

Figure 4 -1

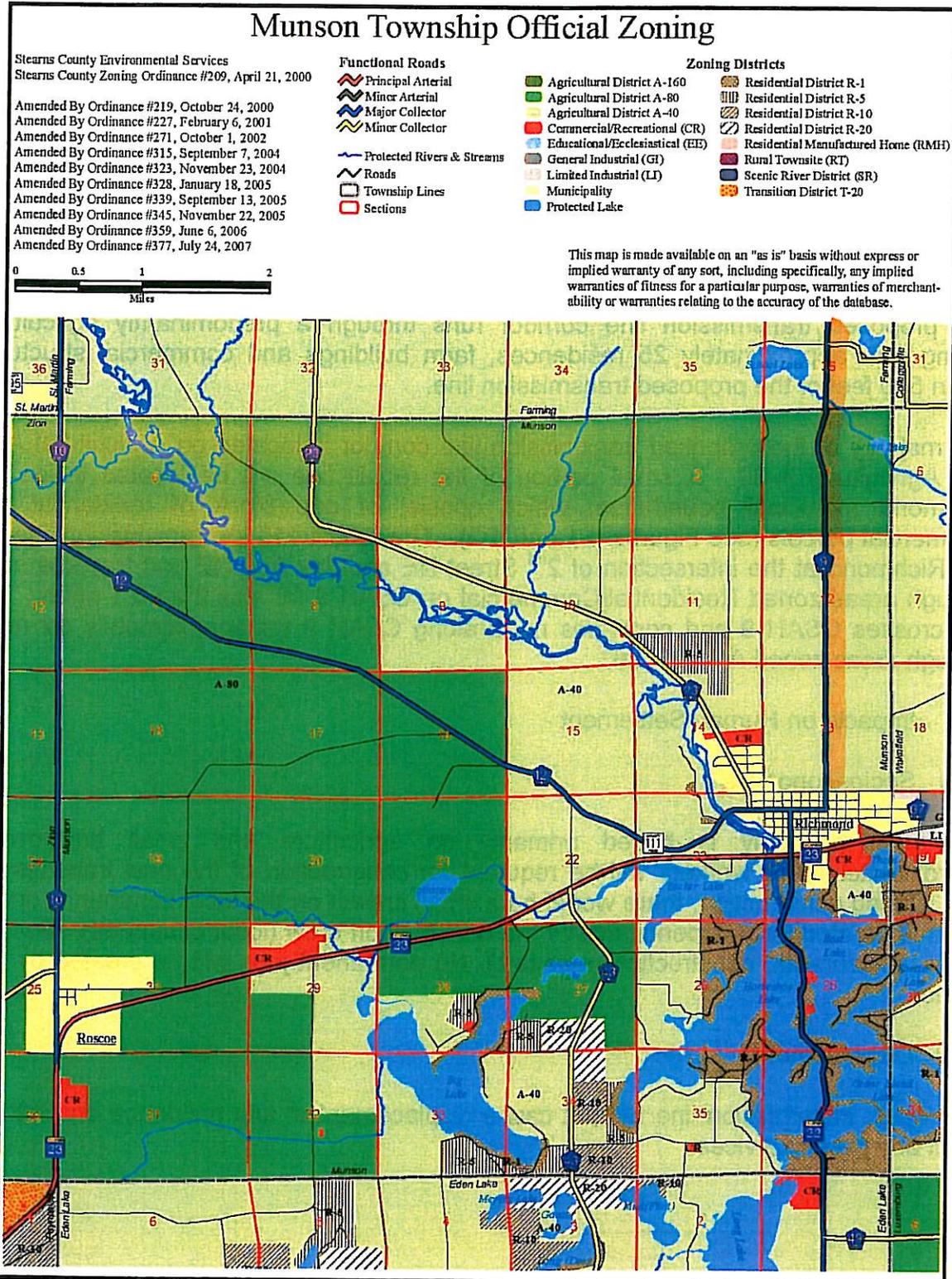
