Appendix A

Intergovernmental Agreement Between PIIC and the City of Pine Island

Document No. **A1597600**
OFFICE OF THE COUNTY RECORDER
OLMSTED COUNTY, MN
I hereby certify that this document was filed
in this office on 12-13-2023 at 12:31 PM
MARY BLAIR-HOEFT - DIR. PROPERTY RECORDS/LICENSING
Fee Amount: $46.00 by deputy: ms

INTERGOVERNMENTAL AGREEMENT BETWEEN THE PRAIRIE ISLAND INDIAN COMMUNITY AND THE CITY OF PINE ISLAND

This Intergovernmental Agreement (***"Agreement"***) is made and entered into on November 29, 2023 (the "***Effective Date***"), between the Prairie Island Indian Community of Minnesota ("***Tribe***"), and the City of Pine Island ("***City***"), and collectively as the "***Parties***."

Recitals

A. The Tribe is a federally recognized Indian tribe that provides governmental services to its members and exercises governmental jurisdiction over certain of the lands it owns.

B. The City is a Minnesota municipal corporation that provides municipal services and public infrastructure, that exercises governmental jurisdiction within its City limits, including the provision of public safety and water/ wastewater services, and the regulation of zoning/land uses, land subdivisions, and land development.

C. The Tribe owns real property located in Olmsted County, some of which is located within City limits, as described on **Exhibit A** (the "Elk Run Property").

D. The Tribe wishes to purchase certain land owned by the City that is adjacent to the Elk Run Property, including approximately 40 acres that is subject to a separate agreement between the City and the Minnesota Department of Transportation ("Interchange Land"), and the City wishes to sell the Interchange Land to the Tribe.

E. The Tribe has submitted an application to the United States Department of the Interior to have a portion of the Elk Run Property placed into trust by the United States for the benefit of the Tribe and added to its Reservation to serve as a safe, permanent homeland for the Tribe; the Tribe likely also will submit one or more additional applications to place additional portions of the Elk Run Property and/or the Interchange Land into trust.

F. If and when portions of the Elk Run Property and/or the Interchange Land are placed into trust the Tribe will have governmental jurisdiction over these lands despite their location partially within City limits.

G. The City supports the Tribe's efforts to have the Elk Run Property and Interchange Land placed into trust and to develop these lands.

H. The City believes that the Tribe's development of these lands will produce economic and other benefits to the City, creating new opportunities for employment and new sources of income for the surrounding community.

I. The Tribe and the City have established a cooperative and mutually respectful government-to-government relationship and they acknowledge that development of the Elk Run Property and Interchange Land will impact the City. The Tribe desires to address mechanisms to mitigate potential impacts from such development through this Agreement and other agreements contemplated herein.

J. The Tribe's plans for development of the Elk Run Property and Interchange Land are ongoing, but likely will include a mix of residential, and economic development and are expected to include, ultimately, tribal governmental activities.

K. The Tribe may utilize certain municipal and related services rather than duplicate such services on the Elk Run Property and/or the Interchange Land. The Tribe desires to pay or reimburse the City for such services, and the City desires to provide such services on mutually beneficial terms which may include a payment-in-lieu of taxes arrangement.

L. The Tribe and the City agree that this Agreement will advance their mutually respectful and beneficial relationship, and that they will amend or otherwise supplement this Agreement as needed as the Tribe's plans for the Elk Run Property are further developed.

M. The Tribe and the City mutually represent that they have the authority to enter into this Agreement.

Now therefore, in consideration of the promises, covenants, agreements and obligations contained herein, the receipt and sufficiency of which are hereby acknowledged, the Parties enter into this Agreement and agree as follows:

1. **Infrastructure for the Elk Run Property.**

The Tribe and the City agree to cooperatively discuss the public and private infrastructure needed to serve the Tribe's development plans for the Elk Run Property, and to amend or otherwise supplement this Agreement regarding infrastructure as may be mutually agreed.

2. <u>Sale of Interchange Property.</u>

The Tribe and the City agree to negotiate in good faith a purchase agreement for the sale of the Interchange Land with the goal of completing the closing/conveyance of such on or before April 1, 2024. Additional terms of such transaction shall be set forth in the separately negotiated and approved purchase agreement. The Tribe and the City agree to cooperatively discuss the public and private infrastructure that may be needed to serve the Interchange Land consistent with paragraph 1.

3. <u>Governmental and Other Services for the Property.</u>

Until such time as the Elk Run Property or the Interchange Land is held in trust by the United States for the benefit of the Tribe, the City shall continue to exercise governmental jurisdiction, respectively, over such land and provide governmental services to the Tribe as the owner thereof. Once the Elk Run Property is held in trust for the Tribe, the parties agree as follows:

A. <u>Governmental Services Provided by the Tribe.</u> The Tribe will be responsible for planning, zoning, subdivision, and land development authority, and for providing (directly or through agreements with other public or private providers, including, if applicable, the City) all necessary and customary governmental services concerning the Property, including, but not limited to, public safety (police and traffic control), fire protection, and emergency medical services.

B. <u>Emergency or Other Services.</u> The Tribe and the City will work cooperatively to avoid conflicts or gaps in their provision of public safety, fire protection, emergency medical, or other services within their respective jurisdictions, may execute joint powers agreements under 2022 Minn. Stat. 471.59 or other authorities as may be necessary and appropriate, and may conduct joint public safety training exercises.

C. <u>Utility Services</u>. The Tribe will provide or acquire electrical, potable water and wastewater services for the Elk Run Property, and the parties will cooperatively discuss the City's provision of such services on mutually agreeable terms.

D. <u>Future Agreements.</u> Any of these services acquired from the City will be the subject of a written agreement between the Tribe and the City, whether as an amendment to this Agreement or pursuant to a separate agreement.

4. Gaming-Related Development.

While the Tribe has no immediate economic development plans for the Property, the Tribe and the City acknowledge that it is possible that in the future the Tribe may use the portion of the Elk Run Property identified in **Exhibit A**, some of which is located within City limits ("Emergency Gaming Parcel") to conduct Class II or Class III gaming (as defined by the Indian Gaming Regulatory Act, 25 U.S.C. § 2701 *et seq.*). The Tribe and the City agree that such potential future gaming would be subject to the following conditions:

A. Limited Forbearance. The Tribe agrees that it will forbear conducting gaming for a minimum of six (6) years from the date on which the Emergency Gaming Parcel is accepted in trust ("Forbearance Period"); provided, that in the event that the Tribe closes operations at its existing gaming facility located on its Reservation at Prairie Island due to impacts from a flooding or nuclear event, the Tribe may, in its discretion, conduct gaming on the Emergency Gaming Parcel sooner than expiration of the Forbearance Period.

B. Infrastructure and Services. In the event the Tribe conducts gaming on the Emergency Gaming Parcel consistent with subsection A, the Tribe and the City will negotiate in good faith concerning the provision of any additional infrastructure and services as may reasonably be necessary to accommodate such development consistent with Sections 1 and 2 herein, and for additional compensation to the City for such services as may be appropriate.

5. Good Faith and Fair Dealing.

The Parties to this Agreement agree that they have a duty of good faith and fair dealing under this Agreement.

6. Notices.

Any notices regarding this Agreement will be sent by certified mail, return receipt requested, or by a nationally recognized overnight delivery service to:

For the Tribe:	For the City:
Prairie Island Indian Community Tribal Administration Offices 5636 Sturgeon Lake Road Welch, MN 55089	City of Pine Island PO Box 280 Pine Island, MN 55963

With a required copy to:

Jessie Stomski Seim, General Counsel
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

With a required copy to:

Robert J.V. Vose
Kennedy & Graven
Fifth Street Towers
150 South 5th Street, Suite 700
Minneapolis, MN 55402

7. **Entire Agreement.**

This Agreement contains the entire agreement of the City and the Tribe with respect to the subject matter of this Agreement, and there are no other understandings between the Parties, written or verbal, relating to the subject matter of this Agreement. Any amendments to this Agreement or separate understandings or agreements between the parties shall be in writing and approved and executed by each party.

8. **Drafting.**

This Agreement was reached through the mutual negotiations of the Parties and no rule of law requiring the Agreement to be construed in favor of or against a party because of drafting will apply.

9. **Severability.**

If, for any reason, any provision of this Agreement is held to be invalid, unenforceable, illegal, or inoperable by a court, tribunal, or administrative agency of competent jurisdiction, the provision will be deemed omitted from this Agreement and its omission will not affect the validity and effect of the other provisions of this Agreement.

10. **No Encumbrance of Real Property.**

A. The City expressly disclaims any right under this Agreement to have or to exercise any proprietary control over, or to attach a claim, lien, charge, right of entry, or liability to, any real property held by the United States in trust for the Tribe. This Agreement shall not be construed as giving the City any such right.

B. The Tribe represents to the City that this Agreement does not give the City the right to have or to exercise any proprietary control over, or to attach a claim, lien, charge, right of entry, or liability to, any real property held by the United States in trust for the Tribe.

11. Limited Waiver of Sovereign Immunity for Dispute Resolution.

The Tribe waives sovereign immunity in favor of the City for the limited purpose of resolving any disputes that may arise out of this Agreement as follows:

The Parties agree that they shall attempt to resolve any disputes through a meet and confer process. The Parties will agree on the particulars of that process should a dispute arise. If the Parties cannot resolve the dispute through the meet and confer process, the waiver hereby provided shall permit Minnesota state courts, including specifically the Olmstead County District Court, to hear and decide the parties' dispute provided, that nothing in this Agreement may be construed or interpreted to effect a waiver of the Tribe's sovereign immunity in any other jurisdiction or court proceeding whatsoever. This Agreement may be used as a basis for the dismissal of any action beyond the limits of this Section 10.

12. No Third-Party Beneficiaries.

This Agreement does not create, and shall not be construed as creating, any right enforceable by any person not a party to this Agreement. Any covenant or agreement contained in this Agreement shall be only for the benefit of the Parties and their respective successors and permitted assigns.

13. Term.

The term of this Agreement shall commence upon the Effective Date of this Agreement and shall continue until November 27, 2030, or until such other date as agreed to in writing by the Parties by mutual agreement.

////

IN WITNESS WHEREOF, this Agreement has been executed and approved by the Parties and persons whose signatures appear below:

Johnny Johnson
Community Council President
Prairie Island Indian Community

David Friese
Mayor
City of Pine Island

Elizabeth Howard
City Administrator
City of Pine Island

State of Minnesota
County of Ramsey

Being duly commissioned under the laws of the State of Minnesota, I certify that the foregoing and annexed document entitled Intergovernmental Agreement between the Prairie Island Indian Community and the City of Pine Island and containing 10 pages is a true and correct copy of an electronic document bearing three electronic signatures as of this day, November 29, 2023.

Notary Public

My commission expires January 31, 2029

SARAH ELIZABETH PHEMISTER
NOTARY PUBLIC
MINNESOTA
My Commission Expires Jan. 31, 2029

This instrument was drafted by:

Paul S. Moe
Faegre Drinker Biddle & Reath LLP
2200 Wells Fargo Center
90 South Seventh Street
Minneapolis, MN 55402

EXHIBIT A

PARCEL 1:

The Northwest Quarter of the Northeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota.

The Northeast Quarter of the Northeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota.

That part of the Southwest Quarter of the Northwest Quarter, Southeast Quarter of the Northwest Quarter, Northeast Quarter of the Southwest Quarter, West Half of the Southeast Quarter and the Southeast Quarter of the Southeast Quarter, of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying northerly and easterly of the following described line:

> Commencing at the northwest corner of said Section 1; thence on an assumed bearing of South 00 degrees 54 minutes 41 seconds East along the west line of said Section 1 a distance of 778.98 feet; thence South 44 degrees 55 minutes 49 seconds East 764.84 feet to the north line of said Southwest Quarter of the Northwest Quarter to the point of beginning of the line to be described; thence South 44 degrees 55 minutes 49 seconds East 5121.99 feet; thence southeasterly 389.04 feet to the south line of said Section 1 along a tangential curve concave to the southwest having a radius of 1083.65 feet and a central angle of 20 degrees 34 minutes 11 seconds and there terminating.

That part of the West Half of the Northwest Quarter, Southeast Quarter of the Northwest Quarter, Northeast Quarter of the Southwest Quarter, West Half of the Southeast Quarter, and Southeast Quarter of the Southeast Quarter, of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying southerly and westerly of the following described line:

> Commencing at the northwest corner of said West Half of the Northwest Quarter; thence on an assumed bearing of South 00 degrees 54 minutes 41 seconds East along the west line of said West Half of the Northwest Quarter 778.98 feet to the point of beginning of the line to be described; thence South 44 degrees 55 minutes 49 seconds East 5886.83 feet; thence southeasterly 389.04 feet to the south line of said Section 1 along a tangential curve concave to the southwest having a radius of 1083.65 feet and a central angle of 20 degrees 34 minutes 11 seconds and there terminating.

That part of the Northwest Quarter of the Southwest Quarter, Southwest Quarter of the Southwest Quarter, and Southeast Quarter of the Southwest Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, which lies northerly of the north right-of-way line of State Highway 52.

The North one-half of the Northwest Quarter (N½ NW¼) of Section 1, Township 108 North, Range 15 West, except that part of the Northwest Quarter of the Northwest Quarter (NW¼ NW¼) lying southwesterly of the center of Township Road running south to north in a generally northwesterly direction.

The Southwest Quarter of the Northeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota.

The Southeast Quarter of the Northeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota.

The Northeast Quarter of the Southeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota.

The Southwest Quarter of the Southwest Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, which lies southwesterly of the southwesterly right-of-way line of State Highway 52, EXCEPT Minnesota Department of Transportation Right of Way Plat No. 55-99.

The Northwest Quarter of the Northeast Quarter and the South Half of the Northeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, EXCEPT that part which lies southerly of Trunk Highway Number 52 and also excepting Parcel 303 as shown on Minnesota Department of Transportation Right of Way Plat No. 55-30 recorded on February 2, 1990, in Book E-5 on Page 401, EXCEPT:

> That part of the West Half of the Northeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:
>
> > Beginning at the northwest corner of said West Half of the Northeast Quarter; thence on an assumed bearing of South 00°50'18" East along the west line of said West Half of the Northeast Quarter 1914.70 feet to the northeasterly right of way line of Trunk Highway Number 52; thence South 59°18'11" East along said northeasterly right of way line 162.79 feet; thence South 04°07'55" West along said northeasterly right of way line 111.80 feet; thence South 59°18'11" East along said northeasterly right of way line 330.88 feet; thence North 00°50'18" West 2282.98 feet to the north line of said West Half of the Northeast Quarter; thence South 89°20'34" West 411.08 feet to the point of beginning.

That part of the North Half of the Southeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying northerly and easterly of State Highway Number 52.

That part of the Northeast Quarter of the Northeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying southerly and westerly of the following described line:

> Commencing at the northeast corner of said Northeast Quarter of the Northeast Quarter; thence on an assumed bearing of South 00 degrees 54 minutes 41 Seconds East along the east line of said Northeast Quarter of the Northeast Quarter 778.98 feet to the point of beginning of the line to be described; thence North 44 degrees 55 minutes 49 seconds West 1087.92 feet to the north line of said Northeast Quarter of the Northeast Quarter and there terminating

That part of the Northeast Quarter of the Northeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying northerly and easterly of the following described line:

Commencing at the northeast corner of said Northeast Quarter of the Northeast Quarter; thence on an assumed bearing of South 00 degrees 54 minutes 41 seconds East along the east line of said Northeast Quarter of the Northeast Quarter 778.98 feet to the point of beginning of the line to be described; thence North 44 degrees 55 minutes 49 Seconds West 1087.92 feet to the north line of said Northeast Quarter of the Northeast Quarter and there terminating.

That part of the West Half of the Northeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Beginning at the northwest corner of said West Half of the Northeast Quarter; thence on an assumed bearing of South 00°50'18" East along the west line of said West Half of the Northeast Quarter 1914.70 feet to the northeasterly right of way line of Trunk Highway Number 52; thence South 59°18'11" East along said northeasterly right of way line 162.79 feet; thence South 04°07'55" West along said northeasterly right of way line 111.80 feet; thence South 59°18'11" East along said northeasterly right of way line 330.88 feet; thence North 00°50'18" West 2282.98 feet to the north line of said West Half of the Northeast Quarter; thence South 89°20'34" West 411.08 feet to the point of beginning.

That part of the West Half of the Northeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing for a place of beginning at the northwest corner of the Northeast Quarter of said Section and running thence East along the north line of said Section a distance of 1304.2 feet to the northeast corner of said West Half of the Northeast Quarter; thence South along the east line of said West Half a distance of 2101 feet to the northerly right-of-way line of U.S. Trunk Highway Number 52; thence Northwesterly along said northerly right-of-way line a distance of 1816.68 feet to the west line of said Northeast Quarter; thence North a distance of 871.6 feet to the place of beginning.

That part of the East Half of the Northwest Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing for a place of beginning at the northeast corner of the Northwest Quarter of said Section 12 and running thence West along the north line of said Northwest Quarter a distance of 921.1 feet to a point in the northerly right-of-way line of U.S. Trunk Highway Number 52; thence southeasterly along said northerly right-of-way line a distance of 1264.65 feet to the east line of said Northwest Quarter thence North along the east line of said Northwest Quarter a distance of 871.6 feet to the place of beginning.

That part of the East Half of the Northeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying and being north and east of Highway Number 52 and south and west of that certain Township Road, formerly known as State Highway Number 20, running northwesterly and southeasterly through said East Half of the Northeast Quarter.

That part of the East Half of the Northeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying north and east of the Township Road.

That part of the Northeast Quarter of the Southeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, lying and being north and east of Highway Number 52 as it is presently located across said Northeast Quarter of the Southeast Quarter.

That part of the East One-Half of the Northwest Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

> Commencing at the center of said Section 12 and thence westerly along the south line of the Northwest Quarter of said Section 12 a distance of 1306.85 feet to the west line of the East One-Half of the Northwest Quarter of said Section 12; thence Northerly along said west line a distance of 1078.91 feet for a point of beginning of the tract to be described; thence continuing northerly along said west line a distance of 1535.66 feet to the southerly right of way line of Trunk Highway No. 52; thence South 45 degrees 32 minutes 35 seconds East along said right of line a distance of 162.70 feet; thence North 44 degrees 27 minutes 25 seconds East a distance of 25.00 feet; thence continuing along said right of way line South 45 degrees 32 minutes 35 seconds East a distance of 864.00 feet; thence South 44 degrees 27 minutes 25 seconds West a distance of 400.00 feet at right angles to said right of way; thence South 45 degrees 32 minutes 35 seconds East a distance of 800.00 feet parallel with said right of way line; thence North 89 degrees 23 minutes 50 seconds West a distance of 1041.17 feet to the point of beginning, EXCEPT Minnesota Department of Transportation Right of Way Plat No. 55-100.

The East Half of the Northwest Quarter and the East Half of the Southwest Quarter of the Northwest Quarter of Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The Northwest Quarter of the Northwest Quarter of Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The West Half of the Southwest Quarter of the Northwest Quarter and the West Half of the Northwest Quarter of the Southwest Quarter of Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The North 5 acres of the Southwest Quarter of the Southeast Quarter lying west of the St. Paul and Elliota Road in Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The Southeast Quarter of the Southwest Quarter of Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The Southwest Quarter of the Southwest Quarter of Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The Southeast Quarter of the Northwest Quarter and the North Half of the Southwest Quarter of the Northwest Quarter of Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The North Half of the Northwest Quarter of Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The South Half of the Southwest Quarter of the Northwest Quarter of Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota.

The Southwest Quarter of the Northeast Quarter of Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota.

EXCEPTING THEREFROM THE FOLLOWING DESCRIBED PARCELS:

1) That part of the Southeast Quarter of the Northeast and the Northeast Quarter of the Southeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at a surveyor's monument located at the northeast corner of the Southeast Quarter of said Section 12; thence on an assumed bearing of South 00° 36'36" East along the East line of said Section 12 a distance of 172.31 feet to the north right-of-way line of Minnesota Trunk Highway Number 52; thence North 65°39'04" West 626.00 feet along said right-of-way line; thence North 22°10'09" East 633.60 feet to the centerline of the Township Road presently known as 59th Avenue; thence South 31°41'17" East 246.86 feet along said centerline; thence southeasterly a distance of 337.05 feet along a tangential curve concave to the northeast having a radius of 2600.00 feet and a central angle of 07°25'39" to the east line of the Southeast Quarter of the Northeast Quarter of said Section 12; thence South 01°24'13" East along the east line of the Southeast Quarter of the Northeast Quarter of said Section 12, not tangent to said curve, 188.00 feet to the point of beginning.

AND

2) That part of the Southwest Quarter of the Northwest Quarter of Section 7, Township 108 North, Range 14 West, described as follows:

Commencing at a Surveyor's monument located at the southwest corner of the Southwest Quarter of the Northwest Quarter of said Section 7; thence on an assumed bearing of the North 1°24'13" West a distance of 188.00 feet along the West line of said Southwest Quarter of the Northwest Quarter; thence South 32°52'02" East 221.13 feet to the South line of said Southwest Quarter of the Northwest Quarter; thence South 88°54'04" West 115.42 feet to the point of beginning.

AND

3) That part of the Southwest Quarter of the Southeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follow:

Commencing at the northwest corner of said Section 1; thence on an assumed bearing of South 00°54'41" East along the west line of the Northwest Quarter of said

Section 1 for a distance of 778.98 feet; thence South 44°55'49" East 4566.75 feet to the point of beginning; thence continuing South 44°55'49" East 755.78 feet; thence South 88°57'41" West 1033.47 feet to the west line of said Southwest Quarter of the Southeast Quarter; thence North 01°13'47" West along said west line of the Southwest Quarter of the Southeast Quarter 515.04 feet; thence easterly a distance of 74.28 feet along a curve concave to the south and not tangent with the last described line, said curve has a radius of 22818.32 feet, a central angle of 00°11'11", and the chord of said curve bears South 89°57'15" East 74.28 feet; thence South 89°51'39" East tangent to said curve 7.10 feet; thence North 00°09'26" East 40.00 feet; thence South 89°51'39" East 429.10 feet to the point of beginning.

AND

4) That part of the Southeast Quarter of the Southwest Quarter and that part of the Southwest Quarter of the Southwest Quarter, all in Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the northwest corner of said Section 1; thence on an assumed bearing of South 00°54'41" East along the west line of the Northwest Quarter of said Section 1 for a distance of 778.98 feet; thence South 44°55'49" East 4566.75 feet; thence continuing South 44°55'49" East 755.78 feet; thence South 88°57'41" West 1033.47 feet to the east line of said Southeast Quarter of the Southwest Quarter and the point of beginning; thence North 01°13'47" West along said east line of the Southeast Quarter of the Southwest Quarter 515.04 feet; thence westerly a distance of 78.47 feet along a curve concave to the south and not tangent with the last described line, said curve has a radius of 22818.32 feet, a central angle of 00°11'49", and the chord of said curve bears South 89°51'15" West 78.47 feet; thence South 89°45'20" West tangent to said curve 239.41 feet; thence North 00°14'38" West 35.00 feet; thence South 89°45'20" West 267.50 feet; thence southwesterly a distance of 466.08 feet along a tangential curve concave southerly having a radius of 1844.86 and a central angle of 14°28'30"; thence South 14°43'05" East not tangent to said curve 5.00 feet; thence southwesterly a distance of 389.36 feet along a curve concave southeasterly and not tangent with the last described line, said curve has a radius of 1839.86 feet, a central angle of 12°07'31", and the chord of said curve bears South 69°13'05" West 388.64 feet; thence South 27°44'48" West not tangent to said curve 56.31 feet; thence South 27°00'55" East 356.65 feet; thence North 88°57'41" East 1283.97 feet to the point of beginning.

AND

5) That part of the Southwest Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follow:

Commencing at the northwest corner of said Section 1; thence on an assumed bearing of South 00°55'04" East along the west line of the Northwest Quarter of said Section 1 for a distance of 778.98 feet; thence South 44°56'12" East 5322.53 feet; thence South 88°57'18" West 1033.59 feet to the east line of said Southwest Quarter; thence North 01°14'01" West along said east line of the Southwest Quarter

515.04 feet; thence westerly a distance of 78.47 feet along a curve concave to the south and not tangent with the last described line, said curve has a radius of 22818.32 feet, a central angle of 00°11'49", and the chord of said curve bears South 89°50'52" West 78.47 feet; thence South 89°44'57" West tangent to said curve 239.41 feet; thence North 00°15'01" West 35.00 feet; thence South 89°44'57" West 150.29 feet to the point of beginning; thence continuing South 89°44'57" West 117.21 feet; thence southwesterly a distance of 466.08 feet along a tangential curve concave southerly having a radius of 1844.86 feet, a central angle of 14°28'30", and the chord of said curve bears South 82°30'42" West 464.84 feet; thence South 14°43'28" East not tangent to said curve 5.00 feet; thence southwesterly a distance of 389.36 feet along a non-tangential curve concave southeasterly, said curve has a radius of 1839.86 feet, a central angle of 12°07'31", and the chord of said curve bears South 69°12'42" West 388.64 feet; thence South 27°44'25" West not tangent to said curve 56.31 feet; thence North 31°35'41" West 204.57 feet; thence North 37°01'22" West 184.22 feet; thence northwesterly a distance of 645.86 feet along a non-tangential curve concave to the southwest, having a radius of 1055.16 feet, a central angle of 35°04'13", and the chord of said curve bears North 54°34'07" West 635.82 feet; thence North 89°47'33" East 1700.60 feet; thence South 00°15'07" East 442.40 feet to the point of beginning.

AND

6) That part of the Northwest Quarter of the Northeast Quarter and that part of the Northeast Quarter of the Northeast Quarter, all in Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the northwest corner of said Northwest Quarter of the Northeast Quarter; thence on an assumed bearing of South 00°04'39" East, along the west line of said Northwest Quarter of the Northeast Quarter, 75.00 feet to the south right of way line of White Pines Road SE; thence South 89°53'39" East, along said south right of way line, 562.51 feet to the point of beginning; thence South 00°47'49" West 460.81 feet; thence South 88°46'10" East 931.93 feet; thence North 00°18'35" East 461.84 feet to said south right of way line; thence westerly 216.54 feet along said south right of way line and along a non-tangential curve, concave to the south, said curve has a radius of 1357.40 feet, a central angle of 9°08'24", and the chord of said curve bears North 85°19'27" West 216.31 feet; thence North 89°53'39" West, tangent to said curve and along said south right of way line, 712.22 feet to the point of beginning, containing 10.00 acres.

AND

7) That part platted as Bioscience Drive SE all in the plat of ELK RUN BIOSCIENCE PARK FIRST, according to the recorded plat thereof.

ALSO LESS AND EXCEPT THE FOLLOWING DESCRIBED PARCELS:

Parcel C-1 Land Description

That part of the South Half of the Southeast Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southwest corner of said Southeast Quarter of Section 1; thence on an assumed bearing of South 89°01'27" East along the south line of said Southeast Quarter 1501.93 feet to the point of beginning; thence continuing South 89°01'27" East along the south line of said Southeast Quarter 250.81 feet; thence northwesterly 741.40 feet along a non-tangential curve, concave to the southwest, to the west line of the Southeast Quarter of said Southeast Quarter, said curve has a radius of 1151.74 feet, a central angle of 36°52'58", and the chord of said curve bears North 38°20'36" West 728.67 feet; thence North 15°38'02" West not tangent to said curve 663.34 feet; thence South 84°45'43" West 1022.66 feet; thence southeasterly 490.48 feet along a non-tangential curve concave to the northeast, said curve has a radius of 501.97 feet, a central angle of 55°59'02", and the chord of said curve bears South 37°44'18" East 471.20 feet; thence South 65°43'49" East tangent to said curve 720.38 feet; thence southeasterly 647.74 feet along a tangential curve, concave to the southwest, said curve has a radius of 921.74 feet, a central angle of 40°15'49", and the chord of said curve bears South 45°35'55" East 634.49 feet to the point of beginning.

The above described parcel contains 16.85 acres and is subject to any easements, covenants and restrictions of record.

Parcel D-1 Land Description

That part of the East Half of the Northeast Quarter of Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the northwest corner of said Northeast Quarter of Section 12; thence on an assumed bearing of South 89°01'27" East along the north line of said Northeast Quarter 1501.93 feet to the point of beginning; thence continuing South 89°01'27" East along the north line of said Northeast Quarter 250.81 feet; thence southeasterly 83.97 feet along a non-tangential curve, concave to the southwest, said curve has a radius of 1151.74 feet, a central angle of 04°10'39", and the chord of said curve bears South 17°48'48" East 83.95 feet; thence South 15°43'28" East tangent to said curve 972.20 feet; thence South 29°45'39" East 103.08 feet; thence South 13°44'23" East 564.60 feet; thence South 30°55'39" East 552.38 feet; thence southeasterly 219.09 feet along a tangential curve, concave to the northeast, said curve has a radius of 2206.83 feet, a central angle of 05°41'18", and the chord of said curve bears South 33°46'17" East 219.00 feet to the east line of said East Half of the Northeast Quarter and to a point that lies 334.93 feet north of the southeast corner of said East Half of the Northeast Quarter; thence South 00°38'43" East not tangent to said curve and along the east line of said East Half of the Northeast Quarter 146.96 feet; thence northwesterly 336.64 feet along a non-tangential curve, concave to the northeast, said curve has a radius of 2600.00 feet, a central angle of 07°25'07", and the chord of said curve bears North 34°38'12" West

336.40 feet; thence North 30°55'38" West tangent to said curve 246.86 feet; thence South 22°55'47" West 117.64 feet; thence North 30°55'39" West 384.85 feet; thence northwesterly 278.59 feet along a tangential curve, concave to the northeast, said curve has a radius of 1049.93 feet, a central angle of 15°12'10", and the chord of said curve bears North 23°19'34" West 277.77 feet; thence North 15°43'28" West tangent to said curve 186.13 feet; thence North 33°43'44" West 210.30 feet; thence North 09°33'15" West 372.16 feet; thence North 15°43'28" West 652.20 feet; thence northwesterly 156.73 feet along a tangential curve concave to the southwest, said curve has a radius of 921.74 feet, a central angle of 09°44'32", and the chord of said curve bears North 20°35'44" West 156.54 feet to the point of beginning.

The above described parcel contains 11.93 acres and is subject to any easements, covenants and restrictions of record.

Parcel E-1 Land Description

That part of the Southwest Quarter of the Northwest Quarter of Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota, described as follows:

Commencing at the southwest corner of said Southwest Quarter of the Northwest Quarter of Section 7; thence on an assumed bearing of North 89°39'37" East along the south line of said Southwest Quarter of the Northwest Quarter 115.42 feet to the point of beginning; thence continuing North 89°39'37" East along the south line of said Southwest Quarter of the Northwest Quarter 185.96 feet; thence northwesterly 452.55 feet along a non-tangential curve concave to the northeast, said curve has a radius of 2206.83 feet, a central angle of 11°44'58", and the chord of said curve bears North 42°29'26" West 451.76 feet to the west line of said Southwest Quarter of the Northwest Quarter and to a point that lies 334.93 feet north of the southwest corner of said Southwest Quarter of the Northwest Quarter; thence South 00°38'43" East along the west line of said Southwest Quarter of the Northwest Quarter 146.96 feet; thence South 32°06'48" East 221.10 feet to the point of beginning.

The above described parcel contains 0.83 acres and is subject to any easements, covenants and restrictions of record.

Parcel G-1 Land Description

That part of the Northeast Quarter of the Northwest Quarter, the Northwest Quarter of the Northeast Quarter and the Northeast Quarter of the Northeast Quarter, all in Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Beginning at the northeast corner of said Northeast Quarter of the Northwest Quarter of Section 2; thence on an assumed bearing of South 00°04'39" East along the east line of said Northeast Quarter of the Northwest Quarter 60.00 feet to the southerly right of way line of 520th Street per the ELK RUN BIOSCIENCE PARK FIRST plat, according to the recorded plat thereof and on file at the County Recorder's Office, Olmsted County, Minnesota; thence North 89°54'02" West parallel with the north line of said Northeast Quarter of the Northwest Quarter, and along said southerly right of way line of 520th Street 675.19 feet to the easterly right of way line of Bioscience Drive SE per said ELK

RUN BIOSCIENCE PARK FIRST plat; thence South 00°59'12" East along said easterly right of way line of Bioscience Drive SE 15.33 feet; thence South 89°55'36"East 674.94 feet to the east line of said Northeast Quarter of the Northwest Quarter; thence South 89°53'39" East 1274.73 feet; thence southeasterly 1081.56 feet along a non-tangential curve, concave to the southwest, said curve has a radius of 1357.40 feet, a central angle of 45°39'10", and the chord of said curve bears South 67°04'04" East 1053.18 feet; thence South 40°12'34" East not tangent to said curve 615.39 feet to the east line of said Northeast Quarter of the Northeast Quarter; thence North 00°09'25" West along the east line of said Northeast Quarter of the Northeast Quarter 306.55 feet; thence North 44°14'30" West 105.25 feet; thence North 44°14'28" West 288.43 feet; thence North 46°47'21" East 374.82 feet to the east line of said Northeast Quarter of the Northeast Quarter; thence North 00°09'25" West 105.98 feet to the northeast corner of said Northeast Quarter of the Northeast Quarter; thence North 89°52'05" West along the north line of said Northeast Quarter of the Northeast Quarter 735.96 feet; thence North 89°51'19" West along the north line of said Northeast Quarter of the Northeast Quarter and along the north line of said Northwest Quarter of the Northeast Quarter 1903.49 feet to the point of beginning.

The above described parcel contains 11.70 acres and is subject to any easements, covenants and restrictions of record.

Parcel H-1 Land Description

That part of the West Half of the Northwest Quarter, the Southeast Quarter of the Northwest Quarter, the Northeast Quarter of the Southwest Quarter, the Northwest Quarter of the Southeast Quarter, and the Southwest Quarter of the Northeast Quarter all in Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the northwest corner of said West Half of the Northwest Quarter of Section 1; thence on an assumed bearing of South 00°09'25" East along the west line of said West Half of the Northwest Quarter 644.65 feet to the point of beginning; thence South 42°03'55" East 395.04 feet; thence South 44°14'29" East 740.00 feet; thence South 66°51'38" East 65.00 feet; thence South 27°32'33" East 52.20 feet; thence South 44°14'29" East 350.00 feet; thence South 71°35'16" East 2857.85 feet to the north line of said Northwest Quarter of the Southeast Quarter; thence South 00°42'03" West 809.46 feet; thence North 89°24'53" West 1298.60 feet; thence North 39°51'50" West 196.52 feet; thence North 44°14'29" West 2950.00 feet; thence North 54°26'43" West 254.02 feet; thence North 44°14'29" West 150.00 feet; thence North 40°12'32" West 24.62 feet to the west line of said West Half of the Northwest Quarter; thence North 00°09'25" West 306.55 feet to the point of beginning.

The above described parcel contains 60.06 acres and is subject to any easements, covenants and restrictions of record.

Parcel I-1 Land Description

That part of the Northwest Quarter of the Northwest Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Beginning at the northwest corner of said Northwest Quarter of the Northwest Quarter; thence on an assumed bearing of South 89°52'05" East along the north line of said Northwest Quarter of the Northwest Quarter 77.86 feet; thence South 00°07'11" West 33.00 feet; thence South 46°47'20" West 106.33 feet to the west line of said Northwest Quarter of the Northwest Quarter; thence North 00°09'25" West 105.98 feet to the point of beginning.

The above described parcel contains 0.12 acres and is subject to any easements, covenants and restrictions of record.

Parcel B-2 Land Description

That part of the East Half of the Southwest Quarter and the West Half of the Southeast Quarter, all in Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southeast corner of said East Half of the Southwest Quarter of Section 1; thence on an assumed bearing of North 00°28'22" West along the east line of said East Half of the Southwest Quarter 1088.11 feet to the point of beginning; thence North 89°29'55" West 1331.51 feet to the west line of said East Half of the Southwest Quarter; thence North 00°18'49" West along the west line of said East Half of the Southwest Quarter 815.48 feet; thence South 84°34'51" East 1180.79 feet; thence South 89°24'53" East 1298.60 feet; thence South 89°06'04" East 164.90 feet to the east line of said West Half of the Southeast Quarter; thence South 00°17'44" East along the east line of said West Half of the Southeast Quarter 610.13 feet; thence North 89°06'04" West 175.51 feet; thence South 84°45'43" West 1022.66 feet; thence North 89°29'55" West 112.27 feet to the point of beginning.

The above described parcel contains 42.98 acres and is subject to any easements, covenants and restrictions of record.

Parcel C-2 Land Description

That part of the East Half of the Southeast Quarter, Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southeast corner of said East Half of the Southeast Quarter of Section 1; thence on an assumed bearing of North 00°07'07" West along the east line of said East Half of the Southeast Quarter 1201.60 feet to the point of beginning; thence continuing North 00°07'07" West along the east line of said East Half of the Southeast Quarter 610.10 feet; thence North 89°06'05" West 1309.09 feet to the west line of said East Half of the Southeast Quarter; thence South 00°17'44" East along the west line of said East Half of the Southeast Quarter 610.13 feet; thence South 89°06'05" East 1307.21 feet to the point of beginning.

The above described parcel contains 18.32 acres and is subject to any easements, covenants and restrictions of record.

Parcel D-2 Land Description

That part of the Northwest Quarter of the Southwest Quarter and the South Half of the Southwest Quarter and the Southwest Quarter of the Southeast Quarter all in Section 6, Township 108 North, Range 14 West, Olmsted County, Minnesota, described as follows:

Commencing at the southwest corner of said Southwest Quarter of Section 6; thence on an assumed bearing of North 00°07'07" West along the west line of said Southwest Quarter 1201.60 feet to the point of beginning; thence continuing North 00°07'07" West along the west line of said Southwest Quarter 610.10 feet; thence South 55°42'31" East 737.89 feet; thence South 00°10'16" East 80.00 feet to the north line of said South Half of the Southwest Quarter; thence North 89°35'26" East along the north line of said South Half of the Southwest Quarter 1930.47 feet to the northeast corner of said South Half of the Southwest Quarter; thence North 89°33'39" East along the north line of said Southwest Quarter of the Southeast Quarter 522.17 feet to the centerline of the Township Road; thence South 36°29'59" East along said centerline 416.88 feet; thence South 89°33'13" West 768.56 feet to the west line of said Southwest Quarter of the Southeast Quarter; thence North 00°16'06" West along the west line of said Southwest Quarter of the Southeast Quarter 161.54 feet; thence northwesterly 652.55 feet along a non-tangential curve, concave to the southwest, said curve has a radius of 2211.83 feet, a central angle of 16°54'14", and the chord of said curve bears North 81°57'27" West 650.18 feet; thence South 88°41'02" West not tangent to said curve 1896.57 feet to the point of beginning.

The above described parcel contains 14.83 acres and is subject to any easements, covenants and restrictions of record.

Parcel B-3 Land Description

That part of the Northeast Quarter of the Southeast Quarter, Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southeast corner of said Southeast Quarter of Section 2; thence on an assumed bearing of North 00°09'22" West along the east line of said Southeast Quarter 1625.14 feet to the northeasterly right of way line of Trunk Highway No. 52 per the Minnesota Department of Transportation Right of Way Plat No. 55-30 and also to the point of beginning; thence northwesterly 221.73 feet along a non-tangential curve, concave to the southwest, and along said northeasterly right of way line of Trunk Highway No. 52, said curve has a radius of 3999.88 feet, a central angle of 03°10'34", and the chord of said curve bears North 55°50'31" West 221.70 feet; thence northwesterly along said northeasterly right of way line of Trunk Highway No. 52 and along a Euler Spiral Curve which falls 100.00 feet northeasterly of and parallel with the Euler Spiral Curve on the existing right of way acquisition line per said Minnesota Department of Transportation Right of Way Plat No. 55-30, the chord of said Euler Spiral Curve bears North 58°10'13" West 153.59 feet; thence North 58°32'38" West and along said northeasterly right of way line of Trunk Highway No. 52 a distance of 523.01 feet; thence South 84°34'51" East 762.40 feet to the east line of said Northeast Quarter of the Southeast Quarter; thence South 00°09'22" East along the east line of said Northeast Quarter of the Southeast Quarter 406.41 feet to the point of beginning.

The above described parcel contains 3.45 acres and is subject to any easements, covenants and restrictions of record.

Parcel C-3 Land Description

That part of the South Half of the Southwest Quarter and the Northwest Quarter of the Southwest Quarter of Section 1, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southwest corner of said South Half of the Southwest Quarter of Section 1; thence on an assumed bearing of North 00°09'22" West along the west line of said South Half of the Southwest Quarter and along the west line of said Northwest Quarter of the Southwest Quarter 1625.14 feet to the northeasterly right of way line of Trunk Highway No. 52 per the Minnesota Department of Transportation Right of Way Plat No. 55-30 and to the point of beginning; thence southeasterly 480.53 feet along a non-tangential curve, concave to the southwest, and along said northeasterly right of way line of Trunk Highway No. 52, said curve has a radius of 3999.88 feet, a central angle of 06°53'00" and the chord of said curve bears South 50°48'44" East 480.24 feet; thence southeasterly along said northeasterly right of way line of Trunk Highway No. 52 and along a Euler Spiral Curve which falls 100.00 feet northeasterly of and parallel with the Euler Spiral Curve on the existing right of way acquisition line per said Minnesota Department of Transportation Right of Way Plat No. 55-30, the chord of said Euler Spiral Curve bears South 46°37'48" East 153.59 feet; thence South 46°15'24" East along said northeasterly right of way line of Trunk Highway No. 52 a distance of 1768.30 feet to the south line of said South Half of the Southwest Quarter; thence South 89°47'24" East along the south line of said South Half of the Southwest Quarter 160.50 feet; thence North 22°45'42" West 1188.39 feet; thence North 89°29'55" West 129.21 feet to the east line of the Southwest Quarter of said Southwest Quarter; thence North 00°18'49" West along the east line of said Southwest Quarter of the Southwest Quarter and along the east line of said Northwest Quarter of the Southwest Quarter 815.48 feet; thence North 84°34'51" West 1335.50 feet to the west line of said Northwest Quarter of the Southwest Quarter; thence South 00°09'22" East along the west line of said Northwest Quarter of the Southwest Quarter 406.41 feet to the point of beginning.

The above described parcel contains 35.52 acres and is subject to any easements, covenants and restrictions of record.

Parcel D-3 Land Description

That part of the Northeast Quarter of the Northwest Quarter, Section 12, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the northwest corner of said Northwest Quarter of Section 12; thence on an assumed bearing of South 89°47'24" East along the north line of said Northwest Quarter 1756.95 feet to the northeasterly right of way line of Trunk Highway No. 52 per the Minnesota Department of Transportation Right of Way Plat No. 55-15 and to the point of beginning; thence South 46°15'24" East along said northeasterly right of way line of Trunk Highway No. 52, a distance of 1012.61 feet; thence North 39°13'29" West 903.04 feet to the north line of said Northeast Quarter of the Northwest Quarter; thence North 89°47'24" West 160.50 feet to the point of beginning.

The above described parcel contains 1.28 acres and is subject to any easements, covenants and restrictions of record.

EXHIBIT B

PARCEL 2:

The South 45.25 acres of that part of the North One-Half of the Northeast Quarter of Section 7, Township 108 North, Range 14 West, lying west of the St. Paul Elliota Road.

EXCEPTING THEREFROM THE FOLLOWING DESCRIBED PARCEL:

Parcel E-2 Land Description

That part of the Northeast Quarter of the Northeast Quarter, Section 7, Township 108 North, Range 14 West, Olmsted County, Minnesota, described as follows:

> Commencing at the northeast corner of said Northeast Quarter of the Northeast Quarter of Section 7; thence South 00°02'35" West along the east line of said Northeast Quarter of the Northeast Quarter 1314.88 feet to the south line of said Northeast Quarter of the Northeast Quarter; thence South 89°29'05" West along the south line of said Northeast Quarter of the Northeast Quarter 258.66 feet to the centerline of C.S.A.H. No. 18 (St. Paul Elliota Road) and the point of beginning; thence continuing South 89°29'05" West along the south line of said Northeast Quarter of the Northeast Quarter 195.44 feet; thence North 00°30'55" West 251.65 feet; thence North 45°14'15" West 495.30 feet; thence North 28°31'01" West 386.31 feet; thence North 89°29'05" East 90.47 feet to said centerline of C.S.A.H. No. 18 (St. Paul Elliota Road); thence South 36°25'22" East along said centerline 901.58 feet; thence southeasterly 240.34 feet along said centerline and along a tangential curve, concave to the southwest, said curve has a radius of 719.00 feet, a central angle of 19°09'08", and the chord of said curve bears South 26°50'48" East 239.22 feet to the point of beginning.

The above described parcel contains 2.65 acres and is subject to any easements, covenants and restrictions of record.

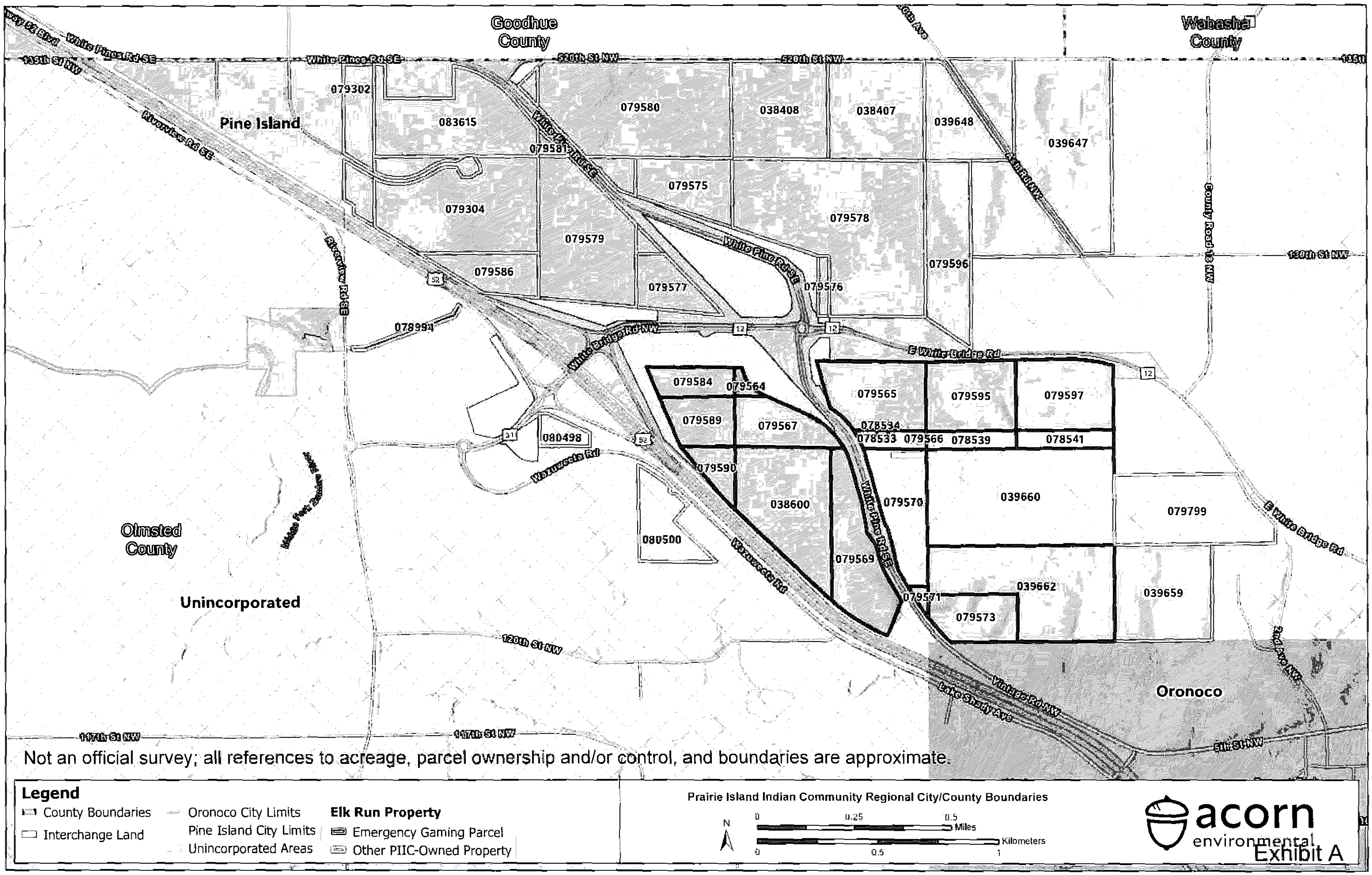
EXHIBIT C

PARCEL 3

That part of the North Half of the Southeast Quarter of Section 2, Township 108 North, Range 15 West, Olmsted County, Minnesota, described as follows:

Commencing at the southwest corner of said Southeast Quarter of Section 2; thence on an assumed bearing of North 00°50'18" West along the west line of said Southeast Quarter 1334.35 feet to the point of beginning; thence continuing North 00°50'18" West along said west line 50.00 feet; thence North 89°01'22" East 274.29 feet; thence North 68°54'11" East 1271.21 feet; thence North 30°41'49" East 155.33 feet to the southwesterly right of way of Trunk Highway Number 52; thence South 45°15'59" East along said southwesterly right of way 51.54 feet; thence South 30°41'49" West 160.15 feet; thence South 68°54'11" West 1297.39 feet; thence South 89°01'22" West 283.29 feet to the point of beginning, EXCEPT that part within the existing county road right of way per Commissioners Order Map No. 93979 and that part within the existing U.S. Highway No. 52 right of way per Minnesota Department of Transportation Right of Way Plat No. 55-99.

Parcel IDs:
850131079584, 850143079564, 850134079589, 850132079567, 851221079590, 851212038600, 851214079569, 850144079565, 840633079595, 840634079597, 850144078534, 850144078533, 850144079566, 840633078539, 840634078541, 851211079570, 840721039660, 840724039662, 851214079571, 840723079573, 850242078994, 850133080498, 851221080500, 850241079586, 850122079581, 850132079579, 850134079577, 850124079575, 850121079580, 850112038408, 850111038407, 840622039648, 840624039647, 840623079596, 850142079576, 850141079578, 850214079302, 850212083615, 850214079304



Goodhue County
Wabasha County
Pine Island
Olmsted County
Unincorporated
Oronoco
079302
083615
079580
038408
038407
039648
039647
079581
079575
079304
079578
079579
079586
079577
079576
079596
078994
079584
079564
079565
079595
079597
079589
079567
078534
078533
079566
078539
078541
080498
079590
038600
079570
039660
079799
080500
079569
039662
039659
079571
079573
White Pine Rd SE
520th St NW
Riverview Rd SE
White Bridge Rd NW
E White Bridge Rd
Wazuweeta Rd
120th St NW
117th St NW
130th St NW
County Road 18 NW
Vintage Rd NW
Lake Shady Ave
5th St NW
2nd Ave NW
Not an official survey; all references to acreage, parcel ownership and/or control, and boundaries are approximate.
Legend
County Boundaries
Interchange Land
Oronoco City Limits
Pine Island City Limits
Unincorporated Areas
Elk Run Property
Emergency Gaming Parcel
Other PIIC-Owned Property
Prairie Island Indian Community Regional City/County Boundaries
0 0.25 0.5 Miles
0 0.5 1 Kilometers
N
acorn environmental

Exhibit A

Appendix B

Water/Wastewater Technical Study

ENGINEERING, REIMAGINED

Prairie Island Indian Community – North Elk Run Community Development Project:

Water/Wastewater Technical Study

July 2024

Table of Contents

List of Figures and Tables

1. Project Introduction

The Prairie Island Indian Community (PIIC) proposes to implement the North Elk Run Community Development Project (referred to herein as the Project) on approximately 781 acres of land currently owned by PIIC (Location map - see **Figure 1**) in fee that is proposed for acquisition into federal trust (Study area - **Figure 2**). The Project consists of Tribal residential, commercial, and community facilities as shown in **Table 1**. PIIC also owns fee land adjacent to the study area that is also proposed for acquisition into federal trust as part of a separate project. This report details existing and future water supply conditions, wastewater treatment conditions, water supply demands, and potential wastewater generation of the Project. Based on estimations, alternatives were developed for both onsite and off-site water supply, wastewater treatment, and wastewater disposal strategies.

Table 1: Development Components of Proposed Residential, Commercial, and Community Facilities in the North Elk Run Community Development Project

Project Land Use Category	Building/Community Facility Description	Building/Facility Units and/or Footprint Size (sf)	Land Use Category Total Acres
Single Family Residential	Single Family Residential	154 Units 415,800 sf	154.21 acres
Multi-Family Residential	Multi-Family Residential	70 Units 147,000 sf	31.27 acres
	Assisted Living Facility	30 Units 10,000 sf	
Community & Administrative	Public Safety Facility	15,000 sf	90.27 acres
	Public Works/Maintenance Facility	10,000 sf	
	Administration Building	22,000 sf	
	Community Center/Wellness Center	40,000 sf	
	Health Clinic/Health Care Facility	5,000 sf	
	Education, Learning, and Training Center/Library	10,000 sf	
	Bison Maintenance Facility	5,000 sf	
	Water Tower and Lift Station	40,500 sf	
Commercial/Industrial	Convenience/Fast Food/Drive Thru	5,000 sf	82.61 acres
	Grocery Store/Coop	15,000 sf	
Cultural Facility	Cemetery/Burial Area	NA	51.68 acres
	Cultural Center (Wacipi)	7,000 sf	
	Ceremonial House/Bark Lodge	1,000 sf	
Multiple Land Use Categories	8' wide multi-use pathways	338,765 sf	NA
Bison Pastureland	-	-	80.46 acres
Natural Areas/Parks and Recreation	-	-	234.28 acres
Agriculture/Crop Land	-	-	56.25 acres
TOTALS:		**1,087,065 sf**	**781.03 acres**

*Facility square footage only includes the footprint of the building. Square footage for parking lot not included.

1.1 Project Location

The study area is located in southeastern Minnesota (MN), adjacent to the eastern side of U.S. Highway (Hwy) 52, just east and north of the Zumbro River, partially within the City limits of Pine Island and partially within unincorporated Olmsted County. The study area is situated approximately 15 miles north of Rochester, MN. the study area's regional location in southeast Minnesota is shown in **Figure 1**.

Figure 1: Elk Run Regional Location Map

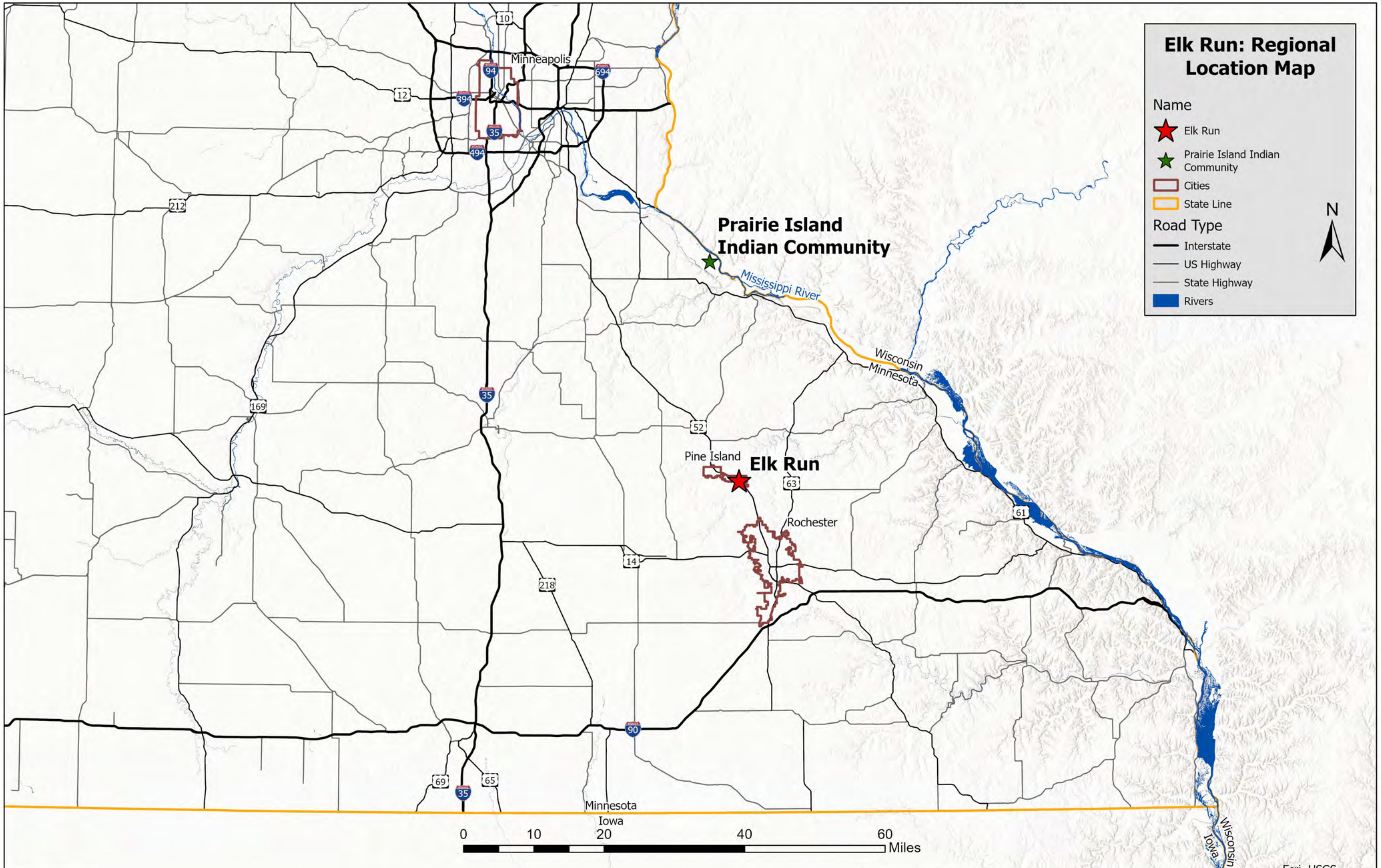
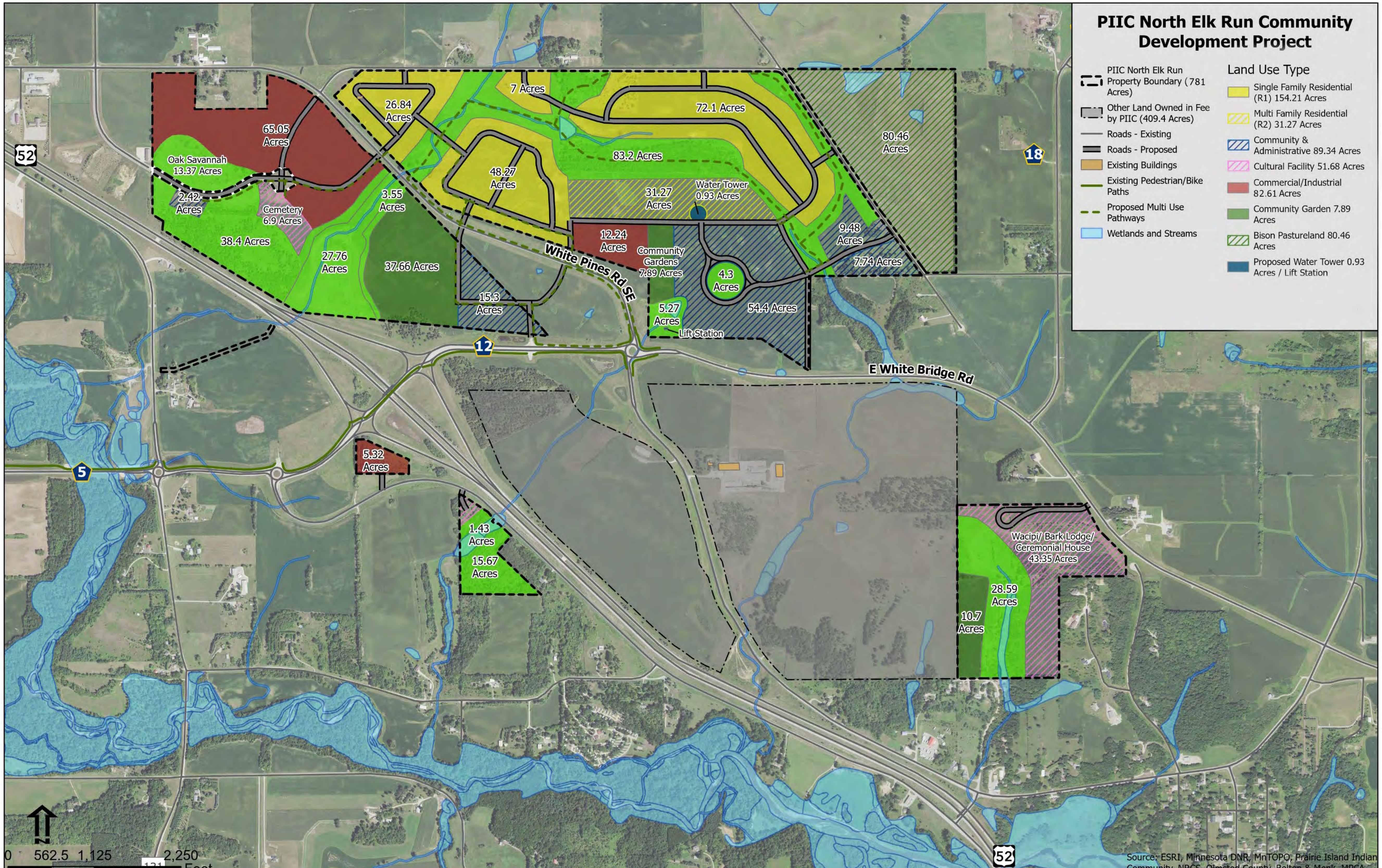


Figure 2: The Project Boundaries and Proposed Land Use Overview Map



2. EXISTING SITE CONDITIONS

2.1 Existing Water Supply Conditions

Two alternatives were identified for supplying water to the Project: an on-site alternative consisting of constructing groundwater wells, and an off-site alternative consisting of connecting the Project to the City of Pine Island's existing water system.

2.1.1 On-site Water Supply Conditions

Elk Run is located in the Prairie Du Chien aquifer. The Minnesota Pollution Control Agency has 20 groundwater monitoring wells in the aquifer approximately 4.5 miles southeast of Elk Run in the Oronoco Township (EXHIBIT A).[1] The groundwater monitoring data available ranges from May 1985 through June 2022. The groundwater quality at Elk Run was compared to the EPA Primary Drinking Water Regulations, as shown in Table 2. EPA Primary Drinking Water Regulations are legally enforceable primary standards and treatment techniques that apply to public water systems. These primary standards and treatment techniques protect public health by limiting the levels of contaminants in drinking water. For the constituents which were sampled, none of the contaminants detected exceeded the National Primary Drinking Water Regulations. However, data was not available for every contaminant which has a Primary Drinking Water Standard, such as nitrates, selenium, and total coliforms. More sampling is needed to determine the treatment levels necessary for an on-site potable water system.

The existing potable water system within the entirety of Elk Run consists of two wells within the "Other Land Held in Fee by PIIC" at the farmstead site located off of White Pines Avenue NE. Potable water is supplied by an underground aquifer approximately 200 to 400 feet below ground surface. According to well log reports, these wells pump water at 50 gallons per minute (gpm).[2,3] Currently there is no onsite water treatment infrastructure. For underground utilities, there is approximately 1.2 miles of existing 12-inch water utility pipe infrastructure within the Project property boundary located in the northwest quadrant, as shown in Figure 4. The material of the pipe is unknown. If the pipe meets Ten State Standards and can manage anticipated water demands, it could potentially be used in the future development.[4]

2.1.2 Off-site Water Supply Conditions

The City of Pine Island has provided information and documentation regarding the City's existing capacity to supply potable water to the developments at the Project in the short-term (0-6 years; 2024-2029). An intergovernmental agreement between PIIC and the City of Pine Island was signed by both parties effective as of November 29th, 2023, that will facilitate the water and wastewater partnership between the City and PIIC. The City of Pine Island has stated that it has the current capacity to supply and treat up to 70,000 gallons per day (gpd) of residential water, along with 40,000 gpd of nonresidential water sources.

There are two municipal wells and two elevated storage tanks in the city of Pine Island that provide water for the City. According to the City of Pine Island's 2023 Drinking Water Report, city obtains water from a groundwater source consisting of two wells ranging from 452 to 555 feet deep which draw water from the Prairie Du Chien-Jordan and Jordan aquifers.[5] The well log and boring reports for these two wells are shown in EXHIBIT C.

---

[1] (Minnesota Pollution Control Agency, 2024)
[2] (Minnesota Department of Health, 2016)
[3] (Minnesota Department of Health, 2014)
[4] (Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2014)
[5] (City of Pine Island, 2023)

According to information provided by the city of Pine Island, the average daily water usage in the city is 0.30 MGD and the total capacity is 0.70 MGD. The city is anticipating a 5% increase in water usage every year. Historical water usage data is publicly available via by the Minnesota Department of Natural Resources Water Appropriations Permit Program website. Based on available data, the city of Pine Island's water usage from 2012 to 2022 ranges from 100.2 million gallons per year to 123.3 million gallons per year.[6] The city of Pine Island's historical water usage is shown in more detail in **Figure 3** and **Table 3**.

For future infrastructure improvements, there are currently no defined water supply projects at this time. The city does not have any projects listed on the Minnesota Department of Health's 2024 Drinking Water Revolving Fund Project Priority List (PPL).[7] According to information provided by the city of Pine Island, they are anticipating a potential need for a new well and elevated water tank in the next 5 to 10 years, depending on demands.

Table 2: Table of Detected Regulated Contaminants in the Prairie Du Chien Aquifer in Monitoring Wells Near Oronoco

Substance	Date Highest Level was Detected	Highest Level Detected (mg/L) *	National Primary Drinking Water Regulation (mg/L)
1,1,1,2-Tetrachloroethane	6/11/2012	< 0.0003	0.2
1,1,1-Trichloroethane	6/11/2012	< 0.0004	0.005
1,1-Dichloroethane	6/11/2012	0.0017	0.007
1,2,4-Trichlorobenzene	6/11/2012	< 0.0003	0.07
1,2-Dibromo-3-chloropropane	6/11/2012	< 0.0007	0.0002
1,2-Dichloroethane	6/11/2012	< 0.0003	0.005
1,2-Dichloropropane	6/11/2012	0.0013	0.005
Arsenic	7/27/2000	0.0034	0.01
Benzene	6/11/2012	< 0.0003	0.005
Cadmium	7/24/2001	< 0.0002	0.005
Carbon tetrachloride	6/11/2012	< 0.0003	0.005
Chlorobenzene	6/11/2012	< 0.0003	0.1
Chromium	7/24/2001	< 0.002	0.1
Ethylbenzene	6/11/2012	< 0.0003	0.7
Mercury	7/25/2003	< 0.00013	0.002
o-Dichlorobenzene	6/11/2012	< 0.0003	0.6
Styrene	6/11/2012	< 0.0003	0.1
Tetrachloroethylene	6/11/2012	0.0017	0.005
Toluene	6/11/2012	< 0.0003	1
trans-1,2-Dichloroethylene	6/11/2012	< 0.0003	0.1
Trichloroethylene	6/11/2012	0.001	0.005
Vinyl chloride	6/11/2012	< 0.0003	0.002
Xylene	7/25/1994	0.0023	10

* Data was obtained from groundwater monitoring wells in the aquifer (Minnesota Pollution Control Agency, 2024).

[6] (Minnesota Department of Natural Resources, 2023)
[7] (Minnesota Department of Health, 2023)

Figure 3: City of Pine Island Historical Water Usage

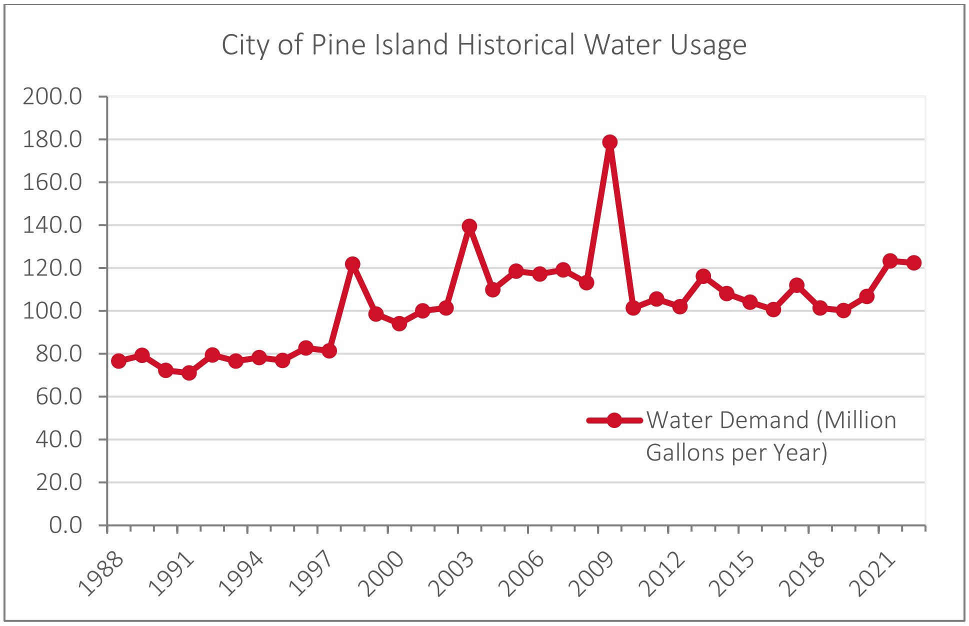


Table 3: City of Pine Island Historical Water Usage

Year	Water Demand (Million Gallons per Year)		
	Jordan Aquifer	Prairie du Chien-St Lawrence Aquifer	Total
2022	49.0	73.5	122.5
2021	39.6	83.7	123.3
2020	49.9	56.9	106.7
2019	32.9	67.3	100.2
2018	68.6	32.8	101.3
2017	46.2	65.8	112.0
2016	41.5	59.1	100.6
2015	42.2	61.9	104.1
2014	44.0	64.1	108.1
2013	46.9	69.4	116.2
2012	54.9	47.0	102.0
2011	57.5	48.0	105.6
2010	74.1	27.3	101.4
2009	44.4	134.4	178.8
2008	0.3	112.9	113.3
2007	7.1	112.1	119.2
2006	0.0	117.2	117.2
2005	0.4	118.1	118.6
2004	0.2	109.8	110.0
2003	0.2	139.2	139.4
2002	0.2	101.2	101.4
2001	0.0	100.0	100.0
2000	0.1	94.0	94.1

2.2 Existing Wastewater Treatment Conditions

Three alternatives were identified for wastewater treatment: subsurface treatment system (septic and drain field), an on-site alternative consisting of a mechanical wastewater treatment facility (surface discharge), and an off-site alternative consisting of connecting the Project to the City of Pine Island's existing sewer system.

2.2.1 On-site Wastewater Treatment Conditions

The only known existing wastewater treatment in near proximity to the Project is a potential septic system at the Elk Run farmstead site, located with the *Other Land Owned in Fee by PIIC*. This septic system is likely designed for a single residential property and cannot be used in future developments. There is also a wastewater collection system located within the same 1.2 miles of the potable water pipe utility easements, running parallel to that piping system, as shown in **Figure 4**. The size and material of the pipe is unknown. If the pipe meets Ten State Standards and can manage anticipated wastewater demands, it could potentially be used in the future development.

2.2.2 Off-site Wastewater Treatment Conditions

The City of Pine Island has provided information and documentation regarding the City's existing capacity to treat wastewater generated from proposed development of the Project in the short-term (0-6 years; 2024-2029). An intergovernmental agreement between PIIC and the City of Pine Island was signed by both parties effective as of November 29th, 2023, that will facilitate the water and wastewater partnership between the City and PIIC. The City of Pine Island has stated that it has the current capacity to treat up to 70,000 gallons per day (gpd) of residential wastewater, along with 40,000 gpd of nonresidential wastewater sources.

The facility description and design loadings for the City of Pine Island's wastewater treatment facility were obtained from Minnesota Pollution Control Agency website "What's in My Neighborhood." City of Pine Island wastewater treatment facility (NPDES Permit No. MN0024511) discharges continuously to the Middle Fork of Zumbro River and has effluent limits for carbonaceous biological oxygen demand (CBOD), CBOD percent removal, fecal coliform, pH, phosphorus, total suspended solids (TSS), TSS percent removal, and total residual chlorine.[8,9] This permit became effective on April 1, 2023, and was issued by the state of Minnesota.

The facility consists of a mechanical bar screen, Parshall flume for influent flow, lift pumps, aerated grit tank, four primary clarifiers, two activated sludge basins, ferric chloride feed system for phosphorus removal, three final clarifiers, Parshall flume for effluent flow, chlorine contact tank, de-chlorination facilities, a waste activated sludge storage tank, a heated primary anaerobic digester, a secondary anaerobic digester, two sludge storage tanks, and land application of biosolids. This facility has a pretreatment agreement with the Significant Industrial User, Land O'Lakes, Inc., located in Pine Island, Minnesota. The City of Pine Island's wastewater treatment facility (WWTF) is designed to treat an average wet weather (AWW) flow of 705,000 gallons per day (gpd) (0.705 MGD), and a 5-day carbonaceous biochemical oxygen demand ($CBOD_5$) of 230 milligrams per liter (mg/L).[10]

The city of Pine Island wastewater treatment facility discharge monitoring report (DMR) data is publicly available through the EPA's Enforcement and Compliance History Online (ECHO) website. Based on data the city reported from to EPA from April 2023 through April 2024, the city's median monthly average flow rate for influent was 0.250 MGD, for effluent 0.241 MGD. For more information, see Table 4 below. Based on information provided by the city of Pine Island, their average daily flow typically ranges from 0.35 MGD to 0.40 MGD, and the capacity of the facility is approximately 0.75 MGD. The City is anticipating an approximate 5% increase in wastewater demand per year over the next 10 years.

[8] (U.S. Environmental Protection Agency, 2024a)
[9] (U.S. Environmental Protection Agency, 2024b)
[10] (Minnesota Pollution Control Agency, 2023)

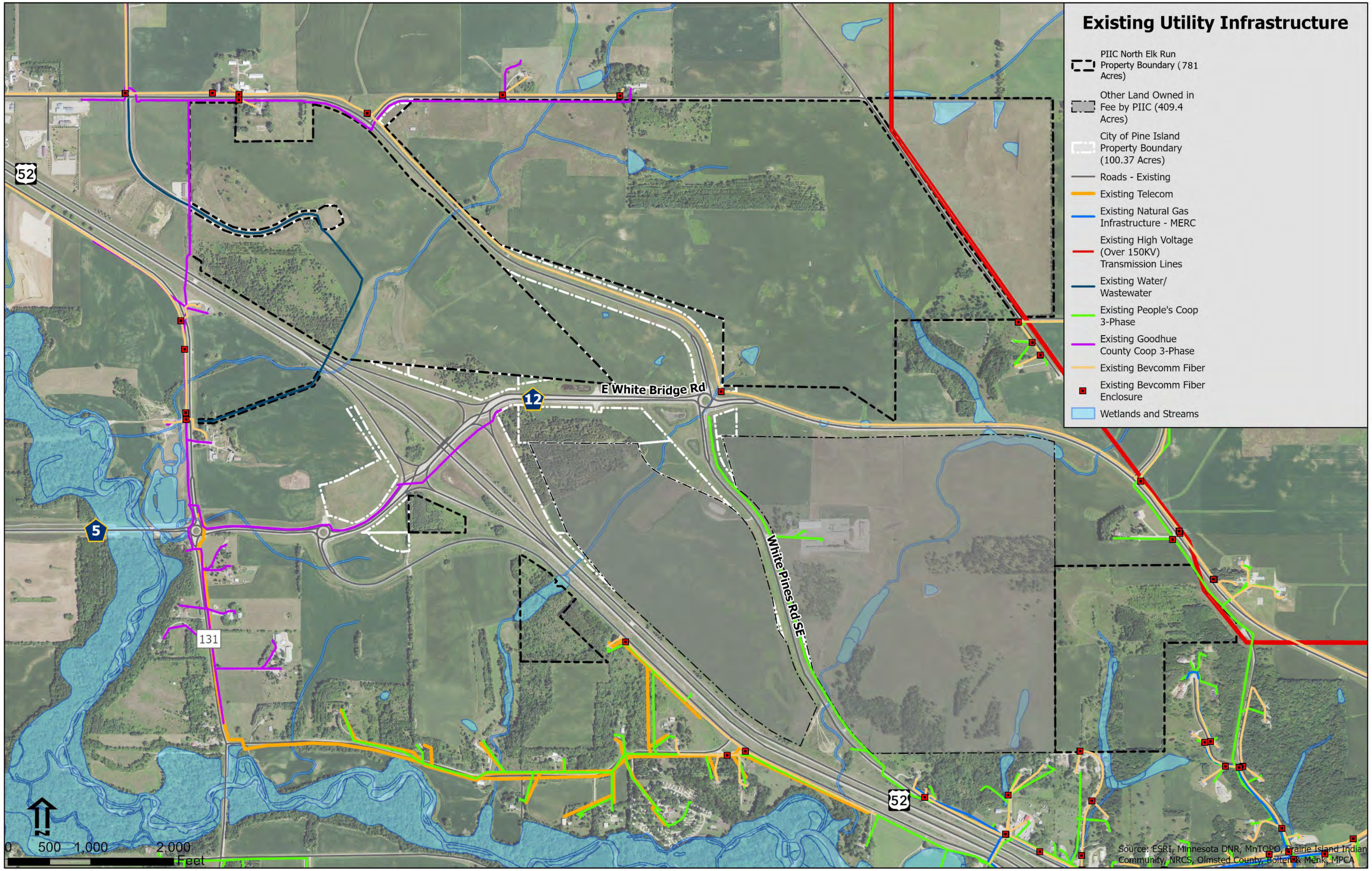
For future infrastructure plans, the regional community is proposing to create a new regional sanitary district to serve the communities of Goodhue, Pine Island, Wanamingo, Zumbrota, and the Prairie Island Indian Community. As part of this, a new wastewater facility will be built near the City of Zumbrota, with an estimated project cost of $48,000,000.[11,12] According to the Minnesota Pollution Control Agency's 2024 Clean Water Project Priority List (PPL), the city of Pine Island is proposing to rehabilitate their wastewater collection system, with an estimated project cost of $1,268,000.[13] For the city of Pine Island wastewater treatment facility, the city states that there may be minor repairs to the existing facility, but no major capital projects or upgrades are currently planned.

Table 4: Pine Island Wastewater Treatment Facility Flow Rate Data

Monitoring Period Date	Effluent Flow Rate		Influent Flow Rate	
	Monthly Average (MGD)	Monthly Maximum (MGD)	Monthly Average (MGD)	Monthly Maximum (MGD)
Discharge Monitoring Report Data				
Apr 2023	0.424	0.485	0.438	0.489
May 2023	0.425	0.56	0.44	0.596
Jun 2023	0.327	0.402	0.336	0.411
Jul 2023	0.264	0.312	0.271	0.328
Aug 2023	0.246	0.292	0.267	0.316
Sep 2023	0.241	0.318	0.246	0.287
Oct 2023	0.241	0.33	0.254	0.347
Nov 2023	0.238	0.379	0.244	0.274
Dec 2023	0.232	0.339	0.239	0.285
Jan 2024	0.25	0.293	0.235	0.275
Feb 2024	0.234	0.336	0.229	0.265
Mar 2024	0.226	0.288	0.237	0.301
Apr 2024	0.241	0.28	0.25	0.285
Summary Statistics				
Count	13	13	13	13
Minimum	0.226	0.28	0.229	0.265
Maximum	0.425	0.56	0.44	0.596
Average	0.276	0.355	0.284	0.343
50th percentile	0.241	0.330	0.250	0.301
80th percentile	0.302	0.393	0.310	0.385
Standard Deviation	0.071	0.084	0.074	0.099

[11] (Minnesota State Legislature, 2023)
[12] (Minnesota State Legislature, 2024)
[13] (Minnesota Pollution Control Agency, 2023)

Figure 4: Elk Run Vicinity Existing Utility Infrastructure Map



3. Water Supply Assessment

3.1 Water Supply Demands

The Project analysis and proposed land use plan is based on a full buildout year of 2027 to allow demonstration of the final long-term build-out of the preferred proposed land use plan for the Project, while also addressing the most critical needs in the short-term.

Based on the Ten States Standards and Minnesota regulations, the following is the estimated water demand for Residential Units, based on 2027 full year buildout (includes single and multi-family units) calculated for the Project.[14]

- Residential – 128,333 gpd total

The total water demand for residential units at full buildout year 2027 is 128,333 gpd, assuming 10% water loss. The estimated water demand for community facilities at buildout year 2027 is 10,039 gpd, assuming 10% water loss. See **Table 5** for more information.

For both residential and community facilities combined at buildout year 2027, the estimated average day water demand is 138,372 gpd (0.14 MGD), assuming 10% water loss. The estimated maximum day water demand is 276,746 gpd (0.28 MGD), which was calculated by doubling the average day water demand. The peak hourly water demand is 384 gpm, assuming a peaking factor of 4 on the average day demand. See **Table 3** for more information.

Based on the International Fire Code, the water distribution system must be able to provide buildings a fire flow of 1,500 gpm for 2 hours.[15] Thus, a water storage facility will need to supply both the maximum day water demands, and the required fire flow, for the Project facilities.

[14] (Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2012)
[15] (International Code Council, 2017)

Table 5: The Project Estimated Water and Wastewater Usage

Full Buildout Year 2027 - Project Estimated Water / Wastewater Use				
RESIDENTIAL UNITS	# Units	Customers / Day	*gal/unit/day	GPD
Single family	154	5	500	77,000
Mutifamily Duplex	70	4	400	28,000
Mutifamily Assisted Living Facility	30	30	350	10,500
TOTAL	**254**	**39**	**1,250**	**115,500**
**gal/unit/day calculated at 100 gpd per customer*				
RESIDENTIAL UNITS ESTIMATE			Wastewater gpd	115,500
			*Water gpd	128,333
			**10% water lost not going into sewer*	
TRIBAL COMMUNITY FACILITIES	Customers/Day		gal/unit/day	GPD
Public Safety Building				
# of Employees	20		15	300
Customers/Public Visitors (avg. / day)	50		2	100
Public Works / Maintenance Building				
# of Employees	10		15	150
Customers/Public Visitors (avg. / day)	5		2	10
Convenience + Fast Food w/ Drive Thru (no fuel)				
# of Employees	10		15	150
Customers/Public Visitors (avg. / day)	1000		5	5,000
Grocery / Coop				
# of Employees	10		15	150
Customers/Public Visitors (avg. / day)	500		2	1,000
Bison Maintenance Facility				
# of Employees	5		15	75
Customers/Public Visitors (avg. / day)	10		2	20
Administrative Building				
Employee	55		15	825
Customers/Public Visitors (avg. / day)	50		2	100
Health Clinic / Health Care Facility				
# of Employees	10		15	150
Customers/Public Visitors (avg. / day)	40		2	80
Community Center / Wellness Center				
# of Employees	10		15	150
Customers/Public Visitors (avg. / day)	100		2	200
Council Chambers/Meeting Space	*These Facilities' use included within the above/overall Community Center water/wastewater gpd estimate.*			
Gym				
Ball Field(s)				
Playgrounds w/ potable water/restrooms				
Education / Learning Center / Library				
# of Employees	20		15	300
Customers/Public Visitors (avg. / day)	50		2	100

Cultural Center / Ceremonial House / Bark Lodge			
# of Employees	5	15	75
Customers/Public Visitors (avg. / day)	50	2	100
COMMUNITY FACILITIES ESTIMATE		Wastewater gpd	9,035
		*Water gpd	10,039
		**10% water lost not going into sewer*	
RESIDENTIAL + COMMUNITY FACILITIES TOTAL ESTIMATE		*Wastewater gpd*	*124,535*
		**Water gpd*	*138,372*
		**10% water lost not going into sewer*	

RESIDENTIAL + COMMUNITY FACILITIES TOTAL ESTIMATE Maximum Day Demand	*Wastewater gpd*	*249,070*
	Water gpd	*276,746*
	2 Multiplier on Average Day Demand	
RESIDENTIAL + COMMUNITY FACILITIES TOTAL ESTIMATE Peak Hour	*Wastewater gpm*	*346*
	Water gpm	*384*
	Peaking factor of 4	

3.2 Water Reuse Potential

Water reuse can reduce demands on the water supply. Some options for water reuse include utilizing stormwater and rainwater for outdoor uses such as landscape irrigation, cropland irrigation, street cleaning, dust control, vehicle washing, firefighting, and decorative water features. Stormwater and rainwater could also be used for indoor uses such as toilet flushing. According to the Water Research Foundation, non-potable water reuse can save up to 25% of the total potable water use in residential buildings.[16] Case studies of water reuse projects are available in the Minesota Stormwater Manual and EPA Website. [17,18]

Another option for water reuse utilizing wastewater for non-potable purposes. The most common type of wastewater reuse is irrigation of cropland, grassland or forests. The nutrients in treated wastewater can contribute to the growth of a wide variety of crops, the maintenance of parks, and pasture lands. In 2017, over 40 Minnesota cities or private wastewater treatment facilities were reusing treated wastewater for some type of irrigation.[19]

3.2.1 Water Reuse Potential – Off-Site Wastewater Treatment

Water reuse potential was calculated based on the amount of gray water that can be captured at commercial facilities prior to being discharged to the collection system and sent to the Pine Island WWTF. Gray water is wastewater that comes from bathtubs, showers, bathroom sinks and washing machines. Toilet waste, kitchen sinks and dishwashers are not considered sources of gray water. Gray water can potentially be used for irrigation of plants, tree and grass on the facility property. It was assumed that 10% of water demand for each tribal community facility can be captured and used for irrigation. Irrigation was assumed to occur over a 6-month period from April through September. Based on this analysis, 904 gpd (164,889 gal/year) of water can potentially be recycled by capturing graywater and using it for irrigation (Table 6).

3.2.2 Water Reuse Potential – On-Site Wastewater Treatment

The water reuse potential for the proposed on-site WWTF was calculated based on the amount of wastewater that can be used for irrigation. Based on the proposed land uses of the Project, the land usable for irrigation with wastewater would be on areas proposed as "Parkland" (234.28 acres), "Cropland" (56.25 acres), and Rangeland (80.46 acres), for a total of 370.99 acres. It was assumed that land would be irrigated at a rate of 1 inch per week during the growing season. The growing season was assumed to be 6 months from April through September.

Based on this analysis, 124,535 gpd (22,727,638 gal/year) of wastewater can potentially be recycled by irrigating with treated wastewater (Table 7). Note that these are only preliminary estimates; sites would need to be individually evaluated to determine if they are suitable for irrigation with treated wastewater. The optimal wastewater application rate may also vary depending on the crop irrigated and nutrient contents of the wastewater. Consultation with EPA would also be needed to determine if NPDES permits are required. Additionally, facilities that irrigate with all of their wastewater or a large volume of it must have sufficient storage to account for the fact that irrigation with wastewater is not allowed when the ground is frozen.

[16] (Water Research Foundation, 2019)
[17] (Minnesota Pollution Control Agency, 2022)
[18] (U.S. Environmental Protection Agency, 2023)
[19] (Minnesota Department of Health, 2018)

Table 6: Water Reuse Potential - Off-site Wastewater Treatment

Residential Units (OR) Tribal Community Facilities	Daily Water Demand (gpd)	Water Recycle Potential (gpd)	Water Recycle Potential (gpy)*
Tribal Community Facilities			
Public Safety Building	400	40	7,300
Public Works / Maintenance Building	160	16	2,920
Convenience + Fast Food w/ Drive Thru (no fuel)	5,150	515	93,988
Grocery / Coop	1,150	115	20,988
Bison Maintenance Facility	95	10	1,734
Administrative Building	925	93	16,881
Health Clinic / Health Care Facility	230	23	4,198
Community Center / Wellness Center	350	35	6,388
Education / Learning Center / Library	400	40	7,300
Cultural Center / Ceremonial House / Bark Lodge	175	18	3,194
Community Facilities Total	9,035	904	164,889

* Water reuse estimates assume that water is only recycled for 6 months from April through September.

Table 7: Water Reuse Potential - On-site Wastewater Treatment

Land Use	Acres	Wastewater Applied During 6 Month Irrigation Season (gal/wk)*	Wastewater Applied During 6 Month Irrigation Season (total gal)*
Parkland	234.28	6,361,264	165,392,871
Cropland	56.25	1,527,323	39,710,385
Rangeland	80.46	2,184,682	56,801,735
*Total Wastewater Required to Irrigate Land (gpy)			261,904,991
*Total Wastewater Supply (gpy)			22,727,638
***Total Wastewater Recycle Reuse Potential (gpy)**			**22,727,638**

* Water Reuse estimates assume that wastewater is only recycled for 6 months from April through September.

3.3 Water Supply Strategies

Based on the estimated water demand of the Project residential and community facilities, water supply strategies were assessed. Both on- and off-site water supply strategies are discussed below.

3.3.1 On-site Water Supply Method

DRILL WELL(S) ONSITE

As previously discussed, the existing potable water system at the Project consists of two off site wells at the Elk Run farmstead site (Other Land Owned in Fee by PIIC). Potable water is supplied by an underground aquifer approximately 200 to 400 feet below ground surface. According to well log reports, these wells pump water at 50 gpm (**Exhibit B**). Based on the estimated maximum day water demand of 276,744 gpd (192 gpm), these two wells would not suffice the needs of the Project's future 2027-year full buildout.

Water usage data is publicly available via by the Minnesota Department of Natural Resources Water Appropriations Permit Program website.[20] Based on available data, Rochester Public Utilities has 18 wells for public water supply in

[20] (Minnesota Department of Natural Resources, 2023)

the Prairie du Chien aquifer. These wells have pumping rates ranging from 800 gpm to 1500 gpm and have well depths ranging from 402 ft to 912 ft (Exhibit D). Assuming that the Prairie du Chien aquifer has relatively similar pumping capacity at the Project, the community will need at least two wells to meet the estimated maximum day demand of 276,746 gpd (192 gpm). Two wells will ensure that the Project can meet the maximum day demand if one well were to be out of service, in accordance with Ten State Standards. Aquifer pumping tests will need to be conducted to determine the actual pumping capacity of the aquifer at Elk Run and to measure how much and how quickly groundwater levels decline in nearby wells.

As previously discussed, groundwater monitoring data is available at sites near Oronoco. For the constituents which were sampled, none of them exceeded the National Primary Drinking Water Regulations. However, data was not available for every contaminant identified under the standard for primary drinking water, such as nitrates, selenium, and total coliforms. Therefore, based on the limited site-specific groundwater monitoring data available, additional sampling is needed to determine the levels of treatment required to meet federal and state drinking water standards.

For water storage, a water storage facility serving the Project will need to be constructed and will need to supply water for both the maximum day demand and required fire flows. To supply a maximum day demand of 276,746 gpd plus fire flows of 1,500 gpm for 2 hours (180,000 gallons), a water storage facility will need a storage volume of at least 456,746 gallons.

3.3.2 Off-site Water Supply Method

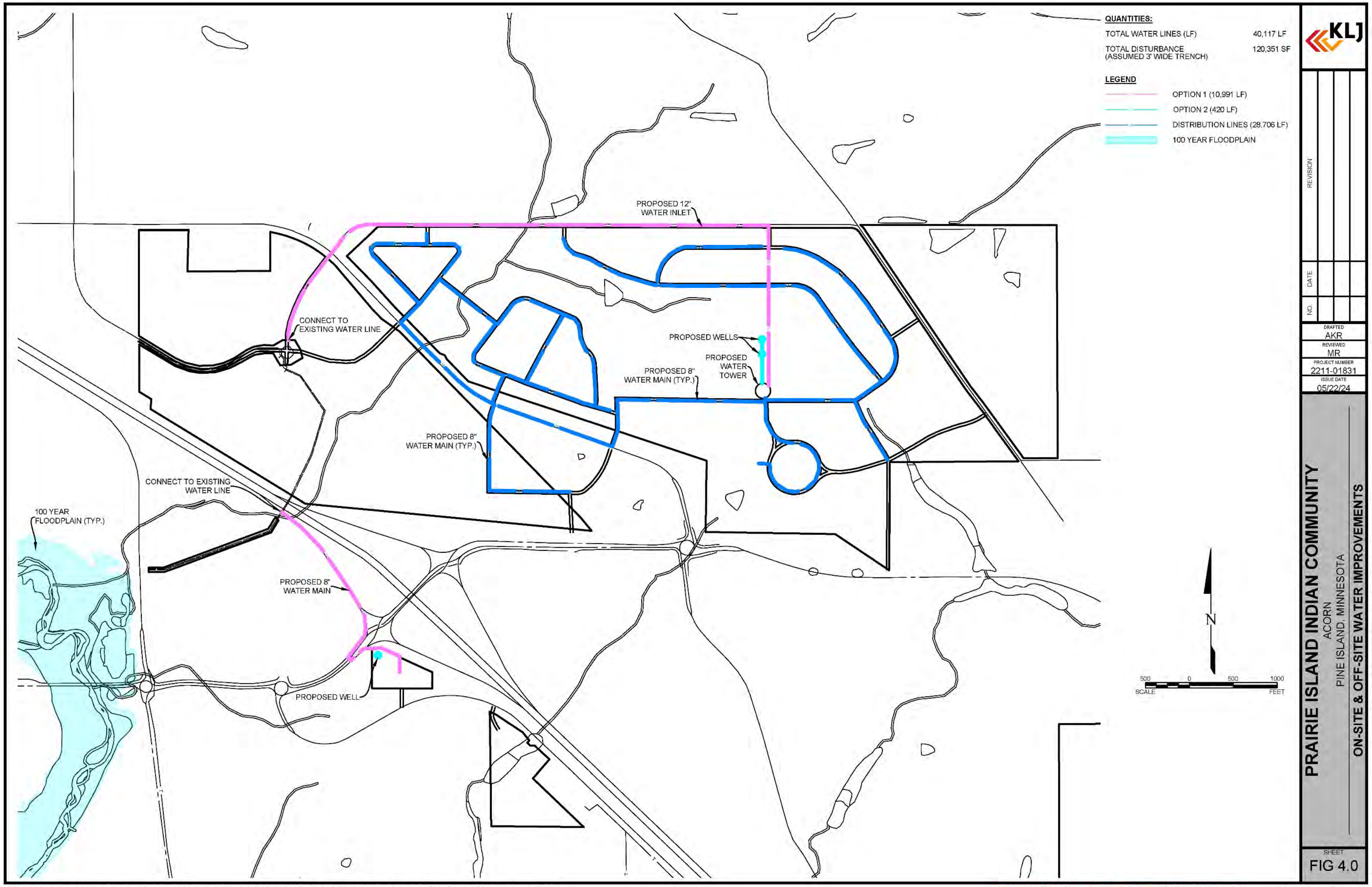
CONNECT TO CITY OF PINE ISLAND WATER SERVICE

If the Project connected to the City of Pine Island's potable water system, it would not need to drill wells or construct a water treatment facility. Connecting to the City of Pine Island's potable water system will provide the Project with a reliable water supply given the redundancy offered by multiple wells, storage reservoirs, transmission mains, and potential new water supply sources in the City's system.

To connect the Project to the City of Pine Island, a pipeline, a storage tank, and potential pumping stations will need to be constructed. Similar, the on-site alternative, the water storage capacity required is equal to the volume of water required to a supply maximum day demand of 276,746 gpd plus fire flows of 1,500 gpm for 2 hours (180,000 gallons). This results in needing at least 456,746 gallons of storage.

The estimated average day water demand is 138,372 gpd, and the estimated maximum day water demand is 276,746 gpd. The City of Pine Island has stated that it has the current capacity to supply and treat up to 70,000 gallons per day (gpd) of residential water, along with 40,000 gpd of nonresidential water. According to information provided by the city of Pine Island, the average daily water usage in the city is 0.30 MGD and the total capacity is 0.70 MGD. The city is anticipating a 5% increase in water usage every year. Based on the city's limited capacity, it will not be able to serve the needs of the Project in the long-term (6+ years). To serve the Project's water demands in the long term and beyond, additional sources of water will need to be obtained. One potential option to overcome this is using on-site facilities in combination with off-site facilities. On-site wells and a water treatment facility could be constructed alongside a distribution system which obtains water from the city of Pine Island.

Figure 5: On-site and Off-site Water Improvements



4. WASTEWATER TREATMENT AND DISPOSAL ASSESSMENT

4.1 Wastewater Demand

As previously discussed, the Project is assuming to be fully developed in full buildout year of 2027.

Based on the Ten States Standards and Minnesota regulations, the following is the estimated water demand for Residential Units (includes single and multi-family units) calculated for the Project. [21]

- Residential (R1 + R2) – 128,333 gpd total

The estimated wastewater demand for community facilities at buildout year 2027 is 9,035 gpd. For residential and community facilities combined at full buildout year 2027, the estimated average day wastewater demand is 124,535 gpd. The estimated maximum day wastewater demand is 249,070 gpd, which was calculated by doubling the average day wastewater demand. The peak hourly wastewater demand is 346 gpm, assuming a peaking factor of 4 on the average day demand. See **Table 5** for more information.

4.2 Wastewater Treatment Strategies

Based on the estimated amount of wastewater generated by the Project residential, commercial, and community facilities, several wastewater treatment and disposal strategies were assessed. Both on- and off-site wastewater treatment options are discussed below.

4.2.1 On-site Wastewater Treatment Method

SUBSURFACE TREATMENT SYSTEM (SEPTIC TANK AND DRAINFIELD)

A subsurface treatment system (STS) consists of a septic tank to retain solids and a drain field to treat wastewater naturally through soil filtration and microbial activity. An STS does not require significant energy inputs for operation, resulting in lower operational costs to mechanical treatment plants. However, STSs generally do not achieve the same level of treatment as mechanical treatment plants, especially for removing nutrients and pathogens. Improperly functioning STSs can introduce nitrogen, phosphorus, organic matter, and bacterial and viral pathogens into the surrounding area and groundwater.[22] An STS also require a large amount of land and may not be suitable for sites with limited land availability or unsuitable soil conditions. Furthermore, STSs are not well suited to handle population growth, as the Project would need to construct additional systems to meet additional wastewater generated.

For STSs, prospective soils should be relatively permeable and should remain unsaturated to several feet below the system depth. Moreover, the soil absorption system should be set well above water tables and bedrock. To avoid contamination of drinking water sources and other problems, soil absorption systems must be situated at prescribed distances from wells, surface waters and springs, escarpments, property boundaries and building foundations. Regulations pertaining to setbacks from water supply, lot lines, and drainage lines must also be considered.[23] Additionally, because the STS would be designed with the capacity to serve 20 or more persons per day, it would be classified by EPA as a large-capacity septic system.[24] Large capacity septic systems are required to obtain an Underground Injection Well permit through EPA.,[25]

[21] (Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2012)
[22] (U.S. Environmental Protection Agency, 1999)
[23] (U.S. Environmental Protection Agency, 1980)
[24] (U.S. Environmental Protection Agency, 2023)
[25] (U.S. Environmental Protection Agency, 2003)

Based on the average day wastewater demand and Minnesota Pollution Control Agency design guidelines, preliminary estimates were made for drain field sizing.[26] The design guide prescribes allowable loading rates based on soil types. According to soil information obtained from the National Resources Conservation Service Web Soil Survey, the soils at the Project consist of various types of silts, loams, sandy loams, and silty clay loams (**EXHIBIT E**).[27] The approximate area required for a drain field system would range from 11 acres to 21 acres, depending on the soil present at the site chosen. Based on the amount of land required and the factors described above, an STS is not feasible as an onsite wastewater treatment system for the Project and should not be considered moving forward.

MECHANICAL PLANT

Package plant sequencing batch reactor (SBR) systems are one type of mechanical plants suitable for areas with little land, stringent treatment requirements, and small wastewater flows. Package plant SBRs are typically manufactured to treat wastewater flow rates between 0.01 and 0.2 MGD; although flow rates can vary based on the system and manufacturer.[28] Package SBRs are appropriate for RV parks or mobile homes, campgrounds, construction sites, rural schools, hotels, and other small applications. SBR systems can manage variable wastewater flows and loadings, making them suitable to manage future growth for Elk Run.

Mechanical plants require skilled and certified operators, which can be difficult to find. The increased complexity of a mechanical plant could mean a higher chance of operation and maintenance issues compared to simpler wastewater treatment facilities. Mechanical wastewater treatment processes such as aeration also consume significant amounts of energy. The increased wastewater demand as the Project develops over time can lead to higher energy consumption and thus higher operational costs. Based on initial estimates, the footprint of an SBR package plant would be approximately 50 ft x 10 ft, or 5000 ft^2 (0.1 acres).

At minimum, wastewater treatment facilities must be able to achieve secondary treatment or its equivalent prior to nonpotable reuse.[29] Discharges of wastewater to surface waters may require tertiary treatment to meet nutrient and bacteria limits, depending on the water quality standards applicable to the stream. Discharges of wastewater to groundwater would have to meet EPA's National Primary Drinking Water Regulations, likely requiring tertiary treatment.

Wastewater Treatment

To discharge wastewater to surface waters from an onsite mechanical wastewater treatment facility, the Project would need to obtain a coverage under a National Pollutant Discharge Elimination System (NPDES) surface water discharge permit and would need to meet effluent discharge limits. As a point of reference for effluent limits, the City of Pine Island wastewater treatment facility (NPDES Permit No. MN0024511) discharges continuously to the Middle Fork of Zumbro River and has effluent limits for carbonaceous biological oxygen demand (CBOD), CBOD percent removal, fecal coliform, pH, phosphorus, total suspended solids (TSS), TSS percent removal, and total residual chlorine.[30,31] This permit became effective on April 1, 2023 and was issued by the state of Minnesota. If the Project's mechanical wastewater treatment facility discharges to the same or a similar waterbody, they would likely have to meet effluent limits for those same parameters.

Utilizing treated wastewater for irrigation could be a feasible option. However, some considerations need to be made. An NPDES permit with EPA may be required if there is a possibility that the wastewater will reach waters of the state.[32] Consultation with EPA would be necessary to determine if an NPDES permit is required. If an NPDES permit is required,

[26] (Minnesota Pollution Control Agency, 2023)
[27] (Natural Resources Conservation Service, 2024)
[28] (U.S. Environmental Protection Agency, 2000)
[29] (Code of Federal Regulations, 2017)
[30] (U.S. Environmental Protection Agency, 2024a)
[31] (U.S. Environmental Protection Agency, 2024b)
[32] (Code of Federal Regulations, 2023)

the wastewater would need to meet secondary treatment standards and may need disinfection to meet bacteria limits.[33] There may also be limits for nitrogen and phosphorus based on agronomic needs for the site, the specific crop irrigated, or applicable water quality standards.[33] Additionally, facilities that irrigate all of their wastewater or a large volume of it must have sufficient storage to account for the fact that irrigation with wastewater during the winter is not allowed in Minnesota.[34] Other disadvantages of land application of wastewater include high land requirements, potential odor and vector problems, and risk to human health if adequate treatment is not employed.

Sludge Disposal

Mechanical wastewater treatment facilities also require consideration of solids disposal, and there are a few options available. Sludge can be land applied to agricultural land after being dewatered using mechanical methods such as centrifugation or belt presses to reduce its moisture content. Proper best management practices (BMPs), recordkeeping, and sampling must be followed to prevent environmental contamination and to comply with regulatory requirements. In some cases, it can be difficult for facilities to meet sludge disposal requirements specified in the federal rules such as pollutant limits and pathogen and vector attraction reduction.[35,36] Additionally, it should be noted that states have begun assessing whether to ban land application of biosolids due to concerns with per- and polyfluorinated substances (PFAS), commonly known as "forever chemicals."[37] Therefore, there is an element of uncertainty about the regulatory future of land application of biosolids which must be considered.

