2025



PATHWAY TO WELLNESS STUDY – STH 32

WISDOT ID#1009-44-23

FOREST COUNTY POTAWATOMI COMMUNITY

WISCONSIN DEPARTMENT OF TRANSPORTATION

FOREST COUNTY POTAWATOMI
Keeper of the Fire

KL Engineering
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ACKNOWLEDGEMENTS

The development of the Feasibility Report would not be possible without data sharing, input, and general cooperation from the following stakeholders:

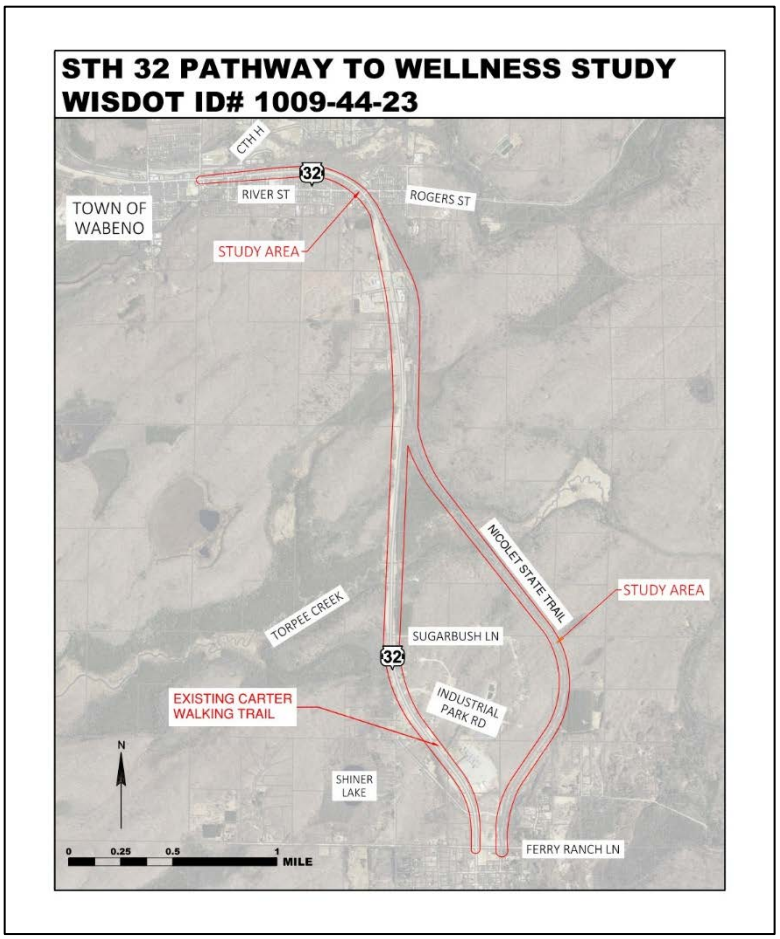
- Forest County Potawatomi – Executive Council
- Forest County Potawatomi Community – Planning Department Staff
- Wisconsin Department of Transportation Staff
- Town of Wabeno Board

EXECUTIVE SUMMARY

The Forest County Potawatomi Community led this feasibility study to add bicycle and pedestrian facilities along STH 32 in the Towns of Wabeno and Carter with assistance from a WisDOT planning grant.

Past community planning efforts identified the importance of establishing a new pedestrian/bicycle route along STH 32. A 2021 study led by the Forest County Potawatomi Community produced the Forest County Potawatomi Community Bicycle and Pedestrian Comprehensive Plan. Several possible routes were identified for further study. The route included within this study effort is an off-road, multi-use path adjacent to State Highway 32 between Ferry Ranch Lane and River Street. Three alternatives were examined for this path:

- Alternative 1 – A path along the west side of STH 32.
    - Alternative 1.1 – An alternative on-street bicycle route along River Street.
- Alternative 2 – A path along the east side of STH 32.
- Alternative 3 – A path along the east side of the existing Nicolet State Trail.



STUDY RECOMMENDATION

Alternative 2 – Alternative 2 is recommended to run along the east side of STH 32 between CTH H in Wabeno and the Carter Walking Trail in Carter. This alternative includes less driveway crossings than Alternative 1 and provides a connection to Wabeno High School via crosswalk. This alternative also has minimal impacts to the right-of-way.

The next steps to move the Pathway to Wellness along STH 32 forward includes design and construction grant requests, discussions with potential project partners, inclusion in long-range planning documents, inclusion of design and construction funding in future budgets and, property acquisition following the federal funding process.

INTRODUCTION

HISTORY AND NEED

The Forest County Potawatomi Community (FCPC) lands are currently facing challenges related to connectivity and accessibility. The disconnection between various parts of the community, including tribal grounds, the Wabeno school, and local businesses, has been a significant concern. The tribal grounds are central to the community's cultural and social activities, but the lack of safe and accessible transportation options makes it challenging for community members to participate fully in these activities. Similarly, the Wabeno Area School District serves as an educational hub, and improving pedestrian and bicycle pathways to the school is essential for enhancing safety and promoting healthier lifestyles. Local businesses in Wabeno are vital for the community's economy, yet the current transportation infrastructure does not adequately support non-motorized access to these businesses. Addressing the disconnection between FCPC lands, tribal grounds, the Wabeno school, and local businesses is essential for creating a safer, more accessible, and cohesive community.

FCPC lands are primarily located within three main communities: Stone Lake, Carter, and Blackwell. However, tribal members live in surrounding communities in Forest County, such as Wabeno, Crandon, and Laona. The checkboard nature of tribal-owned land has created disconnection between tribal members and the main community areas.

Previous community planning initiatives have highlighted the need to create a safer and more accessible transportation option for pedestrians and bicyclists in the area. The Forest County Potawatomi Community Bicycle and Pedestrian Comprehensive Plan was completed in 2021 and identified several potential routes for improving connectivity and transportation options, with a specific focus on routes that would enhance safety, accessibility, and overall mobility for non-motorized users. STH 32 between the tribal lands in Carter and the Wabeno is identified in this document of being a high priority area to increase alternative transportation connections.

The purpose of this study is to evaluate a new pedestrian and bicycle route between Carter and Wabeno along State Highway 32. FCPC obtained TAP funding to produce this feasibility report and subsequently retained KL Engineering for this project through competitive quality-based selection.

PROJECT GOALS

The goal of the study is to evaluate the viability of a new pedestrian and bicycle route between Carter and Wabeno along State Highway 32 and to determine its potential impact on local mobility and safety, while also identifying any challenges that may need to be addressed during the design and construction phases. In addition, the study will provide information to use in grant applications.

The study evaluates multiple alternatives for the path that would provide a safe, off-road transportation option for bicyclists and pedestrians along the study corridor. The alternatives were developed with the following goals:

- Provide a direct route along the corridor for bicyclists and pedestrians to encourage multi-modal transportation.
- Minimize the impact on the natural environment.
- Connect to already-established paths and destinations along the corridor.
- Incorporate a sustainable and maintenance friendly design.
- Provide a facility that is accessible to all.
- Minimize private real estate purchases and partner with other government entities using their land, if necessary.
- Coordinate and enhance adjacent roadway projects where possible.
- Select a cost-effective alternative for construction.
- Respect adjacent land uses.

PLANNING DOCUMENTS

The Forest County Potawatomi Community (FCPC) has a Long Range Transportation Plan that includes goals for connectivity throughout Tribal land and surrounding communities.

- A connectivity goal for FCPC is to create a transportation system that supports and protects all users, including ATV/UTV users, pedestrians, and bicyclists.
- The National Tribal Transportation Facility Inventory (NTTFI) must be included within the Long Range Transportation Plan. Projects included within the NTTFI may be included with the Tribal Transportation Improvement Projects (TTIP) list. Only projects listed on the TTIP can receive federal funding.

Additionally, a Bicycle and Pedestrian Comprehensive Plan for FCPC was completed in 2021.

- At the time the plan was written, only 5.2% of FCPC residents reported walking to work, while no residents reported bicycling to work.
- Survey data suggested that FCPC residents would be more likely to use a bicycle as transportation if there were adequate accommodations.
- The Bicycle and Pedestrian Comprehensive Plan documented existing bicycle and pedestrian paths and outlined several opportunities for future facilities. This included the recommendation of a shared use path adjacent to STH 32 to create a connection between Wabeno and Carter.

STUDY CONTEXT

FACILITY USERS

The STH 32 multi-modal path is designed to accommodate both bicyclists and pedestrians, providing a safe and accessible route for recreation, shopping, and commuting to work. A multi-use path offers several advantages by providing separated facilities from vehicles, enhancing safety for pedestrians and bicyclists. The path accommodates both bikers and walkers, allowing for greater capacity and comfort. In contrast, the Nicolet State Trail combines motorized vehicles with non-motorized users. Motorized vehicles travel at higher speeds than pedestrians, are louder, and kick up dust. Although ATV/UTV riders are required to reduce their speed to 10 mph or less when riding within 100 feet of any person who is not on a motorized vehicle, this isn't always adhered to. By creating dedicated multi-use paths and utilizing Wabeno's sidewalk facilities to the greatest extent possible, the community can ensure safer and more enjoyable transportation options for all non-motorized users.

LEGAL LIMITATION OF REAL ESTATE ACQUISITION

Based on Wisconsin State Law, condemnation for path projects is not allowed. If 1 property owner is not a willing seller it can put the project in jeopardy.

DATA SOURCES

This study included gathering data from several sources, including, but not limited to, the following:

- Forest County: GIS Data, Lidar, Aerial Photography
- WisDOT: Traffic Counts, Aerial Photography
- Wisconsin Traffic Operations and Safety Laboratory: Crash Data
- DNR: Water Surface Viewer
- USDA Natural Resources Conservation Service (NRCS)
- USFWS IPaC: Endangered Species
- Utilities: System Maps from Utility Owners
- Public Comment: Existing Conditions

This initial data was supplemented with field visits, additional meetings with the project team, and various other online resources. This study did not include the following:

- Topographic Field Survey
- Geotechnical Investigations
- Wetland & Waterway Field Analysis
- Cultural & Historical Resources Reviews

Assumptions based on the level of data available are noted within the report.

EXISTING CONDITIONS INVENTORY AND ASSESSMENT

STUDY AREA DESCRIPTION

The area of study for a path along STH 32 spans from River Street on the north to Ferry Ranch Lane on the south for a total length of approximately 4.1 miles. The corridor features diverse areas with distinct characteristics and needs. Carter, home to the Gathering Grounds and Casino, serves as a central hub for community activities and entertainment. Moving north of Sugarbush Lane towards Wabeno, the landscape transitions to a more rural nature. In Wabeno, the urban-like area includes the school and residences.

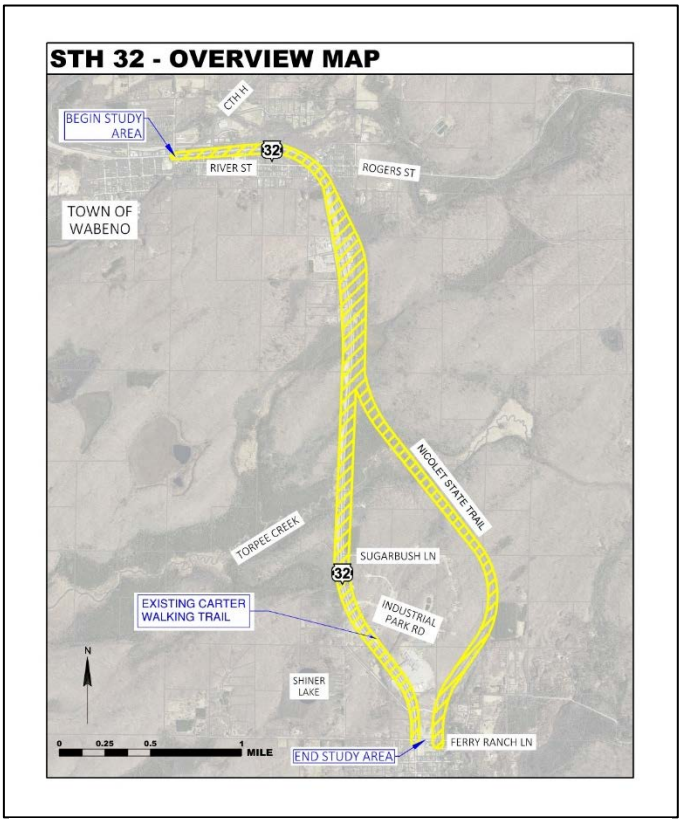


Figure 1: Site Extents

The roadway right of way is owned by WisDOT and is entirely located within the Towns of Wabeno and Carter. Adjacent properties along the corridor are located within the Towns of Wabeno and Carter. Beyond the Right-of-way is primarily owned by the US Government and Forest County Potawatomi.

Road Geometry

- Rural cross section south of Wabeno of 2 12-foot driving lanes, 8-foot shoulders (3-foot paved and 5-foot aggregate), and ditches.
- Urban cross section within Wabeno of 2 12-foot driving lanes, 4-foot shoulders, 30-inch curb and gutter and 6-foot sidewalk for the entirety of the study area on the south side of the roadway with a short section on the north side of the road from Jones Avenue to CTH H.
- Longitudinal running grade of 2.0% to 5.0% throughout the corridor decreasing from North to South with some flatter areas.
- 14 side road intersections along the roadway.
    - 4 on N & E side of roadway.
    - 10 on S & W side of roadway.
- 20 total driveways along the roadway.
    - 12 driveways on the N & E side of the roadway.
    - 8 driveways on the S & W side of the roadway.
- The posted speed is 35 mph in Wabeno, 55 mph between Wabeno and Carter, and 40 mph in Carter.
- The Average Annual Daily Traffic (AADT) from 2022 is 3000.

This is a feasibility study that utilized publicly available, planning level, data. More detailed data is required for final design.

TRAFFIC AND SAFETY

Crash data was collected for the STH 32 project area for the years 2018-2022. These crashes were organized by crash types and injury severity. Injury severity is described using a letter with the following meanings:

K=Fatal
A=Incapacitating Injury

B=Confirmed Injury
C=Possible Injury
O=Property Damage Only

The 2019-2023 Crash Summary for the project area is listed below.

Total Number of Crashes: 13

- Crash types
  - 1 Head On crash (8%)
    - 1 property-damage only
  - 1 Sideswipe - Opposite Direction crash (8%)
    - 1 property-damage only
  - 2 Angle crashes (15%)
    - 2 property-damage only
    - 1 noted snow/ice on road conditions
  - 1 Rear-end crash (8%)
    - 1 property-damage only
  - 1 Sideswipe – Same Direction crash (8%)
    - 1 property-damage only
  - 1 Other crash (8%)
    - 1 property-damage only
    - Snow noted on road conditions
  - 6 Single vehicle crashes (46%)
    - 5 property-damage only
      - 4 noted snow/wet on road conditions
    - 1 A level injury severity
      - Alcohol/drugs flag
    - 1 C level injury
      - Alcohol/drugs flag
- Injury Severity Summary
  - 0 K level
  - 1 A level (Incapacitating Injury)
  - 0 B level
  - 1 C level (Possible Injury)
  - 11 O level (Property Damage Only)

Note this crash data was prior to the roadway work in Wabeno in 2024.

TOPOGRAPHY, SOILS, WETLANDS, WATER BODIES AND FLOODPLAIN

Approximately 53% of the soils in the study area are silt loams with a hydraulic soil group rating of C. Soils with hydraulic soil group C have infiltration rates between 0.05-inches per hour and 0.15-inches per hour, which leads to high runoff potential. Additionally, the silt loam soils in the study area are classified as “moderately well drained.” Moderately well drained soils have a high depth to the water table; because of this, wet soil conditions may be encountered throughout the construction season, but it is not a high probability. Additionally, approximately 13% of soils within the study area are “very poorly drained” Lupton and Cathro soils with a hydraulic soils group rating of A/D. Soils with hydraulic soil group A/D have infiltration rates less than 0.05-inches per hour in poorly drained or saturated areas. This soil classification has a low depth to the water table, and it is very likely that wet soil conditions would be encountered throughout the construction season. Table 1 and Table 2 provide information regarding hydrologic soil groups and drainage classes. **A Custom Soil Resource Report for the study area can be found in Appendix C.**

Table 1: Hydrologic Soil Group, Description, and Associated Infiltration Rate.[1]

Soil Group	Description	Infiltration Rate (mm/h)	Infiltration Rate (in/min)
A	***Lowest Runoff Potential.*** Includes deep sand with very little silt and clay; also deep, rapidly permeable loess.	8 – 12	0.005 – 0.008
B	***Moderately Low Runoff Potential***. Mostly sandy soils less deep than A, loess less deep or aggregated than A, but the group as a whole has above-average infiltration after thorough wetting.	4 – 8	0.003 – 0.005
C	***Moderately High Runoff Potential.*** Comprises shallow soils and soils containing considerable clay and colloids, though less than those of group D. The group has below-average infiltration after pre-saturation.	1 – 4	0.001 – 0.003
D	***Highest Runoff Potential.*** Includes mostly clays of high swelling percent, but the group also includes some shallow soils with nearly impermeable sub-horizons near the surface.	0 – 1	0 – 0.001

Table 2: Soil Drainage Classes and Associated Properties.[1]

Drainage Class	Estimated Depth to Seasonal High Water Table (cm)	Estimated Depth to Seasonal High Water Table (inch)	Duration of Water Ponded on Surface	Wetland
Well Drained	> 120	> 47.2	None	No
Moderately Well Drained	60 – 120	23.6 – 47.2	None	No
Somewhat Poorly Drained	30 – 60	11.8 – 23.6	None	No
Poorly Drained	< 30	< 11.8	Short (Weekly)	Yes
Very Poorly Drained	< 30	< 11.8	Long (Monthly)	Yes

The WDNR Surface Water Viewer was utilized to locate wetland indicator soils in the study area. Figure 2, Figure 3, and Figure 4 show concentrated areas of wetland indicator soils. Wetland indicator soils are located on the north side of STH 32, east of the intersection with CTH H, in Wabeno (Figure 2). Indicator soils are also located on both sides of STH 32 between Wabeno and Carter, concentrated between Adams Lane and Sugarbush Lane (Figure 3). Both sides of STH 32, near Industrial Park Road in Carter have wetland indicator soils (Figure 4). **A WDNR map showing all locations of Wetland Indicator Soils in the study area can be found in Appendix C.**

[1] Data displayed in tables is from the USDA Soil Survey Manual, prepared by Soil Science Division Staff. https://www.nrcs.usda.gov/resources/guides-and-instructions/soil-survey-manual

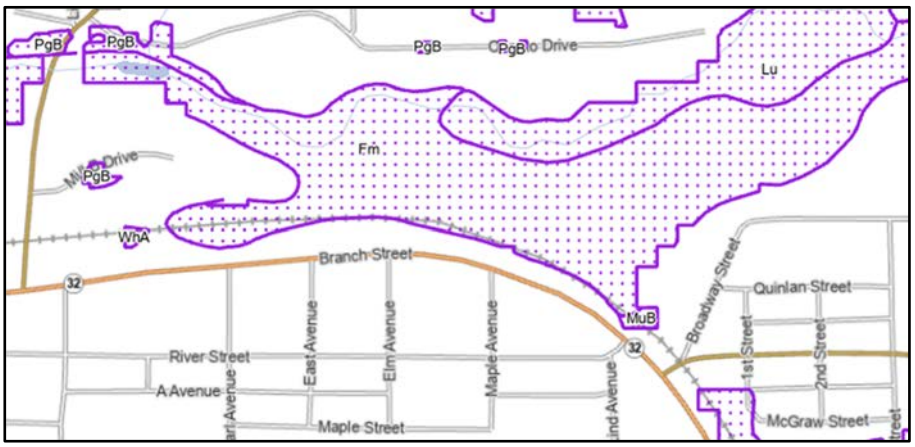


Figure 2: Wetland Indicator Soils (purple) North of STH 32, East of CTH H.

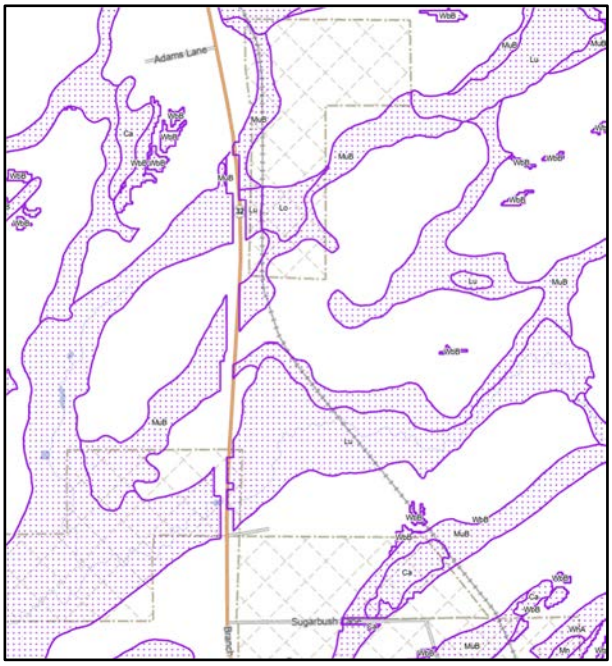


Figure 3: Wetland Indicator Soils (purple) between Adams Lane and Sugarbush Lane.



Figure 4: Wetland Indicator Soils (purple) along STH 32 near Industrial Park Drive.

The Wisconsin DNR Surface Water Viewer was utilized to review locations of mapped wetland class areas, wetland confirmations, and the FEMA 1% Annual Chance Flood Hazard. Figure 5 and Figure 6 show the legends utilized in the later sections for analysis.

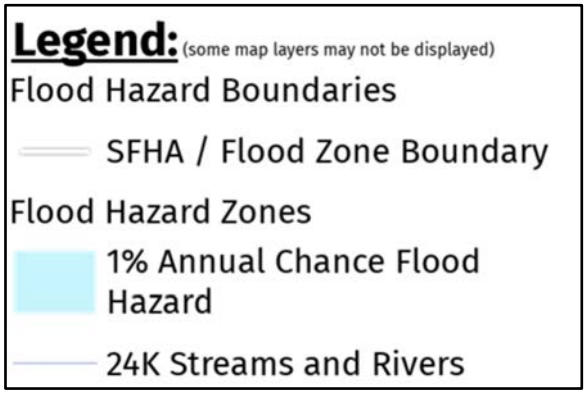


Figure 5: Legend Utilized for Floodplain Map.

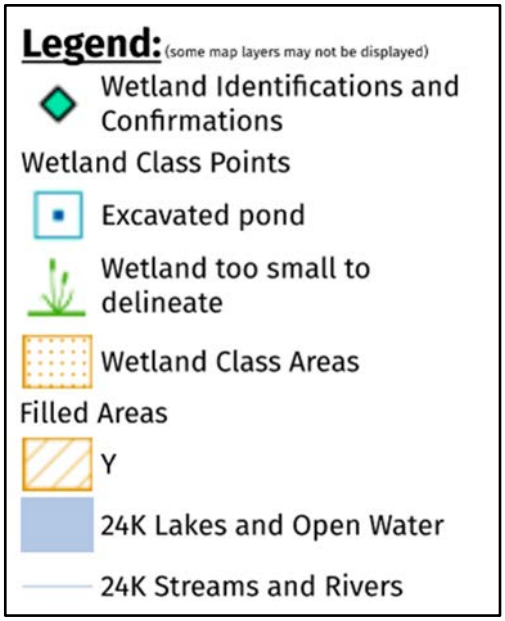


Figure 6: Legend Utilized for Wetland Areas Map.