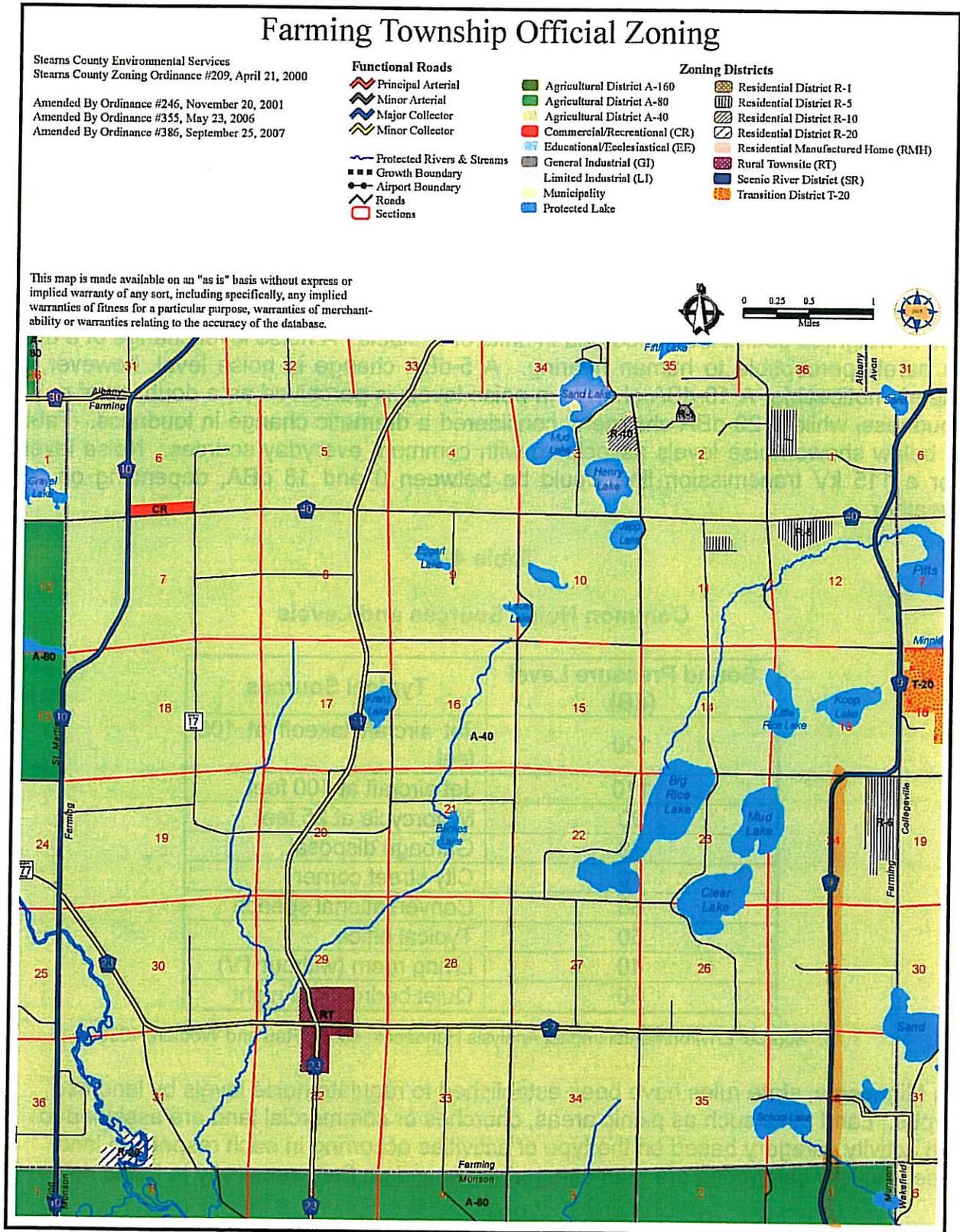