Land application of biosolids has many positive impacts for agricultural production, but it can have negative impacts on water, soil, and air if not practiced correctly. If land application is chosen, a sludge storage facility will need to be constructed, as federal regulations prohibit land applying biosolids in the winter when the ground is frozen. Land application can also produce nuisance odors, especially if land application sites are close to residential areas. Negative impacts to water can result if biosolids are applied at rates that exceed the nutrient requirements of the vegetation. These excess nutrients in the biosolids can then leach from the soil and contaminate groundwater. Similarly, runoff from rainfall may also carry excess nutrients to surface water, contributing to eutrophication and oxygen depletion of waterbodies.[28]

Sludge can also be disposed of through external parties, such as permitted landfill facilities, municipal wastewater treatment plants with sludge handling capabilities, or private contractors specializing in sludge management services. Like with land application of biosolids, proper handling and disposal procedures is required, along with meeting any requirements set by the external party. As with any off-site waste disposal alternatives, an agreement would need to be made with the party accepting sludge.

4.2.2 Off-site Wastewater Treatment Method

The City of Pine Island has stated that in the short-term (less than 6 years), it has the current capacity to supply and treat up to 70,000 gallons per day (gpd) of residential wastewater, along with 40,000 gpd of nonresidential wastewater sources. Based on information provided by the city of Pine Island, their average daily flow typically ranges from 0.35 MGD to 0.40 MGD, and the capacity of the facility is approximately 0.75 MGD.

The City of Pine Island has the capacity to serve the residential wastewater component of the Project. However, the City of Pine Island does not have capacity to serve full build out of the Project (124,535 gpd total). At full buildout year 2027, which includes, residential, commercial and community facilities, the estimated average day wastewater demand is 124,535 gpd, and the estimated maximum day wastewater demand is 249,070 gpd. This exceeds the City of Pine Island's existing treatment capacity of 70,000 gallons per day (gpd) of residential wastewater and 40,000 gpd

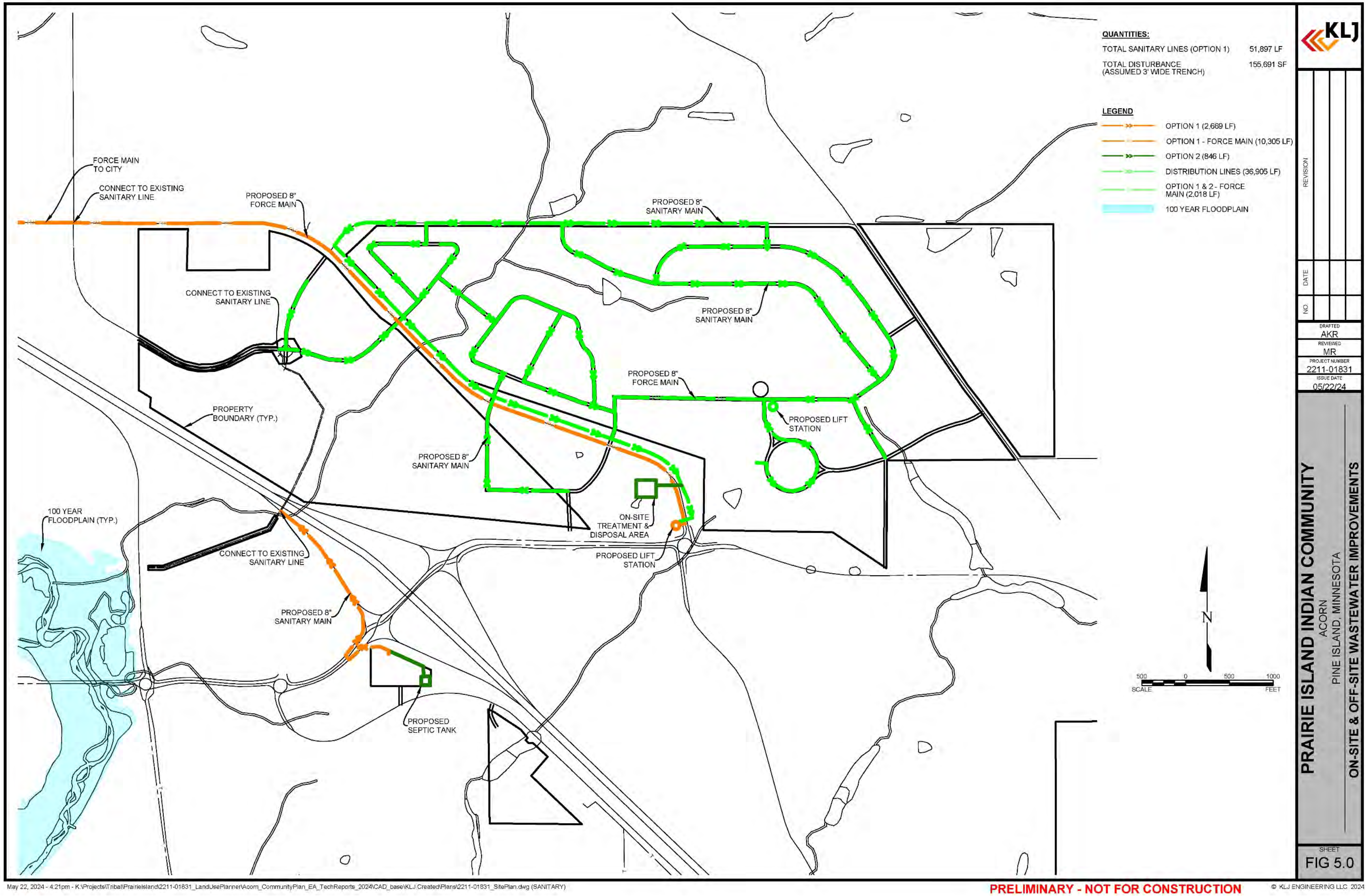
[33] (Minnesota Pollution Control Agency, 2010)
[34] (Minnesota Pollution Control Agency, 2010)
[35] 40 CFR Part 503
[36] (U.S. Environmental Protection Agency, 2023)
[37] (Environmental Council of the States, 2023)

of nonresidential wastewater. Thus, to serve the Project's wastewater demands beyond full build out year 2027, additional capacity will need to be obtained.

In the long-term the Project can partner with and utilize the North Zumbro Sanitary District's proposed wastewater treatment facility. This would require The North Zumbro Sanitary District to have adequate capacity to manage the Project as a user and would require constructing a conveyance system to transport wastewater from the Project to the North Zumbro Sanitary District wastewater treatment facility. The proposed wastewater treatment plant will be located north of the City of Zumbrota, approximately seven miles from neighboring communities. The wastewater treatment plant is planned to serve the cities of Pine Island, Zumbrota, Goodhue, Wanamingo, and the Prairie Island Indian Community.

Both off-site alternatives will require constructing pipelines and lift station(s) to connect wastewater from the Project to the wastewater treatment facilities.

Figure 6: On-site and Off-site Wastewater Improvements



5. Cumulative Impacts

The cumulative impacts of future projects, in conjunction with the project on water infrastructure/capacity was examined. According to 40 CFR 1508.1(g)(3), cumulative impacts are the impact on the environment which result from the incremental impact of the action when added to other past, present, and reasonably near future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[38] The potential future projects to be considered in this cumulative analysis were obtained from email correspondence with Acorn Environmental and are shown in **Table 8**.

Table 8: Potential Future Projects within 1 mile of the Project

Project Name *	Project Location	Project Description	Project Status	Distance from Project Site
Residential Wastewater Development	Oronoco, MN	Construction of a municipal wastewater collection and treatment system to parallel the existing water system.	Under construction	1.0 mile
Hwy 52 Improvements	Hwy 52 from Oronoco to Pine Island	Planned resurfacing of the roadway with potential infrastructure improvements such as a frontage road, flood mitigation improvements, and intersection upgrades.	Planning stages	0.34 miles
PIIC Emergency Gaming Facility and Fee-to-Trust Project	Adjacent to The Project	Fee-to-trust and casino should a catastrophic event occur that would result in closure of the existing Casino.	Planning stages	0.1 miles
Xcel Energy Mankato-Mississippi River Transmission Project	Adjacent to The Project	Approximately 120 miles of new and upgraded 345 kilovolt (kV) transmission lines between the existing Wilmarth Substation near Mankato and a connection point at the Mississippi River near Kellogg, Mn.	Planning stages	0.1 miles

5.1 Water Supply

Of the projects described in Table 8 above, in addition to this project on existing water supply systems, the PIIC Emergency Gaming Facility and Fee-to-Trust Project are the only projects which would cause cumulative impacts on the water supply, because these are the projects which would generate water demand. The residential wastewater development, Highway 52 improvements, and Xcel Energy Mankato-Mississippi River Transmission Project will not generate water demand. The potential cumulative impacts on water supply of the PIIC Emergency Gaming Facility and Fee-to-Trust Project in conjunction with this project are described below.

- » Groundwater depletion: Each new well increases the total groundwater withdrawal, which can lower the water table over time. Development of *Other Land Owned in Fee by PIIC* could increase water demand, potentially stressing the local water supply. In combination with existing wells and future developments, groundwater resources may become over-extracted, leading to reduced water availability for all users, including agricultural, residential, commercial, and industrial sectors. Additional water demand generated by the development of *Other Land Owned in Fee by PIIC* would be an additional stressor, potentially contributing to groundwater depletion.
- » Interference with existing wells: New wells can interfere with the water yield of existing wells by drawing from the same aquifer. This can lead to increased competition for water resources and may necessitate

[38] (Code of Federal Regulations, 2022)

deeper wells or additional infrastructure investments. Additionally, depending on the water usage and its availability in the Prairie du Chien aquifer, new wells can lead to competition for water resources. Additional water demand generated by the development of *Other Land Owned in Fee by PIIC* would be an additional stressor, potentially causing interference with existing wells.

- <u>Water quality degradation</u>: Individual wells may introduce contaminants through surface runoff, agricultural activities, or septic systems. The cumulative effect of multiple wells can result in groundwater contamination, affecting the potability and safety of water for a larger area. If additional wells are constructed to meet additional water demand generated by the development of *Other Land Owned in Fee by PIIC*, this would be an additional stressor, potentially contributing water quality degradation.
- <u>Water supply capacity</u>: The City of Pine Island only has capacity to supply 70,000 gpd of residential water and 40,000 gpd of nonresidential water. the Project's water demand will eventually exceed the city's water supply capacity, necessitating infrastructure upgrades or new water sources.
- <u>Infrastructure Strain</u>: Additional connections require expansions or enhancements to the existing water distribution network. Over time, the cumulative demand from new developments can strain the infrastructure, leading to more frequent maintenance needs and potential service disruptions. Improper maintenance of the water distribution system can accelerate its deterioration over time. Future construction projects would need to take caution to avoid causing breaks in the water mains.

5.2 Wastewater Treatment

Of the projects described in Table 8, the PIIC Emergency Gaming Facility and Fee-to-Trust Projects are the only projects which would cause cumulative impacts on the wastewater system, because they are the only projects which would generate wastewater demand. The Highway 52 improvements and Xcel Energy Mankato-Mississippi River Transmission Project will not increase wastewater demand for the area. The Residential Wastewater Development project in Oronoco, MN would not cause cumulative impacts because city of Oronoco has its own wastewater treatment facility (Permit No. MN0071421) and would be separate from the city of Pine Island or a wastewater treatment facility constructed for this project. The potential cumulative impacts on the wastewater system of the PIIC Emergency Gaming Facility and Fee-to-Trust Projects in conjunction with this project are described below.

- <u>Surface water quality impacts</u>: Increased effluent discharge, even if treated, can affect the receiving water bodies. The Minnesota Pollution Control Agency have identified the Middle Fork Zumbro River as impaired for *E. coli*. The wastewater generated by the Project could contribute to the *E. coli* impairment if discharges to the Middle Fork Zumbro River are above permit limits for *E. coli*. Wastewater generated by the development of *Other Land Owned in Fee by PIIC* would be an additional stressor, potentially contributing to the *E. coli* impairment.
- <u>Treatment capacity</u>: The City of Pine Island only has capacity to treat 70,000 gpd of residential wastewater and 40,000 gpd of nonresidential wastewater. the Project's wastewater demand will eventually exceed the city's treatment capacity, necessitating infrastructure upgrades or connections to new wastewater treatment facilities, such as the proposed North Zumbro Sanitary District wastewater treatment facility. Exceeding the existing treatment capacity can lead to discharges of inadequately treated effluent.
- <u>Infrastructure strain</u>: Over time, increased wastewater demand can lead to more frequent maintenance and higher operational costs. Improper maintenance of the wastewater collection system can accelerate its deterioration over time. Future construction projects would need to take caution to avoid causing breaks in sewer mains. Deterioration of the sewer system can lead to infiltration and inflow, which can contribute to sanitary sewer overflows, in which untreated wastewater is released into the environment.

6. CONCLUSION

This report assessed the available options for water and wastewater infrastructure for the Prairie Island Indian Community (PIIC) North Elk Run Community Development Project. Specifically, this report detailed existing and future water supply conditions, wastewater treatment conditions, water supply demands, and wastewater generation from the Project. Based on these projections, alternatives were developed for water supply and wastewater treatment strategies.

For supplying water to the Project, two alternatives were identified: (1) an on-site alternative consisting of constructing groundwater wells; and (2) an off-site alternative consisting of connecting the Project to the City of Pine Island's existing water system. For wastewater treatment for the Project, three alternatives were identified: (1) an on-site alternative consisting of Subsurface Treatment Systems; (2) an on-site alternative consisting of constructing a mechanical wastewater treatment facility; and (3) an off-site alternative consisting of connecting the Project to the City of Pine Island's existing sewer system.

7. References

City of Pine Island. (2010, October 19). *PINE ISLAND COMPREHENSIVE PLAN .* Retrieved from https://pineislandmn.gov/comperhensive

City of Pine Island. (2023). *Pine Island 2023 Drinking Water Report.* Retrieved from https://mnccr.web.health.state.mn.us/index.faces

Code of Federal Regulations. (2017, January 3). *PART 133—SECONDARY TREATMENT REGULATION*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-133

Code of Federal Regulations. (2021, January 4). *PART 403—GENERAL PRETREATMENT REGULATIONS FOR EXISTING AND NEW SOURCES OF POLLUTION*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-403/section-403.3

Code of Federal Regulations. (2021, January 4). *PART 503—STANDARDS FOR THE USE OR DISPOSAL OF SEWAGE SLUDGE*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-O/part-503

Code of Federal Regulations. (2022, May 20). *PART 1508—DEFINITIONS*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/part-1508#p-1508.1(g)(3)

Code of Federal Regulations. (2023, September 8). *PART 328—DEFINITION OF WATERS OF THE UNITED STATES*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-33/chapter-II/part-328

Code of Federal Regulations. (2024, May 3). *PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141

Davis, M. (2010). *Water and Wastewater Engineering.* McGraw-Hill Professional.

Environmental Council of the States. (2023). *PFAS in Biosolids: A Review of State Efforts.* Washington D.C.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. (2012). *Recommended Standards for Water Works.* Albany, NY: Health Research, Inc., Health Education Services Division.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. (2014). *Recommended Standards for Wastewater Facilities.* Albany, NY: Health Research, Inc., Health Education Services Division.

International Code Council. (2017). *2018 International Fire Code.*

KLJ Engineering. (2023). *Elk Run Future Land Use Plan (Draft).* Prairie Island Indian Community.

Minnesota Department of Health. (2014, September 9). *Well and Boring Report (Well ID 220929).* Retrieved from Minnesota Well Index: https://mnwellindex.web.health.state.mn.us/mwi/index.xhtml?wellId=0000220929

Minnesota Department of Health. (2016, August 8). *Well and Boring Report (Well ID 1000010660).* Retrieved from Minnesota Well Index: https://mnwellindex.web.health.state.mn.us/mwi/index.xhtml?wellId=1000010660

Minnesota Department of Health. (2018). *Advancing Safe and Sustainable Water Reuse in Minnesota.* St. Paul: Environmental Health Division.

Minnesota Department of Health. (2023, November 29). *Drinking Water Revolving Fund 2024 Project Priority List.* Retrieved from https://www.health.state.mn.us/communities/environment/water/docs/dwrf/dwrfpplalpha.pdf

Minnesota Department of Health. (2024, May 7). *Minnesota Well Index*. Retrieved from https://mnwellindex.web.health.state.mn.us/

Minnesota Department of Natural Resources. (2023, October 13). *Minnesota Water Use Data.* Retrieved from https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html

Minnesota Pollution Control Agency. (2010, March). *Municipal Wastewater Reuse.* Retrieved from https://www.pca.state.mn.us/sites/default/files/wq-wwr1-01.pdf

Minnesota Pollution Control Agency. (2022, December 29). *Case studies for stormwater and rainwater harvest and use/reuse*. Retrieved from Minnesota Stormwater Manual: https://stormwater.pca.state.mn.us/index.php?title=Case_studies_for_stormwater_and_rainwater_harvest_and_use/reuse

Minnesota Pollution Control Agency. (2022, July). *Minnesota Pollution Control Agency Wastewater Permit User's Manual.* Retrieved from https://www.pca.state.mn.us/business-with-us/discharge-monitoring-reports

Minnesota Pollution Control Agency. (2023, November 15). *2024 Clean Water Project Priority List (PPL).* Retrieved from https://mn.gov/deed/assets/cw-project-priority-list_tcm1045-274267.pdf

Minnesota Pollution Control Agency. (2023, April 1). *City of Pine Island NPDES Permit (Permit No. MN0024511)*. Retrieved from https://www.pca.state.mn.us/about-mpca/whats-in-my-neighborhood

Minnesota Pollution Control Agency. (2023). *Design guidance for large subsurface Wastewater Treatment Systems.*

Minnesota Pollution Control Agency. (2024, May 7). *Groundwater Monitoring*. Retrieved from https://www.pca.state.mn.us/air-water-land-climate/groundwater-monitoring

Minnesota State Legislature. (2023, March 14). *North Zumbro Sanitary District Proposed.* Retrieved from https://www.house.mn.gov/comm/docs/lqavgNtSlkeE5b5q8cSrXw.pdf

Minnesota State Legislature. (2024, February 2). *HF 4328 as introduced - 93rd Legislature (2023 - 2024)*. Retrieved from https://www.revisor.mn.gov/bills/text.php?number=HF4328&version=latest&session=93&session_number=0&session_year=2023

Natural Resources Conservation Service. (2024, April 29). *Web Soil Survey*. Retrieved from https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

U.S. Environmental Protection Agency. (1980). *Design Manual: Onsite Wastewater Treatment and Disposal Systems.* Washington D.C.: Office of Water.

U.S. Environmental Protection Agency. (1999). *Consideration Of Cumulative Impacts In EPA Review of NEPA Documents.* Washington D.C.: Office of Federal Activities.

U.S. Environmental Protection Agency. (1999). *Decentralized Systems Technology Fact Sheet: Septic Tank - Soil Absorption Systems.* Washington, D.C.: Office of Water.

U.S. Environmental Protection Agency. (2000). *Biosolids Technology Fact Sheet: Land Application of Biosolids.* Washington D.C.: Office of Water.

U.S. Environmental Protection Agency. (2000). *Wastewater Technology Fact Sheet: Package Plants.* Washington, D.C.: Office of Water.

U.S. Environmental Protection Agency. (2002). *Onsite Wastewater Treatment Systems Manual.* Washington D.C.: Office of Water.

U.S. Environmental Protection Agency. (2002, September). *Wastewater Technology Fact Sheet: Slow Rate Land Treatment.* Washington D.C.: Office of Water. Retrieved from https://www3.epa.gov/npdes/pubs/sloratre.pdf

U.S. Environmental Protection Agency. (2003, June). *When is a Septic System Regulated as a Class V Well?* Retrieved from https://www.epa.gov/sites/default/files/2015-08/documents/fs_septic_sys.pdf

U.S. Environmental Protection Agency. (2023, August 1). *Large Capacity Septic Systems*. Retrieved from https://www.epa.gov/uic/large-capacity-septic-systems

U.S. Environmental Protection Agency. (2023, November 21). *Onsite Non-Potable Water Reuse Resources*. Retrieved from https://www.epa.gov/waterreuse/onsite-non-potable-water-reuse-resources

U.S. Environmental Protection Agency. (2023, 6 December). *Regulatory Determinations for Pollutants in Biosolids*. Retrieved from https://www.epa.gov/biosolids/regulatory-determinations-pollutants-biosolids

U.S. Environmental Protection Agency. (2024, January 2). *National Primary Drinking Water Regulations*. Retrieved from https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

U.S. Environmental Protection Agency. (2024, February 15). *Summary of Minnesota's Water Reuse Guideline or Regulation for Agriculture*. Retrieved from https://www.epa.gov/waterreuse/summary-minnesotas-water-reuse-guideline-or-regulation-agriculture

U.S. Environmental Protection Agency. (2024a, April 25). *Detailed Facility Report*. Retrieved from Enforcement and Compliance History Onlline (ECHO): https://echo.epa.gov/detailed-facility-report?fid=MN0024511&sys=ICP

U.S. Environmental Protection Agency. (2024b, April 25). *NPDES Permit Limits and Monitoring Requirements*. Retrieved from Enforcement and Compliance History Online (ECHO): https://echo.epa.gov/trends/loading-tool/reports/permit-limits?permit_id=MN0024511&year=2024

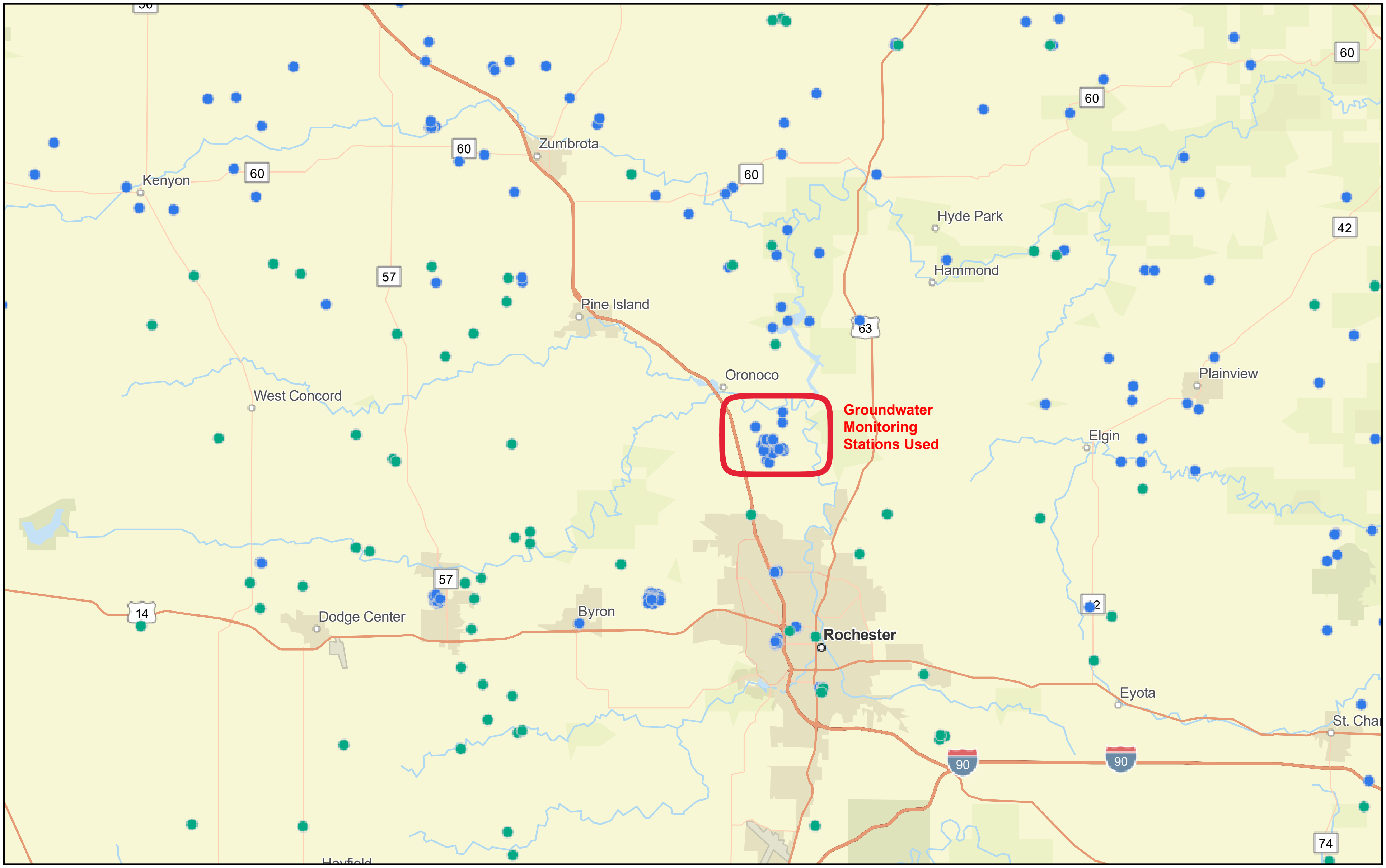
U.S. Environmental Protection Agency. (2024c, April 25). *Waterbody Report*. Retrieved from How's My Waterway?: https://mywaterway.epa.gov/waterbody-report/MNPCA/MN07040004-992

Water Research Foundation. (2019, July 9). *Non-Potable Reuse Synthesis Report.* Retrieved from https://www.waterrf.org/resource/non-potable-reuse-synthesis-report

APPENDICES

EXHIBIT A: GROUNDWATER MONITORING STATIONS NEAR ORONOCO, MN

Minnesota Pollution Control Agency Groundwater Monitoring Stations



5/15/2024, 4:14:18 PM

Groundwater Station

MPCA

MPCA- Ambient Groundwater

1:467,048

0 2.75 5.5 11 mi

0 4.5 9 18 km

Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS

ArcGIS Web AppBuilder

Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS |

<u>Prairie Island Water/Wastewater Technical Study</u>
Groundwater Monitoring Stations near Oronocco, MN
May 15, 2024

City	Oronoco Township
County	Olmsted
Data Source	Minnesota Pollution Control Agency. (2024, May 7). *Groundwater Monitoring* . Retrieved from https://www.pca.state.mn.us/air-water-land-climate/groundwater-monitoring

Station ID	Station Name	Station Type	Station Purpose	Latitude	Longitude
130629	W-8	Well	Monitoring	44.12337	-92.500978
139626	MW-14A	Well	Monitoring	44.133584	-92.496427
139627	MW-14B	Well	Monitoring	44.13362	-92.49643
139630	MW-15A	Well	Monitoring	44.129925	-92.496413
139647	MW-15B	Well	Monitoring	44.129827	-92.496427
187618	MW-13B	Well	Monitoring	44.1325	-92.496445
187619	MW-12	Well	Monitoring	44.135052	-92.503014
187620	MW-13A	Well	Monitoring	44.132545	-92.496444
246008	W-1	Well	Monitoring	44.129795	-92.499879
139626	MW-14A	Well	Monitoring	44.133584	-92.496427
492660	MW-17A	Well	Monitoring	44.134387	-92.498413
492661	MW-17B	Well	Monitoring	44.134374	-92.498331
492662	MW-17C	Well	Monitoring	44.134422	-92.498372
492665	MW-19B	Well	Monitoring	44.128965	-92.50342
514200	MW-18A	Well	Monitoring	44.13403	-92.500891
514201	MW-18B	Well	Monitoring	44.134024	-92.500932
815811	MW-20A	Well	Monitoring	44.135016	-92.501026
815812	MW-20B	Well	Monitoring	44.135026	-92.501126
815813	MW-21A	Well	Monitoring	44.135581	-92.496371
815814	MW-21B	Well	Monitoring	44.134996	-92.496475

EXHIBIT B: WELL AND BORING REPORTS FOR EXISTING GROUNDWATER WELLS AT ELK RUN

Minnesota Unique Well Number

220929

County Olmsted
Quad Oronoco
Quad ID 50A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 01/25/1988
Update Date 09/15/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
HOEHNE, JOHN	108	15	W 12	AAABBB

Elevation 1080 **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W PINE ISLAND MN 55963

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	18	BROWN	
SHAKOPEE-ONEOTA	18	320	WHT/TAN	
JORDAN	320	410	WHITE	

Remarks

Well Depth	Depth Completed	Date Well Completed
410 ft.	410 ft.	07/11/1974

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight** **Hole Diameter**
4 in. To 360 ft. lbs./ft. 8 in. To 360 ft.
4 in. To 410 ft.

Open Hole From 360 ft. To 410 ft.
Screen? ☐ **Type** **Make**

Static Water Level
116 ft. land surface Measure 07/11/1974

Pumping Level (below land surface)
116 ft. hrs. Pumping at 50 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	8	Cubic yards	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 18 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 535138 Y 4891985
Unique Number Verification Name on mailbox Input Date 01/01/1990

Angled Drill Hole

Well Contractor
Christenson Well 20065
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

1000010660

County Olmsted
Quad Oronoco
Quad ID 50A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 01/25/1988
Update Date 08/18/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HOEHNE BROS.	108	15	W	12	null

Elevation 1080 **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Stratigraphy Information

Remarks
DEPTH FROM OWNER

Well Depth	Depth Completed	Date Well Completed
30 ft.	30 ft.	

Drill Method **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.
Screen? ☐ **Type** **Make**

Static Water Level
0 ft. land surface Measure null

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer Prairie Du Chien
Last Strat Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 535131 Y 4891983
Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business Lic. or Reg. No. Name of Driller

EXHIBIT C: WELL AND BORING REPORTS FOR EXISTING GROUNDWATER WELLS AT PINE ISLAND, MN

Minnesota Unique Well Number

127299

County Goodhue
Quad Pine Island
Quad ID 50B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 11/04/1987
Update Date 10/02/2016
Received Date

Well Name	Township	Range	Dir Section	Subsection
PINE ISLAND 3	109	15	W 32	BBCCCC

Elevation 1000 **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well THIRD ST NW PINE ISLAND MN 55963
Contact PINE ISLAND MN 55963

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	10		
SAND	10	27		
FINE SAND	27	39		
COARSE SAND	39	50		
LIMEROCK	50	78		
SANDROCK	78	88		
LIMEROCK &	88	120		
LIMEROCK	120	258		
SANDROCK	258	340		
SANDROCK	340	445		
SANDROCK	445	447		
DOLOMITE	447	452		

Remarks

Well Depth	Depth Completed	Date Well Completed
452 ft.	452 ft.	12/17/1979

Drill Method Cable Tool **Drill Fluid**

Use public supply/community **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below** 1 ft.

Casing Diameter **Weight**
24 in. To 73 ft. 94.6 lbs./ft.
16 in. To 344 ft. 62.5 lbs./ft.

Open Hole From 344 ft. To 452 ft.
Screen? ☐ **Type** **Make**

Static Water Level
22 ft. land surface Measure 12/11/1979

Pumping Level (below land surface)
178 ft. 8.5 hrs. Pumping at 1000 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	19	Cubic yards	0 ft.	344 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat St.Lawrence Formation Depth to Bedrock 50 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected (25 meters)
System UTM - NAD83, Zone 15, Meters X 527897 Y 4894874
Unique Number Verification Information from Input Date 02/11/1999

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Keys Well Co.	62012	SITTIG, R.

Minnesota Unique Well Number

219919

County Goodhue
Quad Pine Island
Quad ID 50B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/29/1990
Update Date 08/30/2016
Received Date

Well Name	Township	Range	Dir Section	Subsection
PINE ISLAND 2	109	15	W 31	DABADD

Elevation 1102 **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact PINE ISLAND MN 55963
Well PINE ISLAND MN 55963

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	8		
SHALE	8	65		
ST. PETER	65	135		
SHAKOPEE & ONEOTA	135	450		
JORDAN	450	555		

Remarks

Well Depth	Depth Completed	Date Well Completed
555 ft.	555 ft.	00/00/1970

Drill Method Cable Tool **Drill Fluid**

Use public supply/community **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
12 in. To 465 ft. lbs./ft.
20 in. To ft. lbs./ft.

Open Hole From 465 ft. To 555 ft.
Screen? ☐ **Type** **Make**

Static Water Level
116 ft. land surface Measure 00/00/1970

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 00/00/1970
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity 1000 g.p. Typ Turbine

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Decorah Shale Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 8 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected (25 meters)
System UTM - NAD83, Zone 15, Meters X 527656 Y 4894356
Unique Number Verification Information from Input Date 02/11/1999

Angled Drill Hole

Well Contractor
Mueller Well Co. 96460
Licensee Business Lic. or Reg. No. Name of Driller

EXHIBIT D: WATER USAGE OF WELLS IN THE PRAIRIE DU CHIEN AQUIFER NEAR ROCHESTER, MN

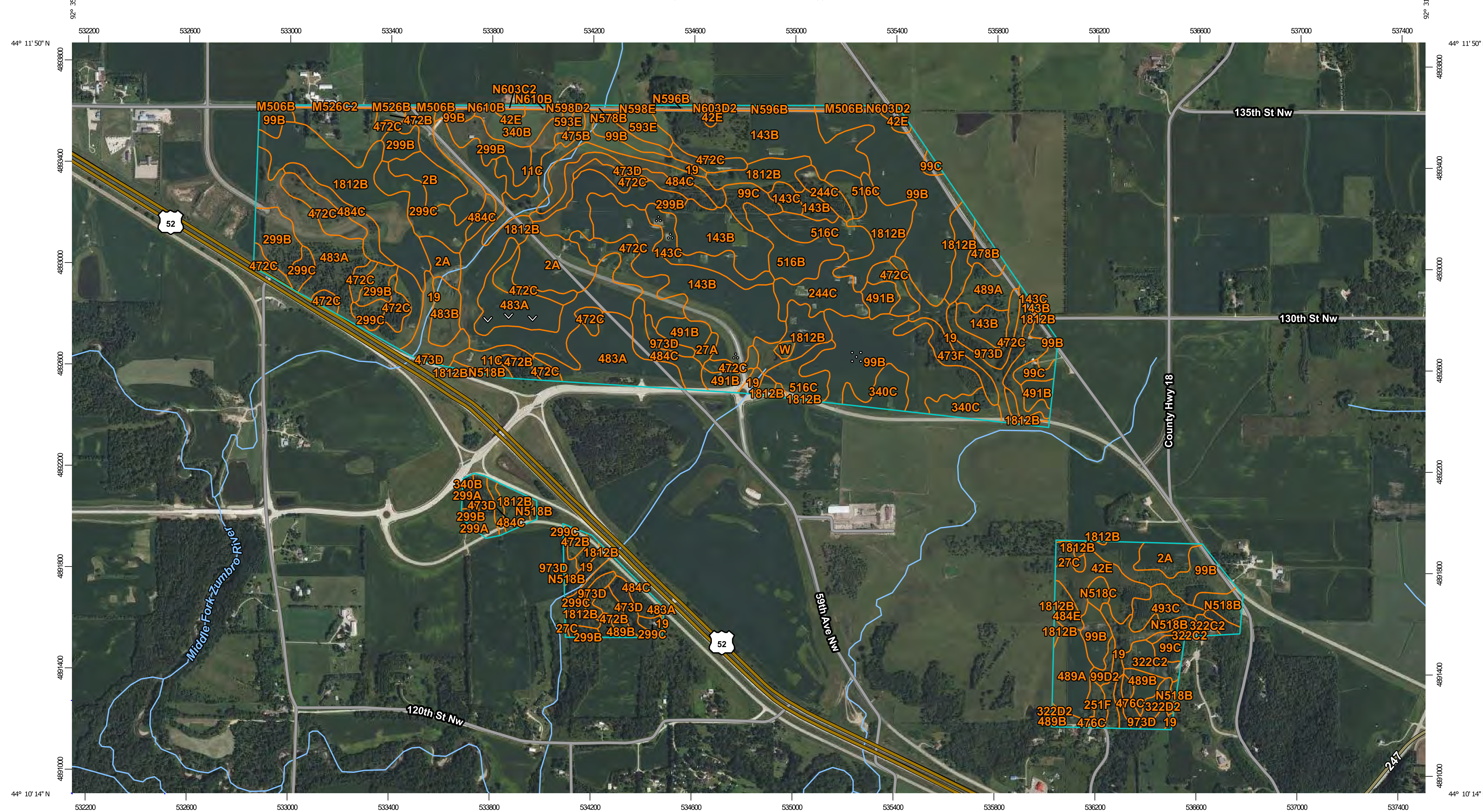
Prairie Island Water/Wastewater Technical Study
Water Usage Data from 1988-2022 for Rochester, Minnesota in the Prairie du Chien Aquifer
May 15, 2024

Permit Number	1979-5076
Permit Status	Active
Permit Effective Date	11/23/2015
Use Type	Municipal/Public Water Supply
Use Category	Water Supply
Landowner	Rochester Public Utilities
Agent	WSB & Associates, Inc.
County Name	Olmsted
Watershed Name	Zumbro River
Permit Total Volume (mgy)	5700
Data Source	Minnesota Department of Natural Resources. (2023, October 13). Minnesota Water Use Data. Retrieved from https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html

Installation Name	Well Number	Location Legal Description	Aquifer	UTM x	UTM y	Well Depth (ft)	Installation Pumping Rate (gpm)
11	220666	T106N-R14W-S2	Prairie du Chien-St Lawrence	543000	4874000	455	1000
13	222525	T107N-R14W-S26	Prairie du Chien-St Lawrence	544000	4877000	442	900
15	222528	T107N-R14W-S27	Prairie du Chien-St Lawrence	541000	4878000	432	900
17	220822	T107N-R14W-S25	Prairie du Chien-Eau Claire	544000	4878000	904	800
20	220662	T106N-R14W-S1	Prairie du Chien-Mt. Simon	544000	4875000	912	1000
22	220818	T107N-R14W-S22	Prairie du Chien-Eau Claire	541000	4880000	730	1000
23	220660	T106N-R14W-S1	Prairie du Chien-Eau Claire	545000	4874000	806	1100
25	220675	T106N-R14W-S10	Prairie du Chien-Eau Claire	542000	4873000	850	1400
26	147451	T107N-R14W-S32	Prairie du Chien-Jordan	538000	4875000	624	1200
27	224212	T107N-R13W-S31	Prairie du Chien-St Lawrence	545000	4876000	448	1200
29	161425	T106N-R14W-S14	Prairie du Chien-St Lawrence	543000	4872000	519	1500
30	239761	T107N-R14W-S36	Prairie du Chien-St Lawrence	545000	4876000	402	1300
31	434041	T106N-R14W-S23	Prairie du Chien-Jordan	542000	4869000	530	1400
32	506819	T107N-R13W-S30	Prairie du Chien-Jordan	546000	4877000	540	800
34	463536	T107N-R14W-S17	Prairie du Chien-St Lawrence	539000	4881000	465	900
35	601335	T107N-R14W-S20	Prairie du Chien-Jordan	539000	4880000	630	1500
37	676687	T107N-R13W-S19	Prairie du Chien-Jordan	546000	4880000	501	1500
40	773386	T106N-R14W-S34	Prairie du Chien-Jordan	542000	4866000	640	1000

EXHIBIT E: NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY SOIL MAP

Soil Map—Goodhue County, Minnesota, and Olmsted County, Minnesota
(Prairie Island Indian Community)



Map Scale: 1:14,400 if printed on B landscape (17" x 11") sheet.

N

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N 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 scales ranging from 1:12,000 to 1:15,800.

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: Goodhue County, Minnesota
Survey Area Data: Version 19, Sep 9, 2023

Soil Survey Area: Olmsted County, Minnesota
Survey Area Data: Version 18, Sep 9, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Aug 17, 2020—Sep 2, 2020

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
M506B	Kasson silt loam, 2 to 6 percent slopes	2.2	0.2%
M522D2	Bassett-Racine complex, 12 to 18 percent slopes, moderately eroded	0.0	0.0%
M526B	Winneshiek silt loam, 2 to 6 percent slopes	0.4	0.0%
M526C2	Winneshiek silt loam, 6 to 12 percent slopes, moderately eroded	1.3	0.1%
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	0.9	0.1%
N596B	Eleva sandy loam, 2 to 6 percent slopes	2.8	0.3%
N598D2	Winneshiek-Waucoma complex, 12 to 18 percent slopes, moderately eroded	0.3	0.0%
N598E	Winneshiek-Waucoma complex, 18 to 35 percent slopes	0.5	0.1%
N603C2	Lilah-Billett complex, 6 to 12 percent slopes, moderately eroded	0.5	0.1%
N603D2	Lilah-Billett complex, 12 to 18 percent slopes, moderately eroded	0.8	0.1%
N610B	Waucoma loam, 2 to 6 percent slopes	0.9	0.1%
Subtotals for Soil Survey Area		**10.8**	**1.2%**
Totals for Area of Interest		**928.4**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2A	Ostrander silt loam, 0 to 2 percent slopes	25.3	2.7%
2B	Ostrander loam, 2 to 5 percent slopes	8.3	0.9%
11C	Sogn loam, 4 to 12 percent slopes	11.8	1.3%
19	Chaseburg silt loam, moderately well drained, 0 to 2 percent slopes	45.3	4.9%
27A	Dickinson sandy loam, 0 to 1 percent slopes	1.5	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
27C	Dickinson sandy loam, 6 to 12 percent slopes	2.2	0.2%
42E	Salida gravelly sandy loam, 12 to 35 percent slopes	15.0	1.6%
99B	Racine loam, 2 to 5 percent slopes	107.6	11.6%
99C	Racine silt loam, 6 to 12 percent slopes	11.8	1.3%
99D2	Racine loam, 12 to 18 percent slopes, eroded	2.0	0.2%
143B	Eleva sandy loam, 2 to 6 percent slopes	100.2	10.8%
143C	Eleva sandy loam, 6 to 12 percent slopes	12.3	1.3%
244C	Lilah sandy loam, 6 to 12 percent slopes	17.1	1.8%
251F	Marlean silty clay loam, 25 to 40 percent slopes	2.4	0.3%
299A	Rockton loam, 0 to 1 percent slopes	0.6	0.1%
299B	Rockton loam, 1 to 6 percent slopes	40.3	4.3%
299C	Rockton loam, 6 to 12 percent slopes	21.8	2.3%
322C2	Timula silt loam, 6 to 12 percent slopes, moderately eroded	6.2	0.7%
322D2	Timula silt loam, 12 to 20 percent slopes, moderately eroded	4.8	0.5%
340B	Whalan loam, 1 to 6 percent slopes	8.1	0.9%
340C	Whalan loam, 6 to 12 percent slopes	12.6	1.4%
472B	Channahon loam, 1 to 6 percent slopes	9.1	1.0%
472C	Channahon loam, 6 to 12 percent slopes	78.4	8.4%
473D	Dorerton loam, 12 to 25 percent slopes	16.8	1.8%
473F	Dorerton loam, 25 to 40 percent slopes	6.3	0.7%
475B	Backbone sandy loam, 1 to 6 percent slopes	2.2	0.2%
476C	Frankville silt loam, 6 to 12 percent slopes	2.6	0.3%
478B	Coggon silt loam, 2 to 6 percent slopes	3.9	0.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
483A	Waukee loam, 0 to 2 percent slopes	63.6	6.9%
483B	Waukee loam, 2 to 5 percent slopes	6.5	0.7%
484C	Eyota sandy loam, 6 to 12 percent slopes	32.9	3.5%
484E	Eyota loamy sand, 12 to 25 percent slopes	3.3	0.4%
489A	Atkinson loam, 0 to 1 percent slopes	18.6	2.0%
489B	Atkinson loam, 1 to 6 percent slopes	6.4	0.7%
491B	Waucoma loam, 2 to 6 percent slopes	15.0	1.6%
493C	Oronoco loam, 6 to 12 percent slopes	6.7	0.7%
516B	Dowagiac silt loam, 2 to 6 percent slopes	12.7	1.4%
516C	Dowagiac sandy loam, 6 to 12 percent slopes	21.1	2.3%
593E	Elbaville silt loam, 18 to 30 percent slopes	5.4	0.6%
973D	Brodale-Sogn complex, 12 to 25 percent slopes	16.7	1.8%
1812B	Terril loam, sandy substratum, 1 to 6 percent slopes	121.2	13.1%
N518B	Lindstrom silt loam, 2 to 6 percent slopes	8.0	0.9%
N518C	Lindstrom silt loam, 6 to 12 percent slopes	2.1	0.2%
W	Water	1.0	0.1%
Subtotals for Soil Survey Area		**917.6**	**98.8%**
Totals for Area of Interest		**928.4**	**100.0%**

Appendix C

Traffic Impact Study

ENGINEERING, REIMAGINED

TRAFFIC IMPACT STUDY

Prairie Island Indian Community – North Elk Run Community Development Project

Pine Island, MN

September 2024

TRAFFIC IMPACT STUDY

Prairie Island Indian Community – North Elk Run Community Development Project

Olmsted County, MN

September 2024

Prepared for:

Acorn Environmental

Prepared By: **KLJ Engineering**	Date: 09/11/2024

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Table of Contents

List of Figures

List of Tables

Appendix

1. Introduction

The Prairie Island Indian Community (PIIC) proposes to implement the North Elk Run Community Development Project (referred to herein as the Project) on approximately 781 acres of land currently owned by PIIC in fee that is proposed for acquisition into federal trust (study area). The Project consists of Tribal residential, commercial, and community facilities as shown in **Figure 1**. Figure 1 highlights future land uses anticipated to generate traffic. PIIC also owns fee land adjacent to the study area that is proposed for acquisition into federal trust, separate from/in addition to the Project. This report details transportation infrastructure needed to support the Project as well as analysis regarding potential traffic-related impacts of the Project.

Study Area and Project Description

The study area consists of approximately 781 acres of land just east of US Highway (Hwy) 52 in Pine Island, MN. The Project consists of single- and multi-family residential development, tribal community and administrative facilities, grocery store/community garden, commercial/industrial land, pastureland, and cultural facilities adjacent to the Project. There is also a planned convenience store/fast food/drive through on Wazuweeta Road located southwest of US 52 (see **Figure 1**).

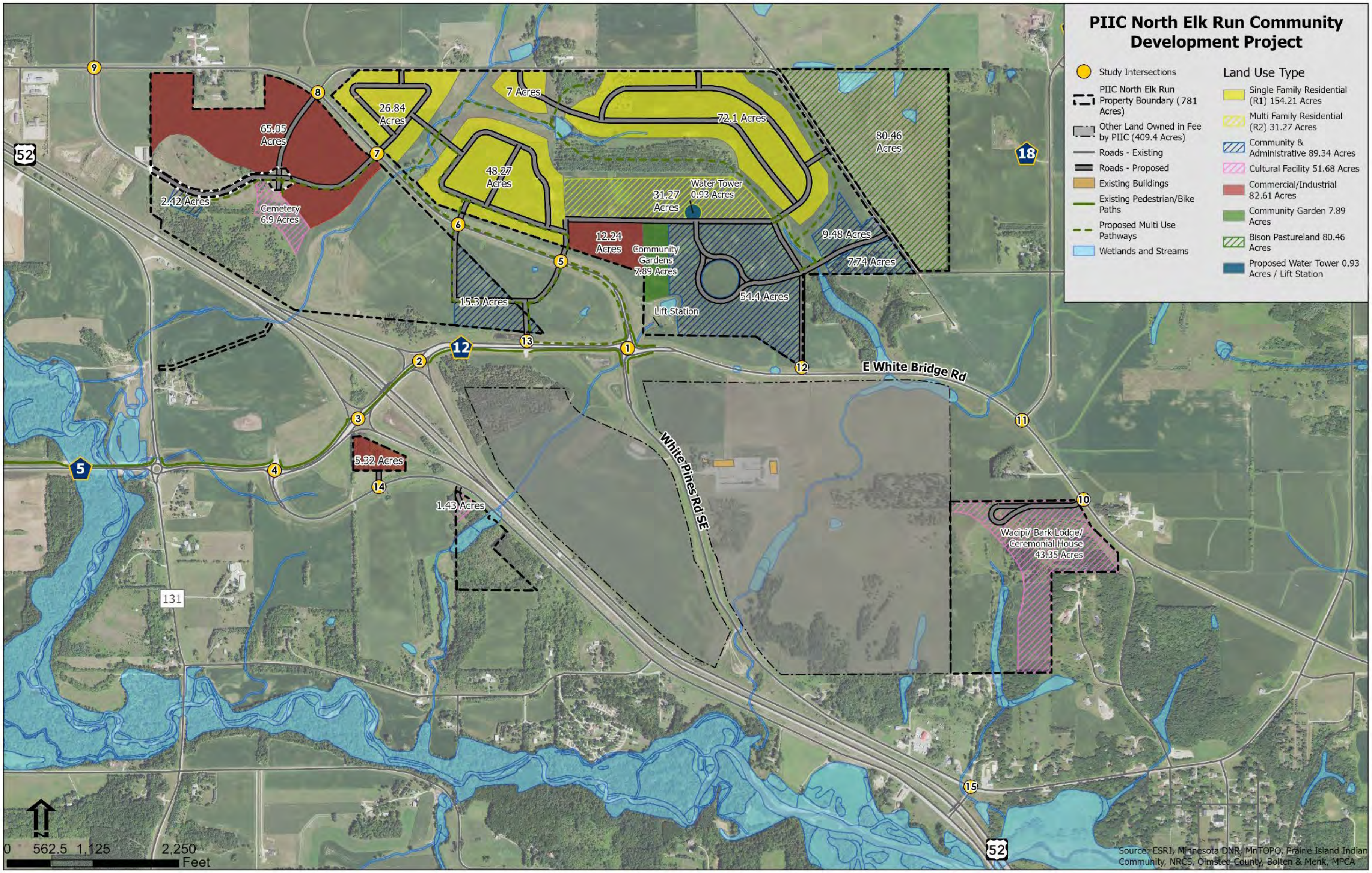
Table 1 – Project Land Use Types with Units/Square Footage

FACILITY TYPE	# of RESIDENTIAL UNITS (or) COMMUNITY FACILITY Sq. Ft.
Single Family Residential	154 Units
Multi-Family Residential	70 Units
Assisted Living Facility	30 Units / 10,000 sq. ft.
TOTAL HOUSING UNITS	254 Units
Public Safety Facility	15,000 sq. ft.
Public Works / Maintenance facility	10,000 sq. ft.
Administration Building	22,000 sq. ft.
Community Center / Wellness Center	40,000 sq. ft.
Health Clinic / Health Care Facility	5,000 sq. ft.
Education, Learning, & Training Center / Library	10,000 sq. ft.
Bison Maintenance Facility	5,000 sq. ft.
Water Tower & Lift Station	40,500 sq. ft.
Convenience + Fast Food w/ Drive Thru	5,000 sq. ft.
Grocery Store / Coop	15,000 sq. ft.
Cemetery / Burial Area	NA
Cultural Center (Wacipi)	7,000 sq. ft.
Ceremonial House / Bark Lodge	1,000 sq. ft.

Objective

The objective of this traffic study is to comprehensively assess the potential impact of the project on the surrounding transportation network, traffic flow, and safety. The report discusses how the project is expected to impact the volume of traffic in the study area and compares traffic conditions for before and after completion of the project at opening year 2027. The study provides recommendations to mitigate any adverse impacts identified such as roadway and intersection improvements, traffic management measures, or transportation demand management strategies.

Figure 1 – Traffic Impact Study Future Land Use Types and Study Intersections



Source: KLJ Engineering

Study Intersections

Eight (8) existing intersections and seven (7) proposed intersections were selected for analysis. The intersections were selected as they are expected to be most impacted by the proposed development. The study intersections with their current traffic control (in parentheses) are listed below and shown in **Figure 1** on the previous page.

1. E White Bridge Rd/County Rd 12 and White Pines Rd SE (Roundabout)
2. US Hwy 52 and County Rd 12/31 Interchange east ramp (Signal)
3. US Hwy 52 and County Rd 31/12 Interchange west ramp (Signal)
4. County Road 5/County Road 31 & Wazuweeta Road (Roundabout)
5. Proposed Intersection along 59th Avenue NW
6. Proposed Intersection along 59th Avenue NW
7. Proposed Intersection along 59th Avenue NW
8. 59th Avenue NW & 520th Street (SSS)
9. 520th Street & 220th Avenue (SSS)
10. Proposed Intersection along E White Bridge Rd
11. E White Bridge Rd & County Road 18 NW (SSS)
12. Proposed Intersection along E White Bridge Rd
13. Proposed Intersection along E White Bridge Rd
14. Proposed Intersection along Wazuweeta Road
15. Vintage Road & 5th Street NW (SSS)

SSS – Side-street Stop

2. Existing Conditions

Roadways

The US Hwy 52 and County Rd 12/31 Interchange is a grade separated interchange where the traffic crosses to the other side of the roadway between freeway ramps. This type of interchange is also known as *Diverging Diamond Interchange* (DDI). The crossing allows for vehicles to turn left on and off freeway ramps more efficiently without stopping or crossing opposing lanes of traffic. Right turns on and off the freeway ramps occur either before or after the crossover intersection, when traffic is on the normal side of the roadway. The thru lanes are controlled by a traffic signal. There is a multi-lane roundabout on either side of the interchange connecting Wazuweeta Road & 59th Street to the highway.

The details of the intersections include:

US Hwy 52 is a four-lane divided freeway that is classified as principal arterial. There are four-foot shoulders on the inside and 12-foot shoulders on the outside lanes. The speed limit of the roadway is 65-mph.

County Road 31/County Road 12/County Road 5/E White Bridge Road – The segment west of 59th Ave NW is a four-lane divided roadway with curb and gutters on both sides. There are no shoulders present on either side of this segment. The segment east of 59th Ave NW is a two-lane undivided roadway with eight-foot shoulders present on both sides of the roadway. The roadway is classified as a minor arterial with a posted speed limit of 40-mph. There are shared use path (SUP) present on the north side of the roadway from Wazuweeta Rd to US-52 west ramps, on the median between the US 52 ramps, and on the south side from US 52 east ramps to 59th Ave NW.

County Road 18 is an undivided one (1) lane principle arterial road in both directions with 4-foot shoulders on both sides of the road. The speed limit is 55 mph.

59th Street is a local road with one (1) lane in each direction. The road is undivided for most of the section and has 7-foot shoulders on both sides of the road. The speed limit is 55 mph, but changes to 45 mph near the intersection with 520th Street.

Wazuweeta Road is a local west side frontage road of US Hwy 52. It has one (1) lane in each direction and is undivided for most of the section with 6-foot shoulders on both side of the road. The speed limit is 45 mph.

Traffic Volumes

The accurate measurement of traffic including timely traffic counts is paramount to effective decision making. KLJ collected peak hour turning movement counts (TMCs) at the study intersections from April 9 to April 11, 2024 to depict weekday AM and PM peak hours. The AM and PM peak on weekday was observed from 7am-8am and 4pm-5pm, respectively.

The existing traffic volumes in the study area for the Weekday peaks are shown in **Appendix A**.. The raw traffic volume profiles of the study intersections are included in **Appendix A**. Segment volumes for the peak hour are included in **Appendix B.**

Table 2 - Existing 2024 Turning Movement Counts

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	5	62	8	1	136	12	11	4	1	2	1	5
	PM	18	112	5	1	88	12	11	8	1	7	10	12
2	AM	21	56	-	-	88	64	57	-	18	-	-	-
	PM	22	81	-	-	47	54	86	-	69	-	-	-
3	AM	-	38	77	71	72	-	-	-	-	35	-	31
	PM	-	31	19	33	100	-	-	-	-	72	-	26
4	AM	1	124	27	2	104	1	47	1	8	1	1	1
	PM	1	79	21	9	122	1	12	1	6	1	1	1
8	AM	-	-	-	1	-	2	-	22	1	1	22	-
	PM	-	-	-	1	-	3	-	29	1	2	31	-
9	AM	1	18	1	1	24	1	1	1	1	3	1	1
	PM	1	29	1	1	27	3	2	1	2	1	1	1
11	AM	-	-	-	12	-	77	-	78	4	16	39	-
	PM	-	-	-	8	-	27	-	58	18	56	68	-
15	AM	13	1	13	2	3	1	40	14	1	1	9	6
	PM	3	4	33	1	1	1	30	15	1	1	19	5

*L – Left, T – Thru, R – Right. For location of the intersections, see **Figure 1**.*

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp.

4 – CR 5 & Wazuweeta Road; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue.

11 – E White Bridge Rd & CR 18; 15 – 5th Street NW & Vintage Road

Non-Motorized User Facilities

Within the study area, County Rd 12 has a multi-use pathway complete with ADA compliant curb cuts and crosswalks. The pathway spans from the west of the US Hwy 52/County Rd 12 interchange and proceeds easterly along County Rd 12/E White Bridge Rd, terminating at the roundabout at the intersection of E White Bridge Rd and White Pines Rd SE. Non-motorized facilities will be built at the time of construction and will be designed to be compliant with the Americans with Disabilities Act (ADA) regarding walkways and pedestrian ramps for access between the newly developed areas and the surrounding land uses.

3. Future Conditions

Project Site Development

This site will be a mixed-use development, featuring residential, commercial, and cultural components.

Background Growth (No-Build Traffic Volumes)

“No-Build” refers to the conditions without the proposed development scenario. For analysis purposes, the year 2027 is used as the opening year, but the actual opening year is dependent on multiple factors. Taking that into consideration, this option includes the existing traffic counts projected to the opening year (2027) and horizon year (2047) of the project. The future non-Project Site related traffic volumes in the study area were estimated using standard annual growth rate of half a percent (0.5%).

It should be noted that a desktop review of forecasted population rates contained in the recently adopted 2022 Olmsted County General Land Use Plan (GLUP) was conducted. The annual growth rate of half a percent used in this study is reflected by the growth rates presented in the Olmsted County GLUP, which covers county growth rates for urban service areas, suburban, small town, and township growth rates in Olmsted County. The GLUP also provides a review of “remaining reserve capacity” for “regional arterial and collector roads” reporting that Olmsted County Rd 12 has a remaining capacity of 71% to accommodate growth, a “low crash risk”, a below average “road segment crash rate”, and ranks in the highest tier of the County’s “seasonal weight limit” within the “10-ton Road” category.[a]

A traffic study that was completed in 2008 for this geographic location (immediately north and west of this current TIS’s study area) was reviewed. The traffic study was a joint project of City of Pine Island/Tower Development/MNDOT reconstruction of the US Hwy 52 and County Rd 31/12 interchange (completed) and accompanying planned development of a Bio-Industrial Park, which was subsequently abandoned shortly after the completion of the US Hwy 52 interchange reconstruction. Due to the age and variance of dissimilar traffic generation inputs of the previous City/Tower/MnDOT TIS, the information from this study was not a reliable baseline for assumptions regarding conceptual future land uses and related future traffic patterns, trip generation, or LOS.

The average yearly growth rates of half a percent were applied to the 2024 traffic volumes to project traffic volumes for the assumed year of opening in 2027 (**Table 3**) and the horizon year in 2047.

---

[a] Olmsted County 2022 General Land Use Plan (GLUP). Figure 4-9, pp. 4.11; Figure 4-10, pp. 4.12; Figure 4-12, pp. 4.14

Table 3 - Projected 2027 No Build Traffic Volumes

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	5	63	8	1	139	12	11	4	1	2	1	5
	PM	18	112	5	1	88	12	11	8	1	7	10	12
2	AM	21	57	-	-	90	65	58	-	18	-	-	-
	PM	22	81	-	-	47	54	88	-	70	-	-	-
3	AM	-	39	79	72	73	-	-	-	-	36	-	32
	PM	-	31	19	33	100	-	-	-	-	73	-	27
4	AM	1	126	28	2	106	1	48	1	8	1	1	1
	PM	1	79	21	9	122	1	12	1	6	1	1	1
8	AM	-	-	-	1	-	2	-	22	1	1	22	-
	PM	-	-	-	1	-	3	-	29	1	2	31	-
9	AM	1	18	1	1	24	1	1	1	1	3	1	1
	PM	1	29	1	1	27	3	2	1	2	1	1	1
11	AM	-	-	-	12	-	78	-	79	4	16	40	-
	PM	-	-	-	8	-	27	-	59	18	57	69	-
15	AM	13	1	13	2	3	1	41	14	1	1	9	6
	PM	3	4	33	1	1	1	30	15	1	1	19	5

L – Left, T – Thru, R – Right. For location of the intersections, see ***Figure 1****.*

Table 4 - Projected 2047 No Build Traffic Volumes

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	5	63	8	1	139	12	11	4	1	2	1	5
	PM	18	112	5	1	88	12	11	8	1	7	10	12
2	AM	21	57	-	-	90	65	58	-	18	-	-	-
	PM	22	81	-	-	47	54	88	-	70	-	-	-
3	AM	-	39	79	72	73	-	-	-	-	36	-	32
	PM	-	31	19	33	100	-	-	-	-	73	-	27
4	AM	1	126	28	2	106	1	48	1	8	1	1	1
	PM	1	79	21	9	122	1	12	1	6	1	1	1
8	AM	-	-	-	1	-	2	-	22	1	1	22	-
	PM	-	-	-	1	-	3	-	29	1	2	31	-
9	AM	1	18	1	1	24	1	1	1	1	3	1	1
	PM	1	29	1	1	27	3	2	1	2	1	1	1
11	AM	-	-	-	12	-	78	-	79	4	16	40	-
	PM	-	-	-	8	-	27	-	59	18	57	69	-
15	AM	13	1	13	2	3	1	41	14	1	1	9	6
	PM	3	4	33	1	1	1	30	15	1	1	19	5

L – Left, T – Thru, R – Right. For location of the intersections, see ***Figure 1****. 1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp; 4 – CR 5 & Wazuweeta Road; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue. 11 – E White Bridge Rd & CR 18; 15 – 5th Street NW & Vintage Road*

Trip Generation and Distribution

Trip Generation and Trip Distribution is a critical component of transportation planning that provides essential information about the anticipated transportation demand associated with a specific land use or development, helping inform planning and infrastructure decisions.

General Factors for Trip Generation

Primary Trips

In a traffic study, the term "*primary trip*" typically refers to trips that are generated by a development or land use and are associated with the primary purpose or function of that development. Primary trips are the trips directly related to the activities taking place at the site in question. For example, within the project, primary trips would include those trips made by residents or employees traveling to the grocery store, health clinic, or grocery store for errands or other duties.

Internal and Pass by Trips

The term, "*internal trips*" refer to trips made entirely within the boundaries of the project or property. These are trips generated by activities or businesses within the project that don't involve entering or exiting the site. Example, if a shopping mall has several stores and a restaurant, the trips made by shoppers moving between stores or having a meal within the mall would be considered internal trips.

The term, "*pass-by trips*" are trips generated by the project but include people who were already traveling on the adjacent road and decided to stop at the project as part of their existing trip. Example, if someone is driving home from work and decides to stop at a grocery store located along their route, that trip to the grocery store is a pass-by trip.

Understanding the number and nature of internal and pass-by trips is used for assessing the impact of a development on the surrounding transportation infrastructure. Internal trips typically have a minimal impact on the surrounding road network because they don't add traffic to the adjacent streets. Pass-by trips have a less significant impact on the overall traffic than external trips (trips generated by the project that wouldn't have occurred otherwise). Pass-by trips are often considered "captured" from the existing traffic flow. **For this study, internal trips or pass-by trip adjustments were estimated using the different land use categories and their likely origins and destinations.**

Trip Generation

To account for trips generated by the Project, the *ITE Trip Generation Manual,* 11th Edition was utilized to estimate additional trips, based on the land use characteristics that most closely fit the proposed development. The assumptions considered the location of the development, trip patterns for traffic along US 52, and engineering judgment.

The assumptions that were made include:

Residential

AM Peak

Outgoing Trips:

- 50% to Rochester (South)
- 20% to Zumbrota/MSP (North)
- 30% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 50% from Rochester (South)
- 20% from Zumbrota/MSP (North)
- 30% within the Project site (grocery store, community facility, cultural facility)

PM Peak

Outgoing Trips:

- 30% to Rochester (South)
- 20% to Zumbrota/MSP (North)
- 50% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 50% from Rochester (South)
- 20% from Zumbrota/MSP (North)
- 30% from within the Project site (grocery store, community facility, cultural facility)

Community Facilities

AM & PM Peak

Outgoing Trips:

- 70% to Rochester (South)
- 20% to Zumbrota/MSP (North)
- 10% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 70% from Rochester (South)
- 20% from Zumbrota/MSP (North)
- 10% from within the Project site (grocery store, community facility, cultural facility)

Grocery Store

AM & PM Peak

Outgoing Trips:

- 65% to Rochester (South)
- 15% to Zumbrota/MSP (North)
- 20% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 65% from Rochester (South)
- 15% from Zumbrota/MSP (North)
- 20% from within the Project site (grocery store, community facility, cultural facility)

Gas Station

AM & PM Peak

Outgoing Trips:

- 45% to Rochester (South)
- 35% to Zumbrota/MSP (North)
- 20% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 45% from Rochester (South)
- 35% from Zumbrota/MSP (North)
- 20% from within the Project site (grocery store, community facility, cultural facility)

Cultural Facility

AM & PM Peak

Outgoing Trips:

- 55% to Rochester (South)
- 15% to Zumbrota/MSP (North)
- 30% within the Project site (grocery store, community facility, cultural facility)

Incoming Trips:

- 55% from Rochester (South)
- 15% from Zumbrota/MSP (North)
- 30% from within the Project site (grocery store, community facility, cultural facility)

Vehicle Routing

- Vehicles from outside the Project site follow the same route to their destinations.
- Vehicles within the Project site take different routes to arrive at their destination.

Results of Trip Generation

The results of the trip generation based on ITE Trip Generation Manual, Edition 11 and Engineering judgment and assumptions are presented in **Table 5**.

Table 5 - Proposed Development Trip Generation

Peak	Land Use Type	Most Applicable ITE Code	Most Applicable ITE Land Use Type	Units	Variable	In	Out	Total
Residential								
AM	Residential	210	Single Family Detached Housing	Units	154	30	86	116
PM						98	54	152
Daily						726	726	1452
AM	Residential	220	Multifamily Housing (Low Rise)	Units	70	8	25	33
PM						25	15	40
Daily						236	236	472
AM	Assisted Living, Residential	252	Senior Adult Housing - Multifamily	Units	30	4	5	9
PM						5	4	9
Daily						49	48	97
Commercial/Industrial								
AM	Convenience + Fast Food w/ Drive Thru	851	Convenience Store	Sq. Ft.	5000	172	172	344
PM						136	132	268
Daily						1906	1905	3811
AM	Grocery Store / Coop	850	Supermarket	Sq. Ft.	15000	53	49	102
PM						70	68	138
Daily						704	704	1408

Table 5 - Proposed Development Trip Generation (Cont.)

Peak	Land Use Type	Most Applicable ITE Code	Most Applicable ITE Land Use Type	Units	Variable	In	Out	Total
Community Facility								
AM	Public Safety Facility	730	Govt Office Building	Sq. Ft.	15000	30	25	55
PM						21	27	48
Daily						169	170	339
AM	Public Works / Maintenance facility	730	Govt Office Building	Sq. Ft.	10000	20	17	37
PM						14	18	32
Daily						113	113	226
AM	Administration Building	714	Corporate Headquarters Building	Sq. Ft.	22000	30	2	32
PM						3	26	29
Daily						87	88	175
AM	Community Center / Wellness Center	495	Recreational Community Center	Sq. Ft.	40000	47	27	74
PM						48	53	101
Daily						576	577	1153
AM	Health Clinic / Health Care Facility	630	Clinic	Sq. Ft.	5000	10	7	17
PM						10	11	21
Daily						94	94	188
AM	Education, Learning, & Training Center / Library	590	Library	Sq. Ft.	10000	31	32	63
PM						44	41	85
Daily						360	361	721
AM	Bison Maintenance Facility	730	Govt Office Building	Sq. Ft.	5000	10	8	18
PM						7	9	16
Daily						56	57	113
Cultural Facility								
AM	Cemetery / Burial Area	566	Cemetery	Acres	51.5	40	23	63
PM						31	34	65
Daily						155	155	310
AM	Cultural Center (Wacipi) & Ceremonial House/Bark Lodge	560	Church	Sq. Ft.	7000	3	2	5
PM						3	3	6
Daily						27	26	53
AM	Ceremonial House / Bark Lodge	560	Church	Sq. Ft.	1000	0	1	1
PM						0	1	1
Daily						4	4	8
GRAND TOTAL								
AM	All	-	-	-	-	488	481	969
PM						515	496	1011
Daily						5262	5264	10526

Trip Distribution and Assignment

Trip origins and destinations for development-generated traffic were estimated based on the total amount of added trips by each land use type, their location, and likely destinations according to the assumptions made within trip generation. **Table 6** shows the projected development adds volumes to each study intersection.

Table 6 - Trip Generation and Distribution Added Volumes

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	135	117	0	0	59	0	0	0	0	31	0	129
	PM	185	72	0	4	95	12	0	0	0	10	0	150
2	AM	62	41	-	-	201	6	107	-	165	-	-	-
	PM	66	33	-	-	228	20	92	-	222	-	-	-
3	AM	-	115	52	174	115	-	-	-	-	20	-	57
	PM	-	82	44	195	125	-	-	-	-	17		32
4	AM	0	0	0	172	0	0	0	0	170	0	0	0
	PM	0	0	0	135	0	0	0	0	130	0	0	0
5	AM	60	66	1	1	66	94	1	2	1	103	5	57
	PM	76	33	1	1	97	106	1	2	1	135	1	93
6	AM	6	112	1	1	113	10	1	1	1	14	1	11
	PM	5	201	1	1	155	30	1	1	1	24	1	4
7	AM	25	85	1	2	98	25	1	1	3	31	1	19
	PM	22	162	1	5	89	73	1	1	3	33	1	3
8	AM	2	1	6	26	1	15	2	83	0	0	82	12
	PM	2	1	6	22	1	3	2	45	44	11	81	4
9	AM	0	61	4	13	80	7	2	1	4	0	1	0
	PM	0	74	3	16	36	0	1	1	17	1	1	0
10	AM	11	-	2	-	-	-	2	83	-	-	82	12
	PM	2	-	2	-	-	-	2	0	-	-	0	7
11	AM	-	-	-	0	0	0	-	3	0	0	38	-
	PM	-	-	-	0	0	0	-	1	0	0	11	-
12	AM	124	97	-	-	153	4	-	-	-	2	-	73
	PM	99	118	-	-	98	4	-	-	-	2	-	126
13	AM	2	255	0	0	286	2	0	0	0	1	0	6
	PM	2	324	0	0	256	2	0	0	0	1	0	6
14	AM	171	32	-	-	57	14	0	0	0	1	0	171
	PM	136	31	-	-	24	14	0	0	0	2	0	131
15	AM	8	0	0	0	0	0	0	3	0	0	0	0
	PM	5	0	0	0	0	0	0	2	1	1	3	0

*L – Left, T – Thru, R – Right. For location of the intersections, see **Figure 1**.*

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp. 4 – CR 5 & Wazuweeta Road; 5 – Proposed Intersection along 59th Ave NW; 6 – Proposed Intersection along 59th Ave NW. 7 – Proposed Intersection along 59th Ave NW; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue. 10 – Proposed Intersection along E White Bridge Road; 11– E White Bridge Rd & CR 18; 12– Proposed Intersection along E White Bridge Rd. 13 – Proposed Intersection along E White Bridge Rd; 14– Proposed Intersection along Wazuweeta Road; 15 – 5th Street NW & Vintage Road

Future Build Traffic Volumes

"Build" refers to the conditions with the proposed development scenario. This includes the existing traffic counts projected to the opening years and 20-year horizon, as well as the additional trips generated by the proposed development.

Year of Opening – 2027

The Build future traffic volumes for the Year of Opening (2027) based on background traffic growth and trips generated by the project are summarized in **Table 7**.

Table 7 - Build Traffic Volumes for Year of Opening (2027)

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	141	187	9	1	212	14	12	5	0	33	1	135
	PM	205	198	6	4	194	26	12	9	1	18	22	164
2	AM	86	104	0	0	300	78	171	0	185	0	0	0
	PM	91	124	0	0	281	81	189	0	300	0	0	0
3	AM	0	158	139	254	196	0	0	0	0	59	0	92
	PM	0	117	65	232	238	0	0	0	0	98	0	29
4	AM	0	140	30	174	117	0	53	0	179	0	0	0
	PM	1	89	24	145	137	1	17	1	137	1	1	1
5	AM	60	66	1	1	66	94	1	2	1	103	5	57
	PM	86	102	1	1	132	106	1	2	1	135	5	93
6	AM	6	112	1	1	113	10	1	1	1	14	1	11
	PM	5	201	1	1	195	30	1	1	1	24	1	4
7	AM	25	85	1	2	98	25	1	1	3	31	1	19
	PM	22	162	1	5	119	73	1	1	3	33	1	3
8	AM	2	1	6	26	1	17	2	108	8	5	79	4
	PM	2	1	6	22	1	6	2	78	44	13	116	4
9	AM	1	81	5	13	107	7	3	1	4	3	1	1
	PM	1	107	3	17	66	3	3	1	19	2	1	1
10	AM	11	0	2	0	0	0	2	83	0	0	82	12
	PM	2	0	2	0	0	0	2	77	0	0	71	7
11	AM	0	0	0	13	0	86	0	90	4	18	82	0
	PM	0	0	0	9	0	30	0	65	20	63	76	0
12	AM	124	97	0	0	153	4	0	0	0	2	0	73
	PM	99	118	0	0	98	4	0	0	0	2	0	126
13	AM	2	335	0	0	356	2	0	0	0	1	0	6
	PM	2	424	0	0	356	2	0	0	0	1	0	6
14	AM	171	32	0	0	57	14	0	0	0	1	0	171
	PM	136	31	0	0	24	14	0	0	0	2	0	131
15	AM	23	1	15	2	3	0	45	19	1	1	10	7
	PM	8	4	37	1	1	1	34	19	1	1	24	6

*L – Left, T – Thru, R – Right. For location of the intersections, see **Figure 1**.*

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp.
4 – CR 5 & Wazuweeta Road; 5 – Proposed Intersection along 59th Ave NW; 6 – Proposed Intersection along 59th Ave NW.
7 – Proposed Intersection along 59th Ave NW; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue.
10 – Proposed Intersection along E White Bridge Road; 11– E White Bridge Rd & CR 18; 12– Proposed Intersection along E White Bridge Rd.
13 – Proposed Intersection along E White Bridge Rd; 14– Proposed Intersection along Wazuweeta Road; 15 – 5th Street NW & Vintage Road

20-Year Horizon – 2047

The Build future traffic volumes for the 20-Year Horizon based on background traffic growth and trips generated by the project are summarized in **Table 8**.

Table 8 - Build Traffic Volumes for Horizon Year (2047)

ID	Peak	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Weekday													
1	AM	156	207	10	1	234	15	13	6	0	36	1	149
	PM	227	219	7	4	214	29	13	10	1	20	24	181
2	AM	95	115	0	0	331	86	189	0	204	0	0	0
	PM	101	137	0	0	310	89	209	0	331	0	0	0
3	AM	0	175	154	281	217	0	0	0	0	65	0	102
	PM	0	129	72	256	263	0	0	0	0	108	0	32
4	AM	0	155	33	192	129	0	59	0	198	0	0	0
	PM	1	98	27	160	151	1	19	1	151	1	1	1
5	AM	66	73	1	1	73	104	1	2	1	114	6	63
	PM	95	113	1	1	146	117	1	2	1	149	6	103
6	AM	7	124	1	1	125	11	1	1	1	15	1	12
	PM	6	222	1	1	215	33	1	1	1	27	1	4
7	AM	28	94	1	2	108	28	1	1	4	34	1	21
	PM	24	179	1	6	131	81	1	1	3	36	1	3
8	AM	2	1	7	29	1	19	2	119	9	6	87	4
	PM	2	1	7	24	1	7	2	86	49	14	128	4
9	AM	1	89	6	14	118	8	3	1	5	3	1	1
	PM	1	118	3	19	73	3	3	1	21	2	1	1
10	AM	12	0	2	0	0	0	2	92	0	0	91	13
	PM	2	0	2	0	0	0	2	85	0	0	78	8
11	AM	0	0	0	14	0	95	0	99	4	20	91	0
	PM	0	0	0	10	0	33	0	72	22	70	84	0
12	AM	137	107	0	0	169	4	0	0	0	2	0	81
	PM	109	130	0	0	108	4	0	0	0	2	0	139
13	AM	2	370	0	0	393	2	0	0	0	1	0	7
	PM	2	468	0	0	393	2	0	0	0	1	0	7
14	AM	189	35	0	0	63	15	0	0	0	1	0	189
	PM	150	34	0	0	27	15	0	0	0	2	0	145
15	AM	25	1	17	2	3	0	50	21	1	1	11	8
	PM	9	4	41	1	1	1	38	21	1	1	27	7

L – Left, T – Thru, R – Right. For location of the intersections, see ***Figure 1****.*
1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp. 4 – CR 5 & Wazuweeta Road; 5 – Proposed Intersection along 59th Ave NW; 6 – Proposed Intersection along 59th Ave NW. 7 – Proposed Intersection along 59th Ave NW; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue. 10 – Proposed Intersection along E White Bridge Road; 11– E White Bridge Rd & CR 18; 12– Proposed Intersection along E White Bridge Rd. 13 – Proposed Intersection along E White Bridge Rd; 14– Proposed Intersection along Wazuweeta Road; 15 – 5th Street NW & Vintage Road

4. Traffic Operations Analysis

Traffic Operations Methodology

Traffic operational analysis results are described as a Level of Service (LOS), ranging from "A" to "F," with "A" operating with the least delay, and "F" operating with the most delay. LOS is determined based on methodology provided by the Highway Capacity Manual (HCM), which defines the LOS based on control delay. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersections on all approaches. The LOS and its associated delay for unsignalized and signalized intersections, as defined by the HCM, are shown in **Table 9**. LOS "E" or lower is considered to be unacceptable for the study intersections, in accordance with industry standard design objective.

Table 9 – Intersection Delay and LOS Thresholds

LOS	Control Delay Per Vehicle (sec.)	
	Unsignalized Intersection	Signalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Traffic Models

Traffic operations analysis was completed using Synchro/SimTraffic V12 software, which included road geometry, such as number of lanes, storage lengths, link distances, speed limits, and traffic volumes. Following creation of models in Synchro, the files were output to SimTraffic for further analysis. SimTraffic is a companion to Synchro that uses network seeding and microsimulation to predict and analyze traffic operations. Analysis results are generally based on actual observations of the modeled conditions. The results of the Synchro analyses are displayed as Measures of Effectiveness (MOE). The primary MOEs that are used in the study are delay and level of service (LOS).

The following scenarios were modeled:

1. No-Build Scenario – Base Year (2024)
2. No-Build Scenario – Year of Opening (2027)
3. Build Scenario – Year of Opening (2027)
4. No-Build Scenario – 20-Year Horizon (2047)
5. Build Scenario – 20-Year Horizon (2047)

"No-Build" refers to the conditions without the project. This option includes the existing traffic counts, and counts projected to the opening year 2027, and the 20-year horizon (2047). "Build" refers to the conditions with the project. This includes the existing traffic counts projected to the opening year 2027 20-year horizon (2047), as well as the additional trips generated by the proposed development. All proposed intersections were modelled as side-street stop controlled intersections. (SSS)

Traffic Operation Results

The traffic operations result for each year and scenario are discussed below.

No Build Scenario – Base Year (2024)

The results for the No-Build – Base Year (2024) scenario are summarized in **Table 10**. Detailed Synchro results for the No Build – Base Year (2024) scenario can be found in **Appendix C**. All intersections and its approaches are operating with acceptable delay and LOS under the existing 2024 conditions.

Table 10 - No Build Scenario (2024) Traffic Operations Results

Int ID	Peak	Approach Delay (LOS)				Intersection Delay (LOS)
		EB	WB	NB	SB	
Weekday						
1	AM	5.4 (A)	4.8 (A)	3.4 (A)	1.6 (A)	4.2 (A)
	PM	4.2 (A)	4.3 (A)	2.8 (A)	1.8 (A)	3.9 (A)
2	AM	2.5 (A)	1.5 (A)	0.9 (A)	- (-)	3.1 (A)
	PM	1.4 (A)	2.3 (A)	1.5 (A)	- (-)	4.1 (A)
3	AM	0.6 (A)	1.6 (A)	- (-)	1.6 (A)	1.6 (A)
	PM	0.7 (A)	1.5 (A)	- (-)	1.1 (A)	1.5 (A)
4	AM	4.4 (A)	5.3 (A)	2.3 (A)	1.4 (A)	4.3 (A)
	PM	3.8 (A)	4.9 (A)	1.8 (A)	1.8 (A)	4.2 (A)
8	AM	- (-)	1.7 (A)	0 (A)	0.2 (A)	0.2 (A)
	PM	- (-)	1.2 (A)	0.1 (A)	0.1 (A)	0.2 (A)
9	AM	2.5 (A)	0.1 (A)	2.7 (A)	2.8 (A)	2.3 (A)
	PM	0 (A)	0.3 (A)	2.5 (A)	5.1 (A)	0.5 (A)
11	AM	- (-)	2.8 (A)	0.4 (A)	0.5 (A)	1.4 (A)
	PM	- (-)	2.4 (A)	0.4 (A)	1.0 (A)	1.0 (A)
15	AM	2.4 (A)	4.8 (A)	0.7 (A)	0.2 (A)	1.3 (A)
	PM	2.2 (A)	3.2 (A)	0.7 (A)	0.1 (A)	1.1 (A)

Delay reported in seconds per vehicle.

EB – Eastbound; WB – Westbound; NB – Northbound; SB – Southbound

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp.

4 – CR 5 & Wazuweeta Road; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue.

11 – E White Bridge Rd & CR 18; 15 – 5th Street NW & Vintage Road

No Build Scenario – Year of Opening (2027)

The results for the No-Build – Year of Opening (2027) scenario are summarized in **Table 11**. Detailed Synchro results for the No Build – Year of Opening (2027) scenario can be found in **Appendix C**. All intersections and its approaches are expected to operate with acceptable delay and LOS under No-Build scenario – Year of Opening in 2027.

Table 11 - No Build Year of Opening (2027) Traffic Operations Results

Int ID	Peak	Approach Delay[b] LOS				Intersection Delay[b] LOS
		EB	WB	NB	SB	
Weekday						
1	AM	3.5 (A)	5.2 (A)	2.3 (A)	1.2 (A)	4.4 (A)
	PM	4.2 (A)	4.3 (A)	2.7 (A)	1.9 (A)	3.9 (A)
2	AM	1.5 (A)	2.4 (A)	0.9 (A)	- (-)	3.3 (A)
	PM	1.4 (A)	2.3 (A)	1.4 (A)	- (-)	4 (A)
3	AM	0.6 (A)	1.6 (A)	- (-)	1.7 (A)	1.8 (A)
	PM	0.6 (A)	1.6 (A)	- (-)	1.2 (A)	1.3 (A)
4	AM	4.5 (A)	5.4 (A)	2.2 (A)	1.8 (A)	4.3 (A)
	PM	3.9 (A)	5.1 (A)	1.8 (A)	1.5 (A)	4.4 (A)
8	AM	- (-)	1.3 (A)	0 (A)	0.2 (A)	0.2 (A)
	PM	- (-)	1.5 (A)	0.1 (A)	0.1 (A)	0.2 (A)
9	AM	0 (A)	0.1 (A)	2.4 (A)	3.1 (A)	0.5 (A)
	PM	0 (A)	0.2 (A)	2.5 (A)	4.4 (A)	0.4 (A)
11	AM	- (-)	2.8 (A)	0.4 (A)	0.4 (A)	1.4 (A)
	PM	- (-)	2.2 (A)	0.7 (A)	1.2 (A)	1.2 (A)
15	AM	2.6 (A)	5.4 (A)	0.8 (A)	0.1 (A)	0.4 (A)
	PM	2.2 (A)	5 (A)	0.6 (A)	0.2 (A)	1.1 (A)

Delay reported in seconds per vehicle.

EB – Eastbound; WB – Westbound; NB – Northbound; SB – Southbound

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp.

4 – CR 5 & Wazuweeta Road; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue.

11 – E White Bridge Rd & CR 18; 15 – 5th Street NW & Vintage Road

Build Scenario – Year of Opening (2027)

The results for the Build Scenario Year of Opening (2027) are summarized in **Table 12**. Detailed Synchro results for the Build Scenario Year of Opening (2027) can be found in **Appendix C**. All intersections and its approaches are expected to operate with acceptable delay and LOS under the Build Scenario Year of Opening in 2027.

Table 12 - Build Scenario Year of Opening (2027) Traffic Operations Results

Int ID	Peak	Approach Delay^b LOS				Intersection Delay^b LOS
		EB	WB	NB	SB	
Weekday						
1	AM	4.4 (A)	4.8 (A)	2.7 (A)	2.3 (A)	4 (A)
	PM	4.7 (A)	4.7 (A)	4.4 (A)	2.8 (A)	4.3 (A)
2	AM	2.4 (A)	1.2 (A)	2.3 (A)	- (-)	3.3 (A)
	PM	2.3 (A)	1.1 (A)	3 (A)	- (-)	3.7 (A)
3	AM	0.8 (A)	2.8 (A)	- (-)	2.3 (A)	3.9 (A)
	PM	0.3 (A)	2.1 (A)	- (-)	0.9 (A)	3.4 (A)
4	AM	5.3 (A)	5.3 (A)	2.7 (A)	0 (A)	4.4 (A)
	PM	4.4 (A)	5.1 (A)	2.4 (A)	3.3 (A)	4.1 (A)
5	AM	1.6 (A)	1 (A)	3.3 (A)	5.4 (A)	2.8 (A)
	PM	2.1 (A)	1.7 (A)	9.8 (A)	7.7 (A)	3.8 (A)
6	AM	0.8 (A)	0.8 (A)	5.5 (A)	4 (A)	1.1 (A)
	PM	0.8 (A)	1.3 (A)	3.9 (A)	5.3 (A)	1.3 (A)
7	AM	1.1 (A)	0.5 (A)	2.5 (A)	3.6 (A)	1.3 (A)
	PM	1.2 (A)	0.8 (A)	3 (A)	5.1 (A)	1.4 (A)
8	AM	3.1 (A)	3.5 (A)	0.5 (A)	0.7 (A)	1.2 (A)
	PM	3.7 (A)	3.6 (A)	0.5 (A)	0.9 (A)	1.1 (A)
9	AM	0.2 (A)	0.8 (A)	3.8 (A)	2.6 (A)	0.7 (A)
	PM	0.3 (A)	0.9 (A)	1.9 (A)	3.7 (A)	0.8 (A)
10	AM	3 (A)	- (-)	0.1 (A)	0.6 (A)	0.6 (A)
	PM	1.6 (A)	- (-)	0.1 (A)	0.6 (A)	0.4 (A)
11	AM	- (-)	3.3 (A)	0.5 (A)	1.2 (A)	1.6 (A)
	PM	- (-)	2.5 (A)	0.4 (A)	2 (A)	1.6 (A)
12	AM	1.6 (A)	1.4 (A)	- (-)	2.7 (A)	1.7 (A)
	PM	1.4 (A)	1.1 (A)	- (-)	3.1 (A)	1.8 (A)
13	AM	0.5 (A)	0.3 (A)	- (-)	2.2 (A)	0.4 (A)
	PM	0.7 (A)	0.4 (A)	- (-)	3.3 (A)	0.6 (A)
14	AM	2.1 (A)	0.5 (A)	- (-)	3 (A)	2.2 (A)
	PM	1.7 (A)	0.4 (A)	- (-)	2.6 (A)	1.9 (A)
15	AM	2.8 (A)	4.6 (A)	0.6 (A)	0.1 (A)	0.4 (A)
	PM	2.4 (A)	3.7 (A)	0.6 (A)	0.1 (A)	0.3 (A)

Delay reported in seconds per vehicle.

EB – Eastbound; WB – Westbound; NB – Northbound; SB – Southbound

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp. 4 – CR 5 & Wazuweeta Road; 5 – Proposed Intersection along 59th Ave NW; 6 – Proposed Intersection along 59th Ave NW. 7 – Proposed Intersection along 59th Ave NW; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue. 10 – Proposed Intersection along E White Bridge Road; 11– E White Bridge Rd & CR 18; 12– Proposed Intersection along E White Bridge Rd. 13 – Proposed Intersection along E White Bridge Rd; 14– Proposed Intersection along Wazuweeta Road; 15 – 5th Street NW & Vintage Road.

No Build Scenario – 20-Year Horizon

The results for the No-Build – 20-year Horizon (2047) scenario are summarized in **Table 13**. Detailed Synchro results for the No Build – 20-year Horizon (2047) scenario can be found in **Appendix C**. All intersections and its approaches are expected to operate with acceptable delay and LOS under No-Build scenario – 20-year Horizon in 2047.

Table 13 - No Build Scenario 20-Year Horizon (2047) Traffic Operations Results

Int ID	Peak	Approach Delay LOS				Intersection Delay LOS
		EB	WB	NB	SB	
Weekday						
1	AM	3.7 (A)	5.1 (A)	2.2 (A)	0.8 (A)	4.4 (A)
	PM	4.1 (A)	4.6 (A)	2.5 (A)	1.8 (A)	4 (A)
2	AM	1.6 (A)	2.6 (A)	0.9 (A)	- (-)	3 (A)
	PM	1.5 (A)	2.3 (A)	1.6 (A)	- (-)	3.9 (A)
3	AM	0.6 (A)	1.4 (A)	- (-)	1.6 (A)	1.7 (A)
	PM	0.4 (A)	1.6 (A)	- (-)	1.1 (A)	1.5 (A)
4	AM	4.5 (A)	5.5 (A)	2.2 (A)	1.8 (A)	4.5 (A)
	PM	4.3 (A)	5.2 (A)	2 (A)	3.5 (A)	4.5 (A)
8	AM	- (-)	1.7 (A)	0 (A)	0.3 (A)	0.3 (A)
	PM	- (-)	1.4 (A)	0.1 (A)	0.2 (A)	0.2 (A)
9	AM	0.1 (A)	0.2 (A)	2.3 (A)	3.4 (A)	0.7 (A)
	PM	0.1 (A)	0.1 (A)	2.5 (A)	4.1 (A)	0.4 (A)
11	AM	- (-)	3.3 (A)	0.6 (A)	0.7 (A)	1.7 (A)
	PM	- (-)	2.7 (A)	0.5 (A)	1.4 (A)	1.3 (A)
15	AM	2.5 (A)	5.7 (A)	0.8 (A)	0.1 (A)	1.4 (A)
	PM	2.3 (A)	4.1 (A)	0.6 (A)	0.2 (A)	1.3 (A)

Delay reported in seconds per vehicle.
EB – Eastbound; WB – Westbound; NB – Northbound; SB – Southbound
1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp.
4 – CR 5 & Wazuweeta Road; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue.
11 – E White Bridge Rd & CR 18; 15 – 5th Street NW & Vintage Road

Build Scenario – 20-Year Horizon (2047)

The results for the Build Scenario 20-year Horizon (2047) are summarized in **Table 14**. Detailed Synchro results for the Build Scenario 20-year Horizon (2047) can be found in **Appendix C**. All intersections and its approaches are expected to operate with acceptable delay and LOS under the Build Scenario 20-year Horizon in 2047.

Table 14 - Build Scenario 20-Year Horizon (2047) Traffic Operations Results

Int ID	Peak	Approach Delay LOS				Intersection Delay LOS
		EB	WB	NB	SB	
Weekday						
1	AM	4.8 (A)	5 (A)	2.9 (A)	2.4 (A)	4.3 (A)
	PM	5.1 (A)	4.9 (A)	4.1 (A)	3.3 (A)	4.6 (A)
2	AM	2.5 (A)	1.2 (A)	2.4 (A)	- (-)	3.7 (A)
	PM	2.4 (A)	1.2 (A)	3.1 (A)	- (-)	4 (A)
3	AM	0.8 (A)	2.5 (A)	- (-)	2.3 (A)	4.2 (A)
	PM	0.8 (A)	2.4 (A)	- (-)	1 (A)	3.8 (A)
4	AM	5.6 (A)	5.3 (A)	2.8 (A)	2.1 (A)	4.4 (A)
	PM	4.5 (A)	5.5 (A)	2.5 (A)	1.4 (A)	4.4 (A)
5	AM	1.7 (A)	1.2 (A)	6.2 (A)	5.6 (A)	2.9 (A)
	PM	2.3 (A)	1.8 (A)	11.9 (B)	9.7 (A)	4.7 (A)
6	AM	0.7 (A)	0.8 (A)	5.3 (A)	4.6 (A)	1.1 (A)
	PM	0.9 (A)	1.3 (A)	5.4 (A)	5.4 (A)	1.4 (A)
7	AM	0.9 (A)	0.6 (A)	2 (A)	4.2 (A)	1.5 (A)
	PM	1.1 (A)	0.9 (A)	4.4 (A)	5.2 (A)	1.4 (A)
8	AM	3.5 (A)	3.3 (A)	0.6 (A)	0.5 (A)	1.1 (A)
	PM	3.5 (A)	3.2 (A)	0.6 (A)	0.9 (A)	1.1 (A)
9	AM	0.1 (A)	0.8 (A)	3 (A)	3.2 (A)	0.7 (A)
	PM	0.4 (A)	0.8 (A)	1.7 (A)	3.7 (A)	0.7 (A)
10	AM	2.7 (A)	- (-)	0.1 (A)	0.6 (A)	0.5 (A)
	PM	1.9 (A)	- (-)	0.1 (A)	0.8 (A)	0.5 (A)
11	AM	- (-)	3.1 (A)	0.4 (A)	1.4 (A)	1.6 (A)
	PM	- (-)	2.8 (A)	0.3 (A)	2.2 (A)	1.7 (A)
12	AM	1.9 (A)	1.4 (A)	- (-)	2.8 (A)	1.9 (A)
	PM	1.5 (A)	1.1 (A)	- (-)	3.3 (A)	1.9 (A)
13	AM	0.6 (A)	0.4 (A)	- (-)	2.4 (A)	0.5 (A)
	PM	0.7 (A)	0.4 (A)	- (-)	3 (A)	0.6 (A)
14	AM	2 (A)	0.8 (A)	- (-)	3.5 (A)	2.4 (A)
	PM	1.7 (A)	0.5 (A)	- (-)	2.8 (A)	2 (A)
15	AM	3 (A)	5.2 (A)	0.7 (A)	0.2 (A)	1.6 (A)
	PM	2.2 (A)	3.8 (A)	0.7 (A)	0.2 (A)	1.2 (A)

Delay reported in seconds per vehicle.

EB – Eastbound; WB – Westbound; NB – Northbound; SB – Southbound

1 – E White Bridge Rd & White Pines Rd SE; 2 – US 52 & CR 12 Interchange E ramp; 3 – US 52 & CR 31 Interchange W ramp. 4 – CR 5 & Wazuweeta Road; 5 – Proposed Intersection along 59th Ave NW; 6 – Proposed Intersection along 59th Ave NW. 7 – Proposed Intersection along 59th Ave NW; 8 – 59th Avenue NW & 520th Street; 9 – 520th Street & 220th Avenue. 10 – Proposed Intersection along E White Bridge Road; 11– E White Bridge Rd & CR 18; 12– Proposed Intersection along E White Bridge Rd. 13 – Proposed Intersection along E White Bridge Rd; 14– Proposed Intersection along Wazuweeta Road; 15 – 5th Street NW & Vintage Road

Turn Lane Warrants

Turn lanes warrants were assessed based on guidelines from MnDOT, Olmsted County, and industry best practices. The analysis considered factors such as traffic volumes, vehicle speeds, intersection control types, accident histories, and potential impacts on traffic flow and safety. It is worth noting that meeting a warrant does not necessarily mean the turn lanes are justified. Engineering judgment is required for that step and all mitigating factors must be considered.

Right-Turn Lane warrants are met when a County Road speed limit is greater than 40 miles per hour according to Olmsted County, or with the volume criteria shown below in **Table 15**.

Left-Turn Lane warrants are met for a two-lane undivided highway when an access is to a public road, an industrial tract, or a commercial center; or with the volume criteria for a County Road shown below in **Table 15**.

Table 15 - Olmsted County Turn Lane Volume Thresholds

(from Transportation Element of Olmsted County Comprehensive Plan)

STREET CLASS	Projected Through Lane Capacity Along Roadway	Projected Volume	INTERSECTION TURN LANES REQUIRED					
			Intersecting Expressway		Intersecting other Major Arterial or Higher Classification		Intersecting Secondary Arterial or Lower Classification	
			LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Expressway	5-6 lanes	>35,000	2	1	2	1	1	1
	4-5 lanes	25-35,000	2	1	1	1	1	1
	4 lanes	<25,000	1	1	1	1	1	1
Other Major Arterial Or Higher Functional Class	5-6 lanes	>40,000	2	1	2	1	1	1
	4 lanes	>30,000	2	1	1	1	1	1
		<30,000	2	1	1	1	1	1
	2 / 2+TL / 3 lanes	>5000	1	1	1	1	1	1
		< 5000	1	1	1	Not Req	1	Not Req
Below Major Arterial Functional Class	2+TL / 3 /4 lanes	>7500	1	1	1	1	1	Not Req
		< 7500	1	Not Req	1	Not Req	Not Req	Not Req
	2 lanes	> 2500	1	1	1	1	Not Req	Not Req

With these thresholds in mind, intersections 12 and 13 (both proposed project access intersections along E White Bridge Rd) warrant a left-turn lane and a right-turn lane.

For local roads, MnDOT's Access Management Manual guidelines that an exclusive right turn is generally required for a two-lane undivided highway when the projected ADT is over 1,500 ADT, and the design speed is 45 mph or higher. A left turn lane is required for a two-lane undivided highway when an access is to a public road, an industrial tract, or a commercial center (*5-4.01.02: Policy on 2-lane Rural Highways, MnDOT Road Design Manual*).

Intersections 5, 6, and 7 (all proposed project access intersections along 59th Avenue NW) meet the volume threshold with a speed limit of 45 mph, warranting a right-turn lane. A right-turn lane is not warranted at Intersection 14 (Proposed Intersection along Wazuweeta Road) due to a speed limit of 40 mph, yet it may be beneficial.

Intersections 5 (proposed project access intersection along 59th Avenue NW) and 14 (proposed project access intersection along Wazuweeta Rd) provide access to a commercial center; therefore, a left-turn lane may be required for both.

5. Issues and Mitigation

An analysis of traffic operations was performed within the study area across different scenarios, considering both the year of opening and a 20-year projection. It is anticipated that all study intersections are expected to maintain acceptable delays and Level of Service (LOS) standards until 2047, with none expected to perform below LOS A during peak hours. As no operational traffic issues were identified, no further alternative analyses are deemed necessary for the intersections in the study area.

6. Summary

This study has been prepared to evaluate the traffic impacts associated with the Project along 59th Avenue NW, E White Bridge Road, and Wazuweeta Road near Pine Island, MN. The study investigated the No-Build and Build traffic operations in the surrounding roadway network. The proposed development is expected to be completed by 2027. The following is the key summary of the study:

Development Alternatives

- The Project consists of residential, commercial, and administrative and cultural facility land uses on 781 acres of land within Pine Island and unincorporated Olmsted County, MN.
- An opening year of 2027 was assumed for the sake of conducting the study according to the developer's timeline.

Trip Generation

- To analyze the No Build scenarios, a 0.5% growth rate was used according to Olmsted County's guidelines. For both alternatives, the ITE Trip Generation Manual, 11th Edition was utilized to estimate additional trips, based on the land use characteristics that most closely fit the project site.
- Assumptions for trip destinations from the project were created based on the site's location, amenities, and likely residents.
- The Build future traffic volumes in the Horizon Year (2047) included traffic growth by background traffic growth and trips generated by the project throughout Pine Island, MN.

Traffic Operations

- All study intersections and their approaches are expected to operate with acceptable delay and LOS for the design hour volume with and without the project within the project Site's vicinity through 2047.
- No intersection or its approaches are expected to operate with worse than LOS B through 2047.

Non-Motorized User Facilities

- The project site is adjacent to existing non-motorized multiuse pathways which currently span from the west side of US Hwy 52 and run along the south side of County Rd 5/12/E. White Bridge Rd, terminating at the roundabout at E. White Bridge Rd and White Pines Rd. SE.
- At the time of completion of this study, there are no pedestrian or bicycle facilities leading to the project sites. However, the project proposes extension of the existing Americans with Disabilities Act (ADA) compliant multiuse pathways. At buildout year 2027 the proposed multiuse pathways tie into the existing pathways where they currently terminate at the roundabout, and continue north along both sides of White Pines Rd SE.
- The project multiuse pathways will be designed to be ADA compliant, as well as any walkways and pedestrian ramps designed for access between the project facility entrances and exits and at all points of intersections with the proposed project access points 5, 6, 7, and 13 (Refer to **Figure 1** for proposed multiuse pathway alignments).

Turn Lanes

- Left and Right turn lanes would be required through Olmsted County guidelines with speed limits over 40 miles per hour on Olmsted Co. Rd. 12/E White Bridge Road at proposed intersections 12 and 13.
- Right turn lanes would be required through MnDOT's guidelines by meeting a volume threshold of 1,500 ADT and a speed limit of 55 mph on 59th Avenue NW at proposed intersections 5,6, and 7.
- A right-turn lane is not required on Wazuweeta Road at proposed intersection 14, but it may be determined to be beneficial, pending preliminary engineering alternative design analysis.
- A left turn is required for a two-lane undivided highway when an access is to a public road, an industrial tract, or a commercial center, qualifying intersections: 5 (proposed intersection along 59th Avenue NW) and 14 (proposed intersection along Wazuweeta Rd).

7. Recommendations

- As no operational traffic issues were identified for the study intersections, no intersection alternatives are deemed necessary.
- Eastbound and westbound right turn lanes would be required on intersections 5,6, and 7 (proposed intersections along 59th Avenue NW).
- Westbound right turn lanes would be required on intersections 12 and 13 (proposed intersections along E White Bridge Rd).
- Eastbound left turn lanes would be required on intersections 5(proposed intersection along 59th Avenue NW), 12 and 13 (proposed intersections along E White Bridge Rd), and 14 (proposed intersection along Wazuweeta Rd).
- All the proposed intersections were modeled as side-street stop-controlled intersections (SSS). The expected volumes at these intersections may not justify the need for a different type of traffic control. It is recommended that traffic volumes at these intersections be periodically monitored to investigate if different traffic control type is required or justified.

