00	200.00																														
Formation Description	Thickness	Depth to Bottom																																													
Brown Clay & Gravel	9.00	9.00																																													
Sand & Gravel W/Stones	89.00	98.00																																													
Gray Clay & Gravel	21.00	119.00																																													
Sandstone & Shale	81.00	200.00																																													
Screen Installed: No Intake: Bedrock Well	Geology Remarks:																																														
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: 5.00 Additives: None Depth: 0.00 ft. to 127.00 ft.	Drilling Machine Operator Name: STEVE DOODY Employment: Employee																																														
Wellhead Completion: Unknown	Contractor Type: Water Well Drilling Contractor Business Name: DOODY WELL DRILLING Business Address:																																														
Nearest Source of Possible Contamination: Type: Septic tank Distance: 70 ft. Direction: North	Reg No: 78-1616																																														
Abandoned Well Plugged: No Reason Not Plugged: Unknown	Water Well Contractor's Certification This well was drilled under my supervision and this report is true to the best of my knowledge and belief. Signature of Registered Contractor Date																																														
General Remarks:																																															
Other Remarks:																																															



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No: 009-27-200-008-02	Permit No: 003539	County: Shiawassee	Township: Sciota
Well ID: 78000006928 Elevation: Latitude: 42.88388 Longitude: -84.32118 Method of Collection: GPS Std Positioning Svc SA Off		Town/Range: 06N 01E	Section: 27
		Well Status: Active	WSSN:
		Source ID/Well No:	
		Distance and Direction from Road Intersection: West of Colby Lake Rd South of East Grand River Rd	
		Well Owner: David & Cheryl Snyder	
		Well Address: 7494 Colby Lake Rd Laingsburg, MI 48848	Owner Address: 7494 Colby Lake Rd Laingsburg, MI 48848

Drilling Method: Rotary	Well Use: Household	Pump Installed: Yes	Pump Installation Only: Yes
Well Depth: 160.00 ft.	Date Completed: 1/8/2021	Pump Installation Date: 1/8/2021	HP: 0.50
Well Type: New	Height: 1.00 ft. above grade	Manufacturer: Berkeley	Pump Type: Submersible
Casing Type: PVC plastic		Model Number: B10K05221	Pump Capacity: 10 GPM
Casing Joint: Solvent welded/glued		Drop Pipe Length: 80.00 ft.	Pump Voltage: 220
Casing Fitting: Drive shoe		Drop Pipe Diameter: 1.00 in.	Drilling Record ID:
		Draw Down Seal Used: No	
Diameter: 5.00 in. to 123.00 ft. depth SDR: 21.00		Pressure Tank Installed: Yes	
		Pressure Tank Type: Diaphragm/bladder	
Borehole: 8.50 in. to 123.00 ft. depth 4.75 in. to 160.00 ft. depth		Manufacturer: Flex-Lite-Flexcon	Tank Capacity: 22.0 Gallons
		Model Number: FL7	
		Pressure Relief Valve Installed: Yes	

Static Water Level: 30.00 ft. Below Grade	Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
Well Yield Test: Pumping level 80.00 ft. after 1.00 hrs. at 17 GPM		Brown Clay	5.00	5.00
		Sand & Gravel	90.00	95.00
		Gray Clay	10.00	105.00
Screen Installed: No	Intake: Unscreened Sand/Gravel	White Sandstone & Shale	35.00	140.00
		Yellow Sandstone	20.00	160.00

Well Grouted: Yes	Grouting Method: Grout pipe outside casing	Geology Remarks:
Grouting Material: Bentonite slurry	Bags: 13.00	
Additives: Retarder	Depth: 0.00 ft. to 123.00 ft.	
Wellhead Completion: Pitless adapter, 12 inches above grade		

Nearest Source of Possible Contamination:	Drilling Machine Operator Name: Adam Loomis
Type: Septic tank	Employment: Employee
Distance: 65 ft.	
Direction: Northeast	

Contractor Type: Water Well Drilling Contractor	Reg No: 78-2272
Business Name: J and M Well Drilling and Service Inc	
Business Address: 7589 W Lansing, Perry, MI, 48872	
Water Well Contractor's Certification This well and/or pump installation was performed under my registration.	
Signature of Registered Contractor	Date

General Remarks:
Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No: 009-34-200-005	Permit No: 005700	County: Shiawassee	Township: Sciota
Well ID: 78000007236 Elevation: Latitude: 42.87456415 Longitude: -84.32071412 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34
		Well Status: Active	WSSN:
		Source ID/Well No:	
		Distance and Direction from Road Intersection: 1/2 MILE S OF GRAND RIVER ON THE W SIDE OF COLBY LK RD. PARCEL G	
		Well Owner: OAK RIDGE HOMES	
		Well Address: 8220 COLBY LAKE RD LAINGSBURG, MI 48848	Owner Address: 720 JOSIE LANE LAINGSBURG, MI 48848

Drilling Method: Rotary	Well Use: Household	Pump Installed: Yes	Pump Installation Only: No
Well Depth: 220.00 ft.	Date Completed: 9/27/2022	Pump Installation Date:	HP: 0.50
Well Type: New	Height: 1.00 ft. above grade	Manufacturer: Franklin Electric	Pump Type: Submersible
Casing Type: PVC plastic		Model Number: 10FB05P4	Pump Capacity: 10 GPM
Casing Joint: Solvent welded/glued		Drop Pipe Length: 80.00 ft.	Pump Voltage: 230
Casing Fitting: None		Drop Pipe Diameter: 1.00 in.	Drilling Record ID:
		Draw Down Seal Used: Yes	
Diameter: 5.00 in. to 87.00 ft. depth SDR: 21.00 5.00 in. to 107.00 ft. depth SDR: 17.00		Pressure Tank Installed: Yes	
		Pressure Tank Type: Diaphragm/bladder	
Borehole:		Manufacturer: Flex-Lite-Flexcon	
		Model Number: FL7	Tank Capacity: 22.0 Gallons
		Pressure Relief Valve Installed: Yes	
Static Water Level: 32.00 ft. Below Grade		Formation Description	Thickness
Well Yield Test:	Yield Test Method: Air		Depth to Bottom
Pumping level 220.00 ft. after 1.00 hrs. at 80 GPM		Brown Clay & Gravel Sandy	22.00
		Gray Clay & Gravel	17.00
		Sand	4.00
		Gray Clay & Gravel	50.00
		Shale & Sandstone	32.00
		Sandstone	95.00
Screen Installed: No	Intake: Bedrock Well		
Well Grouted: Yes	Grouting Method: Grout pipe outside casing	Geology Remarks:	
Grouting Material: Bentonite slurry	Bags: 8.00		
Additives: Retarder	Depth: 0.00 ft. to 107.00 ft.		
Wellhead Completion: Pitless adapter, 12 inches above grade		Drilling Machine Operator Name: STEVE DOODY	
Nearest Source of Possible Contamination:		Employment: Employee	
Type: Septic tank	Distance: 70 ft.	Pump Installer: DENNIS DOODY	
	Direction: West		
		Contractor Type: Water Well Drilling Contractor	
		Business Name: DOODY WELL DRILLING	
		Business Address:	
		Reg No: 78-1616	
		Water Well Contractor's Certification	
		This well and/or pump installation was performed under my registration.	
		Signature of Registered Contractor	Date
General Remarks:			
Other Remarks:			