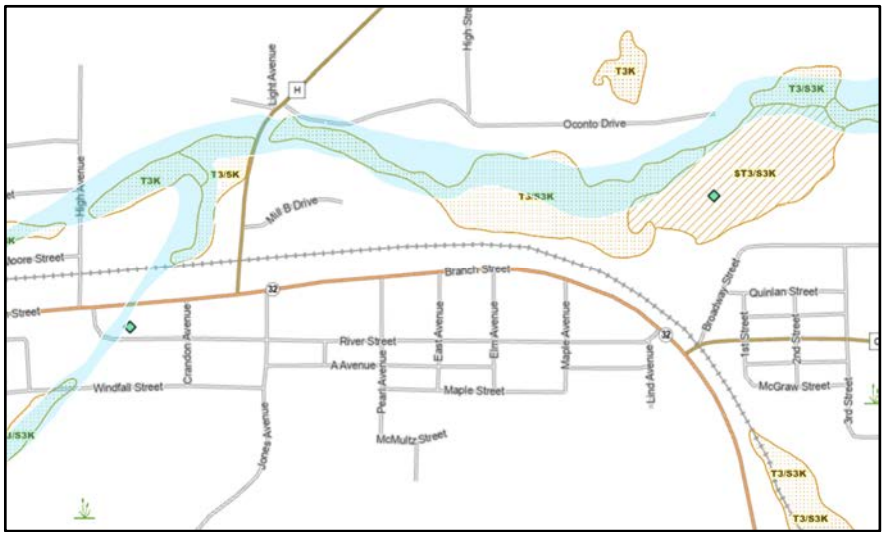


Figure 7: North Branch Oconto River Wetland and Floodplain Areas.

The North Branch Oconto River is located north of STH 32 in Wabeno, near the intersection with CTH H. The FEMA 1% Annual Chance Flood Hazard and wetland class areas are located along the North Branch Oconto River within the STH 32 study area. An area of the North Branch Oconto River adjacent to the study area is also mapped as having confirmed wetland identifications. See Figure 7 (left) for the flood hazard zone, mapped wetland class areas, and the confirmed wetland identification area associated with the North Branch Oconto River.

Torpee Creek crosses the study area under STH 32 through a bridge approximately 1.5 miles north of Carter. The FEMA 1% Annual Chance Flood Hazard is located along Torpee Creek within the STH 32 study area. Mapped wetland class areas are also located along Torpee Creek in the study area. See Figure 8 (right) for the flood hazard zone and mapped wetland class areas associated with Torpee Creek. Torpee Creek, in the Lower North Branch Oconto River Watershed, is an 8.80 mile river in Forest County. This river is a Class II Trout Water under the Fisheries Program. This river is managed for fishing and swimming and is currently not considered impaired.

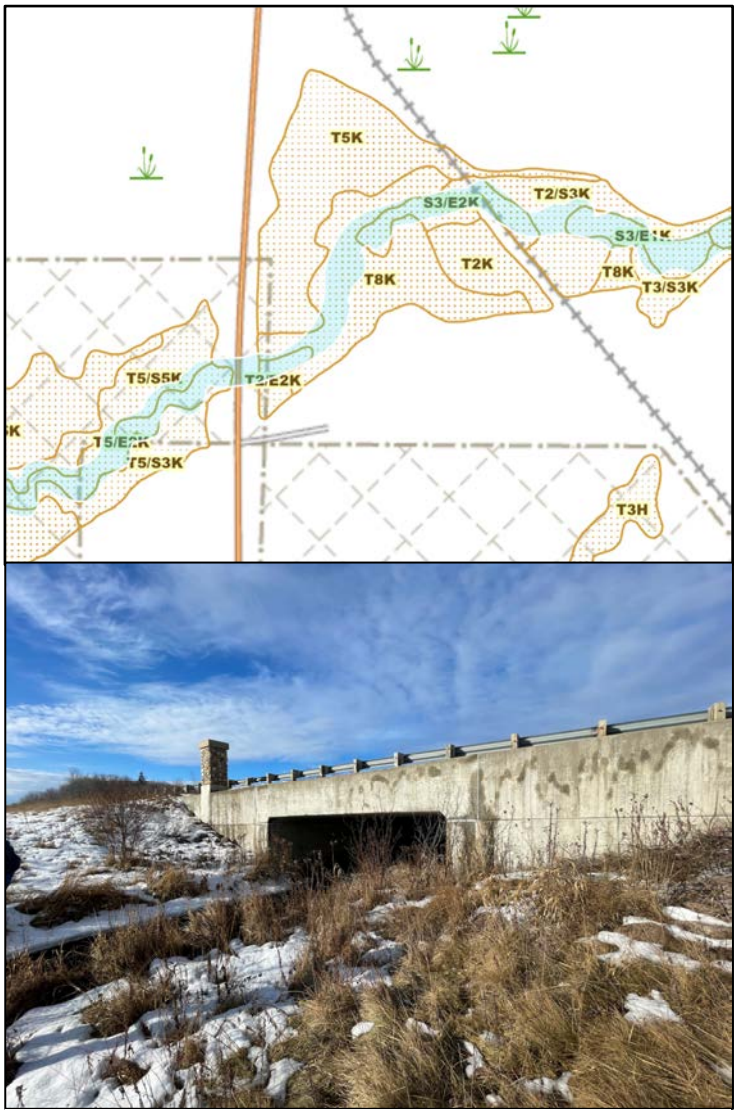


Figure 8: Torpee Creek Wetland and Floodplain Areas.

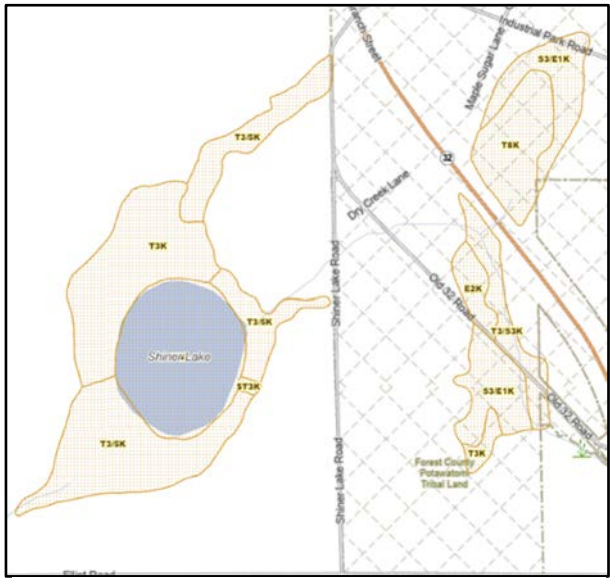


Figure 9: Shiner Lake Wetland Areas.

Shiner Lake is located slightly outside of the STH 32 study area, near Elliot Road in Carter, but the mapped wetland class areas associated with the lake are located adjacent to the study area. There are no mapped floodplain hazards associated with Shiner Lake. See Figure 9 (left) for the mapped wetland class areas associated with Shiner Lake.

Additional mapped wetland class areas are located on both sides of STH 32 within the study area, approximately 0.30 miles south of Adams Lane. This wetland class area is associated with an unnamed branch of Torpee Creek, but this branch does not cross STH 32. There are no mapped floodplain hazards associated with this branch. See Figure 10 (right) for the mapped wetland class areas associated with this unnamed branch of Torpee Creek.

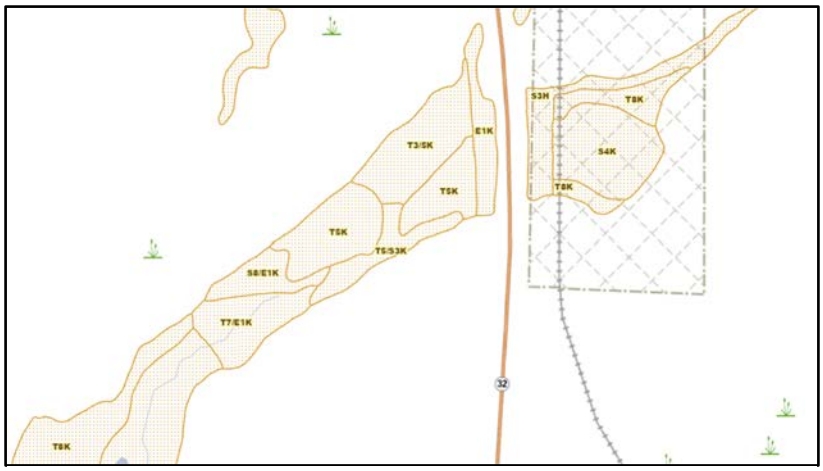


Figure 10: Unnamed Branch Wetland Areas.

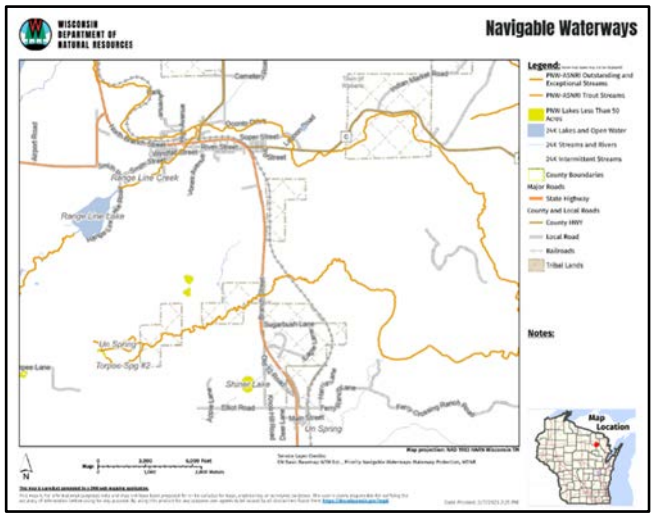


Figure 11: Priority Navigable Waterways.

Maps showing floodplain area, mapped wetland class areas, wetland indicator soils, and priority navigable waterways can be found in Appendix C.

ENDANGERED RESOURCES

Consultation with the US Fish and Wildlife Service (USFWS) was conducted using the USFWS Information for Planning and Consultation website. An official threatened and endangered species list was obtained for the STH 32 project area. Species on this list include the Gray Wolf, the Northern Long-Eared Bat, and the Monarch Butterfly. No critical habitats for these species overlap with the project area. **Consultation documents can be found in Appendix D.**

The Minnesota-Wisconsin Endangered Species Determination Key was utilized to determine potential effects on the threatened and endangered species present within the project area. Use of the key determined that there are not likely adverse effects to the Gray Wolf, and no effects to the Monarch Butterfly. The FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat determination key was utilized for this project. Use of the key resulted in a may likely to affect – not likely to adversely affect determination for Northern Long-Eared Bats in the project area.

CULTURAL RESOURCES

Cultural resources were not investigated as a part of this feasibility study but will be included in future phases.

UTILITIES

The corridor has underground gas, electric, and communications lines, as well as overhead utility lines and poles along and crossing STH 32.

- Based on system mapping provided by utilities there are no significant utility conflicts.
- There are instances of communication line and gas line crossings of the proposed path, but conflicts requiring a utility relocation for these utilities would not be expected.
- Overhead power is present on both sides of roadway. Relocation of poles is possible but will be limited to the greatest extent possible.
- Further coordination in the design phase of the project will be required.

RIGHT-OF-WAY

The width of the right-of-way varies throughout the corridor, between 33 and 210 feet from the centerline of STH 32.



Figure 12: STH 32 ROW Images

INTERSECTION AND ACCESS POINTS

The project corridor outside the roadway right-of-way is largely residential consisting of single-family use structures within Wabeno. Industrial facilities are present 0.75 miles south of Wabeno. The southern portion of the study area connects to the Potawatomi Casino and Tribal grounds.

The Carter Walking Trail, which was constructed in 2024, connects to this study at the southern extents. A future extension crosses STH 32 to Old Highway 32 Road.

A concurrent study is being completed to begin at CTH H and STH 32 in Wabeno extending to Blackwell.

PUBLIC ENGAGEMENT

A PIM for the Pathway to Wellness – STH 32 Study Segment was held on February 26, 2025, at the Wabeno Town Hall. Displays for the segments were presented to the public.

The public was informed about the public involvement meeting using:

- Mailings to property owners along the study corridor.
- Social media posts.

KEY FEEDBACK

The feedback from the public and how it will be considered are as follows:

- Concern of yards impacted for Alternative 1 coming into Wabeno (west/south side of STH 32)
- Concern about the existing crossing near Rogers/CTH C and STH 32. Vehicles come into the town too quickly from the south and people aren't paying attention to the crossing.
- River Street is hilly and not in the best pavement condition – maybe not the best for routing bikes.
- Rest areas/benches along the path (especially at Torpee Creek)
- Will there be parking at either end of the path?
- Are there plans for future connections around the area?

Overall, the public's response to the potential path was encouraging. They expressed their support, provided that the path is implemented with thought, is safe for users, and minimizes impacts on surrounding owners

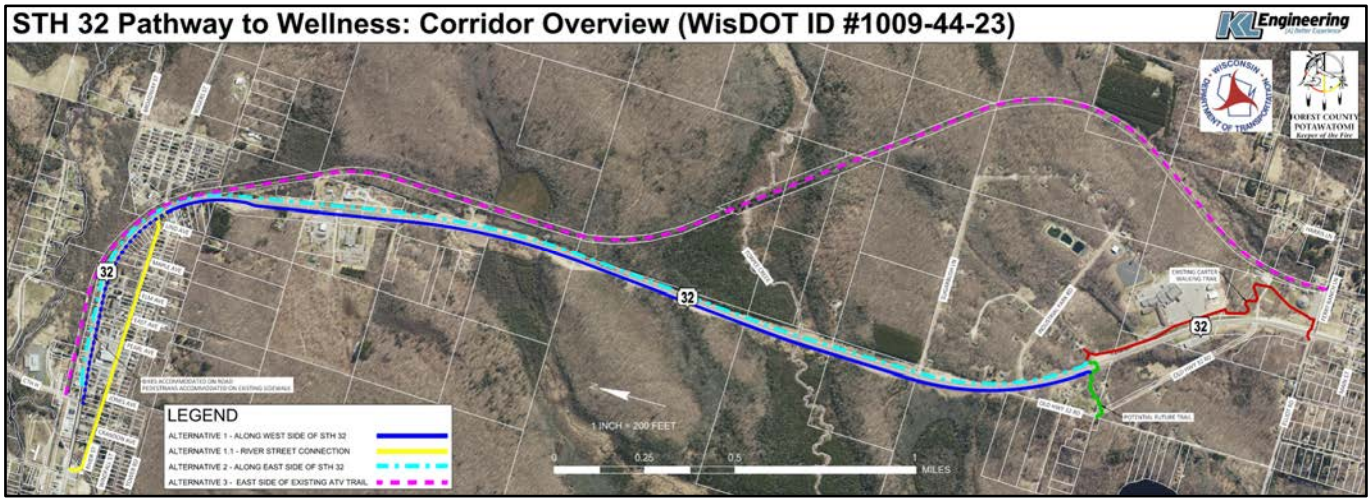


Figure 13: Exhibit Utilized for the Public Involvement Meeting.

ALTERNATIVE DEVELOPMENT

Alternatives were considered to link Carter with Wabeno along STH 32. Both the western and eastern sides of the road were evaluated, as well as a route along the Nicolet State Trail, which runs parallel to STH 32, about 300 feet to the east.

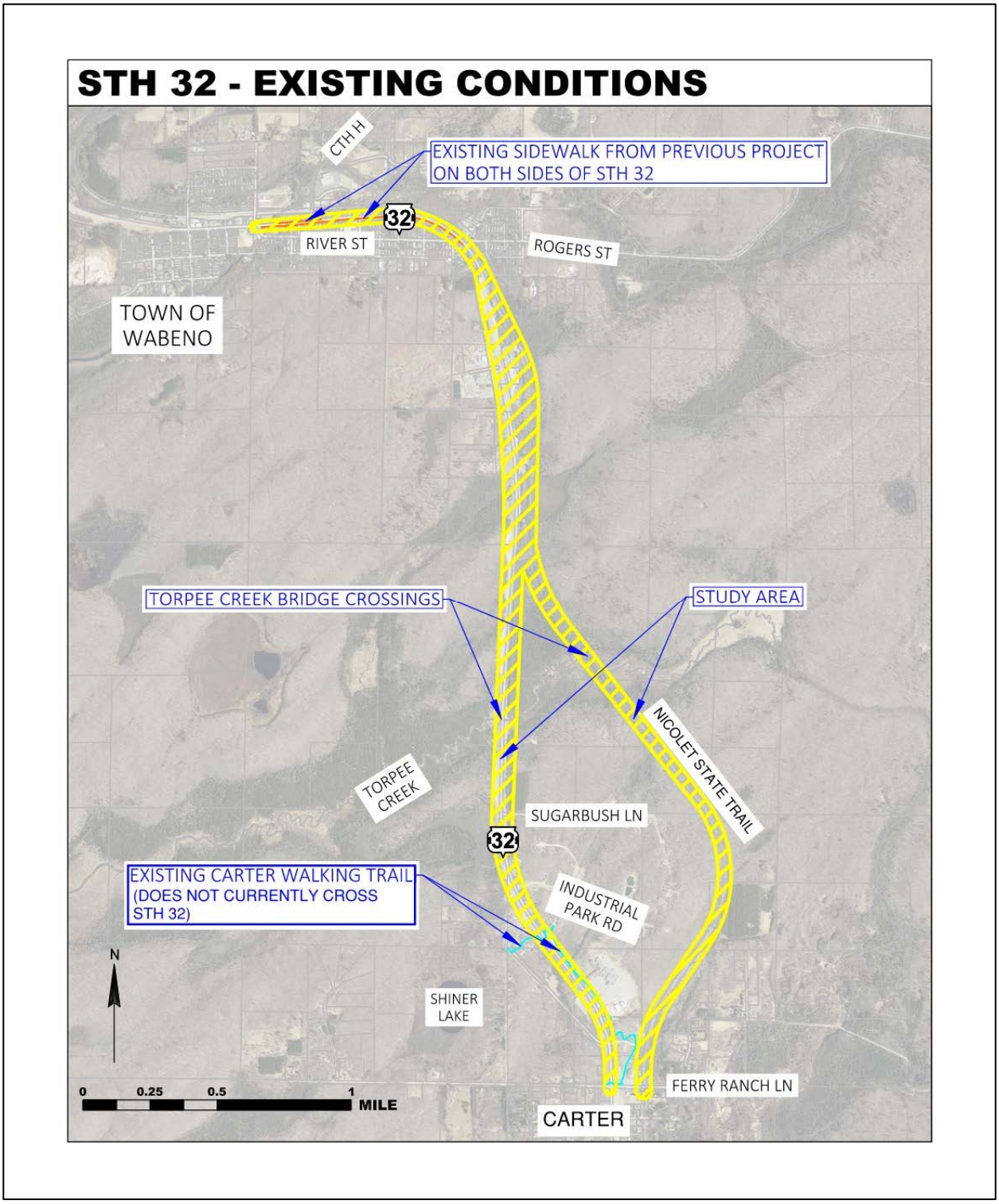


Figure 14: Existing Conditions

Preliminary alternative plans for Alternative 1 and Alternative 2 are provided in Appendix E.

ALTERNATIVE 1 – PATH ON THE WEST SIDE OF STH 32

Alternative 1 proposes a multi-use path along the west side of STH 32, between Rogers Street/CTH C and the Existing Carter Walking Trail to the south. Within Wabeno pedestrians would be accommodated on the existing 6-foot sidewalks along STH 32. These sidewalks would serve as connections to residential developments on the south and west side of the corridor. Bicyclists within Wabeno would be accommodated on the existing 4-foot paved shoulders along STH 32. Where the existing sidewalks end when leaving town heading south an off-road path would be constructed. The proximity of this path to STH 32 would provide ease of access to path users and facilities along STH 32. This alternative would impact approximately 10 acres during the construction process and requires minimal cut to construct. Additionally, placing the path on the west side of STH 32 keeps the path on the upstream end of the Torpee Creek Bridge Crossing, and provides the potential for a longer bridge span for the multi-use structure.

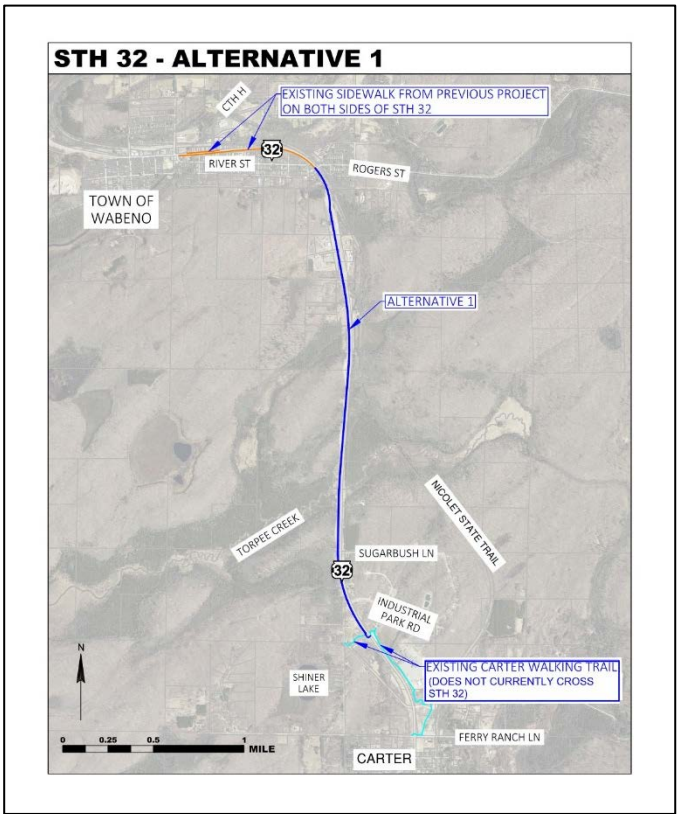


Figure 15: Alternative 1

ALTERNATIVE 1.1 RIVER STREET ROUTE

Alternative 1.1 includes providing signage for a bike route to establish a signed bike route along River Street. This route could be the primary route for bicyclists rather than routing bikes onto the STH 32 shoulders or could be signed as an alternate bike route in addition to the STH 32 shoulders for those bicyclists not comfortable biking along the busier roadway. This route provides bicyclists connection to Wabeno High School along River Street. **Alternative 1.1** is a complementary project that could be completed with any of the alternatives but is not evaluated further with this feasibility study.

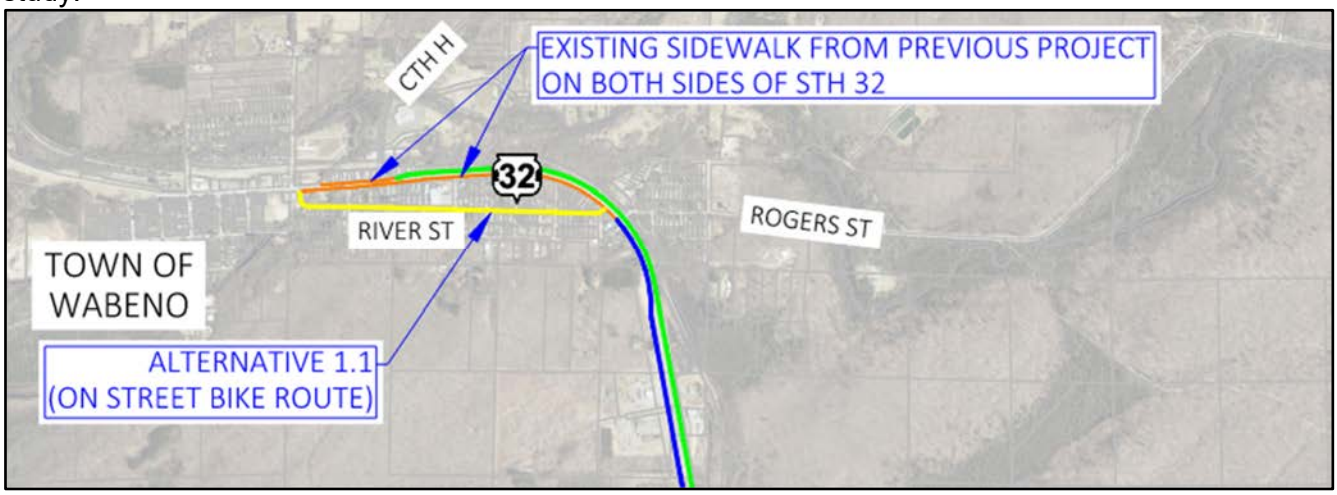


Figure 16: Alternative 1.1

ALTERNATIVE 2 – PATH ON THE EAST SIDE OF STH 32

Alternative 2 proposes a multi-use path along the east side of STH 32, between CTH H and the connection to the existing Carter Walking Trail. Existing five-foot sidewalks along STH 32 will connect the path to River Street and residential developments. This alternative necessitates a crosswalk at Pearl Avenue to provide connection to the Wabeno High School. Future design stages will evaluate speed management alternatives and crosswalk treatment enhancements including the potential of Rectangular Rapid Flashing Beacons. Placing the path on the east side STH 32 will provide a direct connection to the Potawatomi Casino and Hotel, the Fireside Market, and the Farm Store, which are all adjacent to STH 32. This alternative would have minimal impacts on the real estate in the surrounding area but will impact approximately 11 acres during construction. Additionally, this path will be constructed downstream of the buried structure along the Torpee Creek Bridge Crossing which has the potential to lead to a shorter span length for the creek crossing.