APPENDIX A – RAW TRAFFIC COUNTS

Prairie Island TIS

White Pines Ave SE & E White Bridge (West)

Existing (2023)

Date collected: 9/28/2023
Date printed: 6/3/2024

	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR			SBU	SBL	SBT	SBR			EBU	EBL	EBT	EBR			WBU	WBL	WBT	WBR				
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	8	1	0	0	0	0	2	2	9	0	0	1	8	44	9	0	0	1	2	94	3	0	0	184	10%
7:00	0	11	4	0	0	0	0	2	1	5	0	0	0	5	62	8	0	0	0	1	136	12	0	0	247	6%
8:00	0	4	5	0	0	0	1	7	5	6	0	0	0	5	50	5	0	0	0	2	89	3	0	0	182	9%
9:00	0	3	4	0	0	0	2	3	3	3	0	0	0	8	60	8	0	0	0	0	65	1	0	0	160	13%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	2	3	4	0	0	2	2	4	12	0	0	0	10	108	12	0	0	0	1	82	10	0	2	254	7%
16:00	0	9	5	0	0	0	0	3	7	8	0	0	0	16	111	9	0	0	1	1	102	9	0	0	281	5%
17:00	0	12	6	1	0	0	0	6	7	8	0	0	1	11	125	7	0	0	0	1	61	11	0	0	257	1%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%

	NB		SB		EB		WB
Truck % By Approach	2%		3%		7%		7%
Right Turn %	6%		46%		8%		7%

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	11	4	0	0	0	0	2	1	5	0	0	0	5	62	8	0	0	0	1	136	12	0	0	7:00:00 AM	0.92
[redacted]	[redacted]					[redacted]						[redacted]						[redacted]						[redacted]	[redacted]	[redacted]
PM Peak	0	11	8	1	0	0	0	7	10	12	0	0	1	18	112	5	0	0	0	0	88	12	0	0	4:30:00 PM	0.93

Prairie Island TIS

US 52 & E White Bridge (East)

Existing (2023)

Date collected: 9/28/2023
Date printed: 6/3/2024

Time	NB Approach						SB Approach						EB Approach						WB Approach						Int Total	Truck % by Hour
	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes		
	NBU	NBL	NBT	NBR			SBU	SBL	SBT	SBR			EBU	EBL	EBT	EBR			WBU	WBL	WBT	WBR				
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	10	0	18	0	0	0	0	0	0	0	0	0	7	46	0	0	0	0	0	61	51	0	0	193	9%
7:00	0	57	0	18	0	0	0	0	0	0	0	0	0	21	56	0	0	0	0	0	88	64	0	0	304	5%
8:00	0	8	0	10	0	0	0	0	0	0	0	0	0	14	49	0	0	0	0	0	52	47	0	0	180	11%
9:00	0	7	0	19	0	0	0	0	0	0	0	0	0	9	47	0	0	0	0	0	29	46	0	0	157	15%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	49	0	51	0	0	0	0	0	0	0	0	0	24	84	0	0	0	0	0	49	48	0	0	305	6%
16:00	0	71	0	70	0	0	0	0	0	0	0	0	0	12	65	0	0	0	0	0	50	69	0	0	337	5%
17:00	0	81	0	58	0	0	0	0	0	0	0	0	0	25	88	0	0	0	0	0	36	47	0	0	335	3%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%

	NB Approach	SB Approach	EB Approach	WB Approach
Truck % By Approach	2%	0%	12%	6%
Right Turn %	46%	0%	0%	50%

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	57	0	18	0	0	0	0	0	0	0	0	0	21	56	0	0	0	0	0	88	64	0	0	7:00:00 AM	0.86
[redacted]																										
PM Peak	0	86	0	69	0	0	0	0	0	0	0	0	0	22	81	0	0	0	0	0	47	54	0	0	4:45:00 PM	0.91

Prairie Island TIS

US 52 & E White Bridge (West)

Existing (2023)

Date collected: 9/28/2023
Date printed: 6/3/2024

Time	NB Approach						SB Approach						EB Approach						WB Approach						Int Total	Truck % by Hour
	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes		
	NBU	NBL	NBT	NBR			SBU	SBL	SBT	SBR			EBU	EBL	EBT	EBR			WBU	WBL	WBT	WBR				
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	0	0	0	0	0	0	41	0	9	0	0	0	0	12	54	0	0	0	55	17	0	0	0	188	8%
7:00	0	0	0	0	0	0	0	35	0	31	0	0	0	0	38	77	0	0	0	71	72	0	0	0	324	5%
8:00	0	0	0	0	0	0	0	41	0	12	0	0	0	0	21	29	0	0	0	40	19	0	0	0	162	9%
9:00	0	0	0	0	0	0	0	41	0	9	0	0	0	0	12	28	0	0	0	20	15	0	0	0	125	13%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	0	0	0	0	0	0	68	0	19	0	0	0	0	40	40	0	0	0	37	59	0	0	0	263	5%
16:00	0	0	0	0	0	0	0	55	0	25	0	0	0	0	21	44	0	0	0	37	89	0	0	0	271	5%
17:00	0	0	0	0	0	0	0	76	0	18	0	0	0	0	36	24	0	0	0	25	88	0	0	0	267	3%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%

	NB Approach	SB Approach	EB Approach	WB Approach
Truck % By Approach	0%	13%	3%	3%
Right Turn %	0%	26%	62%	0%

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	0	0	0	0	0	0	35	0	31	0	0	0	0	38	77	0	0	0	71	72	0	0	0	7:00:00 AM	0.84
[redacted]	[redacted]					[redacted]						[redacted]						[redacted]						[redacted]	[redacted]	[redacted]
PM Peak	0	0	0	0	0	0	0	72	0	26	0	0	0	0	31	19	0	0	0	33	100	0	0	0	4:45:00 PM	0.89

Prairie Island

Weekday

CR 5 & Wazuweeta Rd

Existing (2024)

Date collected: 4/10/2024

Date printed: 6/3/2024

	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR	EB-WB	EB-WB	SBU	SBL	SBT	SBR	EB-WB	EB-WB	EBU	EBL	EBT	EBR	NB-SB	NB-SB	WBU	WBL	WBT	WBR	NB-SB	NB-SB		
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	2	0	1	0	0	0	0	0	0	0	0	0	0	66	4	0	0	1	1	19	0	0	0	94	3%
7:00	0	47	0	8	0	0	0	0	0	0	0	0	0	0	125	27	0	0	0	2	105	0	0	0	315	10%
8:00	0	5	0	3	0	0	0	0	0	0	0	0	0	0	65	4	0	0	1	3	24	0	0	0	105	26%
9:00	0	4	0	5	0	0	0	0	0	0	0	0	0	0	47	3	0	0	2	4	34	0	0	0	100	26%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	6	0	6	0	0	0	0	0	0	0	0	0	0	80	28	0	0	1	6	85	0	0	1	213	13%
16:00	0	15	0	5	0	0	0	0	0	0	0	0	0	0	70	15	0	0	0	11	112	0	0	0	228	12%
17:00	0	17	0	2	0	0	0	0	0	0	0	0	0	0	82	22	0	0	1	12	88	0	0	0	224	4%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	0	97	0	30	0	0	0	0	0	0	0	0	0	0	534	104	0	0	6	39	468	0	0	1	1280	
Approach Total			127						0						638						514					
Truck % By Approach			5%						0%						11%						14%					
Right Turn %				24%						0%						16%						0%				

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	47	0	8	0	0	0	0	0	0	0	0	0	0	125	27	0	0	0	2	105	0	0	0	7:00:00 AM	0.68
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PM Peak	0	12	0	6	0	0	0	0	0	0	0	0	0	0	80	21	0	0	0	9	123	0	0	0	3:45:00 PM	0.84

Prairie Island

Weekday

White Pines Rd & 520th St

Existing (2024)

Date collected: 4/10/2024

Date printed: 6/3/2024

	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR	EB-WB	EB-WB	SBU	SBL	SBT	SBR	EB-WB	EB-WB	EBU	EBL	EBT	EBR	NB-SB	NB-SB	WBU	WBL	WBT	WBR	NB-SB	NB-SB		
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	0	17	0	0	0	0	1	11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	30	3%
7:00	0	0	20	0	0	0	0	1	20	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	43	0%
8:00	0	0	22	0	0	0	1	0	14	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	40	10%
9:00	0	0	15	0	0	0	0	1	17	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	34	3%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	0	25	1	0	0	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	44	5%
16:00	0	0	28	0	0	0	0	2	30	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	62	0%
17:00	0	0	24	1	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	46	2%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	0	0	151	2	0	0	1	6	126	0	0	0	0	0	0	0	0	0	0	5	0	8	0	0	299	
Approach Total			153						133						0						13					
Truck % By Approach			2%						3%						0%						15%					
Right Turn %				1%						0%						0%						62%				

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	0	22	0	0	0	0	1	22	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	7:15:00 AM	0.84
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PM Peak	0	0	29	0	0	0	0	2	31	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4:15:00 PM	0.86

Prairie Island

Weekday

White Pines Rd & 220th Ave

Existing (2024)

Date collected: 4/10/2024

Date printed: 6/3/2024

	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR	EB-WB	EB-WB	SBU	SBL	SBT	SBR	EB-WB	EB-WB	EBU	EBL	EBT	EBR	NB-SB	NB-SB	WBU	WBL	WBT	WBR	NB-SB	NB-SB		
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	0	0	0	0	0	0	2	0	1	0	0	0	1	10	0	0	0	0	0	17	0	0	0	31	3%
7:00	0	1	0	0	0	0	0	2	0	1	0	0	0	1	17	1	0	0	0	0	22	0	0	0	45	2%
8:00	0	0	0	0	0	0	0	3	0	1	0	0	0	0	14	0	0	0	0	0	24	0	0	0	42	10%
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	0	0	0	0	0	12	4	0	0	34	0%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	0	0	0	0	0	0	1	0	1	0	0	0	1	20	0	0	0	0	1	27	0	0	0	51	6%
16:00	0	0	0	1	0	0	0	1	0	0	0	0	0	0	30	0	0	0	0	1	26	3	0	0	62	0%
17:00	0	2	0	2	0	0	0	0	0	1	0	0	0	1	16	0	0	0	0	0	23	2	0	0	47	2%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	0	3	0	3	0	0	0	9	0	5	0	0	0	6	123	1	0	0	0	2	151	9	0	0	312	
Approach Total			6						14						130						162					
Truck % By Approach			0%						0%						5%						2%					
Right Turn %				50%						36%						1%						6%				

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	1	0	0	0	0	0	3	0	1	0	0	0	1	18	1	0	0	0	0	24	0	0	0	7:15:00 AM	0.77
[redacted]																										
PM Peak	0	2	0	2	0	0	0	1	0	1	0	0	0	1	29	0	0	0	0	1	27	3	0	0	4:15:00 PM	0.88

Prairie Island

Weekday

E White Bridge Rd & CR 18

Existing (2024)

Date collected: 4/10/2024

Date printed: 6/3/2024

Time	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR	EB-WB	EB-WB	SBU	SBL	SBT	SBR	EB-WB	EB-WB	EBU	EBL	EBT	EBR	NB-SB	NB-SB	WBU	WBL	WBT	WBR	NB-SB	NB-SB		
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	0	38	1	0	0	0	3	18	0	0	0	0	0	0	0	0	0	0	10	0	52	0	0	122	9%
7:00	0	0	78	4	0	0	0	16	39	0	0	0	0	0	0	0	0	0	0	12	0	77	0	0	226	13%
8:00	0	0	38	2	0	0	0	21	38	0	0	0	0	0	0	0	0	0	0	8	0	51	0	0	158	26%
9:00	0	0	37	7	0	0	0	27	35	0	0	0	0	0	0	0	0	0	0	9	0	39	0	0	154	25%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	0	54	19	0	0	0	55	58	0	0	0	0	0	0	0	0	0	0	8	0	31	0	0	225	15%
16:00	0	0	50	13	0	0	0	67	55	0	0	0	0	0	0	0	0	0	0	10	0	26	0	0	221	14%
17:00	0	0	58	18	0	0	0	56	68	0	0	0	0	0	0	0	0	0	0	8	0	27	0	0	235	6%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	0	0	353	64	0	0	0	245	311	0	0	0	0	0	0	0	0	0	0	65	0	303	0	0	1341	
Approach Total			417						556						0						368					
Truck % By Approach			8%						17%						0%						18%					
Right Turn %				15%						0%						0%						82%				

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	0	78	4	0	0	0	16	39	0	0	0	0	0	0	0	0	0	0	12	0	77	0	0	7:00:00 AM	0.87
[redacted]																										
PM Peak	0	0	58	18	0	0	0	56	68	0	0	0	0	0	0	0	0	0	0	8	0	27	0	0	5:00:00 PM	0.96

Prairie Island

Weekday

5th St NW & Vintage Rd

Existing (2024)

Date collected: 4/10/2024

Date printed: 6/3/2024

	NB Approach						SB Approach						EB Approach						WB Approach							
Time	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Int Total	Truck % by Hour
	NBU	NBL	NBT	NBR	EB-WB	EB-WB	SBU	SBL	SBT	SBR	EB-WB	EB-WB	EBU	EBL	EBT	EBR	NB-SB	NB-SB	WBU	WBL	WBT	WBR	NB-SB	NB-SB		
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
6:00	0	5	9	1	0	0	0	0	6	1	0	0	0	5	0	8	0	0	0	1	0	0	0	0	36	11%
7:00	0	47	14	1	0	0	0	1	7	4	0	0	0	8	1	13	0	0	0	2	2	0	0	0	100	12%
8:00	0	16	11	1	0	0	0	0	7	3	0	0	0	9	0	12	0	0	0	0	2	0	0	0	61	7%
9:00	0	10	7	2	0	0	0	0	10	5	0	0	0	7	0	17	0	0	0	1	2	0	0	0	61	3%
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
15:00	0	19	12	0	0	0	0	1	18	7	0	0	0	6	3	35	0	0	0	1	2	0	0	0	104	7%
16:00	0	30	15	0	0	0	0	0	19	5	0	0	0	3	4	33	0	0	0	0	0	0	0	0	109	4%
17:00	0	29	9	0	0	0	0	0	12	2	0	0	0	1	1	37	0	0	0	1	1	0	0	0	93	1%
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	0	156	77	5	0	0	0	2	79	27	0	0	0	39	9	155	0	0	0	6	9	0	0	0	564	
Approach Total			238						108						203						15					
Truck % By Approach			7%						7%						4%						13%					
Right Turn %				2%						25%						76%						0%				

	NB Utrn	NB Left	NB Thru	NB Right	South Approach Peds	South Approach Bikes	SB Utrn	SB Left	SB Thru	SB Right	North Approach Peds	North Approach Bikes	EB Utrn	EB Left	EB Thru	EB Right	West Approach Peds	West Approach Bikes	WB Utrn	WB Left	WB Thru	WB Right	East Approach Peds	East Approach Bikes	Peak Start	PHF
AM Peak	0	40	14	1	0	0	0	1	9	6	0	0	0	13	1	13	0	0	0	2	3	0	0	0	7:15:00 AM	0.86
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PM Peak	0	30	15	0	0	0	0	0	19	5	0	0	0	3	4	33	0	0	0	0	0	0	0	0	4:00:00 PM	0.78

APPENDIX B – SEGMENT VOLUME

Int I - CR 31/E White Bridge Road & White Pines/59th Ave Roundabout											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	75	152	64	149	21	8	15	10	Table 2, Page 4
		PM	135	111	120	100	38	29	20	15	
2027	No-Build	AM	76	155	65	152	21	8	15	10	Table 3, Page 5
		PM	137	113	122	102	38	29	20	15	
	Build	AM	337	359	220	227	160	169	17	11	Table 7, Page 13
		PM	409	370	217	224	240	204	22	32	
2047	No-Build	AM	85	171	72	168	25	9	17	11	Table 4, Page 6
		PM	152	125	135	113	43	33	22	17	
	Build	AM	373	396	243	250	177	186	19	12	Table 8, Page 14
		PM	453	408	240	247	266	225	24	35	

Int II - CR 31/E White Bridge Road & US 52 Interchange East											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	77	145	74	152	85	0	75	0	Table 2, Page 4
		PM	103	133	150	101	76	0	155	0	
2027	No-Build	AM	78	148	75	155	86	0	76	0	Table 3, Page 5
		PM	105	136	153	103	77	0	158	0	
	Build	AM	190	471	289	378	164	0	356	0	Table 7, Page 13
		PM	215	470	424	362	172	0	489	0	
2047	No-Build	AM	87	163	83	171	96	0	84	0	Table 4, Page 6
		PM	116	150	169	114	86	0	175	0	
	Build	AM	210	520	319	418	181	0	393	0	Table 8, Page 14
		PM	238	519	468	400	190	0	540	0	

Int III - CR 31/E White Bridge Road & US 52 Interchange West											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	115	103	73	143	0	66	0	148	Table 2, Page 4
		PM	50	126	103	133	0	98	0	52	
2027	No-Build	AM	118	105	75	145	0	68	0	151	Table 3, Page 5
		PM	51	129	105	136	0	100	0	53	
	Build	AM	297	288	217	450	0	151	0	393	Table 7, Page 13
		PM	182	267	215	470	0	127	0	297	
2047	No-Build	AM	130	116	82	161	0	74	0	167	Table 4, Page 6
		PM	56	142	116	150	0	110	0	58	
	Build	AM	328	318	240	497	0	167	0	434	Table 8, Page 14
		PM	201	295	237	519	0	140	0	328	

Int IV - CR 5/CR 31/CR 12 & Wazuweeta Road											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	151	151	132	106	0	0	55	29	Table 2, Page 4
		PM	100	134	85	131	0	0	18	30	
2027	No-Build	AM	154	154	134	108	0	0	56	30	Table 3, Page 5
		PM	101	136	86	133	0	0	18	30	
	Build	AM	170	170	319	291	0	0	232	204	Table 7, Page 13
		PM	113	154	226	282	0	0	154	169	
2047	No-Build	AM	170	170	149	119	0	0	62	32	Table 4, Page 6
		PM	113	150	96	147	0	0	20	34	
	Build	AM	188	188	353	321	0	0	257	225	Table 8, Page 14
		PM	125	170	249	311	0	0	170	187	

Int VIII - 520th Ave & 59th Ave/Whites Pines Rd											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	0	0	1	2	24	23	22	22	Table 2, Page 4
		PM	0	0	2	3	32	33	29	31	
2027	No-Build	AM	0	0	1	2	24	23	22	22	Table 3, Page 5
		PM	0	0	2	3	32	33	29	31	
	Build	AM	9	7	14	44	127	88	118	111	Table 7, Page 13
		PM	9	7	58	29	86	133	124	144	
2047	No-Build	AM	0	0	1	2	27	26	25	25	Table 4, Page 6
		PM	0	0	2	3	36	37	33	35	
	Build	AM	10	7	16	49	140	97	130	123	Table 8, Page 14
		PM	10	7	64	32	95	146	137	159	

Int IX - 220th Ave & 59th Ave/White Pines Rd											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report Source Table Reference
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	
2024	No-Build	AM	20	26	21	24	1	4	1	1	Table 2, Page 4
		PM	30	30	32	31	4	2	4	1	
2027	No-Build	AM	20	26	21	24	1	4	1	1	Table 3, Page 5
		PM	30	30	32	31	4	2	4	1	
	Build	AM	88	111	88	127	10	5	8	19	Table 7, Page 13
		PM	111	70	128	86	5	4	23	21	
2047	No-Build	AM	22	29	23	27	1	4	1	1	Table 4, Page 6
		PM	34	33	36	34	4	2	4	1	
	Build	AM	97	122	97	140	11	5	9	21	Table 8, Page 14
		PM	122	77	141	95	5	4	25	23	

Int XI - E White Bridge Rd & CR 18											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	Source Table
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	Reference
2024	No-Build	AM	0	0	20	89	155	55	82	51	Table 2, Page 4
		PM	0	0	74	35	85	124	76	76	
2027	No-Build	AM	0	0	20	90	157	56	83	52	Table 3, Page 5
		PM	0	0	75	35	86	126	77	77	
	Build	AM	0	0	22	99	176	100	94	95	Table 7, Page 13
		PM	0	0	83	39	95	139	85	85	
2047	No-Build	AM	0	0	22	99	173	62	91	57	Table 4, Page 6
		PM	0	0	83	39	95	139	85	85	
	Build	AM	0	0	24	109	194	111	103	105	Table 8, Page 14
		PM	0	0	92	43	105	154	94	94	

Int XV - 5th Street & Vintage Road											
Year	Scenario	Peak	West Approach		East Approach		North Approach		South Approach		Report
			Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	Source Table
Formula ->			EBL+EBT+EBR	NBL+WBT+SBR	NBR+EBT+SBL	WBL+WBT+WBR	EBL+NBT+WBR	SBL+SBT+SBR	NBL+NBT+NBR	EBR+SBT+WBL	Reference
2024	No-Build	AM	27	49	3	5	27	16	55	24	Table 2, Page 4
		PM	40	35	4	0	18	24	45	52	
2027	No-Build	AM	27	50	3	5	27	16	56	24	Table 3, Page 5
		PM	40	35	4	0	18	24	45	52	
	Build	AM	39	55	3	5	42	18	65	27	Table 7, Page 13
		PM	49	41	6	3	28	31	54	62	
2047	No-Build	AM	31	55	3	5	31	18	62	27	Table 4, Page 6
		PM	44	40	4	0	20	27	51	58	
	Build	AM	43	61	3	5	46	20	72	30	Table 8, Page 14
		PM	54	46	6	3	31	35	60	69	

APPENDIX C – SYNCHRO/SIMTRAFFIC RESULT

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	3.7	4.8	2.3	0.8	4.2

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.4	1.6	3.1

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.6	3.4	1.6

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.8	0.1	0.2
Total Del/Veh (s)	4.4	5.3	2.3	1.4	4.3

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.8	0.8

8: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.4	0.0	0.2
Total Del/Veh (s)	1.7	0.0	0.2	0.2

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	2.4	0.1	0.4
Total Del/Veh (s)	0.1	0.1	2.7	2.8	0.6

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.5	1.6	2.3

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1
Total Del/Veh (s)	2.8	0.4	0.5	1.4

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.2	0.1	2.6	0.3	2.0
Total Del/Veh (s)	2.4	4.8	0.7	0.2	1.3

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.2	0.9

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.5	0.9	1.1

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.4	0.4

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	3.1	3.1
Total Del/Veh (s)	0.9	0.9

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.6	1.6

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.4	1.0

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.1	0.3	1.8

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	2.7	2.7
Total Del/Veh (s)	0.6	0.6

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.5	0.0	3.4

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	4.3

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	4.2	4.3	2.8	1.8	3.9

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.2	2.0	4.1

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	3.8	1.5

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	1.7	0.1	0.2
Total Del/Veh (s)	3.8	4.9	1.8	1.9	4.2

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.6	0.6

8: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	2.3	0.1	0.4
Total Del/Veh (s)	0.0	0.3	2.5	5.1	0.5

9: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.1
Total Del/Veh (s)	1.2	0.1	0.1	0.2

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.7	2.0

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.1
Total Del/Veh (s)	2.4	0.4	1.0	1.0

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.5	0.1	2.4	0.2	2.2
Total Del/Veh (s)	2.2	3.2	0.7	0.1	1.1

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.5	0.2	1.1

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.4	1.1	1.3

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.3	0.3

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	2.4	2.4
Total Del/Veh (s)	1.5	1.5

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.1	1.1

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.4	0.8

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.3

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.8	0.3	1.3

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.6	1.6
Total Del/Veh (s)	0.7	0.7

35: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.5	0.0	3.4

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	4.0

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	3.5	5.2	2.3	1.2	4.4

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.5	1.6	3.3

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.8	3.3	1.8

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.6	0.1	0.2
Total Del/Veh (s)	4.5	5.4	2.2	1.8	4.3

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.7	0.7

8: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.1
Total Del/Veh (s)	1.3	0.0	0.2	0.2

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	2.6	0.1	0.4
Total Del/Veh (s)	0.0	0.1	2.4	3.1	0.5

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	1.6	2.2

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1
Total Del/Veh (s)	2.8	0.4	0.4	1.4

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.2	0.1	2.7	0.3	2.0
Total Del/Veh (s)	2.6	5.4	0.8	0.1	1.4

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.2	0.8

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.5	0.8	1.1

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.4	0.4

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	3.2	3.2
Total Del/Veh (s)	0.9	0.9

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.7	1.7

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	0.5	1.1

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.2	0.3	1.8

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	2.6	2.6
Total Del/Veh (s)	0.6	0.6

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.1	3.4

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	4.3

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	4.2	4.3	2.7	1.9	3.9

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.1	1.9	4.0

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.5	4.0	1.3

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	1.3	0.1	0.2
Total Del/Veh (s)	3.9	5.1	1.8	1.5	4.4

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.6	0.6

8: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.9	0.1	0.3
Total Del/Veh (s)	0.0	0.2	2.5	4.4	0.4

9: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.1
Total Del/Veh (s)	1.5	0.1	0.1	0.2

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.7	2.0

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.1
Total Del/Veh (s)	2.2	0.7	1.2	1.2

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	0.1	2.3	0.2	2.2
Total Del/Veh (s)	2.2	5.0	0.6	0.2	1.1

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.3	1.2

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.4	1.1	1.3

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.3	0.3

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	2.4	2.4
Total Del/Veh (s)	1.4	1.4

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.2	1.2

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.3	0.8

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.3

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.0	0.2	1.2

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.7	1.7
Total Del/Veh (s)	0.6	0.6

35: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.0	3.5

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	4.0

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	4.4	4.8	2.7	2.3	4.0

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.6	2.5	3.3

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	5.8	3.9

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.3		0.2
Total Del/Veh (s)	5.3	5.3	2.7		4.4

5: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1
Total Del/Veh (s)	1.6	1.0	3.3	5.4	2.8

6: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	0.8	0.8	5.5	4.0	1.1

7: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.1	0.5	2.5	3.6	1.3

8: White Pines Rd & 520th St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.1	3.5	0.5	0.7	1.2

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	2.3	0.1	0.2
Total Del/Veh (s)	0.2	0.8	3.8	2.6	0.7

10: Ceremonial House & White Bridge Rd Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	3.0	0.1	0.6	0.6

11: White Bridge Rd & CR 18 Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	3.3	0.5	1.2	1.6

12: White Bridge Rd & South Entrance Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	1.4	2.7	1.7

13: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.5	0.3	2.2	0.4

14: Wazuweeta Rd & Gas Station Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.2	0.1
Total Del/Veh (s)	2.1	0.5	3.0	2.2

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.7	0.1	2.3	0.2	1.7
Total Del/Veh (s)	2.8	4.6	0.6	0.1	1.4

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.8	0.7	1.2

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	1.4	1.8

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.9	0.9

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	2.0	2.0
Total Del/Veh (s)	2.3	2.3

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	2.3	2.3

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.5	1.2	1.6

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.0	1.0

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.4	0.9	2.2

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.8	1.8
Total Del/Veh (s)	0.8	0.8

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.9	0.1	2.5

55: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

60: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.2	1.2

65: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	2.2	2.2

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	7.0

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	4.7	4.7	4.4	2.8	4.3

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.9	2.6	3.7

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.1	6.2	3.4

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.3	0.1	0.2
Total Del/Veh (s)	4.4	5.1	2.4	3.3	4.1

5: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.1
Total Del/Veh (s)	2.1	1.7	9.8	7.7	3.8

6: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.8	1.3	3.9	5.3	1.3

7: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.2	0.8	3.0	5.1	1.4

8: White Pines Rd & 520th St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.7	3.6	0.5	0.9	1.1

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	3.6	0.1	0.5
Total Del/Veh (s)	0.3	0.9	1.9	3.7	0.8

10: Ceremonial House & White Bridge Rd Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.6	0.1	0.6	0.4

11: White Bridge Rd & CR 18 Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.5	0.4	2.0	1.6

12: White Bridge Rd & South Entrance Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	1.4	1.1	3.1	1.8

13: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.7	0.4	3.3	0.6

14: Wazuweeta Rd & Gas Station Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.2	0.1
Total Del/Veh (s)	1.7	0.4	2.6	1.9

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.0	0.1	2.1	0.1	2.0
Total Del/Veh (s)	2.4	3.7	0.6	0.1	1.3

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.7	1.4

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.4	1.8

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.9	0.9

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	1.8	1.8
Total Del/Veh (s)	3.0	3.0

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.2	0.2
Total Del/Veh (s)	0.9	0.9

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.1	1.0	1.1

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.0	1.0

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.2	0.9	1.7

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.6	1.6
Total Del/Veh (s)	0.7	0.7

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.0	0.1	2.5

55: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.5	0.5

60: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.1	1.1

65: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.5	2.7	2.7

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	7.5

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	3.7	5.1	2.2	0.8	4.4

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.5	1.4	3.0

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	3.7	1.7

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.8	0.1	0.2
Total Del/Veh (s)	4.5	5.5	2.2	1.8	4.5

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.7	0.7

8: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.6	0.0	0.2
Total Del/Veh (s)	1.7	0.0	0.3	0.3

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	1.4	0.1	0.3
Total Del/Veh (s)	0.1	0.2	2.3	3.4	0.7

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.6	1.7	2.4

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.1	0.1	0.1
Total Del/Veh (s)	3.3	0.6	0.7	1.7

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.1	0.1	2.7	0.3	2.1
Total Del/Veh (s)	2.5	5.7	0.8	0.1	1.4

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.4	0.2	0.8

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.7	1.1

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.4	0.4

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	3.2	3.2
Total Del/Veh (s)	0.9	0.9

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.6	1.6

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.0	0.4	0.9

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.2	0.3	1.9

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	2.8	2.8
Total Del/Veh (s)	0.6	0.6

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.0	3.5

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	4.4

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1
Total Del/Veh (s)	4.1	4.6	2.5	1.8	4.0

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.1	1.9	3.9

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	5.0	1.5

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	1.5	0.2	0.2
Total Del/Veh (s)	4.3	5.2	2.0	3.5	4.5

6: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.6	0.6

8: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	1.7	0.1	0.2
Total Del/Veh (s)	0.1	0.1	2.5	4.1	0.4

9: White Pines Rd & 520th St Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.1
Total Del/Veh (s)	1.4	0.1	0.2	0.2

10: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.8	2.0

11: CR 18 & White Bridge Rd Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.2
Total Del/Veh (s)	2.7	0.5	1.4	1.3

14: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	0.1	2.4	0.1	2.3
Total Del/Veh (s)	2.3	4.1	0.6	0.2	1.3

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	0.4	1.3

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.5	1.0	1.3

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	0.3	0.3

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	2.3	2.3
Total Del/Veh (s)	1.6	1.6

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.1	1.1

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.4	0.8

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.2	0.2

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.8	0.2	1.3

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.8	1.8
Total Del/Veh (s)	0.4	0.4

35: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.6	0.0	3.3

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	4.1

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	4.8	5.0	2.9	2.4	4.3

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.8	2.9	3.7

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.9	5.7	4.2

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.3	0.1	0.2
Total Del/Veh (s)	5.6	5.3	2.8	2.1	4.4

5: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1
Total Del/Veh (s)	1.7	1.2	6.2	5.6	2.9

6: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.7	0.8	5.3	4.6	1.1

7: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.9	0.6	2.0	4.2	1.5

8: White Pines Rd & 520th St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.5	3.3	0.6	0.5	1.1

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	2.6	0.1	0.2
Total Del/Veh (s)	0.1	0.8	3.0	3.2	0.7

10: Ceremonial House & White Bridge Rd Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.1
Total Del/Veh (s)	2.7	0.1	0.6	0.5

11: White Bridge Rd & CR 18 Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	3.1	0.4	1.4	1.6

12: White Bridge Rd & South Entrance Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.9	1.4	2.8	1.9

13: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.6	0.4	2.4	0.5

14: Wazuweeta Rd & Gas Station Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.2	0.1
Total Del/Veh (s)	2.0	0.8	3.5	2.4

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.6	0.1	2.4	0.2	1.7
Total Del/Veh (s)	3.0	5.2	0.7	0.2	1.6

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.5	0.7	1.2

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.5	1.6	1.9

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.2	0.2
Total Del/Veh (s)	0.9	0.9

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	2.0	2.0
Total Del/Veh (s)	2.4	2.4

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	2.3	2.3

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.6	1.4	1.8

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.0	1.0

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.7	0.9	2.2

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.8	1.8
Total Del/Veh (s)	0.8	0.8

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.9	0.1	2.5

55: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4

60: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.2	1.2

65: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	2.3	2.3

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	7.4

1: Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	5.1	4.9	4.1	3.3	4.6

2: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	6.0	3.2	4.0

3: Performance by approach

Approach	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	6.9	3.8

4: Wazuweeta Rd & CR 5 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.3	0.1	0.2
Total Del/Veh (s)	4.5	5.5	2.5	1.4	4.4

5: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.1
Total Del/Veh (s)	2.3	1.8	11.9	9.7	4.7

6: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.9	1.3	5.4	5.4	1.4

7: White Pines Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.1	0.9	4.4	5.2	1.4

8: White Pines Rd & 520th St Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.5	3.2	0.6	0.9	1.1

9: White Pines Rd & 220th Ave Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	3.6	0.1	0.5
Total Del/Veh (s)	0.4	0.8	1.7	3.7	0.7

10: Ceremonial House & White Bridge Rd Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	1.9	0.1	0.8	0.5

11: White Bridge Rd & CR 18 Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.8	0.3	2.2	1.7

12: White Bridge Rd & South Entrance Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	1.5	1.1	3.3	1.9

13: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.7	0.4	3.0	0.6

14: Wazuweeta Rd & Gas Station Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.2	0.1
Total Del/Veh (s)	1.7	0.5	2.8	2.0

15: 5th St & Vintage Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	0.1	2.4	0.2	2.1
Total Del/Veh (s)	2.2	3.8	0.7	0.2	1.2

16: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	0.8	1.5

17: Performance by approach

Approach	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	1.7	2.0

18: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.2	0.2
Total Del/Veh (s)	0.9	0.9

20: White Pines Rd SE Performance by approach

Approach	NB	All
Denied Del/Veh (s)	1.7	1.7
Total Del/Veh (s)	3.1	3.1

26: Performance by approach

Approach	SB	All
Denied Del/Veh (s)	0.1	0.1
Total Del/Veh (s)	1.0	1.0

28: Performance by approach

Approach	SB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.2	1.3

29: Performance by approach

Approach	SW	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.1	1.1

30: Performance by approach

Approach	EB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.4	1.0	1.8

31: E White Bridge Performance by approach

Approach	NE	All
Denied Del/Veh (s)	1.4	1.4
Total Del/Veh (s)	0.8	0.8

50: Performance by approach

Approach	WB	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.1	0.1	2.4

55: Performance by approach

Approach	NE	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.5	0.5

60: Performance by approach

Approach	WB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.2	1.2

65: Performance by approach

Approach	EB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.4	2.8	2.7

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	8.0

Appendix D

Grading and Drainage Study

ENGINEERING, REIMAGINED

Prairie Island Indian Community – North Elk Run Community Development Project:

Drainage and Grading Technical Study

July 2024

Table of Contents

List of Figures and Tables

1. PROJECT INTRODUCTION

The Prairie Island Indian Community (PIIC) proposes to implement the North Elk Run Community Development Project (referred to herein as the Project) on approximately 781 acres of land currently owned by PIIC (**Figure 1**) in fee that is proposed for acquisition into federal trust (study area) (**Figure 2**). The Project consists of Tribal residential, commercial, and community facilities as shown in **Table 1**. PIIC also owns fee land adjacent to the study area that is also proposed for acquisition into federal trust as part of a separate project. This report details existing conditions and the grading and drainage modifications required to complete the Project.

Table 1: Footprint of Proposed Residential, Commercial, and Community Facilities in the North Elk Run Community Development Project

Project Land Use Category	Building/Community Facility Description	Building/Facility Units and/or Footprint Size (sf)	Land Use Category (Total Acres)
Single Family Residential	Single Family Residential	154 Units 415,800 sf	154.21 acres
Multi-Family Residential	Multi-Family Residential	70 Units 147,000 sf	31.27 acres
	Assisted Living Facility	30 Units 10,000 sf	
Community & Administrative	Public Safety Facility	15,000 sf	90.27 acres
	Public Works/Maintenance Facility	10,000 sf	
	Administration Building	22,000 sf	
	Community Center/Wellness Center	40,000 sf	
	Health Clinic/Health Care Facility	5,000 sf	
	Education, Learning, and Training Center/Library	10,000 sf	
	Bison Maintenance Facility	5,000 sf	
	Water Tower and Lift Station	40,500 sf	
Commercial/Industrial	Convenience/Fast Food/Drive Thru	5,000 sf	82.61 acres
	Grocery Store/Coop	15,000 sf	
Cultural Facility	Cemetery/Burial Area	NA	51.68 acres
	Cultural Center (Wacipi)	7,000 sf	
	Ceremonial House/Bark Lodge	1,000 sf	
Multiple Land Use Categories	8' wide multi-use pathways	338,765 sf	NA
Bison Pastureland	No impacts to grading/drainage	NA	80.46 acres
Natural Areas/Parks and Recreation	No impacts to grading/drainage	NA	234.28 acres
Agriculture/Crop Land	No impacts to grading/drainage	NA	56.25 acres
TOTALS:		**1,087,065 sf**	**781.03 acres**

*Facility square footage only includes the footprint of the building. Square footage for parking lot not included.

1.1 Project Location

The study area is located in southeastern Minnesota (MN), adjacent to the eastern side of U.S. Highway (Hwy) 52, just east and north of the Zumbro River, partially within the city limits of Pine Island and partially within unincorporated Olmsted County. The study area is situated approximately 15 miles north of Rochester, MN. The study area's regional location in southeast Minnesota is shown in **Figure 1**.

Figure 1: Elk Run Regional Location Map

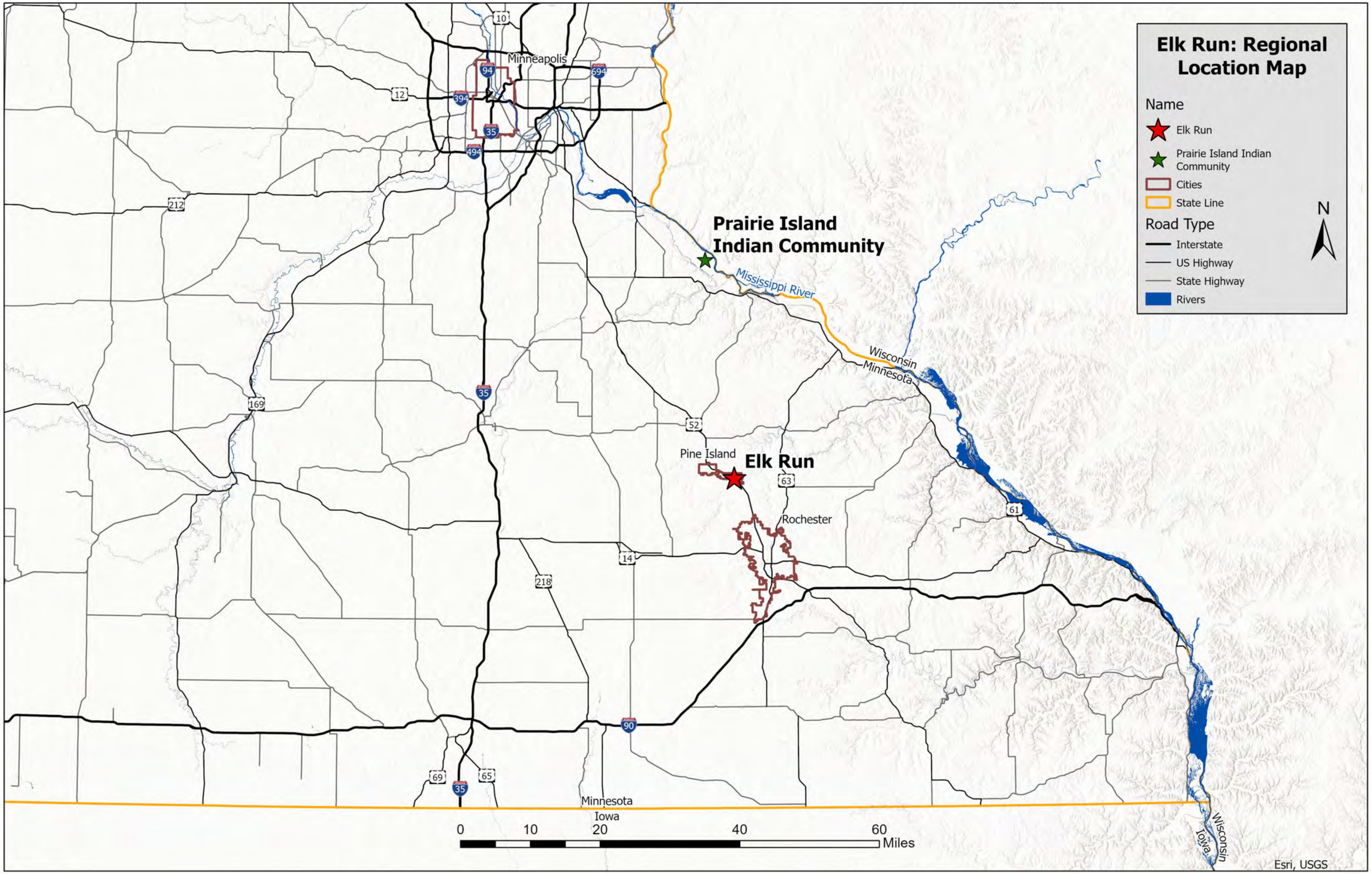
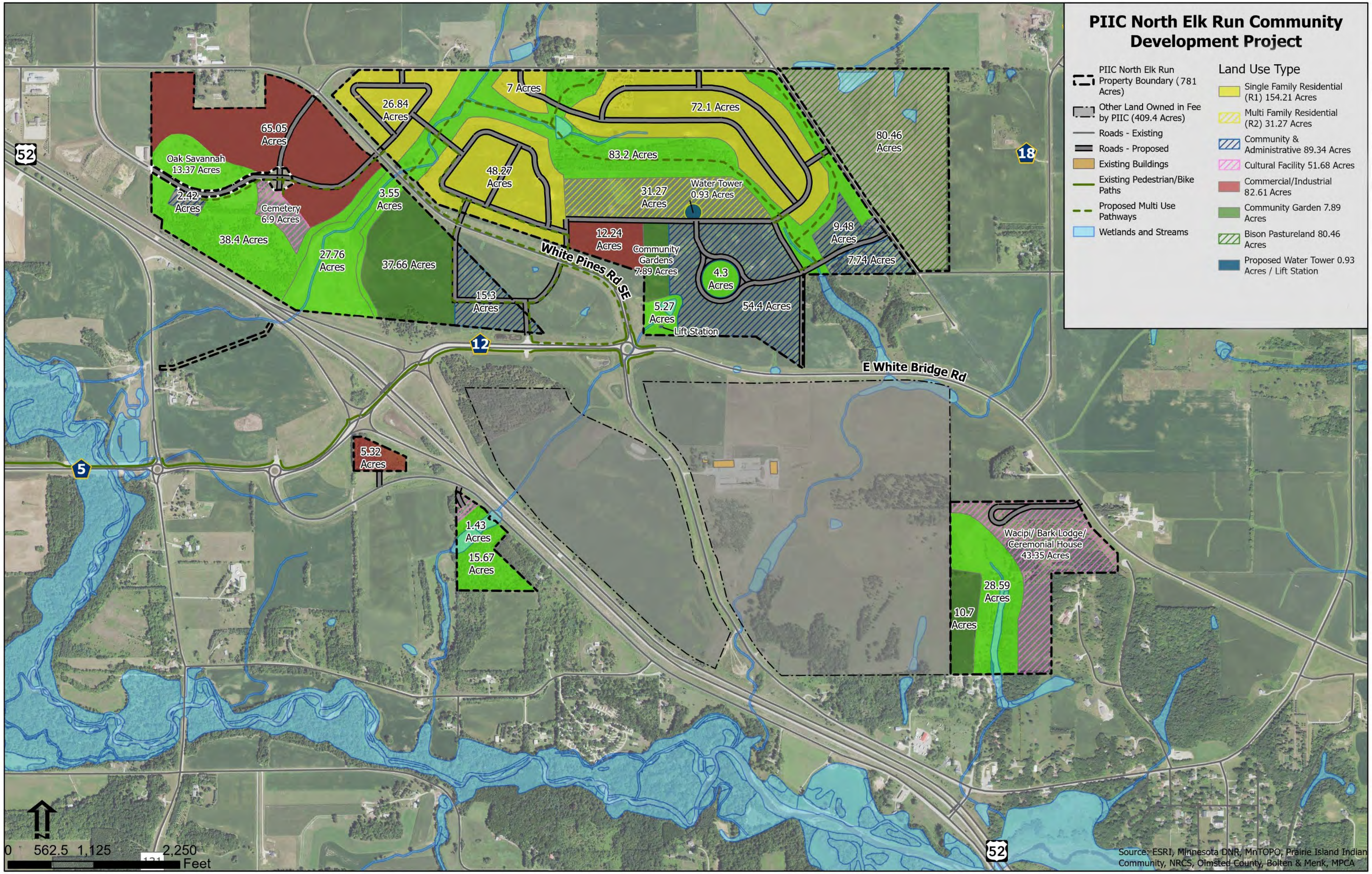


Figure 2: The Project Boundaries and Proposed Land Use Overview Map



2. Existing Site Conditions

2.1 Existing Land Use

Before PIIC acquired Elk Run, the land was operated as a privately owned elk farm. The land was primarily used for grazing pasture for commercial raising and processing of elk. PIIC purchased the land from the previous owner in 2019, and PIIC began the community land use planning process.

Overall, there are multiple land uses that surround Elk Run. Most land bordering Elk Run is agricultural and rural/low-density residential. Elk Run is within the area designated by Olmsted County's General Land Use Plan as "Urban Service Area."[1] The existing land use within Elk Run consists of row crops, 50%-75% grass cover, woods/grass, and seasonal water impoundments, as shown in **Figure 3** below. Row crops comprise the most acreage within the site, with grass cover and woods/grass split nearly equal. A few seasonal water impoundments exist in the site's northeast corner which are considered seasonally emergent wetlands.[2] Elk Run's geology is consistent with the geology of the southeastern Minnesota region, with Karst bedrock ranging from 0-50 feet below grade.[3,4,5]

2.2 Existing Topography and Drainage

The Elk Run area's topography is around 1100 ft above mean sea level, with elevations ranging between 1000 ft and 1150 ft (**Figure 3**).[6] The site's east side generally drains south, while the west side drains southwest. Although it is unknown where culverts are located across the site, the flow of the overall footprint is generally directed toward the Zumbro River. The entirety of the Elk Run area is outside of the 100-year floodplain.[7] According to soil information obtained from the National Resources Conservation Service Web Soil Survey, the soils at Elk Run consist of various types of silts, loams, sandy loams, and silty clay loams (**EXHIBIT B**).[8]

Approximately 43% of the soils at Elk Run are assigned to hydrologic soil group C, 42% are assigned to hydrologic soil group B, 10% are assigned to hydrologic soul group D, 5% are assigned to hydrologic soil group A, and 1% are assigned to the dual hydrologic group B/D, as shown in **Table 2** below.[8] The majority of soils at Elk Run either have a slow (Group C) or moderate (Group B) infiltration rate. For more information, see **EXHIBIT C**.

Table 2: Hydrologic Soil Group of Soils at Elk Run

Hydrologic Soil Group	Area (acres)	Percent of Area
A	42.3	5.0%
B	373.2	42.5%
B/D	4.2	0.5%
C	382.5	43.0%
D	89.6	10.0%

[1] (Olmsted County Planning Department, 2022)
[2] (U.S. Fish and Wildlife Service, 2023)
[3] (KLJ Engineering, 2023)
[4] (Minnesota Department of Natural Resources, 2016)
[5] (Minnesota Department of Natural Resources, 2024)
[6] (Minnesota Department of Natural Resources, 2024)
[7] (Federal Emergency Management Agency, 2024)
[8] (Natural Resources Conservation Service, 2024)

Figure 3: Existing Topography and Drainage

3. Grading and Drainage

This cut and fill analysis was completed specifically for the proposed roads in the Project. Due to this being a preliminary plan, the amount of cut that will be required for the 1,500 square foot homes, the 100-foot by 12-foot driveways, multi-use pathways, and community and commercial businesses was estimated. However, the anticipated fill for bedding the water and sewer utilities was not calculated.

3.1 Design Process

To meet the future full build out year 2027 identified above for the Project, the road network and drainage infrastructure will need to be expanded from the Project's proposed layout. The proposed grading option, shown in **Figure 7**, takes into consideration all existing land conditions and Minnesota Department of Transportation (MnDOT) road design standards.

The proposed road additions to the Project will be approximately 7.46 miles in length across the entire site. A typical cross section of a road includes 14-foot lane widths, a 2-foot shoulder, and 4 to 1 side slopes that tie into the existing ground. A visual of this cross section can be found on **Figure 7**. This crowned lane allows for water to flow perpendicular to the centerline of the road. Based on the typical road cross section, the 32-foot width of the road is considered permanent road disturbance (140,046 square yards [SY]). Whereas the 4 to 1 side slopes are considered temporary disturbance because those areas will be re-vegetated post construction (47,863 SY). Between the permanent road disturbance and the temporary disturbance, the total proposed disturbance is 187,909 SY.

3.2 Volume of Fill Analysis

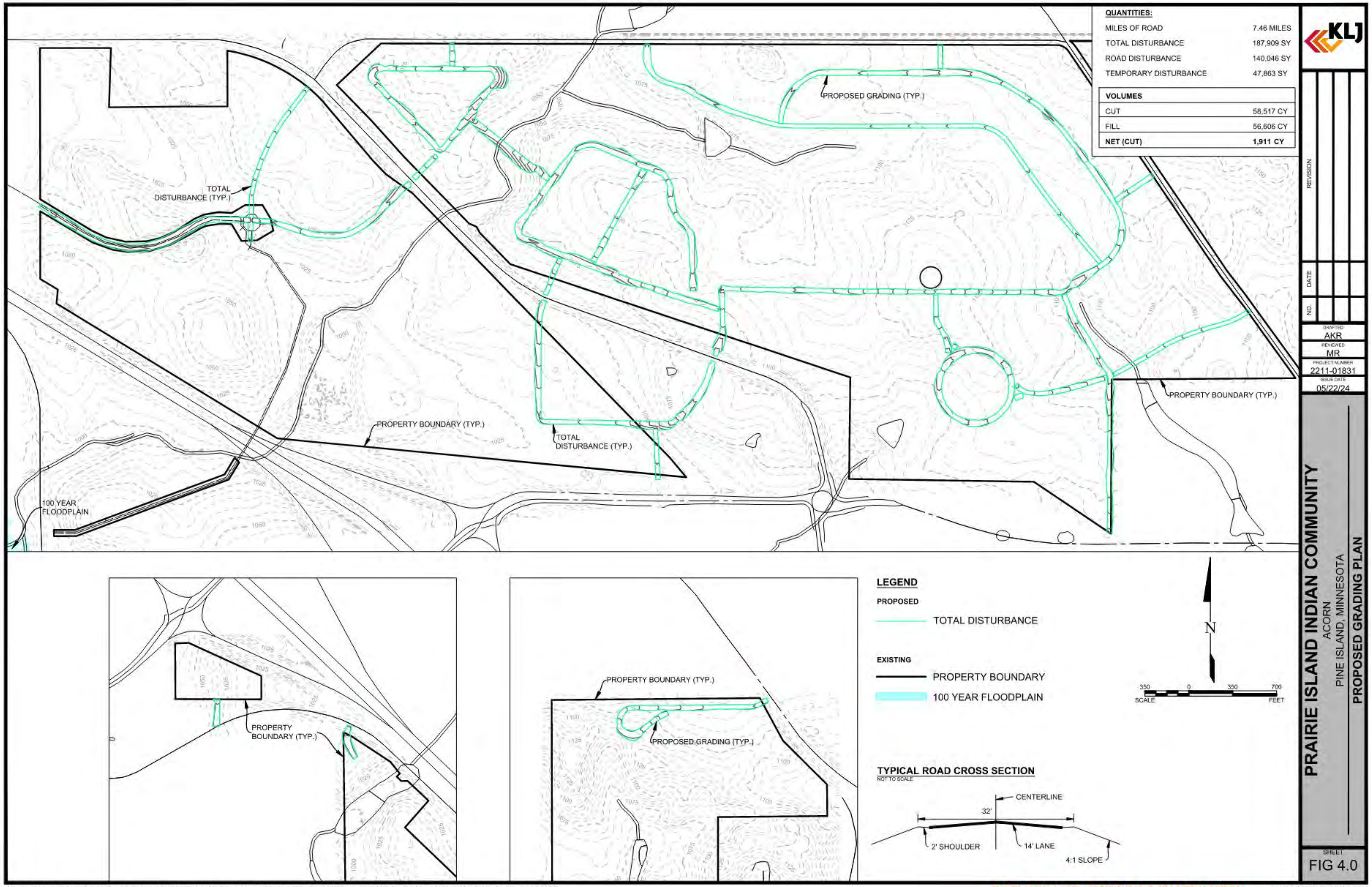
Based on the road design described above, the proposed cut is 58,517 cubic yards (CY) and the proposed fill is 56,606 CY, leaving a net cut of approximately 1,911 CY (**Figure 7**). This net cut can easily be placed throughout the Project. For example, this cut can be used as trench fill during construction of water and sewer utilities.

Figure 4: Photo of Existing Elk Run Farmstead Site

Figure 5: Photo of Elk Run Typical Vegetation and Topography

Figure 6: Photo of Seasonal Water Impoundment at Elk Run

Figure 7: Proposed Grading Plan For The Project



4. HYDROLOGY AND HYDRAULICS

4.1 Methodology

AutoCAD Civil 3D was used to design the proposed roads and perform the cut/fill analysis as shown in **Figure 7**. Each road profile was designed between 0.5% and 7%, never exceeding 7% and ideally following the natural contour of the land. Design controls standards from MnDOT Road Design for crest and sag vertical curves were followed to ensure the proposed roads are in accordance with MnDOT (**EXHIBIT A**).[9] The preferred design speed of a specific area of the site is what determined the vertical curve value. The residential areas which include single and multi-family housing are planned to have a speed limit of 25 miles per hour (mph). The roads in those designated areas were designed for 30 mph to account for realistic driving. All the roads outside of the residential areas are planned to have a posted speed limit of 35 mph. Similarly, the roads in these areas were designed for 40 mph to, again, account for realistic driving.

HydroCAD was used to perform the pre- and post-development drainage analysis shown in **Figure 8** and **Figure 9**. These figures also provide peak flow rates and volumes which utilized the existing conditions / land uses to address drainage conditions for the Project. Due to this analysis being based on a preliminary plan, there has not been sizing of storm drain conveyance systems. In addition, there are no hydrologic studies that have been conducted in the Elk Run area to KLJ's knowledge.

Pre-developed areas were analyzed using different runoff curve number (CN) values based on the location's hydrologic soil group and ground cover. The CN values for the post-developed areas were defined using the Project's plan. Specific zones from the Project were assigned various percentages of impervious and pervious land to produce CN values, while still considering the location's hydrologic soil group and ground cover in certain zones. Time of concentration in both the pre-developed and post-developed conditions was analyzed in the HydroCAD model. Sheet flow and shallow concentrated flow were estimated using the Soil Conservation Service (SCS) TR-20 method.[10]

4.2 Analysis Results

The HydroCAD program was able to conclude the estimated pre-project and post-project peak flows shown in **Figure 8** and **Figure 9**. The differences between these 2-year, 10-year, and 100-year pre- and post-project peak flows are shown in **Table 3**, **Table 4**, and **Table 5**, respectively.

The site will be designed to collect and convey stormwater from impervious services by utilizing primary vegetated swales to transport the water to various detention ponds (**Figure 9**) before discharging into natural waterways surrounding Elk Run. Some of these vegetated swales will run alongside each edge of the proposed roads as these areas were planned to be temporary disturbance areas during the construction phase. There will be additional vegetated swales throughout the Project area, potentially alongside the proposed 8-foot-wide multi-use pathways. Additionally, detention ponds are planned to capture, treat, and mitigate peak flow rates. The overall goal of using best management practices (BMPs) such as vegetated swales, bio-filtration swales, and detention ponds, is to match the existing peak flow rates as much as possible and to treat for water quality (total suspended solids and total phosphorus) before water enters the existing natural waterways and wetlands. Both **Figure 8** and **Figure 9** show the sub-basin drainage areas for the Elk Run and the Project area. These drainage areas are a large component in determining the peak flows, volumes and locations of the proposed detention ponds. The sub-basins on this project were determined using watershed boundaries across the site, combining areas that drain relatively to the same location.

---

[9] (Minnesota Department of Transportation, 1999)

[10] (U.S. Department of Agriculture, 1986)

Table 3: Comparison of 2-Year Peak Flows for Pre-Development Versus Post-Development Drainage Plans

BASIN	AREA (ACRES)	2YR PEAK FLOW (CFS)			
		Pre-Development	Post-Development	Absolute Change	Percent Change
NW1	55.47	89.86	123.25	33.39	37.2%
NW2	134.31	139.64	154.53	14.89	10.7%
NW3	23.46	38.24	38.24	0	0.0%
N1	107.24	166.37	141.14	-25.23	-15.2%
N2	113.49	66.52	66.52	0	0.0%
N3	39.02	64.39	72.23	7.84	12.2%
N4	111.18	159.13	151.38	-7.75	-4.9%
NE1	17.82	43.23	43.23	0	0.0%
NE2	24.44	30.83	30.83	0	0.0%
NE3	38.21	29.59	29.59	0	0.0%
SW1	5.32	4.24	19.39	15.15	357.3%
S1	15.65	28.56	28.56	0	0.0%
S2	1.45	0.63	0.63	0	0.0%
SE1	4.87	0.14	0.26	0.12	85.7%
SE2	13.31	25.75	27.14	1.39	5.4%
SE3	7.66	4.49	4.49	0	0.0%
SE4	53.69	53.23	53.23	0	0.0%
SE5	2.83	5.75	5.75	0	0.0%

Table 4: Comparison of 10-Year Peak Flows for Pre-Development Versus Post-Development Drainage Plans

BASIN	AREA (ACRES)	10YR PEAK FLOW (CFS)			
		Pre-Development	Post-Development	Absolute Change	Percent Change
NW1	55.47	174.33	211.42	37.09	21.3%
NW2	134.31	273.18	291.00	17.82	6.5%
NW3	23.46	83.06	83.06	0	0.0%
N1	107.24	329.53	297.24	-32.29	-9.8%
N2	113.49	173.59	173.59	0	0.0%
N3	39.02	139.66	149.94	10.28	7.4%
N4	111.18	303.31	293.92	-9.39	-3.1%
NE1	17.82	85.36	85.36	0	0.0%
NE2	24.44	79.34	79.34	0	0.0%
NE3	38.21	82.35	82.35	0	0.0%
SW1	5.32	13.07	31.97	18.9	144.6%
S1	15.65	62.59	62.59	0	0.0%
S2	1.45	2.14	2.14	0	0.0%
SE1	4.87	2.45	3.23	0.78	31.8%
SE2	13.31	52.37	54.12	1.75	3.3%
SE3	7.66	14.31	14.31	0	0.0%
SE4	53.69	137.10	137.10	0	0.0%
SE5	2.83	12.27	12.27	0	0.0%

Table 5: Comparison of 100-Year Peak Flows for Pre-Development Versus Post-Development Drainage Plans

BASIN	AREA (ACRES)	100YR PEAK FLOW (CFS)			
		Pre-Development	Post-Development	Absolute Change	Percent Change
NW1	55.47	364.98	400.64	35.66	9.8%
NW2	134.31	576.45	595.27	18.82	3.3%
NW3	23.46	189.90	189.90	0	0.0%
N1	107.24	701.16	664.70	-36.46	-5.2%
N2	113.49	456.16	456.16	0	0.0%
N3	39.02	319.00	331.02	12.02	3.8%
N4	111.18	627.52	617.55	-9.97	-1.6%
NE1	17.82	181.03	181.03	0	0.0%
NE2	24.44	204.07	204.07	0	0.0%
NE3	38.21	222.47	222.47	0	0.0%
SW1	5.32	37.25	58.78	21.53	57.8%
S1	15.65	144.12	144.12	0	0.0%
S2	1.45	6.48	6.48	0	0.0%
SE1	4.87	15.08	16.73	1.65	10.9%
SE2	13.31	113.82	115.75	1.93	1.7%
SE3	7.66	41.61	41.61	0	0.0%
SE4	53.69	352.76	352.76	0	0.0%
SE5	2.83	27.62	27.62	0	0.0%

4.3 Cumulative Impacts

The cumulative impacts of future projects in conjunction with this project were examined. According to 40 CFR 1508.1(g)(3), cumulative impacts are the impact on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[11]

In the event that off-site drainage facilities need to be utilized because drainage is not anticipated to be self-contained on-site, then cumulative impacts concerning drainage need to be considered. The potential future projects considered in this analysis are shown in **Table 6**.

[11] (Code of Federal Regulations, 2022)

Table 6: Potential Future Projects within 1 mile of Project Site Considered in Cumulative Impacts Analysis

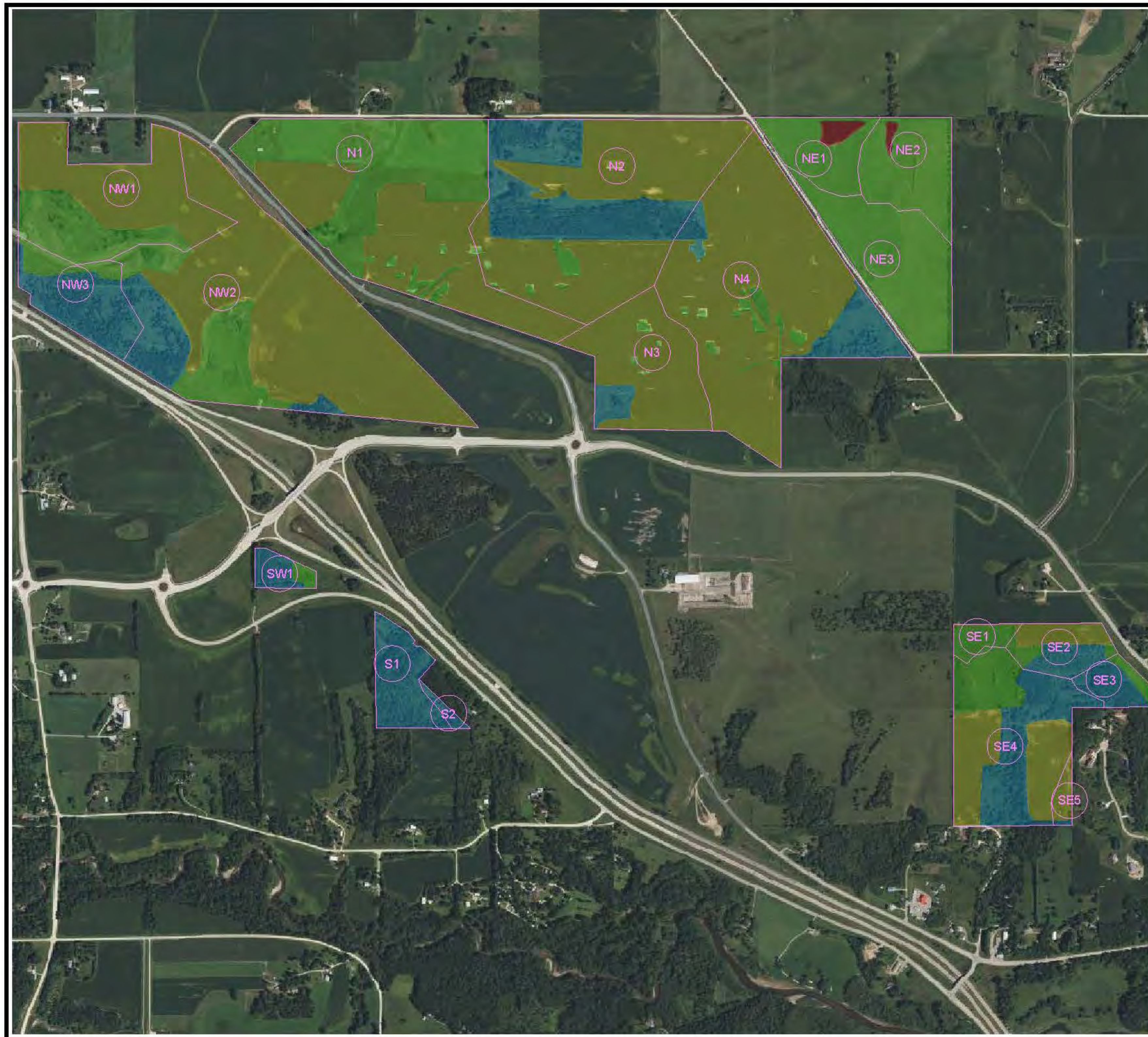
Project Name	Project Location	Project Description	Project Status	Distance from Project Site
Residential Wastewater Development	Oronoco, MN	Construction of a municipal wastewater collection and treatment system to parallel the existing water system.	Under construction	1.0 mile
Hwy 52 Improvements	Hwy 52 from Oronoco to Pine Island	Planned resurfacing of the roadway with potential infrastructure improvements such as a frontage road, flood mitigation improvements, and intersection upgrades.	Planning stages	0.34 miles
PIIC Emergency Gaming Facility and Fee-to-Trust Project	Adjacent to the Project	Fee-to-trust and casino should a catastrophic event occur that would result in closure of the existing Casino.	Planning stages	0.1 miles
Xcel Energy Mankato-Mississippi River Transmission Project	Adjacent to the Project	Approximately 120 miles of new and upgraded 345 kilovolt (kV) transmission lines between the existing Wilmarth Substation near Mankato and a connection point at the Mississippi River near Kellogg, Mn.	Planning stages	0.1 miles

Below are potential cumulative impacts on grading and drainage of future projects in conjunction with this project.

- Increased Impervious Surfaces: Constructing/resurfacing a roadway and building a municipal wastewater collection and treatment system will require grading and creating impervious surfaces such as parking lots and buildings. The installation of transmission lines requires grading for access roads, substation construction, and tower foundations. Grading for transmission line corridors also often involves clearing vegetation, which results in reduced infiltration. The combined effects of these projects may increase impervious surfaces, thereby increasing runoff.
- Erosion and Sedimentation: Exposed soil on construction sites is susceptible to erosion by wind and water. BMPs such as silt fences may not be able to prevent all sediment from leaving the site during heavy rainfall events, leading to sedimentation in nearby water bodies. These effects are exacerbated if construction BMPs are not properly used.
- Water Quality Degradation: Construction activities often involve materials and machinery that can contribute to pollution, such as oil spills or fuel leaks. While BMPs help reduce these occurrences, they cannot entirely eliminate them. These effects are exacerbated if construction BMPs are not properly used.

The effects of each of the impacts identified above can be mitigated with proper usage of BMPs which prevent erosion, control sediment, and treat and contain stormwater to prevent water quality degradation.

Figure 8: Pre-Development Drainage Plan



LEGEND

- PROPOSED SUB-BASIN BOUNDARY
- ROW CROPS
- 50%-75% GRASS COVER
- WOODS/GRASS
- IMPERVIOUS
- P1 MASTER PLANNED BASIN LABEL

BASIN	AREA (ACRES)	2 YR PEAK FLOW (CFS)	2 YR VOLUME (AF)	10 YR PEAK FLOW (CFS)	10 YR VOLUME (AF)	100 YR PEAK FLOW (CFS)	100 YR VOLUME (AF)
NW1	55.47	89.86	6.50	174.33	12.60	364.98	27.01
NW2	134.31	139.64	15.73	273.18	30.48	576.45	65.36
NW3	23.46	38.24	2.04	83.06	4.34	189.90	10.10
N1	107.24	166.37	11.97	329.53	23.56	701.16	51.18
N2	113.49	66.52	6.92	173.59	16.51	456.16	42.15
N3	39.02	64.39	3.37	139.66	7.19	319.00	16.73
N4	111.18	159.13	13.67	303.31	26.09	627.52	55.22
NE1	17.82	43.23	1.89	85.36	3.78	181.03	8.33
NE2	24.44	30.83	1.40	79.34	3.41	204.07	8.85
NE3	38.21	29.59	2.05	82.35	5.10	222.47	13.47
SW1	5.32	4.24	0.23	13.07	0.62	37.25	1.73
S1	15.65	28.56	1.28	62.59	2.78	144.12	6.56
S2	1.45	0.63	0.06	2.14	0.16	6.48	0.46
SE1	4.87	0.14	0.04	2.45	0.22	15.08	0.92
SE2	13.31	25.75	1.35	52.37	2.73	113.82	6.10
SE3	7.66	4.49	0.33	14.31	0.89	41.61	2.49
SE4	53.69	53.23	3.29	137.10	7.85	352.76	20.05
SE5	2.83	5.75	0.25	12.27	0.52	27.62	1.21
TOTAL DISTURBED AREA	771.64						

N

600 0 600 1200
SCALE FEET

KLJ

REVISION
DATE
NO.

DRAFTED JJQ
REVIEWED MRR
PROJECT NUMBER 2211-01831
ISSUE DATE 5/28/24

PRAIRIE ISLAND INDIAN COMMUNITY
ACORN
PINE ISLAND, MINNESOTA
PRE-DEVELOPMENT DRAINAGE LAYOUT

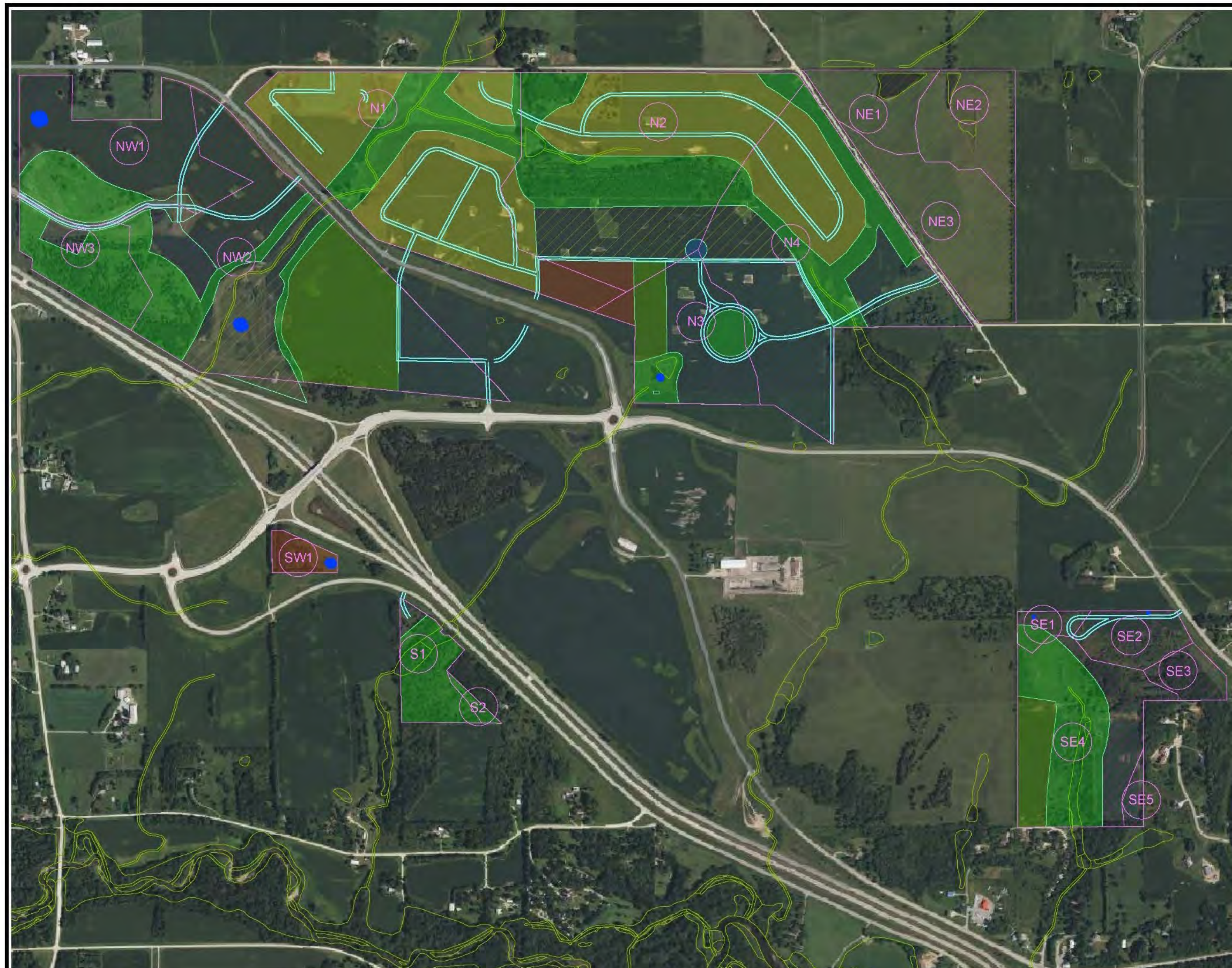
SHEET
FIG 5

May 28, 2024 - 1:42pm - K:\Projects\Tribal\PrairieIsland\2211-01831_LandUsePlanner\Acorn_CommunityPlan_EA_TechReports_2024\CAD_base\KLJ Created\Plans\2211-01831_SWMP-5-13.dwg (22x34LR)

PRELIMINARY - NOT FOR CONSTRUCTION

© KLJ ENGINEERING LLC 2024

Figure 9: Post-Development Drainage Plan



LEGEND

PROPOSED ZONE BOUNDARY
PROPOSED RIGHT OF WAY
PROPOSED SUB-BASIN BOUNDARY
SINGLE FAMILY RESIDENTIAL
MULTI FAMILY RESIDENTIAL
COMMUNITY
CULTURAL
COMMERCIAL
COMMERCIAL / INDUSTRIAL
AGRICULTURE
NATURAL AREAS
DEVELOPMENT CONSTRAINT / ENV REMEDIATION SITE
BISON PASTURELAND
WETLANDS & STREAMS
PROPOSED DETENTION POND
P1 MASTER PLANNED BASIN LABEL

BASIN	AREA (ACRES)	2 YR PEAK FLOW (CFS)	2 YR VOLUME (AF)	10 YR PEAK FLOW (CFS)	10 YR VOLUME (AF)	100 YR PEAK FLOW (CFS)	100 YR VOLUME (AF)
NW1	55.47	123.25	8.96	211.42	15.70	400.64	30.82
NW2	134.31	154.53	17.29	291.00	32.54	595.27	67.99
NW3	23.46	38.24	2.04	83.06	4.34	189.90	10.10
N1	107.24	141.14	10.30	297.24	21.24	664.70	48.06
N2	113.49	66.52	6.92	173.59	16.51	456.16	42.15
N3	39.02	72.23	3.75	149.94	7.73	331.02	17.49
N4	111.18	151.38	13.03	293.92	25.25	617.55	54.13
NE1	17.82	43.23	1.89	85.36	3.78	181.03	8.33
NE2	24.44	30.83	1.40	79.34	3.41	204.07	8.85
NE3	38.21	29.59	2.05	82.35	5.10	222.47	13.47
SW1	5.32	19.39	0.94	31.97	1.60	58.78	3.06
S1	15.65	28.56	1.28	62.59	2.78	144.12	6.56
S2	1.45	0.63	0.06	2.14	0.16	6.48	0.46
SE1	4.87	0.26	0.06	3.23	0.26	16.73	1.01
SE2	13.31	27.14	1.42	54.12	2.83	115.75	6.22
SE3	7.66	4.49	0.33	14.31	0.89	41.61	2.49
SE4	53.69	53.23	3.29	137.10	7.85	352.76	20.05
SE5	2.83	5.75	0.25	12.27	0.52	27.62	1.21
TOTAL DISTURBED AREA	771.64						

N

600 0 600 1200
SCALE FEET

KLJ

REVISION
NO DATE
DRAFTED JJQ
REVIEWED MRR
PROJECT NUMBER 2211-01831
ISSUE DATE 5/28/24

PRAIRIE ISLAND INDIAN COMMUNITY
ACORN
PINE ISLAND, MINNESOTA
POST-DEVELOPMENT DRAINAGE LAYOUT

SHEET
FIG 6

May 28, 2024 - 1:40pm - K:\Projects\Tribal\PrairieIsland\2211-01831_LandUsePlanner\Acorn_CommunityPlan_EA_TechReports_2024\CAD_base\KLJ Created\Plans\2211-01831_POST-SWMP-5-13-24.dwg (22x34LR)

PRELIMINARY - NOT FOR CONSTRUCTION

© KLJ ENGINEERING LLC 2024

5. CONCLUSION

In summary, the estimated volume of cut/fill is calculated to be 58,517 cubic yards (CY) of cut and 56,606 CY of fill, leaving a net cut of approximately 1,911 CY, based on the road design proposed for the Project. The estimated total footprint of buildings, and multi-use pathways is 1,087,065 sf.

For the pre- and post-development drainage analysis, HydroCAD was used to estimate the pre-project and post-project peak flows. From the estimated increase in impervious surface attributed to proposed buildings, roads, and multi-use pathways, the estimated increase in peak flow rates is 39.8 cfs for the 2-year, 44.9 cfs for the 10-year, and 45.2 cfs for the 100-year storm events. With more impervious surface, the volume of stormwater runoff will also increase. However, by implementing stormwater BMPs such as vegetated swales to transport stormwater runoff to detention ponds, the Project can mitigate some or all of the increase in peak flow rates and volume.

Finally, the cumulative impacts of future projects in conjunction with this project were examined. The potential cumulative impacts identified were increased impervious surfaces, erosion and sedimentation, and water quality degradation, which can all be mitigated with proper usage of BMPs.

6. REFERENCES

Code of Federal Regulations. (2022, May 20). *PART 1508—DEFINITIONS*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/current/title-40/part-1508#p-1508.1(g)(3)

Federal Emergency Management Agency. (2024, March 28). *National Flood Hazard Layer*. Retrieved from https://www.fema.gov/flood-maps/national-flood-hazard-layer

KLJ Engineering. (2023). *North Elk Run Community Development Project (Draft).* Prairie Island Indian Community.

Minnesota Department of Natural Resources. (2016). *Minnesota Regions Prone to Surface Karst Feature Development.* Retrieved from https://www.dnr.state.mn.us/waters/groundwater_section/mapping/resource.html

Minnesota Department of Natural Resources. (2024, May). *Minnesota Karst Feature Inventory.* Retrieved from https://www.dnr.state.mn.us/waters/groundwater_section/mapping/springs.html

Minnesota Department of Natural Resources. (2024, May). *MnTOPO.* Retrieved from https://www.dnr.state.mn.us/maps/mntopo/index.html

Minnesota Department of Transportation. (1999, October). *Road Design Manual: Chapter 3 - Alignment & Superelevation*. Retrieved from https://roaddesign.dot.state.mn.us/

Minnesota Department of Transportation. (2021). *Geotechnical Engineering Manual: Appendix A - Geology of Minnesota.* Retrieved from https://www.dot.state.mn.us/materials/geotmanual.html

Minnesota Pollution Control Agency. (2024, May 24). *Protecting Water in Karst Regions*. Retrieved from https://www.pca.state.mn.us/air-water-land-climate/protecting-water-in-karst-regions

Natural Resources Conservation Service. (2024, April 29). *Web Soil Survey*. Retrieved from https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Olmsted County Planning Department. (2022, August). *Olmsted County General Land Use Plan (2022).* Retrieved from https://www.olmstedcounty.gov/business/building-development-gis/planning-land-use-zoning/general-land-use-plan-update-information

U.S. Department of Agriculture. (1986, June). *Urban Hydrology for Small Watersheds: Chapter 5 - Tabular Hydrograph Method.* Retrieved from https://www.hydrocad.net/pdf/TR-55%20Manual.pdf

U.S. Fish and Wildlife Service. (2023, October 1). *National Wetlands Inventory*. Retrieved from https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper

U.S. Geologic Survey. (2022, August 21). *National Hydrography Dataset Plus Version 2.1*. Retrieved from ArcGIS Online: https://www.arcgis.com/home/item.html?id=4bd9b6892530404abfe13645fcb5099a

APPENDICES

EXHIBIT A: MNDOT DESIGN CONTROLS FOR CREST VERTICAL AND SAG VERTICAL CURVES

DESIGN CONTROLS FOR CREST VERTICAL CURVES		
Design Speed (mph)	Sight Distance (ft)	K * (S ≤ L)
30	200	**19**
35	250	29
40	305	**43**
45	360	60
50	425	84
55	495	114
60	570	151
65	645	193
70	730	247
75	820	312

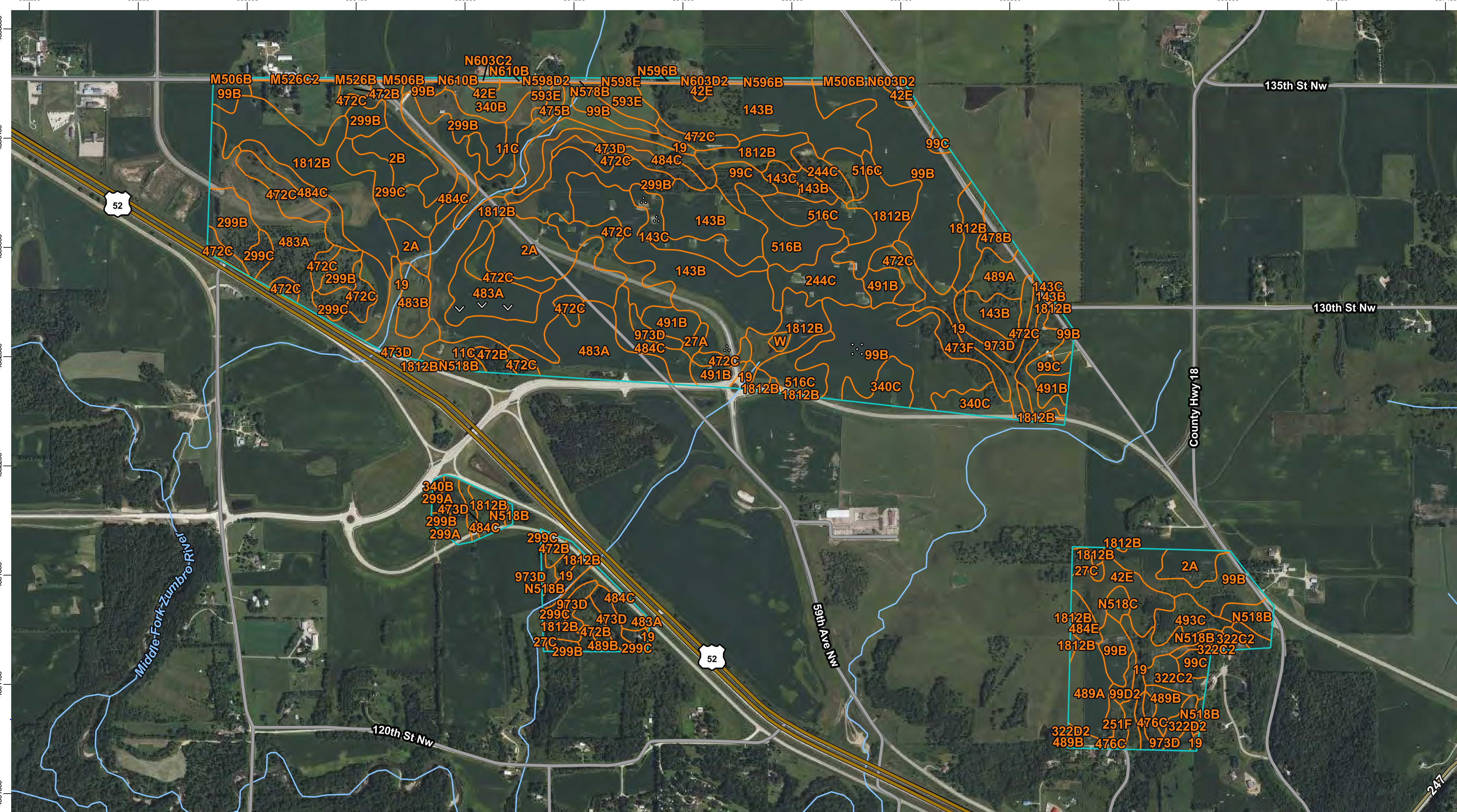
DESIGN CONTROLS FOR SAG VERTICAL CURVES		
Design Speed (mph)	Sight Distance (ft)	K * (S ≤ L)
30	200	**36**
35	250	49
40	305	**63**
45	360	78
50	425	96
55	495	115
60	570	136
65	645	157
70	730	180
75	820	206

EXHIBIT B: NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY SOIL MAP

92° 35' 52" W
92° 31' 50" W
44° 11' 50" N
44° 10' 14" N

532200 532600 533000 533400 533800 534200 534600 535000 535400 535800 536200 536600 537000 537400

4893800 4893400 4893000 4892600 4892200 4891800 4891400 4891000



Map Scale: 1:14,400 if printed on B landscape (17" x 11") sheet.

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N 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 scales ranging from 1:12,000 to 1:15,800.

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: Goodhue County, Minnesota
Survey Area Data: Version 19, Sep 9, 2023

Soil Survey Area: Olmsted County, Minnesota
Survey Area Data: Version 18, Sep 9, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Aug 17, 2020—Sep 2, 2020

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

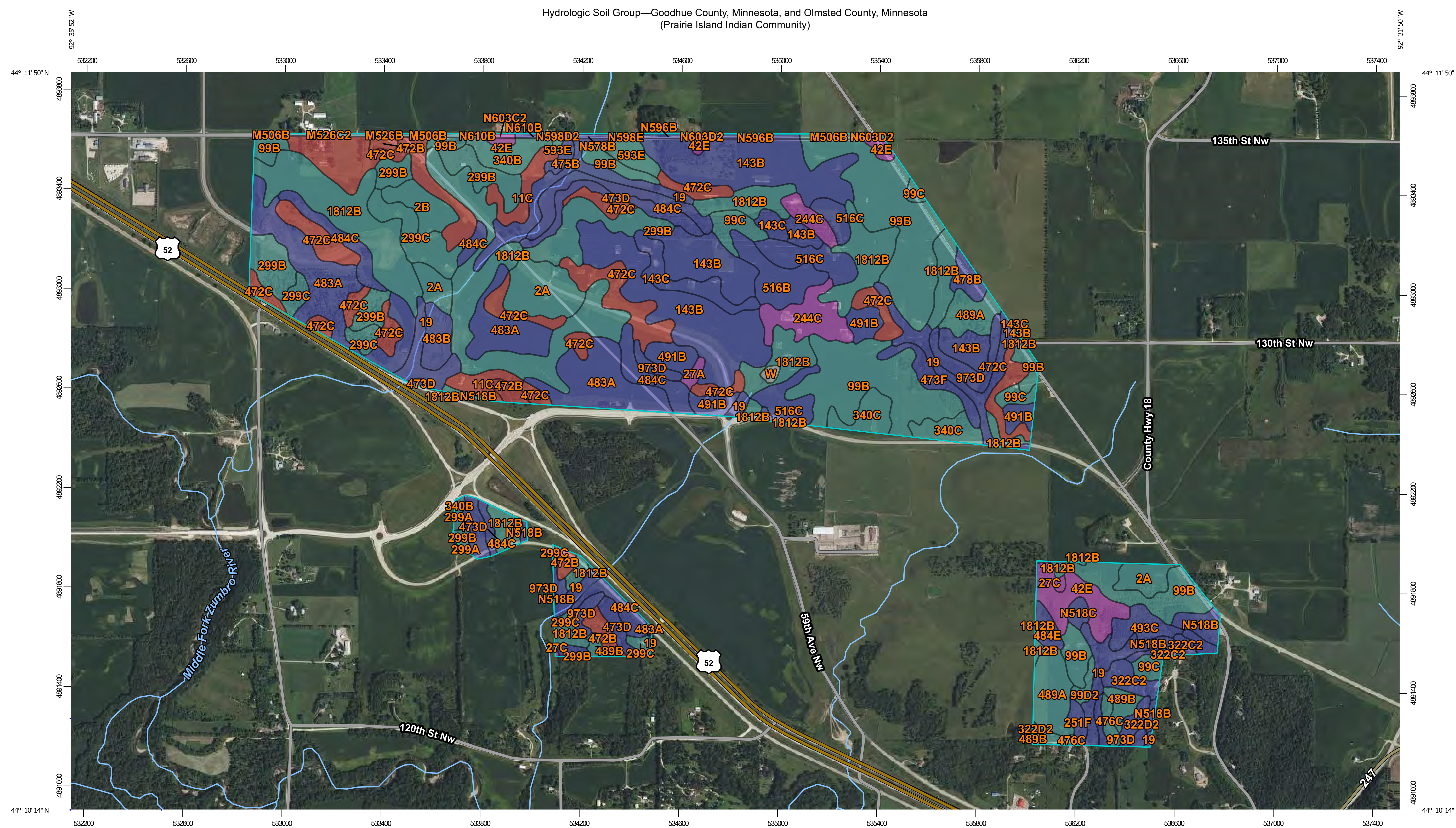
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
M506B	Kasson silt loam, 2 to 6 percent slopes	2.2	0.2%
M522D2	Bassett-Racine complex, 12 to 18 percent slopes, moderately eroded	0.0	0.0%
M526B	Winneshiek silt loam, 2 to 6 percent slopes	0.4	0.0%
M526C2	Winneshiek silt loam, 6 to 12 percent slopes, moderately eroded	1.3	0.1%
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	0.9	0.1%
N596B	Eleva sandy loam, 2 to 6 percent slopes	2.8	0.3%
N598D2	Winneshiek-Waucoma complex, 12 to 18 percent slopes, moderately eroded	0.3	0.0%
N598E	Winneshiek-Waucoma complex, 18 to 35 percent slopes	0.5	0.1%
N603C2	Lilah-Billett complex, 6 to 12 percent slopes, moderately eroded	0.5	0.1%
N603D2	Lilah-Billett complex, 12 to 18 percent slopes, moderately eroded	0.8	0.1%
N610B	Waucoma loam, 2 to 6 percent slopes	0.9	0.1%
Subtotals for Soil Survey Area		**10.8**	**1.2%**
Totals for Area of Interest		**928.4**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2A	Ostrander silt loam, 0 to 2 percent slopes	25.3	2.7%
2B	Ostrander loam, 2 to 5 percent slopes	8.3	0.9%
11C	Sogn loam, 4 to 12 percent slopes	11.8	1.3%
19	Chaseburg silt loam, moderately well drained, 0 to 2 percent slopes	45.3	4.9%
27A	Dickinson sandy loam, 0 to 1 percent slopes	1.5	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
27C	Dickinson sandy loam, 6 to 12 percent slopes	2.2	0.2%
42E	Salida gravelly sandy loam, 12 to 35 percent slopes	15.0	1.6%
99B	Racine loam, 2 to 5 percent slopes	107.6	11.6%
99C	Racine silt loam, 6 to 12 percent slopes	11.8	1.3%
99D2	Racine loam, 12 to 18 percent slopes, eroded	2.0	0.2%
143B	Eleva sandy loam, 2 to 6 percent slopes	100.2	10.8%
143C	Eleva sandy loam, 6 to 12 percent slopes	12.3	1.3%
244C	Lilah sandy loam, 6 to 12 percent slopes	17.1	1.8%
251F	Marlean silty clay loam, 25 to 40 percent slopes	2.4	0.3%
299A	Rockton loam, 0 to 1 percent slopes	0.6	0.1%
299B	Rockton loam, 1 to 6 percent slopes	40.3	4.3%
299C	Rockton loam, 6 to 12 percent slopes	21.8	2.3%
322C2	Timula silt loam, 6 to 12 percent slopes, moderately eroded	6.2	0.7%
322D2	Timula silt loam, 12 to 20 percent slopes, moderately eroded	4.8	0.5%
340B	Whalan loam, 1 to 6 percent slopes	8.1	0.9%
340C	Whalan loam, 6 to 12 percent slopes	12.6	1.4%
472B	Channahon loam, 1 to 6 percent slopes	9.1	1.0%
472C	Channahon loam, 6 to 12 percent slopes	78.4	8.4%
473D	Dorerton loam, 12 to 25 percent slopes	16.8	1.8%
473F	Dorerton loam, 25 to 40 percent slopes	6.3	0.7%
475B	Backbone sandy loam, 1 to 6 percent slopes	2.2	0.2%
476C	Frankville silt loam, 6 to 12 percent slopes	2.6	0.3%
478B	Coggon silt loam, 2 to 6 percent slopes	3.9	0.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
483A	Waukee loam, 0 to 2 percent slopes	63.6	6.9%
483B	Waukee loam, 2 to 5 percent slopes	6.5	0.7%
484C	Eyota sandy loam, 6 to 12 percent slopes	32.9	3.5%
484E	Eyota loamy sand, 12 to 25 percent slopes	3.3	0.4%
489A	Atkinson loam, 0 to 1 percent slopes	18.6	2.0%
489B	Atkinson loam, 1 to 6 percent slopes	6.4	0.7%
491B	Waucoma loam, 2 to 6 percent slopes	15.0	1.6%
493C	Oronoco loam, 6 to 12 percent slopes	6.7	0.7%
516B	Dowagiac silt loam, 2 to 6 percent slopes	12.7	1.4%
516C	Dowagiac sandy loam, 6 to 12 percent slopes	21.1	2.3%
593E	Elbaville silt loam, 18 to 30 percent slopes	5.4	0.6%
973D	Brodale-Sogn complex, 12 to 25 percent slopes	16.7	1.8%
1812B	Terril loam, sandy substratum, 1 to 6 percent slopes	121.2	13.1%
N518B	Lindstrom silt loam, 2 to 6 percent slopes	8.0	0.9%
N518C	Lindstrom silt loam, 6 to 12 percent slopes	2.1	0.2%
W	Water	1.0	0.1%
Subtotals for Soil Survey Area		**917.6**	**98.8%**
Totals for Area of Interest		**928.4**	**100.0%**

EXHIBIT C: NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY HYDROLOGIC SOIL GROUP MAP



Map Scale: 1:14,400 if printed on B landscape (17" x 11") sheet.

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 scales ranging from 1:12,000 to 1:15,800.

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: Goodhue County, Minnesota
Survey Area Data: Version 19, Sep 9, 2023

Soil Survey Area: Olmsted County, Minnesota
Survey Area Data: Version 18, Sep 9, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Aug 17, 2020—Sep 2, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
M506B	Kasson silt loam, 2 to 6 percent slopes	C	2.2	0.2%
M522D2	Bassett-Racine complex, 12 to 18 percent slopes, moderately eroded	B	0.0	0.0%
M526B	Winneshiek silt loam, 2 to 6 percent slopes	C	0.4	0.0%
M526C2	Winneshiek silt loam, 6 to 12 percent slopes, moderately eroded	C	1.3	0.1%
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	B	0.9	0.1%
N596B	Eleva sandy loam, 2 to 6 percent slopes	B	2.8	0.3%
N598D2	Winneshiek-Waucoma complex, 12 to 18 percent slopes, moderately eroded	C	0.3	0.0%
N598E	Winneshiek-Waucoma complex, 18 to 35 percent slopes	B	0.5	0.1%
N603C2	Lilah-Billett complex, 6 to 12 percent slopes, moderately eroded	A	0.5	0.1%
N603D2	Lilah-Billett complex, 12 to 18 percent slopes, moderately eroded	A	0.8	0.1%
N610B	Waucoma loam, 2 to 6 percent slopes	B	0.9	0.1%
Subtotals for Soil Survey Area			**10.8**	**1.2%**
Totals for Area of Interest			**928.4**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2A	Ostrander silt loam, 0 to 2 percent slopes	C	25.3	2.7%
2B	Ostrander loam, 2 to 5 percent slopes	C	8.3	0.9%
11C	Sogn loam, 4 to 12 percent slopes	D	11.8	1.3%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
19	Chaseburg silt loam, moderately well drained, 0 to 2 percent slopes	B	45.3	4.9%
27A	Dickinson sandy loam, 0 to 1 percent slopes	A	1.5	0.2%
27C	Dickinson sandy loam, 6 to 12 percent slopes	A	2.2	0.2%
42E	Salida gravelly sandy loam, 12 to 35 percent slopes	A	15.0	1.6%
99B	Racine loam, 2 to 5 percent slopes	C	107.6	11.6%
99C	Racine silt loam, 6 to 12 percent slopes	C	11.8	1.3%
99D2	Racine loam, 12 to 18 percent slopes, eroded	C	2.0	0.2%
143B	Eleva sandy loam, 2 to 6 percent slopes	B	100.2	10.8%
143C	Eleva sandy loam, 6 to 12 percent slopes	B	12.3	1.3%
244C	Lilah sandy loam, 6 to 12 percent slopes	A	17.1	1.8%
251F	Marlean silty clay loam, 25 to 40 percent slopes	B	2.4	0.3%
299A	Rockton loam, 0 to 1 percent slopes	C	0.6	0.1%
299B	Rockton loam, 1 to 6 percent slopes	C	40.3	4.3%
299C	Rockton loam, 6 to 12 percent slopes	C	21.8	2.3%
322C2	Timula silt loam, 6 to 12 percent slopes, moderately eroded	B	6.2	0.7%
322D2	Timula silt loam, 12 to 20 percent slopes, moderately eroded	B	4.8	0.5%
340B	Whalan loam, 1 to 6 percent slopes	C	8.1	0.9%
340C	Whalan loam, 6 to 12 percent slopes	C	12.6	1.4%
472B	Channahon loam, 1 to 6 percent slopes	D	9.1	1.0%
472C	Channahon loam, 6 to 12 percent slopes	D	78.4	8.4%
473D	Dorerton loam, 12 to 25 percent slopes	B	16.8	1.8%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
473F	Dorerton loam, 25 to 40 percent slopes	B	6.3	0.7%
475B	Backbone sandy loam, 1 to 6 percent slopes	B	2.2	0.2%
476C	Frankville silt loam, 6 to 12 percent slopes	C	2.6	0.3%
478B	Coggon silt loam, 2 to 6 percent slopes	B	3.9	0.4%
483A	Waukee loam, 0 to 2 percent slopes	B	63.6	6.9%
483B	Waukee loam, 2 to 5 percent slopes	B	6.5	0.7%
484C	Eyota sandy loam, 6 to 12 percent slopes	B	32.9	3.5%
484E	Eyota loamy sand, 12 to 25 percent slopes	B	3.3	0.4%
489A	Atkinson loam, 0 to 1 percent slopes	C	18.6	2.0%
489B	Atkinson loam, 1 to 6 percent slopes	C	6.4	0.7%
491B	Waucoma loam, 2 to 6 percent slopes	B	15.0	1.6%
493C	Oronoco loam, 6 to 12 percent slopes	B	6.7	0.7%
516B	Dowagiac silt loam, 2 to 6 percent slopes	B	12.7	1.4%
516C	Dowagiac sandy loam, 6 to 12 percent slopes	B	21.1	2.3%
593E	Elbaville silt loam, 18 to 30 percent slopes	C	5.4	0.6%
973D	Brodale-Sogn complex, 12 to 25 percent slopes	B	16.7	1.8%
1812B	Terril loam, sandy substratum, 1 to 6 percent slopes	C	121.2	13.1%
N518B	Lindstrom silt loam, 2 to 6 percent slopes	B	8.0	0.9%
N518C	Lindstrom silt loam, 6 to 12 percent slopes	B	2.1	0.2%
W	Water		1.0	0.1%
Subtotals for Soil Survey Area			**917.6**	**98.8%**
Totals for Area of Interest			**928.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix E

Expanded Regulatory and Environmental Setting

Expanded Environmental and Regulatory Setting

INTRODUCTION

This appendix provides additional detail regarding the environmental setting and summarizes the framework of laws, regulations, and agreements pertaining to the region of the Project Site and actions outlined in the Environmental Assessment (EA). The topics are organized by resource category, and while most regulations discussed within the document are described here, this list is not comprehensive and is limited to the primary regulations relevant to the analysis within the EA. Once taken into trust, it is noted that state and local laws and regulations are generally not applicable to the Project Site.

LAND RESOURCES – EA SECTION 3.2

Federal

Clean Water Act

The Clean Water Act (CWA) prohibits sediment and erosion discharge into navigable waters of the United States and establishes water quality goals. The State Water Resources Control Board (SWRCB) requires a Construction General Permit if a project will disturb one or more acres of soil. A site-specific Stormwater Pollution Prevention Plan (SWPPP) is required under this permit. For more information on the CWA and the SWRCB, see **Water Resources** below.

State and Local

Minnesota Statute 103A.206 Soil and Water Conservation Policy

Minnesota State Statute 103A.203 provides a statement of policy and encourages landowners to implement land management practices that would conserve soil, water, and other natural resources. The following practices are recommended:

- Control or prevent erosion, sedimentation, siltation, and related pollution in order to preserve natural resources;
- Ensure continued soil health, as defined under section 103c.101, subdivision 10a, and soil productivity;
- Protect water quality;
- Prevent impairment of dams and reservoirs;
- Reduce damages caused by floods;
- Preserve wildlife;
- Protect the tax base; and
- Protect public lands and waters.

New Haven Township Book of Ordinances

Section 10.24 establishes regulations related to extraction of materials and minerals, open pits, and water impoundments. This section requires acquisition of a conditional use permit prior to these activities. Standard permit requirements for extraction of materials and minerals includes fencing of the pit or excavation area, sloping the banks to avoid caving or sliding banks, stabilize against erosion, and maintains roads and loading areas in a dust-free condition.

City of Pine Island Comprehensive Plan

This plan recognizes the importance of agriculture and the fertile soils of the City. It recognizes the importance of locating future agricultural land use planning within fertile soils and prime farmland. The plan includes the following policies related to land resources: 1) Developers must consult the wetlands and soils maps for the site to confirm soil suitability for use, and 2) The future growth boundary should exclude areas of unsuitable soils.

Olmsted County General Land Use Plan

The Olmsted County General Land Use Plan identifies important geological and land resources settings within Olmsted County that drive its related goals and policies. The plan notes that much of Olmsted County, including the Project Site, is within active Karst lands, where the risk of sinkholes can be high. The Project Site falls within an area of low to medium sinkhole risk. The plan further identifies that the Project Site is not within an area known for sand and gravel production, but that there is some potential for crushed stone extraction in the area. Chapter 7 of the plan includes the County policies, including:

- Preserve the natural and cultural resources that provide a “sense of place” for the county.
- Conserve and restore natural resources, including agricultural resources, and protect the ecological systems of the natural environment and economic uses of those resources.
- Respond to land use and resource management issues in a flexible and proactive way.
- Create and maintain sustainable communities.

Environmental Setting

The geological history of southeastern Minnesota has been driven by four glacial periods over the last two million years (GSM, 2017). Within the Mississippi Valley, driftless areas that were not covered by the most recent glacier (the Wisconsin glacier, approximately 10,000 years ago) lack natural lakes. These areas are characterized by deep valleys and exposed bluffs resulting from the erosion of runoff generated by melt from those areas with glacial cover (GSM, 2017). Other areas of exposed rock, including limestone, sandstone, and dolomite, are attributed to historic oceanic influence from over 70 million years ago. Olmsted County is the only county in the state with no natural lakes (Olmsted County, 2022a). Per the County’s GLUP, the Project Site is within active karst lands, where the risk of sinkholes can be high. The Project Site falls within an area of low to medium sinkhole risk.

Seismic Conditions, Liquefaction, and Landslides

A fault is generally considered active if there has been activity within the last 11,000 years. The USGS maintains records of fault locations and activity (USGS, 2023a). There are no known faults within the state, active or otherwise. Therefore, the risk of seismic events at the Project Site is extremely low. Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits temporarily lose strength from seismic shaking.

The primary factors controlling the onset of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soil, on-site stress conditions, and the depth to groundwater. The liquefaction susceptibility for the Project Site is very low given the lack of seismic activity in the State. Areas susceptible to landslides are comprised of weak soils on sloping terrain. Events such as heavy rains or strong seismic shaking events can induce landslides. There are no known documented landslides within three miles of the Project Site. Beyond three miles, the closest recorded landslide events in relation to the Project Site are associated with bank changes observed along regional waterways during a LiDAR analysis of pre- and post-rain event data with no specified date of occurrence (USGS, 2023b).

Soils and Erosion

Erosion is the wearing and removal of soil materials from the ground surface and the transportation of these soil materials resulting in deposition elsewhere. Mechanisms of soil erosion include stormwater runoff and wind as well as human activities. Examples of activities that can cause erosion include changes in drainage patterns and removal of vegetation. Factors that influence erosion include physical properties of the soil, topography (slope), and annual rainfall and peak intensity. Erosion risks increase on sloped areas.

WATER RESOURCES – EA SECTION 3.3

Federal

Executive Order 11988

Executive Order (EO) 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Specifically, EO 11988 states that agencies shall first determine whether the proposed action will occur in a floodplain. EO 11988 defines a floodplain as an area that has a one percent or greater chance of flooding in any given year. Second, if an agency proposes to allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the only practicable alternative action requires siting in a floodplain, the agency shall minimize potential harm to or within the floodplain.

Clean Water Act

The CWA (33 U.S. Code [USC] § 1251-1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The U.S. Environmental Protection Agency (USEPA) is delegated as the administrative agency under the CWA. Relevant sections of the CWA are as follows.

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines. Section 303(d) requires states to identify impaired off-Reservation water bodies, rank these impaired bodies based on severity of contamination and uses for the waters, and develop water quality management strategies, usually in the form of total maximum daily loads for the contaminant(s) of concern.

- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity that may result in a discharge to Waters of the U.S., to obtain certification from the USEPA for on-trust land activities, or the state for off-Reservation activities, that the discharge will comply with other provisions of the CWA.
- Section 402 establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into Waters of the U.S. Each NPDES permit contains limits on concentrations of pollutants discharged to surface waters to prevent degradation of water quality and protect beneficial uses.

The Federal Antidegradation Policy was adopted as part of the 1972 amendments to the CWA. Federal policy (Code of Federal Regulations [CFR], Title 40, Part 131.12) specifies that each state must develop, adopt, and retain an anti-degradation policy to protect the minimum level of off-Reservation surface water quality necessary to support existing uses. Each state must also develop procedures to implement the anti-degradation policy through water quality management processes. Each state anti-degradation policy must include implementation methods consistent with the provisions outlined in 40 CFR § 131.12. On trust land, these issues are addressed by the USEPA.