Figure 4-2



4.2.3 Noise

Noise is comprised of a variety of sounds of different intensities, across the entire frequency spectrum. Humans perceive sound when sound pressure waves encounter the auditory components in the ear. These components convert these pressure waves into perceivable sound. Transmission conductors and transformers at substations produce noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions.

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight". The A-weighted scale (dBA) corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, the A-weighted sound level recorded in units of decibels. A noise level change of 3 dBA is barely perceptible to human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA change in noise levels is perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change in loudness. Table 1 below shows noise levels associated with common, everyday sources. Noise levels for a 115 kV transmission line would be between 0 and 18 dBA, depending on the weather.

Table 4-1

Common Noise Sources and Levels

Sound Pressure Level (dB)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Jet aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. By Rau and Wooten, 1980

In Minnesota, state rules have been established to regulate noise levels by land use types. Land uses such as picnic areas, churches or commercial land are assigned to an activity category based on the type of activities occurring in each respective land use. Activity categories are then categorized based on their sensitivity to traffic noise.

The Noise Area Classification (NAC) is listed in the Minnesota Pollution Control Agency (MPCA) noise regulations to distinguish the categories.

Noise emission from a transmission line increases during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain, the general background noise level is usually greater than the noise from the transmission line and few people would be out near the transmission line. As a result, people do not normally notice audible noise from a transmission line during heavy rain. This is confirmed by calculated levels during a heavy rain (one inch per hour) that shows noise levels for a 115 kV line at less than 25% of the most sensitive state NAC (NAC 1). During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines will produce audible noise at approximately household background levels. During dry weather, audible noise from transmission lines is barely perceptible. The proposed substation would be designed and constructed to comply with state noise standards.

4.2.4 Aesthetics

The proposed transmission line will follow existing transmission ROW for the entire route. The proposed transmission line will be constructed using single poles that are approximately 60 to 75 feet high. Visual impacts would be limited to the immediate corridor.

4.2.5 Human Health and Safety

No threats to public health and safety are anticipated for this project. All facilities will be constructed in accordance with all applicable standards, including the National Electric Safety Code and other industry standards. Construction personnel will be required to follow Occupational Safety and Health Administration regulations. Other safety measures such as warning signs, fencing, and gates will be utilized as needed.

Electric and Magnetic Fields

Questions often arise about electric and magnetic fields (EMF), which are invisible lines of force that surround any electrical device. The term EMF refers to electric and magnetic fields that are coupled together such as in high frequency radiating fields. For lower frequencies such as for power lines, EMF should be separated into electric fields and magnetic fields. Transmission lines operate at a frequency of 60 hertz (cycles per second), which is in the non-ionizing portion of the electromagnetic frequency spectrum. Fields are considered ionizing when they cause electrons to eject from their orbits around a normal atom. This will typically occur with frequencies in the range of 10^{16} to 10^{22} hertz.

Magnetic fields result from the flow of electricity (current) in the transmission line. The intensity of the magnetic field is related to the current flow through the conductors. The

magnetic field associated with the transmission line surrounds the conductor and rapidly decreases with the distance from the conductor. The value of the magnetic field density is expressed in the unit of gauss or milligauss.

The most recent and exhaustive studies of the health effects from power frequency fields conclude that the evidence of health risk is weak. Some of these studies are listed below:

- National Institute of Environmental Health Sciences. 2002. *EMF. Electric and Magnetic Fields Associated with the Use of Electric Power*. National Institutes of Health.
- National Research Council. 1997. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*.
- Minnesota Department of Health. 2002. *EMF White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*.

For this project, the overall EMF impact should be minimal because the transmission corridor either avoids residences or is set back far enough that magnetic fields will be minimal.

4.2.6 Public Services

The proposed transmission line will be rebuilt on the existing transmission ROW. Impacts to other utilities (gas, telephone, electric, water, sewer) will be avoided or minimized. Public services would not be affected by the construction and operation of the proposed transmission line.

4.3 Impacts on Land-based Economies

4.3.1 Recreation/Tourism

The proposed transmission line corridor is adjacent to the Legacy Marsh Wildlife Management Area; however, the line should not affect the current recreational use of the area.

4.3.2 Agriculture

Although the proposed transmission line ROW would impact some farmland, most of the disturbance will be limited to the area immediately surrounding the transmission structures. GRE would work with landowners to minimize impacts to farmland. This would include scheduling work to minimize impacts to crops and land. GRE representatives would work directly with landowners to address crop damages or impacts to farmland. In cases where soil compaction occurs; the construction crews or

a restoration contractor would use various methods to alleviate the compaction as negotiated with landowners.

4.3.3 Transportation

The proposed transmission line will be rebuilt on existing transmission ROW that is currently along or parallel to existing utility or road ROW. The proposed transmission line would cross county, city or township roads at several places. Temporary road closures or lane reductions may be necessary during construction of the transmission line. Operation of the proposed transmission line will not affect the major roads in the area (Trunk Highway 23). In a letter dated January 25, 2008 (Appendix C), the Minnesota Department of Transportation, Office of Aeronautics indicated that the project would pose no hazard to public airports in the area.