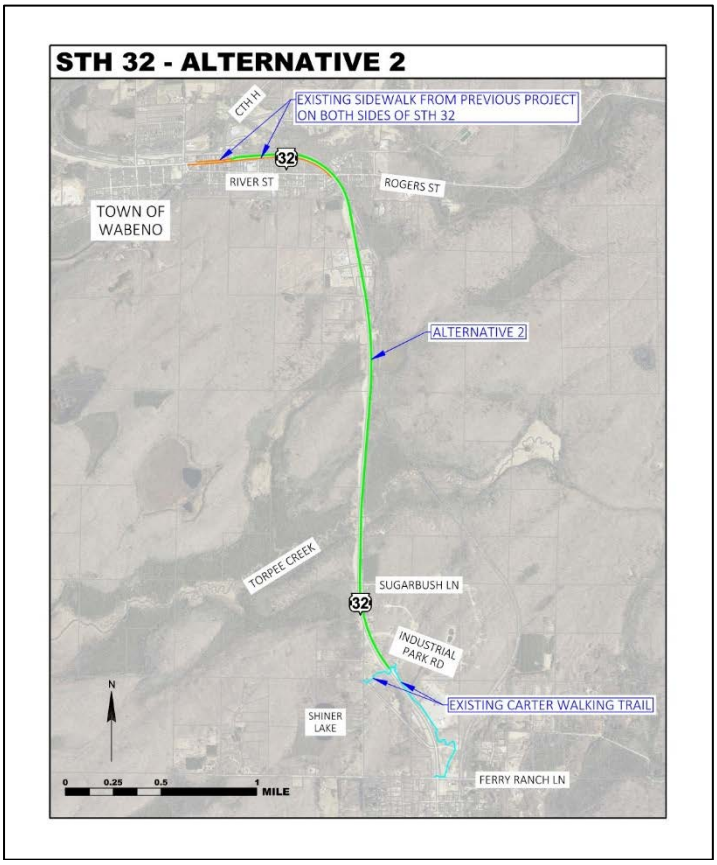


Figure 17: Alternative 2

OPTIONS CONSIDERED BUT DISMISSED

Alternative 3 was initially considered but was not recommended for further feasibility analysis.

Alternative 3 proposes a bicycle and pedestrian path on the east side of the Nicolet State Trail, adjacent to the existing trail. Because this alternative follows the existing trail, there are minimal impacts to drainage, utility crossings, right-of-way/real estate, and other intersections. However, the path would require extensive fill and boardwalk. This path would not provide increased connectivity in the area, as it is further from STH 32. Additionally, it would add conflict points with the Nicolet State Trail users. Previous studies also indicated the preference to a separate facility due to conflicts between potential uses. **Alternative 3** is approximately two times the cost of **Alternative 1** and **Alternative 2.** For these reasons, **Alternative 3** was considered but dismissed.

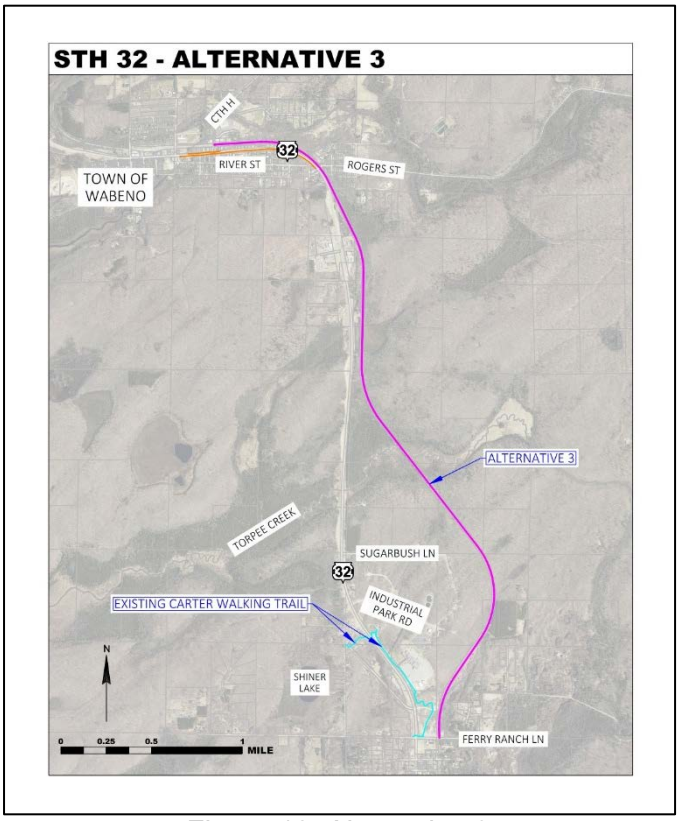


Figure 18: Alternative 3

ANALYSIS

COMPARISON:
A comparison is presented below for the impacts for each alternative.

	Alternative 1	Alternative 2
Topography/Soils	Minimal cut job, ~ 10 acres impacted.	Minimal cut job, ~ 11 acres impacted.
Wetlands	Less potential impacts.	More potential impacts.
Endangered Resources*	Not Evaluated - Similar Risk	
Cultural Resources*	Not Evaluated - Similar Risk	
Utilities	Overhead utilities.	Overhead utilities.
Right-of-Way	Minimal impacts outside of STH 32 right-of-way.	Stays within STH 32 right-of-way.
Intersections	7 Roadway Crossings. 8 Driveway Crossings.	3 Roadway Crossings 5 Driveway Crossings
Drainage	Impacts near roadside ditches.	Minimal impacts.
Real Estate	Anticipating impacts to 6 parcels, 1 acre.	Anticipating no impacts to parcels.
Cost	$4.18M	$4.59M

*Impacts to endangered resources and cultural impacts will likely remain unknown until final plans and permits are drafted.

STAKEHOLDER FEEDBACK
Stakeholder input, including that from the Wisconsin Department of Transportation (WisDOT), will be integrated as it is received. This iterative process ensures that all feedback is thoroughly reviewed and appropriately reflected in project deliverables.

POTENTIAL COSTS
The construction costs assume that the project is being constructed as a standalone project. Given these assumptions costs are as follows:

	Alternative 1****	Alternative 2
Construction Total *	$3,300,000	$3,712,500
Construction Oversight	$250,000	$250,000
R/W Acquisition Contingency**	$90,000	$90,000
Utility Relocation Contingency	$200,000	$200,000
Design Cost***	$340,000	$340,000
Total Project Delivery	$4,180,000	$4,592,500

* Construction Cost assumes 2028 construction and includes preliminary design contingency.
** R/W Acquisition Contingency includes costs for plat, appraisal, and acquisition if required
*** Design Cost is assumed in 2026-2027, includes design oversight.
**** Important to note that Alternative 1 constructs 3,000' less off-road trail than Alternative 2.
The detailed cost estimate is included in Appendix F.

TORPEE CREEK CROSSING

The crossing over Torpee Creek was evaluated, and it was determined that the current STH 32 bridge is not wide enough to accommodate a multi-use path. There are two alternatives that were evaluated in this study and require further evaluation in a future design phase. One alternative would be to extend the buried structure to accommodate the pathway and the other would be to construct a separated structure adjacent to the current bridge. Both options have pros and cons. The extended structure alternative could lead to shared maintenance cost with WisDOT in the future but will require the pathway to be located within the roadway clear zone at the bridge approaches to be cost effective and will require WisDOT Bureau of Structures buy-in and approval. The separated structure would

allow for the pathway to remain outside of the roadway clear zone but would necessitate either large fills or boardwalk approaches to the structure. Hydrology and hydraulic study will be required to determine bridge length and height above water in a future design phase. Either side of State Highway 32 is achievable; the east side appears to be the least complex.

PREFERRED ALTERNATIVE

Based on connection to existing trails, connections to neighborhoods near Carter and Wabeno, accommodating bikes on an off-road path in Wabeno, minimizing impacts to the current ditch and drainage patterns and the associated costs, it is recommended that **Alternative 2** be the preferred alternative.

Challenges that will need to be addressed moving forward include:

- Potential Wetland Areas to be delineated and incorporated into design.
- Structure/Boardwalk/Floodplain.
- Midblock crossings for school access from path will require further design and analysis.

Concept Plans for the Pathway to Wellness – STH 32 segment preferred alternative can be found in Appendix E.

PROJECT PHASING

It is recommended that the STH 32 project be spilt into two phases. Phase 1 of the STH 32 project would begin in Wabeno, connecting with the existing sidewalks from a previous project. Phase 1 would end at US Forest Service Road 2663, approximately halfway between Wabeno and Carter. Phase 2 would connect to Phase 1 at US Forest Service Road 2663 and continue south to the connection with the existing Carter Walking Trail. It may be more likely to be awarded grants or other funding for smaller projects in separate fiscal years, rather than seek the full amount during one funding period.

Phased costs for design and construction for the preferred alternative are as follows:

Phase 1: $2,133,500
Phase 2: $2,459,000

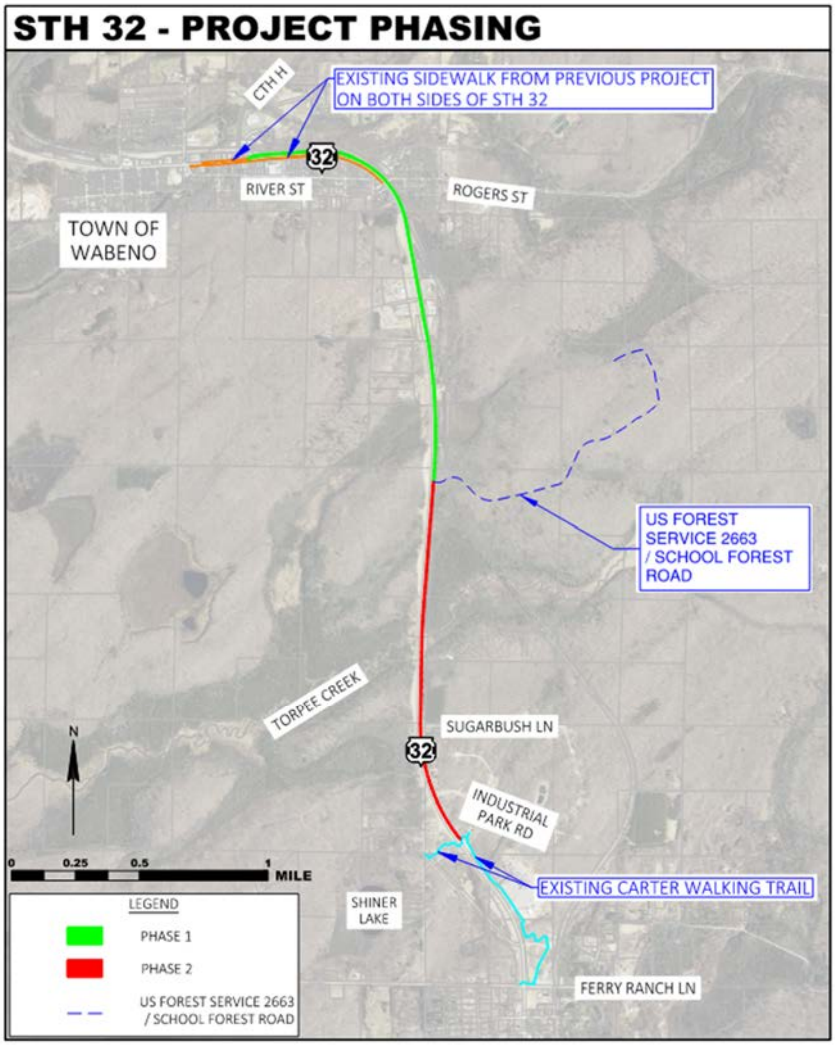


Figure 19: Phases 1 and 2 of the STH 32 Shared-Use Path

POTENTIAL PROJECT SCHEDULE

There are several grant funding opportunities available in 2025 that could be used to fund the design and construction of this project. If 2025 grant funding efforts are successful, we would anticipate the following final design and construction schedule.

Design Kick-Off – June 2026
30% Plans – September 2026
NEPA Environmental Document – November 2026
Property Acquisition (if necessary) – Begin November 2026
Final PS&E – September 2027
Property Acquisition Complete (if necessary) – End November 2027
Project Bidding – December 2027
Begin Construction – February 2028
End Construction – August 2028

NEXT STEPS

PLAN COMMITMENT

To ensure the success of the STH 32 Trail project, it is essential that it be formally included in this study and recognized by the FCPC. Additionally, the project should be incorporated by reference into the following key planning and funding documents to support its implementation and long-term viability

- Obtain project funding
- Engage Engineering Consultant for Final Design
- Future 5-year Prioritized Capital Project Plan
- Annual Budgets
- Future Land Use Plan
- Future Comprehensive Outdoor Recreation Plan
- Long Range Transportation Plan

In addition to FCPC, inclusion/ adoption of the recommendations from this report in County and regional open space and transportation-related reports will all be helpful.

LIST OF APPENDICIES

APPENDIX A – FUNDING AND GRANT OPPORTUNITIES
APPENDIX B – ENGINEERING STANDARDS
APPENDIX C – WETLANDS, WATERBODIES, AND FLOODPLAINS DOCUMENTS
APPENDIX D – INFORMATION FOR PLANNING AND CONSULTATION DOCUMENTS
APPENDIX E – PRELIMINARY PLANS
APPENDIX F – COST ESTIMATE

APPENDIX A – FUNDING AND GRANT OPPORTUNITIES

FUNDING

WISDOT GRANTS

When receiving a WisDOT grant, the design would need to go through the WisDOT Local Program process. The time from grant application to award can vary greatly. Once a grant is awarded and typically, around six months from grant award, a State Municipal Agreement would need to be signed by WisDOT and the project applicant (sponsor). The design process, beginning from selecting a design consultant through awarding the contract for construction, typically takes two years, and most path construction projects can be constructed in one construction season.

Grant Name: Transportation Alternatives Program (TAP)
Supporting Agency: WisDOT
Description: The main WisDOT Grant that provides path funding to local communities is the Transportation Alternatives Program (TAP) grant. TAP Grants are commonly provided as 80% federal funds with a 20% match from the local municipality (sponsor) required. Design and construction costs are eligible.
Evaluation Criteria: In addition to project cost, there are several items that would give a project an advantage in the TAP grant application process, including:

- Logical termini
    - Begin and end of the path, make connections to existing paths, points of interest, schools, parks, neighborhoods, commercial areas, etc.
- The project named in the planning documents mentioned in the Plan Commitment section above.
- Partnerships
    - Work with adjacent municipalities, county, advocacy groups, businesses, and private foundations to build support for the project and use support letters as attachments to the application.
- Completion of the feasibility study
    - Providing proof that the proposed project corridor has been studied to a level that provides some confidence that there are not any glaring barriers to project completion is helpful with an application submittal.

Typical Grant Awards: Grant award amounts can vary greatly in the TAP program. A good rule of thumb to use when strategizing for a TAP Grant application is a construction cost of $1.2 million or less.
Timing of the Grant Applications & Awards: TAP projects are typically solicited every two years on even years, but that schedule is highly dependent on the federal budget and can vary.
Typical Time from Award to Construction: Typically two years between award and construction with design completed during this timeframe.
Overview of Pros

- 80% of funding is higher than many available grants.
- Total project cost is higher than many available grants.

Overview of Cons

- Adherence to more rigorous documentation and approval process.

Grant Name: DNR Trail Grants
Supporting Agency: DNR
Description: DNR grants are also available that could assist in the funding for this project. There are a number of state and federal grants that fall under the DNR Stewardship umbrella and can fund up to 50% of the grant request. Recreational Trails Program funds may only be used on trails that have been identified in or which further a specific goal of a local, county, or state trail plan included or referenced in a statewide comprehensive outdoor recreation plan required by the Federal LWCF

Program. Thirty percent of the funds must be used on motorized trail uses, 30 percent on non-motorized trail uses, and 40 percent on diversified (multiple) trail uses.

High Scoring Criteria:

- Provide public access to outdoor recreation
- Relationship to the Statewide Comprehensive Outdoor Recreation Plan
- Regional or statewide in nature
- Serves the greatest populations
- Involves intergovernmental cooperation or donations
- Supports multiple uses
- Nature-based
- Related or near water facilities
- Improvements to allow for universal accessibility

Typical Grant Awards: Grant awards range from $25,000 up to $500,000. Design and construction costs are eligible.

Timing of the Grant Applications & Awards: Applications are due in spring of each year, with notification of award occurring in early fall.

Typical Time from Award to Construction: One year from authorization is typical.

Overview of Pros

- 50% federal match / 50% local
- Design must meet ADA and WIDNR standards, but no additional reporting other than standard local permits, etc.

Overview of Cons

- Intensive grant application process
- Slower reimbursement timeframe (3 months to 1 year)
- Strong statewide competition for grants (typically get three times the amount of applicants than awards)

To be eligible, the applicant must have a current Comprehensive Outdoor Recreation Plan (CORP) in place.

OTHER GRANTS

WisDOT's Highway Safety Improvement Program Grants (HSIP). It is uncommon that HSIP funds would be used for trail funding, but we anticipate this would become more available for bicycle and pedestrian improvements in the future. HSIP grants are commonly funded at a 90% federal funds and 10% match from the local municipality, but the funding amount is dependent on the project and the crash modification factors the improvements provide.

WisDOT's LRIP grant could be used to pay for roadway pavement improvements that would coincide with a trail project in the same area. Active Transportation Infrastructure Investment Program (ATIIP) is a Federal grant and should be tracked and applied for when a project is eligible.

U.S. DEPARTMENT OF TRANSPORTATION

Federal Lands Highway - The Office of Federal Lands Highway (FLH) is a part of the US Department of Transportation, Federal Highway Administration, and provides program stewardship and transportation engineering services for planning, design, construction, and rehabilitation of the highways and bridges that provide access to and through federally owned lands.

The primary purpose of this program is to provide financial resources and technical assistance for a coordinated program of public roads that service the transportation needs of Federal and Indian lands.

FLH has several programs that may be able to provide financial support to assist local governments with needed improvements to local roads, highways, and bridges.

1. **Public Lands Highway (PLH)** – The Public Lands Highway (PLH) program can fund transportation planning projects, engineering, and possibly construction for routes that are in or provide access to Indian reservations or other federal public lands.

2. **Emergency Relief for Federally Owned Roads (ERFO)** – Routes that have been defined as Federal roads may be eligible for the Emergency Relief for Federally Owned Roads (ERFO) program. These funds are intended to restore roads damaged by a natural disaster.

3. **Tribal Transportation Program (TTP)** – The Tribal Transportation Program (TTP) is the largest program in the Office of Federal Lands Highway. Established in 23 U.S.C. 202 to address the transportation needs of Tribal governments throughout the United States, the program receives $450,000,000 annually to provide safe and adequate transportation and public road access to and within Indian reservations, Indian lands, and Alaska Native Village communities. A prime objective of the TTP is to contribute to the economic development, self-determination, and employment of Indians and Native Americans.

4. **Federal Lands Access Program (FLAP)** – FLAP was established to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands.

5. **Tribal Transportation Program Safety Funds (TTIPSF)** – Each year under the FAST Act, 2% of the available TTP funds are set aside to address transportation safety issues in Native America. Projects are chosen whose outcomes will address the prevention and reduction of death or serious injuries in transportation related incidents, such as motor vehicle crashes.

Better Utilizing Investments to Leverage Development (BUILD) The BUILD program, formerly known as Rebuilding American Infrastructure with Sustainability and Equity (RAISE) and Transportation Investment Generating Economic Recovery (TIGER) discretionary grants, are awarded on a competitive basis for investments in surface transportation infrastructure that will have a significant regional impact. This program was established under the American Recovery and Reinvestment Act of 2009 and operated under annual appropriations acts until RAISE was authorized under the Local and Regional Assistance Program in the Infrastructure Investment and Jobs Act, known as the Bipartisan Infrastructure Law (BIL) in 2021.

PARTNERSHIPS & LOCAL ORGANIZATIONS

The Tribe and local municipalities have done a great job building partnerships with each other, as well as with other organizations. It would be important to continue fostering these relationships and coordinate efforts to schedule and fund the proposed projects.

APPENDIX B – ENGINEERING STANDARDS

The following manuals provide these multi-use path design standards.

- WisDOT Bicycle Facility Design Handbook 2004
- AASHTO Guide for the Development of Bicycle Facilities 2024
- WisDOT Facilities Development Manual 2024
- Public Right-of-Way Accessibility Guidelines July 3, 2024

This list isn't exhaustive but highlights critical design elements.

- 10-foot path width.
- 2-foot shoulders at 6:1 maximum slope.
- Curve radii: minimum of 60-foot, 100-foot preferred.
- Side slopes flatter than 3:1 and requirements for buffer or railing in areas steeper that 3:1 (See Figure 20, from Wisconsin Bicycle Facility Design Handbook.)
- Roadway clear zone assumed to be 30' – pathway to be outside of roadway clear zone.
- Pathway clear zone from edge of path (3-foot typical, 1-foot allowed with continuous obstacle like railing or retaining wall).
- Boardwalk railing required when greater than 30-inches from ground level.
- Structure clear width a minimum of 12-foot.
- Curb ramps with detectable warning fields at all roadway crossings.
- 1.5% cross slope on path.
- Running grades less than 5%.

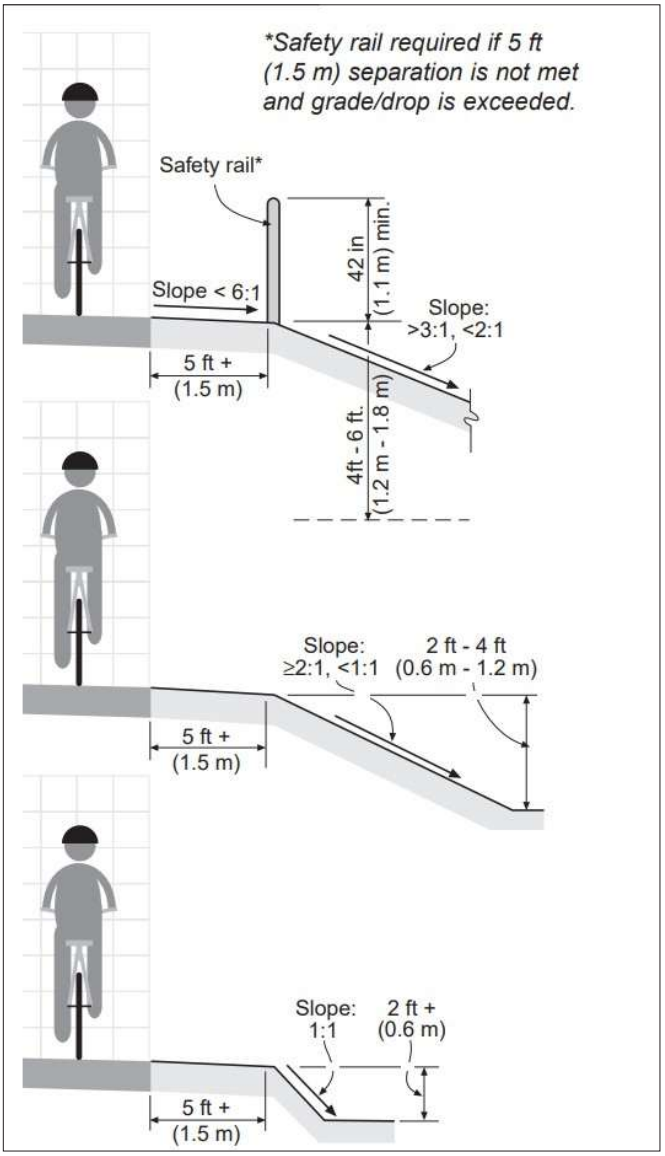


Figure 20: Typical Path Shoulder Section.

