

RECLAMATION PLAN

For

**Miller Limestone Quarry
Gerke Excavating, Inc.**



**NW ¼ of SW ¼ of Section 3, T16N, R1W
Town of Wilton
Monroe County, Wisconsin**

June 2017

Prepared by:

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NONMETALLIC MINING RECLAMATION

For
Gerke Excavating
New Quarry Site

Town of Wilton
Monroe County, Wisconsin
June 2017

1.0 BACKGROUND AND GENERAL INFORMATION

1.1 Description of Project Activity

The purpose of this report is to provide a framework for a nonmetallic mining reclamation at the proposed quarry site. The site is located in the Town of Wilton, Monroe County and 6.5 miles south of Tomah, WI. The proposed mining quarry involves developing a farm field into a limestone quarry.

1.2 Project Location

The project site is located in the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 3, T16N, R1W, Town of Wilton, Monroe County, Wisconsin, containing approximately 36 acres, including access roads.

Said property consists of an agricultural field, located on a ridge, which will be lowered in the mining operation. Figure 1.2-1 is USGS location map of the surrounding area.

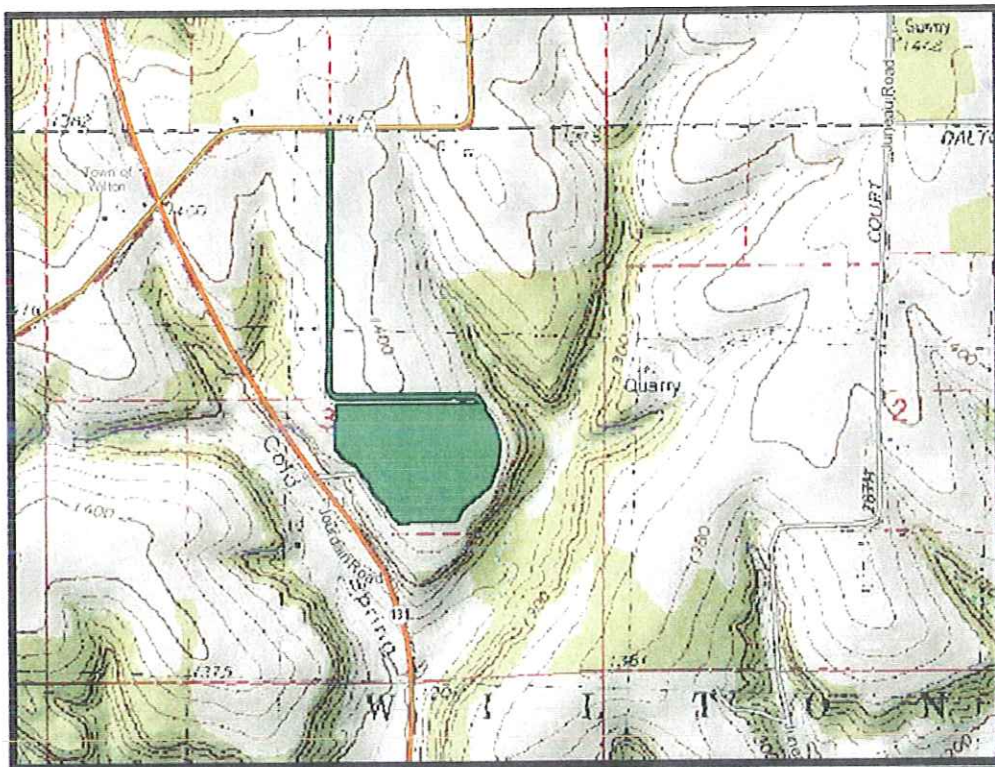


Figure 1.2-1

2.0 STATE AND LOCAL REQUIREMENTS

Section 2.1 below lists the state nonmetallic mining reclamation requirements; Section 2.2 below lists the local requirements and Section 2.3 is a listing of persons and/or entities receiving this document.

2.1 Wisconsin DNR Requirements (NR 135)

2.1.1 Surface Water and Wetland Protection

Nonmetallic mining reclamation shall be conducted and completed in a manner that assures compliance with water quality standards for surface waters and wetlands. Necessary measures for diversion and drainage of runoff from the site to prevent pollution of waters of the state shall be installed in accordance with the reclamation plan. Diverted or channelized runoff resulting from reclamation may not adversely affect neighboring properties.

2.1.2 Groundwater Protection

Nonmetallic mining site shall be reclaimed in a manner that does not cause a permanent lowering of the water table that results in adverse effects on surface waters, or a significant reduction in the quantity of groundwater reasonably available for future users of groundwater infiltration.

2.1.3 Topsoil Management

Removal of on-site topsoil material shall be performed prior any mining activity. Once removed, topsoil or topsoil substitute material shall either be used in contemporaneous reclamation or stored in an environmentally acceptable manner. The location of stockpiled topsoil or topsoil substitute material shall be chosen to protect the material from erosion or further disturbance or contamination. Runoff water shall be diverted around all locations in which topsoil or topsoil substitute material is stockpiled.

2.1.4 Final Grading and Slopes

Final grades and slopes shall provide for stable and safe conditions in the post mining land use. Final reclaimed slopes covered by topsoil or topsoil substitute material may not be steeper than a 3:1. When the post-mining land use includes a body of water, the approved final grade at the edge of a body of water shall extend vertically 6 feet below the lowest seasonal water level. A slope no steeper than 3:1 shall be created at a designated location or locations, depending on the size of the water body to allow for a safe exit.

2.1.5 Topsoil Redistribution for Reclamation

Topsoil or topsoil substitute material shall be redistributed in accordance with the approved reclamation plan in a manner which minimizes compaction and prevents erosion. Topsoil or topsoil substitute material shall be uniformly redistributed except where uniform redistribution is undesirable or impractical. Topsoil material redistribution may not be performed during or immediately after a precipitation event until the soils have sufficiently dried.

2.1.6 Revegetation and Site Stabilization

Except for permanent roads or similar surfaces, all surfaces affected by nonmetallic mining shall be reclaimed and stabilized by revegetation or other means. Revegetation and site stabilization shall be performed as soon as practicable after mining activity has permanently ceased in any part of the mine site.

2.1.7 Assessing Completion of Successful Reclamation

The criteria for assessing when reclamation is complete and, therefore, when the financial assurance may be released shall be specified in the reclamation plan and shall be based on site inspection and report.

2.1.8 Maintenance

During the period of the site reclamation, after the operator has stated that reclamation is complete but prior to release of financial assurance, the operator shall perform any maintenance necessary to prevent erosion, sedimentation or environmental pollution.

2.2 Monroe County Nonmetallic Mining Ordinance

2.3 Submittal List

- Monroe County Land Conservation Department
c/o Bryce Richardson
Soil and Water Conservationist
Monroe County Land Conservation Dept
820 Industrial Drive Suite 3
Sparta, WI 54656
608-269-8976
Bryce.Richardson@co.monroe.wi.us

Other approving authorities will be copied as needed or requested.

3.0 RECLAMATION PLAN

3.1 Site Information.

The proposed mine will contain a limestone quarry located on 80 acres in Monroe County, Wisconsin. The operation will be located approximately 6.5 miles south of city of Tomah, WI. The mine is proposed to operate for 12-24 years allowing 1 to 3 years for reclamation.

Mining of the limestone deposits will occur in six phases. Each separate phase is expected to be about 2-4 years. Reclamation will occur after completion of each of the mining phases as soon as is practical. Reclamation of one phase will be concurrent with mining of the successive phase.

Waste and overburden screens shall be stockpiled to provide a source of backfill material during final reclamation activities.