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No: 009-34-200-005	Permit No: 00598	County: Shiawassee	Township: Sciota
Well ID: 78000007407 Elevation: Latitude: 42.873063 Longitude: -84.320351 Method of Collection: Unknown		Town/Range: 06N 01E	Section: 34
		Well Status: Active	WSSN:
		Source ID/Well No:	
		Distance and Direction from Road Intersection: 1/2 MILE S OF GRAND RIVER ON THE W SIDE OF COLBY LK. PARCEL D.	
		Well Owner: OAK RIDGE CONSTR.	
		Well Address: 8280 COLBY LAKE RD LAINGSBURG, MI 48848	Owner Address: 720 JOSIE LANE LAINGSBURG, MI 48848

Drilling Method: Rotary	Well Use: Household	Pump Installed: Yes	Pump Installation Only: No
Well Depth: 240.00 ft.	Date Completed: 9/12/2022	Pump Installation Date:	HP: 0.50
Well Type: New	Height: 1.00 ft. above grade	Manufacturer: Franklin Electric	Pump Type: Submersible
Casing Type: PVC plastic		Model Number: 10FB05P4	Pump Capacity: 10 GPM
Casing Joint: Solvent welded/glued		Drop Pipe Length: 80.00 ft.	Pump Voltage: 230
Casing Fitting: None		Drop Pipe Diameter: 1.00 in.	Drilling Record ID:
		Draw Down Seal Used: Yes	
Diameter: 5.00 in. to 77.00 ft. depth SDR: 21.00 5.00 in. to 97.00 ft. depth SDR: 17.00		Pressure Tank Installed: Yes	
		Pressure Tank Type: Diaphragm/bladder	
Borehole: 8.50 in. to 97.00 ft. depth 4.50 in. to 240.00 ft. depth		Manufacturer: Flex-Lite-Flexcon	
		Model Number: FL7	Tank Capacity: 27.0 Gallons
		Pressure Relief Valve Installed: Yes	

Static Water Level: 32.00 ft. Below Grade	Formation Description	Thickness	Depth to Bottom
Well Yield Test: Pumping level 240.00 ft. after 1.00 hrs. at 50 GPM			
	Brown Clay & Gravel Sandy	31.00	31.00
	Gray Clay & Gravel	56.00	87.00
	Sandstone & Shale Layered	43.00	130.00
Screen Installed: No	Sandstone	25.00	155.00
Intake: Bedrock Well	Shale & Sandstone	60.00	215.00
	Sandstone	25.00	240.00

Well Grouted: Yes	Grouting Method: Grout pipe outside casing	Geology Remarks:
Grouting Material: Bentonite slurry	Bags: 6.00	
Additives: Retarder	Depth: 0.00 ft. to 97.00 ft.	

Wellhead Completion: Pitless adapter, 12 inches above grade
--

Nearest Source of Possible Contamination:	Drilling Machine Operator Name: STEVE DOODY
Type: Septic tank	Employment: Employee
Distance: 90 ft.	Pump Installer: DENNIS DOODY
Direction: Southwest	

Contractor Type: Water Well Drilling Contractor	Reg No: 78-1616
Business Name: DOODY WELL DRILLING	
Business Address:	

Water Well Contractor's Certification	
This well and/or pump installation was performed under my registration.	
Signature of Registered Contractor	Date

General Remarks:

Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No: 005664	County: Shiawassee	Township: Sciota
Well ID: 78000007408 Elevation: Latitude: 42.87345649 Longitude: -84.32064821 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34
		Well Status: Active	WSSN:
		Source ID/Well No:	
		Distance and Direction from Road Intersection: 1/2 MILE S OF GRAND RIVER ON THE W SIDE OF COLBY LK RD. PARCEL E	
		Well Owner: OAK RIDGE CONSTR	
		Well Address: 8260 COLBY LAKE RD LAINGSBURG, MI 48848	Owner Address: 720 JOSIE LANE LAINGSBURG, MI 48848

Drilling Method: Rotary	Well Use: Household	Pump Installed: Yes	Pump Installation Only: No
Well Depth: 240.00 ft.	Date Completed: 9/2/2022	Pump Installation Date:	HP: 0.50
Well Type: New	Height: 1.00 ft. above grade	Manufacturer: Franklin Electric	Pump Type: Submersible
Casing Type: PVC plastic		Model Number: 10FB05P4	Pump Capacity: 10 GPM
Casing Joint: Unknown		Drop Pipe Length: 80.00 ft.	Pump Voltage: 230
Casing Fitting: None		Drop Pipe Diameter: 1.00 in.	Drilling Record ID:
		Draw Down Seal Used: Yes	
Diameter: 5.00 in. to 77.00 ft. depth SDR: 21.00 5.00 in. to 97.00 ft. depth SDR: 17.00		Pressure Tank Installed: Yes	
		Pressure Tank Type: Diaphragm/bladder	
Borehole: 8.50 in. to 97.00 ft. depth 4.50 in. to 240.00 ft. depth		Manufacturer: Flex-Lite-Flexcon	
		Model Number: FL7	Tank Capacity: 22.0 Gallons
		Pressure Relief Valve Installed: Yes	

Static Water Level: 30.00 ft. Below Grade	Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
Well Yield Test:		Brown Clay & Gravel Sandy	17.00	17.00
Pumping level 240.00 ft. after 1.00 hrs. at 50 GPM		Sand & Gravel	29.00	46.00
		Gray Clay & Gravel	44.00	90.00
Screen Installed: No	Intake: Bedrock Well	Sandstone	25.00	115.00
		Sandstone & Shale	55.00	170.00
		Shale & Sandstone	40.00	210.00
		Sandstone	30.00	240.00

Well Grouted: Yes	Grouting Method: Grout pipe outside casing	Geology Remarks:
Grouting Material: Bentonite slurry	Bags: 6.00	
Additives: Retarder	Depth: 0.00 ft. to 97.00 ft.	

