SAND CREEK CONSULTANTS INC

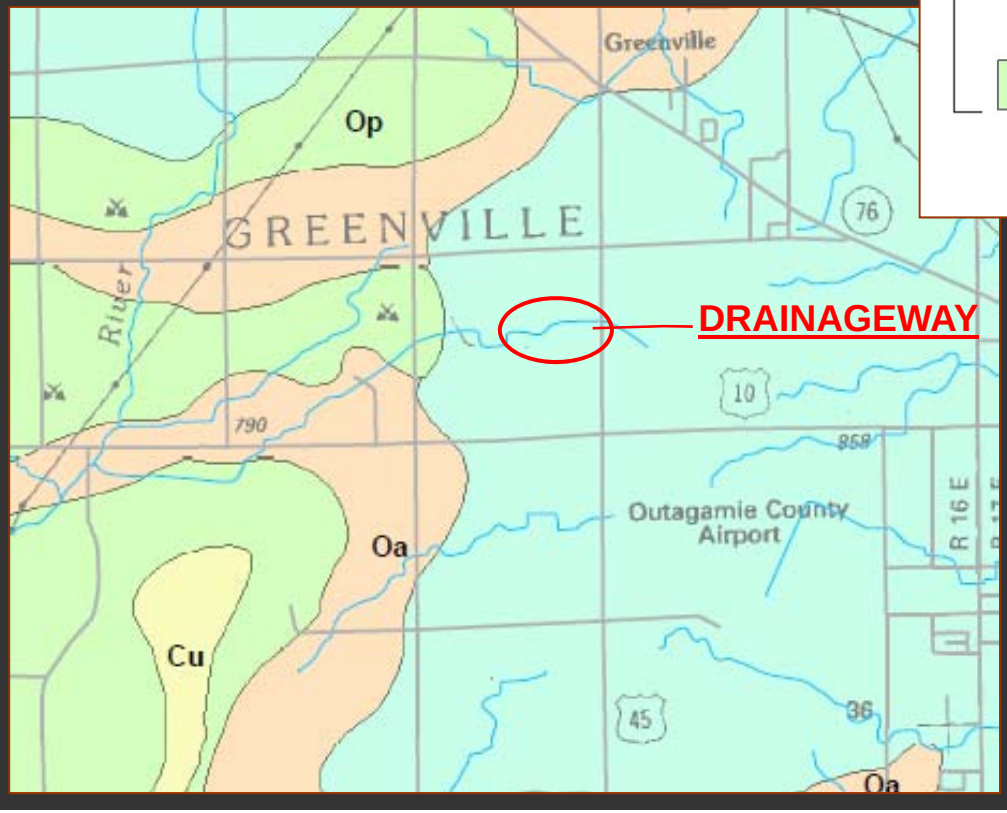
Geologic Evaluation
of a Reported Karst

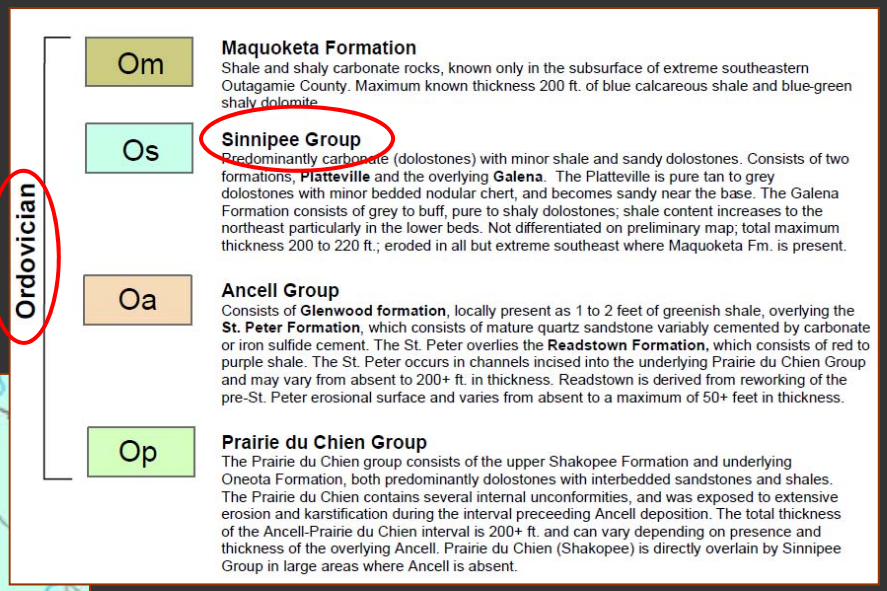
Prepared for

Town of Greenville

For narrated delivery on

September 11, 2017