3.1.1 Legal Description:

Beginning at the East Corner of Section 3, T16N, R1W, Town of Wilton, Monroe County, WI, whose Northing is 360915.708 and whose Easting is 715202.396;
thence bearing S 0-12-8.441 E a distance of 1318.675 ;
thence bearing S 88-58-6.006 W a distance of 869.287 ;
thence bearing S 88-58-6.072 W a distance of 429.000 ;
thence bearing S 88-58-5.956 W a distance of 251.930 ;
thence bearing S 88-58-5.956 W a distance of 465.445 ;
thence bearing N 24-15-25.281 W a distance of 60.499 ;
thence bearing N 35-18-42.721 W a distance of 52.164 ;

thence bearing N 36-30-45.525 W a distance of 59.771 ;
thence bearing N 37-47-41.906 W a distance of 59.771 ;
thence bearing N 39-4-38.286 W a distance of 59.771 ;
thence bearing N 38-27-32.614 W a distance of 399.960 ;
thence bearing N 37-47-52.574 W a distance of 266.271 ;
thence bearing N 0-17-44.452 E a distance of 547.903 ;
thence bearing N 89-1-22.790 E a distance of 36.915 ;
thence bearing N 89-1-22.790 E a distance of 733.209 ;
thence bearing N 89-1-22.790 E a distance of 522.403 ;
thence bearing N 89-1-22.868 E a distance of 130.708 ;
thence bearing N 89-1-22.868 E a distance of 1161.818 to the point of beginning.

3.1.2 Property Boundary

Please see attached Maps A1

3.1.3 Aerial Extent

Map B2.2 illustrates how phasing will occur. Mining occurs in phases to minimize disturbance and erosion on the mining site as well as the amount of exposed soil at one time. Each phase corresponds to a specific excavation period where topsoil is removed and the pit is expanded.

There are six mining phases. Prior any rock extraction, topsoil shall be stripped and relocated to designated stockpile locations. Portions of this topsoil along with waste screens shall be used to reclaim areas excavated during the limestone/gravel excavation. Reclamation efforts shall commence upon completion of each phase as soon as practical. For more information on Phasing see Map B2.2.

3.1.4 Geologic Composition and Depth of Mineral Deposits

The quarry site is located along a ridge line, which is currently a farm field. The bedrock geology for this area is described as limestone, sandstone, and shale. The limestone is found above the level of the sandstone. The purpose of this quarry is to mine the limestone to use as crushed aggregate in construction projects. Some sandstone may be disturbed in the mining process, but it is not the primary focus of this limestone quarry.

3.1.5 Distribution, Thickness and Type of Topsoil

A variety of soils occur in the area of the proposed mining site. A map delineating the soil types has been included in the reclamation plan (Map A9) along with the approximate pre-mining topography (Maps B1.0). The primary soils encountered on the site are of silt loams nature and include Wildale cherty Silt Loam (103C2), Wildale silt loam (105B2) and Valton Silt Loam (133C2).

3.1.6 Groundwater Information

Wisconsin Geologic and Natural History Survey (WGNHS) provides an overview of the regional groundwater regime. Elevation of groundwater in the area proposed for the quarry is approximately 1180' or 220' depth from the existing topography (1400'). Please refer to Map A7 for the approximate elevation of groundwater.

The flow direction of groundwater is generally southwest towards Wilton. The mining operation will be conducted well above the groundwater table.

3.1.7 Location of Surface Waters

DNR surface water viewer depicts only intermittent streams near the proposed mining area. Reclaimed site topography will maintain the drainage pattern to the ephemeral streams generally draining to both sides of a ridgeline. For more details see Map A5.

3.1.8 Existing Topography

Existing topography has been generally represented on Maps A3 and A4, and more specific and localized on B2.0 – B2.2. Map B2.3 also shows the mining site in plan and profile after the reclamation is complete.

3.1.9 Locations of Manmade Features

Please refer to Map A1 which shows the existing site, and Map B2.0 which shows the mining site with the proposed manmade features. Proposed manmade features include access road, road culverts and stockpile locations.

3.2 Post Mining Land Use

Gerke Excavating shall return the site to a combination of post-mining land uses including wildlife habitat and prairie agricultural land or pastures. The proposed reclamation plan provides details and final land uses for the entire mining site. Generally, slopes shall be graded to 3:1 horizontal to vertical ratio or flatter. Rock faces may remain as exposed rock where practical.

Plant materials will be selected for reclamation based on the post-mining land use. Native species will be used to the extent practicable.

3.3 Reclamation Measures

3.3.1 Final Grades and Slopes

Gerke Excavating shall re-grade steep slopes and maintain 3:1 slopes or flatter where practical, to promote natural lines and blending contour lines to the undisturbed site topography. Mine operator shall use overburden screens and other clean material as backfill against vertical slopes. The proposed mining pit line follows existing topography for a majority of the boundary, thus having a more natural appearance.

All grading will be completed and resulting surfaces scarified prior to topsoil redistribution, Grading will be completed in a manner of preventing ponding of water on the reclaimed surfaces. The topsoil and subsoil will be placed and finished to the required lines, grades and slopes as shown on Map B2.0

3.3.2 Topsoil Management

Erosion control measures shall be installed prior any land disturbance activities. Trees, brush and other woody materials removed from the site during grubbing shall be shredded to mulch and stockpiled on site. These materials shall be used later in reclamation activities when possible. Large oversized materials or boulders shall be separated and used to control access to site and the construction of screening berms.

After completing erosion and sediment control measures and clearing and grubbing the site, but prior to commencing mining activities, the top soil and surficial plant growth

material shall be removed. Topsoil horizon is estimated to vary between 12" and 18". In all cases top stripping shall be to a minimum of 6". Minor deviations may occur in the field as the site conditions demand.

Topsoil removal shall be accomplished by scrapers or bulldozers and haul trucks. When feasible, soil will be removed in a manner to minimize the surface area exposed to erosion at any given time.

All topsoil removed from the mining site shall be transported to the locations shown on Map B2.2. Topsoil from each phase shall be stockpiled at the downstream edge of the phase boundary. This topsoil stockpile will be shaped into an elongated profile and shall be protected in a timely fashion from erosion through revegetation using the specified seed mix in Appendix B, page B3.1 or through use of mulch or other protective measures. Utilizing the specified seed mix will minimize completion with undesirable and aggressive weedy species. The elongated stockpile shall serve as a berm to aid in stormwater management.

Topsoil redistribution and site preparation shall be performed to achieve the final topography and drainage patterns as practicable once mining has ceased on a particular phase. All grading will be completed and the resulting surfaces scarified prior topsoil redistribution. This will promote good adherence and bonding between the subsoil and the topsoil and improve infiltration and drainage. Grading will be accomplished so to prevent ponding of water on the reclaimed surface. Topsoil shall be placed back to a depth of minimum 6 inches.

When compaction of soil is found to be too dense (access roads) to allow for suitable bond, the mining operator shall employ measures to rectify this condition such as disking, chisel plowing, ripping and or scarification. These measures will promote good bonding between the topsoil and underlying materials and will ensure suitable substrate for plant growth and the development of plant root system.

All topsoil shall be redistributed into a prepared site. Topsoil redistribution will be performed under dry conditions using appropriate equipment as to minimize compaction. Any clods or lumps present after the topsoil redistribution shall be broken down by the use of harrows, discs or other appropriate equipment in order to provide uniform textured soil.

3.3.3 Structures

Please refer to Map B2.0 for the locations of the access roads and stockpile locations. Any drainage and sediment control structures within the mining area shall be removed once the vegetative cover is sufficiently established to provide equivalent protection.

3.3.4 Revegetation Plan

The revegetation plan includes all activities in support of selecting, obtaining, handling and applying seed or otherwise installing plant materials to fulfill the reclamation plan. Seed and plant materials will be obtained from a licensed nursery that normally works with native prairie plant materials. Seed shall be free of contamination by weedy species.

Seed selection shall be based on the reclamation land use (See Appendix B, Page B3.1):
Mix-2 Wildlife/Grazing

Reclaimed areas shall be seeded only after soils have been properly prepared as specified above. Seeding shall be done at any time during the growing season when soil conditions

are suitable except between July 1 and August 15, unless permitted by the county representative. Seeding activities will not be carried out immediately following rain, when the ground is too dry or during windy periods. Care will be taken to follow the instructions that are provided by the supplier.