PROPOSED CONDITIONS ASSESSMENT

Typical cross section for the path.

- 3-inch of asphalt at a 10-foot width over 8-inch of 1.25-inch crushed aggregate at a 12-foot width.
- 2-foot turf shoulder
- Accounted for possible poor soil conditions with an assumed 20% of the path length requiring additional subgrade improvements, including 12-inch of select crushed and geotextile fabric.
- The right-of-way location will need to be confirmed with topographic survey and title searches in the design phase.

Railing.

- Required at specific locations along the path to protect users from proposed side slopes steeper than 3:1.
- These steep side slopes may be necessary to avoid environmental impacts, property acquisition, and maintain existing drainage along the corridor.

Multi-use Bridge:

- 12-foot Clear Width
- Railing

- Pile supported concrete abutments
- Boardwalk used for approach

Boardwalk.

- 12-foot Clear Width
- Railing required if drop greater than 2-feet
- Minimizes wetland impact and grading
- Helical pile supports

APPENDIX C – WETLANDS, WATERBODIES, AND FLOODPLAINS DOCUMENTS

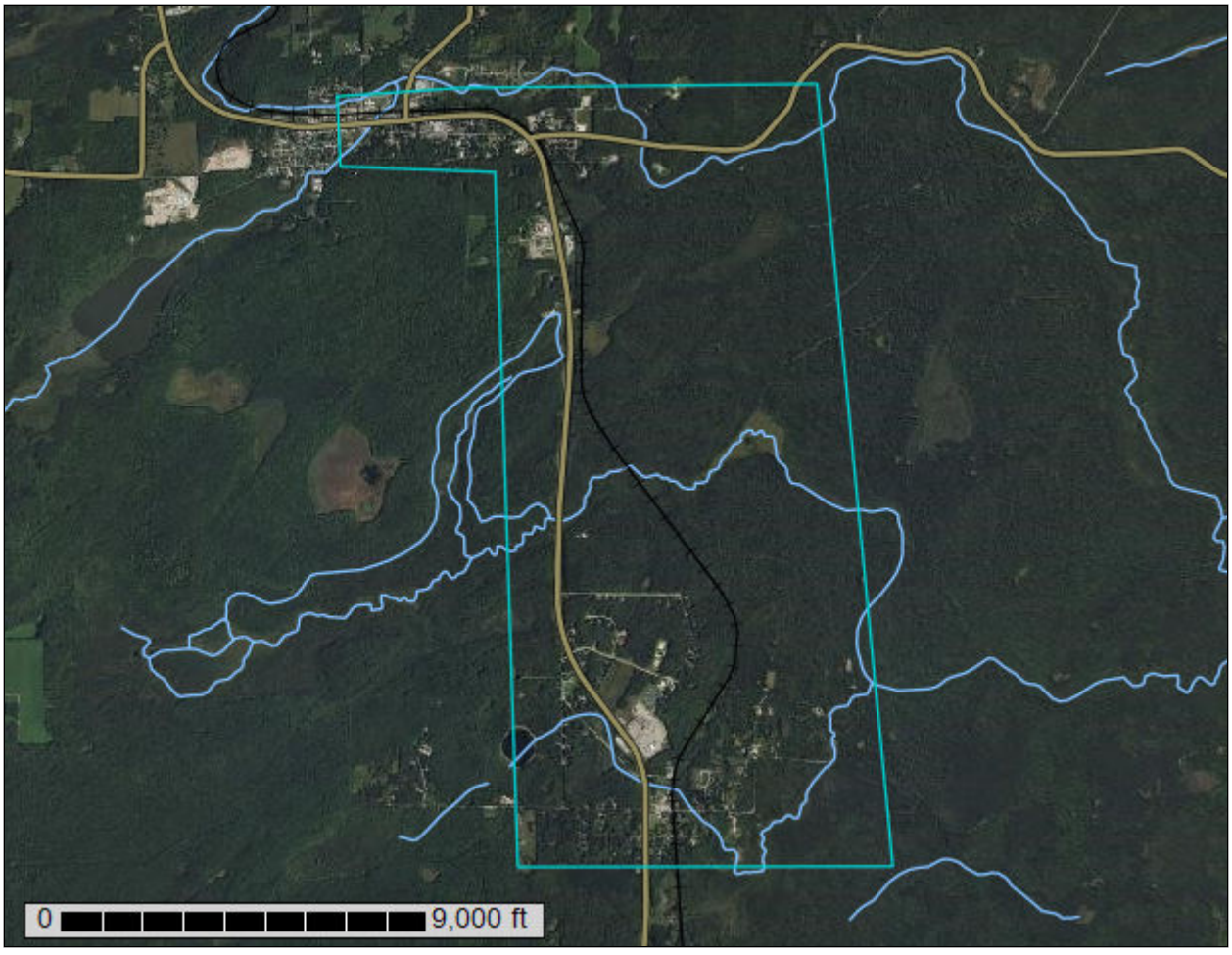
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Forest County, Wisconsin



February 21, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


88° 39' 53" W
88° 35' 48" W
45° 26' 49" N
45° 23' 1" N
370000
370800
371600
372400
373200
374000
374800
5033600
5032800
5032000
5031200
5030400
5029600
5028800
5028000
5027200
VaB
Fm
PgB
Lu
PfD
PgC
WbB
WaC
MuB
SoD
StB
WhA
Ca
3403A
Mn
StC
WdB
PeD
PeC
Pt
W
FeB
N
Map Scale: 1:34,300 if printed on A portrait (8.5" x 11") sheet.
Meters
0
500
1000
2000
3000
Feet
0
1500
3000
6000
9000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Forest County, Wisconsin
Survey Area Data: Version 21, Sep 3, 2024

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

Date(s) aerial images were photographed: Aug 16, 2021—Sep 1, 2021

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3403A	Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes	12.2	0.3%
Ca	Capitola muck, 0 to 2 percent slopes, very stony	101.1	2.5%
FeB	Fence silt loam, 0 to 6 percent slopes	5.4	0.1%
Fm	Fordum loam, 0 to 2 percent slopes	85.4	2.1%
Lu	Lupton and Cathro soils, 0 to 1 percent slopes	527.0	13.3%
M-W	Miscellaneous water	2.6	0.1%
Mn	Minocqua muck, 0 to 2 percent slopes	17.2	0.4%
MuB	Mudlake silt loam, 1 to 6 percent slopes, very stony	374.4	9.4%
PeC	Padus-Pence sandy loams, 6 to 15 percent slopes	48.2	1.2%
PeD	Padus-Pence sandy loams, 15 to 35 percent slopes	14.2	0.4%
PfD	Padus-Soperton silt loams, 15 to 35 percent slopes, very stony	101.9	2.6%
PgB	Padus-Wabeno silt loams, 1 to 6 percent slopes, very stony	9.2	0.2%
PgC	Padus-Wabeno silt loams, 6 to 15 percent slopes, very stony	20.3	0.5%
Pt	Pits, gravel	4.5	0.1%
SoD	Soperton-Goodman silt loams, 15 to 35 percent slopes, very stony	214.8	5.4%
StB	Stambaugh silt loam, 0 to 6 percent slopes	110.5	2.8%
StC	Stambaugh silt loam, 6 to 15 percent slopes	153.9	3.9%
VaB	Vanzile silt loam, 0 to 6 percent slopes	8.7	0.2%
W	Water	11.6	0.3%
WaC	Wabeno-Goodman silt loams, 6 to 15 percent slopes, very stony	1,228.1	30.9%
WbB	Wabeno-Goodwit silt loams, 1 to 6 percent slopes, very stony	861.6	21.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WdB	Wabeno-Mudlake silt loams, 1 to 15 percent slopes, very stony	22.2	0.6%
WhA	Whisklake silt loam, 0 to 3 percent slopes	40.9	1.0%
Totals for Area of Interest		**3,976.1**	**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 pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Forest County, Wisconsin

3403A—Loxley, Beseman, and Dawson peats, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 3110s
Elevation: 790 to 1,970 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Loxley and similar soils: 40 percent
Beseman and similar soils: 30 percent
Dawson and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loxley

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material

Typical profile

Oi - 0 to 7 inches: peat
Oe - 7 to 13 inches: mucky peat
Oa1 - 13 to 28 inches: muck
Oa2 - 28 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: F090AY001WI - Poor Fen
Forage suitability group: Not suited, flooded or organics (G090AY010WI)
Other vegetative classification: Not suited, flooded or organics (G090AY010WI), Tsuga-Thuja-Sphagnum (TTS), Tsuga-Thuja-Mitella (TTM), Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe)

Hydric soil rating: Yes

Description of Beseman

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over loamy till

Typical profile

Oi - 0 to 12 inches: peat
Oa - 12 to 36 inches: muck
Cg - 36 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 20.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: F090AY001WI - Poor Fen
Forage suitability group: Not suited, flooded or organics (G090AY010WI)
Other vegetative classification: Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Description of Dawson

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy glaciofluvial deposits

Typical profile

Oi - 0 to 6 inches: peat
Oa1 - 6 to 11 inches: muck
Oa2 - 11 to 28 inches: muck
A - 28 to 31 inches: mucky fine sand
C - 31 to 79 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: F090AY001WI - Poor Fen
Forage suitability group: Not suited, flooded or organics (G090AY010WI)
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS), Tsuga-Thuja-Mitella (TTM), Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Minor Components

Cathro

Percent of map unit: 5 percent
Landform: Swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY002WI - Mucky Swamp
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS), Tsuga-Thuja-Mitella (TTM), Picea mariana-Larix laricina/Nemopanthus mucronata , Black Spruce-Tamarack/Mountain Holly (3PmLNe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Kinross

Percent of map unit: 5 percent
Landform: Depressions, flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: F090AY005WI - Wet Sandy Lowland
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS), Abies balsamea-Thuja occidentalis-Acer rubrum/Acer spicatum , Balsam Fir-Northern White Cedar-Red Maple/Mountain Maple (3AbThArAsp), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Ca—Capitola muck, 0 to 2 percent slopes, very stony

Map Unit Setting

National map unit symbol: gf8l
Elevation: 800 to 1,800 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Capitola and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Capitola

Setting

Landform: Depressions on moraines, depressions on drumlins, drainageways on moraines, drainageways on drumlins
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Silty alluvium over loamy and/or sandy till and/or mudflow deposits

Typical profile

Oa - 0 to 5 inches: muck
Bg - 5 to 22 inches: silt loam
2Btg - 22 to 36 inches: fine sandy loam
2Cg - 36 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D
Ecological site: F090AY006WI - Wet Loamy Lowland
Forage suitability group: Mod AWC, high water table (G090AY004WI)
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

FeB—Fence silt loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: gf8p
Elevation: 700 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Fence and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fence

Setting

Landform: Glacial lakes, outwash plains, moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over stratified lacustrine deposits

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 3 inches: silt loam
Bs - 3 to 9 inches: silt loam
E/B - 9 to 17 inches: silt loam
B/E1,B/E2,Bt - 17 to 42 inches: silt loam
C - 42 to 60 inches: stratified very fine sand to silt

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: High AWC, adequately drained (G090AY008WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Fm—Fordum loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: gf8r
Elevation: 680 to 1,700 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Fordum and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fordum

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium over sandy and gravelly and/or sandy alluvium

Typical profile

A - 0 to 6 inches: loam
Cg1,Cg2,Cg3 - 6 to 26 inches: silt loam
C1,C2 - 26 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F090AY004WI - Loamy Floodplain
Forage suitability group: Not suited, flooded or organics (G090AY010WI)
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Lu—Lupton and Cathro soils, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tnxw
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Lupton and similar soils: 45 percent
Cathro and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lupton

Setting

Landform: Depressions on moraines, depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Woody organic material and/or herbaceous organic material

Typical profile

Oa1 - 0 to 10 inches: muck
Oa2 - 10 to 25 inches: muck
Oa3 - 25 to 46 inches: muck
Oa4 - 46 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F090AY002WI - Mucky Swamp
Forage suitability group: Not suited, flooded or organics (G090AY010WI)
Other vegetative classification: Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Description of Cathro

Setting

Landform: Depressions on moraines, depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over deposits loamy drift

Typical profile

Oa1 - 0 to 15 inches: muck
Oa2 - 15 to 28 inches: muck
Cg1 - 28 to 49 inches: loam
Cg2 - 49 to 79 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 16.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F090AY002WI - Mucky Swamp
Forage suitability group: Not suited, flooded or organics (G090AY010WI)

Other vegetative classification: Picea mariana-Larix laricina/Nemopanthus mucronata , Black Spruce-Tamarack/Mountain Holly (3PmLNe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Minor Components

Capitola
Percent of map unit: 5 percent
Landform: Depressions on moraines, drainageways on moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Beseman
Percent of map unit: 5 percent
Landform: Depressions on lake plains, depressions on moraines, depressions on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY001WI - Poor Fen
Other vegetative classification: Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Loxley
Percent of map unit: 5 percent
Landform: Depressions on lake plains, depressions on moraines, depressions on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY001WI - Poor Fen
Other vegetative classification: Picea mariana-Larix laricina/Ledum groenlandicum , Black Spruce-Tamarack/Labrador Tea (3PmLLe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Markey
Percent of map unit: 5 percent
Landform: Depressions on moraines, depressions on outwash plains, depressions on lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Ecological site: F090AY002WI - Mucky Swamp
Other vegetative classification: Picea mariana-Larix laricina/Nemopanthus mucronata , Black Spruce-Tamarack/Mountain Holly (3PmLNe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

M-W—Miscellaneous water

Map Unit Setting

National map unit symbol: gfb8
Elevation: 670 to 1,100 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: Not prime farmland

Map Unit Composition

Water, miscellaneous: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water, Miscellaneous

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: Unranked

Mn—Minocqua muck, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tnzp
Elevation: 590 to 1,750 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Minocqua and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Minocqua

Setting

Landform: Depressions, drainageways
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Silty and loamy glaciofluvial deposits over sandy and gravelly outwash

Typical profile

Oa - 0 to 1 inches: muck
Eg - 1 to 9 inches: silt loam
Bg - 9 to 17 inches: silt loam
2Bg - 17 to 22 inches: loam
3BCg - 22 to 25 inches: gravelly loamy coarse sand
3Cg - 25 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 4.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F090AY006WI - Wet Loamy Lowland
Forage suitability group: Mod AWC, high water table (G090AY004WI)
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Minor Components

Cathro

Percent of map unit: 8 percent
Landform: Depressions, drainageways
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: F090AY001WI - Poor Fen
Other vegetative classification: Picea mariana-Larix laricina/Nemopanthus mucronata , Black Spruce-Tamarack/Mountain Holly (3PmLNe), Not suited, flooded or organics (G090AY010WI)
Hydric soil rating: Yes

Oesterle

Percent of map unit: 5 percent
Landform: Terraces, flats

Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga canadensis / Maianthemum canadense - Coptis groenlandica , Eastern Hemlock / Wild Lily-of-the-valley - Goldthread (TMC), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Worcester

Percent of map unit: 5 percent
Landform: Terraces, flats
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga canadensis / Maianthemum canadense - Coptis groenlandica , Eastern Hemlock / Wild Lily-of-the-valley - Goldthread (TMC), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Minocqua, briefly flooded

Percent of map unit: 2 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

MuB—Mudlake silt loam, 1 to 6 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2ypb8
Elevation: 1,120 to 1,870 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mudlake, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mudlake, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over sandy and loamy till

Typical profile

A - 0 to 5 inches: silt loam
E - 5 to 9 inches: silt loam
Bs - 9 to 16 inches: silt loam
B/E - 16 to 29 inches: silt loam
2Bt - 29 to 35 inches: sandy loam
2C - 35 to 79 inches: loamy sand

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Forage suitability group: High AWC, high water table (G090AY007WI)
Other vegetative classification: Acer saccharum / Hydrophyllum virginianum - Impatiens capensis , Sugar Maple / Virginia Waterleaf - Jewelweed (AHI), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Minor Components

Witbeck, very stony

Percent of map unit: 6 percent
Landform: Interdrumlins
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

Wabeno, very stony

Percent of map unit: 4 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Goodwit, very stony

Percent of map unit: 3 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI), Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa)
Hydric soil rating: No

Sarwet, very stony

Percent of map unit: 2 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Viburnum acerifolium , Sugar Maple / Maple-leaved Viburnum (AVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

PeC—Padus-Pence sandy loams, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tnz1
Elevation: 1,030 to 1,900 feet

Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Padus and similar soils: 45 percent
Pence and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus

Setting

Landform: Hillslopes, disintegration moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 3 inches: sandy loam
Bs - 3 to 19 inches: sandy loam
E/B - 19 to 26 inches: sandy loam
B/E - 26 to 38 inches: sandy loam
2C - 38 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Pence

Setting

Landform: Disintegration moraines, hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 8 inches: sandy loam
Bs - 8 to 15 inches: gravelly sandy loam
2BC - 15 to 21 inches: gravelly coarse sand
2C - 21 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Low AWC, adequately drained (G090AY002WI)
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Padus, stony

Percent of map unit: 10 percent
Landform: Hillslopes, disintegration moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum

acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Sayner
Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium , Eastern White Pine - Red Maple / Low Sweet Blueberry (PArV), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis - Polygonatum pubescens variant , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla - Hairy Solomon's Seal variant (PArVAa-Po), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Vilas
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium , Eastern White Pine - Red Maple / Low Sweet Blueberry (PArV), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Uvularia sessilifolia variant , Eastern White Pine - Red Maple / Low Sweet Blueberry - Sessile Bellwort variant (PArV-U), Pinus strobus - Quercus spp. / Gaultheria procumbens , Eastern White Pine - Oak spp. / Wintergreen (PQG), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

PeD—Padus-Pence sandy loams, 15 to 35 percent slopes

Map Unit Setting
National map unit symbol: 2tnz2
Elevation: 1,030 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Padus and similar soils: 45 percent
Pence and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus

Setting

Landform: Disintegration moraines, hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 3 inches: sandy loam
Bs - 3 to 19 inches: sandy loam
E/B - 19 to 26 inches: sandy loam
B/E - 26 to 38 inches: sandy loam
2C - 38 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Pence

Setting

Landform: Disintegration moraines, hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 8 inches: sandy loam
Bs - 8 to 15 inches: gravelly sandy loam
2BC - 15 to 21 inches: gravelly coarse sand
2C - 21 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Upland
Forage suitability group: Low AWC, adequately drained (G090AY002WI)
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Minor Components

Padus, stony

Percent of map unit: 10 percent
Landform: Disintegration moraines, hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Sayner

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium , Eastern White Pine - Red Maple / Low Sweet Blueberry (PArV), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis - Polygonatum pubescens variant , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla - Hairy Solomon's Seal variant (PArVAa-Po), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Vilas

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium , Eastern White Pine - Red Maple / Low Sweet Blueberry (PArV), Pinus strobus - Acer rubrum / Vaccinium angustifolium - Uvularia sessilifolia variant , Eastern White Pine - Red Maple / Low Sweet Blueberry - Sessile Bellwort variant (PArV-U), Pinus strobus - Quercus spp. / Gaultheria procumbens , Eastern White Pine - Oak spp. / Wintergreen (PQG), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

PfD—Padus-Soperton silt loams, 15 to 35 percent slopes, very stony

Map Unit Setting

National map unit symbol: gf99
Elevation: 700 to 1,950 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Padus, sandy substratum, and similar soils: 65 percent
Soperton and similar soils: 33 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus, Sandy Substratum

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty and/or loamy drift over sandy and gravelly and/or sandy outwash

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 3 inches: silt loam
Bs1,Bs2 - 3 to 12 inches: silt loam
E/B,Bt - 12 to 28 inches: sandy loam
2C - 28 to 60 inches: stratified sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained with limitations (G090AY006WI)
Other vegetative classification: Mod AWC, adequately drained with limitations (G090AY006WI), Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb)
Hydric soil rating: No

Description of Soperton

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift over loamy and/or sandy till and/or mudflow deposits

Typical profile

Oa,A - 0 to 6 inches: silt loam
E,Bs,E/B - 6 to 21 inches: silt loam

2B/E - 21 to 29 inches: gravelly sandy loam
2Btx - 29 to 37 inches: gravelly sandy loam
2BC,2C - 37 to 61 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained with limitations (G090AY006WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained with limitations (G090AY006WI)
Hydric soil rating: No

Minor Components

Capitola

Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI)
Hydric soil rating: Yes

Minocqua

Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn)
Hydric soil rating: Yes

PgB—Padus-Wabeno silt loams, 1 to 6 percent slopes, very stony

Map Unit Setting

National map unit symbol: gf9b
Elevation: 700 to 1,950 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Padus, sandy substratum, and similar soils: 65 percent
Wabeno and similar soils: 33 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus, Sandy Substratum

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty and/or loamy drift over sandy and gravelly and/or sandy outwash

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 3 inches: silt loam
Bs1,Bs2 - 3 to 12 inches: silt loam
E/B,Bt - 12 to 28 inches: sandy loam
2C - 28 to 60 inches: stratified sand

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

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

Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Wabeno

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift over loamy and/or sandy till and/or mudflow deposits

Typical profile

A,E - 0 to 6 inches: silt loam
Bs1,Bs2 - 6 to 13 inches: silt loam
E/B - 13 to 27 inches: silt loam
2Btx,2BCx - 27 to 47 inches: gravelly sandy loam
2C - 47 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Minocqua

Percent of map unit: 1 percent
Landform: Depressions

Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn)
Hydric soil rating: Yes

Capitola

Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI)
Hydric soil rating: Yes

PgC—Padus-Wabeno silt loams, 6 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: gf9c
Elevation: 700 to 1,950 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Padus, sandy substratum, and similar soils: 65 percent
Wabeno and similar soils: 33 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus, Sandy Substratum

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty and/or loamy drift over sandy and gravelly and/or sandy outwash

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 3 inches: silt loam
Bs1,Bs2 - 3 to 12 inches: silt loam
E/B,Bt - 12 to 28 inches: sandy loam
2C - 28 to 60 inches: stratified sand

Properties and qualities

Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Wabeno

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift over loamy and/or sandy till and/or mudflow deposits

Typical profile

A,E - 0 to 6 inches: silt loam
Bs1,Bs2 - 6 to 13 inches: silt loam
E/B - 13 to 27 inches: silt loam
2Btx,2BCx - 27 to 47 inches: gravelly sandy loam
2C - 47 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland

Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Capitola
Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI)
Hydric soil rating: Yes

Minocqua
Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn)
Hydric soil rating: Yes

Pt—Pits, gravel

Map Unit Setting
National map unit symbol: gf9n
Elevation: 660 to 980 feet
Mean annual precipitation: 31 to 35 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 110 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Pits, gravel: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Setting
Parent material: Gravelly outwash

Typical profile
H1 - 0 to 10 inches: stratified extremely gravelly coarse sand to very gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Aquents

Percent of map unit: 1 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Ecological site: F090BY004WI - Loamy Floodplain
Other vegetative classification: Fraxinus nigra/Onoclea sensibilis , Black Ash/ Sensitive Fern (1FnOn)
Hydric soil rating: Yes

SoD—Soperton-Goodman silt loams, 15 to 35 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2tnzw
Elevation: 1,260 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Soperton, very stony, and similar soils: 50 percent
Goodman, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Soperton, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 15 inches: silt loam
E/B - 15 to 21 inches: silt loam
2B/E - 21 to 29 inches: gravelly sandy loam
2Btx - 29 to 37 inches: gravelly sandy loam
2BC - 37 to 46 inches: gravelly sandy loam

2C - 46 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 24 to 49 inches to fragipan
Drainage class: Well drained
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
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained with limitations (G090AY006WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained with limitations (G090AY006WI)
Hydric soil rating: No

Description of Goodman, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 12 inches: silt loam
E/B - 12 to 19 inches: silt loam
B/E - 19 to 25 inches: silt loam
2Bt1 - 25 to 41 inches: sandy loam
2Bt2 - 41 to 51 inches: gravelly sandy loam
2C - 51 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Wabeno, very stony

Percent of map unit: 5 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Stambaugh, very stony