Wellhead Completion: Pitless adapter, 12 inches above grade
--

Nearest Source of Possible Contamination:	Drilling Machine Operator Name: STEVE DOODY
Type: Septic tank	Employment: Employee
Distance: 80 ft.	Pump Installer: DENNIS DOODY
Direction: West	

Contractor Type: Water Well Drilling Contractor	Reg No: 78-1616
Business Name: DOODY WELL DRILLING	
Business Address:	

Water Well Contractor's Certification	
This well and/or pump installation was performed under my registration.	
Signature of Registered Contractor	Date

General Remarks:

Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No: 009-34-200-005	Permit No: 005666	County: Shiawassee	Township: Sciota
Well ID: 78000007415 Elevation: Latitude: 42.871441 Longitude: -84.320265 Method of Collection: Unknown		Town/Range: 06N 01E	Section: 34
		Well Status: Active	WSSN:
		Source ID/Well No:	
		Distance and Direction from Road Intersection: 1/8 MILE N OF TYRELL ON THE W SIDE OF COLBY LK RD. PARCEL A	
		Well Owner: OAK RIDGE CONSTR	
		Well Address: 8340 COLBY LAKE RD LAINGSBURG, MI 48848	Owner Address: 720 JOSIE LANE LAINGSBURG, MI 48848

Drilling Method: Rotary	Well Use: Household	Pump Installed: Yes	Pump Installation Only: No
Well Depth: 260.00 ft.	Date Completed: 7/29/2022	Pump Installation Date:	HP: 0.50
Well Type: New	Height: 1.00 ft. above grade	Manufacturer: Franklin Electric	Pump Type: Submersible
Casing Type: PVC plastic		Model Number: 10FB05P4	Pump Capacity: 10 GPM
Casing Joint: Solvent welded/glued		Drop Pipe Length: 80.00 ft.	Pump Voltage: 230
Casing Fitting: None		Drop Pipe Diameter: 1.00 in.	Drilling Record ID:
		Draw Down Seal Used: Yes	
Diameter: 5.00 in. to 70.00 ft. depth SDR: 21.00		Pressure Tank Installed: Yes	
5.00 in. to 90.00 ft. depth SDR: 17.00		Pressure Tank Type: Diaphragm/bladder	
		Manufacturer: Flex-Lite-Flexcon	
Borehole: 8.50 in. to 90.00 ft. depth		Model Number: FL7	Tank Capacity: 22.0 Gallons
4.50 in. to 260.00 ft. depth		Pressure Relief Valve Installed: Yes	

Static Water Level: 25.00 ft. Below Grade	Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
Well Yield Test:		Sand	25.00	25.00
Pumping level 260.00 ft. after 1.00 hrs. at 50 GPM		Gray Clay & Gravel	57.00	82.00
		Sandstone	48.00	130.00
Screen Installed: No	Intake: Bedrock Well	Shale & Sandstone	25.00	155.00
		Sandstone	15.00	170.00
		Shale & Sandstone	40.00	210.00
		Sandstone	50.00	260.00

Well Grouted: Yes	Grouting Method: Grout pipe outside casing	Geology Remarks:
Grouting Material	Bags Additives Depth	
Unknown	6.00 Retarder 0.00 ft. to 90.00 ft.	

Wellhead Completion: Pitless adapter, 12 inches above grade
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Nearest Source of Possible Contamination:	Drilling Machine Operator Name: STEVE DOODY
Type	Employment: Employee
Distance	Pump Installer: DENNIS DOODY
Direction	
Septic tank	
80 ft.	
West	

Contractor Type: Water Well Drilling Contractor	Reg No: 78-1616
Business Name: DOODY WELL DRILLING	
Business Address:	

Water Well Contractor's Certification	
This well and/or pump installation was performed under my registration.	
Signature of Registered Contractor	Date

General Remarks:

Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011415 Elevation: Latitude: 42.882728 Longitude: -84.321086 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: .2 MI S OF GRAND RIVER 150 FEET W OF COLBY LK. WELL ON W SIDE OF HOUSE					
		Well Owner: LINDA VANBUREN					
		Well Address: 7550 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 7550 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 180.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Welded Casing Fitting: None Diameter: 5.00 in. to 125.00 ft. depth Borehole: 7.88 in. to 125.00 ft. depth 4.50 in. to 120.00 ft. depth	Well Use: Household Date Completed: 1/10/1995 Height: 1.00 ft. above grade	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: 50NW1 Drop Pipe Length: 80.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 10 GPM Pump Voltage: 230 Drilling Record ID:	
Static Water Level: 35.00 ft. Below Grade Well Yield Test: at 40 GPM Yield Test Method: Air		Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Amtrol Model Number: 202 Pressure Relief Valve Installed: Unknown Tank Capacity:		
Screen Installed: No Intake: Bedrock Well		Formation Description	Thickness	Depth to Bottom
		Clay	77.00	77.00
		Sand Clay Gravel W/Silt	43.00	120.00
		Sandstone	43.00	163.00
		Shale & Sandstone	17.00	180.00
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: 4.00 Additives: None Depth: 5.00 ft. to 125.00 ft.		Geology Remarks:		
Wellhead Completion: Pitless adapter		Drilling Machine Operator Name: DOODY		
Nearest Source of Possible Contamination: Type: Septic tank Distance: 85 ft. Direction: Northeast		Employment: Employee		
Abandoned Well Plugged: Yes		Contractor Type: Water Well Drilling Contractor Business Name: DS DOODY WELL Business Address: 6131 PITTSBURG RD, LAINGSBURG, MI		
Plugging Material: Bentonite chips/pellets Casing Removed: No		Reg No: 78-1616 Water Well Contractor's Certification This well and/or pump installation was performed under my registration.		
General Remarks:		Signature of Registered Contractor		
Other Remarks:		Date		



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011795 Elevation: Latitude: 42.876652 Longitude: -84.319687 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: ON E SIDE OF COLBY LAKE S OF GRAND RIVER					
		Well Owner: TROY BILL					
		Well Address: 8047 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 8047 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 162.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 86.00 ft. depth Borehole: 7.88 in. to 86.00 ft. depth	Well Use: Household Date Completed: 2/29/1988 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: Drop Pipe Length: 60.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 10 GPM Pump Voltage: 220 Drilling Record ID:
		Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: Well-X-Trol Model Number: 202 Pressure Relief Valve Installed:	Tank Capacity: 30.0 Gallons Unknown

Static Water Level: 40.00 ft. Below Grade Well Yield Test: Pumping level 60.00 ft. after 1.00 hrs. at 25 GPM	Yield Test Method: Unknown	Formation Description	Thickness	Depth to Bottom
		Clay & Sand	60.00	60.00
		Gravel & Stones W/Sandstone	60.00	120.00
		Sandstone	42.00	162.00
Screen Installed: No Intake: Bedrock Well				