General seeding methods include:

Broadcast Seeding Using Agricultural Equipment applicable for agricultural land use and wildlife/passive recreation. Seeding activities will be carried out using specified equipment and in a manner to avoid soil compaction. The area seeded will not exceed the area that can be mulched on the same day. Seed will be uniformly sown by means of equipment adapted to the purpose. Then the site will be lightly raked or dragged to cover the seed with approximately one-fourth inch of soil. After seeding is complete, the areas will be lightly rolled or compacted by means of suitable equipment to improve seed to soil contact and germination.

Following seeding, mulch will be applied uniformly at a rate of between 1 and 1.5 tons per acre. Mulch will be wheat straw, marsh hay or equivalent weed-free mulch. Mulching operations will begin at the top of the slope and proceed downward. The mulch cover will be applied so as to be loose enough to allow some sunlight to penetrate yet thick enough to provide shade and protection from desiccation and raindrop impact and erosion. After spreading on reseeded surfaces mulch will be crimped into the soil by passing over the reclaimed surface with a dull, weighted disk or similar implement. On steep slopes straw or hay mulch will be securely pegged or stapled in place. In lieu of such anchorage, the mulch may be secured by means of heavy biodegradable twine fastened with pegs or staples to form a grid or applied with hydro seed. Also, at the discretion of the project manager erosion blanket, jute netting or a tactifier may be used in addition to or in lieu of the crimping process.

3.3.5 Revegetation Standards

The purpose of establishing clear revegetation surface criteria is necessary to provide a reference point to evaluate the success of the reclamation operation in an objective manner. Suggested revegetation standards are listed below:

Post mining Land Use and Success criteria Table

Post Mining Land Use	Seed Mix	Stage Phase	Success Criteria	Years to Show
Wildlife	#2	Final Reclamation	70% cover	2

Percent cover shall be determined by estimating the percentage of an area covered by vegetation and a predictor of site stability. A typical standard for percent cover is 70% cover (primarily leaf and stem area) averaged over the site at 90 percent statistical confidence level. Count may be physical and photos shall be provided. The measurement of cover should be timed to correspond with the period of peak vegetative growth, generally in early-mid August.

Upon completion of reclamation activities, whether this includes a portion of the site or the entire mining site, the Monroe County Land Conservation Specialist or other relevant regulatory authority shall inspect the site in order to verify success of reclamation.

3.3.6 Erosion Control

The main purpose of a general erosion control plan is to minimize erosion and limit the potential for sediment run-off into surface waters. Erosion control measures will be established prior to any site development activities including topsoil removal and stockpiling. Erosion control measures will be also established prior to initiating reclamation such as contemporaneous reclamation, backfilling or grading. Typical erosion control measures are shown on Map B2.2 and B3.0. Due to the nature of mining, a vast amount of the water will pond and infiltrate within the boundaries of the site. However, perimeter controls to combat the potential for erosion will be employed throughout the duration of the mining and reclamation activities.

3.3.7 Site Maintenance

Mining operator shall inspect the sediment and erosion control systems on a regular basis and immediately after severe storms. Periodic follow-up inspections of all reclaimed or otherwise stabilized surfaces shall be performed to ensure they are in a condition stable enough to control erosion and sedimentation. When damage caused by traffic, wind, water or other cause is detected the mining operator will promptly perform all necessary maintenance and repair work to the erosion control system. Likewise, other work necessary to ensure long term success of the vegetation including follow-up fertilization, necessary soil amendments or any weed or pest control will be accomplished.

As part of maintenance of the reclaimed site, Gerke Excavating will perform any necessary weed control or pest control and maintenance both to facilitate the establishment and survival of vegetation. Exotic species that occur on the site or are accidentally added though contaminants in the seed mixes or through the use of hay or other mulch products that are not weed free will be promptly controlled through fire, mechanical means or with herbicides. This is especially true when the species appears on the list of state noxious weeds. This will continue until the Monroe County Land Conservation Office issues the certificate of completion (COC).

3.4 Criteria for Successful Reclamation

Gerke Excavating shall demonstrate compliance with the revegetation success standards (performance standards) for each post-mining land use contained in the reclamation plan. The techniques employed are as follows: percent cover will be determined as total cover (expressed as a percentage) as measured by coverage of the canopy (vertical projection of plant parts) and will be recorded by species. Cover will be measured over the entire re-vegetated site at no less than 20 randomly placed 10 square feet quadrats for each 10 acre area. Success criteria will vary with the post-mining land use. In addition, both presence (a species list) and frequency (number of quadrats the species occurs in) will be included.

3.5 Certification of the Reclamation Plan

Certification is included within the Monroe County Application for Reclamation Permit for New or Reopened Nonmetallic Mining Sites. Please see Appendix C

3.6 Final Site Actions

The final removal of mining-related structures, drainage structures and sediment control structures will be accomplished once the vegetative cover is robust enough to provide equivalent protection.

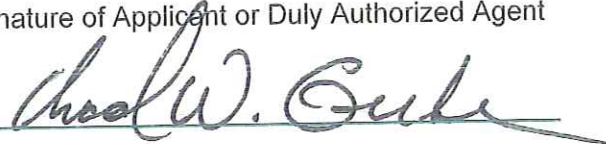
At such time and in accordance with the approved reclamation plan those structures will be removed and the soils in such areas will be reclaimed. At this time Gerke Excavating shall request the Monroe County Land Conservation Department to perform the necessary inspection and evaluation work to certify the reclamation as complete (COC) and to release the financial assurance.

3.7 Certification of the Reclamation Plan

I hereby certify, as a duly authorized representative or agent, that Gerke Excavating, Inc., shall comply with the provisions of this reclamation plan as well as the statewide nonmetallic mining reclamation standards established in ss. NR 135.05 through NR 135.15, Wis. Adm. Code.

Signature of Applicant or Duly Authorized Agent

Date Signed



6-29-17

Owner: Gerke Excavating, Inc. (Same as above)

3.8 Financial Assurance

The objective of financial assurance is to ensure that the Monroe County Land Conservation Department has access to funds necessary to implement site reclamation in the event that the operator does not perform the agreed upon duties. The funds shall accurately reflect the cost for the regulatory authority to hire outside help to perform reclamation. The main purpose of financial assurance is to ensure that the operator will faithfully execute the requirements of the approved reclamation plan, the applicable reclamation ordinance and Ch. NR 135.

- Gerke Excavating, is estimating **\$8,000.00 per acre** for reclamation purposes.
- The total amount of financial assurance shall be based on the actual disturbed acreages of land and not on the overall mining area.
- The length of the financial assurance is dictated by the period of time required to establish the post mining land use specified in the mine reclamation plan.
- Any interest from the financial assurance shall be paid to the operator per NR 135.40(4)
- The amount of financial assurance is reviewed periodically by the Monroe County Land Conservation Department to assure it equals outstanding reclamation costs.
- Upon approval the proposed amount, the mining operator shall establish a bond, net worth test, escrow account or an alternate option to cover the financial assurance.