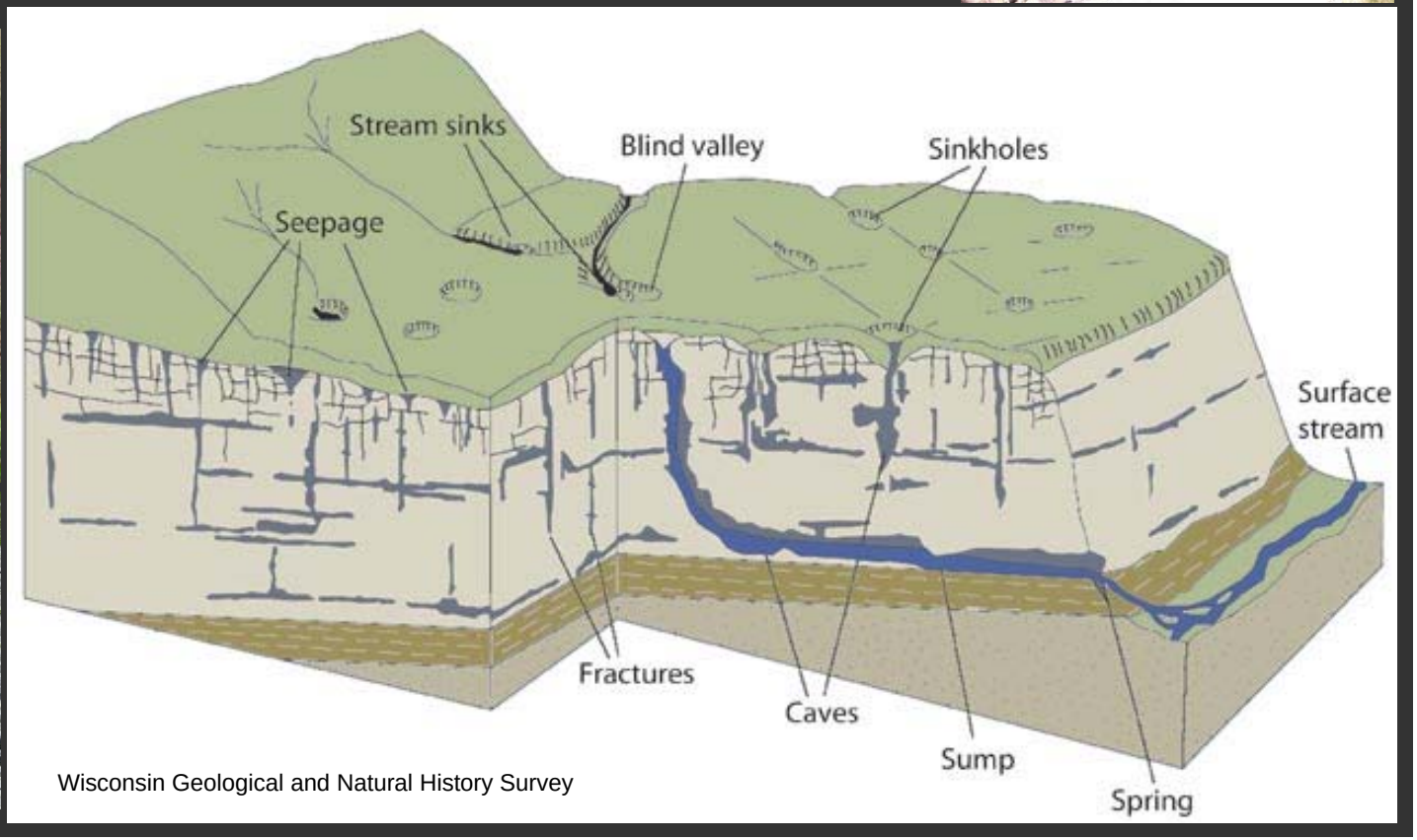
Sand Creek Consultants, Inc.
Environmental and Geological Scientists
and Engineers

What is karst?

- Karst is a type of landscape where water dissolves the underlying soluble bedrock

What is soluble bedrock?