Percent of map unit: 3 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Padus, very stony

Percent of map unit: 3 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex

Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Mudlake, very stony
Percent of map unit: 2 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer saccharum / Hydrophyllum virginianum - Impatiens capensis , Sugar Maple / Virginia Waterleaf - Jewelweed (AHI), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Pence, very stony
Percent of map unit: 2 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

StB—Stambaugh silt loam, 0 to 6 percent slopes

Map Unit Setting
National map unit symbol: gf9s
Elevation: 1,400 to 1,600 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Stambaugh and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stambaugh

Setting

Landform: Stream terraces, outwash plains
Landform position (two-dimensional): Summit, backslope, toeslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift and/or loess over sandy and gravelly outwash

Typical profile

A,E,Bs - 0 to 14 inches: silt loam
E/B,Bt1,2Bt2 - 14 to 35 inches: silt loam
2C - 35 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: High AWC, adequately drained (G090AY008WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

StC—Stambaugh silt loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: gf9t
Elevation: 1,400 to 1,600 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Stambaugh and similar soils: 100 percent

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

Description of Stambaugh

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift and/or loess over sandy and gravelly outwash

Typical profile

A,E,Bs - 0 to 14 inches: silt loam
E/B,Bt1,2Bt2 - 14 to 35 inches: silt loam
2C - 35 to 60 inches: gravelly sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: High AWC, adequately drained (G090AY008WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

VaB—Vanzile silt loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: gf9y
Elevation: 1,000 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Vanzile and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vanzile

Setting

Landform: Outwash plains, stream terraces
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty drift and/or loess over sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 4 inches: silt loam
Bs1,Bs2 - 4 to 14 inches: silt loam
E/B - 14 to 21 inches: silt loam
B/E,2Bt - 21 to 30 inches: silt loam
3C - 30 to 60 inches: stratified sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: gfb1
Elevation: 660 to 980 feet

Mean annual precipitation: 30 to 34 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WaC—Wabeno-Goodman silt loams, 6 to 15 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2tnzv
Elevation: 1,280 to 1,940 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Wabeno, very stony, and similar soils: 50 percent
Goodman, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting
Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile
A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 13 inches: silt loam
E/B - 13 to 26 inches: silt loam
2(B/E)x - 26 to 40 inches: gravelly sandy loam
2Btx - 40 to 50 inches: gravelly sandy loam
2C - 50 to 79 inches: gravelly sandy loam

Properties and qualities
Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 39 inches to fragipan
Drainage class: Moderately well drained
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: About 6 to 18 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Goodman, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 12 inches: silt loam
E/B - 12 to 19 inches: silt loam
B/E - 19 to 25 inches: silt loam
2Bt1 - 25 to 41 inches: sandy loam
2Bt2 - 41 to 51 inches: gravelly sandy loam
2C - 51 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)

Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Stambaugh, very stony
Percent of map unit: 5 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Padus, very stony
Percent of map unit: 5 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Pence, very stony
Percent of map unit: 3 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Pinus strobus - Acer rubrum / Vaccinium angustifolium - Aralia nudicaulis , Eastern White Pine - Red Maple / Low Sweet Blueberry - Wild Sarsaparilla (PArVAa), Low AWC, adequately drained (G090AY002WI)
Hydric soil rating: No

Mudlake, very stony
Percent of map unit: 2 percent
Landform: Drumlins, moraines

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer saccharum / Hydrophyllum virginianum - Impatiens capensis , Sugar Maple / Virginia Waterleaf - Jewelweed (AHI), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

WbB—Wabeno-Goodwit silt loams, 1 to 6 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2tnzt
Elevation: 1,300 to 1,890 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wabeno, very stony, and similar soils: 50 percent
Goodwit, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 13 inches: silt loam
E/B - 13 to 26 inches: silt loam
2(B/E)x - 26 to 40 inches: gravelly sandy loam
2Btx - 40 to 50 inches: gravelly sandy loam
2C - 50 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 39 inches to fragipan

Drainage class: Moderately well drained
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: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Goodwit, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 19 inches: silt loam
E/B - 19 to 24 inches: silt loam
2B/E - 24 to 31 inches: gravelly sandy loam
2Bt - 31 to 45 inches: gravelly sandy loam
2C - 45 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

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

Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Stambaugh, very stony
Percent of map unit: 5 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: High AWC, adequately drained (G090AY008WI), Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa)
Hydric soil rating: No

Mudlake, very stony
Percent of map unit: 5 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: High AWC, high water table (G090AY007WI), Acer saccharum / Hydrophyllum virginianum - Impatiens capensis , Sugar Maple / Virginia Waterleaf - Jewelweed (AHI)
Hydric soil rating: No

Padus, very stony
Percent of map unit: 3 percent
Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum - Tsuga canadensis / Maianthemum canadense , Sugar Maple - Eastern Hemlock / Qild Lily-of-the-valley (ATM), Acer saccharum / Vaccinium angustifolium - Viburnum acerifolium , Sugar Maple / Low Sweet Blueberry - Maple-leaved Viburnum (AVVb), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Witbeck, very stony

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

WdB—Wabeno-Mudlake silt loams, 1 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: gfb4
Elevation: 1,000 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wabeno and similar soils: 65 percent
Mudlake and similar soils: 34 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty drift and/or loess over loamy and/or sandy till and/or mudflow deposits

Typical profile

A,E - 0 to 6 inches: silt loam
Bs1,Bs2 - 6 to 13 inches: silt loam
E/B - 13 to 27 inches: silt loam
2Btx,2BCx - 27 to 47 inches: gravelly sandy loam
2C - 47 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum - Tsuga canadensis / Dryopteris spinulosa , Sugar Maple - Eastern Hemlock / Spinulose Shield Fern (ATD), Acer saccharum / Osmorhiza claytoni - Caulophyllum thalictroides , Sugar Maple / Sweet Cicley - Blue Cohosh (AOCa), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Mudlake

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Footslope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty drift and/or loess over loamy and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 5 inches: silt loam
E - 5 to 9 inches: silt loam
Bs - 9 to 16 inches: silt loam
B/E - 16 to 29 inches: silt loam
2Bt - 29 to 35 inches: sandy loam
2C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B/D
Ecological site: F090AY011WI - Moist Loamy Lowland

Forage suitability group: High AWC, high water table (G090AY007WI)
Other vegetative classification: Acer saccharum / Hydrophyllum virginianum - Impatiens capensis , Sugar Maple / Virginia Waterleaf - Jewelweed (AHI), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Minor Components

Capitola
Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Acer rubrum/Impatience capensis , Black Ash-Red Maple/Spotted Touch-me-not (3FnArI)
Hydric soil rating: Yes

WhA—Whisklake silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: gfb5
Elevation: 1,000 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Whisklake and similar soils: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whisklake

Setting
Landform: Depressions on stream terraces, depressions on outwash plains, drainageways on stream terraces, drainageways on outwash plains
Landform position (two-dimensional): Footslope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Silty drift over sandy and gravelly and/or sandy outwash

Typical profile
A - 0 to 3 inches: silt loam
E - 3 to 6 inches: silt loam
Bs - 6 to 14 inches: silt loam
E',2B/E - 14 to 30 inches: silt loam
2Bt - 30 to 36 inches: loam
3C - 36 to 60 inches: stratified sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Forage suitability group: Mod AWC, high water table (G090AY004WI)
Other vegetative classification: Acer rubrum - Abies balsamea / Cornus canadensis , Red Maple - Balsam Fir / Bunchberry (ArAbCo), Acer saccharum / Caulophyllum thalictroides - Impatiens capensis , Sugar Maple / Blue Cohosh - Jewelweed (ACaI), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: No

Minor Components

Minocqua

Percent of map unit: 1 percent
Landform: Depressions
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus nigra-Abies balsamea-Acer rubrum/ Onoclea sensibilis , Black Ash-Balsam Fir-Red Maple/Sensitive Fern (3FnAbArOn)
Hydric soil rating: Yes

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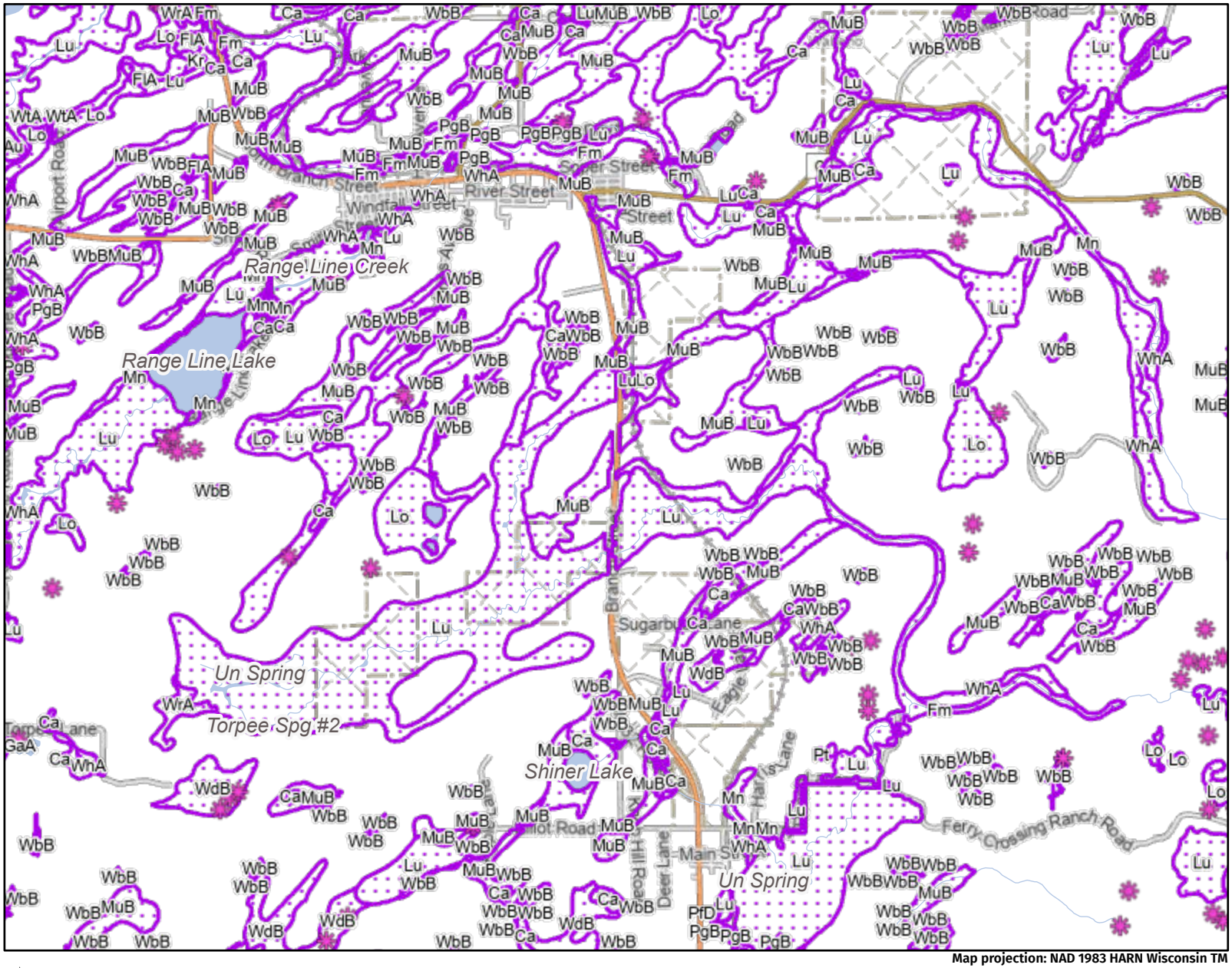
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wetland Indicator Soils



Legend: (some map layers may not be displayed)

- USDA Wetspots
- Wetland Indicators
- 24K Lakes and Open Water
- 24K Streams and Rivers
- 24K Intermittent Streams
- County Boundaries

Major Roads

- State Highway

County and Local Roads

- County HWY
- Local Road
- Railroads
- Tribal Lands

Notes:



Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 3,000 6,000 Feet
0 1,000 2,000 Meters

Service Layer Credits:
Wetland Indicators & Soils: Surface Water Data Viewer Team, EN Basic Basemap WTM Ext:

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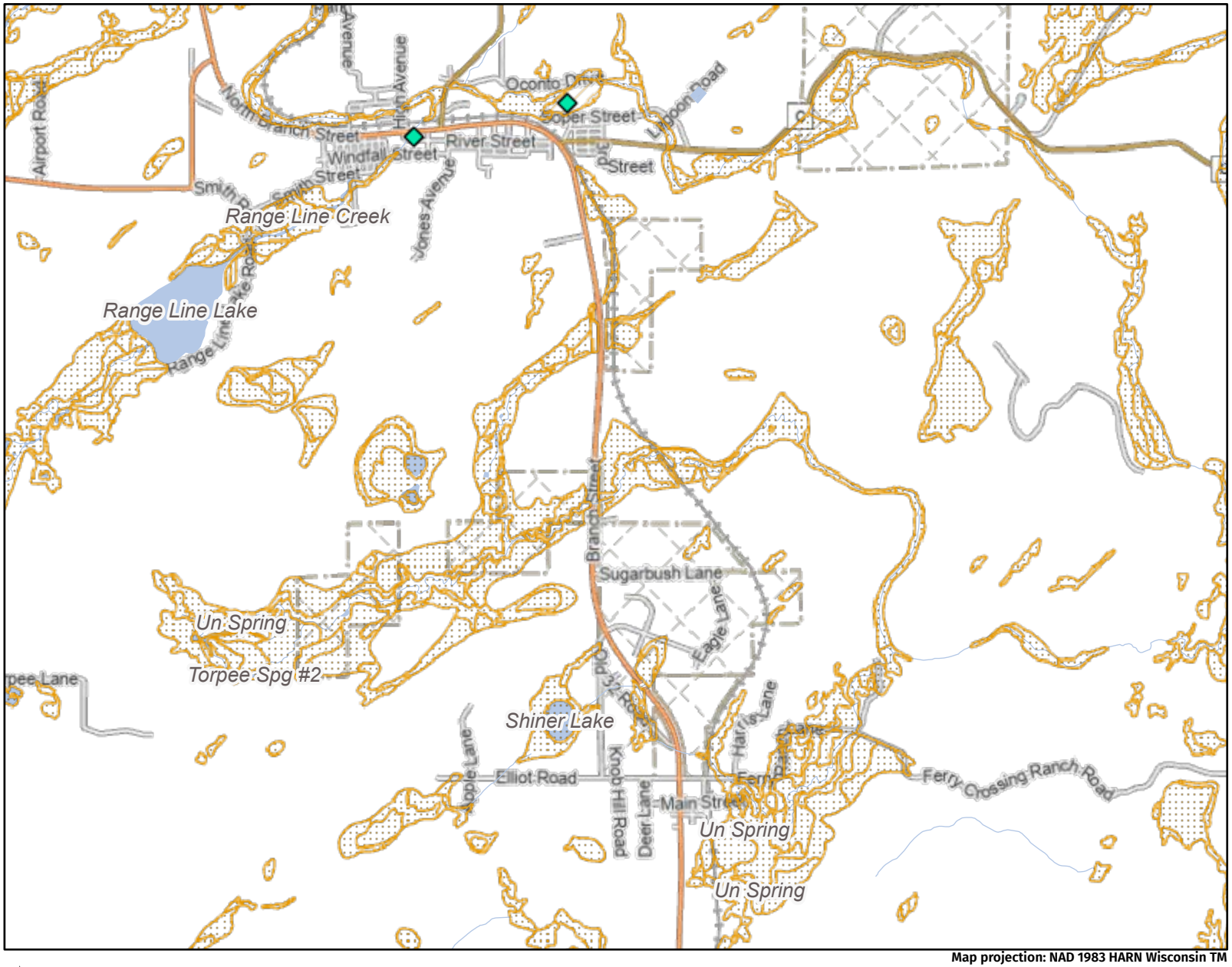
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Mapped Wetlands



Legend: (some map layers may not be displayed)

- Wetland Identifications and Confirmations

Wetland Class Points

- Excavated pond
- Wetland too small to delineate
- Wetland Class Areas

Filled Areas

- Y
- 24K Lakes and Open Water
- 24K Streams and Rivers
- 24K Intermittent Streams
- County Boundaries

Major Roads

- State Highway

County and Local Roads

- County HWY
- Local Road
- Railroads
- Tribal Lands

Notes:



Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 3,000 6,000 Feet
0 1,000 2,000 Meters

Service Layer Credits:
Wisconsin Wetland Inventory NWI (cached): , EN Basic Basemap WTM Ext:

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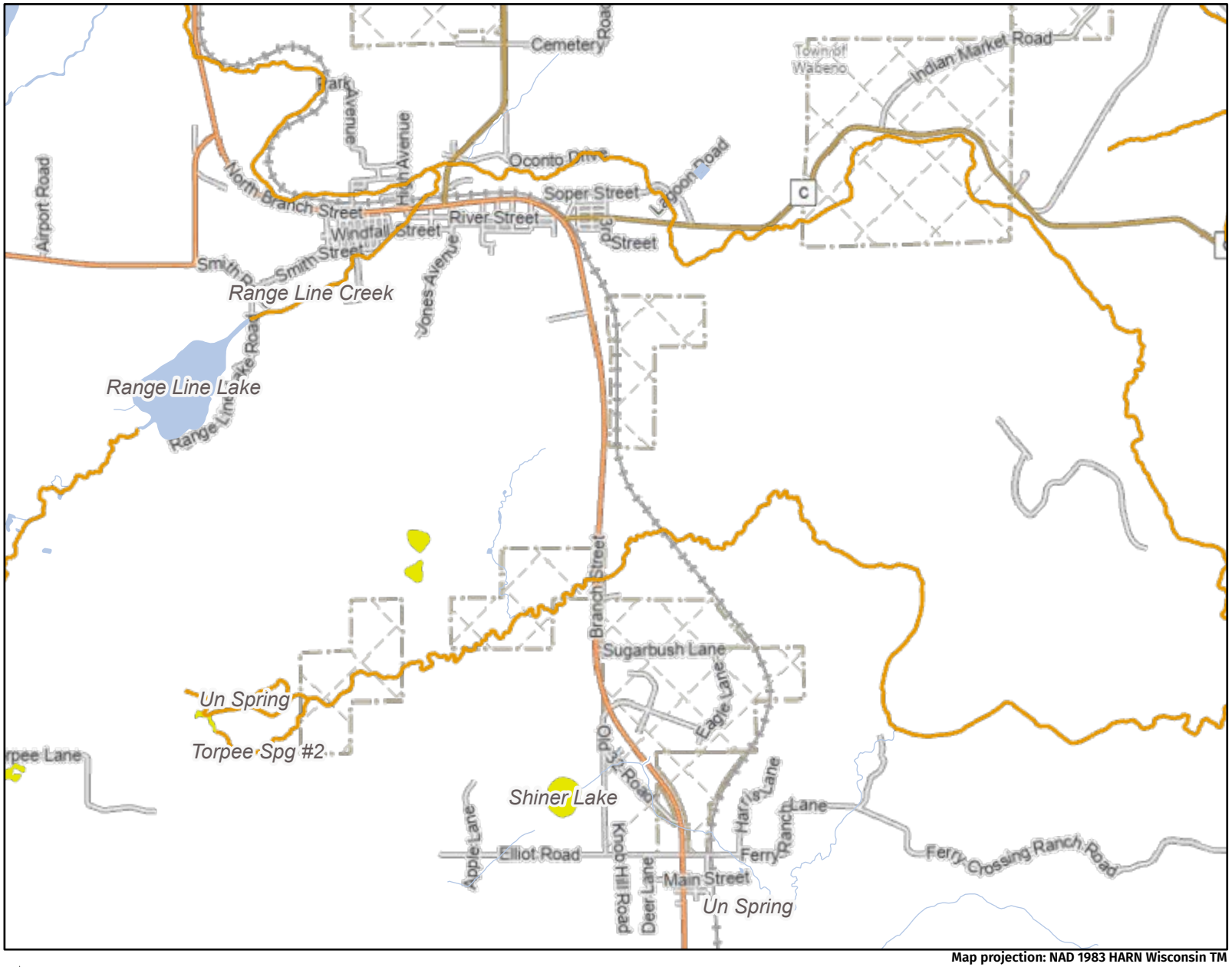
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Navigable Waterways



Legend: (some map layers may not be displayed)

- PNW-ASNRI Outstanding and Exceptional Streams
- PNW-ASNRI Trout Streams
- PNW Lakes Less Than 50 Acres
- 24K Lakes and Open Water
- 24K Streams and Rivers
- 24K Intermittent Streams
- County Boundaries

Major Roads

- State Highway

County and Local Roads

- County HWY
- Local Road
- Railroads
- Tribal Lands

Notes:



Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 3,000 6,000 Feet
0 1,000 2,000 Meters

Service Layer Credits:
EN Basic Basemap WTM Ext: , Priority Navigable Waterways: Waterway Protection, WDNR

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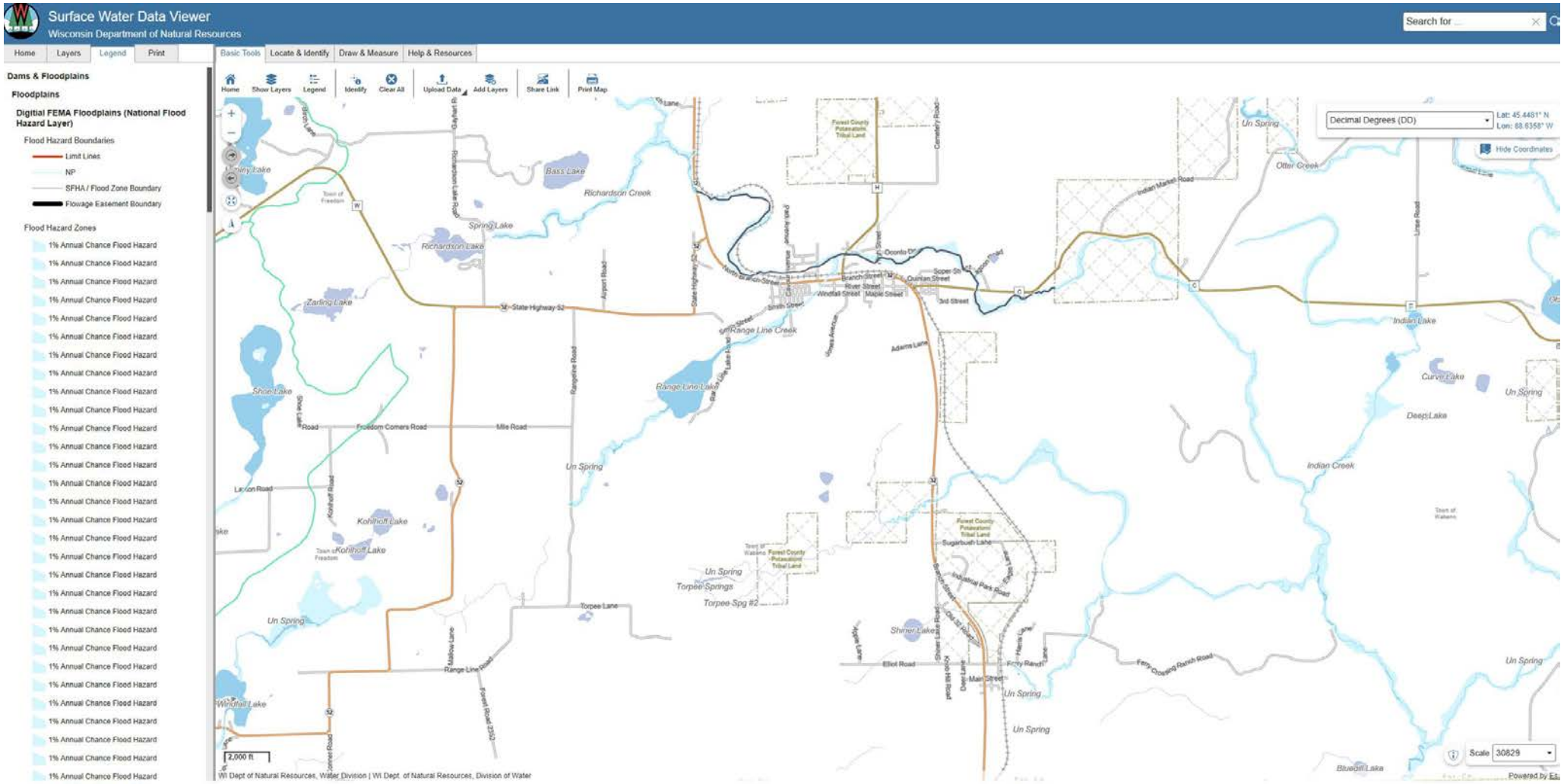
Floodplains



APPENDIX D – INFORMATION FOR PLANNING AND CONSULTATION DOCUMENTS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 04/09/2025 22:55:46 UTC
Project Code: 2025-0081279
Project Name: STH 32 Feasibility Study

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected. For bat activity dates, please review Appendix L in the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC

species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the northern long-eared bat and tricolored bat range-wide D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter. Additional information about available tools can be found on the Service's northern long-eared bat website.