APPENDIX A

General Maps & Additional Information

Miller Quarry - Limestone Quarry

NW ¼ of SE ¼ of Section 3, T16N, R1W

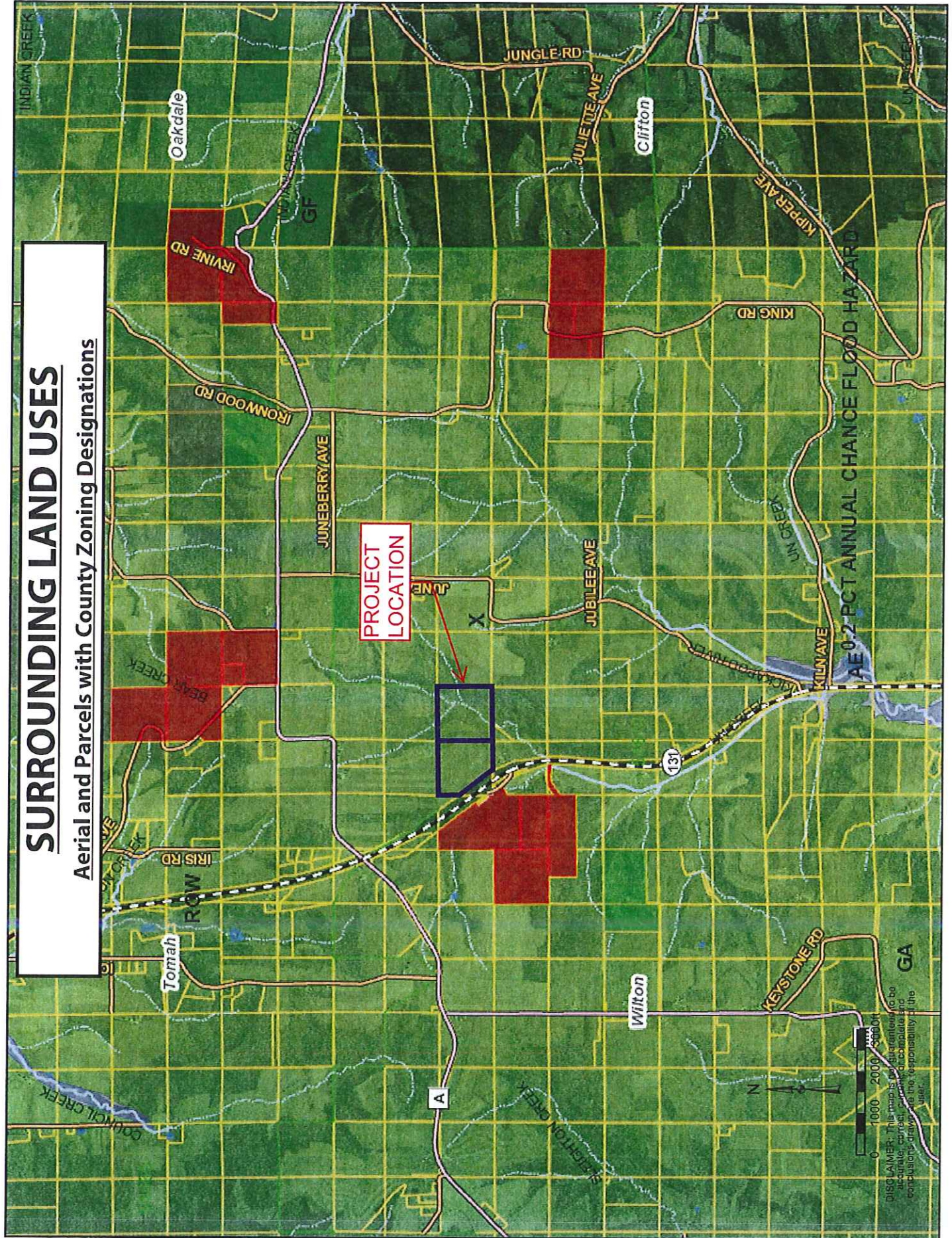


Town of Wilton

Monroe County WI

SURROUNDING LAND USES

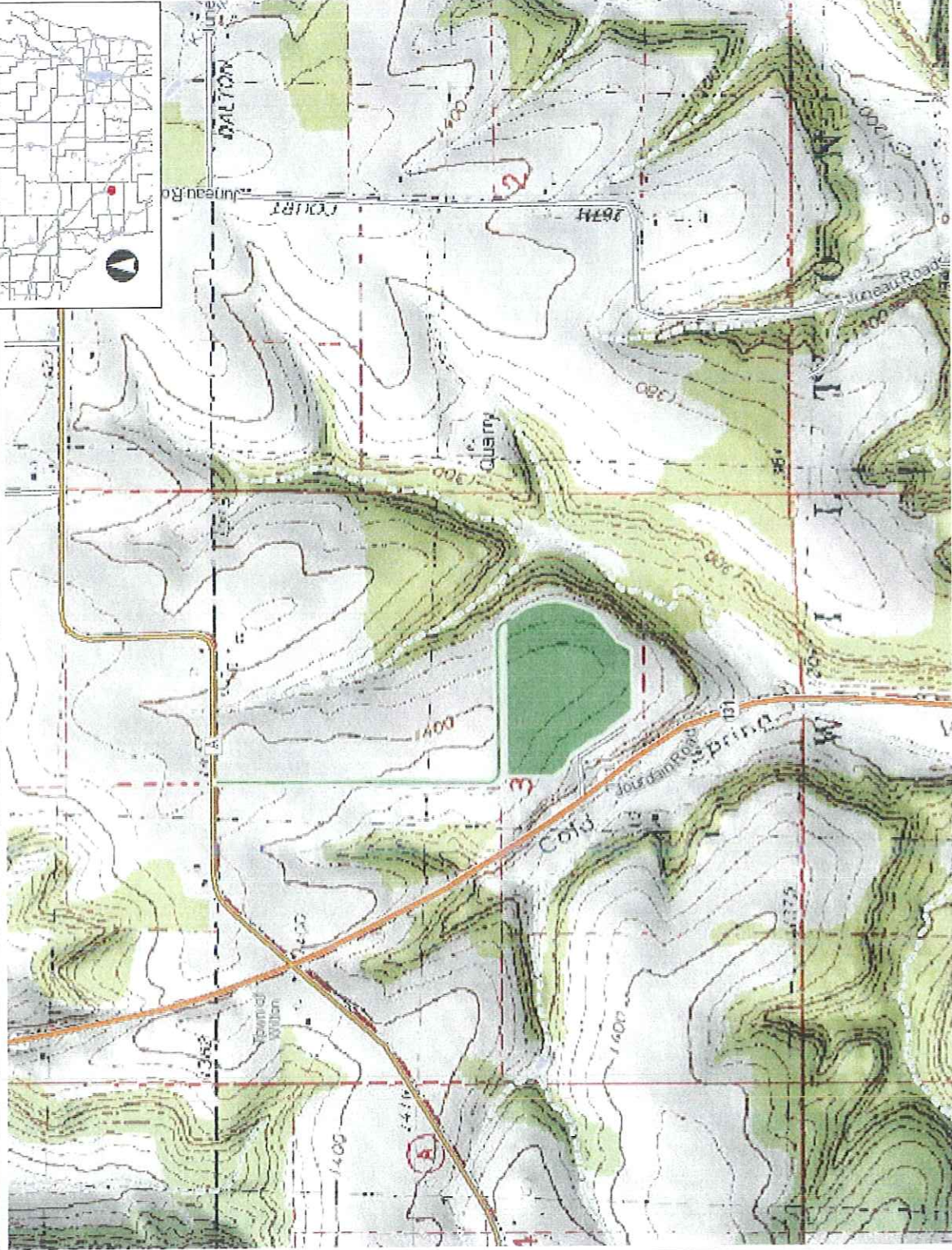
Aerial and Parcels with County Zoning Designations



PROJECT LOCATION

0 1000 2000 3000 ft
DISCLAIMER: This map is representative of the available, correct, and complete and conclusions drawn by the responsibility of the user.

Vegetation



- ### Legend
- Municipality
 - State Boundaries
 - County Boundaries
 - Major Roads
 - Interstate Highway
 - State Highway
 - US Highway
 - County and Local Roads
 - County HWY
 - Local Road
 - Railroads
 - Tribal Lands
 - Rivers and Streams
 - Intermittent Streams
 - Lakes and Open water