Well Grouted: Yes Grouting Material: Unknown Grouting Method: Unknown Bags: 4.00 Additives: None Depth: 0.00 ft. to 25.00 ft.	Geology Remarks:
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Wellhead Completion: Pitless adapter, 12 inches above grade	Drilling Machine Operator Name:
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Nearest Source of Possible Contamination: Type: Septic tank Distance: 62 ft. Direction: West	Employment: Unknown
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Abandoned Well Plugged: Unknown	Contractor Type: Water Well Drilling Contractor Business Name: D A CORNELL AND SON Business Address: BATH, MI	Reg No: 19-1815
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Casing Removed:	Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date
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General Remarks:
Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011808 Elevation: Latitude: 42.88606 Longitude: -84.322885 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: APPROX 500 FEET W OF GRAND RD AND LAKE RD INTERSECTION					
		Well Owner: RAY LESLIE					
		Well Address: 8360 W GRAND RIVER RD LAINGSBURG, MI 48848			Owner Address: 5521 W M 21 OWOSSO, MI		

Drilling Method: Rotary Well Depth: 180.00 ft. Well Type: Unknown Casing Type: Unknown Casing Joint: Threaded & coupled Casing Fitting: Drive shoe Diameter: 4.00 in. to 132.00 ft. depth Borehole:	Well Use: Household Date Completed: 5/28/1980 Height: 1.00 ft. above grade	Pump Installed: No Pressure Tank Installed: No Pressure Relief Valve Installed: No
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Static Water Level: 25.00 ft. Well Yield Test: Pumping level 65.00 ft. after 2.00 hrs. at 15 GPM Unrestricted Flow Rate:	Yield Test Method: Unknown	<table><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Clay</td><td>8.00</td><td>8.00</td></tr><tr><td>Sand & Gravel</td><td>16.00</td><td>24.00</td></tr><tr><td>Clay & Gravel</td><td>45.00</td><td>69.00</td></tr><tr><td>Sand & Gravel</td><td>20.00</td><td>89.00</td></tr><tr><td>Clay Sandy Fine</td><td>32.00</td><td>121.00</td></tr><tr><td>Shale</td><td>11.00</td><td>132.00</td></tr><tr><td>Black Shale</td><td>45.00</td><td>177.00</td></tr><tr><td>White Sandstone</td><td>3.00</td><td>180.00</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></tbody></table>	Formation Description	Thickness	Depth to Bottom	Clay	8.00	8.00	Sand & Gravel	16.00	24.00	Clay & Gravel	45.00	69.00	Sand & Gravel	20.00	89.00	Clay Sandy Fine	32.00	121.00	Shale	11.00	132.00	Black Shale	45.00	177.00	White Sandstone	3.00	180.00															
Formation Description	Thickness	Depth to Bottom																																										
Clay	8.00	8.00																																										
Sand & Gravel	16.00	24.00																																										
Clay & Gravel	45.00	69.00																																										
Sand & Gravel	20.00	89.00																																										
Clay Sandy Fine	32.00	121.00																																										
Shale	11.00	132.00																																										
Black Shale	45.00	177.00																																										
White Sandstone	3.00	180.00																																										

Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: Additives: None Depth: 0.00 ft. to 30.00 ft.	Geology Remarks:
--	-------------------------

Wellhead Completion: 12 inches above grade	Drilling Machine Operator Name:
---	--

Nearest Source of Possible Contamination: Type: Septic tank Distance: 50 ft. Direction: North	Employment: Unknown
--	----------------------------

Abandoned Well Plugged: Unknown	Contractor Type: Water Well Drilling Contractor Business Name: H M HALL Business Address: 1608 W DEWEY RD, MI
--	--

Casing Removed:	Reg No: 78-0189 Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date
------------------------	---

General Remarks:
Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011815 Elevation: Latitude: 42.886011 Longitude: -84.320551 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: 75 FEET E OF COLBY LAKE RD 139 FEET N OF GRAND RIVER. WELL ON W SIDE OF HOUSE					
		Well Owner: MR AND MRS MATHYSON					
		Well Address: 7415 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 7415 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 140.00 ft. Well Type: Unknown Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 110.00 ft. depth Borehole: 7.88 in. to 110.00 ft. depth	Well Use: Household Date Completed: 1/1/1986 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: 50CNW1 Drop Pipe Length: Drop Pipe Diameter: Draw Down Seal Used: Unknown Pressure Tank Installed: No Pressure Relief Valve Installed: Unknown	Pump Installation Only: No HP: 0.50 Pump Type: Unknown Pump Capacity: 10 GPM Pump Voltage: 230 Drilling Record ID:
--	---	--	---

Static Water Level: 23.00 ft. Below Grade Well Yield Test: at 50 GPM Yield Test Method: Air	Formation Description	Thickness	Depth to Bottom
	Topsoil	10.00	10.00
Screen Installed: No Intake: Bedrock Well	Gravel	25.00	35.00
	Clay	12.00	47.00
	Gravel	25.00	72.00
	Gravel W/Sandstone	33.00	105.00
	Sandstone	35.00	140.00

Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: None Additives: None Depth: 0.00 ft. to 110.00 ft.	Geology Remarks:
--	-------------------------

Wellhead Completion: Pitless adapter

Nearest Source of Possible Contamination: Type: Septic tank Distance: 60 ft. Direction: East	Drilling Machine Operator Name: Employment: Unknown
---	--

Abandoned Well Plugged: Unknown	Contractor Type: Water Well Drilling Contractor Business Name: D S DOODY WELL Business Address: 6131 PITTSBURG RD, MI
--	--

Casing Removed:	Reg No: 78-1616 Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date
------------------------	---

General Remarks:

Other Remarks:



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011823 Elevation: Latitude: 42.880274 Longitude: -84.320701 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: S OF GRAND RIVER RD ON THE RIGHT SIDE (W SIDE OF COLBY LK RD)					
		Well Owner: VICKIE CANNING					
		Well Address: 7790 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 7790 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 165.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: None Diameter: 5.00 in. to 130.00 ft. depth Borehole:	Well Use: Household Date Completed: 8/17/1987 Height:	Pump Installed: Yes Pump Installation Date: Manufacturer: Fairbanks-Morse Model Number: 3-W Drop Pipe Length: 40.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: Pump Voltage: 220 Drilling Record ID:	Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: A.O. Smith Model Number: V-60 Pressure Relief Valve Installed: Unknown Tank Capacity: 40.0 Gallons																																													
Static Water Level: 24.00 ft. Below Grade Well Yield Test: at 100 GPM Yield Test Method: Unknown		<table><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Brown Clay</td><td>10.00</td><td>10.00</td></tr><tr><td>Brown Clay & Gravel</td><td>5.00</td><td>15.00</td></tr><tr><td>Gray Clay</td><td>110.00</td><td>125.00</td></tr><tr><td>Gray Shale & Sandstone White</td><td>40.00</td><td>165.00</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></tbody></table>		Formation Description	Thickness	Depth to Bottom	Brown Clay	10.00	10.00	Brown Clay & Gravel	5.00	15.00	Gray Clay	110.00	125.00	Gray Shale & Sandstone White	40.00	165.00																														
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Brown Clay	10.00	10.00																																														
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Gray Shale & Sandstone White	40.00	165.00																																														
Screen Installed: No Intake: Bedrock Well	Geology Remarks:																																															
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: None Additives: None Depth: 0.00 ft. to 130.00 ft.	Drilling Machine Operator Name: Employment: Unknown																																															
Wellhead Completion: Pitless adapter	Contractor Type: Water Well Drilling Contractor Business Name: DYER WELL DRILLING AND SERVICE Business Address: LAINGSBURG, MI																																															
Nearest Source of Possible Contamination: Type: None Distance: Direction:	Reg No: 78-0418																																															
Abandoned Well Plugged: Yes Plugging Material: Unknown Casing Removed: Unknown	Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date																																															
General Remarks:																																																
Other Remarks:																																																