4.3.4 Mining and Forestry

There are no mining areas in the vicinity of the project. There are some small forested areas and there will be some tree clearing required.

4.3.5 Archaeological and Historic Resources

A letter was sent to the Minnesota State Historic Preservation Office (SHPO) requesting review of the proposed project for potential impact on archaeological and historic resources in or adjacent to the project corridor. In a letter dated September 9, 2007 (Appendix C), the SHPO stated that no properties eligible for or listed on the National Register of Historic Places are within the project's area of effect.

4.4 Natural Environment

4.4.1 Air Quality

Because transmission lines do not affect air quality, there will be no long-term environmental impacts on the air from operation of the transmission line.

During construction of the proposed transmission line, there would be emissions from vehicles and other construction equipment and fugitive dust from ROW clearing. Temporary air quality impacts caused by the proposed construction-related emissions would be expected to occur during this phase of activity. The magnitude of these emissions is influenced heavily by weather conditions and the specific construction activity taking place. Adverse impacts to the surrounding environment would be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

4.4.2 Water Resources, Wetlands and Soils

Minimal impacts to water resources are anticipated. The proposed transmission line will cross two Minnesota Department of Natural Resources (DNR) public water (tributary to

School Lake) as shown on Figure 4-3. GRE will apply to the DNR Division of Lands and Minerals for a License to Cross these water bodies.

Letters were sent to the DNR and the US Army Corps of Engineers (USACE) requesting review of the proposed project for potential impact on water resources in or adjacent to the project corridor. In an e-mail dated August 30, 2007 (Appendix C), the DNR did not comment on water resources. As the project design proceeds, GRE will work with DNR staff to determine if any DNR permitting is required.

In an e-mail dated November 13, 2007 (Appendix C), the USACE stated the deposition of dredged or fill material in U.S. waters would require a permit. The existing transmission ROW will be used and construction will not involve deposition of dredged or fill material into any waters. Appropriate erosion control measures (Best Management Practices) such as silt fences would be installed as appropriate to minimize erosion or damage that could compromise the character of the surrounding wetlands. The transmission line will cross some minor drainages that will be spanned. When stringing electrical conductor across bodies of water, ropes are affixed to the conductor wire and then pulled up and across the body of water to pulleys attached to the cross-arms on the poles. GRE crews and contractors always exercise caution when working along the banks of water bodies.

Because the acreage of wetlands to be disturbed is well under the one-half acre threshold for utilities, GRE has sent an application to Stearns County for a lineal utility exemption under the Wetland Conservation Act Rules.

Soils along the transmission route are generally sandy loams, loams, and loamy sands found on the uplands. Muck, mucky peat and histosols are found in the depressions and wetlands.

4.4.3 Vegetation and Wildlife/Rare and Unique Natural Resources

Letters were sent to the U.S. Fish and Wildlife Service (USFWS) and the DNR requesting review of the proposed project for potential effects on vegetation and wildlife resources.

An e-mail from the USFWS dated January 29, 2008 (Appendix C) indicated that there are no federally listed species in the project area. In an e-mail dated August 30, 2007 (Appendix C), the DNR indicated that the project will not negatively affect known occurrences of rare features. The Natural Heritage database was reviewed and showed the *Limosa Fedoa* (Marbled Godwit) and *Dendroica cerulea* (Cerulean Warbler) in the vicinity of the project (Figures 4-4, 4-5 and 4-6).