- Dolomite
- Limestone



Wisconsin Geological and Natural History Survey

BEDROCK GEOLOGY OF WISCONSIN

UNIVERSITY OF WISCONSIN–EXTENSION
Geological and Natural History Survey

APRIL 1981
REVISED 2005

EXPLANATION

DEVONIAN
- D — dolomite and shale

SILURIAN
- Sd — dolomite

ORDOVICIAN
- Om — Maquoketa Formation—shale and dolomite
- Os — Sinnipee Group—dolomite with some limestone and shale
- Osp — St. Peter Formation—sandstone with some limestone shale and conglomerate
- Opc — Prairie du Chien Group—dolomite with some sandstone and shale

CAMBRIAN
- € — sandstone with some dolomite and shale

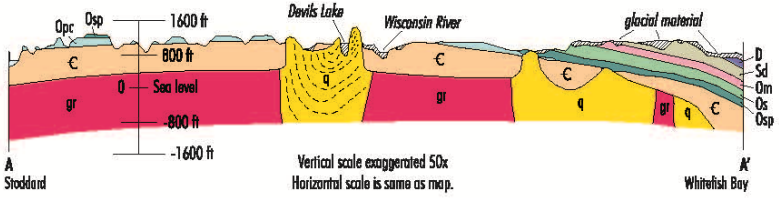
MIDDLE PROTEROZOIC
- ss, v, t — Keweenawan rock—
  - ss, sandstone
  - v, basaltic to rhyolitic lava flows
  - t, gabbroic, anorthositic and granitic rock
- g, a — Wolf River rock—
  - g, rapakivi granite, granite, and syenite
  - a, anorthosite and gabbro

LOWER PROTEROZOIC
- q — quartzite
- gr — granite, diorite, and gneiss
- s, vo, ga — 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

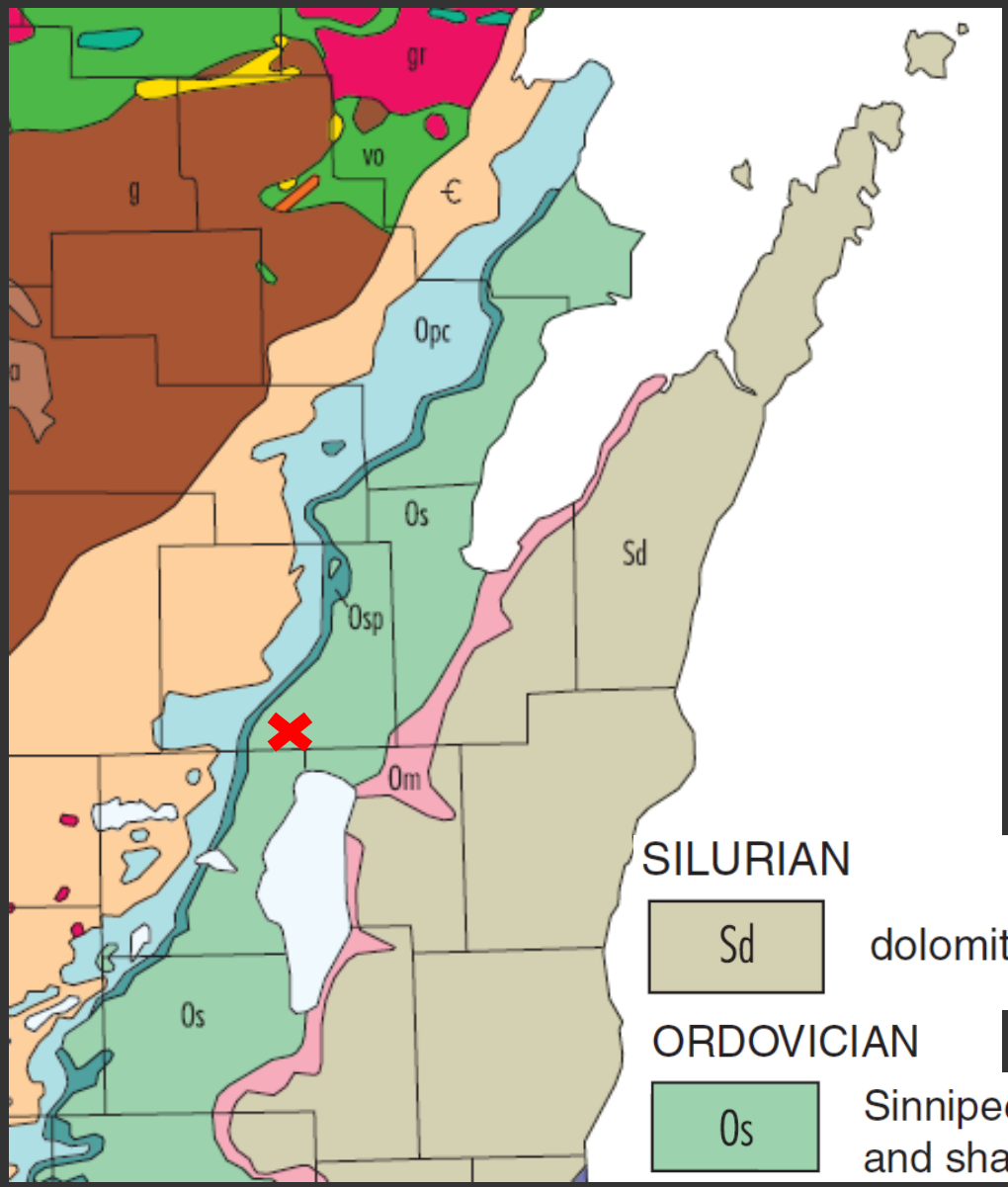
LOWER PROTEROZOIC OR UPPER ARCHEAN
- mv — metavolcanic rock
- gn — granite, gneiss, and amphibolite