General NPDES Permit for Construction

In 1990, an amendment to the CWA directed the NPDES permitting program to address non-point source pollution from construction activities. Construction activities include clearing, grading, excavation, stockpiling, and reconstructing existing facilities involving removal and replacement of existing foundations or other hardscapes. Construction projects disturbing one or more acres of soil must be covered under the NPDES Construction General Permit process. For tribal projects on land held in trust by the federal government, the Tribe proposing the project must apply for coverage under the USEPA's NPDES Construction General Permit. Project proponents are required to submit to the USEPA a complete Notice of Intent (NOI) to comply with the permit. A complete NOI package consists of an NOI form, site map, and fee. The USEPA's NPDES Construction General Permit also requires the development and implementation of a SWPPP.

The SWPPP contains a site map showing the construction site perimeter, existing and proposed buildings, lots and roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the site. The SWPPP must list Best Management Practices (BMPs) that will be implemented during construction and operation to address stormwater runoff rates and quality. SWPPP BMPs include the following categories:

- Site planning considerations, such as preservation of existing vegetation;
- Vegetation stabilization through methods such as seeding and planting;
- Physical stabilization through use of dust control and stabilization measures;
- Diversion of runoff by utilizing earth dikes and temporary drains and swales;
- Velocity reduction through measures such as slope roughening/terracing; and
- Sediment trapping/filtering through use of silt fences, straw bales and sand bag filters, and sediment traps and basins.

Safe Drinking Water Act

Under the mandate of the Safe Drinking Water Act, the USEPA sets legally enforceable National Primary Drinking Water Regulations (primary standards) that apply to public water systems. These standards are established to protect human health by limiting the levels of contaminants in drinking water.

The USEPA also defines National Secondary Drinking Water Regulations (secondary standards) for contaminants that cause cosmetic and aesthetic effects, but not for health effects. The USEPA recommends that these secondary standards be met but does not require systems to comply with them. The USEPA does not oversee the construction and permitting of groundwater wells, but requires that public health standards, such as an effectively installed sanitary seal, are in place. The USEPA will also primarily establish monitoring and operational requirements, which will typically be specific to the project area. Both primary and secondary drinking water standards are expressed as either Maximum Contaminant Levels, which define the highest level of a contaminant allowed in drinking water, or Maximum Contaminant Level Goals, which define the level of a contaminant below which there is no known or expected risk to health. Monitoring requirements typically include total coliform, nitrate, inorganic chemicals, volatile organic chemicals, non-volatile synthetic organic chemicals, secondary drinking water standard constituents, and general chemistry (including alkalinity, hardness, and minerals). The frequency of sampling varies and may be reduced over time.

Federal Emergency Management Agency

The Disaster Relief Act of 1974 as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 created the Federal Emergency Management Agency (FEMA), which is responsible for determining flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers (USACE) studies. FEMA is also responsible for distributing Flood Insurance Rate Maps, which are used in the National Flood Insurance Program. These maps identify the locations of special flood hazard areas, including 100-year floodplains.

State and Local

Soil and Water Conservation Policy

Minnesota State Statute 103A.203 provides a statement of policy and encourages landowners to implement land management practices that would conserve soil, water, and other natural resources. The following practices are recommended:

- Control or prevent erosion, sedimentation, siltation, and related pollution in order to preserve natural resources;
- Ensure continued soil health, as defined under section 103c.101, subdivision 10a, and soil productivity;
- Protect water quality;
- Prevent impairment of dams and reservoirs;
- Reduce damages caused by floods;
- Preserve wildlife;
- Protect the tax base; and
- Protect public lands and waters.

Wetlands Conservation Act

The Minnesota Wetlands Conservation Act was passed into law in 1991 for the purpose of protecting wetlands and thereby water quality and biological diversity. The goal of this act is to result in no net loss of wetlands within the State. When a project or individual may impact a wetland, the Act preferentially requires that an attempt be made to avoid the impact. If full avoidance is not possible, the next action is to minimize the impact. Finally, for unavoidable impacts, the Act requires replacement of lost wetlands.

Replacement habitat is required to be equal in size and function to the habitat lost. The Minnesota Board of Water and Soil Resources oversees local governments that administer the Act, and enforcement is provided by MDNR Conservation Officers.

Minnesota Buffer Law

This law sets forth the necessary vegetative buffers that must be maintained for lakes, rivers, streams, and ditches. The buffers must be made of perennial vegetation and must follow the below standards: 1) 50 feet for lakes, rivers, streams, and 2) 16.5 feet for ditches. In some cases, the Minnesota Board of Water and Soil Resources may allow for alternative buffer setups consistent with the Natural Resources Conservation Service Field Office Guide, provided that the amended buffer provide the same water quality benefits.

Minnesota Water Law

According to the Minnesota Water Law, waters of the State are defined as "surface or underground waters, except surface waters that are not confined but are spread and diffused over the land. Waters of the state includes boundary and inland waters." In general, the Water Law regulates public waters and wetlands, but also specifies regulations related to appropriation of water, impoundment of water, and activities that impact these resources. Additionally, the Water Law specifies that the commissioner of natural resources for the state is responsible for the preparation of a statewide water resources conservation program. The Minnesota Board of Water and Soil Resources provides conservation planning resources for the State of Minnesota.

Minnesota Administrative Rules Ch 6120

Also known as the Shoreland and Floodplain Management Rules, these rules regulate land use and development within shoreland areas and floodplains. This includes restrictions on structure location and height within shorelands, standards for floodplain evaluation, floodplain management minimum requirements, and permitted land uses within floodplains.

Olmsted County Wetland Conservation Ordinance

This ordinance has a no net loss policy for wetlands impacts. The ordinance also considers "edge support areas" to be subject to this ordinance. This is defined as "non-wetland areas with features associated with perched groundwater tables or groundwater supported slope wetlands located in the Decorah Edge." The policy identifies the permitting and development process from the identification of wetlands to avoidance or compensation and monitoring of replacement wetlands.

Olmsted County Water Management Plan

This plan identifies the following water management priority concerns and associated goals:

- Drinking water and groundwater protection
    - Goal: Ensure that all Olmsted County residents have access to safe drinking water, now and in the future
- Agricultural Erosion and Sediment Control, Nutrient Management, & Chemical Use
    - Goal: Protect ground and surface water from any potentially adverse impacts of rural land management activities and implement effective measures to meet all water quality standards in each watershed.

- Impaired surface waters
    - Goal: Ensure the ability of the county and region's surface waters to meet their designated uses.
- Stormwater quality and quantity
    - Goal: Improve our area's water quality through better urban and suburban storm water management.
- Wetland resources and natural corridors protection
    - Goal: Utilize the natural functions of the County's landscape to improve water quality.

Comprehensive Watershed Management Plan (Zumbro River)

This is a planning document to identify issues within the Zumbro River Watershed and to identify priority issues, goals, and management actions. The plan also identifies planning actions to address issues, including capital improvement projects, monitoring/data collection projects, and education and public involvement. The following issues were identified:

- Groundwater contamination
- Excessive flooding
- Degraded surface water quality
- Accelerated erosion and sedimentation
- Degraded soil health, landscape resiliency and altered hydrology, and threats to fish, wildlife, and habitat
- Groundwater supply

City of Pine Island Comprehensive Plan

The Parks, Recreation, and Open Space section of the City's Comprehensive Plan identify those goals and policies related to biological resources. Relevant policies include:

- Limit Pine Island's flood damage liability as well as private investors' liability by adopting and enforcing the urban growth boundary.
- Restrict development in primary flood areas or flood fringe areas consistent with the adopted City Flood Plain Management Ordinance.
- Adopt buffer land protection areas around flood ways and wetland areas as defined by existing floodway and wetland maps.
- Where possible seek dedication of proposed development areas falling within buffer land protection for the purposes of trail and nature area preserve developments.
- Limit the intensity of development within the shoreland areas along protected rivers in the City.

Olmsted County General Land Use Plan

Chapter 3 of the plan identifies significant land features within the County, including wetlands and public waters, geological formations, floodplains, and soil data. Chapter 7 of the plan includes the County policies, including:

- Preserve the natural and cultural resources that provide a "sense of place" for the county.
- Conserve and restore natural resources, including agricultural resources, and protect the ecological systems of the natural environment and economic uses of those resources.
- Respond to land use and resource management issues in a flexible and proactive way.
- Create and maintain sustainable communities.

Environmental Setting

Surface Water

Olmsted County is the only County in Minnesota with no natural lakes. The main surface waters in the vicinity of the Project Site are the Middle Fork Zumbro River and South Branch Middle Fork Zumbro River to the south. Dry Run Creek and the Zumbro River occur north and east of the Project Site. A hydroelectric dam has been constructed across the Zumbro River, which creates Zumbro Lake. The Project Site falls within the Middle Fork Zumbro River Watershed (070400040307) (USEPA, 2023a). In 2017, the USEPA evaluated the condition of two stretches of the Middle Fork Zumbro River as well as the South Branch Middle Fork Zumbro River. As a result, all three of these stretches were listed as impaired under Section 303(d) of the Clean Water Act. Based on the waterbody report for the stretch of the Middle Fork Zumbro River from Pine Island to Oronoco, this waterbody is listed as impaired for aquatic recreation (USEPA, 2022a). This listing is specifically for the presence of Escherichia coli (E. coli), nutrient eutrophication, and turbidity. The stretch of the Middle Fork Zumbro River from Zumbro Lake to Oronoco is listed for aquatic life, specifically for the presence of E. coli, nutrient eutrophication, and turbidity (USEPA, 2022b). The South Branch Middle Fork Zumbro River is listed as impaired for both aquatic life and aquatic recreation, specifically for the presence of E. coli, nutrient eutrophication, and turbidity (USEPA, 2022c).

Flooding

FEMA is responsible for predicting the potential for flooding in most areas. FEMA routinely performs this function through the update and issuance of Flood Insurance Rate Maps, which depict various levels of predicted inundation. The Project Site is within Flood Zone C, which is designated as an area of minimal flood hazard outside of the 100-year floodplain (Zones A and AE) and 500-year flood zone (FEMA, 2017; FEMA, 2023).

Groundwater

The Minnesota Department of Natural Resources (MDNR) maintains information on groundwater provinces throughout the State. The Project Site falls within Groundwater Province 3: Karst Province (MDNR, 2021). This region is defined by having limited groundwater availability through surficial sands and buried sands and good groundwater availability from bedrock sources. According to MDNR, this area is specifically composed of sedimentary bedrock aquifers that are capable of yielding sufficient groundwater for most activities (MDNR, 2021).

The Minnesota Pollution Control Agency also maintains records of groundwater contamination and areas of groundwater quality concern (MPCA, 2023). The nearest record of potential groundwater contamination in relation to the Project Site is the Olmsted County Landfill, which is a closed landfill site located approximately 3.6 miles southeast of the Project Site. According to the Groundwater Contamination Atlas, this site is listed for the presence of contaminants cis-1,2-dichloroethene, trichloroethylene, and vinyl chloride (MPCA, 2021). The site was listed on the EPA National Priorities List but has been delisted since 1995 after remediation activities. Ongoing monitoring has continued since, with the most recent efforts involving placement of four new groundwater monitoring wells in 2016 (MPCA, 2021).

AIR QUALITY – EA SECTION 3.4

Federal

Clean Air Act of 1970

The Clean Air Act (CAA; 42 USC Chapter 85) is the federal legislation for the protection of air quality. The CAA gives the USEPA authority to regulate air quality by promulgating standards and levels for air quality and enforcing those standards and levels on federal, state, and tribal land. The CAA requires the USEPA to regulate hazardous air pollutants, which are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects.

The Federal CAA of 1970, as amended, establishes air quality standards for several critical air pollutants (CAPs): ozone (O_3), carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). These pollutants are termed “criteria” pollutants because the USEPA has established specific concentration threshold criteria based upon specific medical evidence of health effects or visibility reduction, soiling, nuisance, and other forms of damage. These National Ambient Air Quality Standards (NAAQS) are divided into primary standards and secondary standards. Primary standards are designed to protect the public health and secondary standards are intended to protect the public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. NAAQS and Minnesota Ambient air quality standards (MAAQS) are presented in **Table 1.**

Areas are designated attainment, nonattainment, or maintenance by the USEPA depending on whether the area is below or exceed the established NAAQS. Nonattainment areas must take steps towards attainment within a specific period of time. Once an area reaches attainment for particular criteria pollutant, then the area is re-designated attainment or maintenance. The CAA places most of the responsibility on states to achieve compliance with the NAAQS. States, municipal statistical areas, and counties that contain areas of nonattainment are required to develop a State Implementation Plan (SIP), which outlines policies and procedures designed to bring the state into compliance with the NAAQS.

Ozone

Photochemical reactions involving reactive organic gases (ROG)/volatile organic compounds (VOC) and nitrogen oxides (NO_X) resulting from the incomplete combustion of fossil fuels are the largest source of ground-level O_3. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, O_3 is primarily a summer air pollution problem. As a photochemical pollutant, O_3 is formed only during daylight hours under appropriate conditions. However, it is destroyed throughout the day and night. O_3 is considered a regional pollutant as the reactions forming it take place over time and are often most noticeable downwind from the sources of the emissions.

Particulate Matter 2.5

Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as $PM_{2.5}$, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Particles smaller than 2.5 µm pose the greatest problems because they can be inhaled deep into the lungs. Exposure to such particles can affect respiratory system function.

Table 1: Ambient Air Quality Standards

Pollutant	Averaging Time	Standard (parts per million)		Standard (microgram per cubic meter)		Violation Criteria	
		MAAQS	NAAQS	MAAQS	NAAQS	MAAQS	NAAQS
O_3	8 hours	0.070	0.070	137	137	If 3-year average of the annual 4th high daily maximum exceeds standard	If exceeded on more than 3 days in 3 years
CO	8 hours	9	9	10,000	10,000	If annual 2nd high exceeds standard	If exceeded on more than 1 day per year
	1 hour	35	35	23,000	40,000	If annual 2nd high exceeds standard	If exceeded on more than 1 day per year
NO_2	Annual arithmetic mean	0.053	0.053	100	100	If exceeded	If exceeded
	1 hour	0.100	0.100	188	188	If 3-year average of the annual 98th-percentile exceeds standard	N/A
SO_2	Annual arithmetic mean	0.030	0.030	79	79	If exceeded	If exceeded
	24 hours	0.144	0.14	367	N/A	If annual 2nd high exceeds standard	If exceeded on more than 1 day per year
	1 hour (primary)	0.075	197	655	196	If 3-year average of the annual 99th-percentile exceeds standard	N/A
	3 hours (secondary)	0.5	0.5	1,310	N/A	If annual 2nd high exceeds standard	If exceeded on more than 1 day per year
PM_{10}	24 hours	N/A	N/A	150	150	3-year average of the annual estimated exceedance days is less than or equal to 1	If exceeded on more than 1 day per year
$PM_{2.5}$	Annual arithmetic mean (primary)	N/A	N/A	12	12	If exceeded	If exceeded
	Annual arithmetic mean (secondary)	N/A	N/A	15	15	If 3-year average of the seasonally-weighted average exceeds standard	If exceeded
	24 hours	N/A	N/A	35	35	If 3-year average of the annual 98th-percentile exceeds standard	If exceeded on more than 1 day per year
Lead	Rolling 3-month Avg.	N/A	N/A	0.15	0.15	If exceeded	If exceeded
H_2S	30-minutes	0.03	No Federal Standard	42	No Federal Standard	If exceeded more than 2 times in 5 consecutive days	N/A

Source: EPA, 2023; Minn. R. 7009.0080

Carbon Monoxide

CO is not readily dispersed throughout the atmosphere; therefore, it is considered a localized air quality issue as it is close to the emission source. CO emissions generally cause an acute (short-term) health threat. CO is a pollutant of concern at major signalized intersections (greater than 100,000 vehicles per day) that exhibit prolonged vehicle idling times.

Hazardous Air Pollutants

In addition to the above-listed CAPs, Hazardous Air Pollutants (HAP) are a group of chemical pollutants which can cause adverse effects to human health and/or the environment. HAPs are a list of over 188 airborne chemicals developed by the USEPA. Sources of HAPs include industrial processes, such as petroleum refining and chrome plating operations; commercial operations, such as gasoline stations and dry cleaners; cigarette smoke; and motor vehicle exhaust. Cars and trucks release at least 40 different HAPs. The most important, in terms of health risk, are diesel particulate matter (DPM), benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Health effects of HAPs can include cancer, birth defects, and neurological damage.

HAPs are less pervasive in the urban atmosphere than CAPs but are linked to short-term (acute) or long-term (chronic or carcinogenic) human health effects. The majority of health risks from HAPs can be attributed to relatively few compounds. The most important HAPs are found in DPM. Diesel engines emit a complex mixture of air pollutants composed of gaseous and solid material. Diesel exhaust contains a variety of harmful gases and over 40 other cancer-causing substances, and the visible emissions in diesel exhaust are PM that includes carbon particles or “soot.” Exposure to DPM is a health hazard, particularly to children whose lungs are developing and the elderly who may have serious health problems.

Federal General Conformity

Under the General Conformity Rule, updated in 2010, the lead agency with respect to a federal action is required to demonstrate that the proposed federal action conforms to the applicable SIP before the action is taken. There are two phases to a demonstration of general conformity.

- The Conformity Review process, which entails an initial review of the federal action to assess whether a full conformity determination is necessary
- The Conformity Determination process, which requires that a proposed federal action be demonstrated to conform to the applicable SIP

The Conformity Review requires the lead agency to compare estimated emissions to the applicable general conformity levels (40 CFR 93.153 [b][1] and [2]), which these can be seen in **Table 2** and **Table 3**. If the emission estimates from step one is below the applicable threshold(s), then a general conformity determination is not necessary and the full Conformity Determination is not required. If emission estimates are greater than the applicable threshold(s), the lead agency must conduct a Conformity Determination.

Federal Class I Areas

Title 1, Part C of the CAA was established in part to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value.

Table 2: 40 CFR 93.153 [b][1] Emission Rates for Nonattainment Areas (NAAs)

Pollutant	Tons per Year
Ozone (VOC's or NOX):	
Serious NAA's	50
Severe NAA's	25
Extreme NAA's	10
Other ozone NAA's outside ozone transport region	100
Other ozone NAA's Inside an Ozone Transport Region	
VOC	50
NOx	100
Carbon Monoxide: all maintenance areas	100
SO_2 or NO_2: All NAAs	100
PM_{10}	
Moderate NAA's	100
Serious NAAs	70
PM2.5 (direct emissions, SO2, NOX, VOC, and Ammonia)	
Moderate NAA's	100
Serious NAAs	70
PD: all NAA's	25

Table 3: 40 CFR 93.153 [b][2] Emission Rates for Maintenance Areas

Pollutant	Tons per Year
Ozone (NOX), SO_2 or NO_2	
All maintenance areas	100
Ozone (VOC's)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All maintenance areas	100
PM_{10}: All maintenance areas	100
$PM_{2.5}$ (direct emissions, SO_2, NOx, VOC, and Ammonia)	100
All maintenance areas	100
Pb: All maintenance areas	25

The CAA designates all international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres as "Class I areas." The CAA prevents significant deterioration of air quality in Class I areas under the Prevention of Significant Deterioration (PSD) Program. The PSD Program protects Class I areas by allowing only a small increment of air quality deterioration in these areas by requiring assessment of potential impacts on air quality related values of Class I areas.

Any major source of emissions within 100 kilometers (62.1 miles) from a federal Class I area is required to conduct a pre-construction review of air quality impacts on the area(s). A "major source" for the PSD Program is defined as a facility that will emit (from direct stationary sources) 250 tons per year (tpy) of regulated pollutant. For certain industries, these requirements apply to facilities that emit (through direct stationary sources) 100 tpy or more of a regulated pollutant. Mobile sources (e.g., vehicle emissions) are by definition not stationary sources and are therefore not subject to the PSD program.

Tribal New Source Review

The Tribal Minor New Source Review (NSR) permitting program was established by the USEPA under the CAA. The minor NSR program applies to both new minor sources and minor modifications to both major and minor projects in attainment and nonattainment areas. NSR programs must comply with the standards and control strategies of the Tribal Implementation Plan (TIP) or SIP.

If there is not an applicable SIP or TIP, the USEPA issues permits and implements the program. A General Permit under the minor NSR program would be required on tribal trust land if stationary source allowable emissions of regulated pollutants would exceed the thresholds presented in 40 CFR 49.153, Table 1 (presented in **Table 4**). This General Permit serves as a preconstruction permit containing limitations and other restrictions specifying the construction, modification, and operation of a minor source. The applicability of Tribal NSR is made on a source's potential to emit (PTE). For emergency generators, the USEPA has determined that 500 hours per year should be assumed as a reasonable and realistic "worst-case" estimate on a PTE basis (USEPA, 1995).

Table 4: Tribal Minor New Source Review Thresholds

Pollutant	Emissions Thresholds for Nonattainment Areas (tpy)	Emissions Thresholds for Attainment Areas (tpy)
NOx	5	10
ROG	2	5
PM	5	10
PM_{10}	1	5
$PM_{2.5}$	0.6	3
CO	5	10
SO_2	5	10
Pb	0.1	0.1
Source: 40 CFR 49.153.		

Climate Change

On February 19, 2021, Secretary of the Interior Deb Haaland issued Secretarial Order (SO) 3399 to prioritize action on climate change throughout the Department and to restore transparency and integrity in the Department's decision-making processes. SO 3399 specifies that when considering the impact of GHG emissions from a proposed action, Bureaus/Offices should use appropriate tools, methodologies, and resources available to quantify GHG emissions and compare GHG quantities across alternatives.

SO 3399 acknowledges that identifying the interactions between climate change and the environmental impacts of a proposed action in NEPA documents can help decision makers identify opportunities to reduce GHG emissions, improve environmental outcomes, and contribute to protecting communities from the climate crisis.

On January 9, 2023, the Council on Environmental Quality issued National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change (88 Fed. Reg. 1196). This interim guidance directs agencies to consider the potential effects of a proposed action on climate change and the effects of climate change on a proposed action and its environmental impacts. CEQ recommends that agencies quantify a proposed action's projected GHG emissions for the expected lifetime of the action and provide additional context for GHG emissions, including the use of the best available social cost of GHG (SC–GHG) estimates, to translate climate impacts into the more accessible metric of dollars.

This guidance does not propose a specific, quantitative threshold of significance; however, it states that agencies should consider the potential for mitigation measures to reduce or mitigate GHG emissions and climate change effects when those measures are reasonable and consistent with achieving the purpose and need for the proposed action. CEQ recommends that agencies explain how the proposed action and alternatives would help meet or detract from achieving relevant climate action goals and commitments, including federal goals, international agreements, state or regional goals, Tribal goals, agency-specific goals, or others as appropriate.

State

Minnesota Pollution Control Agency

The Minnesota Legislature established the MPCA in 1967. Through the authority of state and federal statutes and guidelines, the state agency focuses on preventing and reducing the pollution of air, land, and water, and protect against the effects of climate change. The MPCA develops and enforces environmental regulations and standards to control pollution and ensure compliance with environmental laws. This includes regulations related to air quality, water quality, solid waste management, and hazardous substances. MPCA issues permits to businesses and facilities that may impact the environment. These permits outline specific conditions and limits to ensure compliance with environmental regulations. The agency also works to ensure that businesses follow these permits and take corrective actions when necessary.

Minnesota Ambient Air Quality Standards

Minnesota's Ambient Air Quality Standards were established in 1969. The standards are summarized in **Table 1** above.

Global Climate Change

In 2023, the Minnesota Legislature established the Clean Energy Law. This legislation establishes a carbon-free energy standard and a renewable energy standard and requires electrical utilities to achieve 80 percent carbon-free energy by 2030, 90 percent by 2035, and 100 percent by 2040. The law also requires that 55 percent of the energy sold to Minnesota customers come from renewable sources by 2035.

BIOLOGICAL RESOURCES – EA SECTION 3.5

Federal

Federal Endangered Species Act

The Federal Endangered Species Act (FESA) protects species that are at risk of extinction and provides for the conservation of the ecosystems on which they depend. The U.S. Fish & Wildlife Service (USFWS) and the National Oceanic and Atmosphere Administration, Fisheries Service (NOAA Fisheries) share responsibility for implementing FESA. Generally, USFWS manages terrestrial and freshwater species, while NOAA Fisheries is responsible for marine and anadromous species. Threatened and endangered species on the federal list (50 CFR Sections 17.11 and 17.12) are protected from take, which is defined as direct or indirect harm. If "take" of a listed species is incidental to an otherwise lawful activity, this triggers the need for consultation under Section 7 of the FESA for federal agencies.

Pursuant to the requirements of the FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed species may be present on the proposed project site and whether the proposed project will have a potentially significant impact upon such species. Under the FESA, habitat loss is considered to be an impact to the species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species that is proposed for listing under the FESA or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC Section 1536[3], [4]). Therefore, project-related impacts to these species, or their habitats, would be considered significant.

Migratory Bird Treaty Act

Migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed under 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The direct injury or death of a migratory bird due to construction activities or other construction-related disturbance that causes nest abandonment, nestling abandonment, or forced fledging would be considered take under federal law. As such, project-related disturbances must be reduced or eliminated during the nesting season.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act was originally enacted in 1940 to protect bald eagles and was later amended to include golden eagles (16 USC Subsection 668-668). This act prohibits take, possession, and commerce of bald and golden eagles and associated parts, feathers, nests, or eggs with limited exceptions. The definition of take is the same as the definition under the FESA. The USFWS established five recovery programs in the mid-1970s based on geographical distribution of the species. Critical habitat was not designated by regulation under FESA.

In 1995, the USFWS reclassified the bald eagle from endangered to threatened under FESA in the contiguous 48 states, excluding Michigan, Minnesota, Wisconsin, Oregon, and Washington, where it had already been listed as threatened. In 2007, the bald eagle was federally delisted under FESA. However, the provisions of the act remain in place for protection of bald and golden eagles.

Clean Water Act (Sections 404 and 401)

Any project that involves discharge of dredged or fill material into jurisdictional Waters of the U.S. must first obtain authorization from the USACE, under Section 404 of the CWA. Projects requiring a 404 permit under the CWA also require a Section 401 certification from either the USEPA for trust land, or the RWQCB for non-trust land. These two agencies also administer the NPDES general permits for construction activities disturbing one acre or more.

Effective September 8, 2023, the USEPA and the USACE have issued a new final rule in the Code of Federal Regulations to conform the definition of 'waters of the United States' to the 2023 Supreme Court's May 25, 2023 decision in Sackett vs. EPA. Under the new final rule, tributaries and wetlands must have a continuous surface connection to navigable waterways to be considered jurisdictional under the Clean Water Act. Only those relatively permanent, standing, or continuously flowing bodies of water meet the current definition.

In certain states where litigation regarding this definition is ongoing, the pre-2015 definition of waters of the U.S. is in effect. Minnesota is not one of these states and currently operates under the definition as promulgated under the new final rule.

Magnuson-Stevens Act and Sustainable Fisheries Act

The Magnuson–Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary law that governs marine fisheries management in U.S. federal waters. First passed in 1976, the Magnuson-Stevens Act fosters the long-term biological and economic sustainability of marine fisheries. Its objectives include: preventing overfishing; rebuilding overfished stocks; increasing long-term economic and social benefits; ensuring a safe and sustainable supply of seafood; and protecting habitat that fish need to spawn, breed, feed, and grow to maturity. The Sustainable Fisheries Act of 1996 (Public Law 104-297) amended the Magnuson-Stevens Act to establish new requirements for fishery management councils to identify and describe Essential Fish Habitat (EFH) and to protect, conserve, and enhance EFH for the benefit of fisheries.

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The Sustainable Fisheries Act also established a federal EFH consultation process that advises federal agencies to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH. Consultation is required if a federal agency has authorized, funded, or undertaken part or all of a proposed activity and the action will adversely affect EFH. An adverse effect includes direct or indirect physical, chemical, or biological alternations to waters or substrate, species and their habitat, quality and/or quantity of EFH, or other ecosystem components. If a federal agency determines that an action will not adversely affect EFH, and NOAA Fisheries agrees, no consultation is required. A 2002 update to EFH regulations allowed fishery management councils to designate Habitat Areas of Particular Concern, specific areas within EFH that have extremely important ecological functions and/or are especially vulnerable to degradation.

State and Local

Minnesota Endangered and Threatened Species Law of 1971

The Minnesota Endangered and Threatened Species Law of 1971, or the Endangered Species Statute, provides the MDNR with jurisdiction to designate species as threatened, endangered, or of special concern.

Under this statute, species listed as threatened or endangered are protected from take, import, transport or sale, with limited exception such as in the case of proper permitting, or destruction of plants under certain agricultural operations. Species of special concern are not afforded specific protections, however, they are included in the MDNR lists as species that merit ongoing observation and may in the future be formally listed.

Soil and Water Conservation Policy

Minnesota State Statute 103A.203 provides a statement of policy and encourages landowners to implement land management practices that would conserve soil, water, and other natural resources. The following practices are recommended:

- Control or prevent erosion, sedimentation, siltation, and related pollution in order to preserve natural resources;
- Ensure continued soil health, as defined under section 103C.101, subdivision 10a, and soil productivity;
- Protect water quality;
- Prevent impairment of dams and reservoirs;
- Reduce damages caused by floods;
- Preserve wildlife;
- Protect the tax base; and
- Protect public lands and waters.

Wetlands Conservation Act

The Minnesota Wetlands Conservation Act was passed into law in 1991 for the purpose of protecting wetlands and thereby water quality and biological diversity. The goal of this act is to result in no net loss of wetlands within the State. When a project or individual may impact a wetlands, the Act preferentially requires that an attempt be made to avoid the impact. If full avoidance is not possible, the next action is to minimize the impact. Finally, for unavoidable impacts, the Act requires replacement of lost wetlands. Replacement habitat is required to be equal in size and function to the habitat lost. The Minnesota Board of Water and Soil Resources oversees local governments that administer the Act, and enforcement is provided by MDNR Conservation Officers.

Minnesota Buffer Law

This law sets forth the necessary vegetative buffers that must be maintained for lakes, rivers, streams, and ditches. The buffers must be made of perennial vegetation and must follow the below standards: 1) 50 feet for lakes, rivers, streams, and 2) 16.5 feet for ditches. In some cases, the Minnesota Board of Water and Soil Resources may allow for alternative buffer setups consistent with the Natural Resources Conservation Service Field Office Guide, provided that the amended buffer provide the same water quality benefits.

Minnesota Water Law

According to the Minnesota Water Law, waters of the State are defined as "surface or underground waters, except surface waters that are not confined but are spread and diffused over the land. Waters of the state includes boundary and inland waters." In general, the Water Law regulates public waters and wetlands, but also specifies regulations related to appropriation of water, impoundment of water, and activities that impact these resources.

Additionally, the Water Law specifies that the commissioner of natural resources for the state is responsible for the preparation of a statewide water resources conservation program. The Minnesota Board of Water and Soil Resources provides conservation planning resources for the State of Minnesota.

Olmsted County Wetland Conservation Ordinance

This ordinance has a no net loss policy for wetlands impacts. The ordinance also considers “edge support areas” to be subject to this ordinance. This is defined as “non-wetland areas with features associated with perched groundwater tables or groundwater supported slope wetlands located in the Decorah Edge.” The policy identifies the permitting and development process from the identification of wetlands to avoidance or compensation and monitoring of replacement wetlands.

City of Pine Island Comprehensive Plan

The Parks, Recreation, and Open Space section of the City’s Comprehensive Plan identify those goals and policies related to biological resources. Relevant policies include:

- Adopt buffer land protection areas around flood ways and wetland areas as defined by existing floodway and wetland maps.
- Where possible seek dedication of proposed development areas falling within buffer land protection for the purposes of trail and nature area preserve developments.
- Limit the intensity of development within the shoreland areas along the protected rivers within the City.
- Encourage developments that incorporate and work with their natural surroundings while they preserve the various functions and integrity of our natural environment.

Olmsted County General Land Use Plan

Chapter 3 of the plan identifies significant land features within the County, including wetlands and public waters, geological formations, historic and current vegetative land cover types, and environmental corridors. Chapter 7 of the plan includes the County policies, including:

- Preserve the natural and cultural resources that provide a “sense of place” for the county.
- Conserve and restore natural resources, including agricultural resources, and protect the ecological systems of the natural environment and economic uses of those resources.
- Respond to land use and resource management issues in a flexible and proactive way.
- Create and maintain sustainable communities.

CULTURAL AND PALEONTOLOGICAL RESOURCES – EA SECTION 3.6

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), as amended, and its implementing regulations found in 36 CFR Part 800 require federal agencies to identify cultural resources that may be affected by actions involving federal lands, funds, or permitting. The BIA must comply with Section 106 for the proposed trust acquisition. The significance of the resources must be evaluated using established criteria outlined in 36 CFR 60.4, as described below. If a resource is determined to be a historic property, Section 106 of the NHPA requires that effects of the federal undertaking on the resource be determined.

A historic property is defined as:

> *…any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in the National Register of Historic Places, including artifacts, records, and material remains related to such a property… (NHPA Sec. 301[5])*

Section 106 of the NHPA prescribes specific criteria for determining whether a project would adversely affect a historic property, as defined in 36 CFR 800.5. An impact is considered adverse when prehistoric or historic archaeological sites, structures, or objects that are listed on or eligible for listing in the National Register of Historic Places (NRHP) are subjected to the following:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property that causes its deterioration; and
- Transfer, lease, or sale of the property out of federal control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

If the historic property will be adversely affected by the undertaking, then prudent and feasible measures to resolve adverse impacts must be taken. The State Historic Preservation Office must be provided an opportunity to review and comment on these measures prior to project implementation.

National Register of Historic Places

The eligibility of a resource for listing in the NRHP is determined by evaluating the resource using criteria defined in 36 CFR § 60.4 as follows. The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, association, and:

A) That are associated with events that have made a significant contribution to the broad patterns of our history;
B) That are associated with the lives of persons significant in our past;
C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D) That have yielded, or may be likely to yield, information important to prehistory or history.

Sites younger than 50 years, unless of exceptional importance, are not eligible for listing in the NRHP. In addition to meeting at least one of the criteria listed above, the property must also retain enough integrity to enable it to convey its historic significance. The NRHP recognizes seven aspects or qualities that, in various combinations, define integrity. These seven elements of integrity are location, design, setting, materials, workmanship, feeling, and association.

To retain integrity a property will always possess several, and usually most, of these aspects. While most historic buildings and many historic archaeological properties are significant because of their association with important events, people, or styles (Criteria A, B, and C), the significance of most prehistoric and some historic-period archaeological properties is usually assessed under Criterion D. Criterion D stresses the importance of the information contained in an archaeological site rather than its intrinsic value as a surviving example of a type or its historical association with an important person or event. It places importance not on physical appearance but rather on information potential.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC 3001 et seq*.,* provides a process for museums and federal agencies to return Native American cultural items – human remains, funerary objects, sacred objects, or objects of cultural patrimony – to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American resources on federal and Tribal land, and penalties for noncompliance and illegal trafficking.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act of 1979 (ARPA; Public Law 96-95; 16 USC 470aa-mm) provides for the protection of archaeological resources and sites that are on public and Indian lands, and fosters increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data that were obtained before October 31, 1979. ARPA also provides for penalties for noncompliance and illegal trafficking.

Paleontological Resources Preservation Act

Paleontological resources are defined as the traces or remains of prehistoric plants and animals. Such remains often appear as fossilized or petrified skeletal matter, imprints, or endocasts, and reside in sedimentary rock layers. Paleontological resources are considered important for their scientific and educational value. Fossil remains of vertebrates are considered significant. Invertebrate fossils are considered significant if they function as index fossils. Index fossils are those that appear in the fossil record for a relatively short and known period of time. This allows geologists to interpret the age range of the geological formations in which they are found.

The Paleontological Resources Preservation subtitle of the Omnibus Public Land Management Act, 16 USC 470aaa to aaa-11 requires the U.S. Department of Agriculture (USDA) and the U.S. Department of the Interior to issue implementation regulations to provide for the preservation, management, and protection of paleontological resources on federal lands and ensure that these resources are available for current and future generations to enjoy as part of America's national heritage.

Minnesota State Historic Preservation Office

The Minnesota State Historic Preservation Office (SHPO) is a division of the Department of Administration. The SHPO leads the state's historic preservation efforts by articulating and supporting a statewide preservation vision. The SHPO also provides standards and oversight for the identification, designation, and protection of the State’s significant cultural resources.

Minnesota Statewide Historic Preservation Plan

The Minnesota Statewide Historic Preservation Plan (2022-2032) is the result of a three-year collaborative process involving the public, stakeholders, and other partners. The Plan contains a summary of past accomplishments, trends affecting historic resources, and challenges and opportunities in preserving such resources. The second part of the Plan outlines the State's vision of accomplishing the five broad Plan Goals focusing on partnerships, access to information, equity, economic benefits, sustainability, and climate resiliency. The Plan was approved by the National Park Service in 2021.

Environmental Setting

Prehistory

Paleoindian

The first documented Native American occupation of Olmsted County followed the retreat of the last glaciers at the end of the Pleistocene. Migratory groups of hunters and gatherers identified as the Paleoindian tradition were present in this area beginning at least 12,000 years before present (B.P.). A small number of characteristic Clovis and Folsom projectile points have been found in Minnesota (Dobbs 1988; Koenen 2007), including at least one point and a unique cache of biface blanks in Olmsted County.

Archaic

Climatic and cultural shifts appear in the archaeological record with the advent of the Archaic tradition, which extended from about 9,500 to 2,500 B.P. Although *Prairie Archaic* and *Eastern Archaic* assemblages have been found in Minnesota (Dobbs 1988), it is difficult to attribute Olmsted County Archaic sites to any specific contexts. Rather, large-scale cultural and technological changes occur during this period and are presented in archaeological assemblages.

Woodland

The Woodland tradition (2,500–1,000 B.P.) is typically associated with the introduction of horticulture, construction of earthen burial mounds, and the manufacture of ceramics. In general, Woodland peoples relied heavily on fish and mussels gathered from major river valleys but continued to exploit large game such as deer and elk. Defining specific complexes and cultural contexts for Woodland manifestations has been difficult (Arzigian, 2008). At present, there is insufficient evidence to securely attribute specific Woodland contexts to Olmsted County.

Mississippian

At about A.D. 1000 in central Illinois, the population and cultural center of Cahokia rose to prominence, and in the space of one hundred years its influence had spread throughout the central United States. There were Cahokia outposts along the Mississippi River and in areas such as Red Wing, where Mississippian and Late Woodland peoples interacted. An example of one characteristic type of artifact, a so-called “chunkey stone” reportedly found in Olmsted County, is curated in the County’s History Center.

Late Prehistoric and Protohistoric:

In southeast Minnesota, the best documented Native American culture of the Late Prehistoric period was the Oneota. Although the origins of Oneota cultures are uncertain, by 900 B.P. they were spreading across much of the Midwest.

Oneota peoples had a mixed hunting, foraging, and agricultural economy, and made a distinctive pottery using shell tempering. Oneota peoples are believed to have had a tribal level of sociopolitical organization, and they lived in large, permanent, or semi-permanent villages. There are no major Oneota agricultural villages reported from Olmsted County, but Oneota sites in La Crosse show evidence of exploitation of the prairies in southeast Minnesota for winter bison hunts.

SOCIOECONOMIC CONDITIONS AND ENVIRONMENTAL JUSTICE – EA SECTION 3.7

Federal

Executive Order 12898

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, as amended, directs federal agencies to develop an Environmental Justice Strategy that identifies and addresses disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The CEQ has oversight responsibility of the federal government's compliance with EO 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. The document *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* provides the following direction on how to analyze the impacts of actions on low-income and minority populations:

> *Under NEPA, the identification of a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe does not preclude a proposed agency action from going forward, nor does it necessarily compel a conclusion that a proposed action is environmentally unsatisfactory. Rather, the identification of such an effect should heighten agency attention to alternatives (including alternative sites), mitigation strategies, monitoring needs, and preferences expressed by the affected community or population. (USEPA, 1998)*

As previously stated, according to guidance from the CEQ (1997) and USEPA (1998), agencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by a proposed action and, if so, whether there may be disproportionately high and adverse environmental effects to those populations. Communities may be considered "minority" under the executive order if one of the following characteristics apply.

- The cumulative percentage of minorities within a census tract is greater than 50 percent (primary method of analysis); or
- The cumulative percentage of minorities within a census tract is less than 50 percent, but the percentage of minorities is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (secondary method of analysis).

According to USEPA, either the county or the state can be used when considering the scope of the "general population." A definition of "meaningfully greater" is not given by the CEQ or USEPA, although the latter has noted that any affected area that has a percentage of minorities above the state's percentage is a potential minority community and any affected area with a minority percentage double that of the state's is a definite minority community under EO 12898. Communities may be considered "low-income" under the EO if one of the following characteristics applies.

- The median household income for a census tract is below the poverty line (primary method of analysis); or
- Other indications are present that indicate a low-income community is present within the census tract (secondary method of analysis).

In most cases, the primary method of analysis will suffice to determine whether a low-income community exists in the affected environment. However, when a census tract income may be just over the poverty line or where a low-income pocket within the tract appears likely, the secondary method of analysis may be warranted. Other indications of a low-income community under the secondary method of analysis include presence of households whose income is less than or equal to 200% of the poverty level.

Executive Order 14096

EO 14096, issued in April of 2023, amends and expands certain provisions of EO 12898, and includes the following:

- Provides a broader definition of potentially disadvantaged communities.
- Explicitly expands definition of potentially disadvantaged communities to include persons with a Tribal affiliation and disabled persons;
- Requires Federal Agencies to fulfill environmental justice reporting requirements and prepare strategic plans; and
- Describes additional reporting and notification requirements related to toxic spills.

State and Local

No regulations applicable to the development of the Project Site were identified during the socioeconomic conditions and environmental justice analysis.

TRANSPORTATION AND CIRCULATION – EA SECTION 3.8

Federal

Department of Transportation (DOT)

The mission of the DOT is to ensure a fast, safe, efficient, accessible, and convenient transportation system that meets national interests and enhances quality of life. Organizations within the DOT include the Federal Highway Administration (FHWA), the Federal Aviation Administration, the National Highway Traffic Safety Administration, the Federal Transit Administration, the Federal Railroad Administration, and the Maritime Administration. The FHWA supports State and local governments in the design, construction, and maintenance of the Nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). US-52 is a federal highway in the vicinity of the Project Site.

State

Minnesota Department of Transportation (MnDOT)

MnDOT is the principal agency of the State for development, implementation, administration, consolidation and coordination of State transportation policies, plans and programs, as well as federal transportation plans and programs. The Stewardship and Oversight Agreement between MnDOT and the FHWA allows MnDOT to assume certain review and approval actions for the FHWA depending on whether a project is on the Interstate System, National Highway System, or off the National Highway System. MnDOT's Access Management Manual addresses planning, design, and implementation of land use and transportation strategies in an effort to maintain a safe flow of traffic while accommodating the access needs of adjacent development. The Facility Design Guide provides design guidance for roads, highways, and other facilities.

Environmental Setting

Transportation Networks and Intersections

The roadways surrounding the Project Site include E White Bridge Road, White Pines Road SE, 59th Avenue NW, 520th Street, Ash Road NW, and Hwy 52. Regional access to the Project Site is provided via Hwy 52 at E White Bridge Road/County Road 31 W where there is a full interchange. The Project Site is locally accessible via 135th Street NW (which becomes 59th Avenue NW near the Project Site) and 230th Avenue (which becomes Ash Road NW near the Project Site) from the north, and from E White Bridge Road and 59th Avenue NW to the south. Additional details of the surrounding intersections and roadways relevant to the Project Site are included below.

- The US Hwy 52 and County Road 12/31 Interchange is a grade-separated interchange in which the traffic crosses to the other side of the roadway between freeway ramps. This type of interchange is also known as Diverging Diamond Interchange (DDI). The crossing lanes allow for vehicles to turn left on and off freeway ramps more efficiently without stopping or intersecting with traffic flowing in the opposite direction. Right turns on and off the freeway ramps occur either before or after the crossover intersection, when traffic is on the normal side of the roadway. The through lanes are controlled by a traffic signal. There is a multi-lane roundabout on either side of the interchange connecting Wazuweeta Road & 59th Street to the highway.
- US Hwy 52 is a four-lane divided freeway that is classified as principal arterial. There are four-foot shoulders on the inside and 12-foot shoulders on the outside lanes. The speed limit of the roadway is 65 mph.
- County Road 31/County Road 12/County Road 5/E White Bridge Road – The segment west of 59th Avenue NW is a four-lane divided roadway with curb and gutters on both sides. There are no shoulders present on either side of this segment. The segment east of 59th Avenue NW is a two-lane undivided roadway with eight-foot shoulders present on both sides of the roadway. The roadway is classified as a minor arterial with a posted speed limit of 40-mph. There are shared use paths present on the north side of the roadway from Wazuweeta Road to the US 52 southbound ramps, on the median between the southbound and northbound US 52 ramps, and on the south side from the US 52 northbound ramps to 59th Avenue NW.
- County Road 18 is an undivided one (1) lane principle arterial road in both directions with 4-foot shoulders on both sides of the road. The speed limit is 55 mph.

- 59th Street is a local road with one (1) lane in each direction. The road is undivided for most of the section and has 7-foot shoulders on both sides of the road. The speed limit is 55 mph, but changes to 45 mph near the intersection with 520th Street.
- Wazuweeta Road is a local west side frontage road of US Hwy 52. It has one (1) lane in each direction and is undivided for most of the section with 6-foot shoulders on both sides of the road. The speed limit is 45 mph.

LAND USE – EA SECTION 3.9

Federal

Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that federal programs are administered in a matter that is compatible with state and local units of government, and private programs and policies to protect farmland (7 U.S.C. § 4201).

The Natural Resource Conservation Service (NRCS) is responsible for the implementation of the FPPA and categorizes farmland in a number of ways. These categories include prime farmland, farmland of statewide importance, and unique farmland. Prime farmland is considered to have the best possible features to sustain long-term productivity. Farmland of statewide importance includes farmland similar to prime farmland, but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique farmland is characterized by inferior soils and, depending on climate, generally needs irrigation.

The NRCS fulfills the directives of the Soil and Water Conservation Act (16 USC § 2001-2009) by identifying significant areas of concern for the protection of national resources. NRCS uses a land evaluation and site assessment system to establish a Farmland Conversion Impact Rating (FCIR) score. The FCIR is completed on form AD-1006. The FCIR form has two components: land evaluation, which rates soil quality up to 100 points, and the site assessment, which measures other factors that affect the property's viability up to 160 points. The total FCIR score is used as an indicator for the project's sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the allowable level; however, the FPPA does not require federal agencies to alter projects to avoid or minimize farmland conversion.

Sites receiving a combined score of less than 160 (out of 260 possible points) do not require further evaluation. For sites with a combined score greater than 160 points, at least two other alternatives are required to be considered and the alternative with the lowest number of points selected unless there are other overriding considerations.

Federal Aviation Regulation

In accordance with 14 CFR 77, which provides requirements, standards, and processes for determining obstructions to air navigation, the Federal Aviation Administration's (FAA's) primary objective is to promote air safety and the efficient use of the navigable airspace. In furthering this mission, the FAA conducts aeronautical studies based on information provided on FAA Form 7460-1, Notice of Proposed Construction or Alteration, by proponents of construction or development in the vicinity of airports. Developers must file Form 7460-1 with the FAA at least 45 days prior to construction if any of the following parameters are met:

- Proposed structure(s) will exceed 200 feet above ground level;
- Proposed structure(s) will be in proximity to an airport and will exceed the slope ratio;
- Proposed structure(s) involves construction of a traverseway (i.e., highway, railroad, waterway, etc.) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b);
- Proposed structure(s) will emit frequencies, and do/does not meet the conditions of the FAA Colocation Policy;
- Proposed structure(s) will be in an instrument approach area and might exceed part 77 Subpart C;
- Proposed structure(s) will be in proximity to a navigation facility and may impact the assurance of navigation signal reception;
- Proposed structure(s) will be on an airport or heliport; or
- Filing has been requested by the FAA.

State and Local

State Agricultural Land Preservation and Conservation Policy

The State Agricultural Land Preservation and Conservation Policy (Section 17.80 of the Minnesota Statues) emphasizes that it is the policy of the State to preserve agricultural land and conserve its long-term use for the production of food and other agricultural products by:

- Protection of agricultural land and certain parcels of open space land from conversion to other uses.
- Conservation and enhancement of soil and water resources to ensure their long-term quality and productivity.
- Encouragement of planned growth and development of urban and rural areas to ensure the most effective use of agricultural land, resources and capital.
- Fostering of ownership and operation of agricultural land by resident farmers.

To accomplish the policies described above, several different methods were identified to best implementing the policies and are described below:

- Defining and locating lands well suited for the production of agricultural and forest products, and the use of that information as part of any local planning and zoning decision.
- Provide government with guidelines, tools and incentives to prevent the unplanned and unscheduled conversion of agricultural and open space land to other uses.
- Providing relief to agricultural areas subject to development pressures, such as with taxes.
- Development of state policy to increase implementation of soil and water conservation by farmers.
- Assuring that state agencies act to maximize the preservation and conservation of agricultural land and minimize the disruption of agricultural production while still taking into consideration the broader agricultural community needs.
- Assuring that public agencies employ and promote the use of management procedures which maintain or enhance the productivity of lands well suited to the production of food and other agricultural products.
- Guiding the orderly development and maintenance of transportation systems in rural Minnesota while preserving agricultural land to the greatest possible extent;

- Guiding the orderly construction and development of energy generation and transmission systems while enhancing the development of alternative energy and preserving agricultural land to the greatest possible extent.
- Guide the orderly development of solid and hazardous waste management sites needs while still preserving agricultural land to the greatest possible extent by minimizing the use of agricultural land for waste management sites.

Olmsted County General Land Use Plan

The GLUP is a long-range policy document that guides the future growth and development of the County for the next 20 to 25 years. It covers the entire county, including the cities, townships, and unincorporated areas. The GLUP is based on a vision statement that reflects the community's values and aspirations for the future of the county. The vision statement is: "Olmsted County is a vibrant, prosperous, and inclusive community that values its natural and cultural resources, fosters innovation and collaboration, and provides opportunities for all to thrive." The GLUP is organized around four guiding principles that support the vision statement and provide the overall direction for the plan. The guiding principles are:

- Preserve and enhance the natural environment and rural character of the County. This principle aims to protect the county's natural resources, such as water, soil, air, wildlife, and scenic beauty, and to maintain the county's agricultural heritage and rural lifestyle.
- Promote compact and efficient urban development patterns. This principle aims to accommodate the county's projected population and employment growth in a way that minimizes sprawl, maximizes infrastructure efficiency, and creates livable and walkable communities.
- Support a diverse and resilient economy. This principle aims to foster a strong and diverse economic base that provides a range of employment opportunities, supports innovation and entrepreneurship, and enhances the county's regional competitiveness.
- Foster a healthy and equitable community. This principle aims to improve the health and well-being of the county's residents, especially those who are vulnerable or disadvantaged, and to ensure that everyone has access to quality education, housing, transportation, and social services.

The GLUP translates the guiding principles into specific goals and policies that address various aspects of land use, such as residential, commercial, industrial, agricultural, natural, and recreational uses. The goals and policies provide the basis for evaluating and regulating land use proposals and requests.

In addition, the GLUP also includes a Future Land Use Plan that illustrates the desired land use pattern for the county in 2045. The Future Land Use Plan designates different land use categories, such as urban, rural, mixed-use, and conservation, and defines their characteristics, locations, and densities. The Future Land Use Plan is consistent with the goals and policies of the GLUP and serves as a guide for zoning and subdivision decisions.

The GLUP identifies several implementation strategies that outline the actions and steps needed to achieve the goals and policies of the plan. The implementation strategies include adopting and updating zoning and subdivision ordinances, preparing, and adopting subarea plans, conducting and updating studies and inventories, coordinating and collaborating with other jurisdictions and agencies, and securing and allocating funding and resources. The GLUP includes a monitoring and evaluation framework that tracks the progress and effectiveness of the plan implementation. The monitoring and evaluation framework consists of indicators, targets, and benchmarks that measure the performance and outcomes of the plan. The monitoring and evaluation framework also provides a mechanism for reviewing and updating the plan as needed to reflect changing conditions and needs of the county.

City of Pine Island Comprehensive Plan

The Pine Island Comprehensive Plan is intended to guide the growth of the community. When the updated version was adopted on October 19, 2010, it became the policy foundation to realize the community vision into reality through zoning and other land use regulation, programs, education efforts, and public expenditures. The Comprehensive Plan includes numerous different subjects regarding city growth and planning that have been organized into goals and policies around the following themes:

- Demographics and Housing
- Land Use
- Transportation
- Parks, Recreation and Open Space
- Wastewater Infrastructure
- Water Infrastructure
- Sustainability
- Historic Preservation

The City of Pine Island Comprehensive Plan is a document that guides the future growth and development of the city. It was adopted by the city council on October 19, 2010. The plan was created with the input of various stakeholders, including residents, businesses, city officials, and neighboring jurisdictions. The plan consists of the following elements:

- Demographic Profile: provides a summary of the population, household, and income characteristics of the city, as well as projections for future trends.
- Housing: analyzes the existing and future housing needs and preferences of the city and identifies goals and policies to promote a diverse and affordable housing stock.
- Natural Resources: identifies the natural features and resources of the city, such as water, soil, vegetation, and wildlife, and establishes goals and policies to protect and enhance them.
- Land Use: inventories the current land use patterns and categories of the city and proposes a future land use plan and map that reflects the desired development pattern and character of the city.
- Transportation: reviews the existing transportation system and facilities of the city, such as roads, trails, transit, and parking, and proposes a future transportation plan and map that addresses the mobility and accessibility needs of the city.
- Parks and Recreation: inventories the current park and recreation facilities and programs of the city and proposes a future park and recreation plan and map that provides adequate and diverse recreational opportunities for the city.
- Public Utilities: summarizes the existing and future water and wastewater infrastructure and services of the city and identifies goals and policies to ensure their adequacy and efficiency.
- Historic Preservation: addresses the historic and cultural resources of the city, such as buildings, sites, and districts, and establishes goals and policies to preserve and promote them.

The comprehensive plan is intended to serve as a vision and a tool for the city to achieve its desired future. It is also a legal document that provides the basis for the city’s zoning and subdivision regulations, as well as other plans and policies.

City of Oronoco Comprehensive Plan: Future Land Use

The City of Oronoco Comprehensive Plan is the guiding document to outline the history and goals of the community, promote orderly growth, and ensure future land use decisions move the city towards its vision. The most recent Comprehensive Plan “Plans, Goals, Policies, & Implementation Steps” document was last updated on July 17, 2006, although a more recent Planned Future Land Use map was published on July 21, 2020. The City is currently undertaking an update to its Comprehensive Plan, but until such time as it is adopted the 2006 Comprehensive Plan remains the guiding document for the municipality. The Comprehensive Plan includes numerous different subjects regarding city growth and planning that have been organized into goals and policies around the following themes:

- Community Profile
- Community Values and Vision
- Community Character and Appearance
- Land Use
- Housing
- Parks, Recreation, and Open Space
- Transportation
- Infrastructure
- Implementation

The Comprehensive Plan seeks to answer many questions across a variety of topics, including what kind of neighborhoods are desired? What should be preserved? How can future development stay in tune with Oronoco’s character? The comprehensive plan provides guidance for the future physical growth of the community based on the existing land use, projections for future growth and input of Oronoco residents, businesses, and property owners. The land use goals are idealized end results that the plan strives to accomplish in managing future growth and protecting manmade and natural resources.

Goodhue County Comprehensive Plan

The Goodhue County Comprehensive Plan is a strategic document that outlines the long-term vision, goals, and policies for the county's development and land use. It serves as a guide for decision-making regarding growth, development, and the preservation of natural resources. The plan aims to balance economic development with environmental stewardship and community needs. Key elements include:

- Agriculture
- Natural Resources
- Housing
- Business and Industry
- Recreation and Tourism
- Cultural, Historic, Scenic Amenities
- Transportation
- Intergovernmental Cooperation
- Utilities and Energy
- Implementation Tools and Strategies

The plan is periodically reviewed and updated to reflect changing conditions and community priorities. It is used by county officials, planners, developers, and residents to make informed decisions about land use and development.

Environmental Setting

Land Use and Zoning

The portion of the Project Site within Olmsted County is zoned A2 (Agricultural Protection District). The purpose of the A2 zoning is to maintain, conserve, and enhance agricultural lands that are historically valuable for pastureland, crop product, and natural habitat for plant and animal life. This designation is intended to encourage long-term agricultural uses and preserve prime agricultural farmland by restricting the location and density of non-farm dwellings and other non-farmland uses, but it allows for slightly higher density of non-farm dwellings and non-farm uses as compared to the A1 Agricultural Protection District.

Permitted uses for A2 zoning include: one farm dwelling, with a second dwelling or mobile home allowed when farms exceed 80 acres; farming and feedlots up to 1,000 animal units; farm drainage, irrigation, and flood control facilities; one seasonal roadside farmstand and associated road; forest and game management areas; renewable energy facilities (non-utility wind energy conversion systems and solar energy farms); State-licensed adult residential care facilities serving six or fewer persons; day care facilities serving less than 12 children; and compost facilities.

The portions of the Project Site located with the City of Pine Island are designated AG (Agricultural District). This designation specifies protecting existing agricultural investments until public utilities can be extended and thus additional development commenced. Allowable uses in AG zoning include: commercial feedlots; farms, hobby farms, stables, and other agriculture; single-family dwellings; golf courses, country clubs, parks, and other recreational uses; essential services other than transmission pipelines; and State-licensed care facilities serving six or fewer persons. In addition to this designation, the Project Site is also within the Urban Growth Boundary set by the City of Pine Island Comprehensive Plan (City of Pine Island, 2010). In 2008, the City prepared a conceptual “Elk Run Concept Master Plan” that included multiple types of residential uses (low-, medium-, and high-density), commercial uses including retail and office space, medical offices, mental and physical wellness centers, schools and sports complex, and various community amenities including parks, outdoor amphitheater, and equestrian center. The portion of the Elk Run Concept Master Plan that overlays the portion of the Project Site within the City limits included a mixture of residential and commercial land uses (City of Pine Island, 2008).

In addition to current land use maps, the Olmsted County General Land Use Plan and Pine Island Comprehensive Plan both have future 2045 land use maps that reflect policies, land use categories, and locational criteria that guide County and City decisions. Within these maps, the Project Site is designated Urban Service Area or Urban Growth Boundary, which indicates the area is intended to be urbanized over the next 25 to 50 years.

The Pine Island Comprehensive Plan future land use map designates the Project Site as Site as Commercial in the western portion and a mixture of Industrial, Low Density Residential, and Medium- and High-Density Residential in the eastern portion, consistent with the previously contemplated Elk Run Concept Master Plan.

Surrounding Land Use and Zoning

Surrounding land uses consist of agricultural land use and rural residences to the north, east, and west, with small commercial developments and rural residences to the south. There are also intermittent stands of forestlands within and in the vicinity of the Project Site.

The Middle Fork of the Zumbro River and the City of Oronoco occur to the south of the Project Site. The largest city in Olmsted County, the City of Rochester, is approximately 12 miles south of the Project Site. The areas north of the Project Site are within Goodhue County, while the areas west and east of the Project Site are within Olmsted County. The City of Oronoco limit borders the southern-most Project Site boundary. Surrounding zoning within the Oronoco city limits includes mainly agriculture, residential, and some scattered commercial areas along Hwy 52. Oronoco's planned future land use for the area directly south of the Project Site is highway commercial development and residential (City of Oronoco, 2020). The Tribe owns the property directly adjacent to the Project site and submitted a separate application for the development of the Emergency Gaming Facility and Fee-to-Trust Project in April 2024. The nearest airport to the Project Site is Dodger Center Airport, approximately 17 miles southwest. The Project Site is not located within an airport plan or zoning.

Nearby sensitive receptors include three single-family homes located adjacent to the northern Project Site boundary on 520th Street NW, one single-family home approximately 500 feet east of the Project site on E White Bridge Road, and several single-family homes located approximately 120 feet east of the Project Site on Territory Lane NW.

Agriculture

Agriculture is a significant industry in Olmsted County with most farm products being exported, but the industry also supplies raw materials to local and regional industries. The County has vast amounts of prime farmland, large amounts of which are protected from conversion by zoning restrictions. The U.S. Department of Agriculture (USDA) conducts a state-by-state census of agriculture every five years. The National Agriculture Statistical Service (NASS) collects census data from a list of all known potential agricultural operators. The census reports on various statistics relating to crop yields, farm acreage, and farm economics. According to the *2017 Census of Agriculture*, in 2002, the three primary crops harvested in Olmsted County were corn, soybeans, and hay, and these trends have remained relatively stable. In 2017, the three primary forms of livestock were cattle, hogs, and chickens. Despite agriculture being a large sector in Olmsted County, it has been experiencing a downward trend as exemplified by the USDA data in the *2017 Census of Agriculture*. In 2002, Olmsted County had 1,395 farming operations on 313,020 acres, but by 2017, there were 256 fewer operations with a total of 285,944 acres being farmed (Olmsted County, 2022). As mentioned above, portions of the Project Site are designated agriculture by both the City of Pine Island and Olmsted County. Numerous soils on the Project Site with varying classifications for agricultural production, which are:

- *Prime farmland* is of particular importance in meeting the nation's short- and long-range needs for food and fiber and is land that "has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses" (USDA, 2023). Prime farmland may be actively cultivated, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. In some areas, prime farmland has been lost to industrial and urban uses which puts pressure on marginal lands, which generally are more erodible, more susceptible to drought, and less productive and cannot be as easily cultivated.
- *Unique farmland* is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It "has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed." (USDA, 2023).

- Land that does not meet the criteria for prime or unique farmland may be considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies, but generally it "includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods" (USDA, 2023).
- Finally, land may be considered *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops as identified by the appropriate local agencies. Farmland of local importance may include land tracts that have been designated for agriculture by a local ordinance.

PUBLIC SERVICES AND UTILITIES – EA SECTION 3.10

Federal

Safe Drinking Water Act and Clean Water Act

See Water Resources – EA Section 3.3 above.

Public Law 280

Public Law 280, enacted in 1953, granted certain states criminal jurisdiction over Native Americans on reservations and allowed civil litigation under tribal or federal court jurisdiction to be handled by state courts. The states mandated to assume criminal and civil jurisdiction over federal Indian lands were Alaska, California, Minnesota, Nebraska, Oregon, and Wisconsin. However, specific tribal lands, such as the Metlakatla Indian Community on the Annette Island Reserve, the Red Lake Reservation, and the Warm Springs Reservation, were exempt. Additionally, some states, including Arizona, Florida, Idaho, Iowa, Montana, Nevada, North Dakota, and Utah, elected to assume full or partial jurisdiction. Under Public Law 280, the federal government relinquished its special criminal jurisdiction over Indian offenders and victims in these states. However, the law did not grant states regulatory authority over lands held in federal trust or over the following areas:

- Federally guaranteed fishing, hunting, and trapping rights
- Fundamental tribal governmental functions, such as domestics relations and tribal enrollment
- Authority to impose state taxes

From its enactment, Public Law 280 was opposed by Native Nations due to the unilateral imposition of state jurisdiction and the failure to recognize tribal sovereignty and self-determination. Over time, subsequent acts of Congress, court rulings, and state efforts to retrocede (return) jurisdiction to the federal government have helped mitigate some of the law's effects and have strengthened tribal authority over civil and criminal matters on their reservations..

State and Local

Minnesota Public Utilities Commission

The Minnesota Public Utilities Commission (PUC) plays a vital role in regulating and overseeing energy and utility infrastructure across the state. As the body responsible for issuing permits for energy-generating facilities, such as power plants and wind farms, the PUC also manages the siting of high-voltage transmission lines through route permits under the Minnesota Power Plant Siting Act.

This comprehensive process ensures that energy infrastructure development is balanced with environmental protections and community considerations. In addition to its permitting duties, the PUC regulates public utilities, including telecommunications, electric, and natural gas services. Its mission is to maintain a regulatory environment that ensures safe, reliable, and efficient utility services at fair and reasonable rates, aligning with the State's energy and telecommunications policies. The PUC also considers emerging priorities like renewable energy and energy efficiency in its regulatory framework. The PUC also operates as a quasi-judicial body, following procedures similar to those of a court. It reviews evidence, conducts hearings, and makes legally binding decisions on petitions, such as utility requests for new projects.

City of Pine Island Comprehensive Plan

The City of Pine Island Comprehensive Plan outlines essential infrastructure strategies to support the City's growth and development, particularly in Chapters 6 and 7. Chapter 6 focuses on the City's wastewater infrastructure, summarizing the existing system and setting goals for future municipal wastewater treatment. These policies aim to upgrade and expand the wastewater treatment facilities as needed to meet regulatory standards and support new development, ensuring efficient and environmentally responsible service to future growth areas. Chapter 7 addresses the City's water infrastructure, providing an overview of the current water supply system and identifying objectives for maintaining and enhancing water services. Key goals include ensuring a safe and reliable drinking water supply, expanding services to accommodate population growth, and implementing water conservation measures. The Plan emphasizes the importance of regular maintenance and strategic upgrades to support both present and future demand.

Overall, the Comprehensive Plan aims to deliver cost-effective and efficient public utilities to areas designated for future development. This includes expanding infrastructure into new residential, commercial, and industrial zones while maintaining affordability for residents. The plan is aligned with broader City goals of promoting responsible development, preserving natural resources, and ensuring the long-term sustainability of municipal service

NOISE – EA SECTION 3.11

Federal

Federal Highway Administration Construction Noise Abatement Criteria

The Federal Highway Administration (FHWA) Construction Noise Handbook (2006) provides guidance with respect to the development of construction noise level thresholds. Based on that guidance and measured ambient noise levels in the Project Site vicinity, the criteria in **Table 6** were developed for use in evaluating the significance of construction noise impacts.

Table 5: Federal Construction Noise Thresholds

Noise Receptor Locations and Land Uses	Daytime (7 am-6 pm)	Nighttime (10 pm-7 am)
Noise-Sensitive Locations (residences, institutions, hotels, etc.)	90 L_{max}	80 L_{max}
Commercial Areas (businesses, offices, stores, etc.)	None	None
Industrial Areas (factories, plants, etc.)	None	None

Federal Noise Abatement Criteria

Operational noise standards used in this study are FHWA Noise Abatement Criteria (NAC) for the assessment of noise consequences related to surface traffic and other project-related noise sources. These standards are discussed below. The FHWA establishes NAC for various land uses that have been categorized based upon activity. Land uses are categorized on the basis of their sensitivity to noise as indicated in **Table 7**. The FHWA NAC is based on peak traffic hour noise levels. Sensitive receptors with the potential to be impacted by the project alternatives primarily consist of residential land uses; thus, the Category B noise standard (67 dBA L_{eq}) would apply to those uses.

Table 6: Federal Noise Abatement Criteria Hourly A-Weighted Sound Level Decibels

Activity Category	Activity Criteria Leq (h), dBA	Evaluation Location	Activity Category Description
A	57	Exterior	Land on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67	Exterior	Residential
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, tv studios, and trails
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or non-profit institutional structures, radio studios, recording studios, schools, and television studios
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
F	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, shipyards, utilities (water resources/treatment, electricity), and warehousing
G	--	--	Undeveloped lands that are not permitted

Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual

Peak particle velocity (PPV) is often used to measure vibration. PPV is the maximum instantaneous peak (inches per second) of the vibration signal. The PPV levels are used to estimate L_v or VdB levels (vibration decibels with a reference velocity of one micro-inch per second). Scientific studies have shown that human responses to vibration vary by the source of vibration, which is either continuous or transient. Continuous sources of vibration include construction while transient sources include truck movements. Generally, the thresholds of perception and annoyance are higher for transient sources than for continuous sources. **Table 8** summarizes the Federal Transportation Administration's (FTA) guideline vibration damage criteria for various structural categories.

Table 8: Construction Vibration Damage Criteria

Building Category	Approximate PPV (in/sec)	Approximate Lv (VdB)
Reinforced-concrete, steel, or timber (no plaster)	0.5	102
Engineered concrete and masonry (no plaster)	0.3	98
Non-engineered timber and masonry buildings	0.2	94
Buildings extremely susceptible to vibration damage	0.12	90

As shown therein, buildings extremely susceptible to vibration damage could be damaged if vibration levels exceed 90 VdB. Additionally, although humans have a perceptibility threshold of 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB (FHWA, 2006). Background vibration velocity in residential areas is usually 50 VdB or lower.

State and Local

Minnesota Pollution Control Agency Guide to Noise Control

The Minnesota Pollution Control Agency (MPCA) enforces State noise rules (Minnesota Rules Ch. 7030). Minnesota's primary noise limits are set by noise area classifications (NACs) based on land uses at the location of the person that hears the noise. NACs are also based on the sound level in decibels (dBA) over ten percent (L10), or six minutes, and fifty percent (L50), or thirty minutes, of an hour. For residential locations (NAC 1), limits are L10 = 65 dBA and L50 = 60 dBA during the daytime (7 am – 10 pm) and L10 = 55 dBA and L50 = 50 dBA during the nighttime (10 pm – 7 am) (Minnesota Rules Ch. 7030.0040). This means that during a one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time (six minutes) and cannot exceed 60 dBA more than 50 percent of the time (30 minutes). Common land uses associated with each NAC include the following:

- NAC 1: Residential housing, religious activities, camping and picnicking areas, health services, hotels, educational services
- NAC 2: Retail, business and government services, recreational activities, transit passenger terminals
- NAC 3: Manufacturing, fairgrounds and amusement parks, agricultural and forestry activities
- NAC 4: Undeveloped and unused land

Although there is a NAC 4, there are no noise standards for these areas. The Project Site falls within NAC 3 for agriculture. Thresholds for each NAC are shown in **Table 9**.

Table 9: NAC Noise Thresholds

NAC	Daytime		Nighttime	
	L10	L50	L10	L50
1	65 dBA	60 dBA	55 dBA	50 dBA
2	70 dBA	65 dBA	70 dBA	65 dBA
3	80 dBA	75 dBA	80 dBA	75 dBA

Source: Minnesota Rules Ch. 7030.0040

Fundamentals of Sounds, Effects of Noise on People, and Characteristics of Vibrations

Fundamentals of Sound

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz). Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected, or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers, and therefore, to avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, which is defined as 0 dB (decibels) at this threshold. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness. Since the decibel scale is logarithmic, not linear, two sound levels 10-dB apart differ in acoustic energy by a factor of 10.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (dBA) and the way the human ear perceives sound. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise. The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. Regarding increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

Stationary point sources of noise—including stationary mobile sources such as idling vehicles—attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

Characteristics of Vibrations

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, amplitude and frequency of the source, and the response of the system that is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities. Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. A threshold of 0.20 inches/second PVV is considered to be a reasonable threshold for short-term construction projects.

HAZARDOUS MATERIALS – EA SECTION 3.12

Federal

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) regulates the land disposal of hazardous materials from cradle-to-grave. This means establishing a regulatory framework for the generation, transport, treatment, storage and disposal of hazardous waste. Specifically, Subtitle D of RCRA pertains to non-hazardous solid waste and Subtitle C focuses on hazardous solid waste. A solid waste can consist of solids, liquids and gases, but these must be discarded in order to be considered waste.

Additionally, the USEPA has developed regulations to set minimum national technical standards for how disposal facilities should be designed and operated. States issue permits to ensure compliance with USEPA and state regulations. The regulated community is comprised of a diverse group that must comprehend and adhere to RCRA regulations. These groups can consist of hazardous waste generators, government agencies, small businesses, and gas stations with underground petroleum tanks.

Food, Drug, and Cosmetic Act

Under the federal Food, Drug, and Cosmetic Act, the USEPA sets maximum residue limits, or tolerances, for pesticides residues on food. When the USEPA sets a tolerance level for a food, this is the level deemed safe. In defining safe, this means that, "reasonable certainty that no harm will result from aggregate exposure to the pesticide residue." When determining a safety finding for a tolerance level, the USEPA considers the toxicity of the pesticide and its break-down products, aggregate exposure to the pesticide in foods and from other sources of exposure if applicable, and any special risks specific to infants and children. If a tolerance is not set for a pesticide residue, a food containing that pesticide residue will be subject to government seizure if deemed appropriate. However, once a tolerance has been established for a pesticide residue, then residue levels below the tolerance will not trigger enforcement actions. If the residue level is detected above that tolerance, then the commodity will be subject to seizure. Some pesticides do not have a set tolerance level as the USEPA may grant exemptions in the cases where the pesticide residue does not pose, under foreseeable situations, a significant dietary risk.

Insecticide, Fungicide, and Rodenticide Act

The federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) addresses the sale, distribution, and labeling of pesticides, as well as the certification and training of pesticide applicators. FIFRA establishes recordkeeping and reporting requirements on certified applicators of restricted use pesticides. Furthermore, FIFRA imposes storage, disposal, and transportation requirements on registrants and applicants for the registration of pesticides. Pesticide use is regulated through requirements to apply pesticides in a manner consistent with the label. The labeling requirement includes directions for use, warnings, and cautions along with the uses for which the pesticide is registered (e.g., pests and appropriate applications). This includes the specific conditions for the application, mixture, and storage of the pesticide. Additionally, the label must specify a time period for re-entry into an area after the pesticide has been applied, and when crops may be harvested after the application of the pesticide. If a pesticide is used in a manner contrary to specifics on its label, then the use constitutes a violation of the FIFRA.

Hazardous Communication Standard

The Occupational Safety and Health Administration helps ensure employee safety by regulating the handling and use of chemicals in the workplace. For instance, it administers the Hazard Communication Standard (HCS). The HCS ensures safety in the workplace concerning chemicals through requiring information to be provided and understood by workers about the identity and hazards associated with chemicals they may work with. This also requires that chemical manufactures and importers evaluate the hazards associated with the chemicals they create or import, and that these chemicals have proper labels and material safety data sheets concerning their hazards to others (e.g., customers). Downstream of the production, employers who utilize these hazardous chemicals in their workplaces are obligated to have labels and safety data sheets for workers and to train them on the proper handling of these chemicals.

Hazardous Substances Act

The Consumer Product Safety Commission has a limited role in regulating hazardous substances; it primarily deals with the labeling of consumer products through the federal Hazardous Substances Act (HSA). HSA only requires products that may at some point be in the presence of people's dwellings to be labeled, including during purchase, storage, or use. These labels must alert consumers of the potential hazards that the product may pose. However, in order for a product to be required for labelling, the product must be toxic, corrosive, flammable/combustible, an irritant, a strong sensitizer, or have the ability to generate pressure through decomposition, heat, or other means. Furthermore, the product must possess the ability to cause severe personal injury or substantial illness during or as a result of any customary or reasonably predictable handling or use, including ingestion by children.

Toxic Substances Control Act

The federal Toxic Substances Control Act (TSCA), as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, permits the USEPA to evaluate the potential risk from novel and existing chemicals and address unacceptable risks chemicals may have on human health and the environment. The USEPA oversees the production, importation, use, and disposal of certain chemicals. This includes the USEPA having the authority to require record keeping, reporting, and test requirements and restrictions associated with certain chemical substances and/or mixtures. However, certain groups of chemicals are excluded from TSCA consideration, including—but not limited to—food, drugs, cosmetics and pesticides. Examples of chemicals included in TSCA consideration are lead paint, asbestos, mercury, formaldehyde, and polychlorinated biphenyls.

Emergency Planning and Community Right-to-Know Act

The federal Emergency Planning and Community Right-to-Know Act (EPCRA) is designed to assist local communities protect public health, safety, and the environment from chemical hazards. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. The EPCRA also requires industry to report on the storage, usage, and releases of hazardous substances to federal, state, and local governments, and states and communities can use the information gained to improve chemical safety and protect public health and the environment.

National Fire Protection Association Codes and Standards

The National Fire Protection Association (NFPA) publishes over 300 consensus codes and standards to minimize the possibility and effects of fire and other risks, including, but not limited to (NFPA, 2022):

- NFPA 13 Standard for the Installation of Sprinkler Systems
- NFPA 72 National Fire Alarm and Signaling Code
- NFPA 88A Standard for Parking Structures
- NFPA 1660 Standard for Emergency, Continuity, and Crisis Management: Preparedness, Response, and Recovery
- NFPA 1140 Standard for Wildland Fire Protection

State and Local

Olmsted County Multi-Hazard Mitigation Plan

The Multi-Hazard Mitigation Plan is a requirement of the Federal Disaster Mitigation Act of 2000. The County is vulnerable to a variety of potential natural disasters that can threaten the loss of life and property in the county. Hazards such as tornadoes, flooding, wildfires, blizzards, straight-line winds, ice storms, and droughts have the potential for inflicting vast economic loss and personal hardship. The Multi-Hazard Mitigation Plan was created from the combined efforts of the County and its local governments to fulfill the responsibility for hazard mitigation planning. The intent of the plan is to reduce the actual threat of specific hazards through reducing their potential to cause damage and losses. The County has specified the following goals for this Multi-Hazard Mitigation Plan:

- To evaluate and rank the hazards that impact the County.
- To determine the extent of existing mitigation programs and policy capabilities within the County.
- To create a detailed, working document that will establish a standardized process for ensuring coordination of hazard mitigation efforts and to implement an ongoing and comprehensive hazard mitigation strategy.
- To familiarize state and local officials and the general public about comprehensive hazard mitigation in the County and obtain their support (Olmsted County, 2017).

Environmental Setting

Hazardous Materials

Wenck Associates, Inc. completed a Phase I Environmental Site Assessment (ESA) in March 2018 that included the Project Site and other nearby properties to assess whether there were recognized environmental conditions (RECs), controlled recognized environmental conditions (CRECs), and historical recognized environmental conditions (HRECs) in connection with these properties (**Appendix Hazmat**). The Phase I ESA was conducted in accordance with the American Society for Testing and Materials (ASTM) Standard Practice E-2247-16 and practices set forth in 40 CFR Part 312 – Standards for Conducting all Appropriate Inquiry. Per the ASTM Standard Practice E-2247-16, RECs, HRECs, and HRECs are defined as follows:

- REC refers to the presence or likely presence of any hazardous substances or petroleum products in, on or at a property due to any release to the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of future release to the environment.
- CREC refers to a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority and are allowed to remain, but subject to the implementation of required controls.
- HREC refers to a past release of any hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority or meets unrestricted use criteria established by a regulatory authority without subjecting the property to any required controls.

A records retrieval and review of records, site reconnaissance, and interviews with people knowledgeable about the Project Site and other properties were conducted in support of the Phase 1 ESA assessment. According to reviewed sources of information, the Project Site was developed with a farmstead prior to 1937 and was primarily agricultural land with limited elk farming until 1985 when the majority of the Project Site was turned into an elk farm and grazing land.

Between approximately 1985 and 2006, the Project Site accepted silage from a local, offsite source, and used the silage as elk food and the liquid silage residue as fertilizer. In 2009, an elk from the Project Site tested positive for chronic wasting disease, and the entire herd of 1,500 elk was subsequently culled. The Project Site received a letter from the USEPA indicating that grazing could resume in 2014. Since 2014, portions of the Project Site have been used for seasonal cattle grazing, and the Project Site is also used for agricultural row crops. Mapped sites of regulatory interest from the databases identified in the GeoSearch Radius Report were determined to not be likely to affect soil, groundwater, or soil vapor conditions at the Project Site due to their locations with respect to the presumed direction of groundwater flow, and/or other information provided by the database report.

During the site visit on March 7, 2018, no conditions of concern were identified on the Project Site itself. However, on the adjacent property, floor drains were observed in the shop area of a tractor barn. Interview information indicated that the floor drains discharged directly to the subsurface at the Project Site, but the precise discharge location was not determined. Due to the management of petroleum products and maintenance chemicals in the tractor barn, the length of time that the floor drains have been in use (at least 47 years at the time of the Phase I ESA), and the subsurface discharge of the floor drains, the Phase I ESA identified a material threat of release of petroleum products and potentially hazardous substances. The material releases and subsequent investigations at the barn drain UST and diesel fuel UST are considered HRECs. No other RECs were identified in connection with the property.

Hazards

Nuclear Power Plant

There are two nuclear power plants in the State, Monticello Nuclear Generating Plant located in Monticello and the Prairie Island Nuclear Generating Plant located outside of Red Wing, located approximately 100 miles and 30 miles from the Project Site, respectively. The Prairie Island Nuclear Generating Plant is located adjacent to the existing Reservation and poses a potentially significant risk to the Reservation and surrounding areas. The plant stores nuclear waste on-site in large steel casks. While the waste is stored in casks that are designed to withstand natural disasters, accidents, and terrorist attacks, the plant has no permanent disposal site for the radioactive waste that is produced by the nuclear fission process (MRP News, 2022). Should a nuclear power plant emergency occur, it could impact an area ranging from the immediate vicinity of the plant to several square miles around it. The danger would arise from radioactive gases or materials that could be carried by the wind from the plant (Xcel Energy, 2020).

FEMA is responsible for overseeing preparedness by state and local authorities situated near nuclear plants. The United States Nuclear Regulatory Commission (NRC) regulations have established 10-mile emergency planning zones (EPZ) around domestic nuclear power plants. Local and state authorities within the 10-mile zone must develop protective action plans for responding to a radiological incident that include evacuations and sheltering in place. Local and state authorities also must provide information on radiation and protective actions to residents of the 10-mile zone on an annual basis. While the existing Casino and Reservation are within the 10-mile EPZ and potential evacuation area for the plant, the Project Site and the City of Pine Island are not. The following documents pertain to the plant:

- Prairie Island Nuclear Generating Plant After Action Report/Improvement Plan: Prepared by FEMA, this report evaluated the Radiological Emergency Preparedness Full Participation Plume Exposure Pathway Exercise conducted on August 24, 2010 to test emergency response capabilities. It includes sections on exercise overview, design summary, and analysis of capabilities, detailing the exercise planning team, participating jurisdictions, and the evaluation of exercise criteria. The report also presents findings, deficiencies, corrective actions, and the schedule of corrective actions for identified exercise issues within the 10-mile EPZ surrounding the Prairie Island Nuclear Generating Plant (FEMA, 2010), of which the existing Casino and Reservation fall within.
- Prairie Island Emergency Planning Guide from Xcel Energy: Provides essential information about radiation and instructions on what to do in the unlikely event of an accident at the Prairie Island Nuclear Generating Plant. It is intended for individuals who live, work, or attend school within 10 miles of the plant or are visiting the area, which includes the existing Casino and Reservation. The guide is updated annually (Xcel Energy, 2022).
- Disaster Accountability Project, Report on Emergency Evacuation Planning for Prairie Island Nuclear Generating Plant: Surveyed local emergency preparedness efforts and the level of information provided to the public within a 50-mile radius of the Prairie Island Nuclear Generating Plant and found a number of deficiencies, including conflicting information provided for 10-mile radius evacuation zones and a lack of preparedness for areas within a 50-miles radius of the plant. The 50-mile radius includes the existing Casino, Reservation, and the Project Site (Disaster Accountability Project, 2016).

The Project Site is approximately 30 miles south of the Prairie Island Nuclear Generating Plant and is therefore outside of the FEMA-designated 10-mile radius EPZ, but within the 50-mile Ingestion Planning Zone. The Ingestion Planning Zone refers to an additional area of concern where protective actions may be necessary associated with contamination of water supplies, food crops and livestock above FDA guidelines, and ground contamination above USEPA guidelines (Minnesota Department of Public Safety, 2018). While there is a multi-hazard mitigation plan in Olmsted County (County), this does not directly address any risks from the Prairie Island Nuclear Generating Plant. Furthermore, there are no evacuation or planning documents addressing nuclear emergency preparedness in the County.

Wildfire

On average from 1976-2011, there were approximately 1,600 wildfires each year in Minnesota, with most occurring in March, April, and May, as well as throughout the year with the exception of winter. During the period with the highest wildfire potential, ample fuel is available due to the winter kill-off that leaves ample dead and dry vegetation that is combustible. Simultaneously, there is less green vegetation to serve as a barrier for a moving wildfire. Approximately 15 wildfires were responded to in Olmsted County in the 30-year period between 1985 and April 2015, which were human-caused and burned a total of 57 acres. The largest fire burned 20 acres in 1997 in the southeastern corner of Olmsted County that originated from a burn pile of debris. Overall, wildfire was ranked as low risk within Olmsted County because their occurrence is uncommon. Furthermore, different jurisdictions in the County do not vary in their vulnerability to wildfires and increased development has not changed this vulnerability in recent years (Olmsted County, 2017).

VISUAL RESOURCES – EA SECTION 3.13

Federal

Wild and Scenic Rivers Act of 1968

The Wild and Scenic Rivers Act of 1968 is a federal law that was established to protect selected rivers in the United States that have outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The Act preserves the unique character of these rivers while also acknowledging their potential for appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection. The National Wild and Scenic Rivers System was created by the Wild and Scenic Rivers Act. River units designated as part of the system are classified and administered three types based on the condition of the river, the amount of development in the river or on the shorelines, and the degree of accessibility by road or trail at the time of designation:

- Wild River Areas: These rivers or sections of rivers are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic River Areas: These rivers or sections of rivers are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational River Areas: These rivers or sections of rivers are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past.

Typically, rivers are added to the system by an act of Congress, but they may also be added by state nomination with the approval of the Secretary of the Interior. Congress initially designated 789 miles of eight rivers as part of the system. Today there are 208 river units with 12,708.8 miles in 40 states and Puerto Rico, administered by federal agencies or by state, local, or tribal governments. Federal agencies are typically the National Park Service, the Bureau of Land Management, the Forest Service, or the Fish and Wildlife Service.

National Scenic Byways Program

The National Scenic Byways Program, established in 1991 and managed by the Federal Highway Administration (FHWA), identifies and promotes exceptional roads across the U.S. for their scenic, cultural, historical, or natural significance. Roads can receive the designation of National Scenic Byways if they highlight at least one key quality, or All-American Roads if they offer two or more outstanding features and are considered destinations in themselves. The program supports the preservation and enhancement of these routes, providing federal funding to improve infrastructure and promote tourism, while helping to protect important natural and cultural resources.

State and Local

Minnesota's Wild and Scenic Rivers Act

Minnesota's Wild and Scenic Rivers Act was established in 1973 by the State Legislature to create a statewide system for preserving and protecting rivers in the State with outstanding natural, scenic, scientific, historic, cultural, and recreational values. The Act mandates the Department of Natural Resources to establish statewide standards and criteria for designating, classifying, and managing the state's Wild and Scenic Rivers, including minimum standards for land use, development, and administration. Six rivers have been designated under the Act: Kettle, Mississippi, North Fork of the Crow, Minnesota, Rum, and Cannon. Each designated stretch has rules that constitute the management plan for that river. The individual river plans include the following:

- The classification of the river or river segments as wild, scenic and/or recreational;
- The boundaries of the area along the river to be included within the system, which may not exceed 320 acres per mile on both sides of the river;
- Rules governing the use of public lands and waters within the designated area, which may differ from the statewide rules;
- Standards for local land use controls within the designated area, which may differ from statewide standards and criteria based on the particular attributes of the area;
- Rules regarding recreation management and the acquisition of land and/or scenic easements within the area; and
- Rules for administering the management plan.

Minnesota Scenic Byways Program

The Minnesota Scenic Byways program is a network of roads that have been designated as having regionally outstanding scenic, natural, recreational, cultural, historic, or archaeological significance. The program was launched in 1992 by the Minnesota Department of Transportation, the Minnesota Department of Natural Resources, the Minnesota Office of Tourism (Explore Minnesota) and the Minnesota Historical Society. The program aims to establish partnerships with communities, organizations and government agencies to match resources with grassroots marketing and economic development efforts. The program is designed to identify highway routes of exceptional interest and to encourage economic development through tourism and recreation. The program has 22 byways that total 2,948 miles throughout the state. The byways travel through or by a variety of topographies, including waterfalls, woods, prairies, and plains.

Olmsted County General Land Use Plan

Olmsted County General Land Use Plan provides a framework for land use decisions in the County. It indirectly includes policies and recommendations for visual resources through the preservation of natural and scenic resources. The General Land Use Plan has several policies and goals for natural and scenic resources. These include preserving natural resources such as wetlands, floodplains, and woodlands, protecting and improving the quality of surface and groundwater resources, and preserving scenic resources such as parks, open spaces, and scenic corridors. These policies and goals are designed to ensure that natural and scenic resources are protected and preserved for the benefit of the community and future generations. For more information on the Olmsted County General Land Use Plan, see Land Resources – EA Section 3.3 above.

Pine Island Comprehensive Plan

The City of Pine Island Comprehensive Plan is a document that guides the future growth and development of the city. It includes several policies and strategies for visual resources through the preservation of natural resources. It identifies and designates specific natural areas to be preserved to protect critical habitats, wetlands, and green spaces from development. The plan integrates natural resource considerations into development plans to avoid sensitive areas and incorporate green spaces within new developments. It also emphasizes the preservation of scenic and visual resources by protecting areas with significant natural beauty. Additionally, the plan promotes sustainable land use practices and involves collaboration with various agencies to align conservation efforts with broader environmental goals. It designates specific areas for future parks within the Urban Growth Area, ensuring that as development occurs, parkland will be dedicated accordingly to maintain recreational opportunities for residents. For more information on the Pine Island Comprehensive Plan, see Land Use – EA Section 3.9 above.

REFERENCES

CEQ, 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Available online at: https://www.energy.gov/sites/default/files/nepapub/nepa_documents/RedDont/G-CEQ-EJGuidance.pdf. Accessed August 2024.

Federal Highway Association, 2006. Construction Noise Handbook. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook00. Accessed August 2024.

Xcel Energy, 2020. Prairie Island Emergency Planning Visitor's Guide. Available online at: https://dps.mn.gov/divisions/hsem/radiological-emergency-preparedness/Documents/PINGP%20Visitor%20Guide.pdf. Accessed July 2024.

MRP News, 2022. Xcel seeks change in Prairie Island nuclear waste storage. January 1, 2022. Available online at: https://www.mprnews.org/story/2022/01/01/xcel-seeks-change-in-prairie-island-nuclear-waste-storage. Accessed July 2024.

NFPA, 2022. List of NFPA Codes and Standards. Available online at: https://www.nfpa.org/Codes-and-Standards/All-Codes-and-Standards/List-of-Codes-and-Standards#:~:text=NFPA%20publishes%20more%20than%20300,and%20used%20throughout%20the%20world. Accessed August 2024.

Olmsted County, 2017. Multi-Hazard Mitigation Plan Olmsted County, Minnesota. 2017. Available online at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.olmstedcounty.gov/sites/default/files/2020-10/All%20Hazard%20Mitigation%20Plan.pdf. Accessed August 2024.

United States Environmental Protection Agency (USEPA), 1995. Memorandum, Subject: Calculating Potential to Emit (PTE) for Emergency Generators. September 1995. Available online at: https://www.epa.gov/sites/default/files/2015-08/documents/emgen.pdf. Accessed August 2024.

USEPA, 1998. Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis. Available online at: https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_epa0498.pdf. Accessed August 2024.

USEPA, 2023. NAAQS Table. Available online at: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed August 2024.

Appendix F

Biological Assessment

BIOLOGICAL ASSESSMENT
PRAIRIE ISLAND INDIAN COMMUNITY

North Elk Run Community Development and Fee-to-Trust Project

Olmsted County, MN| September 2024

Lead Agency:

Bureau of Indian Affairs
Midwest Regional Office
Norman Pointe II Building
5600 W. American Blvd. Suite 500
Bloomington, MN 55437

BIOLOGICAL ASSESSMENT
PRAIRIE ISLAND INDIAN COMMUNITY

North Elk Run Community Development and Fee-to-Trust

Olmsted County, MN | September 2024

Lead Agency:

Bureau of Indian Affairs
Midwest Regional Office
Norman Pointe II Building
5600 W. American Blvd. Suite 500
Bloomington, MN 55437

Prepared By:

Acorn Environmental
5170 Golden Foothill Parkway
El Dorado Hills, CA 95762
916.235.8224
www.acorn-env.com

Table of Contents

LIST OF FIGURES

LIST OF ATTACHMENTS

Section 1 | Introduction

1.1 PURPOSE OF ASSESSMENT

The purpose of this Biological Assessment is to provide technical information and to review the Proposed Action in sufficient detail to determine to what extent the Proposed Action may affect federally threatened, endangered, or candidate species. This Biological Assessment has been prepared in accordance with legal requirements found in Section 7 (a)(2) of the Endangered Species Act (16 U.S. C 1536(c)). The purpose of a Biological Assessment is to evaluate the potential effects of an action on species listed and proposed for listing, as well as designated and proposed Critical Habitat, and to determine whether any such species or habitat are likely to be adversely affected by the action.

1.2 DESCRIPTION OF ACTION AREA AND PROPOSED ACTION

Action Area

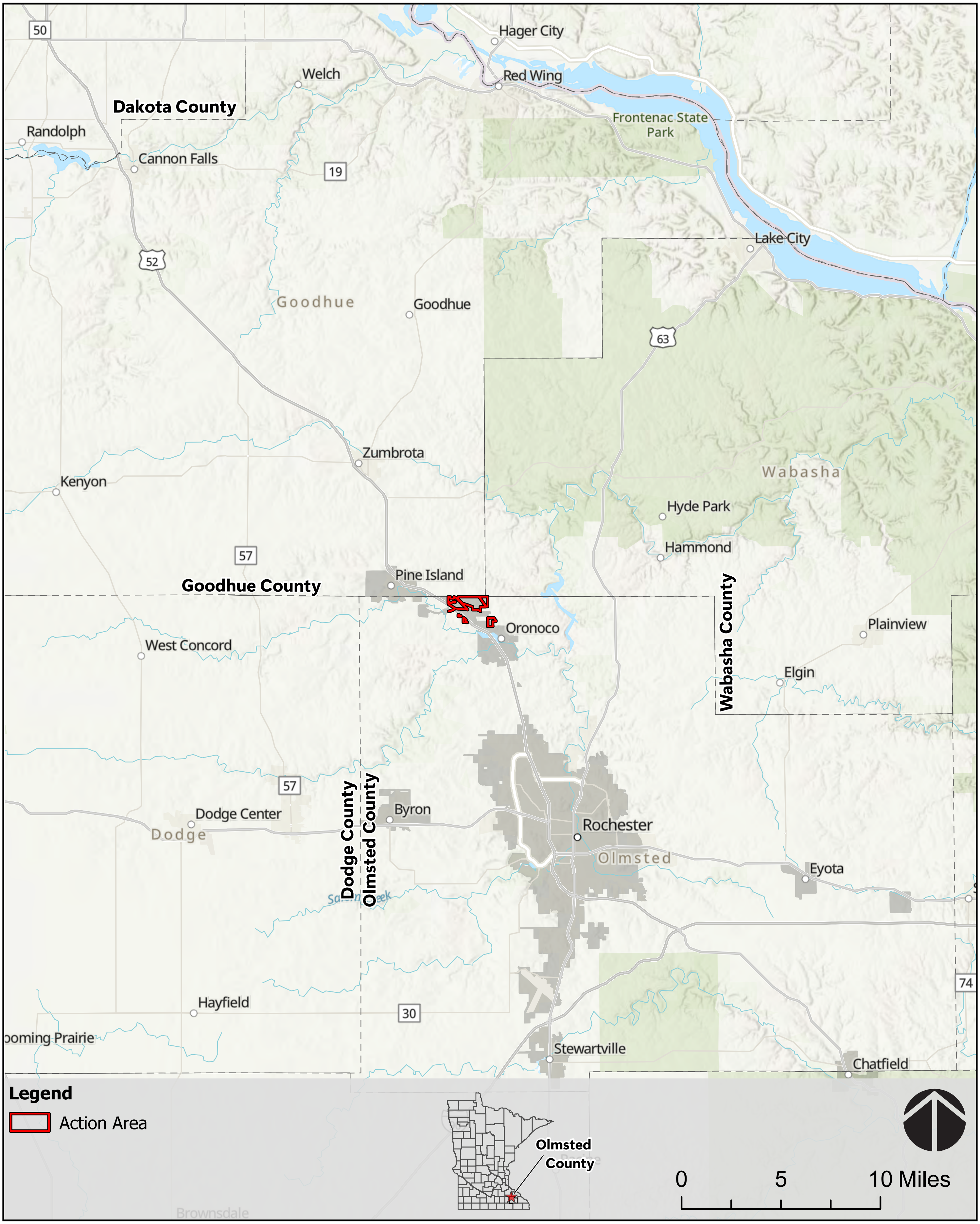
The Proposed Action consists of the acquisition by the U.S. Bureau of Indian Affairs (BIA) of the approximately 781-acre Action Area in unincorporated Olmsted County and City of Pine Island, Minnesota into federal trust status for the Prairie Island Indian Community (Tribe) for a mixed-use community development project (Proposed Action). A portion of the Action Area is within the City of Pine Island, and the remaining portion is within an unincorporated area of the County. The western portion of the Action Area is within the New Haven Township, while the eastern portion of the Action Area falls within the Oronoco Township. The Action Area is located in Sections 1, 2, and 12 of Township 108 North, Range 15 West and Sections 6 and 7 of Township 108 North, Range 14 West, within the Fifth Principal Meridian. The Action Area falls within the Oronoco U.S. Geological Survey (USGS) 7.5' quadrangle map. **Figure 1** and **Figure 2** show the location of the Action Area, and **Figure 3** presents an aerial photograph of the Action Area and the immediate vicinity. For purposes of this assessment, the Action Area is defined as the entire property, which totals 781 acres.

Development Components

Development components are shown in **Table 1**. A conceptual site plan illustrating proposed land uses within the Action Area is provided in **Figure 4**. The conceptual site plan is intended to serve as a general development plan for the Tribe that will guide development of specific projects and land uses over the next 10 - 20 years. Proposed land uses are anticipated to include those listed in **Table 1** and are further described below. The Proposed Action is a mixed-use development that includes residential, community, administrative, commercial, cultural, agricultural, and open space land uses.

Residential, Community, and Administrative

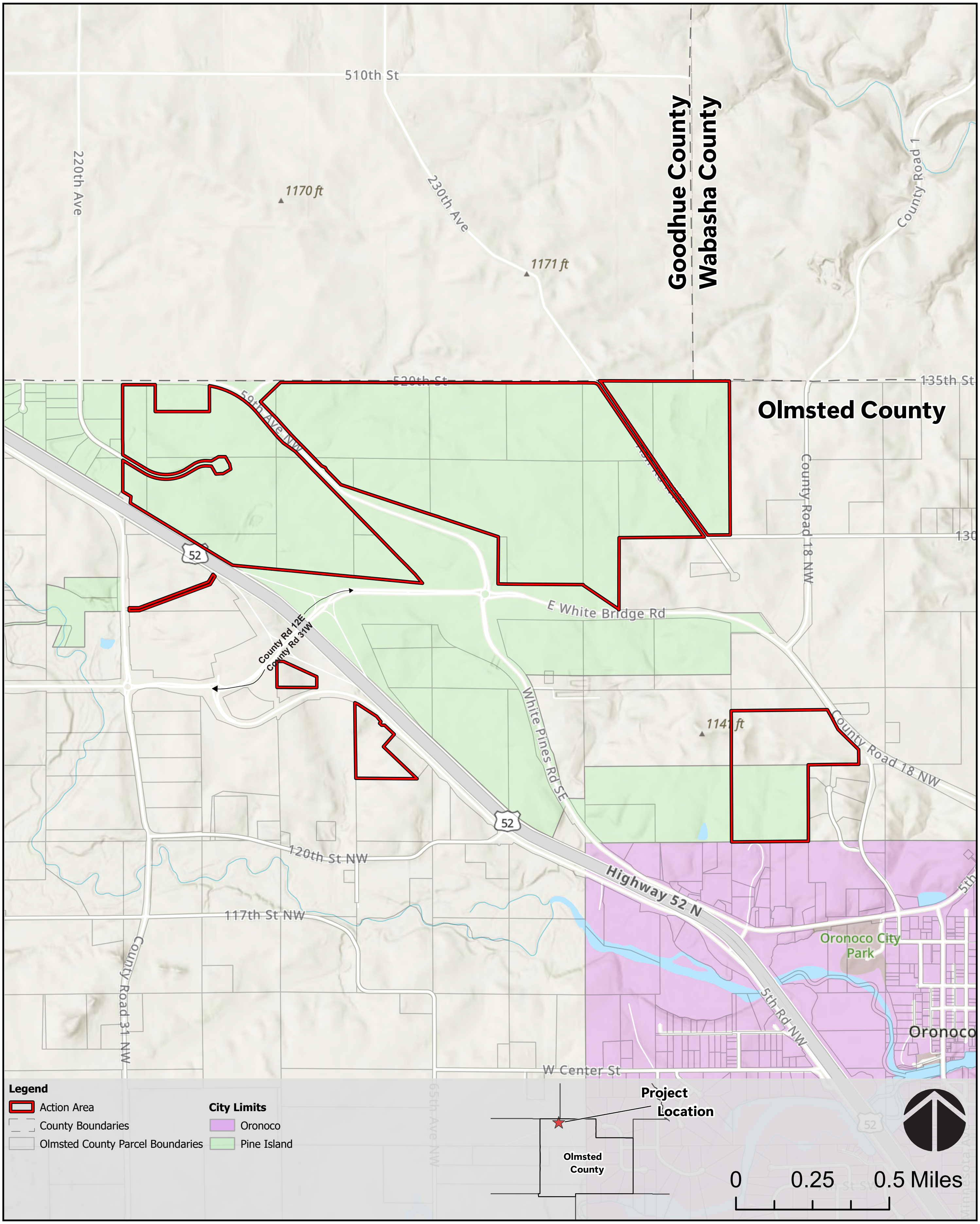
Development would involve the establishment of residential housing for tribal members and associated community and administrative facilities. Proposed residential uses include 154 single-family residences across approximately 154 acres, 70 multi-family residences and a 30-unit (10,000 sf) assisted living facility. Community and administrative facilities would include a public safety facility; public works/maintenance facility; administration building; community center/wellness center; health clinic/health care facility; education center/library; and buffalo maintenance facility.