Notes
USGS

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

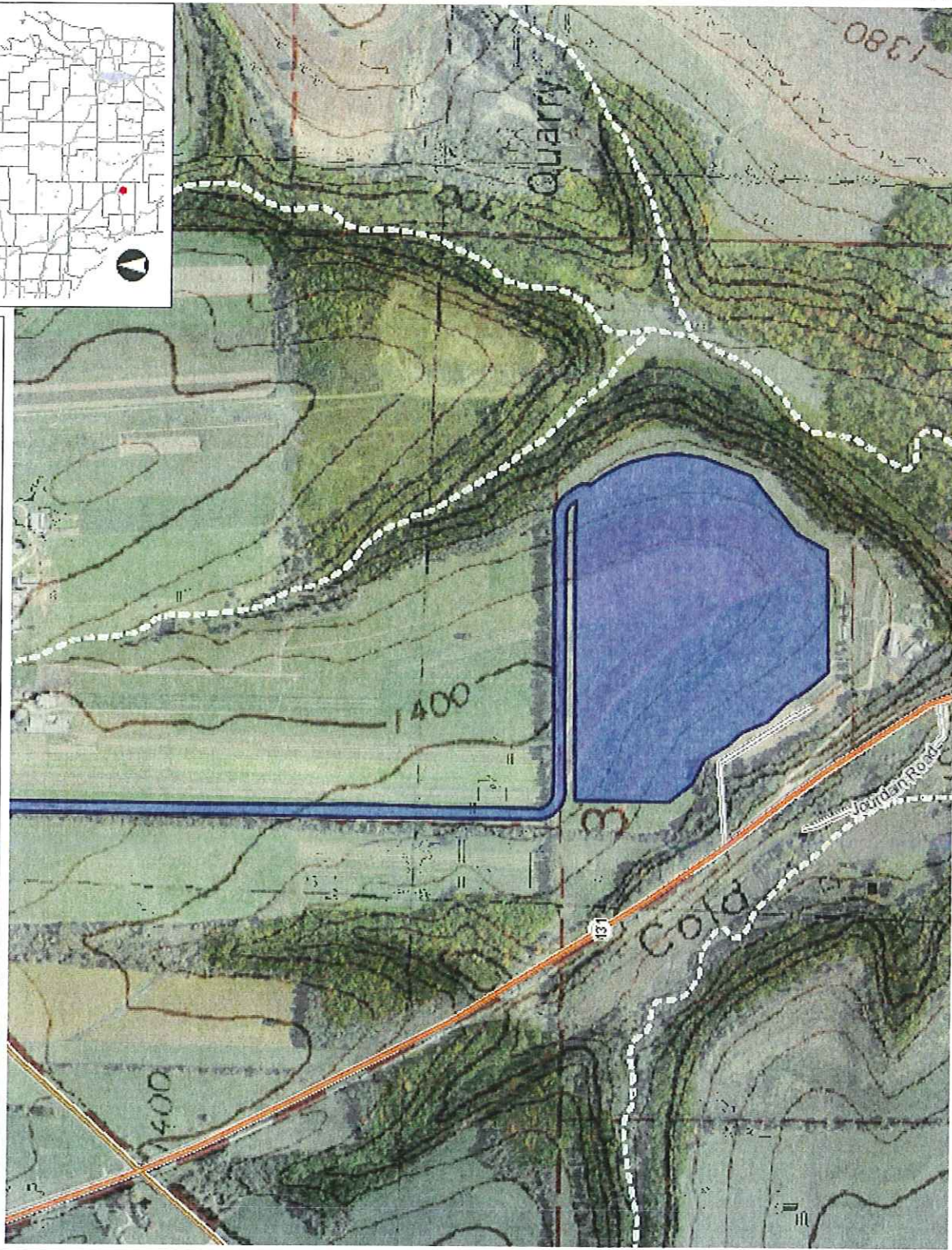


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NAD_1983_HARN_Wisconsin_TM



Surface Water Data Viewer Map



- Legend**
- Municipality
 - State Boundaries
 - County Boundaries
 - Major Roads
 - Interstate Highway
 - State Highway
 - US Highway
 - County and Local Roads
 - County HWY
 - Local Road
 - Railroads
 - Tribal Lands
 - Rivers and Streams
 - Intermittent Streams
 - Lakes and Open water

Notes

USGS w/ Aerial

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0.3 Miles

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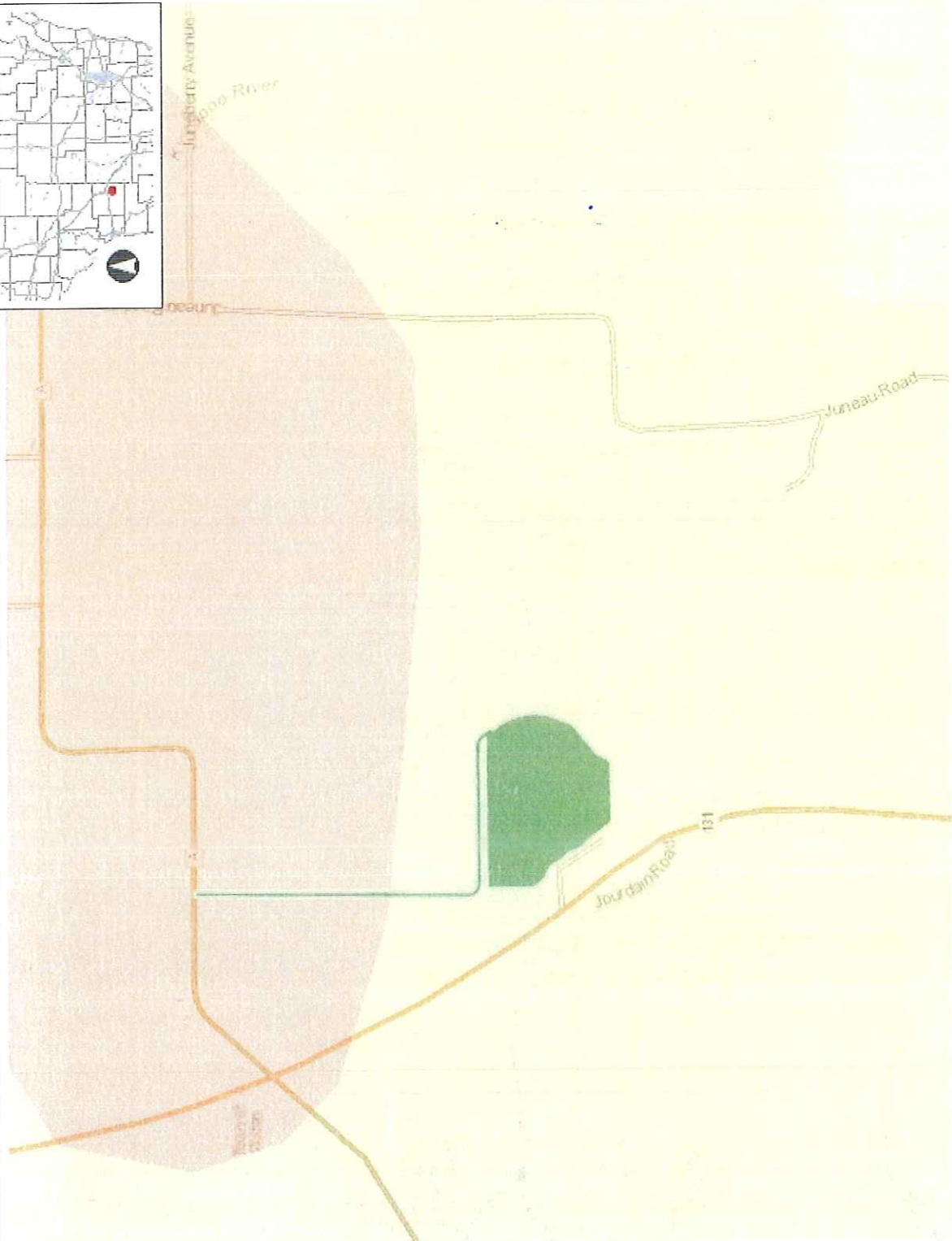
0.3

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Vegetation



Legend

Original Vegetation Cover

- <all other values>
- 0 - Water
- 1 - White spruce, balsam fir, tamarack, white cedar, white birch, aspen
- 2 - Beech, hemlock, sugar maple, yellow birch, white pine, red pine
- 3 - Hemlock, sugar maple, yellow birch, white pine, red pine
- 4 - Sugar maple, yellow birch, white pine, red pine
- 5 - White pine, red pine
- 6 - Jack pine, scrub (hills), oak forest and barrens
- 7 - Aspen, white birch, pine
- 8 - Beech, sugar maple, basswood, red oak, white oak, black oak
- 9 - Sugar maple, basswood, red oak, white oak, black oak
- 10 - White oak, black oak, bur oak
- 11 - Oak openings bur oak, white oak, black oak
- 12 - Prairie
- 13 - Brush
- 14 - Swamp Conifers
- 15 - Lowland Hardwoods
- 16 - Marsh and sedge meadow, wet prairie, lowland shrubs
- Area with vegetation cover type not interpreted on the source map