N, W, E, S

0 30 60 mi
0 50 100 km



Kewaunee vs. Outagamie Bedrock



SILURIAN

Sd — dolomite

ORDOVICIAN

Os — Sinnipee Group—dolomite with some limestone and shale

- Kewanee and Door Counties have Silurian-age sedimentary rock exposed and near surface, and exhibits dissolution effects (karst topography).
- Outagamie County has Ordovician-age sedimentary rock 30 to 60 million years older, scraped free by glaciers of overlying Silurian rock.

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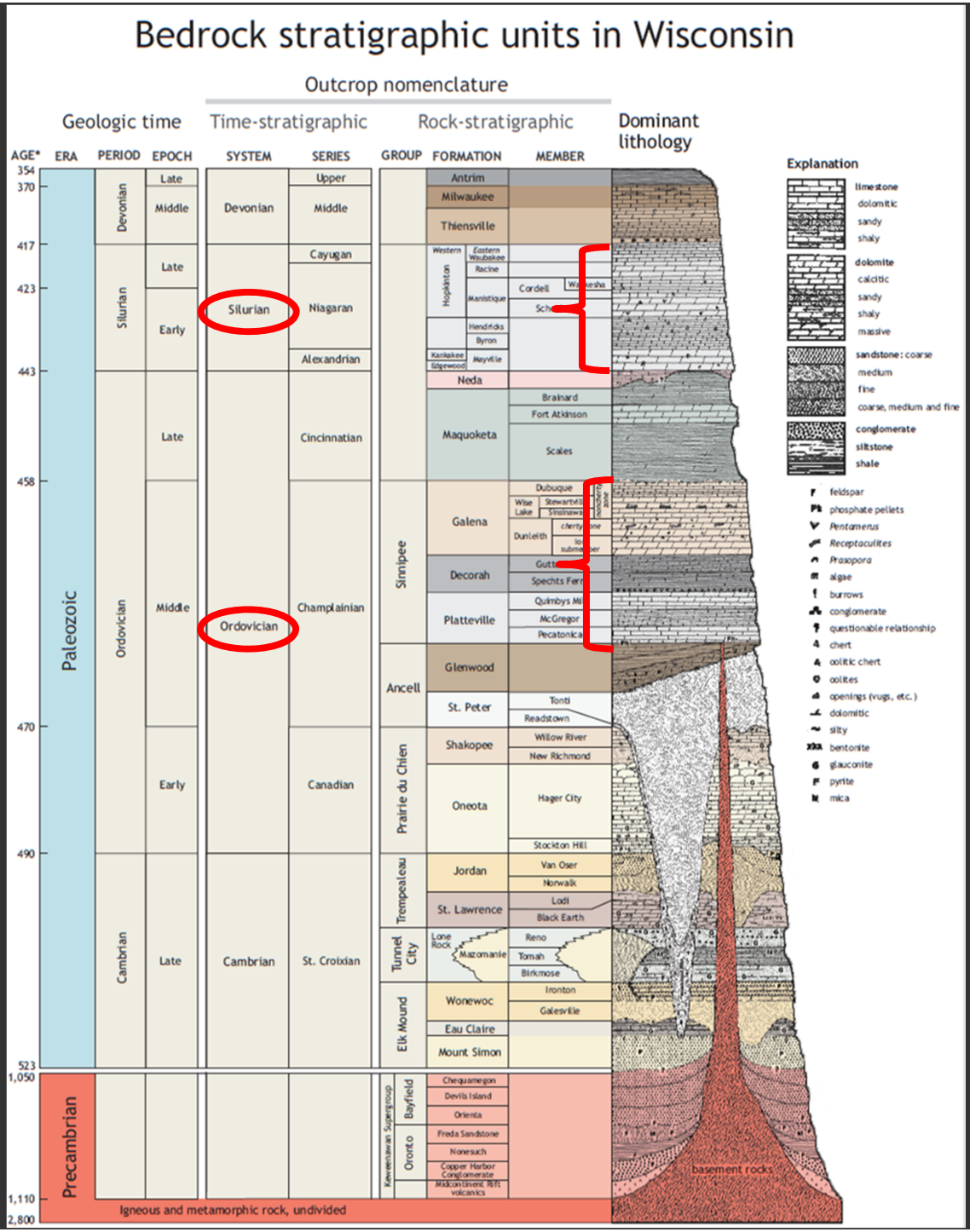
Silurian rocks are younger than Ordovician rocks