Figure 4-3 DNR PWI Map

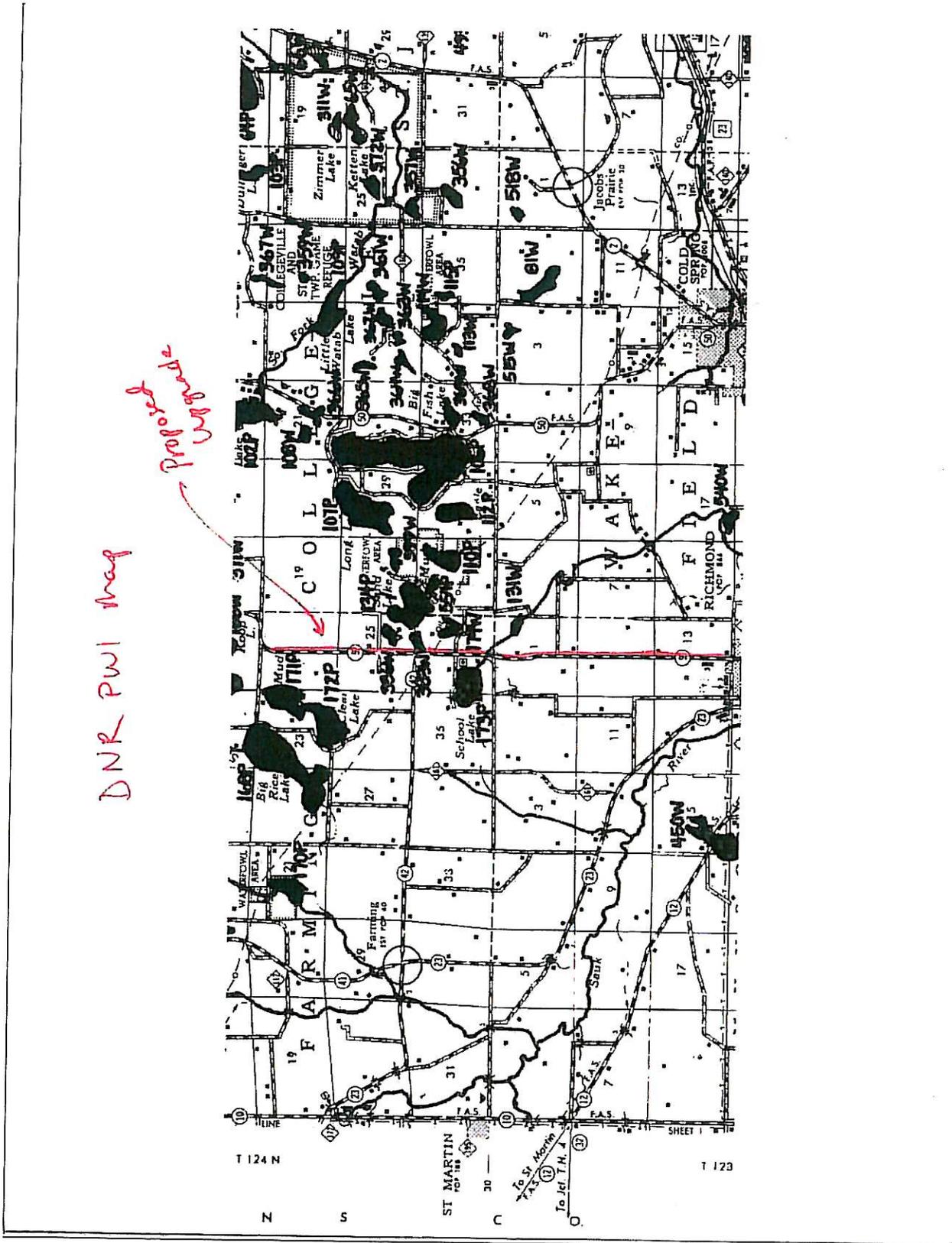


Figure 4-4 - Rare Features Map - Richmond