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000011859 Elevation: Latitude: 42.885495 Longitude: -84.325291 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 27	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: 1/4 MILE W OF COLBY LAKE RD ON THE S SIDE OF GRAND RIVER RD					
		Well Owner: RODNEY ROOSA					
		Well Address: 8501 W GRAND RIVER RD LAINGSBURG, MI 48848			Owner Address: 8501 W GRAND RIVER RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 185.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: Drive shoe Diameter: 5.00 in. to 120.00 ft. depth SDR: 21.00 Borehole: 8.50 in. to 120.00 ft. depth	Well Use: Household Date Completed: 11/18/1994 Height: 1.00 ft. above grade	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: 50SEW0-9BC Drop Pipe Length: 40.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: A.O. Smith Model Number: V140 Pressure Relief Valve Installed:	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: 115 Drilling Record ID: Tank Capacity: 13.0 Gallons Unknown																																										
Static Water Level: 15.00 ft. Below Grade Well Yield Test: at 90 GPM Yield Test Method: Air		<table><thead><tr><th>Formation Description</th><th>Thickness</th><th>Depth to Bottom</th></tr></thead><tbody><tr><td>Brown Clay</td><td>15.00</td><td>15.00</td></tr><tr><td>Gray Clay</td><td>30.00</td><td>45.00</td></tr><tr><td>Gray Clay & Gravel</td><td>60.00</td><td>105.00</td></tr><tr><td>White Sandstone</td><td>5.00</td><td>110.00</td></tr><tr><td>White Sandstone</td><td>20.00</td><td>130.00</td></tr><tr><td>White Sandstone Gray</td><td>55.00</td><td>185.00</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></tbody></table>		Formation Description	Thickness	Depth to Bottom	Brown Clay	15.00	15.00	Gray Clay	30.00	45.00	Gray Clay & Gravel	60.00	105.00	White Sandstone	5.00	110.00	White Sandstone	20.00	130.00	White Sandstone Gray	55.00	185.00																					
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Brown Clay	15.00	15.00																																											
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Gray Clay & Gravel	60.00	105.00																																											
White Sandstone	5.00	110.00																																											
White Sandstone	20.00	130.00																																											
White Sandstone Gray	55.00	185.00																																											
Screen Installed: No Intake: Bedrock Well																																													
Well Grouted: Yes Grouting Method: Unknown Grouting Material: Bentonite slurry Bags: 4.00 Additives: None Depth: 0.00 ft. to 120.00 ft.		Geology Remarks:																																											
Wellhead Completion: Pitless adapter, 12 inches above grade		Drilling Machine Operator Name: JOE DYER Employment: Employee																																											
Nearest Source of Possible Contamination: Type: None Distance: Direction:		Contractor Type: Water Well Drilling Contractor Reg No: 78-0418 Business Name: DYER WELL DRILLING AND SERVICE Business Address: LAINGSBURG, MI, 48848																																											
Abandoned Well Plugged: Yes Plugging Material: Unknown Casing Removed: Unknown		Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date																																											
General Remarks:																																													
Other Remarks:																																													



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.



Import ID:

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000012842 Elevation: Latitude: 42.87577 Longitude: -84.31753 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: .65 MILE S OF GRAND RIVER RD AND 100 YARDS E OF COLBY LAKE					
		Well Owner: MIKE DOYLE					
		Well Address: 8155 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 8155 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Cable Tool Well Depth: 165.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: Drive shoe Diameter: 5.00 in. to 109.00 ft. depth SDR: 21.00 Borehole: 8.00 in. to 109.00 ft. depth	Well Use: Household Date Completed: 3/31/1994 Height: 1.00 ft. above grade	Pump Installed: Yes Pump Installation Date: Manufacturer: Aermotor Model Number: T12502302 Drop Pipe Length: 40.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: 230 Drilling Record ID:
Static Water Level: 12.00 ft. Below Grade Well Yield Test: at 100 GPM Yield Test Method: Air		Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: A.O. Smith Model Number: V140 Pressure Relief Valve Installed: Unknown Tank Capacity: 13.0 Gallons	
Screen Installed: No Intake: Bedrock Well		Formation Description	Thickness Depth to Bottom
		Gravel	20.00 20.00
		Gray Clay	73.00 93.00
		Sandstone	5.00 98.00
		Gray & White Sandstone	2.00 100.00
		Gray Shale	2.00 102.00
		Gray & White Sandstone	41.00 143.00
		Gray Shale Black	2.00 145.00
		Gray & White Sandstone	20.00 165.00
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: None Additives: None Depth: 0.00 ft. to 109.00 ft.		Geology Remarks:	
Wellhead Completion: Pitless adapter, 12 inches above grade		Drilling Machine Operator Name: GREG MEAD	
Nearest Source of Possible Contamination: Type: Septic tank Distance: 70 ft. Direction: East		Employment: Employee	
Abandoned Well Plugged: No Reason Not Plugged: Unable to locate well		Contractor Type: Water Well Drilling Contractor Business Name: DYER WELL DRILLING AND SERVICE Reg No: 78-0418 Business Address: LAINGSBURG, MI, 48848	
		Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date	
General Remarks:			
Other Remarks:			



Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.



Import ID:

Tax No:	Permit No:	County: Shiawassee	Township: Sciota				
Well ID: 78000013234 Elevation: Latitude: 42.871492 Longitude: -84.319694 Method of Collection: Interpolation-Map		Town/Range: 06N 01E	Section: 34	Well Status: Active	WSSN:	Source ID/Well No:	
		Distance and Direction from Road Intersection: 1 MI S OF BALDWIN RD ON COLBY LK RD. WELL ON SE SIDE OF HOUSE					
		Well Owner: RUSS KNOP					
		Well Address: 8371 COLBY LAKE RD LAINGSBURG, MI 48848			Owner Address: 8371 COLBY LAKE RD LAINGSBURG, MI 48848		