Municipality

State Boundaries

County Boundaries

Major Roads

Interstate Highway

State Highway

US Highway

County and Local Roads

Notes

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0.5 Miles

0.25

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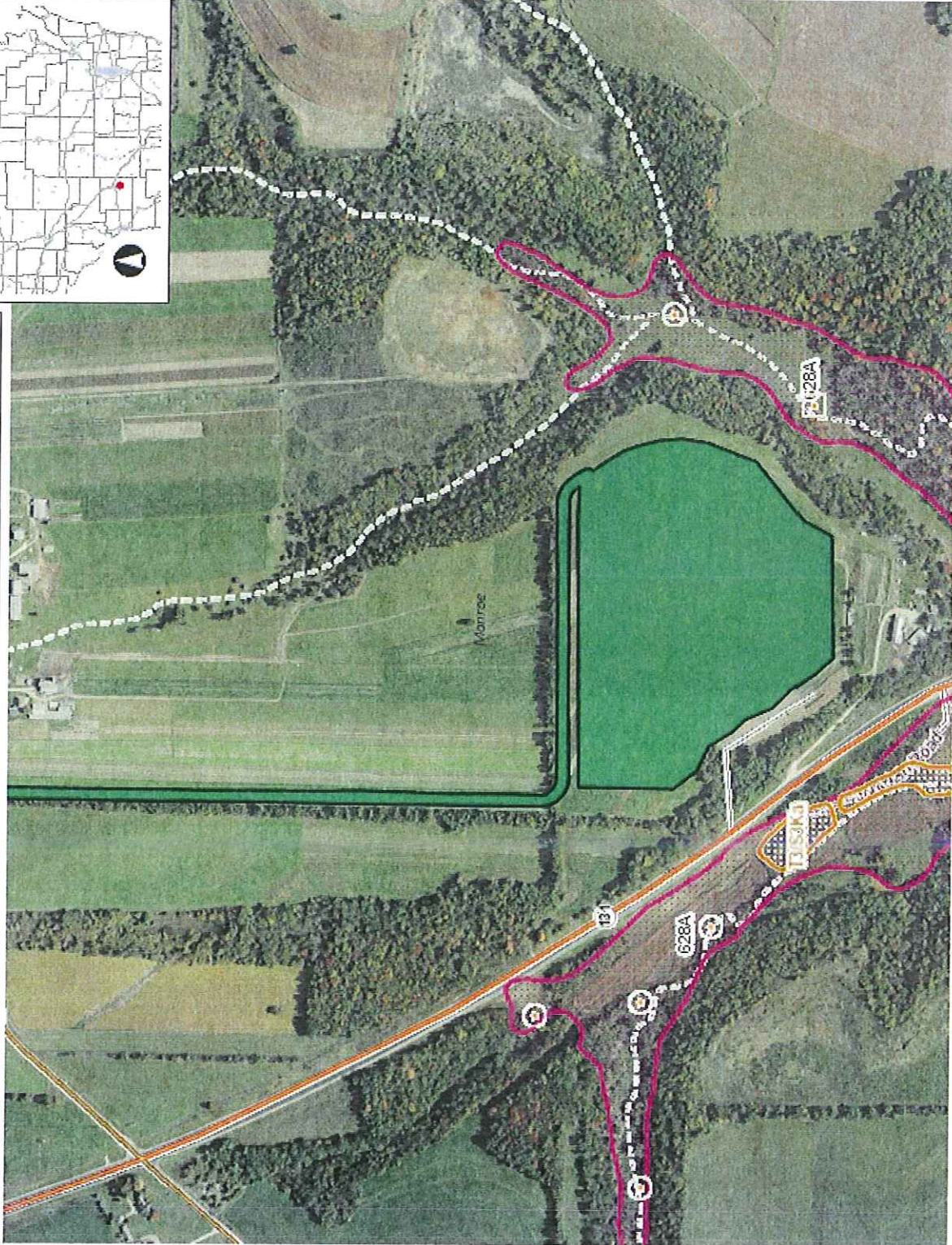
0.5

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NAD_1983_HARN_Wisconsin_TM



Wetlands



Legend

- Wetland Class Points**
 - Dammed pond
 - Excavated pond
 - Filled excavated pond
 - Filled/drainaged wetland
 - Wetland too small to delineate
- Filled Points**
- Wetland Class Areas**
 - Wetland
 - Upland
- Filled Areas**
- NRCS Wetspots**
- Wetland Indicators**
- County Boundary**
- Cities, Towns & Villages**
 - City
 - Village
 - Civil Town
- Municipality**
- State Boundaries**
- County Boundaries**
- Major Roads**
 - Interstate Highway
 - State Highway
 - US Highway
- County and Local Roads**
 - County HWY
 - Local Road
- Railroads**
- Tribal Lands**
- Rivers and Streams**
- Intermittent Streams**
- Lakes and Open water**

Notes

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

0.3 Miles

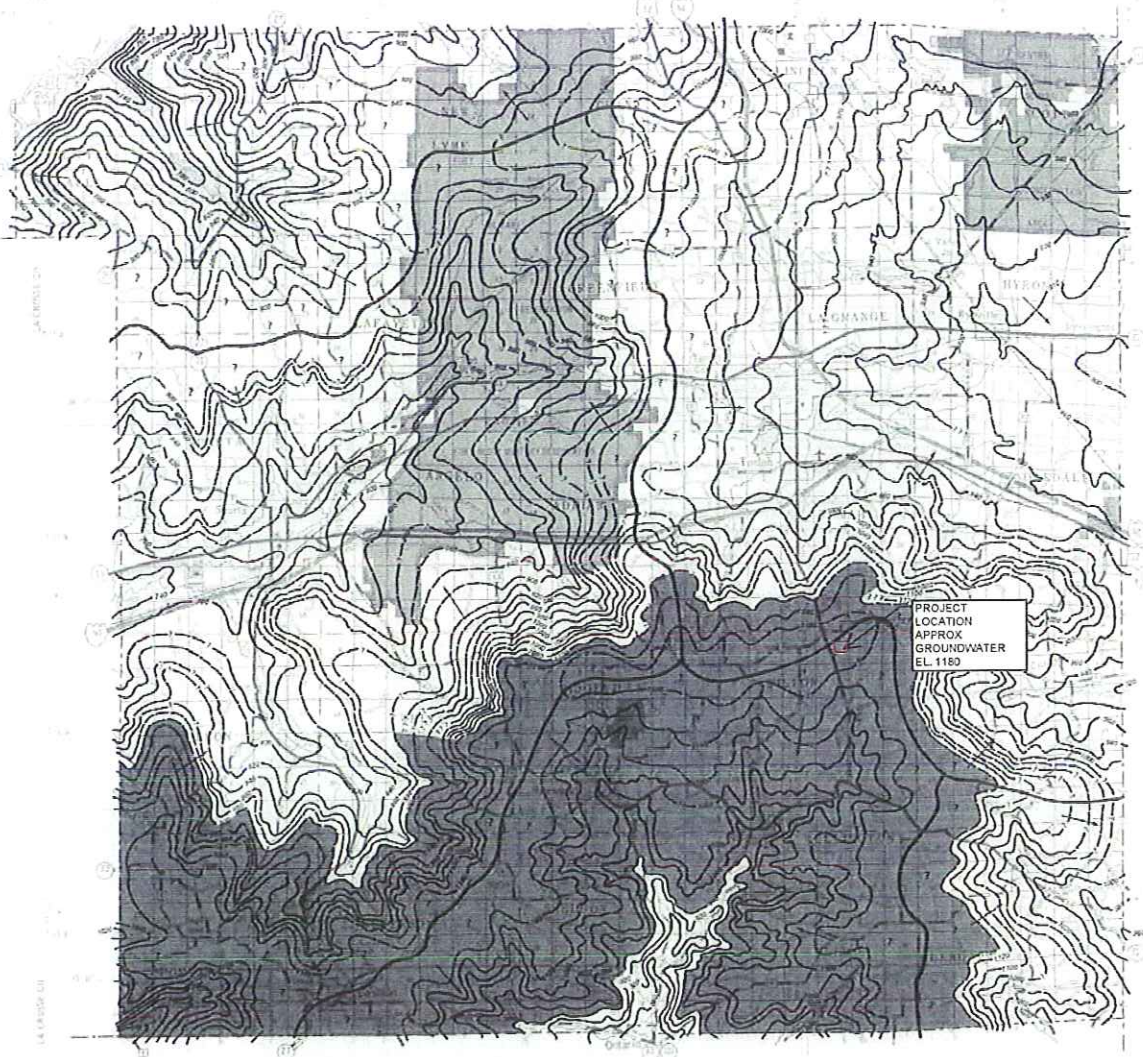
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0.3