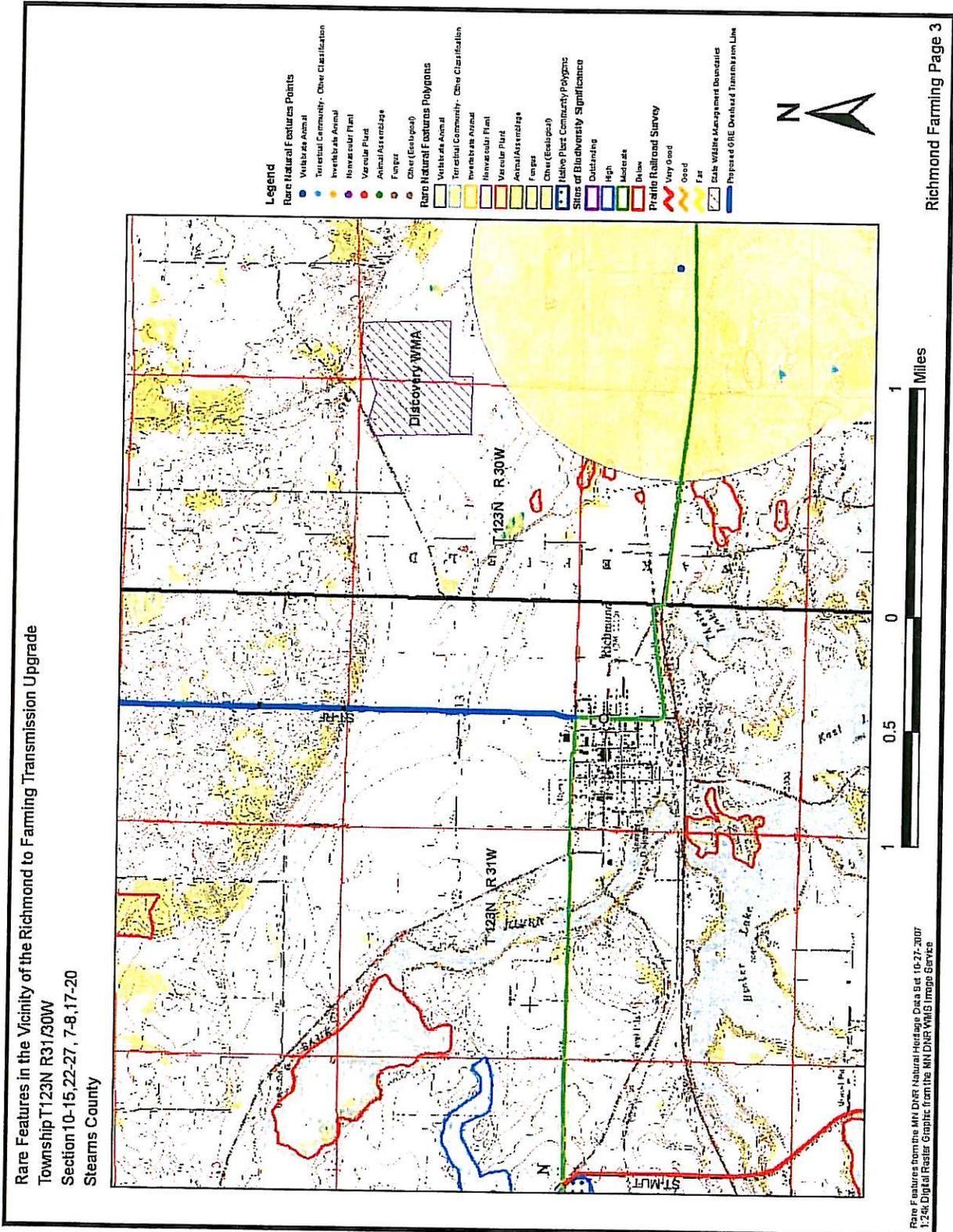


Figure 4-5 - Rare Features Map - Richmond to