Drilling Method: Rotary Well Depth: 140.00 ft. Well Type: Replacement Casing Type: PVC plastic Casing Joint: Unknown Casing Fitting: Shale packer/trap Diameter: 5.00 in. to 96.00 ft. depth Borehole: 8.50 in. to 96.00 ft. depth	Well Use: Household Date Completed: 9/20/1998 Height: 2.00 ft. above grade	Pump Installed: Yes Pump Installation Date: Manufacturer: Red Jacket Model Number: 10BC Drop Pipe Length: 90.00 ft. Drop Pipe Diameter: Draw Down Seal Used: Unknown	Pump Installation Only: No HP: 0.50 Pump Type: Submersible Pump Capacity: 12 GPM Pump Voltage: 230 Drilling Record ID:
Static Water Level: 30.00 ft. Below Grade Well Yield Test: Pumping level 90.00 ft. after 2.00 hrs. at 40 GPM		Pressure Tank Installed: Yes Pressure Tank Type: Unknown Manufacturer: A.O. Smith Model Number: V100 Pressure Relief Valve Installed: Unknown Tank Capacity: 10.0 Gallons	
Screen Installed: No Intake: Bedrock Well		Formation Description	Thickness Depth to Bottom
		Brown Sand	25.00 25.00
		Gray Clay	40.00 65.00
		Gravel & Stones	15.00 80.00
		White Sandstone	25.00 105.00
		Black Shale	35.00 140.00
Well Grouted: Yes Grouting Material: Bentonite slurry Grouting Method: Unknown Bags: 6.00 Additives: None Depth: 0.00 ft. to 96.00 ft.		Geology Remarks:	
Wellhead Completion: Pitless adapter		Drilling Machine Operator Name: JAMIE RICHARD	
Nearest Source of Possible Contamination: Type: Septic tank Distance: 60 ft. Direction:		Employment: Employee	
Abandoned Well Plugged: Yes		Contractor Type: Water Well Drilling Contractor Business Name: J M WELL DRILLING Business Address: PERRY, MI Reg No: 78-2066	
Casing Diameter: 1.25 in. Plugging Material: Bentonite chips/pellets No. of Bags: 2.00		Water Well Contractor's Certification This well and/or pump installation was performed under my registration. Signature of Registered Contractor Date	
General Remarks:			
Other Remarks:			

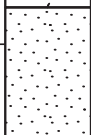
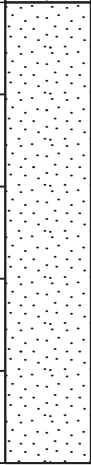
Appendix C

Soil Borings

LOG OF BORING: B-2

Project: HGM SCIOTA TWP

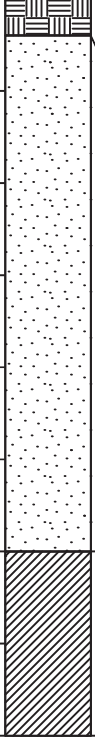
Job Number:

		DATE: 2/12/2025	PAGE #: 2
SURFACE ELEVATION	EASTING (X)	NORTHING (Y)	WATER AT:
846.00	13134925.55	502961.57	
TYPE:	BEGIN TIME:	END TIME:	
Depth, feet	Graphic Log	Description	THICKNESS
		TOP SOIL Yes	3.00
10		SAND CLAY MIX No	15.00
20		FINE SAND Yes	7.00
30		COURSE SAND Yes	25.00
40			
50			

LOG OF BORING: B-3

Project: HGM SCIOTA TWP

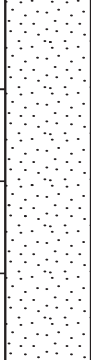
Job Number:

		DATE: 2/12/2025	PAGE #: 3
SURFACE ELEVATION	EASTING (X)	NORTHING (Y)	WATER AT: 30
828.00	13135060.50	502212.59	
TYPE:	BEGIN TIME:	END TIME:	
Depth, feet	Graphic Log	Description	THICKNESS
		TOP SOIL Yes	2.00
10		SAND AND STONE 10%+ Yes	28.00
20			
30		BLUE CLAY IN WATER No	10.00
40			

LOG OF BORING: B-4

Project: HGM SCIOTA TWP

Job Number:

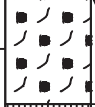
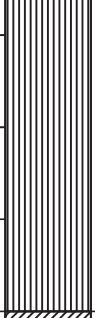
		DATE: 2/12/2025	PAGE #: 4
SURFACE ELEVATION	EASTING (X)	NORTHING (Y)	WATER AT:
824.00	13135226.90	501810.16	
TYPE:	BEGIN TIME:	END TIME:	
Depth, feet	Graphic Log	Description	THICKNESS
		TOP SOIL Yes	2.00
		SAND AND SOME CLAY Yes	8.00
10		SAND AND STONE 10%+ Yes	20.00
20			
30		CLAY No	1.00
		COURSE STONE WITH LIGNITE Yes	9.00
40			

LOG OF BORING: B-5

Project: HGM SCIOTA TWP

Job Number:

		DATE: 2/12/2025	PAGE #: 6
SURFACE ELEVATION	EASTING (X)	NORTHING (Y)	WATER AT:
824.00	13134905.85	501312.60	
TYPE:	BEGIN TIME:	END TIME:	

Depth, feet	Graphic Log	Description	THICKNESS
		TOP SOIL Yes	2.00
		SAND AND CLAY MIX No	6.00
10		SOUPY LOAM WITH STONE No	17.00
20			
30		BLUE CLAY No	10.00

LOG OF BORING: B-6

Project: HGM SCIOTA TWP

Job Number:

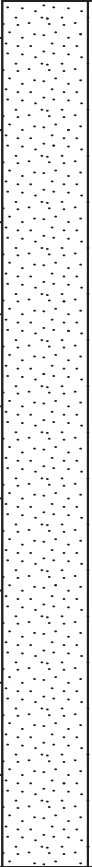
		DATE: 2/12/2025	PAGE #: 5
SURFACE ELEVATION	EASTING (X)	NORTHING (Y)	WATER AT:
836.00	13134750.78	501805.43	
TYPE:	BEGIN TIME:	END TIME: 13:30:19	

Depth, feet	Graphic Log	Description	THICKNESS
		TOP SOIL	2.00
		Yes	4.00
		RED SAND	
		Yes	34.00
10		COURSE SAND AND STONE 25%+	
		Yes	
20			
30			
40		CLAY	5.00
		No	

LOG OF BORING: B-1

Project: HGM SCIOTA TWP

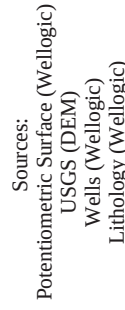
Job Number:

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822.00	13134741.64	502841.70	
TYPE:	BEGIN TIME:	END TIME:	
Depth, feet	Graphic Log	Description	THICKNESS
		SAND AND STONE 10% Yes	3.00
10		COURSE SAND WITH 5-10% STONE Yes	47.00
20			
30			
40			
50			