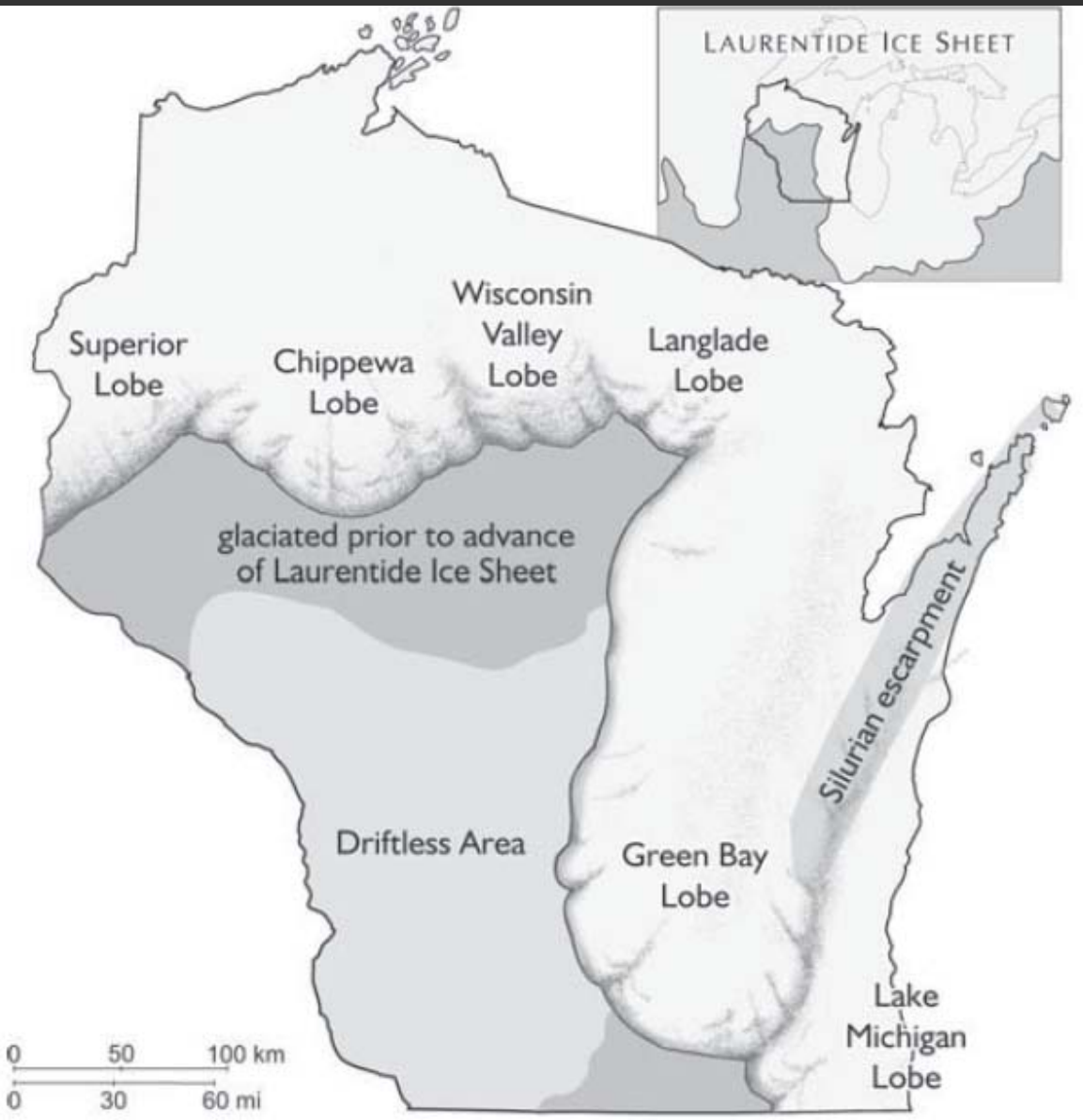
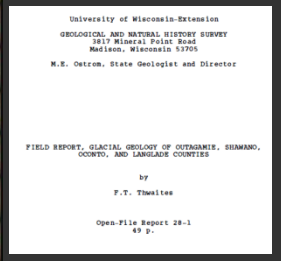
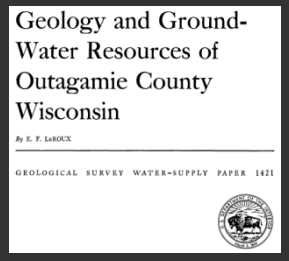