Farming Substation

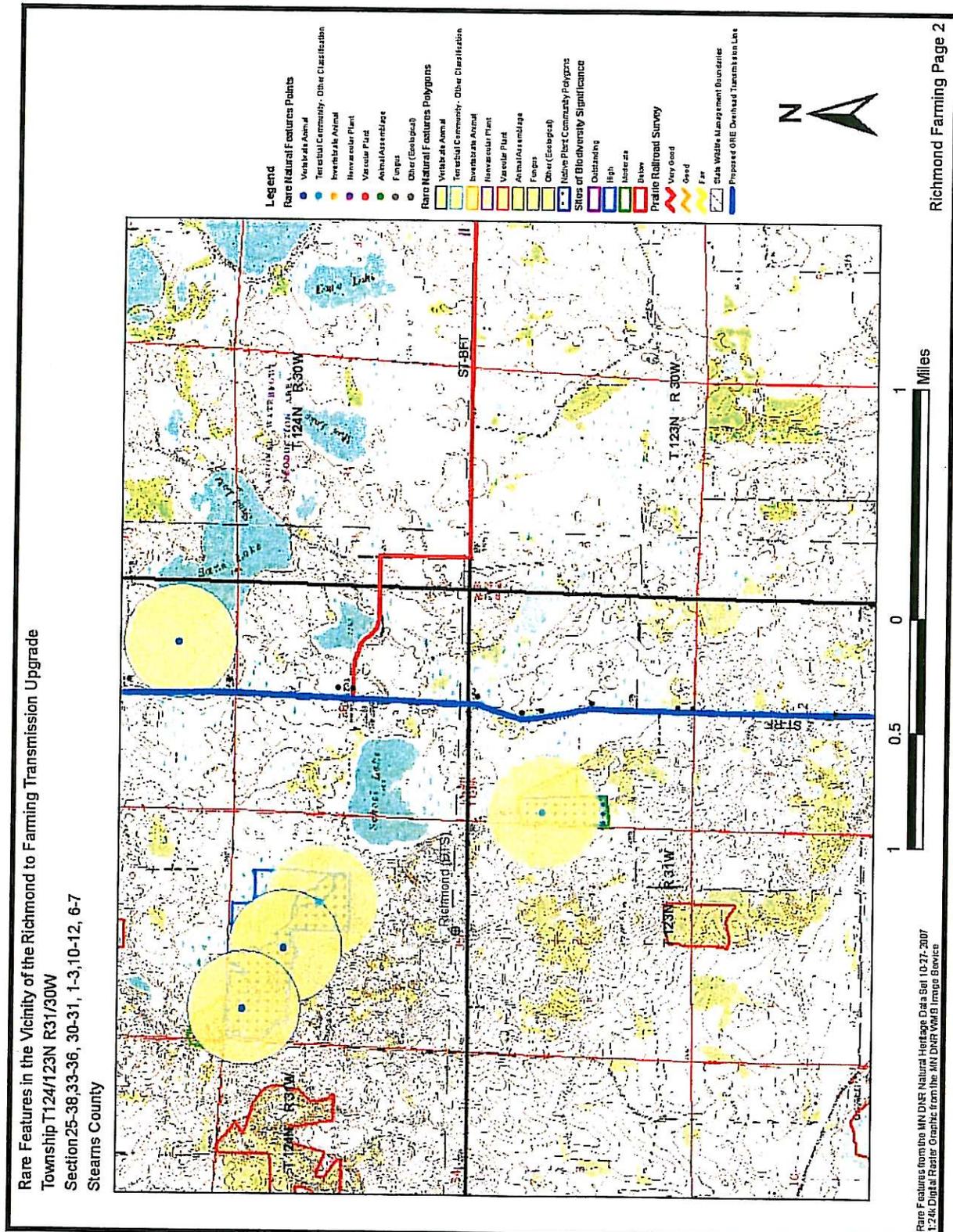
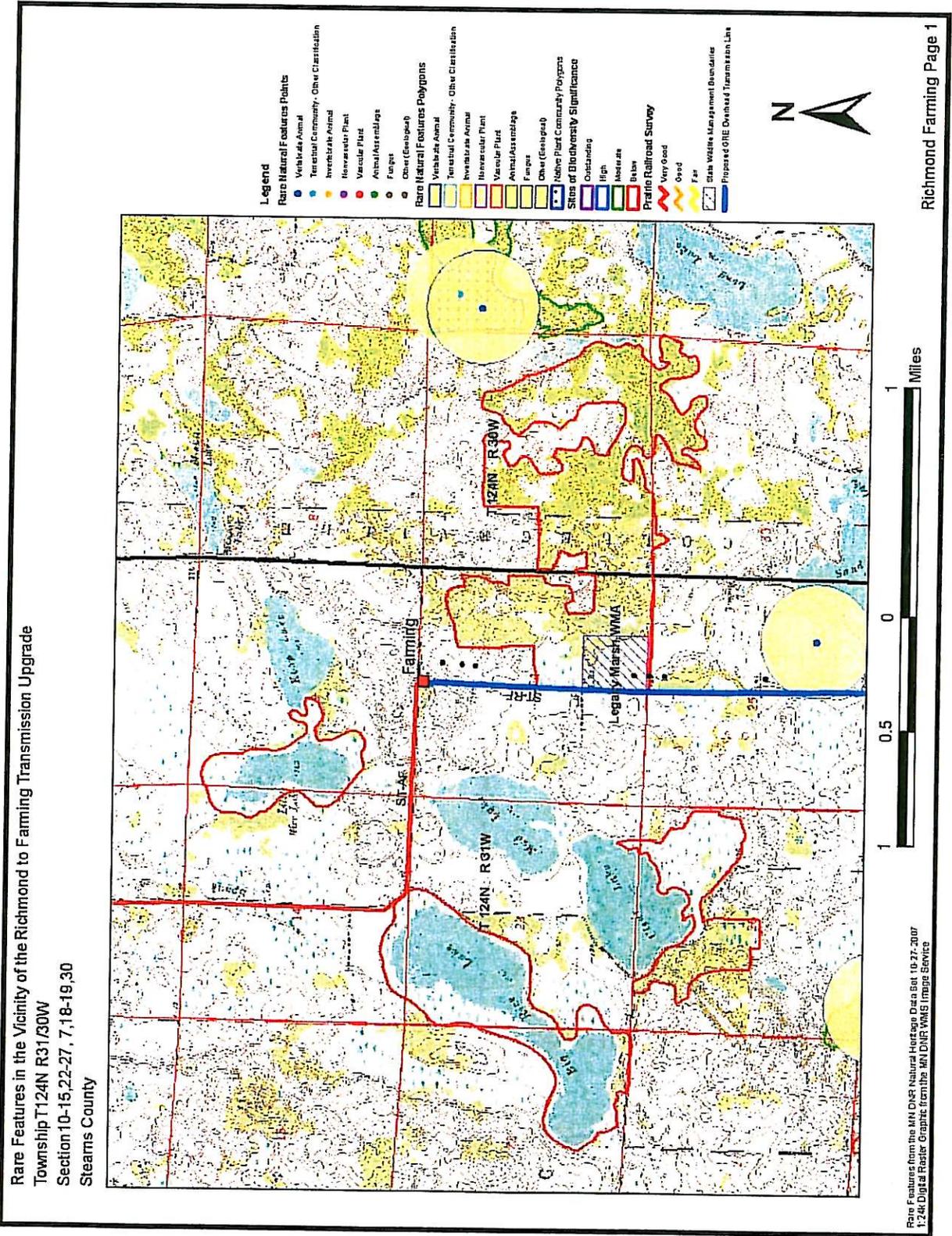