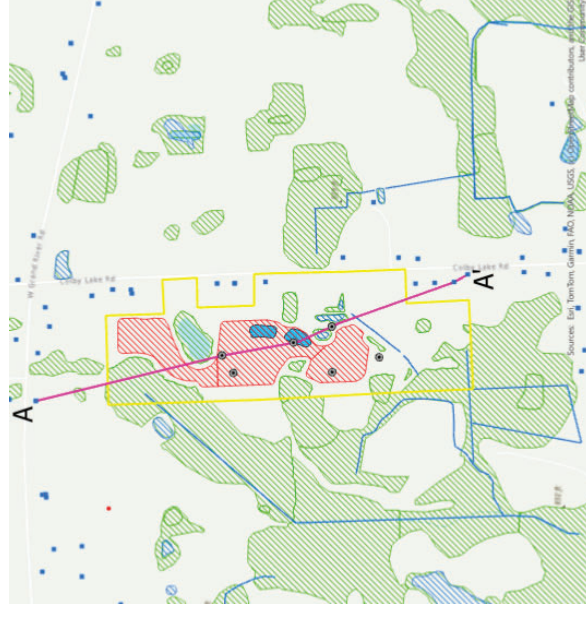
Appendix D

Geologic Cross Sections

Cross Section A to A'



All domestic wells are pumping wells and are not screened. Lithologies were classified Sand (Sand, Sand and some Clay, Sand and Stone Sand w/ Gravel, Sand & Clay). Clay (Clay, Blue Clay, Sand Clay Mix, Brown Clay & Gravel Sandy, Gray Clay & GravelClay w/ Gravel). Sandstone (Sandstone & Shale, Shale & Sandstone, and White Sandstone). Potentiometric surface was made from onsite data from August 2024. All three domestic wells have no screen depth listed on well logs.



Legend:

- Topsoil
- Sand
- Clay
- Gravel
- Proposed Ponds
- Site Boundary
- Mining Boundary
- Soil Boring
- Shiawassee Domestic Wells
- Domestic Well Screen
- Wetland Boundary
- Current Potentiometric Surface
- Distance (ft)

Map Labels:

- Topsoil
- Sand
- Clay
- Gravel
- Proposed Ponds
- Site Boundary
- Mining Boundary
- Soil Boring
- Shiawassee Domestic Wells
- Domestic Well Screen
- Wetland Boundary
- Current Potentiometric Surface
- Distance (ft)

Notes:

- Lithologies were classified as Sand (Sand, Red Sand, and Sand and Stone), Clay (Clay, Clay Gravelly, and Blue Clay)
- Potentiometric surface was made from onsite data from August 2024.
- Domestic Well Screen is .25 ft.

Appendix E
EGLE Water Withdrawl Assesment Tool

Water Withdrawal Screening Results

Summary

Zone:	A
Home Water Management Area (WMA) ID:	20784
Debited WMA (Depletion in gpm):	20784 (22.1)
Pumping Capacity (gpm):	625
Intake Depth (ft):	5
Pumping Frequency:	Intermittent
Pumping Months per year:	April, May, June, July, August, September, October, November
Pumping Days per week:	2
Pumping Hours per day:	10
Latitude:	42.8779
Longitude:	-84.3229
Total Annual Withdrawal (gallons):	26,184,000
Total Annual Withdrawal (acre/inches):	964.28

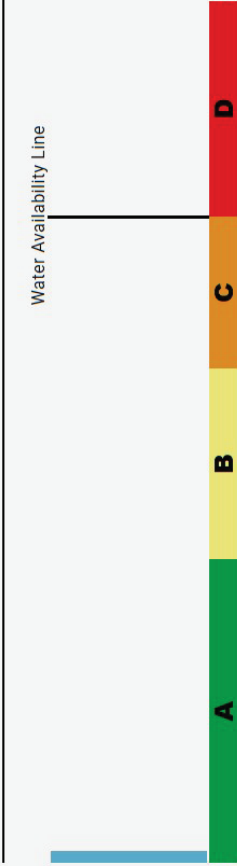
Run 1

Download All

Proceed with Selected

Water Withdrawal Screening Results

Zone Graph



Run 1

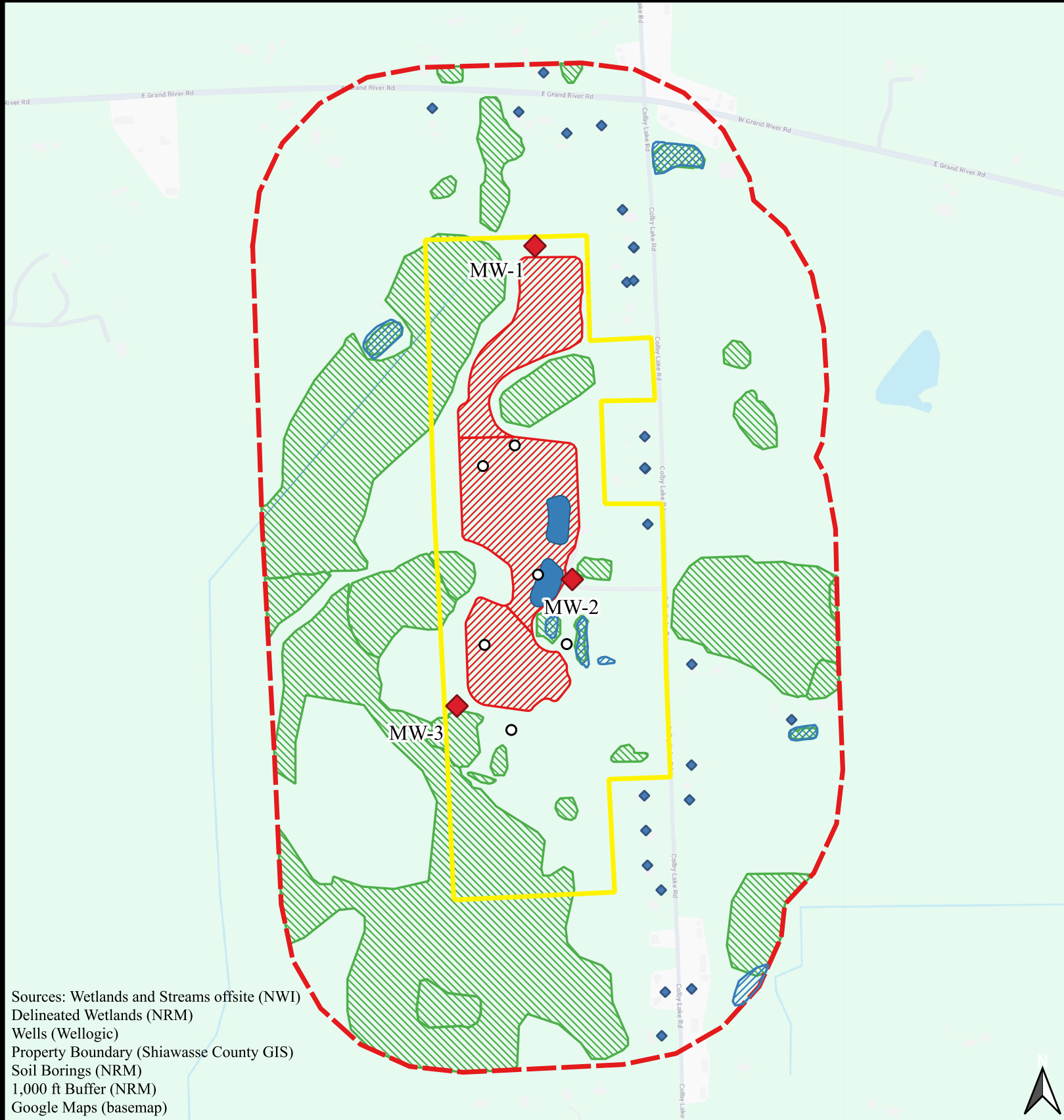
Download All

The proposed withdrawal did not pass the screening process, or additional submitted data requires further review. A site-specific review must be requested below, and written authorization obtained prior to utilizing this withdrawal.