Whooping Crane
Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities
Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. It is the responsibility of the project proponent to survey the area for any migratory bird nests. If there is an eagle nest on-site while work is on-going, eagles may be disturbed. We recommend avoiding and minimizing disturbance to eagles whenever practicable. If you cannot avoid eagle disturbance, you may seek a permit. A nest take permit is always required for removal, relocation, or obstruction of an eagle nest. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. **Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.**

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code: 2025-0081279
Project Name: STH 32 Feasibility Study
Project Type: Recreation - New Construction
Project Description: A study examining the feasibility of an off-road shared use path along STH 32, between Wabeno and Carter.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@45.4165215,-88.62671816633414,14z



Counties: Forest County, Wisconsin

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Wolf *Canis lupus* Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico. There is **final** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/4488	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project

activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

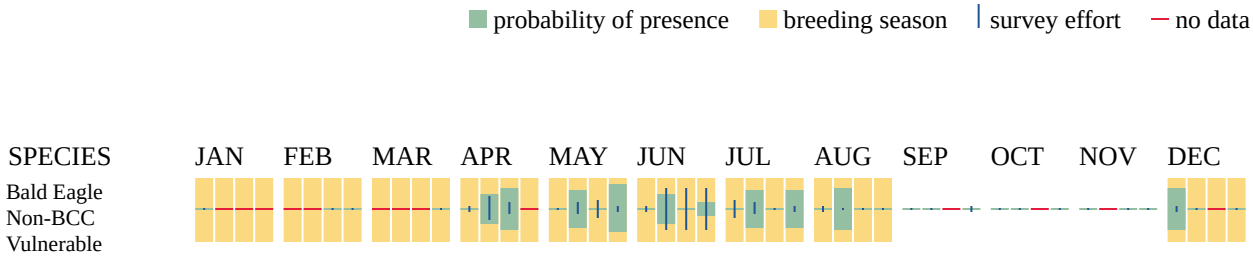
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory

birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern *Chlidonias niger surinamenisis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9465	Breeds May 15 to Aug 10

NAME	BREEDING SEASON
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Veery *Catharus fuscescens fuscescens* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11987	Breeds May 15 to Jul 15
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1C
- PFO1Bg
- PFO2/SS3C
- PSS4Bg
- PFO1/4Bg
- PFO1/4C
- PFO2Bg
- PFO4Bg
- PFO5Fg
- PSS1/EM1Bg
- PFO1/SS1C
- PSS1/EM1C
- PFO2/SS3Bg
- PFO1/4A
- PFO1C
- PSS1Bg

RIVERINE

- R4SBC
- R2UBH
- R5UBH

FRESHWATER EMERGENT WETLAND

- PEM1C
- PEM1F

FRESHWATER POND

- PUBH
- PUBGx

IPAC USER CONTACT INFORMATION

Agency: Forest County Potawatomi Community, Wisconsin
Name: Gabrielle Jones
Address: 5400 King James Way Suite #200
City: Madison
State: WI
Zip: 53719
Email gabrielle.jones@klengineering.com
Phone: 6086535645

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 04/09/2025 22:59:16 UTC
Project code: 2025-0081279
Project Name: STH 32 Feasibility Study

Subject: Technical Assistance letter for 'STH 32 Feasibility Study' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Gabrielle Jones:

The U.S. Fish and Wildlife Service (Service) received on **April 09, 2025** your effect determination(s) for the 'STH 32 Feasibility Study' (Action) using the Minnesota-Wisconsin DKey within the Information for Planning and Consultation (IPaC) system. You have submitted this key to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance of with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your answers and the assistance of the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Gray Wolf (*Canis lupus*)	Endangered	NLAA
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	No effect

Determination Information

Thank you for informing the Service of your "NLAA" determination(s). No further coordination is necessary for the species you determined may be affected, but not likely to be adversely affected, by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your

project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

Species-specific information

Gray Wolf: Please notify the Service if there is observed gray wolf activity during project implementation that could indicate a den or rendezvous site in close proximity (e.g., multiple wolves observed).

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the "taking" of bald and golden eagles and defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Eagle Act's implementing regulations define disturb as "… to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

The following species and/or critical habitats may also occur in your project area and **are not** covered by this conclusion:

- Northern Long-eared Bat *Myotis septentrionalis* Endangered

Coordination with the Service is not complete if additional coordination is advised above for any species.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

STH 32 Feasibility Study

2. Description

The following description was provided for the project 'STH 32 Feasibility Study':

> A study examining the feasibility of an off-road shared use path along STH 32, between Wabeno and Carter.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@45.4165215,-88.62671816633414,14z



QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

   Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

   Yes
2. Is the action being funded, authorized, or carried out by a Federal agency?

   No
3. Are you the Federal agency or designated non-federal representative?

   Yes
4. Does the action involve the installation or operation of wind turbines?

   No
5. Does the action involve purposeful take of a listed animal?

   No
6. Does the action involve a new communications tower?

   No
7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

   No
8. Will your action permanently affect local hydrology?

   No
9. Will your action temporarily affect local hydrology?

   No
10. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

    No

11. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

    Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

    Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

    Yes

12. Will your action disturb the ground or existing vegetation?

    Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

    Yes

13. Will your action include spraying insecticides?

    No

14. Does your action area occur entirely within an already developed area?

    Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

    No

15. [Hidden Semantic] Does the action area intersect the endangered gray wolf AOI?

    Automatically answered

    Yes

16. Is there any potential for the action to harm wolves directly (e.g., mammal trapping, poison bait), or indirectly (e.g., increasing vehicle use that may result in vehicle strikes, exposure to potential human persecution)?

    No

17. [Hidden Semantic] Does the action area intersect the endangered gray wolf AOI?

    Automatically answered

    Yes

18. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

    Automatically answered

    Yes

19. Under the ESA, monarchs remain warranted but precluded by listing actions of higher priority. The monarch is a candidate for listing at this time. The Endangered Species Act does not establish protections or consultation requirements for candidate species. Some Federal and State agencies may have policy requirements to consider candidate species in planning. We encourage implementing measures that will remove or reduce threats to these species and possibly make listing unnecessary.

    If your project will have no effect on monarch butterflies (for example, if your project won't affect their habitat or individuals), then you can make a "no effect" determination for this project.

    Are you making a "no effect" determination for monarch?

    No

IPAC USER CONTACT INFORMATION

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 05/27/2025 22:33:38 UTC
Project code: 2025-0081279
Project Name: STH 32 Feasibility Study

Subject: Not Likely to Adversely Affect Technical assistance letter for the 'STH 32 Feasibility Study' project under the December 13, 2024, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat, Northern Long-eared Bat, and Tricolored Bat.

To whom it may concern:

This letter records the determination of effects to federally listed (or proposed) bat species anticipated to result from the STH 32 Feasibility Study (the Project). This determination is based upon information you entered into the assisted determination key (Dkey) associated with the above referenced Programmatic Biological Opinion/Conference Opinion (PBO/PCO) in the U.S. Fish and Wildlife Service's (Service) Information for Planning and Consultation (IPaC) system on the date listed above. **This letter does not satisfy compliance requirement under section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (16 USC 1536), as amended**. Those requirements will be met upon taking the actions described below.

Ensuring Accurate Determinations When Using IPaC:

The Service developed the IPaC system and this Dkey in accordance with the ESA and based on the PBO/PCO. All information submitted by the project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in the Dkey invalidates this letter. Answers to certain questions in the Dkey commit the project proponent to implementation of conservation measures that must be followed for the ESA determinations to remain valid. Carefully review this letter, your ESA requirements are <u>NOT</u> yet complete.

Determinations:

Based on the information you provided (Project Description shown below), you have determined that the Project is within the scope and adheres to the criteria of the PBO/PCO, including the

adoption of applicable avoidance and minimization measures. Based on your IPaC submission and the PBO/PCO, the Project is consistent with the following effect determinations:

Species	Listing Status	Determination
Northern Long-eared Bat (*Myotis septentrionalis*)	Endangered	NLAA

The tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can confer under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a no effect or not likely to adversely affect (NLAA) determination from the key to confirm that the determination is still accurate.

This "may affect - not likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative requests the Service rely on the PBO/PCO to satisfy the agency's consultation requirements for this project. **To fulfill the next steps in the consultation process, add the lead Federal action agency or designated non-federal representative as a Project Member in the IPaC system and provide this letter to the lead Federal action agency or its designated non-federal representative with a request for review, and as the agency deems appropriate, submit for concurrence verification through the IPaC system. ESA section 7 compliance for this Proposed Action is NOT yet complete until the Federal action agency or its designated non-federal representative receives a not likely to adversely affect verification letter from the Service IPaC system.**

If the Project is modified, or new information reveals that it may affect the Indiana bat, northern long-eared bat, or tricolored bat in a manner or to an extent not considered in the PBO/PCO, further review to conclude the requirements of ESA section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities:

If your initial bridge, culvert, or structure assessment failed to detect Indiana bat, northern long-eared bat, or tricolored bat use or occupancy, yet bats are later detected prior to, or during construction, promptly notify the local Service Field Office within 2 working days of the discovery. In addition, please document whether incidental take occurred, and if so, the type (i.e. kill or harm) and amount (i.e. number of individuals) and submit documentation to the local Service Field Office within 5 working days from the completion of the bridge, culvert, or structure construction (use Appendix E - Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form in the User’s Guide). In these instances, potential incidental take of Indiana bats, northern long-eared bats, or tricolored bats may be exempted provided that the take is reported to the Service. In these instances, potential incidental take of Indiana bats, northern long-eared bats, or tricolored bats may be exempted provided that the take is reported to the Service.

If the Project may affect any other federally listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Field Office is required for those species/designated critical habitat. If the Project has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency to contact this Service Field Office

The following species may occur in your project area and **are not** covered by this determination:

- Gray Wolf *Canis lupus* Endangered
- Monarch Butterfly *Danaus plexippus* Proposed Threatened

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

STH 32 Feasibility Study

DESCRIPTION

A study examining the feasibility of an off-road shared use path along STH 32, between Wabeno and Carter.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@45.41001705,-88.62634831825243,14z



DETERMINATION KEY RESULT

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the Indiana bat, northern long-eared bat or tricolored bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the Programmatic Biological Opinion/Conference Opinion for Transportation Projects in the Range of the Indiana bat, northern long-eared bat, and tricolored bat, dated December 13, 2024.

QUALIFICATION INTERVIEW

1. Which Federal Agency is the lead federal agency the action?

   A) Federal Highway Administration (FHWA)

2. Does the Action Area intersect the species list area of the Northern long-eared bat?

   Automatically answered
   Yes

3. Does your project's activities include raising the road profile above the tree canopy in documented habitat for the Indiana bat, NLEB, or TCB?

   Note: For the definition of documented habitat, refer to Appendix A: https://www.fws.gov/media/users-guide-range-wide-programmatic-consultation-indiana-bat-and-northern-long-eared-bat

   No

4. Is your project located within a karst area?

   No

5. Will the project include bridge, culvert, or structure removal, replacement, and/or alteration activities?

   Note: For definitions of bridge, culvert, and structure, refer to Appendix A: https://www.fws.gov/media/users-guide-range-wide-programmatic-consultation-indiana-bat-and-northern-long-eared-bat.

   No

6. Do your project’s activities involve tree removal/trimming, temporary lighting, new/additional permanent lighting, ground disturbance, percussives that involves noise/vibration above existing background levels, vibrations, or slash pile burning?

   Yes

7. Is there suitable summer habitat for the Indiana bat, NLEB, or TCB within the project action area?

   Note: See the Service's summer survey guidance for current definitions of suitable habitat [https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html].

   Yes

8. Have P/A surveys for the Indiana bat, NLEB, or TCB been conducted within the suitable summer habitat located within your project action area? This refers to mist-netting or acoustic surveys, not bridge assessments.

   Note: See the Service's survey guidance https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html

   No

9. Will the project involve the removal or trimming of trees within suitable habitat for the Indiana bat, NLEB, or TCB?

   Yes

10. Will any tree removal or trimming occur during the bat pup season?

    Note: For more information about bat pup seasons please visit https://www.fws.gov/sites/default/files/documents/2024-10/2024_usfws_rangewide_ibat-nleb_survey_guidelines.pdf

    No

11. Will the removal or trimming of trees occur **within documented habitat** for the Indiana bat, NLEB, or TCB?

    Note: For the definition of documented habitat, refer to Appendix A: https://www.fws.gov/media/users-guide-range-wide-programmatic-consultation-indiana-bat-and-northern-long-eared-bat

    No

12. Will all tree removal or trimming occur within 100 feet of the road or rail surface?

    Yes

13. Does your project include activities involving the temporary or permanent exclusion of Indiana bats, NLEBs, or TCBs from a bridge/culvert or structure?

    Note: exclusion is conducted to deny bats' entry or reentry into a bridge/culvert or structure. To be effective and to avoid harming bats, it should be done according to established standards.

    No

14. Does your project involve the use of temporary lighting within Indiana bat, NLEB, or TCB suitable habitat?

    Note: For the definition of lighting, refer to Appendix A: https://www.fws.gov/media/users-guide-range-wide-programmatic-consultation-indiana-bat-and-northern-long-eared-bat

    No

15. Will the project substantially increase baseline light conditions via the use of permanent lighting (replacement or new/additional) in suitable habitat.

    No

16. Will your project include percussive activities?

    Note: Refer to Stressor #2 Noise/Vibration on page 109 of the PBO/PCO.

    Yes

17. Are the percussive activities only related to tree removal/trimming or bridge/culvert structural work?

    Yes

18. Will the project involve the removal or trimming of more than 20 acres of Indiana bat, NLEB, or TCB suitable habitat per 5-mile section of road/rail?

    No

19. Will the removal or trimming of trees occur within 0.5 miles of a known Indiana bat, NLEB, or TCB hibernaculum?

    No

20. Will the removal or trimming of these trees occur during the active season?

    No

21. Will the removal or trimming of trees occur **beyond 100 feet** of the existing road/rail surfaces?

    No

22. Does the Action Area intersect the species list area of the tricolored Bat (TCB)?

    Automatically answered
    No

23. Does the Action Area intersect the species list area of the northern long-eared bat (NLEB)?

    Automatically answered
    Yes

PROJECT QUESTIONNAIRE

1. Have you made a No Effect determinations for all other species included on the FWS IPaC generated species list?

   Yes

2. Have you made a May Affect determination for any other species on the FWS IPaC generated list?

   No

3. How many acres of trees are proposed for removal/trimming **outside of documented habitat** for the Indiana bat, NLEB, or TCB within 100 feet of the existing road/rail surfaces during the inactive season (NLAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0.5

4. How many acres of trees are proposed for removal/trimming **outside of documented habitat** for the Indiana bat, NLEB, or TCB within 100 feet of the existing road/rail surfaces during the active season **(outside the pup season and not between Dec 15th-Feb 15th in Zone 1 of the NLEB and TCB YR active areas)** (LAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

0

5. How many acres of trees are proposed for removal/trimming **outside of documented habitat** for the Indiana bat, NLEB, or TCB within 100 feet of the existing road/rail surfaces during the pup season **(trees must be <9 in DBH, and not between Dec 15th-Feb 15th in Zone 1 of the NLEB and TCB YR active areas)** (LAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0

6. How many acres of trees are proposed for removal/trimming **either outside or within documented habitat** for the Indiana bat, NLEB, or TCB between 100-300 feet of the existing road/rail surface during the inactive season (LAA)? Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0

7. How many acres of trees are proposed for removal/trimming **either outside or within documented habitat** for the Indiana bat, NLEB, or TCB between 100-300 feet of the existing road/rail surfaces during the active season **(outside the pup season, and not between Dec 15-Feb 15 in Zone 1 of the NLEB and TCB YR active areas)** (LAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0

8. How many acres of trees are proposed for removal/trimming **either outside or within documented habitat** for the Indiana bat, NLEB, or TCB beyond 300 feet of the existing road/rail surfaces during the inactive season (LAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0

9. How many acres of trees are proposed for removal/trimming **either outside or within documented habitat** for the Indiana bat, NLEB, or TCB beyond 300 feet of the existing road/rail surfaces during the active season **(outside the pup season, and not between Dec 15th-Feb 15th in Zone 1 of the NLEB and TCB YR active areas)** (LAA)?

   Note: If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0

AVOIDANCE AND MINIMIZATION MEASURES (AMMS)

This determination key result includes the commitment to implement the following Avoidance and Minimization Measures (AMMs):

GAMM1

Ensure all operators, employees, and contractors working in areas of Indiana bat, NLEB, or TCB suitable habitat are aware of all Transportation Agency environmental commitments, including all applicable AMMs.

TRTAMM1
Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to the extent practicable to avoid tree removal/trimming in excess of what is required to implement the project safely.

TRTAMM2
Ensure tree removal/trimming is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree removal/trimming to ensure contractors stay within clearing limits

TRTAMM3
Ensure tree removal/trimming is limited to the inactive season, occurs within 100 ft of the road/rail surface, and is outside of documented habitat for the Indiana bat, NLEB, and TCB

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING IBAT, NLEB, OR TCB

This key was last updated in IPaC on May 21, 2025. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) and may affect the federally listed endangered Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), and/or federally proposed endangered tricolored bat (*Perimyotis subflavus*).

This decision key should only be used to verify project applicability with the Service's Programmatic Biological Opinion/Conference Opinion for Transportation Projects in the Range of the Indiana bat, northern long-eared bat, and tricolored bat, dated December 13, 2024. The programmatic consultation limited transportation activities that may affect the covered bat species and addresses situations that are both likely and not likely to adversely affect the covered bat species. This decision key will assist in identifying the effect of a specific project/activity and the applicability of the programmatic consultation. The programmatic consultation is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic consultation, or that may affect ESA-listed species other than the Indiana bat, northern long-eared bat, or tricolored bat, or their designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

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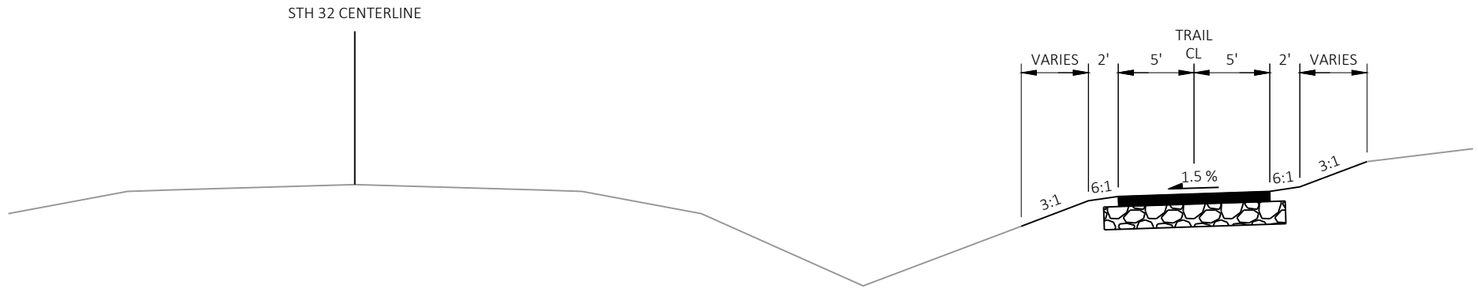
Phone: 6086535645

APPENDIX E – PRELIMINARY PLANS



FINISHED TYPICAL SECTION

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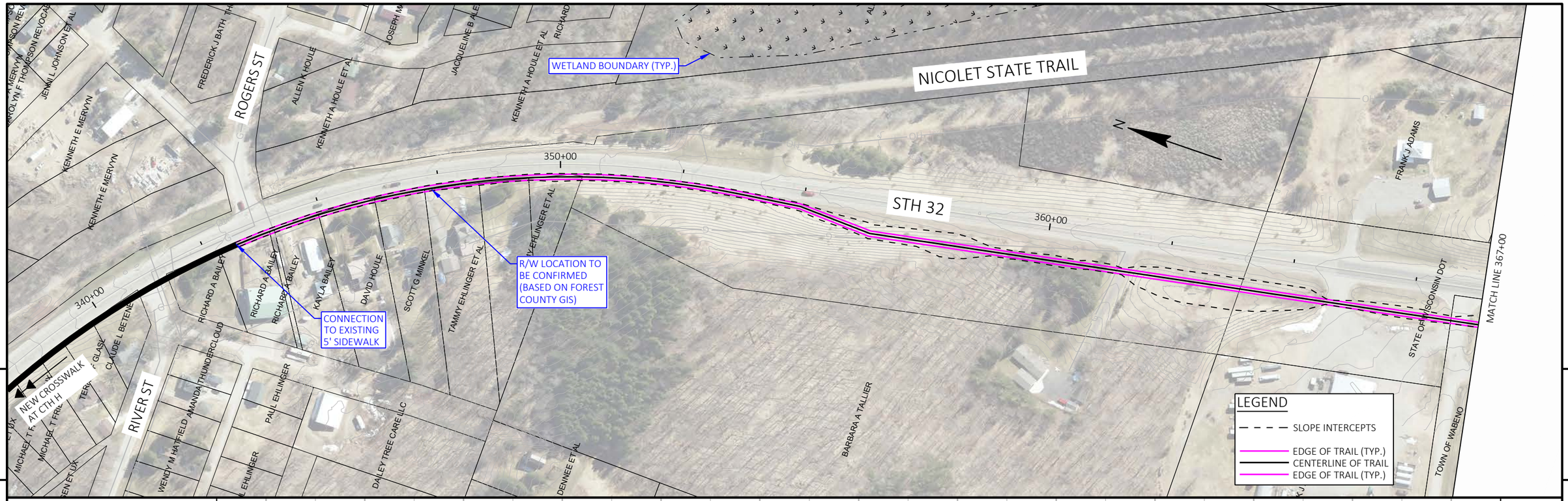