Figure 4-6 - Rare Features Map - Farming Substation



5.0 Regulatory Permits and Approvals Required

Permit requirements or approvals anticipated for this project and the status of each are shown below in Table 5-1.

Table 5-1 Regulatory Permits and Approvals Required

Government Unit	Type of Approval	Regulated Activity	Status
US Dept. of Interior Fish and Wildlife Service	Threatened and Endangered Species Review	Review of records for federally threatened or endangered species that may exist at or near proposed transmission facilities	No federally listed species in the project area (email of 1/29/08).
US Dept. of the Army Corps of Engineers	Wetland and Waterways Review	Review navigable water and the dredging or filling of US waters including wetlands	Corps permit required if there is dredging or filling of wetlands/waters (email of 11/13/07). There will be no filling or dredging associated with the project; however, GRE has notified the Corps of minor impacts to wetlands during construction. That application is pending.
MN Dept. of Natural Resources (DNR)	Wetlands, Water, Threatened and Endangered Species; Trails	Comprehensive review of transmission line impacts	The project will not negatively affect known occurrences of rare features (email of 8/30/07).
MN Historical Society State Historic Preservation Office	SHPO Review of Nationally Registered Historic Places	Historic preservation	No historic properties in the project area (letter of 9/9/07).
MnDOT – Aeronautics Division	Airspace Concerns	Public and private airports/airstrips	No issues – letter of 1/25/08.
Minnesota Pollution Control Agency (MPCA)	National Pollutant Discharge Elimination System (NPDES) Permit	Stormwater Pollution Prevention Plan (SWPPP) and stormwater permit required for disturbance of \geq one acre	None required.
MnDOT	State Highway Crossing Permit	Permit required prior to construction	Pending.
DNR Lands and Minerals	License to Cross Public Water	License required if project crosses DNR Public Waters	Application submitted 4/25/08; pending.
DNR Lands and Minerals	License to Cross Public Land	License required if project crosses DNR Land	Application submitted and license issued; effective 4/15/08.
Stearns County Highway Department	County Highway Crossing Permit	Permit required prior to construction	Pending.
Stearns County	Conditional Use Permit	Installation of station to station transmission services	Application submitted 4/22/08; pending.
City of Richmond	_____	Deferred to Stearns Co. for permitting	_____
Munson Township Farming Township	_____	Permitting is done by Stearns Co.	_____