Summary

Zone:	A
Home Water Management Area (WMA) ID:	20784
Debited WMA (Depletion in gpm):	20784 (22.1)
Pumping Capacity (gpm):	625
Intake Depth (ft):	5
Pumping Frequency:	Intermittent

Proceed with Selected



Legend

- ◆ Proposed Monitoring Wells
- 1,000 ft buffer
- Site Boundary
- Ponds
- Proposed Ponds
- Wetlands
- Streams
- Mining Boundary
- ◆ Domestic Wells
- Soil Borings

Note: Possible existing wells onsite, the proposed wells may change location if existing wells are found when underbrush is removed.

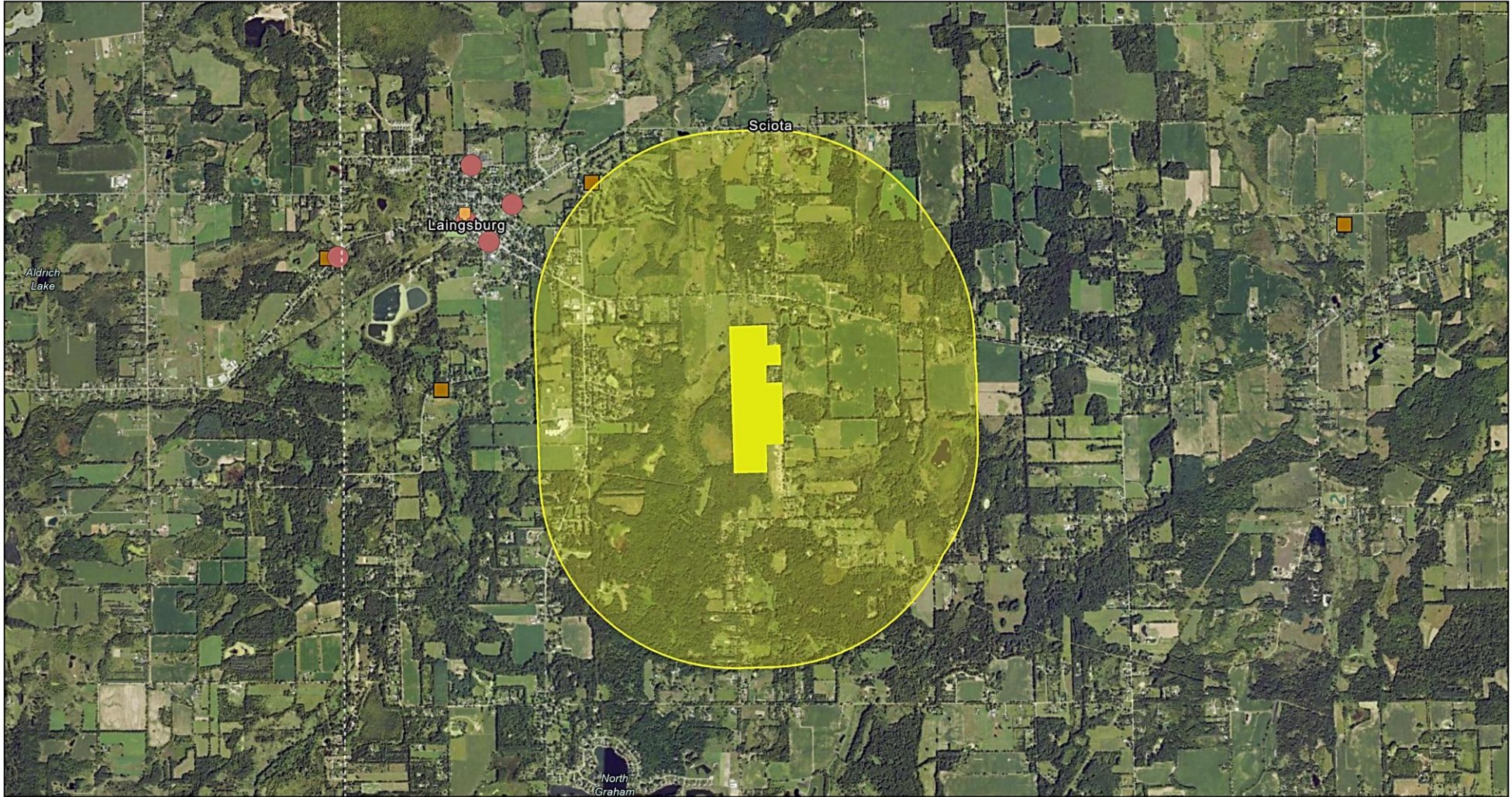
0 500 1,000 ft



Natural Resources Management, LLC
13923 Sherman White Road
Swanton, Ohio 43558
High Grade Materials Company
7/14/2026

Figure A: Proposed Monitoring Well Map

Figure B: EGLE RIDE Mapper - HGM Sciota Township Site



7/14/2026, 2:11:54 PM

- Property Boundary

1 Mile Buffer

Act 381 Tax Increment Financing

Brownfield Assessments

Brownfield Redevelopment Grant

Brownfield Redevelopment Loan

Waterfront Redevelopment Grant

Part 213 Leaking Underground Storage Tanks

Part 211 Underground Storage Tanks

Part 201 Environmental Contamination Sites

Part 111 Michigan Hazardous Waste Treatment, Storage, and Disposal Facilities

FUDS Project Point

Cleanup

Investigation

Response Complete

Response Complete and Site Closeout

FUDS Property Point

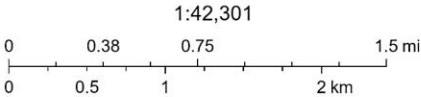
Properties with projects

Properties with all projects at site closeout

Properties without projects

FUDS Property Polygon

FUDS Munitions Response Site



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community, Remediation and Redevelopment Division, Michigan Department of Environment, Great Lakes, and Energy (EGLE). Storage Tank Division, Michigan