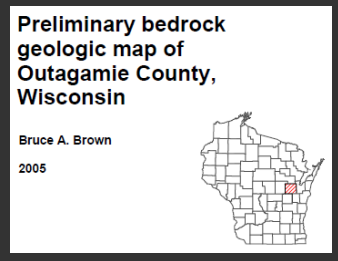
Figure 1. Major landscape regions and extent of glaciation in Wisconsin. Note that the division of the Green Bay and Lake Michigan Lobes coincides with the Silurian escarpment.

Background Information Compilation

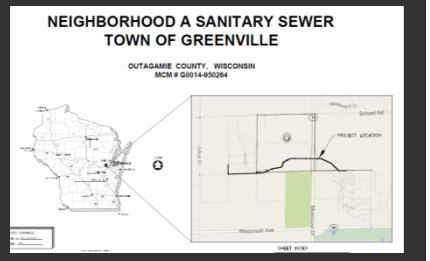
- 1929, Thwaites, *Field Report, Glacial Geology of Outagamie, Shawano, and Langlade Counties*
- 1957, LeRoux, *Geology and Groundwater Resources of Outagamie County, Wisconsin*
- 2005, Brown, *Preliminary bedrock geologic map of Outagamie County, Wisconsin*
- 2014, A&E Geosciences, *Report of Observations Towering Pines/intermittent Stream Project*
- 2015, PSI, *Subsurface Exploration and Subgrade Evaluation*
- 2016, McMahon, *Neighborhood A Sanitary Sewer, Town of Greenville – As-Built*


University of Wisconsin-Extension
GEOLOGICAL AND NATURAL HISTORY SURVEY
3817 Mineral Point Road
Madison, Wisconsin 53705
M.E. Ostrom, State Geologist and Director
FIELD REPORT, GLACIAL GEOLOGY OF OUTAGAMIE, SHAWANO, OCONTO, AND LANGLADE COUNTIES
by
F.T. Thwaites
Open-File Report 28-1
49 p.