Esri, NASA, NGA, USGS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS

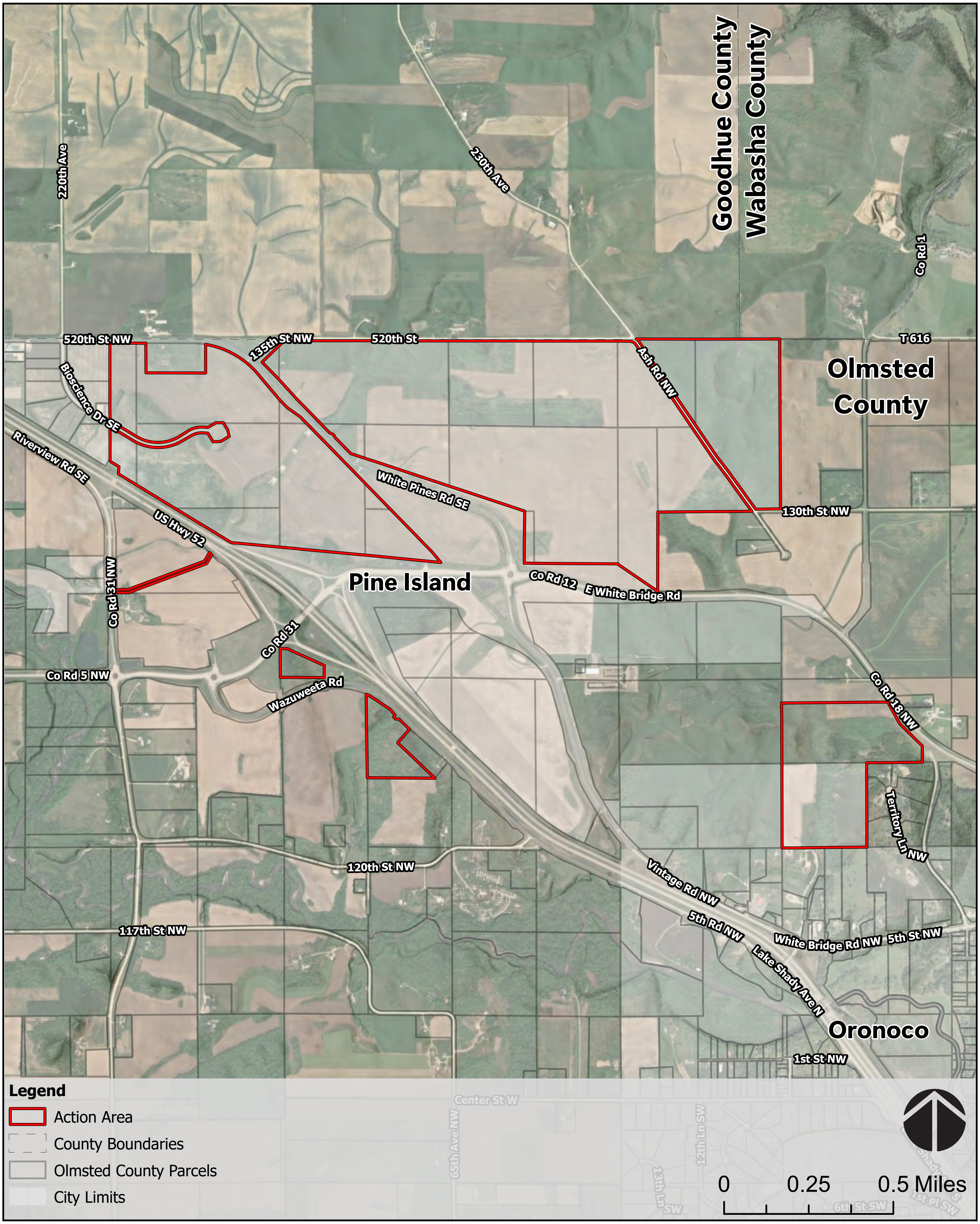
FIGURE 1

REGIONAL LOCATION



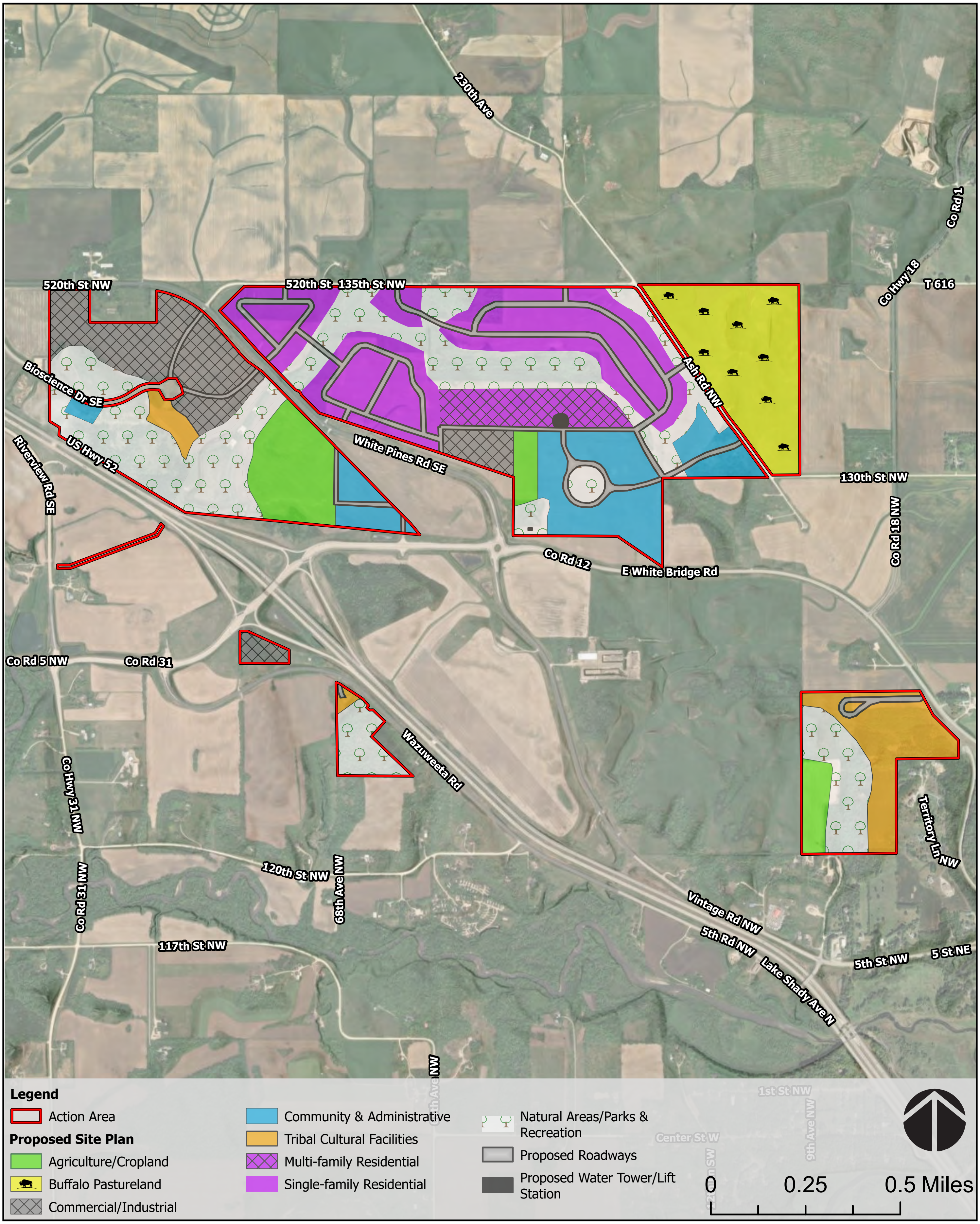
Esri, NASA, NGA, USGS, FEMA, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

FIGURE 2
SITE AND VICINITY



Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Maxar

FIGURE 3
AERIAL OVERVIEW



Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Maxar

FIGURE 4
ALTERNATIVE A SITE PLAN

Table 1: Development Components

Tribal Land Use Designation	Description	Units/Size	Estimated Acreage
Single Family Residential	Single Family Residential	154 Units 423,900 sf	154.21
Multi-Family Residential	Multi-Family Residential	70 Units	31.27
	Assisted Living Facility	30 Units 10,000 sf	
Community & Administrative	Public Safety Facility	15,000 sf	89.34
	Public Works/Maintenance Facility	10,000 sf	
	Administration Building	22,000 sf	
	Community Center/Wellness Center	40,000 sf	
	Health Clinic/Health Care Facility	5,000 sf	
	Education Center/Library	10,000 sf	
	Buffalo Maintenance Facility	5,000 sf	
	Water Tower and Lift Station	40,500 sf	
Commercial/Industrial	Convenience/Fast Food/Drive Thru	5,000 sf	82.61
	Grocery Store/Co-op	15,000 sf	
Cultural Facilities	Cemetery	-	51.68
	Cultural Center/Wacipi	7,000 sf	
	Ceremonial House/Bark Lodge	1,000 sf	
Buffalo Pastureland	-	-	80.46
Natural Areas/Parks and Recreation	-	-	234.28
Agriculture/Cropland	-	-	56.25
Water Tower/Lift Station			0.93
		Total	781.03

Commercial/Industrial

Commercial/industrial uses would include 5,000 sf of convenience, fast food, and drive thru facilities as well as 15,000 sf of grocery store and co-op facilities. The convenience, fast-food, and drive thru development is anticipated to accommodate 10 employees and an estimated 1000 visitors per day, while the grocery store and co-op facilities would accommodate 10 employees and an estimated 500 visitors per day.

Cultural Facilities

A 6.9-acre cemetery/burial area as well as a cultural center (Wacipi) and ceremonial house/bark lodge are planned. The cultural center and ceremonial house would consist of 8,000 sf for the purposes of hosting tribal ceremonies and cultural events. Approximately 43.35 acres have been allocated for these facilities in the southeastern corner of the Action Area. The area proposed for the cultural facility currently consists of agricultural land, wooded areas/oak savannah, and pastureland. The area proposed for the cemetery currently consists of agricultural land and wooded areas. These facilities are anticipated to accommodate 5 employees and 50 visitors per day.

Buffalo Pastureland

Approximately 80.46 acres of the Action Area would be dedicated as buffalo pastureland that would support the Tribe's buffalo herd. The buffalo pastureland would occupy the northeastern-most corner of the Action Area and would provide educational opportunities to students in the community. The area currently consists of pastureland and is used for cattle grazing.

Natural Areas/Parks and Recreation

The majority of the Action Area would be designated as natural areas/parks and recreation. These land uses would consist of approximately 192.35 acres that would be preserved as open space. Currently, these areas consist of oak savannah, open space, agricultural, and grazing land. Multi-use pathways for walking and biking may be developed throughout the Action Area.

Agriculture/Cropland

The Proposed Project includes 56.25 acres of agricultural and cropland. A community garden would be developed south of the proposed residential areas on approximately 7.89 acres. Corn, soybeans, hay, and other crops currently grown on the Action Area will continue to be cultivated.

Access Roads and Utilities

Proposed access roads and utilities needed to support proposed land uses are included in **Table 2** and are further described below.

TABLE 2: PROPOSED ACCESS ROADS AND UTILITIES

Road/Utility	Linear Feet
Roads	41,597.1
Multiuse Trails	42,352.4
Water	44,814
Wastewater	44,814
Force Main	8,000
Electric (People's Coop)	5,166
Electric (Goodhue County Coop)	29,744
Telecommunications	38,587
Natural Gas	TBD

Access Roads and Turn Lanes

Regional access to the Action Area is provided via Hwy 52 at E White Bridge Road/County Road 31 W where there is a full interchange. The Action Area is locally accessible via 135th Street NW (which becomes 59th Avenue NW near the Action Area) and 230th Avenue (which becomes Ash Road NW near the Action Area) from the north, and from E White Bridge Road and 59th Avenue NW to the south. Approximately seven new roadway connections would be established along existing roadways (59th Avenue NW, E White Bridge Road, and Wazuweeta Road) where access to the internal roadway network would be provided. The following access drives are proposed:

- Proposed Drive #5 at 59th Avenue NW
- Proposed Drive #6 at 59th Avenue NW
- Proposed Drive #7 at 59th Avenue NW
- Proposed Drive #10 at E White Bridge Road
- Proposed Drive #12 at E White Bridge Road
- Proposed Drive #13 at E White Bridge Road
- Proposed Drive #15 at Wasuweeta Road

Additionally, in accordance with MnDOT's Access Management Manual and Olmstead County guidelines, the following turn lanes are proposed:

- Proposed Intersections 5, 6, 7: Eastbound and westbound right-turn lanes are proposed (proposed access driveways along 59th Avenue NW).
- Proposed Intersections 12 and 13: Westbound right-turn lanes shall be constructed (proposed access driveways along E White Bridge Road).
- Proposed Intersections 5, 12 and 13, and 14: Eastbound left-turn lanes are proposed for intersections 5 (proposed access driveway along 59th Avenue NW), 12 and 13 (proposed access driveways along E White Bridge Road), and 14 (proposed access driveway along Wazuweeta Road).

Water Supply

There are two options for water supply: 1) installation of on-site groundwater wells; or 2) connection to the City of Pine Island's water supply system. A combination of both options may be utilized as determined necessary as buildout occurs over a period of approximately 10 to 20 years. If the City's water supply system is utilized, a pipeline, storage tank, and pumping stations would be needed to accommodate water demand. This supply is expected to accommodate near-term development; however, based on the City's limited capacity and projected 5% annual increase in demand, the long-term water supply needs would exceed the City's current supply capabilities. Accordingly, development would largely rely on on-site water supply and treatment infrastructure. Two on-site groundwater wells, a water tower, and a water treatment facility could be constructed. On-site water supply and treatment facilities may be implemented in combination with connection to the City's water supply system should available capacity be available.

Wastewater Treatment and Disposal

There are two options for wastewater treatment and disposal: 1) installation of on-site wastewater treatment and disposal facilities; or 2) connection to the City of Pine Island's or North Zumbro Sanitary District's wastewater treatment and disposal system. A combination of both options may be utilized as determined necessary as buildout occurs over a period of approximately 10 to 20 years. In the long-term, development could be served by the proposed North Zumbro Sanitary District wastewater treatment facility, which would cater to multiple communities, including the Tribe. This option would require constructing a conveyance system to transport wastewater from the Action Area to the new facility. Because the feasibility of connecting to either the City of Pine Island or North Zumbro Sanitary District is uncertain, the Tribe may utilize on-site wastewater treatment and disposal systems or in combination with connection to a municipal sewer and wastewater treatment system should available capacity be available.

Because the feasibility of connecting to either the City of Pine Island or North Zumbro Sanitary District is uncertain, the Tribe may utilize on-site wastewater treatment and disposal systems or in combination with connection to a municipal sewer and wastewater treatment system should available capacity be available. On-site wastewater treatment and disposal options include a subsurface treatment system (STS) and a package plant sequencing batch reactor (SBR) system. An STS would consist of a septic tank to retain solids and a drainage field of approximately 11 to 21 acres to treat wastewater through soil filtration and microbial activities. At a minimum, wastewater would be treated to secondary levels, depending on the disposal method utilized, and potential sub-surface systems would be designed consistent with USEPA standards for the collection, treatment, and disposal of wastewater. An on-site sludge storage facility may be developed, or sludge may be disposed of via a landfill, municipal wastewater treatment plant with sludge disposal capabilities, or a private contractor specializing in sludge disposal.

Other Utilities

While electric, telephone, and cable services are already present on the Action Area, additional capacity would be necessary, which could include extending additional lines to the Action Area. The Action Area is primarily within the service area of Peoples Energy Cooperative (PEC) with a small western portion within the Goodhue County Cooperative Electrical Association (Minnesota IT Office, 2023). The Action Area is not within the service area of Xcel Energy, however, Xcel Energy provides electrical services to most of the City in addition to areas immediately north and east, and may be coordinated with to provide electrical service to the Action Area (Xcel Energy, 2023a).

1.3 LISTED SPECIES AND CRITICAL HABITAT

Critical Habitat

There is no designated or proposed Critical Habitat within or adjacent to the Action Area. There is no designated or proposed Critical Habitat within 10 miles of the Action Area.

USFWS Species List

An official USFWS species list was generated online using the USFWS Information for Planning and Consultation (IPaC) Trust Resource Report System (**Attachment A**). The following protected resources were identified:

Mammals

- Northern long-eared bat (*Myotis septentrionalis*) - Endangered

Birds

- Whooping crane (*Grus americana*) – Experimental population, non-essential

Insects

- Monarch butterfly (*Danaus plexippus*) – Candidate
- Western regal fritillary (*Argynnis idalia occidentalis*) – Proposed Threatened

Flowering Plants

- Prairie bush-clover (*Lespedeza leptostachya*) – Threatened

Whooping crane has been listed above as it was returned on the official species list (**Attachment A**). However, whooping crane is listed as endangered wherever found, except where listed as an experimental population. As the Action Area falls within the “experimental population, non-essential” it is not afforded protection under the federal Endangered Species Act. Therefore, this species is not specifically evaluated further within this report.

In addition to the listed and candidate species above, migratory bird species and their nests and eggs that are on the federal list (50 CFR §10.13) are protected under the Migratory Bird Treaty Act of 1918 (16 USC §703-711). The Migratory Bird Treaty Act protects migratory bird species and their nests from injury or death, and project-related disturbances must be reduced or eliminated during the nesting cycle. As discussed above, whooping crane within the Action Area are not afforded specific protections under FESA. However, they would still be protected from take under the MBTA. Bald and golden eagles also receive special protections under the Bald and Golden Eagle Protection Act of 1940.

1.4 HABITAT CONSERVATION PLANS

The Action Area is not located within the covered area of any Habitat Conservation Plan or Natural Community Conservation Plan.

1.5 CONSULTATION TO DATE

This Biological Assessment will be submitted by the Tribe to the U.S. Bureau of Indian Affairs, who may use it to consult with the USFWS.

Section 2 | Methods

2.1 PRELIMINARY DATA GATHERING AND RESEARCH

Prior to conducting the field survey, the following information sources were reviewed:

- Previous biological resource studies pertaining to the Action Area or vicinity, including a land cover Vegetation Survey Report prepared by Ecological Strategies, LLC (ECOS) in October 2023 (ECOS, 2023)
- United States Geologic Service (USGS) 7.5 degree-minute topographic quadrangles of the Action Area and vicinity
- Aerial photography of the Action Area
- USFWS National Wetlands Inventory (NWI) mapper (USFWS, 2023a)
- USFWS species list (IPaC Report; **Attachment A**)
- Minnesota Department of Natural Resources Conservation Planning Report (**Attachment B**)

2.2 FIELD SURVEY

Vegetative and land cover surveys were completed by ECOS biologists on May 19 and 20, 2023; June 11, 15, and 20, 2023; July 6, 2023; August 9, 2023; and September 8, 11, 22, and 27, 2023. These surveys were completed by selecting sample GPS points, gathering vegetation data within a 10-meter representative circle, and wandering meandering transects throughout the cover type to identify additional plant species. Cover types were classified using the Minnesota Land Cover Classification System (MDNR, 2004).

Consulting biologist Dr. Geo Graening and Acorn biologist Kelli Raymond conducted a general biological resources survey of the Action Area from October 17 through October 19, 2023 and collected data on wildlife and plant species present as well as on habitat types and jurisdictional waters. Variable-intensity pedestrian surveys were performed. Fauna and flora observed were recorded in a field notebook and identified to the lowest possible taxon. Survey efforts emphasized the search for federally-listed species with potential to occur in the vicinity of the Action Area. Habitat types occurring in the Action Area were mapped on aerial photographs, and information on habitat conditions and the suitability of habitats to support listed species was also recorded. The Action Area was also assessed for the presence of potentially-jurisdictional water features, including riparian zones, isolated wetlands and vernal pools, and other biologically-sensitive aquatic habitats.

2.3 MAPPING AND OTHER ANALYSIS

Locations of species' occurrences and habitat boundaries within the Action Area were recorded on color aerial photographs and then digitized to produce the habitat maps. The boundaries of potentially jurisdictional water resources within the Action Area were identified and measured in the field and similarly digitized to calculate acreage and to produce informal delineation maps. Geographic analyses were performed using geographical information system software (ArcGIS 10, ESRI, Inc.). Vegetative communities were classified by identifying distinctive associations of plants described by dominant species and particular environmental setting.

Each vegetative community was assigned a land type association consistent with the Minnesota Department of Natural Resources (MDNR) Native Plant Communities (MDNR, 2023). Wetlands and other aquatic habitats were classified using USFWS National Wetlands Inventory Classification System for Wetland and Deepwater Habitats, or "Cowardin class" (Cowardin et al., 1979; USFWS, 2007).

Informal wetland delineation methods consisted of an abbreviated, visual assessment of the three requisite wetland parameters (hydrophytic vegetation, hydric soils, hydrologic regime) defined in the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987).

Section 3 | Results of Surveys

3.1 ENVIRONMENTAL SETTING

The Action Area is located within the Rochester Plateau Ecological Subsection of the Paleozoic Plateau Ecological Section, in the Eastern Broadleaf Forest Province of Minnesota's Southern Floristic Region (Minnesota Natural Heritage Program, 1988). Before settlement in the 19th century, the Action Area contained a mosaic of upland prairie, prairie wetlands, oak woodland and brushland, floodplain forest, and maple-basswood forest. Currently, the Action Area contains only remnants of these forest and prairie community compositions. Much of the land has been converted to agricultural enterprises, primarily row crop production of corn, alfalfa, and soy, or left untilled to provide grazing land for animal meat production (historically for elk and currently for cattle). The Action Area is also dissected by regional drainage systems and transportation corridors.

3.2 INVENTORY OF FLORA AND FAUNA

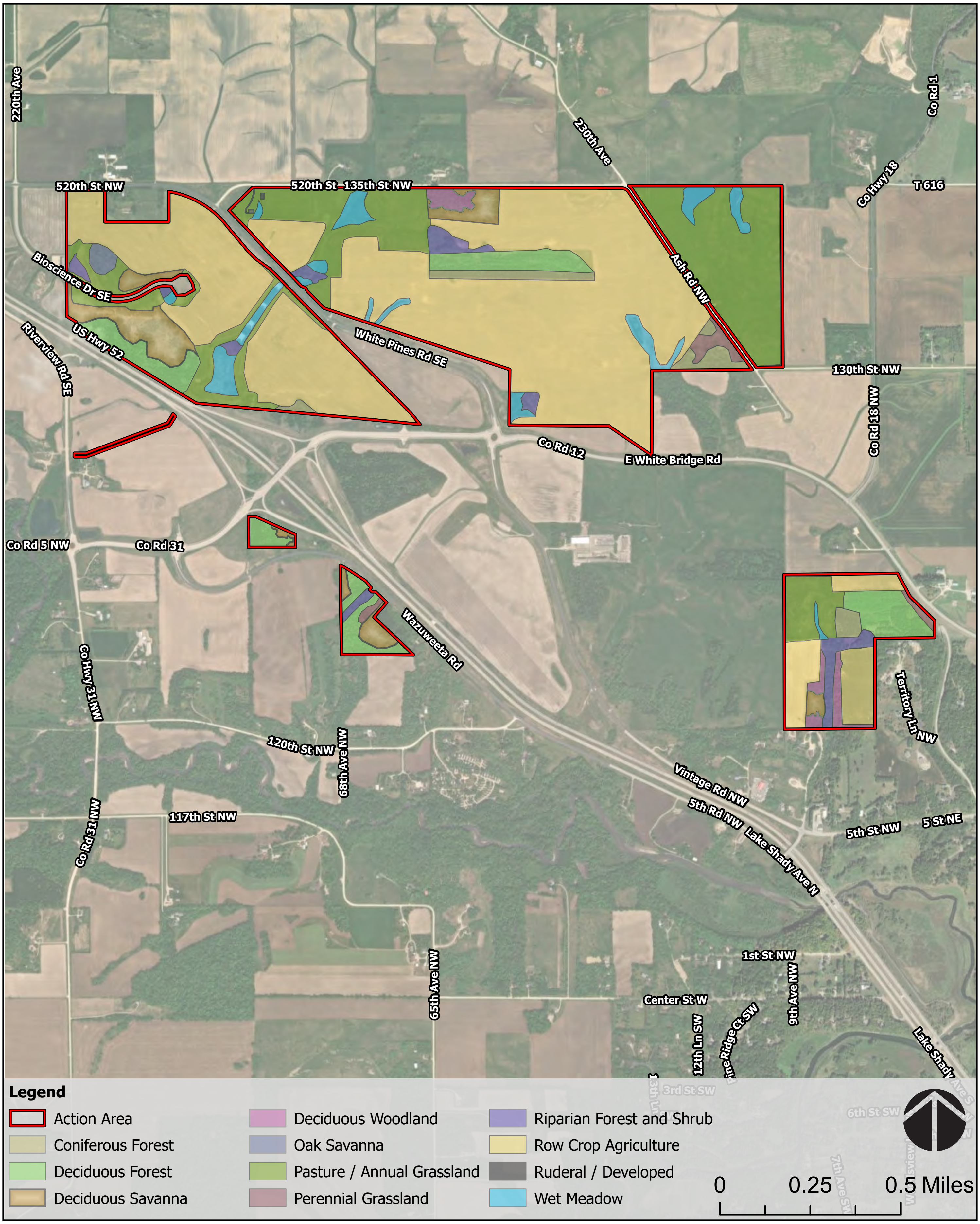
Attachment C contains a list of animals that were either directly observed during the survey, or where definitive sign was observed. Plants observed during surveys are listed in **Attachment D**. No federally-listed plant or animal species were observed during the survey conducted within the Action Area.

3.3 TERRESTRIAL HABITATS

The following terrestrial natural communities occur in the Action Area (**Table 3**). These habitats are described in detail below along with their associated MDNR land cover types (**Figure 5**). Representative site photographs are included as **Attachment E**.

Table 3: Habitat Types within the Action Area

Habitat Type	Acres Within Action Area
Ruderal/developed	2.8
Row crop agriculture	434.2
Coniferous forest	18.4
Deciduous forest	56.8
Deciduous woodland	10.4
Deciduous savanna	37.6
Oak savanna	3.2
Annual grassland/pasture	162.4
Perennial Grassland (Native Prairie)	6.9
Riparian forest and shrub	13.4
Wet meadow	20.4
Ponds and seasonal wetlands	14.5
Ephemeral channels and swales	N/A – linear features
Total	**781.0**



Maxar

FIGURE 5

TERRESTRIAL VEGETATION COMMUNITIES

Ruderal/Developed (2.8 acres)

These areas consist of disturbed or converted natural habitat that are now either in a ruderal state or fully developed. Within the Action Area, this habitat includes a livestock shelter and two silo foundations. Vegetation within this habitat type is virtually absent. The disturbed and altered condition of these lands greatly reduces their habitat value and ability to sustain rare plants or diverse wildlife assemblages. This is not considered a native vegetative community and does not have an associated MDNR land cover type.

Row Crop Agriculture (434.2 acres)

This habitat has been converted from its natural state for use as row crop production. These areas at the time of survey had either evidence of recent harvest of corn or soybeans or were either fallow or possibly planted in winter wheat for the winter season. These areas had evidence of continual disturbance by heavy machinery. These areas are considered planted monocultures that did not support other vegetation. This is not considered a native vegetative community and does not have an associated MDNR land cover type.

Coniferous Forest (18.4 acres)

In the Action Area, several isolated stands of coniferous forests were observed. Some of these stands dominated the undulating hills of glacial moraines that are too rocky to till and produce feed crops or be used by grazers. A majority of these areas are tree plantations, with significant areas of tree-layer monoculture. In areas of plantations, trees were observed to be of a single age class and/or were arranged in straight rows. These forests are a mixture of red pine (*Pinus resinosa*) or white pine (*Pinus strobus*), with occasional oaks, green ash (*Fraxinus pennsylvanica*), or basswood (*Tilia americana*). One stand in the eastern portion of the Action Area is a planted mixture of red pine, white pine, Scots pine (*Pinus sylvestris*), and junipers. The understory is sparse, but contains plants common to the deciduous forest understories, such as Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), goldenrod (*Solidago canadensis*), and honeysuckle (*Lonicera tatarica*). The natural areas most closely relate to MDNR land cover type FDs27 Southern Dry-Mesic Pine-Oak Woodland, however, as noted above many of these areas are planted areas that include a tree cover monocrop of white or red pine and are not a natural, successional habitat.

Deciduous Forest, Woodland, and Savanna (104.8 acres)

In the Action Area, deciduous forest, woodland, and savanna cover the terraces between fertile glacial till valleys where feed crops thrive or grazing is common. Forested areas are those areas where tree canopy is complete or nearly complete. Woodland areas have some notable openings in the tree canopy, but a consistent and relatively continuous tree canopy is generally maintained. Areas where trees were more scattered and significant areas of open understory occur were classified as savanna. A total of 56.8 acres of deciduous forest, 10.4 acres of deciduous woodland, and 37.6 acres of deciduous savanna were identified. Bur oak (*Quercus macrocarpa*) is the dominant species in portions of this habitat, but other dominant trees are present depending on the area of deciduous forest such as green ash, hackberry (*Celtis occidentalis*), and basswood. The understory often contained a significant shrub component; common species are black cherry (*Prunus serotina*), red maple (*Acer rubrum*), chokecherry (*Prunus virginiana*), American hazelnut (*Corylus americana*), gray dogwood (*Cornus racemosa*), Virginia creeper, and poison ivy. The associated MDNR land cover types are: FDs37 Southern Dry-Mesic Oak (Maple) Woodland; MHs49a Southern Wet-Mesic Hardwood Forest; and MHs38 Southern Mesic Oak-Basswood Forest.

Oak Savanna (3.2 acres)

An area of oak savanna was observed within the deciduous savanna. Other tree species common to deciduous forests were observed scattered within this habitat. The open spaces were dominated by species similar to the annual/grasslands habitat as well as annual herbs such as goldenrods and various native prairie grasses and non-native pasture grasses.

Native grasses were generally outcompeted by annual grasses but appeared to perform slightly better in areas protected from grazing by topography and other factors. Where the sedimentary rock layers are exposed, small cliffs and bedrock outcrops of limestone and sandstone occur. Red cedar (*Juniperus virginiana*) and bush juniper (*Juniperus communis*) were the only trees within these small pockets. Grasses are sparse, but an herbaceous layer is present, and Virginia creeper, poison ivy, honeysuckle, and sand cherry (*Prunus pumila*) were common.

MDNR land cover types UPs24 Southern Mesic Savanna and UPs14 Southern Dry Savanna best describe areas with a lower percentage of tree canopy. Minor components of exposed rock within the oak woodland/savanna best fit MDNR land cover types CTs12 Southern Dry Cliff and ROs12 Southern Bedrock Outcrop.

Annual Grassland/Pasture (162.4 acres)

Where livestock grazing is persistent, native prairie has been replaced with annual grassland and pasture. In the Action Area, Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*) are dominant, although pasture grasses are also present such as oats (*Avena sp*.) and barley (*Hordeum sp.*). Conspicuous plants in the herbaceous layer include asters (*Aster spp*.), goldenrods, and western ragweed (*Ambrosia artemisiifolia*). Tilling, hay harvest, or grazing disturbances, rather than periodic wildfires, typically keep this plant community from undergoing successional changes to woodland or reverting back to perennial grassland. These areas have historically been used for elk grazing but are presently used for seasonal grazing of cattle. Cattle were observed throughout annual grasslands/pastures during the survey. As this is a modified habitat that no longer has a dominant native vegetative community, there is no associated MDNR land cover type.

Perennial Grassland (Native Prairie)(6.9 acres)

A relatively intact remnant perennial grassland (short and tall grass prairie) was observed within the canopy openings and scattered within the understory of a portion of the deciduous woodland within the Action Area. This area contained significant amounts of native species such as sideoats grama (*Bouteloua curtipendula*), prairie dropseed (*Sporobulus heterolepis*), and porcupine grass (*Miscanthus sinensis*). This habitat is an isolated remnant of what it once was but was the most representative and largest remnant of native prairie within the Action Area. This habitat type was observed in competition with the annual grassland community described above, however, grazing or row crop production did not occur in close proximity. The associated MDNR land cover type is UPs13 Southern Dry Prairie.

Riparian Forest and Shrub (13.4 acres)

This habitat type was dominated by riparian trees such as American elm (*Ulmus americana*), green ash, and cottonwood (*Populus deltoides*). The understory consists of a lower canopy of silver maple (*Acer saccharinum*), sumac (*Rhus glabra*), and box elder (*Acer negundo*), draped in climbing vines of riverbank grape grape (*Vitis riparia*) and Virginia creeper. Thickets were common, and consisted of gooseberry (*Ribes missouriense*, *Ribes cynobati*) and blackberries (*Rubus spp*.).

Reed canary grass (*Phalaris arundinacea*) is highly invasive and formed dense stands in these areas. In other areas, sumac was extremely dominant. Within the Action Area, this habitat was observed within low-lying areas and slopes draining into low-lying areas where wetter conditions occurred. While these areas lacked standing water at the time of the survey, the topography and vegetation were indicative of wetter conditions compared to flatter areas above these riparian areas. The Land Type Associations (Minnesota Department of Natural Resources, 2023) are: Fs59 Southern Terrace Forest and FFs68 Southern Floodplain Forest.

Wet Meadow (20.4 acres)

This habitat occurred within the annual grassland/pasture habitat in areas where topography or manmade drainages allowed for consistent enough saturation of soils to allow more hydrophytic vegetation than in other areas of the annual grassland/pastureland. This included gentle swales and flat areas created by earthen impoundments or other historical grading activities. While these areas are also heavily grazed as with the annual grassland/pasture habitat, this area is presented as a separate terrestrial habitat due to the vegetative community observed. These areas were heavily dominated by reed canary grass. As these areas are heavily disturbed. It is also noted that these areas are not wetlands. Wetlands observed on site are described in **Section 3.4** below. As this is a heavily modified habitat dominated by invasive grasses, there is no correlating MDNR land cover type.

3.4 AQUATIC HABITATS

Water resource mapping was also conducted during surveys. Surveys determined that the Action Area contains the following water resources:

- Ponds and Seasonal wetlands (14.5 acres)
- Ephemeral channels and swales (linear features)

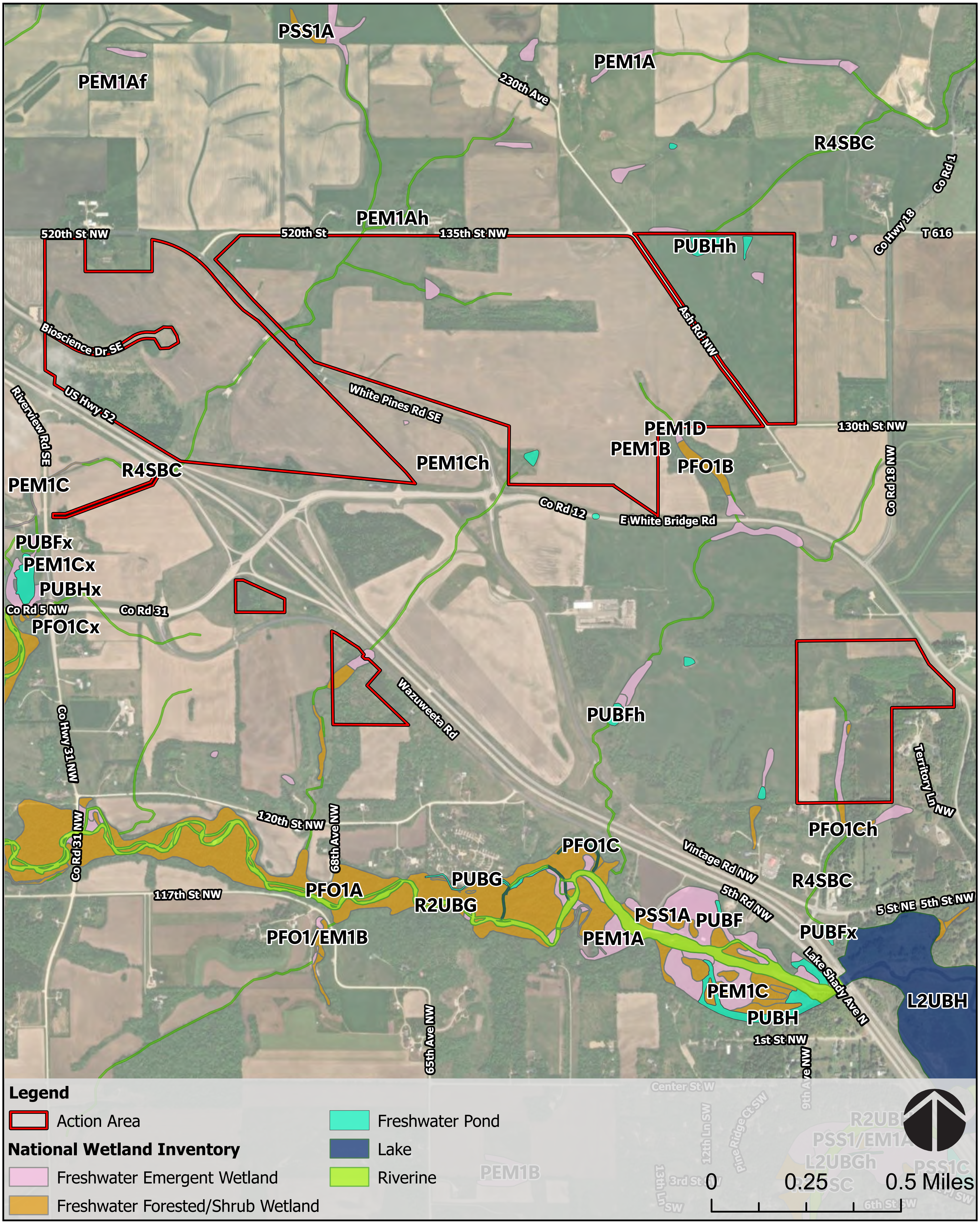
The NWI map of the Action Area is provided as **Figure 6**, and surface water features observed in the field are described in detail below and shown on **Figure 7**.

Ponds and Seasonal Wetlands

Five ponds were observed within the Action Area (**Figure 7**). The largest pond is a manmade stormwater basin that is part of the on-site drainage system. This feature has rock armoring and rip rap lining the bottom and sides of this feature. Standing water was observed in the lower portion of this feature.

Three manmade stock watering ponds were observed in the northeastern parcel. One of these ponds has an earthen dam constructed to impound water, and two of these ponds are bounded by a bermed fenceline along the north. All three of these ponds contained standing water and displayed varying levels of seasonal wetlands around the open water fringes at the time of the survey. Cattle actively graze around the ponds and cattle traffic in and around the ponds is high.

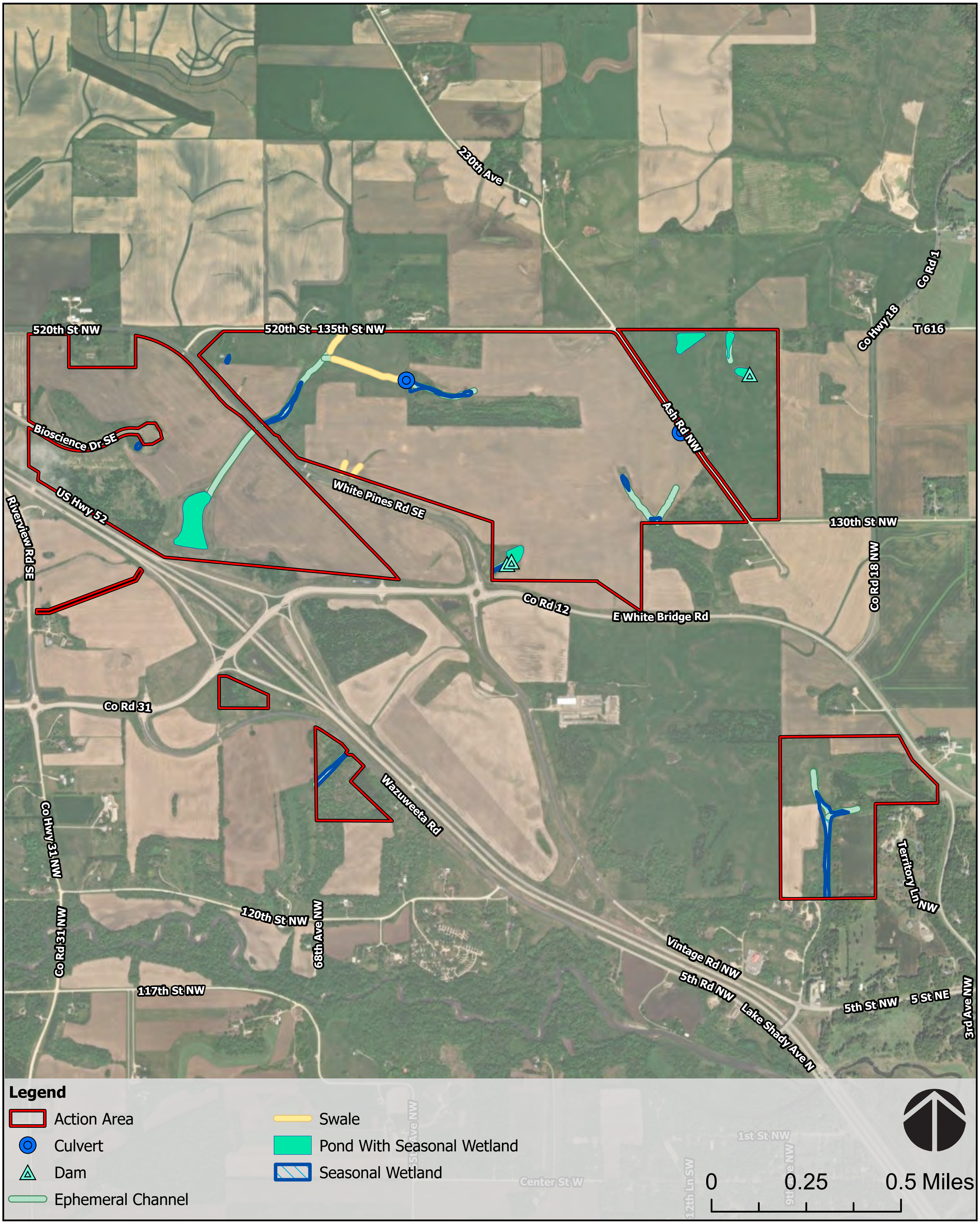
The final pond was observed at the northeast corner of the intersection of E White Bridge Road and White Pines Road SE. This feature is a manmade pond that was likely used for stock watering, though it was not actively being used at the time of the survey. An earthen dam was observed along with standing water.



Maxar

FIGURE 6

NATIONAL WETLAND INVENTORY



Maxar

FIGURE 7

SURFACE WATERS

Ephemeral Channels and Swales

Because the Action Area has undulating hilly terrain and lacks steep drops in elevation, channels are not heavily incised. Instead, most of the channels are broad and vegetated, with little cobble or bedrock exposure. Reed canary grass is the dominant ground cover. Where channels were absent but clear evidence of water conveyance between channels was observed, these areas were mapped as swales. Ephemeral channels and swales within the Action Area were typically within cattle pasture and were heavily disturbed by livestock. These features were generally dry at the time of the survey, with occasional pools of standing water. These features therefore do not hold water year-round.

Section 4 | Species Accounts

4.1 MAMMALS

Northern long-eared bat (*Myotis septentrionalis*)

Endangered

The Action Area falls within the believed extant range of this species. Northern long-eared bats overwinter (November 1 through March 31) in caves and cave-like analogs such as mines. During their active season, this species will roost in caves, structures, or in forested areas where trunk diameter at breast height exceeds three inches and where trees contain appropriate roost characteristics such as snags, exfoliating bark, or hollows. Breeding occurs during late summer/early fall, and females will congregate in groups of 30 to 60 individuals to form a maternity colony to give birth and raise their young. Maternity colonies generally occur from late May to late July (USFWS, 2023b). Outside of maternity colonies, northern long-eared bats will roost as individuals in individual trees or in colonies in larger stands of trees. Preferred foraging habitat is within forested areas with trees containing suitable roosts (USFWS, 2023c).

There are no known occurrences of this species within the Action Area, and this species was not observed during the survey. The Action Area does not contain structures that would provide suitable roosting habitat for this species during the active season. However, suitable roost trees are present elsewhere in the Action Area and provide suitable active-season roosting habitat. Winter hibernacula habitat was not present.

4.2 INSECTS

Monarch Butterfly (*Danaus plexippus*)

Candidate for Listing

The monarch is a candidate species and not yet formerly proposed for listing. During the breeding season, monarchs lay their eggs on their obligatory milkweed host plant (primarily *Asclepias* species), and larvae emerge after two to five days (USFWS, 2023e). Larvae develop through five molts over a period of 9 to 18 days, feeding on milkweed and sequestering toxic chemicals (cardenolides) as a defense against predators. The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly. There are multiple generations of monarchs produced during the breeding season, with most adult butterflies living approximately two to five weeks; overwintering adults enter into reproductive diapause (suspended reproduction) and live six to nine months (USFWS, 2023e). In the fall, monarchs begin migrating to their overwintering sites. This migration can take monarchs distances of over 3,000 km and last for over two months. In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing. The same individuals that undertook the initial southward migration begin flying back through the breeding grounds and their offspring start the cycle of generational migration over again (USFWS 2023e).

There are no known occurrences of this species within the Action Area and this species was not observed during the survey. However, this species only occurs in the area during the summer season and likely would not have been detected due to the timing of the survey.

The milkweed host plant was observed in scattered patches within the Action Area. **Figure 8** shows those areas within the Action Area with suitable habitat to support milkweed. These areas also represent the most suitable foraging habitat for monarch butterfly. These areas are subject to a lower-intensity land management regime. Areas deemed unsuitable are those areas where the land has been developed, has high-intensity grazing/agricultural use, has a closed-canopy tree layer with no understory, has been outcompeted by non-natives, or similar. Suitable milkweed and monarch foraging habitat span 99.65 acres of the Action Area. Mapping of monarch sightings show numerous observations in 2023 within Minneapolis and Rochester, with anecdotal sightings recorded as close as the City of Oronoco in 2022 (Journey North, 2023; KROC, 2022).

Western regal fritillary (*Argynnis idalia occidentalis*)

Proposed Threatened

Western regal fritillary is a non-migratory butterfly that can be found in native prairie habitat, especially upland prairies (MDNR, 2024). Larvae feed exclusively on violets (*Viola* spp.), with bird's-foot violet serving as the most common larval host plant. This species is documented to occur in southern and western Minnesota. The MDNR has documented occurrences of this species in Olmstead County and Goodhue County (MDNR, 2024). Small fragments of prairie habitat broken by agriculture are not considered suitable to support populations of this species (MDNR, 2024).

There are no known occurrences of this species within the Action Area, and this species was not observed during the survey. Host plants for this species were not observed during the survey, however, the survey occurred in October when all violets may not be identifiable. Perennial grassland within the Action Area is limited to two small patches; one along East White Bridge Road and a second within parcel number 851221080500. The patch along East White Bridge Road is not suitable for this species as it is extremely small and associated with a managed roadside right-of-way. Perennial grassland within parcel 851221080500 was observed to be relatively intact. Although not large enough to support a population of this species, dispersing individually have a low probability of foraging within this habitat.

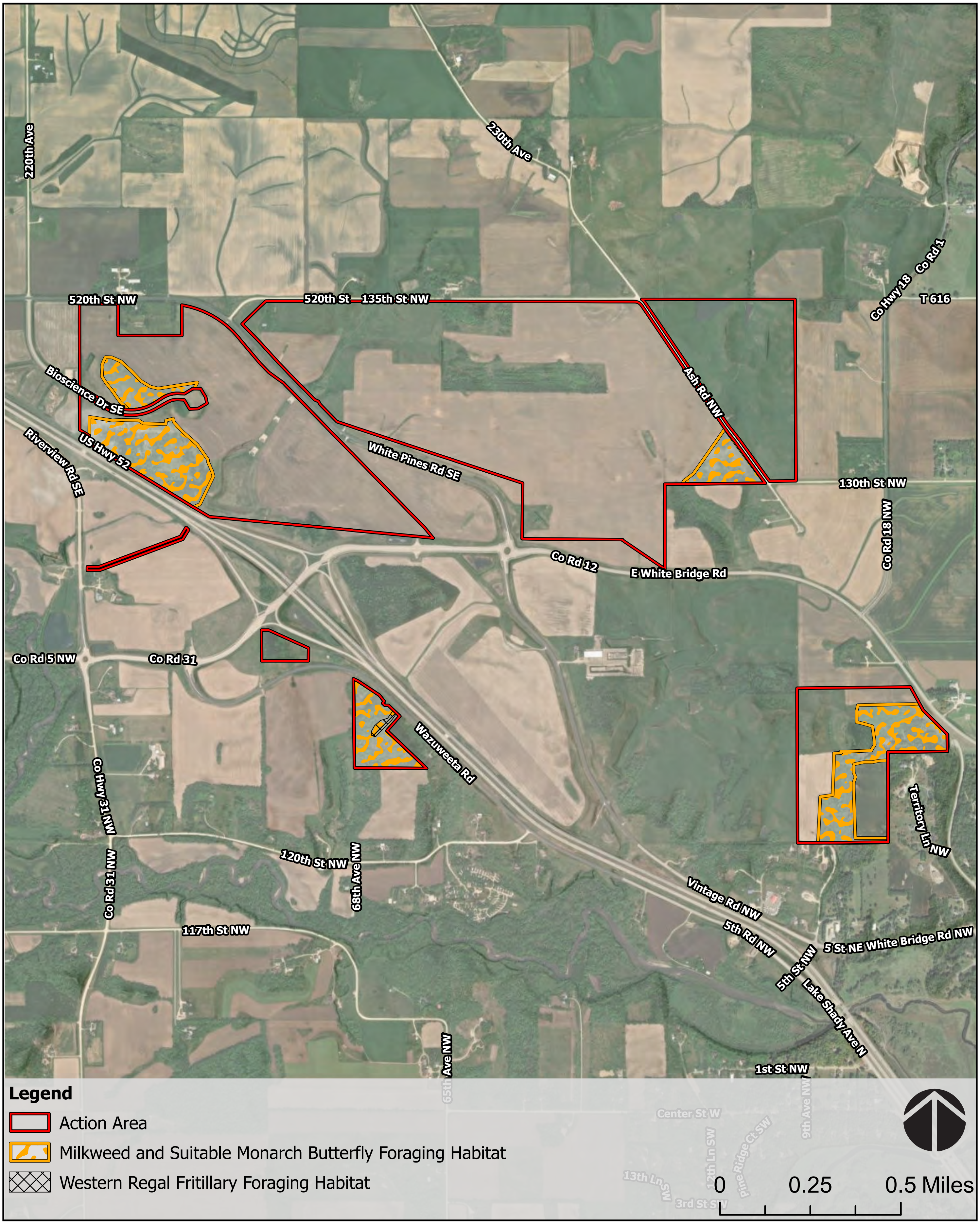
4.3 FLOWERING PLANTS

Prairie bush-clover (*Lespedeza leptostachya*)

Threatened

Prairie bush clover is a member of the pea family that grows up to three feet in height and produces a pale pink to cream flower. This plant has narrow leaflets that grow in clusters of three with a green top side and a silvery, silky underside. The bloom season for this plant is from mid-July to early September, however, this plant can also produce pods from flowers that never open (USFWS, 2023f). Silvery-green seed pods typically form from early September into early October. Prairie bush clover can self-pollenate but may also rely on cross-pollination via wind or pollinators. Individual plants have been known to persist in their environment for 30 years or more. The range of this species has been reduced to isolated patches of land within Illinois, Iowa, Minnesota, and Wisconsin (USFWS, 2021).

There are no known occurrences of this species within the Action Area, and this species was not observed during the survey, however, the survey occurred outside the bloom window for this species. Although this species occurs within dry prairies, it is limited even within these areas as it does not compete well with other native species common within dry prairies (Minnesota Wildflowers, 2020).



Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyrelsen,GSA,GSI and the GIS User Community, Maxar

FIGURE 8

POTENTIAL FEDERALLY-LISTED BUTTERFLY HABITAT

Remnants of a fragmented native prairie was observed within APN 851221080500 adjacent to Highway 52 and located between two row crop fields. This area is likely too small, isolated, and degraded to support prairie bush-clover. According to the MDNR, this species only occurs in isolated patches within the State, with the majority of known plants located in the southwestern portion of the State near the Des Moines River valley (MDNR, 2020). While the MDNR maintains that this plant historically occurred within Olmsted County, there are no records available documenting such occurrences (Minnesota Wildflowers, 2020).

Section 5 | Effects Determination

5.1 POTENTIAL ADVERSE EFFECTS ON CRITICAL HABITAT

There is no designated or proposed Critical Habitat within or adjacent to the Action Area. Additionally, there is no designated or proposed Critical Habitat within 10 miles of the Action Area. Implementation of the Proposed Action will have no effect on designated or proposed critical habitat for federally-listed species.

5.2 POTENTIAL ADVERSE EFFECTS ON LISTED SPECIES

Table 4 outlines the habitat impact acreages resulting from the Proposed Action. Habitats converted to an urban land use include commercial, industrial, community and administrative, cultural facility, residential, and infrastructure. Agricultural land uses include cropland and buffalo pastureland. Unimpacted habitats include those habitats that are within undevelopable areas or within a designated open space/recreation area.

Table 4: Habitat Impacts

Habitat	Acres Converted to Urban Land Use	Acres Intended for Row Crop	Acres Intended for Grazing	Unimpacted Acres
ruderal/developed	0.3	0.0	2.3	0.2
row crop agriculture	318.1	52.3	0.0	44.8
coniferous forest	9.0	1.5	0.0	7.9
deciduous forest	20.0	0.0	0.0	36.8
deciduous woodland	0.7	0.2	0.0	9.5
deciduous savanna	19.4	0.3	0.0	17.9
oak savanna	0.0	0.0	0.0	3.2
annual grassland/pasture	39.9	1.6	71.6	49.3
perennial grassland (native prairie)	5.7	0.0	0.0	1.2
riparian forest and shrub	4.1	0.0	0.0	9.8
wet meadow	15.3	0.3	5.5	13.1
pond with seasonal wetland	0.0	0.0	2.7	6.6
seasonal wetland	0.1	0.0	0.0	5.1

Acres intended for grazing would not be subject to land clearing. These areas have previously been subject to grazing pressures and would therefore experience similar land management actions as current or historical land use. Therefore, significant impacts to biological resources within these areas is not anticipated. Additionally, areas intended for row crop that are already used for row crop production would continue to be managed consistent with existing agricultural use. Therefore, impacts to biological resources would not occur in these areas. The impact discussion below therefore focuses on acres converted to an urban land use and acres intended for row crop not already in row crop production.

Northern Long-Eared Bat

There is potential for individual northern long-eared bats to roost within trees with suitable roost characteristics such as basal hollows during their active season (April 1 through October 31). Within the Action Area, there are 139.8 acres of tree-dominated habitats that may provide roosting habitat for northern long-eared bat. A total of 55.2 acres of tree-dominated habitat fall within areas intended for urban land use or row crop production. It is likely that not all trees within this area would be removed, however, this report conservatively assumes the highest potential for impacts. Therefore, should roosting bats be present during tree removal activities, take of individual bats could occur. Avoidance, minimization, and mitigation measures are included in **Section 5.5**. Avoidance measures include timing of tree removal outside of the active season when there is no potential for northern long-eared bats to occur. Should tree removal occur during the active season, measures in **Section 5.5** would require that trees with suitable roost features be removed over a two-day period during the times of day when roosting northern long-eared bats would not be present. According to the USFWS Standing Analysis for NLEB Determination Key, projects that increase traffic within northern long-eared bat habitat should consider impacts from collision and noise (USFWS, 2023g). The following are considered potentially impactful:

- Construction of one or more new roads (or lanes on an existing road) within 1,000 feet of suitable habitat; and
- New roads or increased traffic through contiguous forest 10 acres in size or greater.

Increased traffic along existing roadways would occur as a result of the Proposed Action, primarily along Highway 52. In these areas, forested habitat is already interrupted and traffic is already considerable. Forested habitat in this area is further fragmented by agricultural development and existing housing. Additional traffic in this area would not significantly alter the quality of nearby habitat for northern long-eared bat as Highway 52 is the primary north-south roadway that connects multiple cities and therefore is already subject to a high traffic load.

There are five continuous blocks of tree-dominated habitat greater than 10 acres within the Action Area. These areas are largely within designated open space and would not be impacted. One block of forested habitat is currently bisected with a graded dirt access drive that is occasionally utilized and was part of a previously-planned development project that was never constructed. Additional roadways would be developed within 1,000 feet of suitable habitat but would not bisect forested habitat. According to the Standing Analysis and Implementation Plan – Northern Long-Eared Bat Assisted Determination Key, this type of impact would not be significant if for every 1,000 feet of new road that crosses between contiguous forest patches, will there be at least one place where bats could cross the road corridor by flying less than 33 feet (10 meters) between trees whose tops are at least 66 feet (20 meters) higher than the road surface. The existing dirt access road is not a new road and is approximately 1,000 feet in length and therefore would not generate a new significant roadway impact.

The Proposed Action would also introduce new sources of artificial lighting within the Action Area. According to the Standing Analysis and Implementation Plan – Northern Long-Eared Bat Assisted Determination Key, artificial lighting within 1,000 feet of suitable habitat could generate a significant impact. Impact minimization measures are included within the Standing Analysis in order to reduce this impact, including (1) the use of downward-facing, full cut-off lens lights; (2) the use of the Backlight, Uplight, Glare (BUG) system developed by the Illuminating Engineering Society, with all three ratings (backlight, uplight, and glare) as close to zero as is possible, with a priority of "uplight" of 0; and (3) use of temporary lighting only when such lighting is directed away from suitable habitat during the active season. These measures have been included in **Section 5.5**.

Finally, the Proposed Action would introduce new noise sources within the Action Area. As noted above, there are five areas with 10 or more acres of contiguous forested habitat suitable for northern long-eared bat. Two of these areas are within the two southernmost parcels isolated from the rest of the Action Area. The only development planned for these parcels are cultural facilities that would not generate significant noise and would not operate overnight or impact nighttime bat activity. One of these areas is immediately adjacent to Highway 52 next to a proposed industrial/commercial area. Highway 52 already subjects this habitat to high levels of noise. Proposed development adjacent to this area would not be operational at night and would not increase ambient nighttime noise. The final two areas are adjacent to proposed single-family residential in areas currently in row crop production. Single family residences would not be expected to generate high levels of nighttime noise. Additionally, these areas are currently subject to agricultural activities including use of heavy machinery and other agricultural equipment.

With consideration of measures presented in **Section 5.5**, implementation of the Proposed Action may affect but is unlikely to adversely affect northern long-eared bat.

Monarch Butterfly

The monarch requires an obligate host plant—milkweed (*Asclepias*)—for feeding, and groves of trees for overwintering. Scattered milkweed was observed in the understory of forested areas where grazing pressures were lower, though there are no known breeding populations within the Action Area. A total of 99.6 acres of suitable milkweed and foraging habitat for monarch butterfly was observed. The Proposed Action would impact 33.4 acres (33.5 percent) of suitable habitat. The majority of suitable habitat for monarch butterfly (66.5 percent) would therefore not be impacted.

In February of 2023, the USFWS issued conservation recommendations for Monarch butterfly that included land management activities. In order to minimize impacts to monarch butterflies, those land management activities that could be implemented for the Proposed Action have been included as avoidance, minimization and mitigation measures in **Section 5.5** for those areas that will be managed by the Tribe, including commercial, industrial, community and administrative, and tribal cultural facilities. These measures include maximizing use of native vegetation in the landscaping and minimizing the use of pesticides. This would provide for monarch butterfly land management actions for landscaping in areas of existing monarch butterfly habitat as well as areas not currently suitable for monarch butterfly. With consideration of measures presented in **Section 5.5**, implementation of the Proposed Action may affect but is unlikely to adversely affect Monarch butterfly.

Western Regal Fritillary

Suitable habitat for this species is limited to a small patch of perennial grassland within parcel 851221080500, where individuals may infrequently forage. There are no construction activities proposed in or near this habitat. This habitat is within an area the Tribe has identified for preservation. Therefore, impacts to this habitat would not occur. The Proposed Action would have no effect on western regal fritillary.

Prairie Bush-Clover

Suitable habitat for prairie bush-clover does not occur within the Action Area. All of the perennial grasslands in the Action Area are within a designated natural area/parks and recreation areas. Therefore, implementation of the Proposed Action will have no effect on prairie bush-clover.

5.3 INTERRELATED, INTERDEPENDENT, AND CUMULATIVE EFFECTS

Interrelated and Interdependent Effects

Interrelated and interdependent effects are direct or indirect effects that occur as a result of activities that are closely affiliated with a project in areas outside the Action Area. Such actions include road or utility improvements off-site that would not be constructed but for implementation of the Proposed Action. Implementation of the Proposed Action would involve the construction of off-site access improvements and may involve off-site improvements for the extension of additional roadway and utility connections to the Action Area.

On tribal trust land, the Tribe must enroll in the USEPA's 2022 Construction General Permit. On non-federal land, the landowner must enroll under the State Water Quality Control Board's Construction General Permit prior to the initiation of construction. In conjunction with enrollment under either of these permit programs, a Storm Water Pollution Prevention Plan, Erosion Control Plan, and a Hazardous Materials Management/Spill Response Plan must be created and implemented during construction to avoid or minimize the potential for erosion, sedimentation, or accidental release of hazardous materials. Implementation of these measures mandated by law would greatly reduce potential indirect construction-related impacts to water quality.

Proposed roadway and utility connections (**Section 1.2**) would occur within public rights-of-way and are therefore considered off-site improvements. Connections may include grading, paving, and widening to provide sufficient access and accommodate anticipated traffic. These activities would impact areas shoulder areas that have been previously paved or disturbed.

<u>Northern long-eared bat:</u> Construction of the access improvements and utility extensions would be limited to work within road shoulders. Roost habitat is not present within these areas. These areas do not contain features of value to northern long-eared bat. Therefore, the Proposed Action would generate <u>no effect</u> on northern long-eared bat related to interrelated and interdependent effects.

<u>Monarch butterfly and western regal fritillary:</u> Interrelated and interdependent actions would be limited to minimal work within disturbed road shoulders and would not directly impact habitat suitable for monarch butterfly or western regal fritillary. Additionally, as discussed above, these actions would not indirectly impact habitat outside of the indirect impact areas. Therefore, the Proposed Action would generate <u>no effect</u> on monarch butterfly or western regal fritillary related to interrelated and interdependent effects.

<u>Prairie bush-clover:</u> Work related to the access improvements and electrical connections would occur entirely within disturbed road shoulders that do not provide suitable habitat for prairie bush clover. Therefore, the Proposed Action would generate <u>no effect</u> on prairie bush clover related to interrelated and interdependent effects.

Cumulative Effects

For the purposes of this assessment, cumulative effects consider the full range of a species and whether the Proposed Action, in conjunction with the condition of the species across its range, would imperil the long-term existence of a species.

For the purposes of this analysis, the cumulative setting includes growth and development envisioned in the in the City of Pine Island Comprehensive Plan, City of Pine Island Elk Run Concept Master Plan, Olmsted County General Land Use Plan, the Oronoco Planned Future Land Use map, and the Oronoco Township Land Use Plan (City of Pine Island, 2010; City of Pine Island, 2008; Olmsted County, 2022; City of Oronoco, 2020; and Oronoco Township, 2002). The cumulative setting also includes known development projects that are proposed, planned, and/or currently being constructed within one mile of the Action Area as shown in **Table 5**. Aside from the Emergency Gaming Facility and Fee-to-Trust Project, discussed further below, these projects consist of infrastructure improvements and thus the potential for cumulative effects in combination with the Proposed Action would be largely related to construction activities.

Table 5: Potential Future Projects within 1 Mile of Action Area Considered in Cumulative Analysis

Project Name	Project Location	Project Description	Project Status	Distance from Action Area
Resident Wastewater Development	Oronoco, MN	Construction of a municipal wastewater collection and treatment system to parallel the existing water system.	Under construction	1.0 mile
Hwy 52 Improvements	HWY 52 from Oronoco to Pine Island	Planned resurfacing of the roadway with potential infrastructure improvements such as a frontage road, flood mitigation improvements, and intersection upgrades.	Planning stages	0.34 miles
PIIC Emergency Gaming Facility and Fee-to-Trust Project	Adjacent to Action Area	Renovation of existing barn structure to gaming facility.	Planning stages	0.1 miles
Xcel Energy Mankato-Mississippi River Transmission Project	Adjacent to Action Area	Approximately 120 miles of new and upgraded 345 kilovolt (kV) transmission lines between the existing Wilmarth Substation near Mankato and a connection point at the Mississippi River near Kellogg, Mn.	Planning stages	0.1 miles
Sources: KIMT, 2022; City of Oronoco, 2023; Oronoco Township Planning Advisory Commission, 2022; Minnesota Department of Transportation, 2023; Meier Companies, Inc., 2023; ABC6 News, 2022				

Adjacent Cumulative Projects

PIIC Emergency Gaming Facility and Fee-to-Trust Project

The Tribe owns parcels adjacent to the Action Area within the boundaries of both the City of Pine Island and Olmsted County and anticipates submitting a separate fee-to-trust application for this land. This project, referred to as the PIIC Emergency Gaming Facility and Fee-to-Trust Project, is in the planning phases and consists of converting an existing barn structure into a gaming facility. It is anticipated that the gaming facility would become operational should the Tribe's existing casino be forced to close but may also operate concurrently with the Tribe's existing casino. This report conservatively assumes full buildout and operation of the PIIC Emergency Gaming Facility and Fee-to-Trust Project. The site is located within an area previously planned for urban development under the City of Pine Island's conceptual Elk Run Concept Master Plan. This former project included multiple types of residential uses (low-, medium-, and high-density), commercial uses including retail and office space, medical offices, mental and physical wellness centers, schools and sports complex, and various community amenities including parks, outdoor amphitheater, and equestrian center (City of Pine Island, 2008). These previously planned uses are generally consistent with the Proposed Action and PIIC Emergency Gaming Facility and Fee-to-Trust Project.

Xcel Energy Mankato-Mississippi River Transmission Project

Xcel Energy is implementing the Mankato-Mississippi River Transmission Project. The project includes approximately 120 miles of new and upgraded 345 kilovolt (kV) transmission lines between the existing Wilmarth Substation near Mankato and a connection point at the Mississippi River near Kellogg, MN. The project is organized into four segments that include either new or upgraded infrastructure. Segment 4, the Rochester Connector, is planned adjacent to the Action Area. Segment 4 includes the implementation of approximately 20 miles of new 161 kV transmission lines between the existing North Rochester Substation near Pine Island and an existing transmission line northeast of Rochester, which is being relocated from its existing alignment to install the new 345 kV infrastructure. Segment 4 Owners include Xcel Energy, Dairyland Power Cooperative, Rochester Public Utilities, and Southern Minnesota Municipal Power Agency. The project is anticipated to be in service in 2028. The Action Area is currently not within the service area of Xcel Energy, however Xcel Energy provides electrical services to most of the City of Pine Island in addition to areas immediately north and east, and may be coordinated with to provide additional electrical service to the Action Area (Xcel Energy, 2023).

Cumulative Species Impacts

Northern long-eared bat: **Section 5.5** includes measures that would avoid potential take of northern long-eared bat. As take of northern long-eared bat would not occur with inclusion of the measures in **Section 5.5**, cumulative impacts related to direct injury or mortality would not occur. Cumulatively considered projects would not impact contiguous forested habitat. Therefore, even when considering potential cumulative impacts, the Proposed Action may affect but is not likely to adversely affect northern long-eared bat.

Monarch butterfly and western regal fritillary: Cumulative projects are largely infrastructure projects that would consist of work within road shoulders or similarly ruderal/developed areas. The PIIC Emergency Gaming Facility and Fee-to-Trust Project would also be limited to ruderal/developed areas. Therefore, there are no known cumulatively considered projects that would result in impacts to Monarch butterfly or western regal fritillary in the vicinity of the Action Area. Therefore, there would cumulatively be no effect.

Prairie bush-clover: As discussed above, the Action Area does not contain habitat prairie bush clover, and direct or indirect impacts to this species would not occur. Therefore, even when considering cumulative impacts to prairie bush-clover, the Proposed Action would have no effect.

5.4 POTENTIAL ADVERSE EFFECTS ON MIGRATORY BIRDS

Vegetation and structures within the Action Area may provide suitable nesting and perching habitat for raptors and/or migratory birds. If construction activities are conducted during the nesting season, nesting birds/raptors could be directly impacted by removal of nesting habitat and indirectly impacted by noise, vibration, and other construction-related disturbance. Implementation of avoidance and minimization measures in **Section 5.5** would reduce potential impacts to migratory birds, and nesting birds in general, to a less than significant level.

5.5 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The following measures will be implemented:

Federally-Listed Bats

- Tree removal shall occur outside the active season of roosting bats (April 1 through October 31) as possible.

  OR

- If tree removal occurs within the active season of roosting bats, a qualified biologist shall perform a preconstruction survey prior to tree removal to identify suitable roost trees. Suitable roost trees shall be removed over a two-day period utilizing hand tools. On the first day, tree limbs shall be removed. On the second day the balance of the tree can be felled.

Nesting Migratory Birds/Other Birds of Prey

- If construction activities commence during the general nesting season (February 15 to September 1), a preconstruction nest survey shall be conducted by a qualified biologist on and within 100 feet of proposed construction within 7 days of initiating ground disturbance. If active nests are identified, the qualified biologist shall determine a suitable avoidance buffer based on the needs of the species observed.
- Avoidance measures include establishment of a buffer zone using construction fencing or similar, or the postponement of construction until after the nesting season, or until after a qualified biologist has determined the nest is no longer active. Avoidance buffers may vary in size depending on habitat characteristics, project-related activities, and disturbance levels.
- Should work activity cease for 14 days or more during the nesting season, surveys shall be repeated to ensure birds and have not established nests during inactivity.

Monarch Butterfly

For lands within the Action Area managed by the Tribe, the following land management practices shall be implemented:

- Landscaping shall maximize the use of native vegetation
- Landscaping plans shall not include non-native tropical milkweed (*Asclepias curassavica*)
- Land management activities shall minimize the use of pesticides, including insecticides, fungicides, and herbicides. Pest management shall be conducted through non-chemical means as feasible. If use of chemical pesticides is necessary, the following practices shall be implemented:
  - Avoid use during summer, which is the peak time for Monarchs to occur in the vicinity of the Action Area.
  - Avoid the use of neonicotinoids or other systemic insecticides.
  - Avoid the application of pesticides on milkweed plants and define buffer zones to protect habitat from nearby areas where pesticides are applied.
  - Avoid insecticides that target lepidopterans.
  - Avoid the use of strobilurin fungicides on milkweeds.
  - Use targeted application methods, avoid large-scale broadcast applications, and take precautions to limit off-site movement.

Section 6 | Conclusions

The Action Area is comprised of a mixture of agricultural and ruderal areas with patches of tree-dominated areas crossed in places by surface water and riparian resources. The USFWS species list identified four federally-listed species with the potential to occur in the vicinity of the Action Area in addition to migratory birds protected under the MTBA. These species are the northern long-eared bat, tricolored bat, monarch butterfly, and prairie bush-clover. This Biological Assessment is respectfully submitted to USFWS for review and concurrence that the Proposed Action would have **no effect** on prairie bush-clover and western regal fritillary, and that the Proposed Action **may affect but is not likely to adversely affect** monarch butterfly and northern long-eared bat with consideration of avoidance and minimization measures.

Section 7 | References

ABC6 News, 2022. Pine Island Moves Forward with Elk Run Development. Available online at: https://www.kaaltv.com/archive/pine-island-moves-forward-with-elk-run-development/. Accessed September 2023.

City of Oronoco, 2006. City of Oronoco Comprehensive Plan, Future Land Use: Plans, Goals, Policies & Implementation Steps. Adopted July 17, 2006. Available online at: https://www.oronoco.com/?SEC=455BFD04-5B18-4B96-AD03-FBA261D8CE4F. Accessed November 2023.

City of Oronoco, 2020. Planned Future Land Use Map. Available online at: https://www.oronoco.com/vertical/sites/%7B0EACF6BF-709F-42E8-AA6B-876F32576E1A%7D/uploads/FLUP_MAP_07212020(2).pdf. Accessed September 2023.

City of Pine Island, 2008. Elk Run Concept Master Plan, Olmsted County, Minnesota. Original: November 30, 2007. Revised June 3, 2008.

City of Pine Island, 2010. Pine Island Comprehensive Plan. Adopted October 19, 2010.

ECOS, 2023. Elk Run Site Vegetation Survey Report. October 19, 2023. Prepared by Ecological Strategies, LLC.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi. 92 pp.

Journey North, 2023. Journey North Maps. Available online at: https://maps.journeynorth.org/map/?map=milkweed-first&year=2022. Accessed November 2023.

KIMT, 2022. Proposed Housing Development in Oronoco Clears Another Hurdle. Available online at: https://www.kimt.com/news/proposed-housing-development-in-oronoco-clears-another-hurdle/article_8f3405a0-d591-11ec-9ec9-6720ba0c9291.html. Accessed September 2023.

KROC, 2022. Huge Sightings in Minnesota Indicates Monarchs are on the way. Available online at: https://kroc.com/when-do-monarchs-come-to-minnesota-iowa-wisconsin-illinois/. Accessed November 2023.

Meier Companies, Inc., 2023. River Bend Riverwood Court SW, Oronoco. Available online at: https://www.rochesterareabuilders.com/wp-content/uploads/2019/01/38-PDF.pdf. Accessed September 2023.

Minnesota Department of Natural Resources (MDNR), 2004. Minnesota Land Cover Classification System User Manual. Available online at: https://files.dnr.state.mn.us/assistance/nrplanning/community/mlccs/mlccs_manual_v5_4.pdf. Accessed December 2023.

MDNR, 2020. Rare Species Guide *Lespedeza leptostachya*. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB27090#:~:text=The%20majority%20of%20known%20plants,lakes%20region%20of%20northwestern%20Iowa. Accessed November 2023.

MDNR, 2023. Minnesota's Native Plant Communities. Available online at: https://www.dnr.state.mn.us/npc/index.html. Accessed November 2023.

MDNR, 2024. Rare Species Guide: *Argynnis idalia*. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IILEPJ6040. Accessed September 2024.

Minnesota Natural Heritage Program. 1988. Natural Vegetation of Minnesota at the Time of the Public Land Survey 1847-1907. Minnesota Department of Natural Resources Biological Report No. 1.

Olmsted County, 2022. General Land Use Plan. Adopted August 2022. Available online at: https://www.olmstedcounty.gov/business/building-development-gis/planning-land-use-zoning/general-land-use-plan-update-information#:~:text=The%20Olmsted%20County%20General%20Land,should%20occur%20throughout%20the%20county. Accessed September 2023.

Oronoco Township, 2002. Oronoco Township Land Use Plan. Available online at: https://www.oronocotownship-mn.gov/vertical/sites/%7BFE3C0B22-FD68-45A1-AE59-CE8C53538DDD%7D/uploads/OronocoLandUsePlan.pdf. Accessed September 2023.

Oronoco Township Planning Advisory Commission, 2022. Minutes of the Oronoco Township Planning Advisory Commission. Available online at: https://www.oronocotownship-mn.gov/vertical/sites/%7BFE3C0B22-FD68-45A1-AE59-CE8C53538DDD%7D/uploads/3b_OR2022-003ZC002GDP_Bassett10-17-2022_Draft_Minutes_OT-PAC.pdf. Accessed September 2023.

United States Fish and Wildlife Service (USFWS), 2021. FWS Focus: Prairie Lespedeza. Available online at: https://www.fws.gov/species/prairie-lespedeza-lespedeza-leptostachya. Accessed September 2023.

USFWS, 2022. FWS Focus: Tricolored Bat. Available online at: https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus. Accessed September 2023.

USFWS, 2023a. National Wetlands Inventory Program, Division of Habitat and Resource Conservation. Available online at: https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/. Accessed September 2023.

USFWS, 2023b. Environmental Conservation Online System. Species Accounts. Northern Long-eared Bat. Available online at: https://ecos.fws.gov/ecp/species/9045. Accessed September 2023.

USFWS, 2023c. FWS Focus: Northern Long-eared Bat. Available online at: https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Accessed September 2023.

USFWS, 2023d. Environmental Conservation Online System. Species Accounts. Tricolored Bat. Available online at: https://ecos.fws.gov/ecp/species/10515. Accessed September 2023.

USFWS, 2023e. Environmental Conservation Online System. Species Accounts. Monarch Butterfly. Available online at: https://ecos.fws.gov/ecp/species/9743. Accessed September 2023.

USFWS, 2023f. Environmental Conservation Online System. Species Accounts. Prairie Bush-clover. Available online at: https://ecos.fws.gov/ecp/species/4458. Accessed September 2023.

USFWS, 2023g. Standing Analysis and Implementation Plan – Northern Long-Eared Bat Assisted Determination Key. Available online at: https://www.fws.gov/sites/default/files/documents/Standing%20Analysis%20Version%201.1%20April%202023.pdf. Accessed November 2023.

USFWS, 2023h. Range-Wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines. Available online at: https://www.fws.gov/sites/default/files/documents/USFWS_Range-wide_IBat_%26_NLEB_Survey_Guidelines_2023.05.10_0.pdf. Accessed November 2023.

Xcel Energy, 2023. Mankato-Mississippi River Transmission Project. 2023. Available online at: https://mmrtproject.com/. Accessed November 2023.

Section 8 | Qualifications of Preparers

G.O. Graening, Ph.D., M.S.E.

Dr. Graening holds a Doctorate in Biological Sciences and a Master of Science in Biological Engineering and is a certified arborist (International Society of Arboriculture). Dr. Graening has 26 years of experience in environmental assessment and research, including the performance of numerous wetland delineations and aquatic restoration projects, USFWS permitted work for multiple bat species, and plant surveys. Dr. Graening also served as an adjunct professor of biology at California State University Sacramento for 10 years and was an active researcher in the area of conservation biology and groundwater ecology.

Kelli Raymond, B.S.

Ms. Raymond holds a B.S. in Animal Biology with a focus on Wildlife Ecology. She has approximately 10 years of experience collecting field data and preparing environmental assessments. Ms. Raymond has worked in several states across the U.S. performing biological resources surveys, including plant surveys, bat acoustic and flyout monitoring, and wildlife utilization monitoring. She also has experience live handling numerous wildlife species, including fish, migratory birds, and big game. Ms. Raymond is experienced in the preparation of Biological Assessments and Section 7 consultation with both the USFWS and NMFS under the federal Endangered Species Act.

Attachment A

USFWS Species List (IPaC Report)

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: 09/10/2024 13:49:19 UTC
Project Code: 2024-0084467
Project Name: PIIC Community Development

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 range-wide northern long-eared bat 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: 2024-0084467
Project Name: PIIC Community Development
Project Type: Acquisition of Lands
Project Description: Land Acquisition and Mixed Use
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.18411105,-92.55451588366822,14z

Counties: Goodhue and Olmsted counties, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 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.

---

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
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

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Western Regal Fritillary *Argynnis idalia occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Prairie Bush-clover *Lespedeza leptostachya* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4458	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[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

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 NO BALD AND GOLDEN EAGLES WITHIN THE VICINITY OF YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

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
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

NAME	BREEDING SEASON
Prairie Loggerhead Shrike *Lanius ludovicianus excubitorides* 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/8833	Breeds Feb 1 to Jul 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.

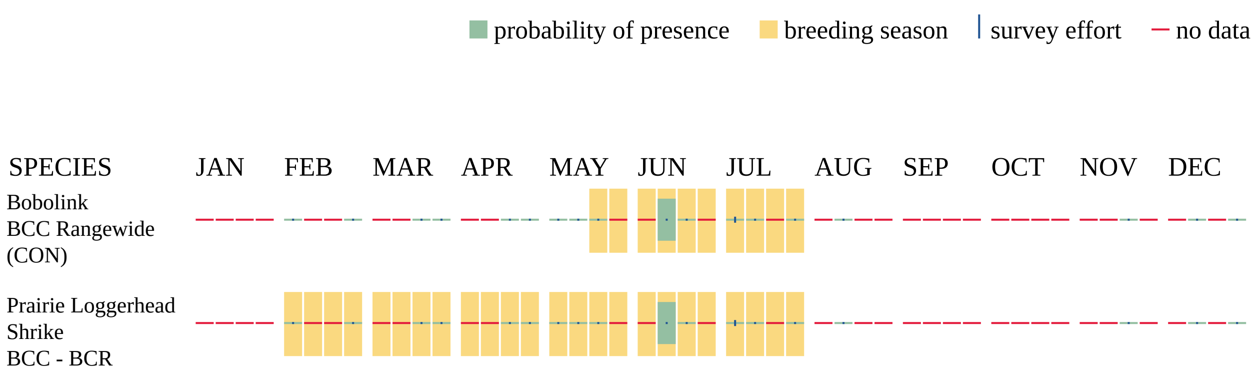
Probability of Presence (■)

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 conservation 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

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.

RIVERINE
- R4SBC

FRESHWATER POND
- PUBFh
- PUBHh

FRESHWATER EMERGENT WETLAND
- PEM1D
- PEM1Ch
- PEM1B
- PEM1C
- PEM1Ah

FRESHWATER FORESTED/SHRUB WETLAND
- PFO1B
- PFO1A

IPAC USER CONTACT INFORMATION

Agency: Prairie Island Indian Community in the State of Minnesota
Name: Kelli Raymond
Address: 5170 Golden Foothill Parkway
City: El Dorado Hills
State: CA
Zip: 95762
Email kraymond@acorn-env.com
Phone: 9162358224

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Bureau of Indian Affairs

Attachment B

Minnesota Department of Natural Resources Report

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

October 11, 2023
Correspondence # MCE 2023-00762

Geo Graening
Acorn Environmental

RE: Natural Heritage Review of the proposed Prairie Island Indian Community Elk Run Project, T108N R14W Sects 6-7, T108N R15W Sects 1-2, 11-12, T109N R15W Sects 35-36; Goodhue and Olmsted Counties

Dear Geo Graening,

As requested, the Minnesota Natural Heritage Information System has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

State-listed Species

- Rare mussels, elktoe (*Alasmidonta marginata*) and fluted-shell (*Lasmigona costata*), both state-listed as threatened, and fish, black racehorse (*Moxostoma duquesnei*) and suckermouth minnow (*Phenacobius mirabilis*), both state-listed as species of special concern, have been documented near the proposed project in the Zumbro River Middle Fork. These aquatic species are particularly vulnerable to deterioration in water quality, especially increased siltation. Drainages in the proposed project area flow into this river so it is important that effective erosion and pollution prevention measures are implemented and continued during construction and maintenance of this project.

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed nearby, all seven of Minnesota's bats, including the federally endangered northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. During the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, the DNR recommends that tree removal be avoided from June 1 through August 15.

- Please visit the DNR Rare Species Guide for more information on the habitat use of these species and recommended measures to avoid or minimize impacts. For further assistance with these species, please contact the appropriate DNR Regional Nongame Specialist or Regional Ecologist.

Federally Protected Species

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool.

Environmental Review and Permitting

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit the Natural Heritage Review website for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

James Drake

James Drake
Natural Heritage Review Specialist
James.F.Drake@state.mn.us

Cc: Melissa Collins

Gmail

Geo Graening <ggraening@acorn-env.com>

Natural Heritage Review: Letter Posted

Drake, James F (DNR) <James.F.Drake@state.mn.us> Fri, Oct 13, 2023 at 8:33 AM
To: Geo Graening <ggraening@acorn-env.com>, "dnr, mce-auto (DNR)" <mce-auto.dnr@state.mn.us>
Cc: "Collins, Melissa (DNR)" <Melissa.Collins@state.mn.us>

There are no known, extant records of state-listed species in the project area.

Jim

From: Geo Graening <ggraening@acorn-env.com>
Sent: Friday, October 13, 2023 10:24 AM
To: dnr, mce-auto (DNR) <mce-auto.dnr@state.mn.us>; Drake, James F (DNR) <James.F.Drake@state.mn.us>
Cc: Collins, Melissa (DNR) <Melissa.Collins@state.mn.us>
Subject: Re: Natural Heritage Review: Letter Posted

You don't often get email from ggraening@acorn-env.com. Learn why this is important

This message may be from an external email source.

Do not select links or open attachments unless verified. Report all suspicious emails to Minnesota IT Services Security Operations Center.

Thank you for expediting this review.

Can your Dept. provide NHIS occurrence locations for any of these state-listed species if they occur in our Elk Run project area?

G.O. "Geo" Graening, PhD, MSE | Senior Biologist

m: 916-452-5442

w: www.acorn-env.com | e: ggraening@acorn-env.com

5170 Golden Foothill Parkway | El Dorado Hills, CA 95762

DEPARTMENT OF NATURAL RESOURCES

Formal Natural Heritage Review - Cover Page

See next page for results of review. A draft watermark means the project details have not been finalized and the results are not official.

Project Name: Prairie Island Indian Community Elk Run Project

Project Proposer: Prairie Island Indian Community

Project Type: Development, Mixed Use

Project Type Activities: Tree Removal;Other

TRS: T108 R14 S6, T108 R14 S7, T108 R15 S1, T108 R15 S11, T108 R15 S12, T108 R15 S2, T109 R15 S35, T109 R15 S36

County(s): Goodhue, Olmsted

DNR Admin Region(s): Central

Reason Requested: Federal Environmental Assessment/Environmental Impact Assessment

Project Description: Tribal community development will require vegetation removal and grading for building foundations and roads, with the intent to avoid all wetlands and channels if possible

Existing Land Uses: Mixture of pasture, cattle range, row crop, rural residential, transportation corridor, and open space.

Landcover / Habitat Impacted: Some combination of pasture, cattle range, row crop, rural residential, transportation corridor, and open space.

Waterbodies Affected: the intent is to avoid all wetlands and channels if possible; new road crossings may affect channels

Groundwater Resources Affected: New developments will require water supplies, which may come from groundwater wells

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	Comments	Tree Removal - Recommendations
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	Needs Further Review	State-protected Species in Vicinity
State-Listed Species of Special Concern	Comments	Recommendations
Federally Listed Species	No Records	Visit IPaC For Federal Review

DEPARTMENT OF NATURAL RESOURCES

October 2, 2023

Project Name: Prairie Island Indian Community Elk Run Project
Project Proposer: Prairie Island Indian Community
Project Type: Development, Mixed Use
Project ID: MCE #2023-00762

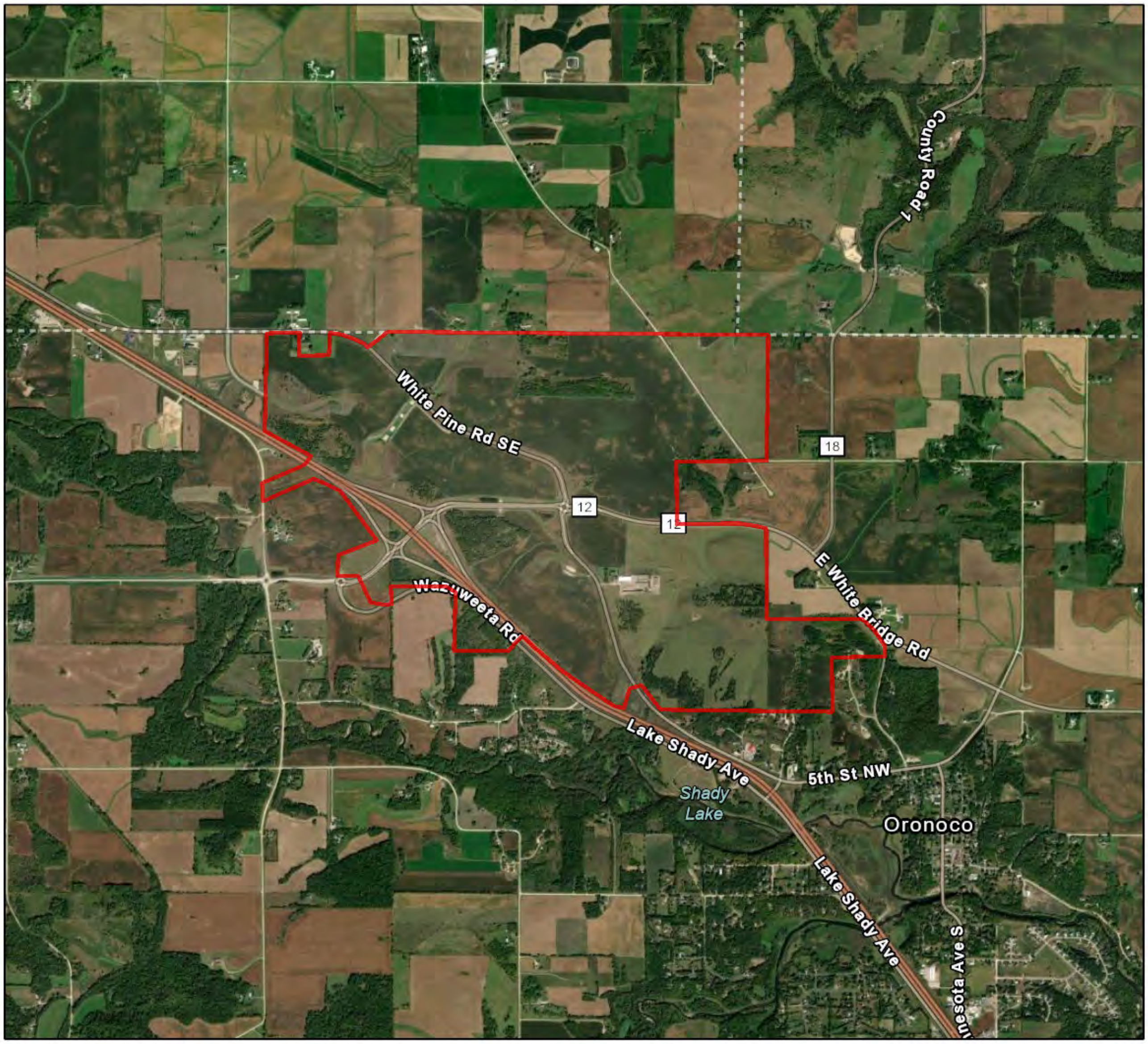
AUTOMATED RESULTS: FURTHER REVIEW IS NEEDED
As requested, the above project has undergone an automated review for potential impacts to rare features. Based on this review, one or more rare features may be impacted by the proposed project and further review by the Natural Heritage Review Team is needed. You will receive a separate notification email when the review process is complete and the Natural Heritage Review letter has been posted.

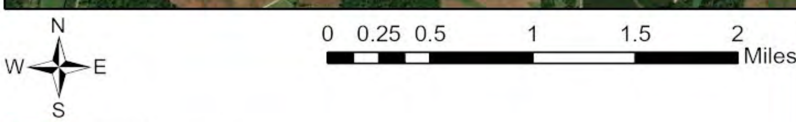
Please refer to the table on the cover page of this report for a summary of potential impacts to rare features. For additional information or planning purposes, use the Explore Page in Minnesota Conservation Explorer to view the potentially impacted rare features or to create a Conservation Planning Report for the proposed project.

If you have additional information to help resolve the potential impacts listed in the summary results, please attach related project documentation in the Edit Details tab of the Project page. Relevant information includes, but is not limited to, additional project details, completed habitat assessments, or survey results. This additional information will be considered during the project review.

Prairie Island Indian Community Elk Run Project

Aerial Imagery With Locator Map





Project Boundary

Project Type: Development, Mixed Use

Project Size (acres): 1,496.26

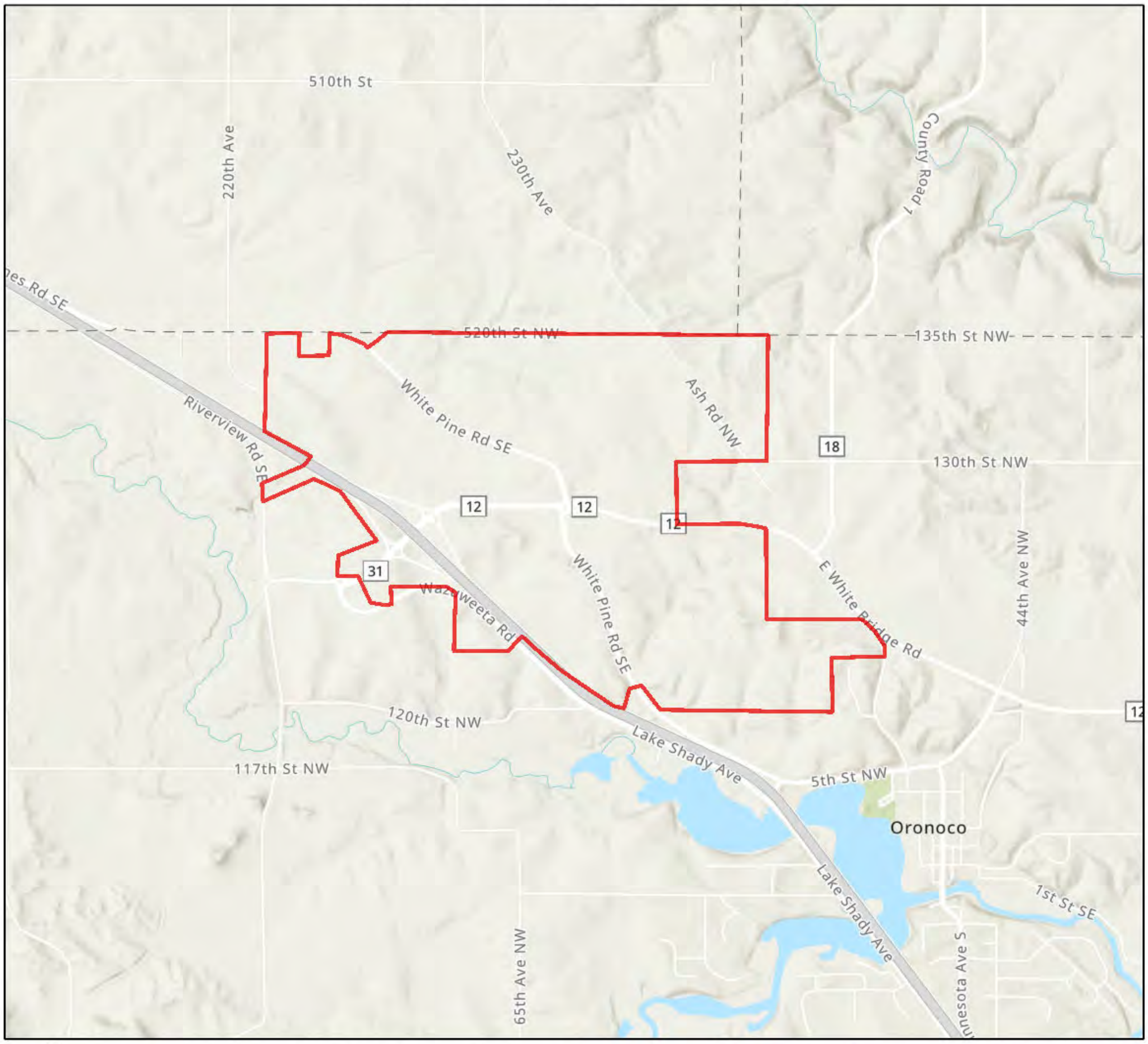
County(s): Goodhue, Olmsted

TRS: T108 R14 S6, T108 R14 S7, T108 R15 S1, T108 R15 S11, T108 R15 S12 +

Earthstar Geographics
Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Prairie Island Indian Community Elk Run Project

USA Topo Basemap With Locator Map



Project Boundary

Project Type: Development, Mixed Use

Project Size (acres): 1,496.26

County(s): Goodhue, Olmsted

TRS: T108 R14 S6, T108 R14 S7, T108 R15 S1, T108 R15 S11, T108 R15 S12 +

Esri, NASA, NGA, USGS, FEMA
Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Attachment C

List of Animals Observed

Animals Observed at Prairie Island Indian Community Action Area
on October 17-19, 2023

Common Name	Scientific Name
house cricket	*Acheta domesticus*
cedar waxwing	*Bombycilla cedrorum*
cattle	*Bos taurus*
Canada goose	*Branta canadensis*
red tailed hawk	*Buteo jamaicensis*
grasshopper	*Caelifera sp.*
coyote	*Canis latrans*
northern cardinal	*Cardinalis cardinalis*
kildeer	*Charadrius vociferus*
rock pigeon	*Columba livia*
common raven	*Corvus corax*
blue jay	*Cyanocitta cristata*
horned lark	*Eremophila alpestris*
field cricket	*Gryllus sp.*
house finch	*Haemorhous mexicanus*
bald eagle	*Haliaeetus leucocephalus*
yellowish skipper	*Hesperilla flavescens*
dark-eyed junco	*Junco hyemalis*
hairy woodpecker	*Leuconotopicus villosus*
wild turkey	*Meleagris gallopavo*
mouse	*Mus sp.*
white tailed deer	*Odocoileus virginianus*
fox sparrow	*Passerella iliaca*
ring necked pheasant	*Phasianus colchicus*
downy woodpecker	*Picoides pubescens*
black-capped chickadee	*Poecile atricapillus*
sow bug	*Porcellionidae sp.*
raccoon	*Procyon lotor*
golden crowned kinglet	*Regulus satrapa*
eastern grey squirrel	*Sciurus carolinensis*
eastern bluebird	*Sialia sialis*
American goldfinch	*Spinus tristis*
American badger	*Taxidea taxus*
American robin	*Turdus migratorius*

Attachment D

List of Plants Observed

Plants Observed at Prairie Island Indian Community Action Area
on October 17-19, 2023

Common Name	Scientific Name
common dandelion	*Taraxacum officinale*
black raspberry	*Rubus occidentalis*
yellow toadflax	*Linaria vulgaris*
houndstongue	*Cynoglossum officinale*
saltbushes	*Atriplex*
wild rye	*Elymus*
stinkgrass	*Eragrostis cilianensis*
whorled milkweed	*Asclepias verticillata*
bur oak	*Quercus macrocarpa*
black cherry	*Prunus serotina*
Canada goldenrod	*Solidago canadensis*
alfalfa	*Medicago sativa*
wild parsnip	*Pastinaca sativa*
American elm	*Ulmus americana*
Tatarian maple	*Acer tataricum*
buffelgrass	*Cenchrus ciliaris*
soybean	*Glycine max*
panicgrass	*Panicum*
vetches	*Vicia*
Tatarian honeysuckle	*Lonicera tatarica*
sandbar willow	*Salix interior*
plum	*Prunus*
foxtail	*Setaria spp.*
prickly gooseberry	*Ribes cynobati*
velvetleaf	*Abutilon theophrasti*
maidenfern	*Thelypteris sp.*
mugwort	*Artemisia vulgaris*
Scots pine	*Pinus sylvestris*
white spruce	*Picea glauca*
poison oak	*toxicodendron pubescens*
Norway spruce	*Picea abies*
eastern cottonwood	*Populus deltoides*
sweet cherry	*Prunus avium*
fleaworts	*Plantago*
water sedge	*Carex aquatilis*
corn	*Zea mays*
red maple	*Acer rubrum*
smooth sumac	*Rhus glabra*
riverbank grape	*Vitis riparia*

eastern red cedar	*Juniperus virginiana*
green ash	*Fraxinus pennsylvanica*
prairie rose	*Rosa arkansana*
eastern black walnut	*Juglans nigra*
boxelder maple	*Acer negundo*
pear	*Pyrus*
mullein	*Verbascum*
Virginia creeper	*Parthenocissus quinquefolia*
apple	*Malus pumila*
hackberry	*Celtis occidentalis*
common milkweed	*Asclepias syriaca*
slender wild oat	*Avena barbata*
Norway maple	*Acer platanoides*
silver maple	*Acer saccharinum*
green foxtail	*Setaria viridis*
calico aster	*Symphyotrichum lateriflorum*
red pine	*Pinus resinosa*
spiny plumeless thistle	*Carduus acathoides*
yarrow	*Achillea millefolium*
hemp	*Cannabis sativa*
stinging nettle	*Urtica dioica*
motherwort	*Leonurus cardiaca*
reed canary grass	*Phalaris arundinacea*
fiddle dock	*Rumex pulcher*
orchard grass	*Dactylis glomerata*
creeping wild rye	*Leymus triticoides*
brickellbush	*Brickellia*
catnip	*Nepeta cataria*
knapweed	*Centaurea spp.*
toadflax	*Linaria sp.*
smooth brome	*Bromus inermis*
ryegrass	*Lolium*
red fescue	*Festuca rubra*
prairie dropseed	*Sporobulus heterolepis*
ground elder	*Aegopodium podagraria*
white pine	*Pinus strobus*
sulphur cinquefoil	*Potentilla recta*
ground ivy	*Glechoma hederacea*
sideoats grama	*Bouteloua curtipendula*
smooth oxeye	*Heliopsis helianthoides*
little bluestem	*Schizachyrium scoparium*
purple lovegrass	*Eragrostis spectabilis*
cocklebur	*Xanthium*

smartweeds	*Persicaria*
duckweed	*Lemnoideae*
umbrella sedge	*Cyperus alternifolius*
yellow foxtail	*Setaria helvola*
smooth witherod	*Viburnum nudum*
red oak	*Quercus rubra*
Shumard oak	*Quercus shumardii*
big bluestem	*Andropogon gerardii*
Timothy grass	*Phleum*
common ragweed	*Ambrosia artemisiifolia*
green foxtail	*Setaria viridis*
aspen	*Populus sp.*
corkscrew willow	*Salix matsudana*
stickseed	*Hackelia virginiana*
fleabane	*Erigeron ssp.*
beardgrass	*Bothriochloa*
lady fern	*Athyrium*
switchgrass	*Panicum virgatum*
white heath aster	*Symphyotrichum ericoides*
alkali sacaton	*Sporobolus airoides*
pigweed	*Oxybasis rubra*
Missouri gooseberry	*Ribes missouriense*
blackberry lily	*Iris domestica*
white vervain	*Verbena urticifolia*
wild lettuce	*Lactuca sp.*
toadflax	*Linaria sp.*
American basswood	*Tilia americana*
chokecherry	*Prunus virginiana*
American hazelnut	*Corylus americana*
gray dogwood	*Cornus racemosa*
bush juniper	*Juniperus communis*
sand cherry	*Prunus pumila*
Kentucky bluegrass	*Poa pratensis*
porcupine grass	*Miscanthus sinensis*
blackberry	*Rubus spp*

Attachment E

Site Photos

Wet meadow looking at manmade earthen dam flanked by annual grassland pasture and agriculture row crop.

Annual grassland pasture leading to stock watering pond with emergent wetland vegetation. Cattle visible in the background.

Riprap within a drainage feature in between two recently harvested agricultural row crop fields.

Planted walnut orchard at the edge of deciduous woodland habitat.

Oak savannah with an annual grassland pasture understory.

View of prior grading and utility alignment completed as part of the City's previous development plan for the Action Area.

Remnant native prairie observed in openings and scattered understory of deciduous woodland.

Representative photo of deciduous woodland.

Appendix G

Air Quality Modeling Outputs

Trip Generation (average daily trips)[1]	Average Distance (miles)[2]	Alternative A	
		Trips/Year	VMT/Year (miles)
10526	10	3,841,990	38,419,900

Sources:
[1] Traffic Impact Study, Prairie Island Indian Community – North Elk Run Community Development Project, KLJ Engineering, June 2024
[2] Trip lengths based on weighted aveage of distance to population centers.
Sources: Elk Run, Minnesota Gaming Market Assessment, October 2023

Table 2a
2027 Mobile Operations Criteria Pollutant and GHG Emissions

	Alternative A
vmt/yr	38,419,900
Criteria Pollutant Emissions (tpy)	
NOx	18.27
VOC	5.82
SO_2	0.09
CO	154.97
$PM_{2.5}$	0.65
PM_{10}	2.08
Greenhouse Gas[1]	
CO_2	17711.7
CH_4	1.6
N_2O	1.0
CO_2e	18056.5

[1] GHG emissions shown in metric tonnes.
Source: MOVES4

Table 2b
2046 Mobile Operations Criteria Pollutant and GHG Emissions

	Alternative A
vmt/yr	38,419,900
Criteria Pollutant Emissions (tpy)	
NOx	6.01
VOC	2.96
SO_2	0.06
CO	61.04
$PM_{2.5}$	0.41
PM_{10}	1.81
Greenhouse Gas[1]	
CO_2	12574.50
CH_4	1.11
N_2O	0.85
CO_2e	12855.88

[1] GHG emissions shown in metric tonnes.
Source: MOVES4

Table 3a
2027 Operational Mobile Annual Average Emission Factors

Criteria Pollutant	grams per mile
NOx	0.39
VOC	0.09
SO_2	0.002
CO	3.13
$PM_{2.5}$	0.01
PM_{10}	0.05
Greenhouse Gases	
CO_2	451.21
CH_4	0.03
N_2O	0.02
CO_2e	459.04
Source: MOVES4	

Table 3b
2027 Operational Start Annual Average Emission Factors

Criteria Pollutant	grams per start
NOx	0.41
VOC	0.47
SO_2	0.000
CO	5.30
$PM_{2.5}$	0.02
PM_{10}	0.02
Greenhouse Gases	
CO_2	97.98
CH_4	0.08
N_2O	0.03
CO_2e	109.34
Source: MOVES4	

Table 3c
2046 Operational Mobile Annual Average Emission Factors

Criteria Pollutant	grams per mile
NOx	0.12
VOC	0.04
SO_2	0.001
CO	1.21
$PM_{2.5}$	0.01
PM_{10}	0.04
Greenhouse Gas	
CO_2	321.93
CH_4	0.02
N_2O	0.020
CO_2e	328.55
Source: MOVES4	

Table 3d
2046 Operational Start Annual Average Emission Factors

Criteria Pollutant	grams per start
NOx	0.23
VOC	0.26
SO_2	0.000
CO	2.29
$PM_{2.5}$	0.02
PM_{10}	0.02
Greenhouse Gas	
CO_2	53.61
CH_4	0.05
N_2O	0.02
CO_2e	60.68
Source: MOVES4	

Table 4
Fugitive Dust Emissions from Construction

	Alternatives A and B
Construction Area (acres)	78.00
Duration of Construction (months)	12
PM_{10} Emisson Factor (tons $PM_{10/}$/acre-month)	0.11
Total PM10 Emissions (tons)	**102.96**
Total $PM_{2.5}$ Emissions (tons)	**10.30**

Source: Emission factors from WRAP's Fugitive Dust Handbook (Level 1).