NAD_1983_HARN_Wisconsin_TM

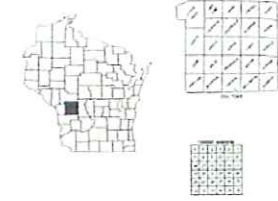
1: 7,920



WATER TABLE ELEVATION
IRRIGABLE LANDS INVENTORY
PHASE I - GROUND WATER AND RELATED INFORMATION
 By:
I. D. LIPPELT
 Prepared by:
WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
 Sponsored by:
GOLDEN SANDS RESOURCE CONSERVATION AND DEVELOPMENT AREA
 Funded by:
UPPER GREAT LAKES REGIONAL PLANNING COMMISSION

SEPTEMBER 1981

- EXPLANATION**
- Elevation of water table, 20 ft. interval
 Datum is mean sea level
 - Area with 40 ft. interval
 - Probable location of water table
 - - - - - Inferred location of water table
 - 7 Location of water table unknown, insufficient data
 - Half interval, 10 ft.
 - Direction of ground water movement
 - Ground water divide, approximate location
 - Probable ground water divide
 - ▨ Federal waste lands
- Data have not been field checked*



- SOURCES:**
- (1) Well Constructor's Reports (1836-1878) - Wisconsin Department of Natural Resources
 - (2) Published and unpublished Geologic Maps (1896 present) - Wisconsin Geological & Natural History Survey
 - (3) USGS Hydrologic Maps
 - (4) Water level observation wells from the Ground Water Level Monitoring Network operated and maintained by Wisconsin Geological and Natural History Survey and USGS
 - (5) Monroe County Land Atlas and Plat Book, 1930, Rockford Map Publishers, Inc.

MONROE CO.
 DEPARTMENT OF TRANSPORTATION

SCALE 1" = 10.13'

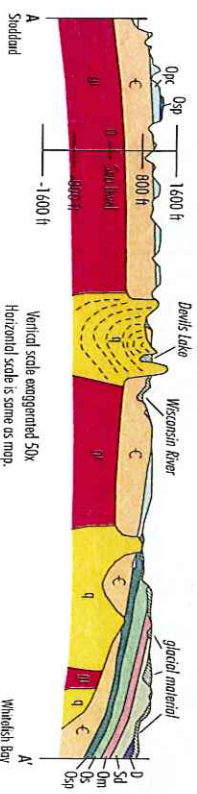
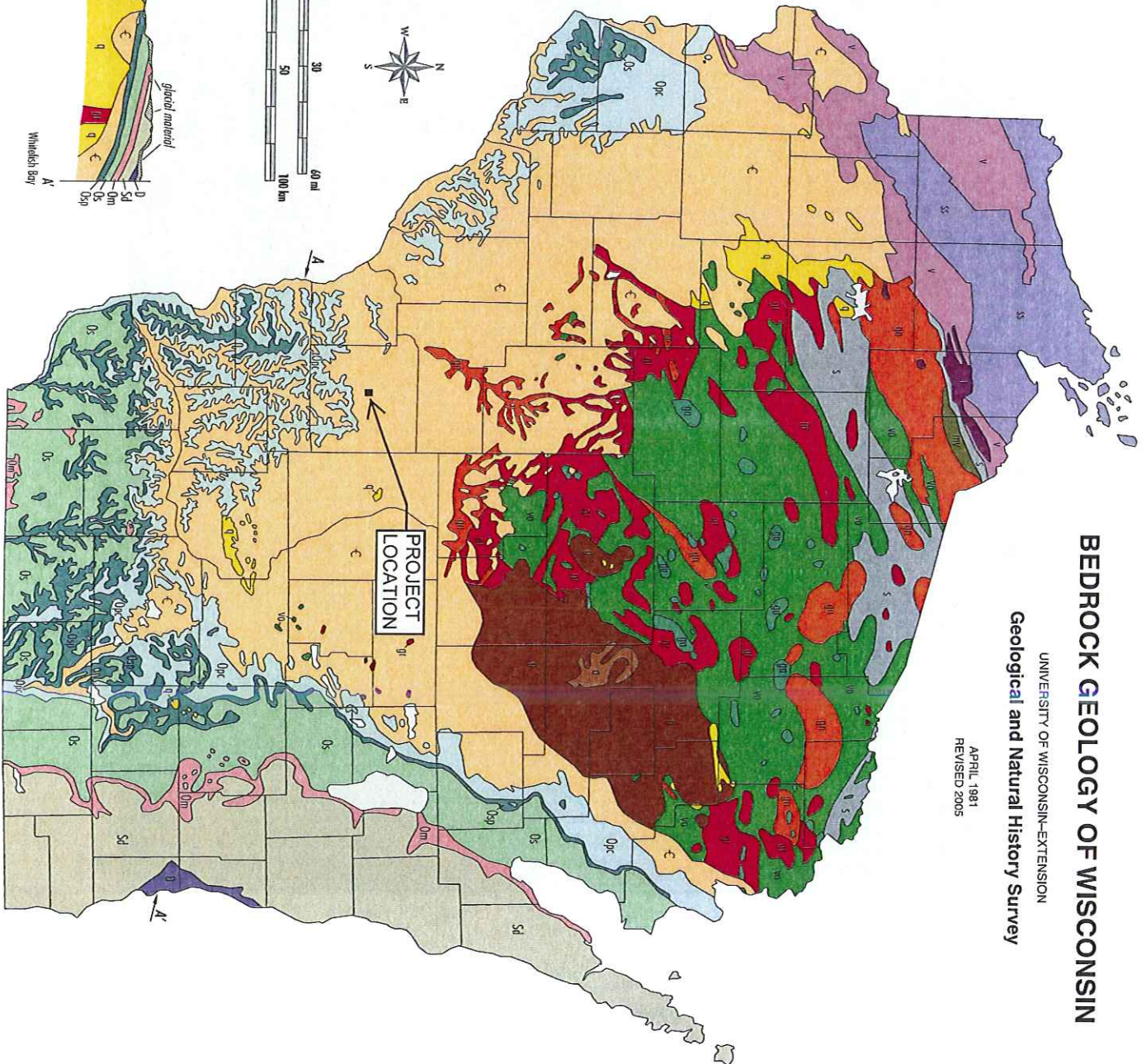
BEDROCK GEOLOGY OF WISCONSIN