Geology and Ground-Water Resources of Outagamie County Wisconsin
By E. F. LeROUX
GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1421


Preliminary bedrock geologic map of Outagamie County, Wisconsin
Bruce A. Brown
2005


Information To Build On
Engineering • Consulting • Testing
SUBSURFACE EXPLORATION AND SUBGRADE EVALUATION
Proposed Utility Construction
Municipal Drive (STH 76)
Town of Greenville, Wisconsin
Prepared for:
Town of Greenville
W6860 Parkview Drive
P.O. Box 60
Greenville, Wisconsin 54942
PSI Project No. 0094224
June 11, 2015


NEIGHBORHOOD A SANITARY SEWER
TOWN OF GREENVILLE
OUTAGAMIE COUNTY, WISCONSIN
MCM # G0014-950264

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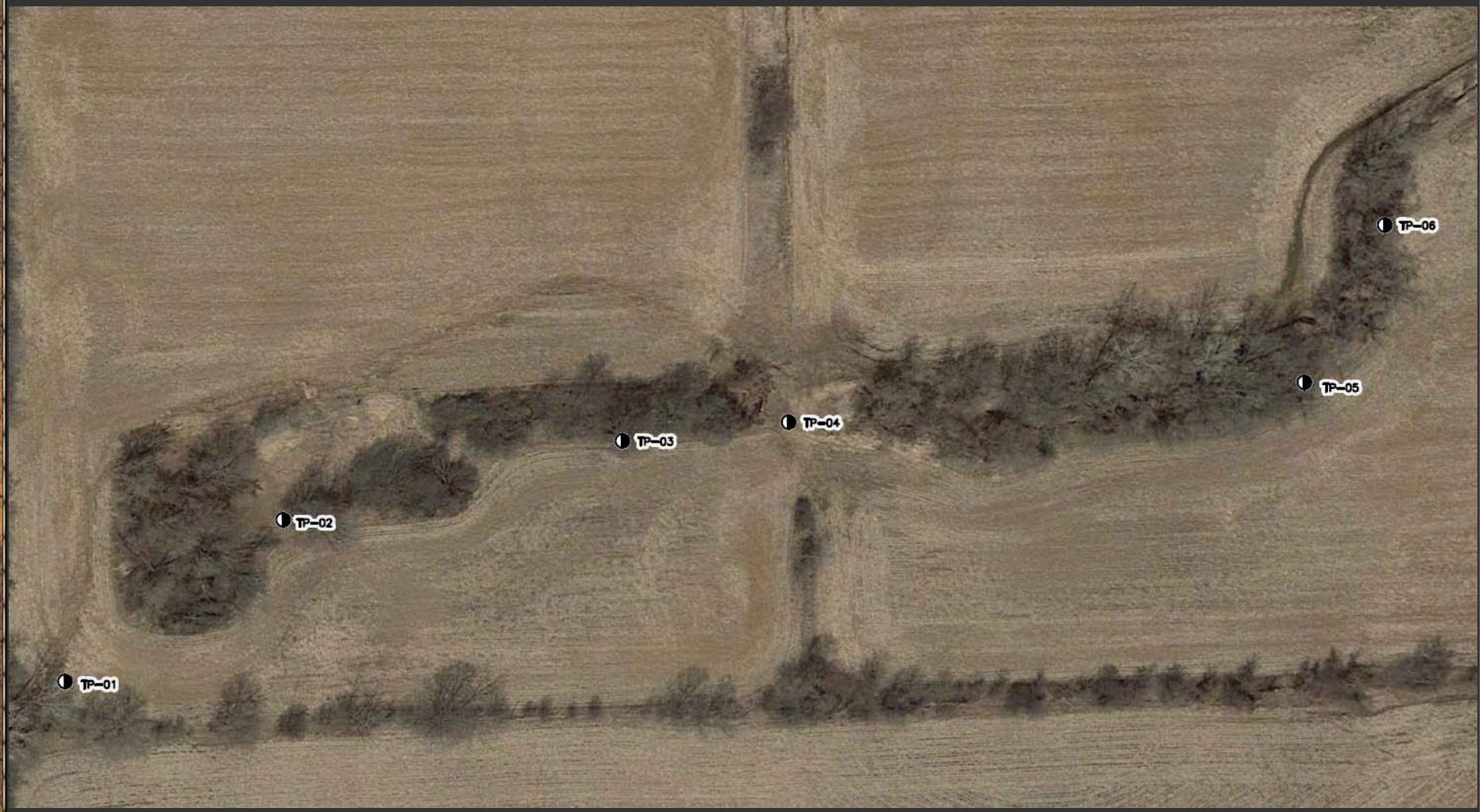