Note: On-site cut/fill from grading and drainage report. PM2.5 estimated to be 10 percent of PM10 emissions.

Table 5
Alternatives A - Construction Emissions

Construction Equipment[1]	Horsepower	Load Factor	Hours in Use[2] (hours/day)	Emission Factors (g/bhp/hr)[5]						Emission (tons/year)					
				CO	VOC	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO	VOC	NOx	SO_2	PM_{10}	$PM_{2.5}$
Site Preparation															
3 Rubber Tired Dozers	367	0.4	8	2.73	0.353	3.22	0.005	0.142	0.131	0.11	0.01	0.12	0.00	0.01	0.01
4 Tractors/Loaders/Backhoes	84	0.37	8	3.48	0.184	1.88	0.005	0.063	0.058	0.04	0.00	0.02	0.00	0.00	0.00
Employee Trips (miles)[3]		4,320		3.00	0.08	0.18	0.00	0.04	0.01	0.05	0.00	0.00	0.00	0.00	0.00
Site Grading															
2 Excavator	36	0.88	8	4.22	0.39	3.41	0.01	0.10	0.09	0.07	0.01	0.06	0.00	0.00	0.00
1 Grader	148	0.41	8	3.40	0.31	2.53	0.01	0.14	0.13	0.05	0.01	0.04	0.00	0.00	0.00
1 Rubber Tired Dozers	367	0.4	8	2.73	0.35	3.22	0.01	0.14	0.13	0.11	0.01	0.12	0.00	0.01	0.01
2 Tractor/Loaders/Backhoes	84	0.37	8	3.48	0.18	1.88	0.01	0.06	0.06	0.06	0.00	0.03	0.00	0.00	0.00
2 Scraper	423	0.48	8	1.54	0.20	1.74	0.01	0.07	0.06	0.17	0.02	0.19	0.00	0.01	0.01
Employee Trips (miles)[3]		14,400		3.00	0.08	0.18	0.00	0.04	0.01	0.05	0.00	0.00	0.00	0.00	0.00
Fugitive Dust														102.96	10.30
Construction															
1 Crane	367	0.29	7	1.64	0.20	1.84	0.01	0.08	0.07	0.40	0.05	0.45	0.00	0.02	0.02
3 Forklifts	82	0.2	8	3.58	0.25	2.34	0.01	0.11	0.10	0.47	0.03	0.30	0.00	0.01	0.01
1 Generator Sets	14	0.74	8	2.86	0.54	4.32	0.01	0.17	0.16	0.08	0.01	0.12	0.00	0.00	0.00
3 Tractors/Loaders/Backhoes	84	0.37	7	3.48	0.18	1.88	0.01	0.06	0.06	0.25	0.04	0.41	0.00	0.01	0.01
1 Welder	46	0.45	8	4.49	0.47	3.57	0.01	0.10	0.09	0.74	0.03	0.20	0.00	0.01	0.00
Employee Trips (miles)[3]		331,200		3.00	0.08	0.18	0.00	0.04	0.01	0.45	0.01	0.03	0.00	0.01	0.00
Vendor Trips (miles)[4]		136,800		2.96	0.10	0.22	0.00	0.04	0.01						
Paving															
2 Pavers	81	0.42	8	3.44	0.23	2.45	0.01	0.12	0.11	0.04	0.00	0.03	0.00	0.00	0.00
2 Paving Equipment	89	0.36	8	3.40	0.18	2.02	0.01	0.08	0.07	0.04	0.00	0.02	0.00	0.00	0.00
2 Rollers	36	0.38	8	4.11	0.53	3.58	0.01	0.15	0.13	0.02	0.00	0.02	0.00	0.00	0.00
Employee Trips (miles)[3]		7,200		3.00	0.08	0.18	0.00	0.04	0.01	0.02	0.00	0.00	0.00	0.00	0.00
Architectural Coating															
1 Air Compressor	37	0.48	6	4.79	0.482	3.54	0.007	0.081	0.075	0.01	0.00	0.01	0.00	0.00	0.00
Coating[6]		0.0116									1.81				
Total Project Construction Emissions										**2.95**	**2.06**	**2.18**	**0.01**	**103.05**	**10.37**

Sources:
[1] Construction equipment list and quantity from CalEEMod. Emission factors for equipment from CalEEMod (grams/mile).
[2] Hours per normal work day from CalEEMod.
[3] Based on 12 mile trip length. Worker trip numbers from CalEEMod. On-Road Emission Factors from MOVES4 for Passenger Truck (31). (ex. # worker trips * 2 one-way trips * construction phase length * 12 miles)
[4] Based on 12 mile trip length. Vendor trip numbers from CalEEMod. On Road Emission Factors from MOVES4 for Light Commercial Truck (32).
[5] Off-Road Emission factors provided from California Air Resources Board OFFROAD2011 emission factors, as sourced from CalEEMod Default Data Tables; On-Road Emission Factors from MOVES4
[6] Paved area from CalEEMod.

Alternatives A - Construction GHG Emissions

Construction Equipment[1]	Horsepower	Load Factor	Hours in Use[2] (hours/day)	Emission Factors (g/bhp/hr)[5]		Emission Factors (g/mile)	Emissions (metric tons)
				CO2	CH4	CO2e	CO2e
Site Preparation							
3 Rubber Tired Dozers	367	0.4	8	533	0.022		18.80
4 Tractors/Loaders/Backhoes	84	0.37	8	530	0.021		5.28
Employee Trips (total miles)[3]		4320				373.13	2
Site Grading							
2 Excavator	36	0.38	8	587.00	0.02		3.86
1 Grader	148	0.41	8	531.00	0.02		7.74
1 Rubber Tired Dozer	367	0.4	8	533.00	0.02		18.80
2 Scrapers	423	0.48	8	475.22	0.02		46.37
2 Tractor/Loaders/Backhoes	84	0.37	8	476.73	0.02		7.12
Employee Trips (total miles)[3]		14,400				373.13	5
Construction							
1 Crane	367	0.29	7	527.00	0.02		117.90
3 Forklifts	82	0.2	8	527.00	0.02		62.29
1 Generator	14	0.74	8	568.00	0.02		14.14
3 Tractors/Loaders/Backhoes	84	0.37	7	530.00	0.02		103.88
1 Welder	46	0.45	8	568.00	0.02		28.25
Employee Trips (total miles)[3]		331,200				373.13	124
Vendor Trips (total miles)[4]		136,800				418.08	57
Paving							
2 Pavers	81	0.42	8	526.00	0.02		5.73
2 Paving Equipment	89	0.36	8	528.00	0.02		5.42
2 Rollers	36	0.38	8	587.00	0.02		2.57
Employee Trips (total miles)[3]		7,200				373.13	3
Architectural Coating							
1 Air Compressor	37	0.48	6	568.00	0.02	373.13	2.42
Construction GHG Emissions							**641**

Source:
[1] Construction equipment list and quantity from CalEEMod. Emission factors for equipment from CalEEMod (grams/mile).
[2] Hours per normal day.
[3] Based on 12 mile trip length. Worker trip numbers from CalEEMod. On-Road Emission Factors from MOVES4 for Passenger Truck (31). (ex. # worker trips * 2 one-way trips * construction phase length * 12 miles)
[4] Based on 12 mile trip length. Vendor trip numbers from CalEEMod. On Road Emission Factors from MOVES4 for Light Commercial Truck (32)
[5] Off-Road Emission factors provided from California Air Resources Board OFFROAD2011 emission factors, as sourced from CalEEMod Default Data Tables; On-Road Emission Factors from MOVES4

Table 7a
Alternative A

Pollutant/GHG	MMscf/year	Emission Factors (lb/MMscf)	Conversion factor (lb/tons)	Emissions (tons)
VOC	22.3	5.5	0.0005	0.06
NOx	22.3	0.64	0.0005	0.01
CO	22.3	84	0.0005	0.94
SO_2	22.3	0.6	0.0005	0.01
PM_{10}	22.3	7.6	0.0005	0.08
$PM_{2.5}$	22.3	7.6	0.0005	0.08
Greenhouse Gas			**lb/MT**	**MT**
CO_2	22.3	120,000	0.00045	1,204.20

Stationary Sources include boilers, stoves, heating units, and other equipment.
Source: AP 42, Tables 1.4-1 and 1.4-2 (EPA, 1998), USEIA, 2022.

Table 8a Indirect GHG Emissions
Alternative A

Sources	Emission Factors			Use	Emissions
	CO_2	CH_4	N_2O		(MT of CO_2e)
	lbs of/MWh			MWh	
Electricity	995.8	0.107	0.015	5,915	2,689.72
	MT of CO_{2e}/MT of Solid Waste			MT of Solid Waste	
Solid Waste	0.503			1,323.40	665.67
Water/Wastewater	MT of CO2e/Million Gallons			Million Gallons	
	6.428			95.96	616.84
Total					**3,972**

Sources: Electricity based on U.S. Energy Information Administration, 2018 Commercial Buildings Energy Consumption Survey and 2020 Residential Energy Consumption Survey Data
Solid Waste value from CalEEMod (132.34) multipled by 10 to account for phased development.

Social Cost of GHG

GHG/Cost per metric ton		Alternative A	
		Tons	Cost
Construction (2026-2027)			
CO_2e	$57	641	$36,537
Operation (2027)			
CO_2e	$59	23,233	$1,370,743
Operation (2046)			
CO_2e	$80	18,032	$1,442,585
Lifetime			
CO2e		541,610	$43,314,081

Costs from IWG, 2021 (3% discount rate)

Appendix H

Cultural Resources Study, Historic Aerials, and THPO Concurrence Letter

Appendix H

Cultural Resources Study

CONFIDENTIAL

Prairie Island Indian Community North Elk Run Community Development and Fee-to-Trust Project

Phase I Cultural Resource Survey
Part 1: Subsurface Testing

Prepared by:

Andrew A. Brown, M.S.
Principal Investigator
Geospatial Research Data Manager, EARTH Systems Laboratory

Ronald C. Schirmer, Ph.D.
Co-Principal Investigator
Co-Director, EARTH Systems Laboratory

30 September, 2024

MINNESOTA STATE UNIVERSITY, MANKATO
EARTH SYSTEMS RESEARCH LABORATORY

Project Background

The Prairie Island Indian Community is preparing a fee-to-trust application for 21 contiguous or nearly-contiguous land parcels near Pine Island in Olmsted County, Minnesota. Between July 22nd and September 23rd, 2024, the EARTH Systems Laboratory undertook a Phase One cultural resources survey on behalf of the Prairie Island Indian Community (PIIC), pursuant to plans to develop parts of some of those parcels for purposes of community facilities, e.g., housing, administration, commerce, roadways, etc. It should be noted that the existing plans are subject to future review and alteration. The current survey was undertaken as a part of the fee-to-trust application process based on the plans that exist at this time. The current report covers only the subsurface testing for this fee-to-trust application; a subsequent report will be prepared after crops are harvested from agricultural production areas within the 21 parcels.

Project Area

A fee-to-trust application is considered an undertaking for purposes of cultural resource management, and in applications of this type, the overall boundaries of the undertaking are considered coterminous with the Area of Potential Effect (APE). This differs to how APEs are often determined in other cultural resource projects. Therefore, for purposes of this phase one cultural resources survey, the APE is defined broadly as coinciding with the boundaries of the undertaking (see Figure 1). The APE includes 21 separate parcels totaling just over 781 acres of land, 491 acres of which are currently in agricultural crop production, and 290 acres of which are used for cattle pasture and woodland. Limited activities that may entail ground disturbance are planned for certain portions of crop production and grazing land or woodland. Because crops currently exist in the agricultural areas, no surface reconnaissance was possible at the time the current report was prepared. However, all subsurface Phase 1 survey (i.e., shovel testing) necessitated by the current plans has been completed, and this report provides information about that work. A subsequent report will be prepared for areas that are currently in crop production, where the current development plans include the potential for ground disturbing activities. If ground disturbing activities for areas not covered by the current plans emerge in the future, after the fee-to-trust conversion, the Prairie Island Indian Community Tribal Historic Preservation Office will exercise their authority consistent with Section 106 of the National Historic Preservation Act to require cultural resources surveys to identify, investigate, mitigate, and/or avoid cultural resources, as is their duty.

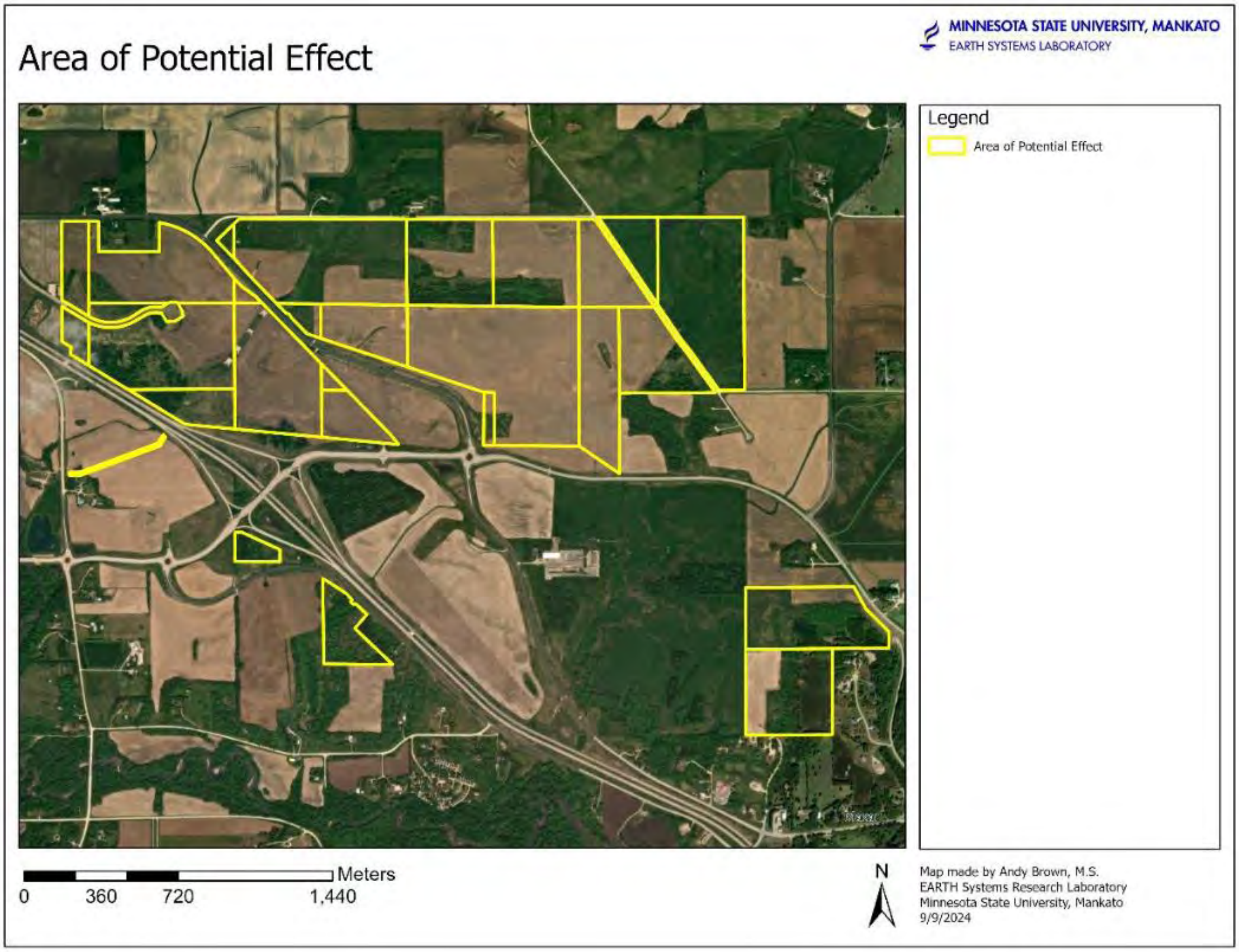


Figure 1. Undertaking Area of Potential Effect.

Current development plans within the APE, that is, those parts of the APE where planned ground disturbing activities can be reasonably anticipated, and which thus require a cultural resources survey at this time, are shown in Figure 2. This figure also shows their currently intended uses, which guided our survey approach. Specifically, we anticipate that areas labeled as residential, commercial, commercial/industrial, community and administrative, tribal cultural facilities, a proposed water tower or lift station, and roadways may be subject to ground disturbance associated with development of those areas. Accordingly, Phase 1 cultural resources investigations are required in these areas.

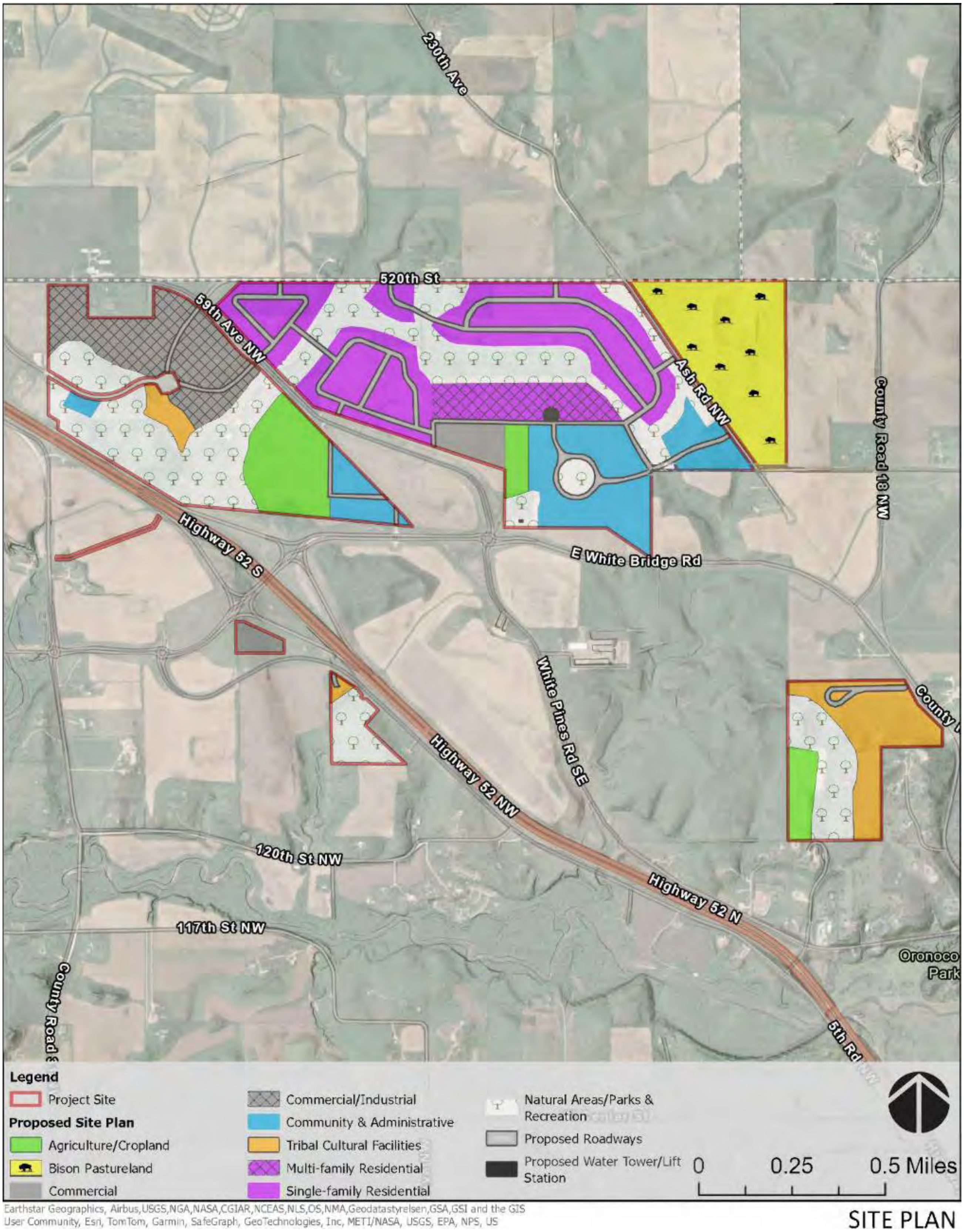


Figure 2. Current Development Plans

Archeological and Environmental Background

Regional Archeological Summary

Literature Review

On 20 September, 2024, the authors conducted a search of the available archeological literature and the current site inventory maintained by the Office of the State Archaeologist of Minnesota (available at https://osaportal.gisdata.mn.gov/). According to the state's current records, there are only 76 recorded archeological sites in Olmsted County, 62 of which contain a precontact component. See Appendix A for a complete list of recorded archeological sites in Olmsted County. This is among the fewest sites recorded for any county in Minnesota, and indicates the generally low level of investigation that has been conducted in the county. It is no exaggeration to say that little is known about the precontact occupation of the county.

The single most extensive source of information about the archeology of Olmsted county consists of a countywide archeological survey conducted in 2010 (Arzigian & Kolb, 2010). In their complete survey of the previously existing archeological literature relevant to the county, Arzigian & Kolb (2010:5) note that,

> In the 1990s and 2000s projects throughout the county examined areas for new sewer systems, cell towers, dredge disposal areas, and so forth. Many of the earlier projects [i.e., pre-1990] did not employ techniques that would be considered standard today, such as systematic shovel testing, and some of the reports are limited in the amount of information provided about both the sites and the artifacts recovered.

They (Arzigian & Kolb, 2010, p. 5) also examined the artifacts held by the county historical society, concluding that, "most of the materials have no provenience or collection information and often cannot even be assumed to be from the county".

Other recent Phase I archeological surveys in the county (e.g. Langseth & Anderson, 2019 Arzigian and Kolb, 2010) similarly attest to a general lack of sites in upland locations, and concur that most known sites are from surface finds in cultivated fields, which lack integrity, and which mostly do not contain any culturally or temporally diagnostic artifacts. Other recent archeological surveys (e.g., Magner and Allan 2022) are extremely limited in scope and, because they were conducted at a distance from the project area and on different landforms, do not present relevant data beyond a general sense that lowlands and terraces adjacent to current or former waterways sometimes contain precontact archeological sites.

County-wide Known Sites Summary

In the state site records, the 76 recorded sites include precontact occupations from the Paleoindian (3), Archaic (9), and Woodland (7) periods. None of these sites are classified as habitation sites in the state's records. The three Paleoindian sites were classified as such by the presence of a Clovis point (21OL0039—Early Paleoindian), a Lanceolate/Plano point (21OL0043—Paleoindian), and a cache of tools and flakes showing evidence of Clovis-like flaking patterns (21OL0044—Early Paleoindian). All three of these sites are reported from surface artifacts in cultivated fields. The nine Archaic sites were classified as such by the presence of grooved axes, Osceola points, and Raddatz Points (Middle Archaic, e.g., 21OL0019, 21OL0020, 21OL0046), Matanzas-like points (Late Archaic/Riverine Archaic, e.g., 21OL0029), and Durst Stemmed points (Late Archaic/Prairie Archaic, e.g., 21OL0023). The Woodland sites were either identified by the presence of grit-tempered, cordmarked and cord-wrapped stick impressed pottery or their proximity to mounds, none of which have been professionally confirmed (Southeast Minnesota Late Woodland, e.g., 21OL0002, 21OL0021).

The sites with culturally or temporally diagnostic materials (e.g., patterned stone tools, pottery, etc.) exist in cultivated fields or in floodplain settings. Thus, the existing archeological record for precontact sites that are classified within determined archeological taxa is based on data from non-intact sites that have not been extensively studied or excavated.

Most of the sites in the county are not attributed to any identified cultural context; non-diagnostic sites consist of small lithic or artifact scatters while 15 sites are single artifact find spots (often a single piece of lithic debitage). These, too, have mostly been documented through surface reconnaissance in cultivated fields. The post-contact/historic sites in Olmsted County either consist of historic railroad whistle stops (e.g., 21OL0035, 21OL0036, 21OL0037) or farm/homesteads (e.g., 21OL0041, 21OL0047, 21OL0059, 21OL0076), most of which have not been evaluated for their National Register eligibility.

Nearby Sites

There are eight recorded archeological sites within one mile of the survey area (21GD0249, 21OL0027, 21OL0028, 21OL0029, 21OL0030, 21OL0031, 21OL0032, and 21OL0073), mostly discovered during a Phase 1 and Phase 2 archeological survey and evaluation project along Highway 52 in the early 2000s (Kluth, 2002). While this may seem significant, in reality, this number is slightly misleading because of the very large acreage of the APE, and the fact that there are several small parcels that are discontinuous with the bulk of the survey area, which lie nearer the Middle Fork of the Zumbro River. Most of the existing sites are located near these southwestern, small parcels, rather than near the bulk of the survey area. Nevertheless, we are treating the APE as continuous for purposes of this review. See Figure 3 for a map of these sites in relation to the survey area.

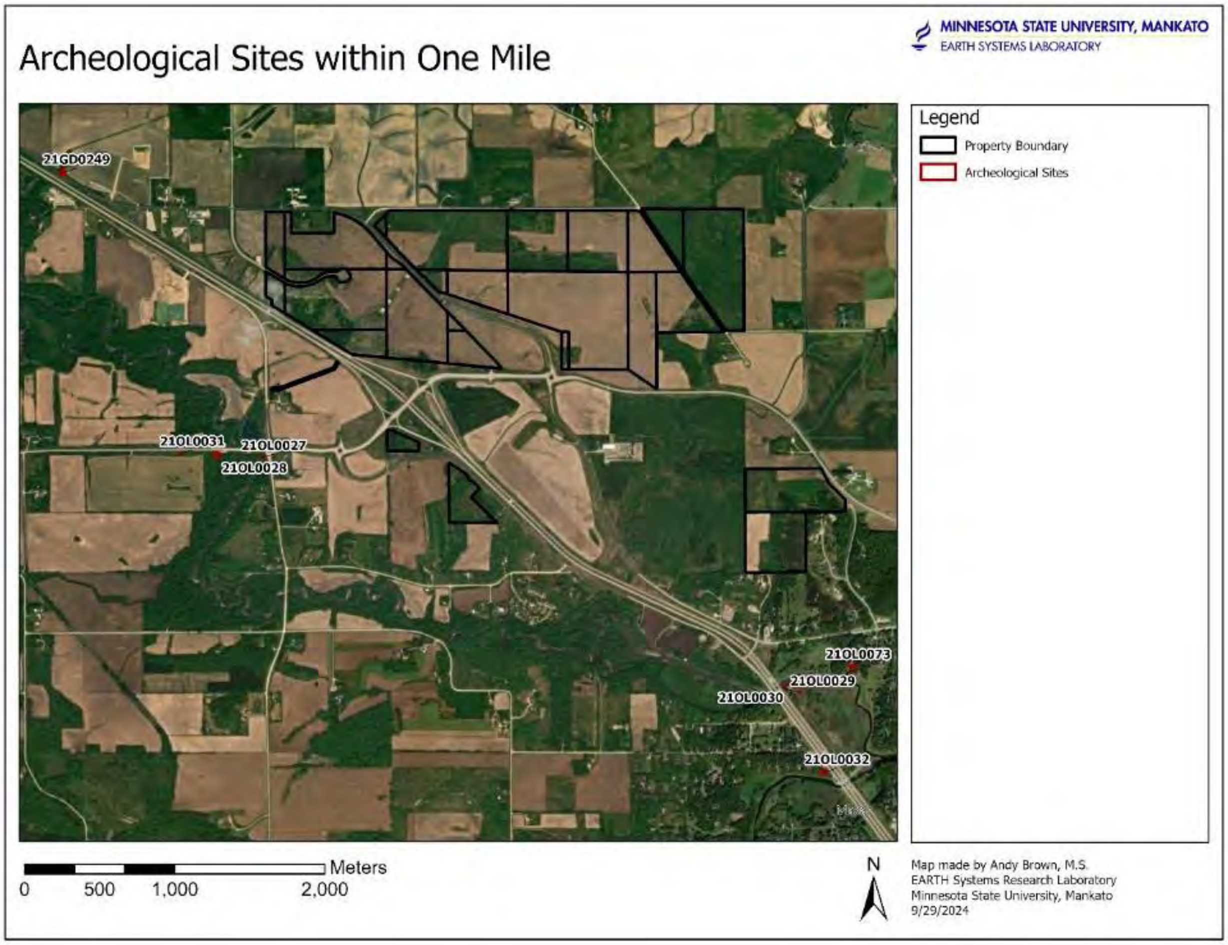


Figure 3. Archeological Sites within One Mile of the APE.

21GD0249 (O'Brien) is a lithic scatter site and lithic workshop in an agricultural field along an unnamed riverine on the east side of the Middle Fork of the Zumbro river. Lithic artifacts documented at the site are almost all local chert (Prairie du Chien chert), consisting of a scraper, a utilized flake, a core fragment, and 29 flakes. Scant other materials at the site include a core fragment of Grand Meadow chert, a Grand Meadow chert utilized flake, and a flake of Hixton orthoquartzite. The site was extensively surface collected, shovel tested and evaluated with excavation units, and determined to be ineligible for the National Register due to the lack of intact archeological deposits (Kluth, 2002).

Site 21OL0027 is a find spot of a single Prairie du Chien chert primary flake on a terrace along the Middle Fork of the Zumbro River. Site 21OL0028 is across the river from 21OL0027, and is also on a terrace. The site is a lithic scatter discovered by shovel testing and evaluated with excavation units. Artifacts consisted of relatively abundant chipping debris that were almost exclusively Prairie du Chien chert (224 flakes and seven core fragments), as well as a tested cobble of Cedar Valley chert, and four flakes of an unknown chert. The artifacts were almost entirely recovered within the plowzone, and the site was determined to be ineligible for the National Register (Kluth, 2002).

The Davis site (21OL0029) also lies on a terrace above the Middle Fork of the Zumbro River and consists of a Riverine Archaic lithic scatter containing lithic debitage and one small Matanzas point. 21OL0030 (Shady Lake) is classified as a precontact habitation site on the terrace above the Middle Fork of the

Zumbro River, although only lithic debitage, two tool fragments (one drill tip and one biface tip), and one unidentified bone fragment, along with historic refuse were found. Like other sites in the area, 21OL31 is near the Middle Fork of the Zumbro River, this time on a bluff edge above 21OL0028. The site consists of a single flake of Hixton orthoquartzite. Finally, 21OL0073 is located on a terrace on the north bank of the Middle Fork of the Zumbro River and is classified as an artifact scatter containing lithic debitage, one core, and a biface fragment, as well as assorted modern and historic refuse.

These eight sites, although relatively close in proximity to the APE, are all in close proximity to the Middle Fork of the Zumbro River, a stable source of water and aquatic resources, rather than the uplands further away from the river, as is the case for the areas investigated here, and they are therefore not environmentally analogous. Importantly, the more complex sites that have been evaluated (i.e., 21GD0249 and 21OL0028) have been determined to be ineligible for the National Register based on the lack of intact archeological deposits, attesting to the deleterious effects of agriculture on sites in the area. Nonetheless, they do attest to the potential for precontact archeological sites nearby, and hence were borne in mind for purposes of this archeological survey and analysis.

Landscape and Soils

The project area lies on the Rochester Plateau, which is a subsection of the Driftless and Dissected Plateau and consists of rolling upland plains incised by paleo-channels (Hobbs, 2002). The soils in the project area consist of upland sandy/silty loams typical of uplands, e.g., Eleva sandy loam, Terril loam, Racine loam, etc. These soils are all common throughout the oak savannah ecological subsection of Minnesota and were formed in oak savannah (Udalfs) and prairie vegetation (Udolls). See Table 1 for the complete list of soils found in the project area and Figure 4 for an overall map. A series of four maps present more detailed information about this, and can be found in Appendix B. There are no permanent sources of water in the project area and the only alluvial features present are intermittent drainages. The only standing water currently present (as listed in Table 1) is a result of a check dam built for erosion control.

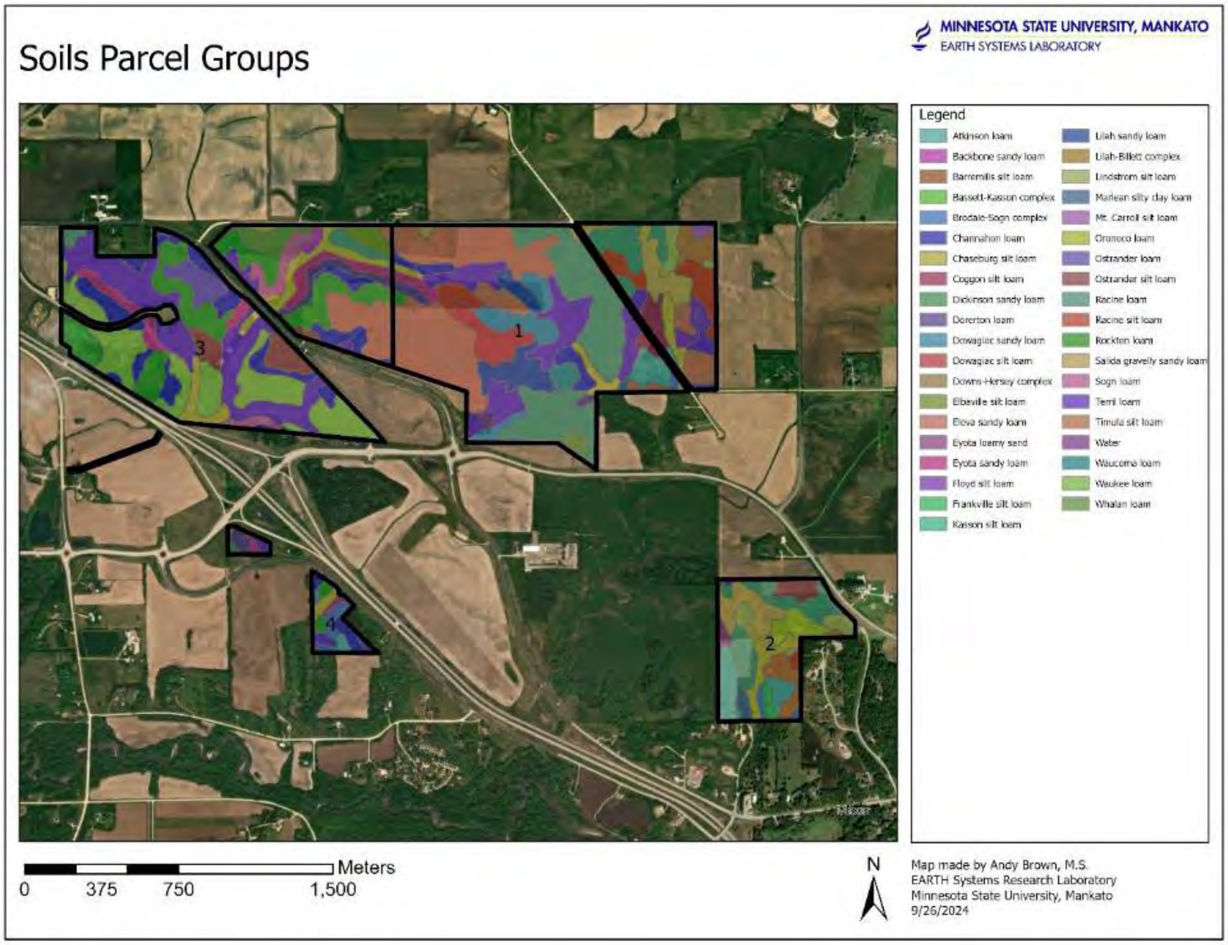


Figure 4. Soil map and numbered parcel groups.

Table 1. List of Soils Found within Project Area.

Soil Map Unit	Soil Taxonomic Classification	Common Landform	Hectares
Eleva sandy loam	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs	Upland valleys and terraces	42.10214
Terril loam	Fine-loamy, mixed, superactive, mesic Typic Argiudolls	Gently rolling uplands and terraces	40.56469
Racine loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Gently rolling landscapes on glacial till plains	39.90449
Waukee loam	Fine-loamy, mixed, superactive, mesic Typic Argiudolls	Upland terraces and ridges	22.87427

Rockton loam	Fine-silty, mixed, superactive, mesic Typic Argiudolls	Gently sloping uplands and ridges in forested regions	22.58665
Channahon loam	Fine-silty, mixed, superactive, mesic Typic Argiudolls	Broad, flat uplands and gently sloping areas	20.42263
Chaseburg silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Upland valleys and gentle slopes in humid areas	15.56083
Salida gravelly sandy loam	Sandy-skeletal, mixed, mesic Typic Torripsamments	Steep slopes, foothills, and arid or semi-arid landscapes	9.724578
Eyota sandy loam	Coarse-loamy, mixed, superactive, mesic Typic Hapludalfs	Upland valleys, outwash plains, and low terraces	8.291952
Atkinson loam	Fine-loamy, mixed, mesic Typic Hapludolls	Upland plains and terraces, well-suited for agriculture	8.022586
Racine silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Gently rolling landscapes on glacial till plains	7.985434
Ostrander silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Gently sloping valleys and upland terraces	7.35871
Dowagiac sandy loam	Fine-loamy, mixed, active, mesic Typic Hapludalfs	Upland plains and terraces	7.094153
Lilah sandy loam	Coarse-loamy, mixed, superactive, mesic Typic Hapludolls	Upland plains and terraces, suitable for agricultural use	6.899846
Timula silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludolls	Gently rolling uplands and terraces	5.72141
Dorerton loam	Fine-loamy, mixed, superactive, mesic Typic Argiudolls	Gently sloping uplands and ridges in forested areas	5.344353
Dowagiac silt loam	Fine-silty, mixed, mesic Typic Hapludalfs	Upland plains and gentle slopes	4.913172
Whalan loam	Fine-loamy, mixed, active, mesic Typic Hapludalfs	Gently sloping ridges and uplands in humid areas	4.514484
Lindstrom silt loam	Fine-silty, mixed, mesic Typic Hapludalfs	Upland terraces and gently sloping landscapes	4.145828

Sogn loam	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs	Upland ridges and slopes	3.916507
Ostrander loam	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs	Terraces and valley slopes in humid areas	3.33623
Brodale-Sogn complex	Combination of Alfisols and Mollisols, typically Hapludalfs	Hilly or irregular landscapes with mixed slopes	2.879149
Coggon silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Upland valleys, terraces, and gentle slopes	2.840227
Oronoco loam	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs	Gently sloping uplands and terraces, commonly in forested areas	2.715692
Elbaville silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Upland valleys, terraces, and footslopes	2.159135
Floyd silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludolls	Upland valleys and gentle rolling landscapes	1.708977
Waucoma loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Gently sloping uplands and terraces	1.568037
Marlean silty clay loam	Fine, mixed, superactive, mesic Typic Hapludalfs	Upland valleys and gently rolling terrain	0.899134
Frankville silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Upland ridges and gently sloping hills	0.875849
Backbone sandy loam	Fine-loamy, mixed, superactive, mesic Typic Hapludalfs	Uplands, ridges, and gently rolling hills	0.869674
Eyota loamy sand	Coarse-loamy, mixed, superactive, mesic Typic Hapludalfs	Upland valleys, outwash plains, and low terraces	0.63495
Mt. Carroll silt loam	Fine-silty, mixed, superactive, mesic Typic Argiudolls	Gently sloping uplands and ridges, often forested	0.609107
Dickinson sandy loam	Mixed, superactive, mesic Typic Hapludalfs	Gently rolling uplands and alluvial plains	0.413704
Water		Aquatic areas or water bodies	0.391542

Lilah-Billett complex	Mixture of coarse-loamy Typic Hapludolls and other soil series	Upland terraces and gentle slopes	0.081977
Downs-Hersey complex	Complex soils typically combining Alfisols and Mollisols	Rolling uplands and moderately sloping terrain	0.0629
Kasson silt loam	Fine-silty, mixed, superactive, mesic Typic Hapludalfs	Gently sloping uplands and terraces	0.050368
Barremills silt loam	Fine-silty, mixed, mesic Typic Hapludalfs	Broad upland areas and gentle slopes	0.035829
Bassett-Kasson complex	Mixture of Hapludalfs and other Alfisol series	Irregular uplands and mixed slope areas	0.023978

MnModel

The majority of the survey area is within what MnModel IV (Hobbs, MnModel Phase 4: Project Summary and Statewide Results, 2019) classifies as Unknown Site Potential/Poorly Surveyed, which indicates that there have been few archeological surveys in similar areas in this region and, as such, this area is predicted to have a low site potential (see Figure 5). This does not necessarily mean that the survey area has a low site potential but rather that there is a need for more survey in this type of ecological area. However, the other areas in the APE are predicted as Low Site Potential/Well Surveyed which means that areas very similar to the APE *have* been well surveyed and *have* been found to have low site potential.

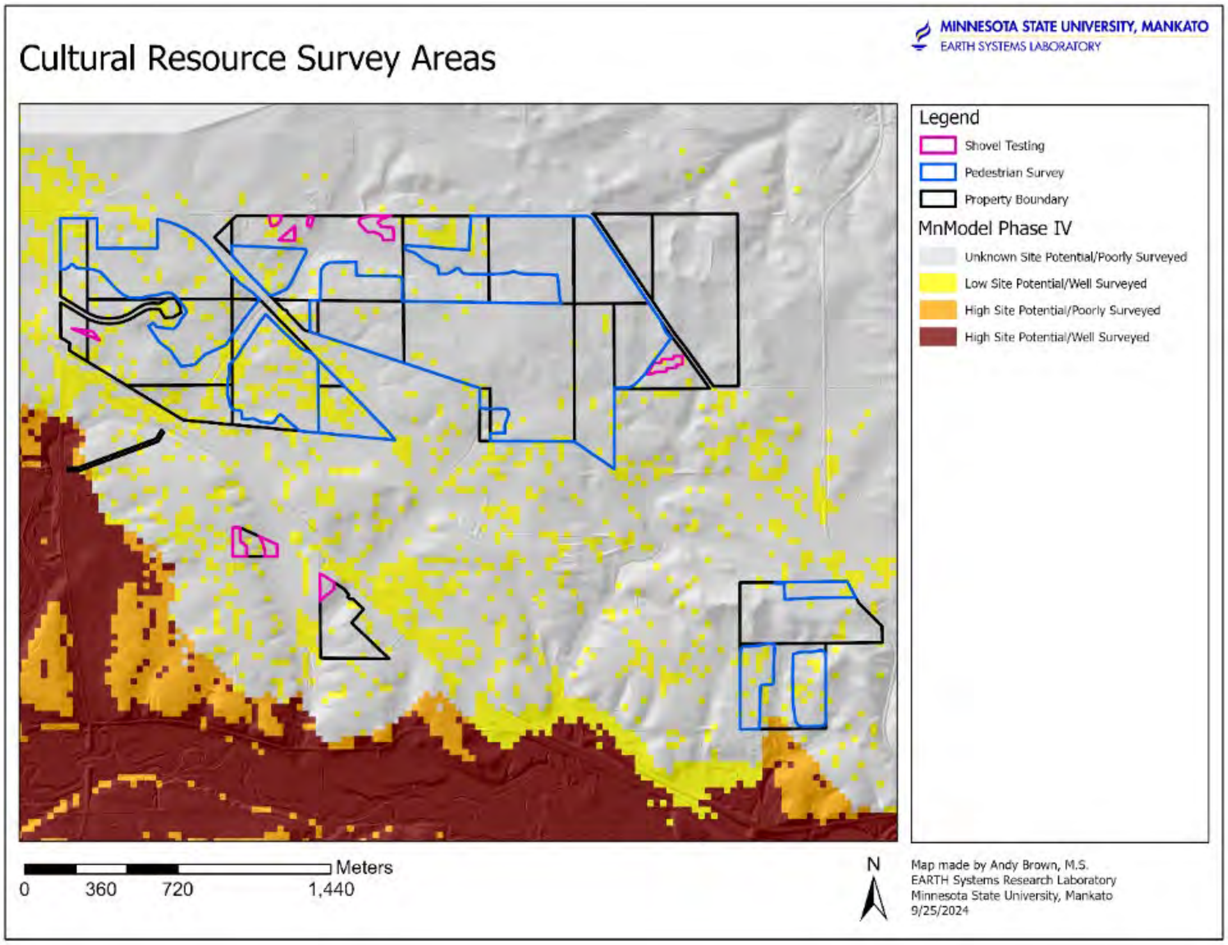


Figure 5. MnModel Phase IV Results in the APE.

Archeological Survey Methods

Prior to field work, the archeological site records of the Office of the State Archaeologist were carefully reviewed to establish a basic familiarity with regional archeological data, such as known sites, site contexts, site contents, etc. The primary method of field investigation was shovel testing. Shovel testing was conducted per the Minnesota State Historic Preservation Office's guidelines. Each test consisted of an approximately 30x30cm hole dug in 10cm levels until pre-Holocene soils were reached, the maximum depth of project disturbance demonstrated no potential effect on cultural resources (that is, to at least 50cm in depth), or other conditions (e.g., bedrock, large tree roots, subsurface boulders, etc.) precluded further work. All shovel test soil was screened through a ¼ inch hard wire mesh onto a tarp and replaced in the shovel test hole when completed.

In all, 196 shovel tests are reported here, organized into five different areas (Figure 6).

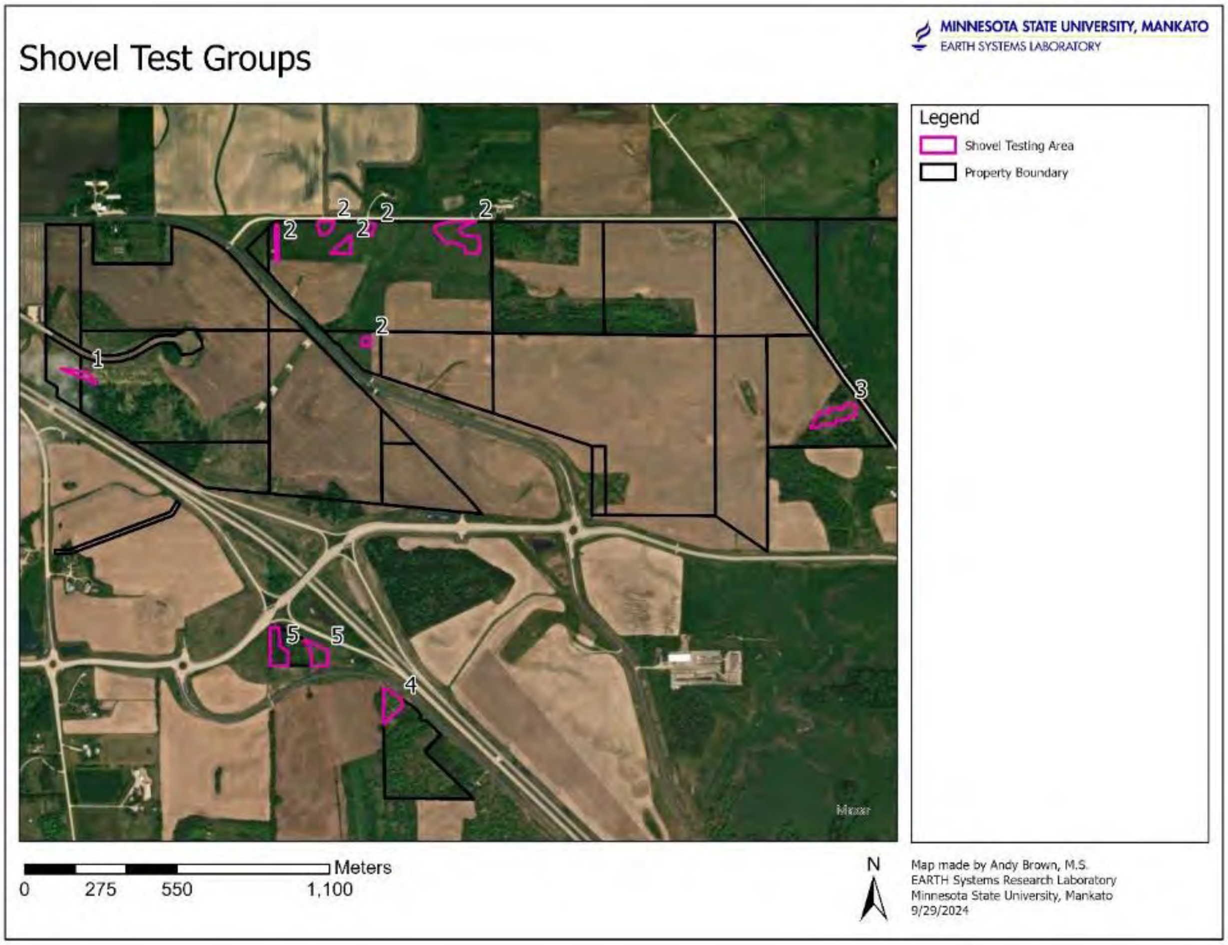


Figure 6. Shovel Testing Areas Grouped by Location.

Standing Structures

Farmstead 1

There is only one standing structure in the areas reported on here. It is located within the boundaries of what was once a farmstead, and is within an area slated for residential development. Historical aerial photographs (see Figure 7 through Figure 19) indicate the presence of multiple pre-1938 buildings that were demolished around 1953. The photographs also reveal that this parcel was subjected to extensive surface modifications that took place in the 1990s. In particular, the 1999 aerial shows extensive surface modification taking place across much of the parcel. The current structure is a framed, open-sided, covered, cattle-pen type building with corrugated metal siding and roofing, built in 1975. The structure has no National Register of Historic Places significance. See Figure 20 through Figure 24 for images of the structure's interior and exterior.

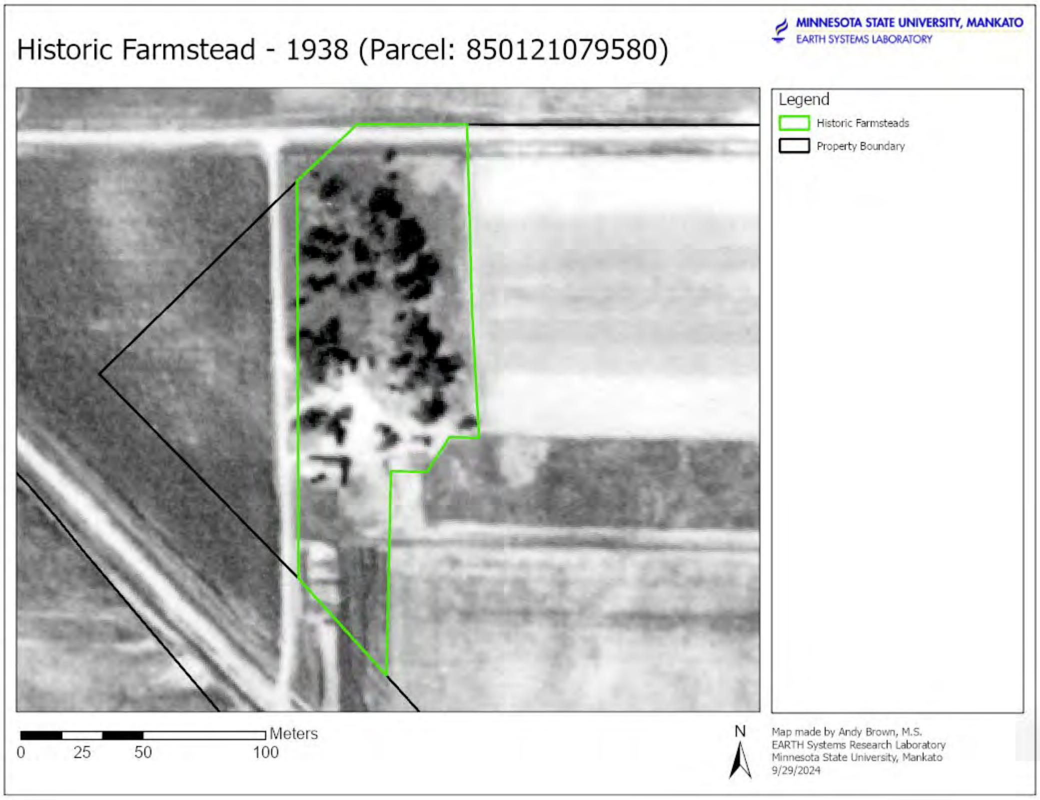


Figure 7. Farmstead 1 in 1938.

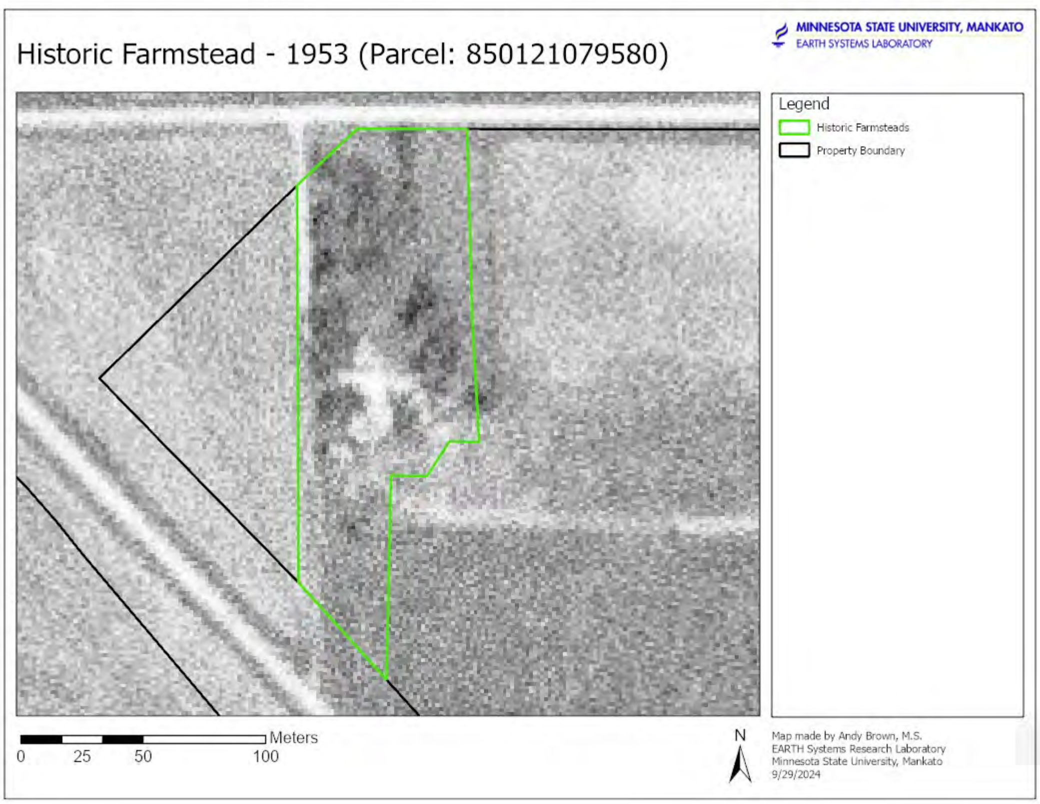


Figure 8. Farmstead 1 in 1953.

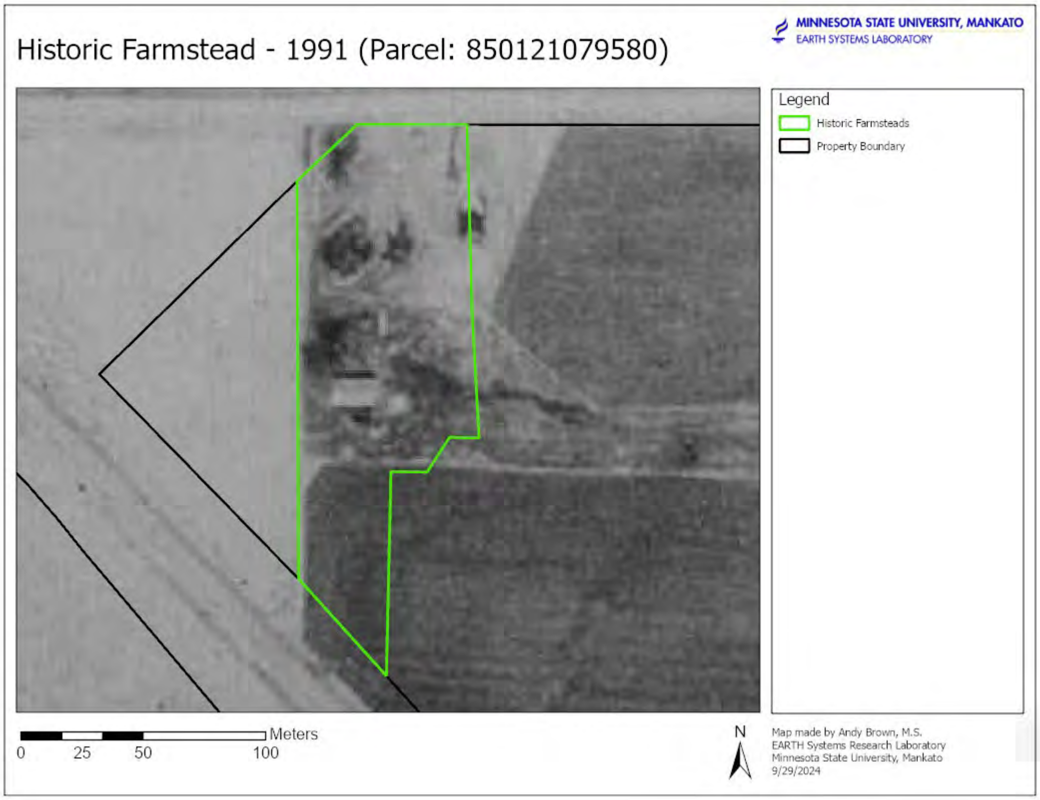


Figure 9. Farmstead 1 in 1991.

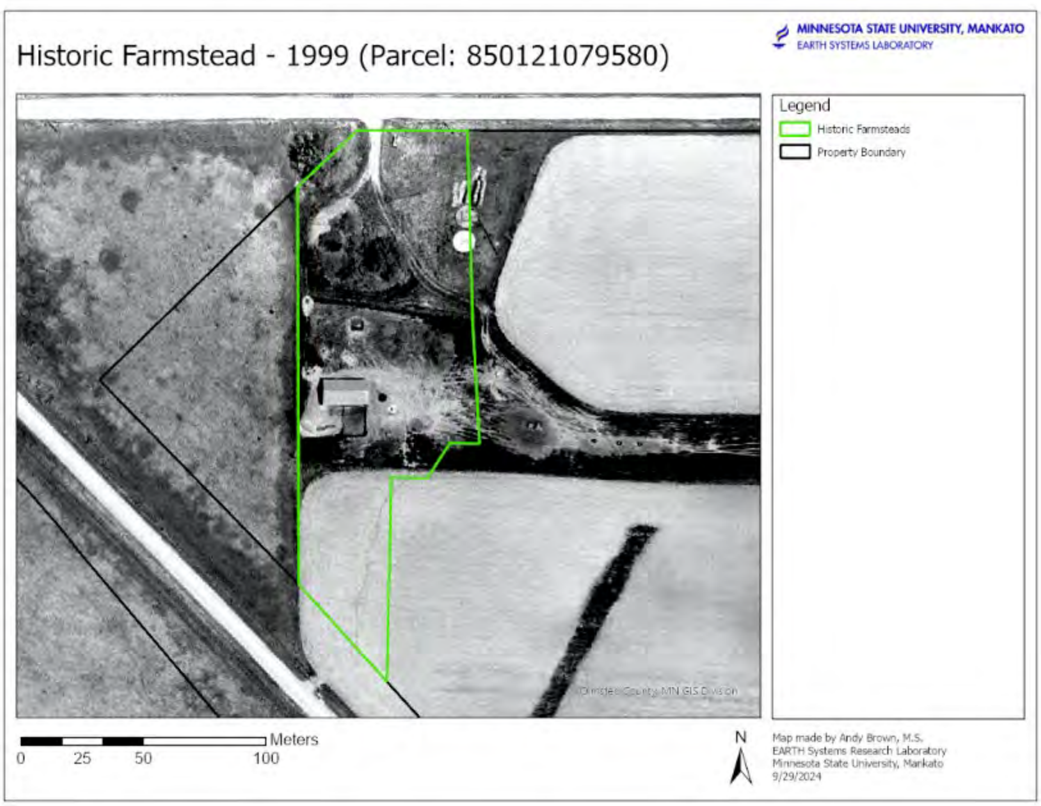


Figure 10. Farmstead 1 in 1999.

Figure 11. Farmstead 1 in 2003.

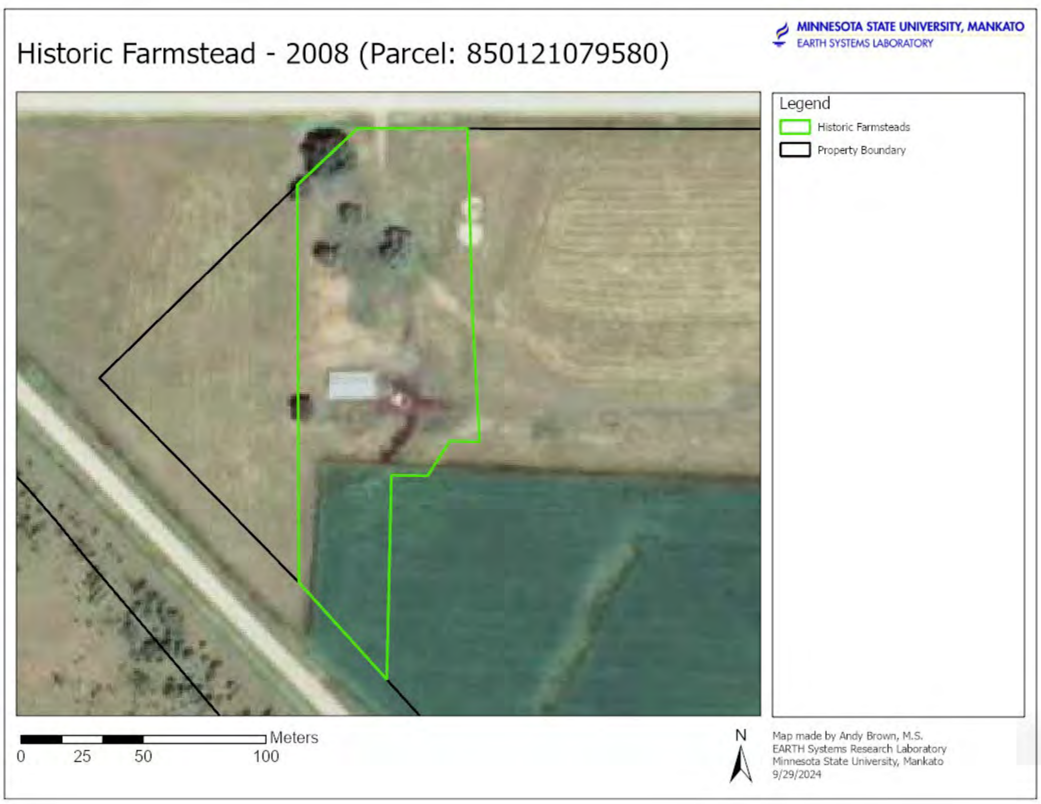


Figure 12. Farmstead 1 in 2008.

Figure 13. Farmstead 1 in 2009.

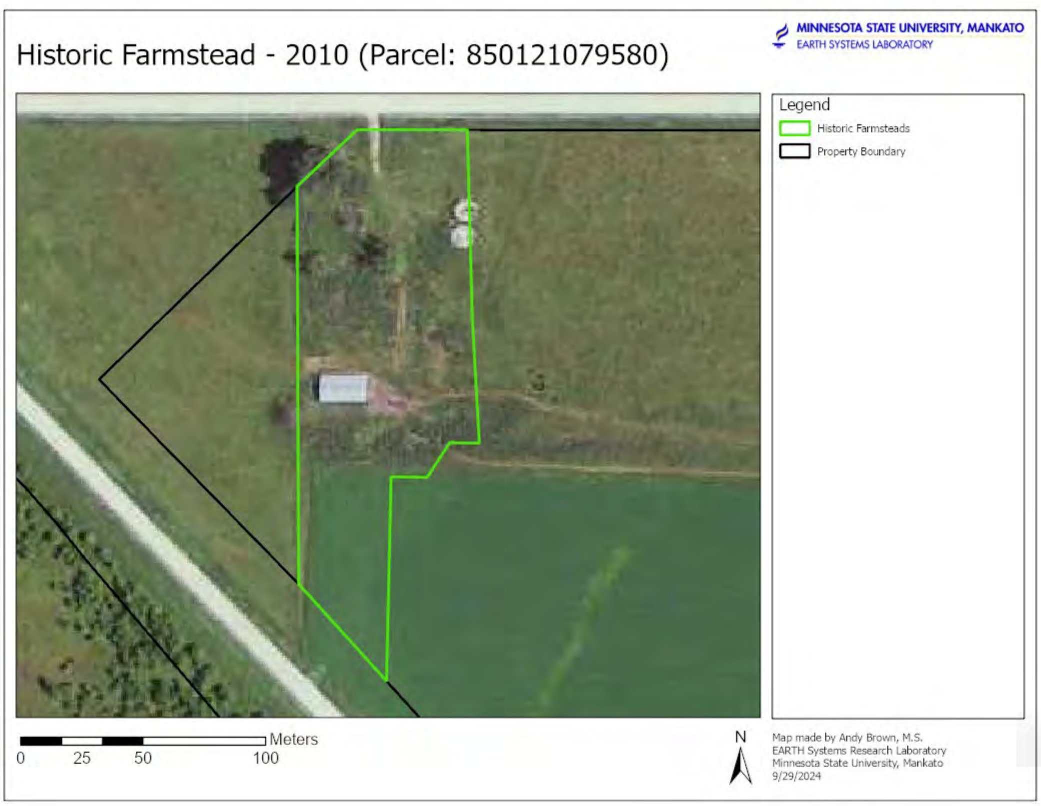


Figure 14. Farmstead 1 in 2010.

Figure 15. Farmstead 1 in 2011.

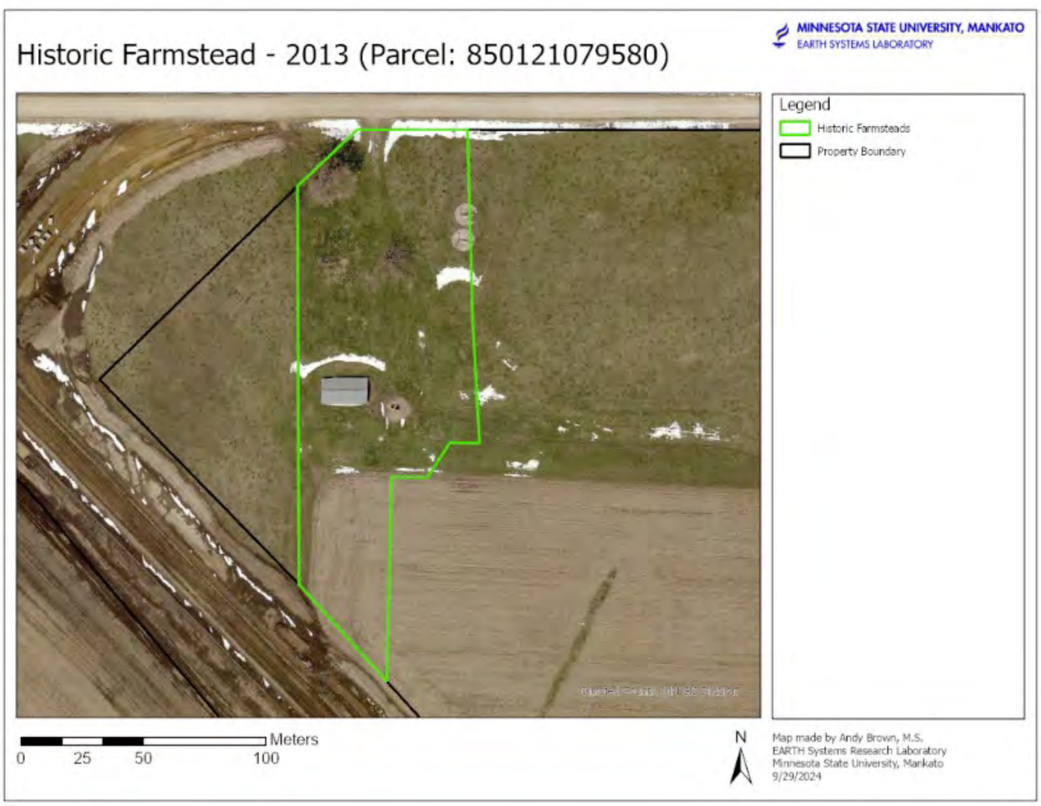


Figure 16. Farmstead 1 in 2013.

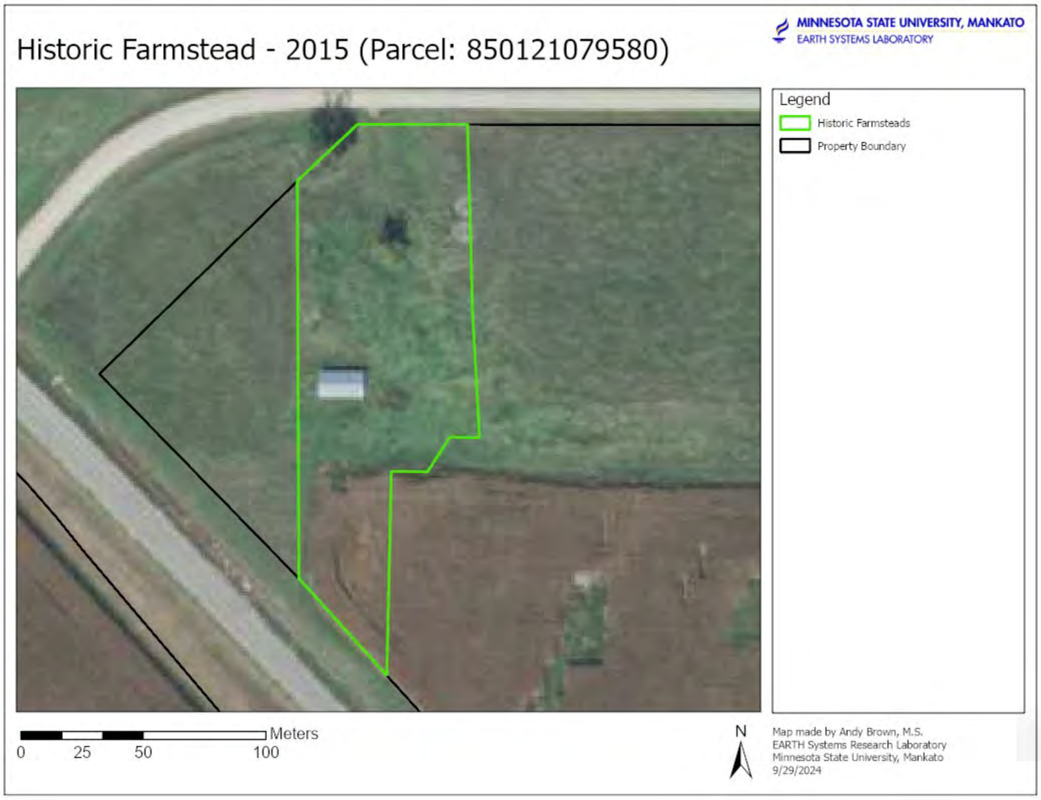


Figure 17. Farmstead 1 in 2015.

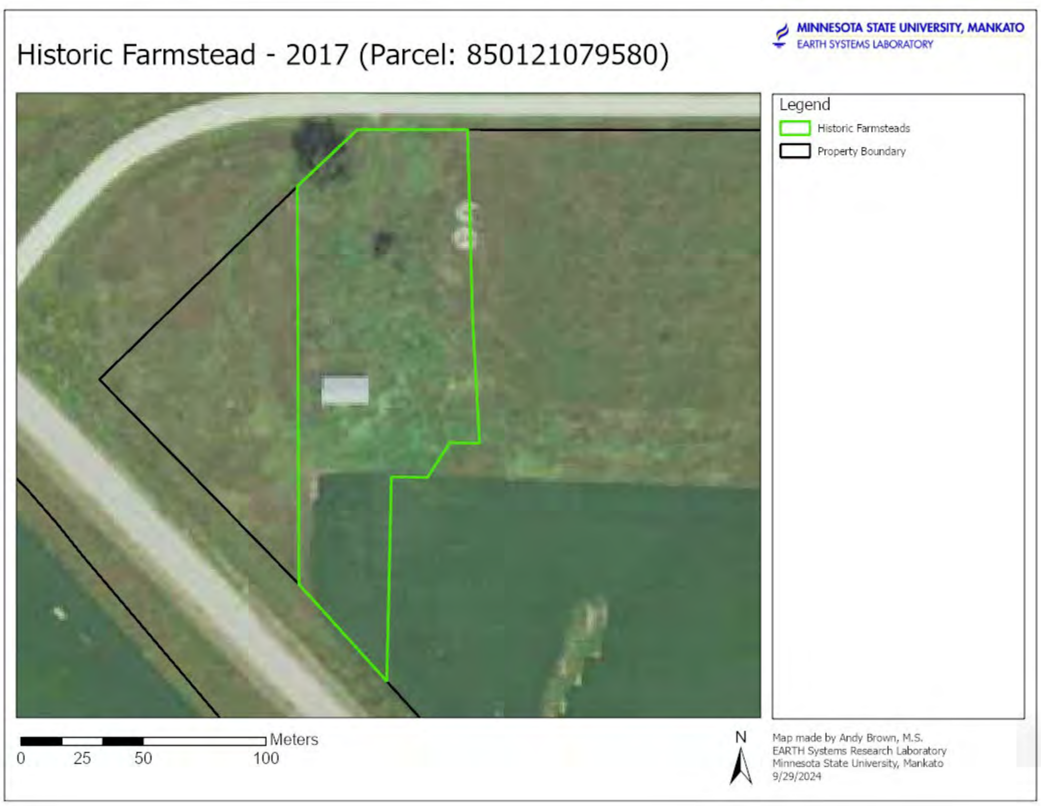


Figure 18. Farmstead 1 in 2017.

Figure 19. Farmstead 1 in 2021.

Figure 20. Farmstead 1 Standing Structure: North View.

Figure 21. Farmstead 1 Standing Structure: South View.

Figure 22. Farmstead 1 Standing Structure: West View.


Figure 23. Farmstead 1 Standing Structure: East View.

Figure 24. Farmstead 1 Standing Structure: Interior View.

Because of the parcel's history, we conducted shovel testing to determine whether or not any intact subsurface artifact deposits associated with the farmstead exist. Nine shovel tests were dug in a single 15m north-south transect through the center of the farmstead parcel (Figure 25 and Appendix C). Four of the nine shovel tests contained historical debris consisting of sparse and uneven amounts of window glass (8 pieces), brown bottle glass (1 piece), clear bottle glass (1 piece), glazed whiteware (1 piece), coal (3 pieces), rusted metal (2 pieces), and a rusted wire nail (1 piece). None of the glass or whiteware was diagnostic (i.e., there were no maker's marks, mold or tooling marks, etc.). See Figure 35 in Appendix C for representative artifacts from these shovel tests. All artifacts were recovered from less than 20cm depth. The soils in the shovel tests were somewhat variable and disturbed, consistent with the heavy degree of modern disturbance; all A horizon soils were gravelly clay to clayey gravel, and had a subangular-blocky texture, indicating a history of disturbance and compaction. The depth of the mixed A horizon varied from 10cm on the north end to more than 40cm on the south end of the transect. This suggests that, consistent with the aerial photographs, there has been significant soil displacement throughout the farmstead parcel, except for the furthest south, where the lidar shows a large borrow pit, and the C horizon was reached at 24cm, hence indicating soil removal.

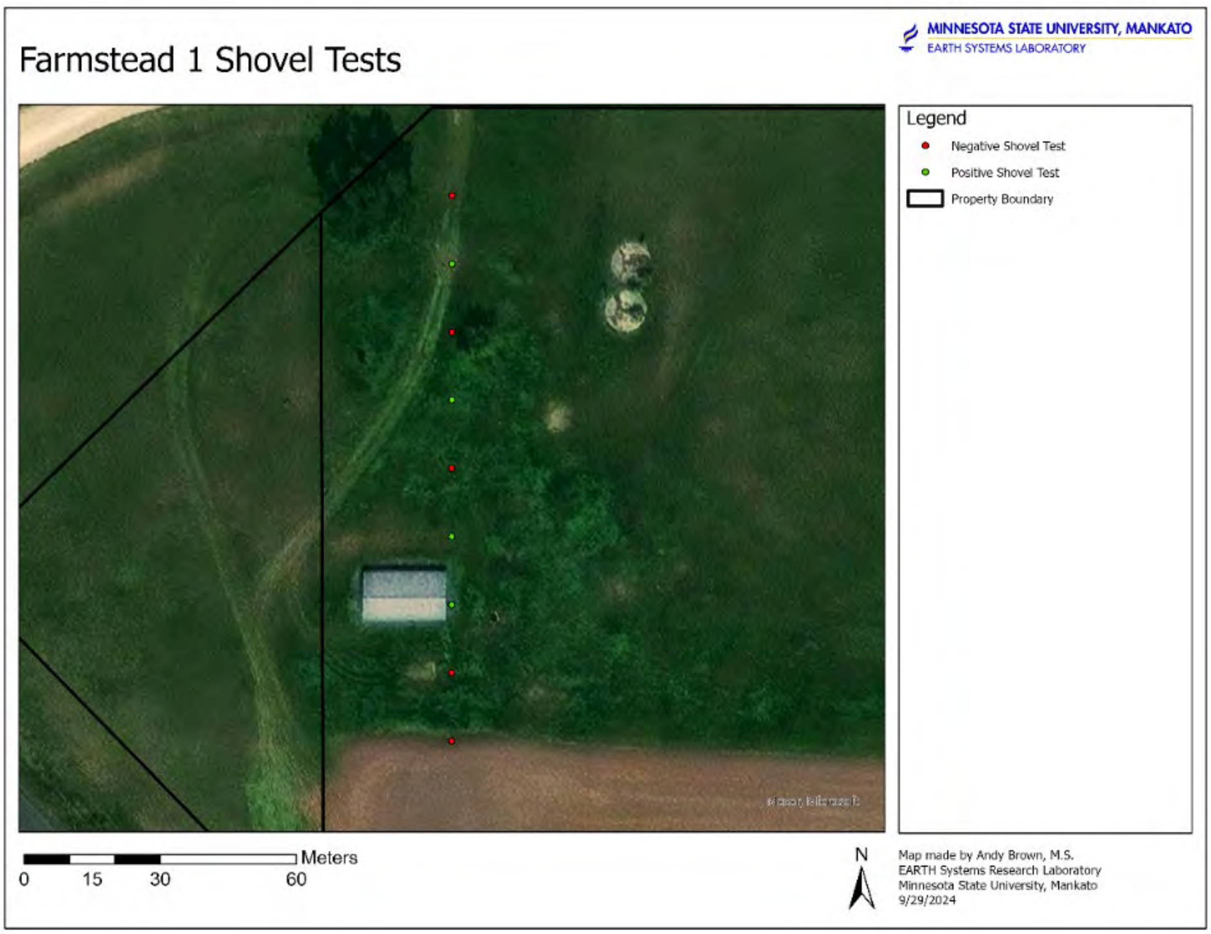


Figure 25. Shovel Test Transect at Farmstead 1.

The results of the aerial photo examination and the shovel testing demonstrate that extensive and intensive ground surface disturbance have completely destroyed any potential for intact subsurface archeological deposits within the farmstead parcel. We therefore conclude that any current or future projects in this parcel have no potential effect to disturb intact cultural resources. We note that areas east and west of the farmstead parcel are currently in crop. After harvest, these areas will be subject to surface reconnaissance to determine whether or not there are artifact deposits potentially associated with the farmstead. If surface artifact deposits are encountered in this area, their depth and integrity will be immediately assessed through shovel testing.

Shovel Test Group 1

This group of shovel tests is within an upland location, in an area where the preliminary development plan indicates the future existence of tribal cultural facilities. Although the specific nature of those facilities is not clearly described at this time, for purposes of the current project we assumed that there would be ground disturbing activities in the area, so we tested it.

Nine shovel tests were dug within the boundaries of the proposed facilities (Figure 26 and Appendix D). Current surface conditions are short grasses and forbs, with abundant sumac groves, and parts of a large plantation of black walnut trees. Soils in these shovel tests consist of a shallow, silty A horizon that generally transitions into a very dense, silty B horizon between 27 and 35cm. None of the shovel tests contained artifacts. We conclude that use of this area for cultural facilities will not disturb any archeological sites.

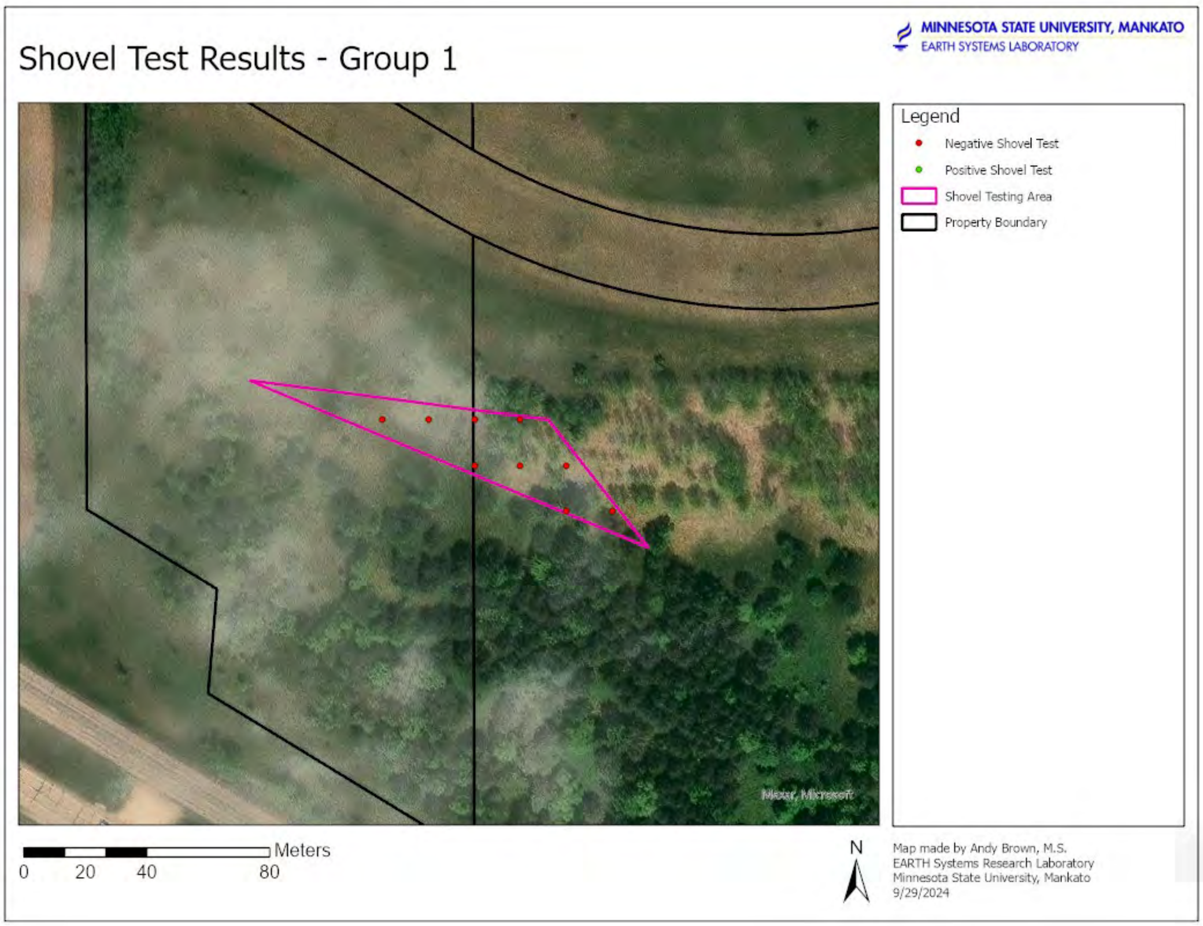


Figure 26. Shovel Test Group 1 Results.

Shovel Test Group 2

Five areas slated for residential development were subject to shovel testing due to topographic and vegetative characteristics Figure 27. Briefly, this area is characterized by rolling pasture, with only a few less rolling areas amenable to testing, which are otherwise separated by slopes and local drainages where testing is not required. The results of these clusters of tests are summarized in Table 2. See Appendix E for the shovel test specifics. Soils across this area vary between sandy silts and silts that consistently show evidence of deep weathering in the form of eluviated A and B horizons. There are also frequent underlying sandstone bedrock knobs which partially cause the rolling topography, and which are relatively close (i.e., <40cm deep) to the surface; numerous shovel tests terminated at these bedrock knobs. None of the shovel tests in this area yielded artifacts, so we conclude that residential development in the tested areas will not disturb any archeological sites. Note that areas south of these shovel test clusters will be subject to surface reconnaissance after harvest.

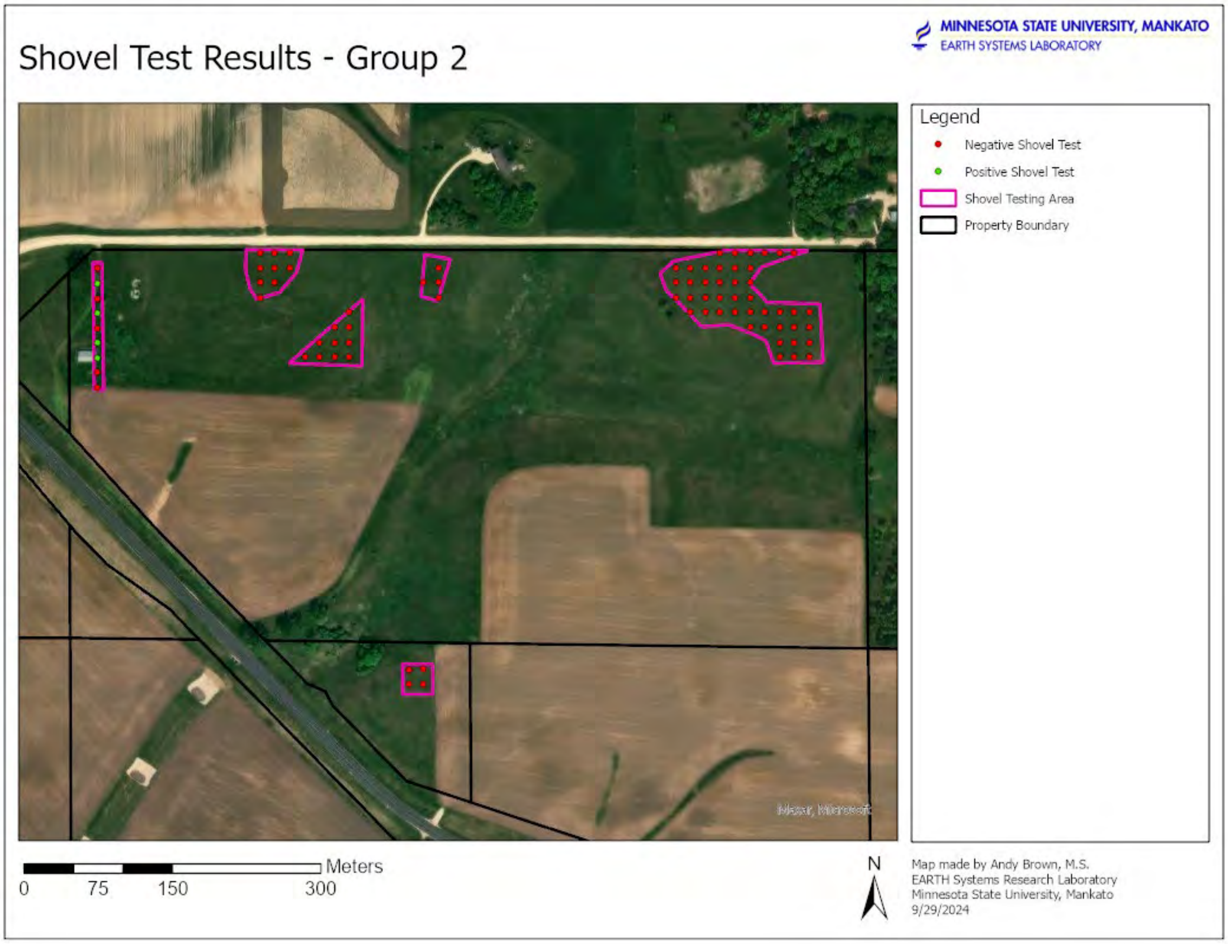


Figure 27. Shovel Test Group 2 Results.

Table 2. Shovel Test Group 1 Results Summarized.

Cluster	Number of Shovel Tests	Positive Shovel Tests
1	9	0
2	10	0
3	4	0

4	4	0
5	44	0
Total	71	0

Shovel Test Group 3

One area on the east side of the main part of the APE was subject to shovel testing because the existing plans indicate a road (Figure 28). The path of the road trends northeast to southwest. The area is currently vegetated by short, mixed grasses and forbs, shrubs, and conifer plantation.

Thirty-four shovel tests were dug in a cluster extending along the proposed route of the planned road (see Appendix F). Our testing grid extended roughly 150m long and 45m to 60m wide. Soils in the area are silty loams and have a relatively shallow AP that tends to end between 18cm and 28cm below the surface, transitioning directly into a very silty B horizon. No shovel tests contained artifacts. We conclude that construction of a road in this area will not disturb any archeological sites. The road path extends into cropland, which will be subject to surface reconnaissance after harvest.

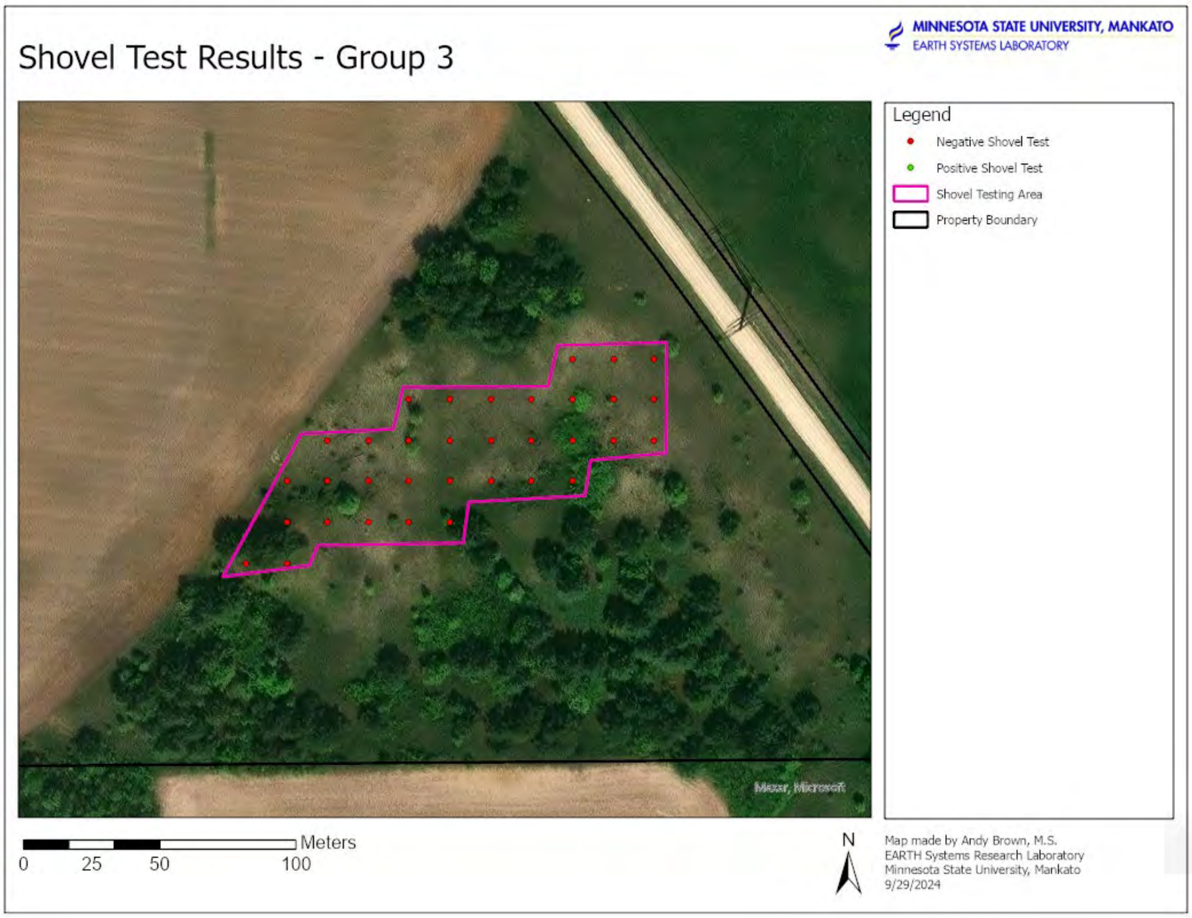


Figure 28. Shovel Test Group 3 Results.

Shovel Test Group 4

These shovel tests are an upland area on the south side of Wazuweeta Rd. Current site conditions consist of short grasses and forbs, with interspersed trees and sumac. Review of historical aerial photos of this area (see Figure 29 through Figure 32) indicate that it was entirely under cultivation well into the 1950s. A farm outbuilding was built in the middle of this parcel before 1972, and additional structures are present by 1991. Some time between 2008 and 2009 all standing structures were completely razed. Further, between 2011 and 2013 the northwestern two-thirds of the area appears to have been scraped, with brush and likely any remaining parts of structures gathered into a large pile in the center of the parcel. Around that time, the north slope was subjected to dramatic downcutting to contour it toward Wazuweeta Rd. The area has slowly re-vegetated since 2013, to its modern condition. Regardless of this history, we felt it important to assess whether any intact archeological contexts may be present. We dug 27 shovel tests in this parcel (Figure 33).

The soil profiles in the shovel tests attest to much of the parcel being heavily disturbed (Appendix G). Across most of the parcel, the pre-existing AP horizon had abundant gravels that were undoubtedly imported when farm structures were built, and which were then distributed across the surface and down into the soil at the time the buildings were razed and the surface was scraped. Some shovel tests along the western side of the area encountered sandstone bedrock between 15cm and 30cm below the surface. Shovel tests along the southeastern edge showed small areas of intact AP extending to ~30cm below the surface, where they abruptly transitioned to a heavy silt B horizon.

As expected, given the parcel's history, modern historical debris was encountered. Shovel test 0E 60N contained 2 wire nails in the 0-10cm level and one wire nail in the 20-30cm level. Shovel test 45E 45N had a fragment of semi-rusted metal at 2cm below the surface. Finally, shovel test 45N 90E contained a rusted wire nail at 40cm below surface. None of these items were retained, and their vertical and horizontal distribution demonstrate the highly disturbed nature of most of the parcel. We conclude that no intact archeological deposits are present in the parcel, and that proposed development will have no negative effect.

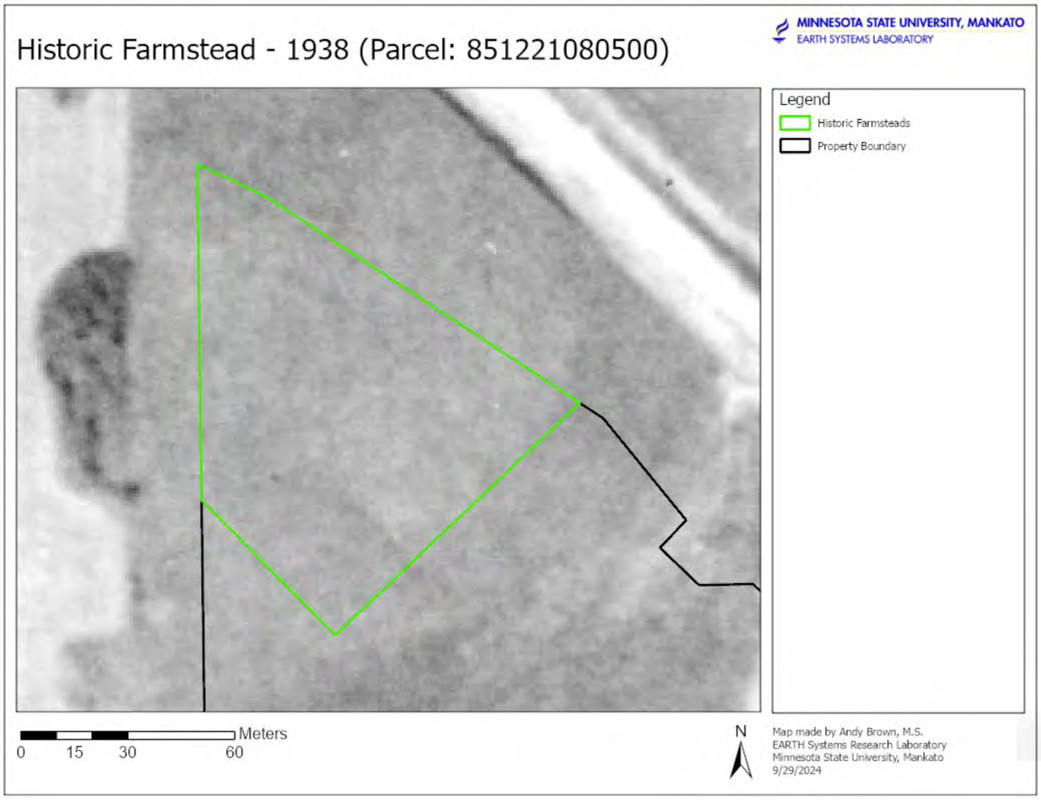


Figure 29. Area Containing Demolished Structures in 1938.

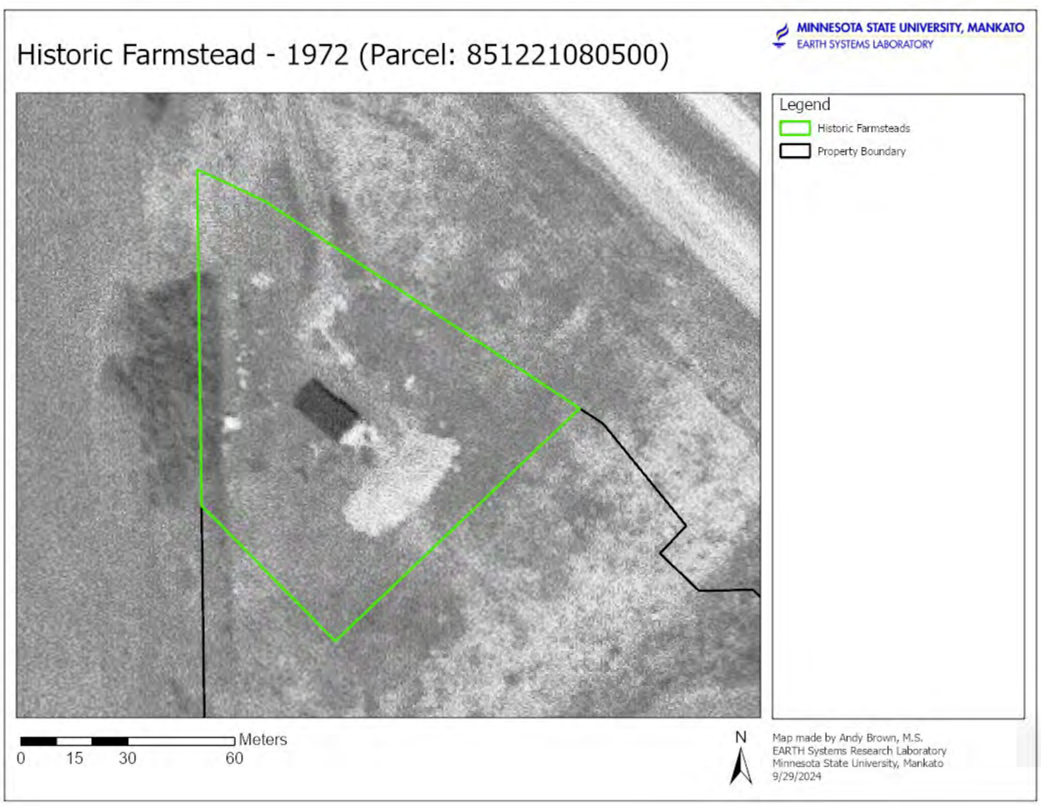


Figure 30. Area Containing Demolished Structures in 1972.

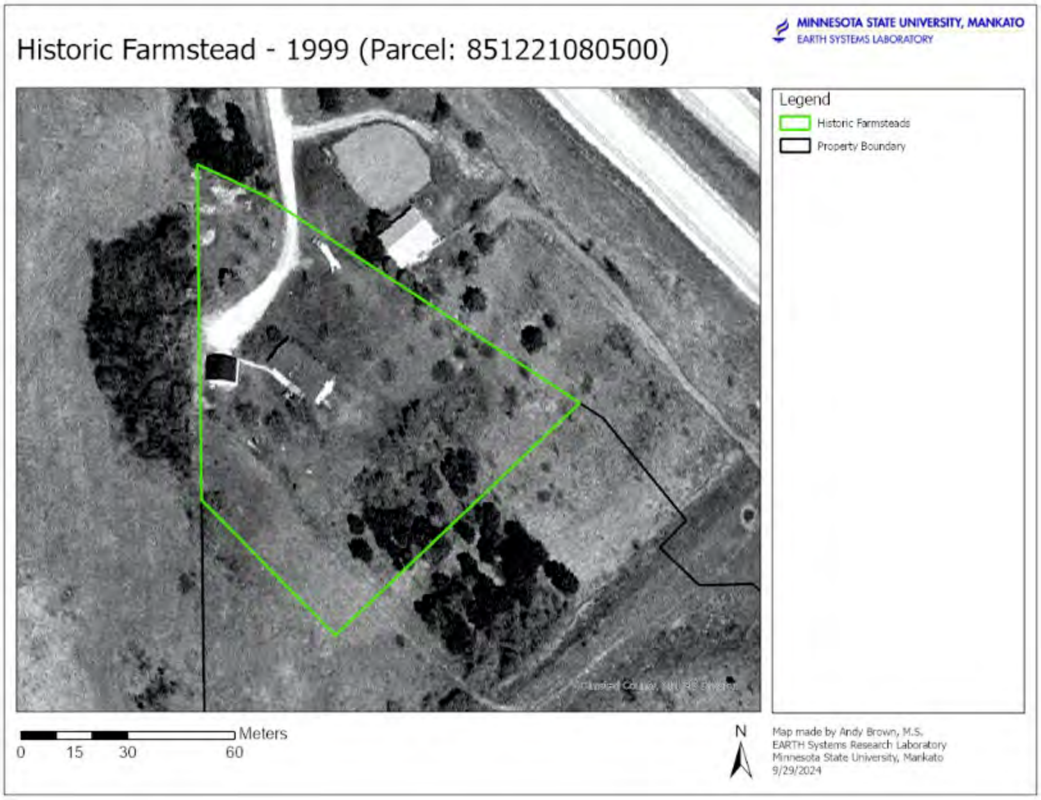


Figure 31. Area Containing Demolished Structures in 1999.

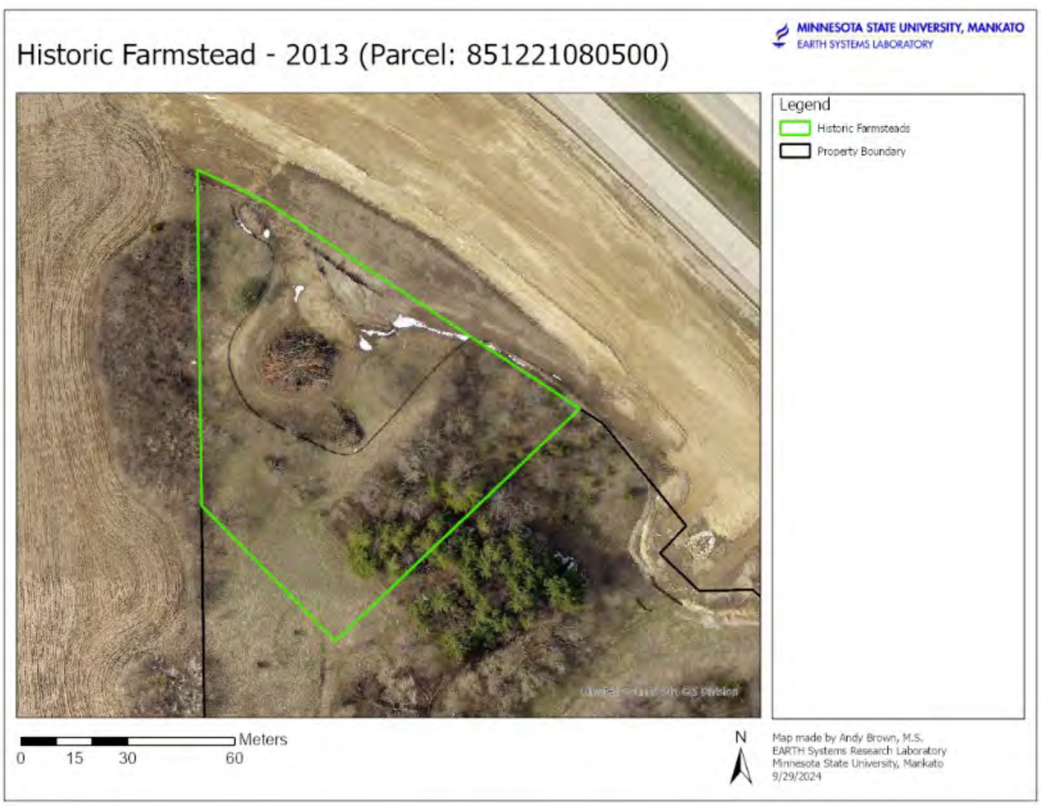


Figure 32. Area Containing Demolished Structures in 2013.