UNIVERSITY OF WISCONSIN—EXTENSION
Geological and Natural History Survey

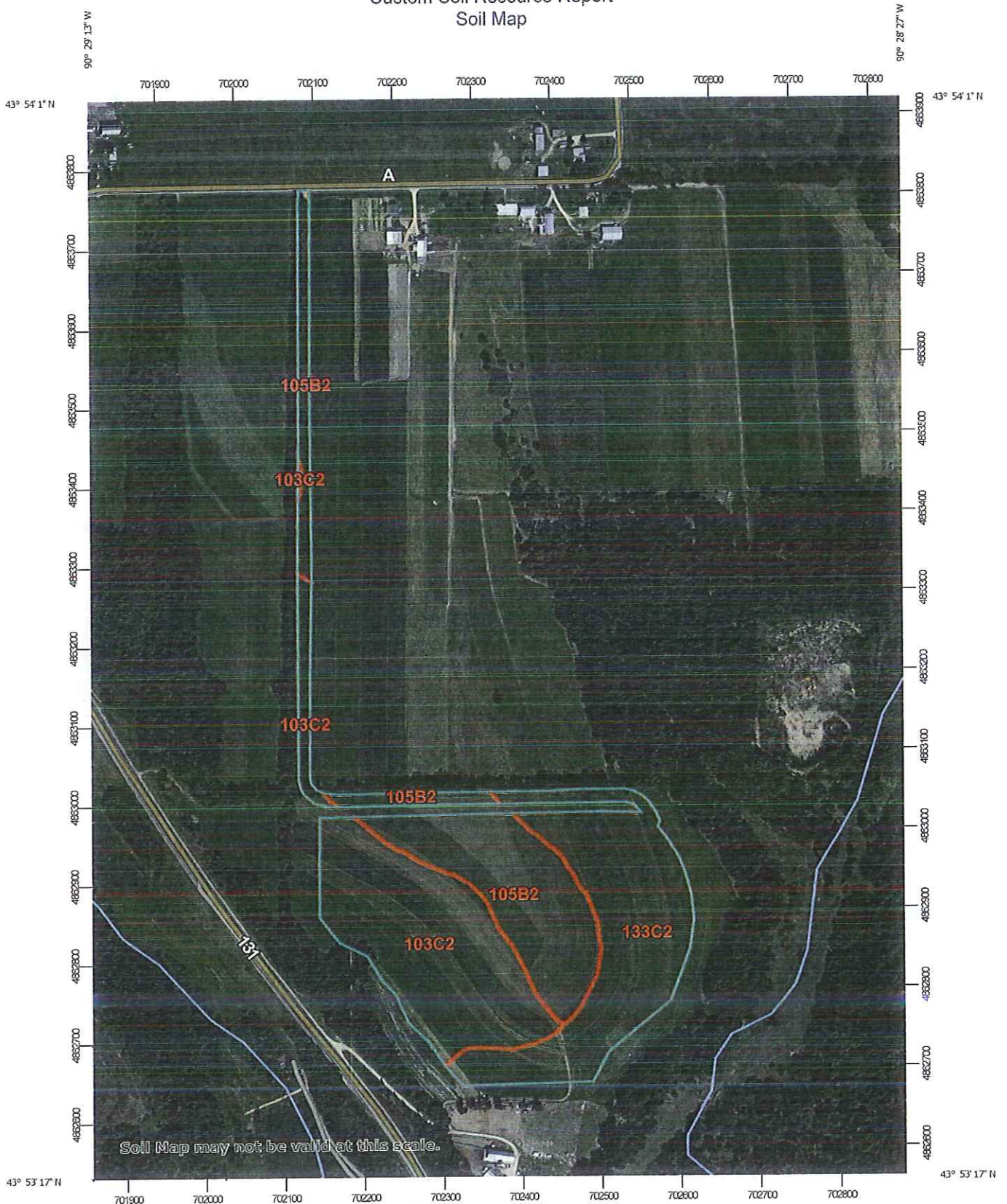
APRIL, 1991
REVISED 2005

EXPLANATION

- DEVONIAN**
Dolomite and shale
- SILURIAN**
Dolomite
- ORDOVICIAN**
Maquoketa Formation—shale and dolomite
Stimpee Group—dolomite with some limestone and shale
St. Peter Formation—sandstone with some limestone shale and conglomerate
Prairie du Chien Group—dolomite with some sandstone and shale
- CAMBRIAN**
Sandstone with some dolomite and shale
- MIDDLE PROTEROZOIC**
Keweenaw rock—
ss, sandstone
v, basaltic to rhyolitic lava flows
l, gabbroic, anorthositic and granitic rock
Wolf River rock—
g, rhyolitic granite, granite, and syenite
a, anorthositic and gabbro
- LOWER PROTEROZOIC**
quartzite
granite, diorite, and gneiss
s, metasedimentary rock, argillite, siltstone, quartzite, greywacke, and iron formation
vo, basaltic to rhyolitic metavolcanic rock with some metasedimentary rock
ga, meta-gabbro and hornblende diorite
- LOWER PROTEROZOIC OR UPPER ARCHEAN**
mv, metavolcanic rock
gn, granite, gneiss, and amphibolite



Custom Soil Resource Report
Soil Map



Soil Map may not be valid at this scale.






































Map Scale: 1:6,610 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters

0 300 600 1200 1800 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 15N WGS84

MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
Special Point Features	 Special Line Features
 Blowout	Water Features
 Borrow Pit	 Streams and Canals
 Clay Spot	Transportation
 Closed Depression	 Rails
 Gravel Pit	 Interstate Highways
 Gravelly Spot	 US Routes
 Landfill	 Major Roads
 Lava Flow	 Local Roads
 Marsh or swamp	Background
 Mine or Quarry	 Aerial Photography
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Monroe County, Wisconsin
 Survey Area Data: Version 11, Sep 27, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 25, 2011—Oct 2, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Monroe County, Wisconsin (WI081)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103C2	Wildale cherty silt loam, 6 to 12 percent slopes, moderately eroded	13.4	36.9%
105B2	Wildale silt loam, 2 to 6 percent slopes, moderately eroded	10.8	29.7%
133C2	Valton silt loam, 6 to 12 percent slopes, moderately eroded	12.2	33.4%
Totals for Area of Interest		36.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

Monroe County, Wisconsin

103C2—Wildale cherty silt loam, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2psv6

Elevation: 1,000 to 1,400 feet

Mean annual precipitation: 28 to 33 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wildale and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wildale

Setting

Landform: Hills

Landform position (two-dimensional): Backslope, shoulder

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Thin loess over clayey pedisidiment

Typical profile

Ap - 0 to 9 inches: silt loam

Bt1 - 9 to 15 inches: silty clay loam

2Bt2-Bt7 - 15 to 73 inches: clay

Properties and qualities

Slope: 6 to 12 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Other vegetative classification: Low AWC, adequately drained (G105XY002WI)

Hydric soil rating: No

Minor Components

Newglarus

Percent of map unit: 5 percent

Landform: Hills

Custom Soil Resource Report

Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G105XY005WI)
Hydric soil rating: No

105B2—Wildale silt loam, 2 to 6 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2psv4
Elevation: 700 to 1,400 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wildale and similar soils: 91 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wildale

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over cherty clayey pedisegment derived from dolomite

Typical profile

Ap - 0 to 9 inches: silt loam
Bt1 - 9 to 15 inches: silty clay loam
2Bt2-2Bt7 - 15 to 80 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Custom Soil Resource Report

Hydrologic Soil Group: C

Other vegetative classification: Mod AWC, adequately drained (G105XY005WI)

Hydric soil rating: No

Minor Components

Valton

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder

Down-slope shape: Convex

Across-slope shape: Convex

Other vegetative classification: Mod AWC, adequately drained (G105XY005WI)

Hydric soil rating: No

Reedsburg

Percent of map unit: 3 percent

Landform: Hills

Landform position (two-dimensional): Summit

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Mod AWC, high water table (G105XY004WI)

Hydric soil rating: No

Fivepoints

Percent of map unit: 1 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope

Down-slope shape: Convex

Across-slope shape: Convex

Other vegetative classification: Low AWC, adequately drained with limitations (G105XY003WI)

Hydric soil rating: No

133C2—Valton silt loam, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1q9n4

Elevation: 680 to 1,400 feet

Mean annual precipitation: 28 to 35 inches

Mean annual air temperature: 43 to 52 degrees F

Frost-free period: 135 to 170 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Valton and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Valton

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over clayey pedis sediment

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 22 inches: silt loam
2Bt - 22 to 60 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Mod AWC, adequately drained (G105XY005WI)
Hydric soil rating: No

Minor Components

Brinkman

Percent of map unit: 6 percent
Landform: Hills
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: High AWC, adequately drained (G105XY008WI)
Hydric soil rating: No

Lamoille

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Mod AWC, adequately drained (G105XY005WI)
Hydric soil rating: No