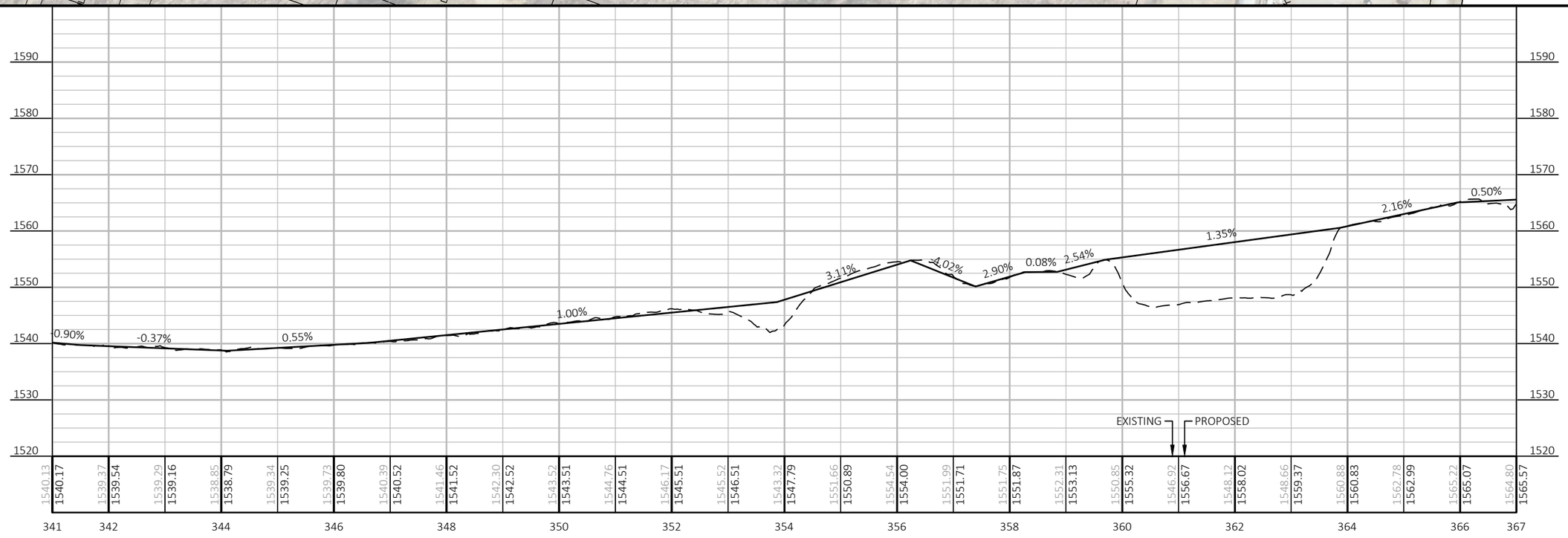

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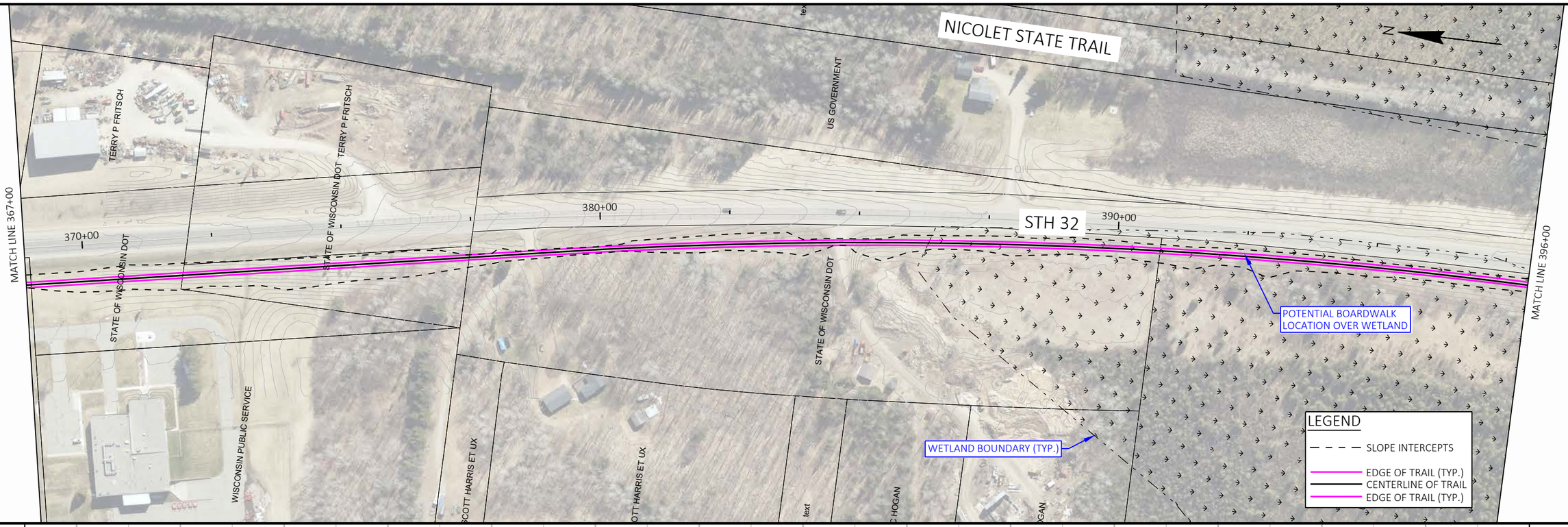



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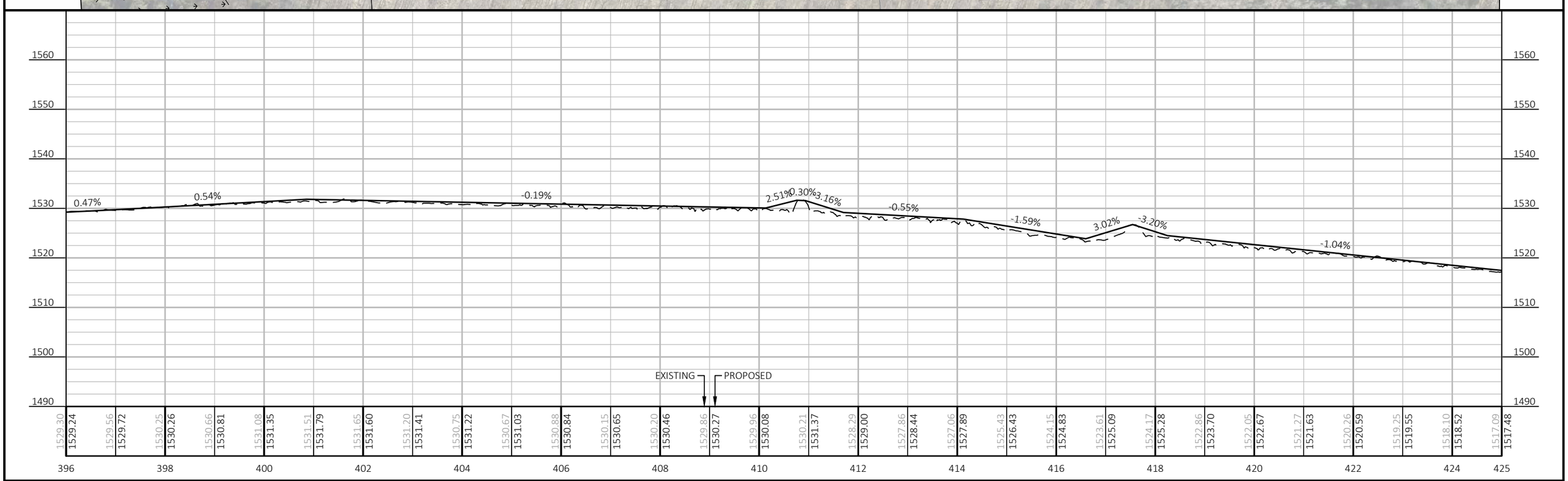

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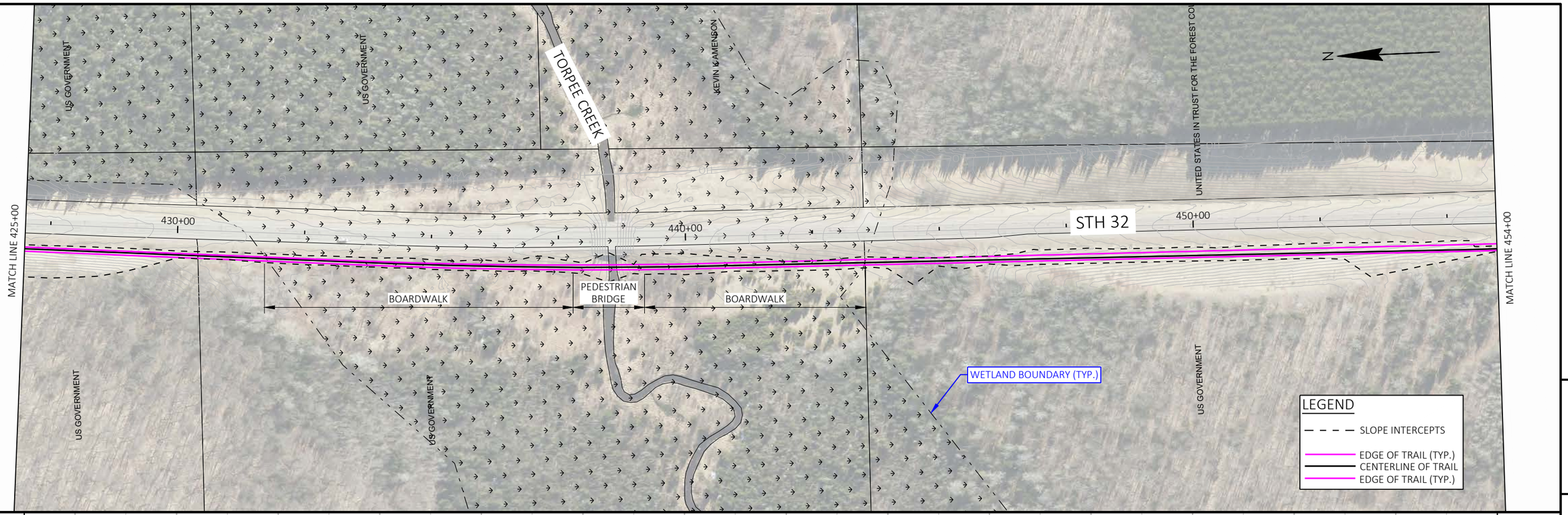

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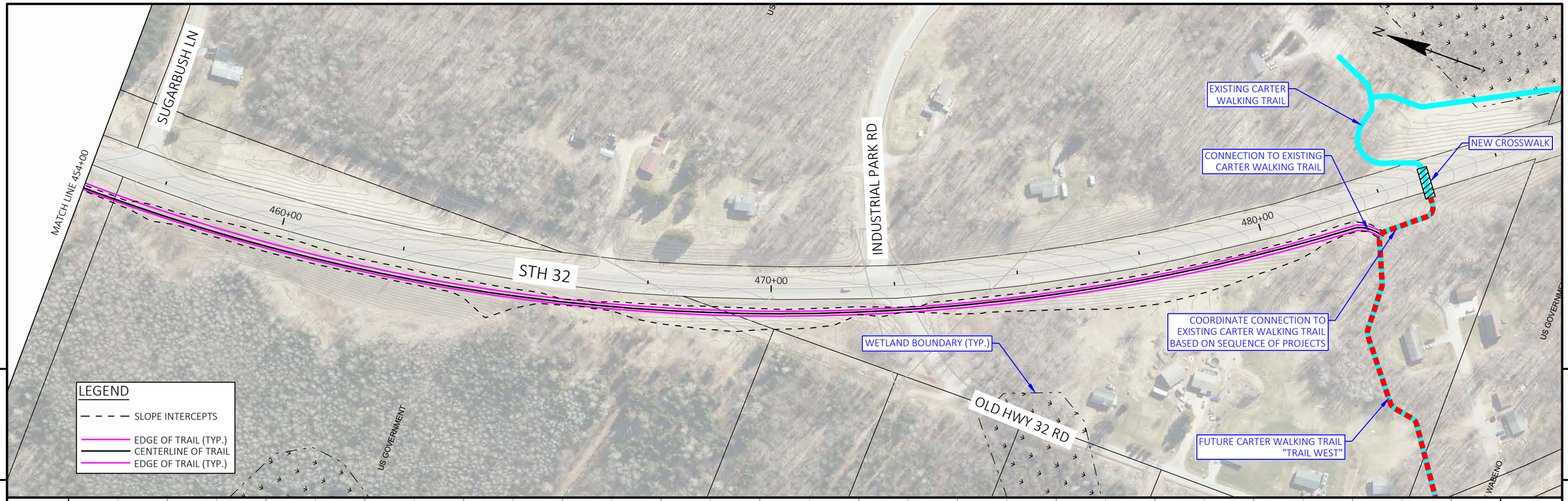

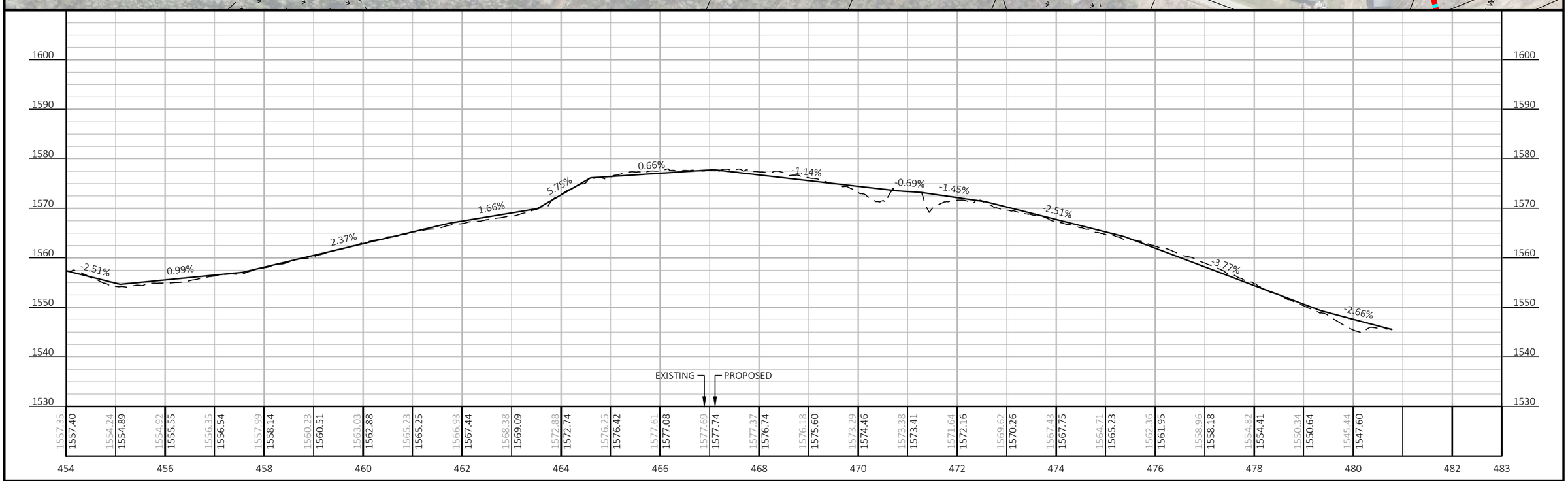

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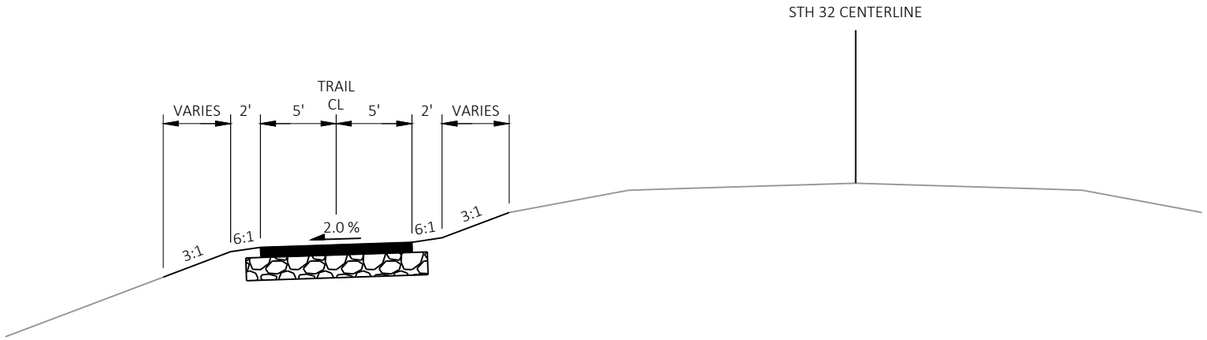

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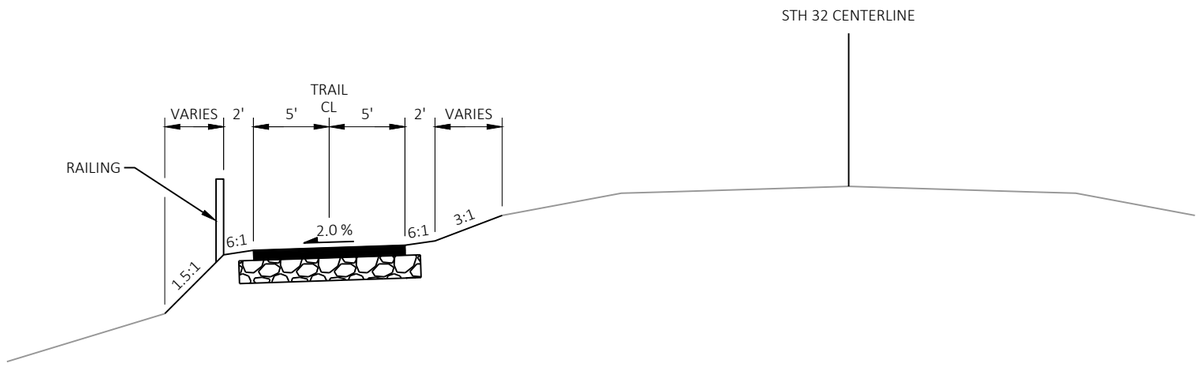

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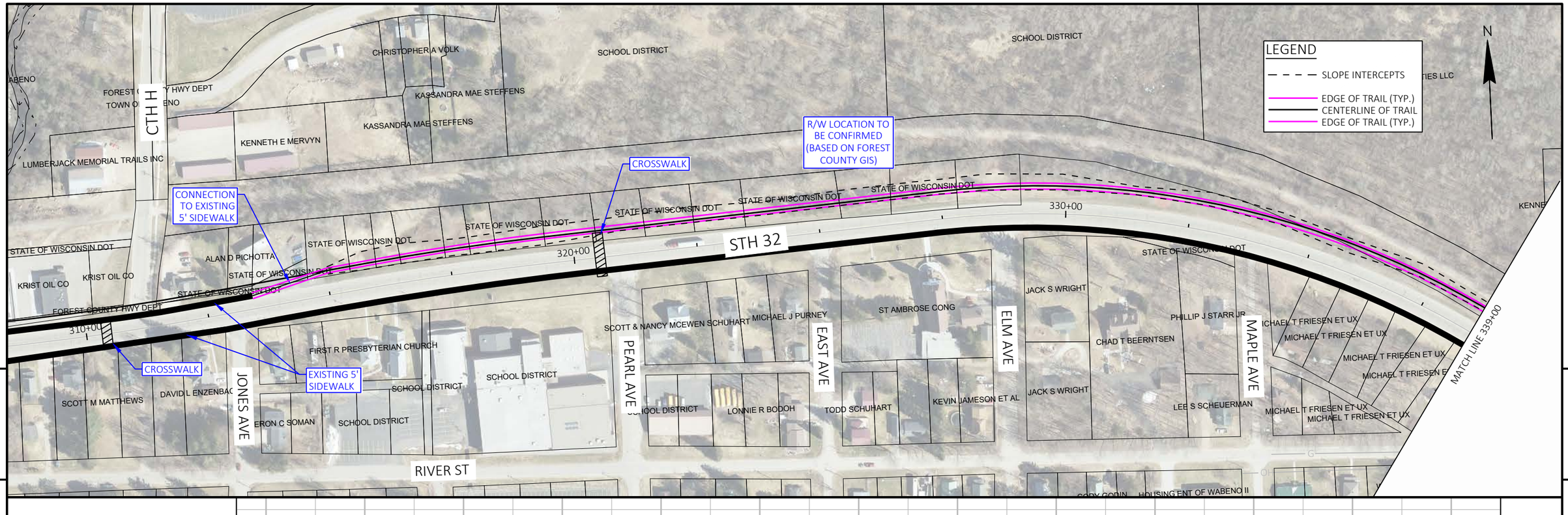
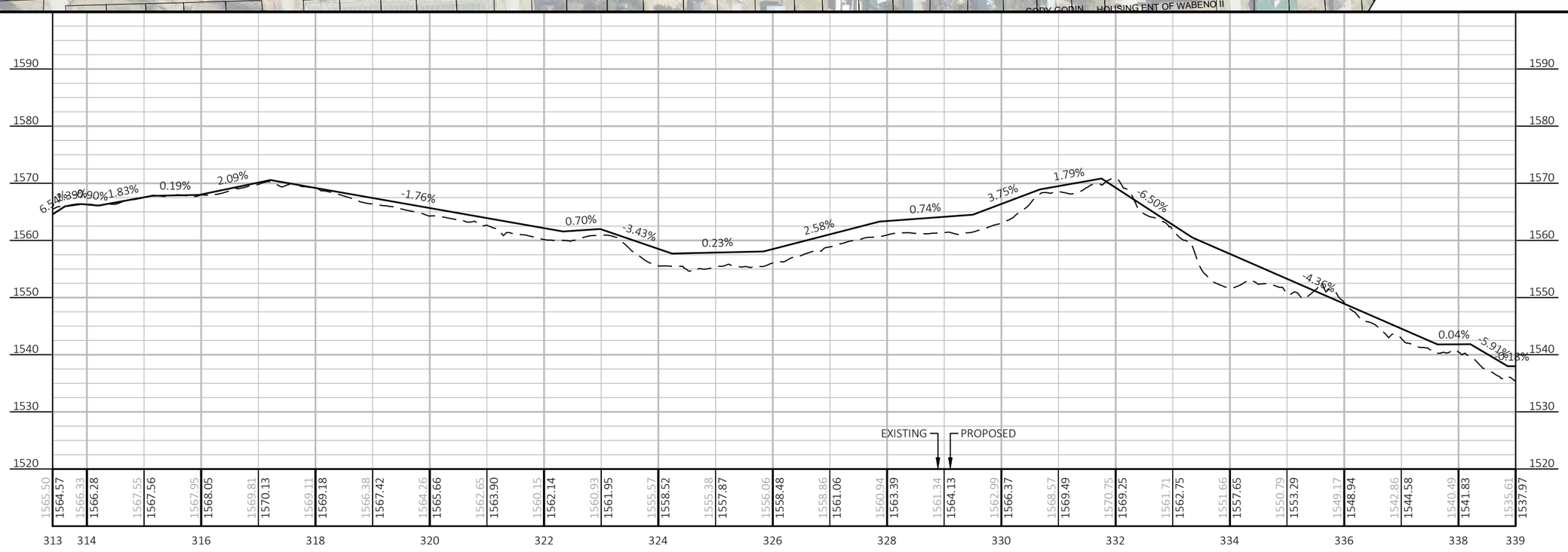
WISDOT/CADDS SHEET 42





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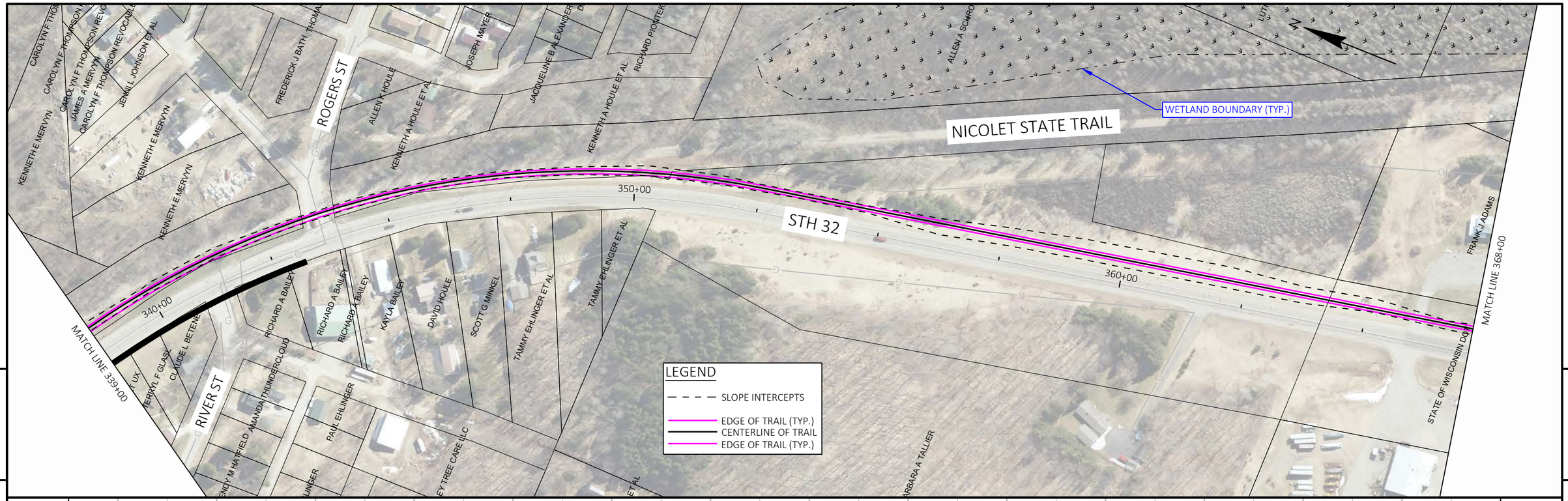