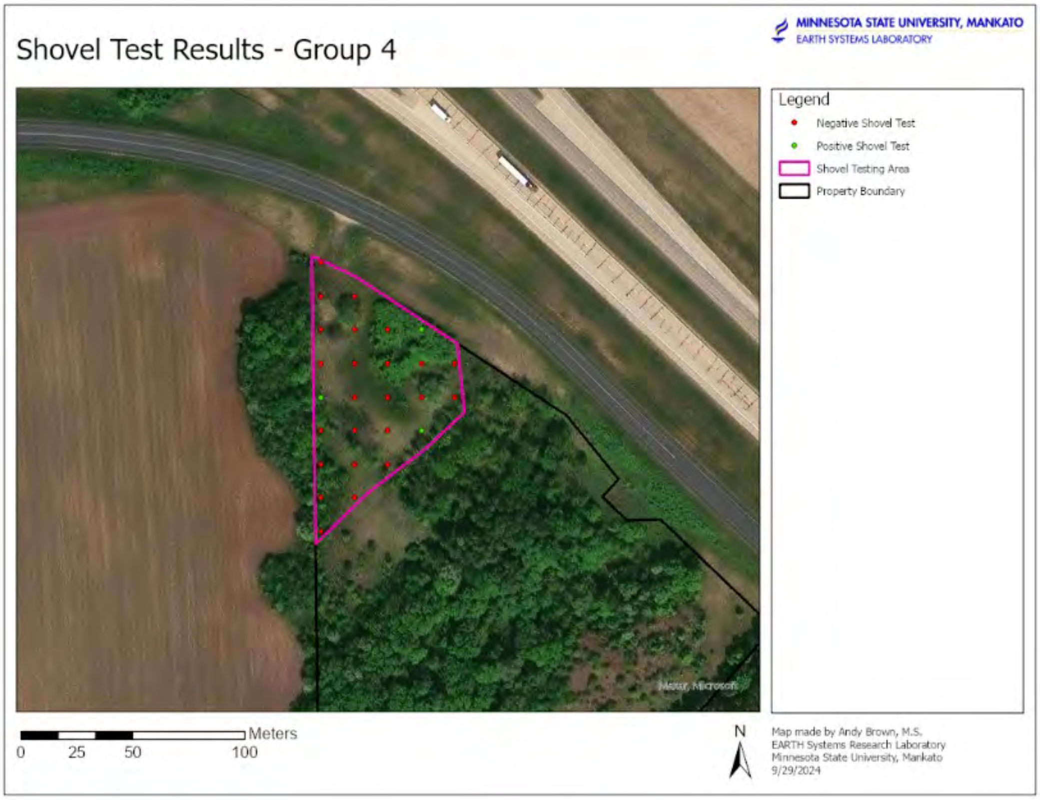


Figure 33. Shovel Test Group 4 Results.

Shovel Test Group 5

Two clusters of shovel tests, separated by a steep slope, were dug in this parcel due to its currently intended use as commercial space, and its surface conditions (Figure 34). Currently, the upper area (the western part) is entirely wooded, much of it in a pine plantation, and the lower area (the eastern part) is in tall grasses and shrubs. Review of aerial photos suggests that the area seems to have been historically used for hay production.

Shovel test data for this area can be found in Appendix H. In the western segment, containing 26 shovel tests, the lack of a plow zone in the shovel test soil horizons confirms that it has not been cultivated at least since the 1930s. The A horizon, a sandy silt, remains relatively shallow throughout the upper area, being generally less than 30cm deep before reaching a silty B horizon.

Soils in the eastern segment, which includes 20 shovel tests, differ markedly to the western segment. Specifically, most shovel tests show an upper layer of translocated sediment varying from 5cm to 13cm thick, overlying an A horizon that extends in some cases to ~50cm below the surface. This is expected given the area's lower elevation compared to areas around it. It is effectively a small swale surrounded by the aforementioned higher area to the west, as well as higher areas to the north (the Highway 52 roadbed) and to the south (the Wazuweeta Rd. bed). Shovel tests terminated either at the B horizon or at 50cm below surface, consistent with state survey standards.

No artifacts were found in any shovel test in this group. We conclude that no archeological sites are present, and that there is therefore no potential effect of using this parcel for commercial development.

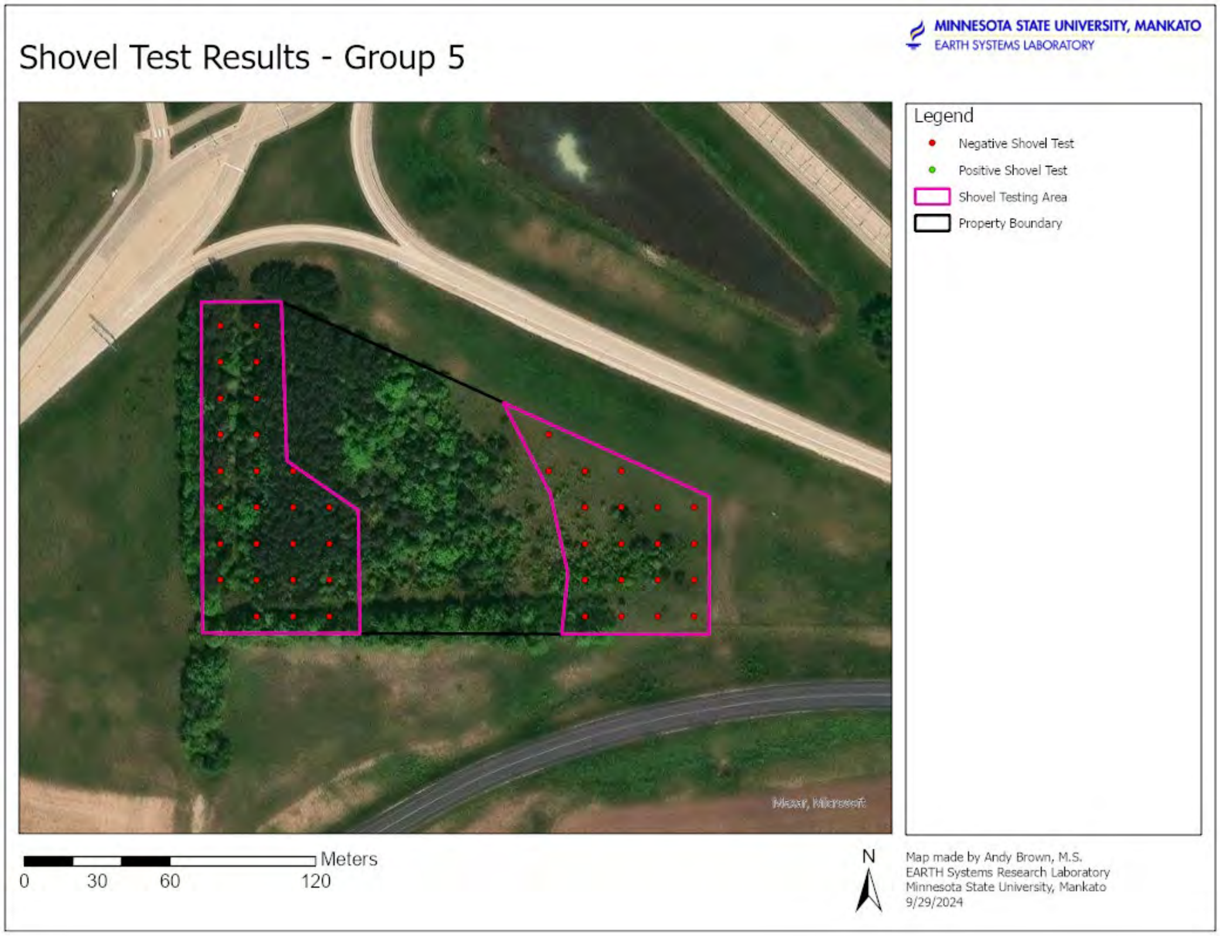


Figure 34. Shovel Test Group 5 Results.

Conclusions and Recommendations

Six areas were shovel tested where the current development plans for the fee-to-trust conversion for purposes of community development may include ground disturbing activities, and where current ground surface conditions required subsurface examination to determine the presence or absence of cultural resources that may be effected. Four of the six areas did not contain any artifacts. The other two areas had very limited artifacts, and the shovel tests as well as an examination of aerial photos demonstrate that no intact archeological deposits are present. We also note the presence of one standing structure that has no National Register significance within the examined parcels. ***We therefore recommend a finding of no potential effect for the areas covered by this report***. This report will be followed by a subsequent report detailing the results of surface reconnaissance covering the rest of the parcels in the fee-to-trust for community development application.

References

Arzigian, C., & Kolb, M. (2010). *2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota.* La Crosse, Wisconsin: Minnesota Office of the State Archaeologist.

Arzigian, C., & Kolb, M. (2011). *2010 Archaeological Reconnaissance Survey of Olmsted County, Minnesota.*

Hobbs, E. (2002). *Rochester Plateau Subsection of Driftless & Dissected Plateau Section*. Retrieved from Mn/Model : https://www.dot.state.mn.us/mnmodel/P3FinalReport/plat.html

Hobbs, E. (2019). *MnModel Phase 4: Project Summary and Statewide Results.* St. Paul, Minnesota: Minnesota Department of Transportation. Retrieved from https://www.dot.state.mn.us/mnmodel/phase4-report/predictivemodelsmmp4.pdf

Kluth, D. W. (2002). *Phase I and II Archaeological and Geomorphic Investigations Along T.H. 52 Between Pine Island and Oronoco, Olmstead and Goodhue Counties, Minnesota.*

Langseth, J. A., & Anderson, J. B. (2019). *Phase I Cultural Resource Investigation of 55 HA (136 Ac) of Land Along the Zumbro River for the Proposed Expansion of Goose Rock Quarry in Oronoco Township, Olmsted County, Minnesota.*

Appendix A
Archeological sites in Olmsted County.

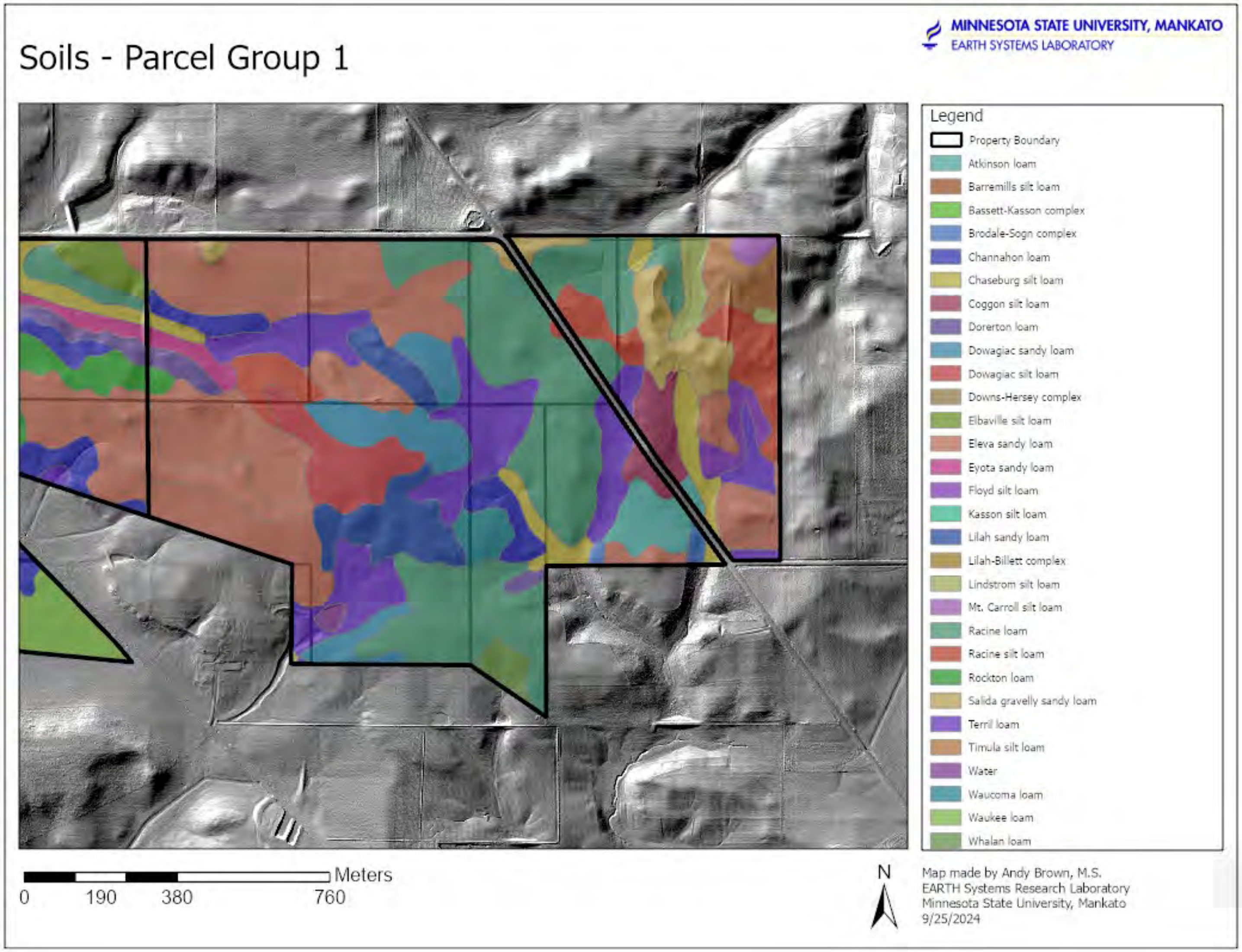
SITENUM	SITENAME	DESCRIPTION	TRADITION	CONTEXT
21OL0001	N/A	Lithic Scatter	Archaic	Early Archaic
21OL0002	N/A	Artifact Scatter	Woodland	Southeast MN Late Woodland
21OL0003	Engel	Earthwork, Artifact Scatter	Woodland (based on probable mounds)	
21OL0004	N/A	Lithic Scatter		
21OL0005	N/A	Lithic Scatter		
21OL0006	(same as 21OL13)	Artifact Scatter		
21OL0008	N/A	Lithic Scatter		
21OL0009	N/A	Earthwork		
21OL0010	N/A	Lithic Scatter		
21OL0011	Sand Bank	Lithic Scatter		
21OL0012	N/A	Lithic Scatter		
21OL0013	(same as 21OL6)	Lithic Scatter		
21OL0014	Keller I	Lithic Scatter		
21OL0015	Keller II	Artifact Scatter	Woodland	Late Woodland
21OL0016	N/A	Lithic Scatter		
21OL0017	N/A	Lithic Scatter		
21OL0018	Younge	Single Artifact		
21OL0019	N/A	Lithic Scatter		Middle Archaic
21OL0020	N/A	Artifact Scatter	Archaic	Middle Archaic

21OL0021	Muenter I	Artifact Scatter	Woodland	Woodland
21OL0022	Muenter II	Artifact Scatter	Archaic, Woodland	Archaic, Southeast MN Late Woodland
21OL0023	N/A	Single Artifact	Archaic	Prairie Archaic
21OL0024	N/A	Single Artifact		
21OL0025	N/A	Lithic Scatter		
21OL0026	N/A	Lithic Scatter		
21OL0027	Traxler I. F.	Single Artifact		
21OL0028	Middle Zumbro Terrace	Lithic Scatter		
21OL0029	Davis	Lithic Scatter	Archaic	Riverine Archaic
21OL0030	Shady Lake	Artifact Scatter		
21OL0031	Middle Zumbro I. F.	Single Artifact		
21OL0032	South Branch	Lithic Scatter		
21OL0033	Zumbro Pit	Single Artifact	Woodland	
21OL0034	N/A	Lithic Scatter		
21OL0035	Byron Whistle Stop	Structural Ruin		Railroad and Agricultural Development
21OL0036	Rochester Whistle Stop	Structural Ruin		Railroad and Agricultural Development
21OL0037	Eyota Whistle Stop	Structural Ruin		Railroad and Agricultural Development
21OL0038	Dover Whistle Stop	Structural Ruin		Railroad and Agricultural Development
21OL0039	Hruska	Lithic Scatter	Early Paleoindian	Clovis
21OL0040	Raynard Johnson	Lithic Scatter		
21OL0041	Grassle/Kaul/Schultz Farmstead	Artifact Scatter, Structural Ruin		Railroad and Agricultural Development

21OL0042	N/A	Artifact Scatter		Railroad and Agricultural Development
21OL0043	Koenig	Single Artifact	Paleoindian	Lanceolate/Plano
21OL0044	Schumann Cache	Lithic Scatter	Paleoindian	Clovis
21OL0045	Schumann Biface	Single Artifact		
21OL0046	N/A	Lithic Scatter	Archaic	Middle Archaic
21OL0047	Chesterwoods Farmstead	Artifact Scatter, Structural Ruin		Railroad and Agricultural Development
21OL0048	Hinckley	Single Artifact		
21OL0049	Buster's Garden	Lithic Scatter		
21OL0050	Axe	Lithic Scatter	Archaic	Middle Archaic
21OL0051	DeCook 1	Single Artifact		
21OL0052	DeCook 2	Single Artifact		
21OL0053	Vermilya 2	Lithic Scatter		
21OL0054	Vermilya 3	Single Artifact		
21OL0055	Keller III	Lithic Scatter		
21OL0056	N/A	Artifact Scatter		Railroad and Agricultural Development
21OL0057	Oxbow Park Box Elder Grove	Artifact Scatter	Woodland	
21OL0058	Zumbro Lake Ring	Rock Alignment		
21OL0059	Tolbert	Farmstead		Railroad and Agricultural Development
21OL0060	N/A	Artifact Scatter		
21OL0061	N/A	Single Artifact		
21OL0062	N/A	Single Artifact		

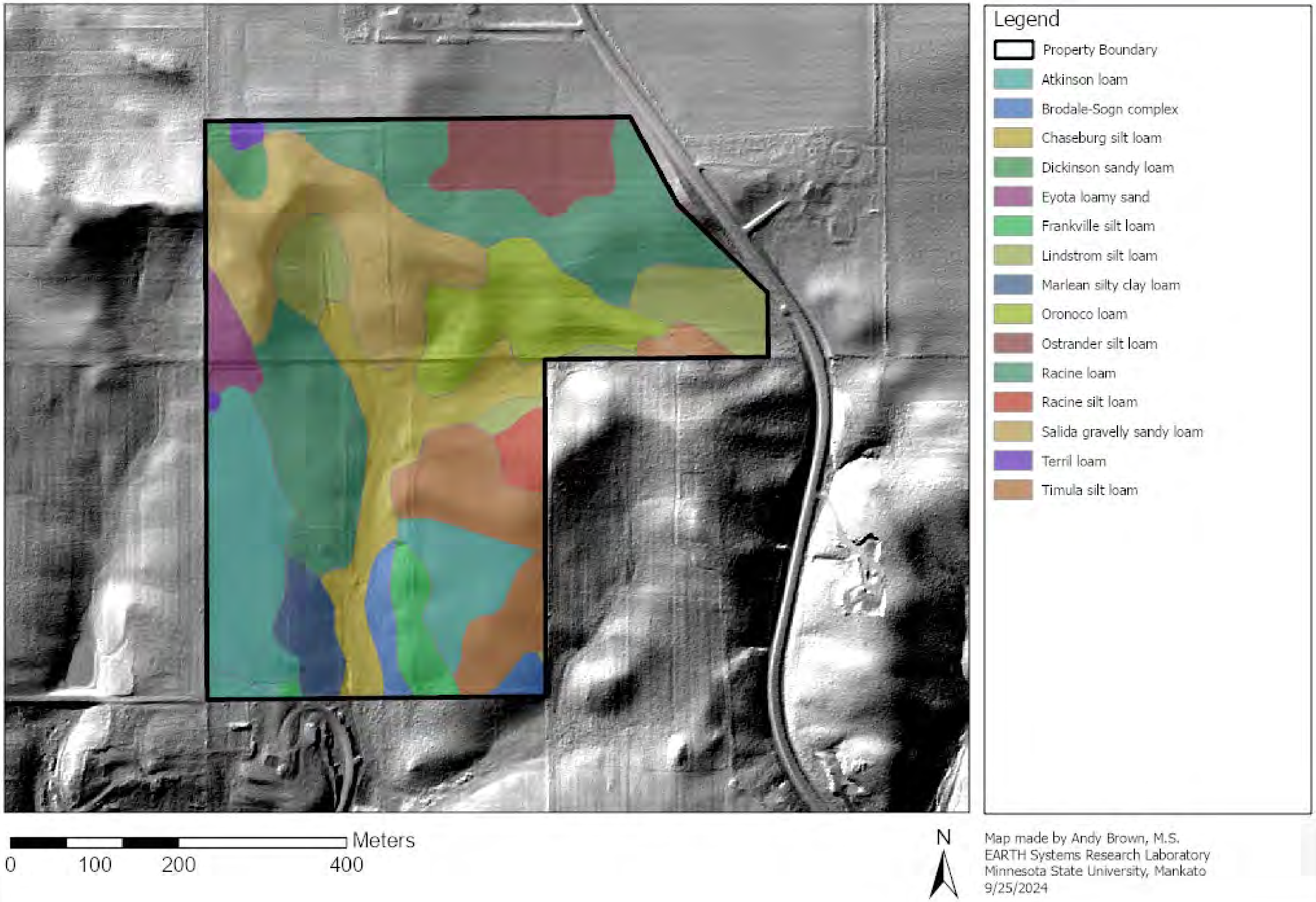
21OL0063	N/A	Single Artifact		
21OL0064	N/A	Artifact Scatter		Railroad and Agricultural Development
21OL0065	N/A	Surface Feature, Artifact Scatter	RA	
21OL0066	N/A	Lithic Scatter		
21OL0067	N/A	Lithic Scatter, Artifact Scatter, Surface Feature		Initial U.S., Early Agriculture and River Settlement
21OL0068	N/A	Lithic Scatter		
21OL0069	N/A	Lithic Scatter		
21OL0070	N/A	Lithic Scatter		
21OL0071	N/A	Single Artifact		
21OL0072	N/A	Lithic Scatter		
21OL0073	N/A	Artifact Scatter		
21OL0074	N/A	Lithic Scatter		
21OL0075	Kamnetz	Artifact Scatter	Woodland	Southeast MN Late Woodland
21OL0076	Reuben Silvester Warner Homestead	Artifact Scatter		Railroad and Agricultural Development

Appendix B
Detailed Soil Maps



Soils - Parcel Group 2

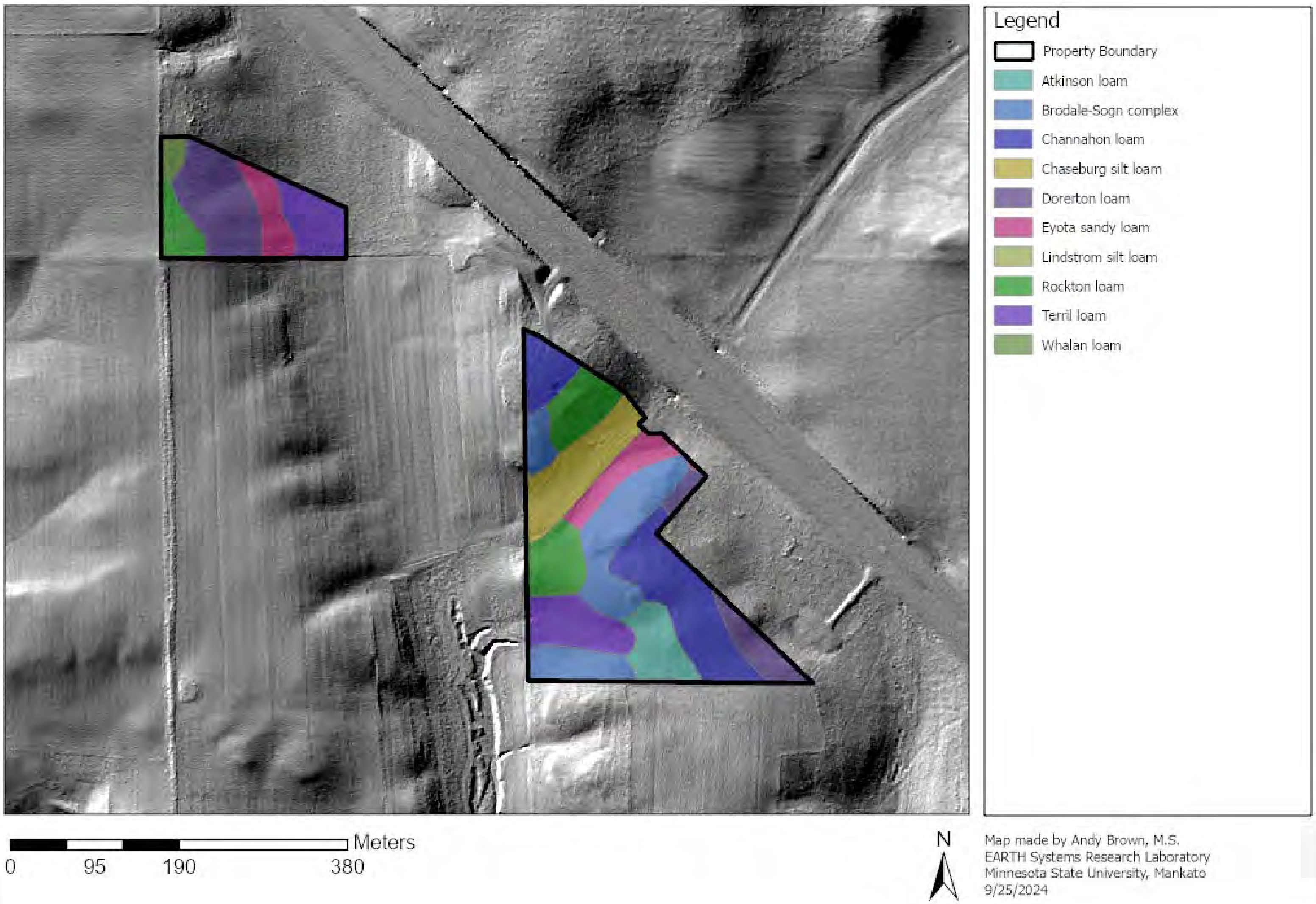
MINNESOTA STATE UNIVERSITY, MANKATO
EARTH SYSTEMS LABORATORY



Map made by Andy Brown, M.S.
EARTH Systems Research Laboratory
Minnesota State University, Mankato
9/25/2024

Soils - Parcel Group 4

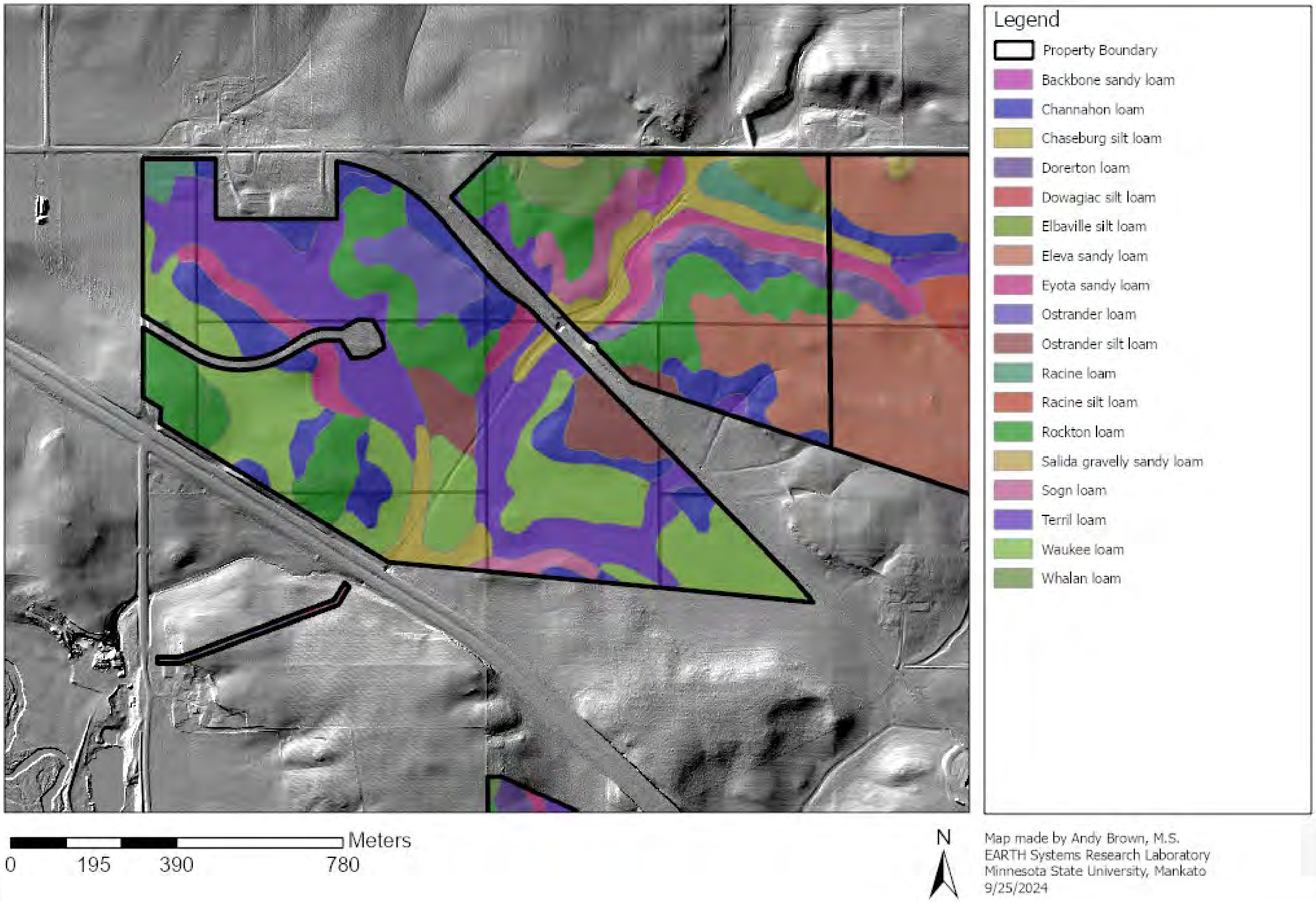
MINNESOTA STATE UNIVERSITY, MANKATO
EARTH SYSTEMS LABORATORY



Map made by Andy Brown, M.S.
EARTH Systems Research Laboratory
Minnesota State University, Mankato
9/25/2024

Soils - Parcel Group 3

MINNESOTA STATE UNIVERSITY, MANKATO
EARTH SYSTEMS LABORATORY



Map made by Andy Brown, M.S.
EARTH Systems Research Laboratory
Minnesota State University, Mankato
9/25/2024

Appendix C
Farmstead 1 Shovel Test Forms

Shovel Test ID	ST -330E, 300N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	49cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silty loam 10YR3/2	A	Moderately compact
26-47cm	Loamy silt 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
47-49cm	Silty clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 315N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	38cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-34cm	Sandy silt 10YR4/2	Ap	Moderately compact
34-38cm	Loamy silt 10YR5/3	B	Moderately compact

Shovel Test ID	ST -330E, 330N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Loamy silt 10YR5/3	Ap	Very compact
24-25cm	Loamy silt 10YR5/3	C	Moderately compact

Shovel Test ID	ST -330E, 345N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	20cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Clayey silty loam 10YR7/2	Ap	Very compact
15-20cm	Clayey loam 10YR4/4	B	Very compact

Shovel Test ID	ST -330E, 360N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	25cm		
Image	No Image		
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Loamy silt 10YR4/3	A	Moderately compact
15-25cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 375N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	27cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Loamy silt 10YR4/3	A	Moderately compact
10-26cm	Loamy silt 10YR4/3	A	Moderately compact
27-27cm	Loamy silt 10YR6/3	B	Moderately compact

Shovel Test ID	ST -330E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-11cm	Silty loam 10YR3/1	Ap	Moderately compact
11-36cm	Silty clayey loam 10YR3/2	A	Moderately compact
36-38cm	Clayey silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 405N
Grid Name	Elk Run Grid 5
Results	Positive
Maximum Depth	44cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-42cm	Clayey gravel 10YR4/2	A	Moderately compact
42-44cm	Gravelly clay 10YR5/4	B	Moderately compact

Shovel Test ID	ST -330E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	7cm		
Image			
Soil Level Descriptions			
Level Depth	Soil Description	Soil Horizon	Compaction
0-7cm	Sandy silt 10YR5/3	Ap	Very compact

Figure 35. Representative Artifact Assemblage from Farmstead 1.

Appendix D
Group 1 Shovel Test Forms

Shovel Test ID	ST 75E, 30N		
Grid Name	Elk Run Grid 4		
Results	Negative		
Maximum Depth	24cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-16cm	Clayey loam 10YR3/2	A	Moderately compact
16-21cm	Silty clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
21-24cm	Sandy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 90E, 30N		
Grid Name	Elk Run Grid 4		
Results	Negative		
Maximum Depth	27cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Loamy clay 10YR4/3	A	Moderately compact
26-27cm	Loamy clay 10YR6/3	B	Moderately compact

Shovel Test ID	ST 105E, 15N		
Grid Name	Elk Run Grid 4		
Results	Negative		
Maximum Depth	42cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Silty loam 10YR2/2	Ap	Moderately compact
28-38cm	Silty loam 10YR2/2 mottled with 10YR4/4	AB	Moderately compact
38-42cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 105E, 30N		
Grid Name	Elk Run Grid 4		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-25cm	Clayey silty loam 10YR3/2	Ap	Moderately compact
25-30cm	Clayey silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 120E, 15N
Grid Name	Elk Run Grid 4
Results	Negative
Maximum Depth	34cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-10cm	Silty loam 10YR2/2	Ap	Not compact
10-29cm	Silty loam 10YR2/2 mottled with 10YR4/4	Ap	Not compact
29-34cm	Clayey loam 10YR4/4	B	Not compact

Shovel Test ID	ST 120E, 30N
Grid Name	Elk Run Grid 4
Results	Negative
Maximum Depth	35cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-34cm	Sandy loamy silt 10YR3/2	A	Moderately compact
34-35cm	Silty loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 135E, 0N
Grid Name	Elk Run Grid 4
Results	Negative
Maximum Depth	39cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-34cm	Loamy silt 10YR4/2	A	Moderately compact
34-39cm	Loamy clay 10YR4/3	B	Very compact

Shovel Test ID	ST 135E, 15N
Grid Name	Elk Run Grid 4
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-27cm	Silty clay 10YR2/2	A	Moderately compact
27-38cm	Clay 10YR3/4	B	Moderately compact

Shovel Test ID	ST 150E, 0N
Grid Name	Elk Run Grid 4
Results	Negative
Maximum Depth	29cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Loamy clay 10YR4/2	A	Moderately compact
23-29cm	Loamy clay 10YR5/3	B	Moderately compact

Appendix E
Group 2 Shovel Test Forms

Shovel Test ID	ST -330E, 300N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	49cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silty loam 10YR3/2	A	Moderately compact
26-47cm	Loamy silt 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
47-49cm	Silty clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 315N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	38cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-34cm	Sandy silt 10YR4/2	Ap	Moderately compact
34-38cm	Loamy silt 10YR5/3	B	Moderately compact

Shovel Test ID	ST -330E, 330N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Loamy silt 10YR5/3	Ap	Very compact
24-25cm	Loamy silt 10YR5/3	C	Moderately compact

Shovel Test ID	ST -330E, 345N		
Grid Name	Elk Run Grid 5		
Results	Positive		
Maximum Depth	20cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Clayey silty loam 10YR7/2	Ap	Very compact
15-20cm	Clayey loam 10YR4/4	B	Very compact

Shovel Test ID	ST -330E, 360N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	25cm
Image	No Image

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Loamy silt 10YR4/3	A	Moderately compact
15-25cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 375N
Grid Name	Elk Run Grid 5
Results	Positive
Maximum Depth	27cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Loamy silt 10YR4/3	A	Moderately compact
10-26cm	Loamy silt 10YR4/3	A	Moderately compact
27-27cm	Loamy silt 10YR6/3	B	Moderately compact

Shovel Test ID	ST -330E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-11cm	Silty loam 10YR3/1	Ap	Moderately compact
11-36cm	Silty clayey loam 10YR3/2	A	Moderately compact
36-38cm	Clayey silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -330E, 405N
Grid Name	Elk Run Grid 5
Results	Positive
Maximum Depth	44cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-42cm	Clayey gravel 10YR4/2	A	Moderately compact
42-44cm	Gravelly clay 10YR5/4	B	Moderately compact

Shovel Test ID	ST -330E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	7cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-7cm	Sandy silt 10YR5/3	Ap	Very compact

Shovel Test ID	ST -165E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	34cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-6cm	Clayey loam 10YR3/2	Ap	Moderately compact
6-32cm	Loamy silt 10YR3/3	AE	Moderately compact
32-34cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST -165E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-7cm	Loamy silt 10YR3/1	Ap	Moderately compact
7-25cm	Loamy clayey silt 10YR3/2	AE	Moderately compact
25-28cm	Silty clay 10YR4/4	BE	Moderately compact

Shovel Test ID	ST -165E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	25cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Clayey silt 10YR3/3	Ap	Moderately compact
5-23cm	Loamy silt 10YR3/2	AE	Moderately compact
23-25cm	Clayey sandy loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST -165E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	32cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-8cm	Loamy silt 10YR2/2	Ap	Moderately compact
8-24cm	Sandy silty loam 10YR3/2	B	Moderately compact
24-32cm	Sand 10YR6/6 mottled with 10YR8/4	C	Not compact

Shovel Test ID	ST -150E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-47cm	Sandy silty clayey sand 10YR3/2 mottled with 10YR3/4	AE	Not compact
47-50cm	Silty sandy sand 10YR4/6	BE	Not compact

Shovel Test ID	ST -150E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Sandy silt 10YR3/2	Ap	Moderately compact
10-20cm	Sand 10YR6/3 mottled with 10YR3/2	BE	Not compact
20-30cm	Sand 10YR6/3	C	Not compact

Shovel Test ID	ST -150E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	46cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Silty sand 10YR3/2	Ap	Moderately compact
20-46cm	Sand 10YR7/2 mottled with 10YR4/6	C	Not compact

Shovel Test ID	ST -135E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-19cm	Silty clay 10YR3/1	Ap	Moderately compact
19-26cm	Silty sandy clay 10YR2/2	B	Moderately compact
26-30cm	Silty sand 10YR5/8	C	Not compact

Shovel Test ID	ST -135E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	31cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-19cm	Sandy loamy silt 10YR4/2	A	Moderately compact
19-31cm	Sandy sand 10YR6/8 mottled with 7.5YR8/1	C	Not compact

Shovel Test ID	ST -120E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Silty clayey silt 10YR4/2	A	Moderately compact
24-30cm	Clayey silty clay 10YR3/6	BE	Moderately compact

Shovel Test ID	ST -105E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silty clay 10YR3/2	AE	Moderately compact
26-30cm	Silty clay 10YR3/6	BE	Very compact

<table>
<tr><td>Shovel Test ID</td><td colspan="3">ST -105E, 345N</td></tr>
<tr><td>Grid Name</td><td colspan="3">Elk Run Grid 5</td></tr>
<tr><td>Results</td><td colspan="3">Negative</td></tr>
<tr><td>Maximum Depth</td><td colspan="3">35cm</td></tr>
<tr><td>Image</td><td colspan="3"></td></tr>
<tr><th colspan="4">Soil Level Descriptions</th></tr>
<tr><th>Level Depth</th><th>Soil Description</th><th>Soil Horizon</th><th>Compaction</th></tr>
<tr><td>0-23cm</td><td>Silty clayey silt 10YR4/2</td><td>A</td><td>Moderately compact</td></tr>
<tr><td>22-32cm</td><td>Silty clayey silt 10YR4/3</td><td>AE</td><td>Moderately compact</td></tr>
<tr><td>32-35cm</td><td>Clayey silty clay 10YR4/6</td><td>BE</td><td>Moderately compact</td></tr>
</table>

<table>
<tr><td>Shovel Test ID</td><td colspan="3">ST -90E, 330N</td></tr>
<tr><td>Grid Name</td><td colspan="3">Elk Run Grid 5</td></tr>
<tr><td>Results</td><td colspan="3">Negative</td></tr>
<tr><td>Maximum Depth</td><td colspan="3">32cm</td></tr>
<tr><td>Image</td><td colspan="3"></td></tr>
<tr><th colspan="4">Soil Level Descriptions</th></tr>
<tr><th>Level Depth</th><th>Soil Description</th><th>Soil Horizon</th><th>Compaction</th></tr>
<tr><td>0-22cm</td><td>Silty clay 10YR3/2 mottled with 10YR4/4</td><td>AE</td><td>Very compact</td></tr>
<tr><td>22-30cm</td><td>Silty clay 10YR4/4 mottled with 10YR3/2</td><td>BE</td><td>Very compact</td></tr>
<tr><td>30-32cm</td><td>Silty clay 10YR4/4</td><td>B</td><td>Very compact</td></tr>
</table>

Shovel Test ID	ST -90E, 345N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	22cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Silty clay 10YR4/2	AE	Very compact
15-22cm	Silty clay 10YR4/4	BE	Very compact

Shovel Test ID	ST -90E, 360N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-12cm	Clayey silt 10YR3/2	AE	Moderately compact
12-26cm	Clayey silt 10YR4/4	BE	Moderately compact

Shovel Test ID	ST -75E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Loamy silt 10YR2/2	Ap	Moderately compact
6-28cm	Loamy silt 10YR3/3	AE	Moderately compact
28-30cm	Loamy silt 10YR4/4	BE	Moderately compact

Shovel Test ID	ST -75E, 345N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-4cm	Clayey loam 10YR3/3	Ap	Moderately compact
4-21cm	Loamy silt 10YR3/2	AE	Moderately compact
21-23cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST -75E, 360N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	22cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Loamy silt 10YR3/2	Ap	Moderately compact
5-19cm	Loamy silt 10YR3/3	AE	Moderately compact
19-22cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST -75E, 375N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	23cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Clayey loam 10YR3/3	Ap	Moderately compact
5-21cm	Silty loam 10YR3/2	AE	Moderately compact
21-23cm	Silty loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST -15E, 0N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-12cm	Silty clay 10YR3/2	A	Moderately compact
12-18cm	Silty clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
18-30cm	Silty clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST -15E, 15N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-16cm	Clayey silt 10YR4/2	AE	Moderately compact
16-24cm	Clayey silt 10YR4/4	B	Very compact

Shovel Test ID	ST 0E, 0N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	33cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-10cm	Silty clay 10YR3/2	A	Moderately compact
10-30cm	Silty clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
30-33cm	Silty clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 0E, 15N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-10cm	Silty clayey silt 10YR4/2	A	Moderately compact
10-23cm	Silty clayey silt 10YR4/3	AB	Moderately compact
23-27cm	Clayey silty clay 10YR5/8	B	Moderately compact

Shovel Test ID	ST 0E, 405N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	23cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Loamy silt 10YR3/2	A	Moderately compact
20-23cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST 15E, 390N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	8cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-8cm	Loamy silt 10YR4/2	A	Moderately compact

Shovel Test ID	ST 15E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-19cm	Sandy silty loam 10YR3/2	AE	Moderately compact
19-23cm	Sandy silty loam 10YR3/2	BE	Moderately compact

Shovel Test ID	ST 15E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-7cm	Silty clay 10YR4/1	Ap	Moderately compact
8-30cm	Silty clay 10YR3/3	AE	Moderately compact
30-38cm	Clayey silt 10YR3/4	BE	Very compact

Shovel Test ID	ST 255E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	44cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Silty silt 10YR3/3	Ap	Moderately compact
5-40cm	Clayey loam 10YR3/2	AE	Moderately compact
40-44cm	Clayey silty loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 255E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	13cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-4cm	Loamy silt 10YR4/2	Ap	Moderately compact
4-12cm	Loamy silt 10YR4/3	AE	Moderately compact
12-13cm	Loamy silt 10YR4/3	C	Very compact

Shovel Test ID	ST 255E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	14cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-3cm	Clayey loam 10YR3/2	Ap	Moderately compact
3-12cm	Silty loam 10YR3/2	AE	Moderately compact
12-14cm	Clayey loam 10YR3/2	C	Moderately compact

Shovel Test ID	ST 270E, 375N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	15cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-2cm	Loamy silt 10YR2/1	Ap	Moderately compact
2-14cm	Loamy silt 10YR2/1	AE	Moderately compact
14-15cm	Loamy silt 10YR2/1	C	Moderately compact

Shovel Test ID	ST 270E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	22cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Silty clayey loamy silt 10YR4/2	Ap	Not compact
5-22cm	Silty clayey loamy silt 10YR4/3	AE	Moderately compact

Shovel Test ID	ST 270E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	29cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Silty clay 10YR3/1	AE	Moderately compact
24-27cm	Silty loam 10YR3/4	BE	Moderately compact

Shovel Test ID	ST 270E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-7cm	Clayey silt 10YR4/2	Ap	Not compact
7-24cm	Silty clayey silt 10YR4/3	AE	Moderately compact
24-26cm	Clayey silty clay 10YR3/6	BE	Moderately compact

Shovel Test ID	ST 285E, 375N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-22cm	Clayey sandy silt 10YR3/2	A	Moderately compact
22-30cm	Sandy clayey silt 10YR4/6	B	Moderately compact

Shovel Test ID	ST 285E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	26cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Silty clayey loam 10YR3/2	A	Moderately compact
24-26cm	Silty clayey loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 285E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Clayey silt 10YR3/2	AE	Moderately compact
6-21cm	Clayey silt 10YR4/4 mottled with 10YR3/2	BE	Moderately compact
21-26cm	Clayey silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST 285E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	28cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Clayey silty loam 10YR3/2	A	Moderately compact
23-28cm	Silty clayey loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 300E, 375N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-18cm	Silty loam 10YR4/2	Ap	Moderately compact
18-23cm	Silty loam 10YR3/2	AE	Moderately compact
23-25cm	Silty loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 300E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-9cm	Silty loam 10YR3/3	Ap	Moderately compact
9-26cm	Silty loam 10YR3/3	A	Moderately compact
26-30cm	Silty loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 300E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	21cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-18cm	Silty loam 10YR3/3	AE	Moderately compact
18-21cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 300E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	23cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Silty loam 10YR3/2	Ap	Very compact
6-20cm	Silty loam 10YR3/3	AE	Very compact
20-23cm	Silty clayey loam 10YR5/8	B	Very compact

Shovel Test ID	ST 300E, 435N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	47cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-40cm	Silty loam 10YR3/2	Ap	Very compact
40-47cm	Loamy silt 10YR3/6	BE	Very compact

Shovel Test ID	ST 315E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-4cm	Silty loamy silt 10YR4/2	Ap	Very compact
4-22cm	Silty loamy silt 10YR4/4	AE	Very compact
22-24cm	Silty loamy silt 10YR4/6	BE	Very compact

Shovel Test ID	ST 315E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	20cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-7cm	Silty loamy silt 10YR4/3	Ap	Very compact
7-16cm	Silty loamy silt 10YR4/4	AE	Very compact
16-20cm	Silty loamy silt 10YR4/4	C	Very compact

Shovel Test ID	ST 315E, 405N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Loamy clayey silt 10YR4/2	Ap	Very compact
5-17cm	Loamy clayey silt 10YR4/3	A	Very compact
17-24cm	Loamy clayey silt 10YR4/6	B	Very compact

Shovel Test ID	ST 315E, 420N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Silty loamy loam 10YR4/2	Ap	Not compact
5-18cm	Silty loamy loam 10YR4/3	AE	Not compact
18-24cm	Silty loamy loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 315E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-4cm	Silty loamy silt 10YR4/2	A	Not compact
4-29cm	Silty loamy silt 10YR4/3	A	Moderately compact
29-36cm	Silty loamy silt 10YR3/6	B	Moderately compact

Shovel Test ID	ST 330E, 360N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	32cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silty loam 10YR3/3	A	Moderately compact
26-33cm	Silty clayey loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 330E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	15cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-4cm	Loamy silt 10YR5/2	Ap	Moderately compact
4-13cm	Loamy silt 10YR5/3	AE	Moderately compact
13-15cm	Loamy silt 10YR4/4	BE	Moderately compact

Shovel Test ID	ST 330E, 390N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-7cm	Silty loam 10YR5/2	Ap	Very compact
6-22cm	Silty loam 10YR3/3	AE	Very compact
22-24cm	Silty clayey loam 10YR4/4	BE	Very compact

Shovel Test ID	ST 330E, 405N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	23cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-8cm	Loamy silt 10YR5/2	Ap	Moderately compact
8-18cm	Loamy silt 10YR4/3	AE	Moderately compact
18-23cm	Loamy clayey silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 330E, 420N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	32cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Silty loam 10YR3/1	Ap	Moderately compact
6-30cm	Silty loam 10YR3/2	AE	Moderately compact
30-33cm	Silty clayey loam 10YR4/2	B	Moderately compact

Shovel Test ID	ST 330E, 435N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	39cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-37cm	Silty loam 10YR4/3	AE	Moderately compact
37-39cm	Silty loam 10YR4/4	BE	Moderately compact

Shovel Test ID	ST 345E, 360N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Loamy silt 10YR4/2	A	Very compact
6-18cm	Loamy silt 10YR4/3	AE	Very compact
18-24cm	Loamy silt 10YR4/6	B	Very compact

Shovel Test ID	ST 345E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-4cm	Silty loam 10YR3/2	Ap	Very compact
4-20cm	Silty loam 10YR4/3	AE	Very compact
20-23cm	Silty clayey loam 10YR4/4	BE	Very compact

Shovel Test ID	ST 345E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-8cm	Loamy silty silt 10YR3/6	Ap	Very compact
8-35cm	Silty loam 10YR4/1	A	Very compact
35-37cm	Silty loam 10YR4/6	B	Very compact

Shovel Test ID	ST 360E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-5cm	Silty clayey silt 10YR4/2	Ap	Not compact
5-19cm	Silty clayey silt 10YR4/3	AE	Moderately compact
19-24cm	Clayey silty clay 10YR3/6	BE	Moderately compact

Shovel Test ID	ST 360E, 345N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-8cm	Silty clayey loam 10YR4/1	Ap	Moderately compact
8-24cm	Silty clayey loam 10YR3/3	AE	Moderately compact
24-27cm	Silty loamy clay 10YR3/4	BE	Very compact

Shovel Test ID	ST 360E, 360N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	20cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Loamy silt 10YR5/3	Ap	Moderately compact
5-17cm	Loamy silt 10YR4/3	AE	Moderately compact
17-20cm	Loamy clayey silt 10YR4/4	BE	Moderately compact

Shovel Test ID	ST 360E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-6cm	Silty loam 10YR3/1	Ap	Very compact
6-26cm	Silty loam 10YR3/2	AE	Very compact
26-28cm	Clayey silty loam 10YR4/6	B	Very compact

Shovel Test ID	ST 360E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-8cm	Loamy silt 10YR4/2	Ap	Moderately compact
8-50cm	Loamy silt 10YR4/3 mottled with 10YR4/6	AE	Very compact

Shovel Test ID	ST 375E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-8cm	Silty clay 10YR4/1	Ap	Moderately compact
8-20cm	Silty clay 10YR3/3	AE	Moderately compact
20-27cm	Silty clay 10YR3/4	BE	Moderately compact

Shovel Test ID	ST 375E, 345N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-22cm	Clayey loamy silt 10YR4/2	A	Moderately compact
22-26cm	Clayey loamy silt 10YR4/3	B	Moderately compact

Shovel Test ID	ST 375E, 360N		
Grid Name	Elk Run Grid 5		
Results	Negative		
Maximum Depth	34cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-29cm	Silty clayey loam 10YR3/2 mottled with 10YR4/4	A	Moderately compact
29-34cm	Silty sandy clayey loam 10YR4/6 mottled with 10YR3/2	BE	Moderately compact

Shovel Test ID	ST 375E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Clayey silt 10YR4/2	A	Moderately compact
28-30cm	Clayey silt 10YR4/4	BE	Moderately compact

Shovel Test ID	ST 375E, 435N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	44cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-40cm	Silty loam 10YR3/3	A	Moderately compact
40-44cm	Silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 390E, 330N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-6cm	Loamy silt 10YR4/2	Ap	Moderately compact
6-23cm	Loamy silt 10YR4/4	AE	Moderately compact
23-27cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 390E, 345N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	35cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-7cm	Clayey loam 10YR3/2	Ap	Moderately compact
7-32cm	Silty loam 10YR3/2	AE	Moderately compact
32-35cm	Silty loam 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 390E, 360N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-5cm	Loamy silt 10YR4/2	Ap	Moderately compact
5-26cm	Loamy silt 10YR4/3	AE	Moderately compact
26-28cm	Loamy silt 10YR4/6	BE	Moderately compact

Shovel Test ID	ST 390E, 375N
Grid Name	Elk Run Grid 5
Results	Negative
Maximum Depth	32cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-30cm	Silty loam 10YR3/2	Ap	Moderately compact
30-32cm	Silty loam 10YR4/6	BE	Moderately compact

Appendix F
Group 3 Shovel Test Forms

Shovel Test ID	ST 0E, -495N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	35cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-27cm	Loamy silt 10YR4/2	A	Moderately compact
27-35cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 15E, -495N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-25cm	Silty loam 10YR4/3	A	Moderately compact
25-26cm	Silty loam 10YR6/4	B	Moderately compact

Shovel Test ID	ST 15E, -480N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	20cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-12cm	Sandy silt 10YR3/2	A	Moderately compact
12-20cm	Clayey silt 10YR3/4	B	Moderately compact

Shovel Test ID	ST 15E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-6cm	Loamy silt 10YR3/2	Ap	Not compact
6-19cm	Loamy clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
19-23cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 30E, -480N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	25cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-3cm	Sand 10YR4/1	A	Moderately compact
3-18cm	Clayey clay 10YR4/1 mottled with 10YR4/3	AB	Moderately compact
18-25cm	Clay 10YR5/6	B	Moderately compact

Shovel Test ID	ST 30E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-4cm	Clayey loam 10YR4/2	A	Moderately compact
4-15cm	Clayey silty loam 10YR4/2 mottled with 10YR4/4	AB	Very compact
15-23cm	Clayey loam 10YR4/4	B	Very compact

Shovel Test ID	ST 30E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Loamy silt 10YR3/2	A	Moderately compact
26-28cm	Loamy clay 10YR4/6	B	Moderately compact

Shovel Test ID	ST 45E, -480N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-7cm	Sandy loam 10YR4/2	Ap	Moderately compact
7-17cm	Loam 10YR4/3	A	Moderately compact
17-28cm	Loam 10YR4/3 mottled with 10YR4/4	AB	Moderately compact
28-38cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 45E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-9cm	Loamy silt 10YR3/2	Ap	Not compact
9-30cm	Loamy clay 10YR3/2 mottled with 10YR4/4	AB	Not compact
30-36cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 45E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	32cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty loam 10YR3/1	Ap	Not compact
10-20cm	Silty loam 10YR2/2	A	Not compact
20-32cm	Clayey loam 10YR4/4	B	Not compact

Shovel Test ID	ST 60E, -480N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-22cm	Clayey silt 10YR3/2	A	Moderately compact
22-30cm	Silty clay 10YR3/4	B	Moderately compact

Shovel Test ID	ST 60E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	35cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Silty loam 10YR3/1	Ap	Not compact
15-25cm	Silty loam 10YR3/1	A	Not compact
25-35cm	Clayey loam 10YR4/4	B	Not compact

Shovel Test ID	ST 60E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-20cm	Loamy silt 10YR3/2	A	Moderately compact
20-30cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 60E, -435N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-10cm	Silty silt 10YR3/2	Ap	Not compact
10-24cm	Clayey silt 10YR3/2	A	Moderately compact
24-28cm	Silty loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 75E, -480N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Sandy silt 10YR3/1	A	Moderately compact
15-25cm	Silty clay 10YR3/6	B	Very compact

Shovel Test ID	ST 75E, -465N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	39cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-33cm	Loamy silt 10YR3/2	A	Not compact
33-39cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 75E, -450N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	34cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-12cm	Sandy loam 10YR4/2	A	Moderately compact
12-30cm	Loamy loam 10YR4/3	AB	Moderately compact
30-34cm	Loamy loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 75E, -435N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-27cm	Loamy silt 10YR3/2	A	Moderately compact
27-30cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 90E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	34cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-29cm	Silty loam 10YR3/2	A	Moderately compact
29-34cm	Loamy clay 10YR3/4	B	Moderately compact

Shovel Test ID	ST 90E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	43cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty loam 10YR3/2	Ap	Not compact
10-25cm	Silty loam 10YR3/3	A	Not compact
25-43cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 90E, -435N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	28cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-21cm	Silty loam 10YR3/2	A	Moderately compact
21-28cm	Silty loam 10YR3/3	B	Moderately compact

Shovel Test ID	ST 105E, -465N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	38cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-35cm	Loamy silt 10YR3/2	A	Moderately compact
35-38cm	Silty clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 105E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-9cm	Silty loam 10YR5/2	Ap	Moderately compact
9-26cm	Silty clayey loam 10YR4/2	A	Moderately compact
26-36cm	Clayey silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 105E, -435N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	33cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-22cm	Silty loam 10YR3/2	Ap	Not compact
22-27cm	Loam 10YR3/2 mottled with 10YR4/4	AB	Not compact
27-33cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 120E, -465N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-22cm	Sandy clay 10YR4/2	A	Moderately compact
22-30cm	Sandy clay 10YR5/3	B	Moderately compact

Shovel Test ID	ST 120E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Sandy silt 10YR5/2	A	Moderately compact
28-30cm	Loamy silt 10YR6/6	B	Moderately compact

Shovel Test ID	ST 120E, -435N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-20cm	Clayey silt 10YR3/2	A	Moderately compact
20-25cm	Clayey silt 10YR3/4	B	Moderately compact

Shovel Test ID	ST 120E, -420N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-15cm	Sandy loam 10YR4/2	Ap	Moderately compact
15-30cm	Loam 10YR4/3	A	Moderately compact
30-45cm	Loam 10YR4/3 mottled with 10YR4/4	AB	Moderately compact
45-50cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 135E, -450N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	48cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Loamy silt 10YR3/2	Ap	Not compact
10-35cm	Silty loam 10YR2/1	A	Not compact
35-48cm	Loamy clay 10YR4/4	B	Not compact

Shovel Test ID	ST 135E, -435N		
Grid Name	Elk Run Grid 6		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Silty loam 10YR3/2	A	Moderately compact
23-30cm	Clayey loam 10YR3/5 mottled with 10YR3/2	B	Moderately compact

Shovel Test ID	ST 135E, -420N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	32cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-13cm	Sandy silt 10YR3/2	Ap	Not compact
13-30cm	Clayey silt 10YR4/2	A	Moderately compact
30-32cm	Clayey silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 150E, -450N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	41cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-21cm	Loamy silt 10YR3/2	A	Not compact
21-36cm	Loamy clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
36-41cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 150E, -435N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-14cm	Loam 10YR5/3	Ap	Not compact
14-37cm	Clayey loam 10YR3/2	A	Moderately compact
37-50cm	Clayey loam 10YR3/4 mottled with 10YR3/2	B	Moderately compact

Shovel Test ID	ST 150E, -420N
Grid Name	Elk Run Grid 6
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Sandy silt 10YR5/2	A	Not compact
28-30cm	Clayey silt 10YR5/4	B	Moderately compact

Appendix G
Group 4 Shovel Test Forms

Shovel Test ID	ST 0E, 0N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	20cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Sandy silty loam 10YR5/1	A	Not compact

Shovel Test ID	ST 0E, 15N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	35cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-35cm	Loamy silt 10YR4/2	A	Not compact

Shovel Test ID	ST 0E, 30N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	16cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Silty loam 10YR3/2	A	Moderately compact
15-16cm	Silty loam 10YR3/2	C	Moderately compact

Shovel Test ID	ST 0E, 45N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	31cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-31cm	Sandy silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST 0E, 60N		
Grid Name	Elk Run Grid 2		
Results	Positive		
Maximum Depth	55cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-55cm	Silty sandy loam 10YR2/2	A	Moderately compact

Shovel Test ID	ST 0E, 75N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-14cm	Gravel 10YR8/1	A	Very compact
14-24cm	Clayey silty loam 10YR4/2	A	Very compact
24-30cm	Clayey silty loam 10YR4/3	B	Very compact

Shovel Test ID	ST 0E, 90N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Silty sandy loam 10YR2/2	A	Not compact

Shovel Test ID	ST 0E, 105N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	25cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Clayey loam 10YR3/2	A	Moderately compact
24-25cm	Clayey loam 10YR3/2	C	Moderately compact

Shovel Test ID	ST 0E, 120N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	15cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-14cm	Clayey loam 10YR3/2	A	Moderately compact
14-15cm	Silty clay 10YR6/4	B	Moderately compact

Shovel Test ID	ST 15E, 15N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	33cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-18cm	Sandy clay 10YR4/3	A	Moderately compact
18-33cm	Loamy clay 10YR5/2	B	Moderately compact

Shovel Test ID	ST 15E, 30N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	19cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-19cm	Silty loam 10YR4/2	A	Moderately compact

Shovel Test ID	ST 15E, 45N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	33cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-33cm	Silty clay 10YR4/2	A	Moderately compact

Shovel Test ID	ST 15E, 60N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Sandy silt 10YR3/2	A	Moderately compact
20-26cm	Sand 10YR7/4	C	Not compact

Shovel Test ID	ST 15E, 75N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	18cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-15cm	Sand 10YR3/2	A	Moderately compact
15-18cm	Silty sand 10YR7/3	C	Not compact

Shovel Test ID	ST 15E, 90N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	27cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-27cm	Sandy silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST 15E, 105N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	36cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-31cm	Clayey loam 10YR4/2	A	Moderately compact
31-36cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST 30E, 30N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Loamy silt 10YR3/2	A	Moderately compact
28-30cm	Loamy clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 30E, 45N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-12cm	Loamy clay 10YR3/2	A	Moderately compact
12-27cm	Loamy clay 10YR3/2 mottled with 10YR4/4	AB	Moderately compact
27-30cm	Clay 10YR4/4	B	Moderately compact

Shovel Test ID	ST 30E, 60N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	40cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Sandy silt 10YR5/2	A	Moderately compact
20-38cm	Silty sand 10YR4/2	B	Moderately compact
38-40cm	Gravelly sand 10YR7/3	C	Not compact

Shovel Test ID	ST 30E, 75N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-50cm	Gravelly silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST 30E, 90N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-38cm	Clayey silt 10YR3/2	A	Very compact

Shovel Test ID	ST 45E, 45N
Grid Name	Elk Run Grid 2
Results	Positive
Maximum Depth	15cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-10cm	Silty sandy loam 10YR5/2	Ap	Moderately compact
10-15cm	Clayey silty loam 10YR5/2 mottled with 10YR4/4	AB	Very compact

Shovel Test ID	ST 45E, 60N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	21cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-21cm	Loamy silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST 45E, 75N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-34cm	Sandy clay 10YR3/2	A	Moderately compact
34-50cm	Sandy clay 10YR5/8	AB	Moderately compact

<table>
<tr><td>Shovel Test ID</td><td colspan="3">ST 45E, 90N</td></tr>
<tr><td>Grid Name</td><td colspan="3">Elk Run Grid 2</td></tr>
<tr><td>Results</td><td colspan="3">Positive</td></tr>
<tr><td>Maximum Depth</td><td colspan="3">45cm</td></tr>
<tr><td>Image</td><td colspan="3"></td></tr>
<tr><td colspan="4">Soil Level Descriptions</td></tr>
<tr><td>Level Depth</td><td>Soil Description</td><td>Soil Horizon</td><td>Compaction</td></tr>
<tr><td>0-44cm</td><td>Silt 10YR3/2</td><td>A</td><td>Very compact</td></tr>
<tr><td>44-45cm</td><td>Sandy silt 10YR4/3</td><td>B</td><td>Very compact</td></tr>
</table>

<table>
<tr><td>Shovel Test ID</td><td colspan="3">ST 60E, 60N</td></tr>
<tr><td>Grid Name</td><td colspan="3">Elk Run Grid 2</td></tr>
<tr><td>Results</td><td colspan="3">Negative</td></tr>
<tr><td>Maximum Depth</td><td colspan="3">23cm</td></tr>
<tr><td>Image</td><td colspan="3"></td></tr>
<tr><td colspan="4">Soil Level Descriptions</td></tr>
<tr><td>Level Depth</td><td>Soil Description</td><td>Soil Horizon</td><td>Compaction</td></tr>
<tr><td>0-22cm</td><td>Clayey loam 10YR3/2</td><td>A</td><td>Moderately compact</td></tr>
<tr><td>22-23cm</td><td>Clayey loam 10YR6/6</td><td>C</td><td>Moderately compact</td></tr>
</table>

Shovel Test ID	ST 60E, 75N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	32cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-27cm	Clayey silty loam 10YR4/2	A	Moderately compact
27-32cm	Clayey loam 10YR4/4	B	Very compact

Appendix H
Group 5 Shovel Test Forms

Shovel Test ID	ST -405E, 225N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-27cm	Silty silt 10YR4/2	A	Moderately compact
27-30cm	Sandy silt 10YR5/4	B	Moderately compact

Shovel Test ID	ST -405E, 240N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	25cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Silt 10YR3/2	A	Moderately compact
23-25cm	Sandy silt 10YR4/3	B	Moderately compact

Shovel Test ID	ST -405E, 255N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	28cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silt 10YR3/2	A	Not compact
26-28cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -405E, 270N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-25cm	Loamy silt 10YR3/2	A	Moderately compact
25-30cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -405E, 285N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Silt 10YR3/2	A	Moderately compact
28-30cm	Clayey silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -405E, 300N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Sandy silt 10YR5/3	A	Moderately compact
28-30cm	Sandy silt 10YR6/4	B	Moderately compact

Shovel Test ID	ST -405E, 315N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	31cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-21cm	Silty loam 10YR5/2	A	Not compact
21-31cm	Silty loam 10YR7/4	B	Not compact

Shovel Test ID	ST -405E, 330N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	38cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-28cm	Silty sand 10YR4/2	A	Not compact
28-38cm	Sandy silt 10YR5/4	B	Moderately compact

Shovel Test ID	ST -390E, 210N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	37cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-34cm	Silt 10YR5/1	A	Moderately compact
34-37cm	Silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -390E, 225N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Silty sandy loam 10YR3/2	A	Not compact
20-30cm	Clayey loam 10YR4/6	B	Not compact

Shovel Test ID	ST -390E, 240N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	36cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-32cm	Sandy silt 10YR5/6	A	Not compact
32-36cm	Sandy loam 10YR4/3	B	Moderately compact

Shovel Test ID	ST -390E, 255N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-25cm	Loamy silt 10YR3/1	A	Not compact
25-30cm	Clayey silty loam 10YR4/6	B	Not compact

Shovel Test ID	ST -390E, 270N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	38cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-33cm	Silt 10YR4/3	A	Moderately compact
33-38cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -390E, 285N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-19cm	Loamy silt 10YR3/1	A	Not compact
19-30cm	Clayey loam 10YR4/6	B	Not compact

Shovel Test ID	ST -390E, 300N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	30cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-26cm	Silt 10YR4/3	A	Moderately compact
26-30cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -390E, 315N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-14cm	Silty silt 10YR4/2	A	Moderately compact
14-26cm	Silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -390E, 330N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	28cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty loam 10YR4/2	A	Moderately compact
10-23cm	Silty loam 10YR4/3	AB	Moderately compact
23-28cm	Silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -375E, 210N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	40cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Loamy silt 10YR3/1	Ap	Not compact
10-35cm	Silty loam 10YR2/2	A	Not compact
35-40cm	Clayey silty loam 10YR4/6	B	Not compact

Shovel Test ID	ST -375E, 225N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	28cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Silt 10YR5/1	A	Moderately compact
20-28cm	Clayey silt 10YR5/8	B	Moderately compact

Shovel Test ID	ST -375E, 240N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	26cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Silt 10YR3/3	A	Moderately compact
23-26cm	Silt 10YR4/6 mottled with 10YR3/5	B	Moderately compact

Shovel Test ID	ST -375E, 255N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-23cm	Silt 10YR4/3	A	Moderately compact
23-30cm	Silt 10YR5/6	B	Very compact

Shovel Test ID	ST -375E, 270N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	24cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-18cm	Silt 10YR4/3	A	Moderately compact
18-24cm	Silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -360E, 210N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	43cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-38cm	Sandy silt 10YR4/3	A	Moderately compact
38-43cm	Loamy silt 10YR4/4	B	Moderately compact

Shovel Test ID	ST -360E, 225N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	30cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty silt 10YR7/1	Ap	Moderately compact
10-25cm	Gravelly sand 10YR5/2	A	Moderately compact
25-30cm	Loamy silt 10YR5/4	B	Moderately compact

Shovel Test ID	ST -360E, 240N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	31cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-22cm	Sandy silt 10YR5/3	A	Moderately compact
22-31cm	Silt 10YR5/6	B	Moderately compact

Shovel Test ID	ST -360E, 255N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	23cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-9cm	Silty loam 10YR4/2	A	Moderately compact
9-17cm	Silty loam 10YR4/3	AE	Moderately compact
17-23cm	Silty loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -270E, 270N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image	No Image		
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-24cm	Silty loam 10YR4/2	A	Moderately compact
24-50cm	Clayey silt 10YR3/3	A	Moderately compact

Shovel Test ID	ST -270E, 285N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	33cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Loamy silt 10YR3/2	A	Moderately compact
10-30cm	Silty clayey loam 10YR3/2 mottled with 10YR4/3	AB	Moderately compact
30-33cm	Clayey loam 10YR4/3	B	Moderately compact

Shovel Test ID	ST -255E, 210N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	54cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-35cm	Silt 10YR4/1	A	Moderately compact
35-54cm	Clayey silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST -255E, 225N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-20cm	Silty loam 10YR4/4	A	Not compact
20-50cm	Silty loam 10YR4/4	A	Not compact

Shovel Test ID	ST -255E, 240N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	38cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-8cm	Silt 10YR3/2	Ap	Moderately compact
8-35cm	Loamy silt 10YR3/2	A	Moderately compact
35-38cm	Clayey loam 10YR4/4	B	Moderately compact

Shovel Test ID	ST -255E, 255N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	41cm
Image	

Soil Level Descriptions

Level Depth	Soil Description	Soil Horizon	Compaction
0-9cm	Silty clay 10YR4/1	A	Moderately compact
9-30cm	Silty clay 10YR3/2 mottled with 10YR5/4	AB	Moderately compact
30-41cm	Silty clay 10YR4/6	B	Moderately compact

Shovel Test ID	ST -255E, 270N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-8cm	Silt 10YR4/2	A	Moderately compact
8-34cm	Clayey silt 10YR4/3	A	Moderately compact
34-50cm	Clayey silt 10YR4/4	A	Moderately compact

Shovel Test ID	ST -240E, 210N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	55cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-13cm	Loamy silt 10YR5/1	Ap	Moderately compact
13-55cm	Silty loam 10YR2/2	A	Moderately compact

Shovel Test ID	ST -240E, 225N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-11cm	Silty loam 10YR7/1	A	Moderately compact
11-30cm	Silty loam 10YR4/2	A	Moderately compact
30-50cm	Sandy silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST -240E, 240N
Grid Name	Elk Run Grid 2
Results	Negative
Maximum Depth	50cm
Image	

Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-14cm	Loamy silt 10YR4/1	Ap	Moderately compact
14-50cm	Silty loam 10YR3/2	A	Moderately compact

Shovel Test ID	ST -240E, 255N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-49cm	Silty loam 10YR3/3	A	Moderately compact
49-50cm	Silty loam 10YR6/4	A	Moderately compact

Shovel Test ID	ST -240E, 270N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-38cm	Clayey silt 10YR4/1	A	Moderately compact
38-50cm	Silty clay 10YR2/2	A	Moderately compact

Shovel Test ID	ST -225E, 210N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	52cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-7cm	Silt 10YR4/1	A	Moderately compact
7-51cm	Silty clay 10YR3/2	AB	Moderately compact
51-52cm	Silty clay 10YR4/3	B	Moderately compact

Shovel Test ID	ST -225E, 225N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-30cm	Silt 10YR4/2	A	Moderately compact
30-50cm	Silt 10YR2/1	A	Moderately compact

Shovel Test ID	ST -225E, 240N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	Soil Description	Soil Horizon	Compaction
0-32cm	Silt 10YR3/3	A	Moderately compact
32-50cm	Silt 10YR3/2	A	Moderately compact

Shovel Test ID	ST -225E, 255N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	Soil Description	Soil Horizon	Compaction
0-12cm	Silt 10YR4/1	A	Moderately compact
12-30cm	Clayey silt 10YR3/4	A	Moderately compact
30-50cm	Clayey silt 10YR3/1	A	Moderately compact

Shovel Test ID	ST -210E, 210N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	52cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-9cm	Silt 10YR3/1	Ap	Moderately compact
9-34cm	Clayey silt 10YR2/1	A	Moderately compact
34-48cm	Loamy silt 10YR2/1 mottled with 10YR4/4	AB	Moderately compact
48-52cm	Loamy clay 10YR4/4 mottled with 10YR4/6	B	Moderately compact

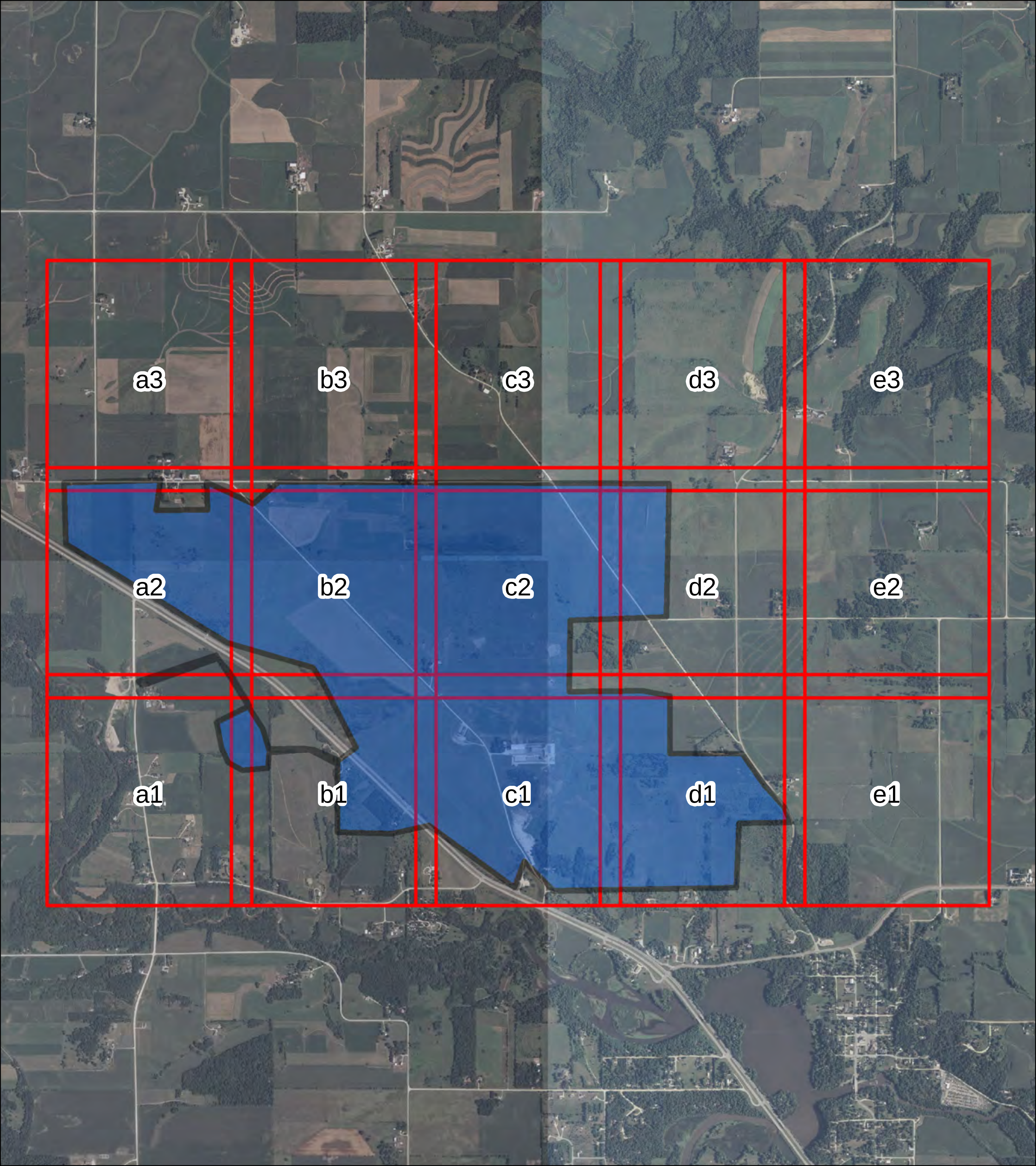
Shovel Test ID	ST -210E, 225N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty loam 10YR4/1	Ap	Not compact
10-28cm	Silty sandy loam 10YR3/3	A	Not compact
28-43cm	Silty sandy loam 7.5YR4/3	A	Not compact
43-50cm	Clayey silty loam 10YR4/4	B	Not compact

Shovel Test ID	ST -210E, 240N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	50cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-11cm	Silt 10YR4/2	Ap	Moderately compact
11-39cm	Loamy silt 10YR3/2	A	Moderately compact
39-50cm	Loamy clay 10YR2/2	A	Moderately compact

Shovel Test ID	ST -210E, 255N		
Grid Name	Elk Run Grid 2		
Results	Negative		
Maximum Depth	53cm		
Image			
Soil Level Descriptions			
Level Depth	**Soil Description**	**Soil Horizon**	**Compaction**
0-10cm	Silty loam 10YR4/1	Ap	Not compact
10-53cm	Silty sandy loam 10YR3/2	A	Moderately compact

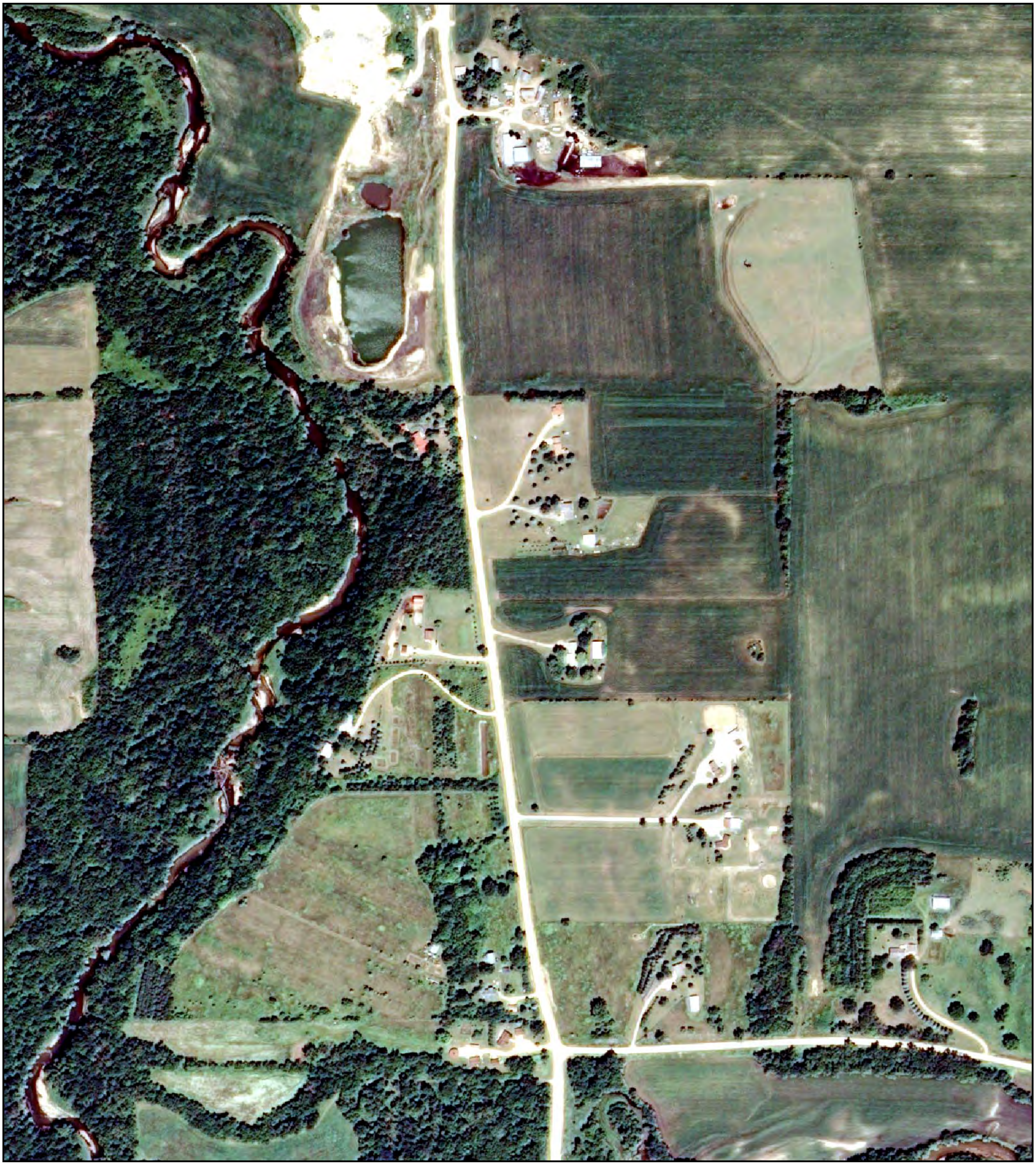
Appendix H

Historic Aerials



a3
b3
c3
d3
e3
a2
b2
c2
d2
e2
a1
b1
c1
d1
e1

Confidential Project Unassigned Oronoco, MN a1	N	**2015** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG



Confidential Project
Unassigned
Oronoco, MN

a1

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project Unassigned Oronoco, MN a1	N	**2003** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a1

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project Unassigned Oronoco, MN a1	N	**1980** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

a1

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN a1	N	**1971** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	

Confidential Project Unassigned Oronoco, MN a1	N	**1964** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a1

N

1958

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a1

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a1

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a1

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a2

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project
Unassigned
Oronoco, MN

a2

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN a2	N	**2003** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

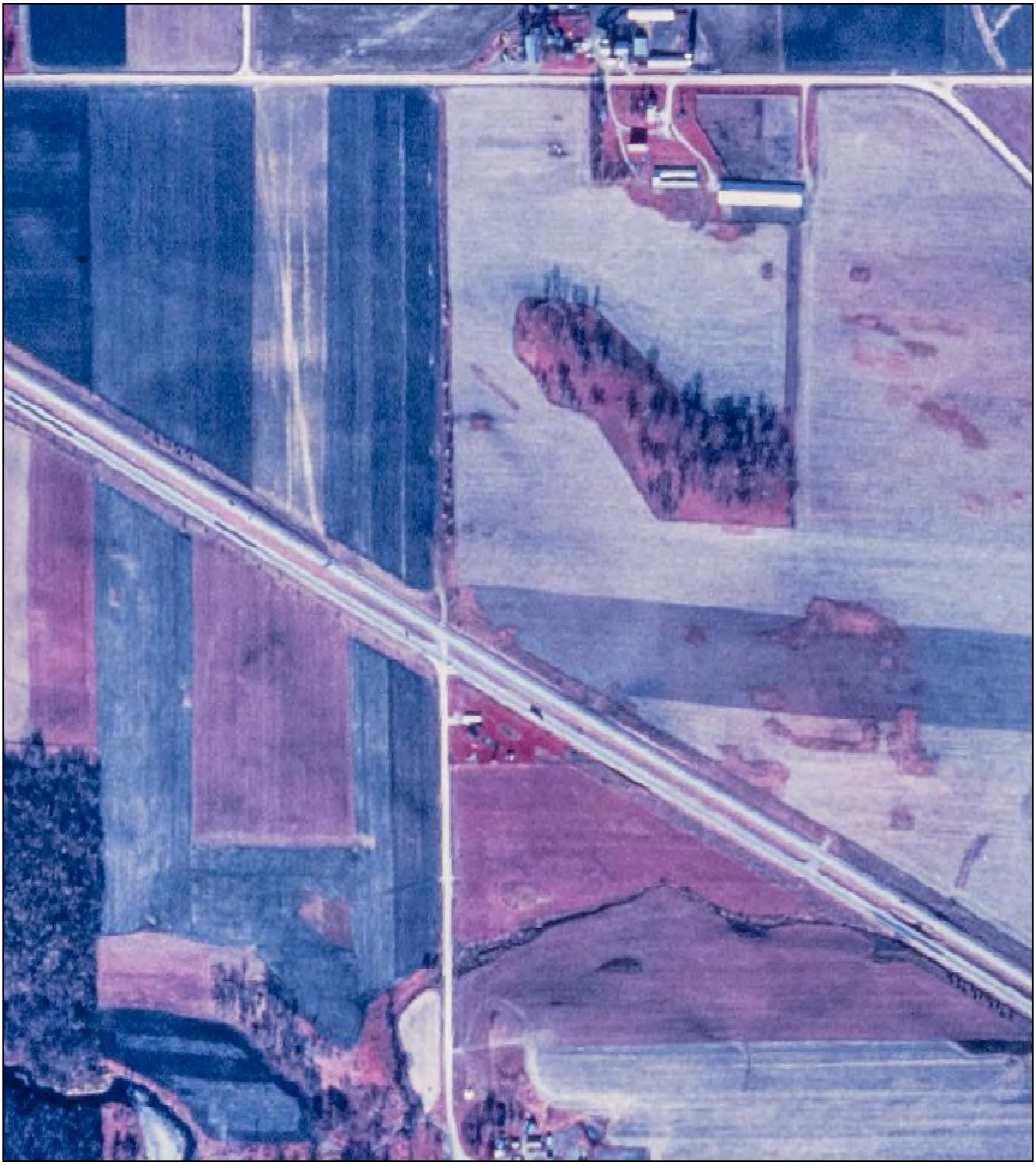
Confidential Project
Unassigned
Oronoco, MN

a2

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project Unassigned Oronoco, MN a2	N	**1980** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

a2

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project
Unassigned
Oronoco, MN

a2

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project
Unassigned
Oronoco, MN

a2

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a2

N

1958

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN a2	N	**1951** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

a2

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

a2

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

2003

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1980

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN b1	N	**1958** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	

Confidential Project
Unassigned
Oronoco, MN

b1

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b1

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN b2	N	**2015** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

2003

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

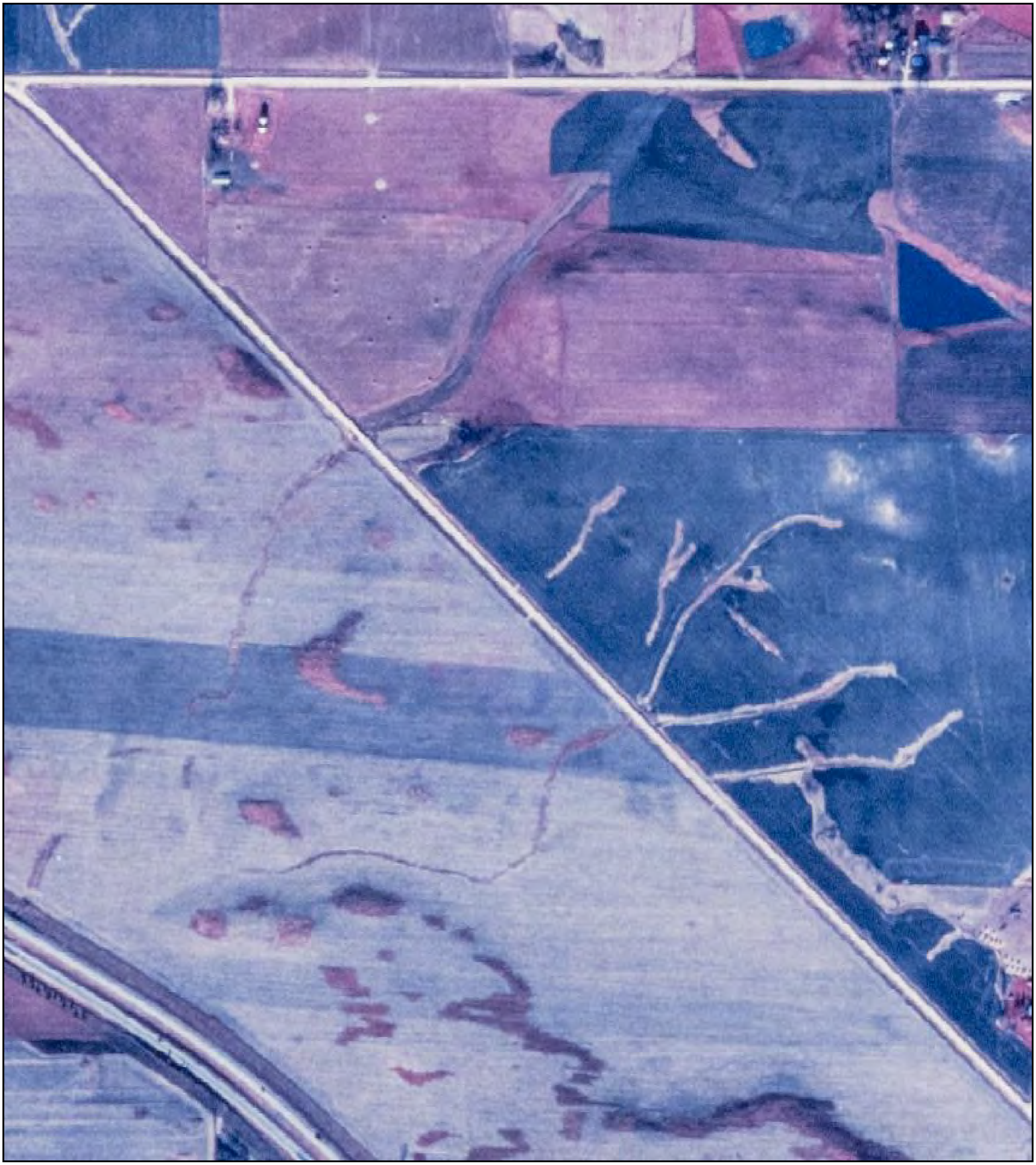
Confidential Project
Unassigned
Oronoco, MN

b2

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project
Unassigned
Oronoco, MN

b2

N

1980

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

1958

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN b2	N	**1951** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

b2

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

b2

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project
Unassigned
Oronoco, MN

c1

N

2003

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

1980

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

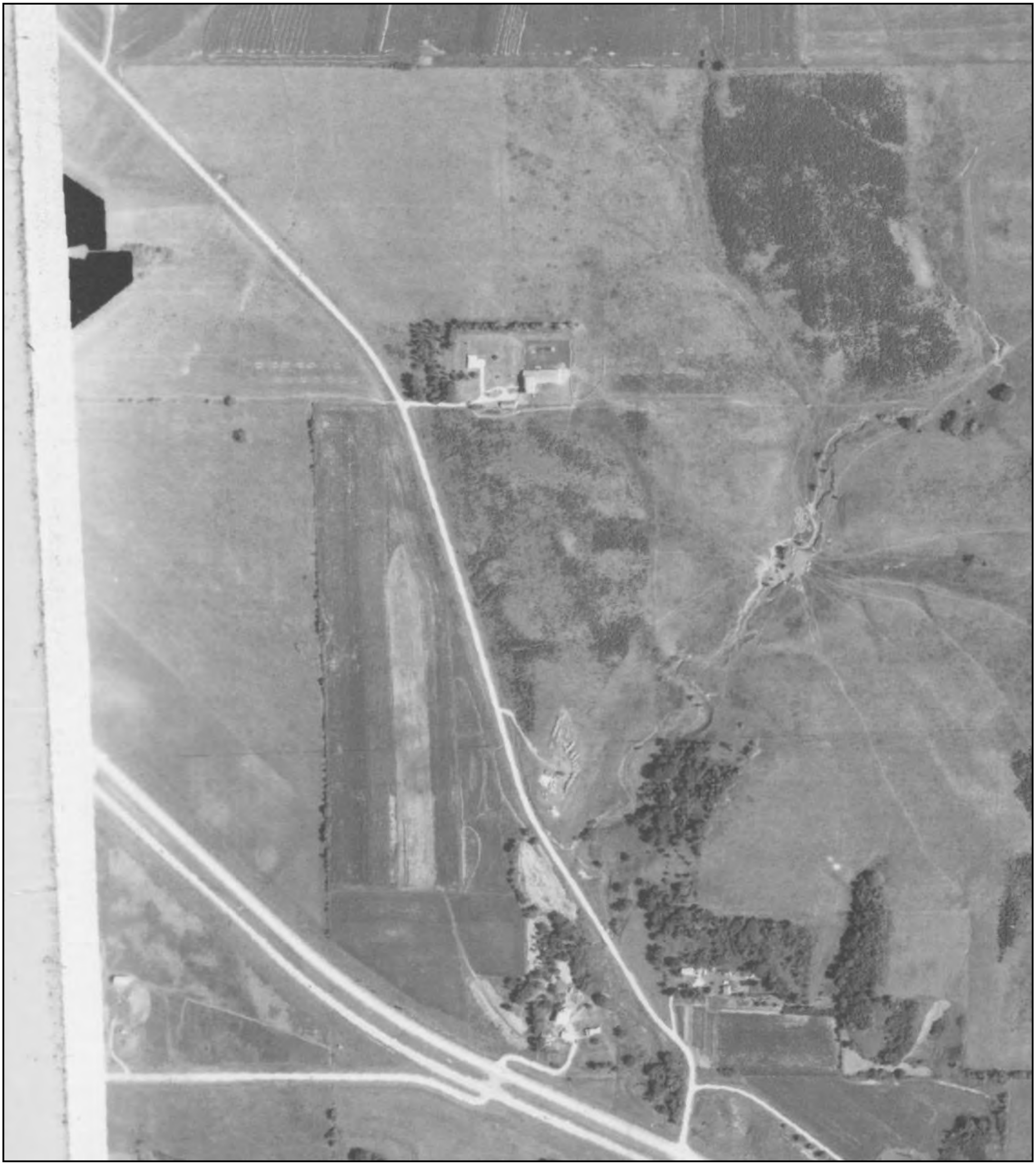
Confidential Project
Unassigned
Oronoco, MN

c1

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project
Unassigned
Oronoco, MN

c1

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN c1	N	**1958** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	

Confidential Project
Unassigned
Oronoco, MN

c1

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c1

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

2003

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1980

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

c2

N

1958

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

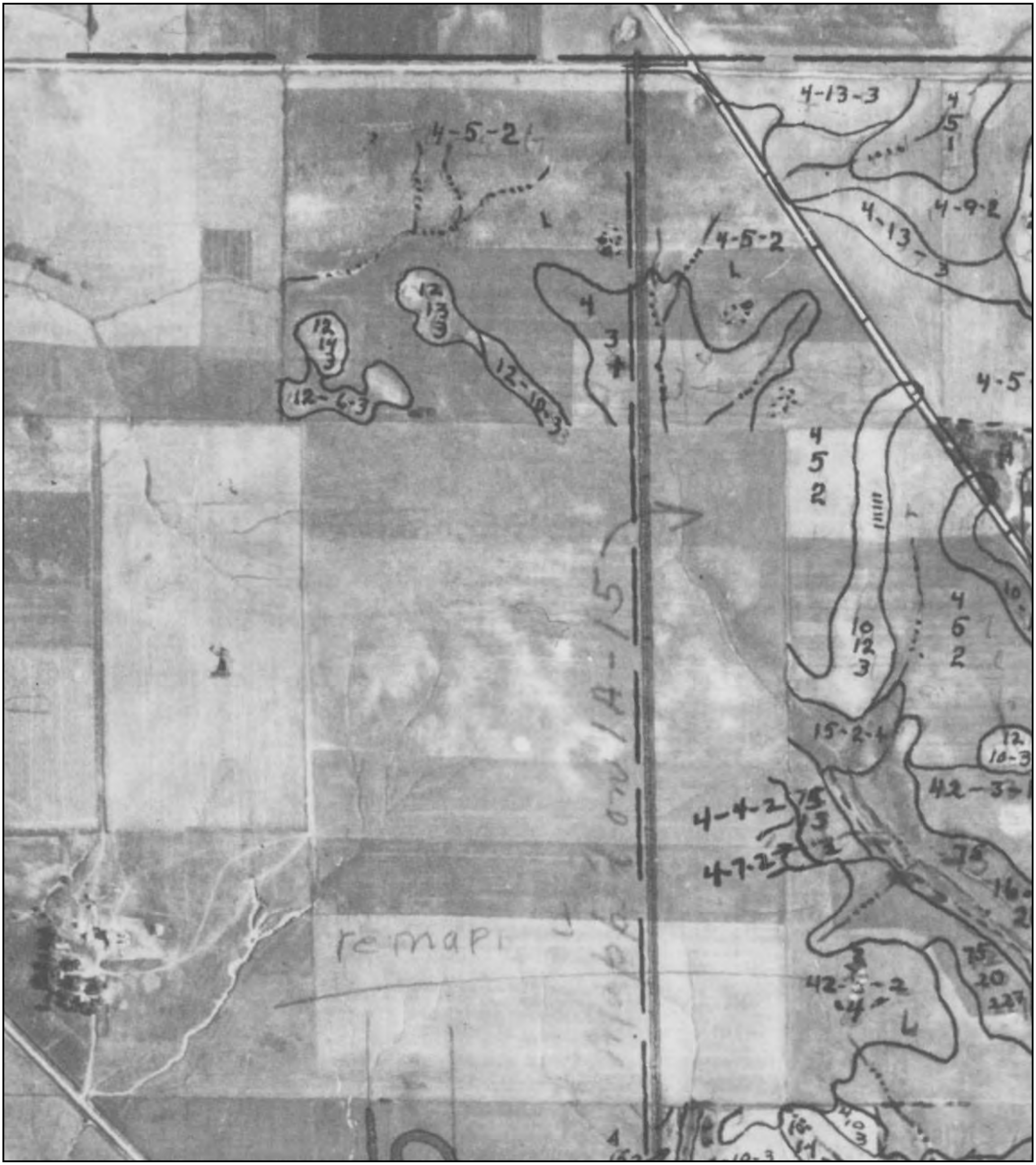
Confidential Project
Unassigned
Oronoco, MN

c2

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project
Unassigned
Oronoco, MN

c2

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN c2	N	**1937** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

2003

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project Unassigned Oronoco, MN d1	N	**1980** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

d1

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN d1	N	**1964** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1958

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d1

N

1937

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d2

N

2015

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d2

N

2008

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN d2	N	**2003** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

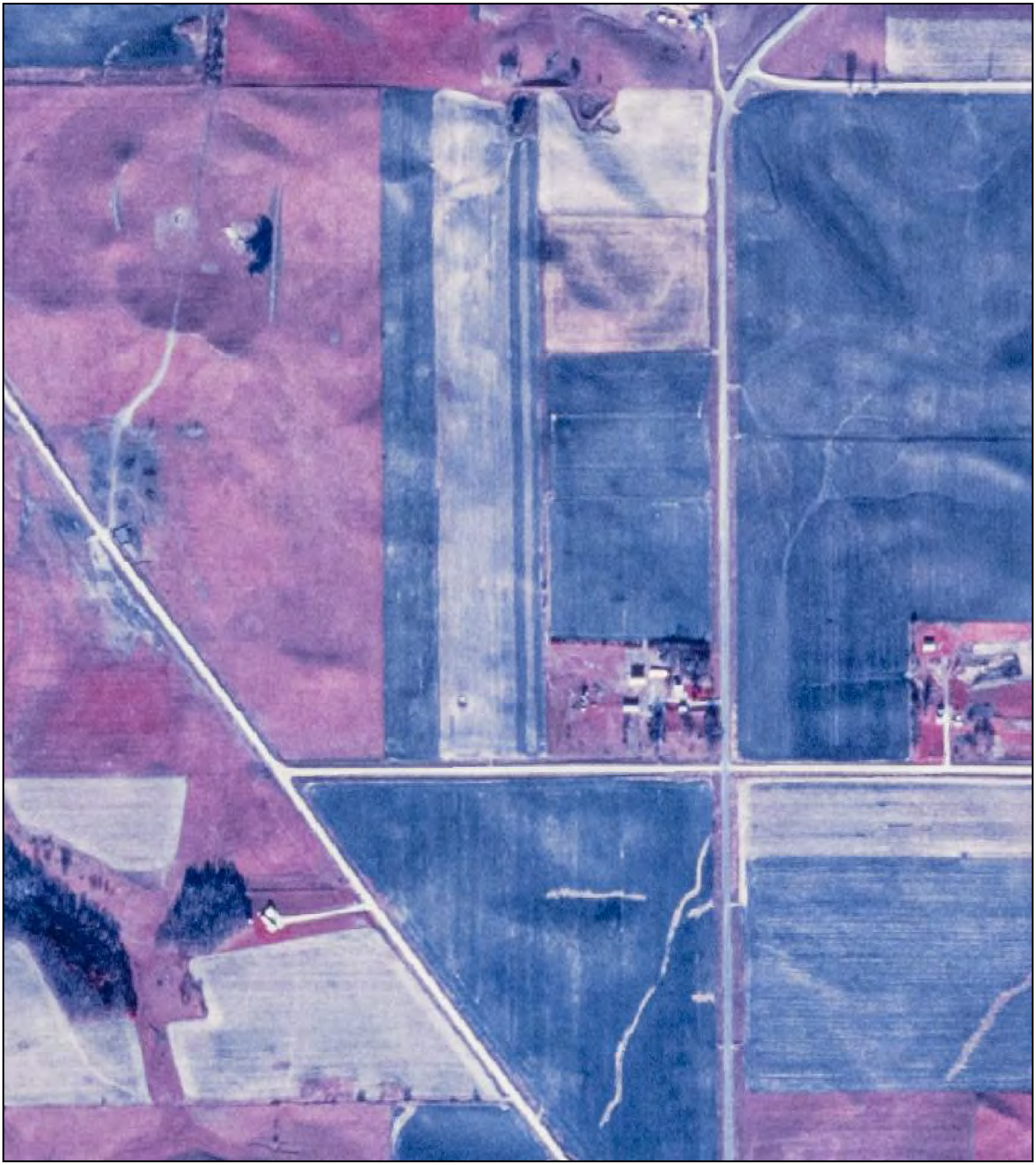
Confidential Project
Unassigned
Oronoco, MN

d2

N

1991

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project
Unassigned
Oronoco, MN

d2

N

1980

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d2

N

1975

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

HIG

Confidential Project
Unassigned
Oronoco, MN

d2

N

1971

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project
Unassigned
Oronoco, MN

d2

N

1964

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

Confidential Project Unassigned Oronoco, MN d2	N	**1958** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com	HIG

Confidential Project
Unassigned
Oronoco, MN

d2

N

1951

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com

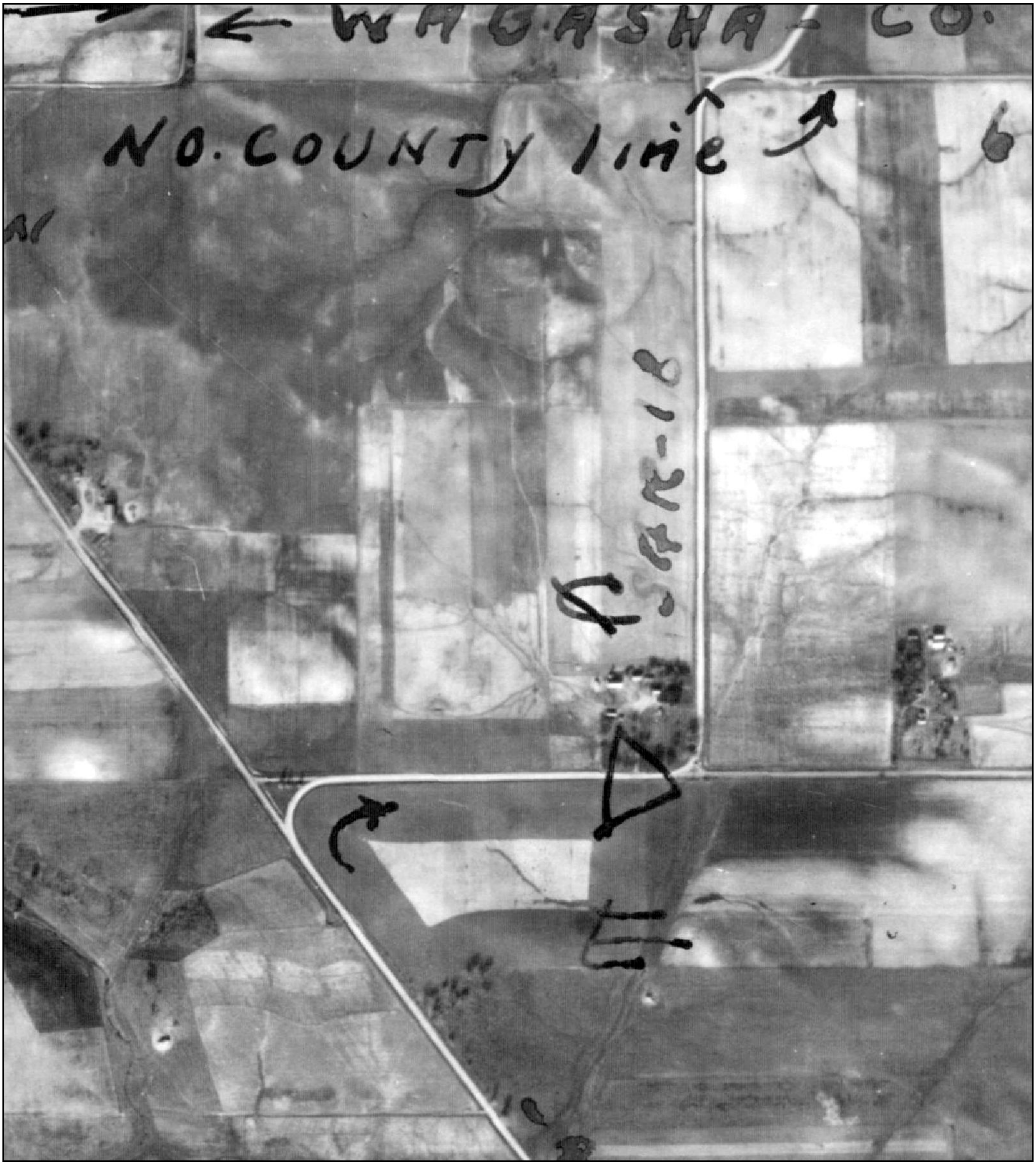
Confidential Project
Unassigned
Oronoco, MN

d2

N

1940

HIG Project # 2013721
Client Project # B4500-0002
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com



Confidential Project Unassigned Oronoco, MN d2	N	**1937** HIG Project # 2013721 Client Project # B4500-0002 Approximate Scale 1: 6,000 (1"=500') www.historicalinfo.com

Appendix H

THPO Concurrence Letter

TRIBAL HISTORIC PRESERVATION OFFICE
Prairie Island Indian Community, Dept. ofLand & Environment
5636 Sturgeon Lake Road, Welch,   55089
Phone (651) 385-2554

October 1 st, 2024

Tribal Council
Prairie Island Indian Community

RE: Prairie Island Indian Community North Elk Run Community Development and Fee-to-Trust Project. Phase I Cultural Resources Survey of Community Development Areas, Elk Run, Pine Island, Olmsted County, Minnesota.