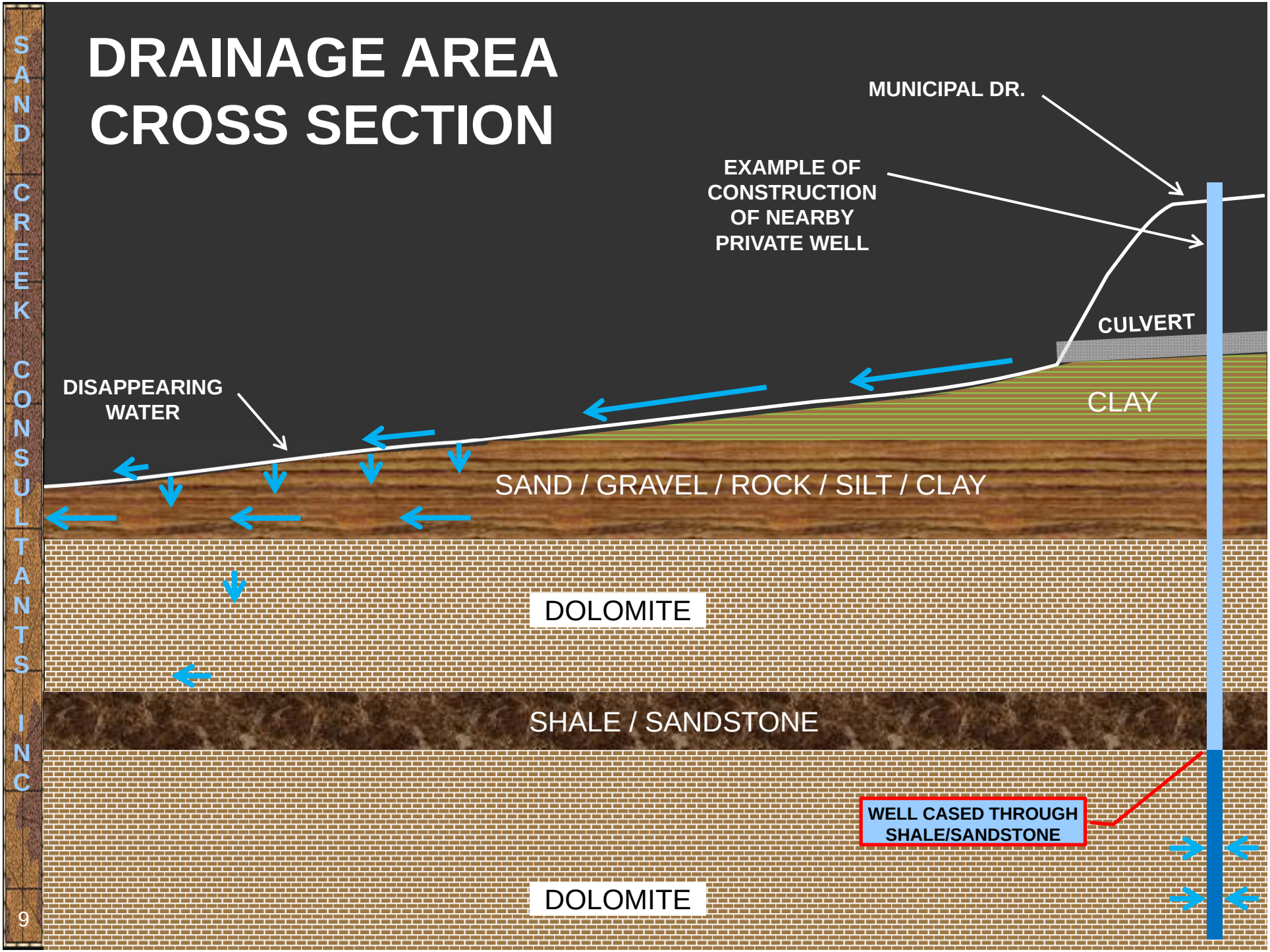
Physical Investigation
Test Pit Locations

Placed at and near locations of reported “disappearing” water

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DRAINAGE AREA CROSS SECTION
MUNICIPAL DR.
EXAMPLE OF CONSTRUCTION OF NEARBY PRIVATE WELL
CULVERT
DISAPPEARING WATER
CLAY
SAND / GRAVEL / ROCK / SILT / CLAY
DOLOMITE
SHALE / SANDSTONE
WELL CASED THROUGH SHALE/SANDSTONE
DOLOMITE
9

Here is what we found:

Test pit movie clip

Questions:

- **Were any karst features identified?**

and

- **Is groundwater quality at risk associated with local drainage features?**

Answers:

No and no.

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