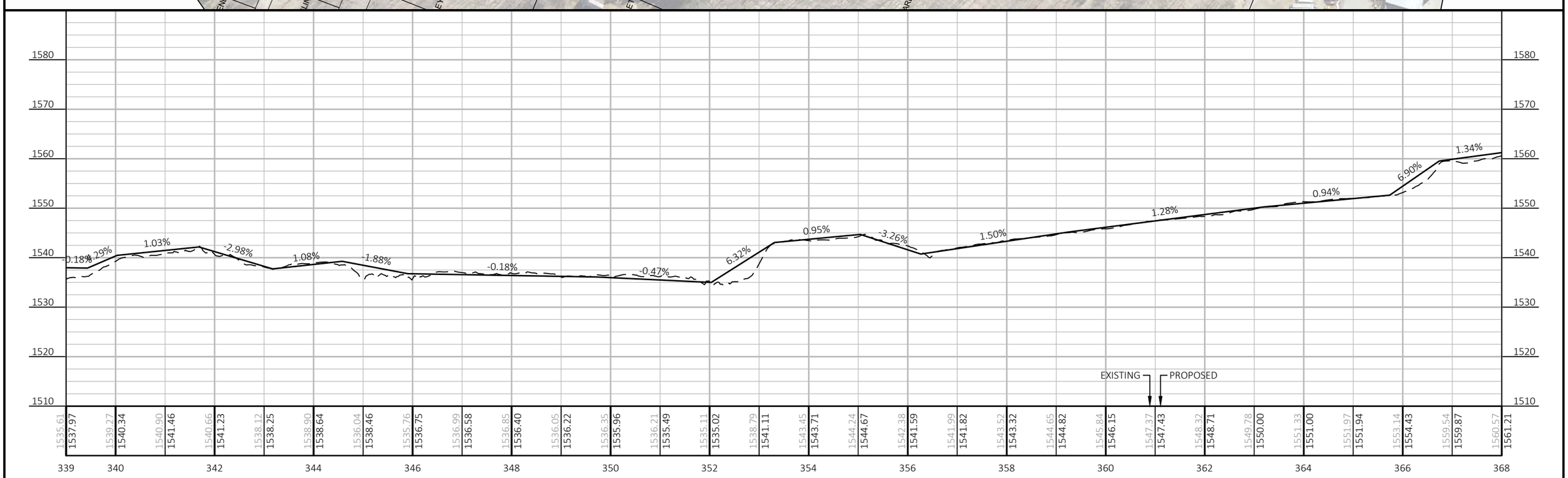

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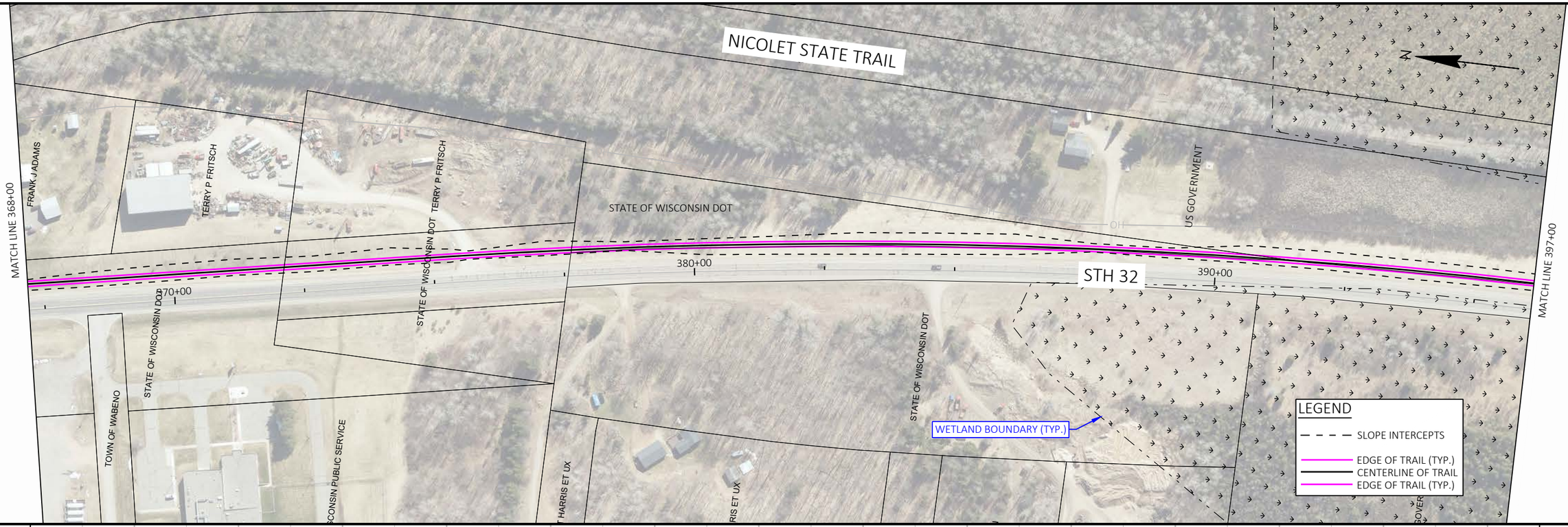

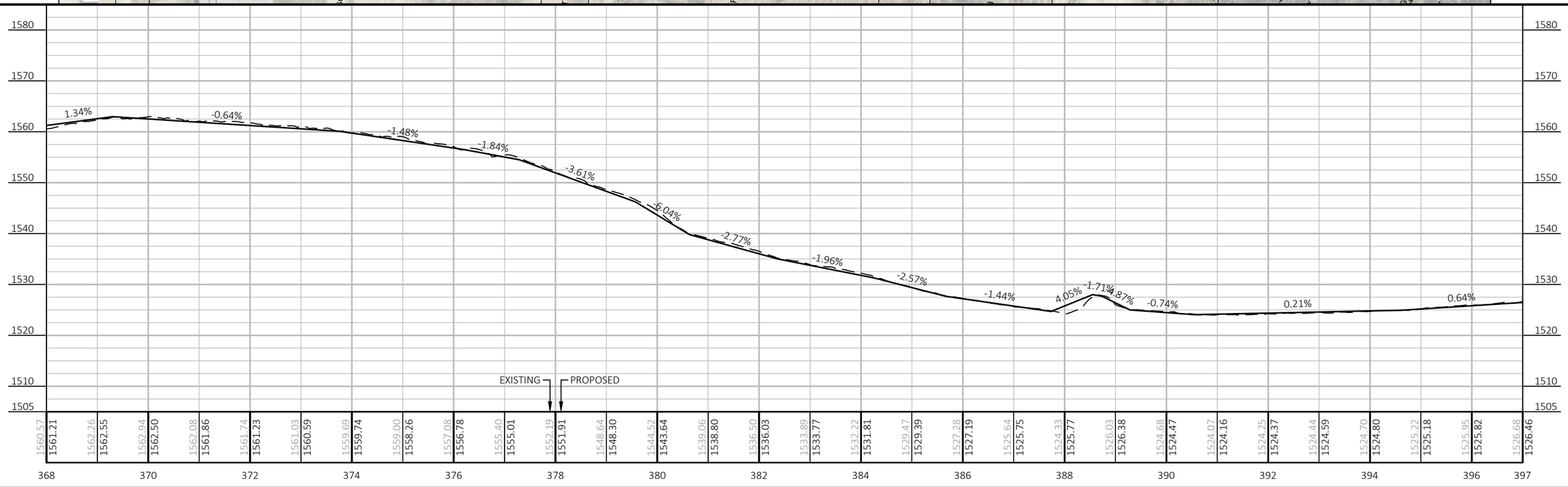

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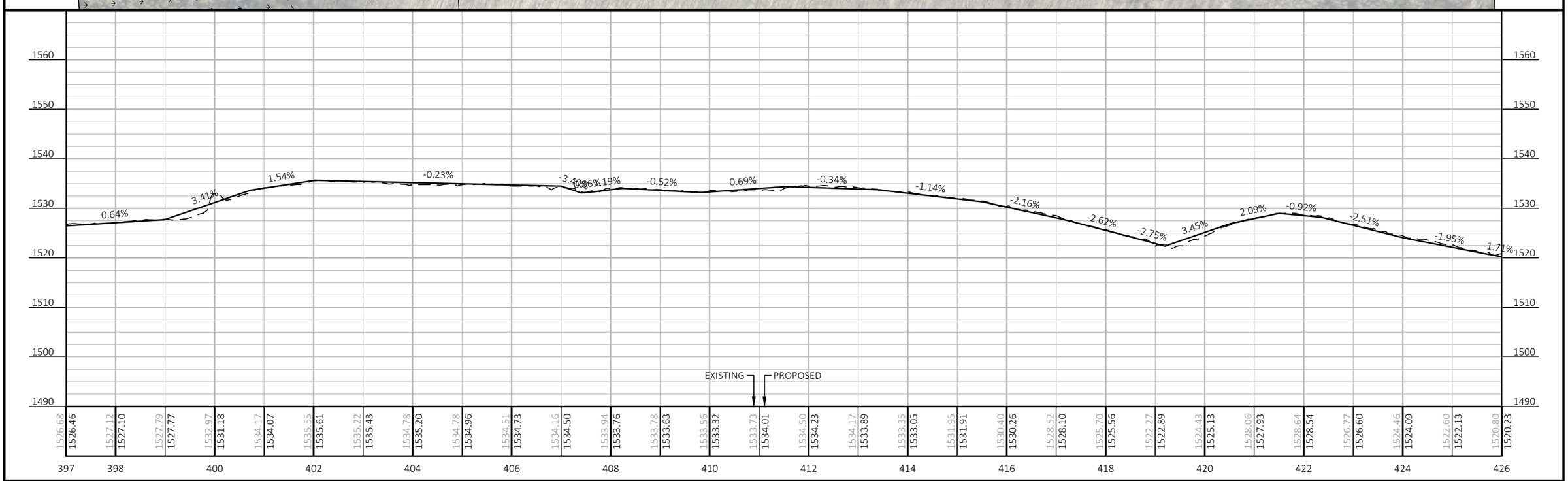
LAYOUT NAME - PP 03

PLOT DATE : 3/20/2025 2:21 PM PLOT BY : NATHAN RULLMAN PLOT NAME : PLOT SCALE : 1 IN:200 FT

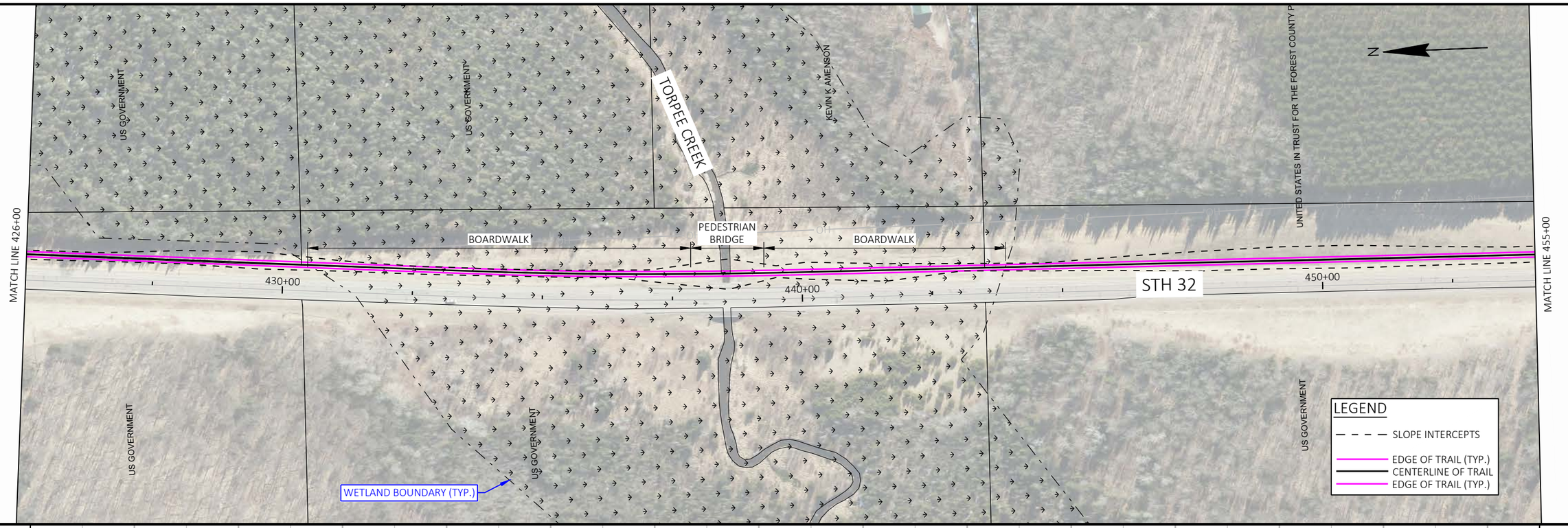




PROJECT NO: XXXX-XX-XX	HWY: XXX	COUNTY: XXX	PLAN AND PROFILE: ALTERNATIVE 2 - ALONG EAST SIDE OF STH 32	SHEET E

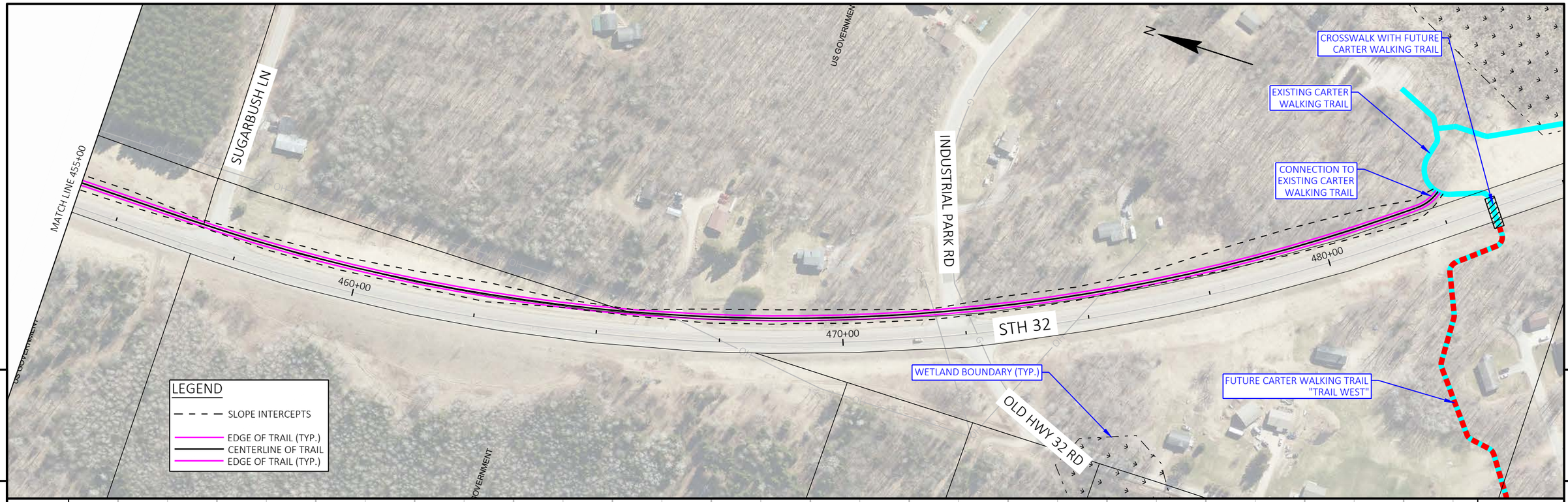
FILE NAME : G:\WDOT LP\FOREST CO POTAWATOMI\24093-000 (FEASIBILITY STUDY)\CIVIL 3D\SHEETSOTHER\STH 32-ALTERNATIVE 2_PPSHEETS.DWG
LAYOUT NAME - PP 04

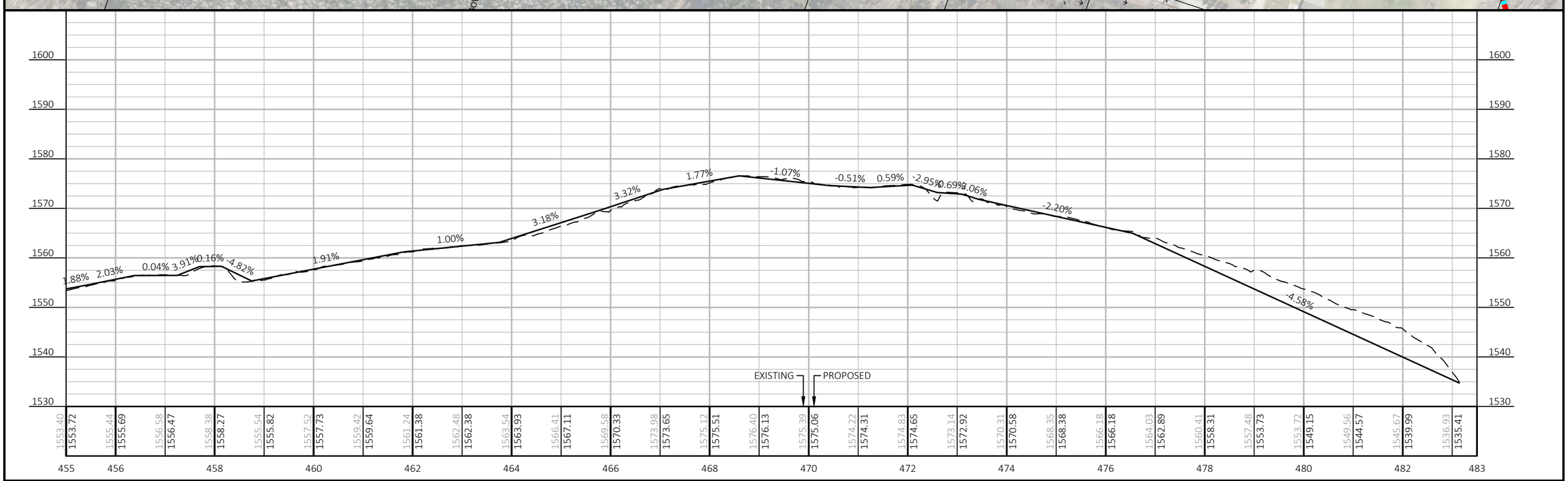
PLOT DATE : 3/20/2025 2:21 PM PLOT BY : NATHAN RULLMAN PLOT NAME : PLOT SCALE : 1 IN:200 FT





PROJECT NO: XXXX-XX-XX	HWY: XXX	COUNTY: XXX	PLAN AND PROFILE: ALTERNATIVE 2 - ALONG EAST SIDE OF STH 32	SHEET E





PROJECT NO: XXXX-XX-XX	HWY: XXX	COUNTY: XXX	PLAN AND PROFILE: ALTERNATIVE 2 - ALONG EAST SIDE OF STH 32	SHEET E

FILE NAME : G:\WDOT LP\FOREST CO POTAWATOMI\24093-000 (FEASIBILITY STUDY)\CIVIL 3D\SHEETSOTHER\STH 32-ALTERNATIVE 2_PPSHEETS.DWG
LAYOUT NAME - PP 06

PLOT DATE : 3/20/2025 2:22 PM PLOT BY : NATHAN RULLMAN PLOT NAME : PLOT SCALE : 1 IN:200 FT

WISDOT/CADDS SHEET 44

APPENDIX F – COST ESTIMATE

STH 32 Alt 1 - Feasibility Study

June 2025

Item Number	Bid Item	Unit	# of Units	Unit Price	Total Price
	MISCELLANEOUS				
642.5001	Field Office Type B	EACH	1	$ 10,000.00	$ 10,000.00
SPV.0060.02	Construction Staking	EACH	1	$ 25,000.00	$ 25,000.00
	Culvert Extensions	LS	1	$ 30,000.00	$ 30,000.00
	Property Acquisition	ACRE	1	$ 50,000.00	$ 50,000.00
	TRAIL				
205.0100	Excavation Common	CY	18,000	$ 18.00	$ 324,000.00
201.0105	Clearing	STA	22	$ 750.00	$ 16,500.00
201.0205	Grubbing	STA	22	$ 500.00	$ 11,000.00
208.1100	Select Borrow	CY	12,000	$ 30.00	$ 360,000.00
305.0120	Base Aggregate Dense 1 1/4-inch	TON	12,000	$ 24.00	$ 288,000.00
	Select Crushed Aggregate/Geogrid	SY	3,000	$ 12.00	$ 36,000.00
465.0105	Asphaltic Surface	TON	6,000	$ 140.00	$ 840,000.00
602.0410	Concrete Sidewalk 5-Inch	SF	600	$ 10.00	$ 6,000.00
602.0515	Curb Ramp Detectable Warning Field Natural Patina	SF	120	$ 50.00	$ 6,000.00
	Erosion Control/Restoration	SF	368,000	$ 0.50	$ 184,000.00
	Pedestrian Bridge	LS	1	$ 250,000.00	$ 250,000.00
SPV.0090.01	Special (01. Boardwalk)	LF	200	$ 1,000.00	$ 200,000.00
	TRAFFIC CONTROL				
SPV.0060.01	Special (01. Traffic Control)	EACH	1	$ 40,000.00	$ 40,000.00

Subtotal Total		$ 2,676,500.00
Contingency		$ 260,000.00
Construction Total (2025)		**$ 2,936,500.00**
Construction Total (2028)		**$ 3,300,000.00**
R/W Acquisition Contingency		$ 90,000.00
Utility Relocation Contingency		$ 200,000.00
Construction Oversight		$ 250,000.00
Design & Oversight		$ 340,000.00
Total Project Delivery		**$ 4,180,000.00**

STH 32 Alt 2 - Feasibility Study

June 2025

Item Number	Bid Item	Unit	# of Units	Unit Price	Total Price
	MISCELLANEOUS				
642.5001	Field Office Type B	EACH	1	$ 10,000.00	$ 10,000.00
SPV.0060.02	Construction Staking	EACH	1	$ 25,000.00	$ 25,000.00
	Culvert Extensions	LS	1	$ 30,000.00	$ 30,000.00
	Property Acquisition	ACRE	0	$ 50,000.00	$ -
	TRAIL				
205.0100	Excavation Common	CY	21,000	$ 18.00	$ 378,000.00
201.0105	Clearing	STA	8	$ 750.00	$ 6,000.00
201.0205	Grubbing	STA	8	$ 500.00	$ 4,000.00
208.1100	Select Borrow	CY	10,000	$ 30.00	$ 300,000.00
305.0120	Base Aggregate Dense 1 1/4-inch	TON	15,000	$ 24.00	$ 360,000.00
	Select Crushed Aggregate/Geogrid	SY	3,000	$ 12.00	$ 36,000.00
465.0105	Asphaltic Surface	TON	8,000	$ 140.00	$ 1,120,000.00
602.0410	Concrete Sidewalk 5-Inch	SF	600	$ 10.00	$ 6,000.00
602.0515	Curb Ramp Detectable Warning Field Natural Patina	SF	120	$ 50.00	$ 6,000.00
	Railing	LF	950	$ 20.00	$ 19,000.00
	Erosion Control/Restoration	SF	415,000	$ 0.50	$ 207,500.00
	Pedestrian Bridge	LS	1	$ 250,000.00	$ 250,000.00
SPV.0090.01	Special (01. Boardwalk)	LF	200	$ 1,000.00	$ 200,000.00
	TRAFFIC CONTROL				
SPV.0060.01	Special (01. Traffic Control)	EACH	1	$ 40,000.00	$ 40,000.00

Subtotal Total		$ 2,997,500.00
Contingency		$ 300,000.00
Construction Total (2025)		**$ 3,297,500.00**
Construction Total (2028)		**$ 3,712,500.00**
R/W Acquistion Contingency		$ 90,000.00
Utility Relocation Contingency		$ 200,000.00
Construction Oversight		$ 250,000.00
Design & Oversight		$ 340,000.00
Total Project Delivery		**$ 4,592,500.00**