Dear Honorable Council,

The Tribal Historic Preservation Officer has reviewed the Phase I Cultural Resources Survey of Community Development Areas for the Elk Run Project. The THPO concurs with the findings of “No Potential Effect" for areas covered by this report.

Should you require any additional information, please do not hesitate to contact me at (651) 3854175.

Sincerely,

Noah White
Tribal Historic Preservation Officer
Prairie Island Indian Community

Appendix I

EJ Screen Community Report

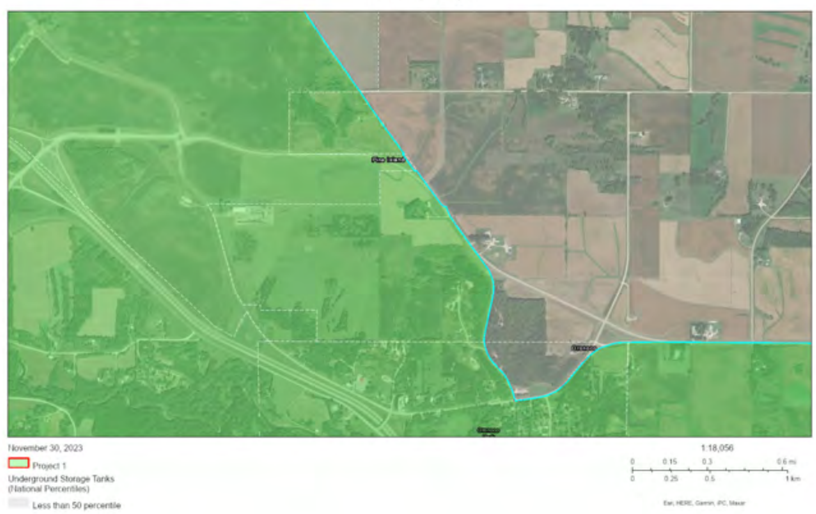
EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Oronoco, MN

Blockgroup: 271090019021
Population: 1,924
Area in square miles: 11.00

A3 Landscape



LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	97%
Spanish	2%
Total Non-English	3%

COMMUNITY INFORMATION

Low income: 5 percent

People of color: 5 percent

Less than high school education: 2 percent

Limited English households: 0 percent

Unemployment: 0 percent

Persons with disabilities: 7 percent

Male: 47 percent

Female: 53 percent

84 years
Average life expectancy

$50,244
Per capita income

Number of households: 637

Owner occupied: 98 percent

BREAKDOWN BY RACE

White: 95%

Black: 0%

American Indian: 0%

Asian: 2%

Hawaiian/Pacific Islander: 0%

Other race: 0%

Two or more races: 1%

Hispanic: 2%

BREAKDOWN BY AGE

From Ages 1 to 4	6%
From Ages 1 to 18	33%
From Ages 18 and up	67%
From Ages 65 and up	12%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	0%
Speak Other Indo-European Languages	0%
Speak Asian-Pacific Island Languages	0%
Speak Other Languages	0%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race. Source: U.S. Census Bureau, American Community Survey (ACS) 2017 -2021. Life expectancy data comes from the Centers for Disease Control.

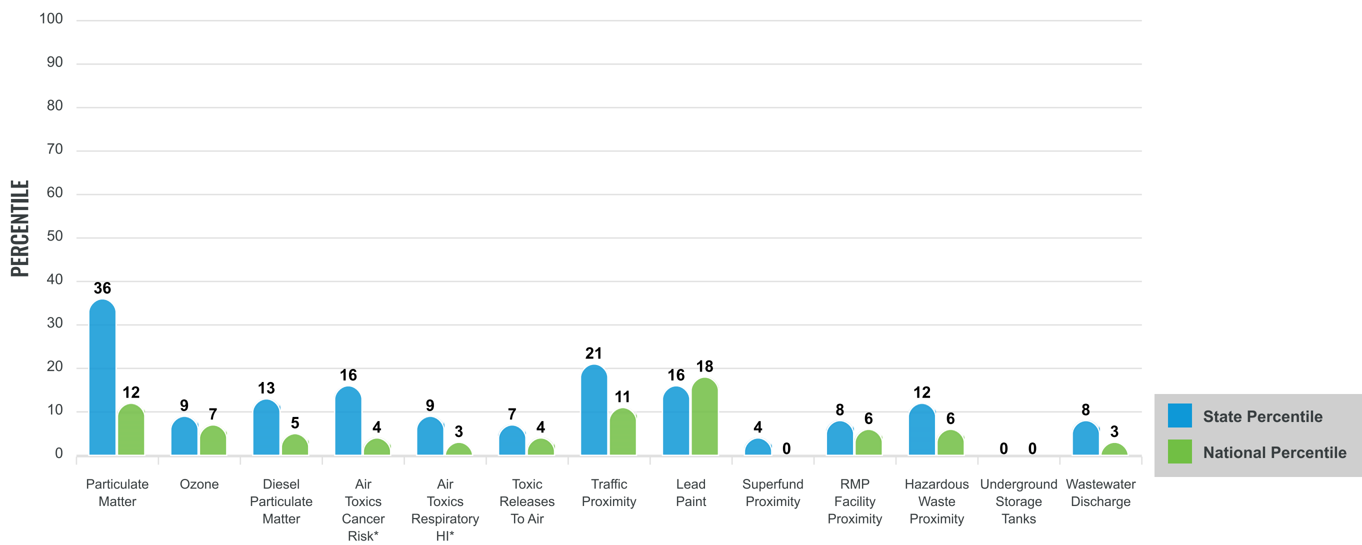
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

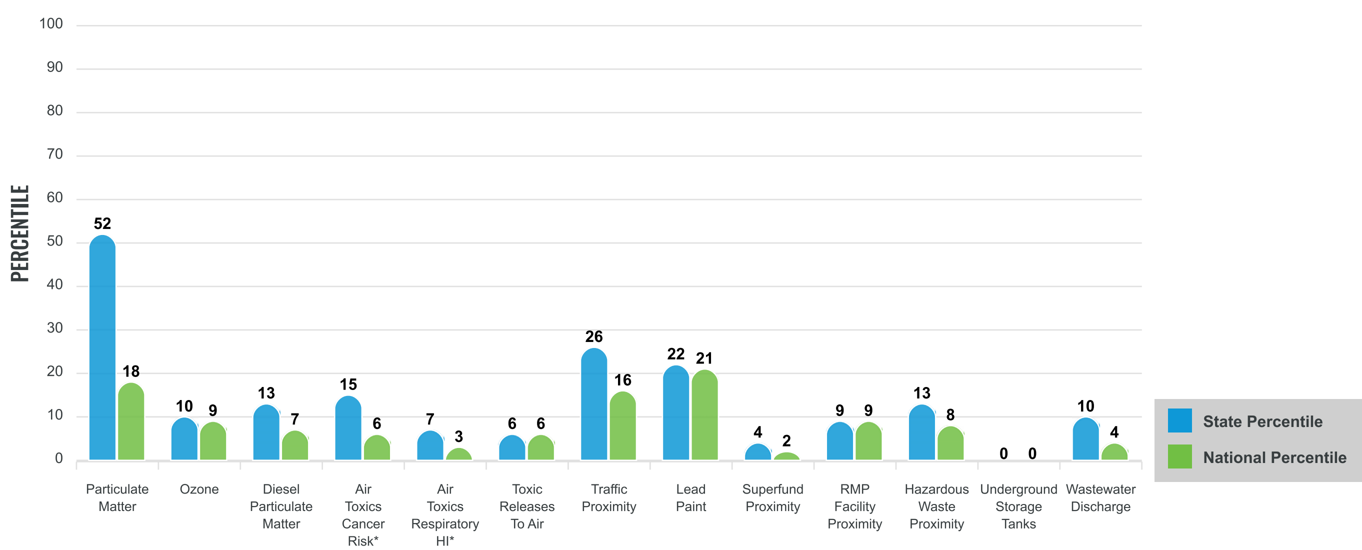
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for Blockgroup: 271090019021

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
POLLUTION AND SOURCES					
Particulate Matter (μg/m^3)	7.82	6.78	88	8.08	40
Ozone (ppb)	57.7	58.2	20	61.6	21
Diesel Particulate Matter (μg/m^3)	0.103	0.21	29	0.261	17
Air Toxics Cancer Risk* (lifetime risk per million)	20	22	12	25	5
Air Toxics Respiratory HI*	0.2	0.26	7	0.31	4
Toxic Releases to Air	34	1,500	14	4,600	15
Traffic Proximity (daily traffic count/distance to road)	38	140	43	210	34
Lead Paint (% Pre-1960 Housing)	0.15	0.33	36	0.3	42
Superfund Proximity (site count/km distance)	0.011	0.19	8	0.13	4
RMP Facility Proximity (facility count/km distance)	0.082	0.48	18	0.43	22
Hazardous Waste Proximity (facility count/km distance)	0.1	1.3	28	1.9	20
Underground Storage Tanks (count/km^2)	0	1.8	0	3.9	0
Wastewater Discharge (toxicity-weighted concentration/m distance)	9.4E-07	0.19	17	22	8
SOCIOECONOMIC INDICATORS					
Demographic Index	5%	22%	5	35%	2
Supplemental Demographic Index	4%	11%	7	14%	3
People of Color	5%	20%	21	39%	12
Low Income	5%	23%	11	31%	7
Unemployment Rate	0%	4%	0	6%	0
Limited English Speaking Households	0%	2%	0	5%	0
Less Than High School Education	2%	7%	31	12%	20
Under Age 5	6%	6%	55	6%	58
Over Age 64	12%	17%	32	17%	33
Low Life Expectancy	14%	17%	20	20%	8

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund 0
Hazardous Waste, Treatment, Storage, and Disposal Facilities 0
Water Dischargers 2
Air Pollution 1
Brownfields 0
Toxic Release Inventory 0

Other community features within defined area:

Schools 0
Hospitals 1
Places of Worship 2

Other environmental data:

Air Non-attainment .... No
Impaired Waters .... Yes

Selected location contains American Indian Reservation Lands* .... No
Selected location contains a "Justice40 (CEJST)" disadvantaged community .... No
Selected location contains an EPA IRA disadvantaged community .... No

Report for Blockgroup: 271090019021

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	14%	17%	20	20%	8
Heart Disease	5	5.6	40	6.1	28
Asthma	8.6	9	27	10	15
Cancer	6.8	6.4	58	6.1	64
Persons with Disabilities	6.3%	11.4%	11	13.4%	9

CLIMATE INDICATORS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	17%	8%	91	12%	82
Wildfire Risk	0%	4%	0	14%	0

CRITICAL SERVICE GAPS					
INDICATOR	HEALTH VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	8%	11%	41	14%	37
Lack of Health Insurance	2%	5%	26	9%	15
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access	No	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Footnotes

Report for Blockgroup: 271090019021

Appendix J

Farmland Conversion Impact Rating Form

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 8/26/2024
Name of Project Prairie Island Indian Community	Federal Agency Involved BIA
Proposed Land Use Tribal Community	County and State Olmsted County, Minnesota
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 8/27/2024 / Person Completing Form: Stuart Veith, ARSS

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☑ NO ☐	Acres Irrigated 133	Average Farm Size 251
Major Crop(s) Corn, Soybeans	Farmable Land In Govt. Jurisdiction Acres: 357315 % 85.16	Amount of Farmland As Defined in FPPA Acres: 336260 % 80.14	
Name of Land Evaluation System Used Crop Productivity Index	Name of State or Local Site Assessment System N/A	Date Land Evaluation Returned by NRCS 9/10/2024	

PART III *(To be completed by Federal Agency)*	Maximum Points	Site A	Site B	Site C	Site D
		Alternative Site Rating			
A. Total Acres To Be Converted Directly		412			
B. Total Acres To Be Converted Indirectly		189			
C. Total Acres In Site		601			
PART IV *(To be completed by NRCS)* Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		312.4			
B. Total Acres Statewide Important or Local Important Farmland		179.6			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted		0.13769			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value		73.4595			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)		69.3733			
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)	13			
2. Perimeter In Non-urban Use	(10)	9			
3. Percent Of Site Being Farmed	(20)	18			
4. Protection Provided By State and Local Government	(20)	17			
5. Distance From Urban Built-up Area	(15)	5			
6. Distance To Urban Support Services	(15)	5			
7. Size Of Present Farm Unit Compared To Average	(10)	10			
8. Creation Of Non-farmable Farmland	(10)	7			
9. Availability Of Farm Support Services	(5)	3			
10. On-Farm Investments	(20)	10			
11. Effects Of Conversion On Farm Support Services	(10)	3			
12. Compatibility With Existing Agricultural Use	(10)	6			
TOTAL SITE ASSESSMENT POINTS	160	106			
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	69.4			
Total Site Assessment *(From Part VI above or local site assessment)*	160	175.4			
TOTAL POINTS *(Total of above 2 lines)*	260	244.8			

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form: Kt Alonzo | Date: 9/11/24

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

Appendix K

Phase I Environmental Site Assessment and Supplementary Environmental Site Assessment

2018 Phase I Environmental Site Assessment

WENCK File #4500-0002
March 2018

Phase I Environmental Site Assessment

1,333 Acres and Improvements
Between Pine Island and Oronoco, Minnesota

Prepared for:

Prairie Island Indian Community

5636 Sturgeon Lake Road
Welch, Minnesota 55089

WENCK
Responsive partner.
Exceptional outcomes.

Prepared by:

WENCK Associates, Inc.
1800 Pioneer Creek Center
Maple Plain, MN 55359
Phone: 763-479-4200
Fax: 763-479-4242

Table of Contents

Table of Contents (Cont.)

FIGURES

APPENDICES

1.0 Summary

Wenck Associates, Inc. (Wenck) was authorized by Prairie Island Indian Community (PIIC) to conduct this Phase I Environmental Site Assessment (ESA) for the property and improvements described as; approximately 1,242 acres of property and approximately 91.20 acres of excess right of way land currently owned by the Minnesota Department of Transportation (MNDOT), all located between Pine Island and Oronoco, Olmsted County, Minnesota (the Subject Property). The Subject Property location is depicted in **Figure 1**. A Site Detail Map of the Subject Property is included as **Figure 2**.

This was conducted in accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property Designation E-2247-16 (ASTM Phase I Standard) and satisfies standards and practices set forth in 40 CFR Part 312 – Standards for Conducting All Appropriate Inquiry (AAI Rule) for the purposes of meeting the all appropriate inquiries provisions necessary to qualify for certain landowner liability protections under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601(35)(B).

The conclusions contained in this report have been made to assist PIIC in evaluating environmental conditions at the present time at the Subject Property.

This ESA has identified the following *recognized environmental condition* (REC) relative to the Subject Property:

- The presence of floor drains within the tractor barn that discharge to the subsurface is a REC for the Subject Property, because the floor drains represent a risk pathway for surface contamination to reach the subsurface, and the floor drains have presumably been in use since the tractor barn was constructed (at least 47 years ago).

This ESA has identified no evidence of *controlled recognized environmental conditions* (CRECs) or *historical recognized environmental conditions* (HRECs) in connection with the Subject Property.

2.0 Introduction

2.1 PURPOSE

Wenck was authorized by Prairie Island Indian Community to conduct this Phase I ESA for the property and improvements described as; approximately 1,242 acres of property and approximately 91.20 acres of excess right of way land currently owned by MNDOT, all located between Pine Island and Oronoco, Olmsted County, Minnesota; the Subject Property. The Subject Property location is depicted in **Figure 1**. A Site Detail Map of the Subject Property is included as **Figure 2**.

The conclusions contained in this report have been made to assist PIIC in evaluating environmental conditions at the present time at the Subject Property. In addition, the report is intended to satisfy the requirements of "all appropriate inquiry… consistent with good commercial or customary practice" referenced in the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601(35)(B).

2.2 SCOPE

This ESA was prepared in accordance with the ASTM Phase I Standard and AAI Rule to identify, to the extent feasible and in accordance with the processes described herein: recognized environmental conditions, controlled recognized environmental conditions, and historical recognized environmental conditions in connection with the Subject Property.

As defined in ASTM E 2247-16, the term recognized environmental condition (REC) means "the presence or likely presence of any hazardous substances or petroleum products in, on or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of future release to the environment."

As defined in ASTM E 2247-16, the term controlled recognized environmental condition (CREC) means "a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls."

As defined in ASTM E 2247-16, the term historical recognized environmental condition (HREC) means "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meets unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls."

A summary of the general scope of work for this project is described in the following tasks:

- **Task I. Records Retrieval and Review of Records:** Wenck obtained publicly available, practically reviewable and reasonably ascertainable federal, state, county and city information about the Subject Property and other properties within minimum established search distances of the Subject Property. These sources were searched for any information about RECs, CRECs, HRECs or business-related environmental risks relative to the Subject Property. This search included a review of Superfund sites; waste treatment, storage and disposal facilities regulated under RCRA; spills or discharges of hazardous substances, toxic materials, or petroleum products; and known or recorded landfills; and/or well databases.

- **Task II. Site Reconnaissance:** Wenck visually inspected the Subject Property to evaluate the Subject Property for any RECs, CRECs, HRECs and business-related environmental risks. The structures and grounds of the Subject Property were observed for filling, subsidence, unusual land or surface forms, colorations, odors, indications of dumping and evidence of suspect environmental features on the Subject Property such as tanks, drains, drywells, etc. Observations pertaining to adjacent property use were also recorded where such observations pertained to RECs, CRECs, HRECs or business-related environmental risks relative to the Subject Property.

- **Task III. Interviews of People with Knowledge of the Subject Property**: Wenck interviewed people with knowledge of the history of the Subject Property and of the surrounding properties. Interviews were completed in order to obtain information pertaining to RECs, CRECs or HRECs relative to the Subject Property. Interviewees included the Subject Property owner(s) and occupant(s), as well as local government officials.

  Data gathered in the course of performing the above three tasks was used in concert to determine if information from one source indicated the need for additional information from another source.

- **Task IV. Reporting:** Wenck completed this Phase I ESA by combining the information retrieved through data searches with the observations that were made during the Subject Property reconnaissance and interviews. Photographs were taken to document the overall status and current use of the Subject Property and specific areas of concern.

Any deviations from the scope described in the ASTM Phase I Standard are identified in Section 2.3.

2.3 DEVIATIONS

No intentional deviations from the ASTM Phase I Standard were made in preparing this report.

2.4 LIMITATIONS AND EXCEPTIONS

The results of this study, performed by Wenck, are based on the scope of work defined in Section 2.2, subject to any project-specific limitations or project-specific additional non-scope considerations described herein.

- The presence of snow cover on the Subject Property at the time of the site reconnaissance is considered a limitation. Wenck does not anticipate that this limitation materially affects the opinions and conclusions contained in this report. However, the presence of snow prevented Wenck from observing three out of four water supply wells that are reportedly located on the Subject Property.

As is the case with any investigation of finite scope, this review is intended to reduce, but cannot eliminate, the uncertainty regarding the potential for RECs, CRECs or HRECs in connection with the Subject Property. Therefore, the possibility of the presence of some localized substances that may be classified as hazardous cannot be ruled out completely. However, it is Wenck's opinion that the conditions observed at the Subject Property are representative of existing conditions at the time of the site reconnaissance.

2.5 SIGNIFICANT ASSUMPTIONS

Wenck assumes that PIIC has provided accurate information that will assist Wenck in determining appropriate inquiry, including but not limited to actual knowledge, previously prepared reports, environmental cleanup liens, and title review information. In addition, Wenck assumes, for the purposes of the site reconnaissance, adequate information has been provided to accurately establish the physical boundaries of the real property being evaluated.

2.6 SPECIAL TERMS AND CONDITIONS

The purpose of this report is to aid in the environmental assessment of the Subject Property and not to evaluate the structural condition of buildings or other features of the Subject Property.

Wenck has performed its work in a manner consistent with the care and skill ordinarily exercised by members of the environmental profession. The conclusions contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted engineering practices at this time and location. Wenck does not offer any form of warranty or guarantee that the Subject Property contains no hazardous substances, pollutants or contaminants.

Wenck assumes no responsibility for the accuracy of information that was obtained from other sources, including, without limitation, regulatory and government agencies, persons knowledgeable about the Subject Property, persons knowledgeable about adjacent properties and vendors of public practice.

2.7 USER RELIANCE

This report has been prepared solely for the information and use of Prairie Island Indian Community and Elk Run LLC. Others wishing to rely on the findings of this report, not having a contractual relationship with Wenck, do so without permission and at their own risk. Our professional recommendations made to the addressee(s) are exclusive to that party's disclosed intended or proposed consideration with respect to the Subject Property at the present time.

3.0 Site Description

The Subject Property is located in an agricultural area between the Cities of Pine Island and Oronoco, Minnesota.

Site Address/Location	**Address:** 2137 White Pines Road SE, 12108 59th Avenue NW, 12440 59th Avenue NW and 12708 59th Avenue NW		**City:** Pine Island
	County: Olmsted		**State:** Minnesota
	Township: 108 North 108 North	**Range:** 15 West 14 West	**Section:** 1, 2, and 12 6 and 7
Property Information	**Size:** 1,333.06 acres **Property Identification Number:** 85.02.42.078994, 85.01.33.080498, 85.12.21.050500, 85.02.41.079586, 85.01.22.079581, 85.01.32.079579, 85.01.34.079577, 85.01.24.079575, 85.01.21.079580, 85.01.12.038408, 85.01.11.038407, 84.06.22.039648, 84.06.24.039647, 84.06.23.079596, 85.01.42.079576, 85.01.41.079578, 85.01.31.079584, 85.01.43.079564, 85.01.34.079589, 85.01.32.097567, 85.12.21.079590, 85.12.12.038600, 85.12.14.079569, 85.01.44.078534, 85.01.44.078533, 85.01.44.079565, 85.01.44.079566, 84.06.33.079595, 84.06.34.079597, 84.06.34.078541, 84.06.33.078539, 85.12.11.079570, 84.07.21.039660, 84.07.11.079799, 84.07.13.039659, 84.07.24.039662, 85.12.14.079571, 84.07.23.079573, 85.02.31.079488, 85.02.21.079300, 85.02.21.079298, 85.02.21.079297, 85.02.24.079301, 85.02.14.079302, 85.02.21.079492, 85.02.14.079304, plus MNDOT parcels with no PID		
Improvements	The Subject Property has one dwelling, a tractor barn and a barn containing a 1-million-gallon capacity concrete pit for liquid silage residue in the southeast portion of the Subject Property. The concrete pit was historically used to collect liquid residue from floor drains at the bottom of two nearby, outdoor concrete silage pits. There is also a livestock shelter on the Subject Property located southeast of the intersection of 520th Street Northwest and 59th Avenue Northwest.		
Building Information	**Size:**	**Year of Construction:**	
	Dwelling: Approximately 2,500 square feet	1960	
	Tractor Barn: Approximately 21,000 square feet	Between 1964 and 1971	
	Silage Barn: Approximately 13,000 square feet	Between 1980 and 1991	
	Livestock Shelter: Approximately 2,130 square feet	Between 1964 and 1971	

	Description: The single-family dwelling is constructed with a concrete block foundation and wood frame. The tractor barn contains an office with a second level conference room in its west portion, a shop and tractor storage area with a cement floor in its central portion, and a former elk corral with a dirt floor that is currently used for hay and water barrel storage in its east portion. The silage barn is constructed with a 1 million-gallon capacity concrete pit beneath wood slats. The silage barn is currently in seasonal use to shelter calves.
Use of the Property	**Current Use:** The Subject Property is in agricultural use for row crops and seasonal cattle grazing. The portion of the Subject Property containing a dwelling is in residential use. There is also an aggregate mine in the northwest portion of the Subject Property. **Past Use:** According to reviewed sources of information, the Subject Property was developed with a farmstead prior to 1937, which was located in the same general location as the currently existing dwelling. Aerial photographs indicate that the historical structures were razed between 1960 and 1971, as the currently existing structures were built. The Subject Property was primarily agricultural land with limited elk farming until 1985, when the majority of the Subject Property was turned into an elk farm and grazing land. Between approximately 1985 and 2006, the Subject Property accepted silage from a local, offsite source, and used the silage as elk food and the liquid silage residue as fertilizer. In 2009, an elk from the Subject Property tested positive for chronic wasting disease (CWD), and the entire heard of 1,500 elk was subsequently culled with involvement from the United States Environmental Protection Agency (EPA). A total of two elk tested positive for CWD at the Subject Property. Elk and cattle grazing were prohibited for five years following the detection of CWD at the Subject Property, and the Subject Property received a letter from the EPA indicating that grazing could resume in 2014. Since 2014, portions of the Subject Property have been used for seasonal cattle grazing. Some of the Subject Property consists of roadway easements owned by the Minnesota Department of Transportation.
Ownership and Operation of the Property	**Current Ownership & Operation:** The Subject Property is owned by Elk Farm LLC, Tower Elk Farm II, LLC, Tower Elk Farm III, LLC, and the Minnesota Department of Transportation. The Subject Property is currently occupied by a residential tenant, and portions are in agricultural use for row crops and cattle grazing.

The Subject Property location is depicted in **Figure 1**. A Site Detail Map showing the Subject Property is provided in **Figure 2**.

3.1 CURRENT USE OF ADJOINING PROPERTIES

The following land uses were noted on adjoining properties:

Direction	Description
North	Agricultural cropland and associated buildings (beyond 520th Street Northwest)
South	Agricultural cropland and associated buildings
East	Agricultural cropland and associated buildings, including a recreational vehicle (RV) dealership
West	Agricultural cropland and associated buildings beyond Highway 52, and a small area of commercial structures adjoining northwest

3.2 PHYSICAL SETTING

3.2.1 Topography

The Subject Property is generally level and is at an elevation of approximately 1,065 feet above mean sea level. Site surface drainage for the south and west portions of the Subject Property appear to run southward towards the Middle Fork Zumbro River; and the north and east portions of the Subject Property appear to run toward the two ponds located in the northeast corner of the Subject Property. Historic development may have included grading or filling of the Subject Property to improve the location for construction and drainage.

3.2.2 Geology

Published references describe the surficial geology at the Subject Property as a complex intertwining of the following;

- Alluvium – deposits of modern streams, channel sand and gravel, overlain by overbank silt and clay.
- Loess – windblown sediment; uniform unbedded silt mixed with some silt and fine sand.
- Terrace Deposits – deposits of Wisconsinan streams; chiefly clean calcareous sand and gravel; includes minor beds of silt and clay in places.
- Till – unsorted, unstratified drift deposited directly by a glacier, a mixture of sand, silt and clay (typical loam to clay loam) containing subangular to rounded clasts of local and erratic rocks.
- Upland sand and gravel – outwash and ice contact deposits and terrace deposits older and higher than Wisconsinan terrace deposits.
- Bedrock – outcrops and thinly covered bedrock excluding colluvium areas; areas where bedrock is generally within 5 feet of the surface. (University of Minnesota, 1988).

Shallow bedrock in the vicinity of the Subject Property consists of the Prairie du Chien Group (University of Minnesota, 1988).

3.2.3 Hydrogeology

The general direction of regional groundwater flow in the area of the Subject Property is presumed to be to the south toward the Middle Fork Zumbro River (University of Minnesota, 1988). Local conditions may vary due to surface water features, perched groundwater conditions or artificially created drainage systems.

4.0 User Provided Information

4.1 TITLE RECORD INFORMATION

A title commitment record for the Subject Property was not provided to Wenck during preparation of this Phase I ESA, and a title search was not within the scope of this ESA.

4.2 USER QUESTIONNAIRE

User provided information includes a copy of the ASTM User Questionnaire completed by Mr. Dan DeRudder, Tribal Utility and Project Manager of PIIC. The following sections include the information obtained from the completed User Questionnaire, which is included in **Appendix A**.

4.2.1 Environmental Liens or Activity and Use Limitations

No independent review of environmental liens was undertaken by Wenck as a part of this scope of work. No activity and use limitations were disclosed to Wenck during preparation of this ESA.

4.2.2 Specialized Knowledge

Prior assessments regarding the Subject Property were provided by PIIC during preparation of this ESA (See Section 5.4).

4.2.3 Commonly Known or Reasonably Ascertainable Information

Commonly known or reasonably ascertainable environmental information was found relevant to this study including previous environmental reports discussed in Section 5.4.

4.2.4 Valuation Reduction for Environmental Reasons

No valuation reduction for environmental reasons was disclosed at the outset of this study.

4.3 OWNER, PROPERTY MANAGER AND OCCUPANT INFORMATION

The Subject Property is owned by Elk Farm LLC, Tower Elk Farm II, LLC, Tower Elk Farm III, LLC, and the Minnesota Department of Transportation. Portions of the Subject Property are in agricultural use for row crops and cattle grazing, and the dwelling is in residential use. Mr. Geoff Griffin, Civil Engineer at the Subject Property, provided access and a tour of the Subject Property.

4.4 REASON FOR PERFORMING PHASE I ESA

This Phase I ESA is being performed as a component of due diligence activities and to determine whether RECs, CRECs or HRECs affect the Subject Property.

5.0 Records Review

5.1 STANDARD ENVIRONMENTAL RECORD SOURCES

Wenck requested and reviewed a search of files from federal and state databases from GeoSearch for the Subject Property (the GeoSearch Radius Report). Files were searched from Federal and State environmental records databases within minimum search distances as specified in the ASTM Phase I Standard, and the GeoSearch Radius Report included a more extensive database list than those minimally identified as required by the ASTM Phase I Standard. A summary of the sites identified in the GeoSearch Radius Report are discussed below, along with information regarding the significance of the listing for the Subject Property. The GeoSearch Radius Report, which contains more information regarding database descriptions and search distances, is included in **Appendix B**.

5.1.1 Subject Property

The Subject Property **was** identified on the following reviewed regulatory databases in the GeoSearch Radius Report:

- Facility Registry System (FRSMN) – The FRS database includes pointers to other databases and facilities that were entered into the Minnesota Delta Program. These listings are not considered to represent RECs, CRECs or HRECs for the Subject Property based on the type of database.

- Permit Compliance System (PCSR05) – The PCS database tracks enforcement status and permit compliance of facilities controlled by the National Pollutant Discharge Elimination System under the Clean Water Act. The Subject Property is listed due to a milk processing plant listed as Hoehne Brothers Farms. This site has multiple violations and enforcements but has corrected each offense. Based on the current status and type of database; this listing is not considered to represent a REC, CREC or HREC for the Subject Property.

- Registered Storage Tank (UAST) – The Subject Property is listed as having two storage tanks that were removed in 1996; one 3,000-gallon capacity gasoline storage tank and one 10,000-gallon capacity diesel storage tank. Wenck contacted Mr. Dale Boettcher, MPCA Records Management Unit, to request additional information. According to Mr. Boettcher, both storage tanks are identified as underground storage tanks (USTs), and he confirmed that both USTs have been removed in 1996. He stated that there is no related electronic file available, and that the hard copy file only contains a tank removal verification form. The MPCA is not in possession of confirmation soil sampling taken at the time of tank removal. It is Wenck's opinion that if a release were identified by the tank removal contractor at the time of removal, then it would likely have been reported to the MPCA. Because there is no evidence of a release or a material threat of release of petroleum products from these two removed USTs, the UAST listing is not considered to represent a REC, CREC or HREC for the Subject Property.

- Water Discharge Permit (WDP)/ Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES) – – The WDP/ICISNPDES database tracks various types of water permits. According to the database report, a wastewater discharge permit was issued to Hoehne Brothers Farms at the Subject Property for discharge of fluid milk. A general permit was also issued to the Subject Property as a minor discharger of non-potable water. No violations or enforcement actions were reported in connection with these permits. Theses listings are not considered to represent RECs, CRECs or HRECs for the Subject Property based on the type of databases and the lack of reported violations.

- What's In My Neighborhood (WIMN) – The WIMN database includes pointers to other databases, and therefore results in duplicate entries for databases described elsewhere. The database was compiled to provide a mapping service for interested parties to review sites of regulatory interest in their area of concern. These listings are not considered to represent RECs, CRECs or HRECs for the Subject Property.

- Enforcement and Compliance History Information (ECHOR05) – The Subject Property is listed on this database because it is subject to inspections for compliance with the Clean Water Act for limestone crushing operations. The Subject Property has no violations or enforcements listed. Due to the lack of reported violations, this listing is not likely to affect soil, groundwater or soil vapor conditions at the Subject Property, and therefore, is not considered to represent a REC, CREC or HREC for the Subject Property.

Wenck did not review regulatory files for these database listings because sufficient information was available from other sources (including an interview with the MPCA) to determine the potential for RECs, CRECs and/or HRECs at the Subject Property.

5.1.2 Surrounding Properties

Additional mapped sites of regulatory interest identified within the search radii defined by the ASTM Phase I Standard, as identified in the GeoSearch Radius Report, include the following:

Number of Sites	Regulatory Database	Comments
8	Concentrated Animal Feeding Operations (CAFO)	CAFO sites have feeding operations of a large number of animals, that are regulated by the government. These listings are not considered to represent RECs, CRECs or HRECs for the Subject Property based on the type of database.
1	Delisted National Priorities List (NPL) site	This DNPL site is located approximately 0.816 miles south-southeast of the Subject Property in a downgradient location with respect to the presumed direction of groundwater flow. The DNPL site identified is the Olmsted County Sanitary Landfill which was discovered to have concentrations of volatile organic compounds in groundwater. After additional investigations it was determined that there was a low-level risk posed by the site and the site was delisted. Based on the site's status, and downgradient location with respect to anticipated regional groundwater flow

Number of Sites	Regulatory Database	Comments
		direction, this listing is not considered a threat to soil, groundwater and/or soil vapor conditions at the Subject Property, and, therefore, is not considered to represent a REC, CREC or HREC for the Subject Property.
1	Registered Leaking Storage Tank (LUAST) sites	The LUAST site identified was the FormerJCS Corner Mark Inc. site (MPCA Leak Site file 116402) located approximately 0.317 miles from the Subject Property in a sode-gradient location with respect to anticipated regional groundwater flows. A release of gasoline was reported in March 2006. The file was granted regulatory closure by the MPCA in January 2008. A closure letter does not eliminate the possibility of residual contamination at the site. Based on the location and regulatory status of the site and the information provided in the GeoSearch Radius Report, this listing is not considered a threat to soil, groundwater and/or soil vapor conditions at the Subject Property, and, therefore, is not considered to represent a REC, CREC or HREC for the Subject Property.
13	What's in My Neighborhood Database (WIMN) sites	The WIMN database includes pointers to other databases, and therefore results in duplicate entries for databases described elsewhere. The database was compiled to provide a mapping service for interested parties to review sites of regulatory interest in their area of concern.
3	MPCA Remediation Sites (REMSITES)	The REMSITES database is a temporary database that includes limited information regarding properties that have enrolled in an MPCA program. Some of these properties contain known or suspected impacts, and other properties in the database do not contain known or suspected impacts. One of these sites is the LUAST site discussed above. The remaining two REMSITES database listings are located over 1/2 mile from the Subject Property in a down-gradient location with respect to anticipated regional ground water flows. These listings are not considered to represent RECs, CRECs or HRECs for the Subject Property based upon their locations with respect to the presumed direction of groundwater flow, their distances from the Subject Property, and/or other information provided by the database report.

No unmapped sites were identified in the GeoSearch Radius Report. Unmapped sites are those where address information is insufficient to allow the sites to be accurately mapped by GeoSearch.

Wenck did not review State/County/City files for these database listings because sufficient information was available from other sources to determine the potential for RECs, CRECs and/or HRECs relative to the Subject Property.

5.2 ADDITIONAL RECORD SOURCES

Additional record sources may be consulted when, in the judgment of the Environmental Professional, such additional records are reasonably ascertainable, sufficiently useful, accurate and complete, and are generally obtained pursuant to good commercial and customary practice. Such records may include local brownfield lists, or other local lists similar to those federal, state and tribal lists. Such sources may include local health or environmental departments, fire departments, planning departments, building permit or inspection departments, and other local pollution, water quality or utility companies.

5.2.1 Olmsted County Tax Information

Olmsted County tax information was obtained and reviewed from the Olmsted County tax assessor's website. Tax records provide publicly available information about the Subject Property. The tax records did not reveal any additional information with respect to the environmental condition of the Subject Property.

The Olmsted County tax information is included as **Appendix C**.

5.2.2 Local Building Records Review

Local building records were not reviewed for the Subject Property. According to reviewed sources of information, the Subject Property was developed with a historical farmstead prior to 1937, which was located in the same general location as the currently existing dwelling. Aerial photographs indicate that the historical structures were razed between 1960 and 1971, as the currently existing structures were built. The Subject Property was primarily agricultural land with limited elk farming until 1985, when the majority of the Subject Property was turned into an elk farm and grazing land. Between approximately 1985 and 2006, the Subject Property accepted silage from a local, offsite source, and used the silage as elk food and the liquid silage residue as fertilizer. Since 2014, portions of the Subject Property have been used for seasonal cattle grazing. Some of the Subject Property consists of roadway easements owned by the Minnesota Department of Transportation.

5.3 HISTORICAL USE INFORMATION

5.3.1 Aerial Photographs

Aerial photographs were reviewed from 1937, 1940, 1951, 1958, 1964, 1971, 1975, 1980, 1991, 2003, 2008 and 2015. The aerial photographs are presented in **Appendix D**.

In the 1937 through 2015 aerial photographs the Subject Property appears to be mainly agricultural cropland with associated agricultural structures and residences. A small silage yard appears to be present in the southeastern portion of the Subject Property. The Subject Property appears to have been developed with a historical farmstead prior to 1937, which was located in the same general location as the currently existing dwelling. Aerial photographs indicate that the historical structures were razed between 1960 and 1971, as the currently existing structures were built.

Surrounding, adjacent sites also appear to be mainly agricultural cropland with associated agricultural structures and residences. In the 1975 through 1980 aerial photographs, additional residential structures are visible adjacent to the west and south of the Subject Property. In the 2015 aerial photograph, there are three commercial structures visible adjacent to the northwest of the Subject Property.

Road infrastructures have improved throughout the years as well. In the 1964 aerial photograph, Highway 52 expanded into a multi-lane divided highway. In the 2015 aerial photograph, considerable road infrastructure, included a new bridge over Highway 52, roundabouts and additional roads are visible near the Subject Property.

5.3.2 City Directories

City directories were researched for the Subject Property and surrounding properties. The streets researched were 5th Street NW, 59th Avenue NW (also known as White Pines Road SE), and Vintage Road NW and directories were available for the years 1993-1994, 1998-1999, 2003, 2009 and 2013. The city directories are included as **Appendix E**. Listings for the address of the Subject Property consist of the following:

Directory Year	Subject Property Listing
1993-1994	12108 59th Avenue NW – No Listing 12440 59th Avenue NW – Sherry Zodrow 12708 59th Avenue NW – No Listing
1998-1999	12108 59th Avenue NW – No Listing 12440 59th Avenue NW – Erica and Eric Shettl 12708 59th Avenue NW –John Hoehne
2003	12108 59th Avenue NW – Victor Stetson 12440 59th Avenue NW – Tammy and Eric Schettl 12708 59th Avenue NW – Agnes and John Hoehne, Hoehne Mining
2009	12108 59th Avenue NW – No Listing 12440 59th Avenue NW – Tammy and Eric Schettl 12708 59th Avenue NW – Agnes and John Hoehne
2013	12108 59th Avenue NW – No Listing 12440 59th Avenue NW – No Listing 12708 59th Avenue NW – Agnes and John Hoehne

Other listings in the vicinity of the Subject Property include Buy RV Sell RV at 614 Vintage Road NW and other residential listings.

5.3.3 Historical Maps

The Oronoco, Minnesota USGS 7.5-minute series topographic maps dated 1965, 1980, 2013 and 2016 show the area of the Subject Property.

There are no structures or other items shown on the Subject Property on the 2013 through 2016 topographic maps. There appears to be 13 structures shown on the Subject Property on the 1965 through 1980 topographic maps. These structures appear to be residential houses and other farmstead structures.

The historical maps are included as **Appendix F**.

5.3.4 Fire Insurance Maps

A search was conducted to determine if fire insurance maps were available for the Subject Property. Fire insurance maps were created for insurance underwriters and often contain information regarding the uses of individual structures and the locations of fuel and/or chemical storage tanks that may have been on a particular property.

According to Historical Information Gatherers, Inc. (HIG), fire insurance map coverage is not available in the research materials searched for the Subject Property. HIG fire insurance map research documentation is included as **Appendix G**.

5.4 PREVIOUS ENVIRONMENTAL REPORTS

PIIC provided Wenck with the following previous environmental report prepared for the Subject Property:

- *Phase I Environmental Site Assessment, Hoehne Elk Farm, Oronoco, Minnesota*, prepared for Mr. Geoff Griffin, GGG Inc. by Omni Environmental and dated September 9, 2003 (2003 ESA Report).

This previous environmental report, as provided to Wenck, is included in **Appendix H**. Wenck was also provided with ALTA surveys, orderly annexation agreements, annexation resolutions, a master development agreement, documentation regarding chronic wasting disease (CWD) at the Subject Property, a general development plan, zoning documents, a reimbursement agreement, MNDOT agreements, a land exchange agreement, a sign easement agreement, a utility extension agreement, leases, parcel maps, soil maps, and additional information that is not relevant to performance of a Phase I ESA in conformance with the ASTM Phase I Standard.

5.4.1 2003 ESA Report

The 2003 ESA Report noted the Subject Property was approximately 1,272 acres in size and consists of five homes and a gravel pit and was mostly used for elk farming/grazing since 1985. Prior to 1985, the land was predominately used for agriculture.

The 2003 ESA report lists two ASTs on the Subject Property; one 1,000-gallon gasoline AST and one 1,000-gallon diesel AST. In addition, historically there were two USTs on the Subject Property; one 3,000-gallon gasoline UST and one 10,000-gallon diesel UST, both of which were removed at an unknown date. The 2003 ESA report identifies two small pits on the Subject Property that were formerly used as silage storage pits, and the report states that the pits were abandoned in 1980. Also, two large concrete silage storage bunkers were present on the Subject Property in 2003, each with a capacity of 50,000 tons of silage, as well as a one-million-gallon underground storage tank used to collect the liquid residue from the silage bunkers. At the time of the 2003 ESA report, the one-million-gallon tank was approximately 15 years old and was constructed of cast in place concrete. This tank is located under a sheet metal barn. These bunkers and tank had not been used extensively used since 2001 according to the owner. The 2003 ESA reports five wells are present on the Subject Property.

The 2003 ESA report identified three RECs for the Subject Property. The previous existence of USTs on the Subject Property is considered an REC. The current ASTs on the Subject Property are considered a REC "based on the potential for impacts to soil and groundwater in the area from the storage and dispensing of petroleum products." And the one million-gallon UST tank is also considered an REC based on contamination potential to soil and groundwater. Wenck has reached different conclusions regarding these items.

6.0 Subject Property

6.1 SUBJECT PROPERTY OBSERVATIONS

Mr. Chad Rogers of Wenck conducted a site reconnaissance on March 7, 2018. Mr. Rogers was accompanied during a portion of the site reconnaissance by Mr. Geoff Griffin, Civil Engineer at the Subject Property. Wenck staff visually observed the Subject Property to identify current land use, obtain evidence of past uses, and to identify surface characteristics of the Subject Property for the presence of RECs, CRECs or HRECs. Subject Property photographs are included in **Appendix I**.

The site reconnaissance consisted of visually observing the interior and exterior portions of the Subject Property. Wenck staff observed (from the Subject Property boundaries) the adjoining properties for evidence of RECs, CRECs or HRECs, and for indications of past and current land use. Snow cover was present at the time of the site reconnaissance.

As noted in Section 3.0, the Subject Property is mostly agricultural land, and it contains a dwelling (photograph 1), a tractor barn (photographs 2-10), a scale house (photograph 11), two silage bunkers (photographs 12 and 13), and a silage barn (photographs 14 and 15) with a one million-gallon capacity concrete pit for collecting liquid silage residue and stormwater that drains from the silage bunkers. The two silage bunkers that drain into the pit in the silage barn were mostly empty at the time of the site reconnaissance. According to Mr. Griffin, the silage bunkers have not been in use since at least 2006. A water supply well was observed near the dwelling (photograph 16).

The Subject Property also contains a livestock shelter in its north portion (photograph 17), near the intersection of 520th Street Northwest and 59th Avenue Northwest. According to Mr. Griffin, a water supply well is located several feet north of the livestock shelter, but Wenck was unable to observe the well at the time of the site reconnaissance due to snow cover.

The Subject Property is accessible from several roads that intersect the Subject Property. A roundabout (not included within the boundaries of the Subject Property) is located in the center of the Subject Property (photograph 18). 520th Street Northwest bounds the Subject Property to the north (photograph 19). Ash Road Northwest bisects the northeast portion of the Subject Property (photograph 20). 59th Avenue Northwest (also known as White Pines Road) intersects the north-central portion of the Subject Property (photograph 21). East White Bridge Road (Photograph 22) intersects the center of the Subject Property from west to east. 59th Avenue Northwest/White Pines Road Southeast/Vintage Road Northwest leads south of the roundabout intersection with East White Bridge Road (photograph 23). Highway 52 bounds the majority of the Subject Property to the west, but there are four MNDOT parcels included in the Subject Property that are located west of Highway 52 (photographs 24-27). 220th Avenue leads south of 520th Street Northwest and reaches a dead end at an aggregate pit (photograph 28).

The dwelling is served by utility electric, natural gas and telephone services. A private septic system serves the dwelling and the restroom located in the tractor barn. Stormwater drains toward low, wet areas on the Subject Property, and generally to the south towards the Middle Fork of the Zumbro River.

6.1.1 Materials Management

Materials managed at the Subject Property include office materials, typical household materials, and agricultural materials and equipment. A tractor, a front-end loader, a riding lawn-mower, two ATVs, and a pontoon boat were observed in the shop portion of the tractor barn at the time of the site reconnaissance (see previously referenced photographs 3-6). Wenck also observed several partially full 55-gallon drums of lubricants, oil, gasoline, and W.R. Meadows™ 2200-WHITE poly-alphamethylstyrene concrete curing compound in the tractor barn (see previously referenced photograph 7). The 55-gallon drums did not show evidence of damage, leaks or spills at the time of the site reconnaissance. Wenck noted chemicals at the Subject Property consist of small quantities of household cleaning and maintenance chemicals.

Several empty, blue water drums were observed in the east portion of the tractor barn (see previously referenced photograph 10). The water drums have reportedly been used to provide water for livestock at the Subject Property. One of the water drums was spray painted with the words "Burn Only." This water drum did not have observable ash or burn marks on its interior or exterior. Hay was also stored in the east portion of the tractor barn. Several empty 300-gallon totes and empty 55-gallon drums were stored in the silage barn at the time of the site reconnaissance (see previously referenced photograph 15). According to Mr. Griffin, the empty drums were delivered to the Subject Property by the son of the residential occupant, and the drums are intended to be used for various storage purposes. According to the labels on the drums and totes, the containers previously held de-icing fluid.

6.1.2 Solid and Hazardous Waste Management

Trash consisted of typical household refuse and was stored in receptacles for regular collection by a solid waste vendor.

No evidence of hazardous waste generation was noted during the site reconnaissance or documented in the GeoSearch™ Radius Map Report.

6.1.3 Aboveground and Underground Storage Tanks (ASTs/USTs)

Wenck observed no evidence of former or existing USTs at the Subject Property. Wenck observed two 1,000-gallon capacity ASTs on the Subject Property at the time of the site reconnaissance (photograph 29). One AST held gasoline and the other held diesel fuel. The dispensers appeared to be in good condition, and no evidence of leaks or staining was observed in connection with the ASTs. Both ASTs were located on concrete pads. The database report documents that the following USTs were removed from the Subject Property:

Tank No.	Size	Contents	Status
1	6,000-gallon	diesel	Removed in 1996
2	3,0000-gallon	gasoline	Removed in 1996

No releases were reported in connection with the USTs at the time of removal.

6.1.4 Interior and Exterior Surface Observations

Wenck observed no evidence of soil subsidence, pooled liquids, stressed vegetation, fill soil piles or debris piles on the Subject Property. Aggregate piles were observed near the aggregate mine on the northwest portion of the Subject Property. Small surface stains that are considered to be *de minimis* were observed on the concrete floor in tractor barn.

6.1.5 Pits, Sumps, Oil-Water Separators and Floor Drains

Wenck noted that there are floor drains in the shop area within the tractor barn (see previously referenced photographs 4 and 5). According to Mr. Griffin, the floor drains are not connected to the private septic system and they discharge to the subsurface. He was unsure of the precise discharge location.

Wenck observed two concrete silage bunkers on the Subject Property at the time of the site reconnaissance. According to Mr. Griffin, the bunkers have not been in use since at least 2006. Prior to 2006, the Subject Property accepted silage from an offsite source, and the silage was used as elk food. Floor drains in the base of each bunker collected “silage juice” consisting mostly of rainwater and decomposing silage, and the liquid drained into a 1-million-gallon capacity concrete pit located beneath floor slats within the silage barn. The liquid mixture was then spread over the agricultural fields and used as fertilizer. At the time of the site reconnaissance, the pit appeared to be partially full with stormwater. No unusual odors were noted in the silage barn. Mr. Griffin stated that he personally performed balancing tests in the concrete pit, and his tests did not identify any leaks in connection with the pit.

Wenck did not observe any sumps or oil-water separators on the Subject Property at the time of the site reconnaissance.

6.1.6 Wastewater and Stormwater Discharge Systems

The dwelling at the Subject Property and the restroom located in the tractor barn are served by a private septic system. Stormwater drains toward low, wet areas on the Subject Property, and generally to the south towards the Middle Fork of the Zumbro River.

6.1.7 Wells, Drywells and Lagoons

Wenck did not observe the presence of drywells or lagoons at the time of the site reconnaissance. According to Mr. Griffin, four water supply wells are located on the Subject Property. Wenck observed one well near the dwelling. The other three wells were not observed by Wenck at the time of the site reconnaissance due to snow cover, but Mr. Griffin pointed out their general locations using a map. There is reportedly a well located southwest of the intersection of Ash Road and 520th Street NW, one near the livestock shelter, and one near a garden where White Pines Road SE becomes Vintage Road NW.

6.1.8 Polychlorinated Biphenyls (PCBs) and Oil-Containing Equipment

Wenck observed several pole-mounted transformers on the Subject Property and on the adjoining roads at the time of the site reconnaissance. The pole-mounted transformers did not show any evidence of leaks or spills at the time of the site reconnaissance. No other potentially PCB-containing equipment was observed on the Subject Property at the time of the site reconnaissance.

7.0 Interviews

7.1 INTERVIEW WITH SUBJECT PROPERTY REPRESENTATIVE

Date of Interview:	**March 7, 2018**
Name:	Mr. Geoff Griffin
Affiliation:	Civil Engineer for the Subject Property
Years familiar with Subject Property:	Since the early 1990's
Telephone Number:	507-269-4039

Wenck interviewed Mr. Griffin regarding the past and current use of the Subject Property. Mr. Griffin stated that the Subject Property was acquired in 2006 by Tower Investments, when the Subject Property was mostly pasture. He provided Wenck with information about the history of CWD on the Subject Property, and with a general understanding of the silage bunkers and liquid silage residue pit. According to Mr. Griffin, the Subject Property ceased accepting silage from an offsite source in approximately 2006. Mr. Griffin stated that he is not aware of any chemical spills, releases, dumps or debris at the Subject Property. He pointed out the locations of four water supply wells on the Subject Property using Wenck's Site Detail Map. Mr. Griffin provided information to Wenck that is included throughout this report.

7.2 INTERVIEW WITH LOCAL GOVERNMENT OFFICIAL

Date of Interview:	**March 14, 2018**
Name:	Mr. Dale Boettcher
Affiliation:	Records Management Unit, MPCA
Years familiar with Subject Property:	N/A
Telephone Number:	651-757-2441

Wenck interviewed Mr. Boettcher regarding the registered storage tank files associated with the Subject Property. Mr. Boettcher confirmed the accuracy of the information contained in the database report, and he stated that both storage tanks are identified as USTs in the MPCA database. After reviewing available records, he stated that there is no electronic file available for the USTs, and that the MPCA is not in possession of confirmation soil sampling documentation related to the UST removal, which occurred in 1996. Mr. Boettcher stated that there is a hard copy file containing only a tank removal documentation record that was submitted by a licensed tank removal contractor. Information provided by Mr. Boettcher was used in Section 5.1.1 of this report.

8.0 Evaluation

8.1 DATA GAPS

Historical information was reviewed back to 1937. Data gaps greater than five years exist from prior to 1937, from 1940 to 1964, from 1965 to 1971, and from 1980 to 1991.

The interviews, historical maps, city directories, aerial photographs and previous environmental reports provide generally good corroborating information that allows an understanding of historical Subject Property use. A research summary is included as **Appendix J**.

Wenck considers the evaluation of the presence of recognized environmental conditions, controlled recognized environmental conditions, and historical recognized environmental conditions to be complete, based on the lack of identified changes in land use during the periods affected by any data gaps of more than five years. Therefore, we do not recommend additional investigation relative to the resolution of those data gaps, as we do not believe it would materially affect our conclusion.

8.2 IDENTIFIED FINDINGS

Wenck was authorized by Prairie Island Indian Community to conduct this Phase I ESA for the property and improvements described as; approximately 1,242 acres of property and approximately 91.20 acres of excess right of way land currently owned by MNDOT, all located between Pine Island and Oronoco, Olmsted County, Minnesota; the Subject Property.

According to reviewed sources of information, the Subject Property was developed with a farmstead prior to 1937, which was located in the same general location as the currently existing dwelling. Aerial photographs indicate that the historical structures were razed between 1960 and 1971, as the currently existing structures were built. The Subject Property was primarily agricultural land with limited elk farming until 1985, when the majority of the Subject Property was turned into an elk farm and grazing land. Between approximately 1985 and 2006, the Subject Property accepted silage from a local, offsite source, and used the silage as elk food and the liquid silage residue as fertilizer. In 2009, an elk from the Subject Property tested positive for chronic wasting disease (CWD), and the entire heard of 1,500 elk was subsequently culled with involvement from the United States Environmental Protection Agency (EPA). A total of two elk tested positive for CWD at the Subject Property. Elk and cattle grazing were prohibited for five years following the detection of CWD at the Subject Property, and the Subject Property received a letter from the EPA indicating that grazing could resume in 2014. Since 2014, portions of the Subject Property have been used for seasonal cattle grazing. Some of the Subject Property consists of roadway easements owned by the Minnesota Department of Transportation.

The Subject Property is in agricultural use for row crops and seasonal cattle grazing. The portion of the Subject Property containing a dwelling is in residential use. There is also an aggregate mine in the northwest portion of the Subject Property.

Floor drains were observed in the shop portion of the tractor barn on the Subject Property. Interview information indicates that the floor drains discharge directly to the subsurface at the Subject Property, and the precise discharge location is unknown to Wenck. Due to the management of petroleum products and maintenance chemicals in the tractor barn, the length of time that the floor drains have been in use (at least 47 years), and the subsurface discharge of the floor drains, there is a material threat of release of petroleum products and potentially hazardous substances. No other observations at the time of the site reconnaissance indicate the presence of a release or a material threat of release of petroleum products or potentially hazardous substances. Four water supply wells are reportedly located on the Subject Property, but only one well was observed at the time of the site reconnaissance. The water supply wells should be managed in accordance with rules established by the Minnesota Department of Health.

A previous Phase I ESA of the Subject Property identified the historical presence of two USTs on the Subject Property as a *recognized environmental condition*. Wenck disagrees with this assertion based upon an interview with the MPCA and the presumption that a licensed tank removal contractor would have reported a release if one were observed. The same previous Phase I ESA also identified the presence of the currently existing one million-gallon concrete liquid silage residue pit as a *recognized environmental condition*, despite the information which was provided to the previous consultant indicating that the concrete pit passed a balancing test and has not leaked. Wenck disagrees with the opinion that the concrete pit is a *recognized environmental condition* on the basis that Wenck has not been provided with information indicating that there has been a release from the pit, and that the pit is currently retaining stormwater. The balancing test also indicates that the pit was in good condition at the time that the test was performed. The same previous Phase I ESA also identified the presence of the currently existing ASTs on the Subject Property as a *recognized environmental condition*, despite noted observations that "The ASTs are located on a concrete slab, which did not show any staining that would indicate spillage or leakage from the tanks." It is Wenck's opinion that the mere presence of ASTs is not considered a *recognized environmental condition*.

Mapped sites of regulatory interest that were identified in the database report are not likely to affect soil, groundwater or soil vapor conditions at the Subject Property due to their locations with respect to the presumed direction of groundwater flow, and/or other information provided by the database report.

8.3 OPINIONS

We have reviewed the above findings and have come to the following opinions:

- The past and current agricultural and residential use of the Subject Property is not considered to represent a REC, CREC or HREC for the Subject Property, because there is no indication of a release or a material threat of release of petroleum products or potentially hazardous substances, other than the floor drains discussed below.
- The presence of floor drains in the tractor barn that discharge to the subsurface of the Subject Property are considered to represent a REC for the Subject Property, because the floor drains represent a risk pathway for surface contamination to reach the subsurface, and the floor drains have presumably been in use since the tractor barn was constructed (at least 47 years ago).
- Mapped sites of regulatory interest revealed within the GeoSearch Radius Report are not considered RECs, HRECs, or CRECs*.* Based on the review of the revealed sites of regulatory interest, including unmapped site listings revealed within search radii defined by the Practice, we identified no material threat of release to the Subject Property from adjacent or upgradient properties.

8.4 CONCLUSIONS

Wenck performed a Phase I ESA in conformance with the scope and limitations of the ASTM Phase I Standard and in accordance with the AAI Rule (40 CFR Part 312) of the property and improvements described as; approximately 1,242 acres of property and approximately 91.20 acres of excess right of way land currently owned by MNDOT, all located between Pine Island and Oronoco, Olmsted County, Minnesota. Any exceptions to, or deletions from, the ASTM Phase I Standard are described in Section 2.3 and Section 2.4 of this report.

This ESA has identified the following REC relative to the Subject Property:

- The presence of floor drains within the tractor barn that discharge to the subsurface is a REC for the Subject Property, because the floor drains represent a risk pathway for surface contamination to reach the subsurface, and the floor drains have presumably been in use since the tractor barn was constructed (at least 47 years ago).

This ESA has identified no evidence of CRECs or HRECs in connection with the Subject Property.

9.0 Non-Scope Considerations

Assessments of potential environmental issues or conditions at the Subject Property that may relate to commercial real estate activities, but were not part of this scope of work include the following:

- Asbestos Survey
- Radon Gas Survey
- Lead-Based Paint Assessment
- Lead in Drinking Water Evaluation
- Wetland Delineation
- Regulatory Compliance Audit
- Cultural and Historic Resources Review
- Industrial Hygiene Review
- Health and Safety Assessment
- Ecological Resources Evaluation
- Endangered Species Survey
- Indoor Air Quality Evaluation
- Mold Investigation
- High Voltage Power Lines Assessment

This list is not intended to be all-inclusive and is not intended to imply significance of further investigation into these non-scope items.

10.0 References

American Society for Testing and Materials, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E 1527-13,* West Conshohocken, PA, 2013.

University of Minnesota, *Geologic Atlas, Olmsted County, Minnesota*, 1988.

Other materials referenced in this report are included in the Appendices.

11.0 Signature Page

We declare that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in 312.10 of 40 CFR Part 312, and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Subject Property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared by:

Chantell Bazewicz
Environmental Scientist

And by:

Chad Rogers
Environmental Analyst

Reviewed by:

J. Joseph Otte
Principal

12.0 Qualifications

Company Experience

WENCK ASSOCIATES, INC. is a full-service environmental consulting firm that specializes in providing comprehensive environmental, regulatory, and safety guidance for our client's real estate asset protection, redevelopment and development needs. Collectively, Wenck offers our clients over 25 years of experience, depth of technical and regulatory knowledge and expertise in the following service areas:

- Environmental Assessment Services (Phase I and II)
- Site Preparation/Planning Services
- Integrated Site Remediation and Risk-based Response Actions
- Storage Tank Removal, Replacement and Compliance
- Stormwater Management Plans and Permitting (NPDES requirements, etc.)
- Wetlands Delineation and Mitigation
- Environmental Permitting and Compliance
- Asbestos and Lead Identification and Abatement
- Voluntary Cleanup Programs and Guidance on Public Funding Mechanisms for Brownfield Redevelopment
- Indoor Air Quality Assessment
- Facility Layout Review for Environmental and Safety Efficiency
- Environmental Impact Assessments (EIA) and Statements (EIS), Environmental Assessment Worksheets (EAW), Alternative Urban Areawide Review (AUAR)
- Traffic Engineering
- Pollution Prevention Plans
- Greenhouse Gas Services

Wenck strives to provide our clients with strategic, high quality and cost-effective services that are customized to their specific needs. For more extensive information on the services we provide please refer to www.wenck.com.

Individual Bios

Chantell Bazewicz

Ms. Bazewicz has over 13 years of experience as an Environmental Scientist on diverse projects including building surveys, abatement oversight for renovation and demolition projects, soil remediation, groundwater investigation, Phase I and Phase II Environmental Site Assessments. She has worked with both public and private industry in Minnesota, Wisconsin, Iowa, Arizona, North Dakota and South Dakota. Specialties include asbestos, lead-based paint, regulated/hazardous materials surveys, abatement oversight, air monitoring and sample analysis, indoor air quality assessments, employee exposure monitoring, soil and ground water investigations/ remediation, project design and contract preparation.

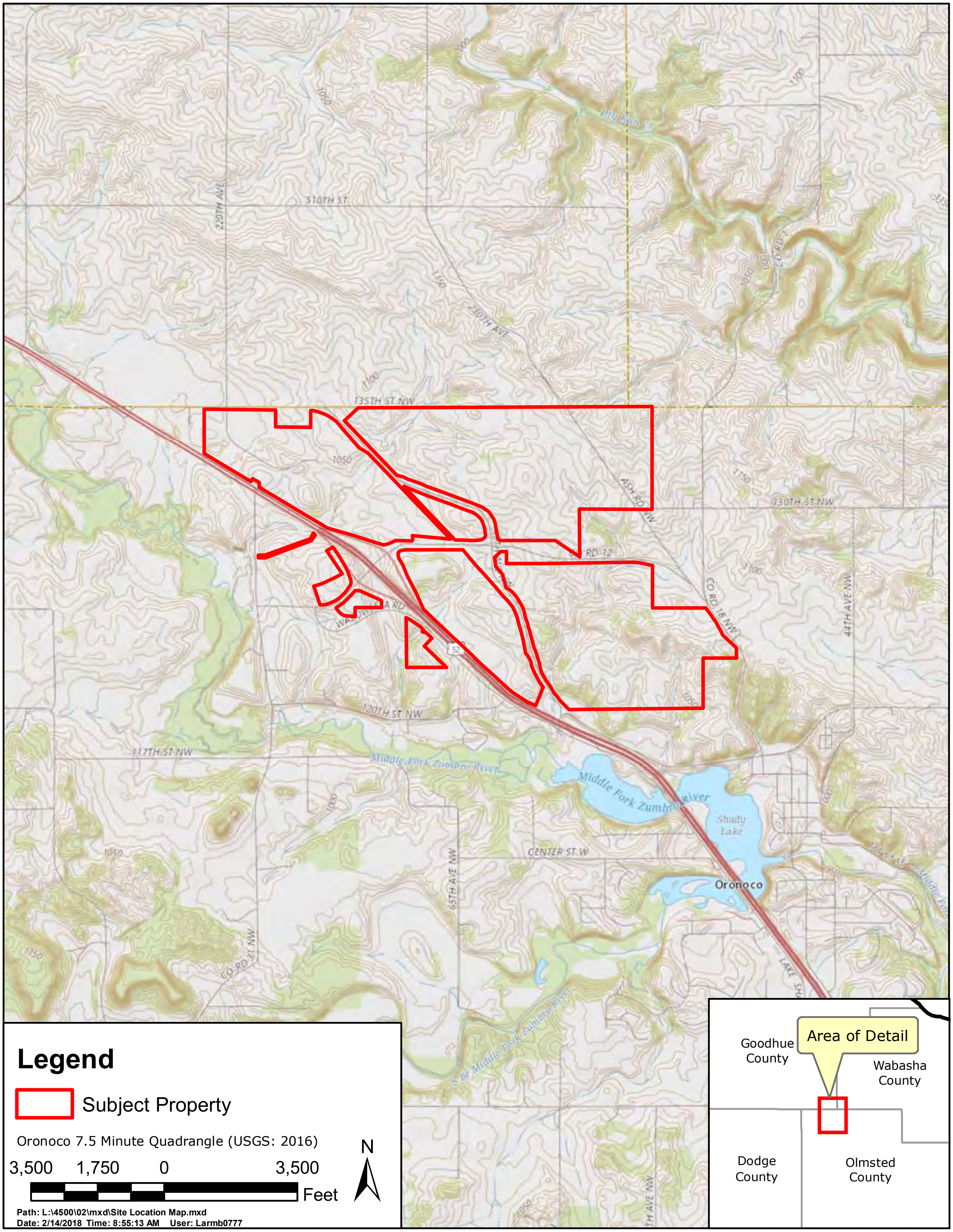
Chad Rogers

Chad Rogers joined Wenck Associates, Inc. as part of the real estate transaction group. As an environmental analyst, he primarily focuses on conducting Phase I Environmental Site Assessments. He also has a background in law and began a role as Wenck's Risk Management Counselor in 2016. Mr. Rogers passed the Minnesota State Bar Examination in 2012, holds a Juris Doctorate from William Mitchell College of Law and a Business Administration Degree from the University of St. Thomas.

J. Joseph Otte

Mr. Joseph Otte joined Wenck Associates, Inc. (Wenck) in 1998 to lead real estate transaction support activities. Since joining Wenck, he has conducted a large number of Phase I Environmental Site Assessments and has been involved in many significant site redevelopment projects. Mr. Otte's past position was as supervisor of the Voluntary Investigation and Cleanup (VIC) Program of the Minnesota Pollution Control Agency (MPCA). He holds a Bachelor of Arts in geology from the College of St. Thomas and a Master of Business Communication from the University of St. Thomas, St. Paul, Minnesota.

Figures



PRAIRIE ISLAND INDIAN COMMUNITY

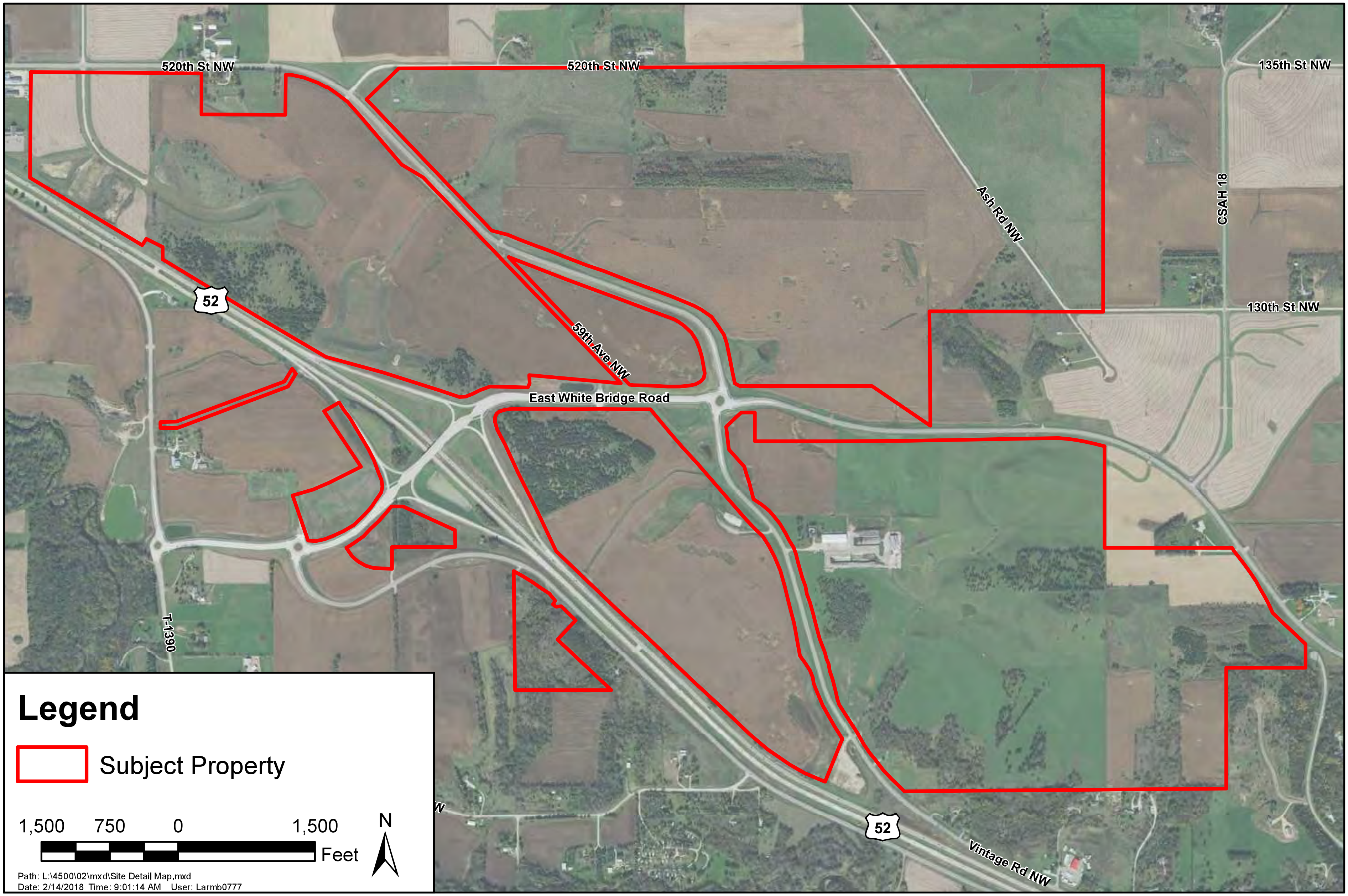
Site Location Map

WENCK

Responsive partner. Exceptional outcomes.

FEB 2018

Figure 1



PRAIRIE ISLAND INDIAN COMMUNITY

Site Detail Map

WENCK
Responsive partner. Exceptional outcomes.

FEB 2018

Figure 2

Attachments/Appendices to the report above are available upon request

2019 Supplementary Environmental Site Assessment

Supplementary Environmental Site Assessment

PIIC Community Development
2137 White Pines Road Southeast
Pine Island, Minnesota

Prepared for

Tower Investments, LLC

Prairie Island Indian Community

Project B1904864.00
November 6, 2019

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
4210 Highway 14 East
Rochester, MN 55904

Phone: 507.281.2515
Fax: 507.281.5303
Web: braunintertec.com

November 6, 2019

Project B1904864.00

Mr. John Pierce
Tower Investments, LLC
250 West Main Street, Suite 101
Woodland, California 95695

Re: Supplementary Environmental Site Assessment
PIIC Community Development
2137 White Pines Road Southeast
Pine Island, Minnesota

Dear Mr. Pierce:

On behalf of Tower Investments LLC, Braun Intertec Corporation conducted a Supplementary Environmental Site Assessment (ESA) of the above-referenced site (Site) in accordance with the authorized scope of services described in our proposal dated August 20, 2019. The Supplementary ESA was prepared in association with the sale and potential redevelopment of the Site. For a complete discussion of our assessment, please refer to the attached report.

The objective of the Supplementary ESA was to further evaluate the extent of contamination found during a previous drilling investigation at the former Tank 1 basin (the trench drain tank) and evaluating how soil, groundwater, and/or soil vapor impacts may affect the planned redevelopment of the Site.

This report was prepared on behalf of and for use by Tower Investments LLC and Prairie Island Indian Community. No other party has a right to rely on the contents of this report without the written authorization of Braun Intertec.

We appreciate the opportunity to provide our professional services to you for this project. If you have any questions or comments regarding this report or the project in general, please contact Alex Boecher (507.281.2515 or aboecher@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

Alex Boecher
.
Nov 6 2019 4:11 PM

Alex Boecher, PE (MN)
Project Engineer

Jeremiah R. Hansen
Associate Principal – Senior Scientist

Attachment:
Phase II Environmental Site Assessment Report

Table of Contents

Table of Contents (continued)

A. Introduction

A.1. Authorization

Braun Intertec Corporation received authorization from Mr. Pierce of Tower Investments LLC to conduct a Supplementary Environmental Site Assessment (ESA) of portion of the proposed Prairie Island Indian Community (PIIC) Community Development located at 2137 White Pines Road Southeast in Pine Island, Minnesota (Site), in accordance with the scope of services described in Braun Intertec's proposal dated August 20, 2019. The Supplementary ESA was prepared in association with the sale and potential redevelopment of the Site.

This Supplementary ESA was prepared on behalf of and for use by Tower Investments LLC and Prairie Island Indian Community in accordance with the contract between Tower Investments LLC and Braun Intertec. No other party has a right to rely on the contents of this report without the written authorization of Braun Intertec.

A.2. Project Objective

The objective of the Supplementary ESA was to further evaluate the extent of contamination found during a previous drilling investigation at the former Tank 1 basin (the trench drain tank) and evaluating how soil, groundwater, and/or soil vapor impacts may affect the planned redevelopment of the Site.

B. Site Background

B.1. Site Location and Description

The Site is located at 2137 White Pines Road Southeast, Pine Island, Minnesota (see Figure 1). The Site is located within the Section 7, Township 108 North, Range 14 West, in the city of Pine Island, Olmsted, Minnesota.

The Site is bordered on the north by cultivated cropland with East White Bridge Road located beyond; on the east by cultivated cropland with cultivated cropland located beyond; on the south by cultivated cropland with cultivated cropland located beyond; and the west by 59th Avenue Northwest with cultivated cropland located beyond. A Site Location Map is included as Figure 1 and a Site Sketch is included as Figure 2.The Site consists of a parcel totaling approximately 24 acres of cultivated cropland and farmland. The Site was previously operated as an elk farm.

B.2. Proposed Development

The PIIC has purchased a tract of land formerly owned by Tower Investments LLC totaling approximately 1,333-acres that includes the Site. The planned redevelopment of the land includes mixed commercial and residential use. This project encompasses a small portion of that larger tract of land.

B.3. Previous Site Investigations

PIIC Development Limited Phase II ESA

Braun Intertec conducted environmental monitoring during drilling of two of the twenty-eight (28) geotechnical soil borings in the vicinity of the known underground storage tank (UST) located near the cultivated cropland, north of the maintenance shop. The drilling was completed at the Site on November 27, 2018. The borings were completed by Braun Intertec using an ATV-mounted drill rig using hollow stem auger drilling techniques.

The soil borings, designated B-27 and B-28, were advanced to depths of 13 to 15.5 feet below ground surface (bgs), respectively. Soil samples were collected continuously from each soil boring using the split spoon sampling method. Braun Intertec monitored the samples for visual and olfactory indications of contamination, and screened the samples for organic vapors using a MiniRAE Lite photoionization detector (PID) equipped with a 10.6 electron-volt lamp.

No debris was observed to be intermixed with Site soils. No other evidence of contamination was observed, including staining, odors, or elevated organic vapor concentrations, as measured with the PID. All recorded soil headspace organic vapor concentrations were less than 1 parts per million (ppm) and were considered to be no higher than background concentrations.

In general, the soil borings encountered fill soil, consisting of sandy lean clay that extended to depths ranging from 0 to 2 feet bgs. The fill soil was underlain by glacial till, consisting of clayey sand and poorly graded sand with silt which extended to depths ranging from approximately 2 to 15.5 feet bgs. Groundwater was observed within the glacial till at depths ranging from approximately 13 to 15 feet bgs in boring B-27. Groundwater was not encountered in boring B-28.

In summary, no impacts were detected in the soil samples collected for laboratory analysis and no groundwater impacts were detected in the groundwater with the exception of diesel range organics (DRO) that was detected in the groundwater sample from B-27 at a concentration of 310 micrograms per liter (ug/L), which exceeded the provisional Minnesota Department of Health (MDH) Health based Value

(HBV) at that time for total petroleum hydrocarbons of 200 ug/L. The previous analytical results are included on Table 2 and 3.

A release was reported to the Minnesota Pollution Control Agency (MPCA) via the Minnesota Department of Public Safety, Division of Emergency Management (DEM) Duty Officer. Based on discussions with the MPCA, a spill or leak number was not assigned to the project since the UST was associated with the trench drains and was not a petroleum storage tank.

2019 General Excavation Report

Braun Intertec was retained by Tower Investments to observe the removal of two petroleum USTs (Tanks 1 and 2) and one non-petroleum UST (Tank 3) installed by the tenant and former owner, John Hoenhe. According to Mr. Hoenhe, the two tanks near the maintenance shop were used to store diesel fuel and later non-potable water and silage slurry. The tank to the north of the maintenance shop received trench drain run-off.

Between July 1 and July 8, 2019, the three USTs were removed by Zahl Petroleum Company. Braun Intertec collected confirmation samples from below each tank and screened excavated soil for evidence of contamination. The petroleum USTs were bedded in clean sand and no soil excavated exhibited field indications of petroleum impacts. Similarly, the trench drain tank was excavated with no signs of impacts in the surrounding soils. Soil samples collected from beneath each tank were analyzed for gasoline-range organics (GRO), diesel-range organics (DRO), and volatile organic compounds (VOCs). The results are summarized in the report titled *General Excavation Report Worksheet* (Project B1904864), dated October 31, 2019. The report identified the following:

- GRO was detected at 906 milligrams per kilogram (mg/kg) beneath Tank 2.
- No other analytes were detected above laboratory reporting limits.

The General Excavation Report recommended a Limited Site Investigation (LSI) to evaluate the extent of impacts related to the release detected beneath Tank 2.

2019 Limited Site Investigation

Braun Intertec conducted a LSI to evaluate the extent of impacts associated with the former UST basin for Tanks 1 and 2. Five soil borings were advanced in the area of the former tank basin. These borings generally encountered glacially-derived clays and silts and glaciofluvial sands. Groundwater was not encountered in any borings. Groundwater direction is unknown, but is likely towards the south.

No field indications of contamination were observed. Analytical soil samples were collected above the bedrock at the depth most likely to encounter migrating contamination. All soil samples collected during this subsequent LSI were analyzed for VOCs, GRO, and DRO. No analytes were detected above laboratory reporting limits. Groundwater was not encountered and no samples were collected due to refusal on bedrock between 12 and 15 feet bgs. Two soil vapor samples were collected for analysis for VOCs. Several compounds were detected above laboratory reporting limits, but no samples exceeded their respective Residential ISVs. A vapor receptor survey was conducted of the surrounding area. Trench drains in the maintenance shop were examined for petroleum vapors. No receptors appeared impacted.

The LSI report indicated that the risk associated with the contamination appears minimal and recommended site closure.

B.4. Published Geologic Information

B.4.a. Topography

According to the United States Geological Survey (USGS) 7.5-minute topographic map series, Oronoco, Minnesota quadrangle, the Site is located at an elevation of approximately 1080 feet above mean sea level.

B.4.b. Geology

The surficial geology in the vicinity of the Site generally consists of sand, gravel, silt, and clay. The bedrock in the vicinity of the Site is generally Shakopee-Oneota and is consist with that of sandstone, dolomite, and limestone (Hobbs, 2000).

B.4.c. Hydrogeology

The static water level in the vicinity of the Site is approximately 116 feet below land surface (Minnesota Well Index).

According to the USGS 7.5-minute topographic map series, Oronoco, Minnesota quadrangle, the surface gradient in the vicinity of the Site is generally flat. The regional groundwater flow direction within the consolidated deposits in the vicinity of the Site may be generally to the south toward the Zumbro River. The local direction of groundwater flow may be affected by nearby streams, lakes, wells, and/or wetlands and may vary seasonally.

C. Scope of Services

The following tasks were conducted at the Site as part of this Supplemental ESA:

- Subcontracted a licensed drilling contractor to clear public utilities through Gopher State One Call and private utilities for the investigation locations.
- Subcontracted a licensed drilling contractor to complete soil borings, install temporary groundwater monitoring wells, and complete soil vapor probes.
- Advanced four environmental soil borings (GP-06 through GP-09) and collected soil samples.
- Installed four temporary monitoring wells in the four soil borings and collected groundwater samples.
- Completed one temporary soil vapor probe (VP-03) and collected soil vapor samples.
- Conducted environmental monitoring during drilling and screened soil samples collected from the borings for the presence of organic vapors using a PID. Visual and olfactory observations regarding potential contamination were also made and recorded.
- Analyzed representative samples of soil and groundwater for one or more of the following parameters: eight resource conservation and recovery act (RCRA) metals, volatile organic compounds (VOCs), DRO, and Gasoline Range Organics (GRO).
- Analyzed the soil vapor sample for VOCs.
- Evaluated the data and prepared this report.

This investigation work was conducted at the same time as a Limited Site Investigation (LSI) was conducted under a separate contract, which is why the investigation identifiers begin at GP-06 and SV-03.

C.1. Deviations from Work Plan/Proposal

Soil borings were proposed to depths of 15 -20 feet bgs; however, due to encountering refusal on bedrock, soil boring GP-06 was completed to a depth of 14 feet bgs and soil borings GP-08 and GP-09 were only completed to depths of 12 feet bgs.

D. Investigation Methods and Procedures

The field work relating to the investigation was conducted between September 5 and September 6, 2019. Prior to beginning the field investigation, public utilities were cleared through Gopher State One Call and private utilities were cleared through a subcontracted private utility locator.

Field methods and results are discussed in the following sections. Soil boring logs are provided in Appendix A, the laboratory analytical reports are provided in Appendix B, and Braun Intertec Standard Operating Procedures (SOPs) are provided in Appendix C.

The investigation locations are shown on Figure 3.

D.1. Soil Evaluation

D.1.a. Soil borings

Braun Intertec subcontracted Range Environmental Drilling of Hibbing, Minnesota, to advance 4 soil borings, designated as GP-06 through GP-09 at the Site to depths ranging from 12 to 17 feet bgs.

The soil borings were completed with a hydraulically-driven push-probe sampling rig. To collect the soil samples from the borings, a disposable thin-walled PVC liner was placed inside of a 5-foot long sampling tool. The borehole was then advanced using a dual-tube system, which allows for the inner sampling tool to be pushed through a larger outer-diameter rod a total penetration depth of up to 5 feet. After advancing the tooling, the sampler was removed from the borehole, but the outer rod remained, keeping the borehole open, and the soil sample was retrieved from the PVC liner for field screening and classification. The process was then repeated to the termination depths of the borings.

D.1.b. Soil Classification and Monitoring

Soils samples from the soil borings were visually and manually classified in the field by an environmental technician using ASTM D 2487 “Unified Soils Classification System” and ASTM D 2488 “Recommended Practice for Visual and Manual Description of Soils.”

Soil samples retrieved were examined by an environmental technician, who was a certified asbestos inspector by MDH, for unusual staining, odors, and other apparent signs of contamination. In addition, the soil samples were screened for the presence of organic vapors using a PID. The PID was equipped with a 10.6-electron-volt lamp and calibrated to an isobutylene standard. The PID was used to perform direct measurement and a headspace method of field analyses, as recommended by the MPCA in Petroleum Remediation Program Guidance Document 4-04 (July 2018).

D.1.c. Soil Analyses

Selected soil samples were collected from the soil borings for laboratory analysis. Soil samples were collected from intervals where indications of contamination were observed in the field. If no indications of contamination were observed, the soil samples were collected from the depth most likely to be impacted based on the potential contaminant source.

Samples were submitted to Pace Analytical Services, LLC. (Pace) in Minneapolis, MN and analyzed for a combination of the following parameters:

- VOCs using United States Environmental Protection Agency (EPA) Method 8260
- GRO using the Wisconsin Department of Natural Resources (WDNR) Method
- DRO using the WDNR method

D.2. Groundwater Evaluation

Temporary monitoring wells were installed in soil borings GP-06 through GP-09 to evaluate groundwater conditions at the Site. The wells were permitted with the MDH.

After the soil borings were advanced 5 feet into the water table, temporary monitoring wells were constructed using 1-inch-diameter PVC riser and 5-foot long, 10-slot screens. The temporary monitoring wells were sampled using a length of new polyethylene tubing equipped with a check ball valve. Water samples retrieved were examined by the field technician for unusual odors, petroleum-like sheen, and other apparent signs of contamination. The groundwater samples were placed directly into laboratory supplied containers, preserved appropriately, and submitted to the laboratory for chemical analysis.

D.2.a. Groundwater Analyses

The groundwater samples collected from the temporary wells were submitted to Pace and analyzed for a combination of the following parameters:

- VOCs using EPA Method 8260
- GRO using the WDNR Method
- DRO using the WDNR Method

D.3. Soil Vapor Evaluation

D.3.a. Soil Vapor Probes

One temporary soil vapor probe (VP-03) was completed by Range Environmental. The soil vapor probe was advanced, using a hydraulically-driven push-probe rig, to a depth of 5 feet bgs and then retracted to a depth of 3 feet bgs. New, inert tubing was attached to the top of the downhole sampler, and the sampling point and tubing were purged with a hand pump to remove two volumes of air prior to sample collection. Following purging, organic vapor concentrations were screened with a PID and the value was recorded. The soil vapor samples were then collected using laboratory-supplied negative pressure air-sample collection canisters (6-liter canisters) equipped with 200 milliliter per minute (mL/min) flow restrictors in accordance with the MPCA guidelines. Following sample collection, the temporary sampling point was removed from the borehole, and the borehole was sealed in accordance with MDH guidelines.

The soil vapor samples were submitted to Pace and analyzed for the VOCs using EPA Method TO-15.

E. Investigation Results

E.1. Geologic Conditions

Soil boring logs with descriptions of the various soil strata encountered during the soil boring operations and water level information are contained in Appendix A. The depths shown as changes between the soil types are approximate. The actual changes may be transitional, and the transition depths are likely to be horizontally variable.

Alluvium soils, consisting primarily of clay and sand with gravel were encountered from the ground surface to depths of 1 to 4 feet bgs. Underlying the alluvium soil was apparent native soil consisting mainly of clayey sand, clay, and silt with gravel between depths of 2 to 17 feet bgs.

E.2. Hydrogeology

Groundwater was encountered between 5.5 and 11 feet bgs in all the soil borings. Groundwater was not observed during the tank removal and therefore may fluctuate regularly.

E.3. Field Screening

Soil recovered from the soil borings was screened by the field technician for evidence of contamination, including odors, staining, and the presence of debris. No odors, staining, or debris were observed in the soils recovered from the borings.

PID readings were recorded for soil samples collected from each borings. All PID readings were below 7 parts per million (ppm). Soil screening PID results are shown on Table 1 and included on the boring logs in Appendix A.

Groundwater samples were examined by the field technician for evidence of contamination, including unusual odors, petroleum-like sheen, and other apparent signs of contamination. No odors, petroleum-like sheen, or other apparent signs of contamination were observed.

E.4. Soil Analytical Results

This section provides a discussion of soil analytical results. A summary of the soil analytical results is provided in Table 2. The complete laboratory reports with chain-of-custody forms are included in Appendix B.

The soil analytical results can be compared with the Soil Reference Values (SRVs) and Screening Soil Leaching Values (SLVs) which are also listed on Table 2. SRVs and SLVs are allowable risk-based contaminant concentrations derived by the MPCA using risk assessment methodology, modeling, and risk management policy to guide investigation and cleanup actions. SRVs relate to direct-contact exposure scenarios and SLVs relate to potential leaching of contaminants to groundwater. Concentrations of contaminants in soil, SRVs, and SLVs are expressed in units of milligrams per kilogram (mg/kg).

No VOCs, DRO, or GRO were detected at concentrations greater than or equal to the laboratory reporting limits.

E.5. Groundwater Analytical Results

This section provides a discussion of the groundwater analytical results. A summary of the groundwater analytical results is provided in Table 3. For comparison purposes, Table 3 includes Drinking Water Criteria from the MDH Human Health-Based Water guidance. Drinking Water Criteria include MDH Health Risk Limits (HRLs), MDH Health Based Values (HBVs), MDH Risk Assessment Advice (RAA), and Maximum Contaminant Levels (MCLs) established by the Environmental Protection Agency (EPA).

Concentrations of contaminants in water and Drinking Water Criteria are expressed in units of micrograms per liter (µg/L). The complete laboratory reports with chain-of-custody forms are included in Appendix B.

No VOCs, DRO, or GRO were detected at concentrations greater than or equal to the laboratory reporting limits.

E.6. Soil Vapor Analytical Results

This section provides a discussion of the soil vapor analytical results. A summary of the soil vapor analytical results is provided in Table 4. The complete laboratory reports with chain-of-custody forms are included in Appendix B.

For comparison purposes, Table 4 includes Intrusion Screening Values (ISVs). ISVs were developed by the MPCA in coordination with the MDH as screening values for evaluating vapor intrusion risks from VOCs identified in indoor air. The potential for indoor air to be impacted by soil vapor intrusion can also be assessed using ISVs. Concentrations of VOCs in air or soil vapor and ISVs are expressed in units of micrograms per cubic meter (µg/m^3).

Per 2017 MPCA Vapor Investigation Document, soil vapor results are compared to 33X ISVs to assess vapor intrusion risk if building conditions are appropriate. According to the guidance, soil vapor concentrations greater than 33X ISVs indicate a vapor source with potential vapor intrusion risk is present. A Site with contaminant concentrations greater than 33X ISVs would typically require either mitigation or additional assessment of potential pathways and receptors to better quantify risks, which might include collection of sub-slab or indoor air samples.

No VOCs were detected at concentrations greater than Residential ISV.

E.7. Quality Assurance/Quality Control

Samples were placed in clean, laboratory supplied containers, preserved, labeled, and transported to the Pace Analytical laboratory under refrigerated conditions using chain-of-custody procedures. Analyses were performed using EPA or other recognized standard procedures.

A quality assessment of field procedures and analytical laboratory reports was performed to evaluate potential effects on data quality used to support project objectives. All applicable Braun Intertec SOPs were followed as prescribed unless otherwise noted in this report. Notable findings are provided in more detail below and incorporated, where necessary, into this report.

A soil trip blank accompanied the investigative samples and was analyzed for GRO and VOCs. No contaminants were detected in the soil trip blank at concentrations greater than the laboratory method reporting limits with the exception of 1,2,3-Trichlorobenzene was detected in the method blank. Pace indicated that all associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit. A water trip blank accompanied the investigative samples and was analyzed for VOCs and GRO. No contaminants were detected in the groundwater trip blank at concentrations greater than the laboratory method reporting limits.

Pace noted that groundwater samples GP-06, GP-07, GP-08, and GP-09, which were analyzed for GRO and VOCs, had a post-analysis pH measurement that indicated insufficient sample preservation. The field notes indicated that the samples effervesced during collection which is typically due to the sediment in the sample when collecting samples from a temporary well. The field technician followed Braun Intertec SOPs, discarded the samples, rinsed out the vials, and recollected the samples without preservative.

In summary, data quality control items identified during the quality review were evaluated and all data collected are acceptable for use in this investigation for the intended purpose of identifying soil, groundwater, and soil vapor impacts within the Site.

F. Conclusions

Soil and groundwater impacts were not identified during this investigation or during the previously conducted tank removal sampling (B-5 and B-6) that will impact redevelopment. DRO was detected at a low concentration in groundwater in one of the previous soil borings (B-27) completed, however, based on the low concentration, lack of field indications of contamination, and lack of impacts detected in the other soil and groundwater samples collected for analysis, the DRO may be associated with organics and not indicative of petroleum impacts. Various concentrations of petroleum and non-petroleum VOCs were detected in soil vapor samples; however, no impacts were above the Residential ISVs. Based on investigations conducted associated with the petroleum UST basin for Tank 1 and Tank 2, GRO was detected in one soil sample at the top of bedrock below Tank 2.

G. Recommendations

Based on the results of this assessment and the previous investigation conducted at the Site, the following recommendations are provided:

- If a Petroleum No Action letter for the initial DRO that was detected in the water from the 2018 Phase II ESA is desired, Braun Intertec recommends that the Site be enrolled in the MPCA Petroleum Brownfields Program (PBP) to facilitate that request.

- We recommend preparing a Construction Contingency Plan (CCP) for the future development that will provide procedures for the management of impacted soil and groundwater that may be encountered. The CCP document should be submitted to the MPCA for review and approval.

H. Assessment Limitations

The analyses and conclusions submitted in this report are based on field observations and the results of laboratory analyses of soil samples, groundwater, and soil vapor samples collected from the soil borings and soil vapor probes completed for this project.

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Attachments/Appendices to the report above are available upon request

MPCA Letters

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

June 10, 2020

John Pierce (electronic)
Elk Farm LLC c/o Tower Investments LLC
250 W Main St, Ste 101
Woodland CA 95695-3686

RE: Petroleum Tank Release Site File Closure
Site: Former Elk Farm, 2137 White Pine Rd SE, Pine Island, Olmsted County 55963
MPCA Site ID: LS0021034

Dear John Pierce:

The Minnesota Pollution Control Agency (MPCA) is pleased to let you know it has determined your investigation and/or cleanup have adequately addressed the petroleum tank release at the site (Site) listed above. Based on the information provided, the MPCA has closed the petroleum tank release site file.

The closure of the petroleum tank release site file means the MPCA does not require any additional investigation and/or cleanup work at this time or in the foreseeable future. Please be aware that file closure does not necessarily mean that all petroleum contamination has been removed from this Site. However, the MPCA has concluded that any remaining contamination, if present, does not appear to pose a threat to public health or the environment under current conditions.

The MPCA reserves the right to reopen this file and to require additional investigation and/or cleanup work if new information, changing regulatory requirements, or changed land use makes additional work necessary. If you or other parties discover additional contamination (either petroleum or non-petroleum) that was not previously reported, Minnesota state law requires that the MPCA be notified immediately.

You should understand this letter does not release any party from liability for the petroleum contamination under Minn. Stat. § 115C.021, subd. 1 or any other applicable state or federal law. In addition, this letter does not release any party from liability for non-petroleum contamination, if present, under Minn. Stat. § 115B, the Minnesota Environmental Response and Liability Act.

Please note that as a result of performing the requested work you may be eligible to apply to the Petroleum Tank Release Compensation Fund (Petrofund) for partial reimbursement of the costs you have incurred in investigating and cleaning up this petroleum tank release. The Petrofund is administered by the Petroleum Tank Release Compensation Board (Petro Board) and the Minnesota Department of Commerce. To learn more about who is eligible, the types of work, and the amount of reimbursement available, please contact the Petrofund at 651-539-1515 or 1-800-638-0418.

If future development of this property or the surrounding area is planned, it should be assumed that petroleum contamination may still be present. If petroleum contamination is encountered during future development work, the MPCA should be notified immediately.

Thank you for your response to this petroleum tank release and for your cooperation with the MPCA to protect public health and the environment. If you have any questions regarding this letter, please contact me at 651-757-2606 or by email at ryan.lundgren@state.mn.us, or the site's hydrogeologist Victor Henao at 651-757-2204 or by email at victor.henao@state.mn.us. Please reference the above MPCA Site ID in all correspondence. You may also reach the MPCA by calling 651-296-6300 or 1-800-657-3864.

Sincerely,

Ryan Lundgren

This document has been electronically signed.

Ryan Lundgren
Environmental Specialist
Remediation Division

Victor Henao

This document has been electronically signed.

Victor Henao
Hydrogeologist
Remediation Division

RL/VH:jmp

cc: Alex Boecher, Braun Intertec (electronic)
Kara Dennis, Minnesota Department of Health (electronic)

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300
800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

June 18, 2020

John Pierce
Tower Investments LLC
250 Main St, Ste 101
Woodland, CA 95695-3686

RE: Petroleum No Action
Elk Farm, 2137 White Pines Rd SE, Pine Island
MPCA Site ID: BF0001337
MPCA Billing ID: 231602
PIN: 84.06.33.078539, 84.06.33.079565, 84.07.21.039660, 85.01.44.78533, 85.01.44.78534, 85.01.44.79565, 85.01.44.79566, 85.12.11.079570

Dear John Pierce:

The Minnesota Pollution Control Agency (MPCA) Brownfield staff have been requested to provide a review for petroleum release(s) identified at the Elk Farm, located at the address referenced above (Site). The MPCA reviewed the following documents:

- *Phase I Environmental Site Assessment* dated March 2018, prepared by WENCK Associates, Inc.
- *General Excavation Report Worksheet* dated October 31, 2019, prepared by Braun Intertec
- *Supplementary Environmental Site Assessment* dated November 6, 2019, prepared by Braun Intertec
- *Limited Phase II Environmental Site Assessment* dated December 20, 2018, prepared by Braun Intertec

Based on the information reviewed, Brownfield staff have determined that no additional action is required with regard to the petroleum release(s). A Petroleum No Action means that the extent and magnitude of the release(s) have been defined, and the identified contamination does not pose a risk to human health or the environment at this time. Therefore, no further investigation and/or response actions are requested.

You should understand this letter does not release any party from liability for the petroleum contamination under Minn. Stat. § 115C.021, subd. 1 or any other applicable state or federal law. In addition, this letter does not release any party from liability for non-petroleum contamination, if present, under Minn. Stat. § 115B, the Minnesota Environmental Response and Liability Act.

If future development of the Site or the surrounding area is planned, it should be assumed that petroleum contamination is present. Property with petroleum contamination to soil or groundwater may cause risks to future occupants. Brownfield staff can assist with environmental risk and development plan review, and will review and approve and/or modify your plan for property development. If contamination is encountered during future development work, the MPCA should be notified immediately.

This letter is subject to the disclaimers found in Attachment A. If you have any questions about the contents of this letter, please contact Ryan Lundgren, Project Manager, at 651-757-2606 or by email at ryan.lundgren@state.mn.us.

Sincerely,

Ryan Lundgren

This document has been electronically signed.

Ryan Lundgren
Environmental Specialist
Remediation Division

Victor Henao

This document has been electronically signed.

Victor Henao
Hydrologist
Remediation Division

RL/VH:svdw

Enclosure

cc: Alex Boecher, Braun Intertec

Attachment A

Disclaimers
Elk Farm
MPCA Site ID: BF0001337
PIN: 84.06.33.078539, 84.06.33.079565, 84.07.21.039660, 85.01.44.78533, 85.01.44.78534, 85.01.44.79565, 85.01.44.79566, 85.12.11.079570

1. Reservation of authorities

   The Minnesota Pollution Control Agency (MPCA) Commissioner reserves the authority to take any appropriate actions with respect to any release, threatened release, or other conditions at the Site. The MPCA Commissioner also reserves the authority to take such actions if the voluntary party does not proceed in the manner described in this letter or if actions taken or omitted by the voluntary party with respect to the Site contribute to any release or threatened release, or create an imminent and substantial danger to public health and welfare.

2. No MPCA assumption of liability

   The MPCA, its Commissioner, and staff do not assume any liability for any release, threatened release or other conditions at the Site or for any actions taken or omitted by the voluntary party with regard to the release, threatened release, or other conditions at the Site, whether the actions taken or omitted are in accordance with this letter or otherwise.

3. Letter based on current information

   All statements, conclusions, and representations in this letter are based upon information known to the MPCA Commissioner and staff at the time this letter was issued. The MPCA Commissioner and staff reserve the authority to modify or rescind any such statement, conclusion or representation and to take any appropriate action under his authority if the MPCA Commissioner or staff acquires information after issuance of this letter that provides a basis for such modification or action.

4. Disclaimer regarding use or development of the property

   The MPCA, its Commissioner, and staff do not warrant that the Site is suitable or appropriate for any particular use.

5. Disclaimer regarding investigative or response action at the property

   Nothing in this letter is intended to authorize any response action under Minn. Stat. § 115B.17, subd. 12.

6. This approval does not supplant any applicable state or local stormwater permits, ordinances, or other regulatory documents.